Be Together
THE BENTLEY USER CONFERENCE

Working *Smarter,* Together

MAY 15 – 17, 2012 | PHILADELPHIA, PA., USA

Bentley

Bentleyuser.dk Årsmøde 2012

Nordic Civil 2012

5.-7. November 2012, Munkebjerg Hotel, Vejle

Workshop – X15

SELECTseries 3 Technology Preview Workshop

Corridor Modeling

Team Leader: Joe Waxmonsky, PE

Bentley Systems, Incorporated
685 Stockton Drive
Exton, PA 19341
www.bentley.com

This page left intentionally blank.

Table of Contents

Command Index

This page left intentionally blank.

Preface

In this workshop, you will design a bifurcated roadway system utilizing the V8*i* (SELECTseries 3) Corridor Modeling tools. We have structured the contents of the exercises herein to allow your interaction with a broad range of available tools; however, we will not use every tool. While it is impossible to engineer a complete project in the time frame of this workshop, we will use the tools in their real-life context so that you can see how to utilize them in your own engineering projects.

This workshop is equally applicable for the MX, InRoads or GEOPAK families of products. Each product contains the identical toolset and identical workflow. The only differences between the three products for the tools are slight differences in the use of feature definitions and some differences in the back-end interaction with other native toolsets, such as drainage. In this workshop, we will use Power InRoads or Power GEOPAK (your choice) V8*i* 08.11.09.xxx.

In the reference file, *video links.dgn*, there will be text entitled with the chapter number. Right clicking on this text will show an option for “Open Link”. This will allow a student whom may be struggling with a particular exercise the ability to watch the video to see how the steps were performed. The video will have audio, so you should mute your computer before viewing. It is encouraged to only watch the videos as a last resort or to review them upon completion of the exercise to compare your results.

In order for all participants to design the same layout and to stay on course and on time, we have provided the completed data for each chapter. This will allow all participants to begin each Chapter at the same starting point as the class.

The workshop guide is yours to take with you. If you don’t finish all the exercises, or just want to work with the dataset upon return to your office, the datasets (both initial and completed files) are provided on the Conference DVD. Many workshops will also have videos of all exercises on the DVD.

Note Prerequisite Knowledge Level: Participant should have a basic understanding of road design principles and be fluent in the use of one of the Bentley Power products or CAD and the native application (MX, InRoads or GEOPAK).

This page left intentionally blank.

Chapter 1: Introduction to Corridor Modeling

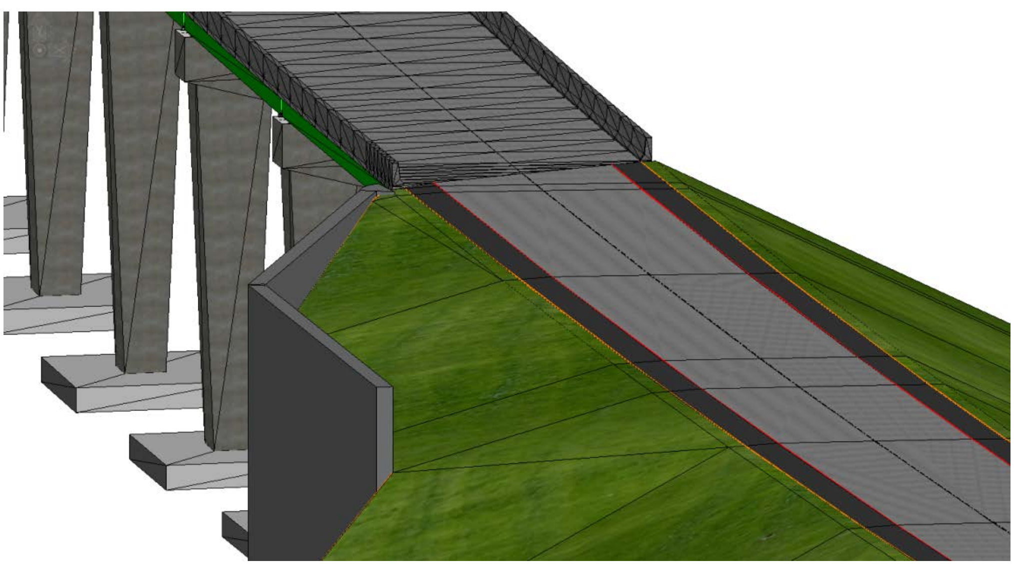
OVERVIEW

In this workshop, we will be designing northbound lanes of a bifurcated highway facility which has the southbound lanes already modeled. Participants will create a Northbound Corridor from data that exists in MicroStation DGN files, which includes Terrain Models, Horizontal Geometry, Vertical Geometry, MicroStation Graphics and an existing Southbound Corridor. These Civil components exist in several DGN's which allows for a federated workflow to be performed through MicroStation Referencing. Participants will also observe and use data from other engineering disciplines that will aid in the decision process in the design of the roadway system.

The intent of this workshop is to help introduce and provide better understanding of the functionality of the corridor modeling tools in Bentley Civil (SELECTseries 3). These new tools leverage Roadway Designer Technology that is found in previous version of the Bentley Civil Product Line and expands it into the MicroStation DGN environment.

PROJECT DESCRIPTION

In this workshop we will be introducing and completing seven specific steps to construct the northbound facilities. In lieu of time constraints, the focus will be on the new concepts and operations of the new corridor design tools. Subsequently, some of the project has been prepared for us, which is not unlike "real world" production work where multiple colleagues are part of the design process. However the use of the primary corridor modeling tools will be covered in this workshop.



Finished Highway Facility

Project Steps

1. Introduction
2. Assembling the "Building Blocks" of the Corridor via Referencing
3. Create a Corridor
4. Add a 3 Lane Section with a Transition
5. Dynamic Sections
6. Targeting the Southbound Corridor & Structures
7. Applying Superelevation
8. Clipping

Getting Started

As we begin today's workshop, let's do some quick checks to be sure your workstation / laptop is ready to go. We have preloaded the workshop files and settings in order to save set-up time.

Exercise: Check Workshop / Laptop Settings

Exercise Objective: Open the correct design file selecting the proper user configuration file.

Procedure:

1. Use the provided login and password to access your laptop if not previously logged in.
2. Your instructor will provide you the path to the workshop dataset. Select either the Power InRoads or Power GEOPAK icon on your desktop. In the File Manager dialog, set the User to ***BC4WK1*** and open the design file: ***NB_Corridor.dgn***.
3. Select **Workspace > Configuration** from the Power GEOPAK or Power InRoads main menu bar.
4. Scroll down and click the variable **MS_DGNLibList.**
5. Check to ensure the workshop path is included as one of the listings. If it is not listed, please advise the instructor.

Chapter Summary

In this chapter, we have been introduced to the design task assignments for this project as well as assuring the correct workspace and configuration settings are present.

Chapter 2: Assembling the "Building Blocks"

OVERVIEW

In this chapter, we will prepare our empty DGN with the "ingredients" to create a corridor via MicroStation Referencing.

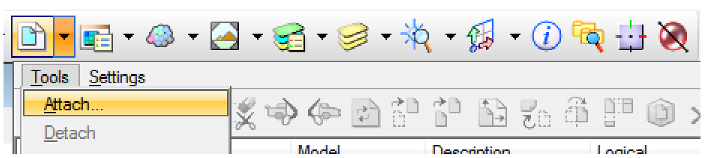
REFERENCE THE TERRAIN MODEL

Exercise: Referencing the Existing Ground.dgn

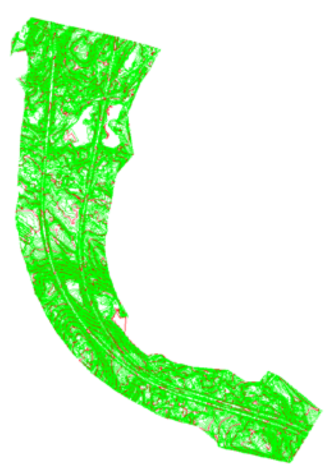
Exercise Objective: Make the existing ground terrain model available for the corridor to be built upon in the current empty DGN file, NB_Corridor.dgn.

