LAB 8 - Create 3D Utility Graphics

In this example, you'll create a Utility model file, work with references, and then place proposed 3D utility lines using the CDOT Menu and the parallel copy tool. You'll also modify the graphics as necessary.

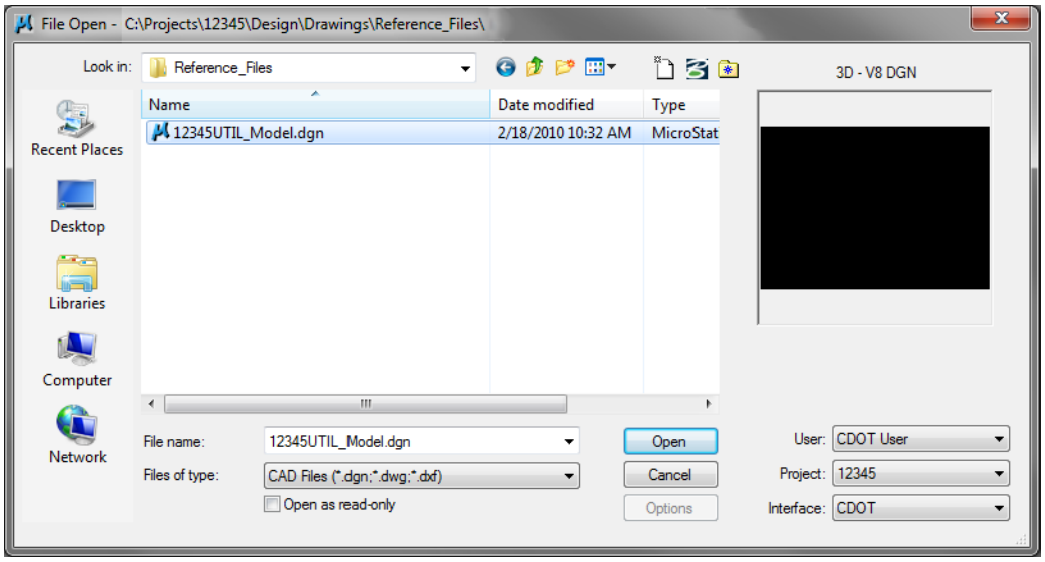
Chapter Objectives:

After completing this exercise you will know how to:

- Work with nested references
- Use the **Copy Attachment** option for references
- Use the CDOT Menu to place custom line styles (Utility lines).
- Place elements in 3D using **Depth Lock**
- Manipulate elements using the **Parallel Copy** tool
- Modify elements using the **Trim** tools

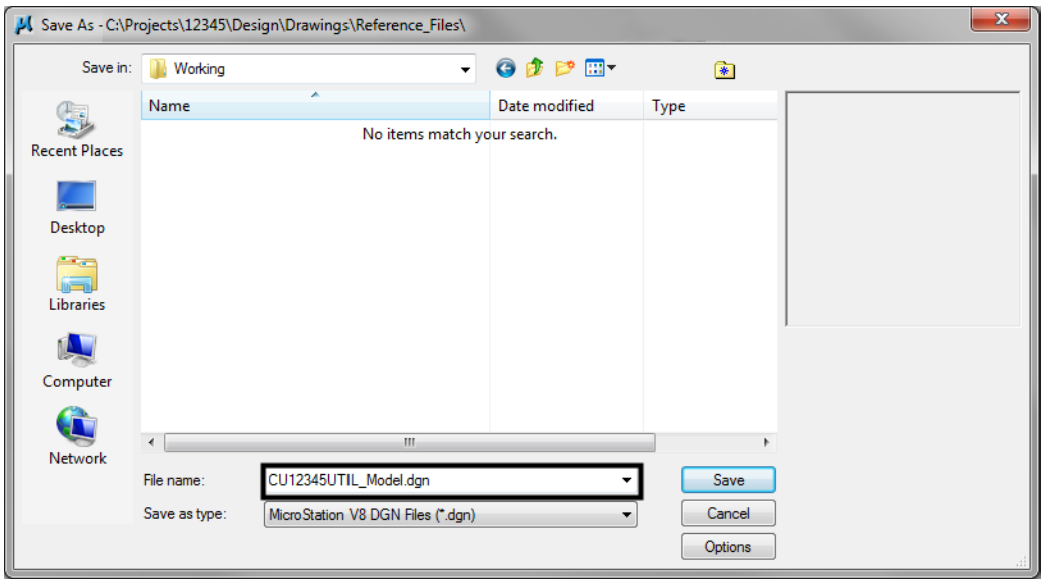
Lab 8.1 - Create the Utility Model File

1. Open the **MicroStation Manager** and set the ***Project*** to **12345**.
2. Set the directory to **\Utilities\Drawings\Reference Files**.



3. Open the file **12345UTIL_Model.dgn**. The blank Utility model file opens.
4. Select **File > Save As...**
5. Set the Directory to **\Utilities\Working**.

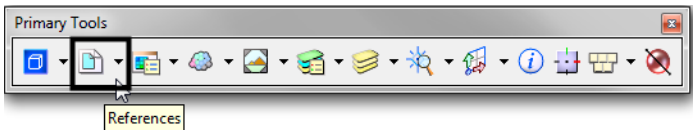
6. Change the file name to **CU12345UTIL_Model.dgn** and select **Save**.



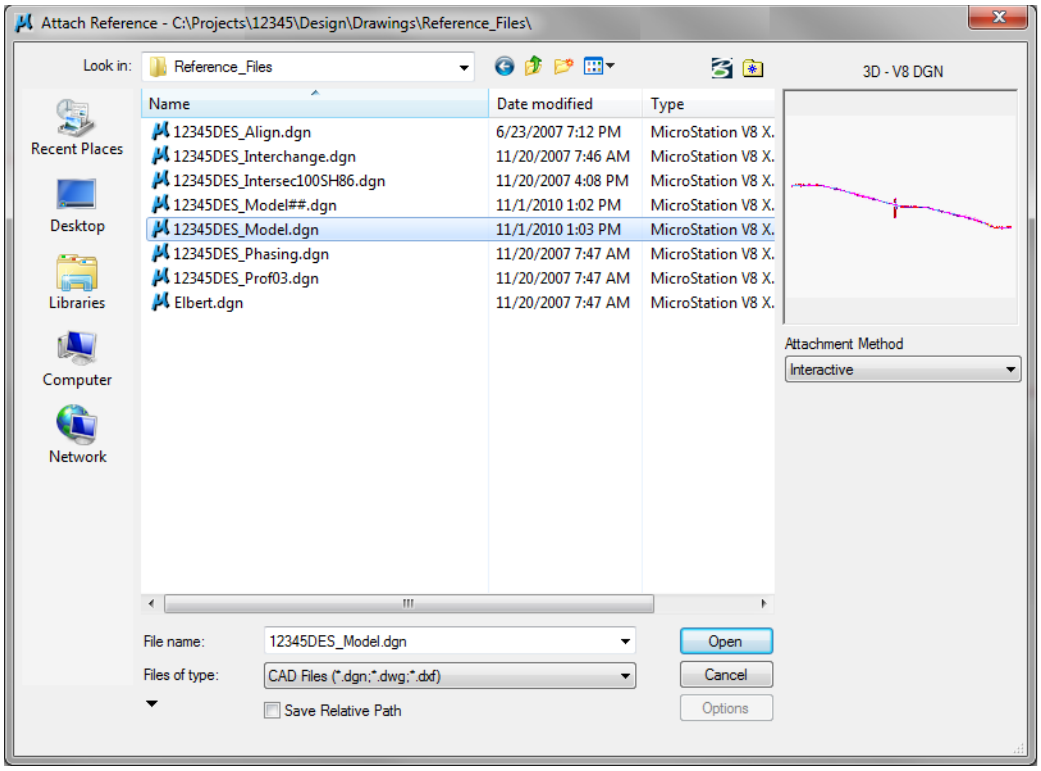
The new file is created in the ***Working*** folder.

