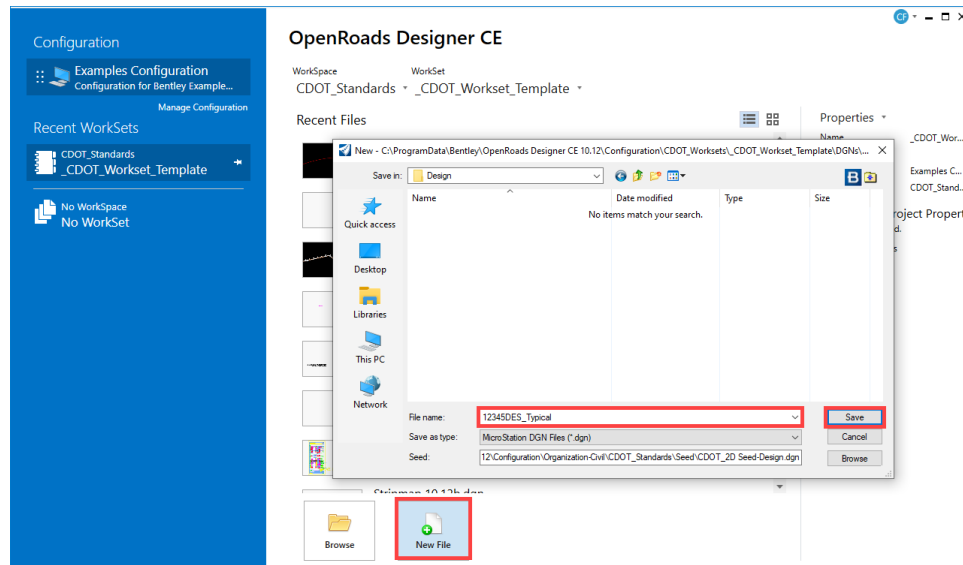


Using the CDOT Typical Section Generator Workflow

This document explains the basic functions of the CDOT Typical Section Program. This program writes graphical data to the typical section file at a scale of 1:10. All of the graphical properties such as the levels, patterns, text, and cells are set by default to the standard CDOT configuration. This workflow works for all ORD versions used at CDOT.

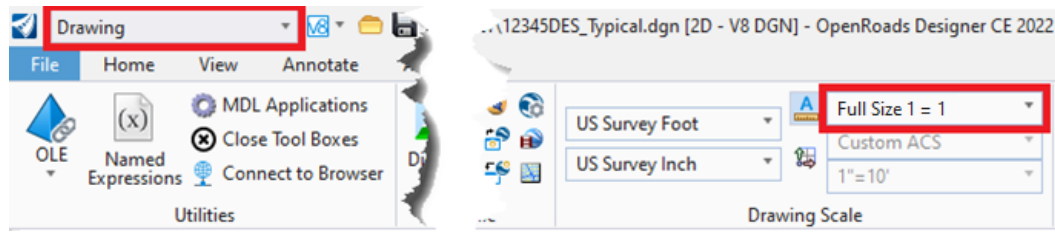
Opening MicroStation and the Typical Section Generator

1. Create the file **JPC#DES_Typical.dgn** using the **2D-Seed_CDOT.dgn**.



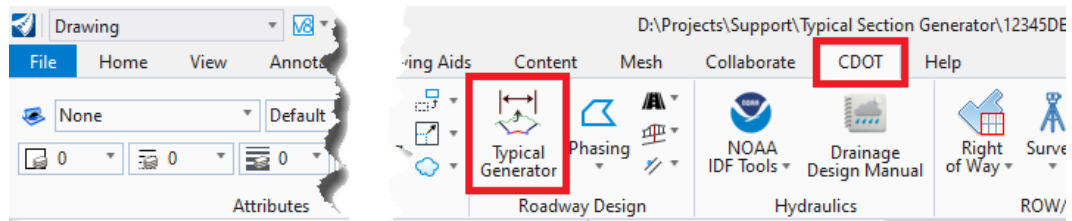
Note: The 5 digit Job Project Code has replaced the 'JPC#' in the filename.

2. Select the **Drawing** workflow.
3. In the **Utilities** tab, **Drawing Scale** group, set the **Annotation Scale** to **Full Size 1=1**.