Procedure:

1. Remain in the file *NB_Corridor.dgn.*
2. Select the MicroStation reference tool and select **Attach**.

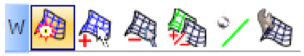


3. Navigate to **Existing Ground.dgn**
4. Attachment Method- **Coincident World.**
5. Select **Open.**
6. Perform a MicroStation to **Fit All** to bring the Terrain Model into view.



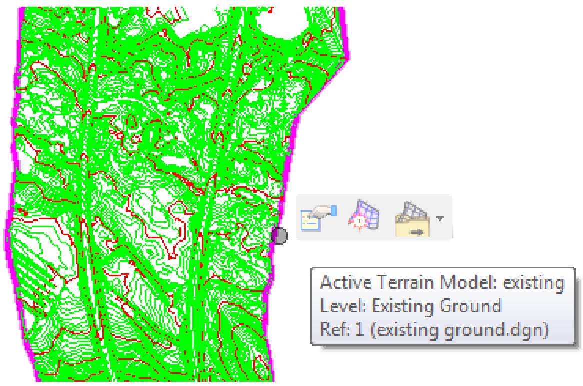
Existing Ground

Terrain Model Tool Used:

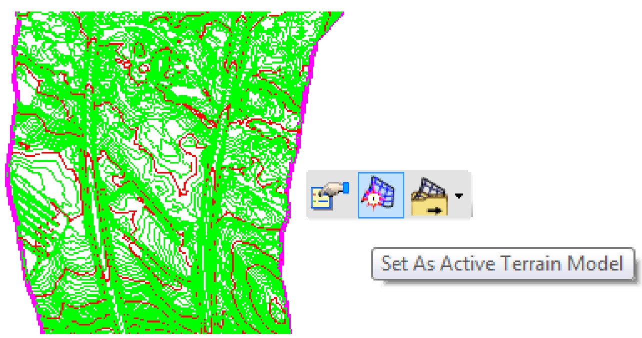
TERRAIN MODEL PANEL	ICON	TOOL
		Set As Active Terrain Model

Note	The Context Tool Bar will be used in lieu of the Task Navigation Menus. The advantage of the Context Tool Bar is it keeps your focus on the data and not on the location of the actual tool.

7. Next we will set the Active Terrain Model. This can be done from the Terrain Modeling Task. However, we will use Context Tool Bar. Using **MicroStation - Select**, the Terrain Model. The following will appear.

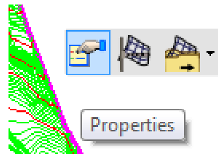


8. Move your Cursur on the **Set As Active Terrain Model** icon on the Context Tool Bar and **Select** it.



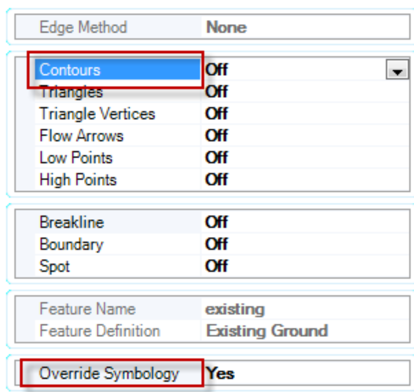
Note	The Context Tool Bar will disappear when you move your cursor away from it, also the ***Set As Active Terrain Model*** is DGN file specific.

9. Contouring is helpful for other tasks in the design process but it is not advantageous for Corridor Modeling. So again use **MicroStation - Select**, and select the *existing* Terrain Model and **Select** the first icon to display the **Properties.**



Context Tool Bar – Properties Selection

10. In the Properties, change the field *Override Symbology* by **double clicking** on *Override Symbology* or **Selecting** the field that contains *No* and choose **Yes** in the pull down.



Quick Properties adjustment of Override Symbology

11. With the *Properties* still displayed, change the field *Contours* by **double clicking** on *Contours* or **Selecting** the field that contains *On* and choose **Off** in the pull down.

Note	Spend some time experimenting with different settings. But when done, set the properties as shown above. Remember, the terrain model exists in a Read-Only reference file.

REFERENCE GEOMETRY

Exercise: Reference NB_Geometry.dgn

Exercise Objective: Make the Northbound horizontal and vertical geometry available in NB_Corridor.dgn.

Procedure:

1. Remain in the file *NB_Corridor.dgn.*
2. Select the MicroStation reference tool and select ***Attach.***
3. Navigate and **Select** *NB_Geometry.dgn.*
4. Attachment Method- **Coincident World.**
5. Select **Open.**
6. Again use the *Context Tool Bar* for the geometry that was referenced. Review the *Properties* and the other available tools for Geometry. Try using the Horizontal Geometry Report.

Note	Quick Properties are available on any Featurized Civil element. The Quick Properties will be context sensitive meaning they will only show applicable settings based on what the element is.

CHAPTER SUMMARY

In this chapter, we have learned how to:

1. Reference and Manage the view of the existing ground Terrain Model.
2. Reference the necessary Civil Geometry Elements that are needed to build a corridor.
3. Learned how to access and use Context Tool Bars.

Chapter 3: Create Corridor

Overview

In this section, we will learn the steps associated with creating the Northbound Corridor. A Corridor will be created by using a template from a template library (.ITL). However, the corridor and its definition will become an object that is contained within the DGN file.

Create a Northbound Corridor

Exercise: Create Corridor

Exercise Objective: Construct 2 Corridors for the Northbound.

Corridor Modeling Tools Used:

Corridor Modeling	Icon	Tool
		Create Corridor

Procedure:

1. Remain in the file *NB_Corridor.dgn*.
2. Using MicroStation Select- **Select** the NB_geometry. The following Context Tool Bar will appear. Choose the **Create Corridor** tool.

3. Follow the heads-up prompts.

HEADS-UP PROMPT	USER ACTION
Locate Profile-Reset for Active profile	**Right mouse click** to reset and to accept the Active Profile.
Corridor Name	Key in **North_Bound** corridor and then **Data Point** to accept.
Select Template	Select <ALT> DOWN ARROW to open the Template Picker. Select Templates > **Templates / 2 lane Rural** then OK. **Data Point** to accept the Template selection
Start Station	Select **<Alt>** Key to lock the Station to the beginning of the geometry then **Data Point** to accept.
Stop Station	Key in Station **1245+16.30** and **Enter** to lock and then **Data Point** to accept.
Drop Interval	Enter in **10.00** and then **Data Point** to accept. Use Arrow up/down to advance cursor in the Heads Up Display.
Minimum Transition Before Drop	Enter in **0.00** and then **Data Point** to accept.
Minimum Transition after Drop	Enter in **0.00** and then **Data Point** to accept.

4. **Right Click** to exit the tool. The tool will allow multiple Template Drops to be placed without re-invoking the tool.
5. Examine the Corridor.
6. Using MicroStation Select- **Select** the NB_geometry again. Choose the **Create Corridor** tool.
7. Follow the heads-up prompts.

HEADS-UP PROMPT	USER ACTION
Locate Profile-Reset for Active profile	**Right mouse click** to reset and to accept the Active Profile
Corridor Name	Key in **North_Bound1** and then **Data Point** to accept.
Select Template	Select ALT > DOWN ARROW to open the Template Picker. Select Templates > **2 lane Rural** then OK. **Data Point** to accept the Template selection.
Start Station	Key in Station **1249+03.60** and **Enter** to lock and then **Data Point** to accept.
Stop Station	Key in Station **1267+00.00** and **Enter** to lock and then **Data-Point** to accept.
Drop Interval	Enter in **10.00** and then **Data Point** to accept.
Minimum Transition Before Drop	Enter in **0.00** and then **Data Point** to accept.
Minimum Transition after Drop	Enter in **0.00** and then **Data Point** to accept.

8. **Right Click** to exit the tool.

CHAPTER SUMMARY

In this chapter, we have learned how to Create a Corridor. We will further investigate why we made two corridors in the upcoming lessons.

