



# Practice Workbook

This workbook is designed for use in Live instructor-led training and for OnDemand self study. OnDemand videos for this course are available through [CONNECT Advisor](#) and on the [Bentley LEARN Server](#).

## Using Civil Cells in OpenRoads Designer

### CONNECT Edition(10.03.00.43)

About this Practice Workbook...

- This PDF file includes bookmarks providing an overview of the document. Click on the bookmark to quickly jump to any section in the file.
- This training uses the *Training and Examples* workspace delivered with the software. It is important that you select the *Training and Examples* workspace and the appropriate workset when working the exercises in this course.
- The terms *Left-click*, *Click*, *Select* and *Data* are used interchangeably to represent pressing the left mouse button. The terms *Right-click* and *Reset* are also used interchangeably. If your mouse buttons are assigned differently, such as for left-handed use, you will need to adjust accordingly.

### Have a Question? Need Help?

If you have questions while taking this course, submit them to the Civil Design Forum on Bentley Communities where peers and Bentley subject matter experts are available to help.

## Exercise 1: Place a T-Intersection Civil Cell and Review

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### Description

In this exercise, you will place a T-intersection civil cell in various planimetric configurations

### Skills Taught

- Review the available Civil Cells via the Pick Civil Cell dialog.
- Select a Civil Cell and Place with varying planimetric configurations
- Review a Civil Cell's 3D Model
- Review the model via the Project Explorer
- Edit Civil Cell Components
- Using Alternatives When Placing a Civil Cell

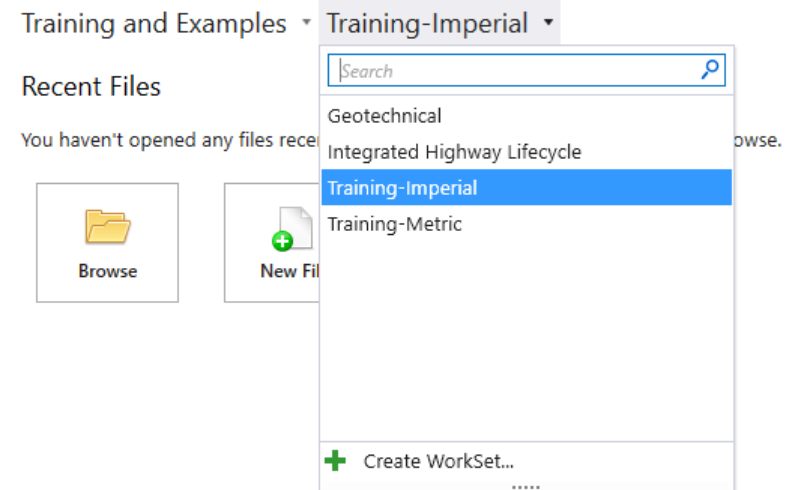
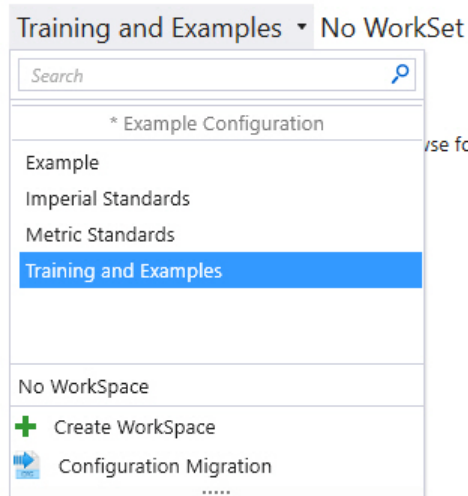
## Place the T-Intersection Civil Cell

In this exercise, we will select a civil cell and place it into our design using multiple references and configurations. There are four alignment configurations in the design file. The first three will be used in this exercise, the fourth is to be used in an optional bonus exercise.

1. Start the software.
2. Set the Workspace and Workset

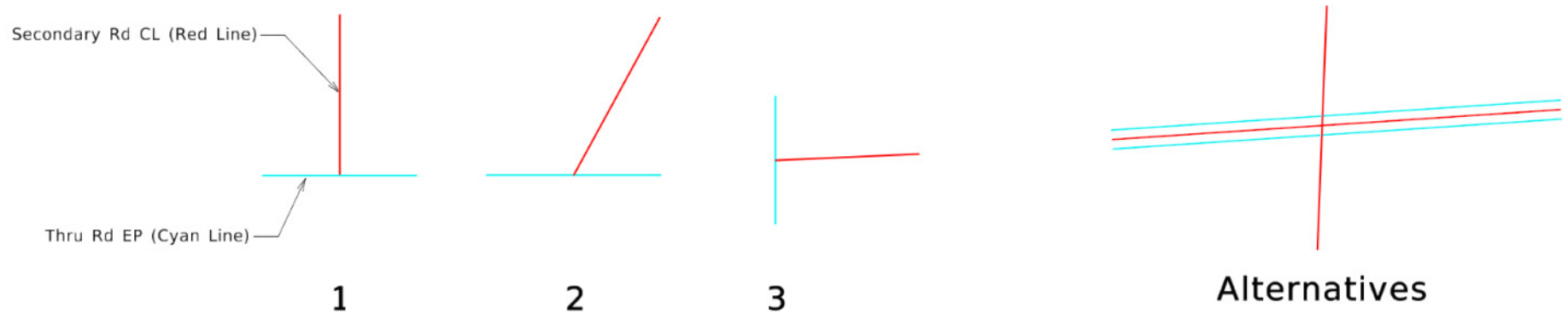
The workspace and workset define standards that are used by the software. The Workspace and Workset used for this training are installed during the software installation.

- a. Select **Training and Examples** from the *Workspace* menu.
- b. Select **Training-Imperial** [*Training-Metric*] from the *Workset* menu.

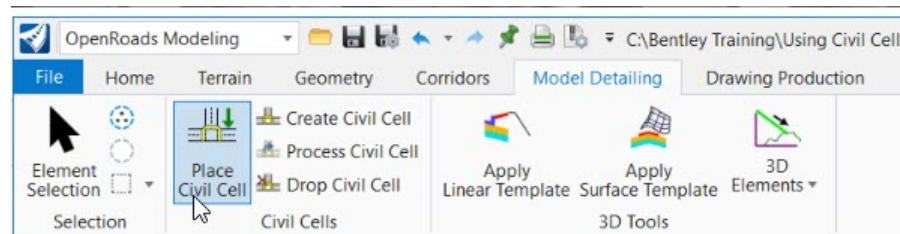


3. Select **Browse** to open the first file.
4. Browse to the folder where you unzipped the dataset files and select the file *Beginning Civil Cells.dgn* [*Metric - Beginning Civil Cells.dgn*].

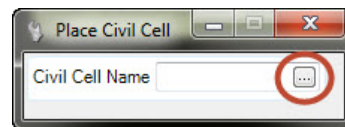
We will use the alignments in the file to place a civil cell within the varying design configurations.



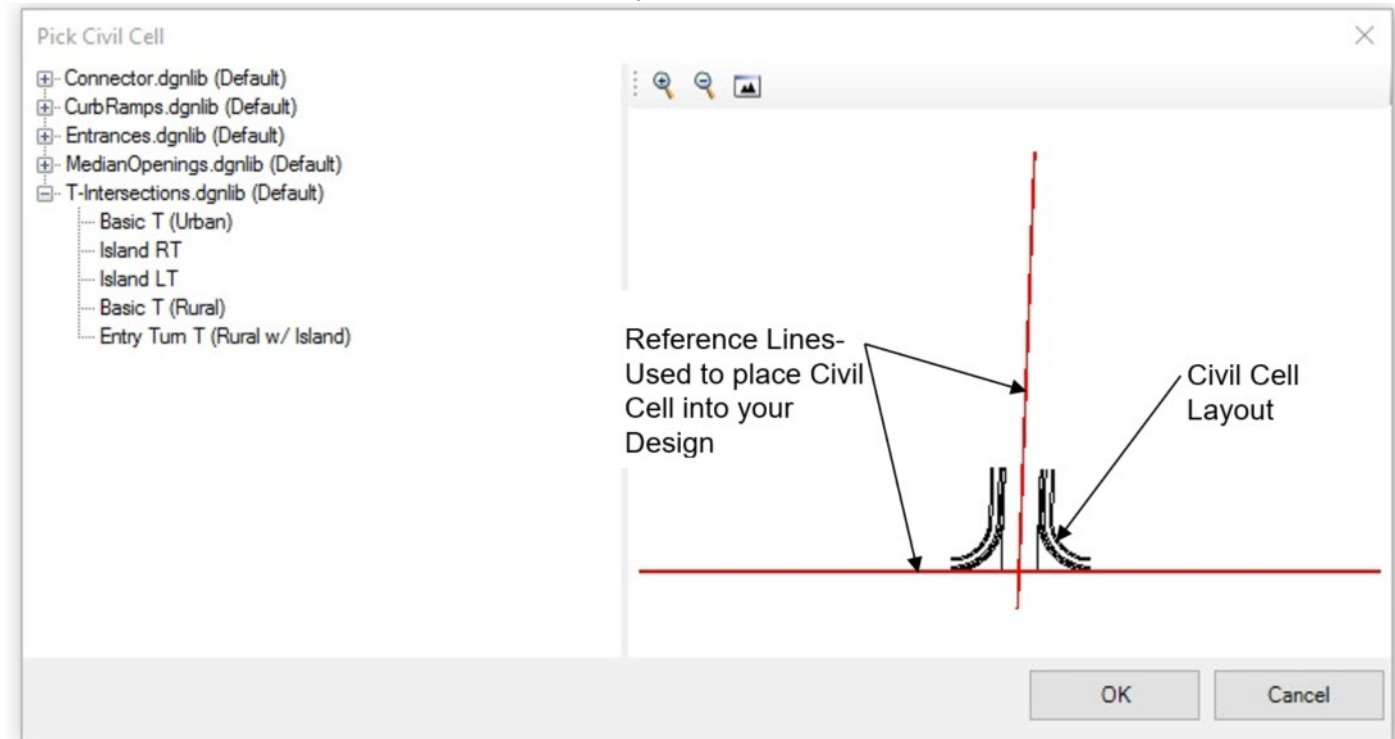
5. In the *OpenRoads Modeling* workspace, click *Model Detailing > Civil Cells > Place Civil Cells*.



6. In the Settings dialog, click the browse button to open the civil cell library.



c. Expand the *T-Intersections.dgnlib* to see the civil cells stored in that library.



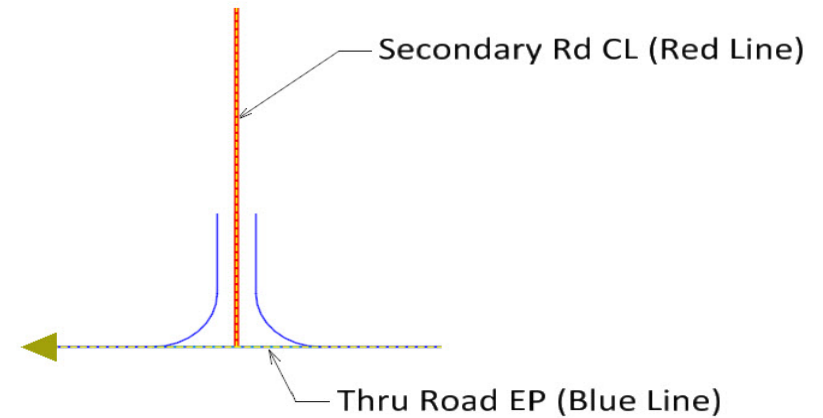
d. Select the **Basic "T" (Urban)** civil cell.

- The dialog displays the planimetric layout of the selected civil cell with black lines
- The dialog also shows the reference lines on which the civil cell is based. These are the red lines and represent the baselines that must be present within the design file to place the civil cell.

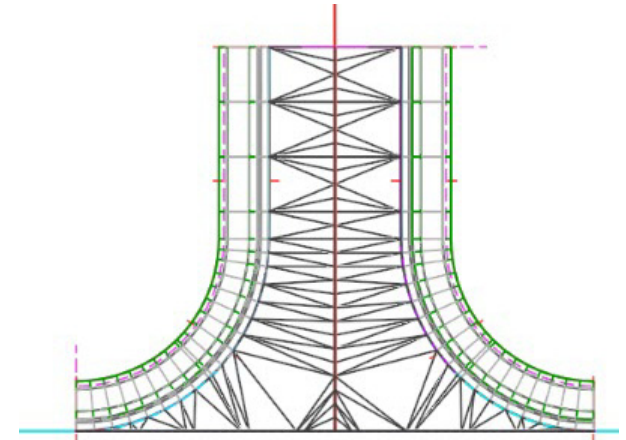
**NOTE:** The number of reference elements can vary for each civil cell.

e. Click **OK**.

7. For configuration 1, follow the heads up prompts:
  - a. At the *Locate Reference Element: Thru Rd EP* prompt, select the **Thru Road EP** element.
  - b. At the *Locate Reference Element: Secondary Rd CL* prompt, select the **Secondary Road CL** element.
  - c. At the *Select Elements to View Alternatives - Reset to Skip* prompt, click the **Reset** mouse button.
  - d. At the *Select Corridors to be Clipped - Reset to Skip* prompt, click the **Reset** mouse button.
  - e. At the *Accept the Civil Cell Placement* prompt, **left-click** to accept.



