Chapter 7 - Profiles

A profile represents the ground surface along a specified path. A profile of the horizontal alignment showing the existing surface ground line is required before creating the vertical alignment, also known as the design profile. Typically, at least to profile sets will be generated. One set is created for the plan sheets by Plan and Profile Generator and is covered in a later chapter. The other is a "working" profile that is used to create the vertical alignment and other design elements.

Chapter Objectives:

- Describe the Create Profile dialog box.
- Discuss the Update Profile dialog box.
- Examine the Annotate Profile dialog box.
- Describe Projecting a vertical alignment to a profile.

Creating Profiles

Section Objectives:

- Explain what preferences do.
- Discuss the settings on the Source, Include, and Offsets leaves of the Create Profile branch.
- Discuss the settings on the Limits leaf of the Controls branch.

Select **Evaluation > Profile > Create Profile**.
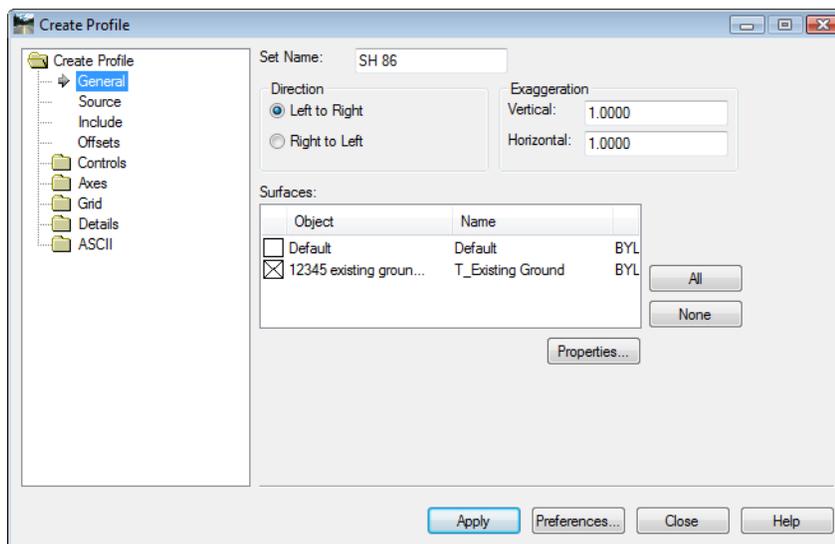
There are several CDOT preferences for the different vertical exaggerations. Choose the appropriate one under **Preferences** and **Load** it to establish the settings in the dialog.
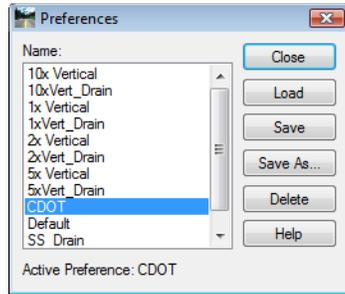
Because preferences reset the menu with predefined settings, the preference should be selected prior to making any changes to the dialog box.

Settings for the Create Profile Dialog Box

The settings for Axes, Grid, and Details are controlled by the Preferences and are not described here. Items under the Create Profile and Controls branches are set by the user and are discussed below.

Create Profile - General Leaf
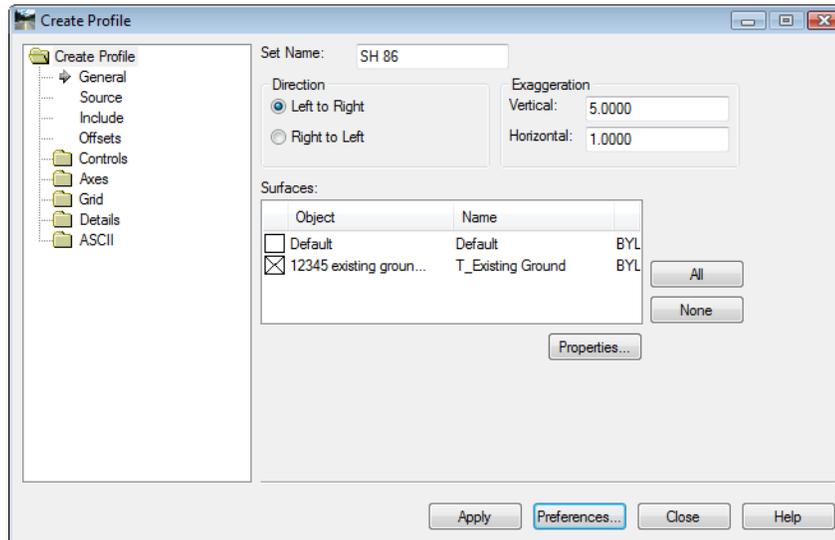
The *General* leaf is where the user makes the initial choices about the profile display. Items to examine on this leaf are:

- *Set Name* - By default this is set to the active horizontal alignment's name. InRoads uses the set name to determining which profile will be used when updating or annotating a profile if more than one exists in the drawing (dgn) file.

- *Direction* - *Left to Right* is the default value. This matches the typical alignment directions of west to east and south to north. If the horizontal alignment runs east to west or north to south, the *Right to Left* option can be selected.

- *Exaggeration* - These values are controlled by the Preference selected. If different values are required use the key in fields provided to enter the desired values.

- *Surfaces* - Toggle on the check box for each surface to be included in the profile display. By default, the first surface loaded with the *Existing* type is toggled on.