Lab 8.2 - Attach References

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

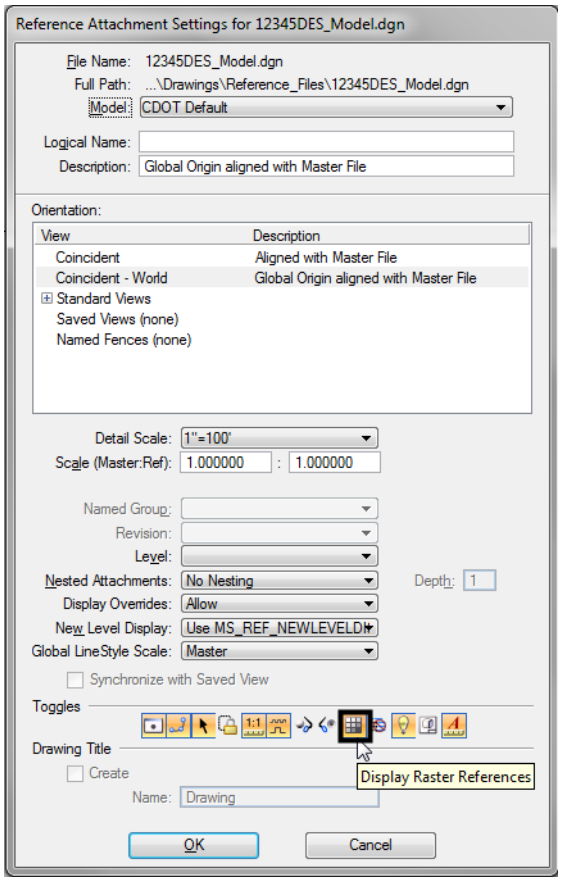


2. From the ***References*** dialog box, select **Tools > Attach** and select the **12345DES_Model.dgn** file from the **Design****Drawings****Reference Files** folder.



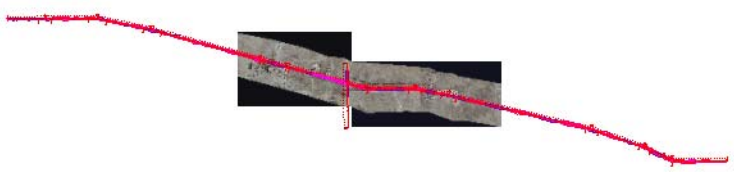
3. Verify the ***Attachment Method*** is set to **Interactive** and select **Open**.

4. In the ***Attachment Settings*** box, keyin a ***Logical Name*** of ***Design*** and a ***Description*** of ***Design Model Plan***. Make sure ***Display Raster Reference*** is ***on***. Set the other options as shown and select **OK**.



5. **Fit** the view.

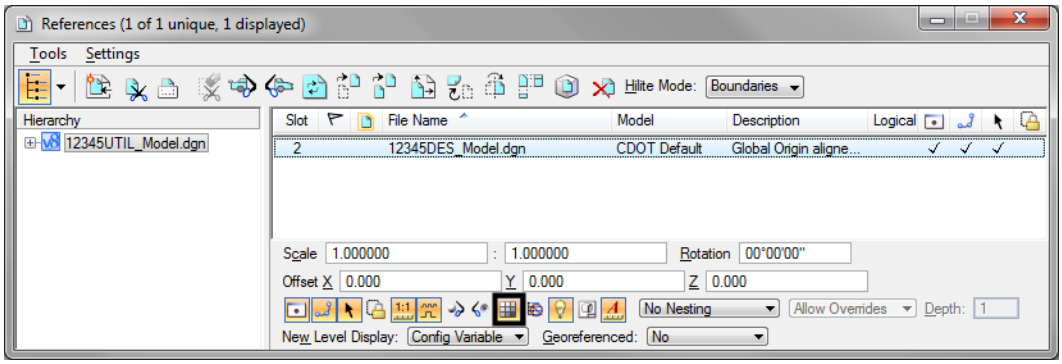
   The Design reference graphics, along with the raster photos, appear in the Utility model file.

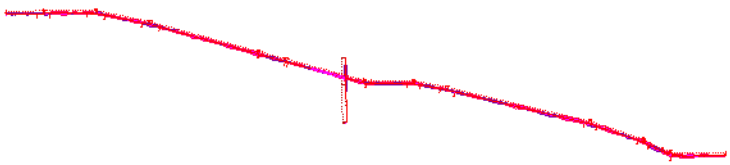


Lab 8.3 - Raster Images

Since ***Display Raster References*** was turned on when attaching the reference, the aerial photos were attached with the design model file (they were turned on in the Design Model file from the last lab). You can quickly turn them off from the ***Reference*** dialog instead of opening the ***Raster Manager***.

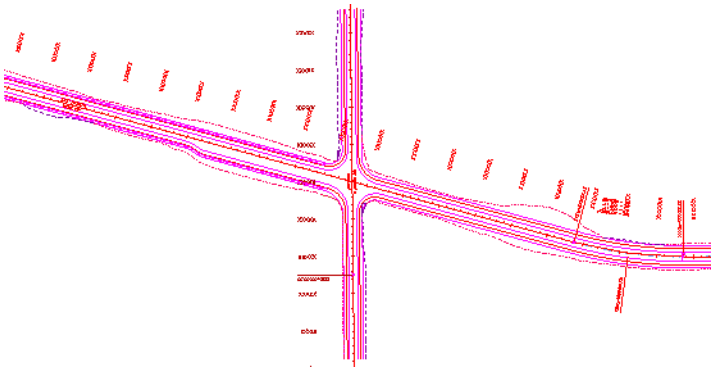
1. In the ***References*** box, highlight the **Design** reference and toggle **Display Raster** References ***off.***



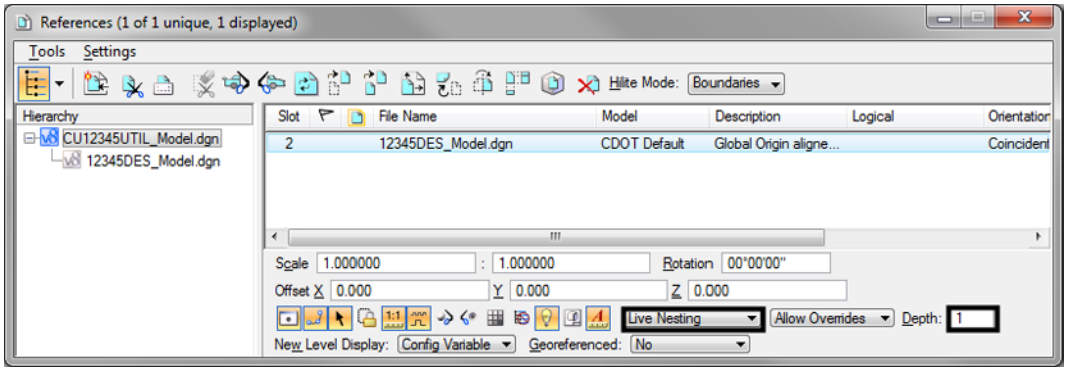


Lab 8.4 - Work with Reference Files

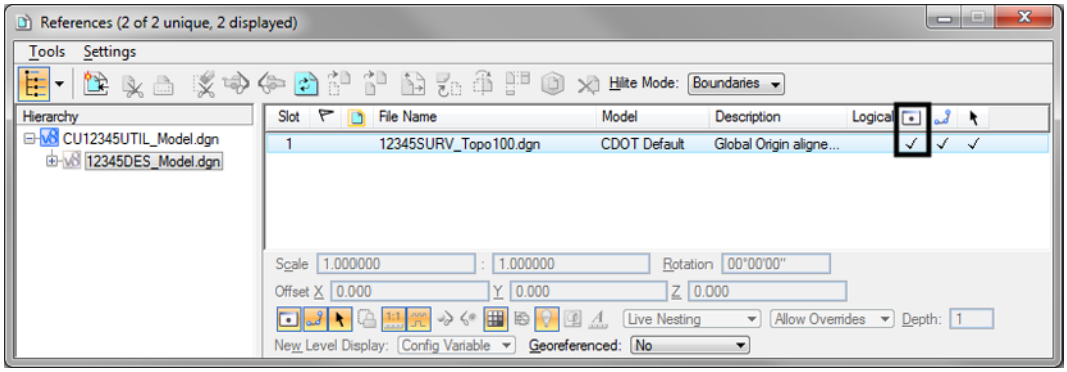
1. **Window** in on the Intersection.