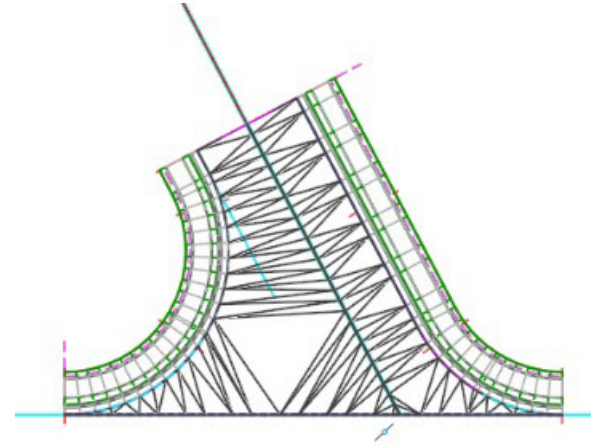
The Civil cell is placed.



8. We can edit the civil cell placement by editing the reference elements from which it was placed.



- a. Using the **Element Selection** tool, select the *Secondary RD CL* (the red line).
- b. Move the end point of the red line by using the element handlers, (the circles and arrows on the selected element). Click on the circle at the end point of the *Secondary RD CL* element and modify the angle of the intersection.
- c. The civil cell updates.



9. Let's reinforce our skills: place the *T-Intersection* civil cell for Configurations 2 and 3. The steps are identical to Configuration 1.

## View the Intersection models in 3D

### 1. View the Intersection models in 3D

#### a. Using the view buttons, open *View 2*

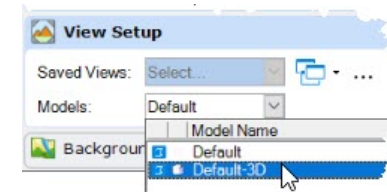


*View 2* is set to the 3D Model.



**NOTE:** The model's display properties can be changed under the *View. Attributes* menu within View 2. Any View can be set to view any Model via the *View Attributes > View Setup >> Models* list

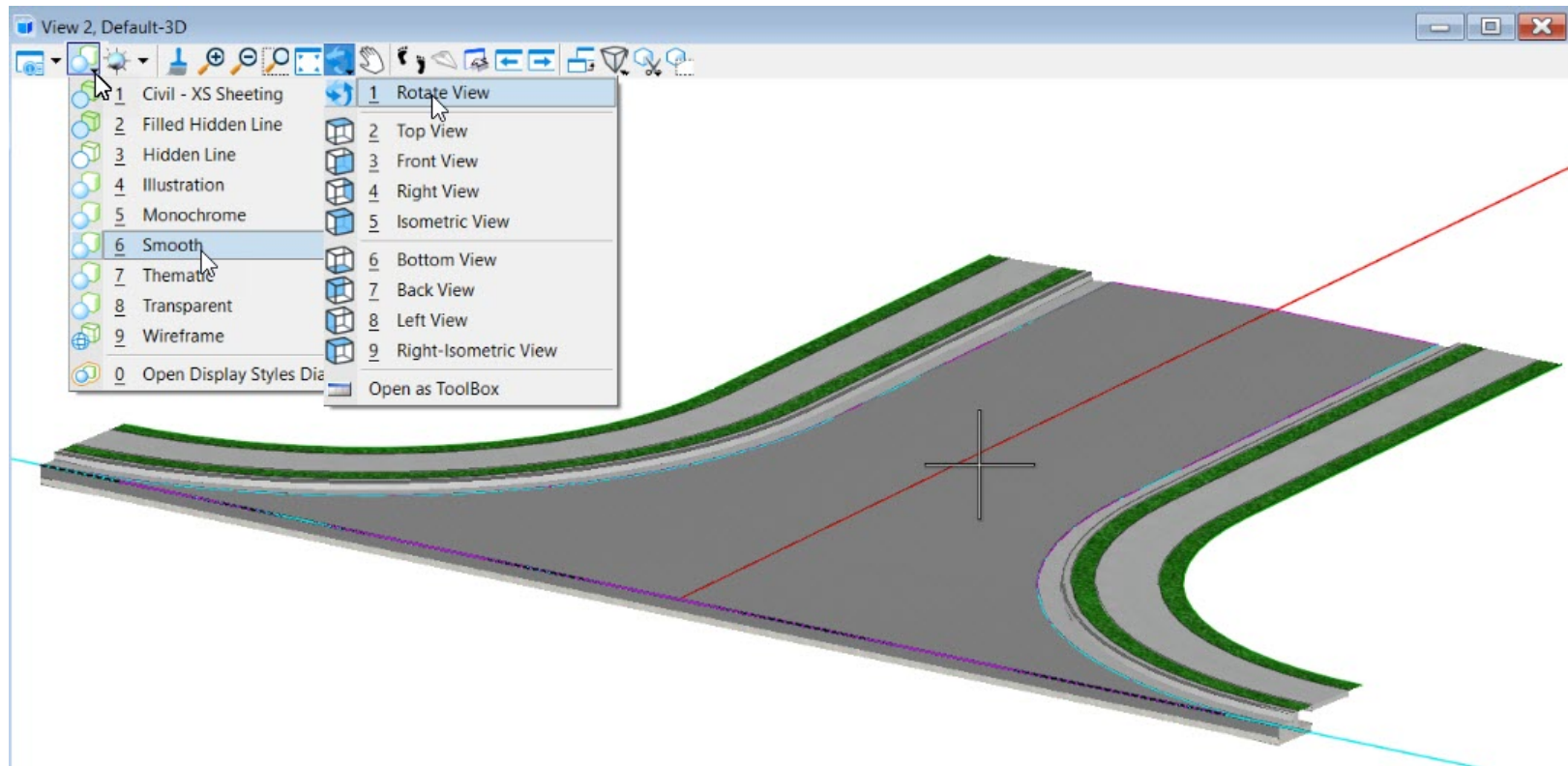
#### b. Make *View 2* active and **zoom in** to review one of the intersection models.







**NOTE:** You can rotate the view by using the *View Rotation* drop down menu within View 2.



You may also experiment with the *Display Settings*.

## View the Civil Cells using the Explorer



1. Click *Home* > *Primary* > **Explorer**.

The Explorer provides a tabular interface into the data structure to review and manage data within the drawing. It provides mechanisms to build link sets to external content, manage CAD standards, and access drawing files and models. OpenRoads uses these mechanisms as a direct interface into the survey, civil design data, and standards.

We will use the Explorer to review the civil cells we have placed into our design.

The Explorer may be docked or floating.

- a. Click the *OpenRoads Model* group to see the active file's civil features.
- b. Expand the *Civil Cells* heading.

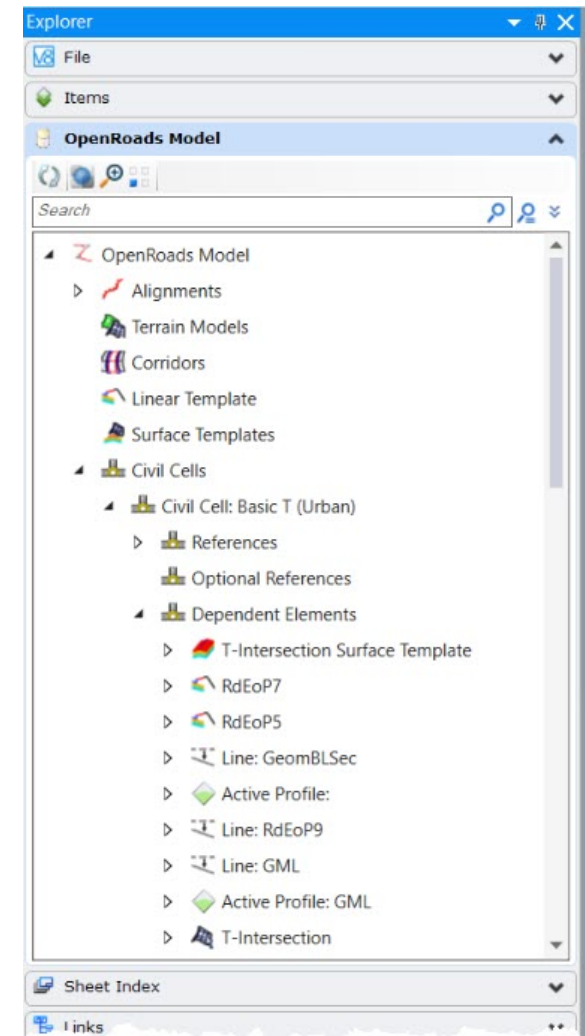
The civil cells in the active dgn are listed.

- c. Continue through the hierarchy and expand **Civil Cell: Basic T (Urban)**
- d. Expand the *Dependent Elements* heading.

Civil cells store the “design intent” as well the graphical elements.

Each of the design features that make up the civil cell are listed. Note that the features are preceded with an icon that indicates the tool they were created with. This is a visual indicator that OpenRoads Remembers. The features retain the rules and relationships they were created with.

Editing the components of the Civil Cell is identical to editing elements not part of a civil cell. Updates conform to the tools used to create them (choosing the correct tool when creating is how you communicate your Design Intent).



## Use Alternatives When Placing a Civil Cell

You may have noticed the prompts for selecting **Alternatives**. In this exercise, we'll see why we need alternatives.

Remember that OpenRoads' automatic geometry updates is based on relationships. One subtle, but important property, is offset direction, left or right. This is standard Civil Engineering convention. Left and Right implies a direction to an element, and OpenRoads remembers each element's direction.

"Viewing Alternatives" in essence allows you to switch the direction of a new reference element to match the direction of the original reference in the Civil Cell.

1. Click *Model Detailing* > *Civil Cells* > **Place Civil Cells**.

*Basic T (Urban)* should still be active.

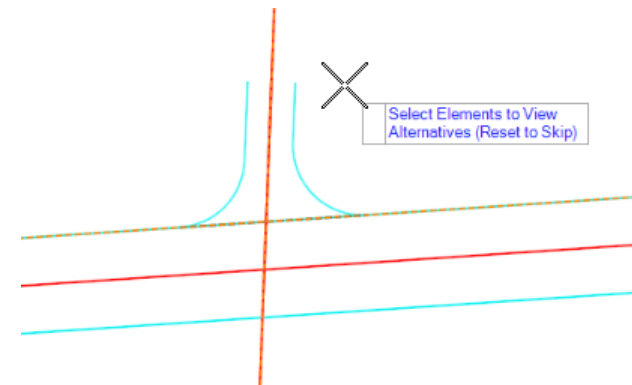
2. Following the prompts, place the T-Intersection civil cell on the north side of the **Alternatives** configuration.
  - a. At the *Locate Reference Element: Thru Rd EP* prompt, select the **Thru Road North side Edge of Pavement** element.
  - b. At the *Locate Reference Element: Secondary Rd CL* prompt, select the **Secondary Road CL** element.

The Preview looks as we expect it should. The directions of the source references and the "destination" references match. No need to View Alternatives.

- c. At the *Select Elements to View Alternatives - Reset to Skip* prompt, click the **Reset** mouse button.
- d. At the *Select Corridors to be Clipped - Reset to Skip* prompt, click the **Reset** mouse button.
- e. At the *Accept the Civil Cell Placement* prompt, **left-click** to accept.

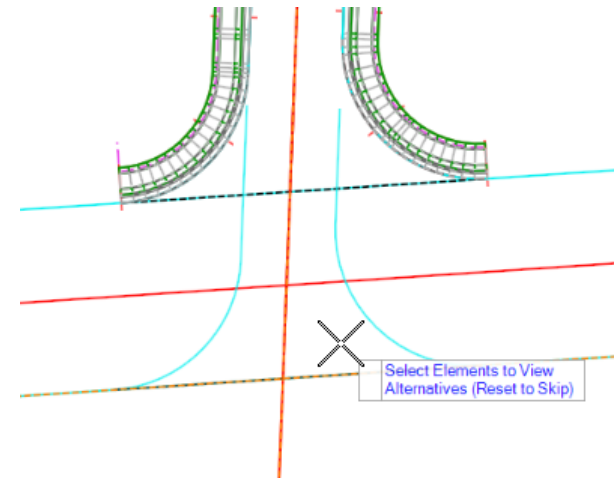
3. Following the prompts, place the T-Intersection civil cell on the south side of the **Alternatives** configuration.

- a. At the *Locate Reference Element: Thru Rd EP* prompt, select the **Thru Road South side Edge of Pavement** element.



- b. At the *Locate Reference Element: Secondary Rd CL* prompt, select the **Secondary Road CL** element.

The Preview is NOT what we want, even though it follows the exact same rules and the exact same way as before. We need to make it go to the south. We need to flip a direction.



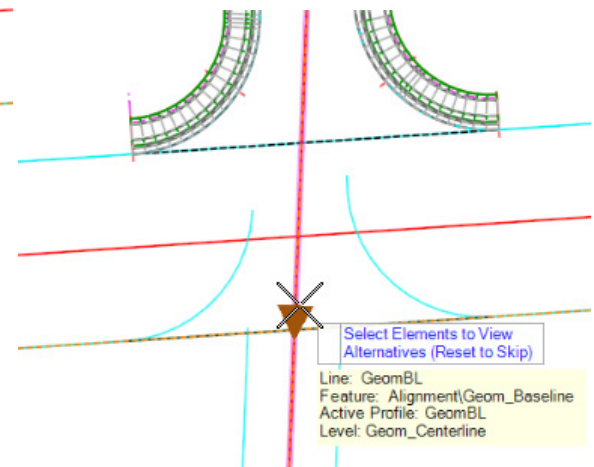
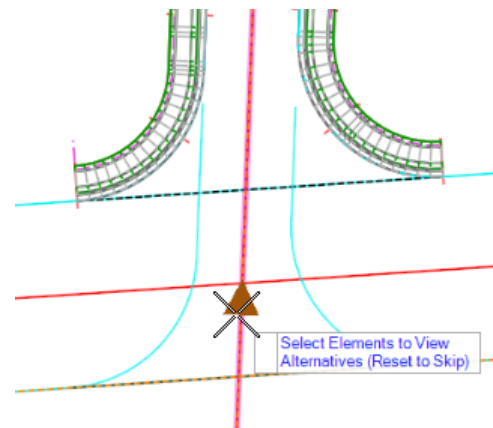
- c. At the *Select Elements to View Alternatives - Reset to Skip* prompt, hover over the secondary road centerline.

