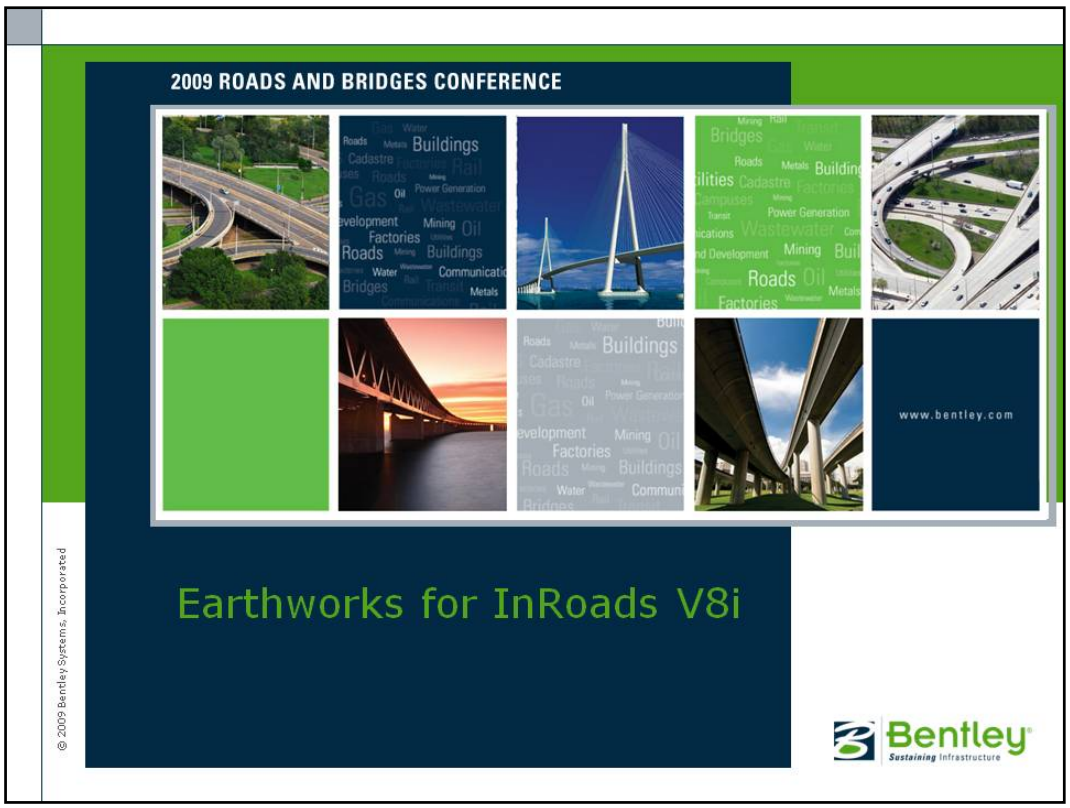
2009 Roads and Bridges Conference

IW-8

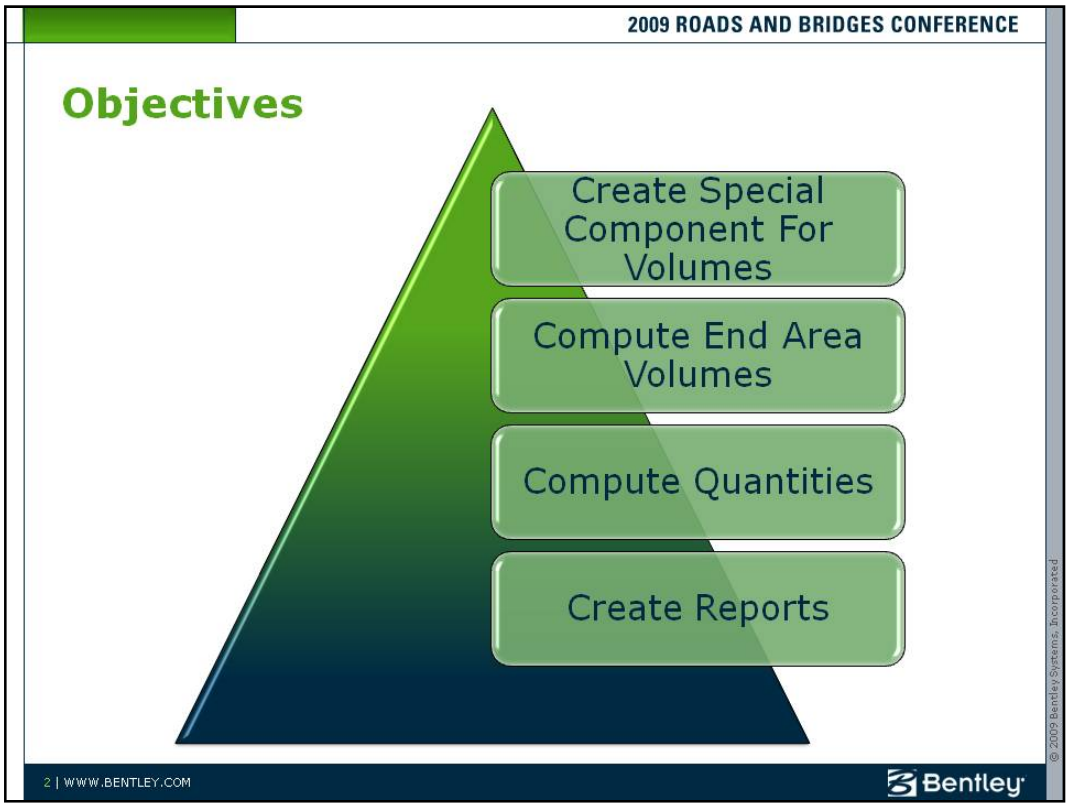
Earthworks for InRoads V8i

Presenter: Volaree Rendon, Senior Application Consultant-Bentley

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



Welcome to Earthworks for InRoads V8i. This workshop introduces some techniques that can be utilized when computing End Area volumes as well some of the new tools for harvesting quantities with Quantity Manager.



In this lesson we will…

Create a special component for computing volumes
Define Areas for Stripping
Compute End Area Volumes
Compute Quantities
Create Reports

