

Quick Guide



Volumes

Volumes is a feature which calculates quantities such as material, area, and cut/ fill comparisons. It also gives you the ability to print .pdf reports including calculations, mapped perimeters, and 2D & 3D graphical surface comparisons.

Calculating a Volume:

Press the Volumes' button.

The following screen will be displayed.

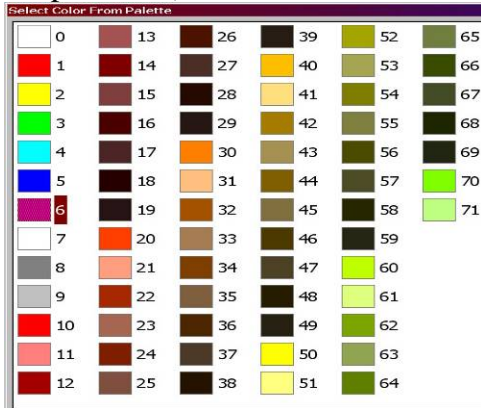
Three entries must be made for a volume calculation to be made.

- 1) **Perimeter**
- 2) **Surface 1 (Starting Surface)**
- 3) **Surface 2 (Final Surface)**

Perimeter:

You will need to set a perimeter around the 2 surfaces that are to be calculated. Any surface or part of a surface outside this perimeter will not be used in the calculation.

First, select the color you want for the perimeter. (This will be the color shown on the screen for the perimeter) There are 255 available colors to choose from.



There are 4 ways to create the perimeter:

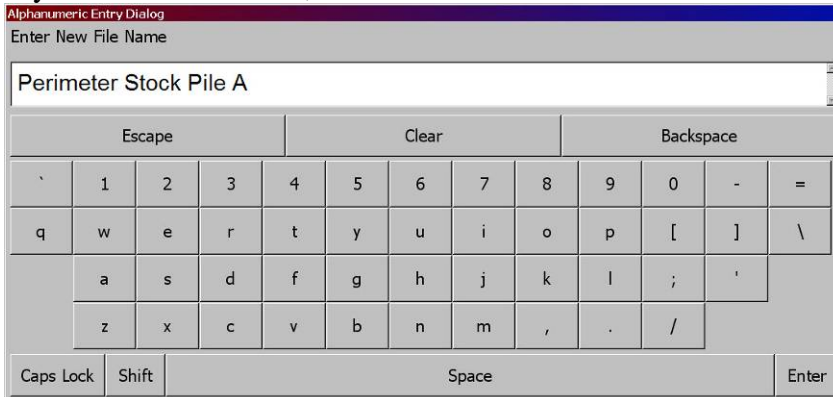
- **Collect** a perimeter by collecting points as you move.
- **Select** an already established perimeter from a file.
- **Pick** from a polyline on the screen.
- **Shrink Wrap** surface 1 or 2 to create the perimeter from the outer most points.

Collect a new perimeter by pressing the Collect button in the perimeter dialog section.



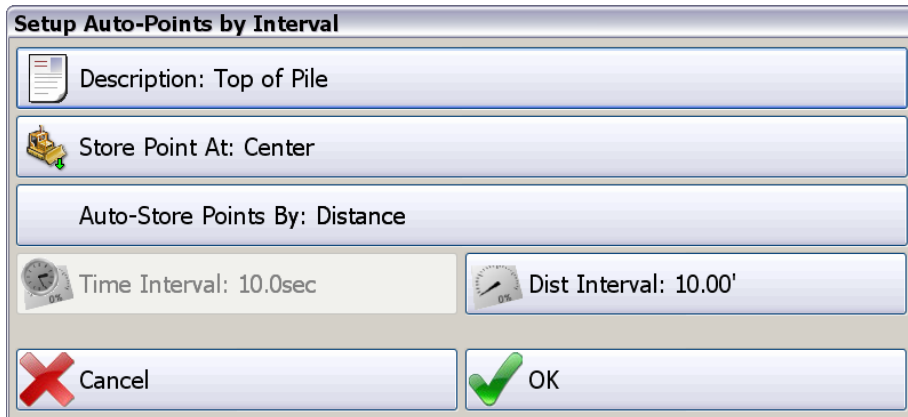
Select **New File** for your perimeter or choose an existing file to append to.

If you choose New File, enter a file name into the box as shown in this example.



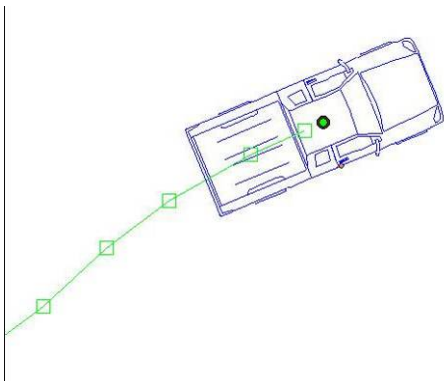
After you have entered or selected a file name, the perimeter collection screen will show your position. Next, press **Setup** to configure the way you want your points to be stored. For **Auto Store**, You can choose to collect points by distance or by time and choose the intervals for each. The example below shows points to be collected by distance and at 10 foot intervals. Type in a Description of the points being stored. Store Point At: is set to center of vehicle. You can also

choose between left side, center, and right side unless your vehicle setting is Man Rover. In this case, your only option is at: Rod.