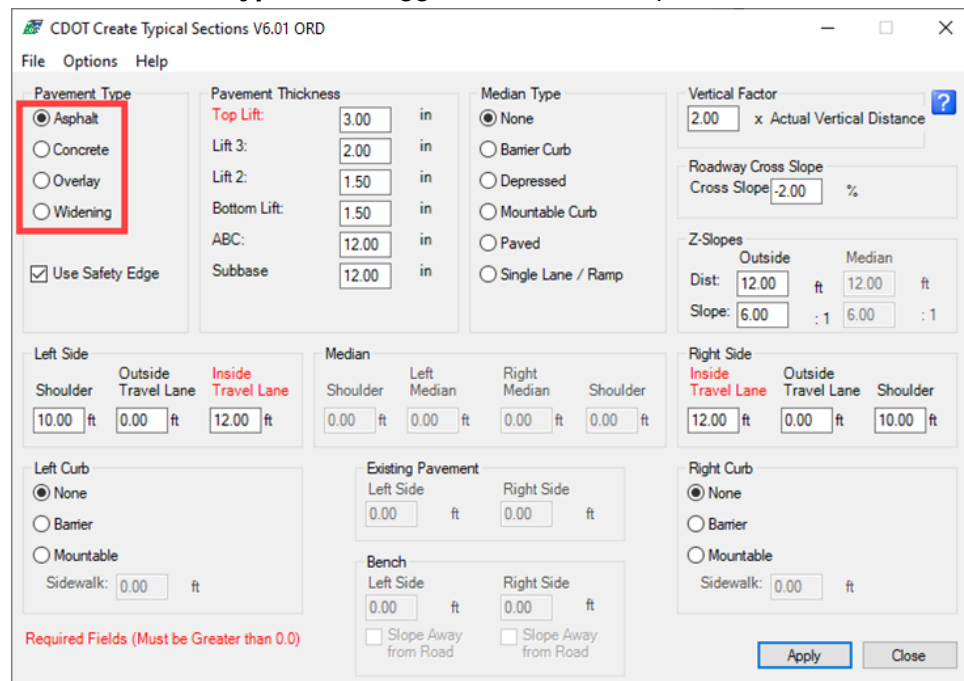
Note: The **Annotation Scale** can also be accessed from the **Drawing Production** tab in other workflows.

4. In the **CDOT** tab, **Roadway Design** group, select the **Typical Generator** command. This displays the **CDOT Create Typical Sections** dialog box'



5. In

the **Pavement Type** area, toggle on one of the options.



Note: The option selected here will affect the available options in other areas of the dialog box.

6. Set the **Use Safety Edge** toggle as desired.



Examples of edge treatment.

7. In the **Pavement Thickness** area, enter data in the fields provided to define the Lift thicknesses. The options in this area change with the **Pavement Type** selected and are shown below:

Pavement Type <input checked="" type="radio"/> Asphalt <input type="radio"/> Concrete <input type="radio"/> Overlay <input type="radio"/> Widening <input checked="" type="checkbox"/> Use Safety Edge	Pavement Thickness Top Lift: 3.00 in Lift 3: 2.00 in Lift 2: 1.50 in Bottom Lift: 1.50 in ABC: 12.00 in Subbase: 12.00 in	Pavement Type <input type="radio"/> Asphalt <input checked="" type="radio"/> Concrete <input type="radio"/> Overlay <input type="radio"/> Widening <input checked="" type="checkbox"/> Use Safety Edge	Pavement Thickness Thickness: 3.00 in 0.00 in 0.00 in 0.00 in ABC: 12.00 in Subbase: 12.00 in	Pavement Type <input type="radio"/> Asphalt <input type="radio"/> Concrete <input checked="" type="radio"/> Overlay <input type="radio"/> Widening <input checked="" type="checkbox"/> Use Safety Edge	Pavement Thickness Top Lift: 3.00 in Middle Lift: 0.00 in Bottom Lift: 0.00 in 0.00 in 0.00 in	Pavement Type <input type="radio"/> Asphalt <input type="radio"/> Concrete <input type="radio"/> Overlay <input checked="" type="radio"/> Widening <input checked="" type="checkbox"/> Use Safety Edge	Pavement Thickness Widen Top Lift: 3.00 in Widen Middle Lift: 0.00 in Widen Bottom Lift: 0.00 in ABC: 0.00 in Subbase: 0.00 in
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Note: The fields with the red titles must have a value greater than zero entered.

