LAB 20 - Annotate the Intersection Plan/Profile Sheet

In this lab, you'll annotate the plan/profile sheet with text, notes, and custom text strings using the CDOT Menu.

Chapter Objectives:

After completing this exercise you will know how to:

- Set the active angle for placing text
- Place Text using the CDOT Menu
- Rotate text
- Place notes with leader lines and a line terminator
- Create and place custom text strings for utility lines using the CDOT Menu

Lab 20.1 - Open Project Plan/Profile Sheet

Start MicroStation

1. Start MicroStation and open **12345DES_PnP19.dgn** from the **C:\Proj**ects\12345\Design\Drawings folder.



Check Text Annotation Scale

1. Select **Models** from the *Primary* toolbar.

2. In the *Model* box, select Edit Model Properties.

| Primary T | ools | × |
|------------|-----------|--|
| d - | 🗅 • 🖬 • 😭 | • 🥪 • 🛝 • 🕧 🖶 🖽 • 阕 |
| | Models | I I I I I I I I I I I I I I I I I I I |
| | < | Model Properties Ippe: Design 3D Name: CDOT Default |
| | | Cell Properties □ Can be placed as a cell Cell Type: Graphic ▼ □ Can be placed as an annotation cell □ QK Cancel |

Note that the *Text Annotation Scale* is set to 1"=100' (the default setting from the seed file).

Note: The **Text Annotation Scale** matches the border scale, which matches the scale for plotting – 1"=100'.

- 4. Cancel the *Model Properties* box.
- 5. Close the *Models* box.

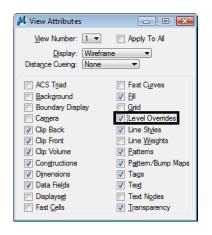
Work with sheet levels and references

The plan limits cell placed along the mainline alignment in the Design model file appears in the sheet. This is on a No Plot level. However, if you don't want to see it, you can turn it off.

1. Open Level Display and turn off the DRAFT_INFO_No_Plot level in the *Design* reference.

- 📕 Level Display - • • 1 2 3 4 5 6 7 8 View Display -🜾 📴 խ (none) 🔻 Levels 🔹 🕶 🕶 E-12345DES_PnP19.dgn E-W Design, 12345DE Model de Open Dialog ₫-<u>v8</u> 12345SURV_ - Profile Side Road Attach... Detach Name Used Ŧ . Display Default ✓ Snap TOPO_BUILDING_Co ✓ Locate TOPO_BUILDING_De TOPO_BUILDING_Fr Update Levels TOPO_BUILDING_Offi TOPO_BUILDING_Pun TOPO_BUILDING_Pun TOPO_BUILDING_She TOPO_CULVERT_Corr Select All Select None Invert Selection Cut OPO_CULVERT_C <u>С</u>ору TOPO_CULVERT_En TOPO_CULVERT_En Paste **Properties**
- 2. In Level Display, turn off the Survey/Topo reference.

3. Select Settings > View Attributes, toggle on Level Overrides.



This applies the Symbology Overrides set in the CDOT level libraries for "graying out" the existing contour levels.

Edit the bar scale text

- 1. Window in on the bar scale cell in the lower left portion of the plan view.
- 2. Use the Edit Text command to edit the text as shown for a 100 scale plot.



Label the Intersection Alignments

Set the active angle for placing the county road text

- 1. On the CDOT Menu, select Settings.
- 2. Set the Active Angle to *O*, Apply and then Close the box.

| 🚔 Active Settin | - • × | |
|-----------------|--------|-------|
| Active Scale: | 100.00 | Apply |
| Active Angle: | 0.00 | Close |

