



F6 - From Civil Model to Cross Section Sheets

Presented by: Joe Waxmonsky, PE

From Civil Model to Cross Sections

- Learn to create and annotate proposed cross sections as well as compute end-area volumes.
- At the end of this training session, an assessment will be given. We will review all assessment questions and answers to see what you have learned.

Learning Objectives

After this presentation you will be able:

- Create cross sections from a 3D design model.
- Annotate proposed cross sections.
- Generate proposed end-area volume calculations.

Cross Section Drawing Requirements

- Use a cross section seed file to give control over the drawing scale.
- The seed file drawing scale should be set to a logical value for cross section plotting. For example 1"=5'.
- To get started try using the Bentley-Civil Workspace.

Referencing the 3D Model

- The 2D alignment must be referenced to the cross section seed file.
- The 3D model must be referenced to the cross section seed file.

Referencing the 3D Model

- Use MicroStation Live Nesting to simplify reference attachments.

Reference Attachment Settings for Completed Design_2D.dgn

File Name: Completed Design_2D.dgn
Full Path: ... \DATA\Completed Design_2D.dgn
Model: Default
Logical Name:
Description: Master Model

Orientation:

View	Description
Coincident	Aligned with Master File
Coincident - World	Global Origin aligned with Master File
<input checked="" type="checkbox"/> Standard Views	
Saved Views (none)	
Named Fences (none)	

Use Live Nesting

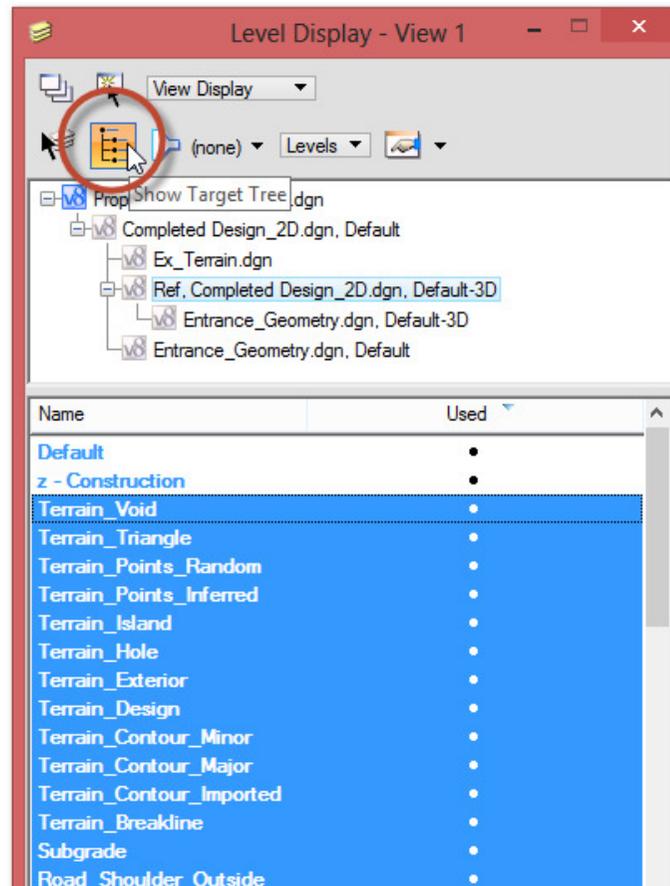
Detail Scale: 1"=10'
Scale (Master:Ref): 1.000000 : 1.000000
Named Group:
Revision:
Level:
Nested Attachments: Live Nesting Nesting Depth: 99

Setting the Levels

- Cross sections are created in a WYSIWYG format.
- The 3D model is “sliced”
- The level settings from the 3D model are honored when the sections are created.
- After setting levels on/off remember to Save Settings in the DGN file.

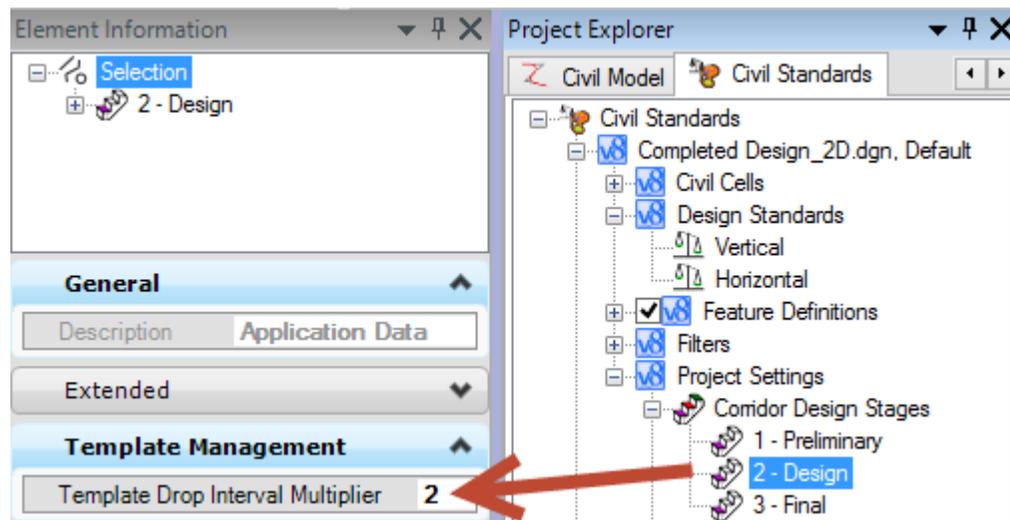
Setting the Levels

- Enable “Show Target Tree” when using Live nesting to set your levels.



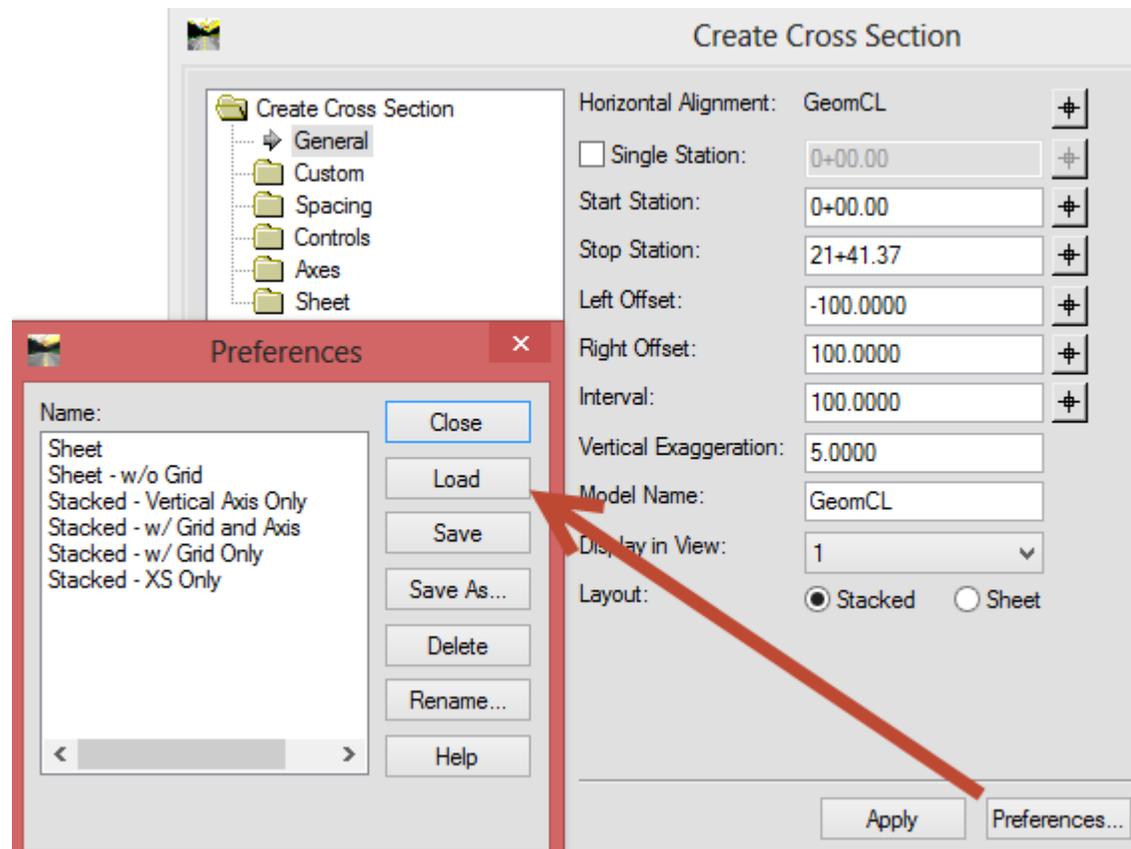
Template Drop Intervals

- Template drop locations, at minimum, should match cross section cut locations to avoid interpolation.
- Bentley-Civil Project Settings (Corridor Design Stages) affect template drop locations with a template drop multiplier setting.



Cross Section Preferences

- In the Create Cross Section application, take advantage of pre-defined preferences.

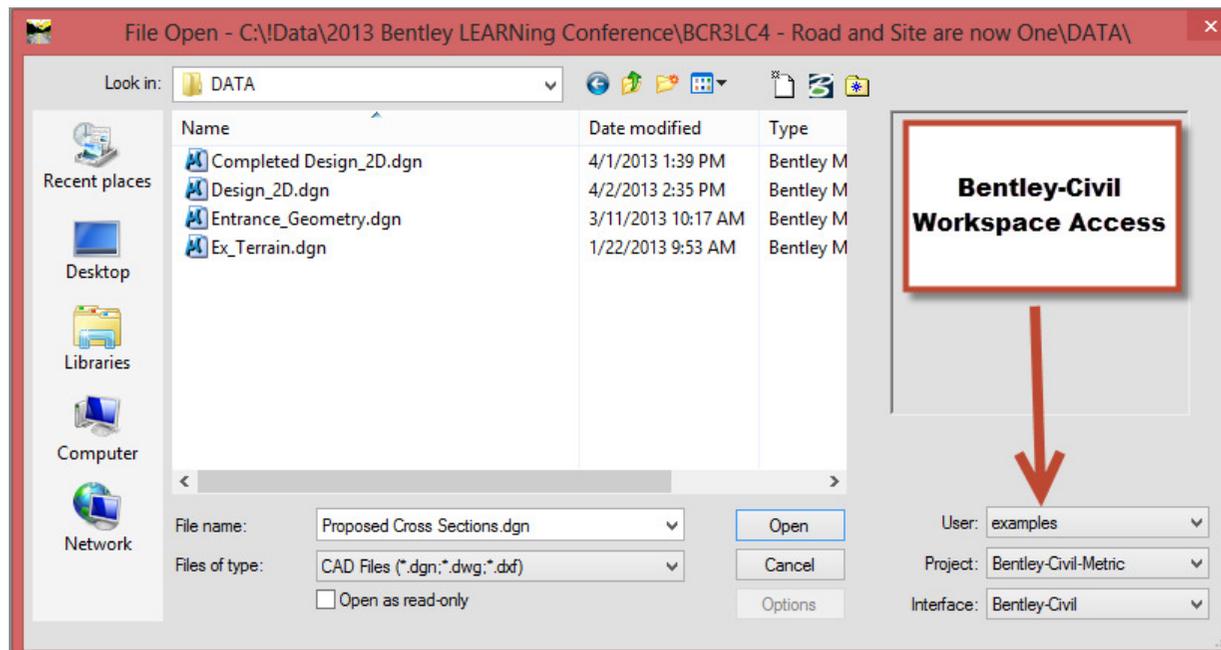


Cross Section Preferences

- Cross Section Preferences are stored in an included XIN settings file.
- Many Cross Section preferences are setup for you as examples in the Bentley-Civil Workspace include in the install.
- The preference entitled “Stacked – XS Only” will produce sections are GEOPAK customers are use to seeing.
- GEOPAK customers will get GEOPAK Cross Section Cells drawn when using the “Stacked” layout option as long as GEOPAK is active.

