Chapter 3 - Interchange Project

As part of the Federal Blvd. and 6th Ave. interchange reconstruction project, access from Federal Blvd. to 6th Ave. and Bryant Street is being added. The ramp from Federal Blvd. to 6th Ave (called the SE Ramp) splits to provide access to Bryant Street. This lab illustrates the InRoads design process for creating this interchange. This lab is concerned with the mergers of the SE Ramp with the 6th Ave. edge of pavement and the mergers of the Bryant Street ramp with the SE Ramp. Therefore, the intersections of the ramps at Bryant Street and Federal Blvd. will not be modeled.

Chapter Objectives:

- Give a project overview
- Create a corridor for the SE Ramp.
- Define Point Controls to tie to the existing 6th Ave. edge of pavement.
- Create a corridor for Bryant Ramp.
- Create initial design surfaces for SE Ramp and Bryant Ramp.
- Determine key stations for ramp mergers.
- Define Point Controls for street returns in both corridors
- Modify Bryant Ramp template for the area in the intersection.
- Create a combined surface of SE Ramp and Bryant Ramp.

Project Overview

Project Description

This project creates accesses to 6th Ave. and Bryant Street from Federal Blvd. The Ramp from Federal Blvd. merges into the existing edge of pavement of 6th Ave. The ramp from Bryant Street merges into the SE Ramp (from Federal to 6th).

Project Data

- **Existing_Ground.dtm** – This contains the survey data for the existing terrain.
- **Interchange.alg** – This contains all of the horizontal and vertical alignments used for this project.
- **Interchange.itl** – The initial templates are stored in this file.

InRoads Design Process

1. Open Data files.
2. Initial Modeling for SE Ramp and Bryant Ramp.
3. Determine Key Stations for ramp mergers.
4. Modify templates for merger areas.

5. Make changes to corridor data.
6. Create the combined design surface.
7. Review the results

Getting Started

1. Open the **Interchange.alg**.
2. Open the **Interchange.itl** template library.
3. Open the **Existing Ground.dtm**.

Initial Modeling

There are two areas of special importance on this project, where the SE Ramps merges with the existing 6th Ave. edge of pavement and where the Bryant Ramp merges with the SE Ramp. In these areas, the templates change to accommodate the narrowing pavement width. To determine the stations where template changes occur, initial design surfaces are created for the SE Ramp and the Bryant Ramp.

Initial SE Ramp Corridor Model

The initial run of the SE Ramp is primarily concerned with locating stations for template changes. Do not be concerned that the template crosses into the 6th Ave. driving lanes, as this will be corrected in the final modeling.

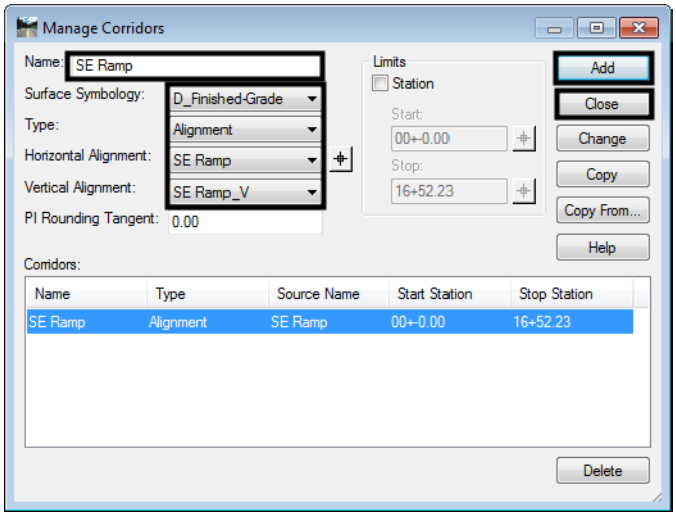
Section Objectives:

- Create a corridor for the SE Ramp alignment
- Add template drops to the corridor
- Create the initial SE Ramp surface

Build the SE Ramp Corridor

1. Select **Modeler > Roadway Designer** from the InRoads menu bar. This displays the ***Roadway Designer*** dialog box.
2. In the ***Roadway Designer*** dialog box, select **Corridor > Corridor Management** or **<D>** the  button. This displays the ***Manage Corridors*** dialog box.
3. In the ***Manage Corridors*** dialog box, key in ***SE Ramp*** for the ***Name***.
4. In the ***Surface Symbology*** field, select **D_Finished-Grade**.
5. Set the ***Type*** to **Alignment**.
6. Select **SE Ramp** as the ***Horizontal Alignment***.
7. Select **SE Ramp_V** as the ***Vertical Alignment***.
8. **<D> Add** to complete the corridor.

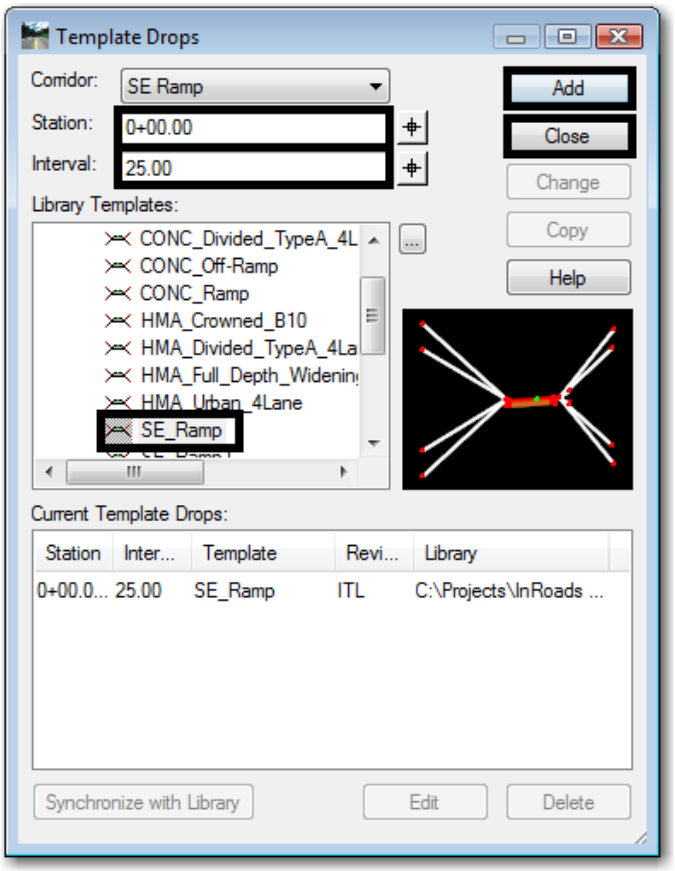
9. **<D> Close** to dismiss the ***Manage Corridors*** dialog box.



Add the SE Ramp Template Drops

1. In the ***Roadway Designer*** dialog box, select **Corridor > Template Drops** or **<D>** the button. This displays the ***Template Drops*** dialog box.
2. In the **Template Drops** dialog box, Key in ***0+00.00*** for the ***Station***.
3. Key in ***25*** for the ***Interval***.
4. In the ***Library Templates*** area, expand the **1 – Templates** folder.
5. Highlight the **SE Ramp** template.
6. **<D> Add**.

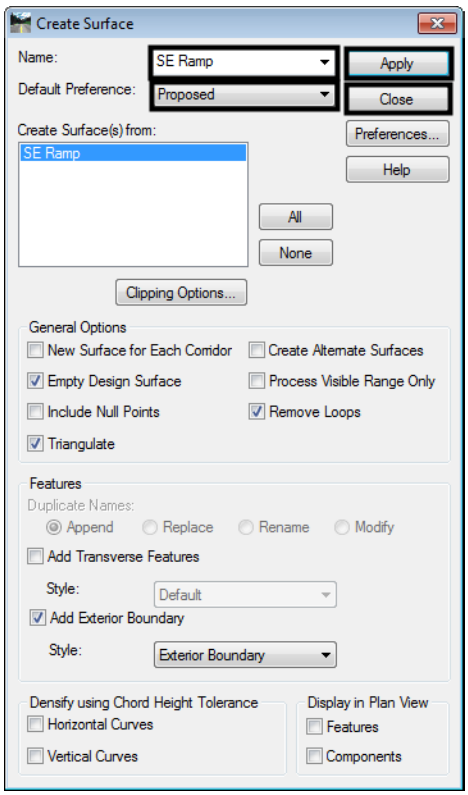
7. **<D> Close**.



Create the Initial SE Ramp Design Surface

1. In the ***Roadway Designer*** dialog box, select **Corridor > Create Surface** or **<D>** the button. This displays the ***Create Surface*** dialog box.
2. Key in ***SE Ramp*** for the ***Name***.
3. Select **Proposed** for the ***Default Preference***.

4. The remaining settings should be correct. If not, set them to match the illustration below.



5. **<D> Apply**.

6. **<D> Close**.

Initial Bryant Ramp Corridor Model

As with the SE Ramp, do not worry about the Bryant Ramp crossing into the SE Ramp. In fact, this has to occur in order to determine the stations required for new template drops.