The arrow indicates the direction of the element. We can “reverse” the direction of how the relationship is defined in the new Civil Cell by selecting the element.

- d. Click on the secondary centerline.

The arrow changes direction and the preview of the civil cell updates accordingly.

It's still not what we want.



- e. Hover over the south Edge of Pavement.

Note that the arrow points to the right. The centerline and the edge of pavement offsets run from left to right.

The curb returns are still going to the “left” of the edge of pavement (as they did on the north side (and as they did in the original Civil Cell definition)).

We will need to have them on the other side, so we need to flip the direction of the edge of pavement.

- f. **Click** on the south edge of pavement. This should cause the curb returns to flip to the correct side.



- g. The prompt is still *Select Elements to View Alternatives - Reset to Skip*, but because the T looks good, click **Reset** to move forward.
- h. At the *Select Corridors to be Clipped - Reset to Skip* prompt, click the **Reset** mouse button.
- i. At the *Accept the Civil Cell Placement* prompt, **left-click** to accept.

## Exercise 2: Adjust the Placed Civil Cells

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### Description

In this exercise, we will edit placed Civil Cells to show the flexibility of OpenRoads and its relationship-honoring architecture.

How often is your repetitive engineering always identical? You often need to adjust one or more aspects of the “standard” engineering template (Civil Cell). The purpose of Civil Cells is to save time. Making small or large edits and adjustments is fast and easy.

For example, your Tee Civil Cell may be built with 35' [10m] radii for the curb returns. You may need 25' [8m] curb returns. Maybe your Civil Cell has a 6' sidewalk and you need 4' or no sidewalk. Maybe your Civil Cell has barrier gutters and you need mountable curbs. All these changes are easy to make.

If you have worked with OpenRoads Geometry, you know that the elements are based on engineering rules and values stored in the data structure. The values are visible and editable in the Heads Up Display and in the Properties dialog. Civil Cells are a collection of OpenRoads Features and their inherent rules and values. As such, the components of a placed Civil Cell are editable, just as if they are “normal” components.

We will work through a series of edits to demonstrate the flexibility of Civil Cells and the ability to edit their components.

Note that should you still find these wide open capabilities of Civil Cells confining, you can use the Drop Civil Cell tool to drop the placed Civil Cell into the components that make it up.

### Skills Taught

- Edit an Intersection's Horizontal Geometry
- Remove everything behind a curb
- Swap out Side-slope Tie-ins
- Show that full “corridor-level” editing/modification tools are available, like Parametrically constraining a component width

## Edit Horizontal Geometry

Here, we'll assume that our new intersections have size requirements that differ from that delivered by the source Civil Cell.

It's important to note that there is a difference between "Changing the Rules" and "Changing the Values of the Rules."

For example, we will widen the right lane of the first Intersection from one lane to two. We will be changing the *Value* of the Offset from 12' [3.6m] to 24' [7.2m]. This is easy.

We will NOT be changing the Edge of Pavement from an Offset of the Centerline to a different type of geometry (independent or based on a different offset reference element). This is not particularly difficult, and there are tools to do this, but it's outside the focus of this class. Classes on these concepts include *Beyond Centerline Geometry*.



### 1. Widen the Right Lane

- a. Click on the *right Edge of Pavement* of the first intersection.

*Tip:* It may be easier to select it by hovering over its "gap". A gap is not visible until you hover over it.

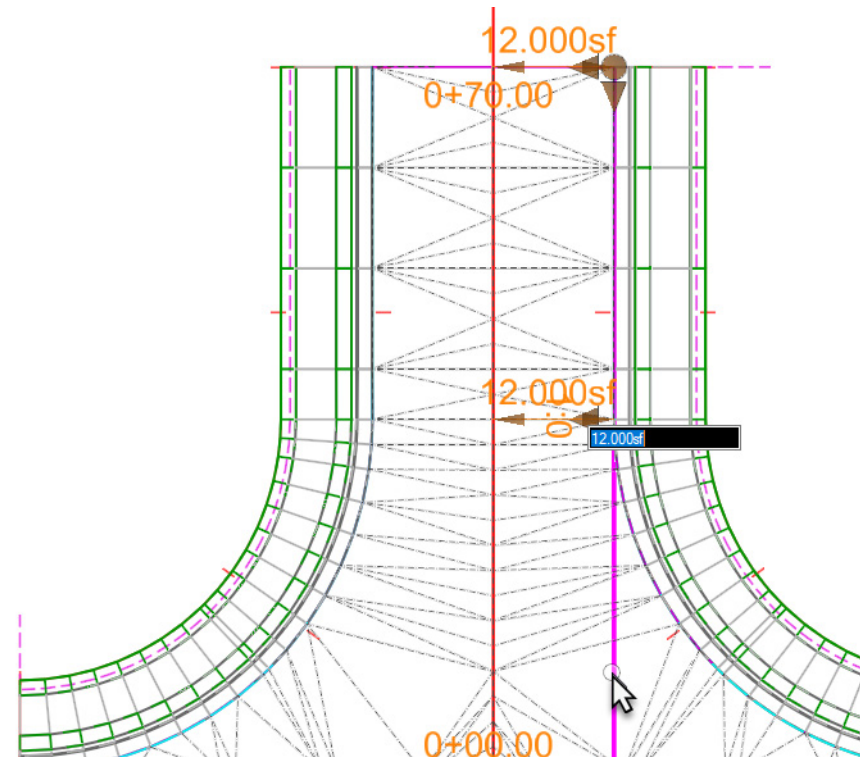
The Edges of Pavement are full-length offsets from the centerline. The curb returns create "gaps" where the edges are trimmed back, but trimmed features are still able to be selected in its "gaps".

One "challenge" in editing Civil Cells is that sometimes it is hard to select what you want to select, especially with full 3D Civil Cells. You may have to right-click a couple times to select your intended element.

You may have multiple overlapping 2D features overlapped with multiple overlapping 3D Features in the reference 3D Model.

*Tip:* Depending on your needs, you can turn off the Locate of the 3D Model Reference or turn off its Display entirely. You can also turn off levels with graphics you find "unnecessary" right now, like triangles. Construction Class element display can be turned on and off via View Attributes.

- b. Once the edge is selected, click on the *midpoint Offset text manipulator*.





c. Type **24 [7.2]** and hit **Return**.

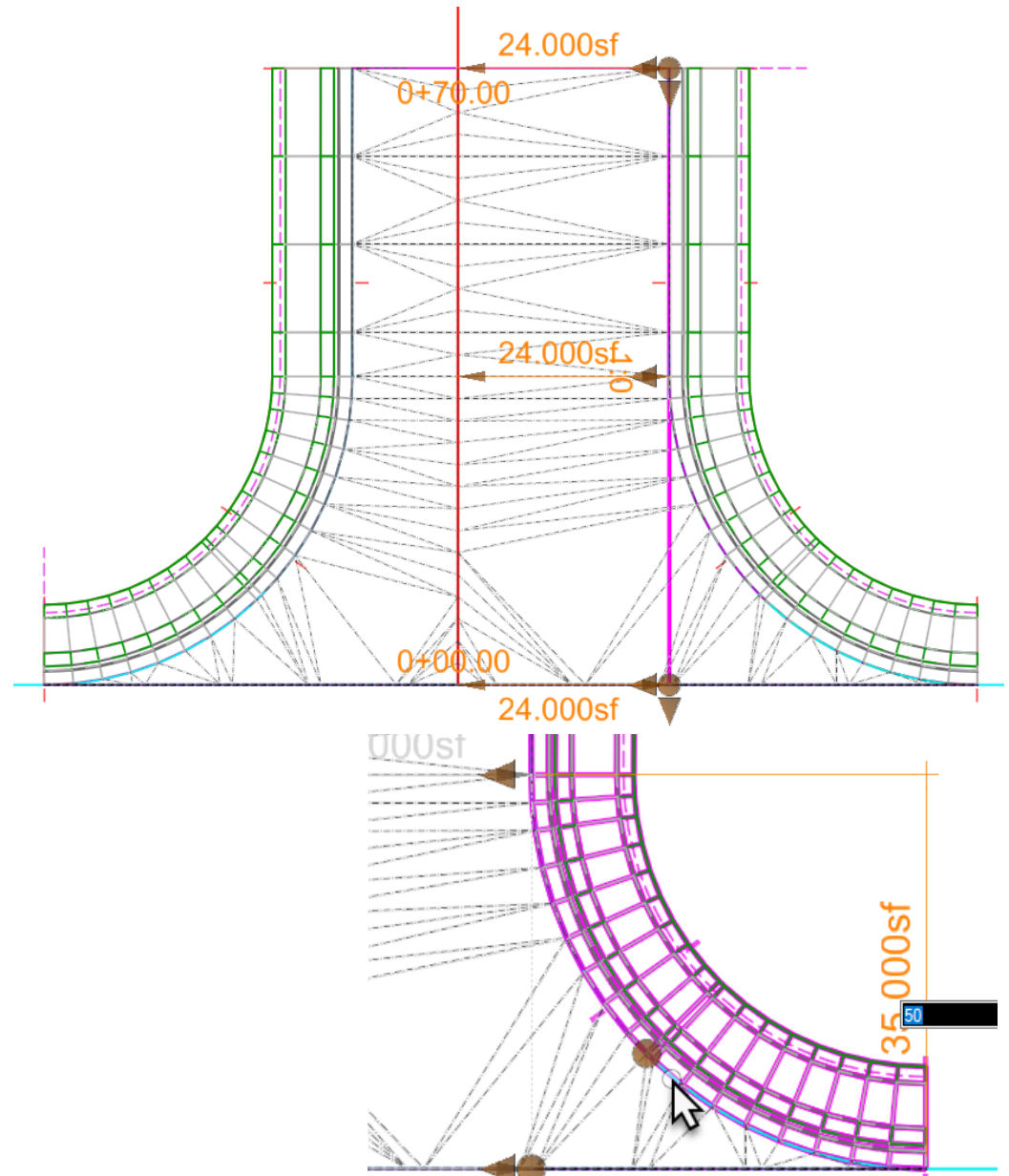
The pavement is widened and all dependent geometry and modeling is updated.

2. Change the Curb Return Radius

a. **Click** on the *right Edge of Pavement curb return*.

This might require multiple right-clicks.

b. **Click** on the *Radius text manipulator*.








## Drop Everything Outside a Curb

To demonstrate the integration between the data, the graphics, and the interface, let's edit the Civil Cell to drop everything behind the curb along one side of the intersection.

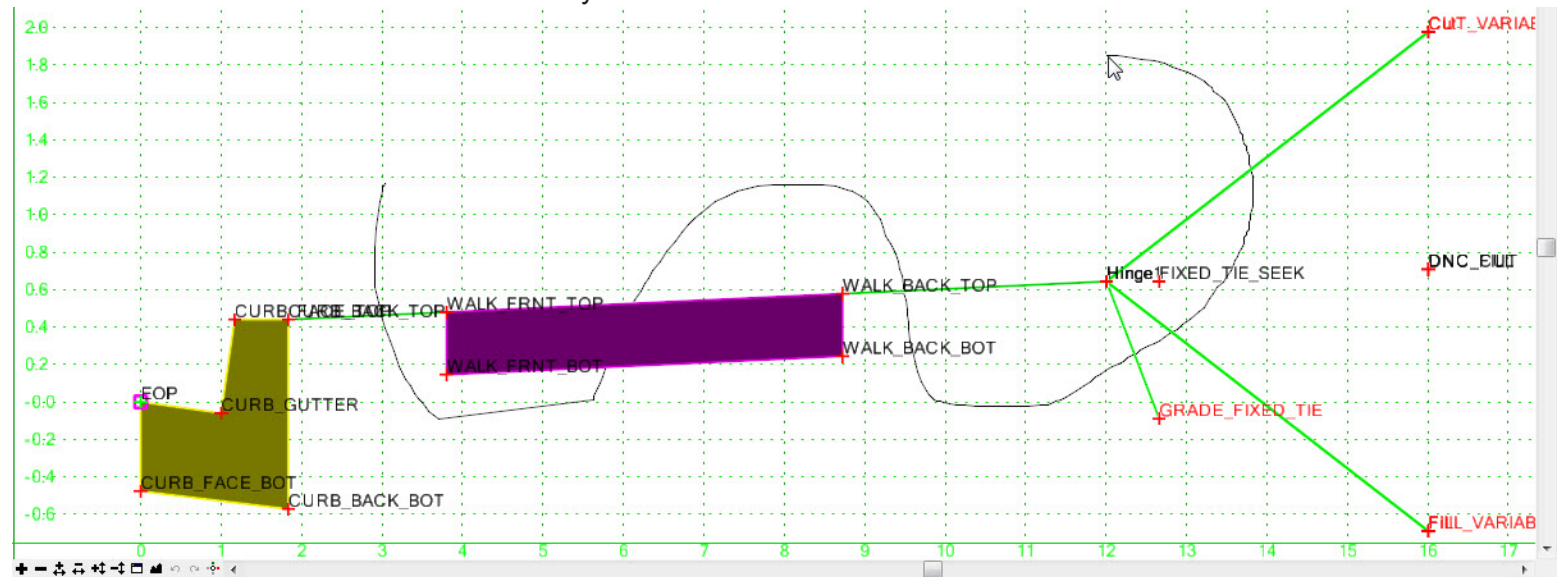


1. Click *Home > Primary > Explorer*.
2. In the OpenRoads Model group, pick a Civil Cell (such as *Civil Cell: Basic T (Urban)*). Expand a Linear Template, indicated by the Linear Template Icon , titled **RdEOP7**. **Template Name is RdEOP\_L or \_R**
  - a. Expand the *Templates* heading and **Right-click** on the *Template Drop* entry.

