LAB 31 - Create End Conditions to Search a Surface

This lab demonstrates the ability of an end condition to target multiple surfaces, using target aliasing. In this exercise, a template is edited and new corridor is defined to target multiple surfaces. The existing ground surface was divided into three separate segments along the length of the project. There is also a rock layer surface 10-feet below the existing ground, for the second and third segments, where there is a deep cut section in the profile. The template end conditions target the rock and active surfaces, so target aliasing is required to target all the existing ground and rock surfaces as the corridor extends along the three segments of the project.

Chapter Objectives:

- Modify a template end condition to target a rock layer when that surface is present.
- Build a corridor and use target aliasing to target multiple existing ground and rock layer surfaces along three segments of the project.
- View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly

The following files are used in this lab:

- C:\Projects\12345\Design\InRoads\12345DES_Geometry-Create End Condit Search Surf.alg
- C:\Projects\12345\Design\InRoads\12345DES_Template-Create End Condit Search Surf.itl
- C:\Projects\12345\Design\InRoads\12345DES_Roadway-Create End Condit Search Surf.ird
- C:\Projects\12345\Design\InRoads\Exist_Ground_1-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_3-Create End Condit Search Surf.dtm

Lab 31.1 - Create End Conditions to Search a Surface

1. Open MicroStation and InRoads using the *12345DES_Create End Cond Search Surf.dgn* file.

In the MicroStation drawing, notice the three perimeters displayed for each existing ground surface

- 2. Select **File> Open** from the InRoads menu bar.
- 3. Open the following files from C:\Projects\12345\Design\InRoads\ directory.
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- Exist_Ground_3-Create End Condit Search Surf.dtm
- Rock_Layer_2-Create End Condit Search Surf.dtm
- Rock_Layer_3-Create End Condit Search Surf.dtm
- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

Lab 31.2 - Edit template end condition components to target rock layer.

- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
- 7. **<D>** on the *Locate Button* next to *Name* in the *Component Properties* dialog box

LT Cut Above Bock	Component Prop	erties			*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut	1.571	< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40 -	35 -30	-25 -20	- 15 - 10	-5 U	Ŧ
╪╼┇╬╪╡╝╗╘╺┊╸┥				4	

8. On the left side of the template, **<D>** on the *LT_Cut_Rock* component.

In the *Component Properties* dialog box, Change the Surface to *Rock_Layer_2*, then
 Apply and <D> Close.

Lab 31.3 - Create a Corridor and Template Drop

Build a corridor that follows the centerline alignment and extends along all three segments of the project.

- 10. Select **Modeler> Roadway Designer** from the InRoads menu bar.
- 11. Select **Corridor > Corridor Management** from the Roadway Designer menu bar.
- 12. In the *Manage Corridors* dialog box:
 - Key in *Centerline* in the *Name* field.
 - Select **Centerline** for the *Horizontal Alignment*.
 - Select **Centerline V** for the *Vertical Alignment*.
- 13. **<D> Add** then **<D> Close**.

Name: Cente	arline		Limits Station		Add
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Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
/ertical Alignn	nent: Cente	erline V 🔹	Stop:		Сору
			/0C+00.00	100	
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
PI Rounding T Corridors: Name	Tangent: 0.00	Source Name	Start Station	Stop	Copy From. Help
PI Rounding T Comidors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From. Help o Station -00.00
PI Rounding ⁻ Corridors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From Help o Station -00.00

- 1. Select Corridor> Template Drops from the Roadway Designer menu bar.
- 2. In the *Template Drops* dialog box, select **Centerline** for the *Corridor* name.
- 3. Key in *50* for the *Interval*.
- 4. Expand 1 Templates folder in *Library Templates* area.
- 5. **<D>** on the **12345_HMA_2Lane_Rock** template.
- 6. **<D> Add** then **Close**.

Templa Corridor: Station: Interval: Library Terr C:VPr C:VPr C:VPr 1	te Drops Centerline 4+00.00 50.00 nplates: 0 12345_H < 12345_H < 12345_H < 12345_H < 2 12345_H < CONC_41 < CONC_41 < CONC_0 < UMA_C		_Template-Libr	Add Close Change Copy Help
Current Te	mplate Drops	3:		
Station	Interval	Template	Revised In	Library
4+00.00	50.00	12345_HMA_2Lane_Rock	ITL	C:\Projects\12345\Design\InRoads\1
<				4
Synchron	iize with Libr	ary		Edit Delete

Lab 31.4 - Define target aliasing

Target aliasing allows multiple targets to be specified for a single end condition. In this example, the existing ground for the project was contained in three separate dtms.

- 7. Select Tools> Target Aliasing from the Roadway Designer menu bar.
- 8. In the *Target Aliasing* dialog box, select **<Active Surface>** for the *Target*.
- 9. Highlight Surface Exist_Ground_1, Surface Exist_Ground_2 and Surface Exist_Ground_3 in the *Surface or Corridor* area.

10. **<D> Add**.

Target Aliasing	X
Target: <active surface=""> Surface or Conidor Surface - Default Surface - Rock_Layer_2 Surface - Rock_Layer_3 Move Up Move Down</active>	Aliases: Surface - Exist_Ground_1 Surface - Exist_Ground_2 Surface - Exist_Ground_3 Use Closest

- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Conidor OK Surface - Default Add -> Surface - Default Surface - Rock_Layer_2 Surface - Exist_Ground_1 <- Surface - Exist_Ground_2 <- Surface - Exist_Ground_3 Move Up Move Down Move Down Use Closest Use Closest

14. **<D> OK.**

Lab 31.5 - Review Design Model

View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly.

1. In the *Roadway Designer* dialog box, key in **373+00** for the *Station*. Notice the end conditions target the existing ground and rock layer surfaces in Roadway Designer dialog's cross- section viewer.



2. Key in *600+00* for the *Station*. Notice in the illustration below, that even though the surfaces are different, the end condition still solves. This is because the Target Aliasing allows multiple surfaces to be specified for the end condition.



Chapter Summary:

- When end conditions are chained together (like the rock layer components used above), all parts of the chain must solve or the whole end condition fails.
- Use target aliasing to target multiple existing ground and rock layer surfaces.