Section Objectives:

- Create a corridor for the Bryant Ramp alignment
- Add template drops to the corridor
- Create the initial Bryant Ramp surface

Build the Bryant Ramp Corridor

1. In the ***Roadway Designer*** dialog box, select **Corridor > Corridor Management** or **<D>** the  button.

2. In the ***Manage Corridors*** dialog box, key in ***Bryant Ramp*** for the ***Name***.

3. In the ***Surface Symbology*** field, select **D_Surface_2**.

4. Set the ***Type*** to **Alignment**.

5. Select **Bryant Ramp** as the ***Horizontal Alignment***.
6. Select **Bryant Ramp_V** as the ***Vertical Alignment***.
7. **<D> Add** to complete the corridor.
8. **<D> Close** to dismiss the ***Manage Corridors*** dialog box.

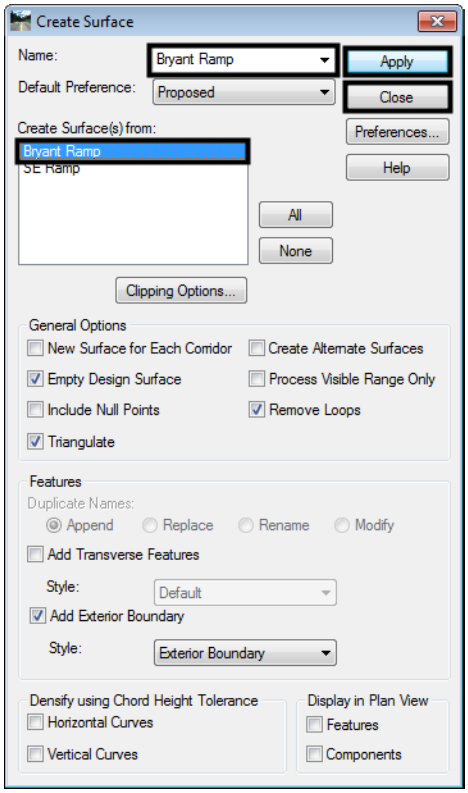
Add the Bryant Ramp Template Drops

1. In the ***Roadway Designer*** dialog box, select **Corridor > Template Drops** or **<D>** the  button.
2. In the ***Template Drops*** dialog box, Key in ***0+00.00*** for the ***Station***.
3. Key in ***25*** for the ***Interval***.
4. In the ***Library Templates*** area, expand the **1 – Templates** folder.
5. Highlight the **Bryant Ramp** template.
6. **<D> Add**.
7. **<D> Close**.

Create the Initial Bryant Ramp Design Surface

1. In the ***Roadway Designer*** dialog box, select **Corridor > Create Surface** or **<D>** the  button.
2. Key in ***Bryant Ramp*** for the ***Name***.
3. In the ***Create Surface(s)*** from area, highlight **Bryant Ramp** only.
4. The remaining settings should be correct. If not, set them to match the illustration below.
5. **<D> Apply**.

6. **<D> Close**.



7. **<D> File > Save** from the Roadway Designer menu bar.
8. In the ***Save As*** dialog box, navigate to the InRoads folder.
9. Key in ***SE Ramp and Bryant Ramp*** for the ***File Name***.
10. **<D> Save**.
11. **<D> Cancel** to dismiss the ***Save As*** dialog box.
12. **<D> Close** to dismiss the ***Roadway Designer*** dialog box.

Determine Key Stations for Ramp Mergers

It was determined that the gore between the merger of SE Ramp and 6th Ave would end at the intersection of the RT_POSS and the existing edge of pavement of 6th Ave. the gore between the merger of SE Ramp and Bryant St ends at the intersection of SE Ramp's LT_POSS and Bryant Ramp's RT_POSS. The stations of these intersections, along with the intersection of the SE Ramp's LT_POSS and Bryant Ramp's LT_POSS, must be determined for the additional template drops needed in the final surface.

Display Design Data

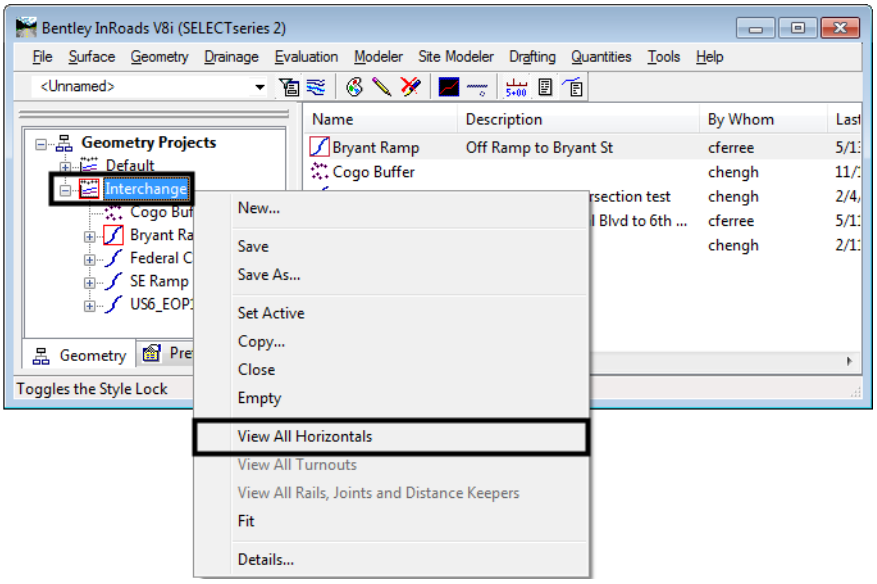
The relevant horizontal alignments are displayed in the dgn file to give a reference location when determining the key stations.

Section Objectives:

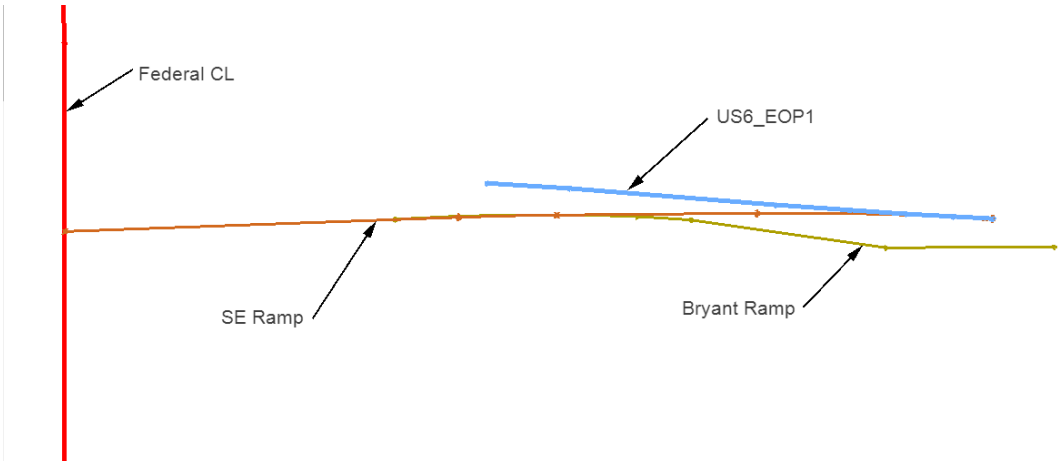
- Display the horizontal alignments

Display Horizontal Alignment Data

1. **<D>** the **Geometry** tab in the InRoads Explorer.
2. **<R>** on the **Interchange** geometry project.
3. Select **View All Horizontals** from the menu.



The illustration below identifies each of the alignments displayed



Key Station Locations

To determine the key stations, the POSS and EOP features of both initial design surfaces are displayed. Then tracking is used on both the SE Ramp alignment and the Bryant Ramp alignment. The stations are needed on each alignment so that template drops can be entered correctly.

Section Objectives:

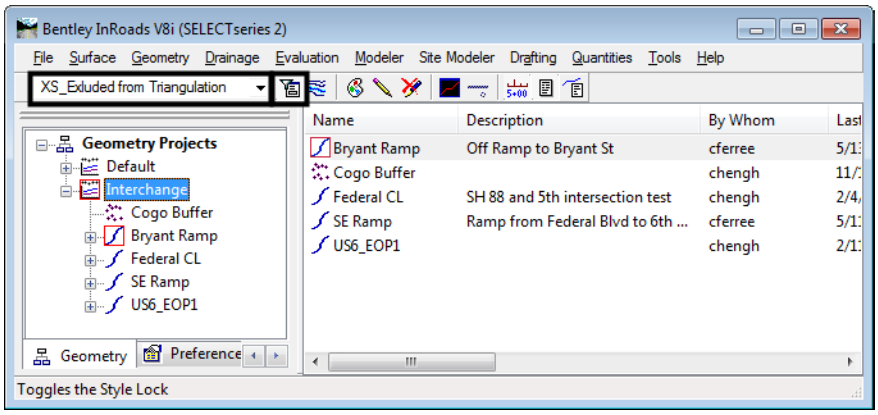
- Display the required surface features from the initial design surfaces
- Use Tracking to identify the key stations

Locate Key Stations for SE Ramp at 6th Ave.

Each point on a template creates a feature in the design surface which can make it difficult to find the desired features for display. To reduce the number of features that have to be combed through, feature filters are used. There is a predefined filter that excludes untriangulated features. This is used reduce the number of features in the dialog box to a manageable number.