Lesson Name: Opening a Project

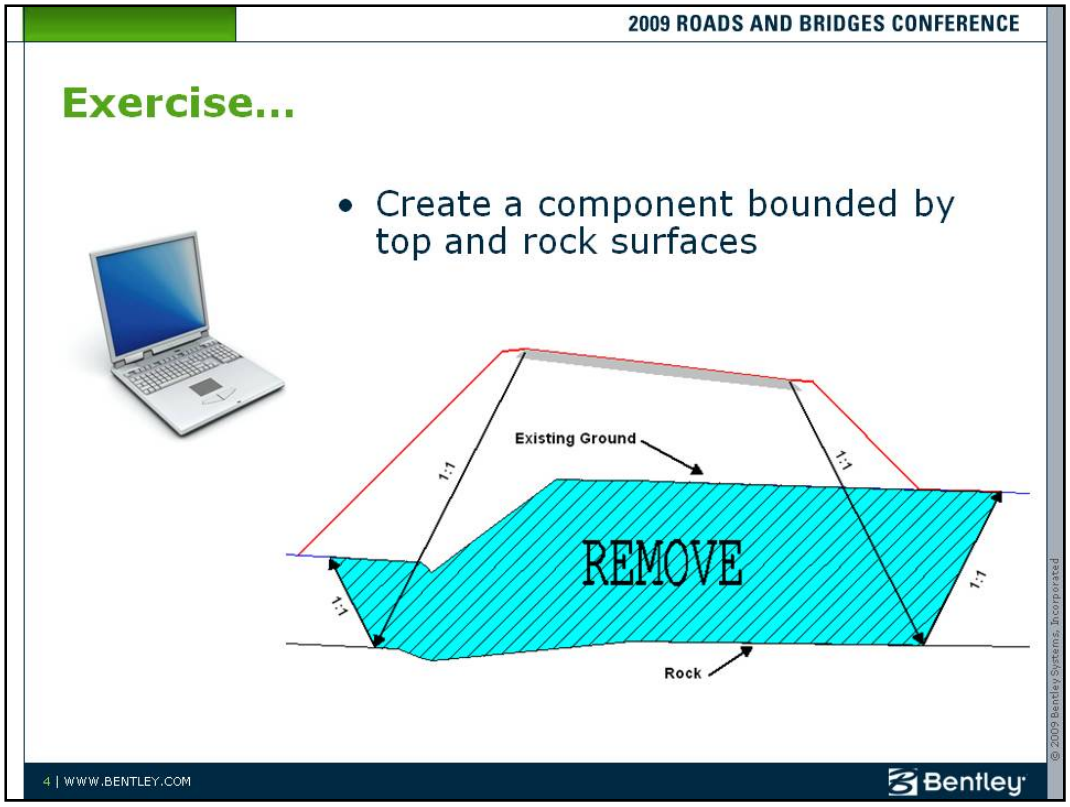
LESSON OBJECTIVE:

In this lesson the student will learn to access an InRoads project in preparation for computing end area volumes.

EXERCISE: GETTING STARTED

This exercise will guide you through the steps to get started

1. Double-click the InRoads or InRoads Suite icon
   The MicroStation Manager appears
   If there is no icon, then an alternate path for launching InRoads is
   Start > Programs > Bentley > InRoads Group V8i (SELECTseries 1) > InRoads
2. The instructor will provide the appropriate path location for this project. Open the CAD file **SR 2067 Bypass.dgn** located in the training folder for this workshop.
3. Once InRoads has started, open the file **Project.rwk** located in the same folder as the design file.



Lesson Name: Create special components for volumes

LESSON OBJECTIVE:

In this lesson the student will create a component whose bottom follows a rock surface and whose top follows the existing surface.

EXERCISE: EVALUATE THE STARTING TEMPLATE

In addition to their use in Cross Section graphics, the areas of each closed component shape are measured when determining End Area Volumes. The End Area Volumes command calculates and reports earthwork volumes between the existing surface and the design subgrades, as well as component volumes. Some agencies require volumes that are more complicated than the industry standard. If volumes for an unusual workflow are required, a component can be made to represent and calculate the volume.

The case shown in the previous illustration requires a proposed component to follow the limits of an existing ground surface on the top and a rock substratum on the bottom. The sides are defined as 1:1 fill slopes from the pavement to the rock surface and then outwards at 1:1 back up to the existing ground surface.

1. Select **Modeler > Create Template**.
2. In the Create Template dialog, open the *Templates* folder and double-click on the **Pavement-Only** template to make it active.
3. Explore and test the template.
   The template consists of a pavement component and left and right fill components seeking the Existing Ground surface.

EXERCISE: CREATE THE PAVEMEN-SUBGRADE TO ROCK TEMPLATE

1. Copy the **Pavement-Only** template
2. Rename the New Template to **Pavement SubgradeToRock**
3. Double-click the **Pavement SubgradeToRock** template to make it Active.

EXERCISE: ADD THE FILL BEDROCK COMPONENT

1. This component will represent material extending from the pavement section to the rock surface with 1:1 fill slopes
2. Select **Tools > Options** and ensure *Apply Affixes* is enabled. **_L** should the left suffix and **_R** should be the right suffix. Leave the Left and Right Prefix blank.
3. Click **OK** in the Template Options dialog
4. Right-Click in the Current Template window and select **Add New Component > Unconstrained**.
5. Enter **Fill to Rock** for the *Component Name*
6. Select **P_Road_AggregateTypeB** for the *Style*
7. Open the Dynamic Settings by selecting **Tools > Dynamic Settings**, or select the last icon on the bottom of the current template window
8. Enter **Rock** for the Point Name and select **E_SURF_Rock** for the *Style*
9. Place the first point by snapping to the **EOP_bot_L** point.

10. Place the second point by snapping to the **CL_bot** point.

11. Place another point by snapping to the **EOP_bot_R** point.

12. In the Dynamic Settings window, select **hs=** for the key in and enter **5,-100%** to place the next Rock_R point.

13. In the Dynamic Settings window, click the **Set Dynamic Origin** button

14. Click the **EOP_bot_L** point.

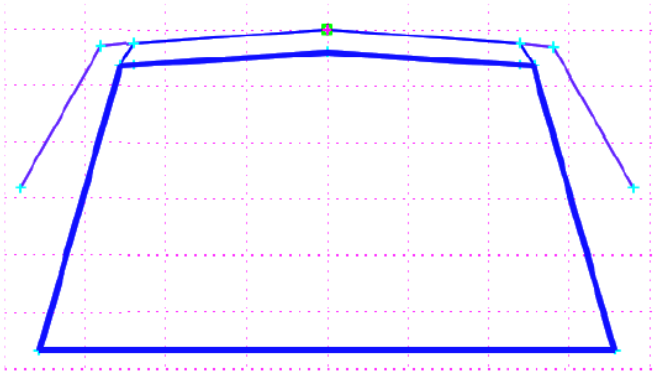
15. In the Dynamic Settings window select **os=** for the key in and enter **-5,100%** to place the **Rock_L** point.

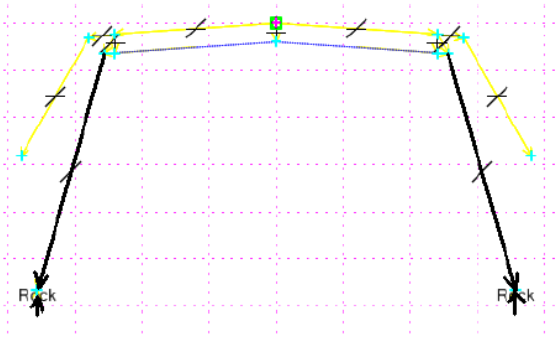
16. Right click and ensure **Close Shap**e is selected, then click **Finish**.

17. Double-click on the **Rock_L** point. Add a **Slope** constraint and assign **EOP_bot_L** as the Parent.

18. Add a Project to Surface (Any Direction) constraint and select the surface Rock.

19. Repeat steps 11 and 12 for the **Rock_R** point with **EOP_bot_R** as the parent. The results should look like the following illustration.





20. Test the template

EXERCISE: CREATE THE SPECIAL VOLUME COMPONENT

This component is bounded on the bottom by the Rock surface, the top by the Existing Ground surface and the sides a 1:1 slope from the Rock Surface.

1. Right-Click in the Current Template window and select **Add New Component > Unconstrained**.
2. Enter **Volume-Existing Rock** for the *Component Name*
3. Select **P_Road_Subbase** for the *Style*
4. Enter **Fill** for the Point Name and select **P_Road_FillLine** for the *Style*
5. In the Dynamic Settings window, click the **Set Dynamic Origin** button.
6. Click on the **Rock_L** point
7. Select os= and enter -4,-100% to place the first point
8. Place the second point by snapping to the **Rock_L** point.
9. Place the third point by snapping to the **Rock_R** point.
10. In the Dynamic Settings window enter **hs=4,100%** to place the last point.
11. Right-click and select **Finish**.

