

## InRoads Select Series 2

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# InRoads

## Select Series 2

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## **Version Information-**





Bentley InRoads V8i (SELECTseries 2) V08.11.07.566

## **Outline for Completing an InRoads Project**

**Note**: Before beginning a project in InRoads, existing dtm and alg files are necessary. For Microstation, a Topo file is needed. These can be retrieved through the intranet-**Internet Explorer:** http://intranet/engrgrp/survey/fsvarch/

#### I. Open and Create Files (Chapter 1)

A. Open Preference file (xin) from the R drive. Save to the project folder.

B. Set up a project default for the new project

C. Open the original surface (dtm) and Geometry Project (alg) files.

D. Open the seed Typical Section Library (Basic Template Library.itl) and save to the project folder as new name.

E. Open Roadway Designer Library (ird) and save to the project folder (this will be an empty file until the corridor is built).

F. Review the original surface and the geometry project.

G. Create a Project File (rwk).

#### II. Create the new Horizontal (Chapter 2)

A. File >New >Geometry > Horizontal Alignment

B. Geometry > Horizontal Curve Set > Add PI

C. Once all the PIs are added, Geometry > Horizontal Curve Set > Define Curve to add the radius of each curve.

D. Enter the Event points and any equations to the alignment

OR.....if given station and offset from CL Survey or northing and easting, use COGO

- 1. Geometry >Cogo points > New
- 2. Define by station and offset or northing and easting
- 3. As the points are created record the numbers
- 4. Geometry > Utilities > Create/ Edit Alignment by Cogo Points
- 5. Name the alignment
- 6. Key in the points
- 7. Once all the PIs are entered use the Define Curve command to enter curve information
- 8. Station the alignment and add event points and equations

#### **III. Create a Vertical Alignment (Chapter 3)**

#### A. Generate A Profile.

- B. Create a NEW Vertical Alignment under the active Horizontal Alignment.
  - C. Add P.I.'s to the Vertical Alignment.
  - D. Use the Vertical Curve Set command to add curve lengths to the Vertical Alignment.
  - E. Save the Geometry Project.

#### IV. Create a Template (Chapter 4)

- A. Retrieve the Basic Template Library
- B. Save the Template Library from the R drive to the job folder and name it for the project.
- C. Create the template using the prebuilt segments.
- D. Edit the pieces to fit the specific job including pavement depth.
- E. Add end conditions to the template and edit them for the project.

F. If there is superelevation on the project, ensure the top layer shoulder components are set to triangulate.

E. Save the Typical Section Library.

#### V. Create A Roadway Design. (Chapters 5)

- A. Create a Corridor.
- B. Create Template Drops.
- C. If necessary create Template Transitions or use point controls.
- D. Run through the "cross sections" view and adjust where necessary.

#### VI. Create Superelevation (Chapter 5)

A. In Roadway Designer... Superelevation > Create Superelevation Wizard > Table

B. Load the table for the project from R:\CADD\_Support\Design\InRoads\superelevation

C. Highlight the desired curves and select Load Values from Table. Once all the curves are finished select the Next button

- D. Select Add on the sections box & define curves with range and crown points
- E. Right click in the superelevation window and set the shoulder rollover locks
- F. Return to the template library and turn off triangulate on the top layer shoulder components, then

#### save.

G. Synchronize the template drops and save the Roadway Designer

#### VII. Run Roadway Designer (Chapter 5)

- A. Go to Corridor>Create Surface.
- B. Select desired Corridor and select the existing Surface.
- C. Name the surface and make the desired setting selections.
- D. Apply the create surface.
- E. Save Design Surface (dtm).

#### VIII. Create Plan & Profile Sheets (Chapter 6)

- A. First load the desired preference. Set the desired Horizontal Alignment. (Main Tab)
- B. Set Station Limits. (Main Tab)
- C. Select Model Files. (Plan Controls tab)
- D. Select AND Highlight the Existing Ground (dtm)(Profile Controls tab)
- E. Select the Host File Name. (Sheet Layout tab)
- F. Select the Seed Host File. (Sheet Layout tab)
- G. Enter the J.P. Number User Text 1 and County Name User Text 3 (Border & Title tab)
- H. Click Apply and data point in view.

I. View the vertical alignment in the profile with the update profile command and annotate it. Annotate finished grades as well.

- J. View the structures in Plan and Profile and drives in the Plan. Annotate them.
- K. View the horizontal alignment in the Plan view and place curve set annotation and stationing.
  - L. View the top of cut and toe of slope features in the Plan view and annotate.

#### IX. Create a Set of Cross Sections (Chapter 7)

A. Load the preference inside the create cross section command and set the desired Horizontal Alignment.

- B. Select the desired surfaces.
- C. Generate Cross Sections and label JP #County and sheet numbers.
- D. Annotate F.G. and ditch elevations

E. Drape the Cross Sections. This includes: utilities (i.e. gas lines, tug lines, and underground power lines and crossing utilities), pres RW, new RW, and alignments.

- F. Display and annotate structures and drives.
- G. Remove the existing pavement from the existing surface
- H. Update the cross sections with the modified existing surface

G. Using the End Areas & Volumes command, label the cross sections (without the fill factor).

#### Create a Mass Diagram

A. In the Create Cross Sections command Select the End Area Volumes folder

- B. Select the Cross Section set needed to create the Mass from.
  - C. Select from the EAV General folder the surfaces to be compared.
  - D. Set the fill factor on the compaction expansion folder and any volume exceptions

E. Select the Mass Haul Diagram subfolder and set the Horizontal and Vertical exaggeration. Adjust until the desired result is achieved.

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# CHAPTER 1

**Project Preparation** 

## Notes

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2 swo4	059	1	v1.dtm	05-Mar-2012	14:10	3.2M	
? swo4	059	1	v2.dtm	05-Mar-2012	14:10	3.2M	

From the explorer window, press Ctrl+F. Key in the JP number and select next. The project will highlight in the list. Open the project and double click on civil. Double click on the alg and dtm files, select the save button and set the path to the new project folder then save the files in the inroads folder.

Next save a copy of the survey dgn file located in the dgn folder in the archives into the project folder. Note: there may be multiple versions of the same swo...In the example below swo3982\_1\_v4.dgn would be correct. If there is a topo (topoid\_v2) save it as well.

Parent Directory	-
clprof.dgn	05-Mar-2012 13:55 576K
dgn39821.dgn	05-Mar-2012 13:55 2.9M
swo3982_1_add2.dgn	05-Mar-2012 13:55 26K
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swo3982_1_v2.dgn	05-Mar-2012 13:55 2.9M
swo3982_1_v3.dgn	05-Mar-2012 13:55 2.9M
swo3982_1_v4.dgn	05-Mar-2012 13:55 2.9M
swo3982d.dgn	05-Mar-2012 13:55 6.8M
topoid.dgn	05-Mar-2012 13:55 17M
topoid_v2.dgn	05-Mar-2012 13:55 17M

## **SURVEY ARCHIVES**

When beginning a project, the first thing to do is create a project folder with an inroads folder inside. Then the files need to be retrieved from the intranet survey archives **Internet Explorer:** http://intranet/survey/data/fsvarch//

http://intranet/survey/ D - C X     in     fit View Favorites Tools Help	dex of /survey/data/tsvarch 🕷
Cut Ctrl+X	
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Select all Ctri+A	
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26.tif	12-Jul-2012 11:40 512
LIGNMENT_STUDIES/	25-Jul-2012 08:42 -
ridge_Shift/	25-Jul-2012 08:42 -
ridge_survey/	25-Jul-2012 08:42 -
IP/	25-Jul-2012 08:42 -
IVIL/	25-Jul-2012 08:42 -
GN/	25-Jul-2012 08:42 -
ood Information/	25-Jul-2012 08:42 -
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AGES/	25-Jul-2012 08:42 -
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EPORTS/	25-Jul-2012 08:42 -
WO4420 1 jp7909 04/	28-Feb-2012 06:20 -
urnerTPK Stroud/	25-Jul-2012 09:01 -
S FTP.LOG	18-Apr-2012 11:08 879
Example swo1234 1 jp12345 1/	25-Jul-2012 09:01 -

Then retrieve the Microstation seed files for the project from R:/CADD\_Support/MicroStation/Seed Files/Roadway. Copy the desired files to the new project folder. When Renaming for a project, replace the 12345(04) with the project number. For example: 12345(04)-Align.dgn becomes 17458(10)-Align01.dgn

- 赵 12345(04)-Align.dgn
- 赵 12345(04)-Const.dgn
- 赵 12345(04)-Detail.dgn
- 赵 12345(04)-DetourXsec.dgn
- 🕌 12345(04)-Erosion Control.dgn
- 赵 12345(04)-Geometric Detail.dgn
- 📕 12345(04)-MassDiagram.dgn
- 赵 12345(04)-Notes.dgn
- 📕 12345(04)-PayQuantity.dgn
- 赵 12345(04)-Profile.dgn

- 12345(04)-ROW.dgn
- 12345(04)-Sequence.dgn
- 12345(04)-Summary.dgn
- 赵 12345(04)-SWMP.dgn
- 赵 12345(04)-Title.dgn
- 赵 12345(04)-Typical.dgn
- 赵 12345(04)-Utilities.dgn
- 赵 12345(04)-Xsec.dgn
- 赵 SeedHostFile N.dgn

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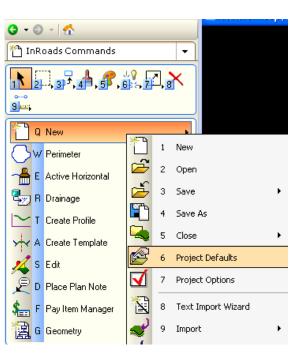
## PROJECT DEFAULTS

Copy the preferences, the seed template library, and the notes file from the R drive. These files can be found in R:/CADD\_Support/Design/InRoads and should be copied to the project folder in the inroads folder.



Now select the Inroads icon from the desktop. This will launch both Microstation & InRoads. Select the desired Microstation file to open.

## From the InRoads Commands select File>Project Defaults (Q>6)



Click the new button to create a new Project Default.

Key in a Name such as the project number. (it can be named anything, so long as it makes sense). Select the OK button on the New Configuration window.

Project defaults will only be on the machine and under the id it was created on.

Configuration Name:	<none></none>			•	Apply
Default Preferences					Close
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Drafting Notes (*.dft).					Import
Pay Items (".mdb)	1				Export
Site Modeler Options (* spf)					Help
	-				
Default Directory Paths ProjectWise Directory:	1				
Project Default Directory:	-				
Report Directory.	-				
Projects (".rwk);	-				
Surfaces (*.dtm)	-				
Geometry Projects (* alg):	-				
Template Libraries (* itl):					
Roadway Design (" lid):	1				
Survey Data (*.fwd);	1				
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## PROJECT DEFAULTS

Once the name is keyed in for the project default and the OK button is selected, a blank line will show for each of the items. Click in the box beside the Preferences and select the Browse button. From the Open window, navigate to the correct file and select the Open button. The path and file name will appear in the Default Preferences. Repeat this process for each item to have it load automatically.

The items in the top box are the default preferences. These load automatically as long as the project default is set.

The items in the bottom box are know as Default Directory Paths. The path set is the folder it will automatically find when opening the corresponding file type

## Do not set a path for the Style Sheet (xsl) – just leave that one blank.

Choose the apply button on the Set Project Defaults window once all desired lines are filled in. When finished select close on the project default window.

It does not have to be the same path for each item (if the path is the same, copy and paste is an option).

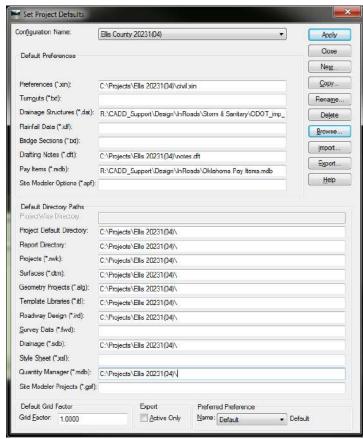
Default Directory Paths ProjectWise Directory:	
Project Default Directory: Y:\Divis	on 5\Kjowa Co. 26477 Undo
Report Directory:	0100
Projects (*.rwk):	Cut
Surfaces (*.dtm):	Сору
Geometry Projects (*.alg):	Paste Delete
Template Libraries (*.itl):	
Roadway Design (*.ird):	Select All
Survey Data (*.fwd):	Right to left Reading order
Drainage (*.sdb):	Show Unicode control characters
Style Sheet (*xsl):	Insert Unicode control character
Quantity Manager (*.mdb):	Open IME
Site Modeler Projects (*.gsf):	Reconversion

## The number of project defaults is virtually limitless.

For example: the rwk for 20231. If project defaults are set and an attempt is made to open the project, it will automatically look in the folder set in the project defaults.

The same is true with anything saved while working in InRoads. It saves to the path set in project defaults (unless a different path is forced).

Configuration Name: Ellis G	ounty 20231(04)		-	Apply
·				Close
Default Preferences			[	Ne <u>w</u>
Preferences (*xin):				<u>С</u> ору
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Drainage Structures (*.dat):			i i	Delete
Rainfal Data (*.idf):				Browse
Bridge Sections (*.txt):				import
Drafting Notes (*.dit):				
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Site Modeler Options (*.spf).				Heip
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Project Default Directory:				
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Projects (*.rwk):				
Surfaces (*.dtm):				
Geometry Projects (*.alg):				
Template Libraries (*.tl)				
Roadway Design (*.ird):				
Survey Data (*.fwd):				
Drainage (*sdb)				
Style Sheet (*xa):				
Quantity Manager (*.mdb):				
Site Modeler Projects ("gsf):				
Default Grid Factor	Export	Preferred Preference		
Grid Eactor: 1.0000	Active Only	Name: Default	▼ Default	



## **Creating a Project within InRoads**

From the inroads menu select Fill>Open (Q>2) Set the files of type default to InRoads files. Choose the existing dtm file and select open.

After the dtm is highlighted and the open button is selected a message will appear at the bottom of the inroads menu stating the existing dtm is open.

Select the existing alg and select open..

Select the basic template library saved to the project folder. If the .xin file is not already open, open it as well. When finished press cancel on the open window.

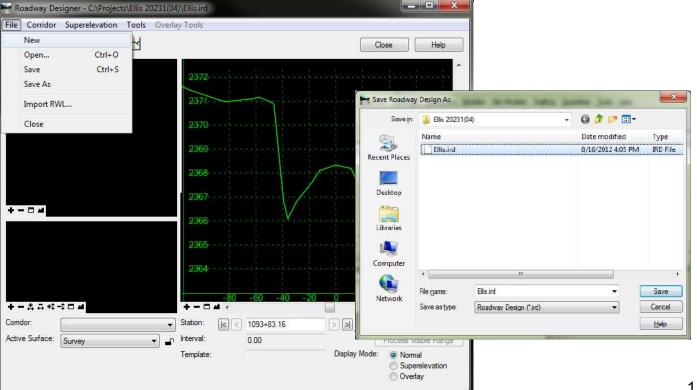
Look in:	퉬 Ellie 20231	(04)	-	G 👂 📂 🛄 -	
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cent Places				4/11/2011 3:58 PM	DTM File
-	Ellis20231	itl		9/18/2009 8:30 AM	ITL File
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Libraries					
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		C	1.000.000	ird:*sdb:*( 🕶	Cancel

1nRoads Commands		ī	
<b>1</b> 2	] <mark>}</mark>		
Q New	<b>*</b> P	1	New
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E Active Horizontal     Gyr B Drainage	ź	з	Save 🕨
T Create Profile	5	4	Save As
A Create Template	-	5	Close •
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🛸 F Payltem Manager	N	8	Text Import Wizard
📆 G Geometry	*	g	Import •
	~	0	Export •
		Q	Translators 🕨 🕨
	₽	W	Exit
			Open 'File' as Toolbox

Next an .ird is needed. IRD stands for Inroads Roadway Designer. It is also know as the corridor file.

From the InRoads Commands select Modeler>Roadway Designer (A>2). On the Roadway Designer menu select File>Save As

Name the .ird file for the project and save. Now there is a blank corridor open. Close out of Roadway Designer.



## How to create an rwk file

Once the primary files are all open and saved to the machine:

Preference .xin Alignment .alg Surface .dtm Template Library .itl Roadway Design Library .ird

Create an .rwk file (InRoads Project file) on the inroads menu File>Save As (Q>4)

Select Projects (.rwk) as the Save as Type

Name the project

Select the options button on the save as window

Save As				×
Save in:	퉬 Ellis 20231(	04) 💌	G 🗊 😕 🛄 -	
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INECWORK	Save as type:	Projects (*.rwk)	•	Cancel
				Help
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	Library	Roadway Design	Site Modeler
Surfaces		Geometry Project	XIN Preferences
			More Options
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dd Update	Surface Nar	ne File Name	
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3 🖾	Survey	C:\Projects\Ellis 20	231(04)\swo4138_1_v1.dtm
Name:			

Go to each of the tabs (Surfaces, Geometry Project, XIN Preferences, Template Library, and Roadway Design) and make sure the add and update boxes are selected on the project files. Be sure that each file has the correct path (the path will show in the file name box when the file is highlighted). NOTE: Do not click add and update on the default files in the .dtm and .alg files.

## Set up for a Project

Project Options Template Library Surfaces	Roadway Design Geometry Project	Site Modeler XIN Preferences More Options Help	selec		options tabs are ( button on the ow		,
Add     Update     Surface       Default     Default       Survey	C:\Projects\Elis 2023	1(04)\swo4138_1_v1.dtm	Selec windo		ve button on th	ie Save As	
	OK Cancel	1125-28	Save in:	🔒 Ellis 20231(0	<b>)4)</b>	- 3 1 1 1	
	ptions tabs are co button on the pro		Recent Places Desktop Libraries Computer	Name Ellis.rwk		Date modified 8/17/2012 11:07 AM	Type RWK File
			Network	<ul> <li>File name:</li> <li>Save as type:</li> </ul>	III Projects (*.rvk)		<u>Save</u> Cancel <u>H</u> elp Options

Each time something is added to a project, it is a good idea to use the save as on the .rwk file and go to the options button to make sure that the add and update are both checked on any new item within the .rwk file. If there are any new files within the project, they will have to be saved before saving the project file or the path will have to be entered manually in the Project options window under the File Name box. If no path is set for the file, it will not save and any new data will be lost when exiting inroads. If the file is saved, but not updated in project options, it will not load with the .rwk file. It will still be there, but will have to be loaded separately.

Now when InRoads is opened, all those files do not have to be loaded individually....

Just open the .rwk file and they will all open at once

# CHAPTER 2

## **Horizontal Alignments**

## Notes

## COGO

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W Perimeter	•							
E Active Horizontal								
🖅 R Drainage		1	View Geometry	1				
🔁 T Create Profile	<del>3</del>	2	Fit Alignment					
🚧 🗛 Create Template	17	3	Horizontal Curve Set	<u>'</u>				
🔏 S Edit	4	4	Vertical Curve Set	•				
🔎 D Place Plan Note		5	Horizontal Element	'				
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	-86	s	Copy Geometry			5	Rename	
	X	D	Delete Geometry			6	Center Point	
	-	F	Rename Geometry		7	7	Edit Multiple	
	***	G	Geometry Utilities		2	8	Edit(Review Extended Descriptions	
	-		Open 'Geometry' as Toolbox		_		Open 'Cogo Points' as Toobox	
					-	-		

Open Inroads and MicroStation. Use the alignment seed file (JPNAlign01.dgn) in Microstation that has been named for the project. *In order to do COGO, there must be opened alg and xin files.* 

Define By:	Easting/Northing	-	1	Apply	Define
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Horizontal Alignment:	A001	+ +			Horizo
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Elevation:	0.00				
Horizontal Alignment:	A001	- [-	 ⊧		
St <u>a</u> tion:	0+00.00		1		
<u>O</u> ffset:	0.00	ł	₽		
Elevation:	0.00				
Description:					
<u>S</u> tyle:	Default	•			

On the inroads menu select Geometry>Cogo Points>New (E>I>1)

Use the define by pull down to select Easting\Northing (or station and offset, depending on the information provided)

If using station and offset, be sure the "alignment to offset from" is active.

The point number is automatically selected by the next available point in the cogo buffer.

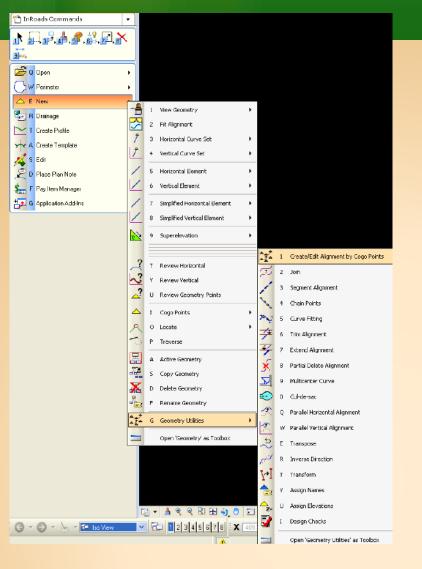
There is no need to key in a number unless a specific number is needed and it is available.

Key in the Northing and Easting (or station and offset)

Elevation 0 for the horizontal

Click apply and record the point number somewhere (note: if the report locks is on a report window will record the points)

The point will display in the Microstation file



Once all the points are created, Geometry>Utilities> Create/Edit Alignment (E>G>1) by Cogo Points

Key in the name of the new horizontal

Key in the description (if desired)

Set the style to proposed (this will determine the alignment's level, color, style and weight in the dgn file)

Key-in the points previously recorded (be sure to put them in order)

Place a space between each of the numbers.

Once all the points are entered select the apply button. The new alignment should appear in the MicroStation window.

## COGO

Freate/E	dit Alignment by Cogo	Points 🔳	
<u>N</u> ame: <u>D</u> escription: <u>S</u> tyle: <u>A</u> lignment D	CRL created by BR 82212 proposed	• •	Apply Close Help
Graphical Center P	Start	Stop Cer Spiral P	Clear nter Point Right
Freate/8	dit Alignment by Cogo	Points	- 0 ×
<u>N</u> ame:	CRL created by BR 82212 proposed efinition:	Points +	Apply Close Help
Name: Description: Style: Alignment D 114 115 11	CRL created by BR 82212 proposed efinition: 6 117 118 117 118	• •	Apply Close Help
Name: Description: Style: Alignment D 114 115 11	CRL created by BR 82212 proposed efinition: 6 117 118 117 118	• •	Apply Close Help

## **Horizontal Alignments**

The horizontal points do not have to be created with COGO. There is a command for creating PIs which can be used to create an alignment.

First create a new alignment using File>New (Q>1). Select the Geometry tab. Set the type to horizontal, key in a name and give a style.

Be sure the new alignment is active and on the Inroads menu select Geometry>Horizontal Curve Set>Add PI (E>3>1)

Watch the prompts on the Microstation screen. Add all the desired Pls.

Type:	Horizontal Alignment		Apply
Name:	CRL		
Description:	created by RT 81912	2	Help
Style:	proposed	-	
Curve Definition:	Arc	-	
Name	Description	Style	
Name	Description	Centerin	
A001	CENTERLINE OF	Centerlin	ne
Detour2	125 offset	Defaut	
edgepavement_lt		Default	
edgepavement_rt		Default	-

🐴 InRoads Commands	-									
◣ੵਗ਼੶₽₽₽										
Surf W Perimeter	•			S DEPARTM	TATE OF IENT OF SURVEY					
E Active Horizontal     F Drainage     T Create Profile     A Create Template		View Geometry     Fit Alignment     Horizontal Curve Set	•	<b>S</b> .W	Define Horizontal	Curve Set			-	x
🔏 S Edit		4 Vertical Curve Set     5 Horizontal Element		2 Insert PI 3 Move PI	Horizontal PI Define By: Known	PI Coordinat	tes	•]	Apply	_
D Place Plan Note	Ĺ	6 Vertical Element	•	4 Delete PI	Direction Back:	N 0^	16'02.36" E	+	Undo	
🚊 G Geometry		7 Simplified Horizontal Elem 8 Simplified Vertical Element		5 Define Curve	Point Name:	1000		<u>+</u>	Rate Cal	lc
	2	9 Superelevation	• {	7 Design Criteria	Easting:	1414	498.4556	+	Design Ca	alc
			Ba	0+0 2+0 8 Stationing	Northing:		56.1965		Curve Ca	alc
		T Review Horizontal Y Review Vertical	=	9 Events Open 'Horizontal Curv	<u>D</u> irection Ahead: Length Ahead:	N 0^	16'02.36" E 99	+	Report	
Once the hor	izor		is crea	ated	Horizontal Curve Curve Set Type: Leading Transition:	S <u>C</u> S     Clothoid	© <u>s</u> cscs ▼	0.00		+
Geometry>H (E>3>5)					Radius <u>1</u> :			1081.64	-	
Set the define	ع h	to Known Pl	Coord	inates	Compound Transition:	Clothoid	Ŧ	0.00		+
Enter the rad	-				Radius <u>2</u> . Trailing Transition:	(au au		0.00		+
PI point using the Define Ho	the	e next button	on the		Define By: <u>R</u> adius	Clothoid	•	0.00		+
Note: be sure to l				r each	🔘 Tangen	t to Spiral	Point Name:			
radius is ente					🔘 Spiral to	Tangent	E <u>a</u> sting:	1414498.	4556	-
					Point or	Curve	Northing:	527756.1	965	

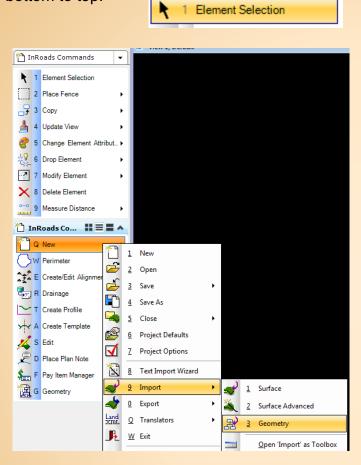
First

- Once the radius for each curve is entered right click on the new alignment
- Select review from the pull down window
- This output gives a report with the alignment data that can be saved to the project folder

head:	N O	16'02.36" E	<u>+</u> (	Report
ead:	1474	.99	<u>+</u> (	Help
Curve				
Гуре:	OSCS	© <u>s</u> cscs		
ansition:	Clothoid	•	0.00	+
			1081.64	
Transition:	Clothoid		0.00	
			0.00	
nsition:	Clothoid	-	0.00	+
) <u>R</u> adius				
Tangent	to Spiral	Point Name:		
🔿 Spiral to	Tangent	Easting:	1414498.45	56 +
Point on	Curve	Northing:	527756.196	5
🔿 Angle up	to PCC (PC	C to PCC)	0^0000.00	)° +
🖱 Angle aft	er PCC (PC	C to PT)		
1.0				
< Previ	OUS	<u>N</u> ext >	Last	Select

## **Horizontal Alignments**

Another option is to draw the desired alignment in MicroStation. It is important to draw the line in order from left to right or bottom to top. When the alignment is drawn in Microstation, use the element selection tool to select each segment in order again from left to right or bottom to top.

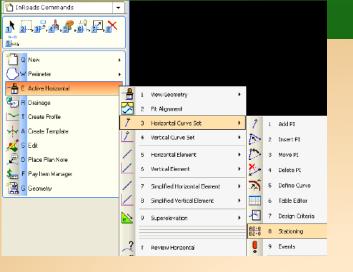


On the Import Geometry window, key in the desired Name of the new alignment and set the Style. For the lines to be all in one alignment be sure to turn on the All Selected Elements Added to Single Alignment.

and the <b>Performance</b>	ICS	Verti	cal from Surface		
/pe:	Horizon	tal Ali	gnment	•]	Apply
Geometry <u>N</u> ame:					
Description:					
Style:	Default	i.	•		<u>H</u> elp
Hori <u>z</u> ontal Cu	rve Defini	tion:	Arc	•	
⊻ertical Curve	s Definitio	82	Parabolic	Ψ.	
Target					
Geometry <u>P</u> ro	ject: (	SWC	04138_1_V1	•	
Horizontal <u>A</u> li	gnment:	A001		*	
	nts 📃 N d Elements	o Dup	e Gaps 🛛 🕅 R olicate Cogo Poir ed to Single Aligr	its	ntangencies
Attribute Tag					
Attribute Tag	Data (	Activ	e	Ŧ	

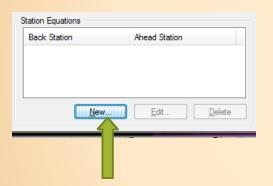
From the InRoads commands select File>Import>Geometry (1>9>3) (from graphics tab)

	ICS	Verti	cal from Surface		
<u>T</u> ype:	Horizo	ntal Al	ignment	•	Apply
Geometry	~				
Name:	CRL				
Description:	create	d by M	IE 52112		2
Style:	propos	ed		•	<u>H</u> elp
Horizontal Cu	rve Defir	nition:	Arc	•	
Vertical Curv	e Definiti	on:	Parabolic	*	
Horizontal Ali	700.0487.028			*	
<u>U</u> se Fence	<b></b>		e Gaps 🛛 🕅 Re Dicate Cogo Point		ontangencies
Use Fence	nts 🔲 l	No Duj	olicate Cogo Point	S	ontangencies
Use Fence	nts 🔲 f d Elemen	No Duj	10074809.005 1.1 <del>1.11</del> 0.000	S	ontangencies
Use Fence Join Elemen	F nts I d Elemen	No Duj	olicate Cogo Point	S	ontangencies
Use Fence Join Elemer All Selected Attribute Tag	F nts I d Elemen	No Duj	olicate Cogo Point led to Single Aligni	S	ontangencies
Use Fence Join Elemen All Selected Attribute Tag	nts 1 d Bemen Is Data	No Duy	olicate Cogo Point led to Single Aligni	S	untangencies



Geometry>Horizontal Curve Set>Stationing (E>3>8)

Select the desired Horizontal Alignment Key in the Starting Station Select the Apply button



Mode:	By Station	Apply
	By Northing/Easting	Close
Back Station:	1082+18.22 +	Help
Easting:	1414496.1788	( <u>1</u> 00)
Northing:	527268.2218	
Ahead Station:	a 1083+05.19	
Add Horizon	ital Event Point	
	Event Point	

## **Stationing the Horizontal**

Hori <u>z</u> ontal Alignment:	CRL •	+	Apply
Starting Station:	1075+00.00		Import
la <u>m</u> e:	2		Report
asting:	1414492.8279	+	Close
l <u>o</u> rthing:	526550.0096		LIOSE
<ul> <li>Synchronize Star</li> <li>Maintain Station</li> </ul>	-		
Maintain Station	-		
	-	on	

To enter a station equation, select the New button at the bottom of the Stationing window.