**NOTE:** The station range may vary based on the modifications that we made to the reference elements earlier in the exercise.

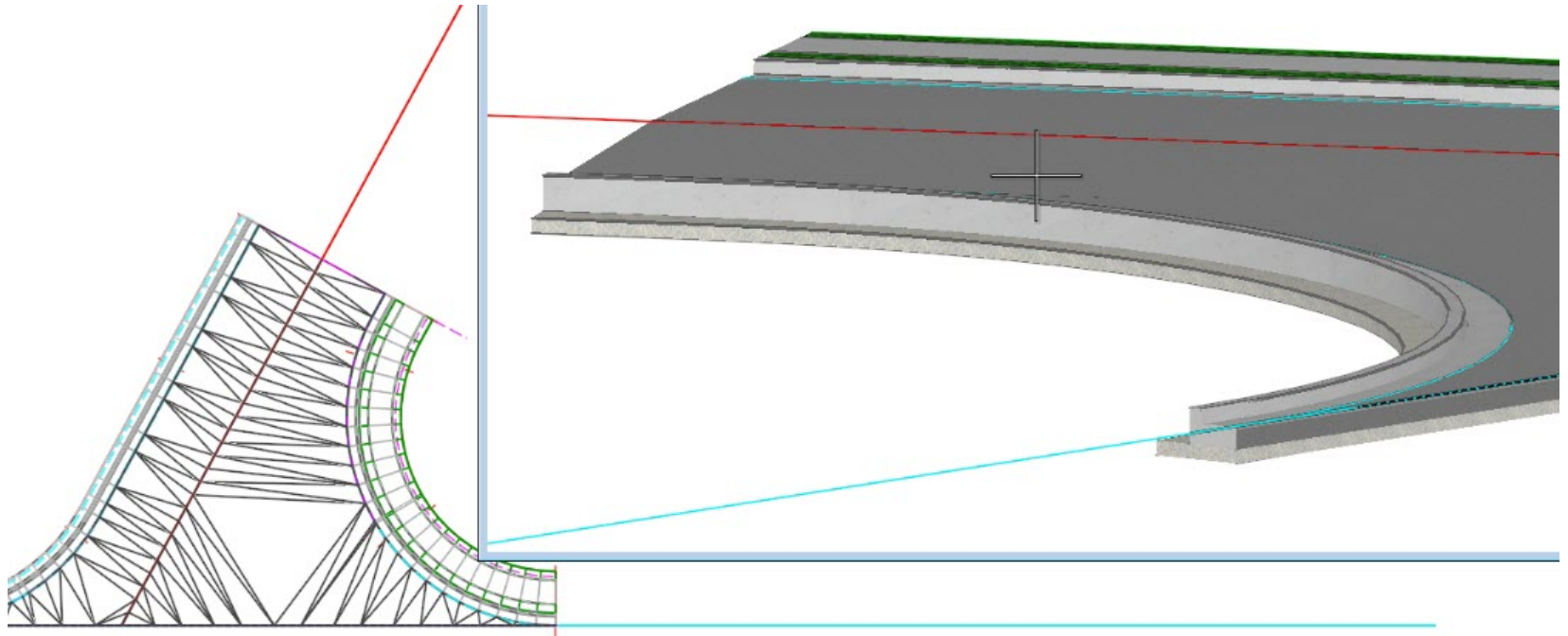
- b. Select **Edit Template Drop**
- c. Delete the end conditions and the sidewalk components from the template.

**NOTE:** To delete the end conditions and components, Right-click in the template window, select **Delete Components** from the drop down menu, and draw a line across each of the elements you wish to delete.



- d. Click **OK**.

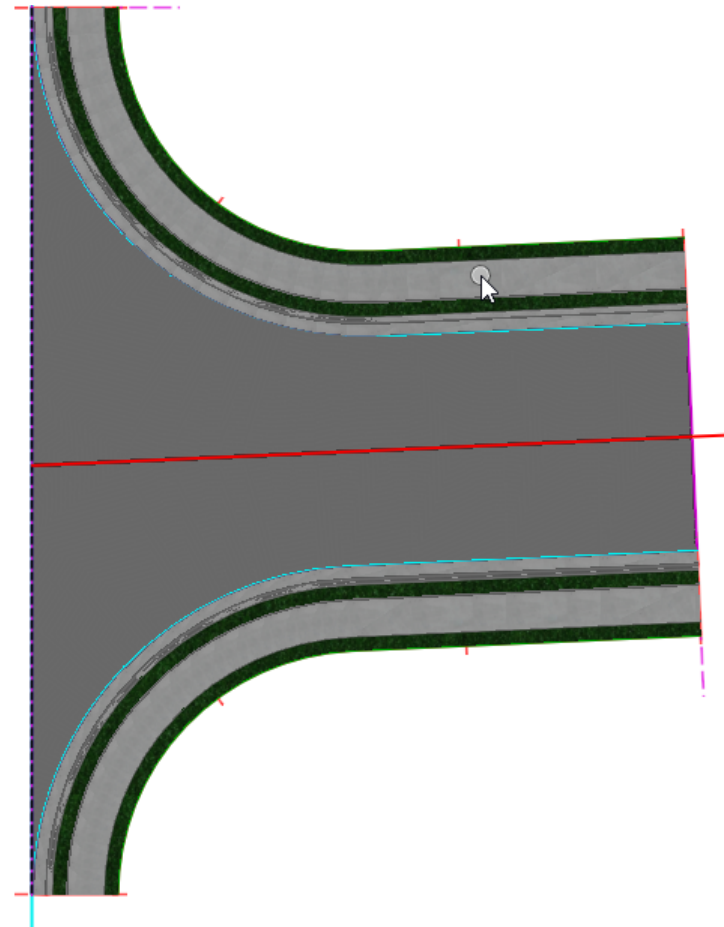
e. Review the T-Intersection model. Notice the sidewalk and side slopes have been removed along one side.



## Swap out the Tie-in Solution

Let's assume that a placed Civil Cell is perfect except that one side should tie into the existing ground, but without a sidewalk adjacent to the curb.

The simplest way to do that is to simple switch to a different template in the linear template that makes up the area outside the edge of pavement.

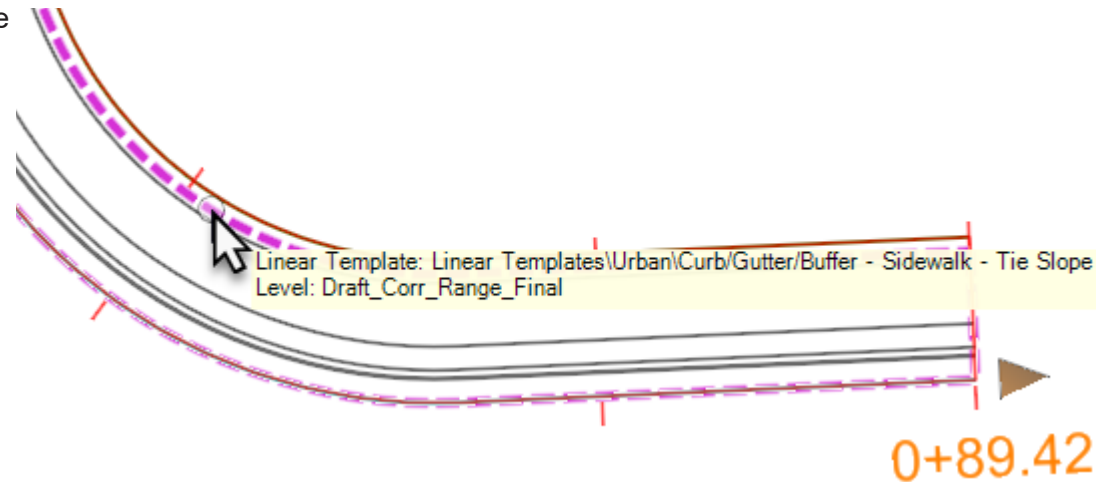


This narrative will use the Configuration 3 Tee, but you can edit any one you want.

1. Click a **Linear Template** in a 2D View. It is a 2D shape with handles.

If you do not see it, it is a Construction Class Element: make sure the View Attributes has **Constructions** ON.

Tip: Zoom in tight to get clear access to it.

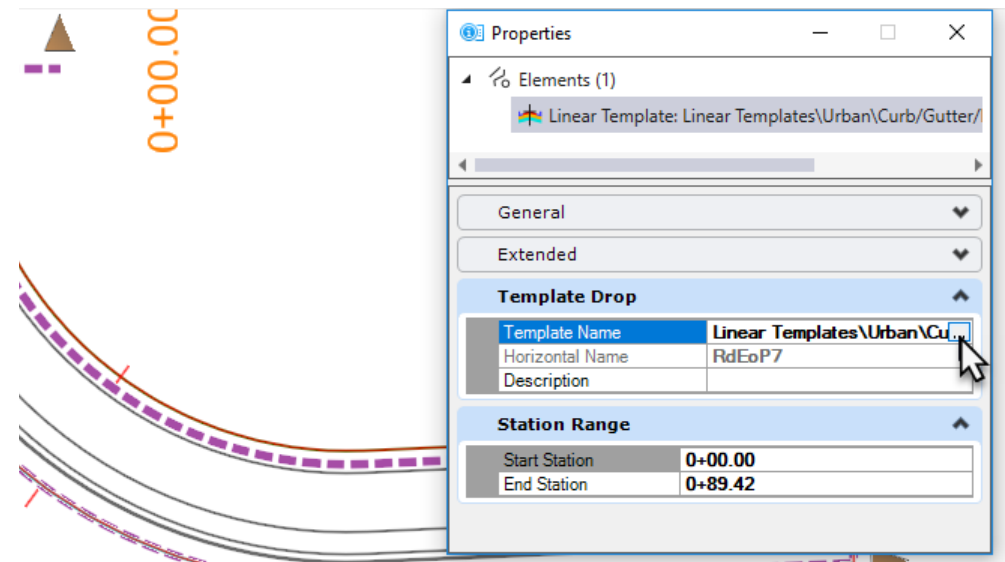


2. In the **Properties** dialog, expand the **Template Drop** group.

The current template is Linear Templates > Urban > Curb/Gutter/Buffer - Sidewalk - Tie Slope.

3. Click the **Browse** button in the right side of the **Template Name** label.

This opens the **Pick Template** dialog.

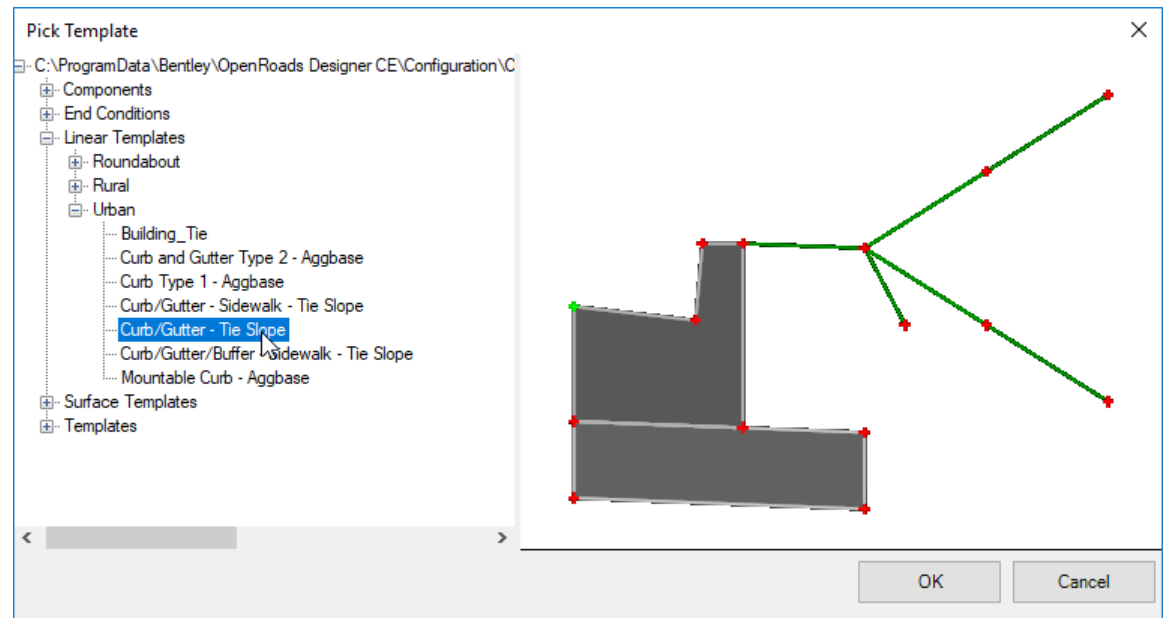


4. Double-click the **Curb/Gutter - Tie Slope** template.

This is similar, but without a sidewalk and the buffer between it and the curb.

This is the Template we'll use, but feel free to review the other templates. The **Curb/Gutter - Sidewalk - Tie Slope**, for example, eliminates only one component, the grass buffer between the curb and the sidewalk.