Set the text attributes using the CDOT Menu

- 1. On the *CDOT Menu* Explorer, select **Drafting**. Set the category to **Text** and set the following options:
 - Filter: Standard (S)
 - Justification: Center Center
 - Item: .07" 100% Standard

| 🧱 CDOT Menu | | |
|--|--|--|
| CDOT Groups CDOT Tools | Options Help | |
| Drafting Bridge Construction Design Geometry Hydraulics Landscape Environmental Materials Geotechnical | Status Status Drafting Border | Proposed Proposed Image: All All All All All All All All All Al |
| ⊷ ROW Survey ⊕ Traffic ITS | Border RE | Center Center 👻 |
| i Utilities | Dimensions | A .05" 80%, Standard A .05" 80%, Standard Mono ✓ ^A .05" 100% Place Note A .05" 100% Standard |
| | Patterning Symbols | A .05" 100% Standard Mono A .07" 80% Standard A .07" 80% Standard Mono |
| | Text | ✓ ^A .07" 100% Place Note A.07" 100% Standard A.07" 100% Standard Mono |
| | | |
| Settings | | |

This sets the active level to **DRAFT_Text-3** and automatically selects the **Place Text** command.

2. In the Word Processor box, key in County Road 101.

- 3. $\langle D \rangle$ to the left of the intersection as shown to label the road.

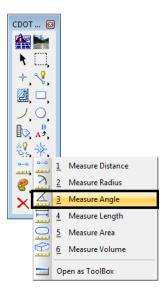
4. **<R>** out of the *Place Text* command when done.

Set the active angle for the main alignment text

- 1. Select Settings > Design File > Working Units.
- 2. Set the **Options** as shown for **Conventional Angle Mode**, **Decimal Degrees**.

| DGN File Settings | |
|---|---|
| Category Active Angle Active Scale Axis Color Element Attributes | Modify Working Unit Settings Linear Units <u>Master Units</u> <u>QK</u> <u>QK</u> <u>Label</u> : <u>Curacy</u> <u>Accuracy</u> 0.123< ▼ |
| Fence Grid Isometric Locks Rendering Snaps | Advanced Settings Resolution: 12000 per Distance Survey Foot Working Area: 1.42159E-008 Miles Solids Area: 157.829 Miles Solids Accuracy: 8.33333E-006 Survey Feet Edit |
| Stream Views Working Units | Angles Format: DD.DDDD v Mode: Conventiona v Accuracy: 0.12 v |
| | Focus Item Description Select category to view. |

3. Select the Measure Angle command from the Measure toolbar.



- 4. **<D>** on the centerline of the side road.
- 5. $\langle D \rangle$ on the centerline of SH 86.

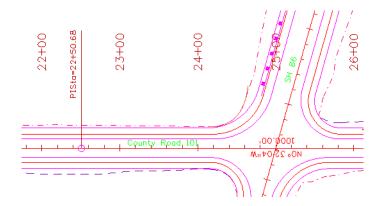
The angle reads out at 74.14 degrees.

6. From the CDOT Menu, select **Settings** and set the **Active Angle** to **74.14**, **Apply** and then **Close**.

| Active Settir | | |
|---------------|-------|-------|
| Active Scale: | Apply | |
| Active Angle: | 74.14 | Close |
| | | Close |

Place the SH 86 text at the active angle

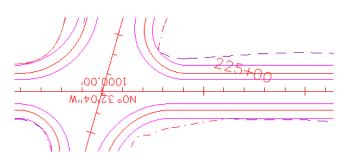
- 1. On the *CDOT Menu* select **Drafting > Text** and select .07 again.
- 2. In the Word Processor box, key in SH 86.
- 3. **<D>** when shown to label the road.



4. **<R>** out of the *Place Text* command when done.

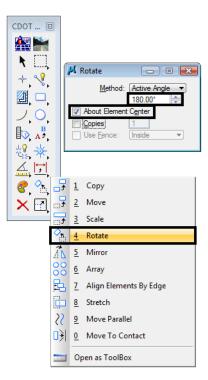
Lab 20.2 - Rotate the InRoads alignment text

1. Window in at the intersection as shown.

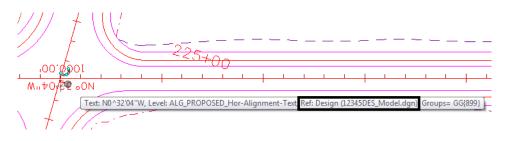


2. Select the **Rotate** command from the *Manipulate* toolbar.

3. Set the Method to Active Angle, set the Angle to *180* and toggle On About Element Center.



4. **<D>** on the bearing text.



You can't rotate the text because it's in a reference.