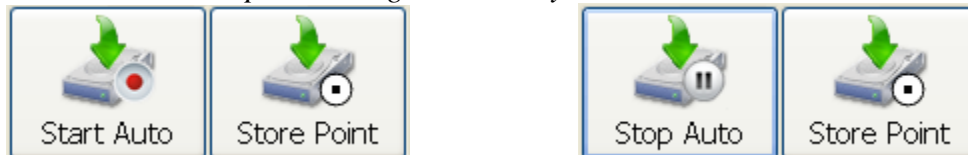


NOTE: This setup will be used for collecting points for perimeter and surfaces. You can change the way you store points for surfaces by changing these settings before starting your surface topo.

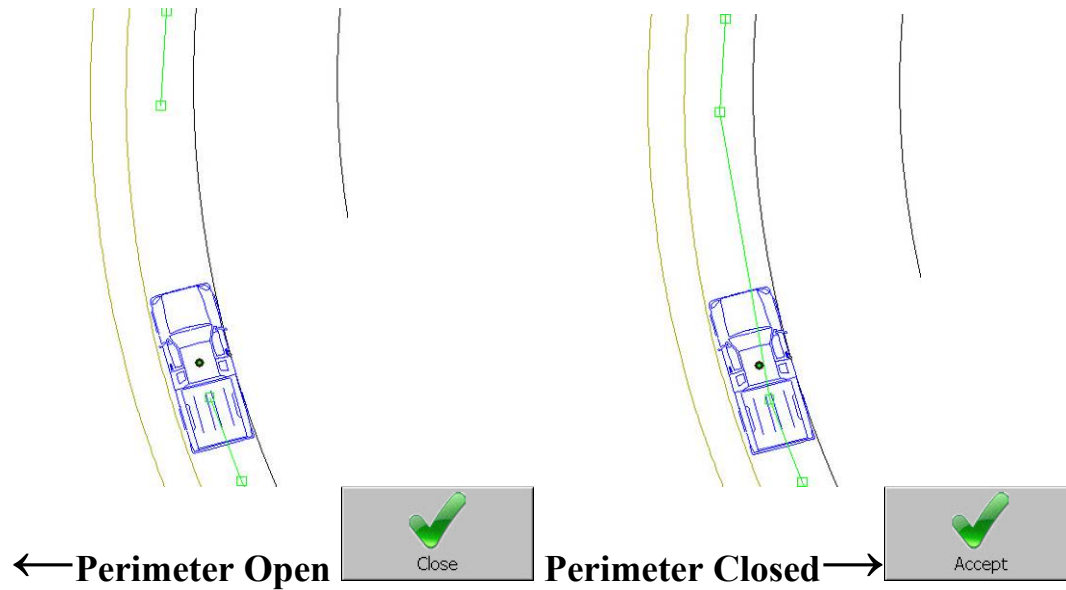
After you accept your settings, you are ready to start storing your perimeter. Move to the location you wish your perimeter to begin, then press **Store Point** to collect a single point or press **Start Auto** to collect points at the interval you have set. As you move, you will see the points being collected on your screen with a perimeter polyline tying the points together to show the perimeter boundary created.



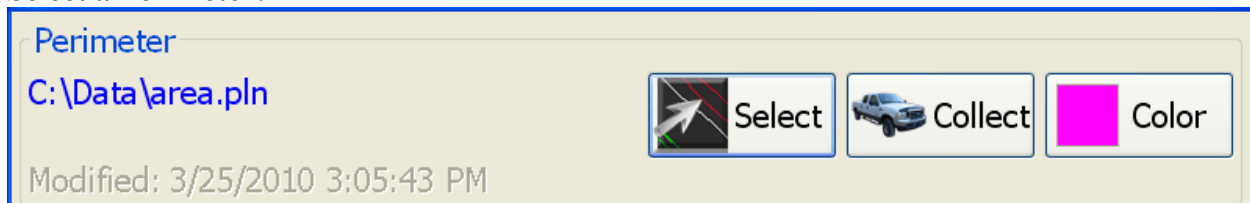
*This screen shows points being collected by **Auto Store**.*



