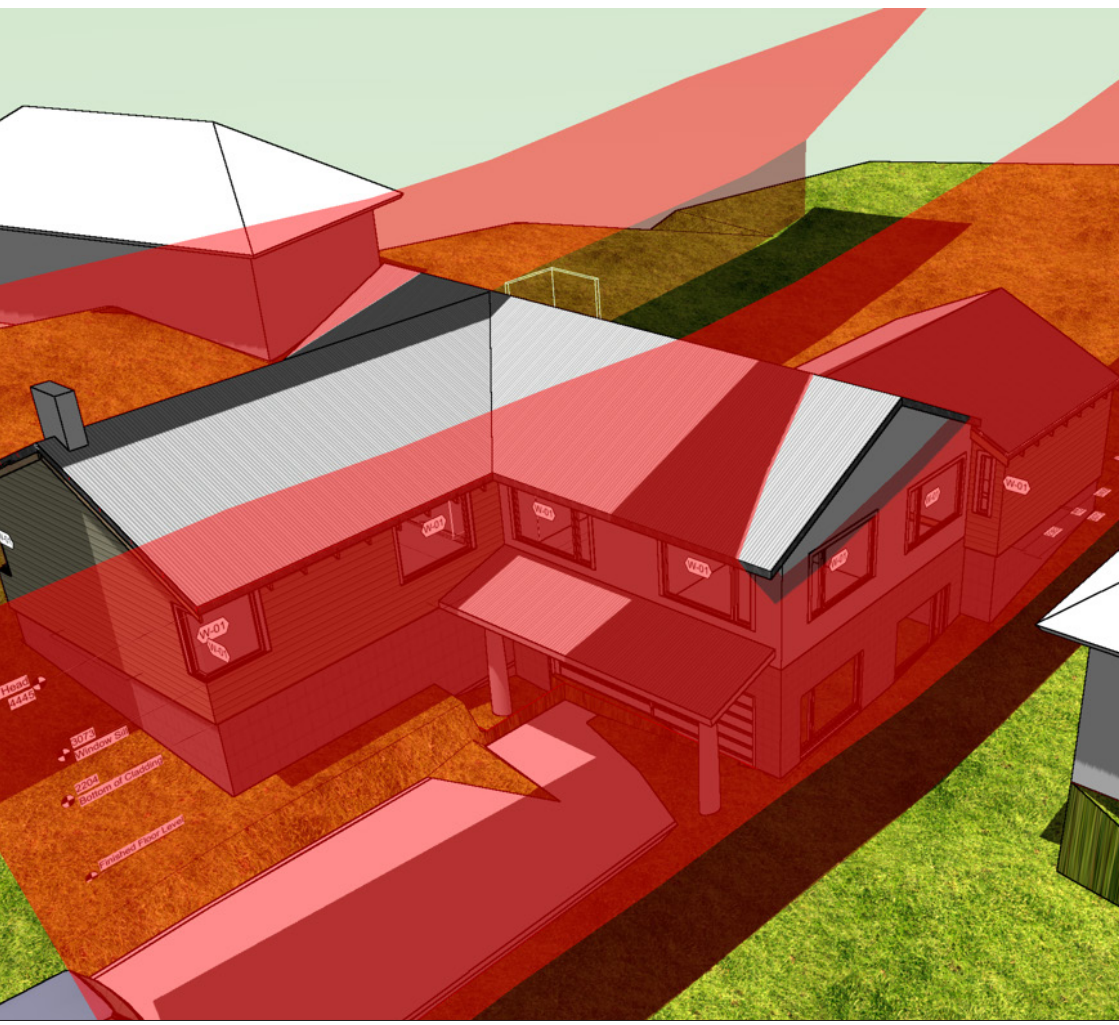
SHORT SHARP MANUALS

Site Modelling



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Contents

Introduction

What is a Site Model

A site model is a way of looking at 3D data (spot levels or contours) in a way that allows you to see complex 3D models and 2D representations. VectorWorks uses the 3D information to create the models based on the data to help you understand the 2D and 3D nature of your site.

You can only make a site model if you have Vectorworks Architect, Landmark or Designer.

How Does It Work?

