

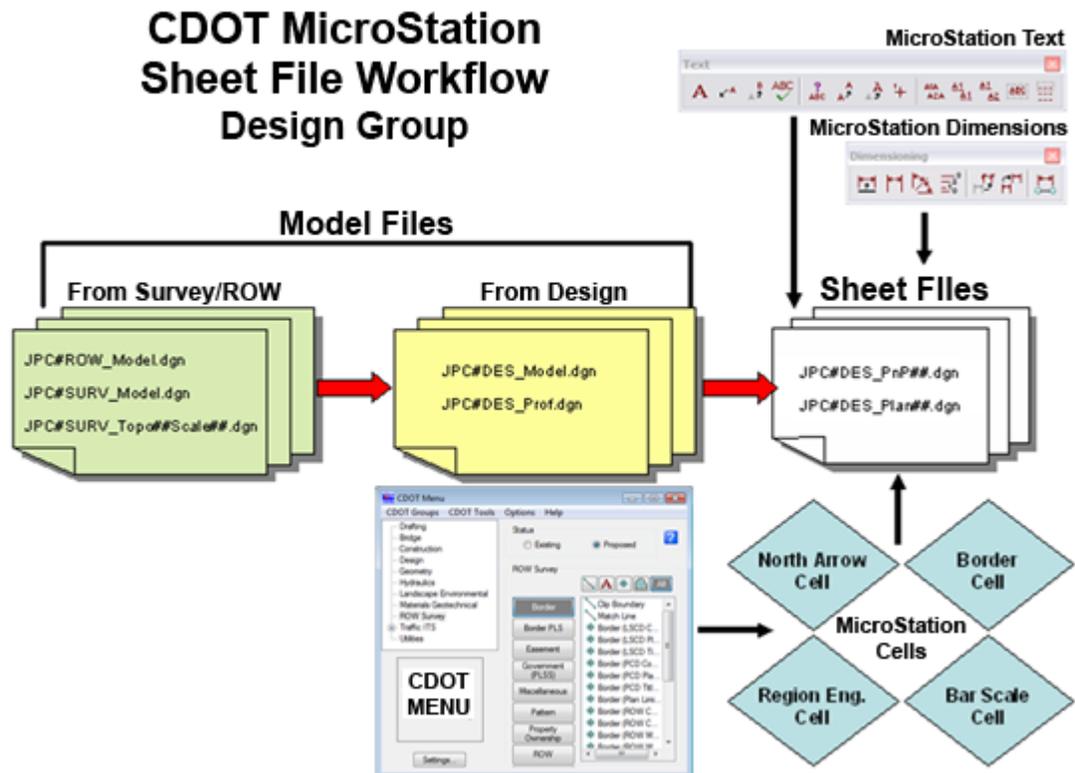
Chapter 10 - Creating Sheets

Roadway Design group

Plan or Plan/Profile sheets

The Design group's sheet file workflow is covered in detail in **Chapter 4, The CDOT workflow**. The following is a summary of the Design group's Plan or Plan/Profile sheet workflow:

- ◆ Create a new MicroStation design file for each sheet.
- ◆ Reference into the sheet file the proposed model file with the Survey/Topo model file nested.
- ◆ Rotate the view, if needed, so graphics appear horizontal.
- ◆ Clip the references to show only what graphics are needed for the sheet.
- ◆ Place the border, north arrow, bar scale and resident engineer information cell directly in the sheet file.
- ◆ Check the sheet file's Model Properties and verify set the Annotation Scale to the sheet's plot scale. The default for all sheet files except Typical Section sheets is 1:100.
- ◆ Edit the border text as needed.
- ◆ Annotate with MicroStation text.
- ◆ Dimension reference graphics, if desired.



Note: InRoads Plan/Profile Generator automates this process and can quickly generate a set of sheets along an InRoads alignment. Use the above workflow for special situations (approach roads, intersections, etc.) or where just a few sheets are needed.