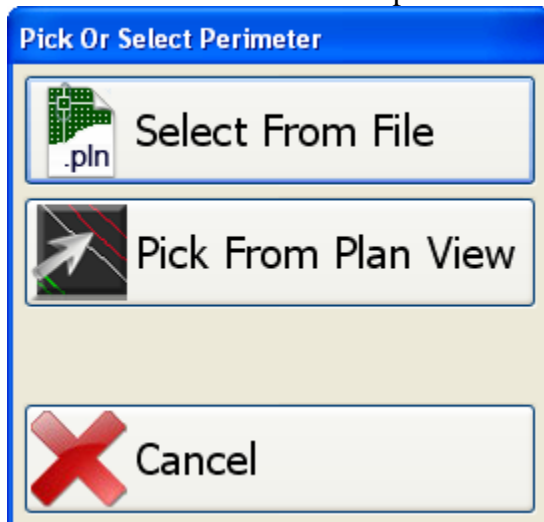
Once you have collected your perimeter, choose **Close** and the perimeter will be closed. Press **Accept** for the perimeter and you will be carried back to the Volumes screen.



Select a Perimeter:



Press the Select button on the perimeter dialog.



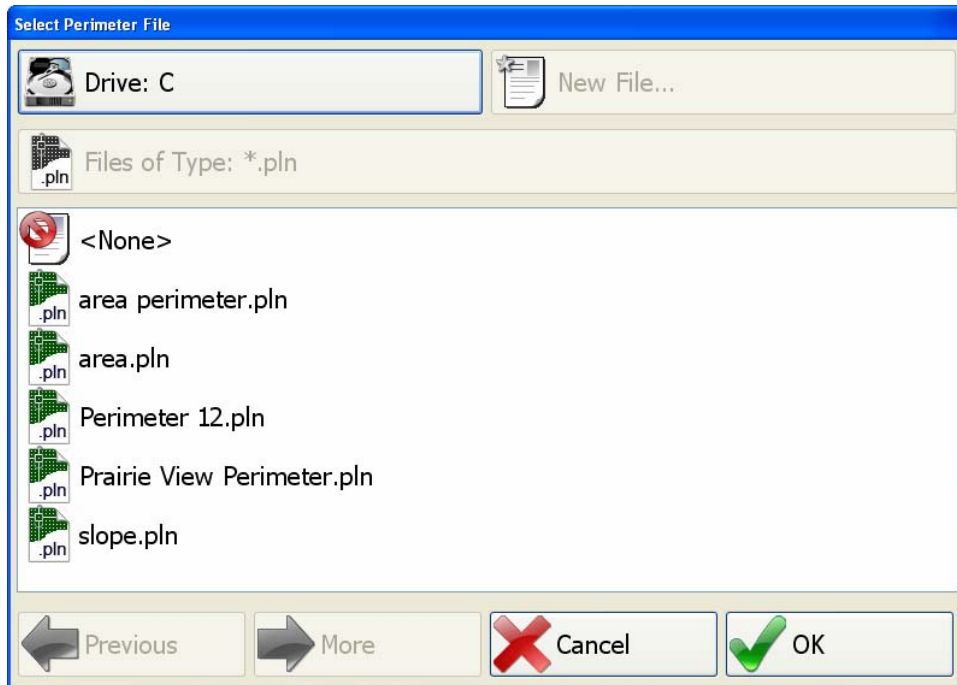
The following menu will give you the option to:

Select from an already established perimeter file.

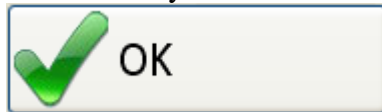
Pick a 3D polyline from the Plan View screen.

Cancel will carry you back to the Volumes' screen.

Select from File:

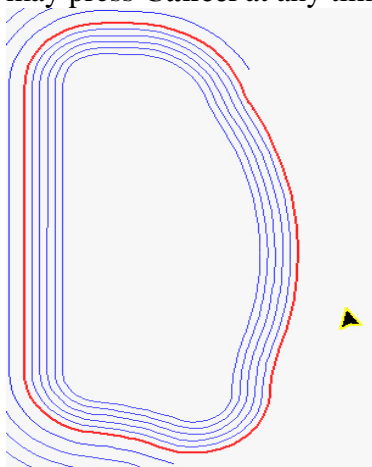


Pick the file you wish to load for the perimeter and press **OK**.



Pick From Plan View:

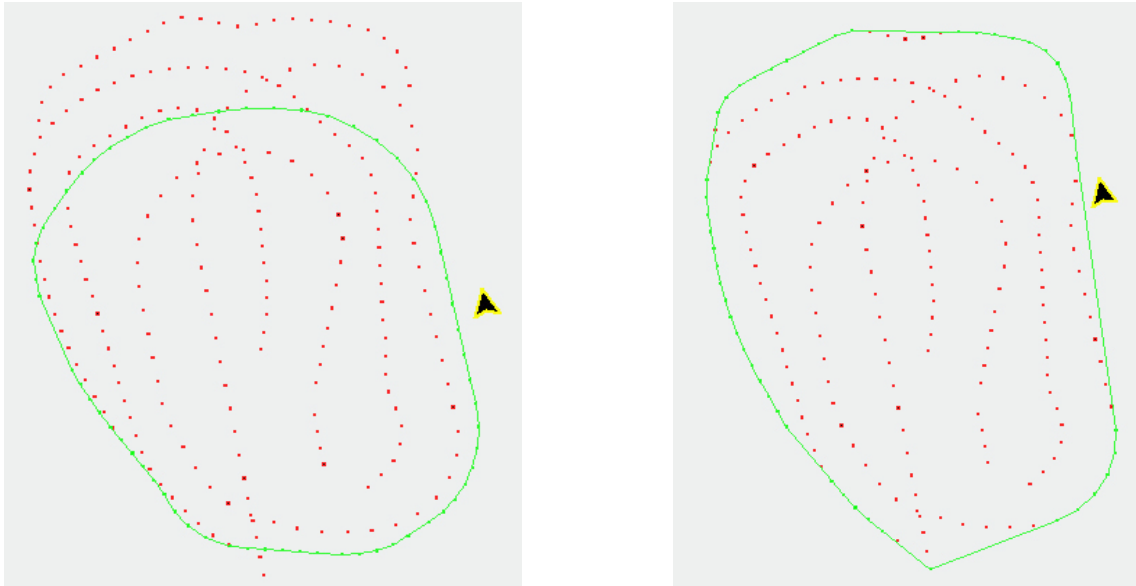
This will bring up the Plan View where you can pan around, zoom in, and zoom out. Locate the 3D polyline you wish to use (example: sediment pond boundary), touch the 3D polyline to Highlight. Next, press **Accept** and then enter a file name for this perimeter to be saved as. You may press **Cancel** at any time to return to the Volumes' screen.



Shrink Wrap:

If you choose this option, you may skip the perimeter setup and move directly to creating or selecting the Starting Surface. You may choose to use the shrink wrap feature with the Starting

Surface or the Final Surface. The following example uses the shrink wrap feature on the Final Surface.

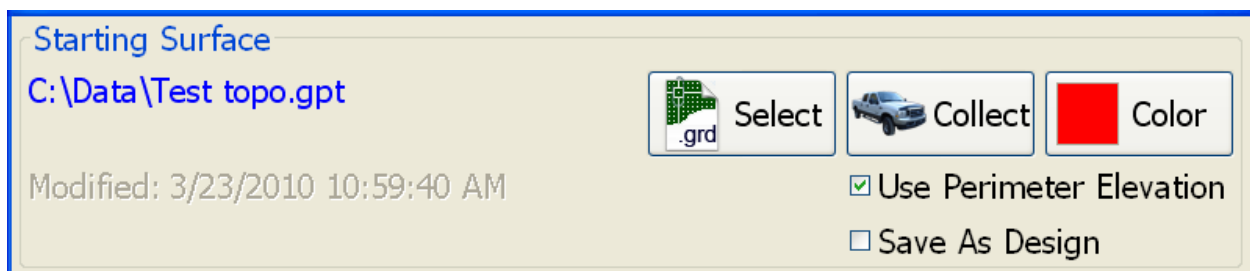


Establish your Starting Surface and Final Surface as discussed in the next sessions '*Starting Surface*' & '*Final Surface*'. After establishing your Final Surface points, locate and press the **Perimeter** button on the toolbar in the Store Points' screen and choose **Shrink Wrap**. This will take the outer most points and create a perimeter around the surface. You will then enter a file name for the perimeter to be saved as and it will be inserted into the perimeter setup location.

Starting Surface (Surface 1):

You can choose to:

- **Collect** points for the surface model to be created from
- **Select** a previously created or designed surface file to be used
- **Select** the surface to be created from the collected perimeter.