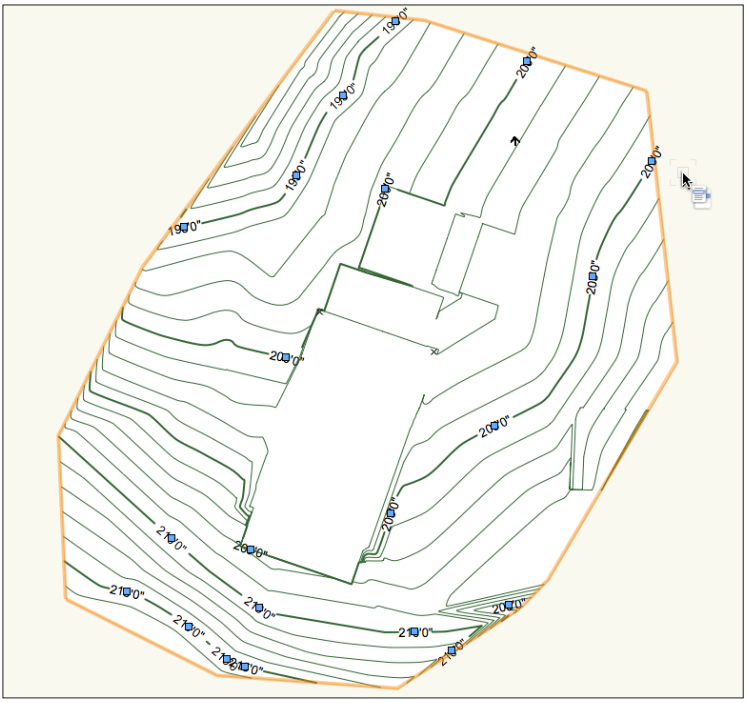
First you have to put in 3D data, such as spot levels, contours or surveyor's file. Then you ask VectorWorks to create a site model from this data. VectorWorks uses a set of algorithms to analyze the information and then creates the 2D and 3D representations. The algorithms can be thought of as a set of mathematical assumptions that are used to calculate the 2D contours and 3D model. Because of these assumptions you may get some odd shaped contours, or 3D models that don't look as you expected. A Site Model is not reality, it's a mathematical model of the data you give VectorWorks. Better data - better Site Model.

When you create a Site model VectorWorks will make an Object that can show one type of information in a 2D view (2D contours) and a different type on information if you are in 3D view (3D contours or extruded contours etc.). Using this hybrid object is a good way of combining the 2D contours and the 3D site model into one object. If you are used to earlier versions of VectorWorks then this will be a very different way of working. The Plug-In Object allows you to turn on or off the existing and proposed site models.

What Can You Use Site Modeling For?

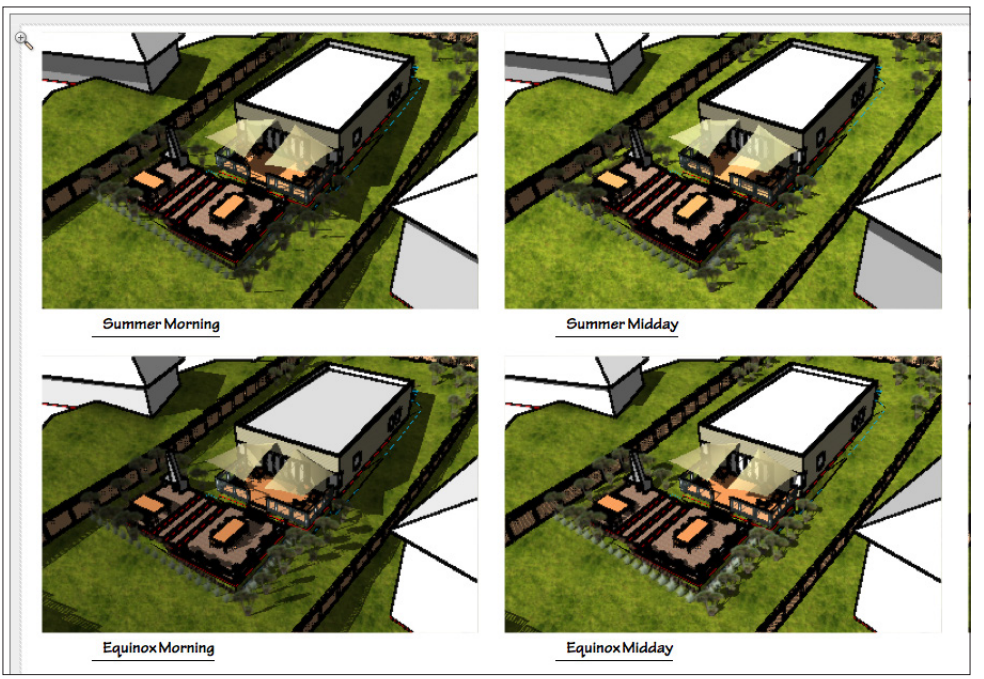
What Can You Use Site Modeling For?

- **Contours**. If you put in a series of 3D spot levels you can use your site model to give the contours, setting the height between the major and minor contours.