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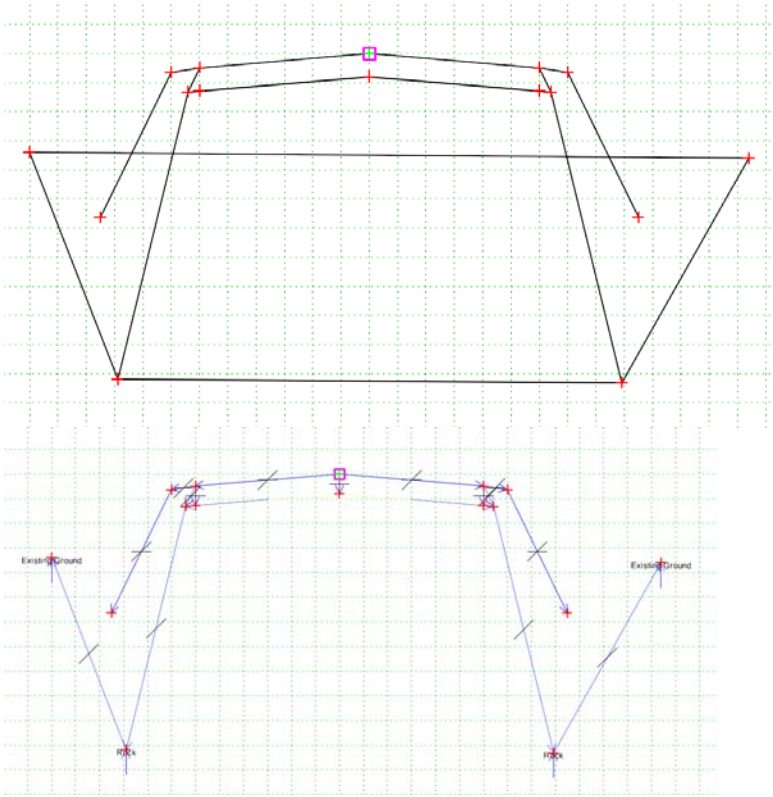
12. Edit the two Fill points with appropriate Project to Surface (Existing Ground) and 1:1 Slope constraints.

The results should look like the following:



13. Test the template when finished

Lesson Name: Use the Template for a New Corridor

LESSON OBJECTIVE:

In this lesson the student will use the template previously created to define a new corridor model and review the results.

EXERCISE: CREATE A NEW CORRIDOR

1. Select **Modeler > Roadway Designer**.
2. Select **File > New**.
3. Navigate to the folder path provided by the instructor for this workshop and enter SR 2067.ird
4. In the Roadway Designer, select **Corridor > Corridor Management**
5. Enter **Subgrade to Rock** for the *Corridor Name*
6. Make sure the *Horizontal Alignment* is set to **SR 2067 Bypass**
7. The *Vertical Alignment* should be set to **Profile Grade**.
8. Select the **Add** button, then Close the Corridor Management dialog.
9. Select **Corridor > Template Drops**.
10. Open the folder **Templates** and **Add** the Pavement SubgradeToRock template
11. Process All and review the design.

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EXERCISE: CREATE A DESIGN SURFACE

1. Select **Corridor > Create Surface**
2. Make sure the Create Surface dialog is set up as follows:

   Surface Name: **Design with Rock**

   Default Preference: **Finished Surface**

   New Surface for Each Corridor: **Disabled**

   Empty Design Surface: **Disabled**

   Include Null Points: **Disabled**

   Add Exterior Boundary: **Enabled**

   Boundary Style: **P_SURF_Exterior**

   Create Surfaces from: **Subgrade to Rock**

   Add Transverse Features: **Disabled**

   Create Alternate Surfaces: **Disabled**

   Process Visible Range Only: **Disabled**

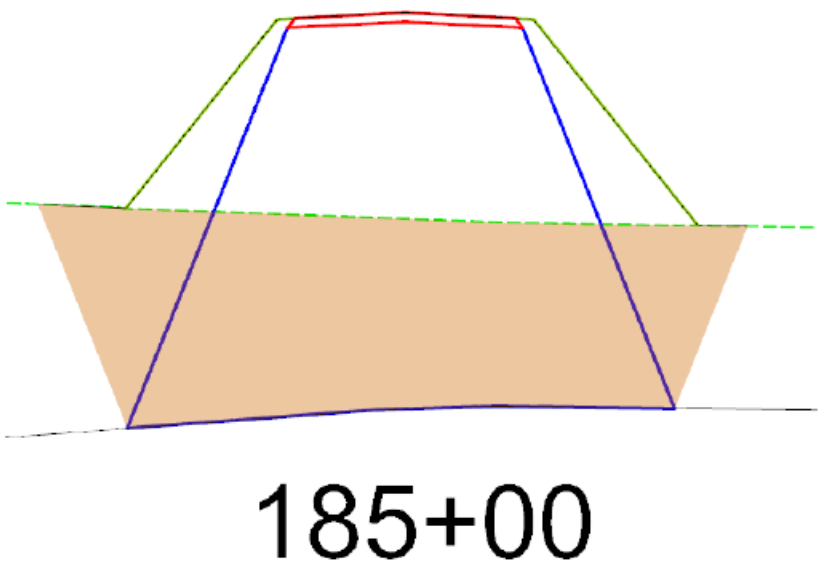
   Remove Loops: **Disabled**

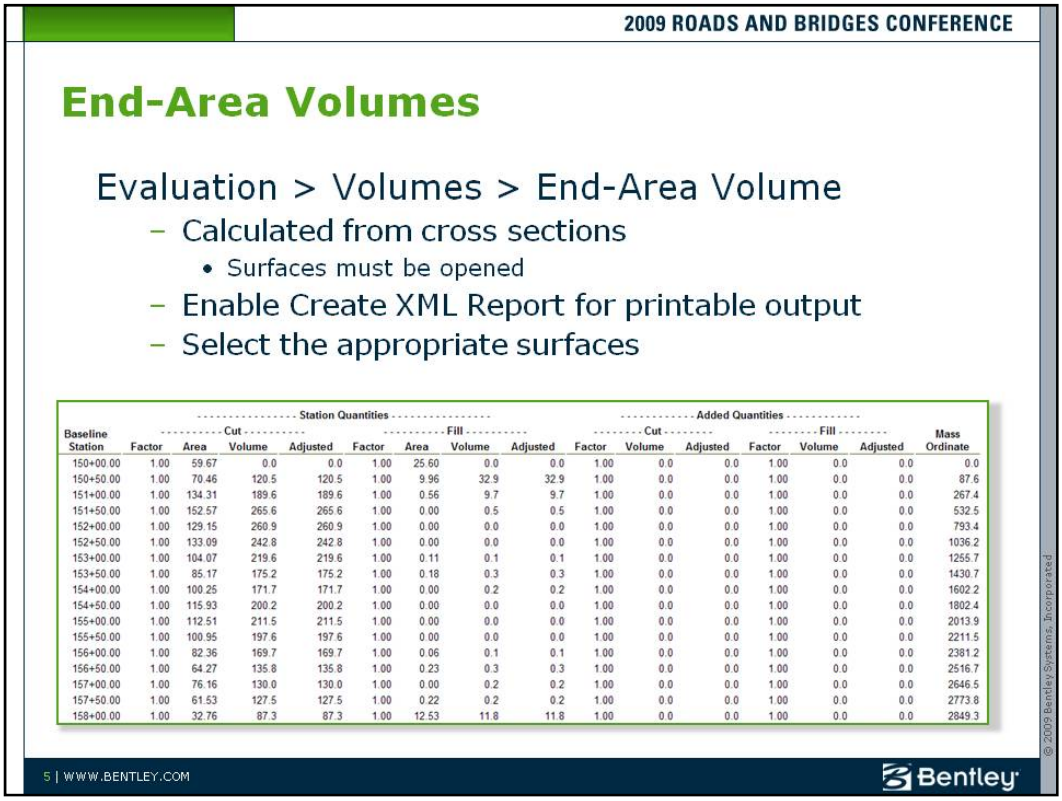
   Display in Plan View: *Features/Components*-**Disabled**

   Triangulate Surface: **Enabled**
3. Select **Apply**, then **Close** the dialog after it executes.
4. Save the Roadway Designer file, then close the Roadway Designer.