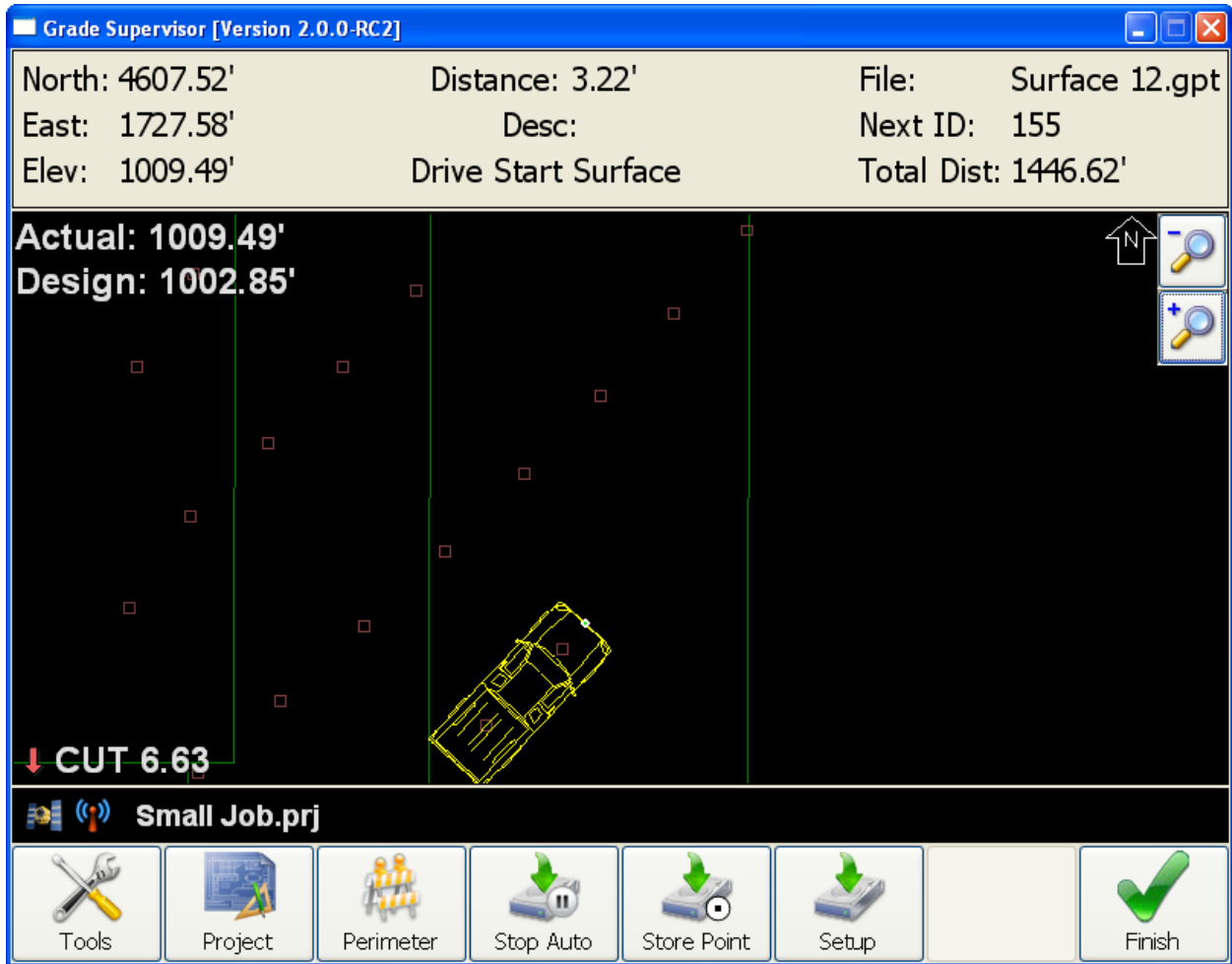


Collect points for the Starting Surface (Surface 1):



Press the **Collect** button for the Starting Surface, enter a **file name** for the surface, move to your desired starting location and press the **Auto Store** button. Drive or walk over the entire area you wish to topo making sure you focus on peaks and valleys

to ensure an accurate surface is produced for the material. You can always press the **Store Point** button to add an extra point while using the **Auto Store** feature.



The example above shows a pickup truck collecting points.

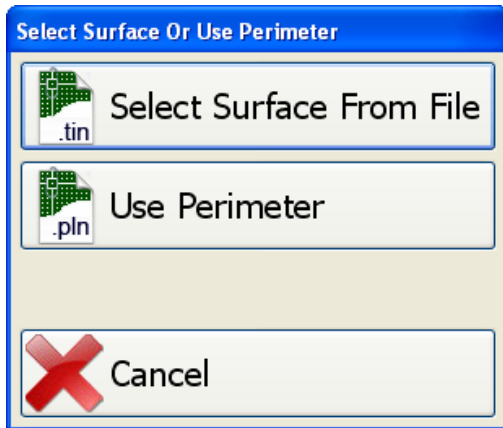


Select the Finish button once you have collected the points for the Starting Surface (Surface 1). This will bring you back to the Volumes screen.



Selecting a Surface from a file:

You may choose to select a design surface or previously collected surface instead of creating one. If this is the case, you simply press the **Select** button and search for the surface file you wish to use for that surface. Highlight the desired file, press OK, and the file will be loaded.



Select Surface to be Created from Perimeter:

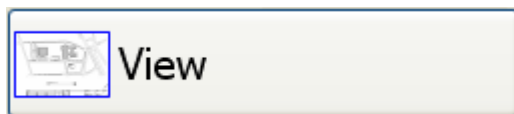
This feature gives you the ability to use a Perimeter to create a surface. Checking the “Use Perimeter” will triangulate a surface from the collected perimeter points. Example: Can be used for building a surface underneath a Stock Pile.