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- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_2-Create End Condit Search Surf.dtm
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- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

Lab 31.2 - Edit template end condition components to target rock layer.

- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
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LT Cut Above Bock	Component Prop	erties			*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut	1.571	< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40 -	35 -30	-25 -20	- 15 - 10	-5 U	Ŧ
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Name: Cente	arline		Limits Station		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
/ertical Alignn	nent: Cente	erline V 🔹	Stop:		Сору
			/0C+00.00	100	
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
PI Rounding T Corridors: Name	Tangent: 0.00	Source Name	Start Station	Stop	Copy From. Help
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Templa Corridor: Station: Interval: Library Terr C:VPr C:VPr C:VPr 1	te Drops Centerline 4+00.00 50.00 nplates: 0 12345_H < 12345_H < 12345_H < 12345_H < 2 12345_H < CONC_41 < CONC_41 < CONC_0 < UMA_C		_Template-Libr	Add Close Change Copy Help
Current Te	mplate Drops	3:		
Station	Interval	Template	Revised In	Library
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<				4
Synchron	iize with Libr	ary		Edit Delete

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Target Aliasing	X
Target: <active surface=""> Surface or Conidor Surface - Default Surface - Rock_Layer_2 Surface - Rock_Layer_3 Move Up Move Down</active>	Aliases: Surface - Exist_Ground_1 Surface - Exist_Ground_2 Surface - Exist_Ground_3 Use Closest

- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Conidor OK Surface - Default Add -> Surface - Default Surface - Rock_Layer_2 Surface - Exist_Ground_1 <- Surface - Exist_Ground_2 <- Surface - Exist_Ground_3 Move Up Move Down Move Down Use Closest Use Closest

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LT Cut Above Bock	Component Prop	erties			*
	Name:	LT_Cut_Rock		+ Apply	
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-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40 -	35 -30	-25 -20	- 15 - 10	-5 U	Ŧ
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Name: Cente	arline		Limits Station		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
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Template Drops Contidor: Centerline Add Station: 4+00.00 ↓ Close Change Cha							
Current Te	mplate Drops	3:					
Station	Interval	Template	Revised In	Library			
4+00.00 50.00 12345_HMA_2Lane_Rock ITL C:\Projects\12345\Design\InRoads\1							
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Synchron	iize with Libr	ary		Edit Delete			

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This lab demonstrates the ability of an end condition to target multiple surfaces, using target aliasing. In this exercise, a template is edited and new corridor is defined to target multiple surfaces. The existing ground surface was divided into three separate segments along the length of the project. There is also a rock layer surface 10-feet below the existing ground, for the second and third segments, where there is a deep cut section in the profile. The template end conditions target the rock and active surfaces, so target aliasing is required to target all the existing ground and rock surfaces as the corridor extends along the three segments of the project.

Chapter Objectives:

- Modify a template end condition to target a rock layer when that surface is present.
- Build a corridor and use target aliasing to target multiple existing ground and rock layer surfaces along three segments of the project.
- View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly

The following files are used in this lab:

- C:\Projects\12345\Design\InRoads\12345DES_Geometry-Create End Condit Search Surf.alg
- C:\Projects\12345\Design\InRoads\12345DES_Template-Create End Condit Search Surf.itl
- C:\Projects\12345\Design\InRoads\12345DES_Roadway-Create End Condit Search Surf.ird
- C:\Projects\12345\Design\InRoads\Exist_Ground_1-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_3-Create End Condit Search Surf.dtm

Lab 31.1 - Create End Conditions to Search a Surface

1. Open MicroStation and InRoads using the *12345DES_Create End Cond Search Surf.dgn* file.

In the MicroStation drawing, notice the three perimeters displayed for each existing ground surface

- 2. Select **File> Open** from the InRoads menu bar.
- 3. Open the following files from C:\Projects\12345\Design\InRoads\ directory.
 - CDOT_Civil.xin
 - 12345DES_Geometry-Create End Condit Search Surf.alg
 - 12345DES_Template-Create End Condit Search Surf.itl

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- Exist_Ground_1-Create End Condit Search Surf.dtm
- Exist_Ground_2-Create End Condit Search Surf.dtm
- Exist_Ground_3-Create End Condit Search Surf.dtm
- Rock_Layer_2-Create End Condit Search Surf.dtm
- Rock_Layer_3-Create End Condit Search Surf.dtm
- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

Lab 31.2 - Edit template end condition components to target rock layer.

- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
- 7. **<D>** on the *Locate Button* next to *Name* in the *Component Properties* dialog box

LT Cut Above Bock	Component Prop	erties		X	*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut		< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	- End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40			15		-
╪╼╪╤┿╪╘┓┪┍╺┊┥	-30	-25 -20		4	

8. On the left side of the template, **<D>** on the *LT_Cut_Rock* component.

In the *Component Properties* dialog box, Change the Surface to *Rock_Layer_2*, then
 Apply and <D> Close.

Lab 31.3 - Create a Corridor and Template Drop

Build a corridor that follows the centerline alignment and extends along all three segments of the project.

- 10. Select **Modeler> Roadway Designer** from the InRoads menu bar.
- 11. Select **Corridor > Corridor Management** from the Roadway Designer menu bar.
- 12. In the *Manage Corridors* dialog box:
 - Key in *Centerline* in the *Name* field.
 - Select **Centerline** for the *Horizontal Alignment*.
 - Select **Centerline V** for the *Vertical Alignment*.
- 13. **<D> Add** then **<D> Close**.

Name: Cente	arline		Limits		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
/ertical Alignm	nent: Cente	erline V 🔹	Stop:		Сору
PI Rounding Tangent: 0.00			/06+00.00		
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
PI Rounding T Corridors: Name	Tangent: 0.00	Source Name	Start Station	Stop	Copy From. Help
PI Rounding T Conidors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From. Help Station 00.00
PI Rounding [*] Corridors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From Help Station 00.00

- 1. Select Corridor> Template Drops from the Roadway Designer menu bar.
- 2. In the *Template Drops* dialog box, select **Centerline** for the *Corridor* name.
- 3. Key in *50* for the *Interval*.
- 4. Expand 1 Templates folder in *Library Templates* area.
- 5. **<D>** on the **12345_HMA_2Lane_Rock** template.
- 6. **<D> Add** then **Close**.