EXERCISE: CREATE CROSS SECTIONS

1. Select **Evaluation > Cross Section > Create Cross Sections**
2. Select the *General* leaf and verify the **Design with Rock, Rock** and **Existing Ground** surfaces are enabled.
3. Click **Apply** and place the cross sections to the right of the plan graphics.
4. Verify the resulting Components and that the tops and bottoms follow the Existing Ground surfaces.





Baseline	Station Quantities								Added Quantities						
	Cut				Fill				Cut			Fill			Mass
Station	Factor	Area	Volume	Adjusted	Factor	Area	Volume	Adjusted	Factor	Volume	Adjusted	Factor	Volume	Adjusted	Ordinate
150+00.00	1.00	59.67	0.0	0.0	1.00	25.60	0.0	0.0	1.00	0.0	0.0	1.00	0.0	0.0	0.0
150+50.00	1.00	70.46	120.5	120.5	1.00	9.96	32.9	32.9	1.00	0.0	0.0	1.00	0.0	0.0	87.6
151+00.00	1.00	134.31	189.6	189.6	1.00	0.56	9.7	9.7	1.00	0.0	0.0	1.00	0.0	0.0	267.4
151+50.00	1.00	152.57	265.6	265.6	1.00	0.00	0.5	0.5	1.00	0.0	0.0	1.00	0.0	0.0	532.5
152+00.00	1.00	129.15	260.9	260.9	1.00	0.00	0.0	0.0	1.00	0.0	0.0	1.00	0.0	0.0	793.4
152+50.00	1.00	133.09	242.8	242.8	1.00	0.00	0.0	0.0	1.00	0.0	0.0	1.00	0.0	0.0	1036.2
153+00.00	1.00	104.07	219.6	219.6	1.00	0.11	0.1	0.1	1.00	0.0	0.0	1.00	0.0	0.0	1255.7
153+50.00	1.00	85.17	175.2	175.2	1.00	0.18	0.3	0.3	1.00	0.0	0.0	1.00	0.0	0.0	1430.7
154+00.00	1.00	100.25	171.7	171.7	1.00	0.00	0.2	0.2	1.00	0.0	0.0	1.00	0.0	0.0	1602.2
154+50.00	1.00	115.93	200.2	200.2	1.00	0.00	0.0	0.0	1.00	0.0	0.0	1.00	0.0	0.0	1802.4
155+00.00	1.00	112.51	211.5	211.5	1.00	0.00	0.0	0.0	1.00	0.0	0.0	1.00	0.0	0.0	2013.9
155+50.00	1.00	100.95	197.6	197.6	1.00	0.00	0.0	0.0	1.00	0.0	0.0	1.00	0.0	0.0	2211.5
156+00.00	1.00	82.36	169.7	169.7	1.00	0.06	0.1	0.1	1.00	0.0	0.0	1.00	0.0	0.0	2381.2
156+50.00	1.00	64.27	135.8	135.8	1.00	0.23	0.3	0.3	1.00	0.0	0.0	1.00	0.0	0.0	2516.7
157+00.00	1.00	76.16	130.0	130.0	1.00	0.00	0.2	0.2	1.00	0.0	0.0	1.00	0.0	0.0	2646.5
157+50.00	1.00	61.53	127.5	127.5	1.00	0.22	0.2	0.2	1.00	0.0	0.0	1.00	0.0	0.0	2773.8
158+00.00	1.00	32.76	87.3	87.3	1.00	12.53	11.8	11.8	1.00	0.0	0.0	1.00	0.0	0.0	2849.3

Lesson Name: Compute End-Area Volumes

LESSON OBJECTIVE:

In this lesson the student will learn to how to compute end area volumes and generate an End-Area Volume report.

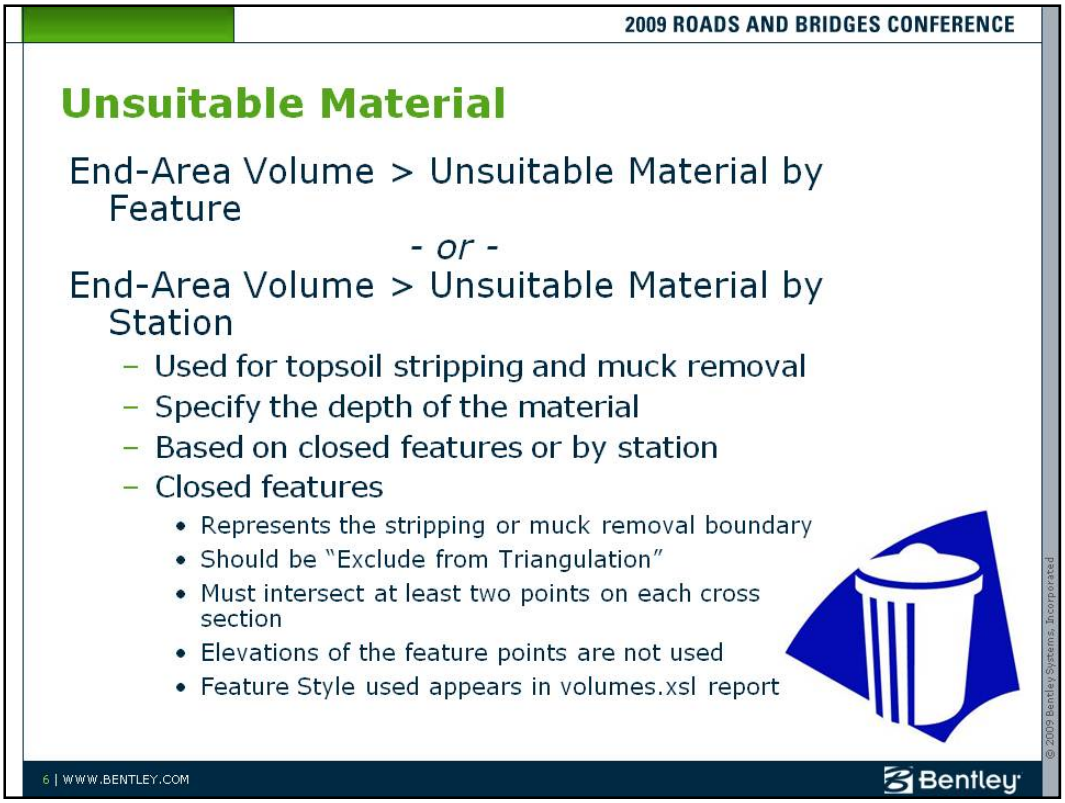
End Area Volume

End-Area volumes are computed using the **Evaluation > Volumes > End Area Volume** command.