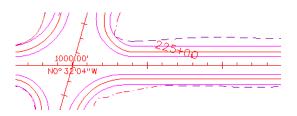
Important! If you're in the Design group and "own" the Design reference, you can "exchange" to that reference to make modifications. Otherwise, contact Design.

5. Select File > Save Settings.

6. On the *References* dialog, select the Design reference and then select **Tools > Exchange**.

| References (10 of 10 uniqu | e, 2 displayed) |
|---|---|
| Tools Settings Attach Detach Detach All Reload Reload All Exchange Open in New Session Move Copy Scale | Image: Solution in the second seco |
| Rotate Merge Into Master Make Direct Attachment Mirror Horizontal Mirror Vertical Clip Boundary Clip Mask Delete Clip | Ne <u>w</u> Level Display: <u>Config Variable</u> |
| Clip <u>F</u> ront Cli <u>p</u> Back | |

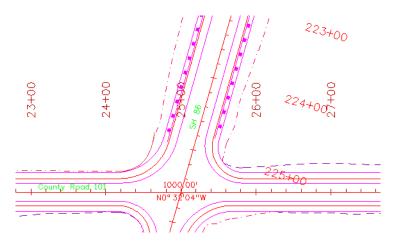
7. Select the **Rotate** command, *<***D***>* on the bearing text and then *<***D***>* to accept.



8. Select the File pull-down menu and open the sheet file from the list of last open files.

Lab 20.3 - Place Notes

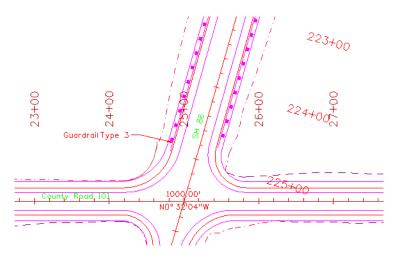
1. Window in above the intersection to view the guardrail as shown.



2. On the CDOT Menu Explorer, select Drafting > Text and select the .07" 100% Place Note item.

| CDOT Menu | | |
|--|--------------------|--|
| CDOT Groups CDOT Tools | Options Help | |
| Drafting Bridge Construction Design Geometry | Status Existing | Proposed |
| Hydraulics Landscape Environmental | - | S T M AII |
| Materials Geotechnical ROW Survey | Border | Justification: |
| Traffic ITS | Border RE | Left Bottom 🔻 |
| ····· Otilities | Dimensions | A .05" 80% Standard A .05" 80% Standard Mono <^ .05" 100% Place Note |
| | Linework | A .05" 100% Standard |
| | Patterning | A .05" 100% Standard Mono A .07" 80% Standard |
| | Symbols | A.07" 80% Standard Mono ✓ ^A .07" 100% Place Note |
| | Text | A .07" 100% Standard |
| | | A .07" 100% Standard Mono |
| | | |
| | | |
| Settings | | |

- 3. Click inside the Word Processor box and key in *Guardrail Type 3*.
- 4. **<D>** on the guardrail as shown to define the start point of the note (note terminator).
- 5. Drag the cursor to the location shown and $\langle D \rangle$ to place the note leader.



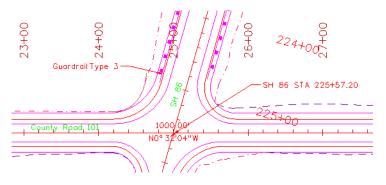
- 6. *IMPORTANT:* With your cursor on the *LEFT SIDE* of the leader line, *<***R***>* to place the text.
 - **Note:** If your cursor is on the right side of the leader when you reset, your note will be placed on the right side.

- 7. With the *Place Note* command still active, click in the **Word Processor** box and key in *SH 86 STA 225+57.20*.
- 8. On the *Snap Mode* toolbar select the Intersection Snap.

Note: You can also click in AccuDraw and press *I* on the keyboard.



- 9. AccuSnap to the intersection of the two centerlines as shown for the note terminator.
- 10. Drag your cursor out and **<D>** to place the leader line.



11. With our cursor on the *RIGHT* side of the leader, <**R**> to place the note.

Lab 20.4 - Attach and Annotate Utility Lines

Next, you'll annotate proposed utility lines using the CDOT menu. However, the Utility model was not attached to plan sheet when it was created. Therefore, you must attach the Utility model after-the-fact in order to reference the utility lines for annotation.