Cross Section Preferences

- For our Metric Customers, use the Bentley-Civil-Metric workspace.
- The cross section preferences will yield results based on typical metric requirements.



Creating Cross Sections

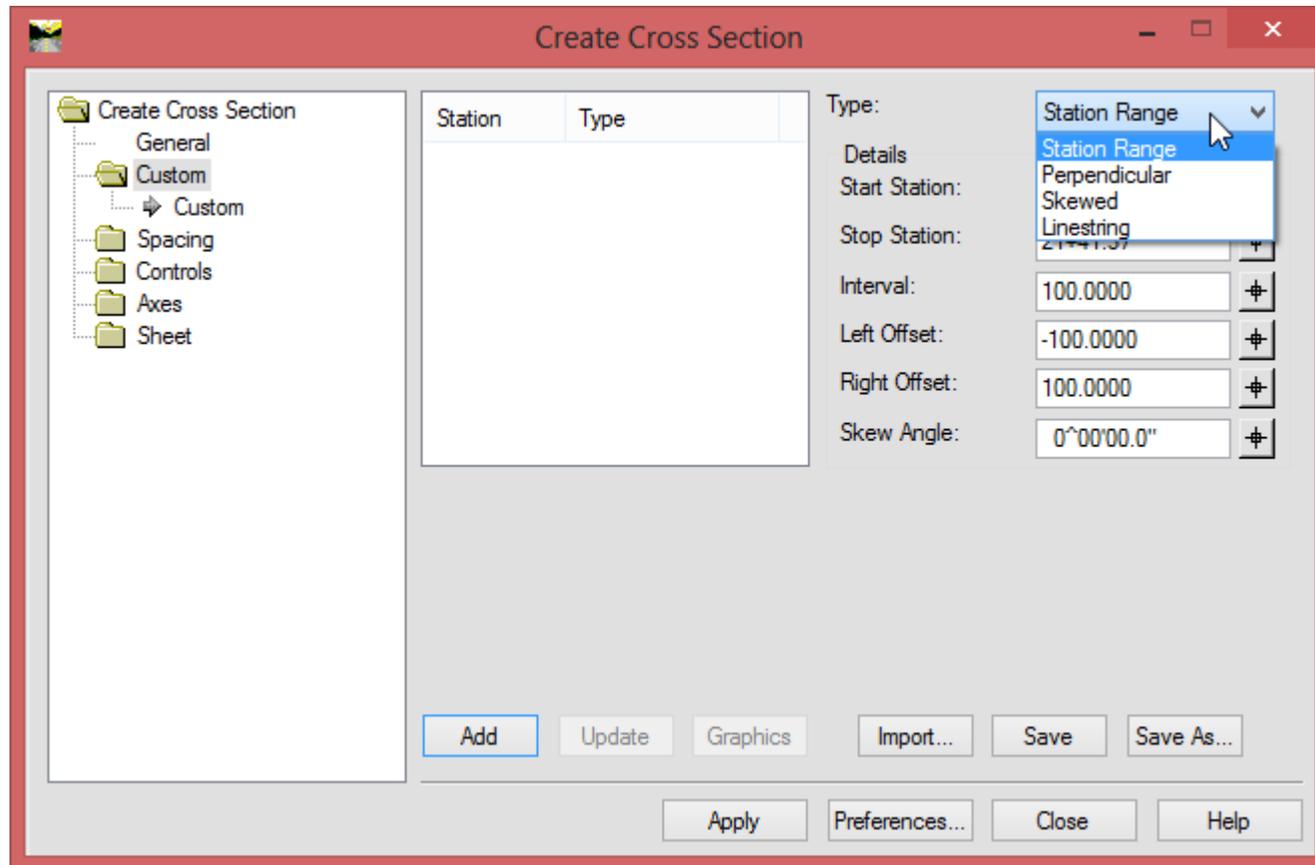
- Use pre-defined preferences to complete the required application settings.
- A MicroStation Drawing Model will be created in the cross section DGN file.
- Vertical Exaggeration is supported.

Creating Cross Sections

- Use the Custom location option if standard interval sections are not adequate.
 - Sections by station range
 - Keyed in individual perpendicular station location
 - Keyed in individual skewed station location
 - Line or linestring location via MicroStation selection set

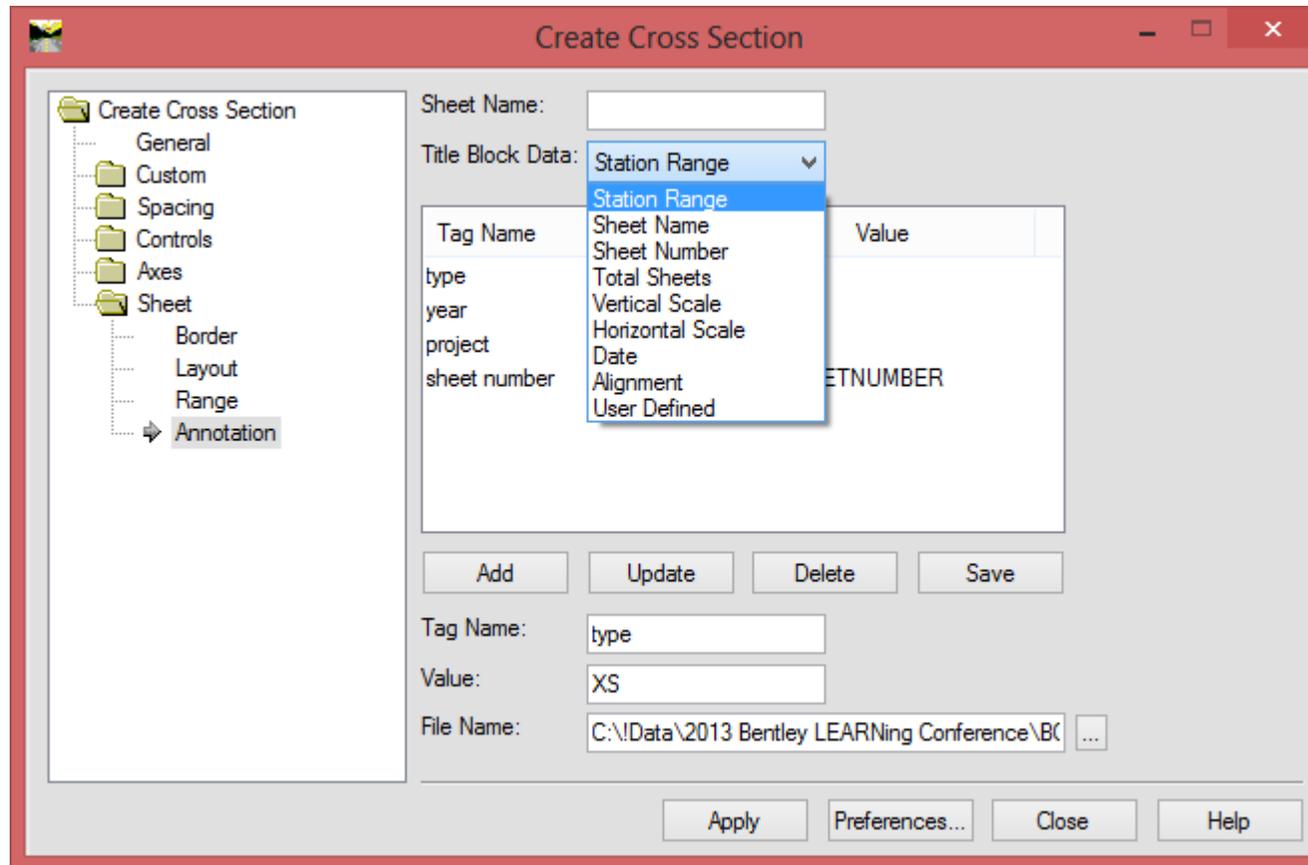
Creating Cross Sections

- Custom location defines specific locations



Creating Cross Sections

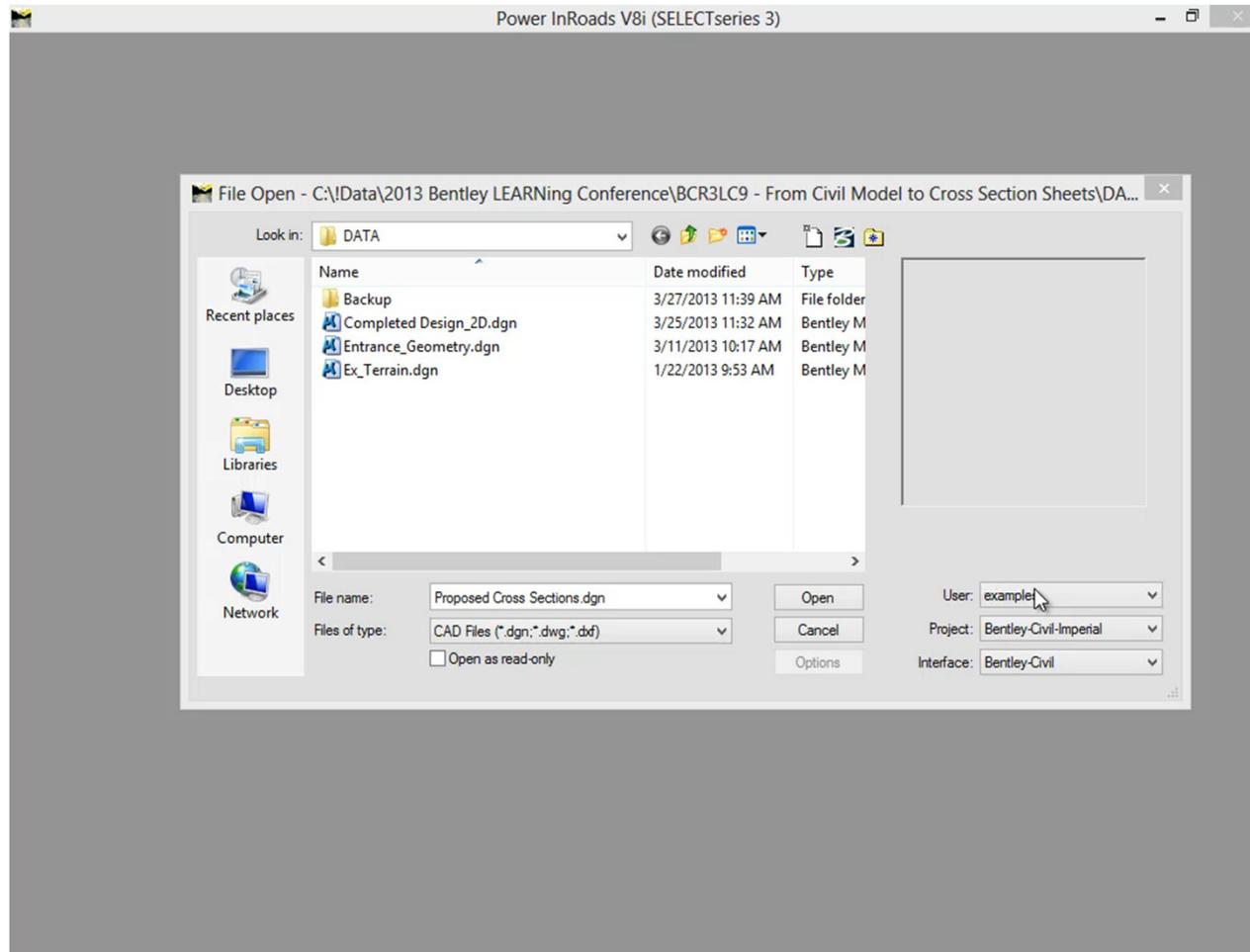
- Use Sheet Annotation to complete the title block