1. On the InRoads Locks toolbar, set the ***Feature Filter*** to **XS_Excluded from Triangulation**.

2. Toggle on the **Feature Filter Lock**.

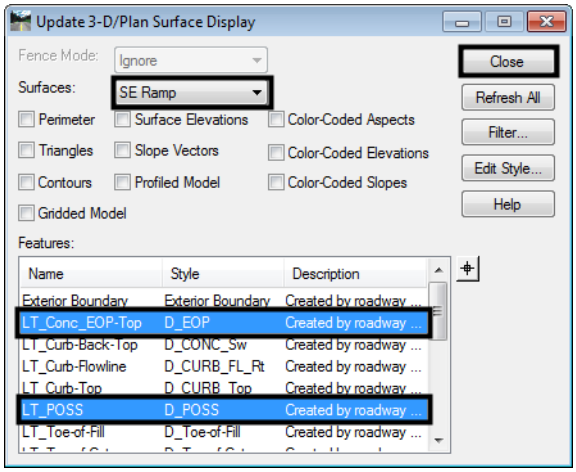


3. On the InRoads menu bar, select **Surface > Update 3d/Plan Surface Display**.

4. In the ***Update 3d/Plan Surface Display*** select the **SE Ramp** surface.

5. In the ***Features*** list, select the features with **EOP** or **POSS** in the name. Hold the ***Ctrl*** key to highlight each of the features. Highlighted features are automatically displayed.

6. **<D> Close**.

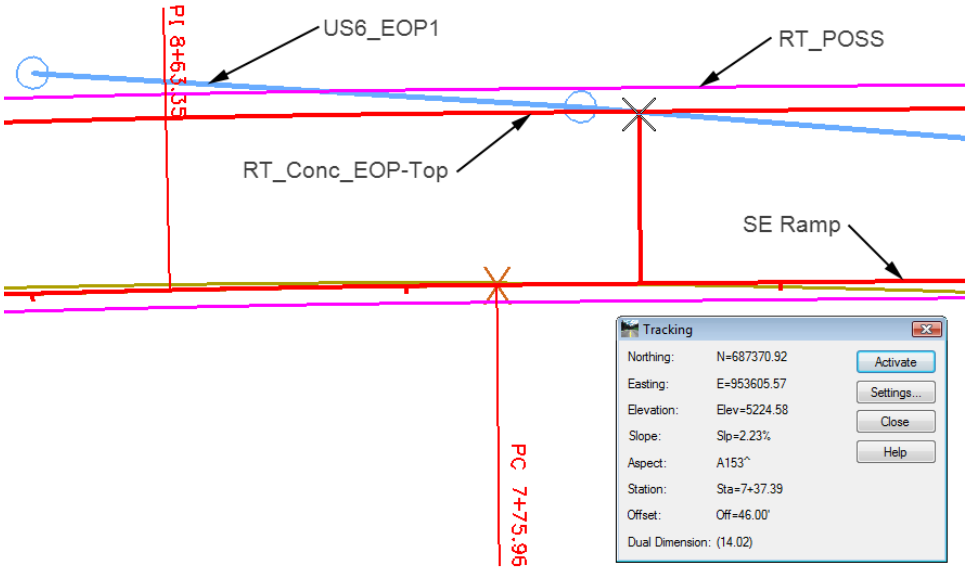


After the features are displayed, tracking is used to determine the key stations for the SE Ramp along the 6th Ave. edge of pavement.

7. Using the MicroStation view controls, zoom in on the left end of the 6th Ave alignment.
8. Set the **SE Ramp** alignment active.
9. From the InRoads menu bar, select **Tools > Tracking > Tracking**.
10. **<T>** where the feature **RT_Conc_EOP-Top** crosses the **US6_EOP1** alignment and note the station.

    Note: Use the ***Intersection*** snap  to locate the station

11. **<T>** where the feature **RT_POSS** crosses the **US6_EOP1** alignment and note the station.



The stations for the two points above are:

- ***RT_Conc_EOP-Top and US6_EOP1 – 7+37.39***
- ***RT_POSS and US6_EOP1 – 8+23.46***

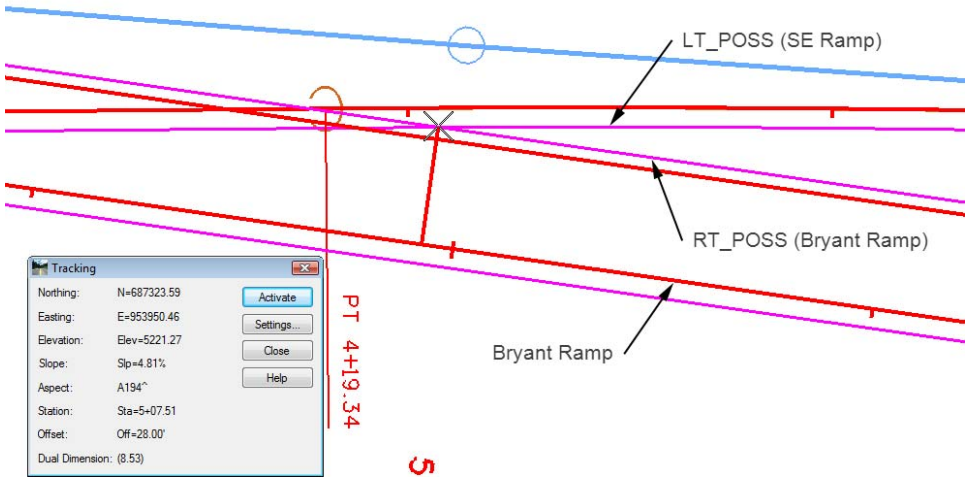
12. **<D> Close** on the ***Tracking*** dialog box.

Locate Key Stations for Bryant Ramp at SE Ramp

The same procedure is used for locating the key stations at the merger of the SE Ramp and the Bryant Ramp.

1. On the InRoads menu bar, select **Surface > Update 3d/Plan Surface Display**.
2. In the ***Update 3d/Plan Surface Display*** select the **Bryant Ramp** surface.
3. Toggle on the **Features** check box.
4. In the Features list, select the features with **EOP** or **POSS** in the name.

5. **<D> Apply** and **<D> Close**.
6. Using the MicroStation view controls, zoom in to the area where SE Ramp and Bryant Ramp intersect.
7. Set the **Bryant Ramp** alignment active.
8. From the InRoads menu bar, select **Tools > Tracking > Tracking**.
9. **<T>** where the feature **RT_POSS** from the ***Bryant Ramp*** crosses the **LT_POSS** from the ***SE Ramp*** and note the station.



- Intersection of **RT_POSS** and **LT_POSS** – ***5+07.51***

10. **<T>** where the feature **LT_POSS** from the ***Bryant Ramp*** crosses the **LT_POSS** from the ***SE Ramp*** and note the station.
    - Intersection of **LT_POSS** and **LT_POSS** – ***8+39.60***
11. Set the **SE Ramp** alignment active and determine the stations for the locations in 9 and 10 above for this alignment also.
    - Intersection of **RT_POSS** and **LT_POSS – *3+92.92***
    - Intersection of **LT_POSS** and **LT_POSS – *7+27.40***
12. **<D> Close** on the ***Tracking*** dialog box.

Template Modifications

As designed, the SE Ramp and Bryant Ramp templates have curb and end conditions on both sides. Templates must be created for the merger areas that do not have the restrictive components.

SE Ramp Template at 6th Ave.

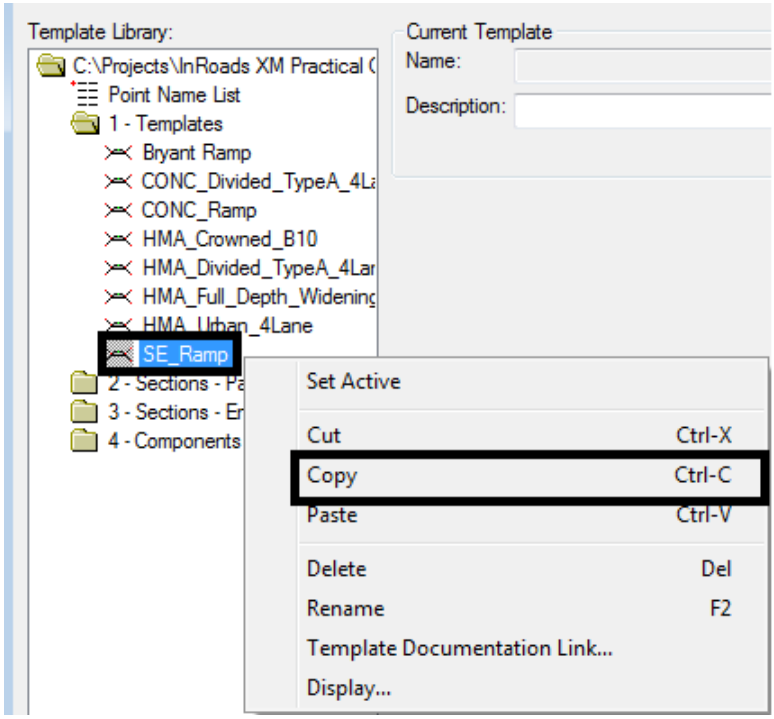
- Copy the SE Ramp template

- Modify the copy for the 6th Ave merger area

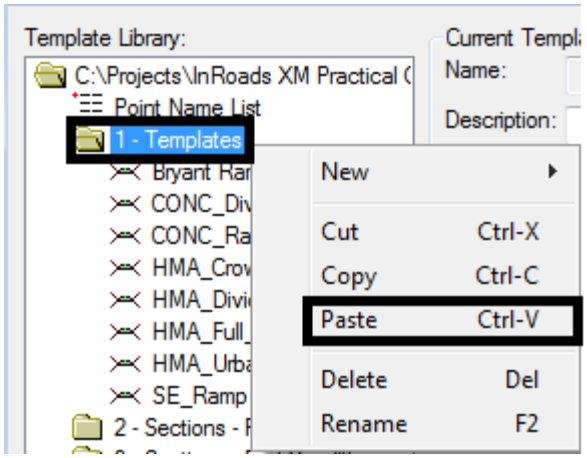
Copy the SE Ramp Template

The basic SE Ramp template is used once all of the merger areas are cleared. A copy of this template is made so that one can be modified and the other left intact.