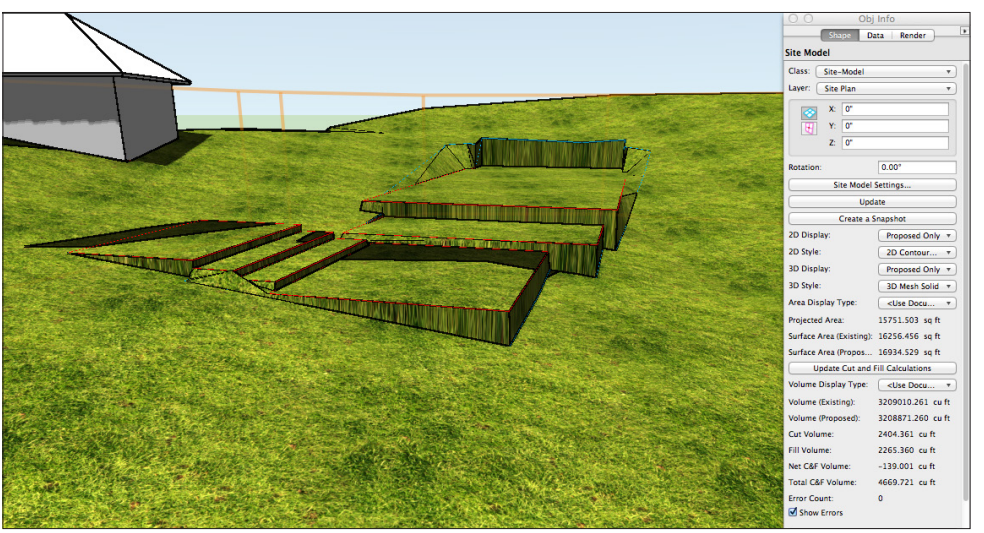


- **Visualization**. You can create a 3D model of the site to help you see the building sitting on the site. Then you can use this to place your building, tree and landscaping. Or you could use the model to show the client how the site looks from different angles.

- **Solar Studies**. When you are planning the layout for the project it can be useful to see how the adjoining buildings and landscape will affect the project.



- **Cut and Fill** calculations between an existing site model and a proposed site model. As well as an overall report of the total cut and fill, you can create a report on each individual area of cut and fill.



- Recession Planes.

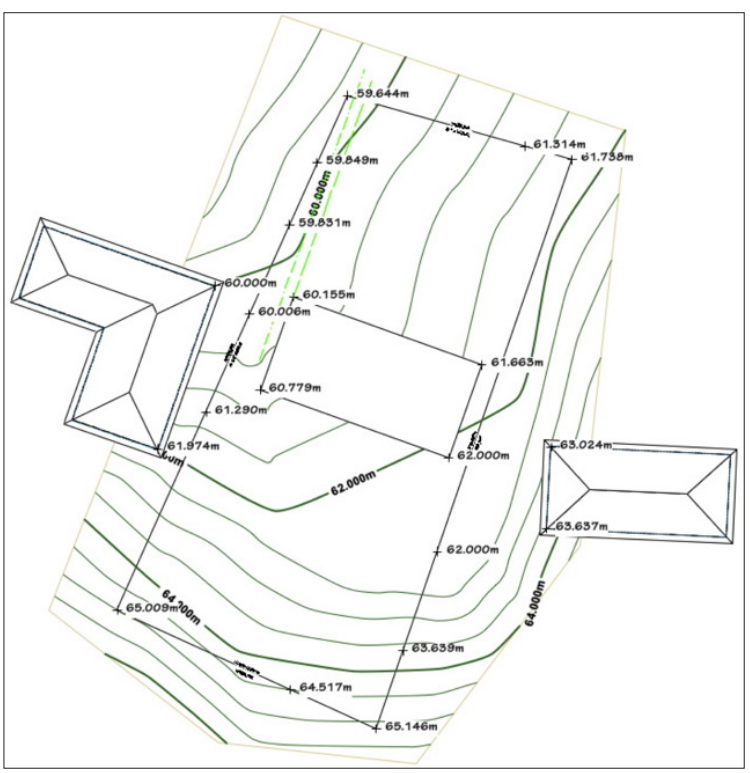
Making a Site Model

These are 4 main methods for creating a Site Model:

- From 3D points. You can place 3D loci or Stake objects manually on an imported survey plan or scanned image.
- From an imported 3D survey file.
- Using a grid method. Where you have been to the site and taken spot levels at grid positions.
- Importing a data file. You can get your surveyor to send you the spot levels in a simple text file that has the x, y, and z coordinates. Make sure that it is an ASCII text file, not a Word Document. You may also have some trouble with the carriage returns (the thing that tells you it has reached the end of the line). PC's use one method, Mac's use another, and Unix uses a different method. If you have trouble open the text file with a simple text editor, WordPad or BBEdit and check the file. Save As.. and save it as plain text.