End-Area Volumes are based on a Cross Section set. The appropriate Cross Section Set is selected on the End-Area Volume dialog. Cross sections must be created prior to computing End-area Volume. The surfaces that were displayed on the Cross Section Set are required to be opened for some of the End-Area Volume options. For example, the Unsuitable Materials by Feature option requires that the surface containing the unsuitable material features be opened for that option to work correctly.

The End-Area Volume command produces reports using the InRoads XML reporting system. To produce reports, enable the Create XML Report option on the **End-Area-Volume > General** leaf.

The End-Area Volume computations are based on the surfaces displayed on the Cross Section Set. Each surface has an associated Type which is set during surface creation or adjusted using the **Surface > Surface Properties** command. For survey or existing ground surfaces, the Type should be set to Existing. Surfaces created using the Roadway Design will automatically have a Type that is set to Design. The Type can also be overridden using the End-Area Volume > Classification leaf. To select which surfaces to be included in the volume computations, enable the appropriate surfaces in the **End-Area Volume > General** leaf.

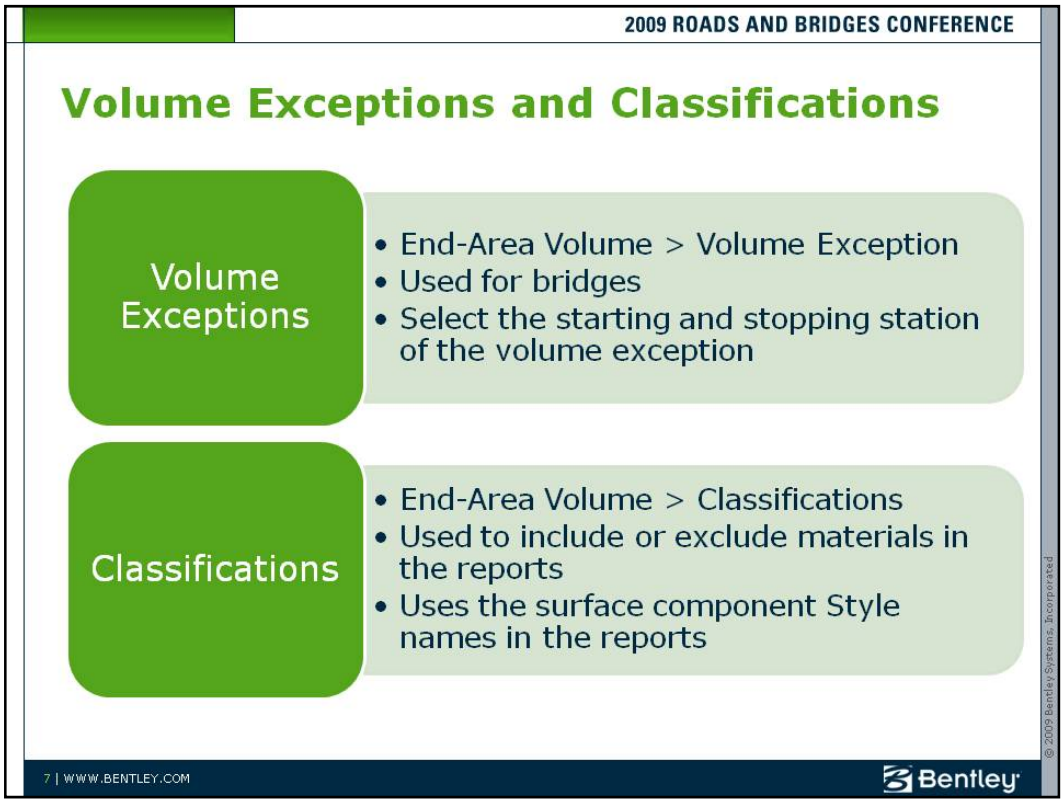


Unsuitable Material

The End-Area Volume command can compute volumes for unsuitable material during the End-Area Volume calculations. Unsuitable material can be used for muck removal and/or topsoil stripping. This volume can also be delineated on the cross sections.

To use the unsuitable material option, select the **End-Area Volume > Unsuitable Material by Feature** leaf or the **End-Area Volume > Unsuitable Material by Station** leaf. Both methods allow you to specify a material depth.

The Unsuitable Material by Feature option requires that a closed surface feature exist that represents the area where the muck and/or topsoil stripping is located in plan view. This closed surface feature should be created as an "Exclude from Triangulation" feature. Two or more points of the closed surface feature must intersect the cross sections. The Feature Style name of the surface feature will appear in the volumes.xsl report.



Volume Exceptions

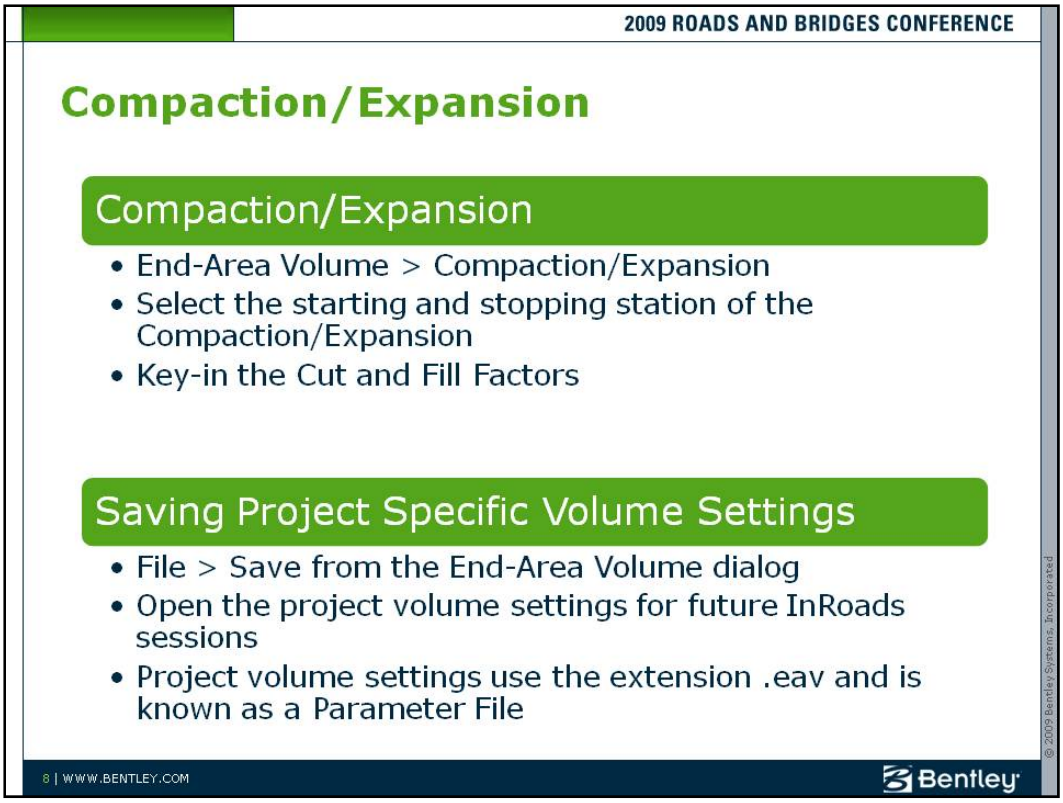
The End-Area Volume command can eliminate volumes based on station ranges. This is commonly used for eliminating fill volumes when the design surface crosses a bridge.

To enter a volume exception, select the **End-Area > Volume Exception** leaf. Select the Start Station and Stop Station, then click the Add button. These stations represent the range where the volumes are not computed. The selected Start and Stop Stations are actual cross section locations and cannot be keyed in.