1. On the InRoads menu bar, select **Modeler > Create Template**.
2. In the ***Create Template*** dialog box, expand the template library to show the contents of the ***1- Templates*** folder.
3. **<R>** on the **SE Ramp** template and select **Copy** from the menu.



4. **<R>** on the **1 – Template** folder and select **Paste**.



5. **<R>** on the **SE Ramp1** template and select **Rename**. Key in ***SE Ramp at 6th Ave*** for the name.

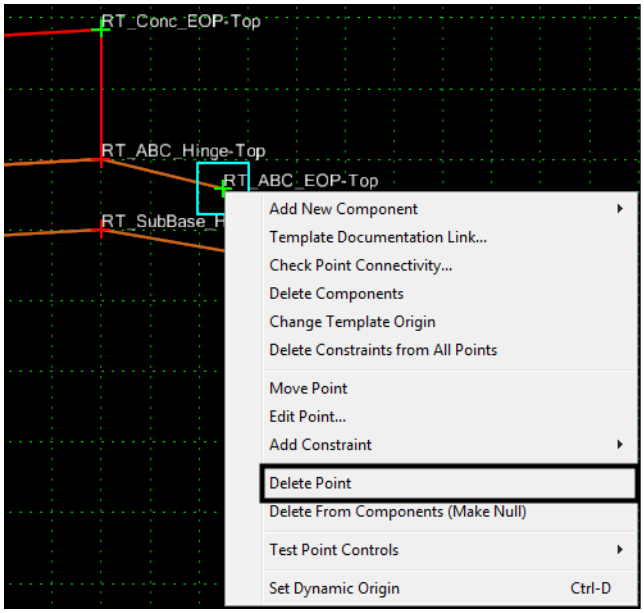
Modify the SE Ramp at 6th Template

This template needs to be modified on the right (6th Ave.) side only.

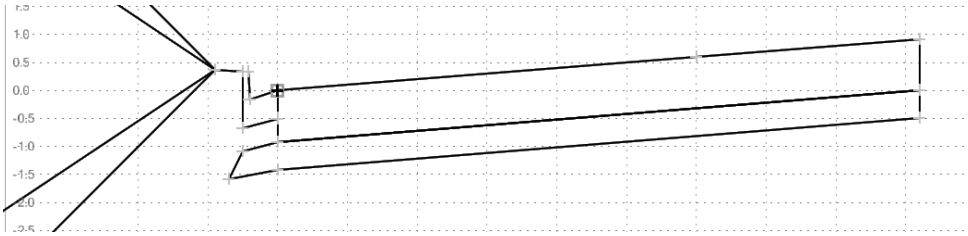
1. **<D> <D> SE Ramp at 6th** template to make it active.
2. Zoom in on the right side of the template.
3. **<R>** in the Template view and select **Delete Components** from the menu.
4. Drag a line through the **RT_C/G_Type2-IIB** and the **RT_Benching** components.

   Note: The end conditions are also deleted because of the parent/child relationship they have with RT_Benching.

5. **<R>** on the **RT_ABC_EOP-Top** and select **Delete Point** from the menu.



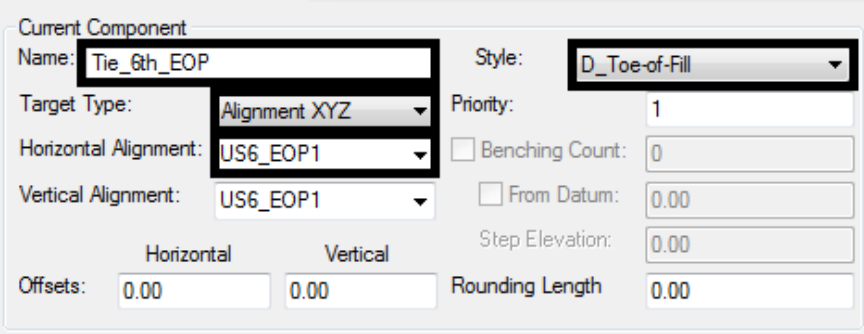
6. Delete the **RT_SubBase_EOP-Top** point also. The illustration below shows the template completed to this point.



Add an End condition to the SE Ramp at 6th Ave template

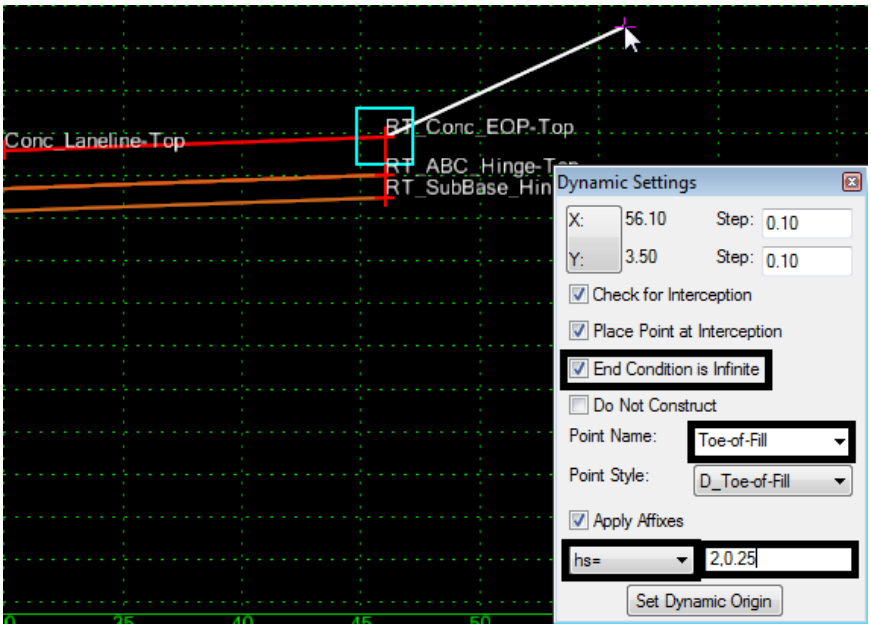
This end condition is used to create the gore after the SE Ramp edge of pavement separates from the 6th Ave. pavement edge.

1. **Select Tools > Dynamic Settings from the Create Template menu bar or <D> the Dynamic Settings** button.
2. Select **Tools > Options** from the ***Create Template*** menu bar.
3. Toggle on **Apply Affixes**.
4. Set the ***X*** and ***Y Step Options*** to ***0.1***.
5. **<D> OK.**
6. **<R>** in the Template view and select **Add New Component > End Condition**.
7. In the ***Component Properties*** area, key in ***Tie_6th_EOP*** for the ***Name.***
8. Set the ***Target Type*** to **Alignment XYZ**.
9. Select **US6_EOP1** for the ***Horizontal Alignment***. This automatically sets the vertical alignment.
10. Set the ***Style*** to **D_Toe-of-Fill**.



11. **<D>** on the **RT_Conc_EOP-Top** point to place the first point.
12. In the ***Dynamic Settings*** dialog box, toggle on **End Condition Is Infinite**.
13. Select **Toe-of-Fill** for the ***Point Name***. This automatically sets the ***Point Style***.
14. Select **hs=** for the key in type.

15. Key in ***2,0.25*** and press ***Enter***.



16. **<R>** and select **Finish**.

SE Ramp Template at Bryant St.

The merger areas for the SE Ramp at 6th Ave. and the SE Ramp at the Bryant ramp overlap. A copy of the SE Ramp at 6th Ave template is modified for use in this merger area. A separate template is used here because using target aliasing and clipping options would result in the loss of the ABC component in the clipped template.