Typical Section sheets

Typical Section sheets are an exception to the rule, since graphics are created directly in the sheet file using the CDOT Typical Section Program. Use the following workflow to create Typical Section sheets (an example is also provided in the lab exercises):

- ◆ Create a new sheet file each sheet (you can use the auto-populated file **JPC#DES_TypISect##.dgn**).
- ◆ If you're using the auto-populated file, it contains a generic border. You can either edit the border information, delete the generic border and place a project border, or replace the generic border cell with the project border cell using the **Replace Cell** command.
- ◆ Check the sheet file's **Model Properties** and verify set the **Annotation Scale** to **1:10**. This is already set-up if you created your file from the auto-populated file.
- ◆ Start the **Typical Section Program** (from the **CDOT Menu** select **Add On's > Launch Typical Section Program**).
- ◆ Use the program to create your Typical Section(s). Place the sections directly inside the sheet border.
- ◆ Save the typical section input file from the Typical Section Program.

Other sheets

Other sheets like detail, title, general notes, etc. have specific requirements, but use the same general premise of referencing the model file(s) to the sheet file and are illustrated in lab exercises.

Specialty Groups

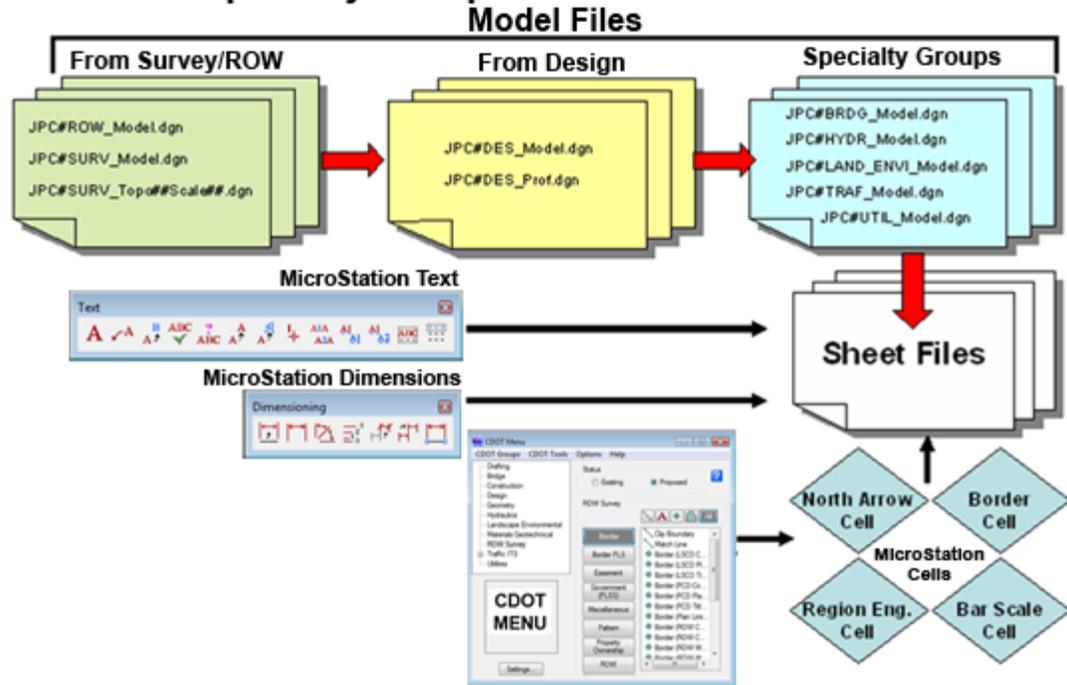
Plan sheets

The following is a summary of the Specialty group's sheet file workflow:

- ◆ The Specialty group creates a new MicroStation design file for each sheet.
- ◆ Reference into the sheet file the Specialty group model file with the Design model and Survey/Topo model files nested.
- ◆ Rotate the view, if needed, so graphics appear horizontal.
- ◆ Clip the references to show only what graphics are needed for the sheet.
- ◆ Place the border, north arrow, bar scale and resident engineer information cell directly in the sheet file.
- ◆ Check the sheet file's Model Properties and verify set the Annotation Scale to the sheet's plot scale. The default for all sheet files except Typical Section sheets is 1:100.
- ◆ Edit the border text as needed.
- ◆ Annotate with MicroStation text.

- ◆ Dimension reference graphics, if desired.

CDOT MicroStation Sheet File Workflow Specialty Groups



Other sheets

Other sheets like detail, tab, and notes sheets have specific requirements which are illustrated in lab exercises.