Create Profile - Source Leaf
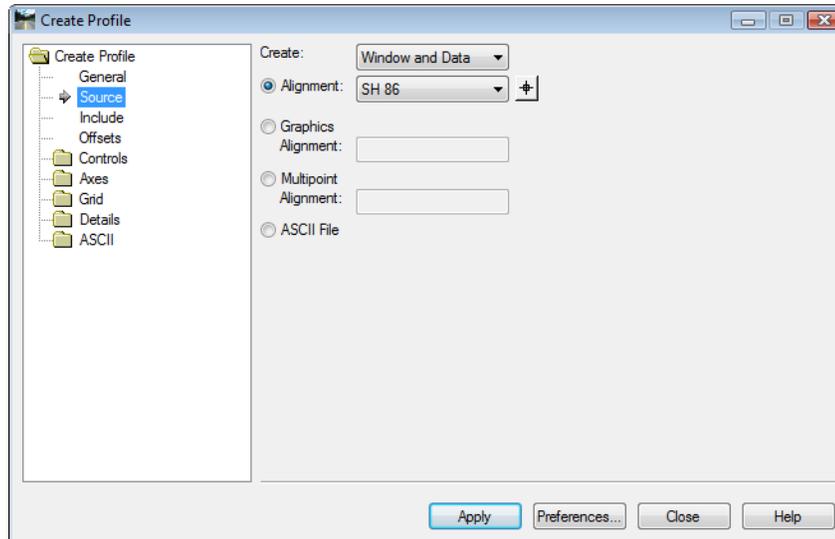
The *Source* leaf is used to specify the path along which surface data is collected for the ground line. Items to examine on this leaf are:

- *Create* - This option is used to specify if a profile window (grid) and surface data or just a profile window is displayed. If Window Only is selected, the profile grid will be created based on the Elevation Limits set on the Controls > Limits leaf (described below), even if they are toggled off.

- *Alignment* - This option is used to select the horizontal alignment along which surface data is collected. Use the drop down menu to select the desired alignment.

- *Graphics* - A MicroStation graphic element can be used to define the path for a profile. The graphic element can be a line, linestring, complex chain or closed shape. The element must be within the perimeter of one of the selected surfaces in order for the command to work.

   ♦ *Alignment* - Typically, a profile created along a graphic element can not be annotated or updated because there is no data for the graphic in the geometry project for the program to consult. Entering a name in the *Alignment* field causes the program to create a horizontal alignment from the graphic element which is stored in the active geometry project.

- *Multipoint* - This is option works similar the *Graphics* option except instead of selecting a graphic element data points are used to locate the path for the profile.

   ♦ *Alignment* - Typically, a profile created along from data points can not be annotated or updated because there is no data for the graphic in the geometry project for the program to consult. Entering a name in the *Alignment* field causes the program to create a horizontal alignment from the data points which is stored in the active geometry project.

- *ASCII* - This option uses a text file to create the profile. This text file contains two columns, one with the station and the other with the ground elevation. The filename is specified on the *ASCII* leaf.

Create Profile - Include Leaf
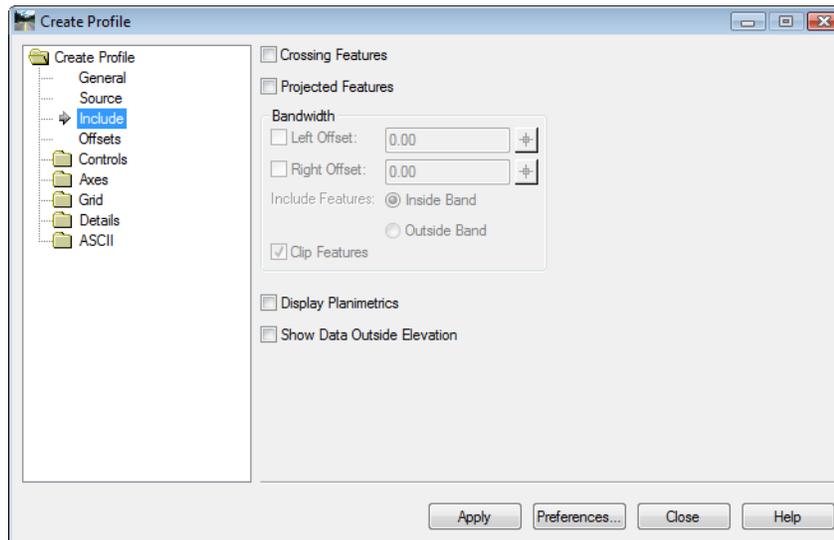
The Include leaf is used to specify additional information to be displayed in the profile window.

Items to examine on this leaf are:

- *Crossing Features* - This option displays surface features that run perpendicular to the alignment or defined path.

- *Projected Features* - This option displays surface features that run parallel to the alignment or defined path.

  ♦ *Bandwidth* - This is the distance to the left and right of the profile path that data is collected for the display of projected features.

    ○ *Include Features* - This is used to specify whether feature data is collected inside or outside the bandwidth.

    ○ *Clip Features* - When on features are clipped when they pass outside of the display area (inside or outside bandwidth specified above). When off, features partially inside the display area are displayed in their entirety.

- *Display Planimetrics* - This displays a graphic element that follows the path of the profile. This can be handy for Multipoint profiles.