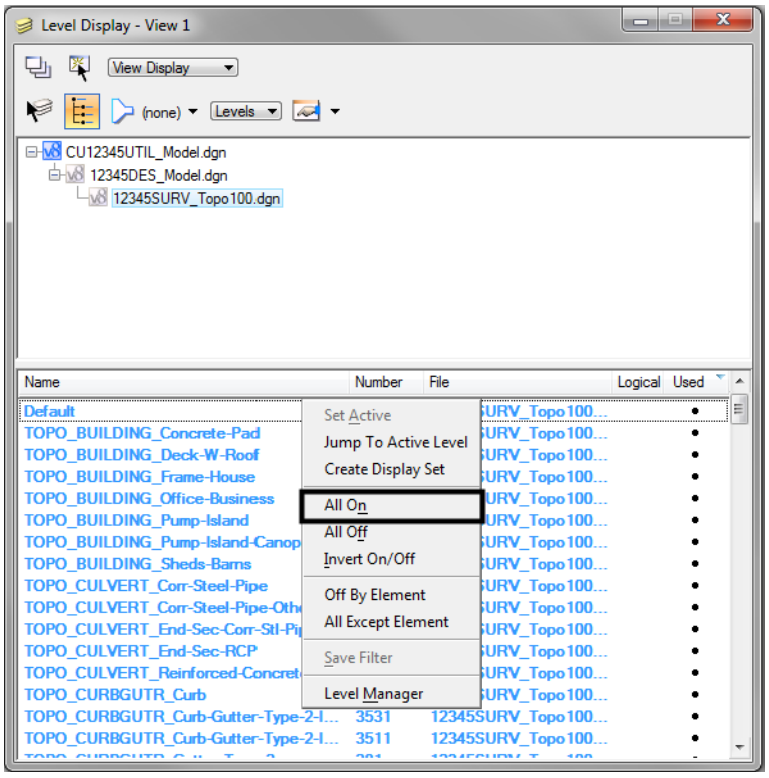
2. On the **Reference** dialog, change **No Nesting** to **Live Nesting** and set ***Depth*** to **1.**



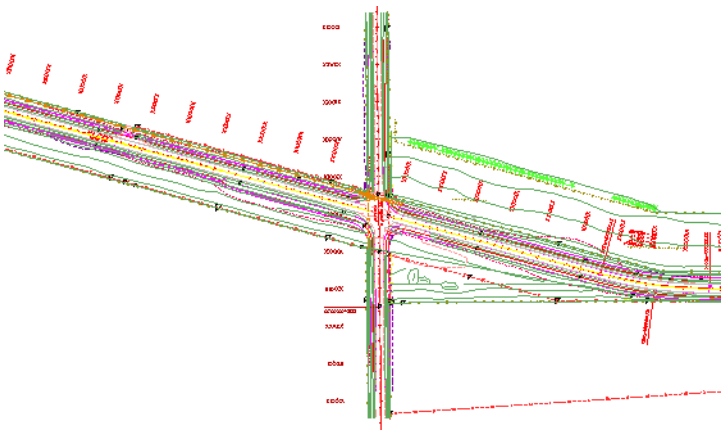
3. In the ***Hierarchy*** pane, select the **Design** reference file as shown below. On the right, select the **Survey/Topo** nested reference and make sure that **Display i**s toggled **on**.



4. Open the ***Level Display*** box, make sure the ***Show Target Tree*** button is **On,** and select the **Survey/Topo** Reference. Right click on the bottom pane and choose **All On** to turn on all reference levels.



The nested Survey/Topo graphics are displayed.



5. Back in the Reference dialog box, select the upper-level **CU12345UTIL_Model.dgn** master file in the ***Hierarchy*** pane. On the right, select the **12345DES_Model.dgn** reference and **toggle off *Display***.

   Both Design and Survey/Topo are turned off since Survey/Topo is nested.

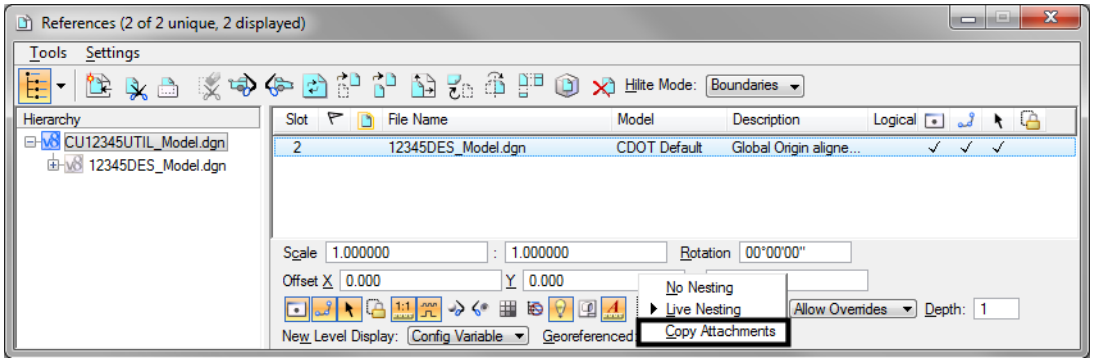
6. Turn the display of the **Design** reference back **On**.

7. How would you turn off the Design graphics and leave the Survey/Topo graphics on? Currently, as nested references, you can't do this. However, in the next section you will accomplish this using **Copy Attachments**.

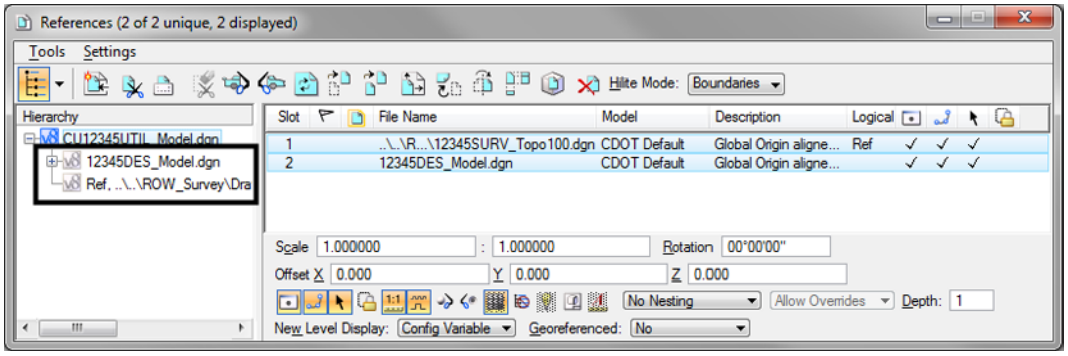
Use the Copy Attachments Option

Many times, especially in Model files, you want all your references to be upper level references (as opposed to nested references) so that you can turn on/off the display of individual reference files. To accomplish this you can either reference all the nested files one by one or you can use the **Copy Attachments** option.

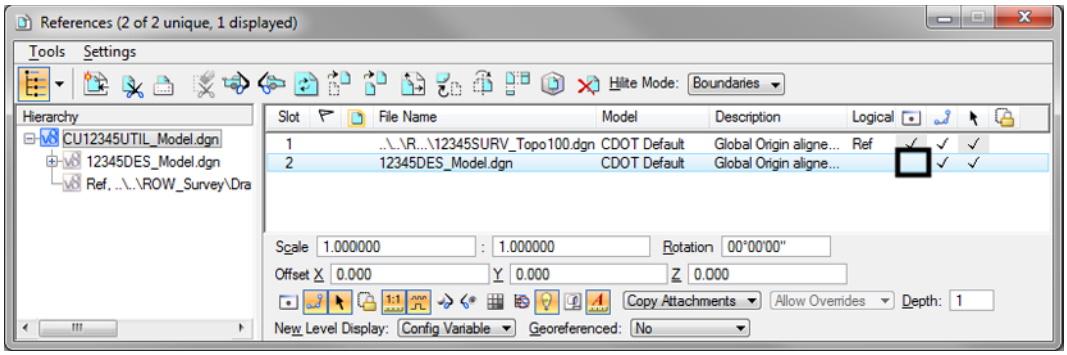
1. With the ***Design*** reference selected on the right, change the **Live Nested** option to **Copy Attachments.**

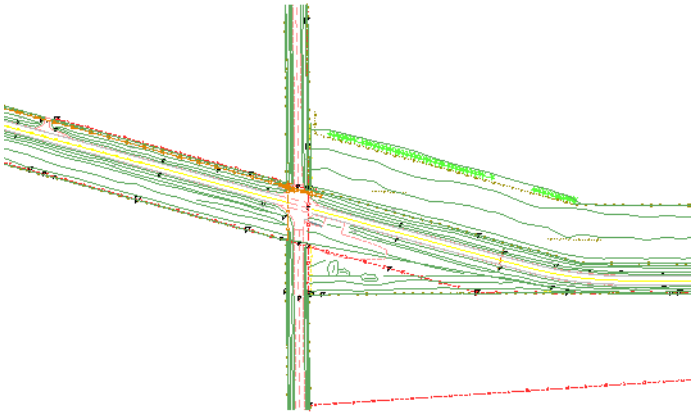


Note: Notice that in the Hierarchy pane of the ***References*** dialog box both the Design and the Survey/Topo references are now upper level references. As a result of changing ***Live Nesting*** to ***Copy Attachments***, the nested Survey/Topo reference was copied in as a direct attachment.