Chapter 4: Add a 3 Lane Section with a Transition

Overview

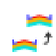
In this section, we will copy an existing template drop and apply it to a different station range. We will make the new template a 3 lane section and add a transition between the two lane and the newly created 3 lane section.

Copy Template Drop

Exercise: Copy Template Drop

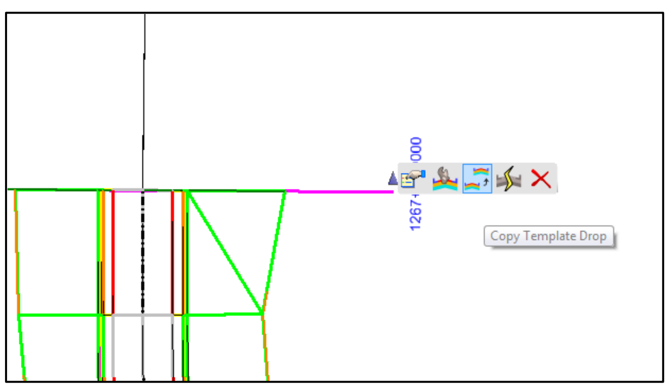
Exercise Objective: Create a 3 Lane Section of Roadway for the NB_Corridor1.

Corridor Modeling Tools Used:

Corridor Modeling	Icon	Tool
		Copy Template Drop

Procedure:

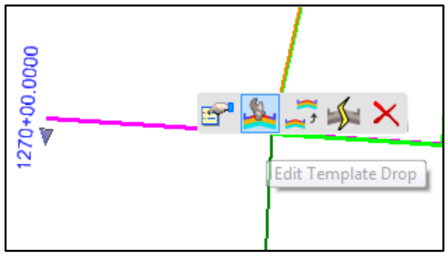
1. Remain in the file *NB_Corridor.dgn*.
2. Using MicroStation Select- **Select** the Template Drop marker @ 1267+00. The following Context Tool Bar will appear. Choose the **Copy Template Drop** tool.



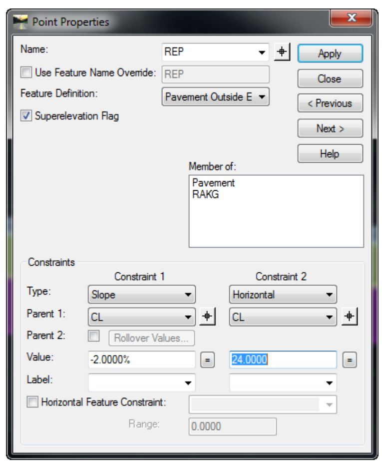
3. Follow the heads-up prompts.

Heads-Up Prompt	User Action
Start Station	Key in Station 1270+00.00 and **Enter** to lock and then **Data Point** to accept.
Stop Station	Key in Station 1300+00.00 and **Enter** to lock and then **Data Point** to accept.

4. Using MicroStation Select- **Select** the Template Drop marker @ 1270+00. The following Context Tool Bar will appear. Choose the **Edit Template Drop** tool.



5. **Double click** the *REP* point in the template to enter the Point Properties dialog. Modify the horizontal Constraint Value to **24**.



6. **Apply** then **Close** the Point Properties Dialog.
7. **OK** to accept and dismiss the Editing Roadway Designer Template Drop dialog.

Create Transition

Exercise: Create Transition

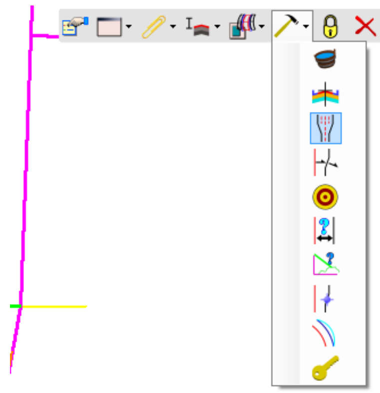
Exercise Objective: Create a 3 Lane Section of Roadway for the NB_Corridor2.

Corridor Modeling Tools Used:

Corridor Modeling	Icon	Tool
		Create Transition

Procedure:

1. Navigate view where a gap exists in the model between 1267+00 and 1270+00 where the Copy Template was performed.
2. Using MicroStation Select- **Select** the Corridor marker near the corridors boundary. The following Context Tool Bar will appear. Choose the **Create Transition** tool.



3. Follow the heads-up prompts.

HEADS-UP PROMPT	USER ACTION
Locate First Template Drop	Locate & **Select** the Template Drop marker near 1267+00, the 2 lane section.
Locate Second Template Drop	Locate & **Select** the Template Drop marker near 1270+00, the 3 lane section.

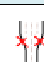
4. **Right Click** to exit tool.

EDIT TRANSITION

Exercise: Edit Transition

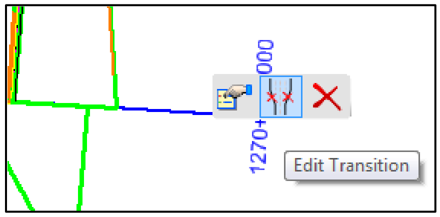
Exercise Objective: Modify the constraints in the transition allowing for a smooth transition from the 2 lane section to the 3 lane section of roadway.

Corridor Modeling Tools Used:

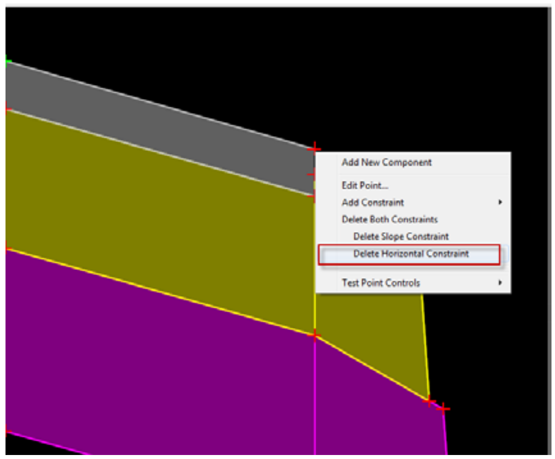
CORRIDOR MODELING	ICON	TOOL
		Edit Transition

Procedure:

1. Using MicroStation Select tool and **Select** the blue Template Transition marker near the beginning or end of the transition. The following Context Tool Bar will appear. Choose the **Edit Transition** tool.



2. Click **Ok** to accept the transition of the template points between the two lane and the 3 lane templates.
3. Dismiss the reminder dialog to “Remove Constraints” by clicking **OK**
4. **Right Click** on *REP* Point and select **Delete Horizontal Constraint.**



5. Select **OK**.

CHAPTER SUMMARY

In this chapter, we have copied an existing template drop and modified it to be a 3 lane roadway section. We also created a 300’ transition between the 2 lane section and the 3 lane section to accommodate an additional lane of traffic.

Chapter 5: Dynamic Cross Sections

OVERVIEW

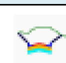
This section will cover the Cross Section View tool. The cross section view is powerful tool to aid the engineer to make design decisions. These sections use Dynamic Section Technology from MicroStation. This gives the sections the ability to cut through any Elements that are displayed in the DGN file. The graphics can be created from Bentley Civil or any other discipline, which makes this technology a valuable asset.

OPENING A DYNAMIC CROSS SECTION VIEW

Exercise: Opening a Cross Section View.

Exercise Objective: In this exercise, the user will learn to open a view and set it to a cross section model view.

Corridor Modeling Tool Used:

CORRIDOR MODELING PANEL	ICON	TOOL
		Open Cross Section View

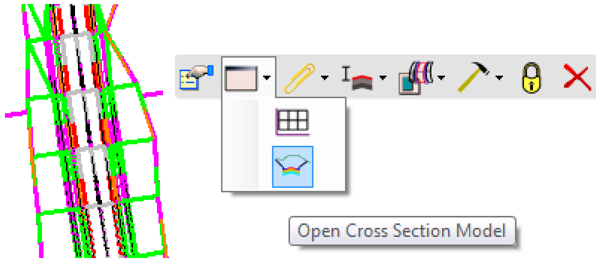
Procedure:

1. Remain in *NB_Corridor.dgn.*
2. Reference in the following files with the Attachment Method- **Coincident World.**
    i. SB_Corridor.dgn
    ii. SB_Bridges & Walls.dgn
    iii. NB_Bridges & Walls.dgn
    iv. Drainage.dgn

Hint	Reference all the files at once by holding the CTRL Key and choose the Attachment method – Coincident World.