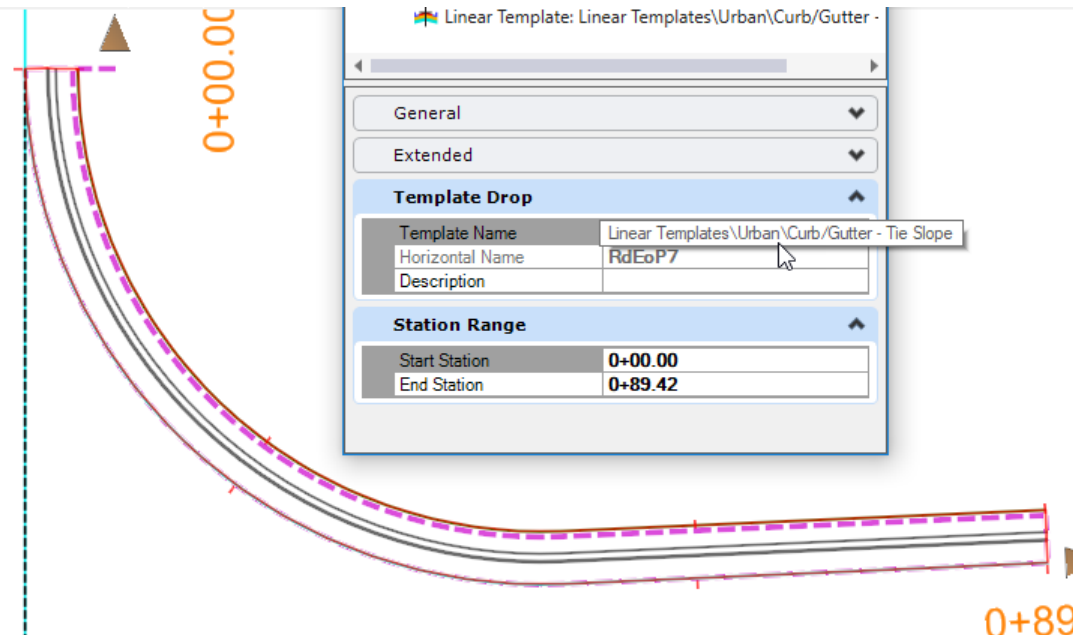
5. Click **OK**.



The linear template processes with the new Template:

Note that there is no sidewalk.

Note also that, because this file has no active Terrain, the side slopes that tie into the ground are not drawn. This is true for all the Civil Cells in this drawing.





## Use Parametric Labels to Change Geometry

Parametric Labels (also known as Parametric Constraints) are Named Relationships between points in a template. Parametric Labels are useful for a variety of reasons, including simplifying managing complex templates, “permanent” geometry changes (within the Edit Template dialog) and overriding Template Geometry for a placed corridor, surface template or linear template.

Parametric Labels can set pavement widths, pavement slopes, pavement thickness, sidewalk width, barrier gutter face height, side slope, etc. The possibilities are endless.

Parametric Labels are also able to provide transitioning geometry. For linear templates the variables have a start and stop value. A Pavement Width Transition looks like this:

Station	Width
0+00	12
10+00	12
12+00	16
99+99	16

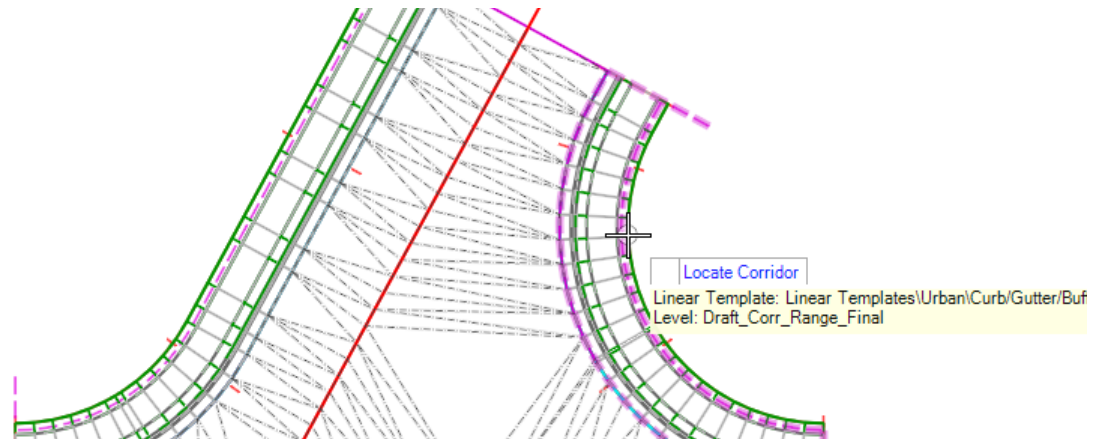
We will widen a sidewalk and thicken a pavement layer.

### 1. Provide a Sidewalk Transition



- a. Click **Corridors > Edit > Edits > Create Parametric Constraint.**
- b. At the **Locate Corridor** prompt, click a **linear template.**

These are outside the curbs. We've selected the Configuration 2 intersection, but you can select whichever you want.



c. In the Settings dialog, open the **Constraint Label** list.

These are the already-defined Constraints in the Linear Template. In a well-managed environment, the names are clear and intuitive.

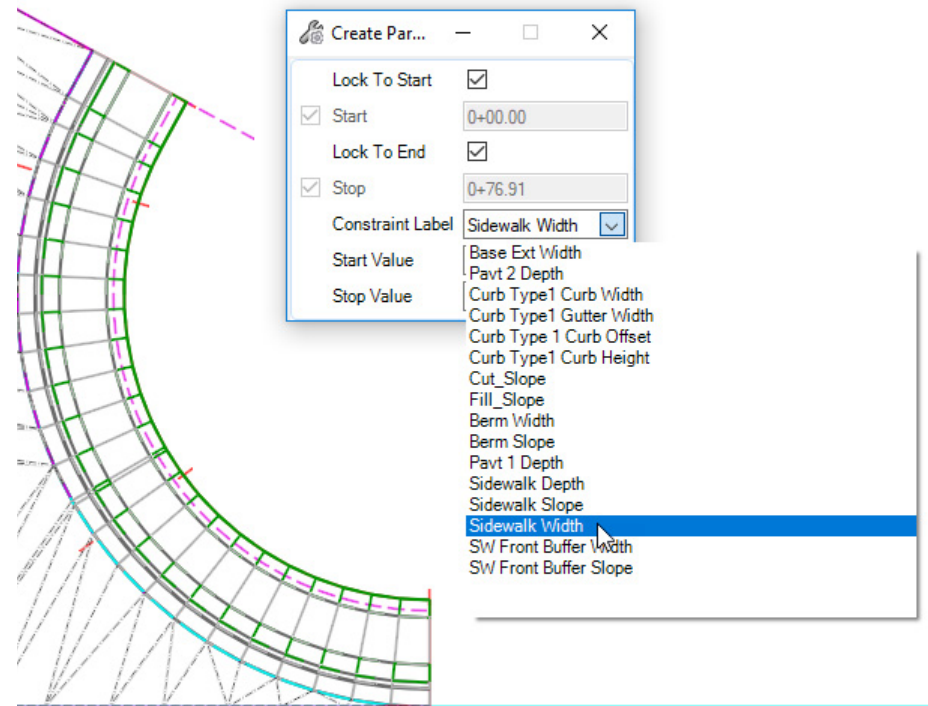
d. Select **Sidewalk Width**.

e. Set the Lock to Start and Lock to End toggles.

If you needed to Start or End the transitions somewhere else, you would leave the Locks unlocked and use data points, snaps, or Stations to designate the locations.

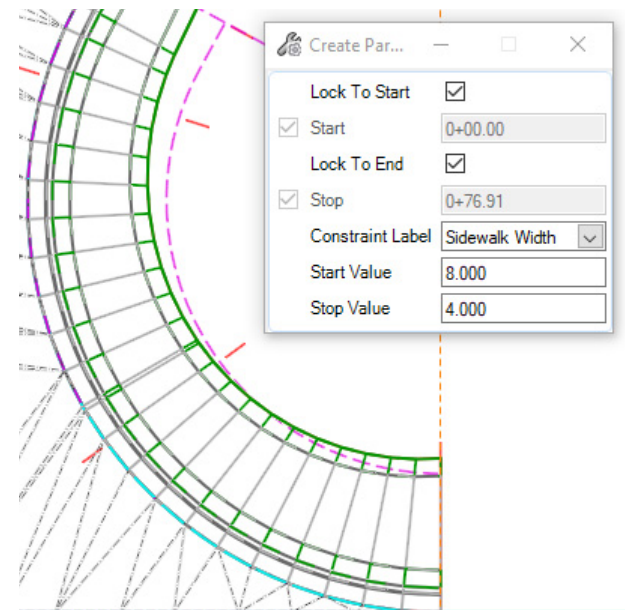
f. For **Start Value**, type **8 [2.5m]**.

g. For **Stop Value**, type **4 [1m]**.



2. Accept all the prompts, with data points.

The sidewalk is widened.





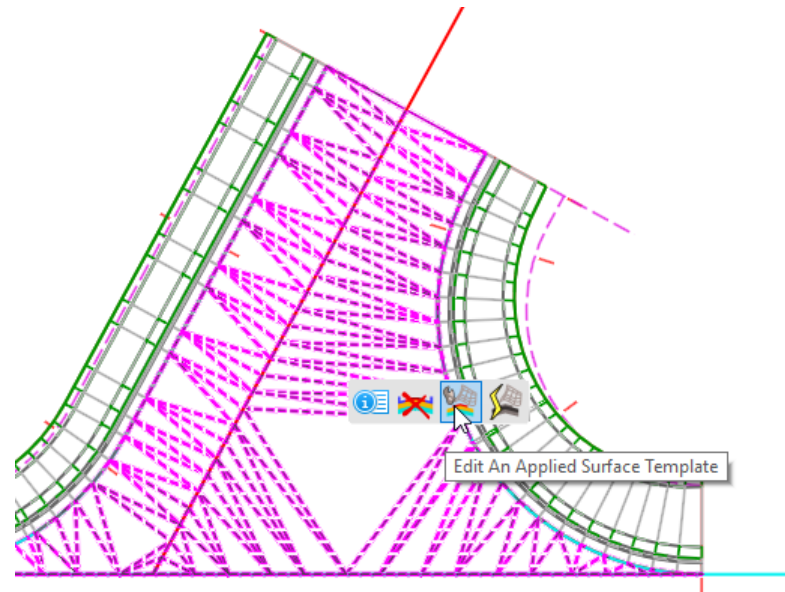
## 1. Change a Pavement Depth

- a. *Click and hover* over the civil cell **terrain model**.

**Note:** You may have to right-click so that the surface template is selected.

- b. From the Context Tool Bar, select **Edit An Applied Surface Template**.

You can select the terrain model in the 3D view if you have disabled the view of the 3D in View 1



2. In the *Editing Roadway Designer Template Drop* dialog...

a. Click the **Active Template** tab.

b. Expand **Parametric Constraints**.

c. Double-click **Pavt 4 Depth**.

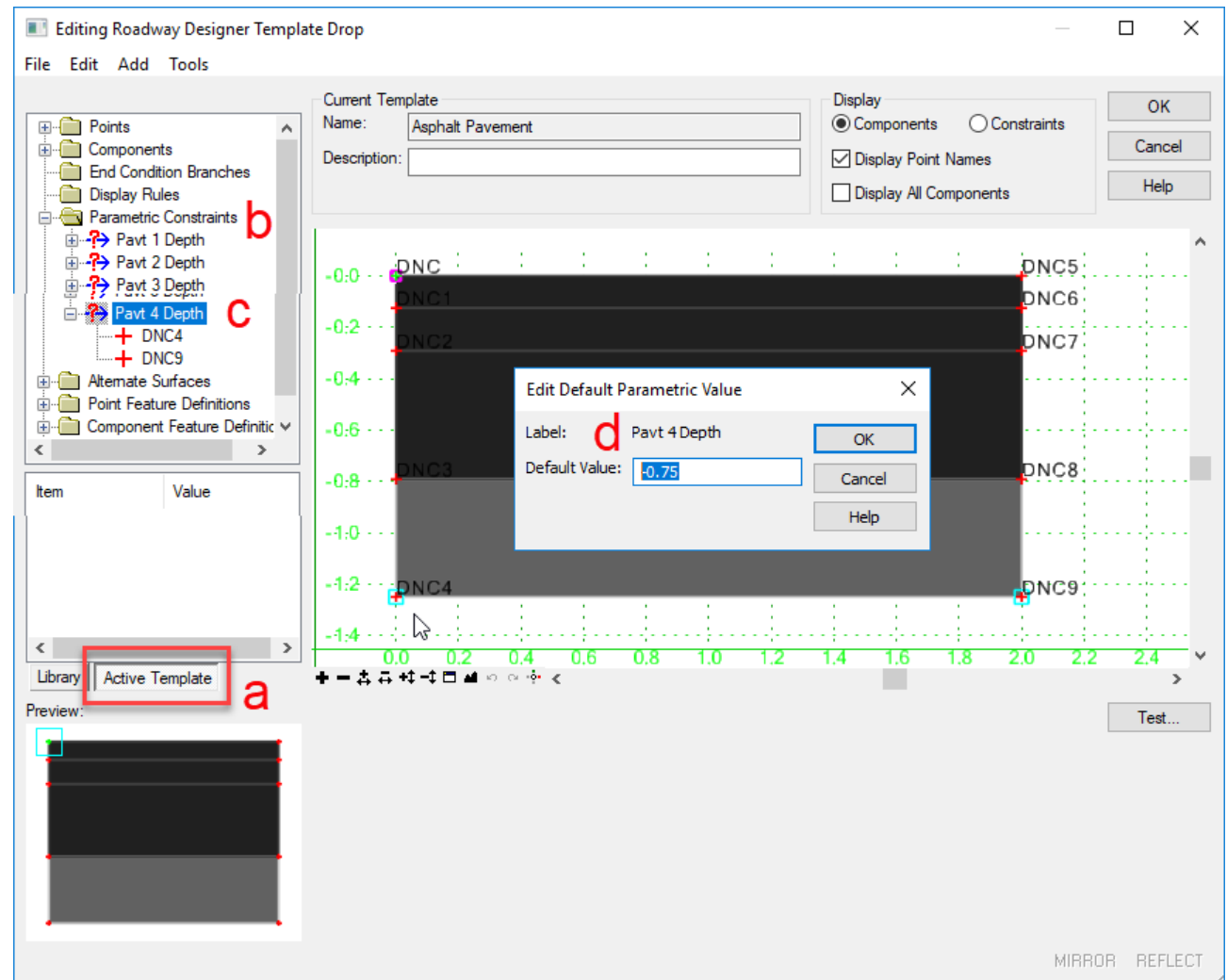
Note the highlighted two points “controlled” by this Constraint

d. Type **-0.75 [.25]** for *Default Value*.

e. Click **OK** to close the Edit Value dialog.

f. Click **OK** to close the Editing Template dialog.