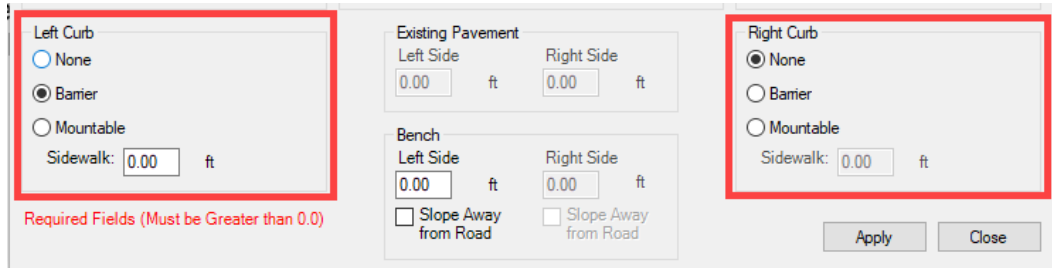
8. The **Median Type** area is used to specify the presence and type of median to be used on the typical. The **Median Type** selected will determine availability and type of fields displayed in the **Median** area of the dialog box. Toggle on a median type.

Thickness: 3.00 in 4.00 in 4.00 in 0.00 in 12.00 in 12.00 in	Median Type <input checked="" type="radio"/> None <input type="radio"/> Barrier Curb <input type="radio"/> Depressed <input type="radio"/> Mountable Curb <input type="radio"/> Paved <input type="radio"/> Single Lane / Ramp	Thickness: 3.00 in 4.00 in 4.00 in 0.00 in 12.00 in 12.00 in	Median Type <input type="radio"/> None <input checked="" type="radio"/> Barrier Curb <input type="radio"/> Depressed <input type="radio"/> Mountable Curb <input type="radio"/> Paved <input type="radio"/> Single Lane / Ramp	Thickness: 3.00 in 4.00 in 4.00 in 0.00 in 12.00 in 12.00 in	Median Type <input type="radio"/> None <input type="radio"/> Barrier Curb <input type="radio"/> Depressed <input checked="" type="radio"/> Mountable Curb <input type="radio"/> Paved <input type="radio"/> Single Lane / Ramp	Thickness: 3.00 in 4.00 in 4.00 in 0.00 in 12.00 in 12.00 in	Median Type <input type="radio"/> None <input type="radio"/> Barrier Curb <input type="radio"/> Depressed <input type="radio"/> Mountable Curb <input checked="" type="radio"/> Paved <input type="radio"/> Single Lane / Ramp	Thickness: 3.00 in 4.00 in 4.00 in 0.00 in 12.00 in 12.00 in	Median Type <input type="radio"/> None <input type="radio"/> Barrier Curb <input type="radio"/> Depressed <input type="radio"/> Mountable Curb <input type="radio"/> Paved <input checked="" type="radio"/> Single Lane / Ramp
Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft	Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft	Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft	Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft	Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft	Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft	Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft	Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft	Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft	Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft

9. The **Left Side** and **Right Side** areas are used to define the number and width of driving lanes and the presence and width of a shoulder. With all median types, except *Single Lane / Ramp*, the **Inside Travel Lane** field must contain a value greater than zero. If the *Single Lane / Ramp* median type is selected, these fields are disabled.

<input checked="" type="checkbox"/> Use Safety Edge	ABC: 12.00 in Subbase: 12.00 in	<input type="radio"/> Paved <input type="radio"/> Single Lane / Ramp	Z-Slopes Outside: Dist: 12.00 ft, Slope: 6.00 : 1 Median: Dist: 12.00 ft, Slope: 6.00 : 1
Left Side Shoulder: 10.00 ft Outside Travel Lane: 0.00 ft Inside Travel Lane: 12.00 ft	Median Shoulder: 0.00 ft Left Median: 0.00 ft Right Median: 0.00 ft	Right Side Inside Travel Lane: 12.00 ft Outside Travel Lane: 0.00 ft Shoulder: 10.00 ft	Left Curb <input checked="" type="radio"/> None
Existing Pavement Left Side: Right Side:	Right Curb <input checked="" type="radio"/> None		

10. The **Left Curb** and **Right Curb** areas are used to define the presence and type of curb. If a curb is present, then a sidewalk can be specified. Toggle on the appropriate curb type. If **Barrier** or **Mountable** is selected, a sidewalk can be defined by entering a width in the field provided.