Creating Cross Sections

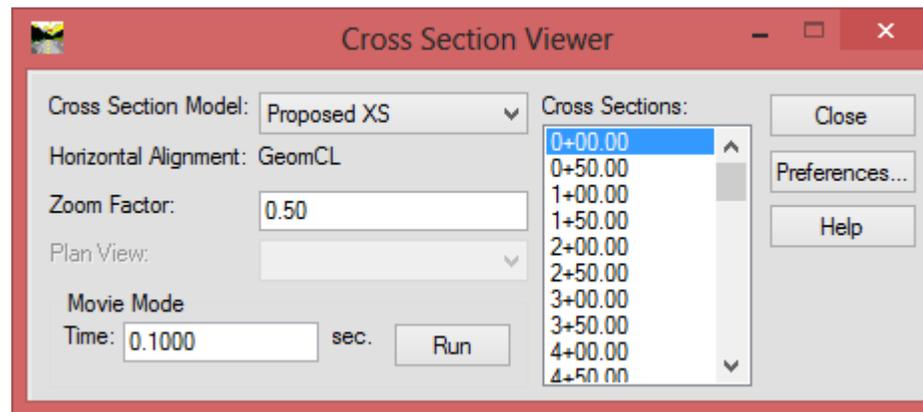
DEMO

Creating Cross Sections



Navigating the Cross Sections

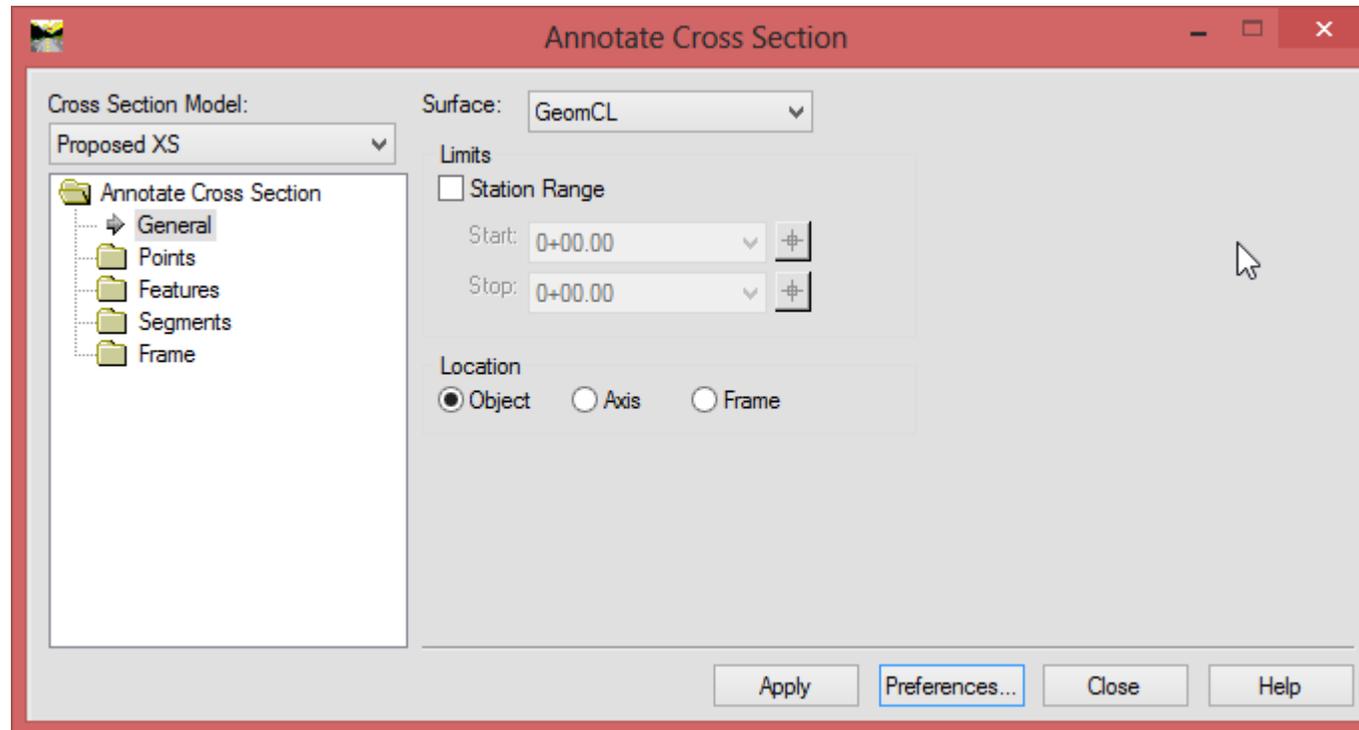
- Use the Cross Section Viewer to easily navigate cross sections.
 - Move to any individual station
 - Zoom factor
 - Movie mode
 - Preferences to remember settings



Annotating the Cross Sections

- Label any featurized surface
- Label station range only if desired
- Label locations include
 - Objects
 - Axis
 - Frame

Annotating the Cross Sections

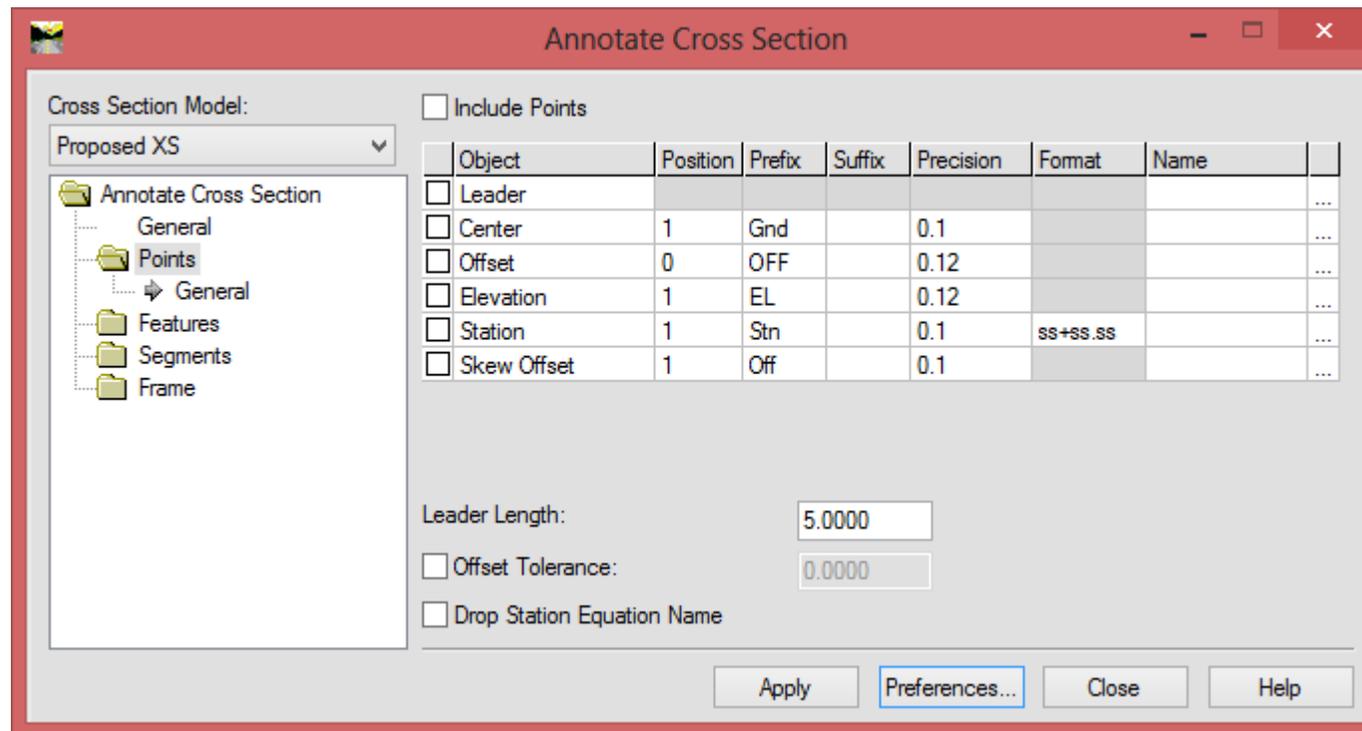


Annotating the Cross Sections

- Label the following
 - Points
 - Features
 - Segments
- User selects what is to be labeled
- Label any cross section model within the active DGN file
- Any featurized surface can be labeled