The Depth of the bottom layer of the surface template is updated to the new value.



## Exercise 3: Place the T-Intersection Civil Cell in a Design Scenario

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### Description

In this exercise, you will place a T-intersection civil cell in a more real-world design scenario.

### Skills Taught

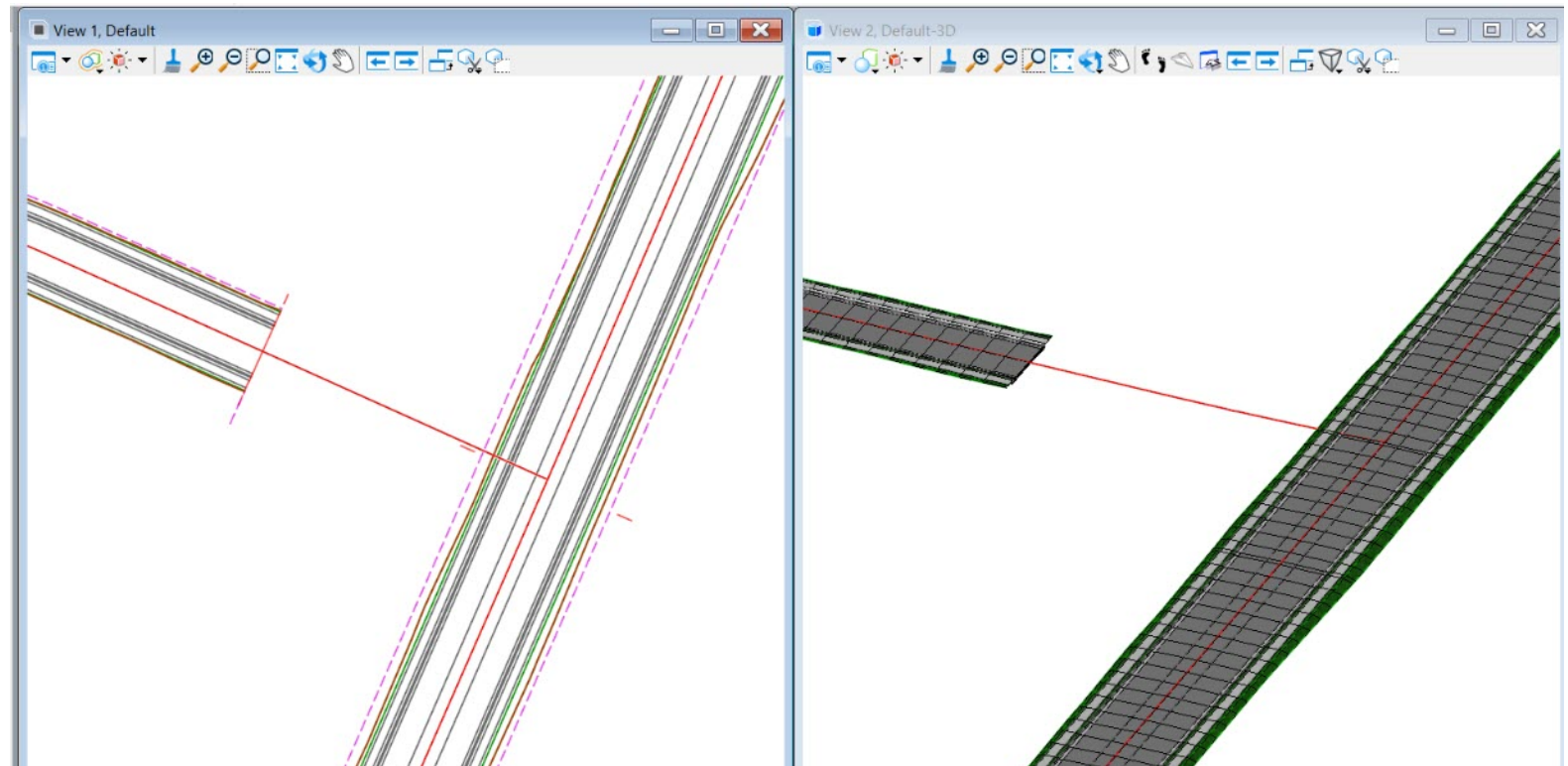
- Placing an intersection civil cell
- Clipping an existing corridor with the civil cell
- Combining the civil cell model with a roadway corridor model

## Place the Civil Cell and Model the Intersection

In the following exercise you will use the basic T-Intersection civil cell to construct the model between two intersecting corridors. We will clip the existing South Blvd corridor when we place the civil cell. Also, it's important to recognize that we will place the civil cell in view 1, the 2D view, and the 3D model will be constructed from it's placement.

1. Open the file *T-Intersection.dgn* [*Metric - T-Intersection.dgn*].

Best Practice:  
Check terrain is  
Active



2. Click *Model Detailing* > *Civil Cells* > **Place Civil Cells**.
3. Select the civil cell named **Basic T (Urban)**.

## Enable view of construction elements in View 1

4. In View 1, follow the heads up prompts:

a. At the *Locate Reference Element: Thru Rd EP* prompt, select the **Thru Road EP** element.

Take care to pick the edge of pavement, not one of the curb lines.

b. At the *Locate Reference Element: Secondary Rd CL* prompt, select the **Secondary Road CL** element.

c. At the *Select Elements to View Alternatives - Reset to Skip* prompt, click the **Reset** mouse button.

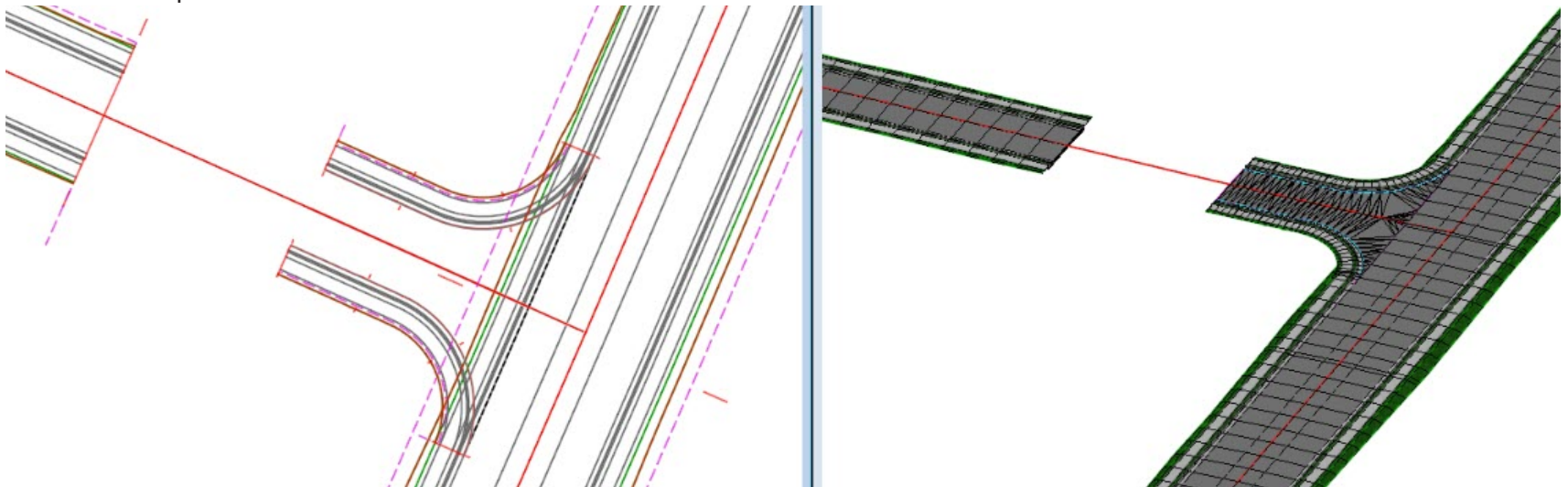
d. At the *Select Corridors to be Clipped - Reset to Skip* prompt, click the **South Blvd Corridor**.

e. **Reset** to complete Corridor Clipping.

The Civil Cell can automatically clip the South Blvd. corridor where it overlaps the civil cell. In some situations, such as if the corridor exists in a referenced dgn file, the corridor may need to be clipped manually.

f. At the *Accept the Civil Cell Placement* prompt, **left-click** to accept.

The Civil cell is placed.



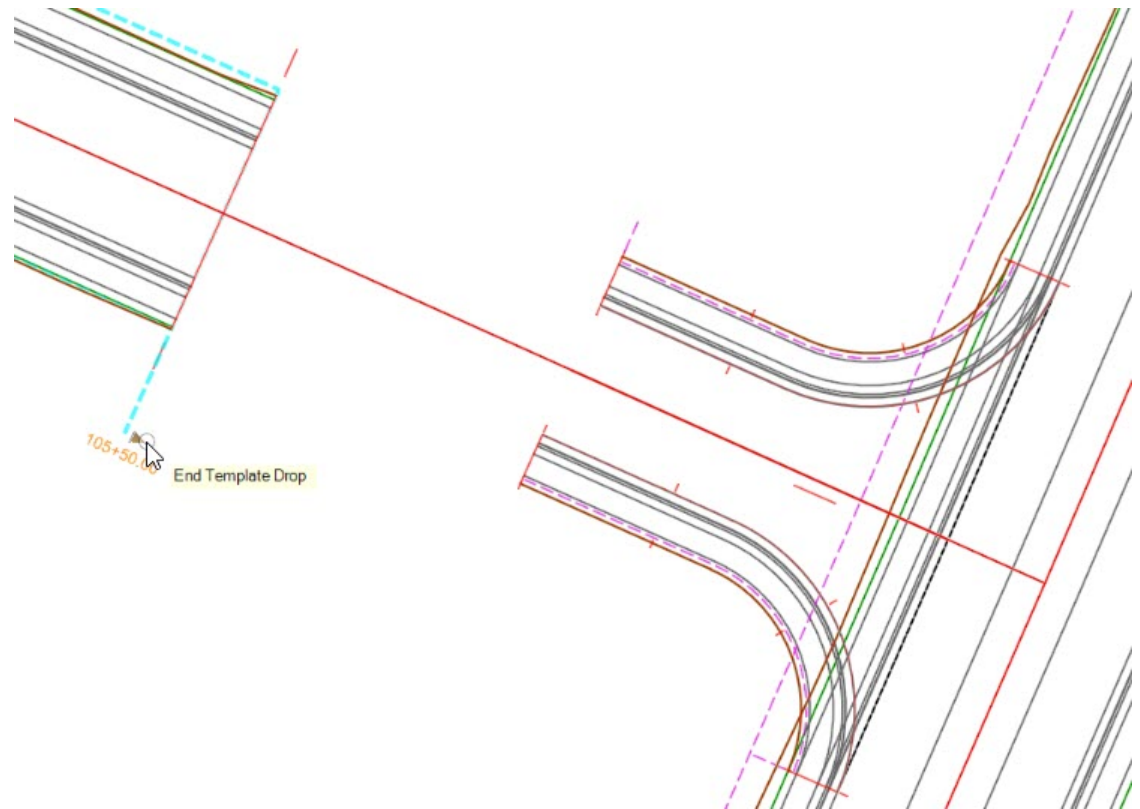
**NOTE:** Civil cell clipping does not clip out the 2D graphics of the corridor in View 1. In the image above, View 1 (2D view) on the left represents the visual interface in which we interact with the model.

5. Review the civil cell placement. Verify that your intersection is aligned properly as shown in the image above.
  - If the cell is placed incorrectly, you may have mistakenly selected the wrong reference element during the placement.
  - To undo the civil cell placement, select *Undo* from the Quick Access tool bar or key in *CTL+Z*.
  - Place the civil cell again.

**NOTE:** The graphic handles displayed with the civil elements, such as the corridors and template drops, as well as other features can be defined as Construction Class elements. Their display can be turned On or Off for clarity via the Constructions toggle in the View Attributes menu. The definition of these elements as construction elements is specified within the OpenRoads workspace and can be changed.

6. Finally, we can remove the gap between the intersection and the existing two-lane corridor.
  - a. Select the **Template Drop handle** within view 1.
  - b. Using the manipulator arrow, drag the handle and the corridor start station to meet the end of the civil cell placement.
  - c. Snap the corridor start to the end of the civil cell to resolve the gap.