Classifications

The End-Area Volume command can compute volumes for selected materials contained in the design surface and other subgrade surfaces. These materials are normally components contained in the design surface.

To compute volumes for a material, select the **End-Area > Classifications** leaf. Click on the material's Mass Ordinate to toggle the material from "Exclude" to "Include". This will "Include" the material in the volume reports. These reports include the Volumes.xsl, MultipleMaterialVolumes.xsl and EarthworkQuantitites.xsl. When reporting on the component's material, the component's Style name is referenced in the reports.



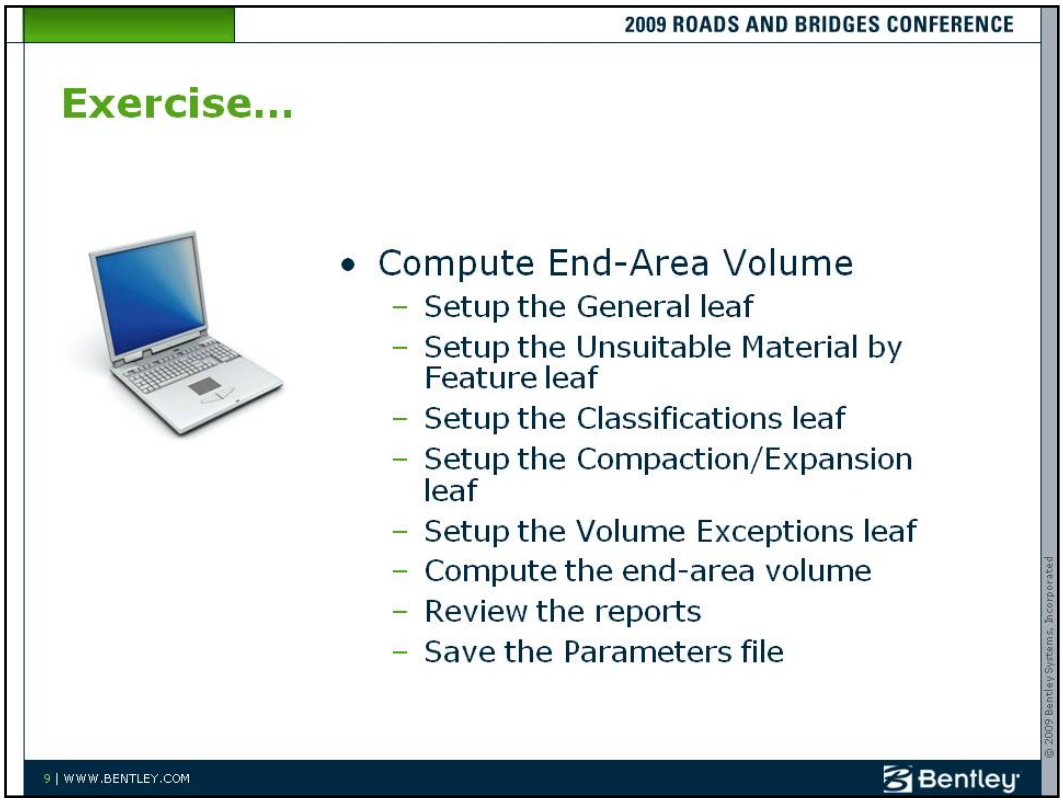
Compaction/Expansion

The End-Area Volume command can compute cut and fill volumes based on material expansion and contraction. The expansion and compaction of material is set using Cut and Fill Factors. When the Cut and Fill Factors are set to 1.0, which is the default, no expansion or compaction is computed.

To set the Cut and Fill Factors, select **the End-Area Volume > Compaction/Expansion** leaf. Key-in the appropriate Cut and Fill Factors along a cross section station range and click the Add button. This allows you to set up expansion and contraction of material that vary along the project corridor, or that are constant throughout the project.

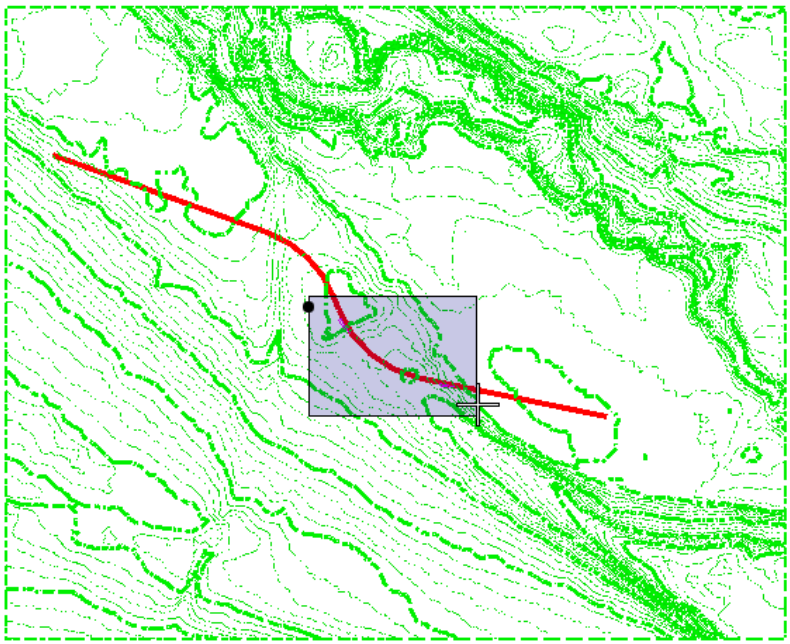
Saving Project Specific Volume Settings

Project specific settings in the various End-Area volume leafs, like the Volume Exceptions and Unsuitable Material by Feature leafs, are saved in a Parameter file. The Parameter file is normally saved in the project folders for later use. To save the Parameter file, select File > Save from the end-Area Volume menus. The Parameters file is opened using the File > Open command from the End-Area Volume menus during a future InRoads session. When existing the End-Area Volumes dialog, you will be prompted to save the Parameters file if there are unsaved changes.

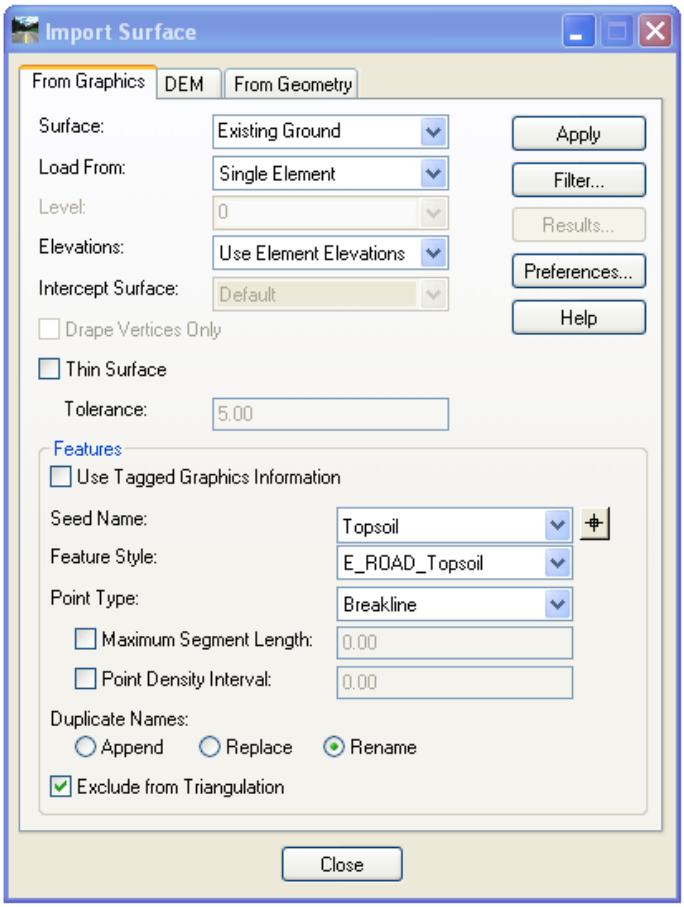


EXERCISE: IMPORT TOPSOIL FEATURES

1. Window Area into the area shown in the illustration below:



2. Just before and after the second curve, you will see two purple dashed shapes.
3. Select **Surface Import Surface Graphics** and set up the parameters according the dialog shown below:



4. Select **Apply** and select the first shape, then repeat for the second shape.
5. Close the Import Surface dialog.
6. Select **Surface > Feature > Feature Properties**.
7. Select the surface Existing Ground. You should see two features named Topsoil and Topsoil1.
8. After verifying the features, close the Feature Properties dialog.