Template Drops Contidor: Centerline Add Station: 4+00.00 ↓ Close Change Cha							
Current Te	mplate Drops	3:					
Station	Interval	Template	Revised In	Library			
4+00.00 50.00 12345_HMA_2Lane_Rock ITL C:\Projects\12345\Design\InRoads\1							
•				•			
Synchron	iize with Libr	ary		Edit Delete			

Lab 31.4 - Define target aliasing

Target aliasing allows multiple targets to be specified for a single end condition. In this example, the existing ground for the project was contained in three separate dtms.

- 7. Select Tools> Target Aliasing from the Roadway Designer menu bar.
- 8. In the *Target Aliasing* dialog box, select **<Active Surface>** for the *Target*.
- 9. Highlight Surface Exist_Ground_1, Surface Exist_Ground_2 and Surface Exist_Ground_3 in the *Surface or Corridor* area.

10. **<D> Add**.

Target Aliasing	X
Target: <active surface=""> Surface or Conidor Surface - Default Surface - Rock_Layer_2 Surface - Rock_Layer_3 Move Up Move Down</active>	Aliases: Surface - Exist_Ground_1 Surface - Exist_Ground_2 Surface - Exist_Ground_3 Use Closest

- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Conidor OK Surface - Default Add -> Surface - Default Surface - Rock_Layer_2 Surface - Exist_Ground_1 <- Surface - Exist_Ground_2 <- Surface - Exist_Ground_3 Move Up Move Down Move Down Use Closest Use Closest

14. **<D> OK.**

Lab 31.5 - Review Design Model

View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly.

1. In the *Roadway Designer* dialog box, key in **373+00** for the *Station*. Notice the end conditions target the existing ground and rock layer surfaces in Roadway Designer dialog's cross- section viewer.



2. Key in *600+00* for the *Station*. Notice in the illustration below, that even though the surfaces are different, the end condition still solves. This is because the Target Aliasing allows multiple surfaces to be specified for the end condition.



Chapter Summary:

- When end conditions are chained together (like the rock layer components used above), all parts of the chain must solve or the whole end condition fails.
- Use target aliasing to target multiple existing ground and rock layer surfaces.

LAB 31 - Create End Conditions to Search a Surface

This lab demonstrates the ability of an end condition to target multiple surfaces, using target aliasing. In this exercise, a template is edited and new corridor is defined to target multiple surfaces. The existing ground surface was divided into three separate segments along the length of the project. There is also a rock layer surface 10-feet below the existing ground, for the second and third segments, where there is a deep cut section in the profile. The template end conditions target the rock and active surfaces, so target aliasing is required to target all the existing ground and rock surfaces as the corridor extends along the three segments of the project.

Chapter Objectives:

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- C:\Projects\12345\Design\InRoads\Exist_Ground_1-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_3-Create End Condit Search Surf.dtm

Lab 31.1 - Create End Conditions to Search a Surface

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- Exist_Ground_3-Create End Condit Search Surf.dtm
- Rock_Layer_2-Create End Condit Search Surf.dtm
- Rock_Layer_3-Create End Condit Search Surf.dtm
- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

Lab 31.2 - Edit template end condition components to target rock layer.

- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
- 7. **<D>** on the *Locate Button* next to *Name* in the *Component Properties* dialog box

LT Cut Above Bock	Component Prop	erties		X	*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut		< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	- End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40			15		-
╡╴╪╤╪╪╪╘┓╝┍╗╝╸╡╝╸╺╗╸ ╡	-30	-25 -20		4	

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Lab 31.3 - Create a Corridor and Template Drop

Build a corridor that follows the centerline alignment and extends along all three segments of the project.

- 10. Select **Modeler> Roadway Designer** from the InRoads menu bar.
- 11. Select **Corridor > Corridor Management** from the Roadway Designer menu bar.
- 12. In the *Manage Corridors* dialog box:
 - Key in *Centerline* in the *Name* field.
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 - Select **Centerline V** for the *Vertical Alignment*.
- 13. **<D> Add** then **<D> Close**.

Name: Cente	arline		Limits		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 👻 🕂	4+00.00	+	Change
/ertical Alignm	nent: Cente	erline V 🔹	Stop:		Сору
PI Rounding Tangent: 0.00			/06+00.00		
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
PI Rounding T Corridors: Name	Tangent: 0.00	Source Name	Start Station	Stop	Copy From. Help
PI Rounding T Conidors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From. Help Station 00.00
PI Rounding [*] Corridors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From Help Station 00.00

- 1. Select Corridor> Template Drops from the Roadway Designer menu bar.
- 2. In the *Template Drops* dialog box, select **Centerline** for the *Corridor* name.
- 3. Key in *50* for the *Interval*.
- 4. Expand 1 Templates folder in *Library Templates* area.
- 5. **<D>** on the **12345_HMA_2Lane_Rock** template.
- 6. **<D> Add** then **Close**.

Template Drops Contidor: Centerline Add Station: 4+00.00 ↓ Close Change Cha							
Current Te	mplate Drops	3:					
Station	Interval	Template	Revised In	Library			
4+00.00 50.00 12345_HMA_2Lane_Rock ITL C:\Projects\12345\Design\InRoads\1							
•				•			
Synchron	iize with Libr	ary		Edit Delete			

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10. **<D> Add**.

Target Aliasing	X
Target: <active surface=""> Surface or Conidor Surface - Default Surface - Rock_Layer_2 Surface - Rock_Layer_3 Move Up Move Down</active>	Aliases: Surface - Exist_Ground_1 Surface - Exist_Ground_2 Surface - Exist_Ground_3 Use Closest

- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Conidor OK Surface - Default Add -> Surface - Default Surface - Rock_Layer_2 Surface - Exist_Ground_1 <- Surface - Exist_Ground_2 <- Surface - Exist_Ground_3 Move Up Move Down Move Down Use Closest Use Closest

14. **<D> OK.**

Lab 31.5 - Review Design Model

View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly.

1. In the *Roadway Designer* dialog box, key in **373+00** for the *Station*. Notice the end conditions target the existing ground and rock layer surfaces in Roadway Designer dialog's cross- section viewer.