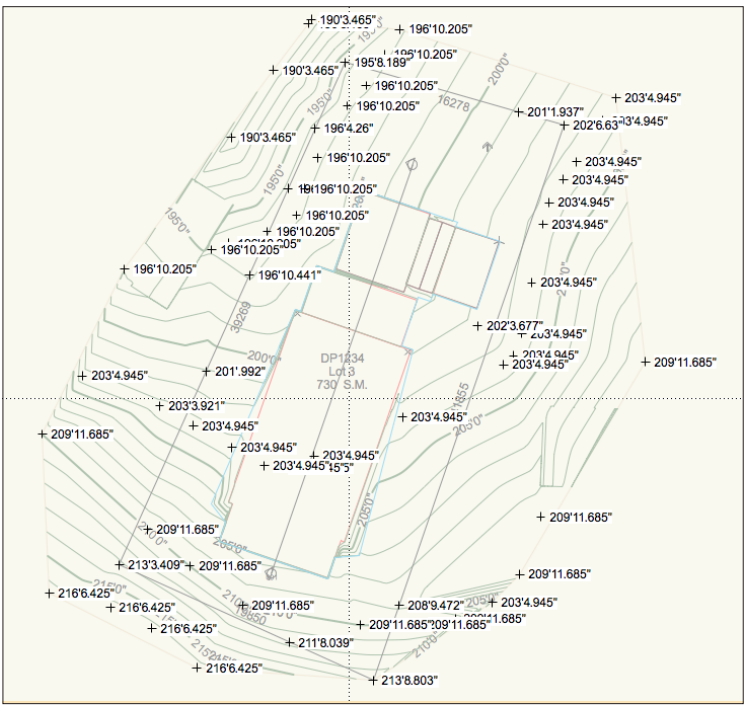
In this case I have a scanned image of the site. This can be used to help create your site model.

- You can trace over the contour lines using a stake object or a 3D locus.

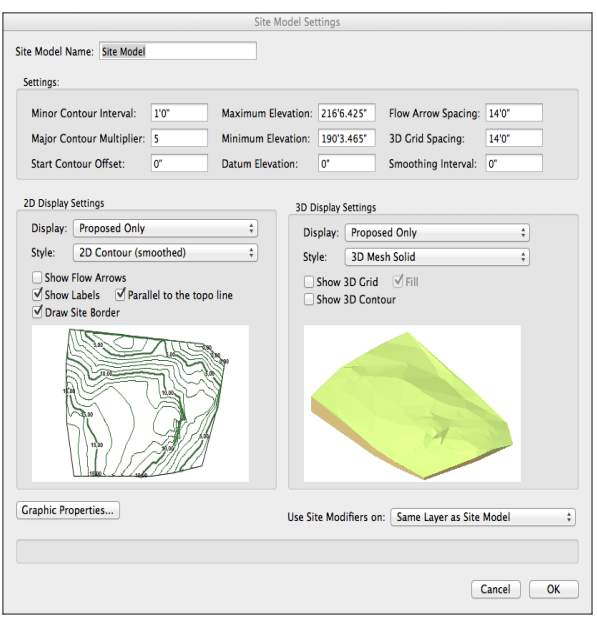


- When you have created the stake objects or the 3D loci, they can be used to create the site model. Vectorworks will then use a mathematical

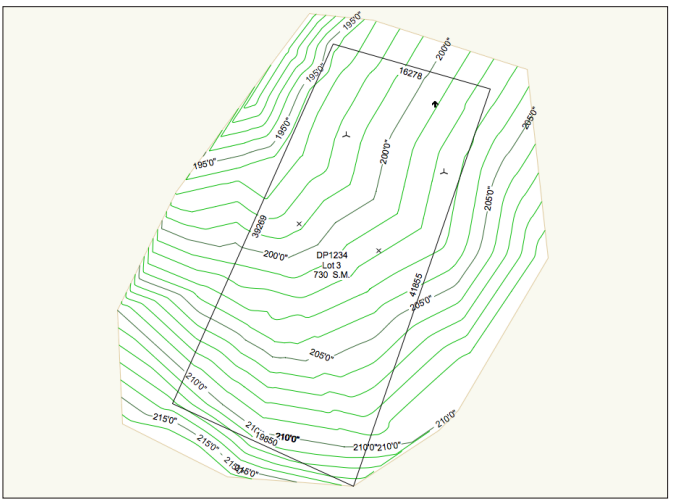
algorithm to calculate the heights of the site between the points you have given. Where possible, include any survey points that are known.