Note: Unlike the **Left Side** and **Right Side** areas, **Left Curb** and **Right Curb** are enabled when the **Single Lane / Ramp** median type is selected.

Note: the Left and Right options for Side and Curb are independent of each other. Different settings can be used on each to define an asymmetrical template.

11. The fields available in the **Median** area are determined by the settings made in the **Median Type** area. The options for each median type are shown below:

<p>Median</p> <p>Shoulder Lt Median Rt Median Shoulder</p> <p>0.00 ft 0.00 ft 0.00 ft 0.00 ft</p>	Barrier Curb, Mountable Curb, or Paved
<p>Median</p> <p>Shoulder Lt Median Rt Median Shoulder</p> <p>0.00 ft 0.00 ft 0.00 ft 0.00 ft</p>	Depressed
<p>Single Lane / Curve</p> <p>Shoulder Travel Lane Travel Lane Shoulder</p> <p>0.00 ft 0.00 ft 0.00 ft 0.00 ft</p>	Single Lane / Ramp

Note: The **Lt. Median** and **Rt. Median** fields require inputs with a value greater than zero (when they are present) as does one **Travel Lane** field for **Single Lane / Ramp** typical sections.

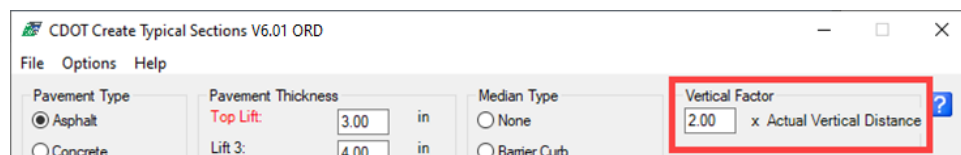
12. The **Existing Pavement** area is enabled only when **Widening** is selected for the **Pavement Type**. Both the **Lt. Side** and **Rt. Side** require inputs with a value greater than zero.



13. A **Bench** is the backfilled area behind a curb. The bench will be placed outside of a sidewalk if one is defined. The **Bench** area is only enabled when either the **Left Curb** and/or the **Right Curb** toggle is set to **Barrier** or **Mountable**. If only one side has a curb specified then only that side's Bench data field will be enabled. By default, a Bench has a 2% slope towards the road. Toggle on the **Slope Away From Road** option if it is appropriate.



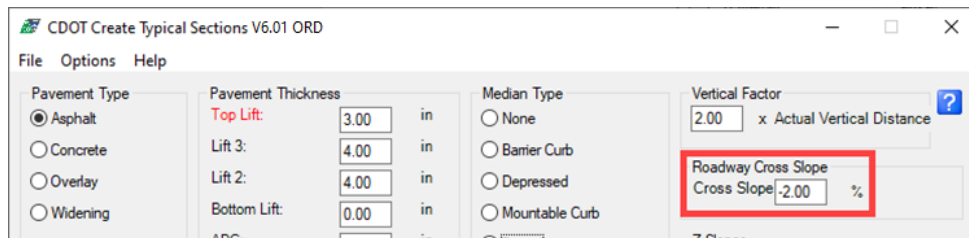
14. The **Vertical Factor** is used to increase the vertical scale. This is done to better illustrate the different slopes and layers that make up the typical section. Use the key in field to enter the desired exaggeration factor.



15. The **Roadway Cross Slope** determines the percent of slope used on travel lanes and shoulders. This is measured from the center of the typical section out to the end of the shoulder. A negative slope drops down from the center of the typical section and a positive number rises above the center point.

Roadway Cross Slope works differently when *Single Lane / Ramp* is selected as the **Median Type**. This is because a constant slope is used from pavement edge to pavement edge. When creating a *Single Lane / Ramp* typical section, a positive **Cross Slope** entry under **Roadway Cross Slope** results in a slope up from right to left and a negative **Cross Slope** entry results in slopes down from right to left.