- *Show Data Outside Elevation* - When on, any data inside the bandwidth will be displayed whether it is inside the profile window or not. When off, Only data that falls inside the profile's elevation range will be displayed.

  Note: This option displays all crossing features and all projected features within the bandwidth. If specific features are desired, they should be displayed using the **Update Profile** command.

Create Profile - Offsets Leaf
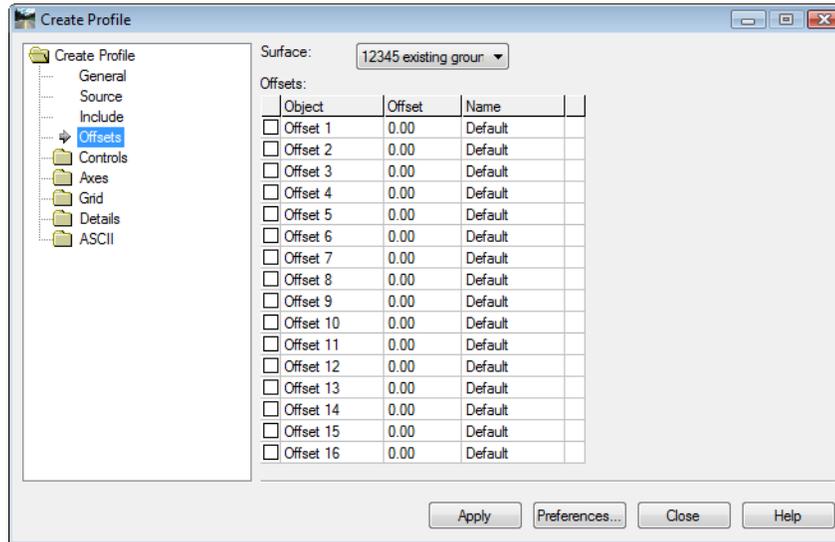
Offsets collect surface data at a specified distance from the profile path. The offset information is stored in the Surface Properties (See *Initial Surface Procedures* for more information). Toggle on the desired offsets to have that data displayed in the profile.

Controls - Limits leaf
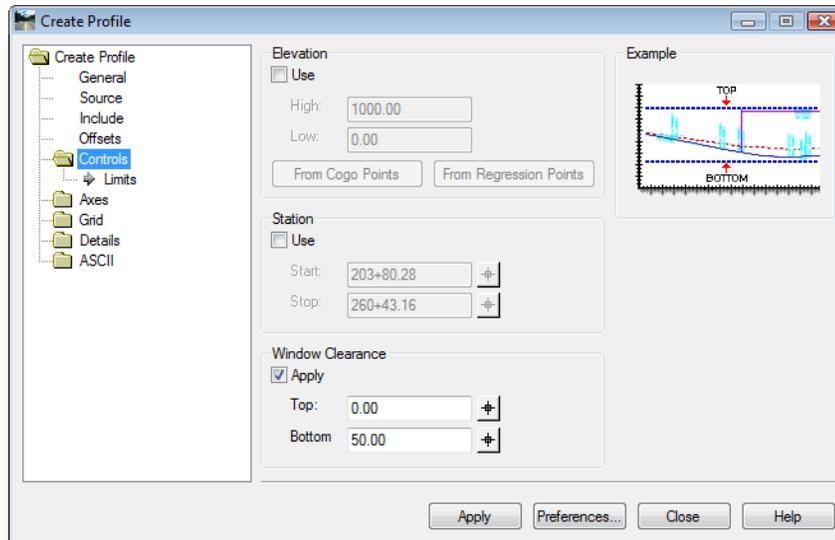
The Limits leaf is used to set a specified size to the profile window. Items to examine on this leaf are:

- *Elevation* - This is used to set the high and low elevations that will be displayed for the profile grid.

    ♦ *From Cogo Points* -When selected, the high and low elevation fields are filled in with data collected from the active geometry project's cogo buffer. The fields can be edited after the program populates the field.

♦ *From Regression Points* - When selected, the high and low elevation fields are filled in with data collected from the active geometry project's horizontal regression buffer. The fields can be edited after the program populates the field.

- *Station* - This sets the start and stop stations for the profile window.

- *Window Clearance* - This sets a minimum number of grids that will appear above and/or below the data line. Grids will be rounded up to the nearest interval specified in the Axes branch.

Displaying the Profile

Once the desired settings are made **<D>** the **Apply** button then **<D>** in the MicroStation view window. The <D> in the view locates the lower left corner of the profile grid when the direction is set to *Left to Right*. It is the lower right corner when the direction is set to *Right to Left*.
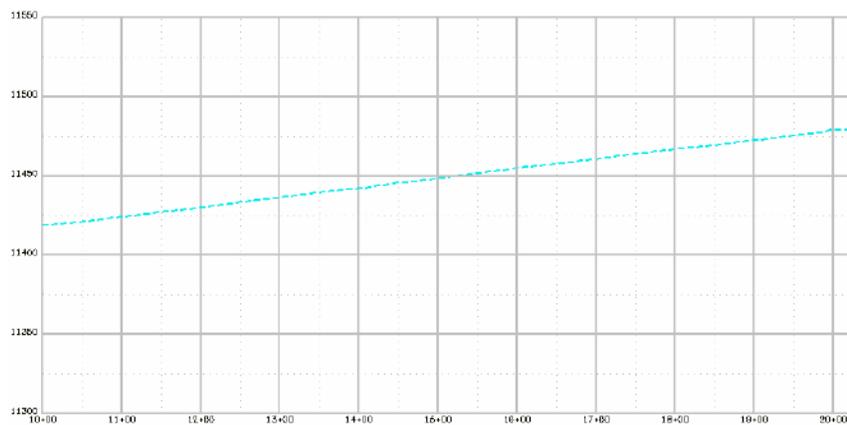
Section Summary:

- Preferences are predefined settings that can affect every leaf in the dialog box.