Final Surface (Surface 2):

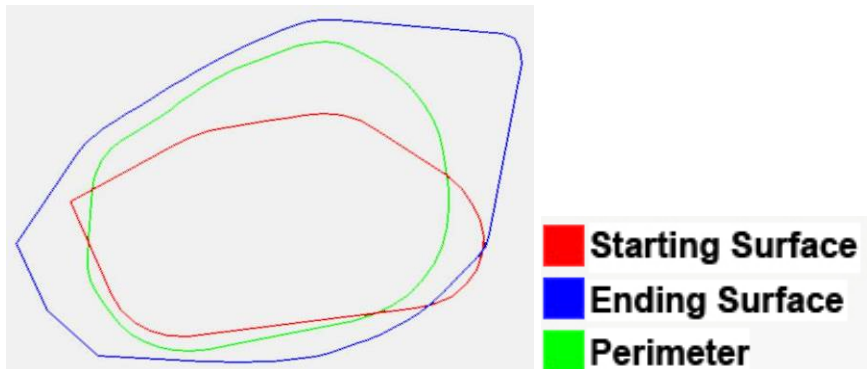
Follow the same procedure for creating the Starting Surface (Surface 1).



Save As Design: Checking this box will save the surface in the ‘Design Folder’ as a .tin file (triangulation file). This file will be saved with the same filename used in the .gpt(Grade Point) except with a .tin (surface) extension. You can load the saved file as a design surface in Grade Supervisor to show actual Cut / Fill values.



View Button:

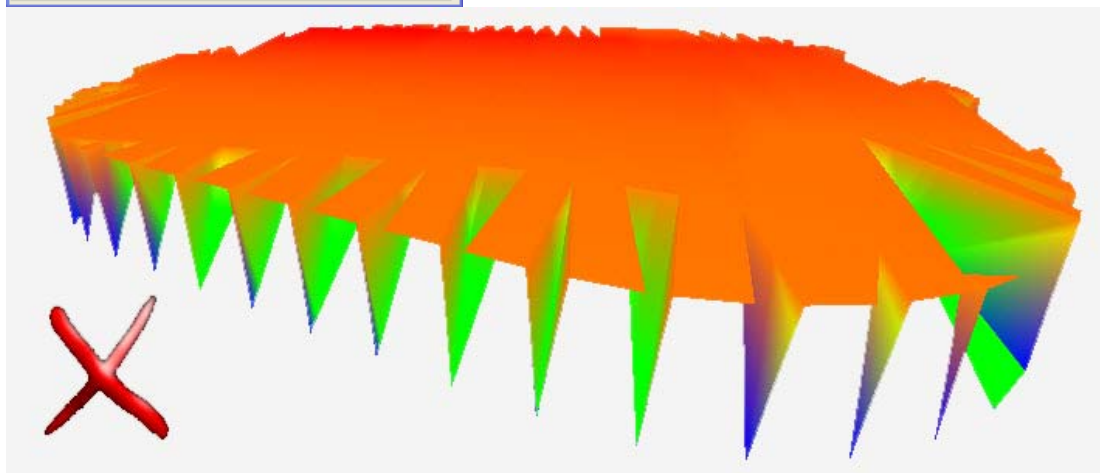
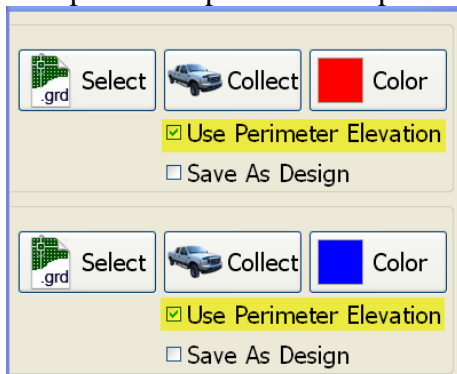


At any time, you can press the view button to see your surface and perimeter boundaries on the screen. This is useful in seeing how your surfaces overlap and the position of your perimeter to your surfaces. Press OK to return to the Volumes screen.

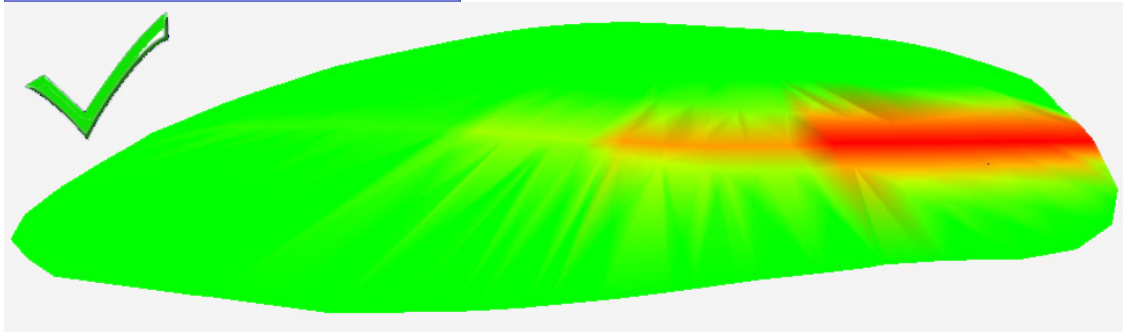
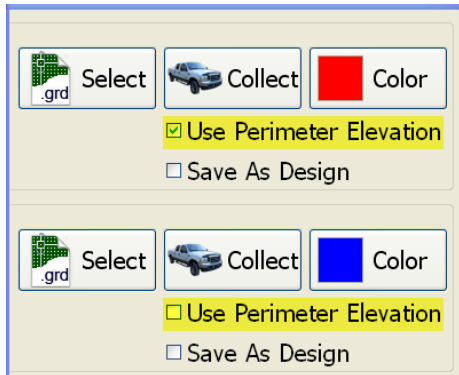
Use Perimeter Elevation (Z):