16. Key in an appropriate value into the **Cross Slope** field.



CDOT Create Typical Sections V6.01 ORD

File Options Help

Pavement Type: ☒ Asphalt, ☐ Concrete, ☐ Overlay, ☐ Widening

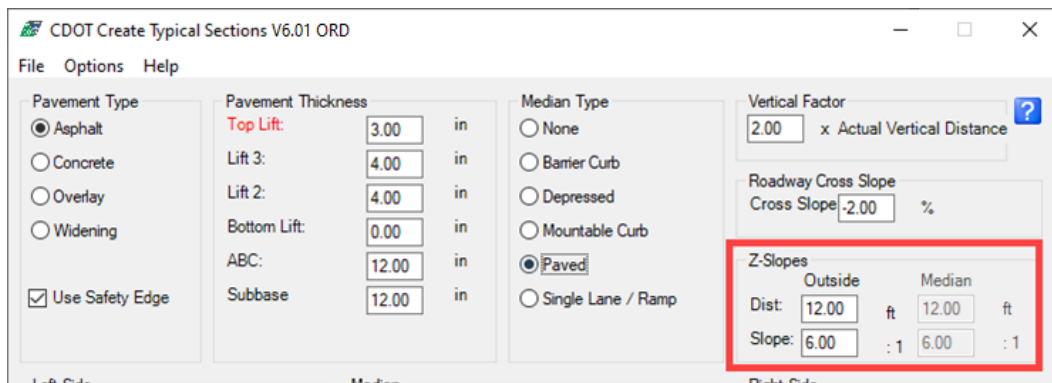
Pavement Thickness: Top Lift: 3.00 in, Lift 3: 4.00 in, Lift 2: 4.00 in, Bottom Lift: 0.00 in, ABC: 12.00 in, Subbase: 12.00 in

Median Type: ☐ None, ☐ Barrier Curb, ☐ Depressed, ☐ Mountable Curb, ☒ Paved, ☐ Single Lane / Ramp

Vertical Factor: 2.00 x Actual Vertical Distance

Roadway Cross Slope: Cross Slope -2.00 %

17. Z-Slopes are located between the edge of pavement (or the end of the Bench when curb is used) and the POSS. The length and slope of the Z-Slopes are user defined. To specify the length, use the **Dist** field. The slope of this segment is defined with a run over rise ratio. The **Slope** field is used to specify the run portion of the ratio. If either the **Dist** or **Slope** fields have '0' entries, the Z-Slope will be omitted from the drawing.



CDOT Create Typical Sections V6.01 ORD

File Options Help

Pavement Type: ☒ Asphalt, ☐ Concrete, ☐ Overlay, ☐ Widening

Pavement Thickness: Top Lift: 3.00 in, Lift 3: 4.00 in, Lift 2: 4.00 in, Bottom Lift: 0.00 in, ABC: 12.00 in, Subbase: 12.00 in

Median Type: ☐ None, ☐ Barrier Curb, ☐ Depressed, ☐ Mountable Curb, ☒ Paved, ☐ Single Lane / Ramp

Vertical Factor: 2.00 x Actual Vertical Distance

Roadway Cross Slope: Cross Slope -2.00 %

Z-Slopes: Outside, Median

Dist: 12.00 ft, 12.00 ft

Slope: 6.00 : 1, 6.00 : 1

18. After all changes have been made to the settings, **Left Click** the **Apply** button to begin placement of the typical section.



0.00 ft 6.00 ft 12.00 ft 0.00 ft 6.00 ft 0.00 ft 2.00 ft 0.00 ft

Left Curb
☒ None
☐ Barrier
☐ Mountable
Sidewalk: 0.00 ft

Existing Pavement
Left Side: 0.00 ft Right Side: 0.00 ft

Bench
Left Side: 0.00 ft Right Side: 0.00 ft
☐ Slope Away from Road ☐ Slope Away from Road