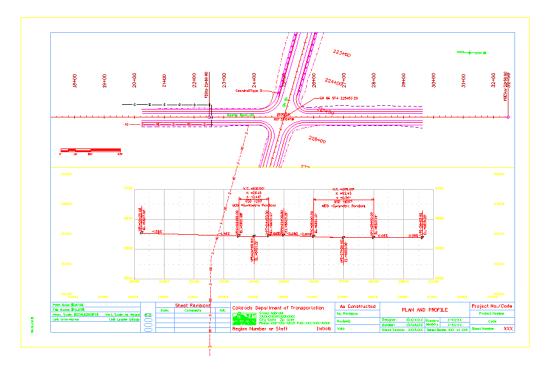
Reference the proposed Utility model

- 1. Fit the view.
- 2. Open the **References** dialog box.

3. Attach the *12345UTIL_Model.dgn* file from project's \Utilities\Drawings\Reference_Files folder. Be sure to attach Coincident-World at a *1:1* scale with No Nesting.

| Reference Attachment | Settings for 12345UTIL_Model.dgn |
|--|---|
| Full Path:\Dr <u>M</u> odel: CDO Logical Name: | 5UTIL_Model.dgn awings\Reference_Files\12345UTIL_Model.dgn T Default I alongin aligned with Master File |
| Orientation: | |
| View | Description |
| Coincident | Aligned with Master File |
| Coincident - World | Global Origin aligned with Master File |
| Standard Views | |
| Saved Views (none |) |
| Named Fences (nor | ne) |
| | |
| | |
| Toggles: | 💽 🛃 🔁 🛄 🥐 🤣 🖽 🗞 🖓 🖉 |
| Scale (Master:Ref) | 1.000000 : 1.000000 |
| | |
| Named Group: | |
| Revision: | · · · · · · · · · · · · · · · · · · · |
| | |
| Clip Boundary Element: | |
| Le <u>v</u> el: | · · · · · · · · · · · · · · · · · · · |
| Nested Attachments: | |
| Display Overrides: | Allow |
| Ne <u>w</u> Level Display: | Use MS_REF_NEWLEVELDI |
| Global LineStyle Scale: | Master 🔻 |
| | <u>O</u> K Cancel |

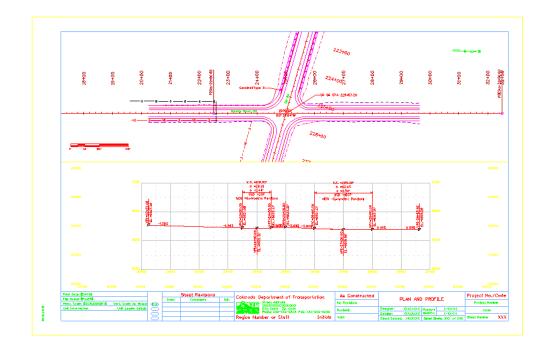
The Utility model is reference, but needs clipping.



4. On the *References* toolbar, select the Utility reference and then select **Tools > Clip Boundary**.

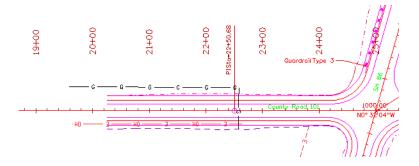
| (| |
|--|--|
| 📕 References (4 of 4 unique, 3 displayed | |
| <u>T</u> ools <u>S</u> ettings | |
| 📴 - 🖹 🙀 👌 🌾 🇇 | 🖻 🔂 🎦 🏠 🚰 📳 🕲 🗙 Hilte Mode: None 🔍 |
| Hierarchy Clip Reference | Slot File Name Description 💽 🤳 🦎 🔓 |
| ⊕ 12345DES_PnP19.dgn | 1 12345DES_Model.dgn Proposed Intersection ✓ ✓ 2 12345DES Prof03.don Proposed profile for side road ✓ ✓ 3 12345UTIL Model.dgn Global Origin aligned with M ✓ ✓ |
| | Scale 1.000000 Orientation Top Rotation 0* Offset X -178956.971 Y -178956.971 Z -178956.971 Image: Control of the state |

5. **<D>** on the clip boundary block and then **<D>** to accept.