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Chapter Summary:

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Chapter Objectives:

- Modify a template end condition to target a rock layer when that surface is present.
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- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
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- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

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- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
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LT Cut Above Bock	Component Prop	erties			*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut	1.571	< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40 -	35 -30	-20 -20	- 15 - 10	-5 U	Ŧ
╪╼┇╬╪╡╝╗╘╺┊╸┥				4	

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Name: Cente	arline		Limits Station		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
/ertical Alignm	nent: Cente	erline V 🔹	Stop:		Сору
			/0C+00.00	100	
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
PI Rounding T Corridors: Name	Tangent: 0.00	Source Name	Start Station	Stop	Copy From. Help
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- 3. Key in *50* for the *Interval*.
- 4. Expand 1 Templates folder in *Library Templates* area.
- 5. **<D>** on the **12345_HMA_2Lane_Rock** template.
- 6. **<D> Add** then **Close**.

Templa Corridor: Station: Interval: Library Terr C:VPr C:VPr C:VPr 1	te Drops Centerline 4+00.00 50.00 nplates: 0 12345_H < 12345_H < 12345_H < 12345_H < 2 12345_H < CONC_41 < CONC_41 < CONC_0 < UMA_C		_Template-Libr	Add Close Change Copy Help
Current Te	mplate Drops	3:		
Station	Interval	Template	Revised In	Library
4+00.00	50.00	12345_HMA_2Lane_Rock	ITL	C:\Projects\12345\Design\InRoads\1
•				4
Synchron	iize with Libr	ary		Edit Delete

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Target Aliasing	X
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- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Conidor OK Surface - Default Add -> Surface - Default Surface - Rock_Layer_2 Surface - Exist_Ground_1 <- Surface - Exist_Ground_2 <- Surface - Exist_Ground_3 Move Up Move Down Move Down Use Closest Use Closest

14. **<D> OK.**

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Chapter Objectives:

- Modify a template end condition to target a rock layer when that surface is present.
- Build a corridor and use target aliasing to target multiple existing ground and rock layer surfaces along three segments of the project.
- View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly

The following files are used in this lab:

- C:\Projects\12345\Design\InRoads\12345DES_Geometry-Create End Condit Search Surf.alg
- C:\Projects\12345\Design\InRoads\12345DES_Template-Create End Condit Search Surf.itl
- C:\Projects\12345\Design\InRoads\12345DES_Roadway-Create End Condit Search Surf.ird
- C:\Projects\12345\Design\InRoads\Exist_Ground_1-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_3-Create End Condit Search Surf.dtm

Lab 31.1 - Create End Conditions to Search a Surface

1. Open MicroStation and InRoads using the *12345DES_Create End Cond Search Surf.dgn* file.

In the MicroStation drawing, notice the three perimeters displayed for each existing ground surface

- 2. Select **File> Open** from the InRoads menu bar.
- 3. Open the following files from C:\Projects\12345\Design\InRoads\ directory.
 - CDOT_Civil.xin
 - 12345DES_Geometry-Create End Condit Search Surf.alg
 - 12345DES_Template-Create End Condit Search Surf.itl

- 12345DES_Roadway-Create End Condit Search Surf.ird
- Exist_Ground_1-Create End Condit Search Surf.dtm
- Exist_Ground_2-Create End Condit Search Surf.dtm
- Exist_Ground_3-Create End Condit Search Surf.dtm
- Rock_Layer_2-Create End Condit Search Surf.dtm
- Rock_Layer_3-Create End Condit Search Surf.dtm
- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

Lab 31.2 - Edit template end condition components to target rock layer.

- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
- 7. **<D>** on the *Locate Button* next to *Name* in the *Component Properties* dialog box

LT Cut Above Bock	Component Prop	erties			*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut	1.571	< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40 -	35 -30	-20 -20	- 15 - 10	-5 U	Ŧ
╪╼┇╬╪╡╝╗╘╺┊╸┥				4	

8. On the left side of the template, **<D>** on the *LT_Cut_Rock* component.

In the *Component Properties* dialog box, Change the Surface to *Rock_Layer_2*, then
 Apply and <D> Close.

Lab 31.3 - Create a Corridor and Template Drop

Build a corridor that follows the centerline alignment and extends along all three segments of the project.

- 10. Select **Modeler> Roadway Designer** from the InRoads menu bar.
- 11. Select **Corridor > Corridor Management** from the Roadway Designer menu bar.
- 12. In the *Manage Corridors* dialog box:
 - Key in *Centerline* in the *Name* field.
 - Select **Centerline** for the *Horizontal Alignment*.
 - Select **Centerline V** for the *Vertical Alignment*.
- 13. **<D> Add** then **<D> Close**.

Name: Cente	arline		Limits Station		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
/ertical Alignm	nent: Cente	erline V 🔹	Stop:		Сору
			/0C+00.00	100	
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
PI Rounding T Corridors: Name	Tangent: 0.00	Source Name	Start Station	Stop	Copy From. Help
PI Rounding T Comidors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From. Help o Station -00.00
PI Rounding ⁻ Corridors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From Help o Station -00.00

- 1. Select Corridor> Template Drops from the Roadway Designer menu bar.
- 2. In the *Template Drops* dialog box, select **Centerline** for the *Corridor* name.
- 3. Key in *50* for the *Interval*.
- 4. Expand 1 Templates folder in *Library Templates* area.
- 5. **<D>** on the **12345_HMA_2Lane_Rock** template.
- 6. **<D> Add** then **Close**.

Templa Corridor: Station: Interval: Library Terr C:VPr C:VPr C:VPr 1	te Drops Centerline 4+00.00 50.00 nplates: 0 12345_H < 12345_H < 12345_H < 12345_H < 2 12345_H < CONC_41 < CONC_41 < CONC_0 < UMA_C		_Template-Libr	Add Close Change Copy Help
Current Te	mplate Drops	3:		
Station	Interval	Template	Revised In	Library
4+00.00	50.00	12345_HMA_2Lane_Rock	ITL	C:\Projects\12345\Design\InRoads\1
•				4
Synchron	iize with Libr	ary		Edit Delete

Lab 31.4 - Define target aliasing

Target aliasing allows multiple targets to be specified for a single end condition. In this example, the existing ground for the project was contained in three separate dtms.