- Select the desired Preference before making other changes to the dialog box.

- With the exception o of the Create Profile branch and the Controls branch, all other settings are handled by the preference.

- Profiles generated from Graphics or Multipoint can not be updated because InRoads does not normally save the path by which they were created.

- Using the Alignment filed for profiles generated from Graphics or Multipoint saves the path of these as horizontal alignments in the active geometry project.

Updating Profiles

If there are changes that need to be made to the profile after it is cut, such as turning on or off a surface or features, or updating surfaces or features that have been modified, you can update the profile.

Section Objectives:

- Describe how each update Mode works.

- Discuss the settings on the various leaves.

- Discuss the Style and Filter buttons.

Select **Evaluation > Profile > Update Profile**.

There are four leaves used to update the profile, Surface, Offsets, Crossing Features, and Projected Features. These are explained below.

Profile Set and Mode
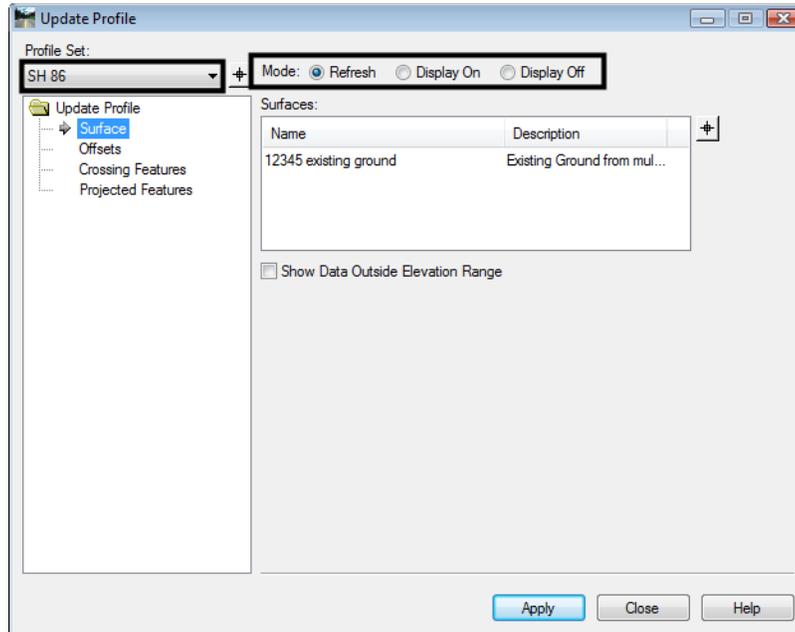
The *Profile Set* drop down menu is used to select the profile to be updated when more than one profile set exists within the dgn file. The *Mode* is common to all leaves. It is used to specify how data is modified. There are three options; *Refresh*, *Display On*, and *Display Off*.

- *Refresh* - This option is used to update existing data in the profile.
- *Display On* - This option displays items not currently shown in the profile.
- *Display Off* - This option deletes items currently displayed in the profile.

Surface Leaf
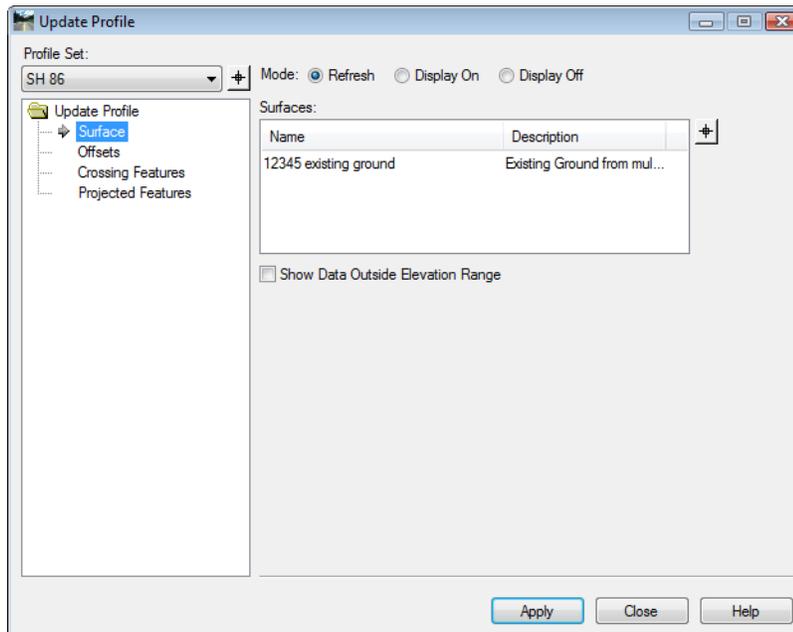
The Surface leaf is used to identify which surfaces) is to be modified.