Right Curb
☒ None
☐ Barrier
☐ Mountable
Sidewalk: 0.00 ft

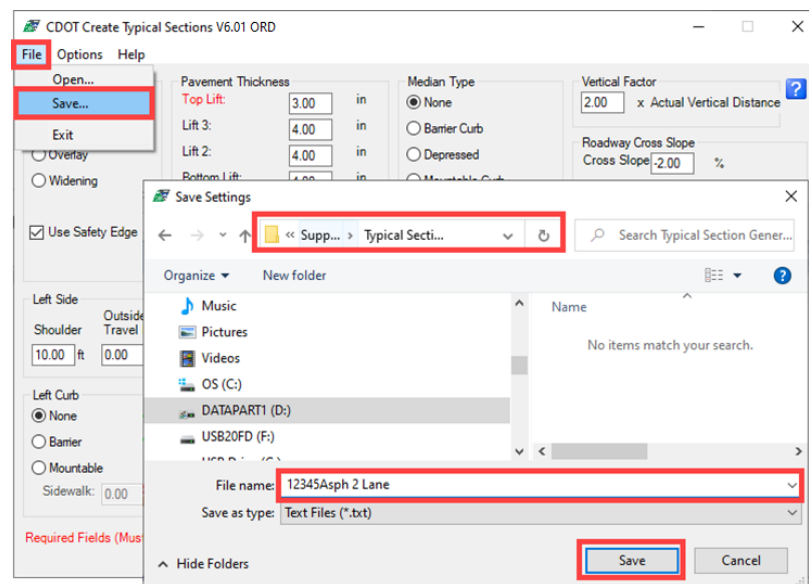
Required Fields (Must be Greater than 0.0)

Apply **Close**

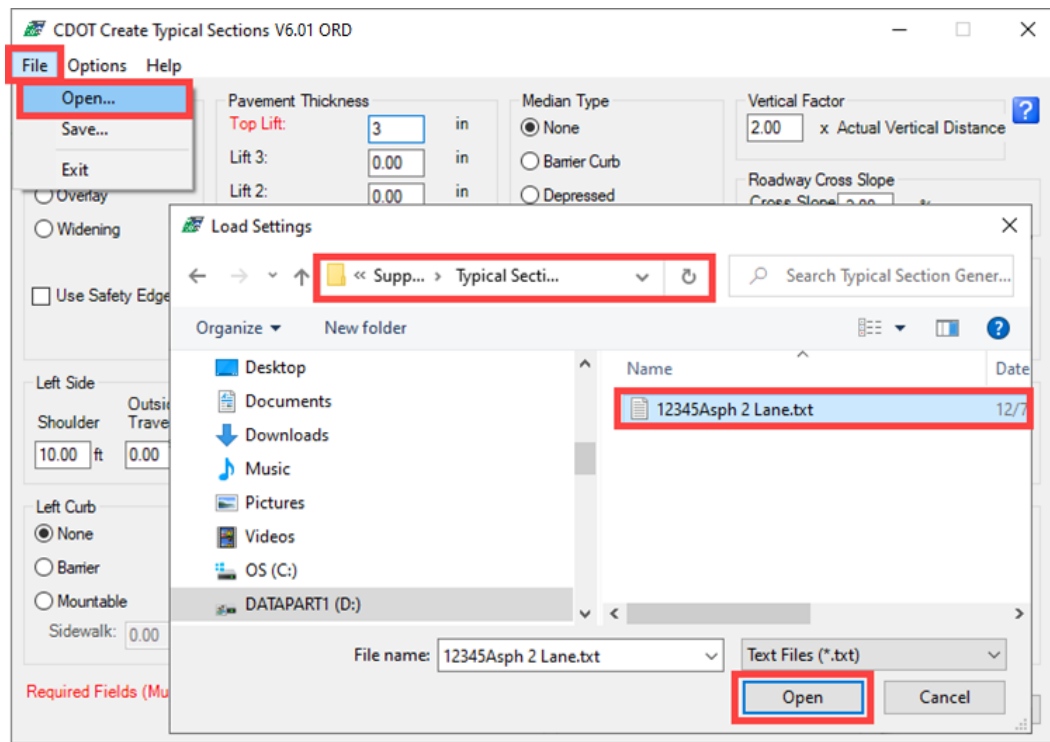
19. **Left Click** on the location to display the information and the typical section is placed. Below is an example of a completed typical section.
20. When the display of the typical section is complete, the dialog box maximizes.

The data entered to create the typical section can be saved to a text file for later use.