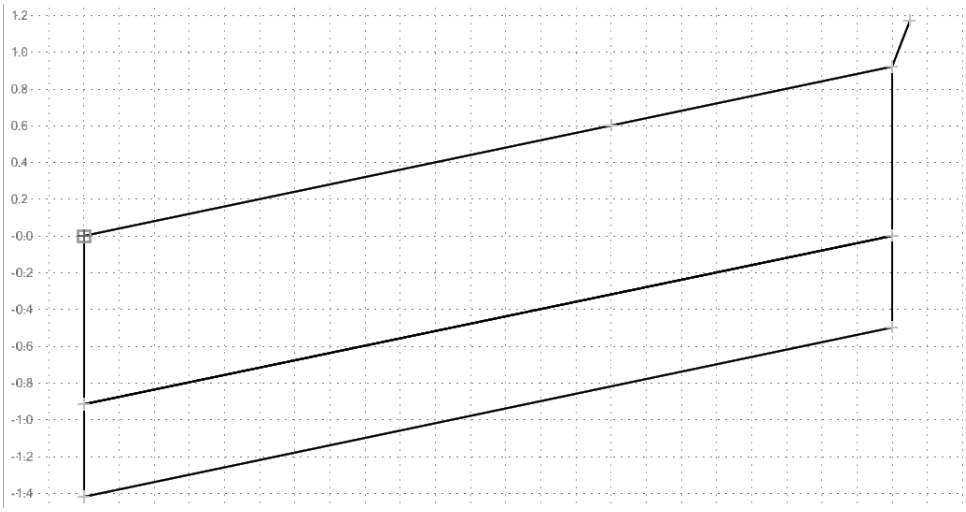
Section Objectives:

- Copy the SE Ramp at 6th Ave template
- Modify the copy for the Bryant Ramp merger area

Copy and Modify the SE Ramp at 6th Ave Template

1. Make a copy of the ***SE Ramp at 6th Ave*** and key in ***SE Ramp at Bryant*** for the name.

2. Modify the ***SE Ramp at Bryant*** template as described above deleting the curb and end condition components and sub base points on the left side of the template. The illustration below shows the completed template.



Bryant Ramp at the SE Ramp

A copy of the Bryant Ramp template is also modified to work in the merger area.

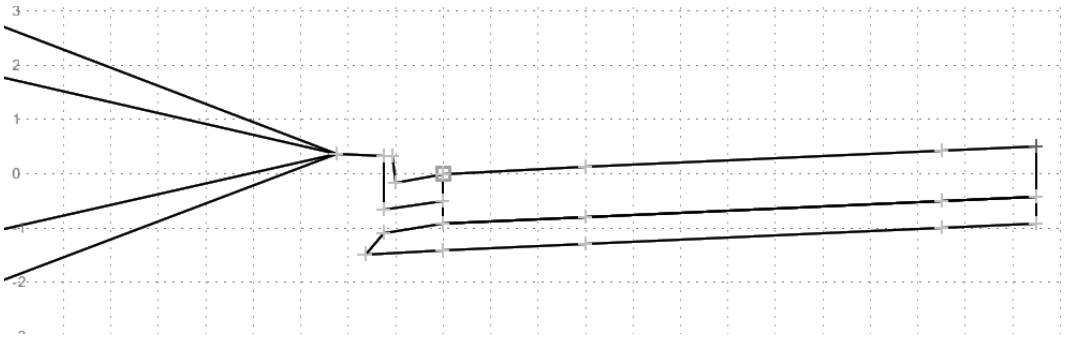
Section Objectives:

- Copy the Bryant Ramp template
- Modify the copy for the SE Ramp merger area

Copy and Modify the Bryant Ramp Template

1. Make copy of the **Bryant Ramp** template as described above. Name it ***Bryant Ramp at SE Ramp***.

2. Modify the ***Bryant Ramp at SE Ramp*** template as described above making the changes on the right side of the template. The illustration below shows the completed template.



Set Up For Final Modeling

With the key stations determined and the new templates created, the corridors are modified to use this data. Changes in corridor stations, additional template drops, point controls, and target aliasing are used to incorporate this data. Also, after reviewing the initial design surface data, some sideslopes require modification

Set Up for the SE Ramp

Section Objectives:

- Add template drops for the new SE Ramp templates
- Add point controls to match the template to the 6th Ave edge of pavement
- Modify sideslopes in the template view

Adding Template Drops

These are added to include the new templates into the corridor.

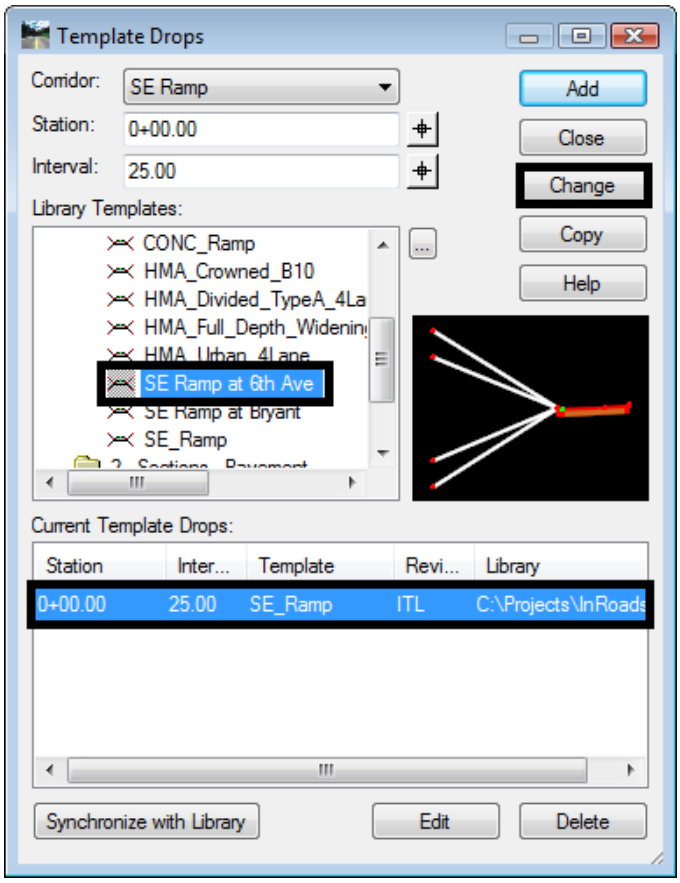
1. Open **Roadway Designer**.
2. Set the ***Corridor*** to **SE Ramp** and the ***Active Surface*** to **Existing_Ground**.

3. Open the **Template Drops** dialog box.

Because this alignment runs west to east, the first template drop is at the edge of 6th Ave. Therefore, the template for this drop is changed to use the SE Ramp at 6th Ave template.

4. Highlight the template drop in the ***Current Template Drops*** list.
5. In the ***Library Templates*** area, expand the **1 – Templates** folder and select the **SE Ramp at 6th Ave** template.

6. **<D> Change**.



The next two template drops define the change from the SE Ramp at 6th Ave to the SE Ramp at Bryant Ramp template. This change occurs in 0.01 feet so that there is an abrupt change from a template with a curb to a template without one.

7. Key in ***3+88.03*** for the ***Station***.
8. Key in ***25*** for the ***Interval***.

   Note: The interval for this template drop could be anything greater than 0.01.

9. In the ***Library Templates*** area, highlight the **SE Ramp at 6th Ave** template.
10. **<D> Add**.
11. Key in ***3+88.04*** for the ***Station***.
12. Key in ***25*** for the ***Interval***.
13. In the ***Library Templates*** area, highlight the **SE Ramp at Bryant Ramp** template.
14. **<D> Add**.

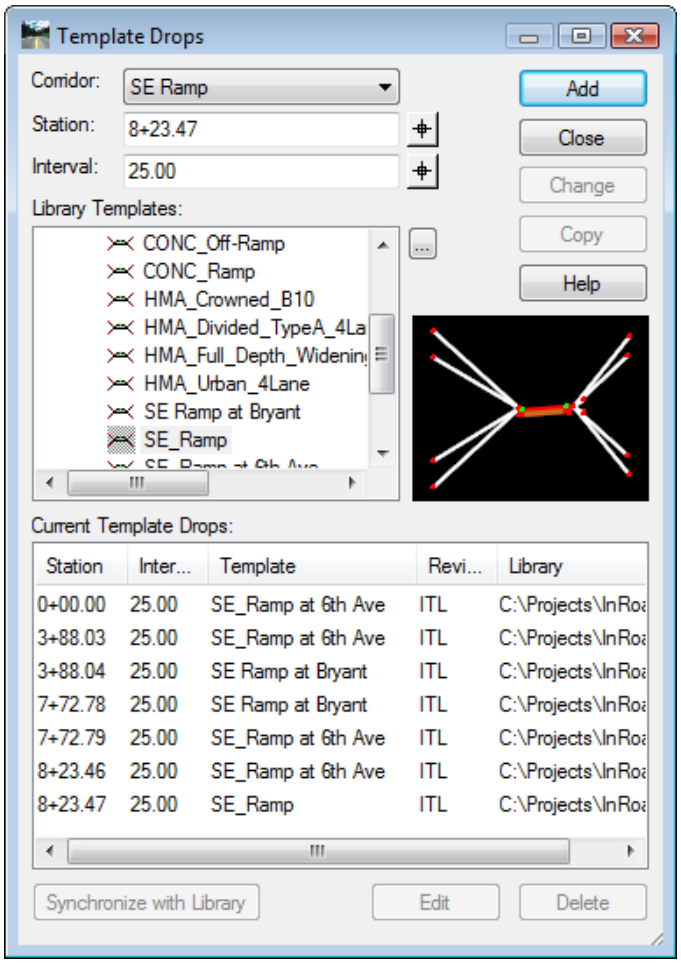
The next transitions define the end of the Bryant ramp merger. Again, an abrupt change between templates is needed so the transition occurs in 0.01 feet.