Select the Mode: By Station Key in the Back Station Key in the Ahead Station placing an "a" before the station. If desired, turn on the Add Horizontal Event Point Select the Apply button. Repeat this for each equation on the project.

Remember once an equation on the project. Remember once an equation is entered, the stations after the first equation will begin with "a". The second equation Ahead station will start with "b". The third will start with "c" and so on and so forth.

## Stationing the Horizontal

#### Stationing

This command defines the initial station and adds, edits, or deletes station equations.

The Name, Northing, and Easting fields represent a point that will be defined with the specified station. **Horizontal Alignment:** 

Select the horizontal alignment to which the stationing or equations will be applied.

#### **Starting Station:**

defines the station to apply to the alignment at the start point. This field can also be used to set the stationing at a certain point on the alignment. Enter the station to be applied at the point that is defined in the Point Name, Northing, and Easting fields. After applying the station, this field displays the new, calculated starting station.

#### Name:

specifies the point name at which the new stationing will be applied.

#### Northing:

specifies the northing coordinates for the station.

#### Easting:

specifies the easting coordinates for the station.

#### Vertical and Superelevation Alignments:

changes the vertical alignment to correspond to the new stationing when toggled on. Stationing is adjusted, maintaining the distance relationship between the start of the horizontal alignment and the start of the vertical alignment. When this option is toggled off, the vertical alignment remains as originally defined (that is, the PVI, PVC, and PVT stationing remains unchanged).

#### **Do Not Update:**

when selected, the vertical alignment remains as originally defined (that is, the PVI, PVC, and PVT stationing remains unchanged).

#### Synchronize Starting Stations:

when selected, changes the vertical alignment to correspond to the new stationing.

#### **Maintain Station Difference:**

when selected, stationing is adjusted and the distance relationship between the start of the horizontal alignment and the start of the vertical alignment is maintained.

### **Station Equations:**

displays the back and ahead stations of an existing station equation on the active alignment. New:

displays the Station Equation dialog box, which allows entering the back and ahead stations of the station equation to add to the active alignment.

When entering the ahead station, specify a name for the station equation first. For example, suppose station 12+00.00 back should be defined as 13+00.00. Enter the back station as 12+00 and the ahead station as a13+00 where "a" is a unique name.

#### Edit:

displays the Station Equation dialog box, which allows modification of existing station equations. Select the station equation to be edited before clicking Edit.

Starting Station:       1075+00.00       Import         Name:       2       Import         Easting:       1414492.82/79       Import         Northing:       526550.0096       Import         Vertical and Superelevation Alignments       Close         Do Not Update       Import         Synghronize Starting Stations       Import         Maintain Station Difference       Station Equations         Back Station       Ahead Station	lori <u>z</u> ontal Alignment:	CRL	• +	Apply
lame:     2       asting:     1414492.82/79       orthing:     526550.0096       Vertical and Superelevation Alignments       Do Not Ugdate       Synghronize Starting Stations       Maintain Station Difference	tarting Station:	1075+00.00		Import
asting: 1414492.82/79 + Close orthing: 526550.0096 <u>Help</u> © Do Not Ugdate © Synchronize Starting Stations © Maintain Station Difference Station Equations	a <u>m</u> e:	2		Report
orthing:     526550.0096       Vertical and Superelevation Alignments       Do Not Ugdate       Synchronize Starting Stations       Maintain Station Difference	asting:	1414492.8279	+	
O Not Update     Synchronize Starting Stations     Maintain Station Difference     Station Equations	l <u>o</u> rthing:	526550.0096		Close
Back Station Ahead Station	Station Equations			
			0.077	

## CHAPTER 3

## **Vertical Alignments**

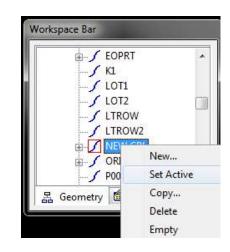
Notes

#### In Microstation, make a working profile.dgn from the seed file JPNProfile01.dgn

A vertical is stored within the .alg file (geometry project)

- To create a vertical, there must be a parent horizontal to tie it to. The first thing to do is set the horizontal that the vertical will be attached to as the active.
- From the Workspace bar, right click on the horizontal and select Set Active (a red box will appear around the icon for the horizontal).

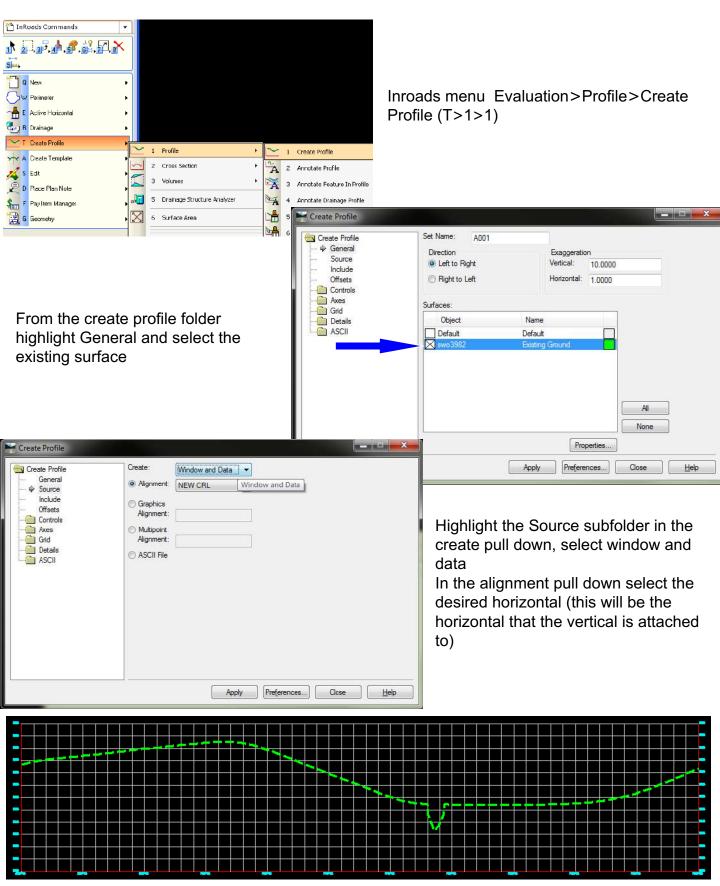




- On the InRoads task menu select File>New (Q>1)
- From the New window select the geometry tab
- From the Type pull down select Vertical Alignment
- Key in the name and desired description. Select the desired style.
- Olick the apply button
- The new empty vertical can be seen attached to the horizontal (select the plus sign beside the horizontal alignment)

rface Geor	netry Site Modeler	Surface Geometry	V Site Modeler		
ype:	Geometry Project	Type:	Vertical Alignment	•	Apply
Name:	Geometry Project Horizontal Alignment	<u>N</u> ame:	CRL Vert		Help
escription:	Vertical Alignment	<u>D</u> escription:			
Style:	Vertical Alignment	Style:	proposed	•	
Curve Definitio	n: 🗸	<u>C</u> urve Definition:	Parabolic	•	
Name	Description	Name	Description	Style	
Name Woods Co.	Description	Name CRL Vert	Description	Style propose	d
	Description		Description	and the second s	d

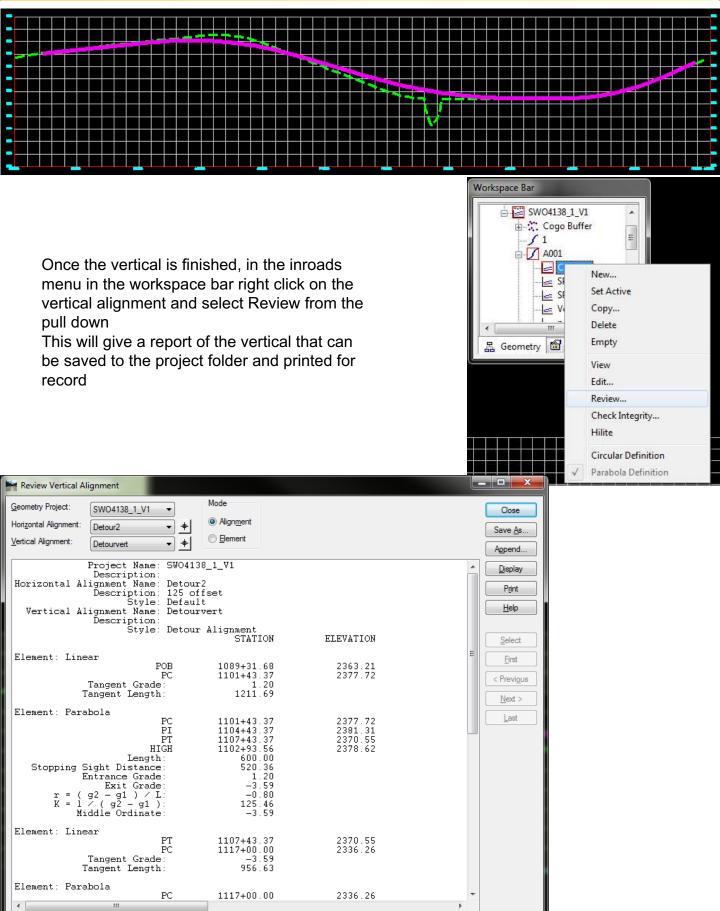
Once the new empty vertical alignment is created, it is necessary to create a profile



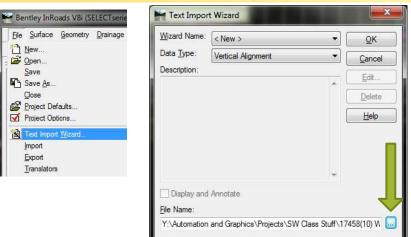
È	Q	Open		•					
C	w	Perimeter		۲					
	E	Active Horizontal		•					
<b>.</b>	J R	Drainage		1	View Geometry	•			
$\sim$	т	Create Profile	3	2	Fit Alignment				
*	A	Create Template	Î	3	Horizontal Curve Set	•			
1	s	Edit	Î	4	Vertical Curve Set	•	Ź	1	Add PI
ē	D	Place Plan Note	1	5	Horizontal Element	۲	1	2	Insert PI

After creating a profile, Geometry>Vertical Curve Set>Add PI (E>4>1). In the lower left-hand corner of the microstation window it will ask to identify to the alignment end. In the microstation key in window, enter se=station, elevation (for example: se=19600,605) Repeat this step for each vertical PI. Once all the PIs are entered right click to let go.

🕒 👻 🕤 👻 🖛 🎦 Iso View					-
> Identify alignment end	se=19600	),605.32		¥	इ.स्
	2     0     Open       W     Perimeter       ■     E     Active Horizontal       Image     Image       Image     Image </td <td><ul> <li>I View Geometry</li> <li>Fit Alignment</li> <li>Fit Alignment</li> <li>A Horizontal Curve Set</li> <li>4 Vertical Curve Set</li> <li>5 Horizontal Element</li> <li>6 Vertical Element</li> <li>7 Simplified Horizontal Element</li> <li>8 Simplified Vertical Element</li> <li>9 Superelevation</li> </ul></td> <td><ul> <li>I Add PI</li> <li>I Add PI</li> <li>I 2 Insert PI</li> <li>I 3 Move PI</li> <li>Pi 4 Delete PI</li> <li>I 5 Dynamics Settings</li> <li>C 6 Define Curve</li> </ul></td> <td>5</td> <td></td>	<ul> <li>I View Geometry</li> <li>Fit Alignment</li> <li>Fit Alignment</li> <li>A Horizontal Curve Set</li> <li>4 Vertical Curve Set</li> <li>5 Horizontal Element</li> <li>6 Vertical Element</li> <li>7 Simplified Horizontal Element</li> <li>8 Simplified Vertical Element</li> <li>9 Superelevation</li> </ul>	<ul> <li>I Add PI</li> <li>I Add PI</li> <li>I 2 Insert PI</li> <li>I 3 Move PI</li> <li>Pi 4 Delete PI</li> <li>I 5 Dynamics Settings</li> <li>C 6 Define Curve</li> </ul>	5	
After all the PIs are e Geometry>Vertical C Curve(E>4>6) Type the curve length Apply to enter the len button to go to the ne Repeat these steps u lengths are entered n Apply button after eac	Curve Set>Den in the Lengt ngth then sele ext PI until all of the make sure to	th box ect the next curve click the	Define Vertical PI         Define PVI By:         Station:         Elevation:         Entrance Grade:         Exit Grade:         Vertical Curve         Calculate By:         Length:         Adjacent Curves         Update By:         Define PVI By:         Station:	Station and Elevation         223+50.00         1492.04         -1.66%         -3.18%         Length of Curve         0.00	Close Undo Design <u>C</u> alc Report <u>H</u> elp



## Importing a Vertical from text



Before going into the Text Import Wizard, set the Horizontal active to tie into the vertical(In the Geometry highlight the desired horizontal, right click and select Set Active from the pull down)

From the InRoads menu select File>Text Import Wizard (Q>8)

Wizard Name select New

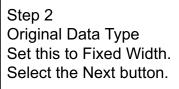
Select the ellipses at the bottom of the window and set the path to the file containing the vertical text Select the OK button

Define Import Range			[
ines within <u>R</u> ange			<u>H</u> elp
Start Import at Line:	1 🚖		
End Import at Line:	EOF		
Lines within Relative Range			
Start Import at Start of File +	0		
End Import at End of File -	0		
atomation and Graphical Project			(otion) bet
utomation and Graphics\Projecte		VOODS\WHOLEPROJECT\ 1492.87	/ertical.bd
utomation and Graphics\Projects	s\SW Class Stuff\17458(10) V		/ertical.bd
utomation and Graphics\Projects	s\SW Class Stuff\17458(10) V 223+00.00	1492.87	/ertical.bd
utomation and Graphics\Project	s\SW Class Stuff\17458(10) V 223+00.00 223+50.00	1492.87 1492.04	/ertical.bt
utomation and Graphics\Project	SV Class Stuff\17458(10) V 223+00.00 223+50.00 224+00.00 224+50.00 225+00.00	1492.87 1492.04 1490.45 1489.43 1488.34	/ertical.bt
utomation and Graphics\Projects	s\SW Class Stuff\17458(10) V 223+00.00 223+50.00 224+50.00 224+50.00 225+00.00 225+50.00	1492.87 1492.04 1490.45 1489.43 1488.34 1487.36	/ertical.bt
utomation and Graphics\Projects	SV Class Stuff\17458(10) V 223+00.00 223+50.00 224+00.00 224+50.00 225+00.00	1492.87 1492.04 1490.45 1489.43 1488.34	/ertical.bt
utomation and Graphics\Projects	s\SW Class Stuff\17458(10) V 223+00.00 223+50.00 224+50.00 224+50.00 225+00.00 225+50.00	1492.87 1492.04 1490.45 1489.43 1488.34 1487.36	/ertical.bd

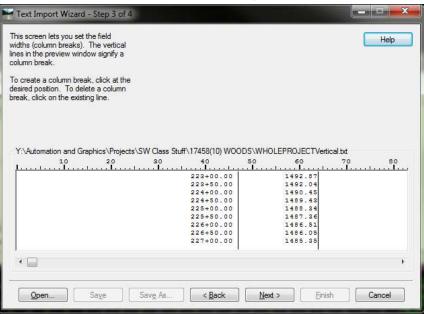
#### Step 1

Start Import at Line -1 (or the line the vertical alignment begin station is on) End Import at Line- EOF (stands for end of file) or the line number the end vertical station is on. Select the Next button.

All Lines     Lines that <u>S</u> tart With:     Lines that Include:	Exercise 1	al Data Type ed Width - Fields are aligned in co limited - Characters separate each Filters:	
Segments of Text	Name	Description	Add
Start: Include Start in Import			Delete
End: Include End in Import			Update
Exclude Filtered Lines From Import			
Automation and Graphics\Projects\SW Class Stuff\ 223+00 223+50 224+00 224+50	).00 ).00 ).00 ).00 ).00	(OODS\WHOLEPROJECTVertica 1492.87 1492.04 1490.45 1469.43 1468.34 1468.34 1467.36	l bt
225+50			
		1486.51	



## Importing a Vertical from text



### Step 3

Place a line to separate the columns by clicking in the window between the station and elevation columns and between the elevation and curve length columns (see picture).

To change the line location, click on the line to make it disappear and place again.

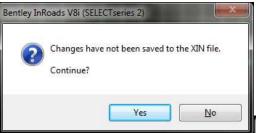
Select the Next button once all the columns are placed.

### Step 4

Right click on the "Skip" headings for each column and select the correct name for each column.

Skip		Skip	Skip
269+5	Skip	1476.50	330
a283+	Station	1467.65	600
a289+	Northing	1457.58	550
a296+	-	1465.32	650
a302+	Easting	1456.70	300
a309+	Elevation	1456.70	300
	Curve Length		
	к		
<u> </u>	Radius	Sav <u>e</u> As < <u>B</u> ac	k <u>N</u> ext >
	Slope		

Once all the columns are set to the correct name, select the Finish button.



Name the new vertical and select a style. Select the Ok button. A new message will appear that the alignment was successfully imported. The new vertical will appear under the active horizontal.

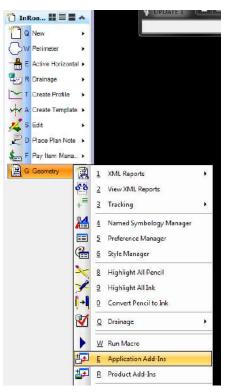
iolumn <u>D</u> ata Format:	Skip 🔹		Help
Geometry Options Style:	Default 🚽 🔽 Specify at	mport	
:Vater ion and Gr	aphics\Projects\SW Charles Ouff\17458(10) WO( Elevation	DDS\WHOLEN CCTVertical.bt Curve Length	1
Station			
Station 69+50.00	Elevation	Curve Length	
Station 69+50.00 283+00.00	Elevation 1476.50	Curve Length	
Station 69+50.00 283+00.00 289+50.00	Elevation 1476.50 1467.65	Curve Length 330 600	
Station 69+50.00 283+00.00 289+50.00 296+00.00	Elevation 1476.50 1467.65 1457.58	Curve Length 330 600 550	
	Elevation 1476.50 1467.65 1457.58 1465.32	Curve Length 330 600 550 650	

If the message about changes to the .xin not being saved appears, it means the preference wasn't saved from the preference button at the bottom of the text import screen. If desired it can be saved. Select the Yes button on the message window.

Geometry	-	ОК	
Na <u>m</u> e:	CRL Vert	Cancel	Bentley InRoads V8i (SELECTseries 2)
De <u>s</u> cription:	ME prop vertical 81412		
St <u>yl</u> e:	proposed	Help	Successfully imported alignment 'CRL Vert'

## **Using Vertical Elements to Create Special Ditches**

Creating a vertical alignment in segments can be beneficial as a special ditch alignment. If the template's end conditions are built to seek the special ditch first, the special ditch will be built where the special ditch alignment is and where it cannot be found, the normal ditch or fill conditions will automatically be placed.



The vertical element tool is an application add in. Select Tools>Application Add Ins (F>E). From the Application Add-In window, turn on the Horizontal and Vertical Elements Add-In. Select the Ok button and close the Application Add-Ins window.

Application Add-ins	
Available:	ОК
Generate Grade Contour Add-In GENIO Translator Add-In Global Scale Factors Add-In	Cancel
Graphics Translator Add-In	<u> </u>
Hydrology and Hydraulics Add-In Import AMSA Add-In	
Import LAS Add-In Import SRV Add-In	
Description The Horizontal and Vertical Elements Add-In provides commands for t component method of creating and modifying alignments. This metho PI method of design because you define linear and circular component instead of by locating, adding, and insetting points of intersection and These components are then computed and fit together to form an alig	d differs from the nts, or elements, curve sets.
Command	<b>^</b>
Geometry>Horizontal Element>Add Fixed Line Geometry>Horizontal Element>Add Roating Line	
Geometry>Horizontal Element>Add Free Line Geometry>Horizontal Element>Add Fixed Curve	
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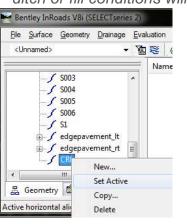
## Creating a Vertical Alignment –

First set the correct horizontal alignment active with a right click on the horizontal from the workspace bar select Set Active. On the Inroads menu select File>New (Q>1). Select the Geometry tab. Set the Type to Vertical Alignment.

and a second	Site Modeler	
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## **Using Vertical Elements to Create Special Ditches**

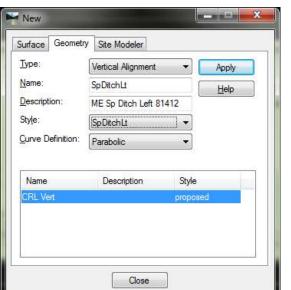
Creating a vertical alignment in segments can be beneficial as a special ditch alignment. If the template's end conditions are built to seek the special ditch first, the special ditch will be built where the special ditch alignment is and where it cannot be found, the normal ditch or fill conditions will automatically be placed.



Creating a Vertical Alignment –

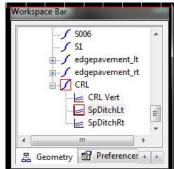
First set the correct horizontal alignment active with a right click on the horizontal from the workspace bar select Set Active. On the Inroads menu select File>New(Q>1). Select the Geometry tab. Set the Type to Vertical Alignment.

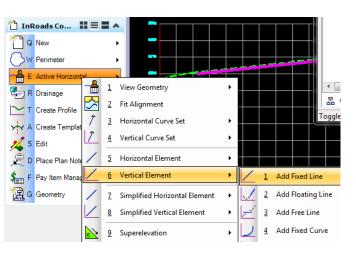
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Type:	Geometry Project	Apply
	Geometry Project Horizontal Alignment	Help
Description:	Vertical Alignment	
Style:		
Curve Definition: [		
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Name SW04138_1_V1	Description	
Name SW04138_1_V1	Description	



On the new window, key in the Name, then Description, and set the Style to Special Ditch. Select the Apply button.

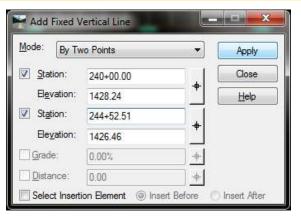
Make sure the new vertical special ditch is active and go to Geometry>Vertical Element>Add fixed line (E>6>1). There are two ways to put in a vertical element: by two points or by point distance and grade. Which one is used depends on what Information is provided.





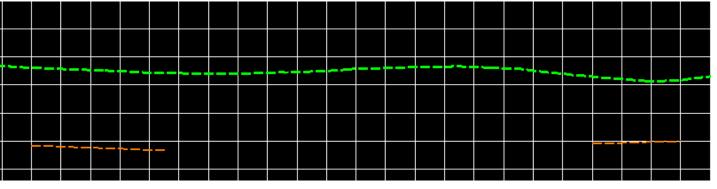
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Elevation:	0.00		
Grade:	0.00%	+	
Distance:	0.00	+	

## **Using Vertical Elements to Create Special Ditches**



On the Add Fixed Vertical Line window, turn on both check boxes for Station and Elevation. Key in the desired start point station and elevation of the first special ditch and the desired end point station and elevation (or the first station and elevation and the desired grade). Select the Apply button and data point in the profile to accept.

Repeat this process for each special ditch until all of them are entered. Be sure to hit the apply button after each one and then accept in with a left mouse click on the Microstation screen.



The new vertical will look like the picture above, in separate pieces. It is still all one alignment. It can be reviewed, annotated and edited much like a normal vertical alignment. It can also be targeted in the template with end conditions.

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Notes

# CHAPTER 4

## **Template Creation**

## Notes

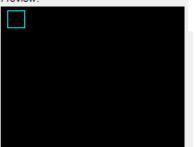
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A Create Temp	<b>y 1</b>	Create Template
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D Place Plan N	<b>4</b> 9 2	Roadway Designer
F Pay Item Mar	<u>2</u>	Express Modeler
G Geometry		Open 'Modeler' as Toolbox

The fuchsia colored box in the main window is known as the dynamic origin.

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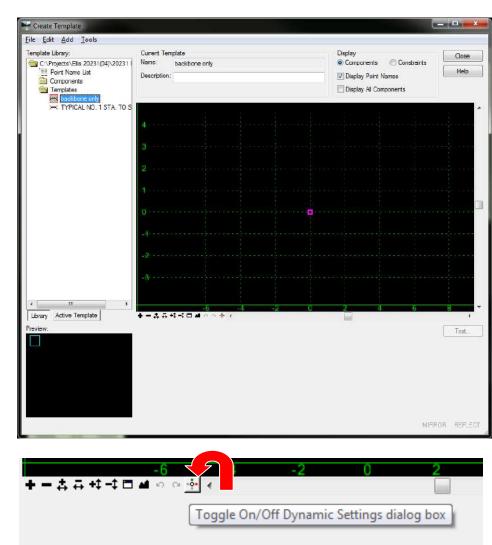
Preview:



### Template Creation

Go to the template creator in the Inroads menu. Modeler> Create Template (A>1)

Open the Basic Template Library that was saved to the project inside the Create Template window (File> Open) Use the folders to locate the right side only (inside the template folder) double click on the right side only to make it active



Using the dynamic settings icon (looks like a compass) from the Create Template window set the step to 1 for the x and y Using the drag and drop method (with backbone only as the active template) pull in the different components from the component folder to piece together the project typical section

The cyan colored box in the preview window represents the origin for the displayed components (note: this point can be moved by double clicking on the desired point but only from the preview window)



A point can have at most two constraints on it. Then it is considered "fully constrained." A point that is fully constrained is represented by a red plus sign.



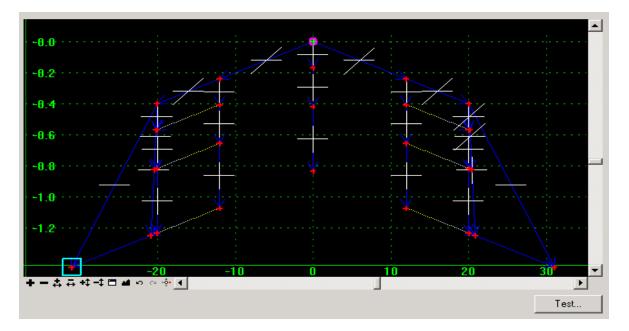
A point that is partially constrained, meaning it has only one constraint on it is shown with a yellow plus sign.



An unconstrained point is shown with a green plus sign.



The child point has two parent points and will be projected onto the vector defined by the two parents. If the offset is not zero, then the child point will maintain a perpendicular offset from the parent vector at the specified offset value. Negative values indicate an offset to the left of the vector defined by the parent points. Positive values indicate an offset to the right.



### About Constraints....

All points should be based from the top layer points. Keep in mind the shoulder will be rotating when superelevation is added

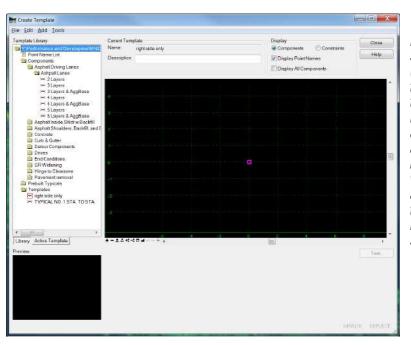
Constraints are also important for the backfill. Locked in with a vector offset from the shoulder and a 1:6 slope from the finished grade shoulder, the width will vary based on the rotation of the road.

Vector offset (which keeps the same slope as the two points used as parent points) can be used for any case where the slope varies and needs to be matched.

The color of the points represents the number of constraints on the point

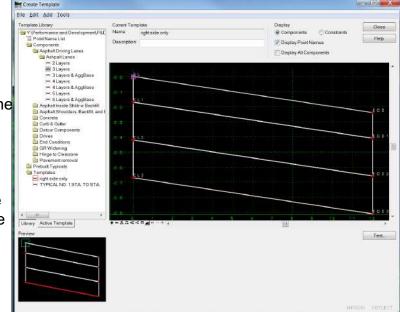
Point constraints are used to manage the behavior of points in a template. They are used so that if a point is moved in a template, either by the user editing the template or by the application of a horizontal or vertical control during design processing (such as superelevation), all the points related to the point being moved behave in a rational and predictable manner.

Because the Edge of Backfill point is determined by the slopes from the template, the only thing required to do is make sure the slope that is set is correct for the project by double clicking on the EOB point. Make sure the slope constraint matches the slope to clearzone desired.