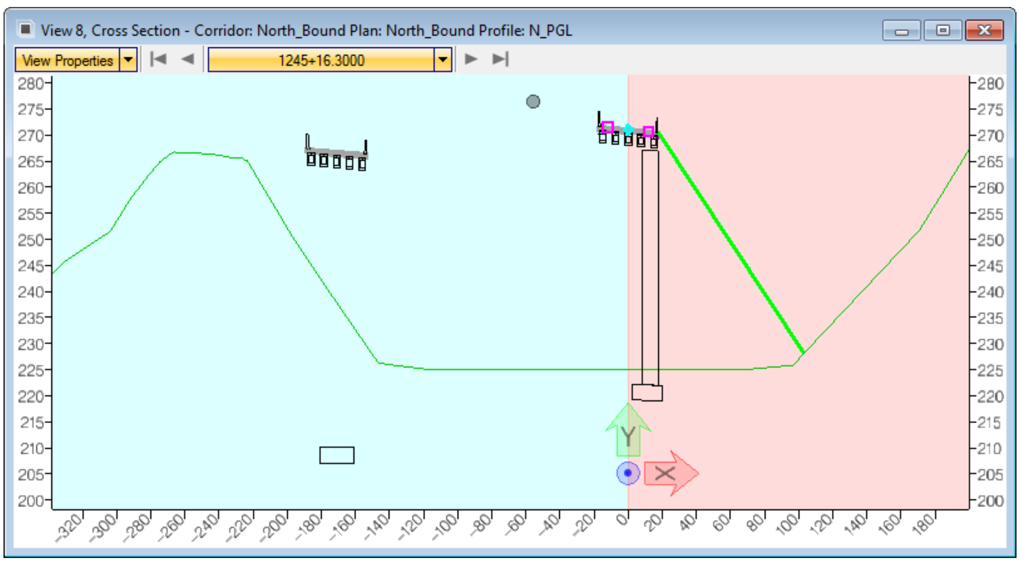
3. Open MicroStation **View 8.**

4. Using the MicroStation Select tool, **Select** the *North_bound* corridor south of the bridges by its green markers near the boundary of the corridor to Context Tool Bar and navigate to **Open Cross Section Model**.



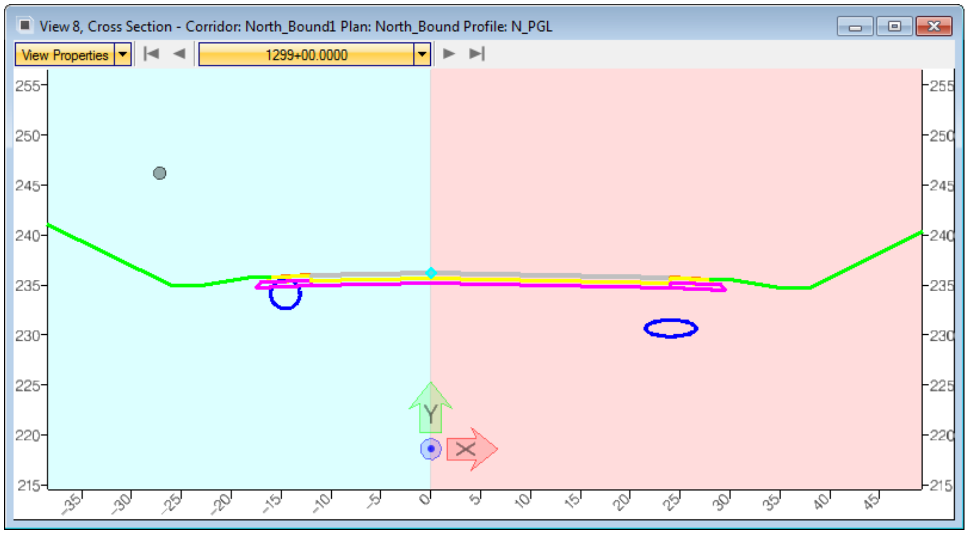
5. Open and **Data Point** in View 8 to display the corridor's Dynamic Sections.
6. Use the Navigation Tools at the top of the cross section view to examine the cross sections. Examine the area near the structures.

Hint	Right Clicking in the Cross Section View and selecting View Properties will display a variety of tools that are specific to Cross Sections.



7. Using the MicroStation Select tool, **Select** the northbound corridor, *North_Bound1*, north of the bridges by its green markers near the boundary of the corridor to Context Tool Bar and navigate to **Open Cross Section Model.**
8. **Data Point** in View 8 to display the corridor's Dynamic Section.

9. Navigate to 1299+00. Note the drainage structures depth.



Note	The Cross Section view instantly provides feedback to the designer; in this case the pipes do not have enough cover. Remember, superelevation has not been applied to this corridor so this condition will be made worse. This allows the issue to be rectified earlier in the design instead of waiting to do clash detection or publish cross section sheets to find that the issue exists.

10. Dismiss the Cross Sections by closing View 8.

CHAPTER SUMMARY

In this chapter, we have introduce and learned to use Cross Section View.

This page left intentionally blank.

Chapter 6: Targeting the Southbound Corridor & Structures

Overview

In this section, we will have the Northbound Corridor target the Southbound Corridor that we referenced in the previous exercise. We will also target alias MicroStation meshes that were obtained from the structures discipline.

Target Aliasing the Southbound Corridor and Structures

Exercise: Define Target Aliasing.

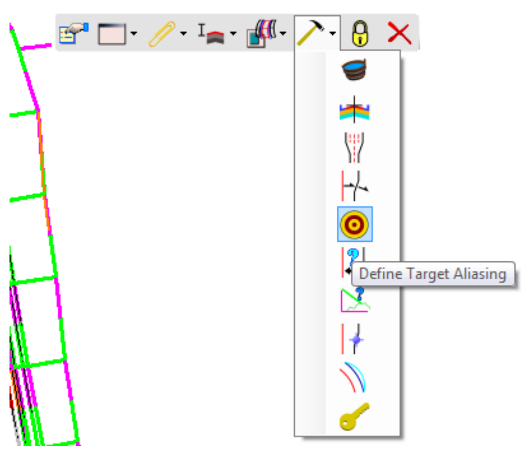
Exercise Objective: Allow the End Conditions to take account of other target types besides the Existing Ground that was originally defined. Target Aliasing will allow the Southbound Corridors and the retaining walls and the existing ground to be used when solving daylight/touchdown points during End Condition Processing.

Corridor Modeling Tool Used:

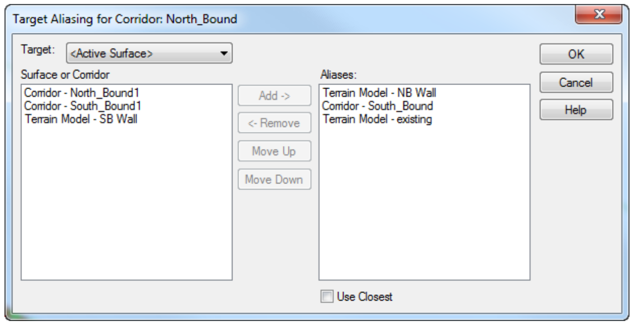
Corridor Modeling Panel	Icon	Tool
		Define Target Aliasing

Procedure:

1. Using MicroStation Select tool, **Select** the North_Bound corridor that begins at 1193+00 by its green markers near the boundary of the corridor to gain access Context Tool Bar and navigate to **Define Target Aliasing** as shown below.