2. On the right-hand side of the ***References*** box, select the reference for the **Design** model and toggle the ***Display*** **off**.

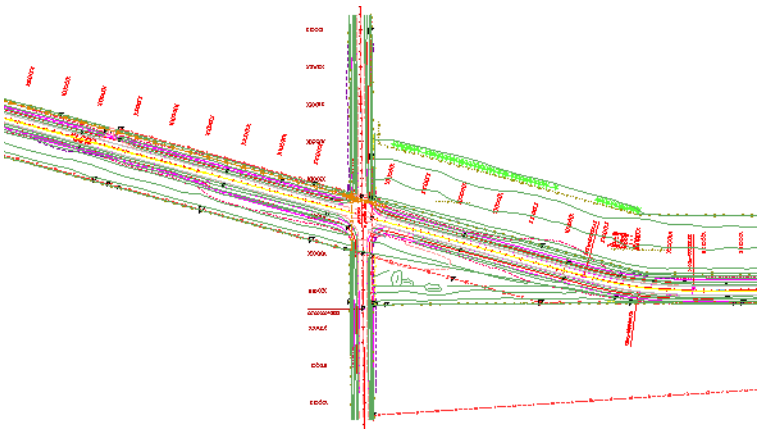




With both references as direct attachments, each reference can be individually turned on/ off. In this example the Design reference is turned off while the Survey/Topo graphics remain on.

Note: As a rule of thumb for Model files, you can reference nested to avoid having to attach multiple times. Then, once the nested references are attached, use the **Copy Attachments** option to make all nested references direct attachments. For Sheet files (see Chapter 9), you should typically use nested attachments.

3. Turn the ***Design*** reference display back **On**.



Lab 8.5 - Drawing in 3D (Using ACS Plane Snap Lock)

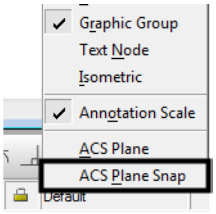
In the next series of steps, you will practice placing utility graphics from the CDOT Menu with and without ***ACS Plane Snap lock***. The ACS Plane Snap lock sets the elevation of the graphics are placed in a 3D file.

Place overhead electrical lines

1. To check your active depth, key in ***az=$*** then **<D>** in the view.

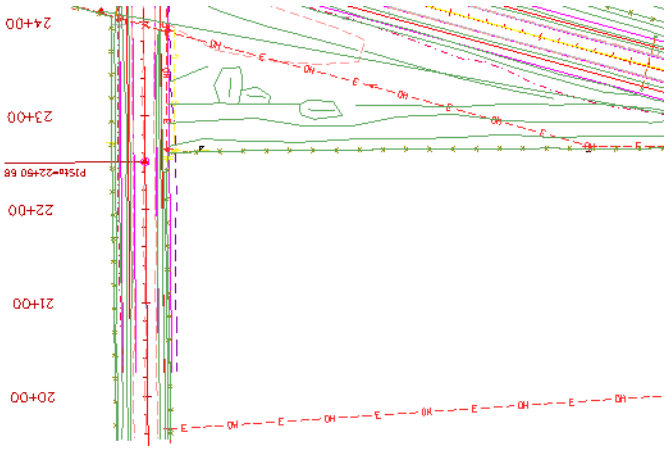
   The default active depth for the CDOT for the Utility model file is ***0.00***.

   Select the **Locks** button on the status bar and verify that ***ACS Plane Snap lock*** is turned **Off**.

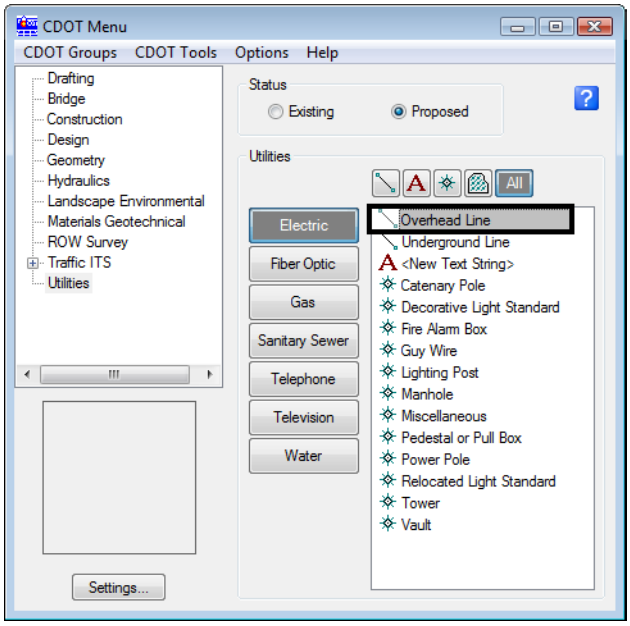


   With ***ACS Plane Snap lock*** turned off, you will pick up the elevation of elements you snap to in a 3D file.

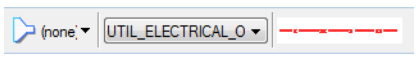
2. **Zoom in** on the south side of the intersection cross road.



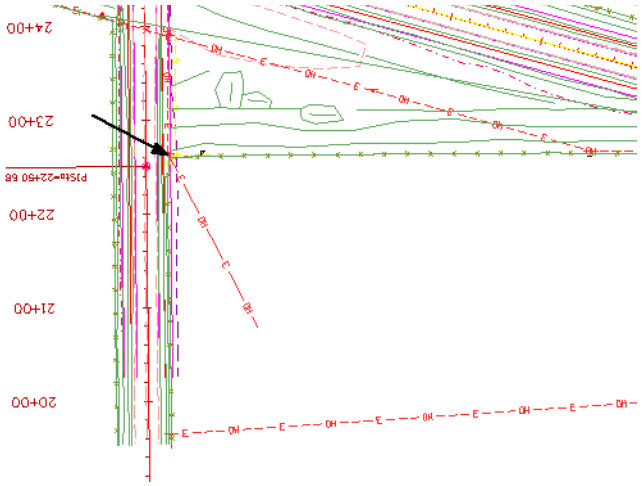
3. On the CDOT Menu highlight the **Utilities** group and set ***Status*** to **Proposed.**
4. Select the **Electric** category.
5. Set the ***Filters*** category to **All.**
6. Select the **Overhead Line** item.



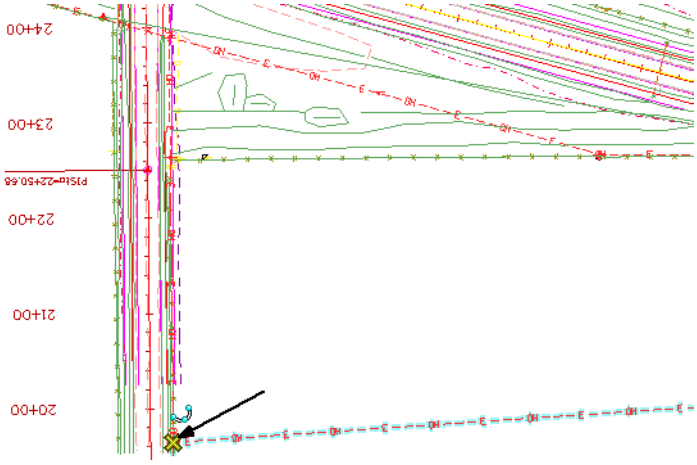
Note that the active level is automatically set to ***UTIL_ELECTRICAL_Overhead*** and the ***Place SmartLine*** command is started.