Note: Double clicking on the Right side only template will set it active (the red square). Whichever template is active will be viewed in the big window. By clicking **once** on a component or

another template a preveiw will appear in the small window on the bottom left Preview. This window is where the blue square appears, allowing the template or component to be dragged to the active window. Be careful as to which template is selected as active.



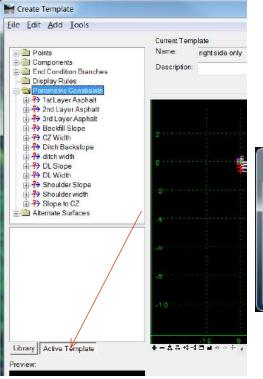
With the right side only active select from the driving lanes the desired pavement thicknesses -DOUBLE CLICK TO SET A TEMPLATE ACTIVE, SINGLE CLICK TO HIGHLIGHT

Drag the component from the library for the driving lane into the main window and place it on the dynamic origin point



Repeat this process to place the shoulder, backfill, clearzone and end conditions (from the centerline of the template –over). Be sure to set the horizontal constraint on the shoulder component EOS point to the desired width for the project. Do this by double clicking on the EOS point and edit the width on the horizontal constraint.

If desired, merge components (careful to get right on the line-it may be necessary to use the zoom in command)



Next edit the template to match your typical section by clicking on the active template tab and editing the parametric constraints.

abel:	1st Layer Asphalt	ОК
efault Value:	-0.17	Cancel
		Help

Double click on the special ditch foreslope 1:6. On the Component Properties window set the horizontal and vertical alignment to the special ditch alignment for this template.

Repeat this process for each special ditch foreslope (1:4 and 1:3).

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End Condition Propert Target Type: Horizontal Alignment:	ies Alignment Elevation V A001 V Special Ditch Rt	Priority:	1 0

Next check special ditch, ditch, and fill points. These are pre-set in the seed template library to fit the 1:6 to 4', 1:4 to 10', and 1:3 for greater than 10' (measured from the edge of finished shoulder). If necessary, change the vertical constraints on the points and set them to reflect the desired vertical depth. Leave the slope constraint on the points.

End condition points are edited in the same way the template points are edited except they have the end condition properties window

- Check for Interception- specifies the preceding segment will be checked for interception of the target when the end-conditions are solved. If it is turned off, then the segment will be ignored when checking for interceptions.
- Place Point at Interception- specifies that when an interception is found along the preceding line segment, the line segment will be drawn to the interception. Otherwise, if the interception is found, the line segment will be drawn to its maximum width.
- End Condition is Infinite- specifies the last segment will be considered to be of infinite length when attempting to intercept the target. This option is only applicable to the last point on the end condition.
- Do Not Construct- specifies the point will be solved like all other points in the end-condition, but the point will be skipped when drawing the component segments.

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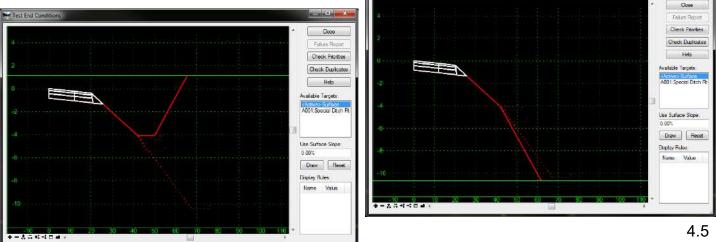
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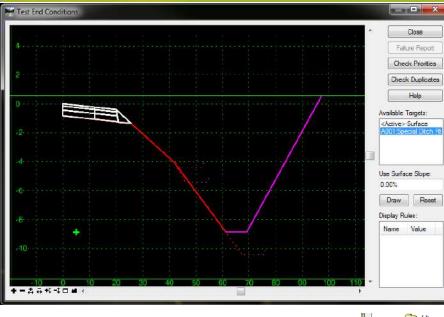
### PRIORITIES

Priorities are set on end condition components No two end conditions on the same side of the template can have the same priority (this results in priority conflicts)

The ditch bottom and ditch backslope can be part of the same component Testing end conditions before going on to roadway designer can save time and rework

Select the Test button on the Create Template window. Under Available Targets, select the <Active> Surface. Move into the window and move the cursor up and down to see how the end conditions perform.





Data point just above the template to keep the active surface on screen and select under Available Targets the special ditch alignment and select the Draw button. Move into the window and move the cursor up and down to test the special ditch end conditions.

Close the Test End Conditions window.

Once all the end conditions are edited and tested, right click on the template folder and select New > Template from the drop down menu

Right click on the new template and select rename from the drop down menu Name the template to the name desired to appear on the Typical Section sheet. For example: TYPICAL NO. 1 STA. 196+00.00 TO STA. 212+50.00

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12 Sho	Options Dynamic Settings	
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Before pulling in the backbone, set the apply affixes command. On the Create Template window Tools> Options

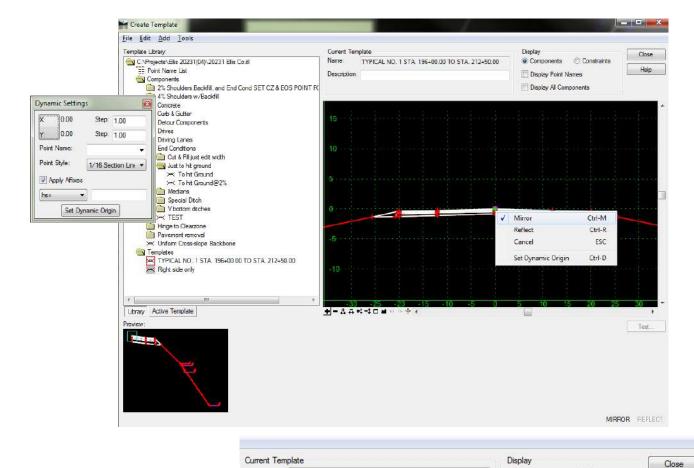
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oint Seed Name:				Help
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On the Template Options window, turn on Apply Affixes

Key in the Suffix (space) L for left (space) R for right

Select the OK button

Set TYPICAL NO. 1 active with a double click. Single click on Right Side Only and while dragging it into the main window of the new template (holding down the left mouse button) right click and select mirror from the pull down. Make sure the template origin point is lined up exact with the dynamic origin at 0,0. This can be checked looking at the XY on the Dynamic Settings window as the template is pulled in.



TYPICAL NO. 1 STA. 196+00.00 TO STA. 212+50.00

Name:

Description:

If display point names is turned on from the display options in the top right corner of the Create Template window, the point names become visible



Components

Display Point Names
 Display All Components

Constraints

Help

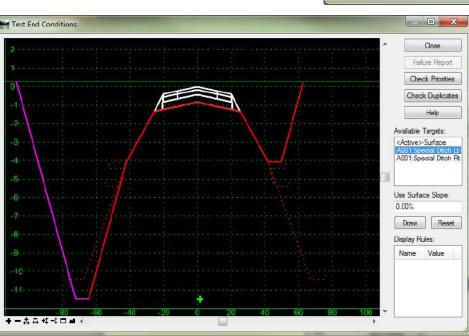
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-0:2 EOD	CL1 EOD R
-0:4 EOD11	CL2 EOD1 R
-0.6 EOD21	
	Add New Component
-0:8	Template Documentation Link
-1:0	Check Point Connectivity
EOD31	Delete Components
-1:2	Change Template Origin
-1:4	Delete Constraints from All Points
	Edit Component
-1:6	Insert point
-1:8	Add Point
	Merge Components
- <u>-10 -5</u> ▶— 초 등 박 다 티 페 성 의 한 ∢	Unmerge Component Points

#### Right click on the line running down the center of the template and merge the left and right components.

The cursor must be placed directly on the component or Merge Components will not be an option.

Now that both sides of the template are created, set each of the special ditch foreslope components to seek the special ditch vertical for the left side.

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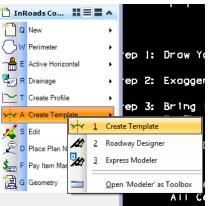


Once all of the left side end conditions are **adjusted** : Select the test button

First place the existing ground in the window just above the template.

Highlight the left special ditch alignment in the available target window and select draw to place it on the test screen. Then select the existing surface and slide the bar to test the conditions

### M JPNTypical01 N.dgn



Open the template folder and right click on the template

Select display from the drop down menu

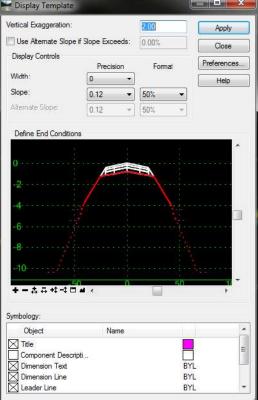
From the display template window load the preference

## **Template Creation**

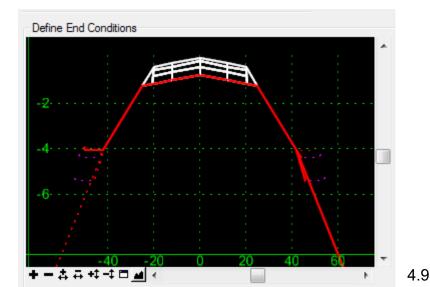
### Viewing the Template in MicroStation

In Microstation open the Typical.dgn saved to the project. From the InRoads task menu Modeler>Create Template (A>1)





From the display template window for Define End Conditions select the end conditions that need to display with the template. If the incorrect one is selected to deselect just data point on the segment again.



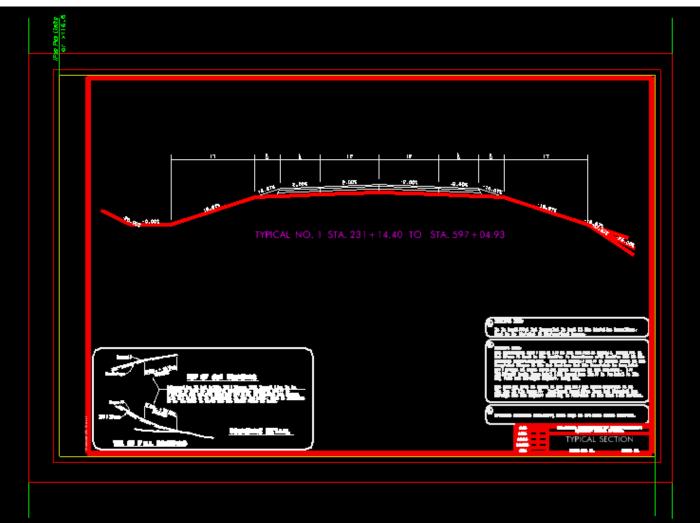
# Viewing the Template in MicroStation

Once all the appropriate end conditions are chosen, select the apply button on the Display Template window. Data point in the Microstation screen. Close the display template window.

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Define End Conditio	ons	Æ		

Make adjustments to the text and end condition lengths and rounding as needed. Place the Typical Standard Sheet Border from the cell library and scale it.

Note: The entire template and all the text are a graphic group. When graphic group is turned on they move together.

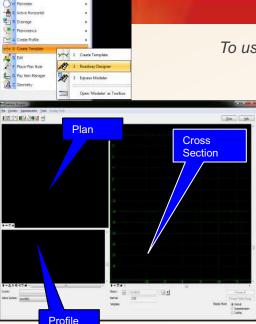


# CHAPTER 5

# **Roadway Designer**

Creating a Surface using InRoads Roadway Designer

# Notes



There are three views in Roadway Designer The plan view (upper left corner) The profile view (lower left corner) The cross section view (on the right side)

There is also a radial for superelevation which creates a fourth window. Within that window there is a right click option where all of the superelevation commands may be accessed. It has more options to choose from than the Superelevation menu on the top of the Roadway Designer window.



The first task inside Designer is to manage corridors (the first icon on the row of designer icons) This step tells InRoads which horizontal & vertical is

desired and station limits

In the manage corridors window, name the corridor (this will be the name of the surface produced when create surface is run). Next set the surface symbology. In the drop down for Type, select alignment Set the station limits (by not setting limits, it will default to the length of the alignment)

Select the add button to add a corridor to the designer

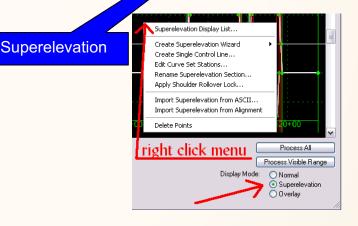
# **Roadway Designer**

To use roadway designer, it is necessary to have:

A horizontal and vertical alignment or a surface feature that defines the location of the new road or object being designed.
One or more existing surfaces to define the extents of the design.

•One or more templates, created with the Create Template command, to determine the cross section of the design.





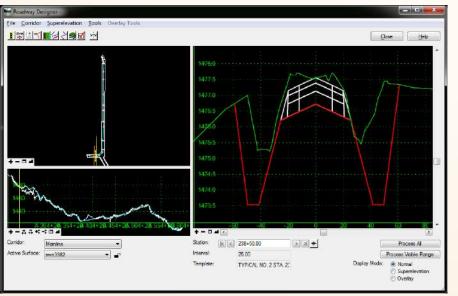
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### **Roadway Designer**

The second icon on the designer window is the template drops



- Select template drops to tie the template to the corridor
- From the template drop window select the desired corridor
- Select the station the template should start
- Select the desired interval (this will be the frequency of template drops along the alignment. 25 is the standard for earthwork purposes)
- Use the folders in the Library Templates to navigate to the desired template (notice the template appears in the display window when it is selected)
- Select the Add button
- The template drop will appear in the Template drops window
- Multiple Template drops can be made in this window
- To edit the template drop highlight the drop desired to change from the Current Template Drops (at the bottom of the template drops window) make the changes and select the change button
- Once a template drop is added and the window is closed, the drop shows in all three views of the Roadway designer window



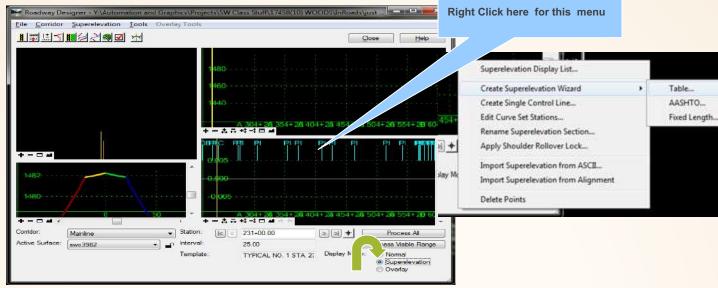
If a template is edited from the template library, it will appear red in the template dr	rops box
until it is selected in the template drop and the synchronize with library button is se	ected

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		TYPICAL NO. 2		ITL	

# **Superelevation Wizard**

If there is superelevation on the project, that will be the next step Select the display superelevation radial at the bottom right hand corner of Designer. This will display all the curves based on the corridor's horizontal alignment. A <u>right click in the</u> <u>superelevation window</u> will give a pull down menu. Select Create Superelevation Wizard > Table...



- 1. For Table, use the ellipses to navigate to the appropriate table. Select from: R:\CADD\_Support\Design\InRoads\superelevation
- 2. Highlight the desired curves and select Load Values From Table. If the job has more than one design speed, this step will be repeated for each speed.

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3. On the top portion ( the sections part) select the add button

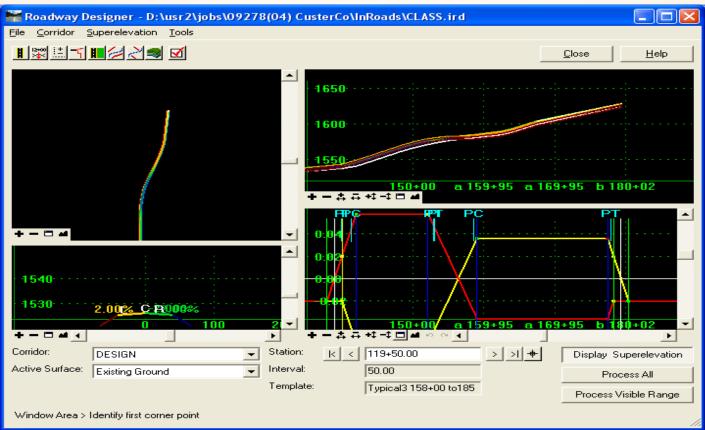
4. Turn on the check box for List all backbone points. Set the Crown Point (for this example: centerline. Left range is the edge of driving lane on the left and Right range is the edge of driving lane on the right). For pivot direction select From Crown Point. The number of lanes selected will depend on the number of lanes rotating. If the project has a runoff multiplication factor, enter it (Only if there are more than 4 lanes). Select the okay button once all the information is entered.

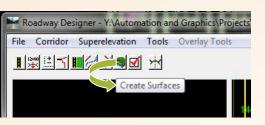
Superelev	ation Secti	ion Definiti	ons			- 0 <b>X</b>	Su	perelevatio	n Controls			
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- 5. Check the information in the Superelevation for Selected Sections to make sure it matches the load sheet that was calculated.
- 6. On the final window select the finish button.



7. If there is an overlap a prompt will appear to automatically fix with the Fix Superelevation Overlap window. Select the check box Apply Full Super to Full Super Planar Transition and then the select the Apply button.





## Create Surface

The create surface icon is the next step in Roadway Designer. It is good practice to run through the designer after the template drops and make any necessary adjustments to the design before creating a surface

Select the icon (hovering over the icon will show it's name) that looks like a slice of green layer cake

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On the create surface window:

Key in a name (this will be the name of the new surface

Select the default preference

Select empty design surface

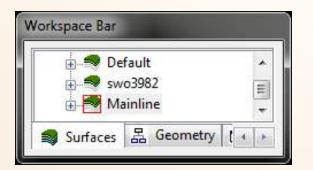
Add exterior boundary (set the style to exterior boundary)

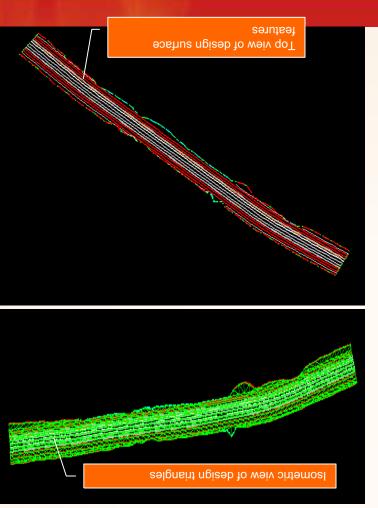
Triangulate (this will triangulate the new surface once it is created)

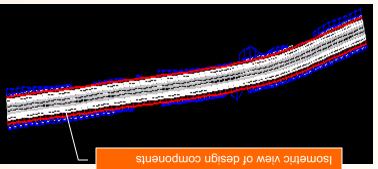
Select the apply button to create the new surface The creating surface window will appear

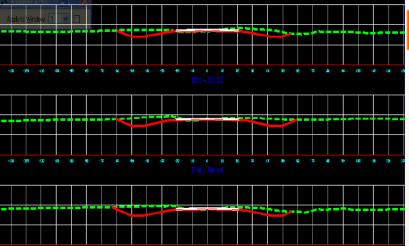
Once it is finished close the Create surface window

The new surface will appear in the surface portion of the workspace bar.









## **Roadway Designer**

- Creating a surface actually creates a 3d model of the design using the typical section designed in Create Template and the horizontal & vertical alignments
- The features are created from the template points and these features determine the triangulation.
- The color, level, line weight, and line style of the features displayed in the plan view are determined by the features' style. Components work the same way.
- Components are created with the components defined in Template Creation and can be used to show the various pavement thicknesses
- The volumes command in cross sections can measure the components.
- The cross sections show the design surfaces and the existing surfaces in an actual cross section view at the designated stations
- Best practice for designing a surface in inroads is to build everything into the model.
- Contractors have the capability to set their grading machines from our submitted dtm file. It reads the coordinates from each point on the feature and grades the road accordingly.
  - Never edit the cross sections by hand!
  - In version i the ability to model the road according to any design has become possible.
    - Although it may require a little extra effort in the beginning, building the model correctly can actually save a lot of time in the long run.



# Notes

# CHAPTER 6

# **P&P SHEETS**

# Notes



# **P&P GENERATOR**

Border and	l Title	Symbo	ls and Details	Match Lines	Sheet Index
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 ][			>		art Stop
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		Apply Prefere Name	Preferences		art Stop
		Apply	Preferences		art Srop

Create a new microstaton file using the seed file R:\CADD\_Support\MicroStation\Seed\_Files\ Roadway- North or South zone\ Profile. Save it in the project folder in the reference folder. It will also need to be renamed, such as project number.

The preferences (xin) must be loaded

Next on the Microstation task from the InRoads Commands go to Drafting>Plan & Profile Generator (S>T) At the bottom there is a preference box. Load the appropriate preference for the job. This brings in settings for the sheets based on scale.



Set the start station to an even station AND turn off the station locks, to get a full first sheet. This will eliminate a lot of clean up work. Just make sure to turn the station locks back on when finished generating P&P sheets.

🖥 Plan and Profile Generator 📃 🗖 🔀	🕌 Plan and Profile Generator 📃 🗖 🔀	
Border and Title Symbols and Details Match Lines Sheet Index Main Plan Controls Profile Controls Sheet Layout View Layout	Border and Title         Symbols and Details         Match Lines         Sheet Index           Main         Plan Controls         Profile Controls         Sheet Layout         View Layout	
Main     Plan Controls     Profile Controls     Sheet Layout     View Layout       Method     Hoigontal Alignment:     Edit       Ø Plan Only     CRL     Image: CRL       Ø Plan Only     CRL     Image: CRL       Ø Plan Yiews     Geogretry Projects in this VDF:     Help       Ø Use Plan Yiews     Image: CRL     Image: CRL       Ø Use Profile Views     Outless otherwise noted, all measurements for this command are in model units.       Ø Use Station Limits     Station Limits	Mail         Model Files           Vidih Left:         500.00           Width Eight:         500.00           Qvelap:         0.00           Bounday Chords:         6           Efforce Rectangular Boundary         Help           Model Files:	Oyee Mudd Title Look & O FO W Snew Boomer
Sheets         Start:         214+00.00         214+00.00           V Dg Information Only         b 599+97.22         b 599+97.22           Image: V Dg Information and Host Files         3000.00         Image: Start         Total:         0           Plan Vjews:         Total:         0         Profile Views:         Total:         0           I         Name         Start         Stop         Start         Stop	C:\Projects\17458(10) WODDS\P&P\swo3982_1_v4.dgn C:\Projects\17458(10) WODDS\P&P\swo3982_1_v4.dgn Nested Attachments	Ved to: Ved to: Ved to::::::::::::::::::::::::::::::::::::
Apply Preferences Close	Apply Preferences Close	

Main tab- Set the horizontal alignment to the alignment needed for the PnP Sheets. Also set the station limits

station limits Plan Controls tab- load the model files. This will be any file that needs to be attached for the P&P Sheets (except the profile which attaches itself).

# **P&P GENERATOR**

Plan and Profile	Generator	
Border and Title Main Pl	Symbols and Details an Controls Profile Controls	Match Lines Sheet Index Sheet Layout View Layout
Seed View <u>N</u> ame: Set Name: Profije Preference: ⊻ertical Alignment: Syrface: ☐ Default ⊠ swo3382	1 CRL 50 Scale Solar Solar Shift at Minor Stations Shift Where Needed Dg Not Shift Note: Highlighted surfaces control elevation shifts	Heip         Horizontal Spacing         Left to Left         Distance:         100.00    Vertical Spacing          O Bottom to Bottom         Distance:         100.00
Profile Height Profiles per Column: Margins Top: 0.00 Left: 37.00	50.00 1 Bottom: 19.00 Right: 37.00	Example
	Apply Preferences.	Close

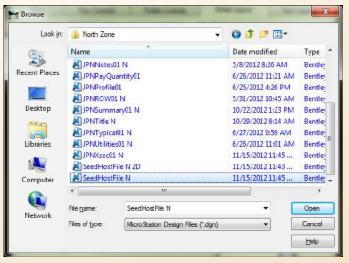
**Sheet Layout tab-** Set the Host file (Note: this "Host file" is just a name and a path. Set the path where the PP sheets will go and name the P&P sheets as needed for the project-(this file does not have to be pre-existing).

Then select the ellipses for the Seed Host File (R:\CADD\_Support\MicroStation\Seed Files\Roadway\ select either North or South zone folder- depending on the projection of the survey files and choose SeedHostFile.dgn).

**Profile Controls tab-** select the existing surface The box that has the X in it represents the surface that will be displayed in the profile and that will automatically attach to the P&P sheets. The surface that is highlighted will control the window shift. These do not have to be the same surface.

🖥 Plan and Pr	ofile Ge	nerator					
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a	🔊 SW04432_	1_ADD3_	11/30/2011 3:21 PM	Bentle
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in the second se	🔊 SW04432_	1_TOPOID_V2	1/25/2011 8:59 AM	Bentle
Libraries	📕 SW04432_	1_TOPOID_V3	5/14/2012 11:44 AM	Bentle
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HEWOR	Save as type:	MicroStation Design Files (*.dgn)	•	Cancel
				Help



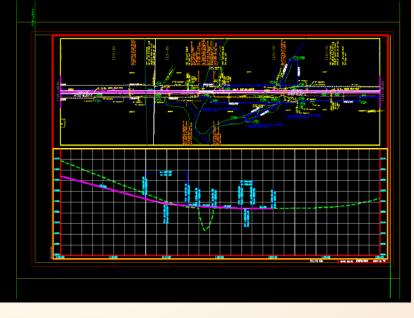
# **P&P GENERATOR**

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	evel for Each 9		Custo <u>m</u> Height: Title <u>B</u> lock Data		
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		Apply	Pre <u>f</u> erences	Close	

### Border and Title tab- set the user text 1 and user text 3. Be sure to use the tab key to enter them once they have been typed them in.

Click Apply and data point in the profile.dgn to generate sheets. It is normal for this process to take a few minutes.

InRoads will create separate files for each P&P Sheet, attach the P&P border, the North Arrow, the profile, and all the reference files (defined in model files)



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# **Horizontal Annotation**

Open the seed file JPNAlign01 that has been named for the project and saved to projects folder.



Apply button.

<u>ALIGNMENT</u> view the alignment (right click on the alignment from the workspace bar and select View from the pull down)

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✓ Off-Alignment Station Equations	Duplicates
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Display As Complex Linestring	🗌 Planarize
Apply Interactive Prefe	rrences Close

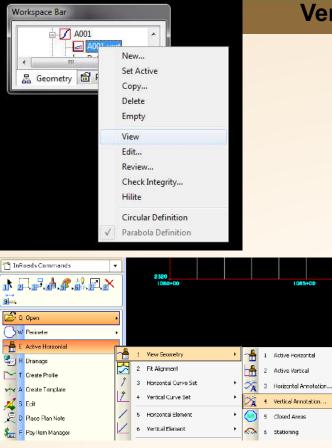
### **BEARINGS**

- Geometry>View Geometry>View Horizontal Annotation (E>1>3)
  - -Key in the Horizontal Alignment or use the target button to select the alignment from the Microstation display
  - -Click the Apply button

# **Horizontal Annotation**

	Curve Set Annotation	
CURVE DATA Geometry>View Geometry>Curve Set Annotation (E>1>3) Under the main tab set the alignment Click the Apply button then hit close on the curve set annotation window	Horizontal Alignment: CRL    Horizontal Alignment: CRL    Horizontal Alignment: CRL   Horizontal Alignment: CRL  Horizontal Align	
	Apply References Close	<u>H</u> elp
<mark>#**1.6 195+32</mark>	205+00	

The curve data, bearings, and stationing are all automated information stored in InRoads and can be viewed.



Geometry>View Geometry>Vertical Annotation (E>1>4)

Select the Preference button from the View Vertical Annotation window. Choose the appropriate preference for the alignment annotation Select the Apply button and close the view vertical annotation window

lame:		Close
50 scale Detour set g 50 scale-set global s 50 scale with Hi & Lo	cale fact	<u>L</u> oad
Default		Save
Detour Detour Alignment Detour prefix on all p	oints	Save <u>A</u> s
Existing Alignment Existing Alignment 50	) scale	<u>D</u> elete
Include Hi & Lo Point		Help

# **Vertical Annotation**

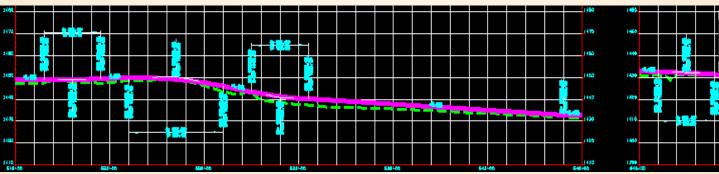
Open the profile attached to the P&P Sheet

On the InRoads menu highlight the vertical and right click> select view from the pull down

Turn on the delete ink lock!

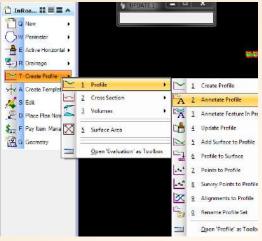


🗑 View Vertical An	notation	
Main Points Curv Hori <u>z</u> ontal Alignment: ⊻ertical Alignment:	es Tangents Affixes CRL	Help
Profile Set:	CRL 🔽 🕈	
Station Start: 223+00.00 Stop: b 600+00.		