You would make any edits to the Civil Cell to match the Secondary Corridor before dragging the template drop to connect the 2 corridors, Secondary to Civil Cell.



## Exercise 4: Place Sidewalk Ramps Within the Intersection Model

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### Description

In this exercise, you will place sidewalk ramps within the intersection model using a civil cell.

### Skills Taught

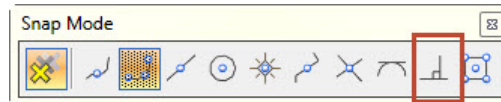
- Drawing the Centerline required for the Ramp Civil Cell
- Placing a Sidewalk Ramp Civil Cell
- Clipping the Sidewalk from under the Ramp
- Moving the Sidewalk Ramp within the model



## Draw the Sidewalk Ramp Centerline

This civil cell contains four reference elements and requires they be identified in the design model as the civil cell is placed. The gutter line and the back of sidewalk exist - they were created as part of the Civil Cell, but the ramp centerline does not. We will create a ramp centerline to be the basis for our ramp location within the model.

1. Click **Geometry > Horizontal > Lines > Line Between Points**.
  - a. In the settings dialog, type a **Name** for the line, such as **Ramp CL**.
  - b. Click the **Perpendicular** snap to place the line perpendicularly along the gutter flow line (cyan line).

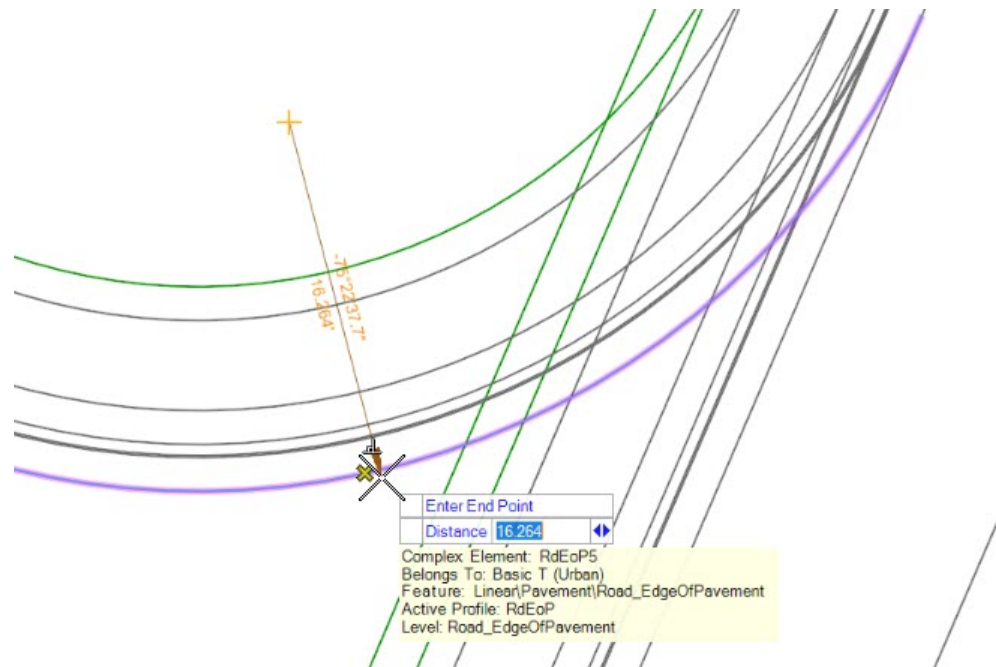


- c. Place the line near the middle of the north curb return of the intersection. Be sure to extend the line past the back of the sidewalk.

**Note:** As an alternate technique, we could have placed the ramp centerline using the Place Smartline or Place Line drawing tools. Both these and the OpenRoads tools honor the Perpendicular snap.

The difference is that the drawing tools have no memory of a Perpendicular relationship.

OpenRoads remembers that the centerline has a Perpendicular relationship with the edge of pavement and honors the relationship during a change in geometry.





## Select and Place the Ramp Civil Cell into the Intersection Model

We will select the referenced civil cell and place it into our intersection model.



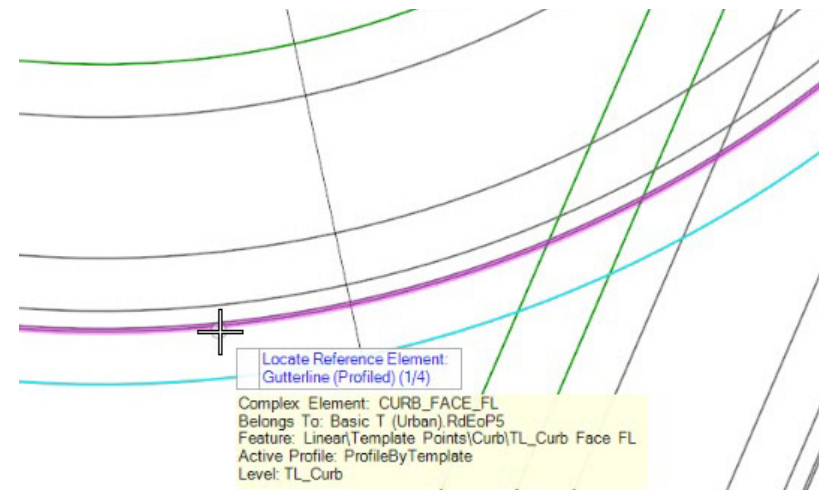
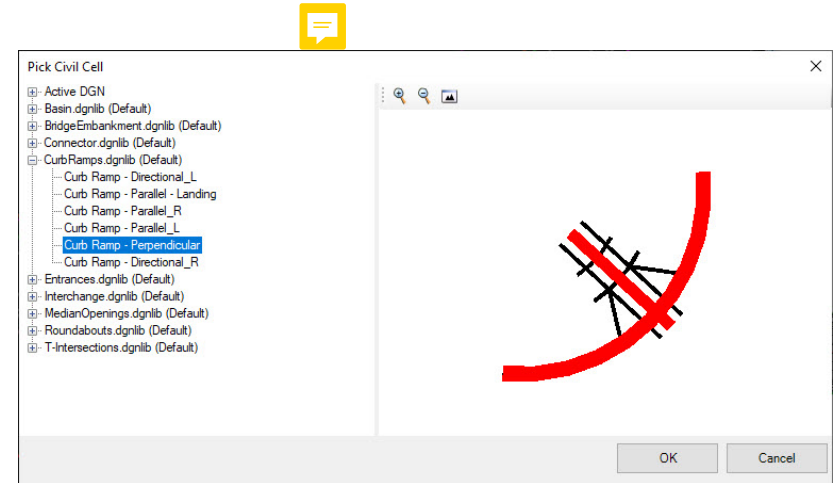
1. Click *Model Detailing* > *Civil Cells* > **Place Civil Cells**.
2. Select the civil cell named **CurbRamps.dgnlib > CurbRamp Perpendicular**.

This ramp is built from four geometry references:

- The Bottom of the Curb Face or Flowline
- The Back Top of Curb (CURB\_BACK\_TOP)
- The Back of Ramp Sidewalk
- The Centerline of the Ramp

They will all be prompted for. Note that the sequence and the Prompt verbiage is flexible and was defined by the creator of the Civil Cell.

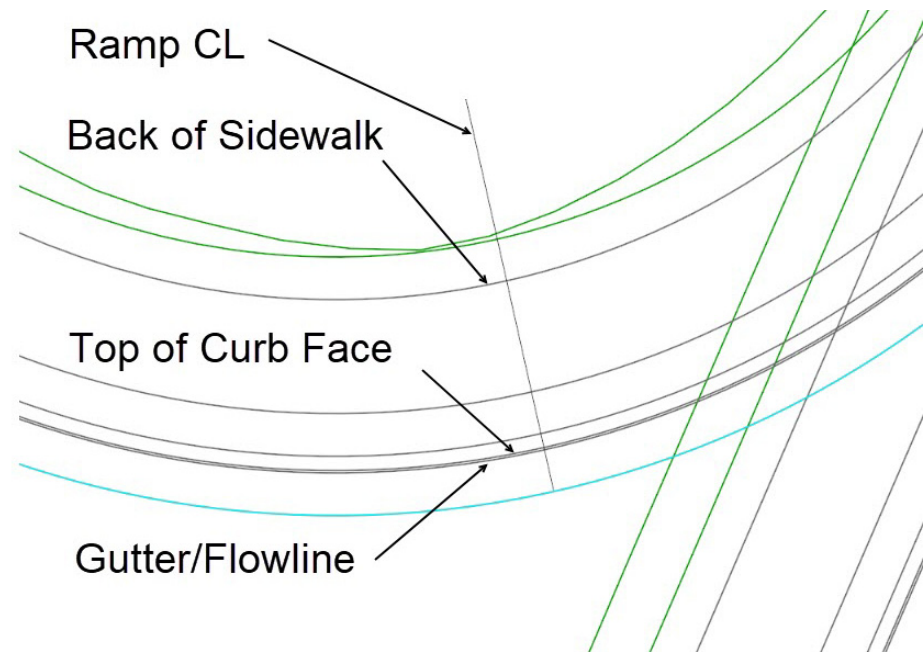
3. Follow the heads-up prompts:
  - a. At the *Locate Reference Element: Gutterline (Profiled) (1/3)* prompt (the first of three prompts for reference), select the **Flowline** element. This has a Feature Definition of TL\_Curb\_Face\_FL.  
**Note:** if you mistakenly pick the Top of Curb, your ramp elevations will be incorrect.  
**Note:** “(Profiled)” is simply a convention the Civil Cell creator adopted to indicate to the user that the element must have an active Profile (so that it has a vertical reference).



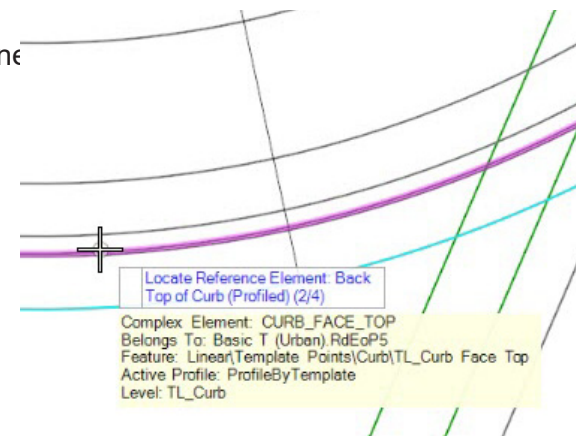
The image to the right shows the four reference elements in the north curb return.

**Note:** Civil Cells work by replicating geometry rules from the reference element's geometry, NOT from their Names or Feature Definitions.

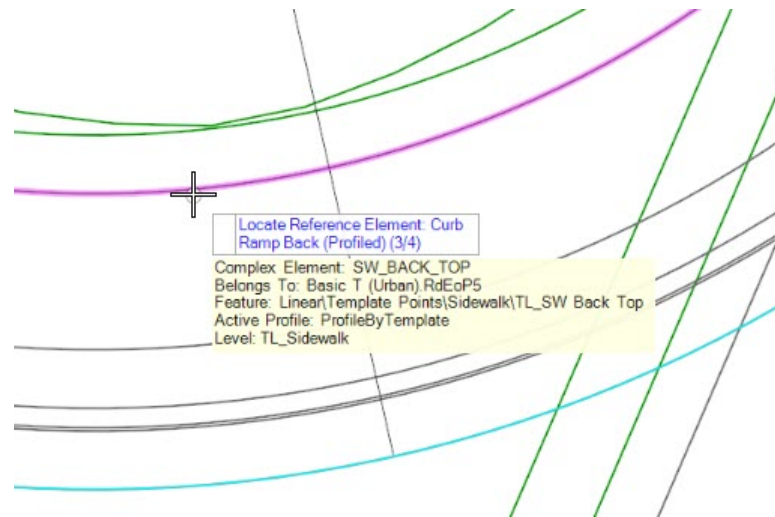
**Note:** You can Place a Civil Cell on geometry based on completely different workspace definitions: it's the geometry that matters. For example, if Bentley or a Department of Transportation has a Civil Cell that would work on a non-conforming project: the Civil Cell will still work if the Geometry is correct (the resulting feature's symbology will match the source, not the destination's conventions).



- b. At the *Locate Reference Element: Back Top of Curb (Profiled) (2/3)* prompt, click the TL\_Curb\_Face\_Top element (it is just inside the gutter line)



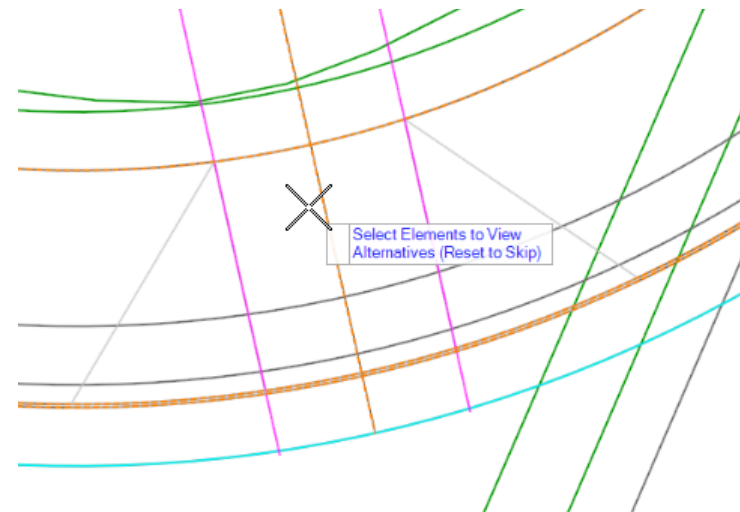
- c. At the *Locate Reference Element: Ramp CL (Placed from EP to Curb Ramp Back) (3/3)* prompt, click on the ramp centerline we recently placed.