7. **AccuSnap** to the end of the existing North/South overhead line at the power pole as shown.



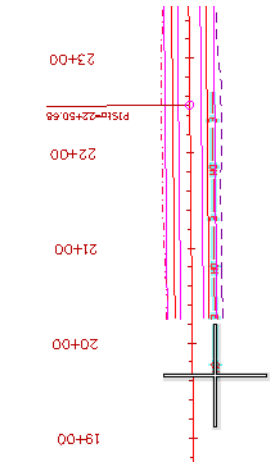
8. **AccuSnap** to the end of the existing east/west overhead line at the power pole as shown.



9. **<R>** to complete this line.

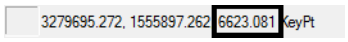
10. Turn **Off** the display of the Topo/Survey reference to better see the proposed graphics**.**

11. **<T>** on the end of the proposed overhead electrical line you just placed.



Note: Even though the active depth is 0, since **Depth lock** is turned off the line was placed at the elevation of the existing overhead line (6627.317).

12. **<T>** on the other end of the proposed overhead electrical line to check its elevation.

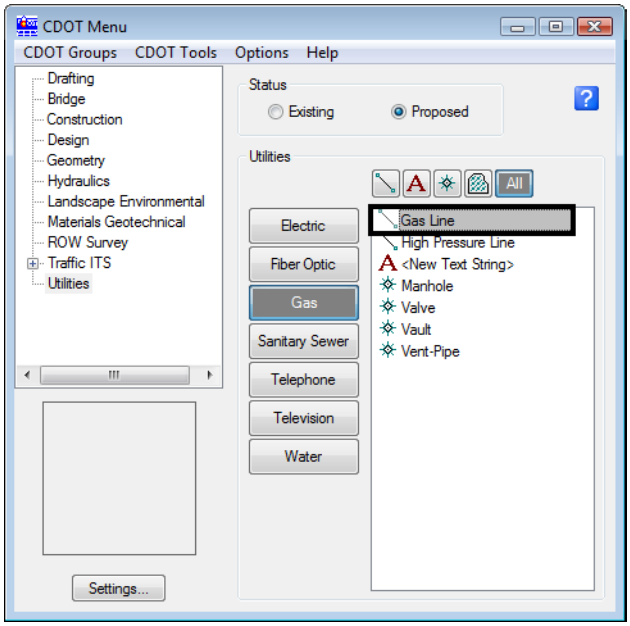


Place proposed gas lines

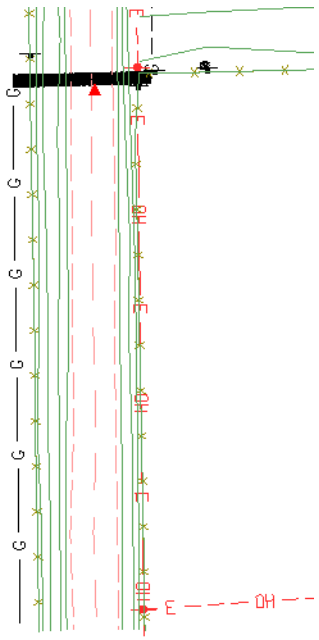
1. Turn **Off** the display of the ***Design*** reference and turn **On** the display of the ***Survey/Topo*** reference.

2. On the CDOT Menu, select the ***Gas*** category.

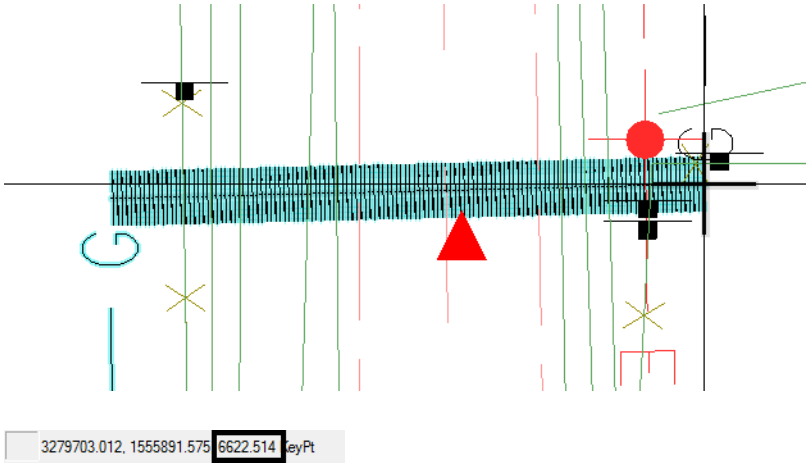
3. Select the **Gas Line** item.



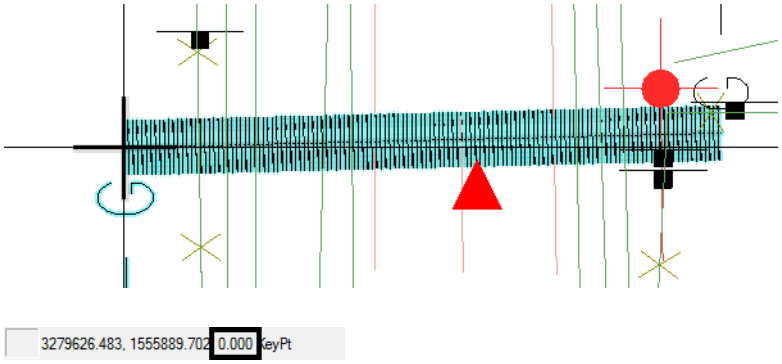
4. **<T>** on the end of the existing gas line on the east side of the road.
5. Place data points to draw the gas line in the approximate location shown.
6. **<R>** when done.



Note: The line does not look as expected. **<T>** on the East end of East-West section of the newly placed gas line and note the elevation.

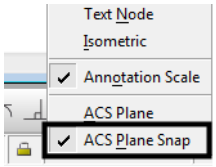


<T> on the West end and note the elevation

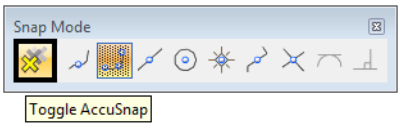


<T> snapping to an existing element positions the starting point of the new element at the elevation of the original element. Subsequent points that are not snapped to are placed at the ***Active Depth*** (Elevation) ***of 0.*** In this case, what you see is a proposed gas line that goes from an elevation of +/- 6622 to an elevation of 0 making the utility much longer than it should be. Because there are now so many "G" symbols in a line that is over 6000' long, it gives the appearance of a thick line.

7. **Delete** the proposed gas utility line you just placed.
8. Select the **Locks** from the status bar.
9. Toggle **On** ***ACS Plane Snap Lock***.



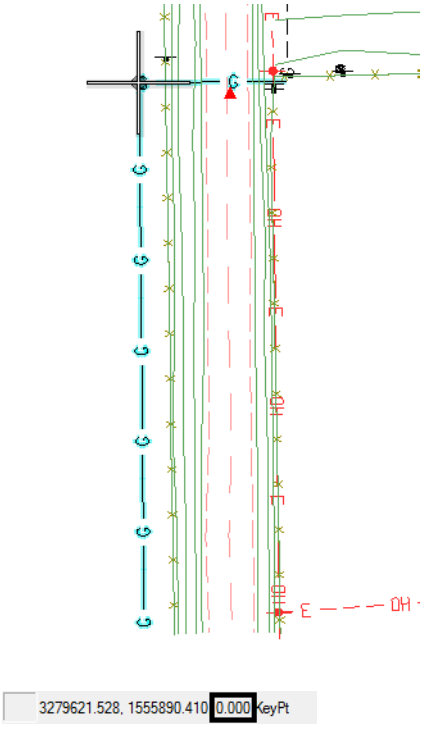
10. On the **Snap Mode** toolbar, toggle ***AccuSnap* Off**.



Note: ***AccuSnap*** doesn't work consistently when ***Depth Lock*** is on. Therefore, to ensure Depth lock works correctly, toggle ***AccuSnap*** off.

11. Place the proposed gas line again by a **<T>** on the end of the existing gas line and then placing the other data points in the approximate location shown.

12. **<T>** anywhere on the proposed gas line you just placed and note the elevation.



Since ***ACS Plane Snap lock*** is on, the proposed gas line was placed at an elevation of ***0***.