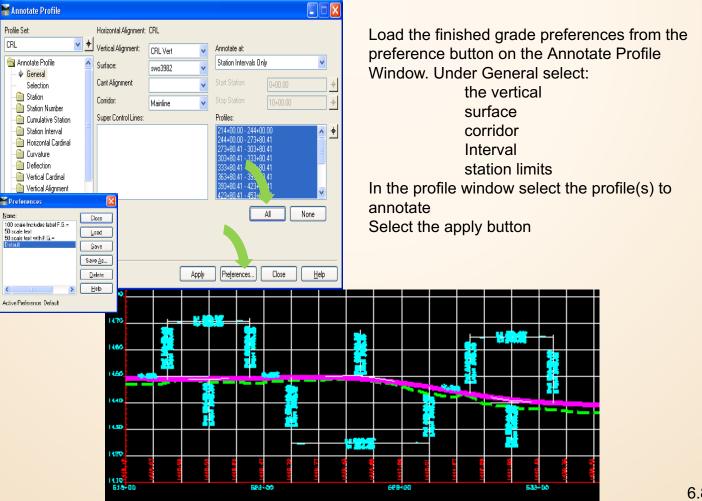
# **Vertical Annotation**

### Annotation for Profile Finished Grades



Make sure the desired profile set is active (in the pull down for profile set select the appropriate profile)

rofile Set:		Horizontal Alignment:					
A001_2 ·	+	Vertical Alignment:	Default	•	Annotate at:		
Annotate Profile	*	Surface:	Default	•	Station Intervals	Only	•
I General Selection		Cant Alignment:		•	Start Station:	1070+00.00	
Station		Corridor:		•	Stop Station:	1145+00.00	
Cumulative Station		Super Control Lines:			Profiles:		
Horizontal Cardinal Curvature Deflection Vertical Cardinal Grade and Distance Vertical Ordinate Vertical Ordinate						All None	
Superelevation Cant Alignment Speed	•						



### Evaluation>Profile>Annotate Profile(T>1>2)

Using the Generator to Create Erosion Control Detail Sheets

- P&P GENERATOR for Erosion Control Detail Sheets
- LOAD <u>TWO SEED FILES FROM THE R DRIVE</u>. These can be created using the seed files from the R drive or copied to the machine from the R drive.
  - Erosion Control.dgn
  - SeedHostFile.dgn
- LOAD THE PREFERENCES FROM THE R DRIVE THAT HAS BEEN SAVED TO THE MACHINE.
- Now all the files are ready, to start in the Erosion control.dgn. Note: an ALG is required. Set the global scale factor for the text.
- To avoid sheet mess ups extend the horizontal alignment to an even station (back to the nearest 500') and turn off the station locks. This forces the first sheet to be a full sheet, making less to fix.
- Inside Generator:
- MAIN TAB

#### 1. Load the preference (Erosion Control)

- **2.** Set the alignment.
- 3. Set the station limits

#### PLAN CONTROLS TAB

Use the browse button to load the model files. This is any sheet that will be attached to the EC Detail Sheets

#### SHEET LAYOUT TAB

- Set the host file (select the browse button and set the path and name the file for the job-this file can be created right here and it needs to be named different than the file currently being worked in. it can't be Erosion Control.dgn)
- Set the seed host file (SeedHostFile.dgn)

#### O BORDER AND TITLE TAB

Set the user text 1 (use the tab key to enter after it has been typed it in)

Toes

- Set the user text 3 (again use the tab key to enter)
- O CLICK APPLY

Note: if creating all sheets in one, the reference files will have to be moved. Select all the even numbered reference files and move them to the desired location along with every other sheet border cell. To avoid this moving, build the sheets using single each sheet from the sheet layout tab Host file content radial on the Plan and Profile Generator window.

Drives

Paved and Special Ditches

A Key for EC items

Note: Things to show in Erosion Control Detail Sheets-

Alignment & Stationing

Right of Way

All Structures

New Road

Everything else can be turned off.

Border and	Title	Sym	bols and Details 🛛 🔔	Match Lines
Main	Pla	n Controls	Profile Controls	Sheet Layout
Sheet Number:	1	<u>N</u> ame:	1	Host Fle Content
Hogt File:	ine\20	946(04)E iosio	Single Sheet Each	
Seed Host File:	YNAut	omation and G	raphics\Proje	O Al Sheets in <u>O</u> ne

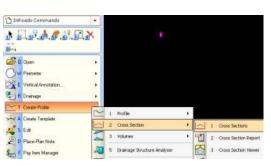
# CHAPTER 7

**Cross Sections** 

# Notes



# **Cross Sections Creation**

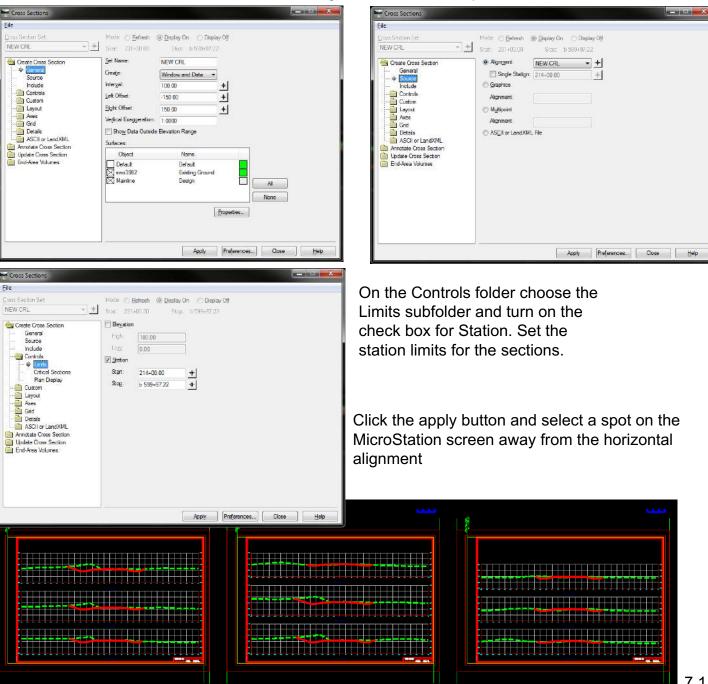


Create a new Microstation file using the seed file from the R drive (in R:\CADD Support\ MicroStation\ Seed Files\Roadway) named JPNXSec01 and save to the project folder.

Note: view the horizontal alignment to make sure the sections don't overlap the alignment

On the InRoads menu select Evaluation>Cross Section>Create Cross Section (T>2>1)

Select the General subfolder and select the desired surfaces Select the Source subfolder and select the alignment from the drop down menu



# **Cross Sections Creation**

Before completing any work on the cross section set, the earthwork should be compared to make sure each of the surfaces to be labeled with the end area volumes are within 2% of the triangle volume calculations.

+ +

Cross Sections

File Cross Section Set

A001\_1

On the cross section window select the folder for End-Area Volumes. Choose the surfaces to be calculated. Select the Apply button.	)	Annotate Update C End-Area 	eral oute Quant iitable Mate	tion on enals by Feat enals by Stati pansion	ure	rface Existing w Pave. Detour Mainline	Type Existing Design Design Umits Station Range Start: 1087+00.00 * + Stop: 1087+00.00 * +
		1	ed Quantitie ed Balance	and a second		perial Units	
		As B			۲	Cubic Yards	Cubic Feet Ignore Areas Smaller Than: 0.00
			tation Haul Diag	gram		reate XML Repor	rt 🔄 Plot Mass Haul Diagram
Bentley Civil Report Browser - C:\Users\URDY01~1.OKL\AppData\Lo	ocal\Tem	RPT7B5.xml	1.00	1000			n
File Tools Help				-		10 <u>- 01</u>	
C:\Program Ries (x86)\Bentley\InRoads Group V8.11\XML Data\en\	0	0 0	1.00	0.00	0	0 ^	
CrossSectionASCIIInputFormat xsl	0	0 0	1.00	0.00	0	0	
	0	0 0	1.00	0.00	0	0	Apply Preferences Close <u>H</u> eb
CrossSectionASCIIInputFormatWithPencodes.xsl	0	0 0	1.00	0.00	0	0	
CrossSectionDesignSufaceFeatures.xsl	0	0 0	1.00	0.00	× o×	0	
A: CrossSectionGradebook xsl	0	0 0	1.00	0.00	0	0	
Clossectorialdebookite.xai	0	0 0	1.00	0.00	× o	0	From the report browser,
	0						•
-At CrossSectionPointsList xs	2		1.00	0.00	0	0	choose the
CrossSectionProfileList xsl	0	0 0	1.00	0.00	0	0	EndAreaVolume.xsl. At the
A Crossoccionsiopestake Listing Asi	0	0 0	1.00	0.00	0	0	EndAreavolume.xsl. At the
	0	0 0	1.00	0.00	0	0	bottom of the report, the total
CrossSectionStakingTable xsl     A: CrossSectionsToCSVxsl	0	0 0	1.00	0.00	0	0	• •
A: CrossSections IoCSV xsi	0	0 0	1.00	0.00	0	0	cut is shown on the right and
	0	0 0	1.00	0.00	0	0	u u u u u u u u u u u u u u u u u u u
	0	0 0	1.00	0.00	0	0	total fill on the left. Save the
5 Frathursd O matting and	0	0 0	1.00	0.00	ő	0	report or record these
EndAreaVolume.xsl	0	0 0	1.00	0.00	0	0	
A: EndArea Volume Page Totals xsl	0	C A 2				A	numbers the totals are in
A EndArea Volume Station Range xsl	U	0 0	1.00	0.00	0	0	
Multiple Material Volumes xsl	1			XX	X		cubic yards.
Roadway Designer Component Quantities Summary xel     Roadway Designer Component Quantities xsl	1287	9 128799	X	$\langle \chi \rangle$	13857	13857 ≡	
A:     Triangle Volume By Station 1 xsl       A:     Triangle Volume By Station 2 xsl       A:     Triangle Volumes xsl	$\mathbf{A}$	X		44		•	

Mode: (a) Befresh (b) Display On (c) Display Off

Start: 1087+00.00 Stop: 1137+00.00

From the Inroads commands select Evaluation>Volumes>Triangle Volumes (1>T>3). On the Triangle Volume window set the Original surface (existing ground) and Design surface- these must be the same surfaces selected on the EndAreaVolumes command. Select the Add button so the surfaces appear in the main box and Apply.

Close
Help
117(R)

# **Cross Sections Creation**

Program Files (x86)\Bentley\InRoads Group V8.11\XML D	ata\en\			
A: Cross Section ASCIIInput Format Feature xsl     Cross Section ASCIIInput Format With Pencodes xsl     Cross Section Gradebook xsl     Cross Section Gradebook NE xsl     Cross Section Gradebook Wide xsl     Cross Section Points xsl     Cross Section Points List xsl     Cross Section Profile List xsl     Cross Section Slope Stake Listing xsl		Surface: Description: Preference:	Existing Mainline Created from roadway designer	
A: Cross Section Staking xsl A: Cross Section Staking Table xsl	1		Design	
A: CrossSectionsToCSVxsl		Cut Factor:	1.00	
CrossSectionSurveyFormat.xsl		Fill Factor:	1.00	$\geq$
A: CrossSectionWide xsl				
A: EarthworkQuantities.xsl	5	Cut:	3477021 cu ft	
A EndAreaVolume xsl		Fill:	372675 cu ft	
A]     EndArea Volume Page Totals xsl       A]     EndArea Volume Station Range xsl       A]     Multiple Material Volumes xsl		Net:	3104346 cu ft	
A: Roadway Designer Component Quantities Summary x	d	Cut:	128779 cu yd	
A: Roadway Designer Component Quantities sal	744 (j. 1	Fills	13803 cu yd	
Triangle Volume By Station 1 xsl		Net:	114976 cu yd	

From the report browser, choose the TriangleVolume.xsl. At the bottom of the report, the total cut and total fill are shown in cubic yards. Save the report or record these numbers. The end area volumes must be within 2% of the triangle volumes. Divide the end area volumes by the triangle volumes. If this number is more than 1.02 or less than 0.98, add event points or cut the sections closer together to get it within 2%.

= ? (where ? must be < 1.02 and >

0.98)

# **Custom Cross Sections**

Mostly written by: Terrie Troupe

Gather all Roadway information and files required to make a set of Cross Sections.

Acquire the following information from Bridge:

Begin Bridge Station End Bridge Station Subgrade Intercept Stations (Known to Roadway as Last Full Stations)

Load InRoads and all necessary files to create a profile and a set of Cross Sections.

Create a profile drawing.

Locate the Subgrade Intercept Station (Last full station) on the profile.

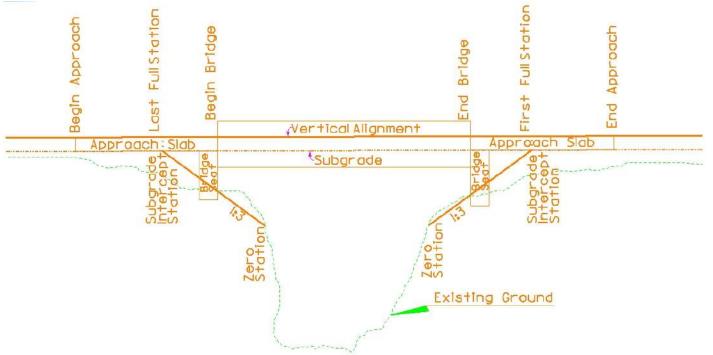
*Project a 1:3* (1' vertical to 3' horizontal) *line* on the profile. The line should begin on the subgrade at

the Subgrade Intercept Station (Last Full Station) and extend at a 1:3 slope until it intersects with the existing ground. (See illustration below.)

<u>Caution</u>: The horizontal and vertical scales may not be equivalent. Make sure the 1:3 projected line (slope) matches the appropriate scale for the plan and profile sheet being used.

### Notes:

Bridge may carry the dirt included in this area on occasions. (For instance in a ditch or channel realignment.) When Bridge carries the dirt, it is normally determined early in the planning process (such as in a Plan-in-Hand.)



## **Custom Cross Sections**

Mostly written by: Terrie Troupe

Trim the projected 1:3 lines to the lowest point on the channel bed if the lines do not intersect with the existing ground. (Example right)

Determine the Stations where the projected 1:3 slope intersects with the existing ground. Roadway describes this as the Zero Station. If the projected line does not intersect with the existing ground, use the lowest point of the channel. (Example right)

All prerequisite data should be gathered at this point and a custom set of Cross Sections can now be created. The initial set up to creating a Custom Set of Cross Sections is the same as a normal set.

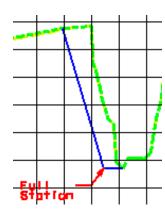
Open the Create Cross Section tool.

Select General and choose the desired surfaces.

Select Source and choose an alignment to run the Cross Sections on. Select Custom and choose and/or set the necessary items

le					
ross Section Set.	Mode:      Refresh      Display O     Start: Stop:	n 🔘 Disp	lay Off		
Create Cross Section	Station Type	Туре	: tails	Station Range	•
Source Include			rt Station:	1075+00.00	+
Controls		Sto	<u>p</u> Station:	1140+60.54	+
Custon C			r <u>v</u> al:	100.00	+
		Left Offset: <u>Rig</u> ht Offset:		-100.00	+ +
				100.00	+
		Ske	e <u>w</u> Angle:	0^00'00.00"	<u>+</u>
	Features Crossing Projected		Storm and		
	Ahead Barid: 0.00	-	Ahead I		+
	Back Band. 0.00	+	Back B	and. 0.00	+
	Add Update G	aphics	Import.	. <u>S</u> ave Save	e As
		Apply	Preference		Help

The option Station Range will be used to create Custom Cross Sections for Bridge Exceptions. Using a station range will produce multiple cross sections perpendicular to the alignment. The span duration will be defined by the stations specified in the start and end station boxes. Note: The stations used in Custom will over ride the stations limits defined in Controls.



## **Custom Cross Sections**

Mostly written by: Terrie Troupe

Station	Туре
1075+00.00	Station Range
1096+53.24	Perpendicular
1097+15.62	Perpendicular
1101+82.97	Station Range

The Custom dialog box should now reflect the first station that was entered each time the Add button was pressed as well as the Type of Cross Sections to be created for that entry. (Example upper right) Repeat the steps for additional bridges if applicable. The Update, Save, and Save As buttons can be used if desired. Saving and Updating allows for quick editing when changes occur and cross sections may need to be rerun. If no other special situations need to be addressed, *press the apply button* and place a set of cross sections . The cross sections should reflect the data entered in the Custom dialog box. Stations run from the beginning station to the first full station. Then skip to the two zero stations. Conclude with the second full station and continue with the normal intervals to the end of project.

The Type Perpendicular will also be used to create a custom set of cross sections. Perpendicular option will create a single cross section perpendicular to the alignment.

#### Custom Steps:

Set the Preferences as needed for the project. Set the Type to Station Range. Enter the Start Station for the Project. Enter the first Full Station for the End Station. Edit the Intervals and offsets if needed for the project. Press the Add button. This action will create a range of cross sections from the beginning station to the full station. Set the Type to Perpendicular. Enter the first Zero Station. Edit the offsets if needed for the project. Press the Add button. This action will result with a single cross section cut perpendicular to the alignment at the specified station. Set the Type to Perpendicular. Enter the second Zero Station. Edit the offsets if needed for the project. Press the Add button. Set the Type back to Station Range. Enter the second full station for the start station. Enter the end of project station for the End Station. Edit the Intervals and offsets if needed for the project. Press the Add button.

Before the features can be annotated, they must be viewed in the cross sections...

In Update cross sections Evaluation>Cross Section>Cross Sections (T>2>1)

Select the Update Cross Section folder

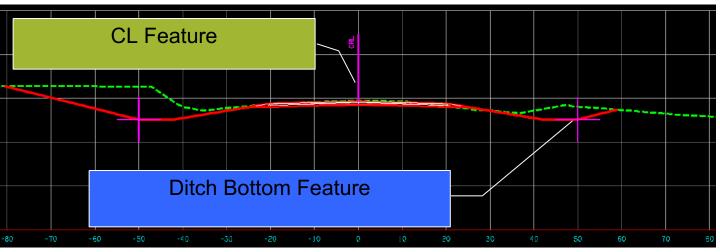
Highlight Crossing Features sub-folder

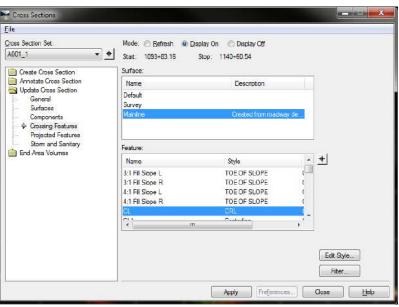
Select the surface

Select the feature

Click apply

Note: most features show up as a symbol. The centerline should show up as the CRL. This would depend upon the style tied to that feature.





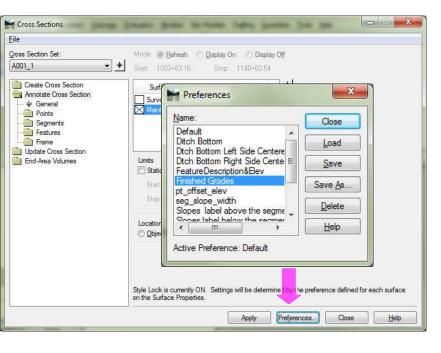
Name	Style	^ <u>:</u>
Ditch Backslope R	TOP OF CUT	(
Ditch Bottom L	Ditch Bottom	
Ditch Bottom R	Ditch Bottom	
EOB L	Hinge	C
EOB R	Hinge	( _
	Destas	( ×

#### Feature:

reature.		
Name	Style	*
Special Ditch Backslope 4:1 L	Ditch Special Bottom	C
Special Ditch Bottom 3:1 L	Ditch Special Bottom	0
Special Ditch Bottom 3:1 R	Ditch Special Bottom	- C
Special Ditch Bottom 4:1 L	Ditch Special Bottom	
Special Ditch Bottom 4:1 R	Ditch Special Bottom	
CDate C0.1	Dark F	E.

Evaluation > Cross Section > Cross Sections.(T>2>1) Select the Annotate Cross Sections folder. Under the General subfolder select the surface the feature to be annotated is in. To limit the stations the annotation is displayed turn on the Limits by selecting the check box next to Station Range and set a range of stations to display the annotation.

Cross Sections Eile Cross Section Set: A00 1_1	Mode:  Befresh Display On Display Off Start 109349316 Store 1140+50 54
Create Cross Section ← Annotate Cross Section ← ∲ General Points Segments	Surfaces     Preference       Surfaces     Preference       Mainline
Features     Frame     Update Cross Section     End-Area Volumes	Limits Station Range Stat: 1093+83.16 + Stop: 1093+83.16 +
	Location © <u>O</u> bject
	Style Lock is currently ON. Settings will be determined by the preference defined for each surface on the Surface Properties.
L	Apply Preferences Close Help

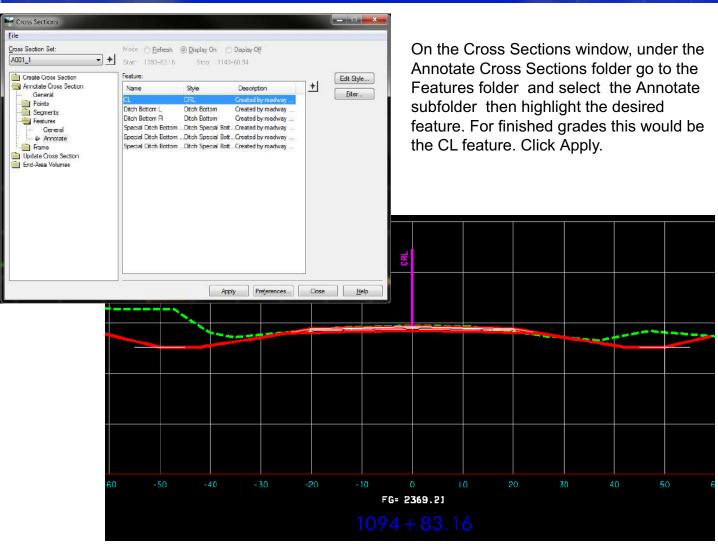


Choose the Preference button at the bottom and pick the desired preference for what annotation is needed. For example to annotate finished grade elevations, load the preference Finished Grades.

This preference will determine how the annotation is displayed for each item.

Make sure the delete ink lock is turned off when using the annotation command.





Next highlight the ditch bottom features and select the preference button. Choose the desired preference for ditch bottom and select the load button. Close the preference window and select the Apply button on the Cross Sections window to annotate the selected ditch bottoms.

2365.14



Cross Sections

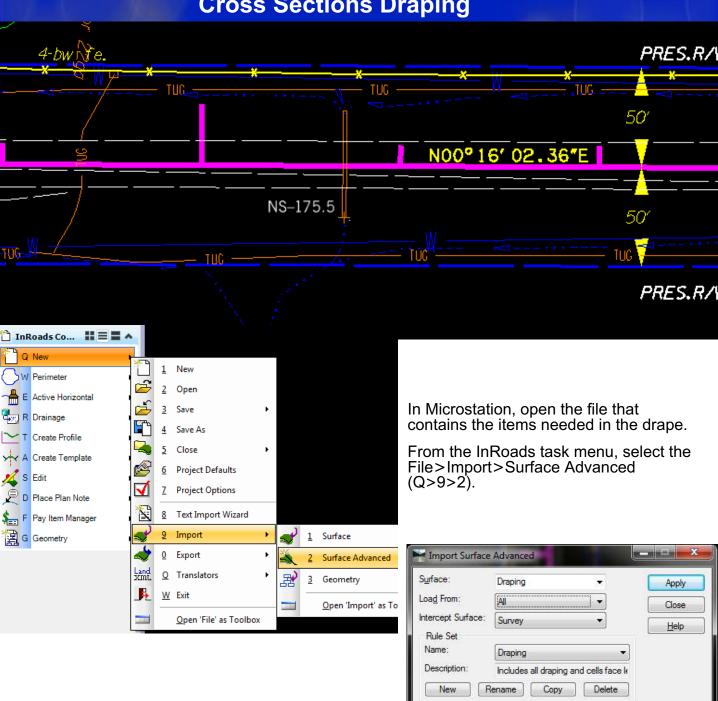
If the preference selected was the left si prefe repea other

side only (or right side only) erence for the ditch bottom,	Ele Gross Section Set: AD01_1		ilay On 💿 Display C ilop. 1140+60,54	θŧ	
eat the process to annotate the	Create Cross Section	Feature:	~ .		+ Edit Style
er side.	General Points	Name CL Ditch Bottom L	Style CRL Ditch Bottom	Description Created by roadw Created by roadw	<u>Filter</u>
	Segments	Ditch Bottom R	Ditch Bottom	Created by roadw	
Preferences	General	Special Ditch Bottom 3:1 L		Created by roadw	
	Annotate	Special Ditch Bottom 3:1 R	Ditch Special Bott	CONSIGNATION CONSIGNATICON CONS	
Name:       Close         Backslopes       Load         Default       Load         Ditch Bottom       Letter         Dtch Bottom Left Side Centere       Save         Dtch Bottom Right Side Centere       Delete         Prature Description&Elev       Delete         Offset from CL Survey       Help         Active Preference: Dtch Bottom Right Side Centered       Help	Update Cross Section	Special Ditch Bottom 4.1 L	ntich Special Bett.	. Created by readw	
Active Preference, Dich Bottom Right Side Centered			Apply	Preferences	Close Help

Create Cross Section       Name       Description         Worker Cross Section       Name       Created from roadway de.         Surfaces       Components       Pedure:         Projected Features       Store       Feature:         Name       Store       CR         Store       Cost of the Cross Section       Feature:         Name       Store       CR         Store       Created Features       Store         Store       CR       CR         Name       Store       CR         Cost Section       Created features       Store         Name       Store       CR         Name       CR       CR       CR         Name       CR       CR       CR         Name       CR       CR       CR         Name       CR       CR       CR         Special Dich Bottom 31 R       Dich Special Bottom       CR         Special Dich Bottom 31 R       Dich Special Bottom       CR         Special Dich Bottom 31 R       CR       CR       CR         Special Dich Bottom 31 R       CR       CR       CR         Special Dich Bottom CR       CR       CR       CR	Cross Sections			_ <b>_</b> X	1
United Cools Section       Settice:       Effected       Display Off       Display Off       Display Off         Settice:       Settice:       Settice:       Display Off       Disp	Eile				Once annotatio
Name       Description         Under Conservers       Marries         Components       Sector         Tod-Areas Volumes       Features:         Name       String         Peature:       Name         Name       String         Peature:       Name         String       String         String       String         String       String         String       String         String       String         String       String         Name       String         Peature:       Name         Name       String         String       String					the Update Cro
Apply button.				- -	from the Cross
Set the mode to highlight the sur- Surfaces Friedward Fetures Find-Area Volumes Feture: Name Style Che Botom R Special Exh Botom 31 E Data Botom Special Exh Botom Special Exh Botom Special Exh Botom Special Exh Botom 31 E Data Botom Special Exh Botom 31 E Data Botom Special Exh Botom Special Exh Botom Special Exh Botom 31 E Data Special Special Exh Botom 31 E Data Special Exh Botom Special Exh Botom Special Exh Botom 31 E Data Special Exh Botom Special Exh Botom					and choose Cro
E C C C C C C C C C C C C C C C C C C C	Surfaces     Components     Pojected Features     Sorm and Sanitary	Feature: Name CL Ditch Bottom L Ditch Bottom R Special Ditch Bottom 3.1 L Special Ditch Bottom 3.1 R Central Data Data	Style CRL ( Dtch Bcttom E Dtch Special Bottom	Edit Style	highlight the su Surface box and ditch bottom fea
2365.14 2365.1 200.1			Apply Preferences	Close Help	
2365.14 2365.1 200.1					
-BC -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40				B B	
-BC -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40					
-BC -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40					
-BC -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40					
-BC -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40					
		2365.14			2365.
	-80 -70 -60	-50 -40 -30			20 30 40

n is complete, select ss Section folder Sections window ossing Features. Display Off and rface from the d select all of the atures. Select the

\_ **\_** ×



Rules:

Name

Oil Line Present ROW

L SURVEY

Gas UG Line

**RW** Proposed

Sanitary Sewer

Description

111

- On the Import Surface Advanced window first set the intercept surface (this will be the surface the elevations will come from-usually the existing ground).
- Next for surface, key in the name of the new surface (example: Draping) or select the that the features will go into.
- Select the Apply button and close the Import Surface Advanced window.

×.

=

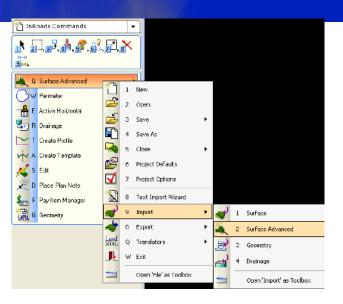
To check draping, select from the InRoads task menu Surface>Feature>Feature Properties(W>7>1)

On the Feature Properties window, scroll through the features and make sure all of the elements from the dgn file imported successfully.

Surfa <u>c</u> e: <u>F</u> eature:	Draping	•			Style Availa <u>b</u> le:				Apply Close
Name Sty	de	Description	*	+					Close
Present RW	Present LT		_	_					Filter
Present RW	Present LT								Edit Style
Present RW								-	New Style
Present RW Present RW					Primary:				
Present RW								•	List Point:
Present RW	STATE & B. C. &				Secondary:				Help
Present RW	Present LT								
Present RW	Present LT								
15 TH 9 10 10	Telephone U/G Line Lt.								
33.6	Telephone U/G Line Lt.				Pay Items				
	Telephone U/G Line Lt. Telephone U/G Line Lt.				Linear Inc.		5 01	*	
	Telephone U/G Line Lt.				Name Desc	cription	From Style	a la la constante de	
	Telephone U/G Line Lt.							26	
Waterlin Utl	우리 비행 방법 양양 방법 방법 방법 이 동안 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이		III						
			+						
< [			h		8				
la <u>m</u> e:	Tugline Lt				Triangulation				
escription:	1		_		Feature <u>T</u> ype:	Breakline	•		
79 - 11 - 11 - 11 - 11 - 11 - 11 - 11 -			_		Point Density Interval:	0.00	+		
arent:					Exclude from Triangula	tion	1		
Refresh/Dis	play in 3-D/Plan Vie <u>w</u>								

If any of the items are missing, it may be the selection criteria in the import surface advanced command. The selection criteria will have to be changed so that the element will be selected on import. Once the rule is adjusted, empty the Draping surface and repeat the import process.