- 7. Select Tools> Target Aliasing from the Roadway Designer menu bar.
- 8. In the *Target Aliasing* dialog box, select **<Active Surface>** for the *Target*.
- 9. Highlight Surface Exist_Ground_1, Surface Exist_Ground_2 and Surface Exist_Ground_3 in the *Surface or Corridor* area.

10. **<D> Add**.

Target Aliasing	X
Target: <active surface=""> Surface or Conidor Surface - Default Surface - Rock_Layer_2 Surface - Rock_Layer_3 Move Up Move Down</active>	Aliases: Surface - Exist_Ground_1 Surface - Exist_Ground_2 Surface - Exist_Ground_3 Use Closest

- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Conidor OK Surface - Default Add -> Surface - Default Surface - Rock_Layer_2 Surface - Exist_Ground_1 <- Surface - Exist_Ground_2 <- Surface - Exist_Ground_3 Move Up Move Down Move Down Use Closest Use Closest

14. **<D> OK.**

Lab 31.5 - Review Design Model

View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly.

1. In the *Roadway Designer* dialog box, key in **373+00** for the *Station*. Notice the end conditions target the existing ground and rock layer surfaces in Roadway Designer dialog's cross- section viewer.



2. Key in *600+00* for the *Station*. Notice in the illustration below, that even though the surfaces are different, the end condition still solves. This is because the Target Aliasing allows multiple surfaces to be specified for the end condition.



Chapter Summary:

- When end conditions are chained together (like the rock layer components used above), all parts of the chain must solve or the whole end condition fails.
- Use target aliasing to target multiple existing ground and rock layer surfaces.

LAB 31 - Create End Conditions to Search a Surface

This lab demonstrates the ability of an end condition to target multiple surfaces, using target aliasing. In this exercise, a template is edited and new corridor is defined to target multiple surfaces. The existing ground surface was divided into three separate segments along the length of the project. There is also a rock layer surface 10-feet below the existing ground, for the second and third segments, where there is a deep cut section in the profile. The template end conditions target the rock and active surfaces, so target aliasing is required to target all the existing ground and rock surfaces as the corridor extends along the three segments of the project.

Chapter Objectives:

- Modify a template end condition to target a rock layer when that surface is present.
- Build a corridor and use target aliasing to target multiple existing ground and rock layer surfaces along three segments of the project.
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- C:\Projects\12345\Design\InRoads\Exist_Ground_1-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_3-Create End Condit Search Surf.dtm

Lab 31.1 - Create End Conditions to Search a Surface

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- 2. Select **File> Open** from the InRoads menu bar.
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- Exist_Ground_1-Create End Condit Search Surf.dtm
- Exist_Ground_2-Create End Condit Search Surf.dtm
- Exist_Ground_3-Create End Condit Search Surf.dtm
- Rock_Layer_2-Create End Condit Search Surf.dtm
- Rock_Layer_3-Create End Condit Search Surf.dtm
- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

Lab 31.2 - Edit template end condition components to target rock layer.

- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
- 7. **<D>** on the *Locate Button* next to *Name* in the *Component Properties* dialog box

LT Cut Above Bock	Component Prop	erties		X	*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut		< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	- End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40			15		-
╪╼╪╤┿╪╘┓┪┍╺┊┥	-30	-25 -20		4	

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Lab 31.3 - Create a Corridor and Template Drop

Build a corridor that follows the centerline alignment and extends along all three segments of the project.

- 10. Select **Modeler> Roadway Designer** from the InRoads menu bar.
- 11. Select **Corridor > Corridor Management** from the Roadway Designer menu bar.
- 12. In the *Manage Corridors* dialog box:
 - Key in *Centerline* in the *Name* field.
 - Select **Centerline** for the *Horizontal Alignment*.
 - Select **Centerline V** for the *Vertical Alignment*.
- 13. **<D> Add** then **<D> Close**.

Name: Cente	arline		Limits		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
/ertical Alignm	nent: Cente	erline V 🔹	Stop:		Сору
			/06+00.00		
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
PI Rounding T Corridors: Name	Tangent: 0.00	Source Name	Start Station	Stop	Copy From. Help
PI Rounding T Conidors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From. Help Station 00.00
PI Rounding [*] Corridors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From Help Station 00.00

- 1. Select Corridor> Template Drops from the Roadway Designer menu bar.
- 2. In the *Template Drops* dialog box, select **Centerline** for the *Corridor* name.
- 3. Key in *50* for the *Interval*.
- 4. Expand 1 Templates folder in *Library Templates* area.
- 5. **<D>** on the **12345_HMA_2Lane_Rock** template.
- 6. **<D> Add** then **Close**.

Templa Corridor: Station: Interval: Library Terr C:VPr C:VPr C:VPr 1	te Drops Centerline 4+00.00 50.00 nplates: 0 12345_H < 12345_H < 12345_H < 12345_H < 2 12345_H < CONC_41 < CONC_41 < CONC_0 < UMA_C		_Template-Libr	Add Close Change Copy Help
Current Te	mplate Drops	3:		
Station	Interval	Template	Revised In	Library
4+00.00	50.00	12345_HMA_2Lane_Rock	ITL	C:\Projects\12345\Design\In Roads\1
•				•
Synchron	iize with Libr	ary		Edit Delete

Lab 31.4 - Define target aliasing

Target aliasing allows multiple targets to be specified for a single end condition. In this example, the existing ground for the project was contained in three separate dtms.

- 7. Select Tools> Target Aliasing from the Roadway Designer menu bar.
- 8. In the *Target Aliasing* dialog box, select **<Active Surface>** for the *Target*.
- 9. Highlight Surface Exist_Ground_1, Surface Exist_Ground_2 and Surface Exist_Ground_3 in the *Surface or Corridor* area.

10. **<D> Add**.

Target Aliasing	X
Target: <active surface=""> Surface or Conidor Surface - Default Surface - Rock_Layer_2 Surface - Rock_Layer_3 Move Up Move Down</active>	Aliases: Surface - Exist_Ground_1 Surface - Exist_Ground_2 Surface - Exist_Ground_3 Use Closest

- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Conidor OK Surface - Default Add -> Surface - Default Surface - Rock_Layer_2 Surface - Exist_Ground_1 <- Surface - Exist_Ground_2 <- Surface - Exist_Ground_3 Move Up Move Down Move Down Use Closest Use Closest

14. **<D> OK.**

Lab 31.5 - Review Design Model

View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly.