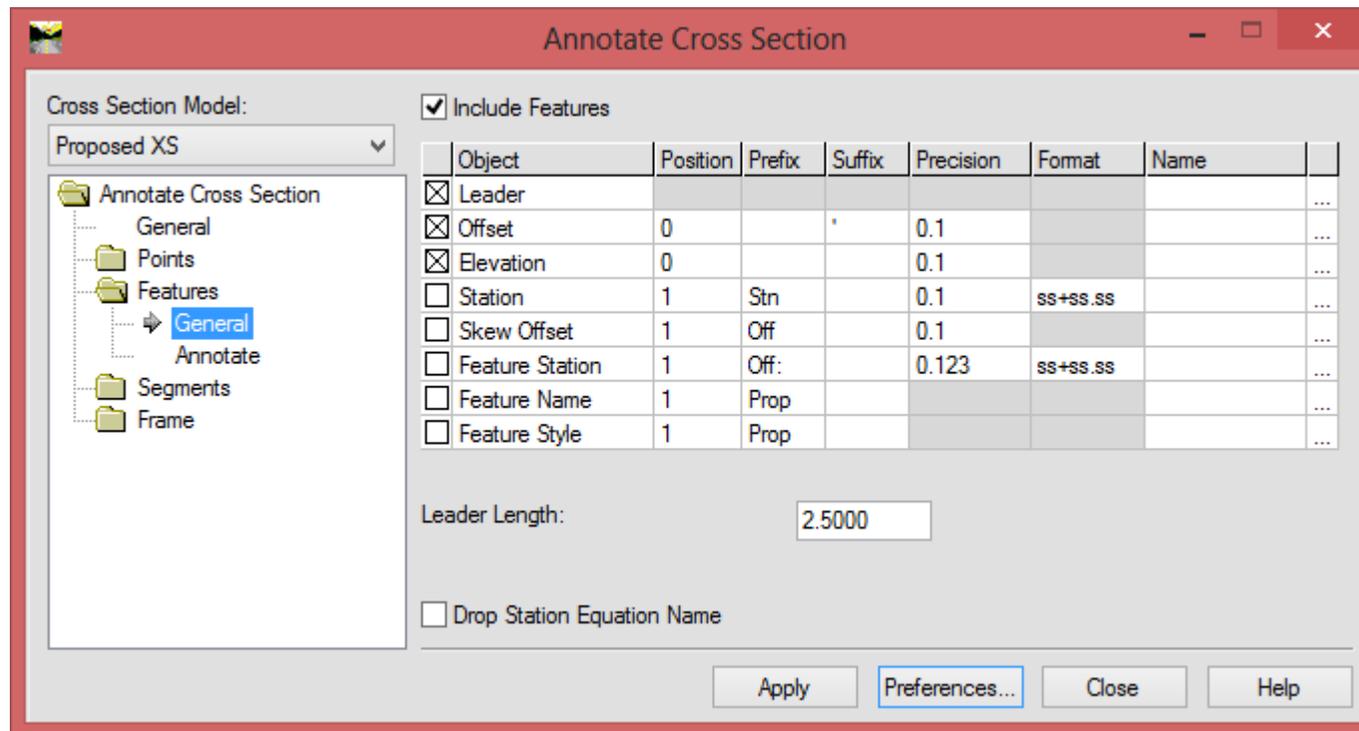
Annotating the Cross Sections

- Point Labeling



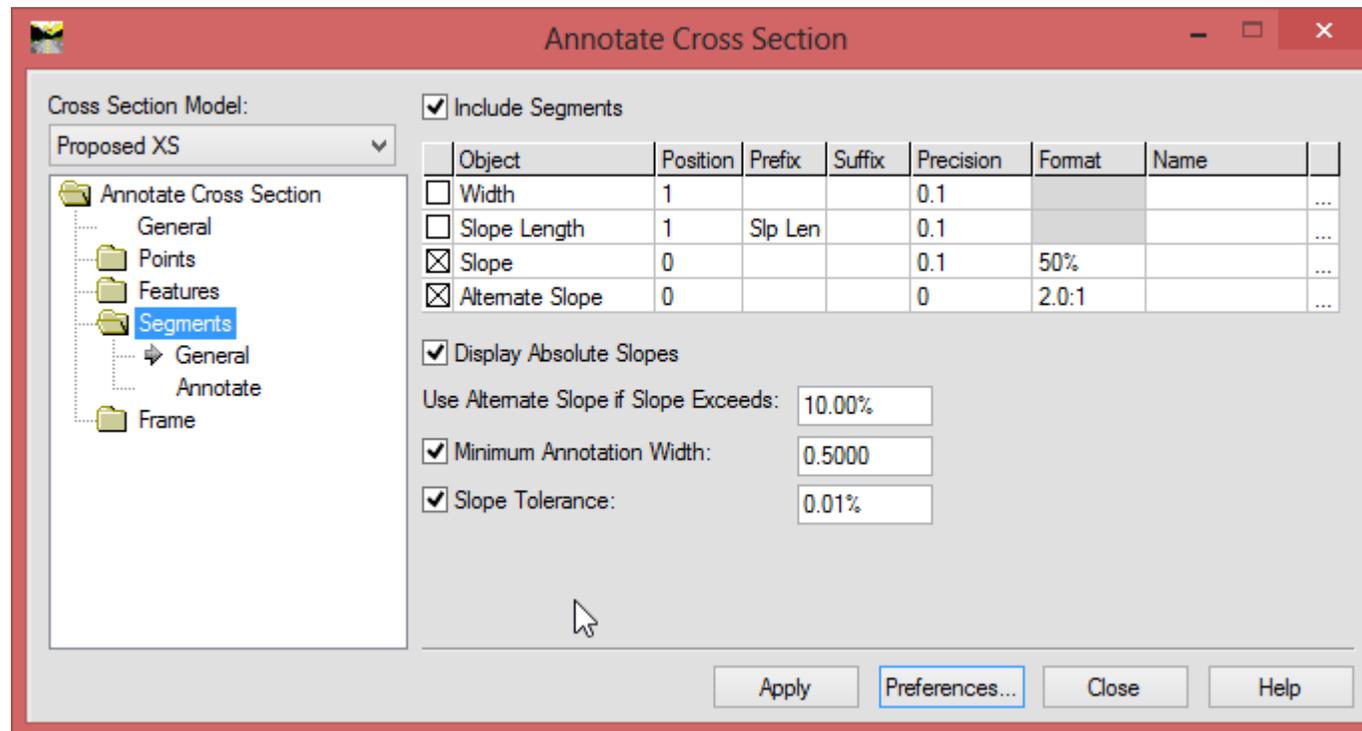
Annotating the Cross Sections

- Features Labeling



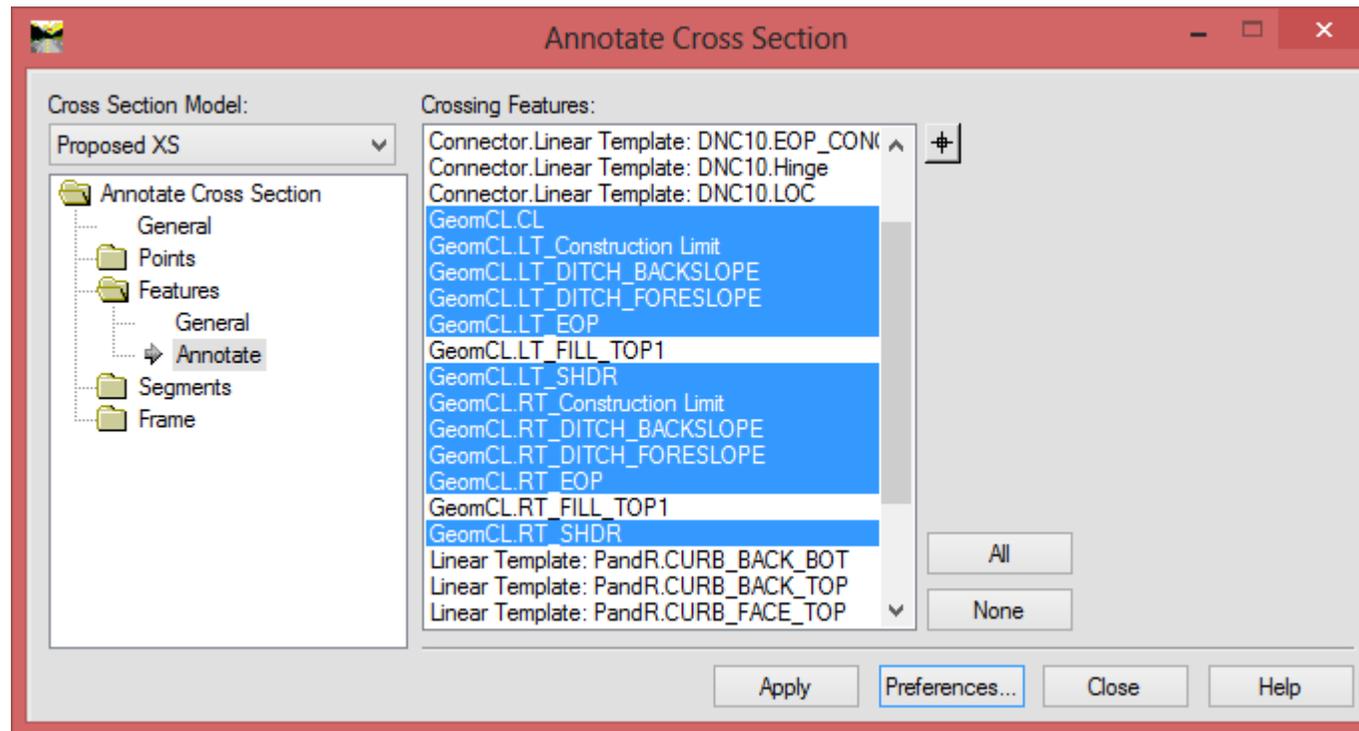
Annotating the Cross Sections

- Segments Labeling



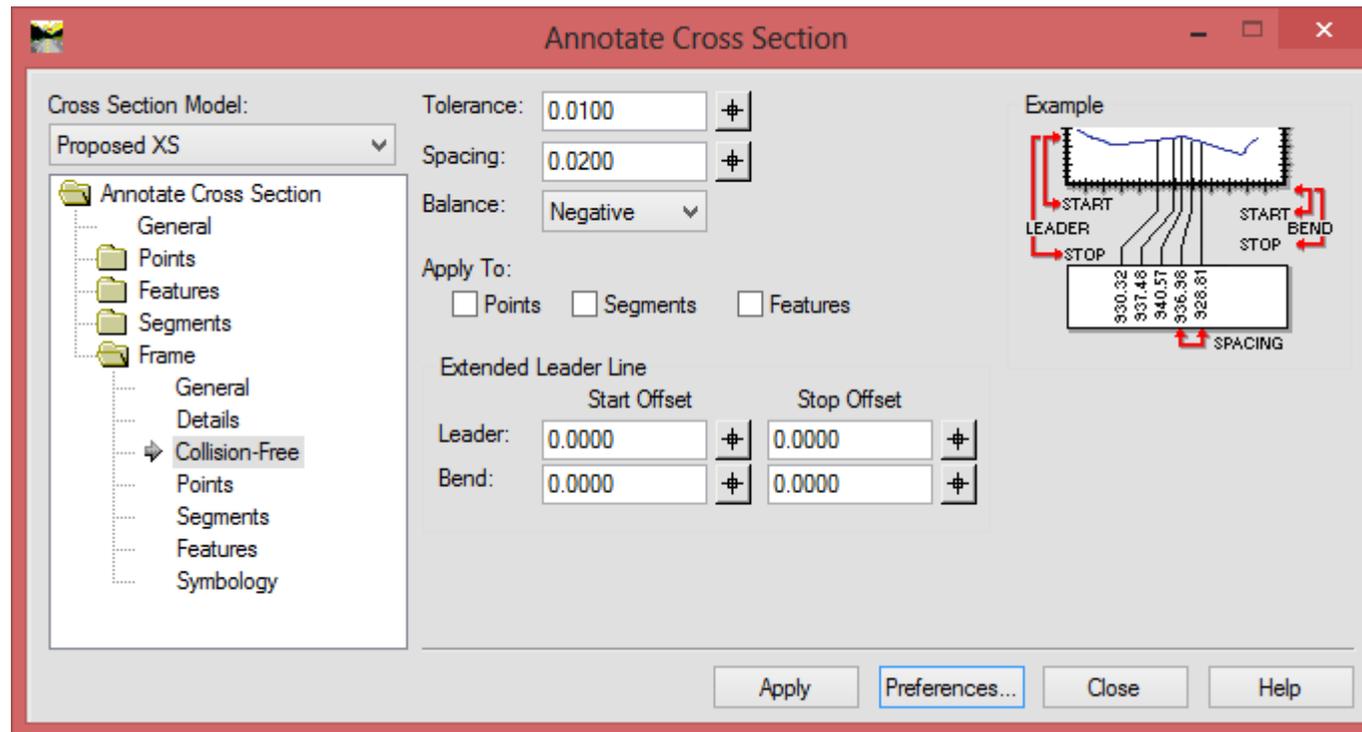
Annotating the Cross Sections

- User Selection Labeling for Features and Segments



Annotating the Cross Sections