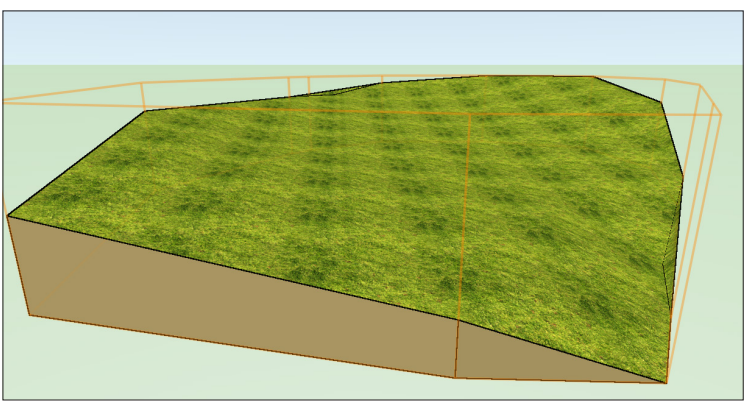
- Select all the 3D information and use the Create Site Model… command.
- This dialog box allows you to control the heights of the contours, the number of minor contours between each major contours, the maximum and minimum elevations of the site model, all of the 2-D display settings, and all of the 3-D display settings.



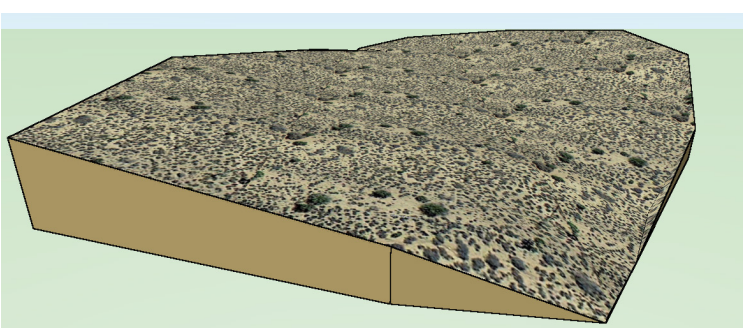
- When Vectorworks Finishes the calculations you can view the site model as a plan view.



- You can view the site model as a 3-D view. The site model also has a grass texture applied to it. You can apply textures such as grass, soil, or you can create your own textures.



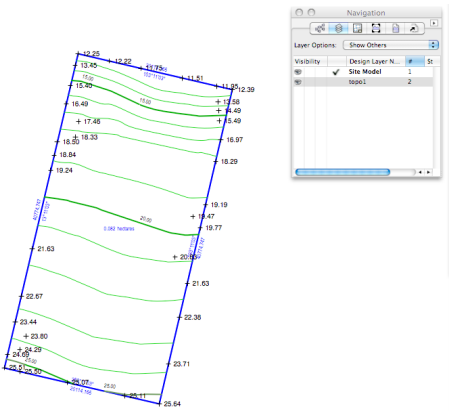
- You can capture the site from Google Earth, and create that into a texture. This texture is the actual image from the client's site.



Importing Information

Import a Survey Drawing as 2D Information

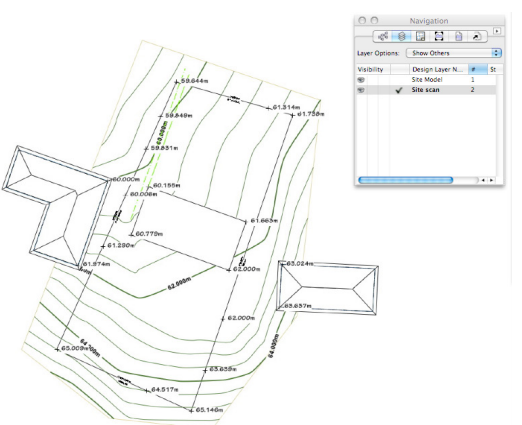
Import your sure drawing into a new file. Never import a DXF or DWG file into an existing drawing.



Import an Image

- Go to the **Menu** bar.
- Choose **File > Import > Import Image File...**

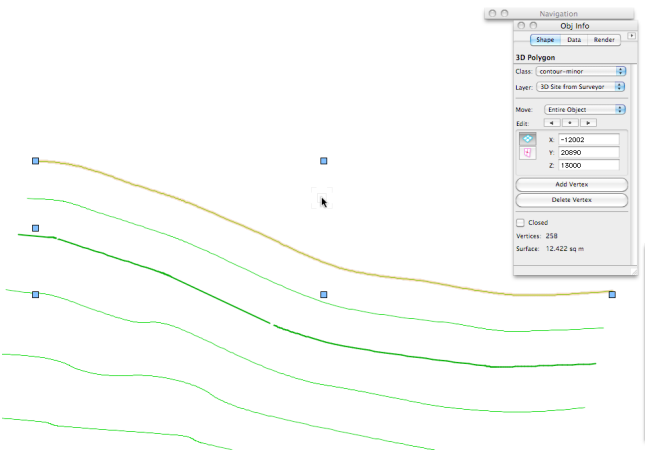
When you use a scanned image of a site plan:



Import a Survey Drawing a 3D Information

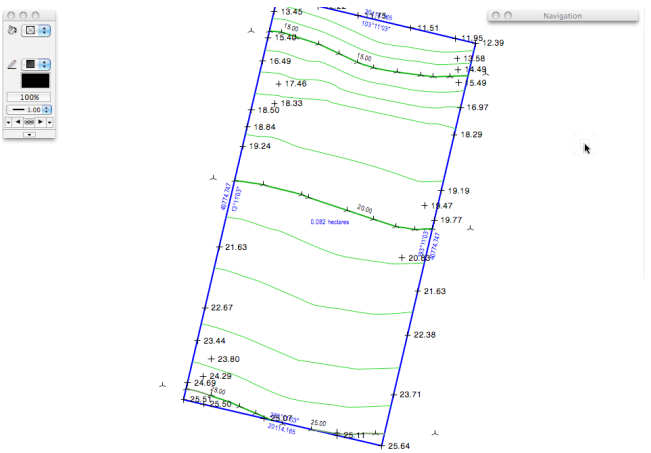
When you import a survey file, you often have the choice whether you want to import the information as 2D or 3D. For very large sites, it is a lot of work to input 3D loci, stake objects, to tracing polygons. If you can use the 3D information from the survey file, you will save hours.

Import your sure drawing into a new file. Never import a DXF or DWG file into an existing drawing.

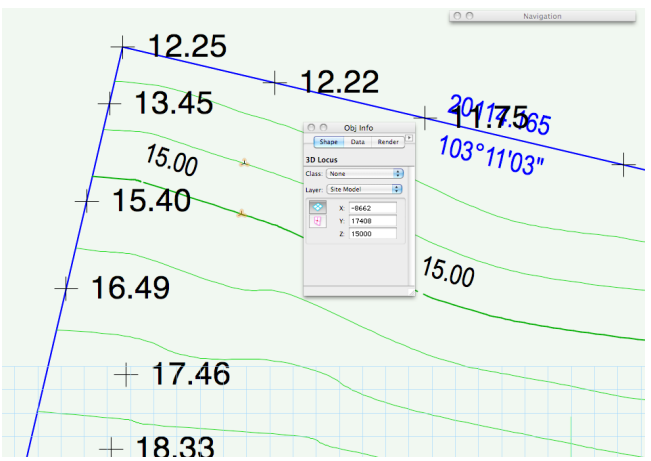


Creating 3D Information

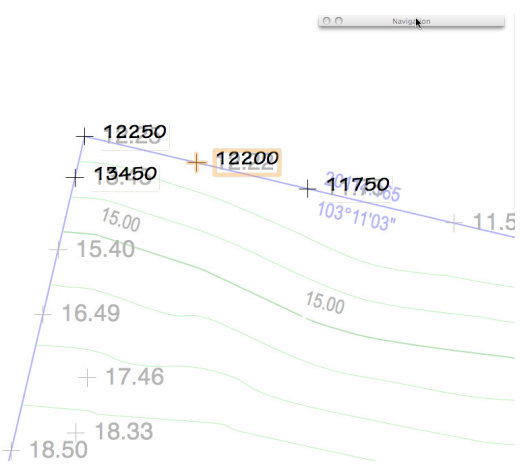
- Creating Spot Levels using Polygons



- Creating Spot Levels using 3D Loci



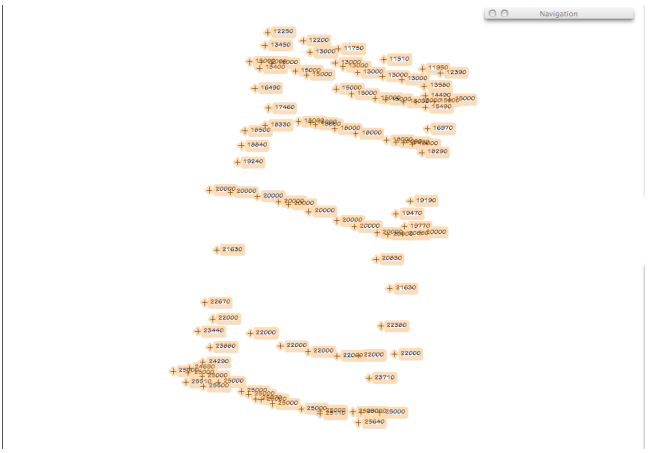
- Adding Spot Levels Using Stake Objects



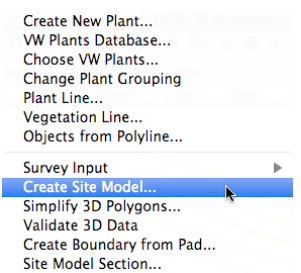
Creating the Site Model

A site model is created from 3D loci, 3D polygons or stake objects, but they have to be selected.