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This lab demonstrates the ability of an end condition to target multiple surfaces, using target aliasing. In this exercise, a template is edited and new corridor is defined to target multiple surfaces. The existing ground surface was divided into three separate segments along the length of the project. There is also a rock layer surface 10-feet below the existing ground, for the second and third segments, where there is a deep cut section in the profile. The template end conditions target the rock and active surfaces, so target aliasing is required to target all the existing ground and rock surfaces as the corridor extends along the three segments of the project.

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- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_2-Create End Condit Search Surf.dtm
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- Exist_Ground_1-Create End Condit Search Surf.dtm
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- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

Lab 31.2 - Edit template end condition components to target rock layer.

- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
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LT Cut Above Bock	Component Prop	erties		X	*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut		< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	- End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40			15		-
╪╼╪╤┿╪╘┓┪┍╺┊┥	-30	-25 -20		4	

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Lab 31.3 - Create a Corridor and Template Drop

Build a corridor that follows the centerline alignment and extends along all three segments of the project.

- 10. Select **Modeler> Roadway Designer** from the InRoads menu bar.
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- 13. **<D> Add** then **<D> Close**.

Name: Cente	arline		Limits		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
/ertical Alignm	nent: Cente	erline V 🔹	Stop:		Сору
			/06+00.00		
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
PI Rounding T Corridors: Name	Tangent: 0.00	Source Name	Start Station	Stop	Copy From. Help
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Current Te	mplate Drops	3:		
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•				•
Synchron	iize with Libr	ary		Edit Delete

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- 9. Highlight Surface Exist_Ground_1, Surface Exist_Ground_2 and Surface Exist_Ground_3 in the *Surface or Corridor* area.

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Target Aliasing	X
Target: <active surface=""> Surface or Conidor Surface - Default Surface - Rock_Layer_2 Surface - Rock_Layer_3 Move Up Move Down</active>	Aliases: Surface - Exist_Ground_1 Surface - Exist_Ground_2 Surface - Exist_Ground_3 Use Closest

- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Conidor OK Surface - Default Add -> Surface - Default Surface - Rock_Layer_2 Surface - Exist_Ground_1 <- Surface - Exist_Ground_2 <- Surface - Exist_Ground_3 Move Up Move Down Move Down Use Closest Use Closest

14. **<D> OK.**

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- Use target aliasing to target multiple existing ground and rock layer surfaces.
LAB 31 - Create End Conditions to Search a Surface

This lab demonstrates the ability of an end condition to target multiple surfaces, using target aliasing. In this exercise, a template is edited and new corridor is defined to target multiple surfaces. The existing ground surface was divided into three separate segments along the length of the project. There is also a rock layer surface 10-feet below the existing ground, for the second and third segments, where there is a deep cut section in the profile. The template end conditions target the rock and active surfaces, so target aliasing is required to target all the existing ground and rock surfaces as the corridor extends along the three segments of the project.

Chapter Objectives:

- Modify a template end condition to target a rock layer when that surface is present.
- Build a corridor and use target aliasing to target multiple existing ground and rock layer surfaces along three segments of the project.
- View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly

The following files are used in this lab:

- C:\Projects\12345\Design\InRoads\12345DES_Geometry-Create End Condit Search Surf.alg
- C:\Projects\12345\Design\InRoads\12345DES_Template-Create End Condit Search Surf.itl
- C:\Projects\12345\Design\InRoads\12345DES_Roadway-Create End Condit Search Surf.ird
- C:\Projects\12345\Design\InRoads\Exist_Ground_1-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_3-Create End Condit Search Surf.dtm

Lab 31.1 - Create End Conditions to Search a Surface

1. Open MicroStation and InRoads using the *12345DES_Create End Cond Search Surf.dgn* file.

In the MicroStation drawing, notice the three perimeters displayed for each existing ground surface

- 2. Select **File> Open** from the InRoads menu bar.
- 3. Open the following files from C:\Projects\12345\Design\InRoads\ directory.
 - CDOT_Civil.xin
 - 12345DES_Geometry-Create End Condit Search Surf.alg
 - 12345DES_Template-Create End Condit Search Surf.itl

- 12345DES_Roadway-Create End Condit Search Surf.ird
- Exist_Ground_1-Create End Condit Search Surf.dtm
- Exist_Ground_2-Create End Condit Search Surf.dtm
- Exist_Ground_3-Create End Condit Search Surf.dtm
- Rock_Layer_2-Create End Condit Search Surf.dtm
- Rock_Layer_3-Create End Condit Search Surf.dtm
- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

Lab 31.2 - Edit template end condition components to target rock layer.

- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
- 7. **<D>** on the *Locate Button* next to *Name* in the *Component Properties* dialog box

LT Cut Above Bock	Component Prop	erties			*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut	1.571	< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40 -	35 -30	-20 -20	- 15 - 10	-5 U	Ŧ
╪╼┇╬╪╡╝╗╘╺┊╸┥				4	

8. On the left side of the template, **<D>** on the *LT_Cut_Rock* component.

In the *Component Properties* dialog box, Change the Surface to *Rock_Layer_2*, then
 Apply and <D> Close.

Lab 31.3 - Create a Corridor and Template Drop

Build a corridor that follows the centerline alignment and extends along all three segments of the project.

- 10. Select **Modeler> Roadway Designer** from the InRoads menu bar.
- 11. Select **Corridor > Corridor Management** from the Roadway Designer menu bar.
- 12. In the *Manage Corridors* dialog box:
 - Key in *Centerline* in the *Name* field.
 - Select **Centerline** for the *Horizontal Alignment*.
 - Select **Centerline V** for the *Vertical Alignment*.
- 13. **<D> Add** then **<D> Close**.