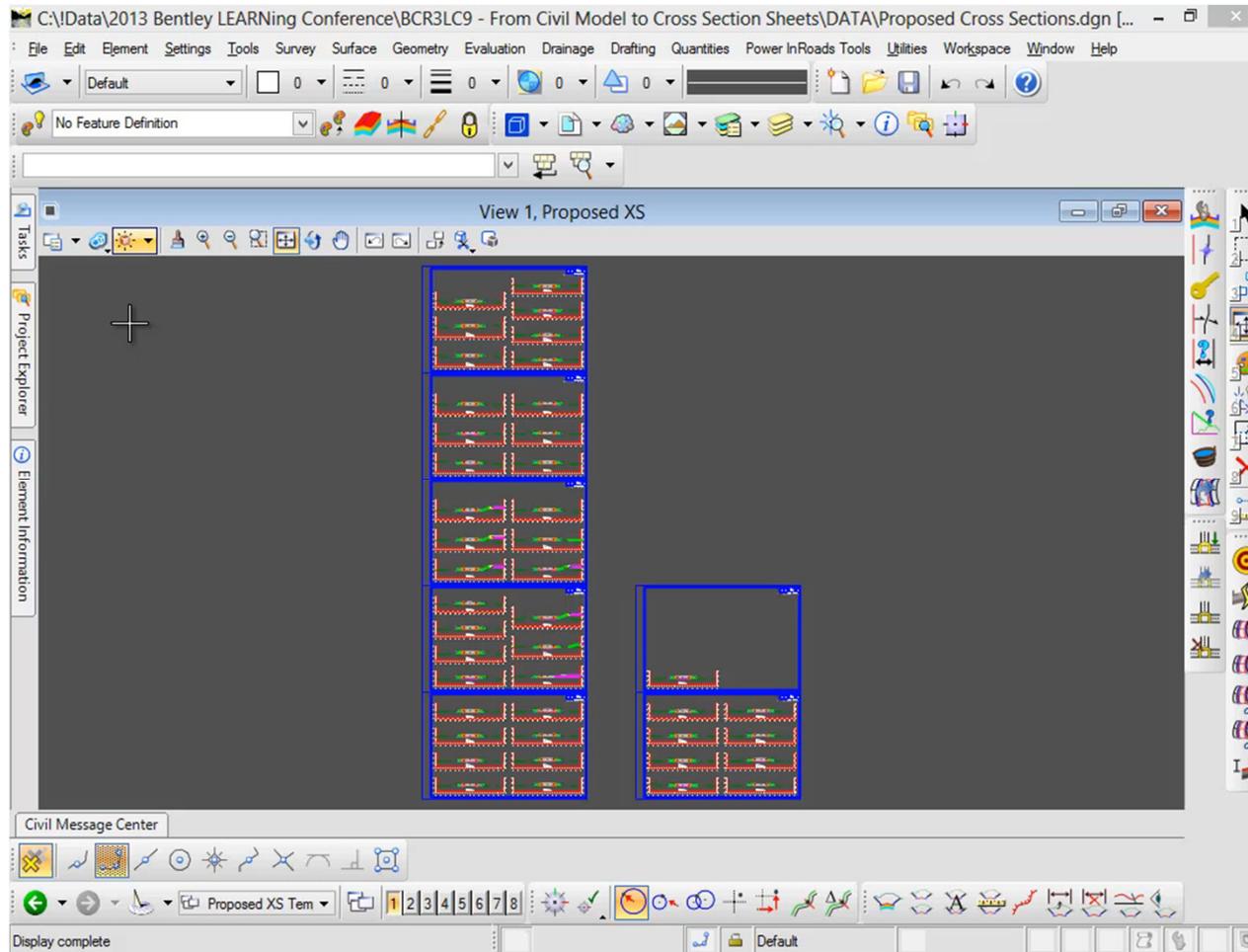
- Frame labeling supports collision-free labeling



Annotating the Cross Sections

DEMO

Annotating the Cross Sections

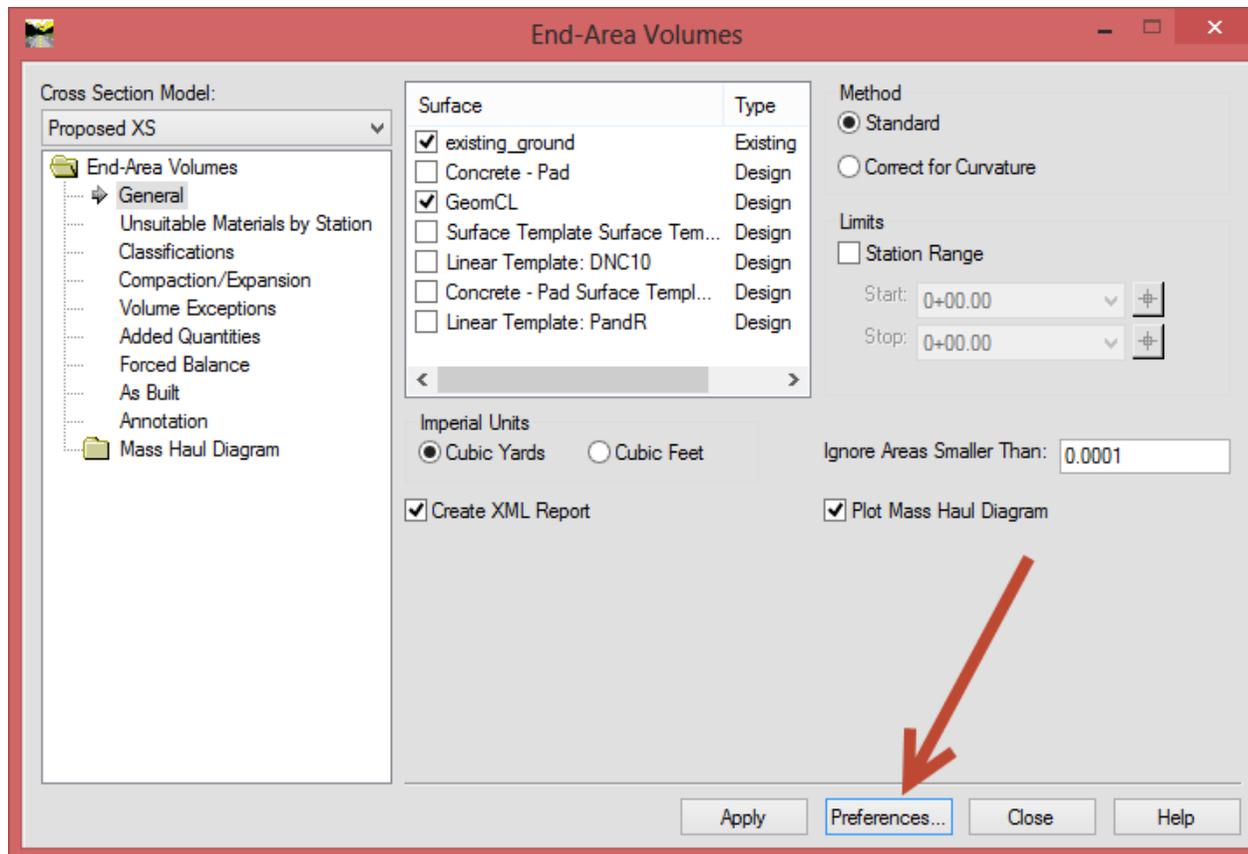


Computing End-Area Volumes

- User selects surfaces to be computed
- Create XML reports for quantities
- Plot Mass Haul diagram automatically
- Curvature Correction
- Compute by station range or entire alignment