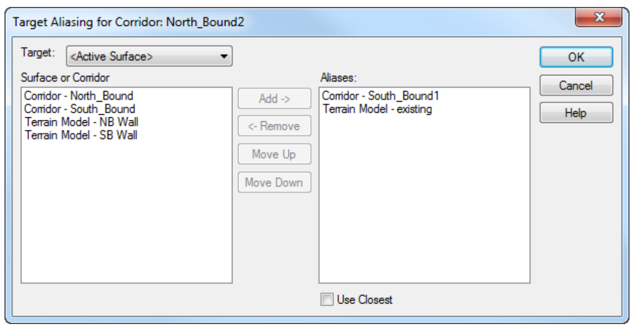


2. Select the targets in the following order.



3. Select **OK.**

4. Repeat the process for the Northbound Corridor north of the bridge and define the following alias list.



5. Review the 3D Model in View 1 & open Dynamic Cross Section view in View 8 to review the results of the target aliasing.

Note	Notice the Southbound Corridor overlap the Northbound results this will handled in a later chapter.

CHAPTER SUMMARY

In this chapter, we have learned how to apply a Target Aliasing to a Corridor.

Chapter 7: Assigning Superelevation

Overview

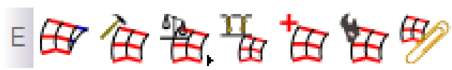
In this section, we will assign previously defined Superelevation. The Superelevation will be made available to be used by the corridor by reference the DGN file it exists in.

Assigning Superelevation to a corridor

Exercise: Assign Superelevation to the two northbound corridors.

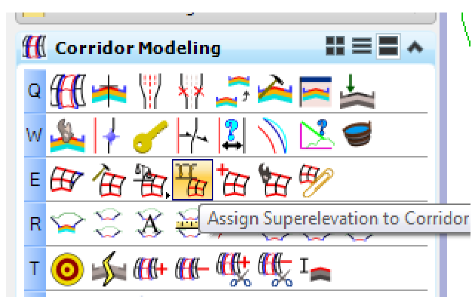
Exercise Objective: Superelevate the roadway facility.

Corridor Modeling Tool Used:

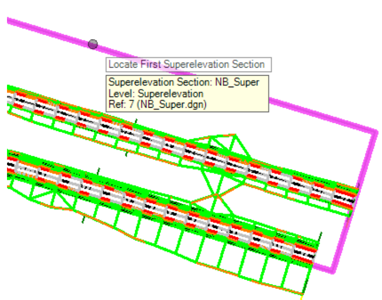
Superelevation Panel	Icon	Tool
		Assign Superelevation to Corridor

Procedure:

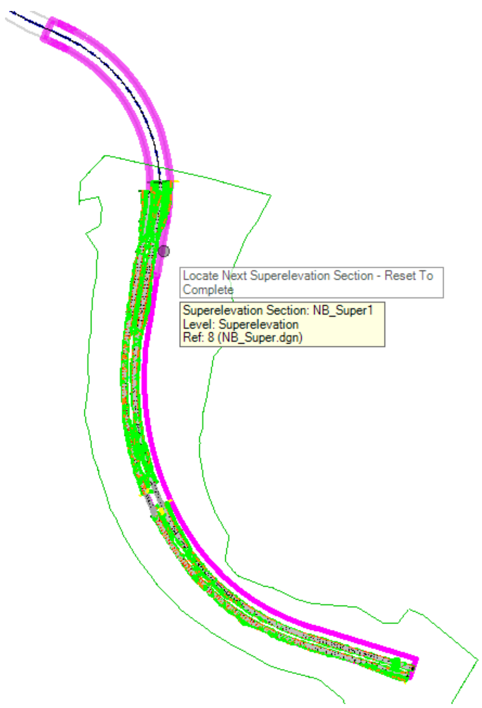
1. Remain in *NB_Corridor.dgn.*
2. Reference in the **NB_Super.dgn** with the Attachment Method- **Coincident World**
3. Zoom out to see the entirety of the existing Terrain Model.
4. Navigate to Tasks>Corridor Modeling>Assign Superelevation to Corridor.



5. Select the Superelevation Section as shown.



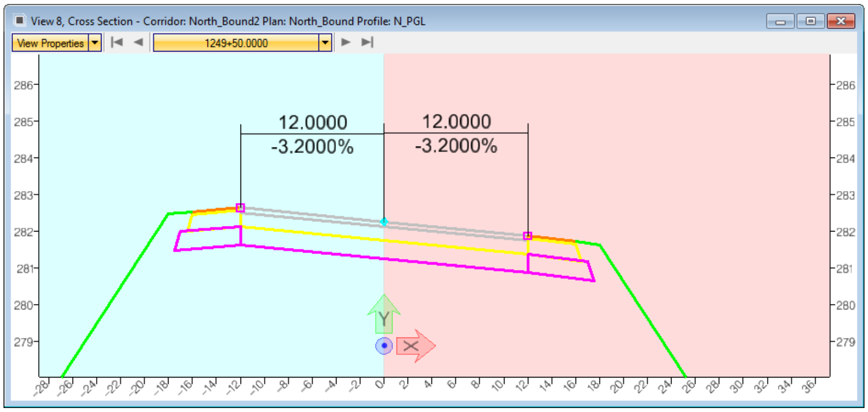
6. **Right Click** to accept the superelevation sections have been selected.
7. **Pick** the corridor south of the bridge, North_Bound.
8. **OK** to accept the Association Superelevation Dialog.
9. Since there are two northbound Corridors, repeat the process by selecting the **Assign Superelevation to Corridor** tool.
10. Select the Superelevation Sections. This can be done by holding the **<CTRL>** key and data pointing on both Superelevation Sections for the right and left handed curve sets, *NB_Super* and *NB_Super1*.



Note	Multiple Superelevation Sections can be selected by drag selecting all the graphics. The tool will sort out and only process the Superelevation Objects from that selection method.

11. Reopen Dynamic Section on the North_Bound1 Corridor in View 8 and review your results.
12. **Right Click** in the Cross Section View and choose **Place Temporary Dimension Line**.
13. **Select** the point **CL** and **REP** and then place the dimension by **data pointing** it position in the Cross Section View.

14. **Right Click** in the Cross Section View and choose **Place Temporary Dimension Line,** and select **CL** and **LEP**.



Northbound Corridor with Temporary Dimension Lines

Chapter Summary

In this chapter, we have learned how to add Superelevation to a Corridor that was created in a different DGN file.

This page left intentionally blank.

Chapter 8: Clipping References

Overview

In this section, we will learn the steps associated with applying a Clipping Reference to the northbound corridors and the previously established southbound corridors. This process will address the skewed approaches of the bridges and also clip out the southbound corridor results where it intersects with the northbound corridors.

Applying a Clipping Reference

Exercise: Adding a Clipping References to the Northbound Corridors

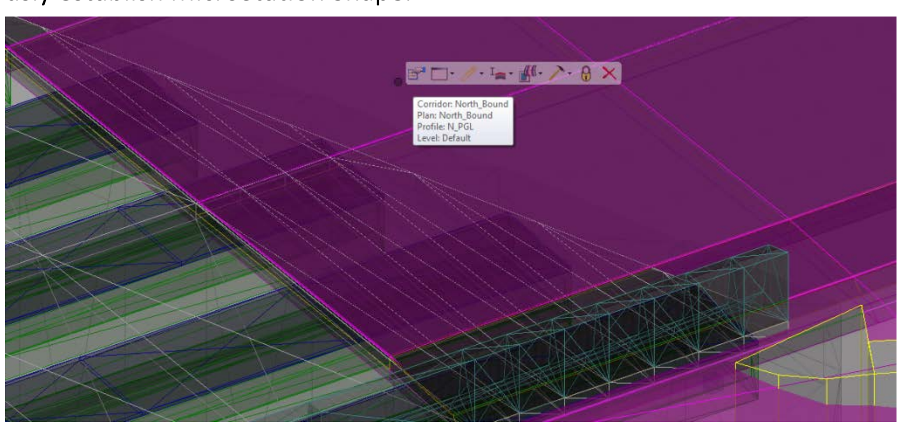
Exercise Objective: Assign a Clipping Reference to the northbound corridors to clip or (mask) overlapping data at the bridge approaches.