EXERCISE: CREATE A NEW CORRIDOR

1. Open the Roadway Designer
2. Select **Corridor > Corridor Management**
3. Create a new Corridor called **Option 2**
4. When finished, close the Corridor Management dialog.
5. Select **Corridor > Template Drops**
6. Open the Templates folder and **Add** the Two Lane Urban template
7. When finished, close the Template Drops dialog
8. Process All and Review the design.

EXERCISE: CREATE A DESIGN SURFACE

1. Select **Corridor > Create Surface**
2. For the surface name enter **Finished**
3. Select the Corridor **Option 2**
4. Disable *Remove Loops* and *Display Features in Plan View*, then click **Apply.**
5. Save the Surface Finished.
6. Close the Roadway Designer

EXERCISE: CREATE CROSS SECTION

1. Select **Evaluation > Cross Section > Create Cross Secton**
2. Ensure **Finished** and **Existing Ground** Surfaces are enabled. Disable all other surfaces.
3. Name the cross section set Option 2
4. Click **Apply** and place the set of cross sections below the previous set of cross sections

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EXERCISE: COMPUTE END AREA VOLUME

1. Select **Evaluation > Volumes > End-Area Volume**
2. Select **Option 2** for the Cross Section Set.
3. Ensure the Existing Ground, Finished surfaces are enabled.
4. Enable the *Create XML* Report option.
5. Select the **Unsuitable Material by Feature** leaf.
6. Select Existing Ground for the Surface.
7. Key-in **1.0** for the Depth
8. Select **Topsoil** and **Topsoil1** from the *Available Closed Features* list.
9. Click **Add**.
10. Select the Classifications leaf. Click the Mass Ordinate field for the P_Road_Asphalt material. This will change the value from "Exclude" to "Include".
11. Select the **Compaction/Expansion** leaf.
12. Select 257+50 as the Stop Station.
13. Key-in **1.10** for the Cut factor
14. Key-in **1.05** for the Fill Factor
15. Click **Add**
16. Select the **End Area Volume > Volume Exceptions** leaf.
17. Select **179+00** as the Start Station
18. Select **206+00** as the Stop Station.
19. Click **Add**.
20. Click **Apply** on the End-Area Volume dialog.
    This brings up the Bentley InRoads Repor Browser If you get a warning message stating "You need to set the Style Sheet Default…", click OK and select the Evaluation > Volumes.xsl Style Sheet. Browse through the other available style sheets and review the results.
21. Review the graphics on the cross sections using the Cross Section Viewer. Notice the Topsoil shown on the cross sections near 210+50 and 230+00

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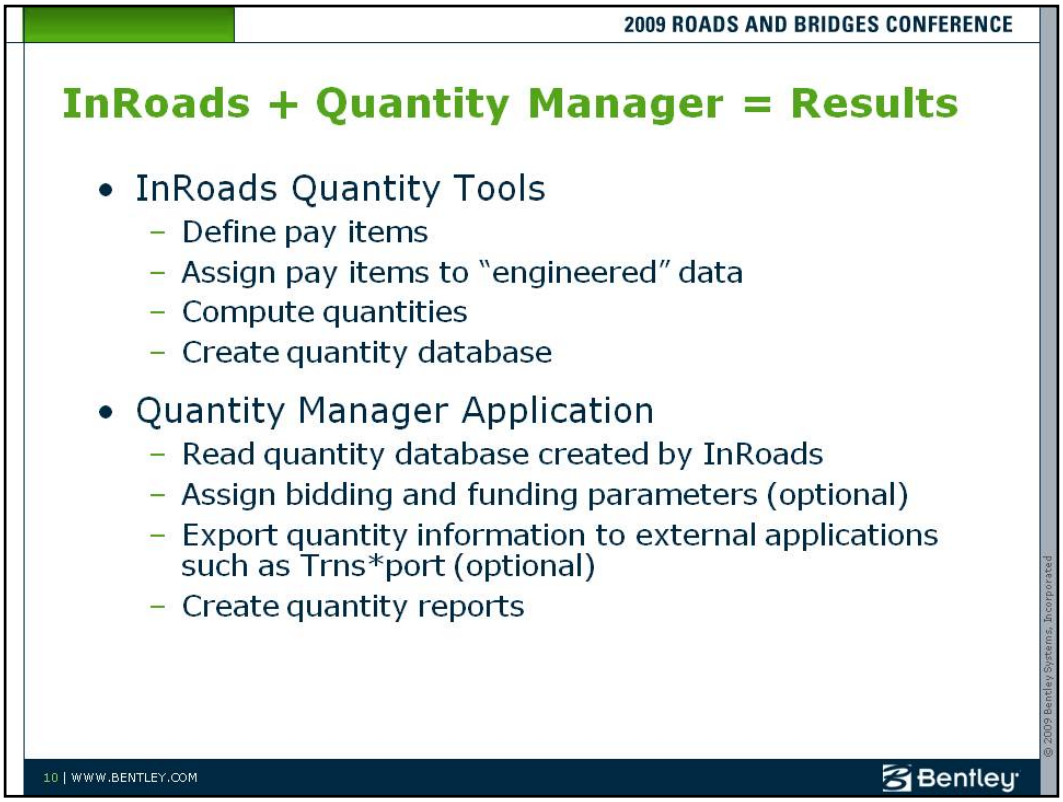
EXERCISE: SAVE THE PARAMETERS FILE

1. Select **File > Save** from the End-Area Volume dialog
2. Save the file to the directory specified by the instructor for this workshop
3. Key-in **SR 2067 Bypass volumes**.eav for the File name.
4. Click **Save**.
5. Close the End-Area Volume and Cross Section viewer dialogs.



Lesson Name: Quantity Manager

LESSON OBJECTIVE:

In this lesson the student will learn how to assign pay items and harvest quantities with the Quantity Manager

InRoads Quantity Tools

The Quantity commands are used to store and manage pay item information, quantity measurement formulas, and convert geometric measurements of an InRoads surface feature to a quantity.

All quantity formulas and pay items are stored in a pay item database, which is a Microsoft Access database to store InRoads quantity formulas and pay item information. The pay item database is totally independent of the civil.xin and any other InRoads files. It can reside at any location and can be used interchangeably in a manner similar to a civil.xin file. Also, it can be loaded through project defaults.

The quantity take off solution consists of formulas to compute various types of quantities, computation parameters that are associated with feature styles, and an automated process to compute InRoad quantities. The automated process locates data that matches a specified set of pay items, computes the quantity for that data and outputs the quantity information to a Quantity Manager database.