Note: To return to the default settings, turn ***ACS Plane Snap lock* Off** and toggle ***AccuSnap*** back **On**.

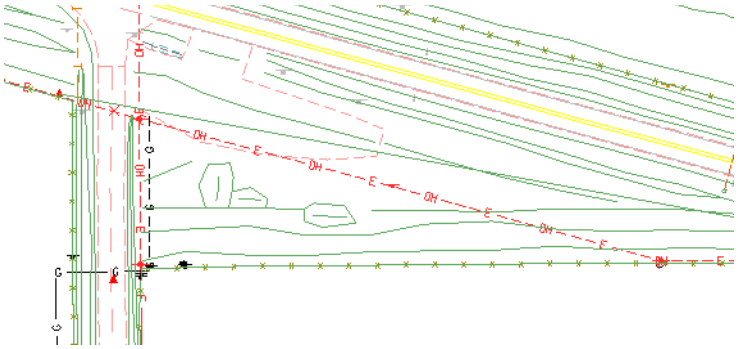
Place fiber optic lines using parallel copy

Follow the steps below to place a fiber optic line by copying parallel an existing telephone line.

Locate reference graphics for copying

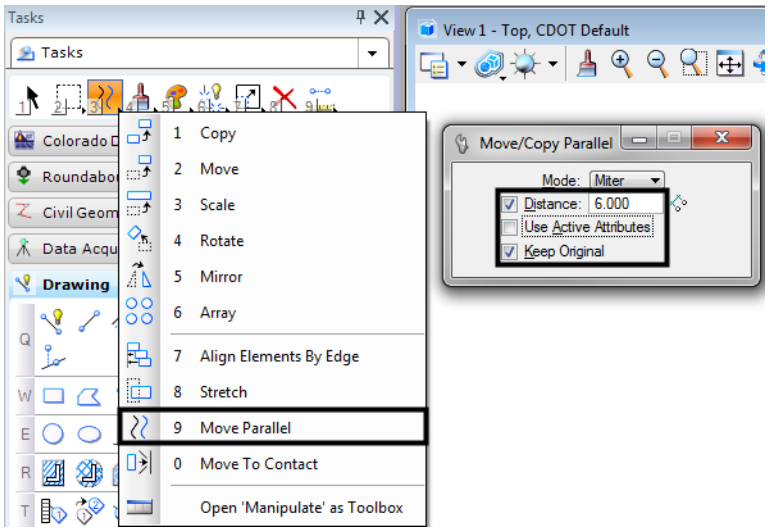
1. Turn off the **TOPO_TERRAIN_Break-Lines** level in the SurveyTopo reference.

2. **Window** in on the existing overhead electrical line in the southeast quadrant of the intersection as shown.



3. Select the **Move Parallel** tool from the ***Main*** task toolbar.

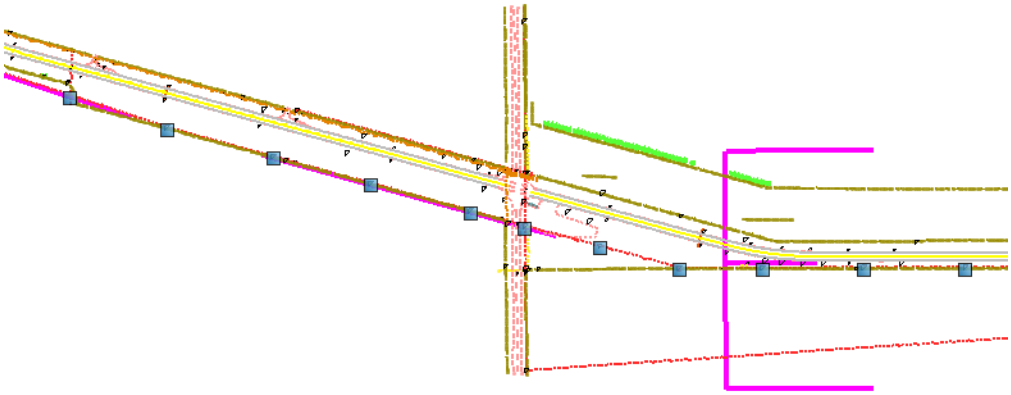
4. In the ***Tool Settings*** box, set the options as shown below.



5. **<D>** on the existing overhead line

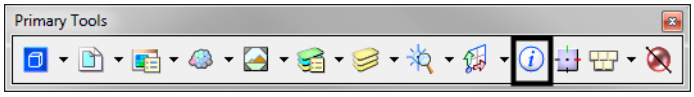
6. Move the cursor down to specify the direction of the parallel copy.

7. **<D>** to place the copy.



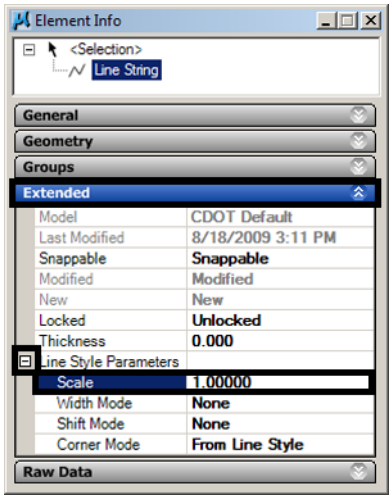
Note: When copying graphics from a Topo file, elements will maintain a hard coded linestyle scale and thus appear at the incorrect scale. This scale needs to be adjusted using the Element Info tool. In this example the linestyle scale of the new utility line need to be changed from a value of 100 to 1.

8. Select the new graphic and **<D>** on the ***Element Info*** tool.



9. Expand the ***Extended*** category and ***Line Style Parameters*** sub-category.

10. Change the value of the ***Scale*** option to **1**.

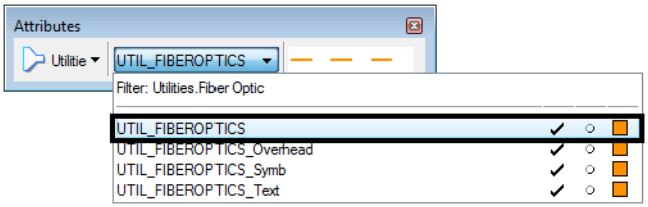


11. **Close** the Element Info

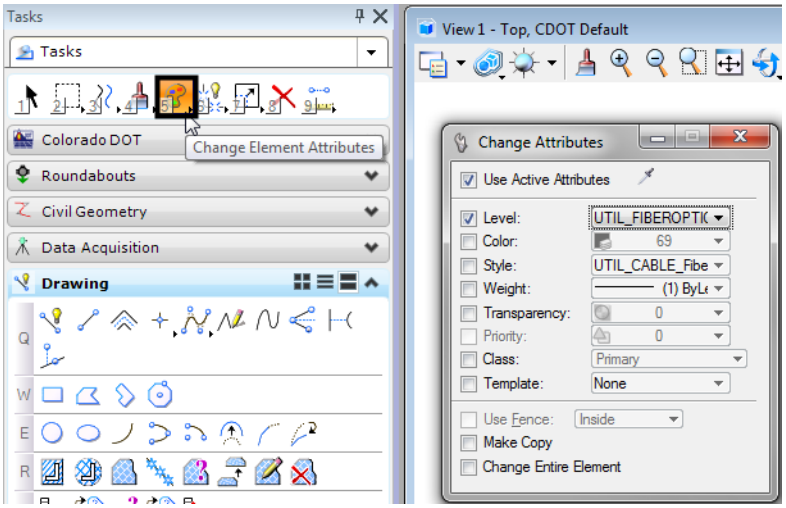
Change element attributes

Change the overhead electrical line to an underground fiber optic line using the ***Change Element Attributes*** command.