Corridor Modeling Tool Used:

Corridor Modeling Panel	Icon	Tool
		Add Clipping Reference

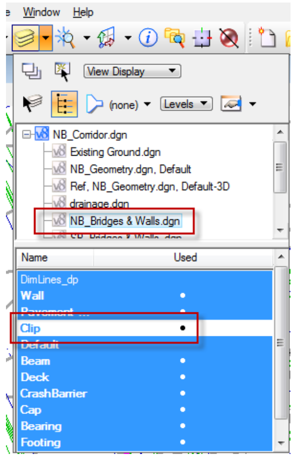
Procedure:

1. **Navigate** your view to the location of the south approach of the northbound bridge. Notice the *North_Bound* corridor results overlaps with northbound bridge due to the bridge's skewed approach as shown below. We will rectify this by clipping out the corridor with a previously establish MicroStation Shape.

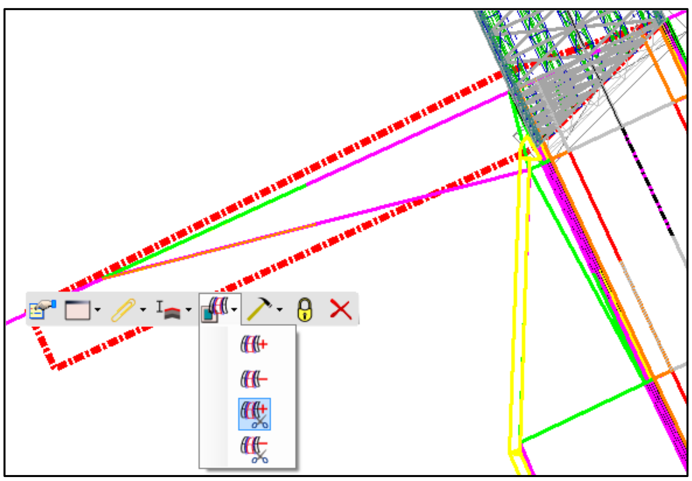


Northbound Corridor Skewed Bridge Approach with Overlapping Solutions

2. Turn on level **Clip** in the referenced DGN file, *NB_Bridges & Walls.dgn* from **Level Display** from the MicroStation Primary toolbar.



3. Using MicroStation Select tool, **Select** the *North_Bound* corridor by its green markers near the boundary of the corridor to gain access Context Tool Bar and navigate to Select the **Add Clipping Reference** task as shown below.



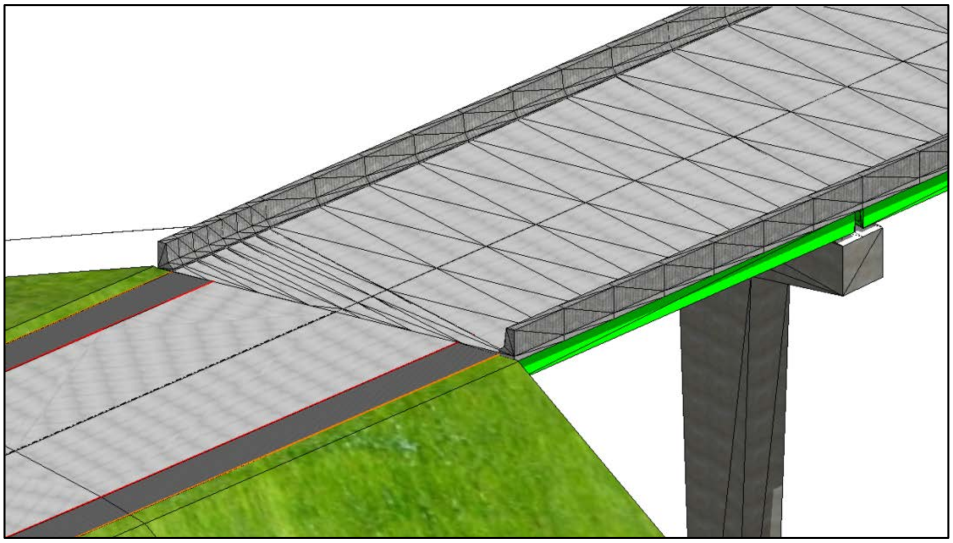
4. Follow the heads-up prompts.

Heads-Up Prompt	**User Action**
Locate First Clipping Reference	Select the Red Dash shape at the South side bridge approach.
Locate Next Clipping Reference – Reset to Complete	Right mouse click to Reset

5. Repeat this process to clip the skewed bridge on the north side of the structure, navigate the view to the north bridge approach.
6. Using MicroStation Select tool, **Select** the North_Bound1 corridor by its green markers near the boundary of the corridor to gain access Context Tool Bar and navigate to Select the **Add Clipping Reference** task.

7. Follow the heads-up prompts.

HEADS-UP PROMPT	USER ACTION
Locate First Clipping Reference	**Select** the Red Dash shape at the north side bridge approach.
Locate Next Clipping Reference – Reset to Complete	Right mouse click to Reset



Northbound Corridor Skewed Bridge Approach Clipped

Exercise: Adding a Clipping References to a Southbound Corridors

Exercise Objective: Assign a Clipping Reference to the southbound corridors to remove the overlapping data at the bridge approaches and to clip out the southbound corridor results where it intersects with the northbound facilities.

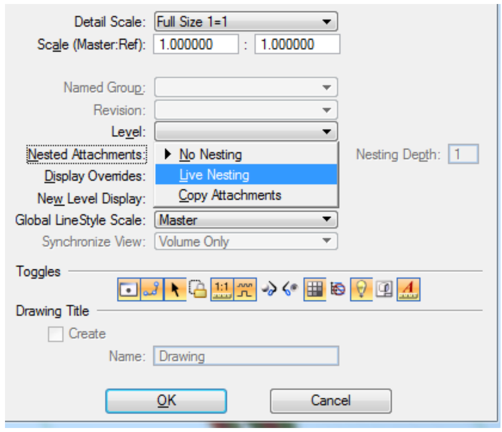
Corridor Modeling Tool Used:

CORRIDOR MODELING PANEL	ICON	TOOL
		Add Clipping Reference

Procedure:

1. Use MicroStation **File>Open** and select *SB_Corridor.dgn*.
2. Reference in the **NB_Corridor.dgn** with the Attachment Method- **Interactive**
3. **Open**.

4. Select **Live Nesting** for the Nested Attachment method.



Live Nesting

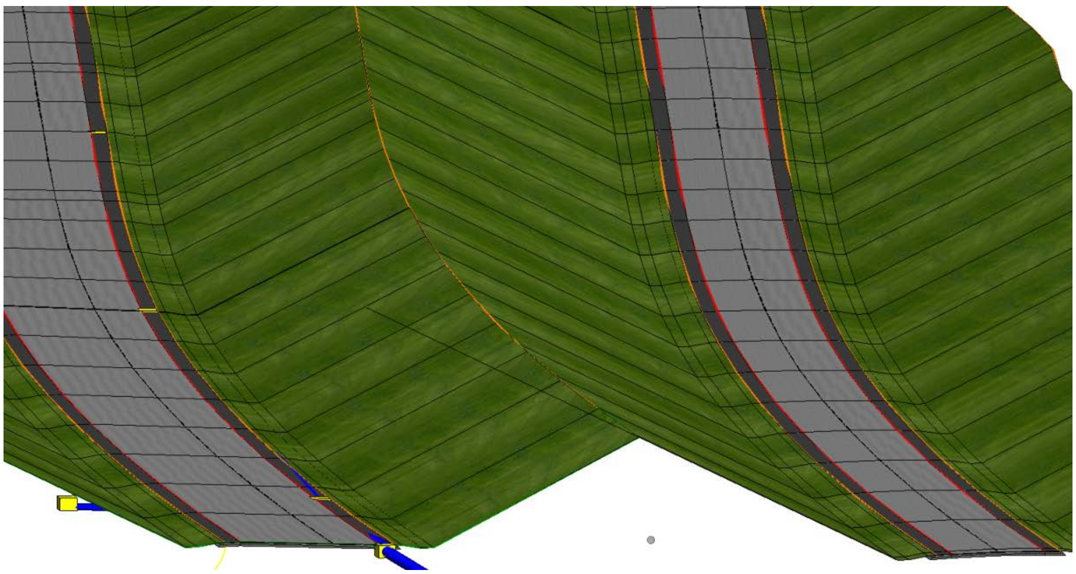
5. **Navigate** your view to the location of the south approach of the southbound bridge.
6. Turn on level **Clip** in the referenced DGN file, ***SB**_Bridges & Walls.dgn* from *Level Display* from the MicroStation Primary toolbar.
7. Using MicroStation Select tool, **Select** the *South_Bound* corridor by its green markers near the boundary of the corridor to gain access Context Tool Bar and navigate to Select the **Add Clipping Reference** task as shown below.
8. Follow the heads-up prompts.