Items in the dgn file that use by level symbology will not be recognized. If changes were made to any by level symbology properties to the actual linestyle before importing, most of the criteria is searching for linestyle so that should solve most cases. There are some items which search for specific levels instead of the linestyle.



File>Import>Surface Advanced (Q>9>2). Locate Tuglines listed in the Rules box. Double click to open the Edit for that rule. If there were items in the file that did not become features when using the Import Surface Advanced command, check the rules for that particular item. For example, if drapeing the existing utilities from the Topo file by following the steps from the previous page, the Tug lines did not come in as features but the rest of the items did, check the rule for Tuglines.

🚟 Import Surfac	e Advanced					
S <u>u</u> rface:	Merge Detour and Existin 🐱	Apply				
Loa <u>d</u> From:	All	Close				
Intercept Surface:	Merge Detour and Existin 🔽					
Rule Set						
Name:	Draping	<b>~</b>				
Description:	otion: Includes all draping and cells face I					
New Rename Copy Delete						
Rules:						
Name	Description	<u>^</u>				
RW Proposed Sanitary Sewer TV Underground Lir Temp R/W	ne					
Tugline						
Underground Powe Waterline	line	~				
<						

🕌 Edit Import Rule		
Name: Tugline > Edit Import Rule General Selection Criteria Process Settings	Rule Description:         Seed Name:         Description:         Parent:         Feature Style:         Point Type:         Point Density Interval:         ✓ Exclude from Triangulat         Target Surface:         ● Active         Bandom Points         ● Single Feature         ● One Point Per Feature	<ul> <li>Merge Detour and Existin</li> <li>Linear Features</li> <li>One Linestring Per Feature</li> </ul>
	Арр	ly Close <u>H</u> elp

On the Edit Import Rule window, select the Selection Criteria folder.

Notice the Element is filtered by LineStyle. To test if it is read the file's linestyle, select the "Highlight Matching Elements" button. If the element does not highlight then add the elements linestyle to the selection criteria. This can be done by selecting the Line Styles subfolder and locating the style from the Available list and selecting the Add> button to add it to the Selected list.

🚟 Edit Import Rule	
Name: < Tugline >    ✓ Tugline   ✓ Edit Import Rule   General   ✓ General   ✓ General   ✓ General   ✓ Colors   Colors   ✓ Line Styles   ✓ Weights   Cell Names   ✓ Process Settings	Filter Elements By         Level         Type         Color         LineStyle         Weight         Cell Name         Match Element Properties         Highlight Matching Elements
	Apply Close <u>H</u> elp

Multiple line styles may be added. Also, selecting other "Filter Elements By" items such as Level and add the level the selected item is on. When finished adding, select the apply button to save the changes. The changes will be stored in the .xin file. Notify Automation and Graphics if a linestyle should be permanently added to the master preference file.

🚟 Edit Import Rule			
Name:          Iugline       >         Edit Import Rule       General         Selection Criteria       General         Levels       Types         Colors       Line Styles         Weights       Cell Names         Process Settings	Available: Township tphibk tplobk Trail trail tree TV Underground tvug Unimproved Road Unimproved	Add ->	Selected: Telephone Underground tuglin
	A	pply C	lose <u>H</u> elp

Note: Keep in mind that any elements matching the criteria here will be imported.

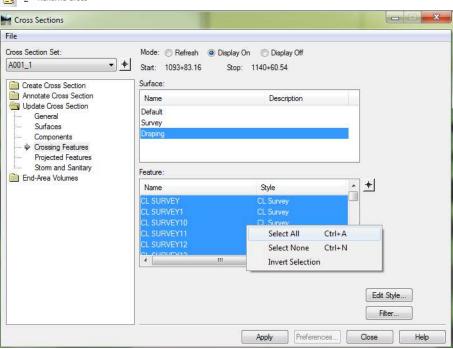
#### 📋 InRoads Co... 🔡 🔳 🔺 Q New ۲ W Perimeter ۲ 🖶 E Active Horizontal 🖏 R Drainage 💛 T Create Profile Profile 1 ۲ A Create Template $\sim$ 2 **Cross Section** . 1 Cross Sections 🔏 S Edit Volumes 엽 3 ۲ 2 Cross Section F D Place Plan Note 숩 $\ge$ Cross Section V 3 Pay Item Manager \$<u>=</u> F 5 Surface Area G Geometry 1×°I 4 Place Feature in \_ Open 'Evaluation' as Toolbox $\sim$ 5 Add Surface to Inla. <u>6</u> Cross Section t NNN 7 Rename Cross

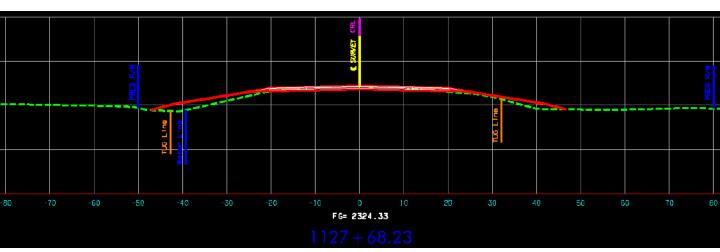
## **Cross Sections Draping**

Next, use the update cross section command to view the new draped features in the cross sections.

Evaluation>Cross Section>Cross Sections (T>2>1)

From the Cross Sections window, select the Update Cross Sections folder. Set the desired cross section set. Select the Crossing Features subfolder. Highlight the desired Surface from the surface box. Next highlight the desired features from the feature box (to select all right click in the Feature window and choose Select All). Select the Apply button then close the Cross Section window.

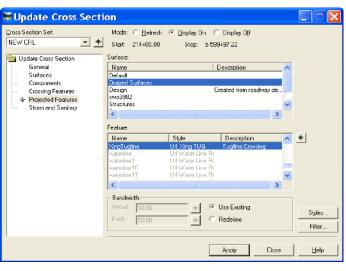




## **Drape & Label Crossing Utilities**

Locate the crossing utilities from the existing topography file. Place a cell close to the alignment where the utility is located using the place cell command in MicroStation. Import the crossing utility from the inroads menu select: File>Import>Surface (Q>9>1)

- Set the surface to the one the feature will be located in
- Load from single element
- **Elevations: Drape Surface**
- Intercept Surface: the existing ground surface
- Key in the Seed Name
- Set the style to Utility Tugline Crossing
- Point type for crossing utilities will be Random
- Be sure to turn on exclude from triangulation
- Click the apply button and select the cell placed on the utility



🕌 Import Surface						
From Graphics DEM	From Geome	try				
S <u>u</u> rface:	Draping	Draping 🗸				
Loa <u>d</u> From:	Single Element	*		Filter		
Level:	Alignment Alter	nate 🗸 🗸		Results		
Ele <u>v</u> ations:	Drape Surface	*	Pr	eferences		
Intercept Surface:	PICK YOUR E	XISTING S 🔽				
Drape Vertices Only	,			Help		
Lhin Surface						
L	ance: 5.00					
Features Use Tagged <u>G</u> rap	hics Information	n				
Seed Name:		XingTug		★		
Feature Style:		Utility Tugline C	rossing	~		
Point Type:		Random		~		
Maximum Segr		0.00				
Point Density I	nterval:	0.00				
		Rename				
Exclude from Triar	ngulation					
		lose				

Update the cross sections to show the new features.

Select Evaluation>Cross Section>Cross Sections>Update Cross Sections (T>2>1) Make sure the mode is set to display on Select the sub-folder for projected features Select the Surface the utility features are in Select the feature from the feature list Click the Apply button

0		•			
Annotate Cross Section General Dints General General	tion  Sufaces Releance Sufaces Releance New Deega Xing Utiles Label New Deega Xing Utiles Label Oregod Surfaces	Preferences Name: Dich Bottom Fredu Possition *E by	Annotate Cross Section	IE	Sigles.
	Lont Statut	Penithed Brades     Save       Penithed Brades     Save       Penithed Brades     Save       Superied Andes     Save       Superied Andes     Save       Superied Andes     Save       Ming Unites Label     Belete       Help     Active Preference: Xing Utilities Label	Features General Annotate Frame	Apply Preferences Do	e <u>H</u> eb

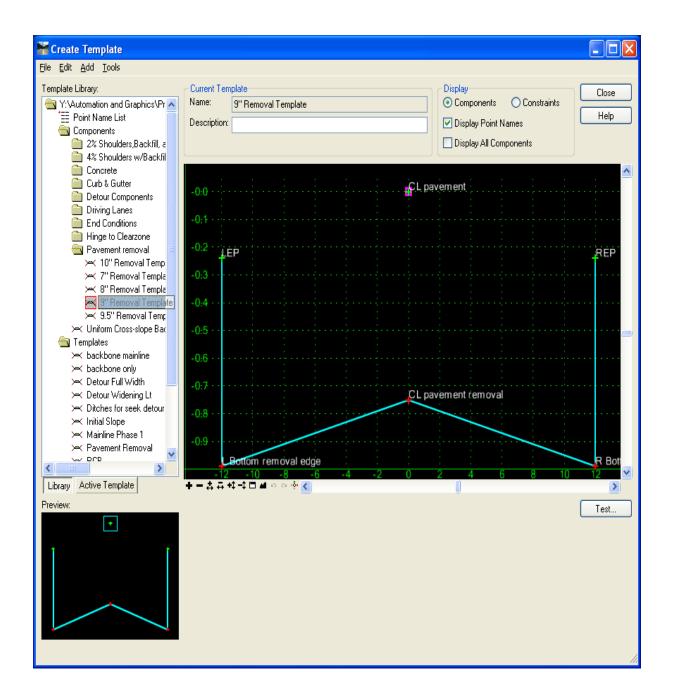
Evaluation>Cross Section>Cross Sections>Annotate Cross Section (T>2>1)

Load the preference (from the bottom of the Annotate Cross Section window) named Xing Utilities Label

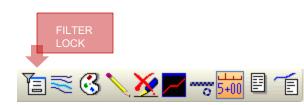
On the General folder select the surface the feature is in

On the Features folder select the sub-folder Annotate and select the crossing utility feature that needs to be annotated

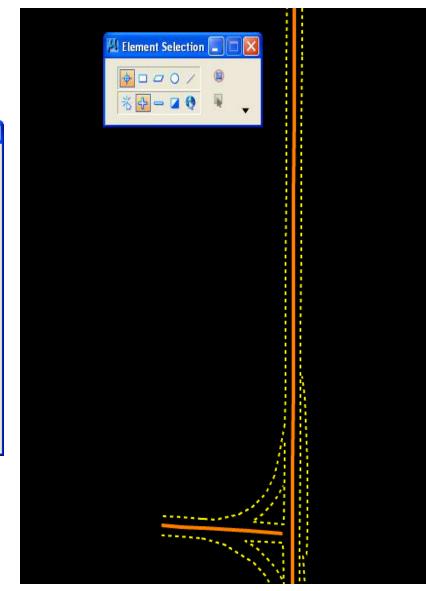
Select the Apply button on the Annotate Cross Section window

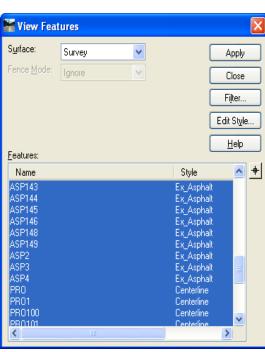


Use the template library to create a specific pavement removal template.



First be sure that to begin **IN A 3d MICROSTATION** file. From the InRoads commands select Surface>View Surface>Features (W>1>5). Set the surface to the existing dtm from survey. Using the filter button, set the filter to existing asphalt and centerline (The filter can be set from the View Features command by selecting filter from the InRoads Surface tasks). Make sure the Filter Lock is turned on from the Locks toolbar. View the existing asphalt features. Using the Microstation tool Element Selection, select the centerline of pavement.





#### Select from the InRoads tasks

File>Import>Geometry (Q>9>3). Select the Type Horizontal and Vertical Alignment from the Import Geometry window then key in the name for the Center of existing pavement. Select the Style. Make sure the check box for All Selected Elements Added to Single Alignment is on and Apply.

Repeat this process for the left and right pavement edges using the Microstation command Element Selection to select each one individually. Be sure to delete or deselect the previous feature string for each.

🐴 InR	oads Commands	-						
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<mark>ے ا</mark>	Active Horizontal	ž	з	Sava	•			
	Drainage	6	4	Save As				
	Create Profile		5	Close	•			
1.4	Create Template	B	6	Project Defaults				
	Edit	$\checkmark$	7	Project Options				
	Place Plan Note	1	8	Text Import Wizard				
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E C	Geometry	-	0	Export	۲	<u>×</u>	2	Surface Advanced
		Land XIML	Q	Translators	•	2	3	Geometry
		JF.	W	Exit		Z	4	Drainage
		-		Open 'File' as Toolbox		_		Open 'Import' as To

From Graphics	ICS Vert	ical from Surface	4
<u>Type:</u>	Horizontal ar	nd Vertical Alignment 🔍	Apply
Geometry			
<u>N</u> ame:	Center of exi	sting pavement	
Description:			
Style.	Existing Align	nment 💌	Hdp
Horizontal Cur	ve Definition:	Arc 🗸	
<u>V</u> ertical Curve	Definition:	Parabolic 🔽	
Horizontal <u>Alig</u>		ter of existing paveme 👻	
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Import Geome	try			
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Pigiect:	Activ	ve	~	
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rom Graphics	ICS Vert	ical from Surface		
<u>Type:</u>	Horizontal ar	nd Vertical Alignme	nt 🗙 🚺	Apply
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$\underline{D}$ escription:				
Style:	Existing Align	nmerit	v (	<u>H</u> dp
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Use Fence	🔲 <u>R</u> esolv	e Gap: and Nonta	angencies	
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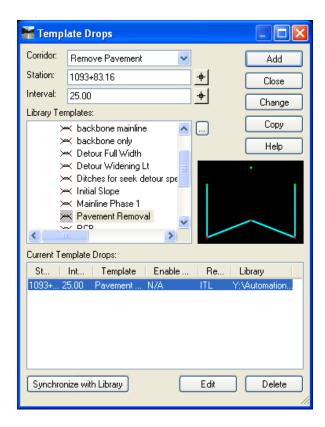
InRoads Modeler Task>Roadway Designer. Create a new corridor(s) for pavement removal (the reason for this is because if there is more than one removal area then more then one corridor is required).

WHATEVER ALIGNMENT CHOOSEN TO BE USED TO CREATE THE CROSS SECTIONS WILL BE THE ALIGNMENT THE CORRIDOR IS BUILT ON. If the cross sections are created on the A001 alignment, the corridor will be created using A001.

Note: Point controls will be used to move the template to the center of pavement alignment (created in previous step).

🎬 Mana	age Corrid	lors					
Surface S Type: Horizonta Vertical A PI Round	Remove Pav Symbology: al Alignment: slignment: ding Tangenl	Alignment A001 A001 vert	>	+	Limits ✓ Station Start: 1093+83.16 Stop: 1130+21.78	+	Add Close Change Copy Copy From Help
Corridors: Name		Туре	Source	Name	e Start Station	Stor	Station
Remove	Mainline /	Alignment Alignment Alignment	A001 A001 A001		1093+83.16 1093+83.16 1088+64.08	1130+ 1130+	•21.78 •21.78 •48.62
							Delete

Add a template drop for the Pavement Removal Template. Make the interval 25 for removal.



🚟 Point Controls				
Corridor: Remove Pa	avement			Add
Control Description:				Close
Point:	CL pavement 🔽 🛨	Station Limits		Change
Mode		Stat: 1093+83.16		
O Horizontal	Vertical 💿 Both	Stop: 1130+21.78		Help
Control Type:	Aignment	- Horizontal Offsets		
Horizontal Alignment:	CDP 🔽 🛨	Stait: 0.00 +		
Vertical Alignment	COP 🗸	Stop: 0.00 +		
Use as Secondary	Alignment			
		Vertical Offsets Start: 0.00		
		Stop: 0.00 +		
Priority:	1			
Horizontal and Vertica	al Controls:			
			Type Control	Description
X 1 LEP X 1 REP	P 1093+83.16 1	130+21.78 Both Ali	ignment LEP:LEP ignment REP:REP	
X 1 CLp	pavement 1093+83.16 1	130+21.78 Both Ali	gnment COP:COP	
<				>
				Delete

Use point controls to control the CL, LEP and REP points with the new alignments created from the existing pavement features for the extent of the removal.

Edit Element Settings

1 2 3 3 4 5 6

🔏 🛛 Place SmartLine

📃 😾 Place Block

C E Place Circle

🖉 🖪 Hatch Area

T Attach Tags

A A Place Text

🔆 S Place Active Cell

F Dimension Element

D Measure Distance

J

.

<u>R</u>aster <u>R</u>edline Reference Roundabouts Security Selection Sheet Composition <u>S</u>olids Surfaces <u>T</u>ext View <u>Vi</u>sualization Tool <u>B</u>oxes..

Close Tool Boxes...

Ctrl+T

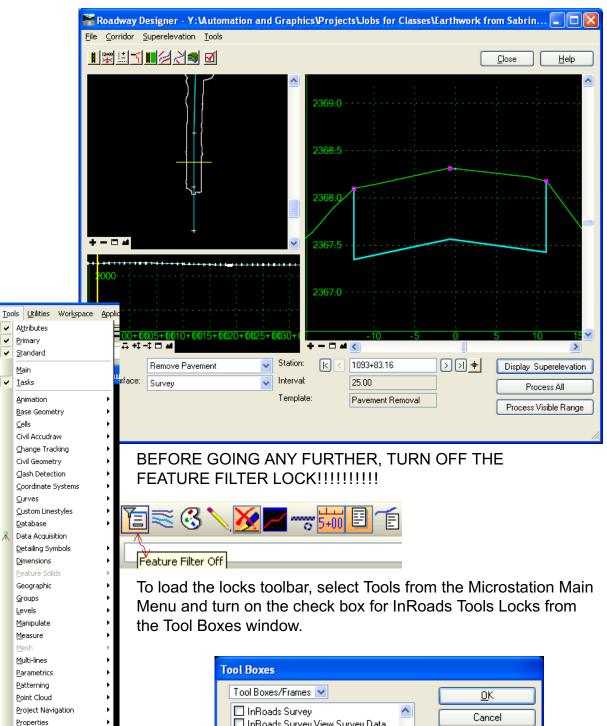
File

🧟 🔻 Default

G - O - 🚮

📢 Drawing

9 .....;



Tool Boxes	
Tool Boxes/Frames 💌	<u> </u>
InRoads Survey     InRoads Survey View Survey Data     InRoads Tools	Cancel
InRoads Tools Drainage InRoads Tools Locks	<u>R</u> emove
<ul> <li>InRoads Tools Locks</li> <li>InRoads Tools Tracking</li> <li>InRoads Tools XML Reports</li> <li>Interchange</li> </ul>	<u>C</u> ustomize
Tool Frames listed in BOLD text	
Large Buttons	
✓ Show Tool Tips	
🔽 Immediately Open	

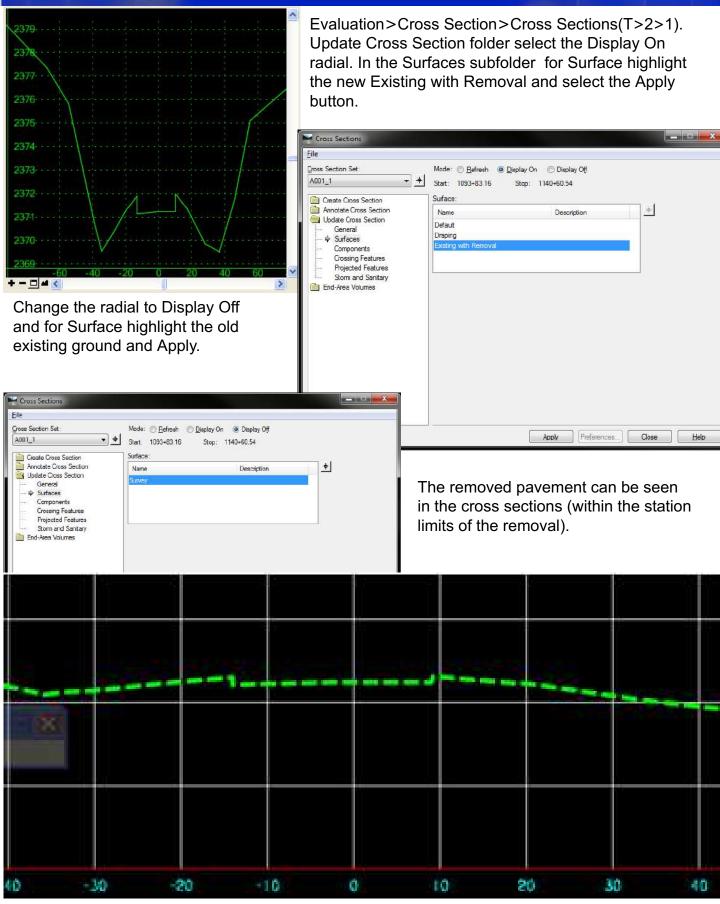
Create the surface for the pavement removal. This surface will then be merged with the existing surface from survey using the Merge Surface command (Surface>Edit Surface> Merge Surfaces).

🚟 Create Surfac	e		×
Name: Default Preference:		~	Apply Close
✓ New Surface for ✓ Empty Design Su Include Null Poin	rface		Preferences Help
Add Exterior Bou	ndary - Style: al Curves using Cho	Exterior Bo	
	Curves using Chord	-	
Detour Initial Slope Mainline Mainline Phase 1 Remove Pavement Remove Pavement woods stuff testing			All
	O Replace O	Rename	() Modify
Add Transverse Style:	Transverse Featu	re 🔽	
Create Alternate : Process Visible R Remove Loops Display Features	ange Only		

🚟 Merge Surfac	es	
Surfaces		Apply
<u>O</u> riginal:	Survey 🔽	
De <u>s</u> ign:	Remove Pavement 🔽	Close
Destination:	First run merge exist 🔽	Filter
		Preferences
📃 <u>R</u> etain All Origina	Il Surface Points	Help
🗹 Retain Features I	Excluded from Triangulation	
Merge Selected /	Areas from Original	
🛃 Add Design Surfa	ace Edge as <u>B</u> reakline	
Included Design S	urface Features	
Name		Style 🔺 🛨
CL pavement remo	oval	pavement remov
Exterior Boundary		Exterior Bounda 📄
L Bottom removal	eage	pavement remotion
R Bottom removal	edne1	pavement remo
RFP		
<		
Duplicate Names: O Append	⊖ Repla <u>c</u> e ⊙ Rena <u>m</u> e	8

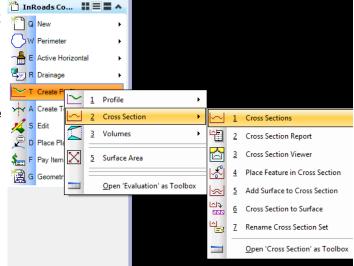
On the Merge Surfaces window the Original surface will be the surface that was there first. For Design set the pull down to the surface that was created called Remove pavement. The destination surface is a surface that can be created from this window by keying in the new name.

Repeat all the steps that created the first run removal surface for any other removal on the project. Create the other surface and merge it with the merge surface created in the first step. Do these steps as many times as necessary, each time selecting as the original surface the merge surface before it.



## **End Area Volumes**

Evaluation>Cross Section>Cross Sections (T>2>1). From the Cross Sections window, select the preference button and choose the desired preference and hit the Load button then close the Preferences window. Next if there is more than one phase of earthwork on the Inroads menu select from the locks toolbar and turn off the delete ink lock.





Note: If the locks toolbar does not appear, choose from the Microstation main menu Tools>Toolboxes and turn on InRoads Tools Locks.

From the Cross Sections window select the End-Area Volumes folder. Select the preference button and choose the desired preference and hit the Load button then close the Preferences window.

Under the General subfolder check the surfaces to compare. If desired, for Limits turn on the Station Range check box and set the stations.

	Cross Section Set:	1.1	O Display Off b 599+97.22
Preferences	Create Cross Section Annotate Cross Section Update Cross Section End-Area Volumes Compute Quantities Compute Quantities Unitable Matrials by Fe		Method Standard Correct for Curvature Upits Station Range Start: 231+00.00 + + Stop: b 599+97.22 + +
1 Phase- Phase 1 2 Phases- Phase 1 2 Phases- Phase 2 3 Phases- Phase 1 3 Phases- Phase 2 3 Phases- Phase 3 4 Phases- Phase 1 4 Phases- Phase 2	Close E Save Save As	Imperial Units Cubic Yards  Cubic Feet  Create XML Report	Ignore Areas Smaller Than: 0.00
4 Phases- Phase 3 4 Phases- Phase 4 5 Phases- Phase 1 Active Preference: Mainline	+ <u>H</u> elp		

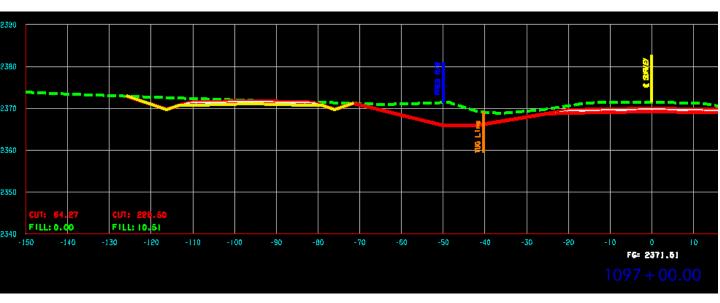
Note: for the type, one must be existing and one design. Type is set on the main tab in the surface properties command.. If it needs to be changed, then it must be updated in the cross sections or inroads will not recognize it.

## **End Area Volumes**

If there are volume exception(s), on the Cross Sections window choose the subfolder Volume Exceptions. For Settings, choose the Start and Stop Stations for the exception. Choose the Add button so that the stations appear in the Volume exceptions box.

Cross Sections File			
<u>Cross Section Set:</u> <u>NEW CRL</u> Create Cross Section Create Cross Section Update Cross Section Update Cross Section Compute Quantities Compute Quantities Compute Quantities Create Sections Classifications Cassifications Cassifications Added Quantities Forced Ealance Added Quantities Forced Ealance Added Quantities Added Quanti	Mode:		
	Start Station a 319+39.65	Stop Staton a 411+23.60	Change Delete
		Apoly Preferences	Cose Help

In Microstation select the level manager and turn on the desired phase level for the project.



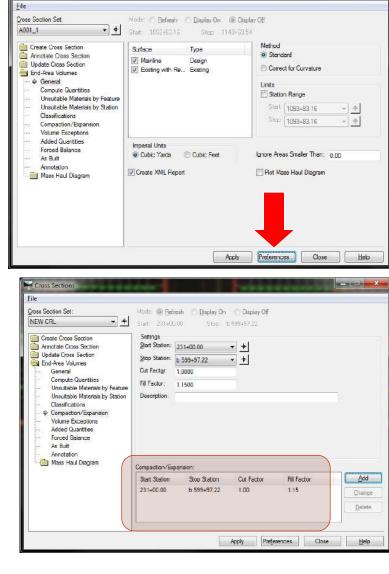
If there are multiple phases on the project turn off the delete ink lock before running the next phase.

## Cross Sections End Area Volumes

To create the report for balancing the earthwork FIRST LOAD THE PREFERENCE Fill Factor

<u>l</u> ame:		Close
5 Phases- Phase 1 5 Phases- Phase 2 5 Phases- Phase 3	^	Load
5 Phases- Phase 4 5 Phases- Phase 5		<u>S</u> ave
Default Detour		Save As
Fill Factor Mainline		<u>D</u> elete
Mass 1:1 Secondarv	+	Help

Select the Compaction/Expansion subfolder. For Settings select the Start and Stop Stations. Key in the desired amount in the Fill Factor box. Select the Add button so that the stations appear in the Compaction/Expansion box.



Select the Apply button. Save the report to the project folder.