This feature allows you to choose whether or not to use Perimeter elevations (Z) as additional points on your surfaces (Starting Surface and/or Final Surface) If perimeter elevations (Z) are **NOT** selected to be used in one or both surfaces, any area inside the created perimeter without surface information will not be used in calculations. Therefore, a volume will only be calculated from the two surface areas that overlap.

Example: If you wish to calculate a volume within a defined area (perimeter) using a driven topo (Starting Surface) and compare it to a final design surface (Final Surface), you will want to USE perimeter elevations (Z) for the driven topo and NOT USE perimeter elevations (Z) for the design surface. In this scenario: if you choose to USE perimeter elevations (Z) in both surfaces and your design surface is above the existing surface, you will see spikes in the design surface around the area of the perimeter. This is caused by points on the design surface being extrapolated to points on the perimeter as shown below.



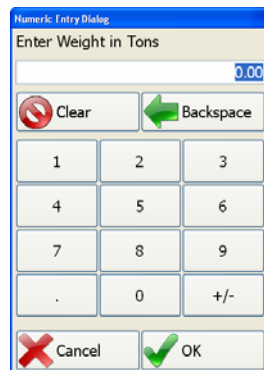
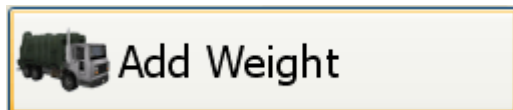
This example below is of the same calculation made with perimeter elevations (Z) NOT being used on the design surface.



Calculating the Volume:

Press Calculate once you have entered a perimeter, Starting Surface, and Final Surface. You also have the option to Add Weight to calculate Density.

To add weight, enter the weight in Tons to be calculated in the report.



A report will be generated showing the following:

Calculations:

Calculations show information for the following:

- **Area in Cut:** Surface area inside perimeter where the Final Surface is above the Starting Surface elevation.
- **Area in Fill:** Surface area inside perimeter where the Final Surface is below the Starting Surface elevation.

- **Area in Daylight:** Area inside perimeter where the 2 surfaces are at the same elevation.
- **Total Volume Area:** Area inside perimeter where both surfaces overlap.
- **Total Area in Perimeter:** Area inside of total perimeter.
- **Cut Volume:** Quantity (Volume) of material inside the Area in Cut.
- **Fill Volume:** Quantity (Volume) of material inside the Area in Fill.
- **Volume to Balance:** Quantity (Volume) of material that needs to be exported or imported to achieve the Final Surface in the defined area (Perimeter). Fill
 $\text{Volume} - \text{Cut Volume} = \text{Volume to Balance}$.
- **Weight:** Shows the amount you entered for Weight
- **Density:** The calculation between the volume and entered weight in percentage, lbs per cubic yards, and lbs per cubic feet.

Calculation Sample:

The screenshot shows the 'Grade Supervisor' software window with the following data displayed:

Category	Value 1	Value 2
Area in Cut:	6,670.27 Sq Feet	0.15 Acres
Area in Fill:	5,268.22 Sq Feet	0.12 Acres
Area in Daylight:	0.00 Sq Feet	0.00 Acres
Total Volume Area:	11,938.49 Sq Feet	0.27 Acres
Total Area in Perimeter:	0.00 Sq Feet	0.00 Acres
Cut Volume:	23,814.11 Cu Feet	882.00 Cu Yards
Fill Volume:	26,334.67 Cu Feet	975.36 Cu Yards
Volume to Balance:	2,520.56 Cu Feet	93.35 Cu Yards
Weight:	750.00 tons	
Density:	76.89 % Tons/Cu Yards	
Density:	1,537.90 LBs/Cu Yards	56.96 LBs/Cu Feet

The software interface includes a menu bar with 'Calculations', 'Plan', '3D View', and 'PDF Output'. At the bottom, there are buttons for 'Tools', 'Project', and 'Return'.

Plan:

This view shows you the hatch area within the perimeter that has been used in the calculations. This is helpful to ensure you have set up the correct perimeter, Starting Surface, and Final Surface.