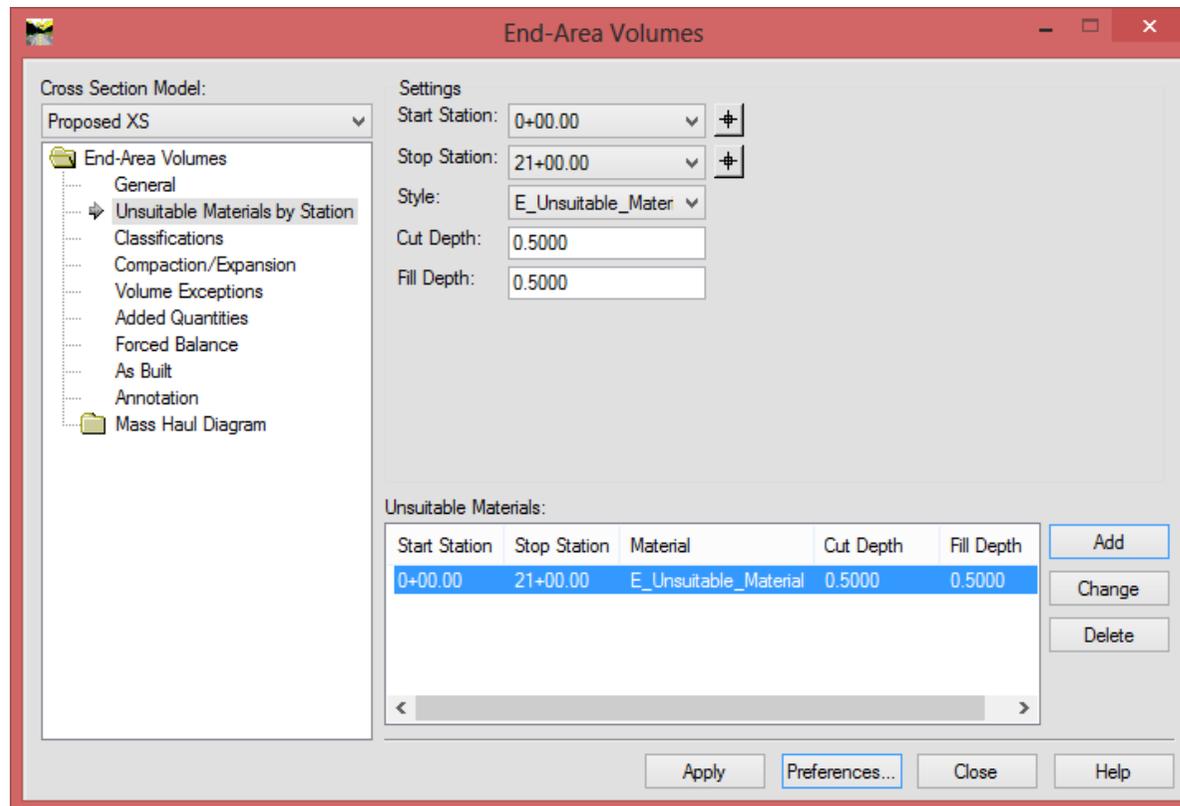
Computing End-Area Volumes

- Preferences are supported in the XIN settings file



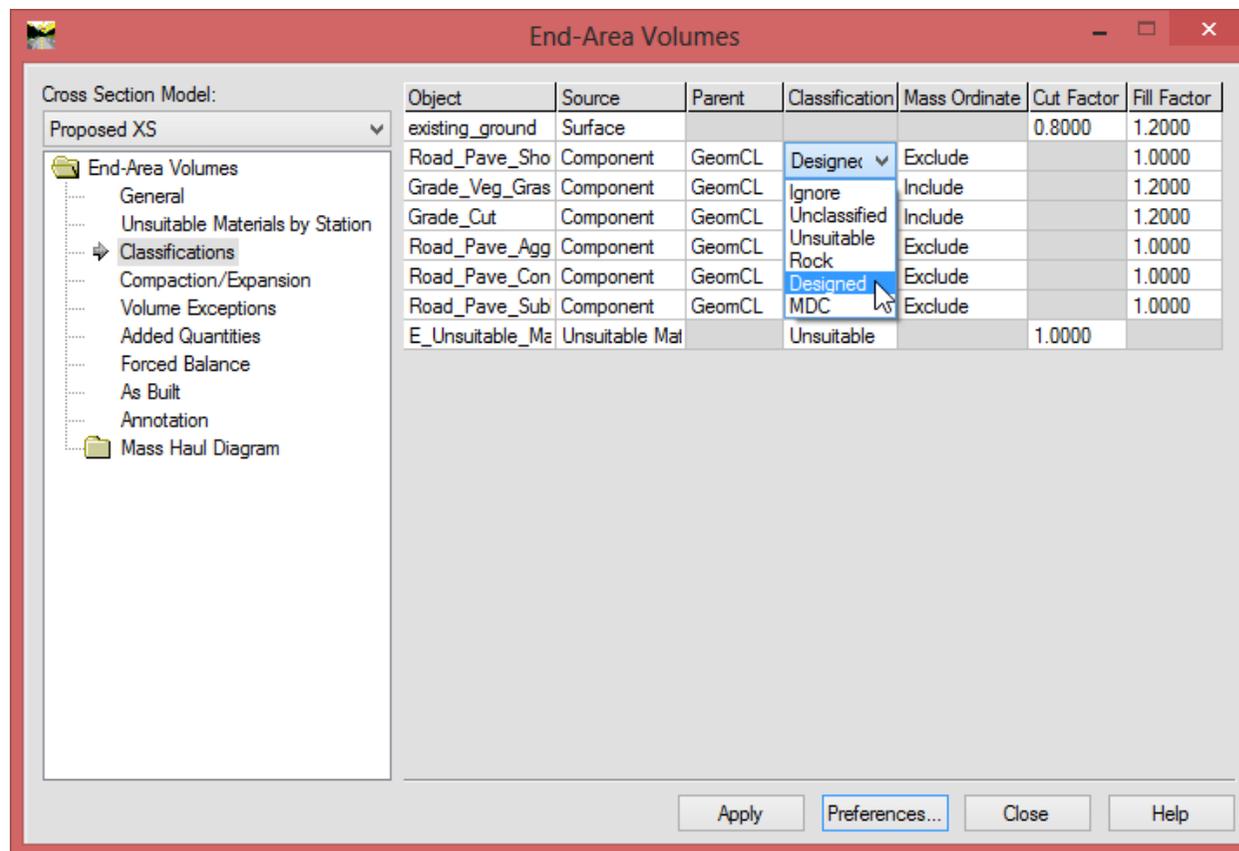
Computing End-Area Volumes

- Unsuitable material removal such as top soil stripping



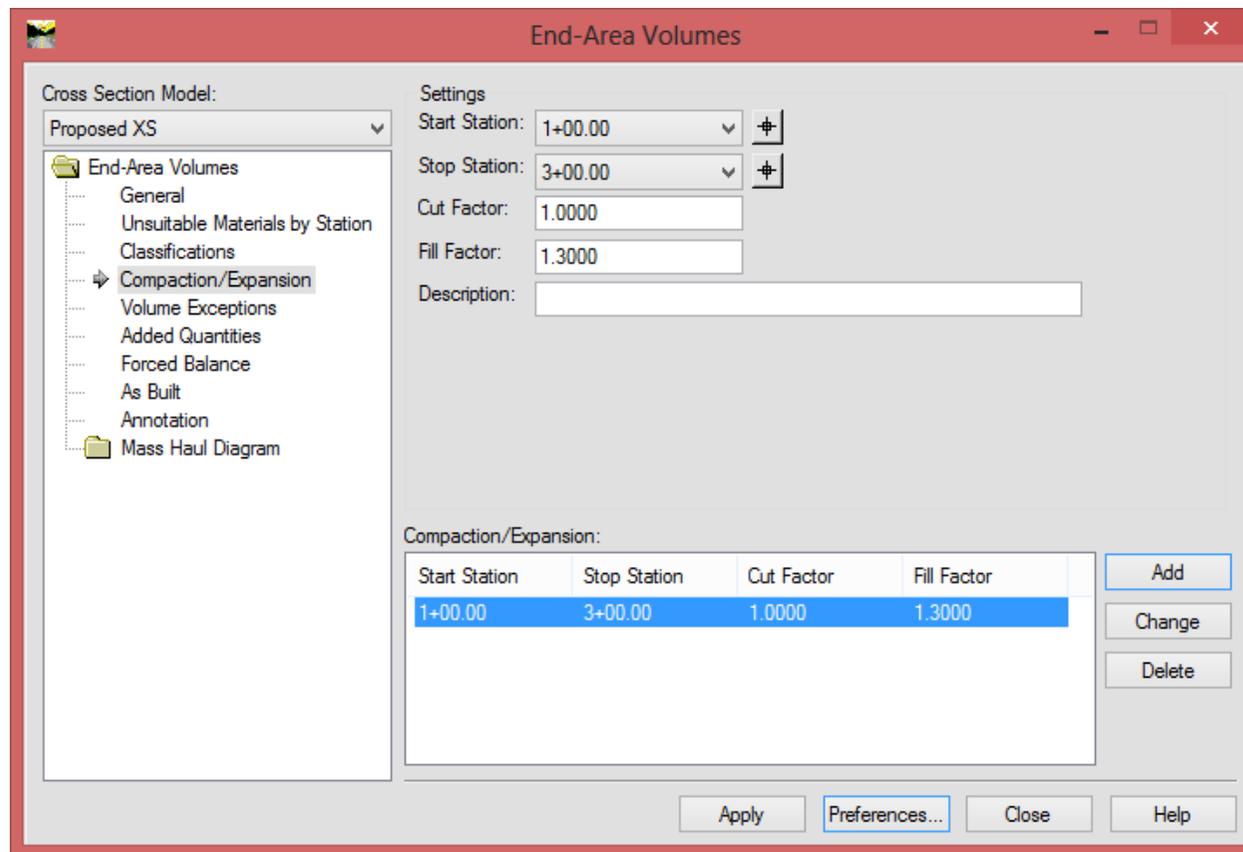
Computing End-Area Volumes

- Classification for each material object



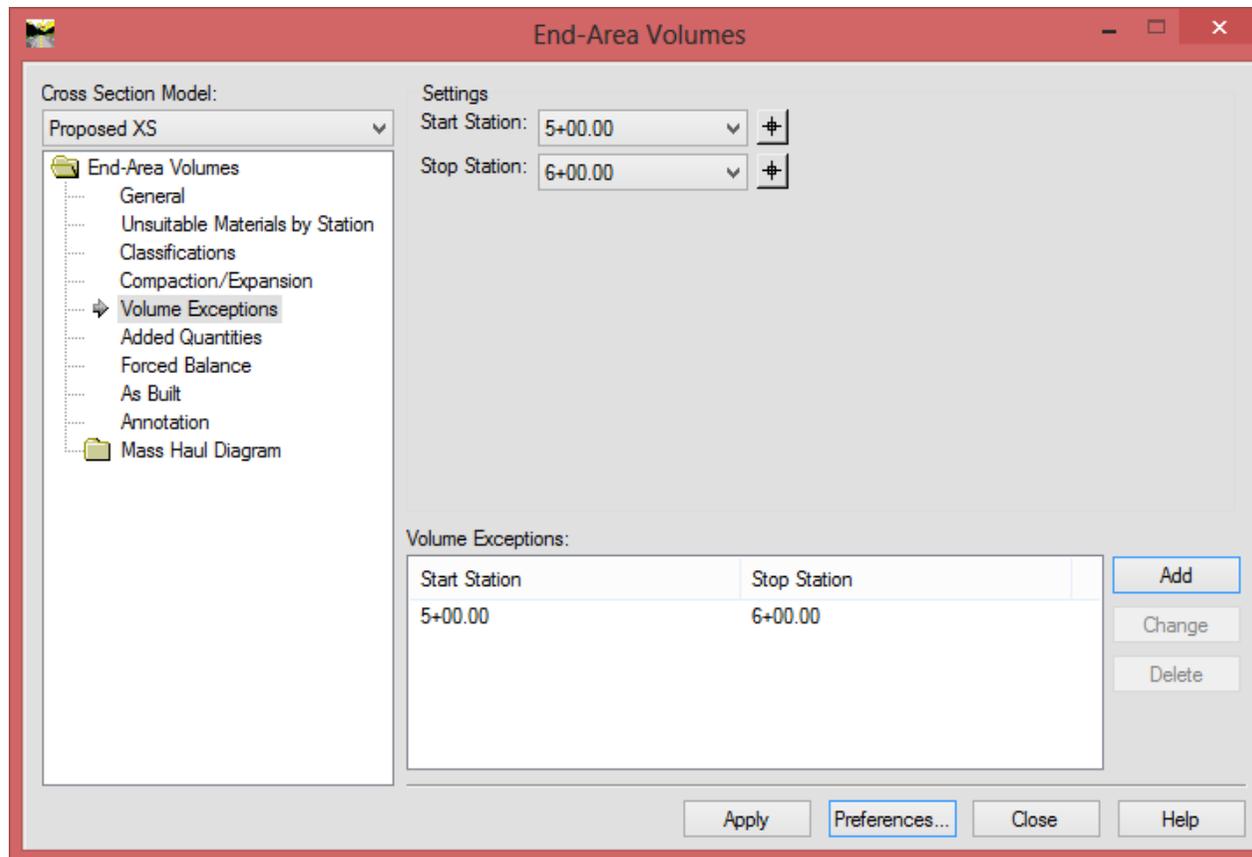
Computing End-Area Volumes

- Custom compaction and expansion capability



Computing End-Area Volumes

- Volume Exceptions (i.e. Bridge Omissions)



Computing End-Area Volumes

- Added Quantities (i.e. Borrow Pit)

End-Area Volumes

Cross Section Model: Proposed XS

Settings

Start Station: 10+50.00

Stop Station: 10+50.00

Type: Cut Fill

Volume: 1500.0000

Factor: 0.8000

End-Area Volumes

- General
- Unsuitable Materials by Station
- Classifications
- Compaction/Expansion
- Volume Exceptions
- Added Quantities
- Forced Balance
- As Built
- Annotation
- Mass Haul Diagram

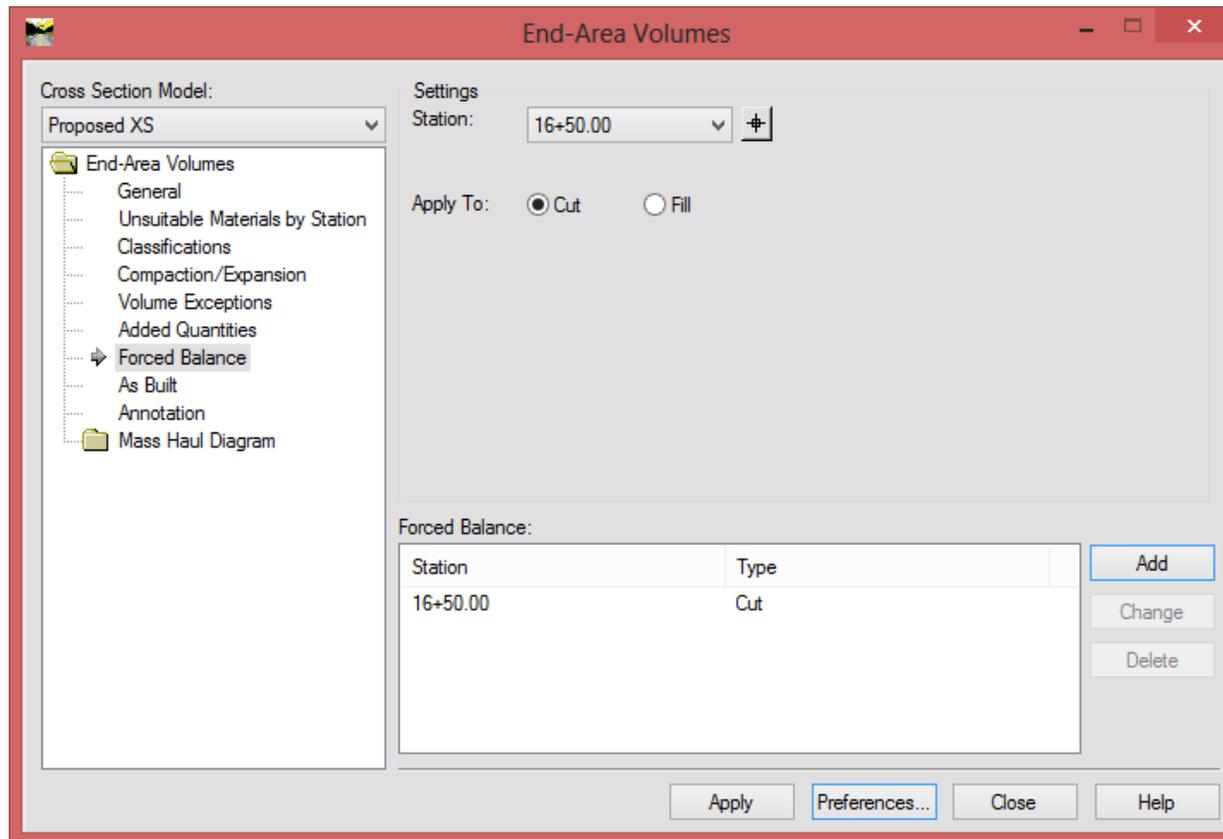
Added Quantities:

Start Station	Stop Station	Type	Volume	Factor
10+50.00	10+50.00	Cut	1500.0000	0.8000

Buttons: Add, Change, Delete, Apply, Preferences..., Close, Help

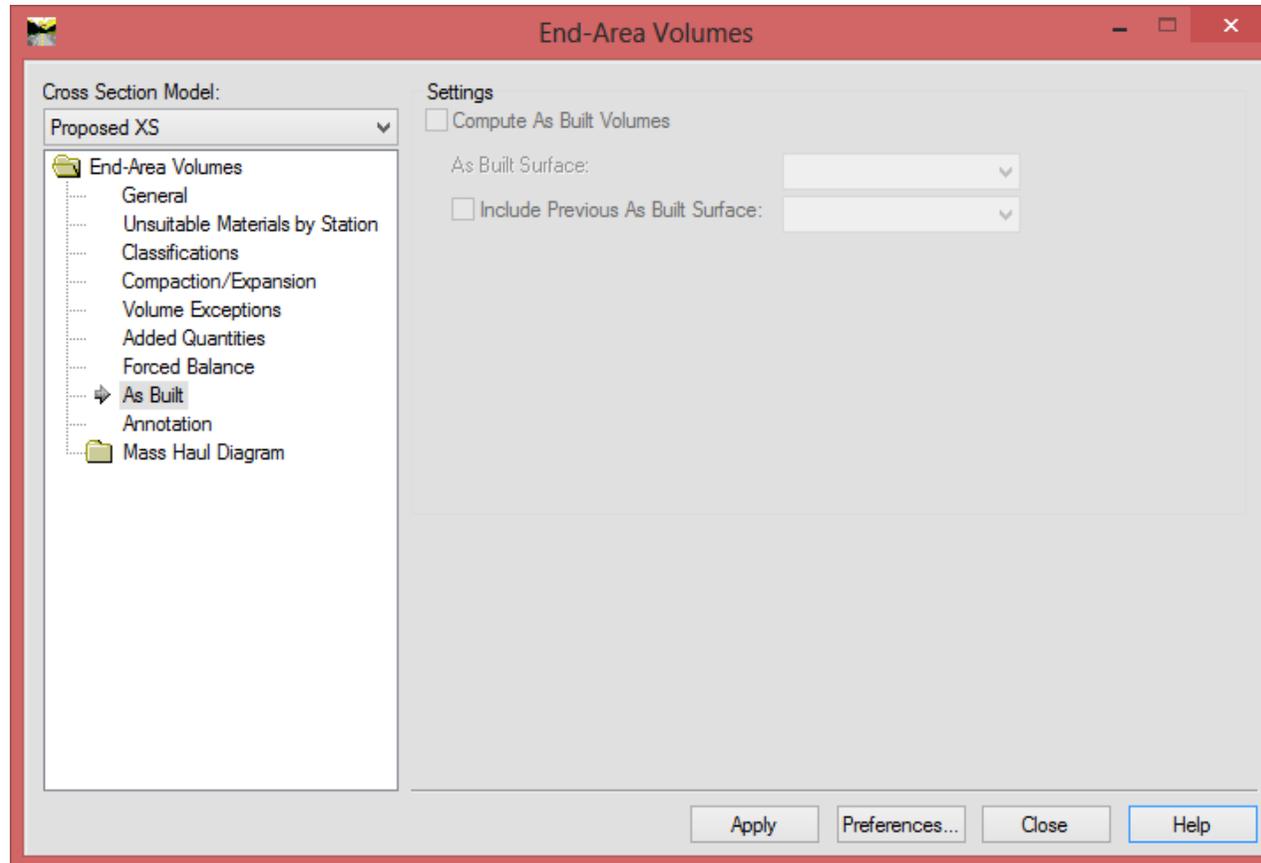
Computing End-Area Volumes

- Forced Balance locations for critical sections along a project such as bridges.



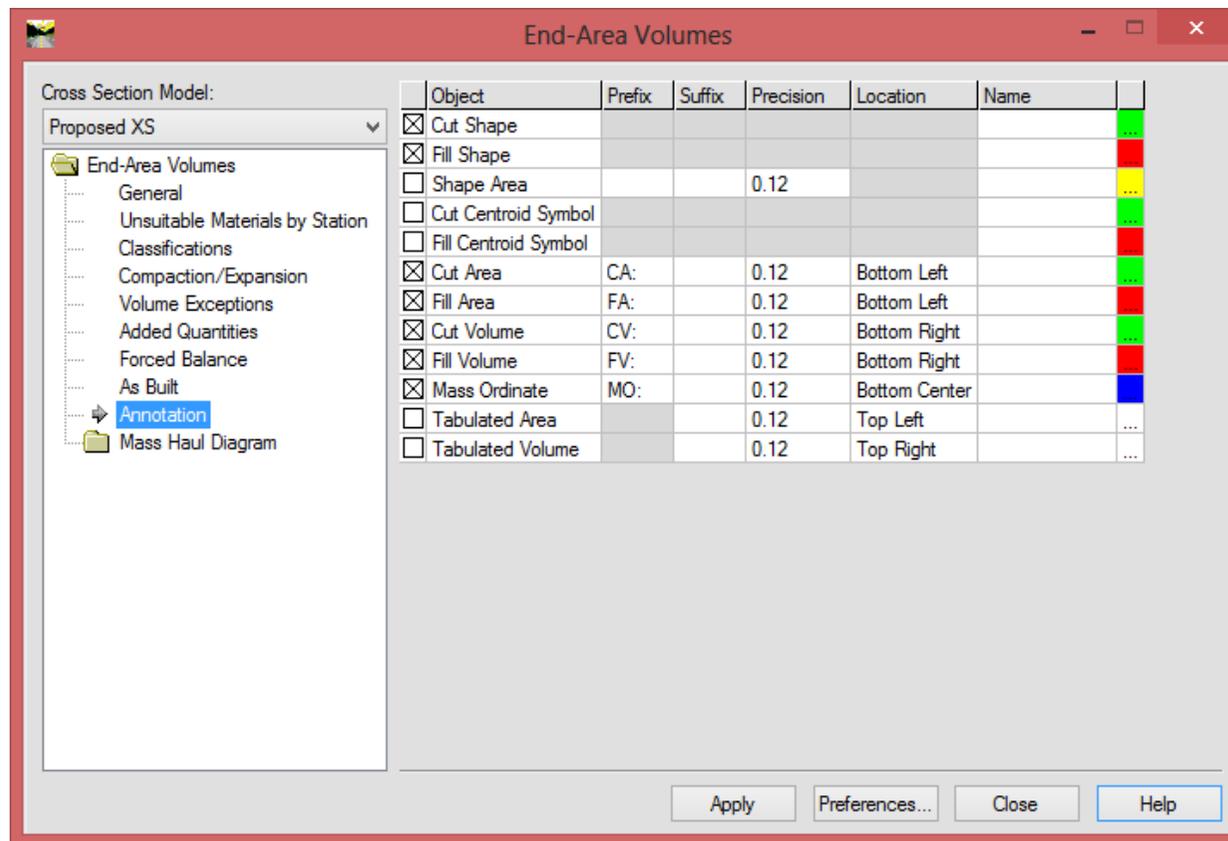
Computing End-Area Volumes

- As Built calculations for surfaces with type set to “none”.