1. Set the active level to **UTIL_FIBEROPTICS** (hint: use a filter to help you set the level).

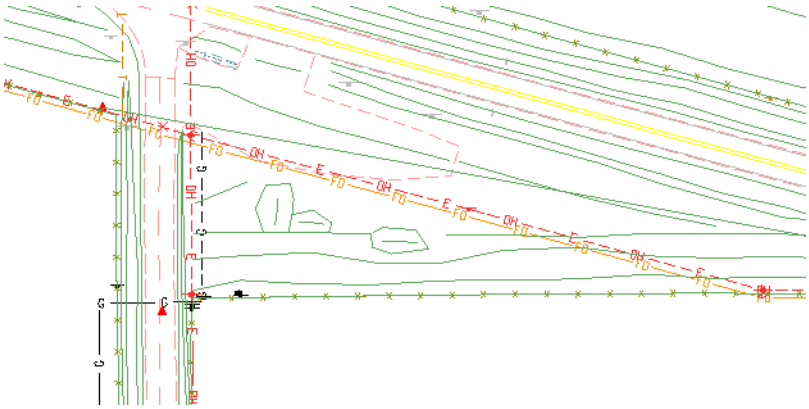


2. Select the **Change Element Attributes** command from the ***Main*** task toolbar.
3. Set ***Method*** to **Change.**
4. **Toggle On** ***Use Active Attributes***.
5. **Toggle On** ***Level*** (this picks up the active level).



6. **<D>** on the overhead electrical line you just copied as the element to change.

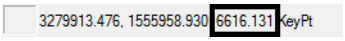
7. **<R>** when done.



Since the ***Use Active Attributes*** option was turned on, the element was changed to the active level **UTIL_FIBEROPTICS**.

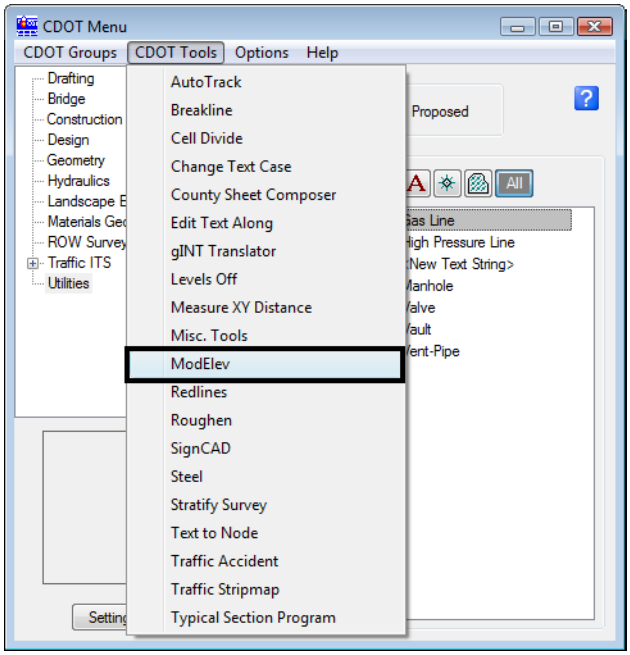
Set the elevation

1. **<T>** on the fiber-optics line you just placed.

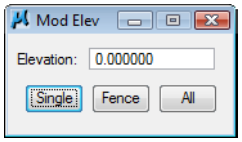


The proposed fiber-optics line is in the 6615 elevation range (your exact elevation may be vary depending on where you placed a tentative point). This elevation is wrong for the fiber optic line since you copied the overhead electrical line. For now, you can set the elevation of this line to 0 and later, it can be placed as a feature in the InRoads surface at the correct elevation. One way to set the elevation of an element is to use the **ModElev** command on the CDOT Menu.

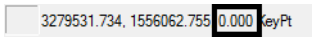
2. On the CDOT Menu, select **CDOT Tools > ModElev**.



3. In the ***ModElev*** tool settings box, set the elevation to ***0***.



4. Select **Single** (to identify a single element).
5. **<D>** on the new fiber-optics line you created.
6. **<D>** to accept.
7. **<R>** when done.
8. **<T>** on the fiber-optics line to check its elevation.

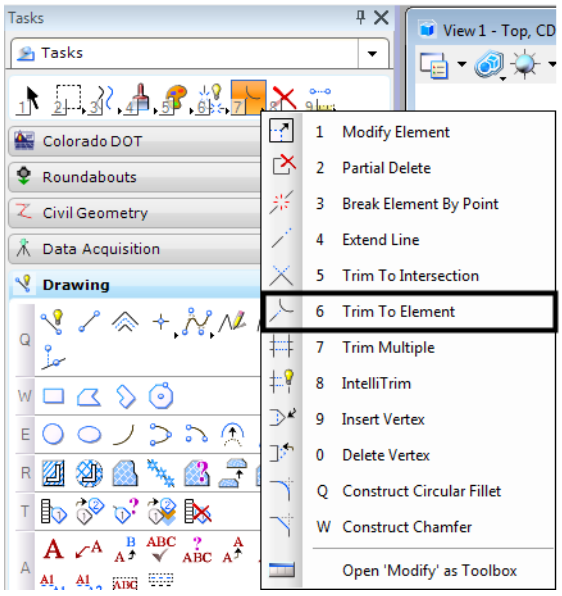


The Z value is now at 0. Use the ModElev command to easily set the elevation of any element or group of elements (selected with a fence).

Trim graphics

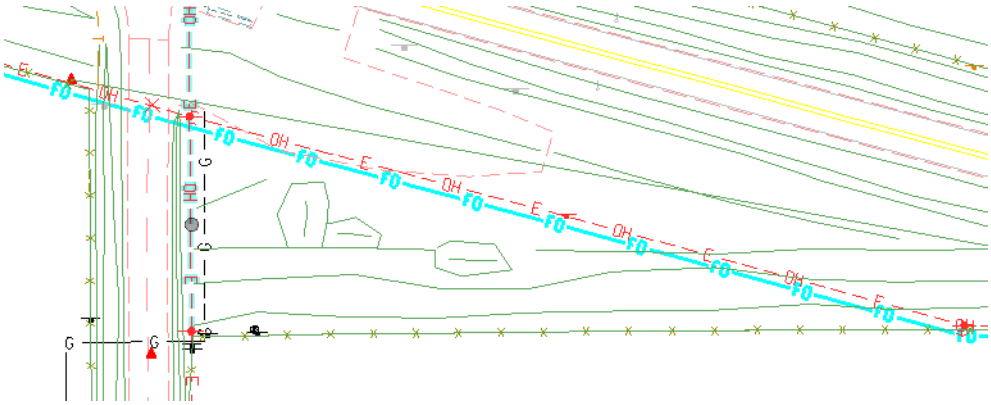
The new fiber optic line is only going in on the east side of the intersection cross road. Follow the steps below to use the ***Extend Element to Intersection*** command to trim the fiber optic graphics.

1. Select the **Trim to Element t**command from the ***Main*** task toolbar.

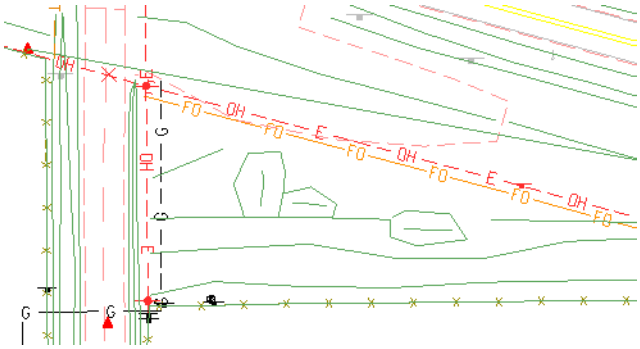


2. **<D>** on the fiber optic line to the right of the intersection, this is the section we wish to keep.

3. **<D>** on the north/south proposed overhead electrical line as the cutting element.



The fiber-optics lines are trimmed as shown.