Offsets Leaf
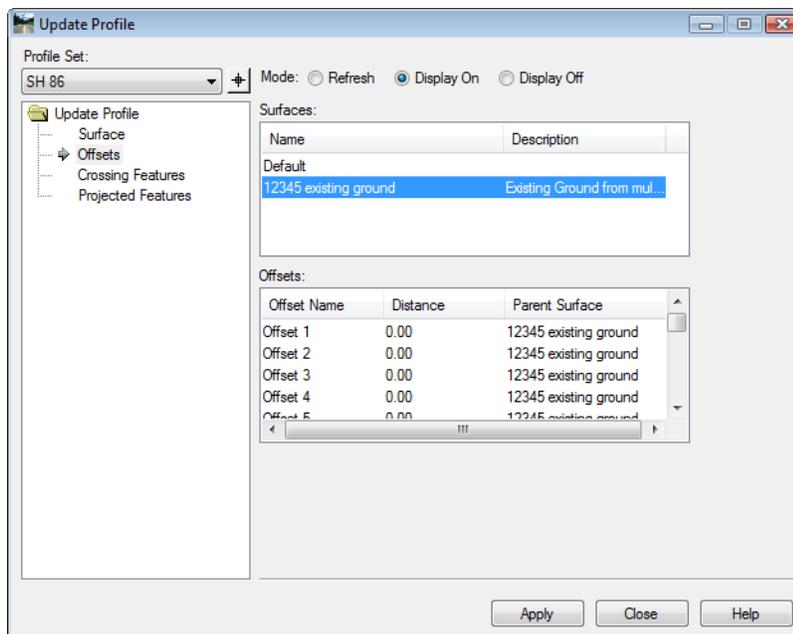
The ***Offsets*** leaf is used to update surface offsets. There are two areas in this leaf, ***Surfaces*** and ***Offsets***.

- ***Surfaces*** - This area is used to identify the surface(s) that contain the offsets to be modified.

- ***Offsets*** - This area is used to select the offset to be modified.

> ***Note:*** Changes to the offset data are made in the ***Surface Properties*** dialog box (See *Initial Surface Procedures* for more information).

Crossing Features Leaf
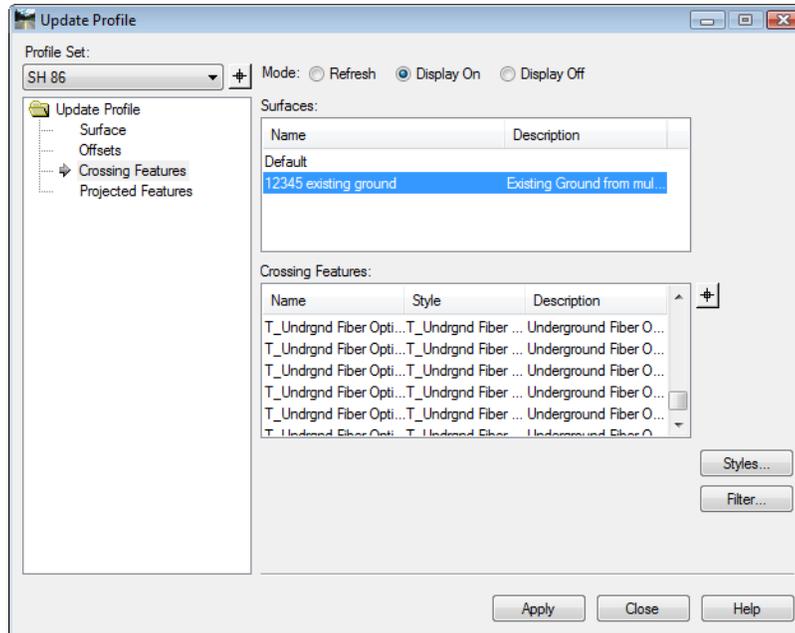
The Crossing Features leaf is used to identify features that are perpendicular to the profile path for updating. There are two areas on this leaf; ***Surfaces*** and ***Crossing Features***.

- ***Surfaces*** - This area is used to identify the surface(s) that contain the features to be updated.

- ***Crossing Features*** - This area is used to select the specific features to be modified. Features in the list are shown in one of three colors; black, grey, and red.

  - ♦ ***Black*** - This color indicates that the ***Feature Style*** allows this feature to be displayed in the profile

  - ♦ ***Grey*** - This color indicates that the ***Feature Style*** does not allow the feature to be displayed in the profile.

  - ♦ ***Red*** - This color indicates that the ***Feature Style*** does not exist in the xin file and is, therefore, not a valid CDOT style.

Projected Features Leaf
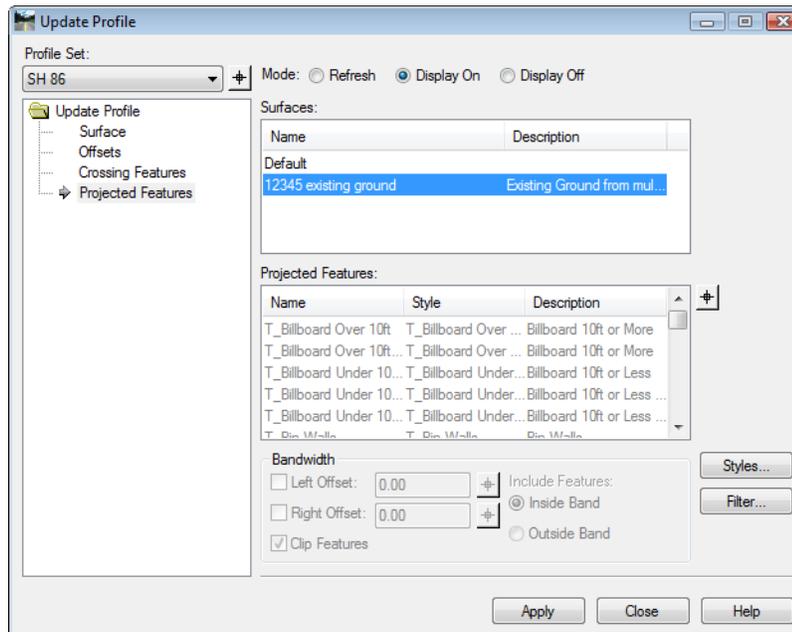
The Projected Features leaf is used to identify features that are parallel to the profile path for updating. There are three areas on this leaf; *Surfaces, Projected Features*, and *Bandwidth*.

