

# Bentleyuser.dk Årsmøde 2011 Nordic Civil 2011

14.-16. November 2011, Munkebjerg Hotel, Vejle

# Workshop - X1 Introduction to InRoads Roadway Designer. InRoads V8i

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# LESSON NAME: OPENING A PROJECT (INROADS USER)

### LESSON OBJECTIVE:

In this lesson the student will learn to access an InRoads project in preparation for designing a model in Roadway Designer. Note, this lesson is for InRoads users only. For GEOPAK users, please proceed to the next lesson on the next page.

# EXERCISE: GETTING STARTED (INROADS USER)

This exercise will guide you through the steps to get started

- 1. Go to Start > Programs > Bentley > Power InRoads (SELECTseries 2) > Power InRoads
- 2. The instructor will provide the appropriate path location for this project. When the MicroStation Manager appears select the file:

*Plan.dgn* and click OK.

- When the InRoads Explorer appears, go to File > Open from the InRoads menu.
- 4. When the Open dialog appears select the InRoads project file:

*My\_Project.rwk* and click OK.

Opening the *RWK* project file opens the following files: CMJOB001.alg Templates.itl Original.dtm Default\_Styles.xin

5. Select **Modeler > Roadway Designer** from the InRoads Explorer menu to access Roadway Designer.

Be	ntley InRoads Suite	• V8i (SELE	ECTser	ies 1)						_	
<u>F</u> ile	<u>S</u> urface <u>G</u> eometry	<u>B</u> ridge <u>[</u>	<u>)</u> rainag	e S <u>u</u> rvey	<u>E</u> valuation	<u>M</u> odeler	Site Modeler	Dr <u>a</u> fting	<u>Q</u> uantities <u>T</u> ools	<u>H</u> elp	
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	Surfaces			🔫 Default		🦧 <u>R</u> oad	dway Designer.	. N	Administrator	8/24/2009 2:36	Read-
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Design	s and manages roadwa	ay corridors	;								



# LESSON NAME: OPENING A PROJECT (GEOPAK USER)

### LESSON OBJECTIVE:

In this lesson the student will learn to access a GEOPAK Corridor Modeler project in preparation for designing a model in Roadway Designer. Note, this lesson is for GEOPAK users only.

# EXERCISE: GETTING STARTED (GEOPAK USER)

This exercise will guide you through the steps to get started

- 1. Go to Start > Programs > Bentley > MicroStation V8*i* > Bentley MicroStation V8*i* (SELECTseries 1).
- 2. The instructor will provide the appropriate path location for this project. When the MicroStation Manager appears select the file:

Plan.dgn and press OK.

- 3. Go to Applications > GEOPAK > Road > Corridor Modeling.
- 4. Select the GPK job number 001
- 5. Choose **File > Load** from the Corridor Modeling dialogue.
- 6. Load the Corridor Modeler project file entitled My\_Project.rdp.
- 7. Choose the **Open Roadway Designer** icon from the Corridor Modeling dialogue to access Roadway Designer.

📕 Corridor Modeling - C	:\2009 RBC\EW-2\DATA\My_	Project.rdp	_ 🗆 X
<u>File T</u> ools			
Job: 001 🔍 🗸	× 🍂 🚋 🍰 🚽		
Preferences DDB DTM Geometry Plan Graphics ALG Viewer	Prefetences Open Roadway Designer Station Lock: Slope Readout: Horizontal Chord Height: Vertical Chord Height: Template Library:	Even ▼ 50% ▼ 0.010000 0.010000	2



# LESSON NAME: BUILDING A CORRIDOR

# LESSON OBJECTIVE:

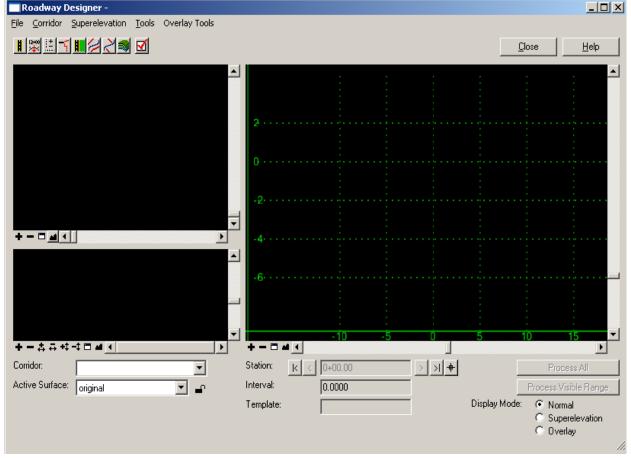
This lesson will take you through how to setup and apply templates to a corridor.