More Information

For more information on creating sheet file, see CDOT Workflows [Sheet File Creation](#), [Sheet File Creation Multiple Scales](#), [Creating Multiple Plan Sheets](#), [Note Sheets](#), and [Title Vicinity Map](#).

CDOT Work Flow

Work Flow :

- [CDOT Alignment Display in Cross Section.Ink](#)
- [CDOT Annotating Horizontal and Vertical Alignments.Ink](#)
- [CDOT Batch Printing.Ink](#)
- [CDOT Batch Processing.Ink](#)
- [CDOT Configuration ReadMe file.Ink](#)
- [CDOT Converting AutoCAD Files to MicroStation.Ink](#)
- [CDOT Creating Multiple Plan Sheets.Ink](#)
- [CDOT Directory Structure.Ink](#)
- [CDOT Displaying Features in Cross Section and Profile.Ink](#)
- [CDOT Exporting Fieldbook Files.Ink](#)
- [CDOT Greek Characters.Ink](#)
- [CDOT Level Update for V03.01.Ink](#)
- [CDOT Linking MicroStation to Excel Documents.Ink](#)
- [CDOT MicroStation Printing.Ink](#)
- [CDOT Note Sheets.Ink](#)
- [CDOT PCF Management.Ink](#)

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Useful Links

See also the [CDOT CADD Manual](#), *Chapter Eight – Drawing Information, Section 8.4 Project Sheets*. This contains several useful links for sheet workflows.

Simple Resident Engineer Job Placement Demonstration

8.4 Project Sheets

Many sheets for each project are created after the Project Manager runs the [Project Creation Utility](#) program, as described in Chapter 3. The sheets are created, named and placed in the appropriate directories for the project team's use. The following sections will address the standard sheets, outlining what should be included on them in order to achieve consistency between projects.

8.4.1 Title Sheet

Title Sheet development begins with the completion of the project. Title Sheet is located in the project folder under \DesignDrawings. The file will be named Job Project Code TitleSheet.dgn.

Standard Title Sheet information includes:

- Title information
 - DEPARTMENT OF TRANSPORTATION
 - STATE OF COLORADO
 - HIGHWAY CONSTRUCTION BIG PLANS OF PROPOSED
- Project Specific Title Sheet information that must be edited per project includes:
 - Federal Aid or Colorado Project Number
 - State Highway Number
 - Project Code Number
 - ENRWA oversight and National Highway System check blocks
 - Other project numbers and codes (e.g. R.O.W., U/I or P.E.)
 - Index of Revisions
 - Tabulation of Length and Design Data
 - Project Location Map
 - Index of Sheets
 - Time and issued Standard Plans
 - Designer block (e.g. Resident Engineer initials and Region information)
 - Contract Information block
 - Description of Project

[Title Sheet Samples](#)

8.4.2 Typical Section Sheet

Typical Section sheets show a detailed, cross-sectional view of the roadway surface design. Development of the typical section sheets includes the use of custom program called CDOT Typical Section Program. This program writes graphical data to the typical section file at a scale of 1/16. All of the graphical properties such as the levels, patterns, text, and coils are set by default to CDOT standards. This drawing is located in the \DesignDrawings folder and is called Job Project Code\TypicalSection.dgn. See the [Typical Section Workflow](#) to

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Rotating Views

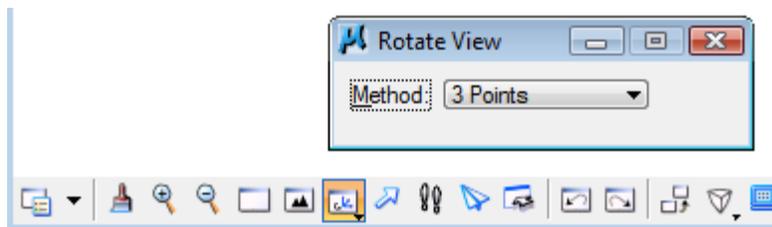
It is often necessary, especially with highway design projects, to rotate a plan view so that the alignment is horizontal to the view. This is especially useful when creating plan sheets. You can accomplish this using the following methods.

Rotate the Plan View with a Keyin

If you know the degree of rotation, you can rotate the view using the rv= keyin (**rv=X axis rotation, Y axis rotation, Z axis rotation**).

