

# CDOT Calculate Volume

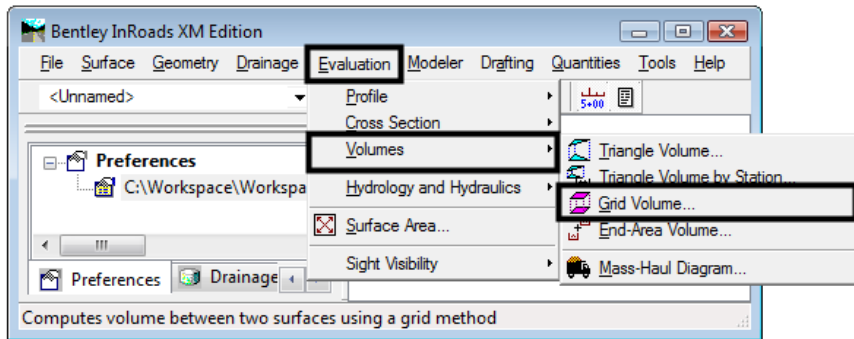


This document guides you through three methods to calculate volume: Grid, Triangle, and End Area.

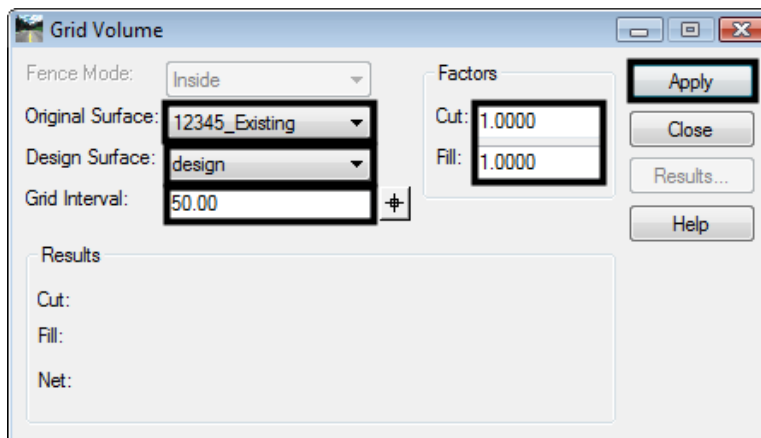
## Calculating Grid Volumes

Follow the steps below to calculate the volume between the existing surface and the proposed surface using the grid volume method.

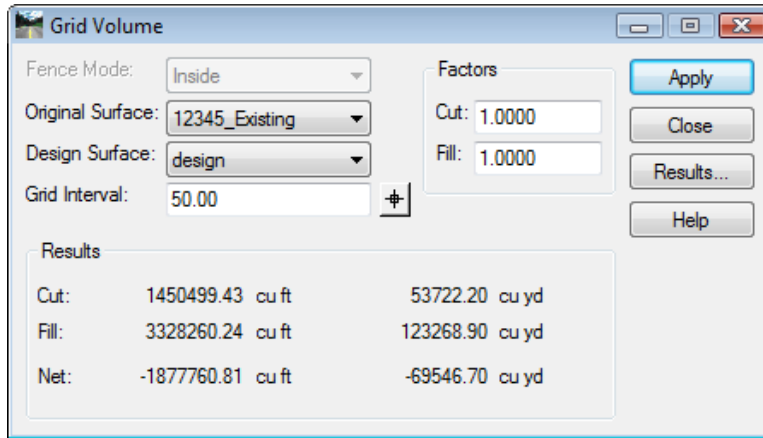
1. Select **Evaluation > Volumes > Grid Volume** from the InRoads menu.



2. If using a fence, set the **Fence Mode** with the drop down menu.
3. Select the **Original Surface** from the drop down menu.
4. Set the **Design Surface** from the drop down menu.
5. Enter the desired **Grid Interval**. This should be the same, or a multiple of the interval used for the template drops when the design surface was created.
6. **Key-in** the desired **Cut** and **Fill** Factor.



7. <D> **Apply**. The results are displayed in the bottom portion of the dialog box.



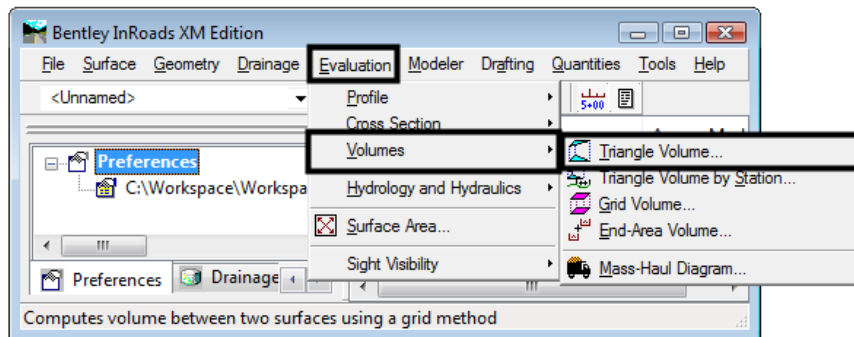
8. <D> **Close** to dismiss the *Grid Volume* dialog box.