15. Key in ***7+72.78*** for the ***Station***.
16. Key in ***25*** for the ***Interval***.
17. In the ***Library Templates*** area, highlight the **SE Ramp at Bryant Ramp** template.
18. **<D> Add**.
19. Key in ***7+72.79*** for the ***Station***.
20. Key in ***25*** for the ***Interval***.
21. In the ***Library Templates*** area, highlight the **SE Ramp at 6th Ave** template.
22. **<D> Add**.

Finally the transition to an independent SE Ramp is defined.

23. Key in ***8+23.46*** for the ***Station***.
24. Key in ***25*** for the ***Interval***.
25. In the ***Library Templates*** area, highlight the **SE Ramp at 6th Ave** template.
26. **<D> Add**.
27. Key in ***8+23.47*** for the ***Station***.
28. Key in ***25*** for the ***Interval***.
29. In the ***Library Templates*** area, highlight the **SE Ramp** template.

30. **<D> Add**. The completed Template Drops dialog box is shown below.



31. **<D> Close**.

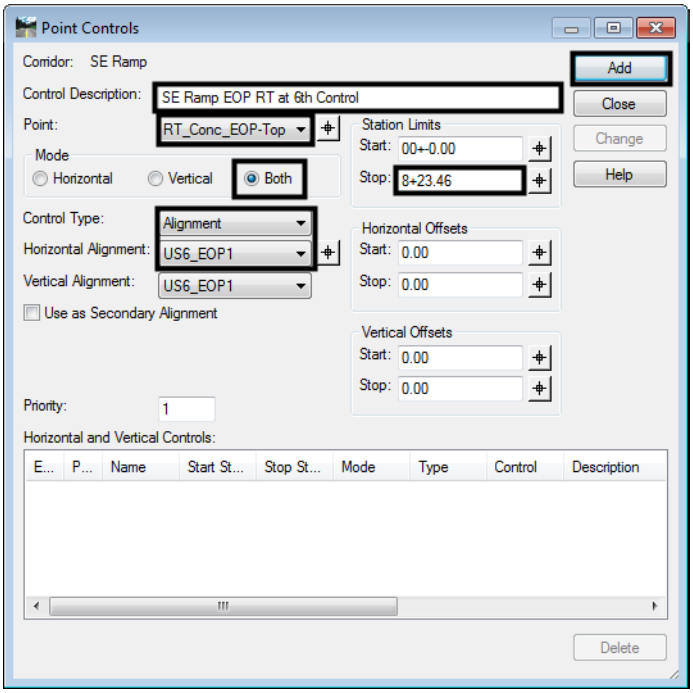
Add Point Controls for the SE Ramp

A point control is used to match the right edge of pavement of the SE Ramp templates to the existing pavement edge of 6th Ave. (defined by the US6_EOP1 alignment).

1. Select **Corridor > Point Controls** from the InRoads menu bar. This displays the ***Point Controls*** dialog box.
2. In the ***Control Description*** field, key in ***SE Ramp EOP RT at 6th Control***.
3. Select **RT_Conc_EOP-Top** for the ***Point***.
4. Toggle on **Both** for the ***Mode***.
5. Set the ***Control Type*** to **Alignment**.
6. Select **US6_EOP1** for the ***Horizontal Alignment***. The vertical alignment is automatically set.

7. In the ***Station Limits*** area, leave the ***Start*** at ***0+00.00*** and key in ***8+23.46*** for the ***Stop*** station.

8. **<D> Add** and **Close**.



Modify Side Slopes for SE Ramp

There is a area in this corridor where the computed end condition created an undesirable result. Because this area only covers two template drops, it is corrected by modifying the templates at those stations. If this area were larger, an end condition override or a new template should be used.

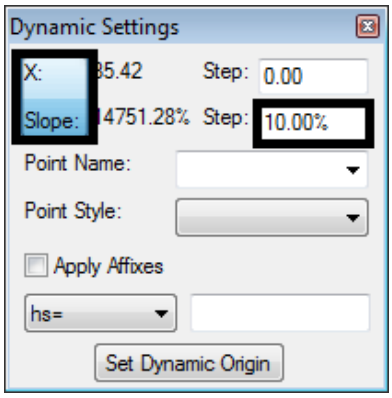
1. Set the ***Station Indicator*** to **7+72.79**.

2. **<D> <D>** in the Template View to open the ***Edit Template at Station 7+72.79 Only*** dialog box.

3. Open the ***Dynamic Settings*** dialog box.

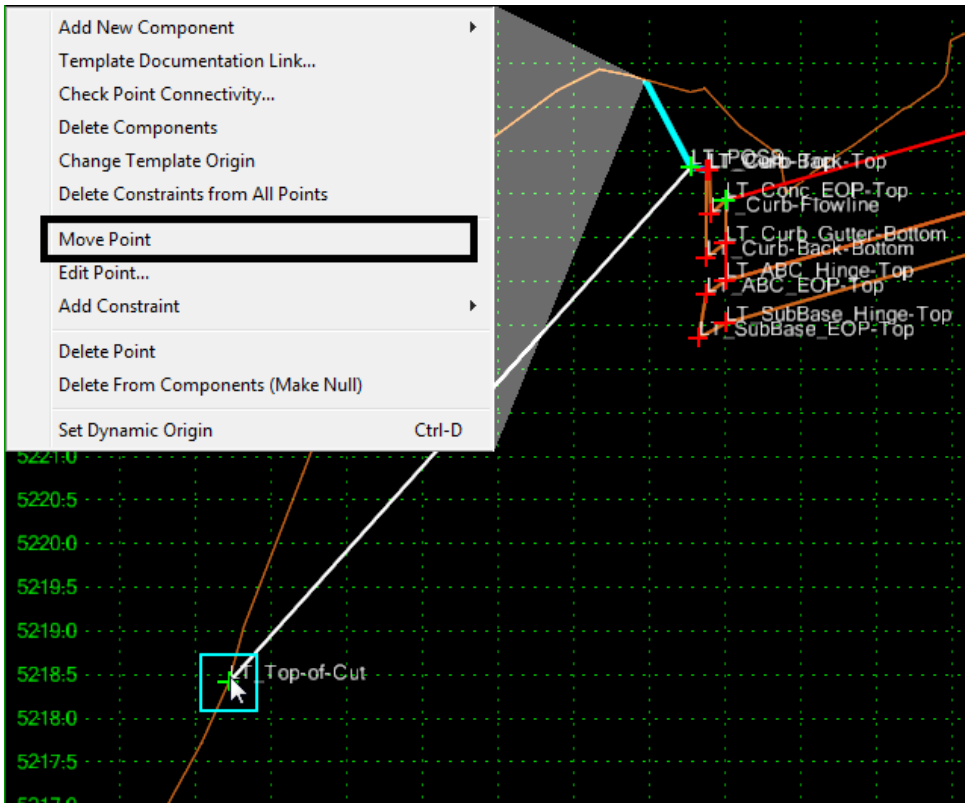
4. **<D>** on the Readout button to change it to ***X*** and ***Slope***.

5. Key in ***10.00%*** for the slope ***Step***.



6. **<R>** on **the LT_Top-of-Cut** point and select **Move Point** from the menu.

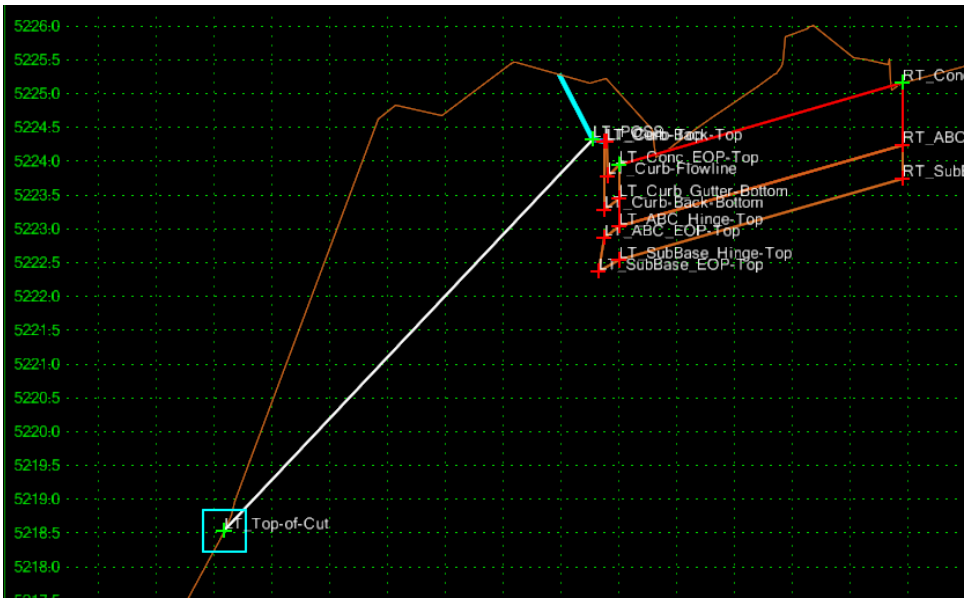
7. Move the point to the location shown in the illustration below. **<D>** to place it.