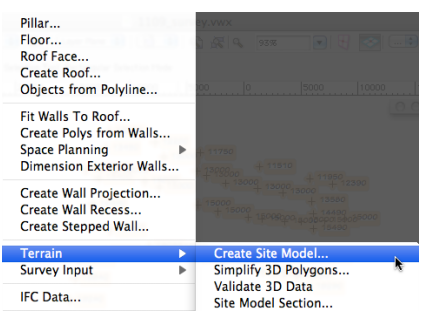
- Select your source objects 3D loci, stakes or 3D polygons).



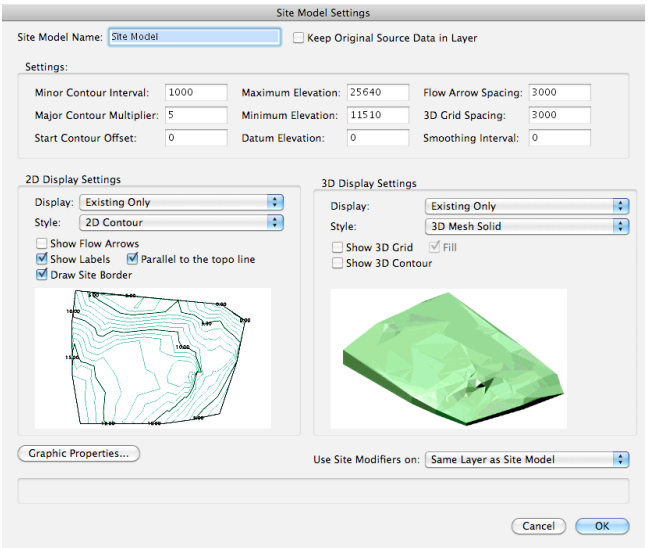
- If you are using Landmark, then to the Menu Bar.
- Choose **Landmark > Create Site Model...**



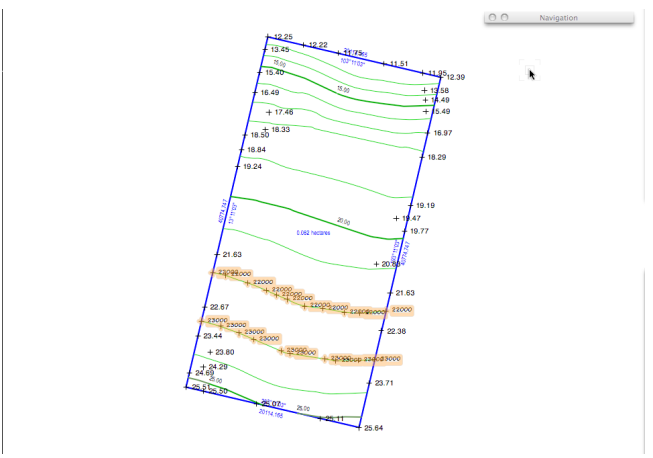
- If you are using Architect, then to the Menu Bar.
- Choose **AEC > Terrain > Create Site Model...**



- Here are the site model settings for a metric file (millimeters).



- Edit Source Data



- Edit Site Model Crop

Site Modifiers

There are several options for site modifying. You can add extra source data into the site model to modify it, see page 37, and you can use site modifiers like roads (good for roads and paths), pads (good for flat or uniformly sloping areas), hardscapes, landscape walls, 3D polygons, and stake objects.

Each site modifier follows the same strategy. The site modifier has a 3D part the will change the site model and a boundary. The Boundary is a planar shape that defines how much of the site model will be affected. The Boundary is flexible and it allows you to choose the extent of the site modification. If the boundary is close to the site modifier, you will have a steep slope. If the boundary is a long way from the site modifier, you will have a gentle slope.

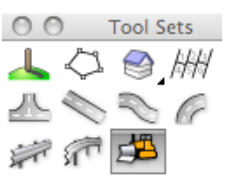
Roads

Roads are great for making simple roads and paths. They can be easily fitted to the slope of the site. Do not think that Vectorworks is a roading design package though. There are several road situations you can not make in Vectorworks easily.