21. To create the text file **Select File > Save**. The **Save Settings** dialog box is displayed.
22. In the **Save Settings** dialog box, navigate to the desired directory.
23. key in the file name in the **File Name** field.
24. **Left Click Save**. The file is placed in the selected directory and the **Save Settings** dialog box is dismissed.



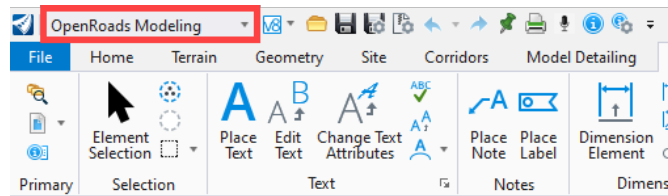
25. An existing data file can be loaded into the program for repeated use or modification. To load a file, select **File > Open**. The **Load Settings** dialog box is displayed
26. In the **Load Settings** dialog box, select the directory that contains the data file from the **Look in** drop down menu.
27. Select the file from the list then **Left Click Open**. The **Load Settings** dialog box is dismissed and the data from the file is populated into the **Create Typical Sections** dialog box. The data can be edited, deleted, or added to as desired.



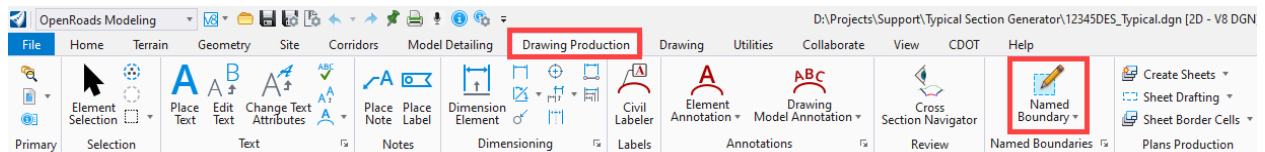
Creating a Typical Section Sheet

In this section the process for creating the typical section plan sheet is described.

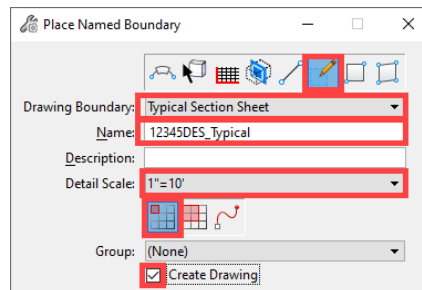
1. Select the **OpenRoads Modeling** workflow.



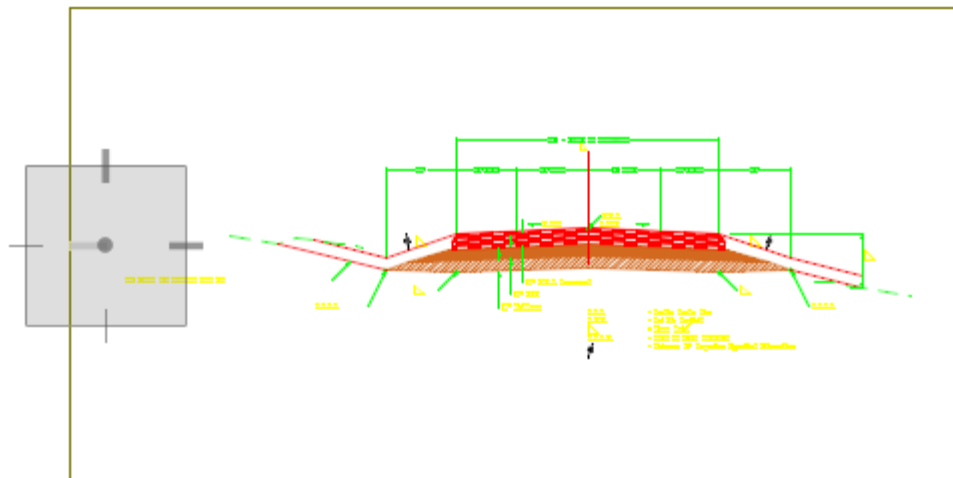
2. On the ribbon, select the **Drawing Production** tab > **Named Boundaries** group > **Place Named Boundary** command.