Note: The point will snap to the Existing Ground line when the cursor is moved next to the line.

8. **<D> OK** to accept the change and dismiss the dialog box.

9. Modify station **7+75.00** in a similar manner as shown in the illustration below.



Set Up for the Bryant Ramp

Section Objectives:

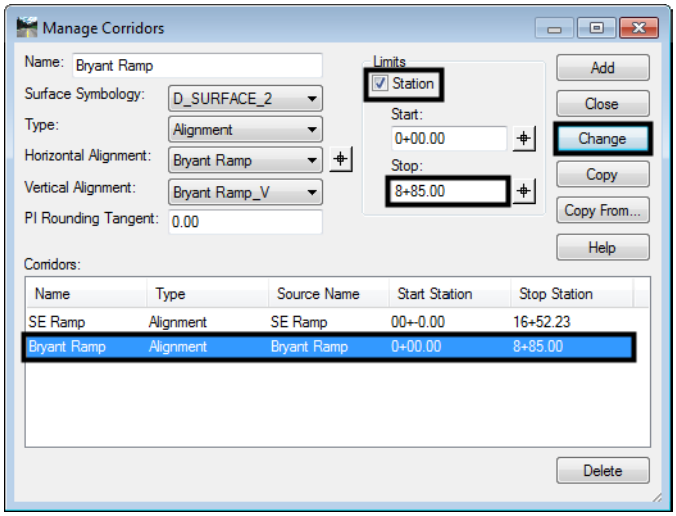
- Change the end station for the Bryant Ramp corridor
- Add template drops for the new Bryant Ramp templates
- Add point controls to match the template to the SE Ramp edge of pavement
- Define target aliasing to target the SE Ramp surface
- Modify sideslopes in the template view

Edit Corridor Stations

The Bryant Ramp alignment runs past the point where the Bryant Ramp template is no longer used. The corridor is modified to end at the same place where the template needs to end.

1. Set the ***Corridor*** to **Bryant Ramp**.
2. Select **Corridor > Corridor Management** from the InRoads menu bar. This displays the ***Manage Corridors*** dialog box.
3. In the ***Manage Corridors*** dialog box, highlight the **Bryant Ramp** entry from the ***Corridors*** list.
4. In the ***Limits*** area, toggle on **Station**.
5. Key in ***8+85.00*** for the ***Stop*** station.

6. **<D> Change** and **Close**.

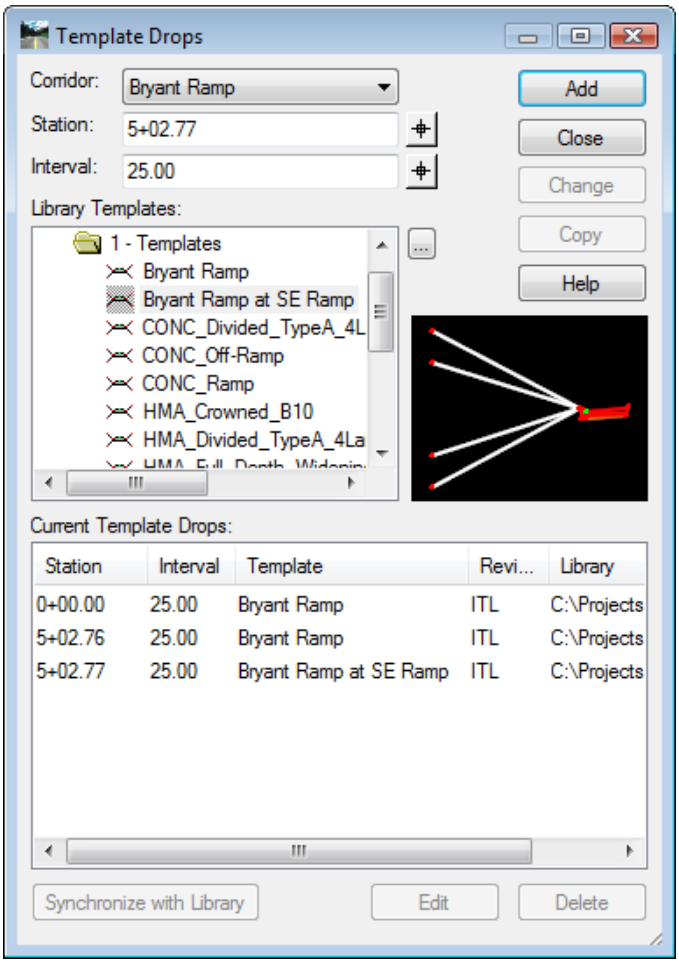


Adding Template Drops

The additional template drops are added to include the modified template properly as explained above.

1. Open the **Template Drops** dialog box.
2. Key in ***5+02.76*** for the ***Station***.
3. Key in ***25*** for the ***Interval***.
4. In the ***Library Templates*** area, highlight the **Bryant Ramp** template.
5. **<D> Add**.
6. Key in ***5+02.77*** for the ***Station***.
7. Key in ***25*** for the ***Interval***.
8. In the ***Library Templates*** area, highlight the **Bryant Ramp at SE Ramp** template.

9. **<D> Add** and **Close**. The completed Template Drops dialog box is shown below.

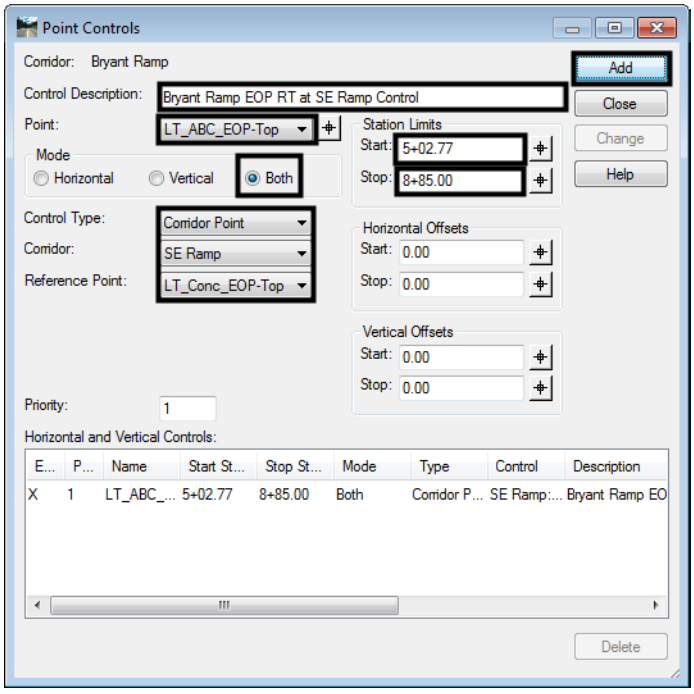


Add Point Controls for the Bryant Ramp

This point control matches the right edge of pavement of the Bryant Ramp to the left edge of pavement of the SE Ramp. It causes the Bryant ramp to transition to 0 by the end of the merger.

1. Select **Corridor > Point Controls** from the InRoads menu bar.
2. In the ***Control Description*** field, key in ***Bryant Ramp EOP RT at SE Ramp Control***.
3. Select **RT_Conc_EOP-Top** for the ***Point***.
4. Toggle on **Both** for the ***Mode***.
5. Set the ***Control Type*** to **Corridor Point**.
6. Select **SE Ramp** for the ***Corridor***.
7. Select **LT_Conc_EOP-Top** for the ***Reference Point***.
8. In the ***Station Limits*** area, key in ***5+02.77*** for the ***Start*** station and key in ***8+85.00*** for the ***Stop*** station.

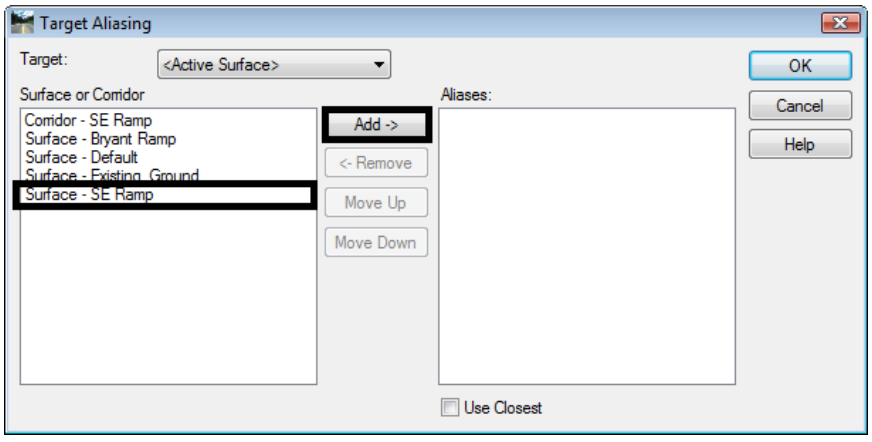
9. **<D> Add** and **Close**.