HEADS-UP PROMPT	USER ACTION
Locate First Clipping Reference	Select the Red Dash shape at the South side bridge approach.
Locate Next Clipping Reference – Reset to Complete	Proceed to Select the *North_Bound* corridor by its perimeter.
Locate Next Clipping Reference – Reset to Complete	Right mouse click to Reset

9. Navigate your view to the location of the north approach of the southbound bridge.
10. Using MicroStation Select tool, **Select** the *South_Bound1* corridor by its green markers near the boundary of the corridor to gain access Context Tool Bar and navigate to Select the **Add Clipping Reference** task as shown below.

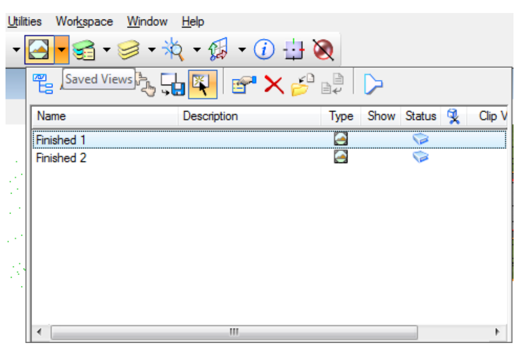
11. Follow the heads-up prompts.

Heads-Up Prompt	**User Action**
Locate First Clipping Reference	**Select** the Red Dash shape at the South side bridge approach.
Locate Next Clipping Reference – Reset to Complete	Proceed to **Select** the *North_Bound1* corridor by its perimeter.
Locate Next Clipping Reference – Reset to Complete	Right mouse click to Reset



Completed Clipping

12. Go to **Saved Views**. And select *Finished 1* then try *Finished 2*.



Chapter Summary

In this chapter, we have learned how to add a clipping reference to a Corridor with a MicroStation element and with another Corridor.

This page left intentionally blank.

Glossary

2D Point Feature	Contains no elevation (Z). 2D Point Features are defined and stored in plan model.
3D Geometry	3D geometry is created in 3D model by mathematically combining the horizontal and vertical geometry to create 3D elements. These 3D geometry elements in turn define a design model.
3D Model	This is created and managed automatically. User can interact with it but this is not usually required. The mathematical combination of Plan Geometry and Profile Geometry is stored in the 3D model.
3D Point Feature	3D points can be defined in plan model or 3D model. They are stored in 3D model but represented in both plan and 3D.
Active Object	The current object to which is added all geometry which is created.
Active Profile	Of the multiple possible profiles for an element, the active profile is the one used for design. The active profile is combined with the horizontal geometry to build a 3D element which is used in the 3D model.
Active Terrain Model	One terrain model can be designated as "Active". The active terrain model is the one used to display "existing ground"; in other words the one which displays automatically in a profile model when it is opened. The active terrain model is also the one which is targeted by side slopes unless the template defines a different target by name.
ALG	A legacy (proprietary) InRoads file containing coordinate geometry information, superelevation, and alignment information for a specific geometry project.
Alignment	A linear feature which serves the special purpose of defining the centerline or baseline of a roadway.
Apply Linear Template	Applies a corridor template along a feature while hiding some of the complexity of creating a corridor.
Apply Surface Template	Applies a corridor template to a terrain model for the purpose of creating components (such as pavement layers) under the terrain model.
Arc Definition	Curve definition method generally used in roadway applications. The radius R is used to define the curve and is defined by the equation R=5729.58/D where the degree of curvature D is the central angle subtended by a 100-foot arc. Set in the Design File Settings > Civil Formatting under Radius Settings. *See also Chord Definition.*
Aspect	An angular measure of the direction that the face of a surface is oriented. The format of the value is dependent on angular settings In the DGN file.
Base Geometry	In many instances the geometry element will be trimmed. The original (or base), untrimmed element is always preserved as it is the storage for the rule.

Boundary (Terrain Model)	Used to constrain the external boundary of the terrain model. No triangles are created outside the boundary. In addition, any point data outside the boundary is ignored.
Break Line	A surface feature consisting of a collection of spatial coordinates that have an implied linear relationship. No triangle side (in the triangulated surface) can cross over a break line.
Break Void	A closed area of missing or obscured data that uses the elevations of each vertex, while the void lines between successive void coordinates are inserted as break lines. Therefore, break voids change the slope and elevations of the TIN surface.
Cardinal Points	One of the points used to define the geometry of an alignment. Cardinal points include PC, PT, PI, and CC points for horizontal geometry and VPC, VPI and VPT for vertical geometry.
Centroid (triangle)	Geometric center of a triangle in a terrain model.
Chord Definition	Curve definition method generally used in railway applications. The radius R is used to define the curve, and is defined by the equation R=50/SIN(0.5*D) where the degree of curvature D is the central angle subtended by a 100-foot chord. *See also Arc Definition.*
Civil Cell	Used as a mechanism to preconfigure commonly used complex geometric layouts. These layouts will commonly be stored in DGNLIB files for reuse across multiple projects but it is possible and sometimes useful to store directly in an active DGN file for use in that single location. The civil cell will contain horizontal geometry and can also contain the vertical geometry.
Civil Message Center	Used to display a continuous updating log of Civil messages, including warnings and errors. As errors and warnings are resolved, they are removed from the list. New messages are added whenever the conditions warrant. Most messages relate to civil geometry, superelevation, and corridor modeling.
Civil Template	A civil design concept used most often for corridor modeling but also has other applications. The Civil Template defines the cross-sectional shape of the object being modeled. This cross-section is then “extruded along” a 3D geometry element to form the final model. The corridor template can create or target features such as road edges. The result is the creation of a corridor.
Clipping Reference	Clipping allows you to remove areas of overlap when working with multiple corridors in a single surface. For example, in a corridor intersected by a crossing roadway, clipping would be used to remove all overlapped features within the intersection.
Complex Terrain Model	A terrain model created by merging or appending two or more terrain models.
Context Toolbox	When an element is selected, hovering over the element provide a heads-up and context sensitive toolbar which pops up at the cursor. This toolbar provides a few of the most commonly used tools which operate on the element selected element type. The first tool in this toolbar is always Quick Properties.
Contour	A linear symbol representing points of equal elevation relative to a given datum.