On-Line Help Topic: Search on "Roadway Designer"

# Exercise: Building Corridors

This exercise will take you through setting up a corridor in Roadway Designer.

1. When the Roadway Designer opens you will see three panes in the window. The top left pane is the plan view. The bottom left is the profile view. The right pane is the cross section view.



- 2. To create a corridor, select **Corridor > Corridor Management** from the menu on the **Roadway Designer**.
- 3. Select *Proposed Finished Grade* for the Surface Symbology. Key-in *Route1* in the **Name** field and click **Add**.



Manage Corridor	'5				<u>- 🗆 ×</u>
Name: Route 1			imits		Add
Surface Symbology:	Proposed Finish	ned G 💌	Station		Close
Туре:	Alignment	•	12+34.00	+	Change
Horizontal Alignment:	HIGHWAY	•	Stop:		Сору
Vertical Alignment:	HIGHWAY	•	75+12.80	-	Copy From
PI Rounding Tangent	0.0000				
					Help
Corridors:					
	Туре	Source Name	Start Station	Stop S	itation
	Туре	Source Name	Start Station	Stop S	itation
	Туре	Source Name	Start Station	Stop S	itation
	Туре	Source Name	Start Station	Stop S	itation
	Туре	Source Name	Start Station	Stop S	itation
	Туре	Source Name	Start Station	Stop S	
	Туре	Source Name	Start Station	Stop S	Delete

- 4. Close the Corridor Management dialog.
- 5. On the **Roadway Designer** dialog click the **Fit** on the profile pane. You should now see the plan view of the alignment and the profile view of it.
- 6. To apply templates to the corridor go to **Corridor > Template Drops**.
- 7. Ensure that **12+34** is set for the **Station**.
- 8. Set the Interval to 10.00.
- 9. Expand the Library Templates tree and highlight the 2Lane template.
- 10. Click Add.



🔜 Temp	ate Drops				
Corridor:	Route1	•			Add
Station:	12+34.00		+		Close
Interval:	10.0000		<del>+</del>		Change
Library Te					Сору
Tem	plates.itl Backbones				
	End Conditions	:			Help
	Templates				/
	≪ 2Lane ≪ 4Lane				
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				7	₩/
I					
	emplate Drops:	1		-	
Station	Interval	Template	Enable Transiti	Revise Librar	
12+34.00	) 10.0000	2Lane		ITL Templa	ates.itl
Synchro	mize with Libra	ry -		Edit	Delete

- 11. Key in station 25+00 and select the 2Lane template again and select Add.
- 12. Add the following template drops:

Station 30+00	Template: 4Lane
Station 55+00	Template: 4Lane
Station 60+00	Template: 2Lane

- 13. Close the Template Drops dialog.
- 14. Select the **Process All** button.
- 15. In the Roadway Designer dialog select **File > Save** to save the Roadway Designer project file. Name the file **My\_Project.ird**.

# **LESSON NAME: TEMPLATE TRANSITIONS**

#### LESSON OBJECTIVE:

This lesson will take you through how to handle template transitions that you defined in the corridor.

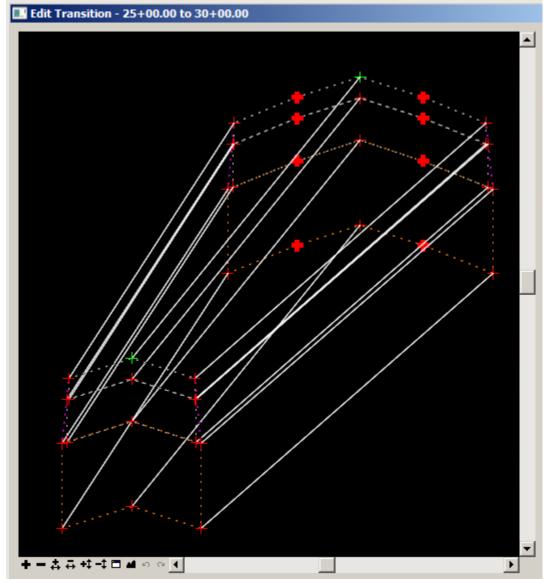


On-Line Help Topic: Search on "template transitions"

# **EXERCISE: TEMPLATE TRANSITIONS**

This exercise will take you through defining template transitions. The reason you will need to define transitions is because when transitioning between one template and a template that has more segments in it, the Roadway Designer does not know how to connect the segments. This is because there may be more than one way to connect them.