- *Surfaces* - This area is used to identify the surface(s) that contain the features to be updated.

- *Projected Features* - This area is used to select the specific features to be modified. Features in the list are shown in one of three colors; black, grey, and red.

    ♦ *Black* - This color indicates that the *Feature Style* allows this feature to be displayed in the profile

    ♦ *Grey* - This color indicates that the *Feature Style* does not allow the feature to be displayed in the profile.

    ♦ *Red* - This color indicates that the *Feature Style* does not exist in the xin file and is, therefore, not a valid CDOT style.

    ♦ *Bandwidth* - This is the distance to the left and right of the profile path that data is collected for the display of projected features.

        ○ *Include Features* - This is used to specify whether feature data is collected inside or outside the bandwidth.

        ○ *Clip Features* - When on features are clipped when they pass outside of the display area (inside or outside bandwidth specified above). When off, features partially inside the display area are displayed in their entirety.

Styles and Filter Buttons
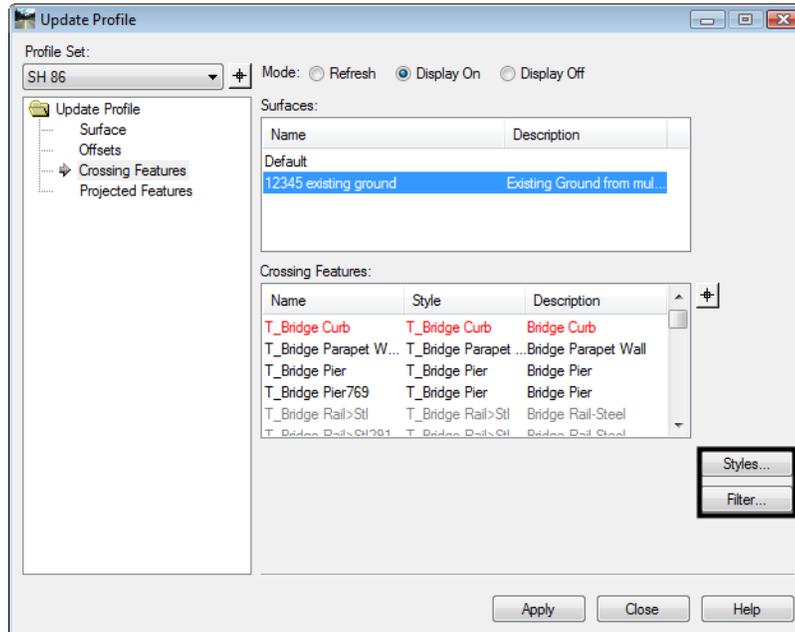
The *Style* and *Filter* buttons are used to access the *Style Manager* and *Feature Select Filter* respectively. The S*tyle Manager* is used to change feature style properties and the *Feature Select Filter* is used to limit the number of features displayed in the dialog box.

- *Styles* - This button displays the *Edit Style* dialog box for the feature highlighted in the list box. The Edit Styles dialog box is used to temporarily modify a style to allow a feature to be displayed in the profile. The toggles to do this are shown in the illustration below.
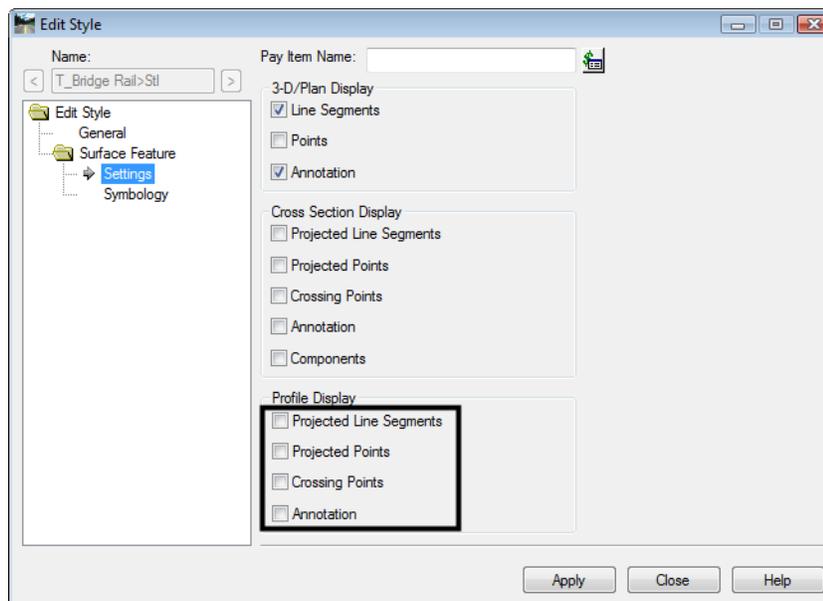
> ***Note:*** Modifying a style changes data in the ***CDOT_Civil.xin*** file. This file is managed by ServerCop and will be overwritten at the next log in, wiping out any changes made to the styles. To request a permanent change to a style, contact the CADD Managers office.