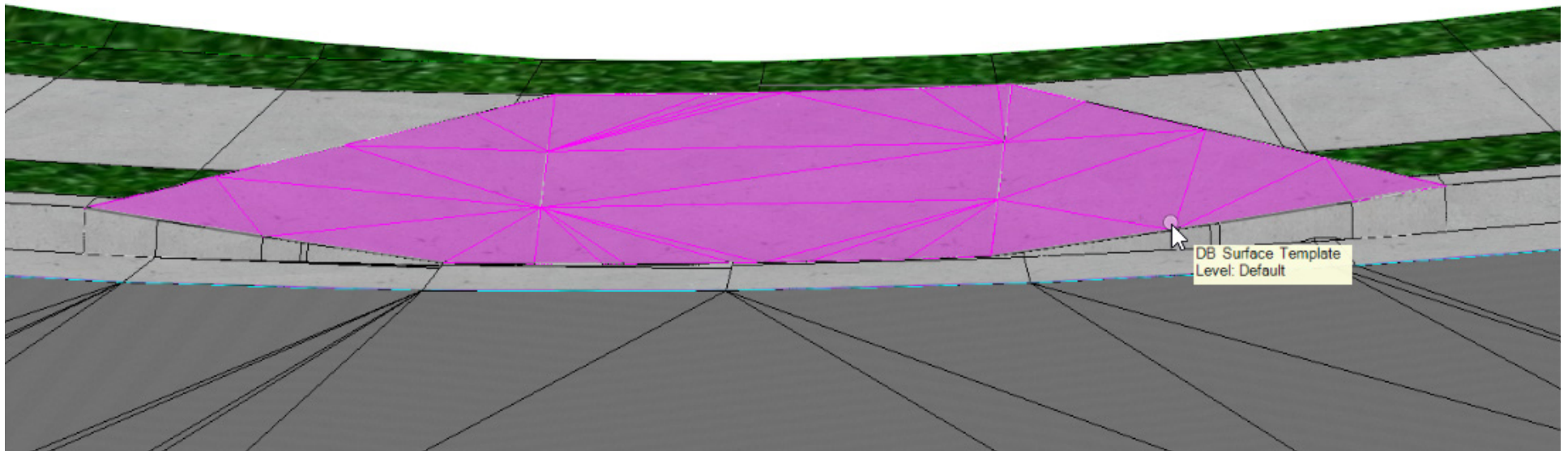
- e. At the *Select Elements to View Alternatives (Reset to Skip)* prompt, click **Reset** because the ramp schematic looks correct.
- f. At the *Select Corridors to clip (Reset to Complete)* prompt, click **Left-Click** on the corridor, then Reset to accept the clipping.
- g. **Left-Click** to Accept the civil cell placement

The sidewalk ramp is placed into the model.

**Note:** If the civil cell's placement is not correct, undo the command by going to *Undo* from the Quick Access tool bar or key in *CTRL+Z*. You can also delete the Civil Cell from the *Explorer*.



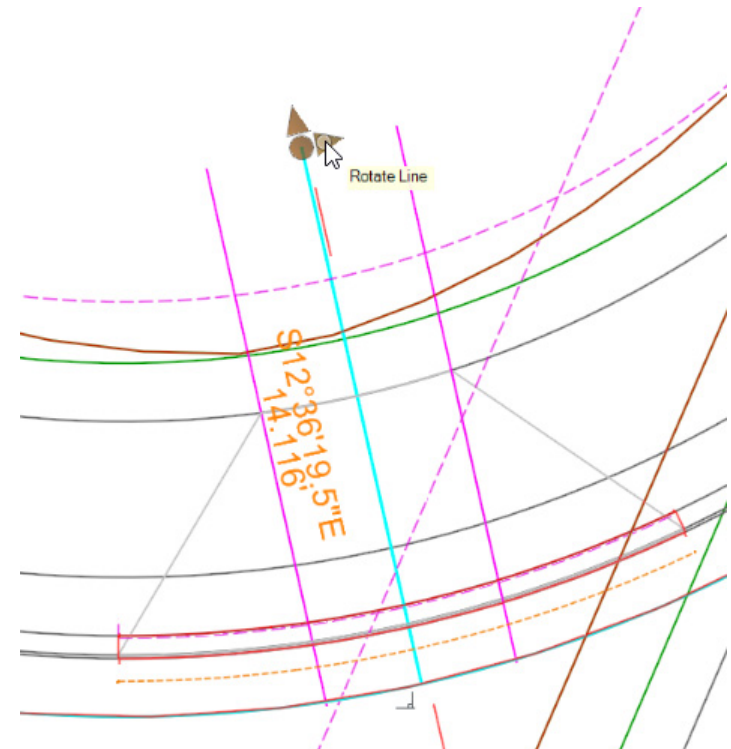
The final clipped ramp should look similar to the following image.



## Move the Sidewalk Ramp

The Sidewalk Ramp was built centered on the ramp center line feature. What happens if we move the center line? What happens if the curb return radius changes?

1. Move the sidewalk ramp.
  - a. **Click** the Ramp Centerline
  - b. **Click** onto the circle or the “sideways arrow” at the end of the end of the Ramp centerline.
  - c. **Drag** this to a new position and place a **data point** to relocate the line and ramp.
2. Click on the Edge of Pavement curb return. Change the Radius to **40 ft [15m]**.  
Notice the ramp slides along with the centerline and that the ramp follows the curb in event of geometry changes (= automatic updates).



## Exercise 5: Place a Pond Into the Model

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### Description

In this exercise, you will learn how to place a pond within the model using a civil cell.

### Skills Taught

- Placing a pond using a civil cell
- Modifying the pond

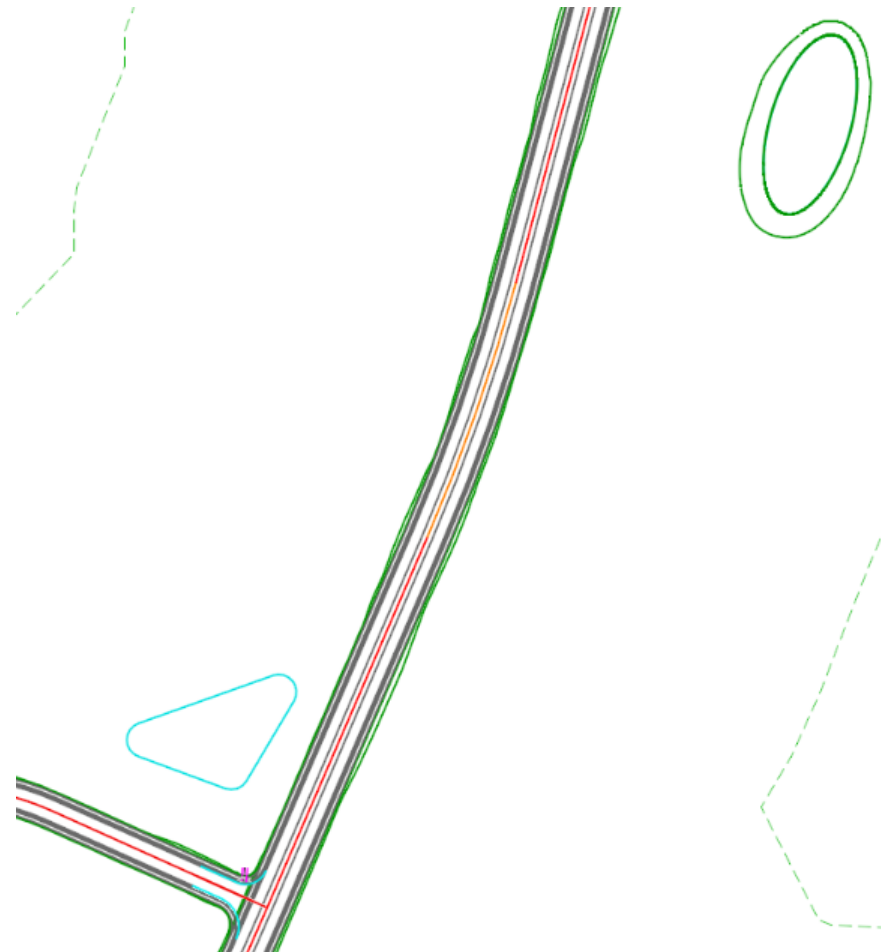
## Create a Pond using a Civil Cell

In the following exercise, we will place a pond adjacent to the intersection.

The pond to the north is already modeled and we want to use the same engineering criteria (the same relationships) for the southern pond.

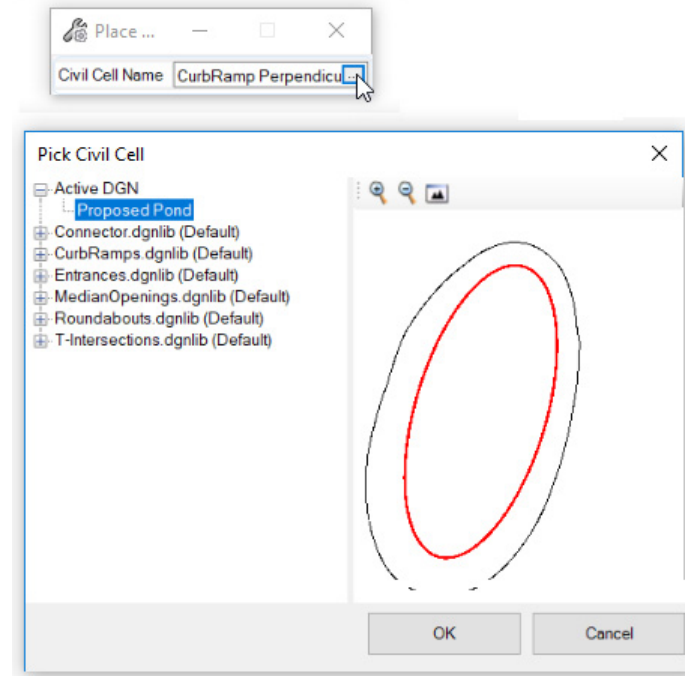
Whenever you have similar, repetitive engineering, be it ponds or driveways or roundabouts, you can use Civil Cells to automate the work. In this case, you would create a Civil Cell from the elements of the first pond and then Place that new Civil Cell on the new pond shape. It's that simple.

Here, we have already created a Civil Cell from the first pond. In this exercise, we will use start with the Pond Civil Cell already created.

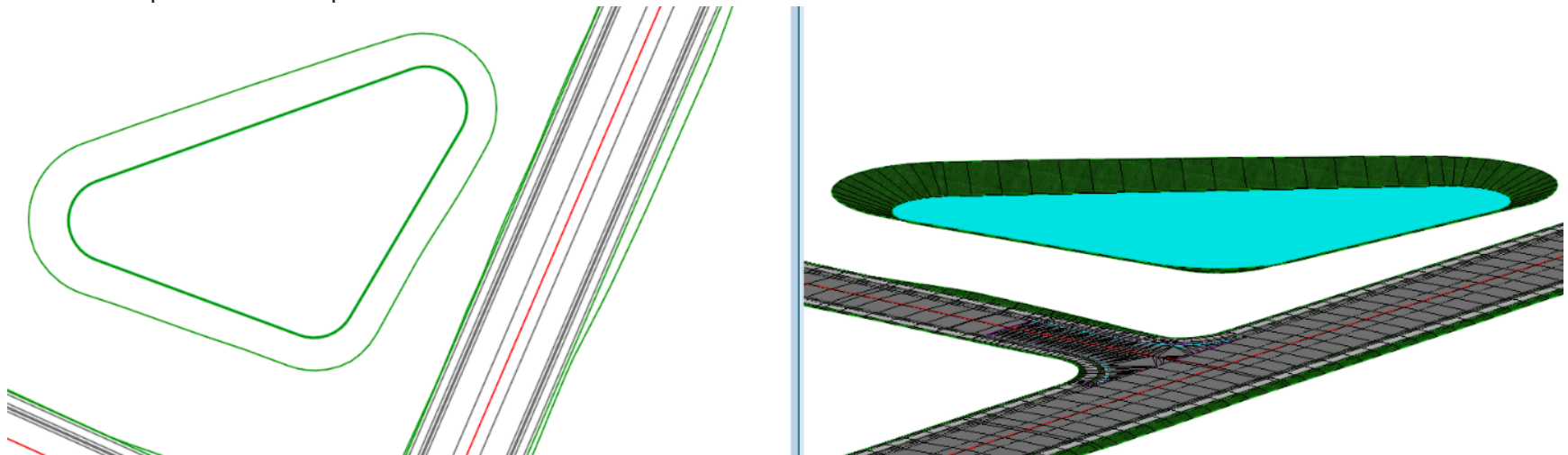




1. Zoom out so that the pond bottom shape north of the intersection is visible.
2. Click *Model Detailing* > *Civil Cells* > **Place Civil Cells**.
3. In the *Settings* dialog, click the **Browse** button to open the *Pick Civil Cell* dialog.
4. Expand the **Active DGN** object.
5. Select the civil cell named **Proposed Pond**.
6. Click **OK**.
7. At the *Locate Reference Element Linear\Site\Site\_Pond* prompt, click the **Pond shape**.
8. At the *Select Elements to View Alternatives (Reset to Skip)* prompt, **right-click** to skip.
9. *Click to Accept* the civil cell placement.



The civil cell is placed and the pond is created.





## Modify the Pond



1. Click *Drawing > Modify > More > Insert a Vertex*.
2. Select the pond bottom element and insert a vertex.

The Pond updates in 2D and 3D.