1. From the **Roadway Designer** double click on the west yellow shape in the plan view. This will bring up the **Edit Transition** dialog.

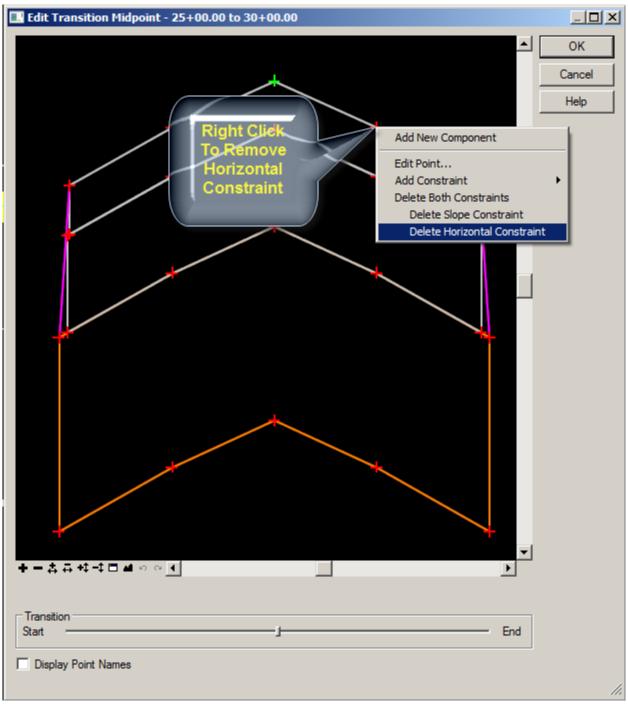


2. To edit the transitions **click** on the bolded tic mark and then connect it to the desired transition location by clicking on it (the center points of the first template).



- 3. Finish defining the transitions.
- 4. Select OK.
- 5. Now you see the cross section view that is half way trough the transition.
- At the bottom of the Edit Transition Midpoint dialog you will see a slider bar. Try moving the bar to the left and right. Is anything happening? The reason nothing is happening is because of the constraints on the template points. To modify the constraints right click on the right lane line point and select Edit point.





- 7. Try sliding the Transition bar again. What is happening?
- 8. Correct the constraint on the left lane line point.
- 9. When completed click **OK** on the **Edit Transition Midpoint** dialog.
- 10. Correct the west transition with the same steps as above.
- 11. In the Roadway Designer dialog select **File > Save** to save the Roadway Designer project file updating from the previous save.



**LESSON NAME: EXAMINING THE CORRIDOR** 

# **LESSON OBJECTIVE:**

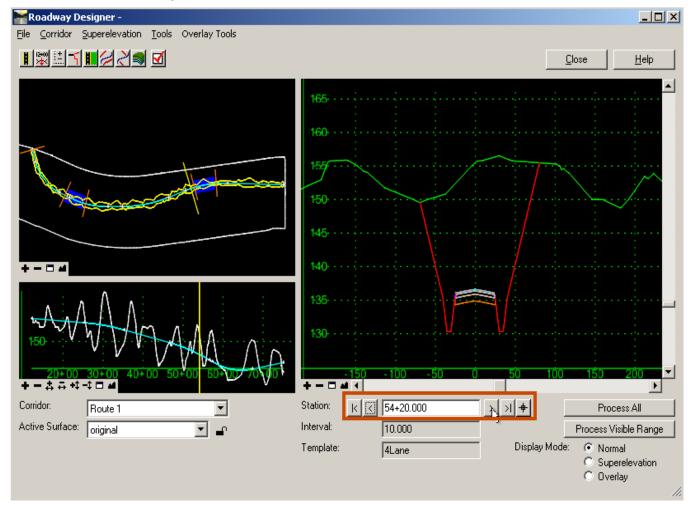
This lesson will take you through how to navigate through the corridor.