Name: Cente	arline		Limits Station		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
/ertical Alignm	nent: Cente	erline V 🔹	Stop:		Сору
			/0C+00.00	100	
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
PI Rounding T Corridors: Name	Tangent: 0.00	Source Name	Start Station	Stop	Copy From. Help
PI Rounding T Comidors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From. Help o Station -00.00
PI Rounding ⁻ Corridors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From Help o Station -00.00

- 1. Select Corridor> Template Drops from the Roadway Designer menu bar.
- 2. In the *Template Drops* dialog box, select **Centerline** for the *Corridor* name.
- 3. Key in *50* for the *Interval*.
- 4. Expand 1 Templates folder in *Library Templates* area.
- 5. **<D>** on the **12345_HMA_2Lane_Rock** template.
- 6. **<D> Add** then **Close**.

Templa Corridor: Station: Interval: Library Terr C:VPr C:VPr C:VPr 1	te Drops Centerline 4+00.00 50.00 nplates: 0 12345_H < 12345_H < 12345_H < 12345_H < 2 12345_H < CONC_41 < CONC_41 < CONC_0 < UMA_C		_Template-Libr	Add Close Change Copy Help
Current Te	mplate Drops	3:		
Station	Interval	Template	Revised In	Library
4+00.00	50.00	12345_HMA_2Lane_Rock	ITL	C:\Projects\12345\Design\InRoads\1
<				4
Synchron	iize with Libr	ary		Edit Delete

Lab 31.4 - Define target aliasing

Target aliasing allows multiple targets to be specified for a single end condition. In this example, the existing ground for the project was contained in three separate dtms.

- 7. Select Tools> Target Aliasing from the Roadway Designer menu bar.
- 8. In the *Target Aliasing* dialog box, select **<Active Surface>** for the *Target*.
- 9. Highlight Surface Exist_Ground_1, Surface Exist_Ground_2 and Surface Exist_Ground_3 in the *Surface or Corridor* area.

10. **<D> Add**.

Target Aliasing	X
Target: <active surface=""> Surface or Conidor Surface - Default Surface - Rock_Layer_2 Surface - Rock_Layer_3 Move Up Move Down</active>	Aliases: Surface - Exist_Ground_1 Surface - Exist_Ground_2 Surface - Exist_Ground_3 Use Closest

- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Conidor OK Surface - Default Add -> Surface - Default Surface - Rock_Layer_2 Surface - Exist_Ground_1 <- Surface - Exist_Ground_2 <- Surface - Exist_Ground_3 Move Up Move Down Move Down Use Closest Use Closest

14. **<D> OK.**

Lab 31.5 - Review Design Model

View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly.

1. In the *Roadway Designer* dialog box, key in **373+00** for the *Station*. Notice the end conditions target the existing ground and rock layer surfaces in Roadway Designer dialog's cross- section viewer.



2. Key in *600+00* for the *Station*. Notice in the illustration below, that even though the surfaces are different, the end condition still solves. This is because the Target Aliasing allows multiple surfaces to be specified for the end condition.



Chapter Summary:

- When end conditions are chained together (like the rock layer components used above), all parts of the chain must solve or the whole end condition fails.
- Use target aliasing to target multiple existing ground and rock layer surfaces.

LAB 31 - Create End Conditions to Search a Surface

This lab demonstrates the ability of an end condition to target multiple surfaces, using target aliasing. In this exercise, a template is edited and new corridor is defined to target multiple surfaces. The existing ground surface was divided into three separate segments along the length of the project. There is also a rock layer surface 10-feet below the existing ground, for the second and third segments, where there is a deep cut section in the profile. The template end conditions target the rock and active surfaces, so target aliasing is required to target all the existing ground and rock surfaces as the corridor extends along the three segments of the project.

Chapter Objectives:

- Modify a template end condition to target a rock layer when that surface is present.
- Build a corridor and use target aliasing to target multiple existing ground and rock layer surfaces along three segments of the project.
- View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly

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- C:\Projects\12345\Design\InRoads\Exist_Ground_1-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_2-Create End Condit Search Surf.dtm
- C:\Projects\12345\Design\InRoads\Rock_Layer_3-Create End Condit Search Surf.dtm

Lab 31.1 - Create End Conditions to Search a Surface

1. Open MicroStation and InRoads using the *12345DES_Create End Cond Search Surf.dgn* file.

In the MicroStation drawing, notice the three perimeters displayed for each existing ground surface

- 2. Select **File> Open** from the InRoads menu bar.
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- Exist_Ground_2-Create End Condit Search Surf.dtm
- Exist_Ground_3-Create End Condit Search Surf.dtm
- Rock_Layer_2-Create End Condit Search Surf.dtm
- Rock_Layer_3-Create End Condit Search Surf.dtm
- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

Lab 31.2 - Edit template end condition components to target rock layer.

- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
- 7. **<D>** on the *Locate Button* next to *Name* in the *Component Properties* dialog box

LT Cut Above Bock	Component Prop	erties			*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut	1.571	< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40 -	35 -30	-25 -20	- 15 - 10	-5 U	Ŧ
╪╼┇╬╪╡╝╗╘╺┊╸┥				4	

8. On the left side of the template, **<D>** on the *LT_Cut_Rock* component.

In the *Component Properties* dialog box, Change the Surface to *Rock_Layer_2*, then
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Lab 31.3 - Create a Corridor and Template Drop

Build a corridor that follows the centerline alignment and extends along all three segments of the project.

- 10. Select **Modeler> Roadway Designer** from the InRoads menu bar.
- 11. Select **Corridor > Corridor Management** from the Roadway Designer menu bar.
- 12. In the *Manage Corridors* dialog box:
 - Key in *Centerline* in the *Name* field.
 - Select **Centerline** for the *Horizontal Alignment*.
 - Select **Centerline V** for the *Vertical Alignment*.
- 13. **<D> Add** then **<D> Close**.

Name: Cente	arline		Limits Station		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
/ertical Alignm	nent: Cente	erline V 🔹	Stop:		Сору
			/0C+00.00	100	
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
PI Rounding T Corridors: Name	Tangent: 0.00	Source Name	Start Station	Stop	Copy From. Help
PI Rounding T Comidors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From. Help o Station -00.00
PI Rounding ⁻ Corridors: Name Centerline	Tangent: 0.00 Type Alignment	Source Name Centerline	Start Station 4+00.00	Stop 706+	Copy From Help o Station -00.00

- 1. Select Corridor> Template Drops from the Roadway Designer menu bar.
- 2. In the *Template Drops* dialog box, select **Centerline** for the *Corridor* name.
- 3. Key in *50* for the *Interval*.
- 4. Expand 1 Templates folder in *Library Templates* area.
- 5. **<D>** on the **12345_HMA_2Lane_Rock** template.
- 6. **<D> Add** then **Close**.