EXERCISE: REVIEW PAY ITEMS

1. Pay Items are stored in a Pay Item Database, and must first be opened before Pay Items can be assigned.
   Note: This workshop does not cover how to create pay items or pay item formulas. More detailed topics related to Quantity Manager are featured in other workshops.
2. Select **Tools > Application Add-Ins** and select Quantity Add in. This will cause the Quantities menu to appear in the InRoads Explorer.
3. Select **Quantities > Pay Item Manager**
4. In the Pay Item Manager dialog, select **File > Open**
5. Browse to the directory specified by the instructor for this workshop and open **Pay Items.mdb**
6. On the left hand side of the Pay Item Manager dialog, open the folder
   450-490 CONCRETE PAVING AND ASSOCIATED ITEMS
7. On the right hand side, double-click on the **Pay Item 450C00-Curb** Integral Curb Linear Feet
8. Review the setting for this pay item, and use the arrows at the top to review a few more pay items.
9. When finished, Close the Edit Pay Item dialog.
10. Close the Pay Item Manager.

EXERCISE: ASSIGN PAY ITEMS TO SURFACE FEATURES

Pay items can be assigned to surface features, feature styles, and CAD graphics. Pay items can also now be assigned to components as well as to cut, fill, borrow and waste in the End Area Volumes command, which will be covered in a later exercise.

1. First, we will assign pay items to surface features. Pay items can be assigned to surface features using the Quantities > Assign Pay Items command or through the Feature Properties command.
2. Select **Surface> Feature > Feature Properties**
3. Select the surface **Finished**
4. In the Feature Properties dialog, select the feature **Option 2–LT_BOC**.
5. In the Pay Items area, select the Pay Items button.
6. In the Pay Item dialog, open the folder **450-490 CONCRETE PAVING AND ASSOCIATED ITEMS**
7. Locate the pay item **450C00-Curb** Integral Curb Linear Feet.

8. Click **Add**
9. Select the Pay Item **450D00-JT Seal** and click **Add**, then **Close**
10. Click **Apply** in the Feature Properties dialog.
11. Repeat steps 5-9 for the Option 2- **RT_BOC** feature.
12. Select the feature **CL_Agg_Bot**
13. Assign the pay item **411A020-ASPH** (located in the 411-429 ASPHALT PAVING, LEVELING, BINDER AND WEARING folder) to this feature. Don't forget to click **Apply**.
14. Assign the following pay item to the **Exterior Boundary** feature:
    201B000 Clearing (located in the 201-209 CLEARING, GRUBBING AND REMOVAL folder)

EXERCISE: COMPUTE QUANTITIES

1. Select **Quantities > Compute Quantities** in the Output area
2. Select the Browse button and browse to directory specified by the instructor for this workshop.
3. Name the file SR2067.mdb
4. Click **Apply**, then close the Compute Quantities dialog.

EXERCISE: COMPUTE QUANTITIES

1. Select **Quantities > Quantity Manager** (this might take a few seconds to load)
2. Select **Project > Open** from the Quantity Manager dialog
3. Select the **Browse** button and select **SR0267.mdb** from this workshop directory
4. Click **Connect** and Review the pay item tree on the left hand side.

5. Highlight the root folder. (this is so when we create a report it will report on all of the pay items.)
6. Select **Tools > Reports > Create**
7. Select the report **Sample Pay Item Summary** (HTML)
8. Name the file **SR2067.html**
9. Click **Create**
10. Review the report.
11. Close Quantity Manager

Name	Description	Unit	Unit Cost	Total Quantity	Total Cost
201B000	Clearing	Acre	0.0	16.00	0.00
411A020 - ASPH	Hot Bituminous Pavement, Mix 1	Ton(s)	0.0	447.77	0.00
450C00-Curb	Integral Curb	Linear Feet	0.0	21783.25	0.00
450D00-JTSeal	1 1/4" Preformed Elastomeric Joint Seal	Linear Feet	0.0	21783.25	0.00

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Lesson Name: Computing Quantities from End Area Volumes

LESSON OBJECTIVE:

In this lesson the student will learn how to assign pay items and compute quantities in the End Area Volumes command and append to an existing quantity report.

The Compute Quantities leaf in the End Area Volume dialog is entirely new to InRoads V8i SELECTseries 1, and allows you to assign pay items to cut, fill, borrow and waste and compute your earthwork through quantity manager. You can also assign pay items to components in the Classifications leaf. The pay items can be appended to an existing database so that one report can be generated for all the quantities in your project.

Cut - when selected, the CUT volume is reported on and is classified as the pay item entered in the box for pay item. The description field should be populated from the description of the payitem. NOTE: the formula assigned to this pay item will be ignored - the quantities.mdb file will reflect the data straight from the End Area volumes calculations.

Fill - when selected, the FILL volume is reported on in the same manner as the CUT volume described above. The same rule applies regarding formulas - no impact upon this value.

Borrow - when selected, BORROW volume is computed in the following manner - If the mass ordinate is a negative value at the end of the volume calculations, this number will indicate the total amount of BORROW needed to balance the dirt work.

Waste - when selected, WASTE volume is computed similar to BORROW, except the positive value for the WASTE will indicate an extra amount of dirt/earth.

EXERCISE: COMPUTE QUANTITIES FROM END AREA VOLUMES

1. Select **Evaluation > Volumes > End Area Volumes**
2. Select **Option 2** for the Cross Section Set
3. Select the **Compute Quantities** leaf on the left.
4. Enable *Output Quantities*
5. Click in the database field, then click the browse button on the right.
6. Select the file **SR2067.mdb** from the folder for this workshop.

7. For the *Mode* select **Append**.
8. In the *Pay Items* area, enable the **Cut** checkbox.
9. Click in the *Name* field, then click the Pay Items button on the right.
10. Open the **210-214 EXCAVATION AND BACKFILL** folder
11. Select **210A000-CUT,** then Click **Add**
12. Close the Pay Items dialog
13. Add the remaining pay items:

    Fill: **210A00c-FILL**

    Borrow: **210000b-BORROW**

    Waste: **210A000c-Waste**
14. Click **Apply**
15. Open Quantity Manager.
16. Select **Project > Open** from the Quantity Manager dialog
17. Select the **Browse** button and select **SR0267.mdb** from this workshop directory
18. Click **Connect** and Review the pay item tree on the left hand side, notice now there are pay items from End Area volume computations.
19. Highlight the Root folder on the left, then Select **Tools > Reports > Create**

20. Select the report **Sample Pay Item Summary** (HTML)

21. Name the file **SR2067.html**,

22. Click **Create**. if it asks if you wish to overwrite the existing file, click Yes.

23. Review the report:

Name	Description	Unit	Unit Cost	Total Quantity	Total Cost
201B000	Clearing	Acre	0.0	16.00	0.00
411A020 - ASPH	Hot Bituminous Pavement, Mix 1	Ton(s)	0.0	447.77	0.00
450C00-Curb	Integral Curb	Linear Feet	0.0	21783.25	0.00
450D00-JTSeal	1 1/4" Preformed Elastomeric Joint Seal	Linear Feet	0.0	21783.25	0.00
210A000 - CUT	CUT	Cubic Yard	0.0	6737.70	0.00
210A000 - FILL	FILL	Cubic Yard	0.0	79976.62	0.00
210A000 - BORROW	BORROW	Cubic Yard	0.0	73238.92	0.00

24. Close Quantity Manager. Exit InRoads and MicroStation.

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