**Note:** If using the Fence option the view must be set to *Top*.

## Calculating Triangle Volumes

Follow the steps below to calculate the volume between the existing surface and the proposed surface using the triangle volume method.

1. Select **Evaluation > Volumes > Triangle Volume** from the InRoads menu.



2. Set the desired **Mode**. The most commonly used mode is **Entire Surface**, however, **Fence** and **Selected Shapes** are available.

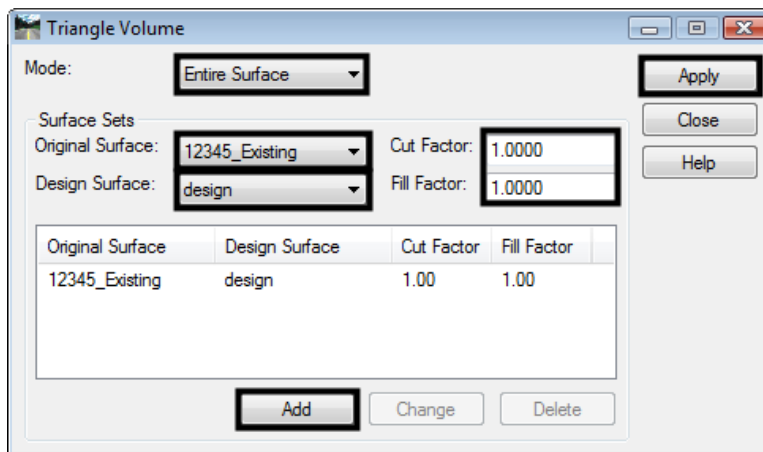
**Note:** The **Fence** option only works in the **Top** view. If the Fence mode is selected in a rotated view quantities are calculated for the Entire Surface and the fence is ignored.

3. Select the **Original Surface** from the drop down menu.
4. Select the **Design Surface** from the drop down menu.
5. **Key-in** the desired **Cut** and **Fill** Factor.

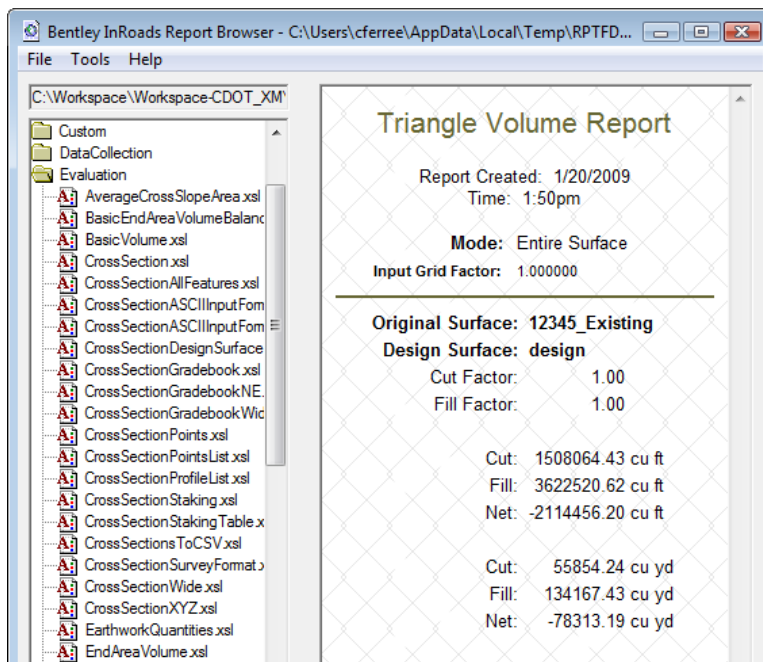
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- <D> Add.
- Multiple surface combinations can be added. To add additional surface combinations, repeat steps 3 through 6 in this section for each combination.

**Note:** The *Mode* selected at the time the **Apply** button is selected will be used for all surface combination calculations.