Templa Corridor: Station: Interval: Library Terr C:VPr C:VPr C:VPr 1	te Drops Centerline 4+00.00 50.00 nplates: 0 12345_H < 12345_H < 12345_H < 12345_H < 2 12345_H < CONC_41 < CONC_41 < CONC_0 < UMA_C		_Template-Libr	Add Close Change Copy Help
Current Te	mplate Drops	3:		
Station	Interval	Template	Revised In	Library
4+00.00	50.00	12345_HMA_2Lane_Rock	ITL	C:\Projects\12345\Design\InRoads\1
•				4
Synchron	iize with Libr	ary		Edit Delete

Lab 31.4 - Define target aliasing

Target aliasing allows multiple targets to be specified for a single end condition. In this example, the existing ground for the project was contained in three separate dtms.

- 7. Select Tools> Target Aliasing from the Roadway Designer menu bar.
- 8. In the *Target Aliasing* dialog box, select **<Active Surface>** for the *Target*.
- 9. Highlight Surface Exist_Ground_1, Surface Exist_Ground_2 and Surface Exist_Ground_3 in the *Surface or Corridor* area.

10. **<D> Add**.

Target Aliasing	X
Target: <active surface=""> Surface or Conidor Surface - Default Surface - Rock_Layer_2 Surface - Rock_Layer_3 Move Up Move Down</active>	Aliases: Surface - Exist_Ground_1 Surface - Exist_Ground_2 Surface - Exist_Ground_3 Use Closest

- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Conidor OK Surface - Default Add -> Surface - Default Surface - Rock_Layer_2 Surface - Exist_Ground_1 <- Surface - Exist_Ground_2 <- Surface - Exist_Ground_3 Move Up Move Down Move Down Use Closest Use Closest

14. **<D> OK.**

Lab 31.5 - Review Design Model

View the corridor to examine the end condition's behavior and determine if templates and target aliasing are working properly.

1. In the *Roadway Designer* dialog box, key in **373+00** for the *Station*. Notice the end conditions target the existing ground and rock layer surfaces in Roadway Designer dialog's cross- section viewer.



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Chapter Summary:

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Chapter Objectives:

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- C:\Projects\12345\Design\InRoads\Exist_Ground_3-Create End Condit Search Surf.dtm
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In the MicroStation drawing, notice the three perimeters displayed for each existing ground surface

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- 4. **<D> Cancel** the to dismiss the *Open* dialog box.

Lab 31.2 - Edit template end condition components to target rock layer.

- 1. Select **Modeler> Create Template** from the InRoads menu bar.
- 2. **<D> <D>** on the root folder in the Template Library pane to expand the folder structure.
- 3. Expand the *1 Templates* folder.
- 4. **<D> <D>** on the *12345_HMA_2Lane_Rock* template to open it for editing.
- 5. **<D> <D>** on the RT_Cut_Rock component.
- 6. In the *Component Properties* dialog box, change the Surface to *Rock_Layer_2* and <D> Apply



- **Note:** This end condition has two components and is only placed when there is a rock surface above the ditch bottom. The first component, *RT_Cut_Rock*, extends to intersect the rock layer surface. The second, *RT_Cut_Above_Rock*, is a child of the first and extends to intersect the active surface (existing ground). All other end condition components in this template target the active surface (existing ground).
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LT Cut Above Bock	Component Prop	erties			*
	Name:	LT_Cut_Rock		+ Apply	
8 LT_Cut_Rock	Description:			Close	
6	Style:	D_Top-of-Cut	1.571	< Previous	
4	Parent Component: Display Rules:		<u>+</u>	Next >	
2	Exclude from triangu	ulation		Help	
	End Condition Proper	ties			
-2	Target Type:	Surface 🔻	Priority:	1	
-4	Surface	 Rock_Layer_2 	Benching Count:	0	
-6			From Datum:	0.00	
	Horizor	ntal Vertical	Step Elevation:	0.00	
	Offsets: 0.00	0.00	Rounding Length	0.00	
-50 -45 -40 -	35 -30	-25 -20	- 15 - 10	-5 U	Ŧ
╪╼┇╬╪╡╝╗╘╺┊╸┥				4	

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Name: Cente	arline		Limits Station		Add
Туре:	Align	ment 💌	Start:		Close
Horizontal Alig	nment: Cente	erline 🔻 🕂	4+00.00	+	Change
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			/0C+00.00	100	
PI Rounding 1	Tangent: 0.00		700+00.00	-Ψ-	Copy From.
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- 5. **<D>** on the **12345_HMA_2Lane_Rock** template.
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Templa Corridor: Station: Interval: Library Terr C:VPr C:VPr C:VPr 1	te Drops Centerline 4+00.00 50.00 nplates: 0 12345_H < 12345_H < 12345_H < 12345_H < 2 12345_H < CONC_41 < CONC_41 < CONC_0 < UMA_C		_Template-Libr	Add Close Change Copy Help
Current Te	mplate Drops	3:		
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•				•
Synchron	iize with Libr	ary		Edit Delete

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Target Aliasing	X
Target: <active surface=""> Surface or Conidor Surface - Default Surface - Rock_Layer_2 Surface - Rock_Layer_3 Move Up Move Down</active>	Aliases: Surface - Exist_Ground_1 Surface - Exist_Ground_2 Surface - Exist_Ground_3 Use Closest

- 11. Select **Rock_Layer_2** for the *Target*.
- 12. Highlight Surface Rock_Layer_2 and Surface Rock_Layer_3 in the *Surface or Corridor* area.
- 13. **<D> Add**.

Target: Rock_Layer_2 Surface or Comidor OK Surface - Default Surface - Default Surface - Default Add -> Surface - Exist_Ground_1 Surface - Rock_Layer_2 Surface - Exist_Ground_2 Move Up Move Down Move Down Image: Use Closest Image: Use Closest

14. **<D> OK.**

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