Rotate the Plan View by 3 Points

Use this method to define a view's new positive horizontal (X) axis and new positive vertical (Y) axis. The first two data points define the view's new X axis and the third data point defines the direction for rotation.



Rotate the Plan View by Element

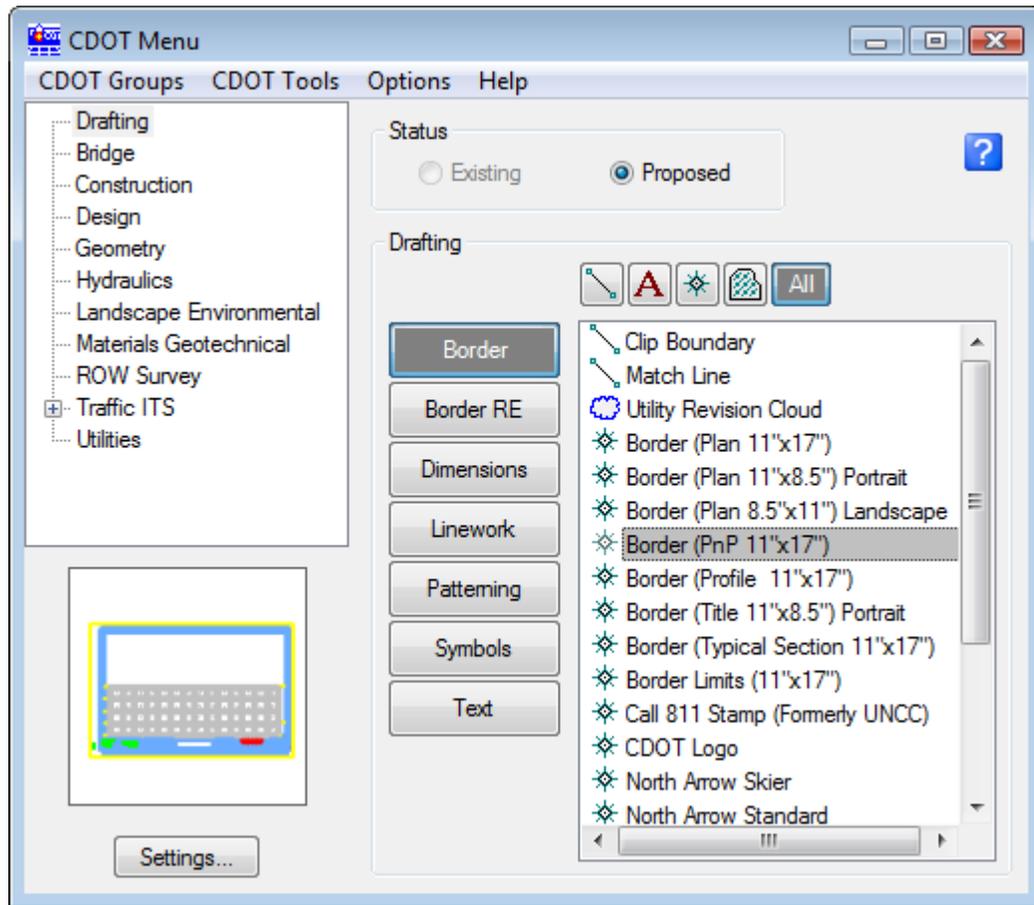
You can use the direction of an element to rotate a view so that the view is horizontal to the element (e.g. a horizontal alignment). Key in **Rotate View Element** and then <D> on the element to rotate the view.

Note: The view is rotated based on the direction the element was drawn. The positive X axis is based on the positive direction of the element.

Placing Borders

Using the CDOT Menu for Border Placement

The **Border** and **Border RE** Categories under **Drafting** on the CDOT Menu provide a convenient method of placing the border and related information in a sheet file.