3. In the **Place Named Boundary** dialog box, select the **From Drawing Boundary** icon.
4. Select **Typical Section Sheet** from the **Drawing Boundary** drop down menu.
5. Key in the desired name for the drawing boundary.
6. Set the **Detail Scale** to **1" = 10'**.
7. Select the **Place a single named boundary** icon.
8. Toggle on the **Create Drawing** check box.



9. Place the named boundary centered around the typical section then **Left Click**.



-
- Create Drawing**
- Name: 12345DES_Typical
- Drawing Seed: Typical Section Sheet
- View Type: Detail
- Discipline: Civil
- Purpose: Enlarged Detail
-
- ☒ Create Drawing Model
- Seed Model: CDOT_Roadway-General Sheets.dgnlib, Typi
- Filename: (Active File)
- Scale: 1"=10'
-
- ☐ Create Sheet Model
- Seed Model: CDOT_Roadway-General Sheets.dgnlib, Typi
- Filename: (Active File)
- Sheets: (New)
- Scale: 1"=10'
- Drawing Boundary: Typical Section Sheet
- Detail Scale: 1"=10' (By Named Boundary)
- ☒ Add To Sheet Index
- ☐ Make Sheet Coincident
- ☐ Replicate Drawing in Sheet File
- ☒ Open Model
- OK** Cancel

40' - Width of Pavement

12' Shoulder

12' Lane

12' Lane

12' Shoulder

64' - Total Width

2% Slope

P.O.B.

P.O.E.

P.O.S.

P.O.F.

Not Slopes steeper than 3:1

P.O.S.S.

Legend:

- P.O.B. - Profile Grade Line
- P.O.E. - End of Pavement
- P.O.S. - Start of Pavement
- P.O.F. - Point of Finish
- P.O.S.S. - Maximum 40' Topped at Specified Alternative

Sheet Revisions

Rev.	Comments	Date
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Colorado Department of Transportation

Region

As Constructed

as Permitted

Reviewed

Checked

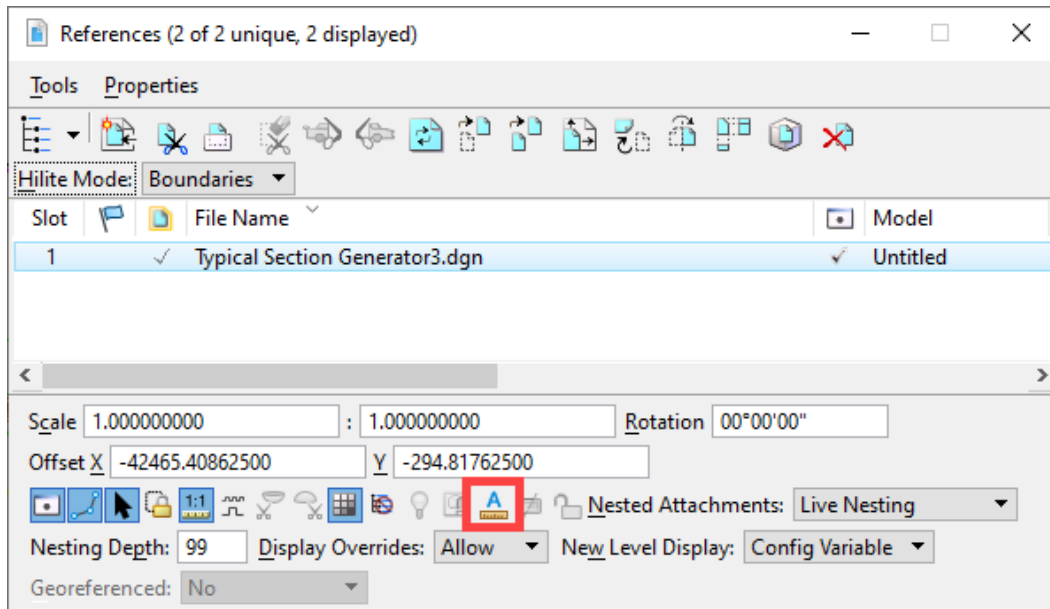
Drawn

Project No. 1000000000

Sheet Number 0000



Note: If the annotations are too large in the Sheet Model, toggle off the Use Active Annotation Scale toggle in the References dialog box.



13. When working on the typical section itself, return to the **CDOT Default** model.