- ***Filter*** - This button activates the ***Feature Selection Filter*** dialog box. The use of feature selection filters is explained in *InRoads Options* and *Initial Surface Procedures*.
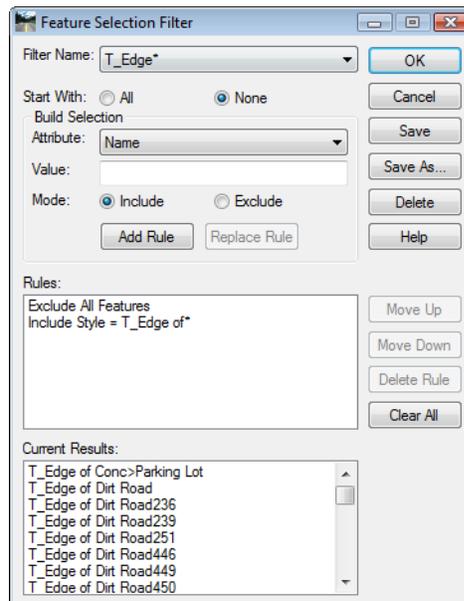
Once the desired settings have been made, **<D>** the **Apply** button to update the profile. **<D> Close** to dismiss the dialog box.

Section Summary:

- The ***Mode*** is used to specify whether data is added, removed, or updated.
- Features should be added to the profile from this dialog box because it allows control over what features are displayed and the ***Create Profile*** command does not.
- Projected features run roughly parallel to the profile's path. Crossing features run roughly perpendicular to it.
- Feature styles should only be changed to allow an item to be displayed in the profile. Changes to styles will be overwritten at log in.
- Use feature selection filters to reduce the items listed in a list box when searching for specific features.

Profile Annotation

Section Objectives:

- Discuss the profile annotation preferences.
- Describe items on the General leaf.
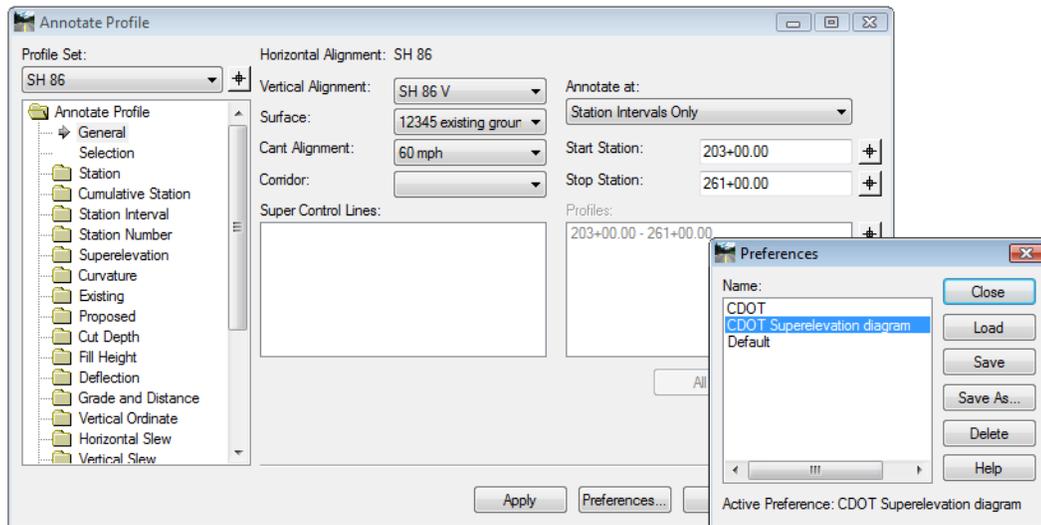
Annotation is used to put text data in the profile. Typically, this is in the form of existing ground and proposed ground elevations. There are two Preferences set up for CDOT annotation. The **CDOT** preference displays existing and proposed ground elevations. **CDOT Superelevation Diagram** adds the superelevation diagram to the surface data. The desired preference should be selected prior to making changes in the dialog box. The preference sets the information in the other leaves of the dialog box, so the user only needs to look at the *General* leaf.

General Leaf
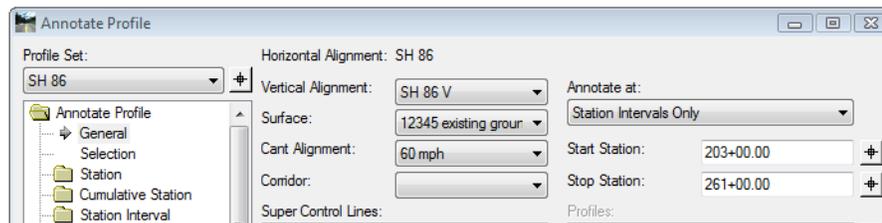
The General leaf is used to specify where data is taken from for the annotation. The items to examine are:

- *Profile Set* - This is used to specify which profile to annotate when more than one exists in the dgn file.

- *Vertical Alignment* - Proposed elevations are taken from the vertical alignment selected with this drop down menu.