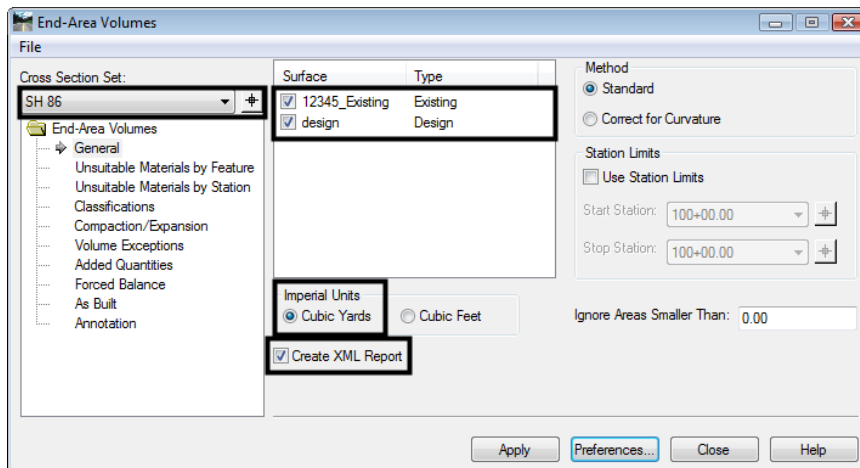
- <D> Apply.
- <D> Close to dismiss the *Triangle Volume* dialog box. The results of the triangle volume calculations are displayed in an XML report.



## Calculating End-Area Volumes

Follow the steps below to calculate the volume between the existing surface and the proposed surface using the end-area volume method (CDOT standard method).

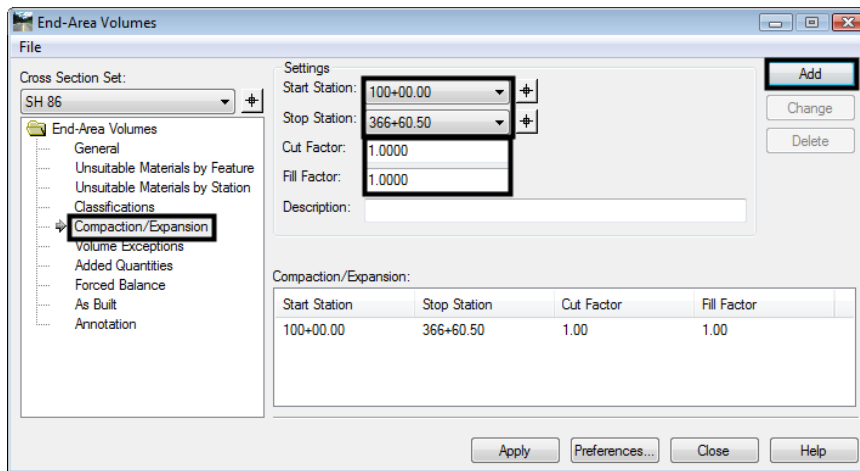
1. Select **File > Open** from the MicroStation menu bar and open the cross section design file.
2. From the InRoads menu, select **Evaluation > Volumes > End-Area Volume**.
3. Select the **Cross Section Set** using the pull down menu or the  button then <D> in the desired cross sections.
4. Toggle on the check boxes for the surfaces to be used. The existing and design surfaces are determined by the Type, which is set in the **Surface Properties** dialog box.
5. Set **Imperial Units** to **Cubic Yards**.
6. Toggle on the check box for **Create XML Report**.



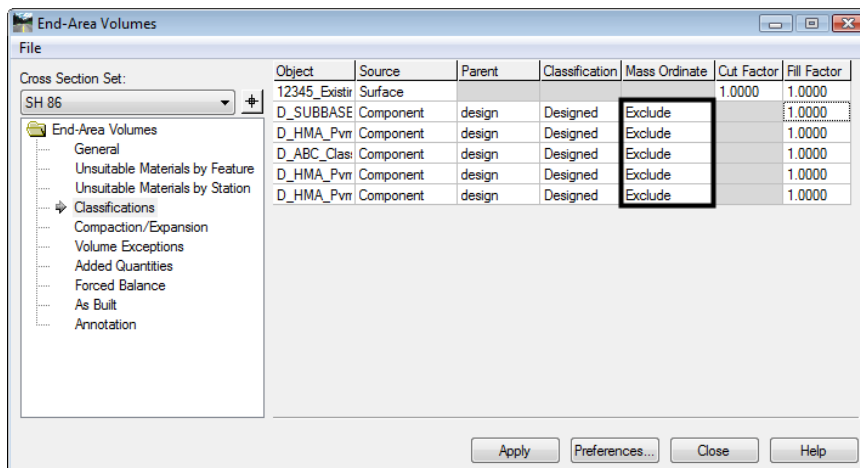
**Note:** If Compaction/Expansion factors are not going to be used, skip to step 10.

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7. Select **Compaction/Expansion** from the menu explorer.
8. Select the desired **Start Station** and **Stop Station** using the drop down menus.
9. Key in the desired **Cut** and **Fill** Factor.
10. <D> **Add**. Multiple entries can be added by repeating steps 7 through 9 in this section.