On-Line Help Topic: Search on "Roadway Designer"

# EXERCISE: CORRIDOR NAVIGATION

This exercise will take you through the navigation tools in the Roadway Designer.

- 1. From the Roadway Designer click on the Process All button.
- 2. At the bottom of the Roadway Designer dialog there is a station value with advancing arrows on either side of it.



3. Clicking on the arrows move along the stations.



- 4. Notice in the plan view and the profile view there is a yellow line across the alignment and the profile. This line represents where the cross section view is.
- 5. Double click in the plan view. Notice that the line moved to the place on the alignment that was orthogonal to your double click.
- 6. Try the same in the profile view.
- 7. Now using your left mouse button click and hold on the yellow line in the plan view and drag it along the alignment.
- 8. Try the same in the profile view.



# LESSON NAME: SUPERELEVATION (GEOPAK / INROADS USERS)

# LESSON OBJECTIVE:

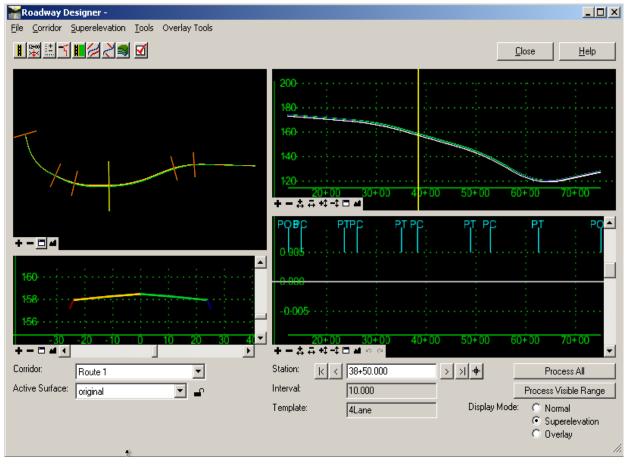
This lesson will take you through how to setup superelevation.

On-Line Help Topic: Search on "Superelevation"

# **EXERCISE:** SUPERELEVATION

This exercise will take you through defining and setting up superelevation.

- 1. On the **Roadway Designer** click the Display Mode: **Superelevation** option in the on the bottom right of the dialog.
- 2. The top left pane is the plan view. The bottom left pane is the cross section view. The top right pane is the profile view and the bottom right pane is the superelevation diagram.



 To set up super elevation we must first calculate the superelevation rates. Right click on the superelevation diagram pane and select Create Superelevation Wizard > AASHTO. This will bring up the AASHTO Wizard.



AASHTO Wizard			
Corridor: Route1			Help
General Superelevation Data Maximum Delta G: % Runoff on Tangent Non-Linear Curve Length:	Image: Spiral Tar     60%   Tar	gent Point at: ro Cross Slope rmal Crown	
Horizontal Curve Sets:			
1D	Start Station 14+90.02	Stop Station 23+56.69	Superelevation Rate 7.70%
2	26+14.60	25+06.35	3.85%
3	38+27.33	48+91.74	2.57%
4	52+91.94	62+56.94	3.08%
•			Rate Calculator
<	Back Next > F	references Close	 ]

- 4. First we need to compute the rates. **Click** the **Rate Calculator** button.
- 5. When the **Rate Calculator** appears **Edit** each record and set the design speed to **55**.



Superelev	vation Rate	Calculate	or					x
Superelevation	n Rates:							Apply
Curve Numb	er Start St	ation	Stop Station	Radius	Design Sp	eed (mph)	Superelevation	
1	14+90.0		3+56.691	-1000.000	55.000		-7.7047%	Close
2	Supere	levation	Rate Calcula	tor Editor			× 23%	Edit
4	Method:	AASH	TO Method 1		•	ок	82%	Undo
	Design Spe	ed:	55.00	0		Cancel		Report
	Friction Fac	tor:	13.00	)00%		Preferences.		Help
	Running Sp	peed:	55.00	0		Liele		
	Absolute M	aximum Ra	ate: 8.000	0%		Help		
	Preferred M	laximum R	ate: 0.000	)0%	Rour	nd Rates To:		
	Computed I	Rate:	7.704	7%	0.1			
	Curve Lin	nits						
	🔽 Use C	urve Limits	3					
			Radius	%f Used	f Demand	e Value	_	
	NC to RC	:	0.000	0.000	0.000	0.0000%		
	RC to Sup	perelevatio	n: 0.000	0.000	0.000	0.0000%		
	Start Maxi	imum Rate	0.000	0.000	0.000	0.0000%		
•								li.