Create Target Aliasing for the Bryant Ramp

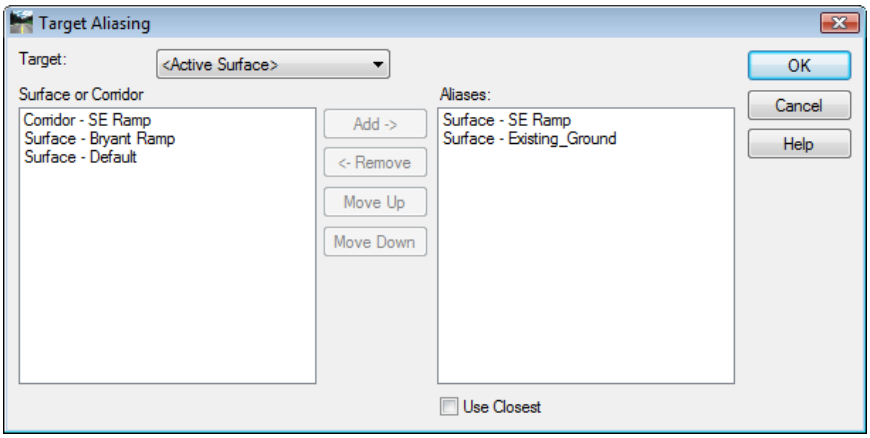
Target aliasing is used to tie the Bryant Ramp sideslope to the SE Ramp sideslope in the area before the merger. Without this, the combined surface will not triangulate properly in areas where the toes overlap.

1. Select **Tools > Target Aliasing** from the Roadway Designer menu bar.
2. Highlight **Surface – SE Ramp** in the ***Surface or Corridor*** list.
3. **<D> Add**.



4. Highlight **Surface – Existing_Ground** in the ***Surface or Corridor*** list.

5. **<D> Add**. The dialog box looks like the illustration below.

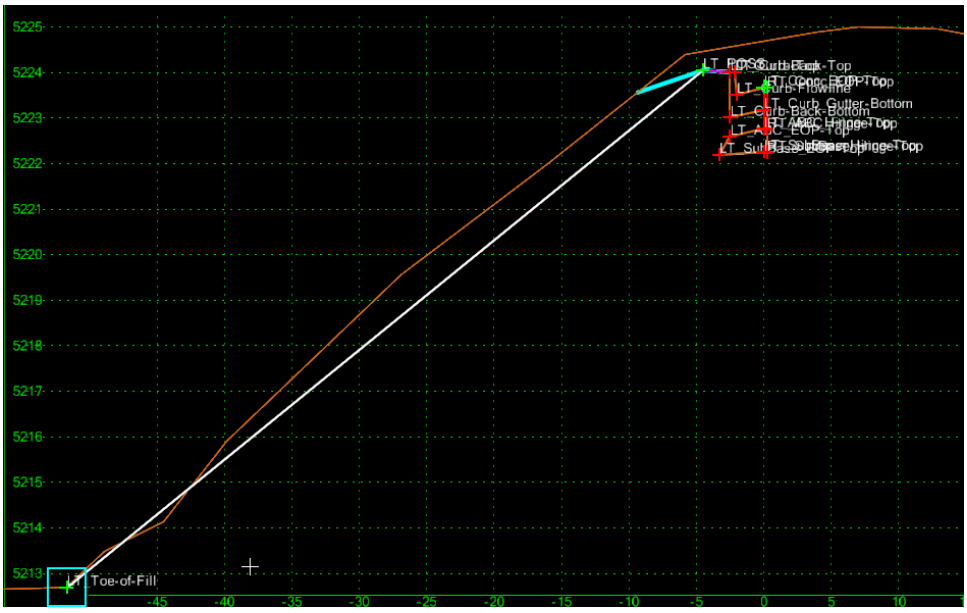


6. **<D> OK**.

Modify Side Slopes for Bryant Ramp

This corridor also has an undesirable result on a sideslope. Again, because this result occurred in a limited area, the template at the station is edited.

1. Set the ***Station Indicator*** to **8+50.00**.
2. **<D> <D>** in the Template View to open the ***Edit Template at Station 8+50.00 Only*** dialog box.
3. Move the point **LT_Toe-of-Fill** as shown in the illustration below.
4. **<D> OK** to accept the change and dismiss the dialog box



Create the Final Combined Design Surface

The two corridors are combined into one surface of the interchange.

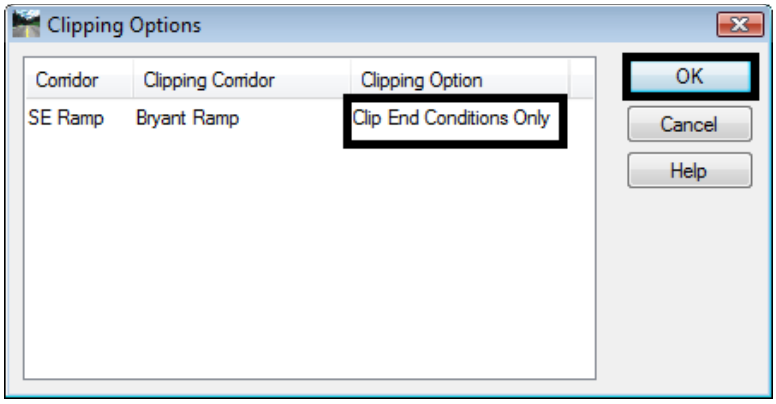
Section Objectives:

- Create a combined surface from the SE Ramp and Bryant Ramp corridors

1. Open the ***Create Surface*** dialog box.
2. In the ***Name*** field, key in ***SE-Bryant Ramps***.
3. Set the ***Default Preference*** to **Proposed**.
4. In the ***Create Surface(s) From*** list box, highlight both **Bryant Ramp** and **SE Ramp**.

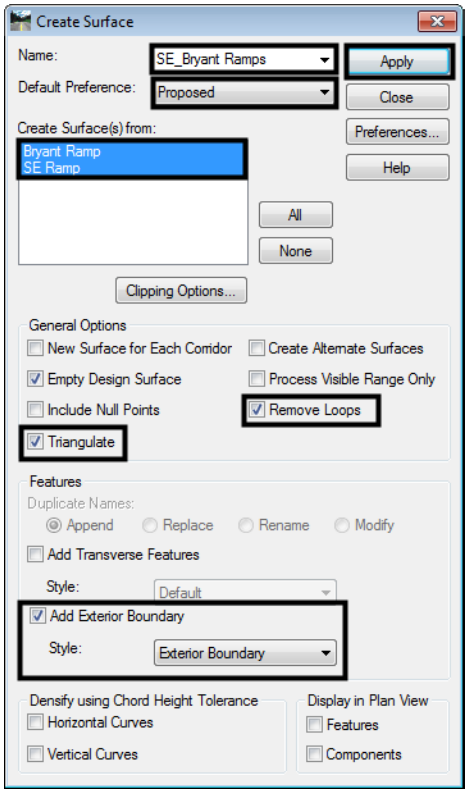
The clipping options are used to modify the combined surface where the end conditions overlap prior to the merger.

5. **<D>** the **Clipping Options** button.
6. Set the ***Clipping Option*** to **End Conditions Only**.
7. **<D> OK** to accept the change and close the ***Clipping Options*** dialog box.



8. Verify that **Add Exterior Boundary**, **Triangulate**, and **Remove Loops** are toggled on.

9. **<D> Apply** and **Close**. Also, close the ***Results*** window if it is displayed.



10. Select **File > Save** from the Roadway Designer menu bar.
11. **<D> Close** to dismiss the Roadway Designer dialog box.

Review the Results

Once the design surface is created a review of that surface will determine if additional work is required.

Cross Sections

Cross sections are one of the standard design surface review tools.

Section Objectives:

- Create a set of cross sections

Display Cross Sections with the SE Ramp Alignment

The SE Ramp alignment is the main alignment for this project, so it is used when reviewing the data.

1. Set the **SE Ramp** alignment active.
2. Open the **Create Cross Sections** dialog box.
3. Set the ***Left Offset*** to ***-150*** and the ***Right Offset*** to ***100***.

4. Select the **Existing_Ground** and **SE-Bryant Ramps** surfaces
5. **<D> Apply** and **<D>** to place the set.
6. Close the ***Create Cross Sections*** dialog box.
7. Review the cross sections paying particular attention to the merger areas.

View 3D Components

With the advent of template components, a new option has been added to the view surface commands. Viewing the design surface components in 3d is a new tool for reviewing surfaces.

Section Objectives:

- Display surface components into the MicroStation file

1. Select **Surface > View Surface > Components** from the InRoads Menu.
2. In the ***View Surface Components*** dialog box, select **SE-Bryant Ramps** for the S***urface***.
3. In the ***Component*** list, **<R>** and choose **Select All** from the menu.
4. Hold the ***Ctrl*** key and **<D>** on the ABC components to deselect them.
5. **<D> Apply** and **Close**.
6. Examine the components, rotating the view to see different perspectives.