- *Surface* - Existing elevations are taken from the surface selected with this drop down menu.

- *Cant Alignment* - This is used in rail applications and will not affect roadway design data.

- *Corridor* - This drop down menu is used to specify the corridor that contains the superelevation data to be annotated.

- Superelevation Control Lines - This area is used to select which superelevation control lines are used to create the superelevation diagram.

After the desired settings are made, **<D>** the **Apply** button to display the annotation. The illustration below is an example of annotation using the ***CDOT Superelevation Diagram preference.***
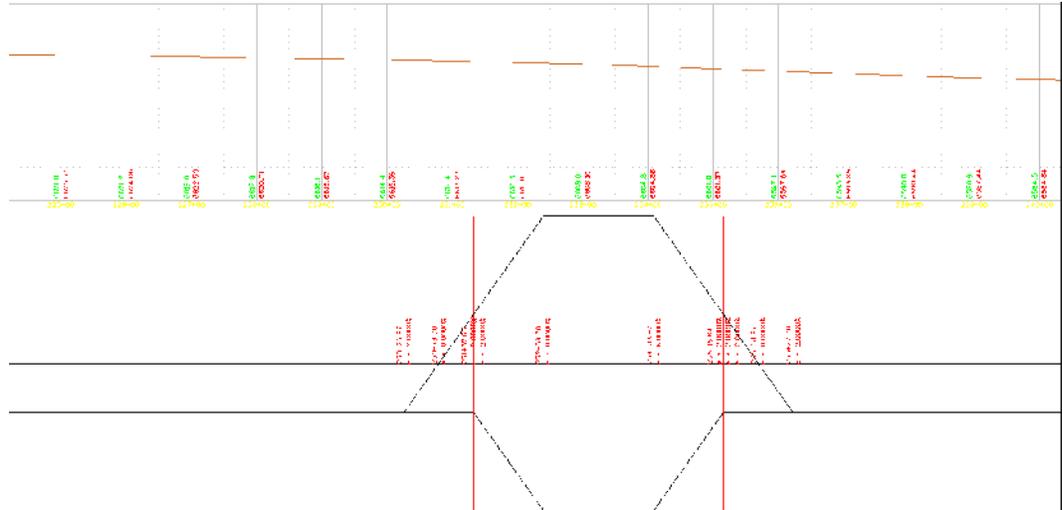
The green text (to the left of the grid line) represents the existing ground elevations. The red text (to the right of the grid line) is the proposed elevations. The superelevation diagram is placed below the profile grid.

Section Summary:

- There are two preferences that manage profile annotation; CDOT for most uses and CDOT Superelevation Diagram when the superelevation diagram is required.

- There is a separate command for annotating vertical geometry. The Annotate Profile command is mainly concerned with adding surface data annotation.

Projecting A Vertical Alignment From Another Horizontal Alignment On To A Profile

The ability to display the vertical alignment from one horizontal alignment into the profile of another will come in handy when designing merging roadways.

Section Objectives:

- Discuss the Alignments to Profile command

To display a projected vertical alignment select **Evaluation > Profile > Alignments** to Profile from the InRoads menu bar.
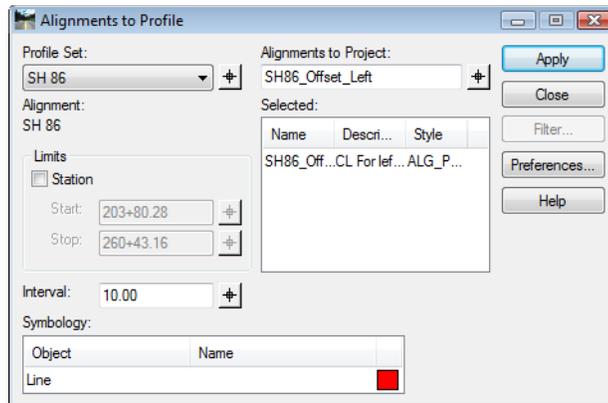
The following items should be examined:

- *Profile Set* - This is used to select the profile that will be updated when more than one profile exists in the dgn file.

- *Limits* - Station Limits are used to define a specific area where the projected alignment will be displayed. To use Station Limits, toggle on *Station* and key in the *Start* and *Stop* stations.

- *Interval* - The projected alignment is not a display of the geometry elements of the selected vertical alignment. Instead, elevations of the projected alignment are plotted in the profile at corresponding stations and connected by a linestring. The interval determines the stations where data is collected.

- *Alignments to Project* - this field is used to specify the alignment(s) that will be displayed in the profile. Key in the alignment name to specify the desired alignment. a wildcard, the "*", can be used to specify multiple verticals. The alignment can also be identified by using the "target" button and selecting a graphic of the horizontal alignment that contains the desired vertical alignment.

After the desired settings are made, **<D> Apply** to display the projected alignment into the profile. **<D> Close** to dismiss the dialog box.

Section Summary:

- Use this command to aid in merging one vertical alignment into another.

- Projected alignments can not be annotated.

Chapter Summary:

- Profiles are used when designing vertical alignments.

- A profile consists of a path (horizontal alignment, graphic element, or series of data points) and the elevations of a surface under that path.

- Use Update Profile to add additional details like crossing and projected features.

- Annotate the working profile with the existing ground elevations. It will make it easier to determine elevations at particular stations.

- Use projected alignments when designing a merging roadway.