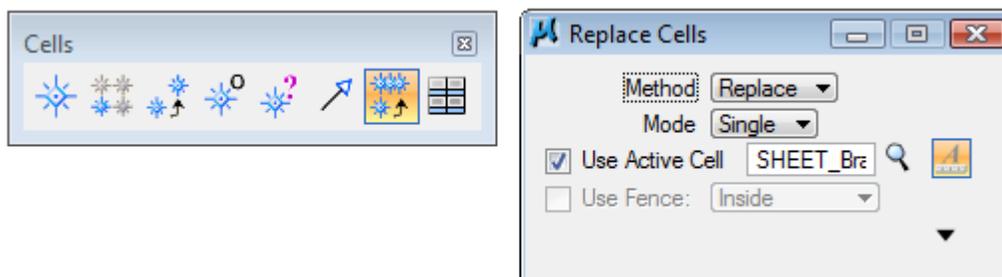


You have the option of placing different types of border cells, as well as other cells for the bar scale, north arrow and resident engineer.

Creating a Project-Specific Border Cell

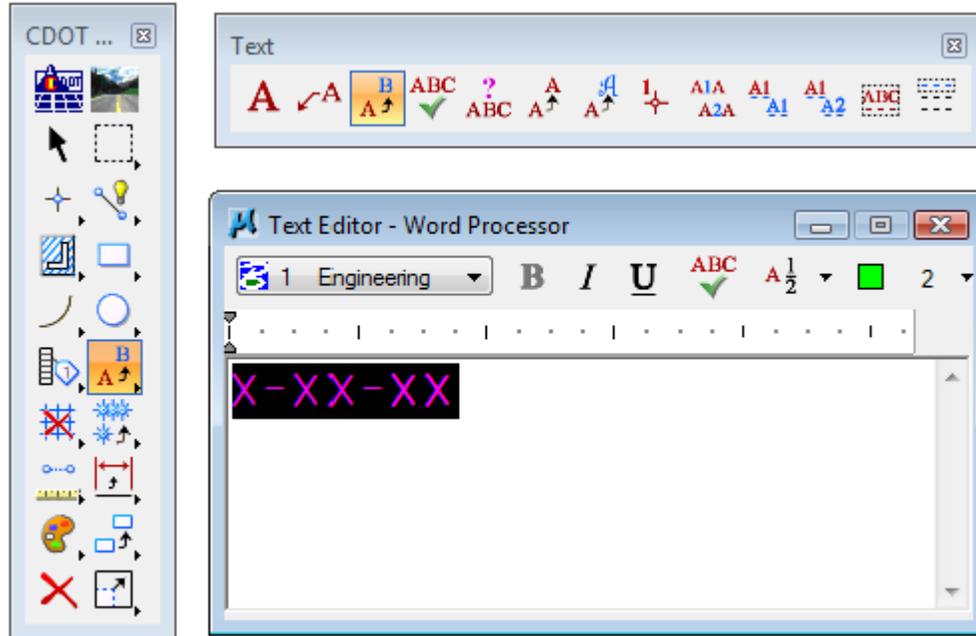
If you use the generic border in the auto-populated sheet files, or if you place a border cell in a sheet file using the CDOT Menu or the **Place Active Cell** command, then you will need to edit the border to specify all of the project-specific information for every sheet. This can be a time-consuming process.

Instead, you can create a project-specific border cell. Place the cell in a blank file, and then edit the cell text to fill in all of the project information (number, code, initials, etc.). You can either place this border in a blank sheet file, or replace the generic border cell with the project border cell in the auto-populated file. MicroStation's **Replace Cell** command is handy for this.