- 6. When editing is complete select **Apply** and then **Close**. You will be returned to the **AASHTO Wizard**.
- 7. Move the yellow navigation line to somewhere where the 2Lane template exists.
- 8. Select Next.
- 9. Select Add.
- 10. When the **Add SuperElevation Section** dialog appears select the button beside the **Crown Point** field and select the crown point in the cross section view.
- 11. Do the same for the **Left Range Point** and **Right Range Point** by selecting the edges of pavement.
- 12. Turn on the **Station** toggle and key in the **12+34** for the **Start** and **25+00** for the **Stop**.



Add Superelev	ation Section		×
Name:	Section1		OK
Crown Point:	CLRD_WC_Top	•	Cancel
Left Range Point:	L_EP_WC_Top	•	Help
Right Range Point:	R_EP_WC_Top	•	
Pivot Direction:	From Crown Point	•	
Limits Station			
Start:	12+34.000	+	1
Stop:	25+00.000	<del>+</del>	

- 13. Click **OK** to add the first super elevation section.
- 14. Move the yellow navigation line somewhere where the 4Lane template exists.
- 15. Repeat the process for identifying the points and set the station range to **25+00** through **59+99.99**.
- 16. Move the yellow navigation line somewhere where the **2Lane** template exists.
- 17. Repeat the process for identifying the points and set the station range to 60+00 to 75+12.802. Don't forget to move the yellow navigation line to the 2Lane section.



ctions:						Help
Name	Start Station	Stop Station	Crown Point	Left Range	Right Range	Pivot Direction
Section 1	12+34.000	25+00.000	CLRD_WC	L_EP_WC	R_EP_WC	From Crown Point
Section2	25+00.000	59+99.990	CLRD_WC	L_EP_WC	R_EP_WC	From Crown Point
Section3	60+00.000	75+12.802	CLRD_WC	L_EP_WC	R_EP_WC	From Crown Point
				Add	. Edit	. Delete
perelevation	for Selected Sectio	in:		Add.	Edit.	Delete
perelevation Start Station	for Selected Sectio	n: Entering Run	Exiting Runo		Edit.	
		/	Exiting Runo 36.98			
Start Station	Stop Station	Entering Run		Width from pi	Superelevation	
Start Station	Stop Station	Entering Run		Width from pi	Superelevation	
Start Station	Stop Station	Entering Run		Width from pi	Superelevation	
Start Station	Stop Station	Entering Run		Width from pi	Superelevation	
Start Station	Stop Station	Entering Run		Width from pi	Superelevation	
Start Station	Stop Station	Entering Run		Width from pi	Superelevation	
Start Station	Stop Station	Entering Run		Width from pi	Superelevation	

- 18. Select Next.
- 19. Select Finish.
- 20. Select Process All.
- 21. In the Roadway Designer dialog select **File > Save** to save the Roadway Designer project file updating from the previous save.
- 22. Spend some time navigating through the panes and looking at the model. Notice in the plan view that the cross slope is denoted by colors.



**Note To GEOPAK Users**: As an alternative to using the AASHTO superelevation Wizard, GEOPAK users can import a GEOPAK shapes input file to establish the super elevation control lines. The next exercise takes advantage of importing GEOPAK shapes input files as an alternative to the AASHTO Wizard. Regardless of which method is chosen by the GEOPAK user, only one method should be used for a project to avoid duplicate superelevation control lines.

Important: When using the AASHTO Wizard, additional options are available for editing the super elevation control lines once they are established. If however a GEOPAK user imports a shapes input file, they will be limited on their ability in accessing all of the available super elevation control line editing tools.



# LESSON NAME: SUPERELEVATION (ALTERNATIVE FOR GEOPAK USERS)

### LESSON OBJECTIVE:

This lesson will take you through how to setup superelevation using GEOPAK Shapes Input files.

On-Line Help Topic: Search on "Superelevation"

### **EXERCISE:** SUPERELEVATION

This exercise will take you through defining and setting up superelevation.