Tools Help														
Program Files/Bentley/InBoads Group V8.80/ML Data/	$\sim \sim \sim$	$\sim \sim$	$\sim \sim$	$\sim \sim$	$\sim \sim$	$\sim$	$\sim$	<u>727</u>	$\sim$	$\sim$	$\sim \sim$	$\sim$	$\sim$	$\sim 1$
Evaluation				XX	and A	Area	Volum	ie Rep	ort					
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CrossSectionProfileList.sel	Station F	actor Area	Volume	Adjusted I	actor	Area	Volume .	Adjusted	Factor V	olume A	djusted l	Factor '	Volume A	djuste
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ClossSectorMide.ed	198+00.00	1.00 186.80	798.27	796.27	1:15	0.40	0.73	0.84	1.00	0.00	0.00	1.00	0.00	<u>~0</u> 0
CrossSection%7Z.ssl	199+00.00	1.00 160.60		643.34	~1,15^	0.99	2.57	2.95	1.00	0.00	0.00	1.00	0.00	_0.0
Earthwork [ uantities.xel	200 +00.00	1.00 59.07	405.81	406.81		44.30	83.87	96.45	1.00	0.00	0.00	1.00	0.00	0.0
Ad EndAreaV dume xxl Ad EndAreaV Style Sheet Help	201+00.00	1.00 41.06	185.43	185.43		71.58	214.59	246.78	1.00	0.00	0.00	1:00	0.00	×0.0
All Endlarenk	202+00.00	1.00 24.05	128.67	120.57	1:15		416.10	478.51	1.00	0.00	0.00	1.00	0.00	0.0
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Geometry Set As Default Legal Description	204+79.36	1.00 44.41	161.66	161.66	1 104	577.07	1307.90	1504.09	1.00	0.00	0.00	1:00	0.00	$\sim$ 1.0
IC5 Set As Default Turnouts Imagez Set As Default Horizontal Slew	205+00.00	1.00 40.24	32.36	32.36		516.68	418.13	480.85	1.00	0.00	0.00	1.00	0.00	-00
LegalDescript Set As Default Vertical Slew	205+00.20	1.00 16.95	105.90	105.90		453.93	1797.80	2067.47	1.00	0.00	0.00	1.00	0.00	- 0.0
LightBailMant Set As Default Horizontal Annotation Tabling	207.47	1.00 203.41		408.07	1.15	0.14	840.87	967.00	1.00	0.00	0.00	1.00	0.00	×16
RoadwayDez Set As Default Light Rail Manufacturing Schemas	205	76-9464	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	619.22	1.15	1.37	2.80	3.22	1.00	0.00	0.00	1.80	0.00	0.0
Schemas Set As Default Bridge Stakeout Set As Default Cross Section				529.93	1.15	12.95	25.40	29.21	1.00	0.00	0.00	1.00	0.00	0.0
StationOffset				466.03	1.15	28.32	75.30	86.60	1.00	0.00	0.00	1.00	0.00	0.0
Superelevatio Sufaces Set As Default Triangle Volume	21			807.06	1.15	0.00	52.44	60.31	1.00	0.00	0.00	1.00	0.00	×0.0
Survey Set As Default Survey	X- P		- <del>X - 7</del>	$\leftarrow \times$	$\times \rightarrow$	$\leftarrow \times$		XX	$\rightarrow$	$\leftarrow \times$	XX	<del>. X</del>	$\times$	
Tabling Set As Default Roadway Design	211+84.													
TemplateLbra Set As Default Superelevation Turnouts Set As Default Template Library	$\sim \sim$		J.	t Autor	×., *	-	Ň	t. A	×7	t.	XX	Ň	ŻŻ	Ň
XIN XI	212200.00	1.00.288.40	1161.02	1161.02	1.16	0.00	× 0.00	- 0.00	-1.00	0.00	0.00	1.00	_0.70	× 1.0

Note: if the style sheet is not set there will be a message asking for a style sheet default for End Area Volume Reports. The style sheet default can be set with a right click on the style sheet

and the second

#### Crossing

if checked, elements in the Storm and Sanitary database of a valid type are displayed if they fall within the Left and Right Offsets and within the Ahead and Back Bands for each entry. Valid crossing types are pipes, culverts, channels and utilities.

The Storm & Sanitary element must have the Surface Feature style > Settings > Cross Section Display > Crossing Points toggled on.

#### Projected

- if checked, Storm and Sanitary elements that fall within the Left and Right Offsets and within the Ahead and Back Bands for each entry are displayed. Valid types are all Storm and Sanitary elements except zones and areas. The Storm & Sanitary element must have the Surface Feature style > Settings > Cross Section Display > Projected Points or Projected Line Segments Points toggled on.
- If the inlet or manhole's center style has a cell specified in its cross section point symbology and the inlet or manhole has a top height greater than 0.0 the top of the vault is clipped the top height amount and a cell is placed that represents the vault top.

#### Ahead Band

specifies which elements or parts of elements are projected to a section. A band is formed by the constraints of the Left and Right cross section offsets and the Ahead and Back bands.

#### Back Band

specifies which elements or parts of elements are projected to a section. A band is formed by the constraints of the Left and Right cross section offsets and the Ahead an Back bands.

#### Add

adds a cross section definition to the Station/Type list.

#### Update

updates the cross section definition that is selected in the Station/Type list.

When multiple items are selected only the crossing and projected toggles and corresponding bands are updated. Not available for the Details section of this dialog when multiple items are selected.

#### Graphics

adds the graphics in the current selection set as a cross section definition. A cross section is cut along each graphic in the selection set. The selection set of graphics can be made without exiting the Cross Section dialog box. If the Add Graphics button does not become active after defining the selection set, be sure to select Linestring for the Type.

#### Import

loads an existing set of custom cross sections. Replaces previous version Open and Browse buttons.

#### Save

saves the currently open file.

When saving a custom list that contains Storm and Sanitary entries, the structure IDs are saved to the file instead of Station/Offset or XY locations. This allows the structure locations to change and the same custom file be used without updating the file.

#### Save As

saves the currently open file.

#### Apply

executes the command using the information defined in the dialog box. The dialog box remains active after clicking Apply.

#### Preferences

displays the Preferences dialog box. This dialog box saves the current dialog box settings. These settings can then be loaded at a later time.

#### Close

dismisses the dialog box and exits the command. The information that has been entered in the dialog box is displayed the next timethe command is used.

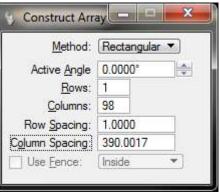
#### Help

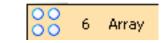
displays help.

## Label the Cross Section Block in MicroStation

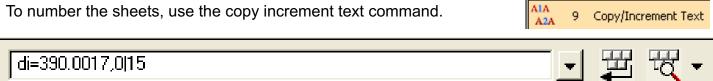


On the first cross section, key in the county name, JP number, and the sheet number. Power select the county name and JP number. Use the array command.





Set the number of columns to the number of sheets. Set the column spacing to the distance between cross section sheets (390.0017 for regular size cross sections) Follow the MicroStation prompts on the lower left hand corner of the screen.



Next TURN OFF ACCUDRAW !!!!!!! AccuDraw will cause the text to overlap





Select the sheet number and in the key in window key in di=390.0017,0

This gives the distance to copy horizontally and vertically.

The rest of the key in determines how many numbers will be copyed.

From the computer keyboard select shift + pipe then key in the number of sheets.



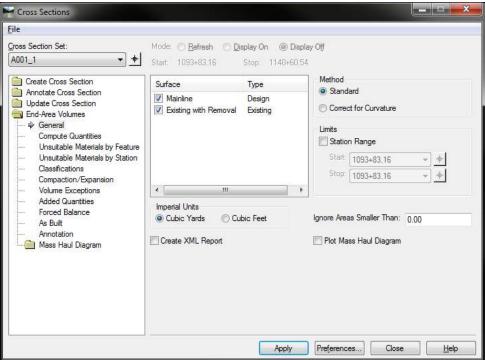
110	120	130	140	150 23233(04)
		E JOD NO. FEPHENS	County	<b>A</b>

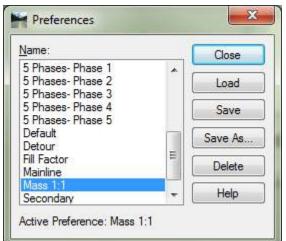
Save in:	🕌 Elis 20231(	04)	÷	G 🕸 🖻 🗔 •	(*)	2D - V8 DGN
(Ang	Name			Date modified	Туре	
2	P&Ps			9/18/2012 2:08 PM	File folder	
ecent Places	M JP20231 Ma	ass Diagram.dgn		9/18/2012 3:29 PM	Bentley M	
	📕 Feature W	ork.dgn		8/28/2012 8:37 AM	Bentley M	
		pical01 N.dgn		8/28/2012 4:29 PM	Bentley M	
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Libraries						
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	Save as type:	MicroStation V8 DGN Fik	es (*.dgn)	•	Cancel	
				1	Options	

To create a Mass Diagram the same file the cross sections reside in must be open. Go into the cross section file and on the Microstation main menu select File> Save As. Name the file Mass Diagram.

From the inroads commands
select Evaluation>Cross
Section>Cross
Sections(T>2>1). Make sure
to select the correct Cross
Section Set from the pull
down.

Choose the End Area Volumes folder and turn on the check boxes for the two surfaces that need to be compared.





Select the preference button and highlight the Mass 1:1 preference and select load. Close the Preferences window.

Cross Section Set: NEW CRL	Mods: (a) Be Start 231+0 Settings Start Station:	2.00 Stop t	• 599+97.22			Select subfol and St
Update Upses Sector  Update Upses Sector  General  Compute Quantities  Unsuitable Materials by Station  Classifications  Quantitable Materials by Station  Classifications  Volume Exceptions  Added Quantities  Forced Balance	Stop Station: Cut Factor: Fil Factor: Description:	b 599+97.22 1.0000 1.1500	• +			amour Add bi the Cc
As Buit Annotation Mass Haul Diagram	Compaction/E	pansion'				
	Start Station	Stop Station	Cut Factor	Fill Factor	Adv	d and a second se
	231+00.00	b 599+97.22	1.00	1.15	Chan Dele	

Cross Section

Select the Compaction/Expansion subfolder. For Settings select the Start and Stop Stations. Key in the desired amount in the Fill Factor box. Select the Add button so that the stations appear in the Compaction/Expansion box.

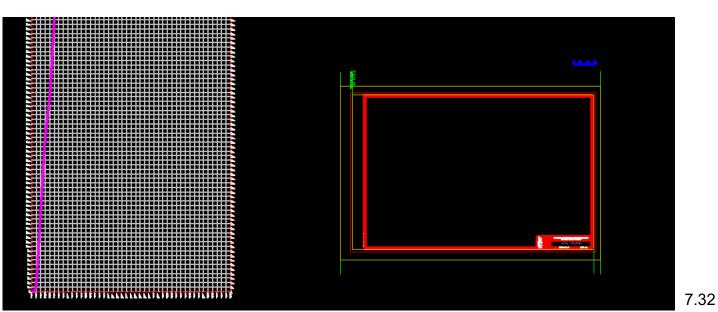
If there are volume exception(s), on the Cross Sections window choose the subfolder Volume Exceptions. For Settings, choose the Start and Stop Stations for the exception. Choose the Add button so that the stations appear in the Volume exceptions box.

File Gross Section Set: NEW CRL		Display On C Display Off Stop: b 599-97-22	
Create Cross Section Annotate Cross Section Update Cross Section General Compute Guantities Unsuitable Materials by Feature Unsuitable Materials by Station Classifications Compaction/Expansion Volume Exceptions Added Guaritites Forced Balance Ae Buit Annotation	Settings Start Station: a 319+ Stop Station: a 411+ Volume Exceptions:		
	Start Station	0.00	E Add
	start Station	Stop Station a 411+23.60	Add
		0 41 1723 50	<u>C</u> hange <u>D</u> elete
//L	1	Apoly Preferences Cos	e <u>H</u> elp

Select the Apply button on the Cross Sections window and data point somewhere above the cross section set to place the new 1:1 mass diagram.

Cell Library [...\MicroStation\Cells\Roadway\Xsec.cel] X Next from the Microstation menu File choose Element> Cells. On the Cell 🔄 Use Shared Cells Display All Cells In Path Display: Wireframe Library window navigate to the Mass Name T \* Description HW\_SCGW\_7x4 Safety Grated Wingwall 7x4' (Texas) Safety Grated Wingwall 7x5' (Texas) G G Diagram Sheet Border and select the HW SCGW 7x5 HW SCGW 8x3 Safety Grated Wingwall 8'x3' (Texas) G Placement button to make it the active GE HW\_SCGW\_8x4 Safety Grated Wingwall 8'x4' (Texas) HW\_SCGW\_8x5 Safety Grated Wingwall 8'x5' (Texas) G placement cell. Mass Diagram Sheet Border Standard Sheet Border for Mass Diagram G Mass Notes and Sheet Estimate G -Estimate box and notes for Mass ٠ Active Cella Placement Mass Diagram Sheet Border Point Element Edit. Delete Pattern Share Terminator Create Association 😵 Drawing Q Place SmartLine W Place Block From the Microstation Drawing commands, select E Place Circle Place Active Cell (S>1). From the Place Active Cell R Hatch Area window set the X and Y Scale to 1. T Attach Tags BO A Place Text Place Active Cell 1 Place Active Cell D Measure Distance The state of the local division of the local х Place Active Cell \*\* 2 Place Active Cell Matrix ÷ F Dimension Element ₩ \*\* Select And Place Cell Active Cell: Mass Diagram Shee 3 \* Active Angle: 0.0000° 4 Define Cell Origin Mass Diagram Sheet B \*? X Scale: 1.000000 5 Identify Cell Y Scale: 1.000000 R 6 Place Active Line Terminator ¥¥ \* ↑ 7 Replace Cells 0 0 8 Place Cell Index Open 'Cells' as Toolbox

Data point in the Microstation screen to place the sheet border. **Do not change the scale of the sheet border** because the text size is set based on the size of this border. Use the chart on the next page to adjust the mass to fit the border.



To make the Mass wider or narrower change the Horizontal Exaggeration. To make the Mass taller or shorter change the Vertical Exaggeration.

Mass Haul L	ine G	Brid Information
Horizontal Exaggeration	=	Bottom Spacing
Vertical Exaggeration	=	Left & Right Spacing
0.01	=	10000.00
0.02	=	5000.00
0.025	=	4000.00
0.04	=	2500.00
0.05	=	2000.00
0.0666667	=	1500.00
0.08	=	1250.00
0.0869562	=	1150.00
0.10	=	1000.00
0.20	=	500.00
0.25	=	400.00
0.40	=	250.00
0.50	=	200.00
0.67	=	150.00
0.80	=	125.00
0.87	=	115.00
1.00	=	100.00
1.25	=	80.00
1.3333333	=	75.00
1.6666670	=	60.00
2.00	=	50.00
2.222222	=	45.00
2.50	=	40.00
2.8571429	=	35.00
3.3333333	=	30.00

Formula if you have an exaggeration that you prefer: 100/(Exaggeration)=Spacing OR 100/(Spacing)=Exaggeration

To change the Vertical Exaggeration find the number in the chart. On the Cross Sections window select the Mass Haul Diagram folder. Key in the new Vertical Exaggeration from the chart. Hit the tab key on the keyboard to accept the change.

File			
Cross Section Set:	Mode: O Befresh	lisplay On 🛛 🕐 Display Off	
A001 • +	Start: 1093+00.00	Stop: 1137+00.00	
Create Cross Section	Direction	Exaggeration Horizontal: 1.0000	
Update Cross Section	─ Bight to Left	Vertical: 0.0100	
Classifications Compaction/Expansion Volume Exceptions Added Quantities Forced Balance As Built Annotation Mass Haul Diagram	Symbology:	Name	_
	Object Data Line	Name	

Cross Sections File When changing the vertical Cross Section Set: Mode: 🕐 Refresh 🔘 Display On 👘 Display Off Exaggeration, the Left and Right A001 - + Stop: 1137+00.00 Start: 1093+00.00 Major Ticks Minor Ticks End-Area Volumes spacing will also need to be Length: 0.00 Length: 0.00 General adjusted according to the chart. **Compute Quantities** Position: Position: Outside Inside -+ Unsuitable Materials by Featu Select the Left Axis subfolder Unsuitable Materials by Static Spacing: Minors/Major: 10000.00 0 Classifications and set the Spacing. Hit the Tab Compaction/Expansion Label Volume Exceptions Prefix: key to accept the change. Added Quantities Suffix Forced Balance As Built Precision: Annotation 🛐 Mass Haul Diagram General Title: Left Axis and the local division of Symbology: Cross Sections Bottom Axis **Right Axis** Object File Top Axis Left Axis Cross Section Set: Mode: O Refresh @ Display On O Display Off Vertical Center Axis Major Ticks A001 + + Start: 1093+00.00 Stop: 1137+00.00 Horizontal Center Axis Minor Ticks Grid Title Text 💼 End-Area Volumes Major Ticks Minor Ticks Title Title Day Length: 0.00 Length: 0.00 General 111 Compute Quantities Position: Position: Outside Inside Unsuitable Materials by Featu Spacing Minors/Major: 0 Unsuitable Materials by Static 10000.00 Classifications Compaction/Expansion Lahel Volume Exceptions Prefix: Added Quartities Forced Balance Suffix: Select the Right Axis As Built Precision: Annotation subfolder and set the Spacing. 🛚 Mass Haul Diagram Title: General Hit the Tab key to accept the Left Axis Symbology: Bottom Axis change. . Right Object Name Top Axis 🔀 Right Axis E Vertical Center Axis Major Ticks Horizontal Center Axis Minor Ticks Grid Title Text Title Titla Das 4 Apply Preferences... Close Help

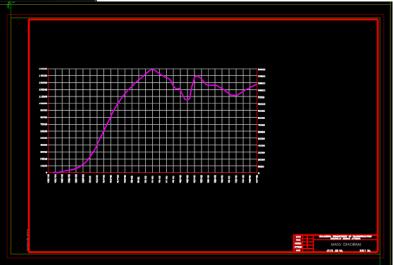
To change the Horizontal Exaggeration find the number in the chart. On the Cross Sections window select the Mass Haul Diagram folder. Key in the new Horizontal Exaggeration from the chart. Hit the tab key on the keyboard to accept the change.

File					
Cross Section Set	Mode: 🕐 <u>R</u> efresh	() Display Or	n 🜔 Display Of		
A001 🔹 🛨	Start: 1093+00.00	Stop:	1137+00.00		
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General General	<ul> <li>Left to Right</li> </ul>	Honzontal:	0.6700		
Compute Quantities	Bight to Left	Vertical:		Ħ.	
Unsuitable Materials by Feature	C Bight to Leit	Venca.	0.0100		
Classifications					
Compaction/Expansion     Volume Exceptions					
Added Guantties					
Forced Balance					
- As Buit					
Annotation					
General					
Left Axis					
Bottom Axia	Symbology:			-	
Right Axis	Object	Name			
Top Axis Vertical Center Axis	Data Line				
Horizontal Center Axis					
Grid					
Tite					

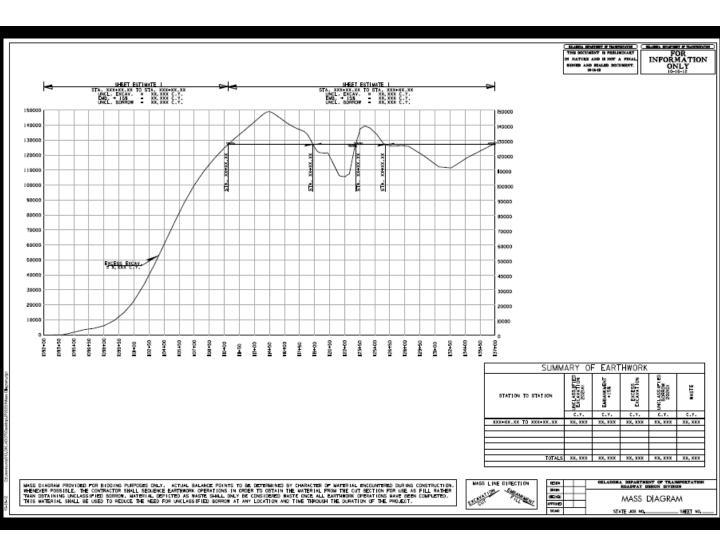
ile						
ross Section Set	Mode: C Ref	iresh @ <u>D</u> is	play On	🗇 Display Off		
A001 🔹 🕇	Start: 1093+1	00.00	Stop: 11	37+00.00		
End-Area Volumes	Major Ticks			Minor Ticks		
General	Length:	0.00	1	Length:	0.00	
Compute Quantities     Unsuitable Materials by Feature	Position.	Outside	•	Position:	Inside	•
Unsuitable Materials by Feature     Unsuitable Materials by Static	Spacing:	150,00	_	<u>M</u> inors/Major:	4	_
Classifications						
Compaction/Expansion     Volume Exceptions	Label					-
Added Quantities	Prefix:			Maj <u>o</u> r Format:	\$\$ <b>+</b> \$\$.\$\$	<b>•</b> ]
Forced Balance	Suffix:		7	Minor Format:	None	-
As Built	Precision:	6	•	Drop Eguati	on Name	
Annotation 🔤 Mass Haul Diagram 🛛 🗉	-	6				
General	]itie:	1				
Left Axis ₽→ Bottom Axis	Symbology:					
Right Axis	Object		Name		<u>_</u>	
Top Axis	Bottom Axe	5			-	
Vertical Center Axis Horizontal Center Axis	Major Tick					
Grid	Minor Tick	5			4	
Ttle	Title Text				÷ +	
< III +	<	.11				

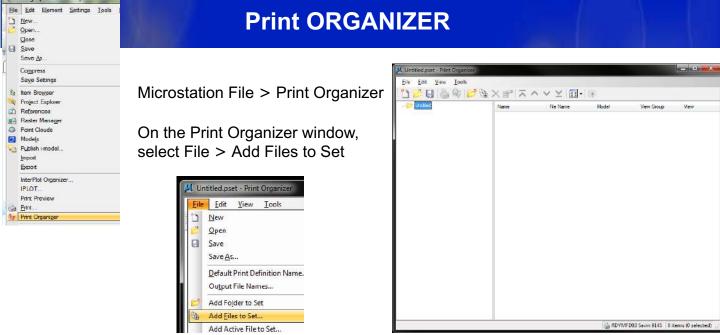
When changing the Horizontal Exaggeration, the Bottom Spacing will also need to be adjusted according to the chart. Select the Bottom Axis subfolder and set the Spacing. Hit the Tab key on the keyboard to accept the change.

Data point in the MicroStation screen to place the new mass diagram. With graphic groups turned on use the MicroStation task menu move command (3-2) and move the new mass into the mass sheet border. If it does not fit or if there isn't enough room, make a new mass with a different exaggeration using the chart on page 7-31 for exaggeration numbers and spacing.



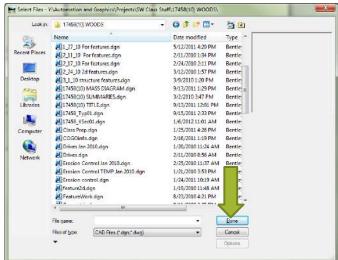
Finish the Mass with the balance lines, arrows and feathers. Label Excess Excavation and Unclassified Borrow. Place the Summary grid on the sheet or add another border and place it on a separate sheet. Add sheet estimates and notes.





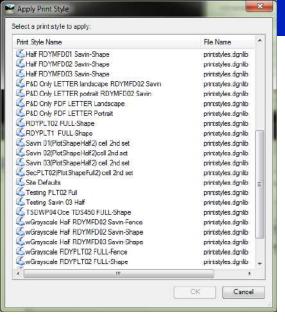
On the Create Print Definition window, select the Add button. On the Select Files window, navigate to the project folder where the print files will be added. Use the control button to select more than one at a time within the same folder. Select the Done button to add the files to the set. Select the Add button again if more files are needed from another folder.

		<u>A</u> dd
	tione	
		9
Print definition creation op Print style name: Manually Specified		9



On the Create Print Definitions window, click on the magnifying glass for the Print Style name.

Create Print Definitions	Apply Print Style	
Input files Y-Vutomation and Graphics\Projects\SW Class Stuff\17458(10) WC Add	Select a print style to apply:	
Y:\Automation and Graphics\Projects\SW Class Stuff\17458(10) WC         Y:\Automation and Graphics\ProjectsW Class Stuff\17458(	Print Style Name       File Name         Image: Space Style       File Style         Image: Space Style       File Style </td <td></td>	
Manually Specified Options OK Cancel	Fence Boundary Half RDY printstyles.dgnlib Fence Boundary Half RDY printstyles.dgnlib Fence Boundary Half RDY printstyles.dgnlib	7.3



## Select the OK button on the Create Print Definitions window.

Print Organizer Status

Adding print definitions to set

📕 Untitled.pset - Print Organize

<u>File Edit View T</u>ools

17458\_Typ01

to the new print style.

.... CLatest PP1

⊡~ 📂 Untitled

Loading design file 'Y:\Automation and Graphics\Projects\SW Class Stuff.17458(10) WOODS\P&P\P&F1.dgn'

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Name

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IntertDD1

Print	ORGANIZER	

From the Apply Print Style window, select the desired print style. To automatically find the shape on level Plot Shape Half (or Full) select a print style with Shape in the name. Once the desired Print Style is selected, choose the OK button.

:s\Projects\S :s\Projects\S :s\Projects\S :s\Projects\S :s\Projects\S :s\Projects\S :s\Projects\S	W Class Stuff\1 W Class Stuff\1 W Class Stuff\1 W Class Stuff\1 W Class Stuff\1 W Class Stuff\1 W Class Stuff\1	7458(10) WOOI 7458(10) WOOI 7458(10) WOOI 7458(10) WOOI 7458(10) WOOI 7458(10) WOOI 7458(10) WOOI 7458(10) WOOI	05/P&P/P&P2.dgn 05/P&P/P&P3.dgn 05/P&P/P&P5.dgn 05/P&P/P&P5.dgn 05/P&P/P&P7.dgn 05/P&P/P&P7.dgn 05/P&P/P&P8.dgn 05/P&P/P&P9.dgn 05/P&P/P&P1.dn	E	<u>A</u> dd <u>R</u> emove
Print definition Print style na	creation options	3			
Half RDYMF	D03 Savin-Shap	e			<
Manual	y Specified <u>O</u> pt	ions			

On the Print Organizer select File > Save As. Set the path and key in a name for the print set (for example 17458 Woods Half size RDYMFD03) and save the new print set.

Catestini	LatestPP1	LatestPP1.dgn	Default	lso View	View 1						
Latest PP2	🔍 LatestPP2	LatestPP2.dgn	Defau							_	×
	🛒 LatestPP3	LatestPP3.dgn	Defau	17458 Woods RDYMFD	isHalf.pset - I	Print Organizer				الحالك	
C Latest PP4	LatestPP4	LatestPP4.dgn	Defaul	File Edit View To	ols						
	🔍 LatestPP5	LatestPP5.dgn	Defaul								
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			NA I			(17458 XSec01	17458 XSec01.dgn	Default	Default Views	View 1	
			9			(17458 XSec01	17458 XSec01.dgn	Default	Default Views	View 1	
						17458 XSec01	17458 XSec01.dgn	Default	Default Views	View 1	
Class the Drint (	Oreceiter					(17458 XSec01	17458 XSec01.dgn	Default	Default Views	View 1	
Close the Print (	organizer.					(17458_XSec01	17458_XSec01.dgn	Default	Default Views	View 1	
						17458_XSec01	17458_XSec01.dgn	Default	Default Views	View 1	
Note: To change	e the print s	styles, all				17458_XSec01	17458_XSec01.dgn	Default	Default Views	View 1	
0	,			17458 XSec01		17458_XSec01	17458_XSec01.dgn	Default	Default Views	View 1	Ψ.
files within the s	et must be	changed		17458 XSec01	Ψ.	< III					P

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View

Menu 1

View Group

na Mary

Model

Defende

File Name

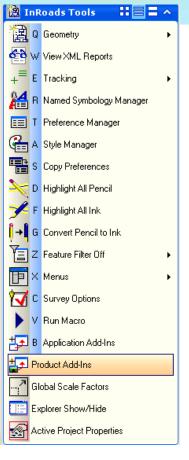
IntertDD1 dee

ò RDVMFD03 Savin 9145 | 51 items (1 selected)

# CHAPTER 8

## **Storm & Sanitary**

## Notes



## **Storm and Sanitary**

Before using Storm and Sanitary, the program must be made available inside InRoads. It is a product add in. Go to the InRoads Tools>Product Add-Ins (F>R)

From the Product Add-Ins window, select the Bentley InRoads Storm and Sanitary. Also turn on the Persist Product Add-Ins on Exit check box at the bottom of the window.

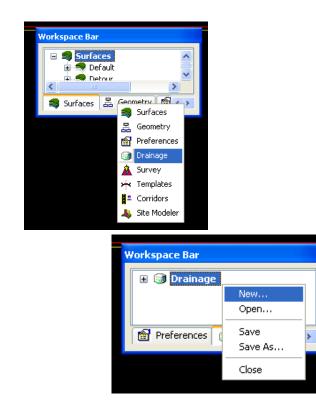
🚟 Product Add-Ins	
Available: Bentley InRoads Bridge V8i (SELECT series 1) Bentley InRoads Storm and Sanitary V8i (SELE( Bentley InRoads Survey V8i (SELECT series 1) Bentley Rail Track V8i (SELECT series 1)	OK Cancel Help
Description Bentley InRoads Storm & Sanitary generates a network drainage systems for engineering design and analysis. B Storm & Sanitary offers tools for evaluating, managing, a storm drainage networks in a graphics environment.	entley InRoads
Persist Product Add-Ins on Exit	

## Storm and Sanitary

🖀 Set Project Defaults	
Configuration Name:	Ellis County
Default Preferences	
Preferences (*.xin):	C:\work on version i new pref.xin
Turn <u>o</u> uts (*.txt):	
Drainage Structures (*.dat):	R:\CADD_Support\Design\InRoads\Storm & Sanitary\ODOT_imp
Rainfall Data (*.idf):	

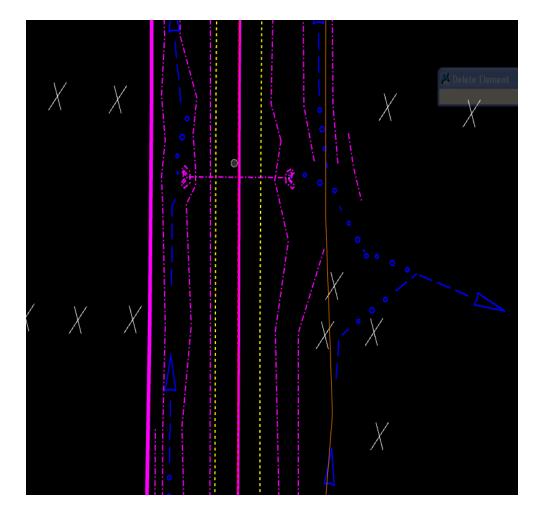
Before starting, make sure the ODOT\_imp\_structures.dat file is loaded in the project defaults (R:\CADD\_Support\Design\InRoads\Storm & Sanitary). This file will give the standard sizes from our Roadway standards for structures.