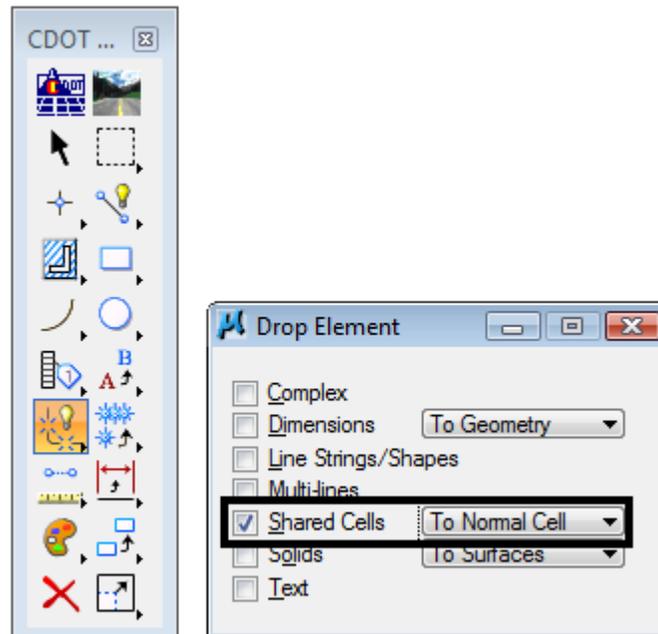


Editing text on the Border

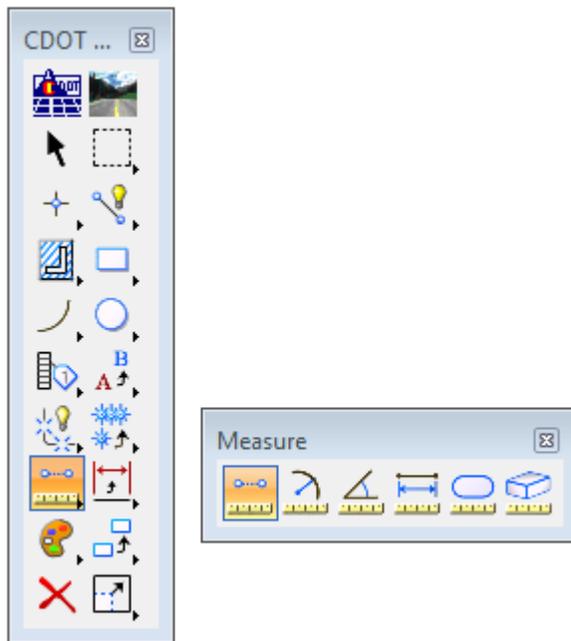
Text in the border cell can be edited using the **Edit Text** command on the **Text** toolbar. Select the text to edit, key in the new text in the **Text Editor** window, and then <D> to accept the edit.



Note: If you place the border cell as a Shared Cell, you must first drop the cell status to a regular cell if order to edit the cell text.



Measurement Tools

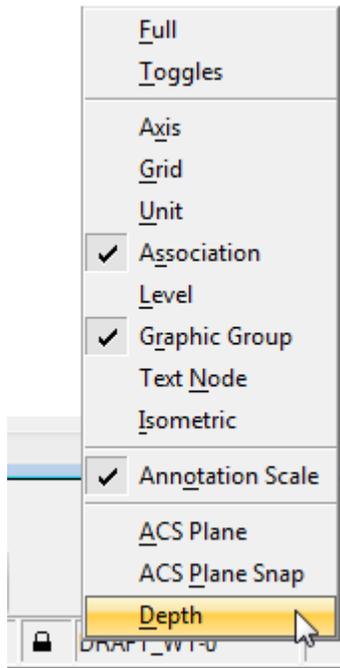


The **Measure** toolbar is used to measure distances, angles, radii and areas. Use **Settings > Design File > Working Units** to define how measurement values will display (units, precision, etc.). If you reference your model file graphics into your sheet file at 1:1, you can measure graphics in the sheet file with accurate results. Otherwise, you'll need to measure graphics in the model file.

Measuring in 3D

Important! In a 3D file, if you want planar measurements, turn on Depth lock before using the appropriate measure command. Make sure AccuSnap is off if you're snapping to points when measuring in 3D. Use Tentative snaps instead.

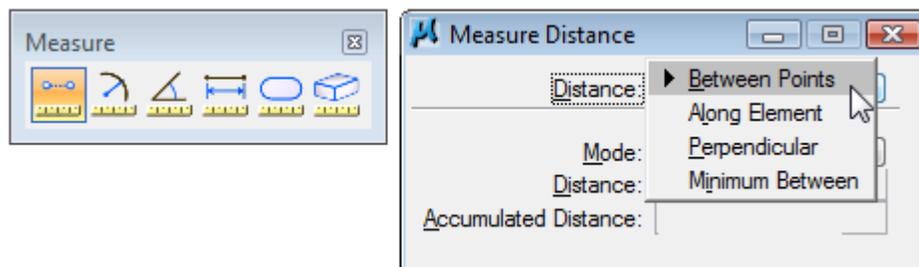
If you want true slope (3D) measurements, turn **Depth** lock off.