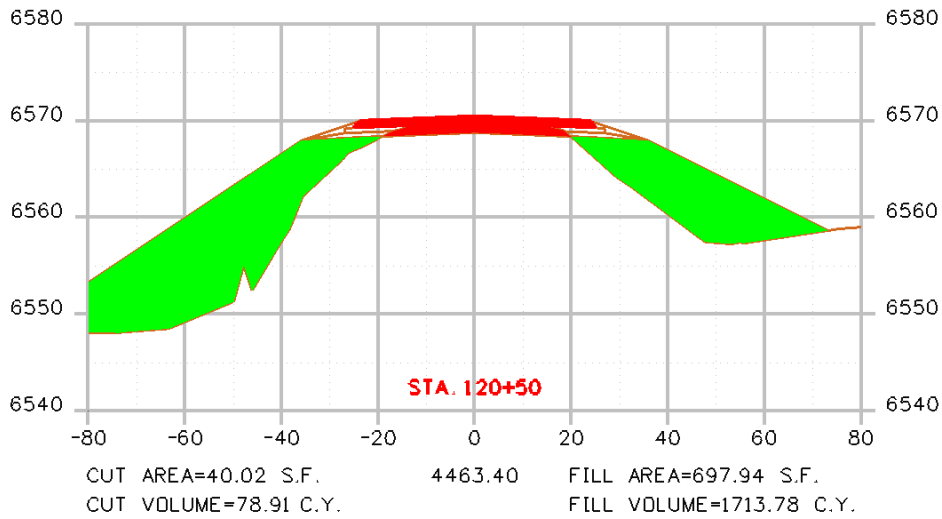


11. Select the **Classification** category from the menu explorer.
12. Use the **Mass Ordinate** field to **Include** or **Exclude** template components from the volume calculation. <D> in the field to toggle the selection.



13. <D> **Apply**. The data will be displayed on the cross sections and an End Area Volume XML Report will appear.
14. <D> **Close** to dismiss the **End Area Volume** dialog box.

15. The report can be saved by selecting File > Save As from the *Bentley InRoads Report Browser*.



Bentley InRoads Report Browser - C:\Users\fermed\AppData\Local\Temp\BPT3386.rvt

File Tools Help

Workspace\Workspace.CT

End Area Volume Report

Report Created: 1/20/2009  
Time: 3:41pm

Cross Section Set Name: SH 06  
Alignment Name: SH 06  
Input Grid Factor: 1.000000

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

Station	Factor	Cut			Fill			Cut			Fill			Mass Ordinate	
		Area	Volume	Adjusted	Area	Volume	Adjusted	Factor	Volume	Adjusted	Factor	Volume	Adjusted		
100+00.00	1.00	121.6412040	0.00	0.00	1.15	9.8054970	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
100+50.00	1.00	124.3390730	227.76	227.76	1.15	17.1994970	25.00	28.76	1.00	0.00	0.00	1.00	0.00	0.00	199.00
101+00.00	1.00	127.8630410	233.52	233.52	1.15	12.0718790	27.10	31.17	1.00	0.00	0.00	1.00	0.00	0.00	491.36
101+50.00	1.00	134.1545110	242.61	242.61	1.15	2.1832590	13.20	15.18	1.00	0.00	0.00	1.00	0.00	0.00	628.78
102+00.00	1.00	139.4071810	253.30	253.30	1.15	0.0000000	2.02	2.33	1.00	0.00	0.00	1.00	0.00	0.00	879.75
102+50.00	1.00	139.2140860	257.88	257.88	1.15	0.0000000	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1137.74
103+00.00	1.00	128.3975960	247.79	247.79	1.15	2.0125670	1.86	2.14	1.00	0.00	0.00	1.00	0.00	0.00	1383.38
103+50.00	1.00	132.6532750	241.71	241.71	1.15	0.0000000	1.86	2.14	1.00	0.00	0.00	1.00	0.00	0.00	1622.95
104+00.00	1.00	128.3644190	241.68	241.68	1.15	0.8158400	0.76	0.87	1.00	0.00	0.00	1.00	0.00	0.00	1863.77
104+50.00	1.00	118.7228200	228.78	228.78	1.15	1.8860290	1.76	2.02	1.00	0.00	0.00	1.00	0.00	0.00	2090.53
105+00.00	1.00	105.1629740	207.30	207.30	1.15	2.0567950	2.91	3.34	1.00	0.00	0.00	1.00	0.00	0.00	2294.49
105+50.00	1.00	96.2568460	186.50	186.50	1.15	5.1668260	6.69	7.69	1.00	0.00	0.00	1.00	0.00	0.00	2473.30
106+00.00	1.00	95.0623510	177.15	177.15	1.15	5.1041880	9.51	10.94	1.00	0.00	0.00	1.00	0.00	0.00	2639.51