Next create a drainage data base (.sdb) for the project. Right click on the bottom of the workspace bar and select Drainage from the pop up. On the Drainage workspace right click on Drainage and select New from the pop up. Use the New window to name the drainage database.

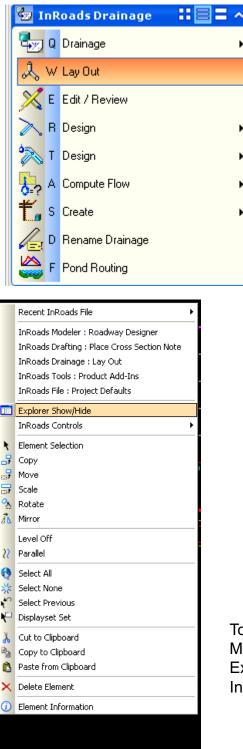


Name:     Ellis 20943       Description:	ame: Ellis 20943 <u>H</u> elp escription: able: Pipe eld Type: Text	Surface Geometry	Drainage Surv	vey Data	
Description:	escription:	<u>T</u> ype:	Drainage Databa	se 🔽 🚺	Apply
Description:	escription:	<u>N</u> ame:	Ellis 20943		Help
	eld Type: Text	Description:		·	
Field Type:	1,202	Ta <u>b</u> le:	Pipe	~	
Ecta Sea	el <u>d</u> Name:	Field Type:	Text	¥	
Field Name:		Field Name:	110555		

## Storm and Sanitary



To put in the existing structures, view the features from the existing .dtm and locate the first existing structure needed in the database.



In the Inroads commands select Drainage>Lay out (R>2)

Curve Pi	ре	Mul	tiple Junctio	ins	Pipe by	Slope
Pipe	Cha	annel	Culvert	Man	hole	Inlet
Pipe <u>I</u> D:		P1			E	lelp
-Location		6		640		
I <u>D</u> :	Not S	Upstream	1.000	Dow Not Set	Instream	-4
Easting:	0.000	355	<u>+</u>			
<u>N</u> orthing:	0.000000000		+	0.0000		-4
Northing.	0.000	U		0.0000	al <u>C</u> onnect	
O Invert (		0.00		<u>+</u>	ft ft	
<ul> <li>Invert I</li> <li>Invert I</li> <li>Slope:</li> </ul>		100000		<u>+</u>	1.00	

To get back the InRoads Explorer right click on the Microstation Screen and hold. From the popup select Explorer Show\Hide. Dock the workspace bar back on the InRoads Explorer Menu.

## Drainage Layout

For the Pipe ID: key in the station and partial description. For example: 1090+72.08 EXISTING 24"x51.6'

Use the target button to locate the northing and easting on each end of the structure (from the features displayed from the existing dtm). The upstream would be the side with the highest elevation. The existing structure elevations are listed in the structure notes in the survey file.

Sta.	1090+	72.08 (	<u>î</u> 24".	x51 <b>.</b> 6′	Rdy,	RCP
45°W	lings	" X" ing	¢ 26.	5' Lt .	& 25	5.ľ Rt.
		2359,0				

Key in the elevations.

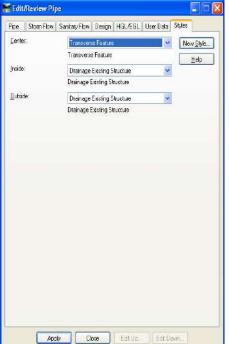
Note: if the radial is toggled, it will lock the elevation.

After the Apply button is selected the structure can be located in the drainage database on the inroads menu. Right click on the structure to edit the size, set the symbology and add the details. For User Data in the Description key in the rest of the structure details i.e.: RDY RCP 26.5' LT & 25.1' RT

Curve Pi	pe	Mul	tiple Junctio	ns	Pipe	by Slope
Pipe	Cha	nnel	Culvert	Ma	anhole	Inlet
Pipe <u>I</u> D:		h 090+;	72.08 EXIST	ING		Help
Location		Jostrean		D	ownstream	
ID:		ENT	+	FREE		•
Easting				1000.000	25.2980	_
Northing:	1.02200	2.3360	+	10.0000	1.8260	+
	52012	2.0000	_		eral <u>Conn</u>	ection
Use Sof	ft Eleva	tions				
 Oln <u>v</u> ertI	n:	2359.0	0	TÌ.	<b>∔</b>   ft	
Invert	]ut:	2358.0	0	-1	<b>₽</b> (1)	
Slope:		1.94%		=	_	
		1.4.4		iii		
Ilter Data F	ed					
	1979-1779 2010			6		
Uver Data N Uver Data V	1979-1779 2010	Court	s less than 1			



	The second se			Sanitary Flow Design HGL/EGL User Data	
ice (D:	1090+72.08 EXISTING	Hdp	Description:	RDY RCP 26.5'LT. & 25.1'RT	Hep
pstigam ID.	FREE_ENT		Installation Date:	MM/DD/YY	
ownstream ID:	FREE_EXT		<u>S</u> ervice Date	MM/DD/11	
hape:	Circular 🛛 🗹 Dirc	ulai	User Data Eieldi:		
atenat	RC-ODOT 🛛 🖌 RC-	ODOT	User Data <u>V</u> alue:		
aterial Diescription:					
loughness	0.013000 0.0	13000			
Sige (W s T):	15.00 x 1.8750	v n			
Plan Length: Pipe Length: Invoit Igu: Signe: Spli Flow: Structure Status -	$\begin{array}{c} 1200 \approx 1.7900 \\ 1500 \approx 1.9500 \\ 2100 \approx 2.2500 \\ 2400 \approx 2.2500 \\ 2400 \approx 2.2500 \\ 3600 \approx 2.2500 \\ 3600 \approx 2.2500 \\ 3600 \approx 3.2000 \\ 4200 \approx 3.5000 \\ 4200 \approx 3.5000 \\ 4200 \approx 3.5000 \\ 4800 \approx 4.0000 \\ 5400 \approx 4.0000 \\ 5400 \approx 4.0000 \\ 5400 \approx 4.0000 \\ 5400 \approx 5.000 \\ 7500 \approx 5.000 \\ 7800 \approx 5.000 \\ 7800 \approx 5.000 \\ 9000 \approx 7.5000 \\ 9000 \approx 7.5000 \\ 9000 \approx 7.5000 \\ 9000 \approx 8.0000 \\ 102,00 \approx 9.0000 \\ 102,00 \approx 9.000$	h			
	Besize				



## Place Cross Section Notes

#### 🔚 Set Project Defaults

Configuration Name:

Ellis County

#### **Default Preferences**

F

F

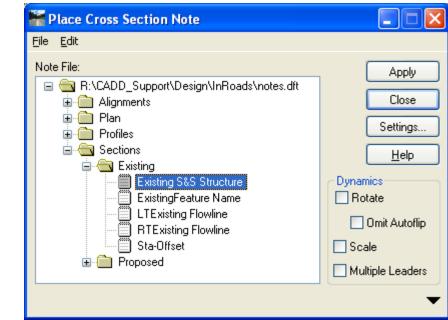
B

F S

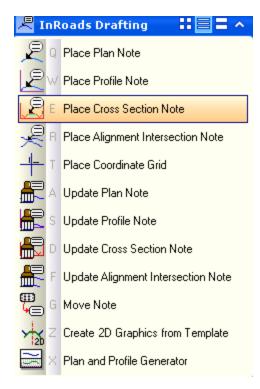
Preferences (".xin):	C:\work on version i new pref.xin
Turnguts (*.txt):	
Drainage Structures (*.dat):	R:\CADD_Support\Design\InRoads\Storm & Sar
Rain/all Data (".idf):	[
Bridge Sections (*.txt):	
Drafting Notes (".dft):	R:\CADD_Support\Design\InRoads\notes.dlt
Pay Items (*.mdb):	[
Site Modeler Options (".spf):	1

#### **Default Directory Paths**

ProjectWise Directory:	
Project Default Directory:	C:\Projects\20943(07) Ellis Co\InRoads
Report Directory:	C:\Projects\20943(07) Ellis Co\InRoads
Projects (*.rwk):	C:\Projects\20943(07) Ellis Co\InRoads
Surfaces (".dtm);	C:\Projects\20943(07) Ellis Co\InRoads
Geometry Projects (".alg):	C:\Projects\20943(07) Ellis Co\InRoads
Template Libraries (*.itl):	C:\Projects\20943(07) Ellis Co\InRoads
Roadway Design (".ird):	C:\Projects\20943(07) Ellis Co\InRoads



Make sure the notes.dft file is loaded in the project defaults



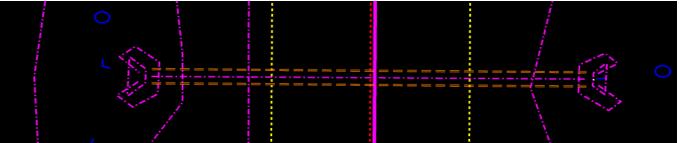
For existing structures use the Existing folder from the Sections folder. Select the note needed and click apply. In Microstation click on the structure in the cross sections and single click to place the note.

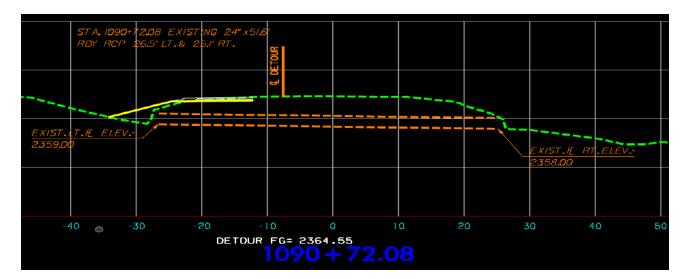
To view the structures in the cross sections, open the Update Cross Section folder on the Cross Section window. Set the desired cross section set. Select Storm and Sanitary. Select from the Projected window all the structures that need to be viewed(or right click to select all). Select the apply button.

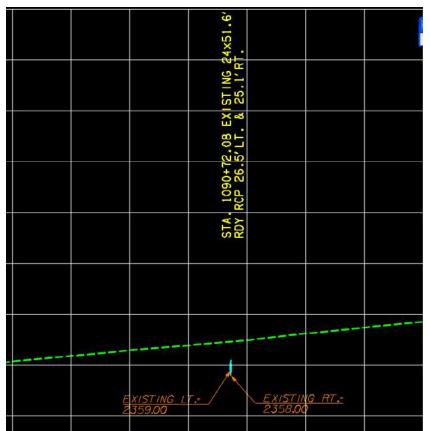
Note: If there are not event points for all the structures, it may be necessary to set the Bandwidth ahead and back to be able to see all the structures.

Cross Sections		
Eile		
Cross Section Set: A001 Create Cross Section Annotate Cross Section Update Cross Section Components Crossing Features Projected Features	Mode:       Refresh       Display On       Display Off         Start:       1088+50.00       Stop:       1139+00.00         Crossing:       Inside       Outside       Center         1125+       Culvert       Drainage Exi       Drainage Exi       Transverse F         1125+       Culvert       Drainage Exi       Drainage Exi       Transverse F	
<ul> <li>Indeced Foldates</li> <li>Storm and Sanitary</li> <li>End-Area Volumes</li> </ul>	Projected:         ID       Element       Inside       Outside       Center       Image Exiliary         1125+       Culvert       Drainage Exiliary       Transverse F       Image Exiliary       Image E	
	Bandwidth         Ahead:       25.00	
	Apply Preferences Close	<u>H</u> elp

Plan, Profile and Cross Section Views of the existing structure using Storm & Sanitary and the Place Plan Notes command

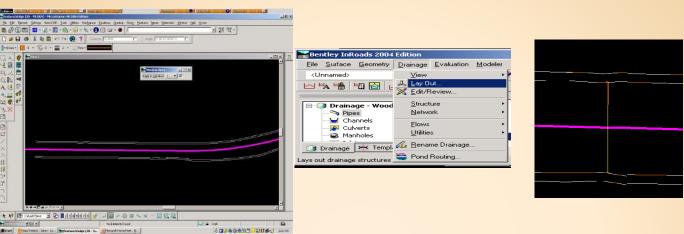






To create new structures in Storm & Sanitary, view the ditch features in the plan view of a 2d file. Place a line in microstation where center of the structure will be located.

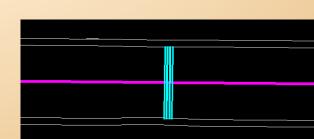
InRoads reads the X and Y from the line when it is snapped to using the target buttons for structure location

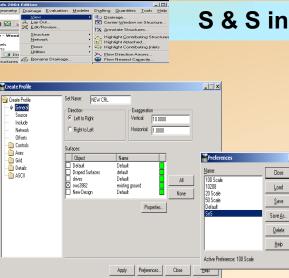


- On the Inroads menu select Drainage>Lay Out (R>2) Select the Options button to set the size of the structure Set the shape and size from the pull down menus
- Select the apply button
- Name the structure in the Pipe ID window (use the structure number)
- Select the target button beside the easting and northing for the upstream
- Snap on the high side of the structure
- Repeat this step for the downstream side
- Key in the Invert In (flowline in) and the Invert Out (flowline out) elevations.

Drainage	Lay Out
Curve Pi Pipe	pe Multiple Junctions Pipe by Slope Channel Culvert Manhole Inlet
Pipe <u>I</u> D:	P0 Help
_ Location	
ID:	Upstream Downstream
<u> </u>	
Northing:	•
	□ Lateral <u>Connection</u>
C Invert ( C Slope:	0.00
User Data F User Data \	
	Apply Options Close

General	Inlet Structure		er Section Pipe	Area Channe	Zor   Culv		
Drainage :	Structures:	1\be	ntley\inroad	~1.8\data	Nimperial\	_structures.da	ıt.
Shape:		Pipe	Arch		-	Help	
Material:		BC C	506	-	RC C506		-
Size (S × F	3 x T):	28.5	0 × 18.00 × 3	3.000	28.50 × 1	18.00 × 3.0000	
Roughnes	18:	0.01			0.01		
Center Sty	le:	Pipes					
Inside Styl	le:	Pipes					
Outside SI	yle:	Pipes					
Minimum S	Slope:	0.10	e e		_		
Magimum	Slope:	20.00	0%				
Minimum (	over:	1.50				ft	
Maximum	Coyer:	20.00	)			ft	





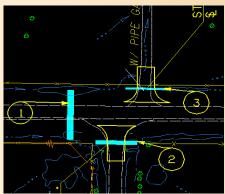
## S & S in the Plan and Profile

Preferences	×
lame:	Close
Center w/ Cells Default default - named symb	Load
loriauli - rialled syllid In/Dut no Cells In/Dut with Cells	Save
SnS	Save <u>A</u> s
	Delete
	Help

Yiew Drainage	_ 🗆 X
Dbject Nane  Pipe Carler Pipe Outside Dararel Carler Dararel Carle	pply lose rences

The drainage structures placed with Storm & Sanitary can be viewed in the plan (much like features)

Drainage>Drainage View>Drainage (R>1>1) Select the items that need to be displayed (there are preferences here too). Select the apply button. They may also be annotated with Drafting> Place Plan Note.



- To view the structures in the Profile, Go to the Evaluation > Profile > Create Profile command Load the preference named SnS
- Select the Source folder and key in the desired structure name under network in both the From and To box
- Be sure existing profile is selected under drainage network reference
- Select the apply button and click inside the desired profile
- The structure will appear
- The structures can be annotated using Drafting>Place Profile Note

				<b>~</b> ₩		Apply to <u>W</u>
Create Profile		x		6, 8		
Create Profile General	Create: Window and Data 💌				-   	i i
- 🖗 Source	C Alignment: NEW CRL 💌 🔶			18		(
Include Network	C Graphics Alignment:		, , _	<u>\$</u> X		
Offsets	C Multipoint			®		
- Axes	Alignment			• •		ļ
- Controls - Axes - Grid - Details - ASCII	C ASCI File			< Q		ļ
- 🛅 ASCII	Network     Drainage Network Reference			STA. 3-28		
	Aughment NEW CRL			PA'		
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Cross Section Set:       Mode:          C Befresh          C Display On          C Display Off          NEW CPL              Stat:         214+00.00           Stop:         539+97.22          Update Cross Section           General             Crossing:          Components           Components           D         Pipe         Pipes         Pipes	Update Cross Section							_ 🗆 🗙
Update Cross Section General       ID       Element       Inside       Outside       Center       ▲         Surfaces       10       Pipe       Pipes       Pipes       Pipes       Pipes         Crossing Features       11       Pipe       Pipes       Pipes       Pipes       Pipes         Projected Features       12       Pipe       Pipes       Pipes       Pipes       Pipes         Image: Storm and Sanitary       13       Pipe       Pipes       Pipes       Pipes       Pipes       None         Projected       ID       Element       Inside       Outside       Center       Image: None       None         Projected       ID       Element       Inside       Outside       Center       Image: None         ID       Element       Inside       Outside       Center       Image: None       None         Projected       ID       Element       Inside       Outside       Center       Image: None         11       Pipe       Pipes       Pipes       Pipes       Pipes       Pipes       Pipes       Pipes       Pipes       Pipes       All         13       Pipe       Pipes       Pipes       Pipes <t< td=""><td>Cross Section Set:</td><td>Mode:</td><td>O <u>R</u>efresh</td><td>Display 0</td><td>n 🔿 Display</td><td>, O<u>f</u>f</td><td></td><td></td></t<>	Cross Section Set:	Mode:	O <u>R</u> efresh	Display 0	n 🔿 Display	, O <u>f</u> f		
General       ID       Element       Inside       Outside       Center       ▲         Surfaces       1       Pipe       Pipes       Pipes       Pipes       Pipes         Crossing Features       10       Pipe       Pipes       Pipes       Pipes       Pipes         Projected Features       12       Pipe       Pipes       Pipes       Pipes       Pipes       All         Image: Storm and Sanitary       13       Pipe       Pipes       Pipes       Pipes       Pipes       Pipes       None         Projected       ID       Element       Inside       Outside       Center       ▲         ID       Pipe       Pipes       Pipes       Pipes       Pipes       Pipes         ID       Pipe       Pipes       Pip	NEW CRL	- Start	214+00.00	Stop:	ь 599+97.22			
Back 25.00 TRedefine	General Surfaces Components Crossing Features Projected Features	ID 1 10 11 12 13 14 15 Projecte ID 1 10 11 12 13 14 15 Bandw	Element Pipe	Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes	Pipes Pipes Pipes Pipes Pipes Pines Pines Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes	Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes Pipes		All None
		Back:	25.00	+	C Redefine	e	-	
Apply Close Help								
					Apply	0	ose	Help

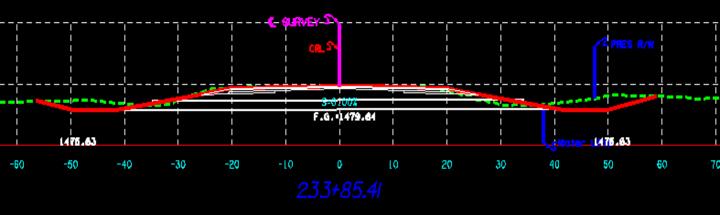
## S & S in the Cross Sections

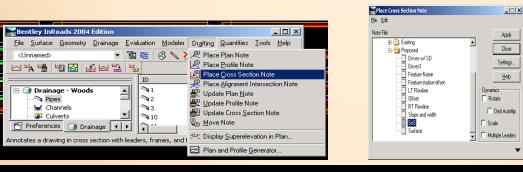
To view the structures in the cross sections, use the update cross sections command

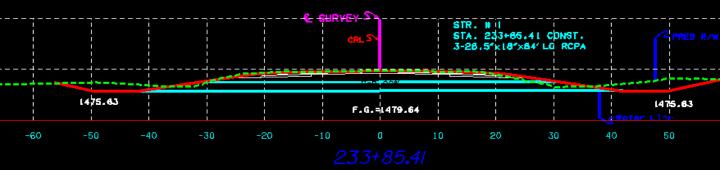
Select the Storm & Sanitary folder and highlight the structures desired to view

Select the apply button

Once the structure is viewed, it can be annotated with place cross section note command (under drafting)







# CHAPTER 9

## **Quantity Manager**

Bentley InRoads 2004 Edition		
<u>File Surface Geometry Drainage Eva</u>	luation <u>M</u> odeler Dr <u>a</u> fting	Quantities Tools Help
· 너 백 🖷 🖬 🐼 🖾 배 별 백		Eay Item Manager
<unnamed></unnamed>	🧝 🚳 🔪 🎽 🗖 -	🚰 Quantity Formula Manager
	Surface Name Descr	<ul> <li>Compute Quantities</li> <li>Shapes Tool</li> </ul>
E Sefault	Default     Erosion Control	🕼 Quantity <u>M</u> anager
Erosion Control	a existing	C:\Roadway\20
😟 🔁 Summarize 💌	Summarize	C:\Roadway\20
Creates, edits, and manages quantity formula	s	11.

- Before using the pay items, they must have a formula attached
- Quantities > Quantity Formula Manager
- There are already many formulas created, but it is possible job specific items and change formulas to fit the current project
- Formulas are based on different types of measurement
- Once the formula is tied to the pay item, and the pay item to the featureit reads the information for the measurement in the formula from the feature.

Name	Description	▲ Diose
4C	Agres	
DF .	Dubic Feet (By Area)	<u>N</u> ен
CF-L	Cubic Foat (By Length)	
DW	Hundred Weight	<u>E</u> dt
CY	Eubic Yards (By Area)	Cons.
CY-L	Eubic Yards (By Length)	Lob)
CY (3lt thick)	Dubic Yards (By Area)	Datata
CY (8in thick)	Eubic Yards (By Area)	
СҮ (Болом)	Eubic Yards (By Area)	Inte
Cr' (Classě)	Eubic Yards (By Area)	<u>Heb</u>
CY (ClassÅ) (headwall)	Dubic Yards (By Item)	
CY (ClassC)	Eubic Yards (linear)	
CY (ClassiC) Ditch	Eubic Yards (linear)	
EY (encavation)	Cubic Yardz (By Area)	
DAY	Days	
DOL	Dollars	
EA	Each	-
EAGP 4	Fach Brown	

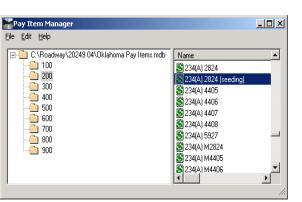


Once the formula has been created, tie the formula to the corresponding pay item.

Quantities> Pay Item Manager

The pay items are sorted in folders by number Select the pay item to change from the list In the formula drop down, select the desired formula. Repeat these steps for each pay item used.





each pay hem us	seu.
🕌 Edit Pay Item	×
Pay Item Name: 234(A) 2824 (seeding)	>Apply
Pay Item Code: 234(A) 2824	
Description: FERTILIZING (10-20-1	10) Help
Unit Name: TON	
Quantity Calculation       Formula:       TONF10-20-10 (seeding)       Variables:       Name       Value       Value:       0.00	Deduct from Pay Item       Pay Items:       Pay Item       Deduction       Walue:
Mode:  Planarized Slope	Apply Quantity Factor: 0.00
, supe	Apply Rounding Factor: 1.00     Round Up C Round Down

- Create a surface to place the summary features in.
- File>new>surface
- Type is design
- Give it a name
- Save the new surface to the project folder
- It is best to use a 2d file for importing the summary features

#### "AREA" MEASUREMENT

To add area features:

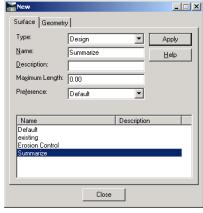
Go to surface>view surface>features (W>1>5) View the features from the design surface to create shapes for measuring areas.

It is suggested to view one part at a time to simplify

For example: view the left and right edge of pavement

Using MicroStation commands, draw lines at each end to close the shape.







Once the shape is closed: Quantities>Shapes Tool (D>4)

Select the radial Fill

Set the surface to summary (the surface needing the feature)

Set the duplicate names radial to rename Turn on the exclude from triangulation

Click the apply button

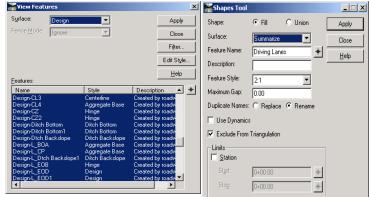
Select inside the shape and be sure to accept it Once accepted it will add the new driving lane feature to the summary surface as a closed shape

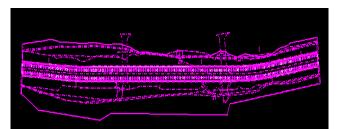
Now repeat the same steps to add each shape to the summary surface starting with the view features command

It is necessary to repeat these steps for <u>ALL</u> the features that need an area measurement View features

Close the shape

Use the shapes tool to import the features to the summary surface





#### "LINEAR" MEASUREMENT

- After the area shapes are all entered, enter the linear items.
- Again it is best to be in a 2d drawing to place lines.
- Use MicroStation commands to place the line at the correct length.
- Use the File>Import>Surface (Q>9>1) command to import the line as a breakline.
- For example to add a paved ditch to summary surface:
  - Set the surface to summary
  - Load from single element
  - Elevations set to use element elevations
  - Give the seed name
  - Set the point type to breakline
  - Exclude from triangulation is turned on

Now repeat the same steps to add each linear item to the summary surface

#### **"EACH" MEASUREMENT**

After the area shapes and linear items are all entered, enter the "each" items

Use MicroStation commands to place a cell in the desired location

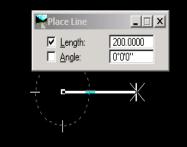
Use the File>Import>Surface (Q>9>1) command to import the cell as a random point.

For example to add a temporary sediment filter to summary surface:

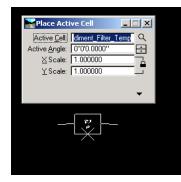
Set the surface to summary Load from single element Elevations set to use element elevations Give the seed name Set the desired feature style Set the point type to random Exclude from triangulation is turned on

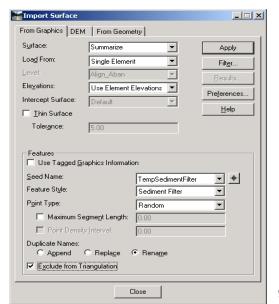
Now repeat the same steps to add all the "each" items to the summary surface





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	Close					

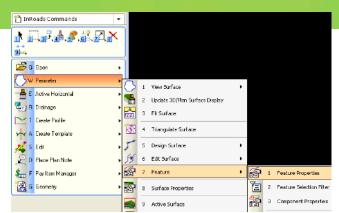




- Once all of the features are created, the pay items need to be tied to the features.
- Surface>feature>feature properties (R>7>1)
- Use the pay item icon to locate the pay item that will be added to the feature.
- Highlight the pay item and select the add button to add as many pay items as necessary for each feature
- Once the pay items are attached, be sure to apply on the feature properties window.
- After all the pay items are attached to the features, save the summary surface.

-	Pay Items	×
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After all the pay items are tied to the features, Quantities> Compute Quantities (D>3)

Under the main tab,

select the alignment

Mode to all (or fence)

Pay Items to all (or selected)

Features to all (or selected)

Database: In the output box under database click on the ellipses (the three dots) to set the file path and name the new mdb for the project.

Mode: Set the mode radial to Create (or append) Phase: Select the desired phase (Design, Final or Primary) from the drop down menu

🎬 Compute Quantities	
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Once the apply button is selected at the bottom of the MicroStation screen it will say Processing.....

When it finishes computing, the MicroStation screen will say the database has been created similar to the screen capture shown to the right. It will also give the path and the file name.

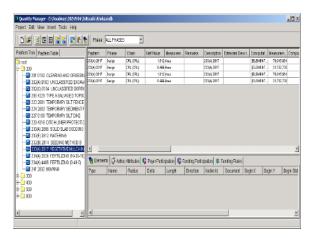
## **Quantities**

- Under the pay items tab click in the box beside the top folder to select all the items in the pay item database (but it will only compute the ones tied to features) or select only the items that need to be computed.
- Under the features tab in the top surface box: highlight the summary surface (the surface carrying the features with the pay items attached)
- In the features box, select the features that need to be computed.
- NOTE: Right click inside the features box to select all. Compute Quantities will only compute the features that have been selected.
- Click the apply button to compute the selected features.

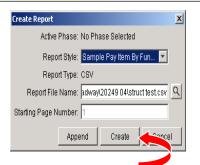
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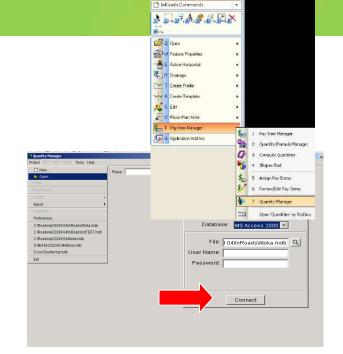


- The next step is Quantities>Quantity Manager (D>7)
- In the top left corner Project> Open
- Set the file to the one created with compute quantities (there is a magnifying glass to select to set the path and file)
- Click the connect button
- All the computed quantities from the features will appear in the Quantity Manager
- By selecting the plus sign beside the pay item folders each computed pay item will show in the window
- By selecting a single pay item the quantity will appear in the top right window



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Once all of the quantities in Quantity Manager, with all the items highlighted (use the shift and control keys to highlight as many items as desired)

Tools>Reports>Create

Select the style sheet sample pay item by funding

Name the report

Click create

Open the file

Make modifications so all the columns are viewable, etc.