Some of the more commonly used measuring tools include:

Measure Distance

Measures distance using one of the following methods:



- ◆ Between Points
- ◆ Along Element
- ◆ Perpendicular
- ◆ Minimum Between

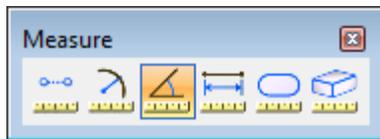
Measure Radius

Measures the radius of a circle or an arc, or a circular segment of a complex chain or shape, or the primary and secondary axes of an ellipse.



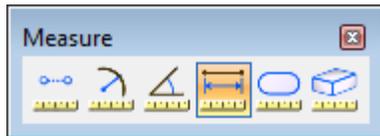
Measure Angle

Measures the angle between two lines or linestrings, or the angle between two segments of a shape.



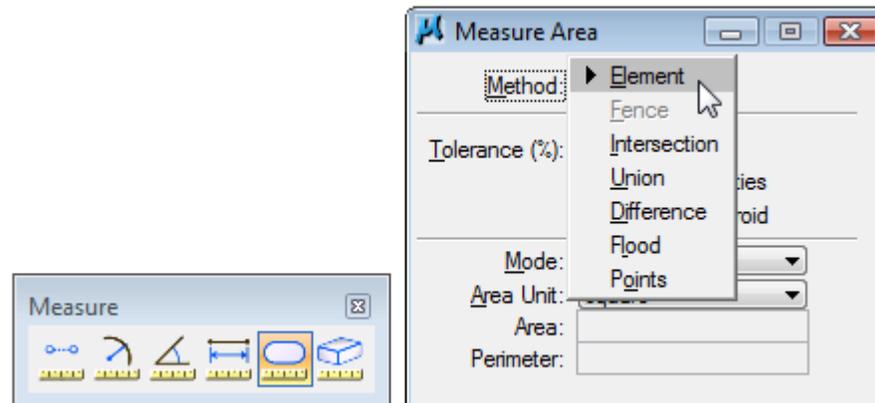
Measure Length

Measures the length of an element or the perimeter of a shape.

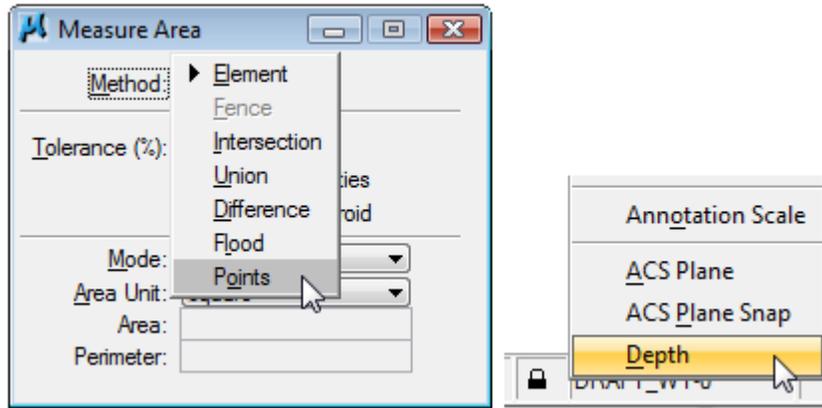


Measure Area

Measures area using the same method options as the **Pattern** tools. This includes the area of a shape (**Element** method) or an area you dynamically define using the **Points** method. In addition, you can **Flood** an area or measure the area of the **Intersection**, **Union** or **Difference** between elements (see **Pattern** commands for an explanation of these methods).



Note: If you're measuring the area of 3D graphics, the Points method is the only method that will provide a planar measurement with Depth lock turned on.



The CDOT Custom Measure XY Distance tool

From the CDOT Menu, select **Add On's > Measure XY Distance** to open this custom tool, which allows you to easily obtain *both* planar XY distances along with true 3D slope measurements *without having to check or set active depth or the depth lock*. You can use this tool the standard MicroStation Measurement tools for options shown below, including the **Perpendicular from element** option.

XY Distance

Measurement Options

- Between points
- From point on element
- Perpendicular from element
- Perpendicular from point on element
- Tangent from element
- Tangent from point on element

Calculated Values

Delta X: -288.756'

Delta Y: 577.511'

Delta Z: -518.628'

Slope: 80.323%

Angle: N 26° 33' 54.18" W

Horiz. Distance: 645.677'

Slope Distance: 828.175'

Use Reference Attachment Scale

Restart Exit