- 1. On the **Roadway Designer** click the Display Mode: **Superelevation** option in the on the bottom right of the dialog.
- 2. The top left pane is the plan view. The bottom left pane is the cross section view. The top right pane is the profile view and the bottom right pane is the superelevation diagram.
- 3. To create superelevation control lines, we must import the GEOPAK input file input files. To do this, right-click in the superelevation diagram pane and select "**Import Superelevation from INP file**..."
- 4. In the Section field, type a descriptor entitled **Section1**.
- 5. In the *File* field choose the shapes file entitled **Shapes1.inp**.

Import Superelevation from .INP file								
Section:	Section1					Apply		
File:	C:\2009 RE	C\EW-2\DATA	\Shapes1.inp			Cancel		
Point		Offset	Pivot Point	Station	Cross Slope	Help		
L_EP_WC	_Top	-12.0000	CLRD_WC_Top	12+34.00	-2.00%			
R_EP_WC	_Тор	12.0000	CLRD_WC_Top	12+34.00	-2.00%			

- 6. Click **Apply** to assign the superelevation control lines to the first portion of the project.
- 7. In the *Section* field type a descriptor entitled **Section2** and choose the shapes input file entitled **Shapes2.inp**.



Import Su	perelevati	on from .INP	file			2
Section:	Section2					Apply
File:	C:\2009 R	BC\EW-2\DATA	A\Shapes2.inp			Cancel
Point		Offset	Pivot Point	Station	Cross Slope	Help
L_LL_WC	_Тор	-12.0000	CLRD_WC_Top	25+00.00	-2.00%	
L_EP_WC	_Тор	-24.0000	L_LL_WC_Top	25+00.00	-2.50%	
R_LL_WC	_Тор	12.0000	CLRD_WC_Top	25+00.00	-2.00%	
R_EP_WC	_Top	24.0000	R_LL_WC_Top	25+00.00	-2.50%	

- 8. Click **Apply** to assign the superelevation control lines to the second portion of the project.
- 9. In the Section field, type a descriptor entitled **Section3**.
- 10. In the *File* field choose the shapes file entitled **Shapes3.inp**.

Import Su	iperelevati	on from .INP	file			×
Section:	Section2					Apply
File:	C:\2009 R	3C\EW-2\DATA	\Shapes3.inp			Cancel
Point		Offset	Pivot Point	Station	Cross Slope	Help
L_EP_WC	_Top	-12.0000	CLRD_WC_Top	60+00.00	3.08%	
R_EP_WO	_Top	12.0000	CLRD_WC_Top	60+00.00	-3.08%	

- 11. Click **Apply** to assign the superelevation control lines to the third and final portion of the project.
- 12. Dismiss the Import "Superelevation from INP File" dialog.
- 13. Select **Process All** to apply the superelevation to the project.
- 14. In the Roadway Designer dialog select **File > Save** to save the Roadway Designer project file updating from the previous save.
- 15. Spend some time navigating through the panes and looking at the model. Notice in the plan view that the cross slope is denoted by colors.



LESSON NAME: GENERATING A SURFACE MODEL

# LESSON OBJECTIVE:

This lesson will take you through how to generate a surface from your roadway design.

On-Line Help Topic: Search on "Create Surface"

# EXERCISE: CREATE SURFACE

This exercise will take you through defining and setting up the Create Surface command.

- 1. On the Roadway Designer select Corridor > Create Surface.
- 2. Set or key-in the following values:

	Design
Empty Design Surface: On	
Add Exterior Boundary: On	
Style:	Exterior Boundary
Triangulate:	On (InRoads Users Only)
Display In Plan View: Features	



<b>Create Surface</b>			×	
Name:	Design	•	Apply	
Default Preference:	Default	•	Close	
Create Surface(s) from	n:		Preferences	
Route 1			Help	
	1	All		
Clip	ping Options			
General Options    General Options   New Surface for Each Corridor   Empty Design Surface   Process Visible Range Only   Include Null Points   Triangulate				
Features Duplicate Names:				
Add Transverse Features				
Style:	140	7		
Add Exterior Boundary				
Style:	Exterior Boundary	•		
Densify using Chord	-	<b>I</b> F∈	ay in Plan View eatures omponents	

- 3. Click Apply.
- 4. Dismiss the **Results** dialogue.
- 5. Click **Close** on the Create Surface dialog.
- 6. Collapse the Roadway Designer.
- 7. Using MicroStation examine the features displayed in the DGN file.