Contour, Isopach	Contours of a delta terrain model which represent cut and fill values as contours, not elevations. A positive contour represents fill, while a negative contour is cut.
Contour, Major	The primary elevation line indicating a specific elevation in a surface model. Usually major contours are drawn with a heavier line weight or using a different color. Elevation text labels are usually drawn in association with major contours.
Contour, Minor	A secondary elevation line indicating a specific elevation in a surface model. Minor contours are often drawn without special color or weight indexing and without elevation text labels.
Corridor	A civil object used for modeling a roadway and is automatically managed by the corridor modeling tools.
Cross Section Model	DGN models (extracted perpendicular to defined horizontal geometry) with special station elevation coordinates defined and other specialized capabilities such as view exaggeration. Cross section stations match the interval in the template drop when a corridor is used as the basis. When horizontal geometry is utilized, the left / right offsets and interval are user-defined.
Curve Stroking	Stroking is the process of automatically adding shots to the terrain model or corridor by interpolating new shots from the curved sections of the data. This distance is used to interpolate new shots along the curved element in corridor processing and applying linear templates. This value is used as a perpendicular minimum distance from chords generated along the arc. Chords are drawn along the arc and the perpendicular distance is measured from the middle of each chord to the arc. If this distance is larger than the Curve Stroking, the process is repeated with a shorter chord length. This process is repeated until the end of the curve is reached. The flatter the curve, the fewer number of points will be calculated. The steeper the curve, the greater number of points that will be calculated.
DDB File	GEOPAK file (Design DataBase) which contains features definitions, associated symbology and annotation settings.
Delta Terrain Model	A surface containing data derived from the difference in elevation between two terrain models or a terrain model and a plane.
Dialog	The tool settings box for the active command. The dialog shows all available options for a command. For most civil commands, most of the time, the dialog can be hidden and ignored since the user is given all necessary instruction and inputs by way of the cursor prompt. The dialog is necessary for configuring command customizations.
Drape	The process of vertically projecting elements onto a surface so that the element elevations are defined by the surface.
Drape Void	A closed area of missing or obscured data where the void coordinates are not included in the triangulation. Voids are inserted post triangulation. The void coordinates and lines are draped on the TIN surface. Even though a user must provide an elevation for the Drape Void vertices, the user elevations are changed to the elevation of the TIN surface at the XY Drape Void coordinate position.

Element Template	MicroStation concept which allows preconfigured definitions for symbology and other miscellaneous display of MicroStation elements and civil features.
End Condition	A specialized component of a corridor template which provides information tie into active surface.
End Condition Exception	Used to modify the behavior of an end condition solution without requiring the use of additional template drops. When an end condition exception is added, it must be edited to change its behavior.
Export to Native	Option to automatically or manually push horizontal and vertical geometry into native products (InRoads - ALG, MX - PSS and GEOPAK - GPK).
Feature	A Feature is anything that can be seen or located and is a physical part of your design, representing a real world thing. A feature's definition is one of its properties. At any given time in the design process, the feature will have a Horizontal Geometry, a Vertical Geometry, 3D Geometry or a combination to define its location.
Feature Definition	Used to define options when creating features. These are the items which are created in advance, usually used across multiple projects and define symbology, annotation and quantities. The feature definition is assigned (usually) in the plan model and profile/3D feature definitions follow from there.
Feature Name	Each Feature can have a name.
Gap	When a feature is trimmed the part(s) which are invisible on the base geometry.
GPK	A legacy (proprietary) GEOPAK database containing coordinate geometry information.
Graphical Filter	Using in developing terrain models, an automated way of storing search settings for graphic elements when creating terrain models using 3D element. A graphical filter can be created for each feature (i.e., spots, breaks, voids) then the filters can be defined as a Graphical filter group.
Heads Up Prompt	Command instructions are given in a heads up and dynamic prompt which floats at the cursor.
Horizontal Geometry	The elements which define the horizontal layout of the design. These elements are 2D elements even if the DGN model is 3D. Horizontal Geometry may be points, lines, arcs, spirals, splines or any combination in a complex element.
Interval	When a feature is trimmed the part(s) which are visible on the base geometry.
Island	Closed area used to place within a void, i.e., islands in the middle of rivers, lakes, etc.
Key Station	Additional station added to the corridor to force processing at the particular location.
LIDAR	(Light Detection And Ranging) is an optical scanning technology which scans ground and other physical features to produce a 3D model.

Linear Feature	In plan model, composed of lines, arcs, spirals, splines or combinations of these. In profile model, composed of lines, parabola, splines or combinations of these.
Linear Stroking	Stroking is the process of automatically adding shots to the terrain model or corridor by interpolating new shots from the linear sections of the data. Linear stroking is measured along the element. Interpolated vertices are added whenever the distance between the vertices is greater than the linear stroking value (in master units).
Manipulators	The heads up, on-screen editing interface. Only the most common properties are presented in manipulators. Manipulators are in two types: graphical and text
Overlay Vertical Adjustment	Within Corridor Model, tool used to develop a vertical geometry (based on milling and overlay parameters) and apply to the corridor.
Parametric Constraints	Used to set up constraint value overrides for specified station ranges.
Plan Model	The usual DGN model, used for laying out horizontal geometry. Best practices will dictate that this is a 2D DGN model but 3D DGN model can be used. This is where geometric layouts and corridor definitions are kept. The geometric layouts are not only alignments but also edges, parking, striping, sidewalks, etc.
Point Features	Defined by a single X, Y (Z optional) location. A point need not be a feature. It may be defined as a non-featurized point by way of AccuDraw, Civil AccuDraw, Snap or a data point. Non featurized points are use to control the construction of Linear Features.
Point Cloud	A set of vertices in a 3D coordinate system and these vertices are defined the by X, Y and Z coordinates. Point clouds are usually created by 3D scanners. These devices measure a large number of points on the surface of an object and output a point cloud as a data file. The point cloud represents the visible surface of the object that has been scanned or digitized.
Point Control	Used to modify the behavior of points in a template. These controls take precedence (they override) over existing constraints on the point.
Project Explorer	MicroStation's interface for browsing elements in a DGN file. Extended by civil to accommodate specialized civil needs.
PSS File	MX file (Plans Style Set) which provides the graphical representation for the MX string features.
Reference Element	The rule for some geometry is a calculation from another element. This other element is the reference element.
Secondary Alignment	Used to modify the direction of cross section processing. By default, as any given station, the cross section is created orthogonal to the main alignment/feature. If a secondary alignment exists, then that portion of the cross section which lies outside the secondary alignment will be orthogonal to the secondary alignment instead of the main alignment.
SEP File / Method	Uses the superelevation settings which originated in GEOPAK.

SMD File	GEOPAK file (Survey Manager Database) which contains survey features definitions and associated element and textual settings.
Spot Elevation	A set of X, Y, Z coordinates representing a point on the terrain model surface. There is no implied relationship between regular points.
SRL File / Method	Uses the superelevation settings which originated in MX
Superelevation Lane	The closed area defined by the superelevation tools used for the limits of transition calculations and pivoting location.
Superelevation Section	Area along a horizontal geometry element, where superelevation will be calculated.
Target Aliasing	Used to create the desired results when working with multiple surfaces without having to edit the template from the template library. Target aliases can also be used so that one corridor can target the solution of another corridor.
Template Drop	An area (usually defined by station limits) along a corridor to which a specific template is applied.
Template Library	A file that stores definitions for templates, generally with an ITL file extension.
Template Transition	The transition indicator occurs in the corridor between templates of differing names.
Terrain Model	A three-dimensional DGN element defined by spots, break lines, voids, holes, contours to model a surface on the earth.
Tooltips	When hovering the cursor over an element or a handle, a tooltip is shown which gives explanatory information.
Trace Slope	Upstream - The indicated path follows the steepest ascent from a user-defined point through the terrain model terminating at a high point or the edge of the terrain model. Downstream - The indicated path follows the steepest descent from a user-defined point through the terrain model terminating at a low point or the edge of the terrain model.
Vertical Alignment	A linear feature in profile model which serves the special purpose of defining the elevations of an alignment.
Vertical Geometry	The elements which define the vertical layout of a corresponding horizontal geometry element. These vertical elements are 2D and are stored in a profile model.
Void	Closed shape to demarcate areas of missing data or obscure areas. No point or break data located within the void area is utilized and no triangles are created inside the void areas. The Void coordinates are included in the triangulation and void lines between successive void coordinates are inserted as drape lines on the surface. Therefore, they do not change the slope or elevations of the surface.
Watershed	Defined by either a low point within the terrain model or a low edge point along the terrain model edge, it's the closed area wherein all water would drain to the low point.

XIN File	InRoads file which contains features definitions, associated styles, annotation, and other settings.

This page left intentionally blank.