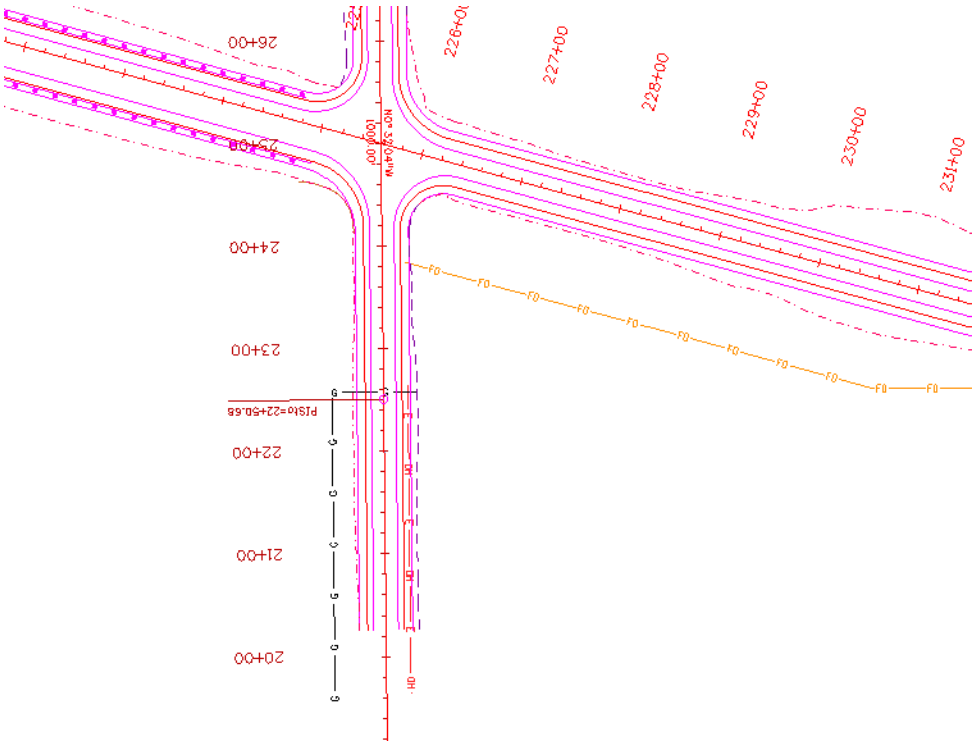


4. Turn off the display of the **Survey/Topo** references.

5. **Fit** the view.

Only the proposed gas, electric and fiber-optic utility graphics should appear in the ***CU12345UtilityModel01.dgn*** file.

6. Turn the display of the ***Design*** reference **On** and window into the intersection as shown.

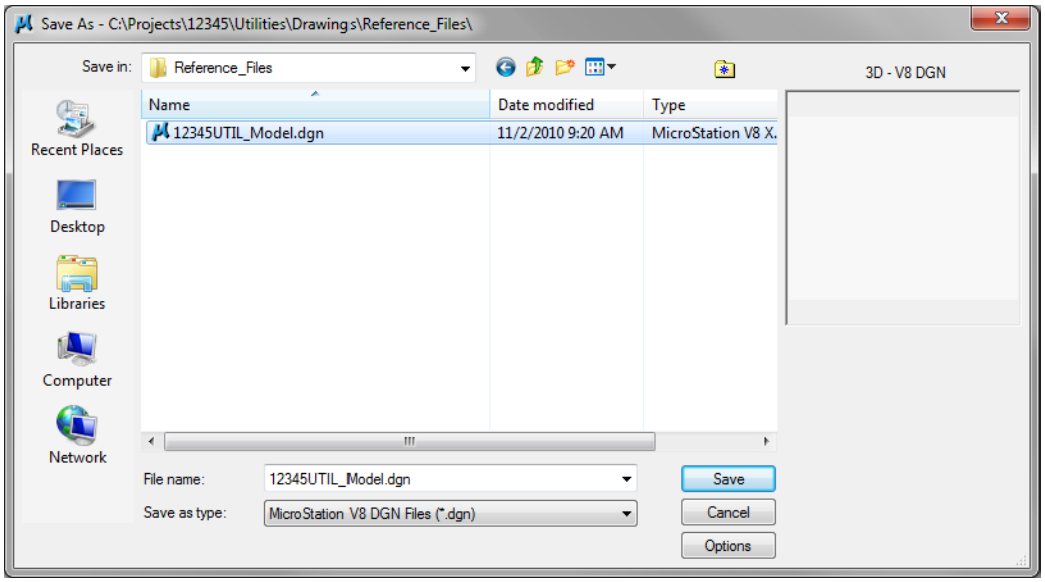


Move the utility model to the Reference Files folder

Move the utility model so that other groups can reference your work.

1. Select **File > Save As** and set the directory to the project's **\Utilities\Drawings\Reference_Files** folder.

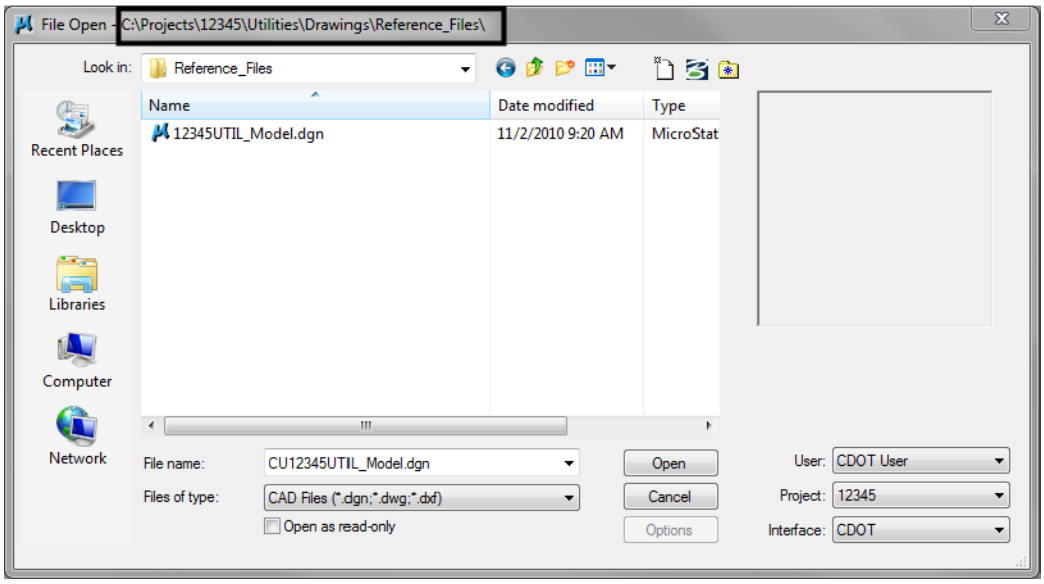
2. Remove the **CU** initials from the file name and select **Save**.



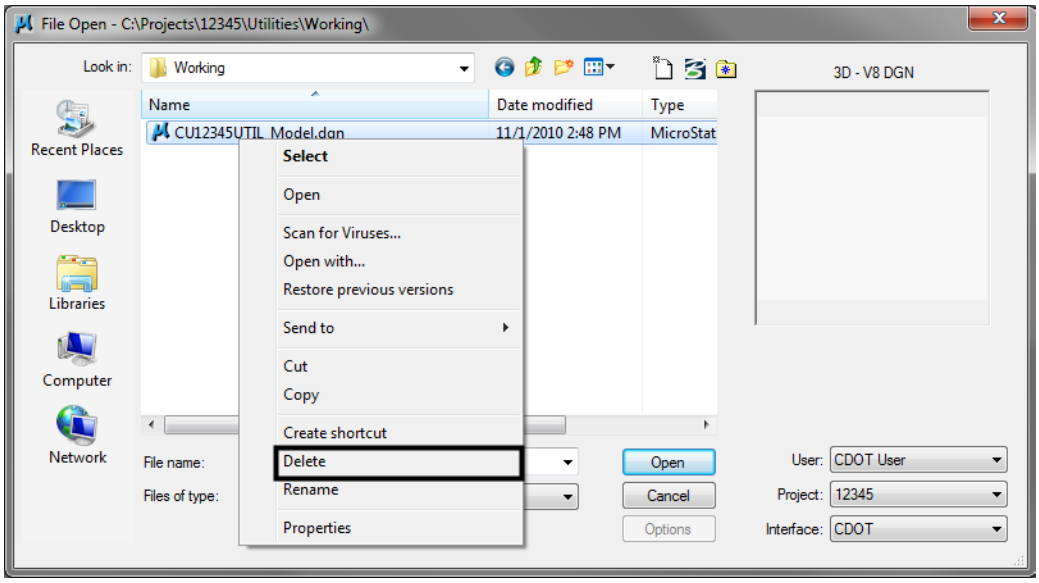
The file is saved to the new location.

Note: The project template delivers standard dgn's for model and sheet files as starter files. Use caution when prompted to confirm saving over an existing file as you could lose data.

3. Select **File > Close**.
4. In the ***MicroStation Manager*** verify that the file was saved to the ***Reference_Files*** folder.



5. Set the directory to **\Utilities\Working**.
6. **Right-click** while hovering over the file and select **Delete** to delete the file from the Working folder.



7. **Cancel** the MicroStation Manager to exit.