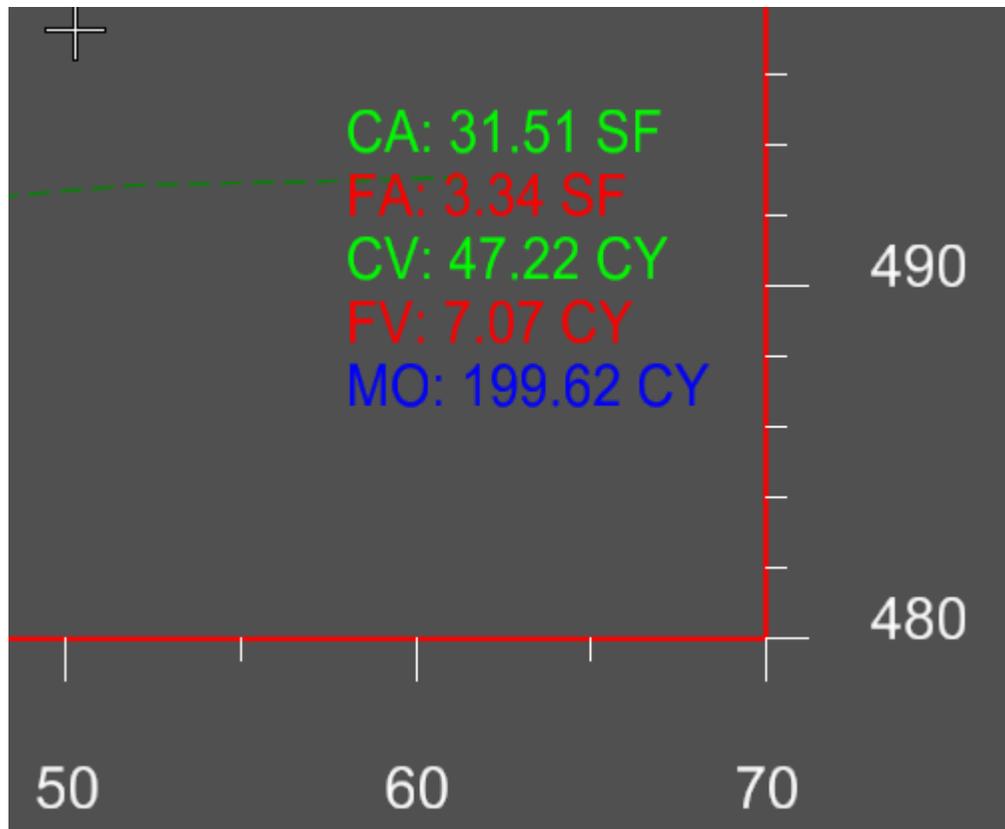
Computing End-Area Volumes

- Customizable Annotation Settings



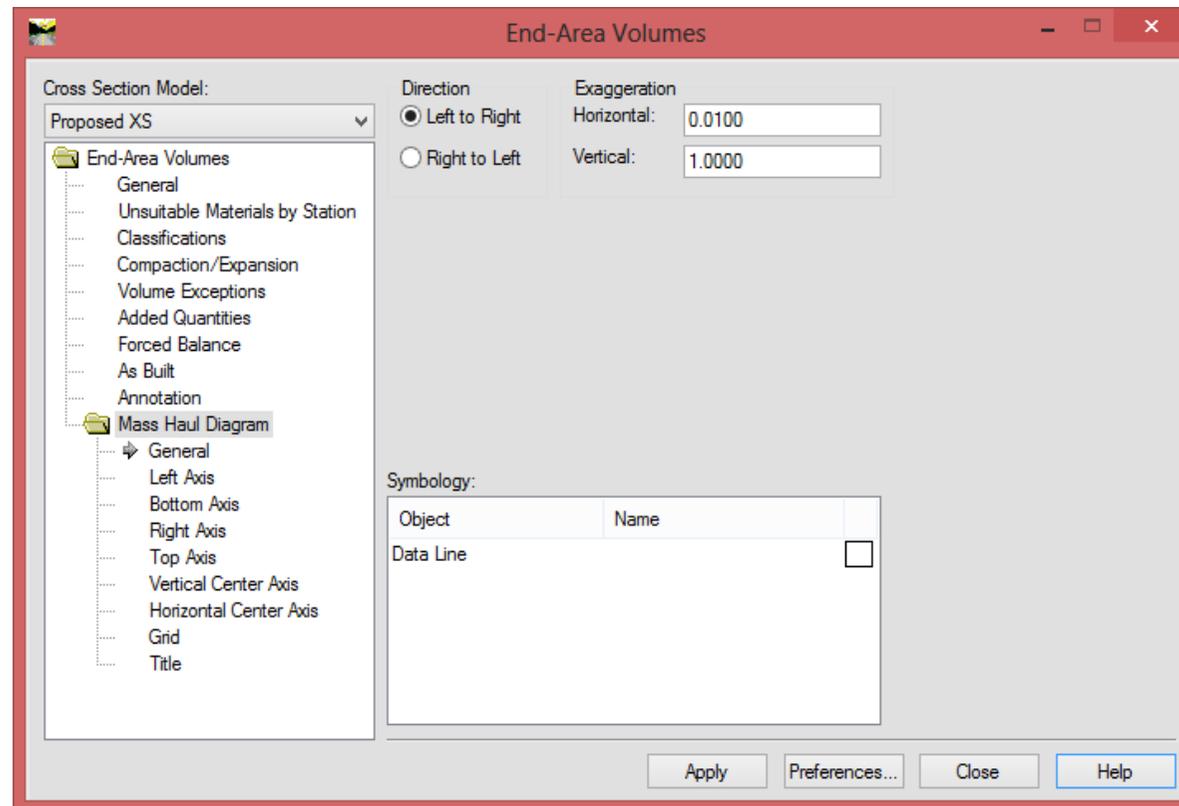
Computing End-Area Volumes

- Customizable Annotation Settings example



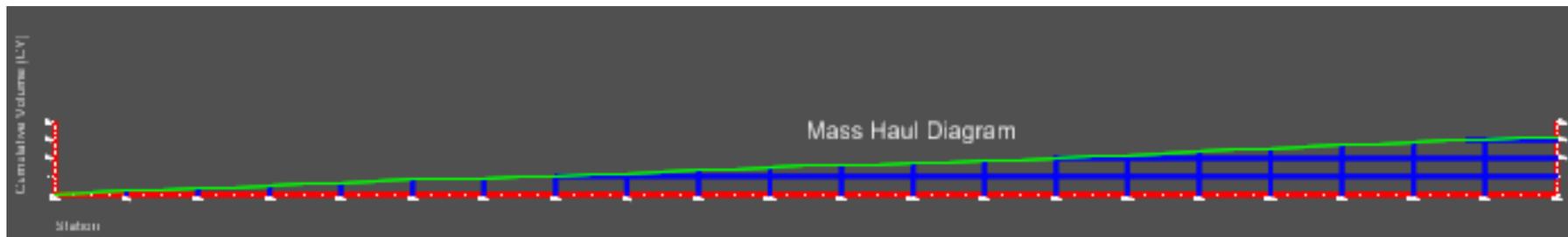
Computing End-Area Volumes

- Mass Haul Diagram



Computing End-Area Volumes

- Mass Haul Diagram example



Computing End-Area Volumes

- Numerous detailed XML reports

Volumes with Replaced Material Added to Normal Fill Report

Report Created: 4/5/2013
Time: 1:35pm

Cross Section Set Name: Proposed XS
Alignment Name: GeomCL
Input Grid Factor: 1.000000

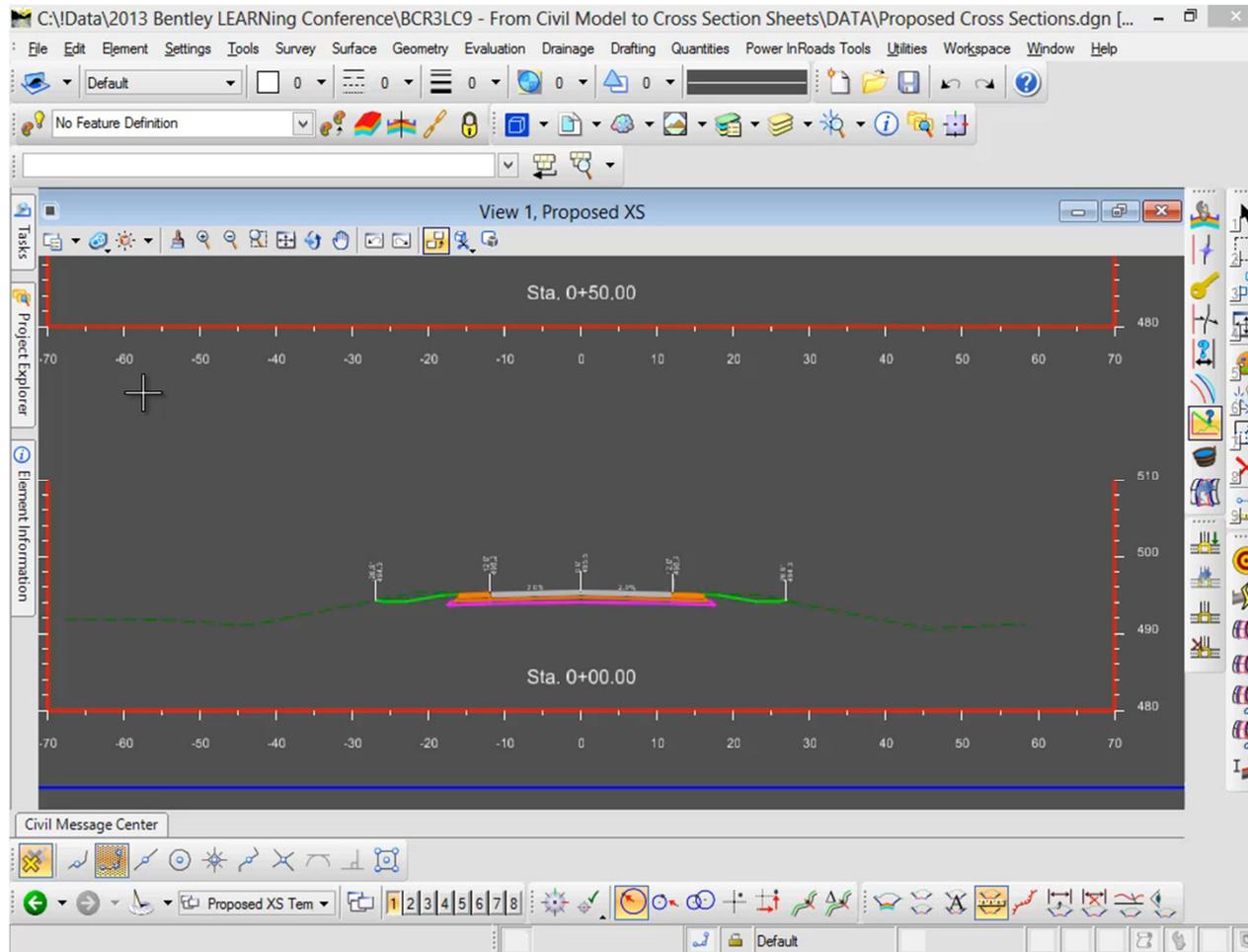
Note: All units in this report are in feet, square feet and cubic yards unless specified otherwise.

Station	Type	Area	Volume	Factor	Adjusted Volume	Included in Mass Ordinate?	Mass Ordinate
0+00.00							0.0
	Normal Cut:	32.0	0.0	0.80	0.0	Yes	
	Normal Fill:	0.0	0.0	1.20	0.0	Yes	
	Normal Fill plus Replaced Material:	2.7	0.0		0.0		
	Added Cut:		0.0	1.00	0.0	Yes	
	Added Fill:		0.0	1.00	0.0	Yes	
	E_Unsuitable_Material (replaced):	2.7	0.0	1.20	0.0	Yes	
	E_Unsuitable_Material (not replaced):	24.3	0.0	1.00	0.0	No	
	Total E_Unsuitable_Material:	27.0	0.0	1.00	0.0		
	Grade_Veg_Grass:	0.0	0.0	1.20	0.0	Yes	
	Grade_Cut:	0.0	0.0	1.20	0.0	Yes	
	Road_Pave_Subbase:	16.3	0.0	1.00	0.0	No	
	Road_Pave_Aggregate:	17.3	0.0	1.00	0.0	No	
	Road_Pave_Shoulder:	2.7	0.0	1.00	0.0	No	
	Road_Pave_Concrete:	8.0	0.0	1.00	0.0	No	

Computing End-Area Volumes

DEMO

Computing End-Area Volumes



Learning Paths: Ready-Made Training Plans

Choose from:

- Bentley recommendations
- Configure your own
 - Organizational
 - Personal

Select:

- Product(s) and version(s)
- Language
- Training type

Enroll team members in:

- One learning path
- Multiple learning paths

The image displays two screenshots of the Bentley Learning Path personalization interface. The left screenshot shows a 'Personalize Learning Path' form with fields for Name and Description, and a list of courses under 'Find Training (14)'. The right screenshot shows a similar form with a different description and a 'Manage Master Course List' section with a table of courses.

Live	Title	Language	Generation	Release Label	LU's
<input type="checkbox"/>	MicroStation Essentials	English			
<input type="checkbox"/>	MicroStation Essentials Basics	English			
<input type="checkbox"/>	MicroStation Essentials Express	English			
<input type="checkbox"/>	MicroStation Essentials	English			
<input type="checkbox"/>	MicroStation for AutoCAD Users	English			
<input type="checkbox"/>	MicroStation for AutoCAD Users Express	English			
<input type="checkbox"/>	MicroStation for Mining and Metal Extraction	English			
<input type="checkbox"/>	MicroStation for AutoCAD Users Express	English			

Live	Title	Language	Generation	Release Label	LU's
<input type="checkbox"/>	ProjectWise User Essentials	English	V8i	SELECTseries 2	8
<input type="checkbox"/>	ProjectWise User Essentials	English	V8i	SELECTseries 3	8
<input type="checkbox"/>	ProjectWise Client Start Up Guide	English	V8i	Base Release	4
<input type="checkbox"/>	ProjectWise User Essentials	English	V8i	Base Release	8

On-Demand	Title	Language	Generation	Release Label	LU's	Type
<input type="checkbox"/>	MicroStation Essentials Lecture Series	English	V8i			
<input type="checkbox"/>	MicroStation Quick Start Guide	English	V8i			
<input type="checkbox"/>	MicroStation Essentials	English	V8i			
<input type="checkbox"/>	MicroStation for AutoCAD Users	English	V8i			
<input type="checkbox"/>	MicroStation for Mining and Metal Extraction	English	V8i			
<input type="checkbox"/>	MicroStation Essentials	English	V8i			
<input type="checkbox"/>	Design Management Studio	English	V8i	Base Release	1	OnDemand eLearning: Lecture
<input type="checkbox"/>	ProjectWise User Essentials	English	V8i	SELECTseries 2	8	OnDemand eLearning: Hands-on
<input type="checkbox"/>	ProjectWise User Essentials	English	V8i	SELECTseries 3	8	OnDemand eLearning: Hands-on
<input type="checkbox"/>	ProjectWise Client Start Up Guide	English	V8i	Base Release	4	OnDemand eLearning: Hands-on
<input type="checkbox"/>	ProjectWise User Essentials	English	V8i	Base Release	8	OnDemand eLearning: Hands-on
<input type="checkbox"/>	ProjectWise User Essentials	English	V8i	Base Release	5	OnDemand eLearning: Hands-on

This session's Learning Path:

Here's a link to a short learning path that includes this session and recommended modules that you may share with your colleagues:

Assessment

1. **True or False:** Cross Sections are cut from the actual 3D Design Model?

Answer - ***True***

2. **Fill In the Blank:** MicroStation's _____ is used to change cross section annotation text size?

Answer – ***Drawing Scale***

3. **Multiple Choice:** A cross section seed file must be:

a. 2D b. 3D c. 2D or 3D Answer - ***c. 2D or 3D***

Conclusion

Questions?