Highlight the entire area that needs to be pasteed

Right click and copy

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## **Pay Quantities into MicroStation**

- Now open the Pay Quantities design file in MicroStation that the quantities will be pasted to. Edit > Paste Special
- Select Embedded Microsoft Office Excel Worksheet
- Place the box where the pay item box is desired
- By double clicking in the box the spread sheet will open, allowing any necessary additional changes.

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## CHAPTER 10

## Helpful Tools

## Notes

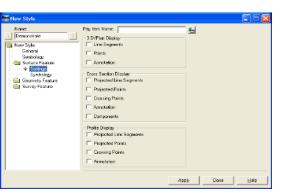
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## InRoads Style Creation

From the InRoads menu Tools>Style Manager (F>6)

From the New Style window under the general subfolder select the desired include definition for (in this example the surface feature will be shown). Key in the new name. If desired key in a description

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Under the Settings subfolder for Surface Feature select the desired check boxes. This will determine how and where the feature is allowed to display.

Under the Symbology subfolder, either pick from the drop down menu for symbology name or select the new button and create new symbology. This will determine the points, text, and lines' level color linestyle and weight in plan, profile, and cross sections.

Note: if the desired result is the same in all three locations, it is possible to simply elect to set up the defaults.

Key in the new name and description and double click on the desired items to set them up.

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<u>W</u> idth:	0.10		<u>Z</u> Scale:	1.0000	
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C Absolut	e Angle		C A <u>b</u> solu	ute Angle	
Angle:	0^00'00.00"		Angle:	0^00'00.00"	

Note: it is only possible to select a cell from the current active cell library. 10.1

#### LINE SYMBOLOGY

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OK

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## **Using Global Scale Factors with InRoads**

Currently, all text generated by InRoads is 100 Scale. For text at 50 or 20 Scale, the Global Scale Factors option can be used. This option can increase or decrease the size of text without having to reset numerous preferences.

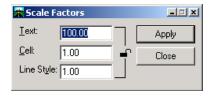
Activating Global Scale Factors- To activate the Global Scale Factors menu, select Tools => Application Add-Ins. This will display the Applications Add-Ins window.



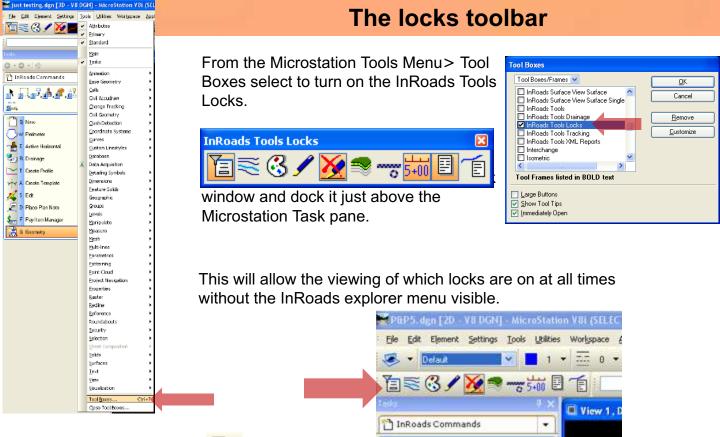
Scroll through the list and select the Global Scale Factors Add-In by clicking its box.

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Feature Table To Preference Add-In									ancel
Generate Grade Contour Add-In								ł	Help
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Hydrology and Hydraulics Add-In									
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Description									
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Tools>Options>Factors for quicker access	when chang	jing sca	ale tao	ctors.					
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Command Commands placed in Tools menu	🛣 📈	×	×	<u> </u>	X	X		X	<u></u>
commanus piaced in robis menu	^	^	$^{\circ}$	^	^	$^{\circ}$	$^{\circ}$	^	^

The Global Scale Factors button is now added to the bottom of the Tools menu. Selecting the Global Scale Factors button will display its window. To change the Scale factor, simply highlight the text field and type in the desired scale. For example, for 50 scale sheets, type in 50. Please note that the scale factors for cells is generally set within the command placing the cell (in P & P Generator, for example) so the Global Scale Factor should be left at "1".



Once the desired scale is entered, click the Apply button to activate the new scale. Remember, this does not affect the regular MicroStation text commands.



#### **Feature Filter lock**



When the lock is on, only surface features that meet the criteria of the active Feature Selection Filter are displayed in the surface features list on any dialog box. Limiting the surface features in this way allows those commands to operate only on the surface features that meet the filter criteria. When the lock is off, surface feature filters have no effect, and surface features lists on dialog boxes show every feature in the Digital Terrain Model (DTM).

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#### **Feature Highlight Lock**

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This command turns on or off the Feature Highlight lock. Use this command to highlight selected features in plan view.

Effect on Commands with a Feature List View:

When the lock is on, any commands that include a feature list field highlights the feature in plan view when it is selected in the list. While this primarily affects Surface commands, it also applies to Evaluation commands that include feature lists.



Turn on the Feature Highlight Lock by selecting Feature Highlight Lock On from the locks tool bar. From any command that includes a list of features, on screen it will highlight any selected feature.

#### Style Lock

The main concept behind the Style lock is *data-driven symbology*. The Style locks affects two groups of commands: the View Surface commands, and the Annotate Cross Section command. The effect of the Style lock is different for the View Surface commands than for the Cross Section commands.

This lock forces the command to read from the symbology tied to the feature instead of the symbology set up within the command.

## The Pencil/Pen lock 🖌 📐

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applies to plan display only. It does not apply to cross sections or profiles. This command toggles the Pencil/Pen lock between Pencil mode and Pen mode. This lock affects the display of virtually every piece of plan graphics representing surfaces or geometry. The Pencil/Pen lock controls what happens when a piece of graphics is <u>redisplayed</u>. The two actions that might occur are: 1) the new graphics will be displayed in addition to the old ones (Pen mode), or 2) the new graphics will replace the old ones (Pencil mode).

Pen mode would be used when it is necessary to keep the previous work displayed and not lose it when it is modified, and redisplay the surface or geometry. Pencil mode, on the other hand, is a convenience because it automatically cleans up the graphics from the previous work as it is modified in the design and redisplay. The following two points summarize the basic notion of each mode:

•Pen mode – graphics are permanent; allows duplicates (see the Delete Ink lock)

•Pencil mode – graphics persist only until the item is redisplayed; no duplicates

It is critical to understand that the current setting of the Pencil/Pen lock is irrelevant in determining what will happen when a piece of graphics is redisplayed. What is relevant is whether the existing graphics were displayed in Pencil mode or in Pen mode.

### The locks toolbar

#### The Delete Ink lock



allows redisplayed graphics to replace graphics that were drawn in Pen mode. Normally, graphics that were drawn in Pen mode (an alignment, for example) are not removed when redisplaying; however, if the Delete Ink lock is on when redisplay is used, the previous graphics – even if drawn in Pen mode – will be replaced. Graphics drawn in Pen mode are said to be drawn in *ink*.

#### **Locate Lock**



The lock applies when using a locate button to specify a position in the graphics file. (Locate buttons are found throughout the interface. Each button is indicated by crosshairs icon.) The Locate lock determines whether to snap to graphics displayed in the graphics file or to snap to the position occupied by a feature in the active surface.

If the lock is set to graphics (the icon shows a single, red line), locate actions will seek the nearest displayed graphics.

If the lock is set to features (the icon shows an image of a surface), locate actions will seek the position of the nearest feature in the active surface whether or not the feature is actually displayed. It is possible to use the locate lock to locate features that are not even displayed. If they exist in the DTM, the locate will find them.

#### **Element Snap Lock**



The Element Snap lock enables or disables the ability to snap or lock onto any geometry element (any object that would require multiple data points to define) in the geometry project. Use this lock to aid in using the direction, distance, length, radius, and/or angle of an existing geometry element to design a new element. With this lock toggled on, the software snaps to the element nearest the data point placed in the drawing file. This lock and the Point Snap lock are mutually exclusive. When using a point pick button element snap will snap to a point in the same manner as Point Snap.

### The locks toolbar

#### **Point Snap Lock**

Station Lock



The Point Snap lock enables or disables the ability to snap or lock onto any point contained in the geometry project. Use this lock to aid the placement process of geometry elements. For example, if it is needed to input point data into a dialog box, then it is possible to toggle this lock on and place a data point in the drawing file. The software finds the closest point and displays the point data in the dialog box. The Point Snap lock and the Element Snap lock are mutually exclusive.



The Station lock is applicable only when the first station specified on the horizontal alignment is an odd-numbered station (for example, 2+38) and when generating cross sections, executing the Roadway Designer, or generating station type reports. When this lock is turned on, the software applies a given command action to the first station and then forces all subsequent actions to even-numbered stations. For example, if the first station is 2+38 and the station interval is defined as 50, the software performs the command action at stations 2+38, 2+50, 3+00, and so on. When the Station lock is turned off and the first station is odd-numbered, the software performs the command actions only (for example, 2+38, 2+88, 3+38).

#### **Report Lock**

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The Report lock is used by several commands to control whether or not the command displays output in a dialog box as the command calculations are performed. If this lock is off, the command processes and stores results without displaying them in an output dialog box.

#### Cogo Audit Trail



This document defines the coordinate geometry audit trail. The intent of the audit trail is to record all coordinate geometry results to a text file. The results are the same as the results that are displayed in the Results Dialog box when report lock is toggled on.

This lock displays on the Locks Toolbar and the Tools > Locks menu.

## **Drafting Notes**

The place plan note is great for labeling toes. First view the features using the Surface>View Surface>Features (W>1>5)

And select the features from the list on the View Features window desired to label (such as top of cut and toe of slope). Select the apply button and close the View Features window.

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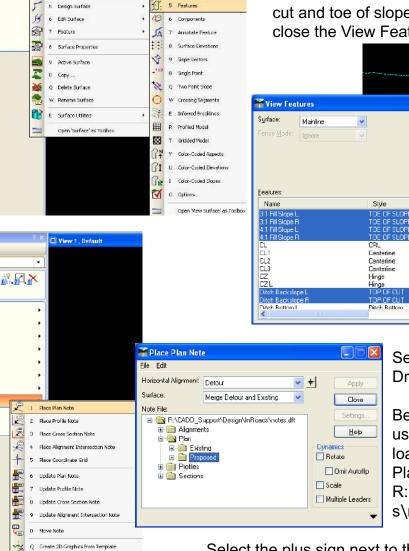
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Edit Style..

Help

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<u>~</u> +



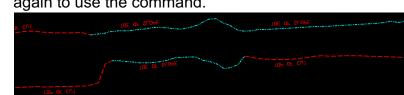
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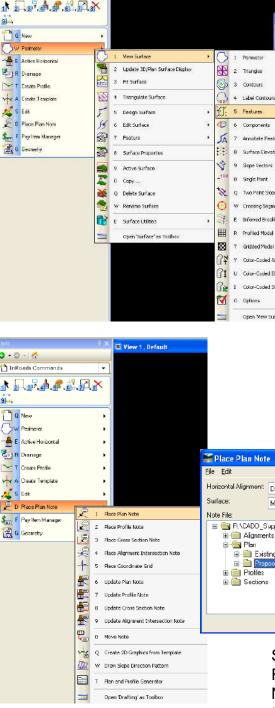
Select the Plan Note command. Drafting>Place Plan Note (D>1)

Before the drafting notes can be used, the notes.dft file must be loaded. Go to File on the Place Plan Note window and navigate to: R:\CADD Support\Design\InRoad s\notes.dft

Select the plus sign next to the Plan folder from the Notes File box on the Place Plan window.

Next select the plus sign next to the folder Proposed. Select the Feature Style (USE FOR TOES and etc.) and select the Apply button on the Place Plan Note window. Select on one of the features and accept to see the note. Move the cursor where the note will be located and accept again to place the note. Note: once the command is rejected, the Apply button on the Place Plan Note window will need to be selected again to use the command.





E View 1, Default

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🗂 InRoads Command:



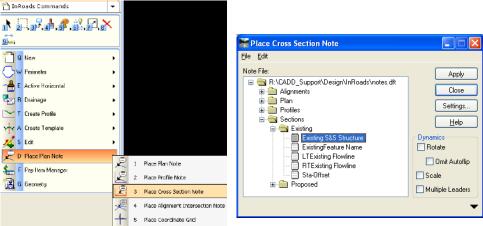
## **Drafting Notes**

#### Place Cross Section Notes

Make sure the notes.dft file is loaded in the project defaults or load it from the Place Cross Section Note window by selecting File>Open and navigate to

R:\CADD Support\Design\InRoads\notes.dft

To use this command it is necessary be in the file in Microstation that contains the cross sections set that need to be annotated.



Configuration Name:	Ellis County
Default Preferences	
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Rainfall Data (".idf):	
Bridge Sections (".txt):	
Drafting Notes (".dlt):	R:\CADD_Support\Design\InRoads\notes.dlt
Pay Items (*.mdb):	
Site Modeler Options (*.spł)	
Default Directory Paths	
ProjectWise Directory	
Project Default Directory:	C:\Projects\20943(07) Ellis Co\InRoads
Report Directory:	C:\Projects\20943(07) Ellis Co\InRoads
Projects (".rwk):	C:\Projects\20943(07) Ellis Co\InRoads

Geometry Projects (".alg): C:\Projects\20943(07) Ellis Co\InRoads

Template Libraries (\*.itl): C:\Projects\20943(07) Ellis Co\InRoads

Roadway Design (".ird): C:\Projects\20943(07) Ellis Co\InRoads

C:\Projects\20943[07] Ellis Co\InRoads

Surfaces (\*.dtm)

Select Place Plan Note>Place Cross Section Note (D>3). For example, to annotate existing structures use the Existing folder from the Sections folder. Select the note Existing S&S Structure and click apply. In Microstation click on the structure in the cross sections and accept to get the note move where it is needed and accept to place the note. If annotating flowline elevations, use the LT or RT Existing Flowline note and take care to snap on the top of the bottom set of lines accept it and move the note where it should be located and accept again.

## CHAPTER 11

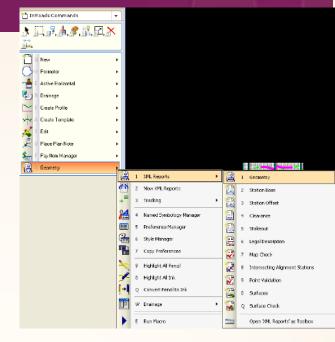
Reports

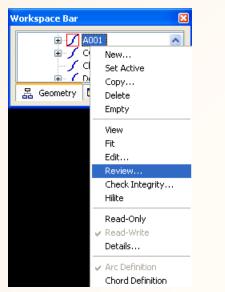
Written by: Josh Jones

## Notes

## **Guideline for Reports:**

All reports are found from the InRoads Commands task menu under Tools>XML Reports (G>1)





### Horizontal Alignment Review:

Go to the Geometry tab in the InRoads workspace bar. Right click on the alignment that needs to be veiwed. Click review.

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It is possible to set which alignment will be viewed at the top of the Review Horiz. Align. window.

## Horizontal Align. Review with Event

On the InRoads task menoing to Tools>XML Reports>Geometry (F>1>1)

- Under Horiz. Alignments Include: Type in the name of the alignment > press tab > select the alignment in the box
- O Check on Include Horiz. Event Points
- Check on the Interval box and set the interval > click apply

Geometry Report		
Horizontal Alignments Include:  Selected: Name Description Sty. CRL Default	Cogo Points Include:  Selected: Name Description Style	Apply Close Filter Preferences Help
<ul> <li>Include Vertical Alignments</li> <li>All Active</li> <li>Include Cant Alignments</li> <li>All Alignments</li> <li>All Vertical Event Points</li> <li>Include Horizontal Event Points</li> </ul>	✓ Interval:       100.00       ◆         Limits       Station       ◆         Start:       0+00.00       ◆         Stop:       0+00.00       ◆	

#### After clicking apply, the Horizontal Alignment Review Report will appear.

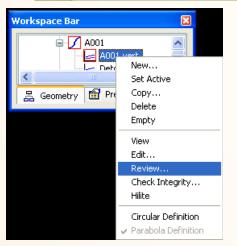
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## **Vertical Align. Review:**

#### Click on the HorizontalEvents.xsl to view the Horiz. Events Report.

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Senter

The vertical and/or horizontal that needs a report to show can be changed. Go to the Geometry tab in the InRoads menu. Click the plus sign on the horizontal align. Right click on the vertical align > click review.

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On the InRoads menu, go to Tools>XML Reports>Geometry (F>1>1)

- Enter in the horiz. alignment and then press tab, or if the alignment is already there, select the horiz. from the box.
- O Check the Include Vertical Alignments check box
- Select <u>All</u> for all alignments or <u>Active</u> for the active alignment

👫 Geometry Report				
Horizontal Alignments	Cogo Point	s	+	Apply
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Click on the HorizontalAndVerticalAlignmentReview.xsl. The Horiz. information is listed first followed by the vertical.

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### **Station Offset Report:**

On the InRoads menu go to Tools>XML Reports>Station Offset (F>1>3)

- Set the horiz. align.
- O Click the Include subfolder and check the box next to the points needed
- O Click the Horiz. Align. subfolder to add info. for an additional horiz. align.
- Click the Features subfolder to see features from a selected surface. NOTE: When the features are listed in the window select the features which need to be seen in the report. Right clicking in the window will allow select all button to be used. Click apply

		Station Offset Report		_ L 🔀
Station Offset Report	_	Station Offset Report	Surface: WOODS	▼ Filter
Station Diffset Report	From Horzontol Alignment CRL Surface: Feature: CL	- General - Include - Horizontal Alignments - ∳ Features	Name     Style       Q.     Centerline       Q.1     Centerline       Q.2     Centerline       Q.3     Centerline       C.4     Centerline       L_31     Fill Slope       L_31     Fill Slope       L_32     Toe of Slo       L_32     Fill Slope       L_02     Hinge       L_Drich Backslope     Top of Cut       L_01ich Backslope     Ditch But	Created by roadway . Created by roadway . Created by roadway . Select Al Corl+ A pe Select None Ctrl+ N Invert Selecton General by roadway .
	Apply Preferences Close Help	1	Apply Preferences	Close Help

#### Click on the StationOffset.xsl report.

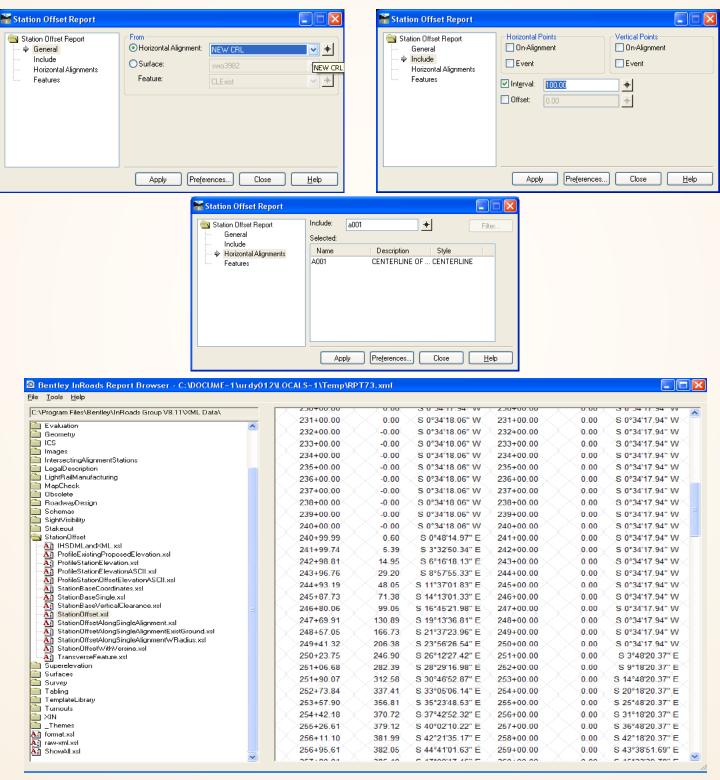
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hidge	Station Offset Report							
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nvey bling	234+00.00	0.00	S 0°34'18.02'' W	233+30.00	0.00	S 0°34'18 02"		
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nemes netvol	235+50.00	0.00	5 0°34'18.02' W	235+50.00	0.00	S 0°34'18.02'		
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	239+00.00	0.00	S 0°34'18.02' W	239+00.00	0.00	S 0°34'18.02"		
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	247+80.00	0.00	S 19°30'16.01" E	247+80.00	0.00	S 19°30'16 01"		
	250+40.00	0.00	S 26°39'16.05" E	250+40.00	0.00	S 26°39'16 05"		
	254+60.00	0.00	S 38°12'16.11" E	254+60.00	0.00	S 38°12'16.11"		

Select the Station Offset Report

Under the General subfolder select the primary alignment

On the Include subfolder select and set the interval

On Horizontal Alignments subfolder select another alignment (the one which will be compared) Click apply

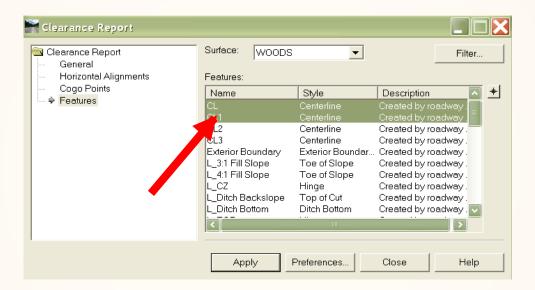


On the InRoads menu, go to Tools>XML Report>Clearance (F>1>4)

- O Click the Features subfolder.
- Select the surface
- Select only 2 features

NOTE: This report only works properly between 2 like features. Another report will need to be run if another Feature to Feature report needs to be seen.

Click apply NOTE: This may take a while to generate.



Progra <sup>w</sup> 1)Bertley/InPosed*1 8/44, Date,	E La companya da companya d									
Bridge		Featur	e to Feature Clear	rance Report						
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lufeces	233+75.00	1479.54	1479.71	-0.17	-4.17					
abling	234+00.00	1479.37	1479.54	-0.17	-4.17					
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	235+75.00	1478.43	1478.60	-0.17	-4.17					
	236+00.00	1478.34	1478.51	-0.17	-4.17					
	236+25.00	1478.20	1478.46	-0.17	-4.17					
	236+50.00	1478.24	1478.41	-0.17	-4.17					
	230+75.00	1478.19	1478.36	-0.17	-4.17					
	237+00.00	1478.14	1478.31	-0.17	-4.17					
	237+25.00	1478.06	1478.23	-0.17	-4.17					
	237+50.00	1477.97	1478.14	-0.17	-4,17					
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	238+75.00	1477.36	1477.53	-0.17	-4.17					
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## **Feature Station Elevation:**

On the InRoads menu, go to Tools>XML Report>Clearance (F>1>4)

- O Click the Features subfolder
- Select the surface
- Select the feature that needs a report of
- Click apply

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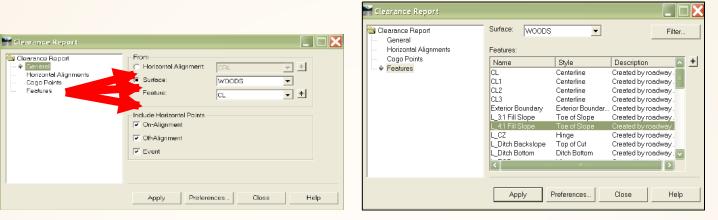
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	Features:
Cogo Points	Name Style Description 💽 🕈
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	CL2 Centerline Created by roadway.
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	L_Ditch Bottom Ditch Bottom Created by roadway .
	Apply Preferences Close Help
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Bandisal Varias/Status) Statilizeorian Anno Sal Varias Varias Varias San Astrono San Astrono San	Station         Elevation

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## **Feature Station Elevation Offset:**

On the InRoads menu go to Tools>XML Reports>Clearance (F>1>4)

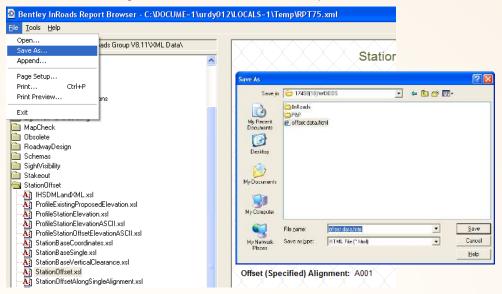
- In the General subfolder select the desired horiz. align. This is the alignment the stationing comes from.
- Check the box next to any points that need to be seen
- In the Features subfolder, select any feature that needs to be veiwed
- Click apply



#### Click on the FeatureStationElevationOffset.xsl report.

ntley inRoads Report Browser - C:\DOCUME-1\urdyl	164\LOCALS-1\Temp\RPT17.xml				
Tools Help					
ogra~1 (BentleyA)nRoad~1.8\V94LData\	Station Elevation Of	ffset Report			
idge					
eorance	L_3:1 Fill Slope				
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FeatureStationElevationOffsetxs1	254+50.00	1466.73	-62.96	WOODS	
Feature To Feature xsl	266+00.00	1466.28	-62.14	WOODS	
MinimumCleorance xsl	266+25.00	1464.19	-64.14	NOODS	
UnprojectedClearance.csl	266+50.00	1463.11	-67.64	MOODS	
stom	266+75.00	1462.80	-68.85	WOODS	
taCollection	267+00.00	1462.64	-69.61	WOODS	
aluation	267+25.00	1462.45	-70.46	WOODS	
ometry					
	267+50.00	1462.20	-71.48	MOODS	
oges	267+75.00	1461.96	-72.49	MOODS	
gd/Description	268+00.00	1462.13	-72.23	WOODS	
htReilManufacturing	268+25.00	1462.97	-69.94	WOODS	
odwayDesign	268+50.00	1465.14	-63.58	MOODS	
hemos skeout	268+75.00	1467.31	-61.56	WOODS	
skeout stionOffset	270+50.00	1465.38	-6Z.01	WOODS	
perelevation	270+75.00	1464.43	-64.46	WOODS	
foces	271+00.00	1464.11	- 65 - 00	WOODS	
noues rvey	271+25.00	1463.85	-65.31	WOODS	
bling	271+50.00	1463.33	-66.38	WOODS	
mplateLibrary	271+75.00	1462.37	-68.76	WOODS	
mouts	272+00.00	1461.44	-71-07	NOODS	
1	272+25.00	1460.58	-73.16	WOODS	
hemes	272+50.00	1459.98	-74.46	WOODS	
matxal					
lax intervention and the second secon	272+75.00	1459.53	-75.31	WOODS	
owAlbel	273+00.00	1459.43	-75.14	WOODS	
	273+25.00	1459.47	-74.50	MOODS	
	273+50.00	1459.58	-73.70	WOODS	
	Z73+75.00	1459.65	-72.98	WOODS	
	274+00.00	1459.86	-71.B6	WOODS	
	274+25.00	1460.34	-69.94	MOODS	
	274+50.00	1460.84	-67.94	WOODS	
	274+75.00	1461.09	-66.70	WOODS	
	275+00.00	1460.13	-69.08	WOODS	
	275+25.00	1459.90	-69.28	WOODS	
	275+50.00	1460.29	-67.64	WOODS	
	275+75.00	1460.63	-66.12	WOODS	
	276+00.00	1462.36	-65.91	NOODS	
	283+25.00	1455.17	-62.40	WOODS	
	283+20.00	1455.94	-62.21	WOODS	
	283+75.00	1455.48	-62.68	WOODS	
	284+00.00	1454.88	-63.57	WOODS	
	284+25.00	1454.79	-62.B7	WOODS	
	366+50.00	1424.33	-61.69	NOODS	
	366+75.00	1424.02	-62.55	WOODS	
	367+00.00	1423.18	-65.01	WOODS	
	367+25.00	1422.67	-66.48	WOODS	
	367+50.00	1422.73	-66.28	WOODS	

Many of the reports output to an html file. These files can be opened with Excel and edited to give the desired results. To do this go to file Save As on the report browser window



Save as HTML file

A

Browse to the file in explorer and right click on the file and select open with Excel. Then once inside the file, select the columns that need to be deleted and right click on the letter at the top. Select delete from the pull down menu.

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4	232+00.00	0.00	232+00.00	
5	233+00.00	0.00	233+00.00	
6	234+00.00	0.00	234+00.00	
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8	236+00.00	0.00	236+00.00	
9	237+00.00	0.00	237+00.00	
10	238+00.00	0.00	238+00.00	
11	239+00.00	0.00	239+00.00	
12	240+00.00	0.00	240+00.00	
13	240+99.99	0.60	241+00.00	
14	241+99.74	5.39	242+00.00	
15	242+98.81	14.95	243+00.00	
16	243+96.76	29.20	244+00.00	
17	244+93.19	48.05	245+00.00	
18	245+87.73	71.38	246+00.00	
19	246+80.06	99.05	247+00.00	
20	247+69.91	130.89	248+00.00	
21	248+57.05	166.73	249+00.00	
22	249+41.32	206.38	250+00.00	
23	250+23.75	246.90	251+00.00	
24	251+06.68	282.39	252+00.00	
25	251+90.07	312.58	253+00.00	

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