Figure A: Shows an area where a Plan View file was available

Figure B: Shows an area where a Plan View file was not available. Example: Stock Pile



Figure: A

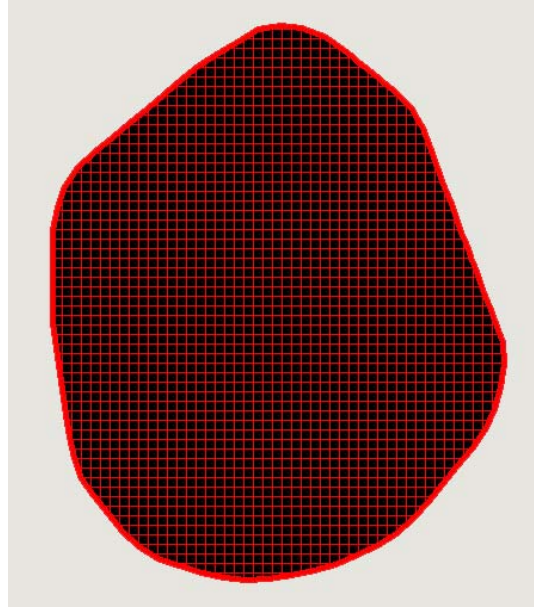


Figure: B

3D View:

Contains:

- 3D Graphical models of calculated Cut / Fill areas.....
- 2D & 3D surface overlay to show where surfaces intersect....
- 2D view to show site location of calculated Volumes.....

Figure: C

Figure: D

Figure: E

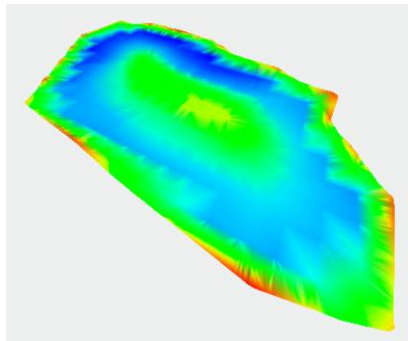


Figure: C (3D)

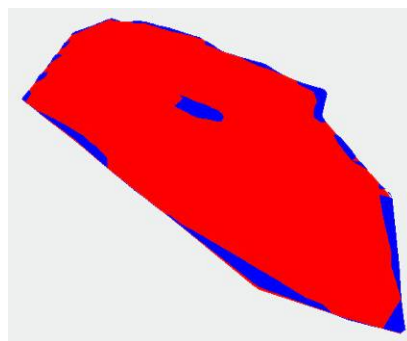


Figure: D (3D)

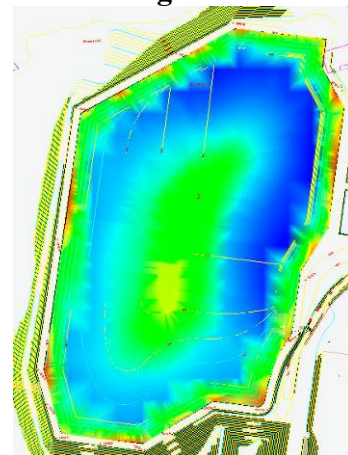


Figure: E (2D)

PDF Output:

Calculations Plan 3D View PDF Output

PDF Options

Include Calculations: Yes

Include Plan: Yes

Include 3D: Yes

File Name: vreport-2010-06-21-11-46.pdf

Create Report

Tools Project Return

You can save your report as a .pdf to be printed out at a later time. It will be saved in the **reports** folder inside of the **Data** directory. Reports are Date & Time stamped. These reports can be used for producing “Running Reports” on material moved daily, weekly, monthly, or scheduled to the way you work. You can customize your reports to include the information you would like to see. You can select the following to be saved to the .pdf.

- Include Calculations
- Include Plan
- Include 3D

You then can choose to use the default Date & Time stamped filename or enter your own.

Sample Report:

Volume Report

Project: smalljob.prj

Created: Monday, 19 June 2010, 11:47

Total Area: 11,938.49 Sq Feet, 0.27 Acres

Cut Area: 6,670.27 Sq Feet, 0.15 Acres

Fill Area: 5,268.22 Sq Feet, 0.12 Acres

Area in Daylight: 0.00 Sq Feet, 0.00 Acres

Total Volume Area: 11,938.49 Sq Feet, 0.27 Acres

Total Area in Perimeter: 0.00 Sq Feet, 0.00 Acres

Cut Volume: 23,814.11 Cu Feet, 882.00 Cu Yards

Fill Volume: 26,334.67 Cu Feet, 975.36 Cu Yards

Volume to Balance: 2,520.56 Cu Feet, 93.35 Cu Yards

Weight: 750.00 Tons

AUF: 76.89 % Tons per Cu Yards

Density: 1,537.90 LBs per Cu Yards 56.96 LBs per Cu Feet