Annotate the gas line

1. Window in on the plan sheet area shown.



- 2. From the *CDOT Menu* Explorer, select Group Display > Utilities and set the following options:
 - Set Status to Proposed
 - Set the Category to Gas
 - Set **Filters** to **All** (or Text)
 - Select the item <New Text String>

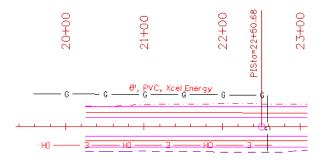
| Drafting Bridge Construction | | Status | Proposed |
|---|---|----------------|---------------------------------|
| Construction Design Geometry Hydraulics Landscape Environmental Materials Geotechnical | | Utilities | |
| | | Electric | Gas Line |
| | | Fiber Optic | A <new string="" text=""></new> |
| Utilities | | Gas | -≫ Manhole -≫ Valve |
| | | Sanitary Sewer | ☆ Vault ☆ Vent-Pipe |
| | | Telephone | |
| m | • | Television | |
| | | Water | |
| | | | |
| | | | |
| | | | |

- 3. In the Create Text String dialog box set the following from the drop down options:
 - ♦ Set Size to 6"
 - Set Material to PVC

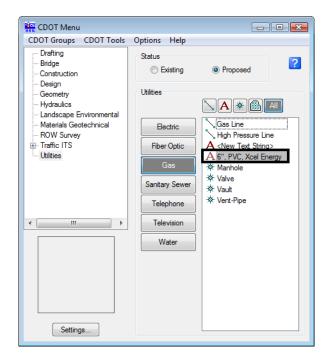
• For Owner, key in *Xcel Energy*

| Create Text | String | - • × | | | |
|---|-------------|-----------------------|--|--|--|
| Size: | 6" | 🗕 🖉 ОК | | | |
| Material: | PVC | ▼ Cancel | | | |
| Owner: | Xcel Energy | ₽ | | | |
| ${m \ell}$ Indicates that you can enter your own values in this field | | | | | |

- 4. Select OK.
- 5. When prompted to *Identify Element*, *<***D***>* on the proposed gas line.
- 6. **<D>** above the line to accept the text placement.



Note: Your custom text 6", PVC, Xcel Energy is saved as an item in the Gas category for placement again.



You can right-click on a custom text string and either edit or delete it.

Annotate the fiber optic line

1. Create a custom text string (6", Qwest) for the fiber optic line and annotate as shown.

| CDOT Menu | | | • • | | |
|--|---|---|------------|----------------------------|----|
| CDOT Groups CDOT Tools Drafting Bridge Construction Design Geometry Hydraulics Landscape Environmental Materials Geotechnical ROW Survey Traffic ITS Utilities | Options Help Status Existing Utilities Electric Fiber Optic Gas Sanitary Sewer Telephone Television Water | Proposed Proposed A Proposed Fiber Optic Line Fiber Optic Overt A (New Text String A Grigge A G | nea | | |
| 50+00 51+0000000000 | | PISta=22+50.68 | 23+00 5 | 00 + 4 uardrail Type | 3 |
| | <u> </u> | | County | Rpad, 101 | NO |

Note: Be sure to *<*D*>* near the bottom of the line to fit the annotation.

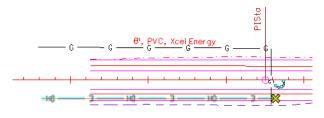
Lab 20.5 - Measure Graphics

Since you referenced your plan view graphics at a 1:1 scale, they are the actual size in the sheet file. Therefore, you can measure plan graphics in the sheet file and get the same results as measuring in the model file. Make sure that Locate is turned on for the reference before using the measuring tools on reference graphics.

Measure Distance

Between points

- 1. Measure the OH Electrical Line with the CDOT custom add-on tool.
 - From the CDOT Menu select CDOT Tools > Measure XY Distance
 - In the XY Distance Dialog box, set Measurement Option to Between points
 - AccuSnap on the *two* endpoints of the proposed Overhead electrical line as shown (snap to tie-in at power pole symbols – see arrows below)

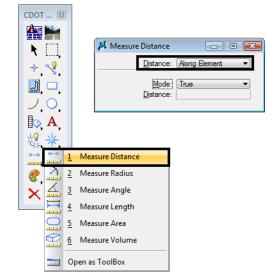


- ♦ <**R**> when done
- Your results should match the dialog box

| XY Distance | | |
|---------------------------------------|--|--|
| Measurement Options | | |
| Between points | | |
| C From point on element | | |
| C Perpendicular from element | | |
| C Perpendicular from point on element | | |
| C Tangent from element | | |
| C Tangent from point on element | | |
| Calculated Values | | |
| Delta X: -3.344' | | |
| Delta Y: 299. 183' | | |
| Delta Z: 0' | | |
| Slope: 0% | | |
| Angle: 90° 38' 25.66" | | |
| Horiz. Distance: 299.202' | | |
| Slope Distance: 299.202' | | |
| ☑ Use Reference Attachment Scale | | |
| Restart Exit | | |

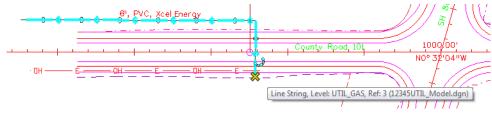
Along element

1. Measure the Gas Line with standard MicroStation tools.



• Select the Measure Distance command from the Measure toolbar.

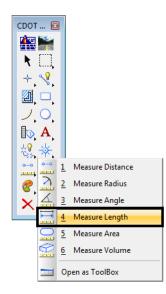
- Set the *Method* to Along Element
- AccuSnap on the start and end points of proposed 6" gas line as shown (see arrows).



• Record your results: ______ft.

Note: Individual results will vary based on how the line was originally drawn.

2. Select the Measure Length command.



- \diamond **<D>** on the gas line.
- Record your results: ______ft.

Your results should be the same as in step 2. With this command, you only have to select the element with a data point to get its entire length.

3. Use Measure Length to measure the length of the OH Electrical line.

| 📕 Measure Le | ngth 👝 🗉 💌 |
|----------------|------------------|
| Tolerance (%): | 1.000000 |
| | Mass Properties |
| | Display Centroid |
| Mode: | True |
| Length: | 299.202' |
| Angle Of Line: | 270°38'25.66" |
| | |

Your results should be the same as step 1 where you measure with the CDOT custom **XY Distance** tool.

Note: When measuring a straight line with this method, you also get the angle of the line.

Measure perpendicular

1. In the Design Model reference, turn Off the level DRAFT_LC-Center_WT-3.

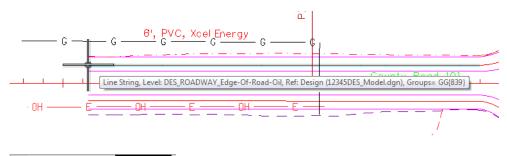
This element (a blue dashed line) is a coincident to the alignment centerline. Since you will only be working with the alignment, turn this level off and leave the **ALG_PROPOSED_Hor-Alignment** turned on.

- 2. Turn Depth lock Off.
- 3. **<T>** on the side road horizontal alignment and note the Z value.

3279671.701, 1555884.034, 0.000 KeyPt

Horizontal Alignments, like this one, are typically placed at elevation 0.

4. **<T>** on the red upper edge of oil line at the beginning of the alignment and note the Z value.



3279656.098, 1555658.860, 6626.647 KeyPt

The edge of oil line is placed at the correct elevation.

- XY Distance

 Measurement Options

 © Between points

 © From point on element

 Image: Perpendicular from element

 © Perpendicular from point on element

 © Tangent from element

 © Tangent from point on element
- 5. In the XY Distance dialog box, set the Option to Perpendicular from element.

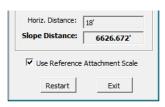
6. **<D>** on the side road horizontal alignment.

MicroStation displays a horizontal tracking line.

7. AccuSnap on the end of the upper edge of oil line.



8. Review your results:



Note that even though the two elements are at different elevations, the CDOT custom **XY Distance** tool provides both the **Horizontal Distance** of 18 feet along with the true 3D slope measurement (or **Total Distance**) of 6626.672 feet.