Pads and Grade Limits

Pads and Grade Limits are the main tools for site modifying. The Pad creates the 3D site modifier and the Grade Limits tells Vectorworks how much of the site will be affected.

- You can use the Site modifier tool from the Site Model toolset, but it is often easier to use the command **Objects from polyline...**



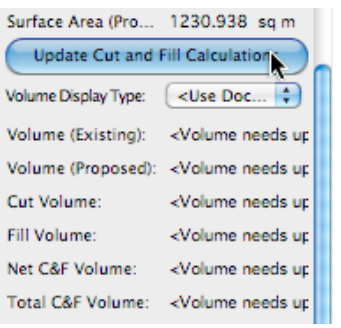
Cut and Fill Calculations

You need 2 things for cut and fill calculations, you need a site model and you need site modifiers. The first one should be obvious, with a out a site model Vectorworks has no way or calculating the site. The second part is, if the site is not modified, there is no cut and no fill.

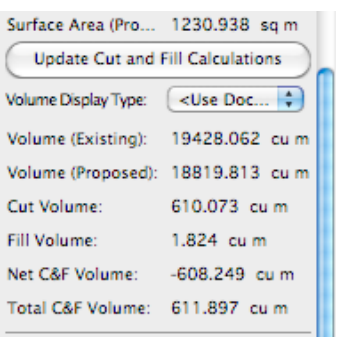
The cut and fill calculations are shown on the Object Info palette when you select a site model.

If the cut and fill calculations are not shown, then they need to be updated.

- Go to the Object Info palette.



- Click on the Update Cut and Fill Calculations button. Vectorworks will carry out the calculations. It can take some time. When I was writing these notes, Vectorworks took over five minutes to finish the calculation. One client thought his Vectorworks had crashed.

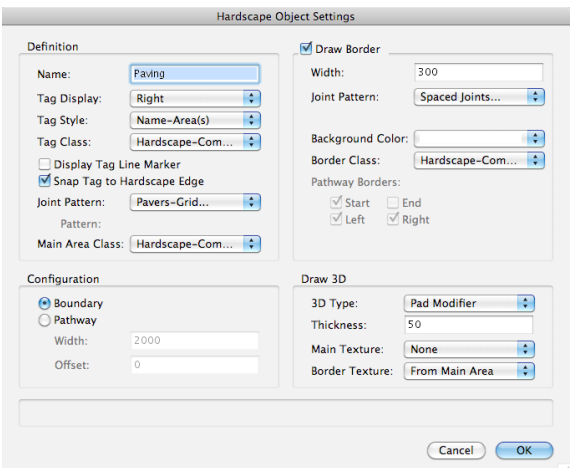


The completed calculations, showing cut volume, fill volume and the net. In this case the net amount is a cut volume that needs to be removed from the site. This volume does not include the expansion of the soil as you cut it.

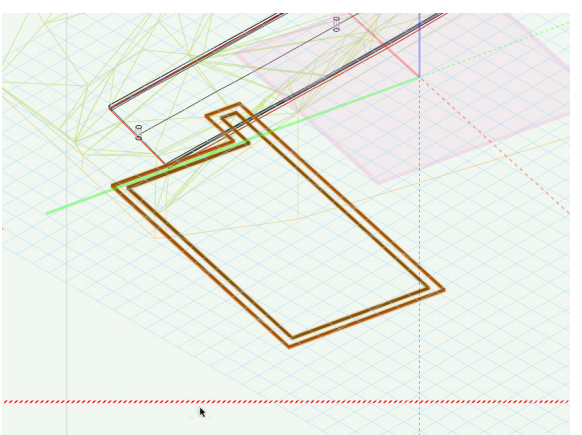
Hardscape

Hardscape is a special tool that makes it easy to draw areas of paving. This hardscape can be 2D only, or it can be 2D and 3D. If you make it 3D, then it can be a site modifier and can affect the site model.

There are several setting here to make the hardscape look better, but the important setting for site modifying is the one at the bottom-right, Draw 3D.

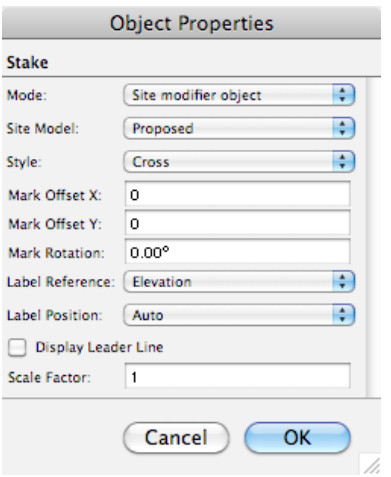


- Set the **3D Type** to **Pad Modifier**.
- Click on the **OK** button.



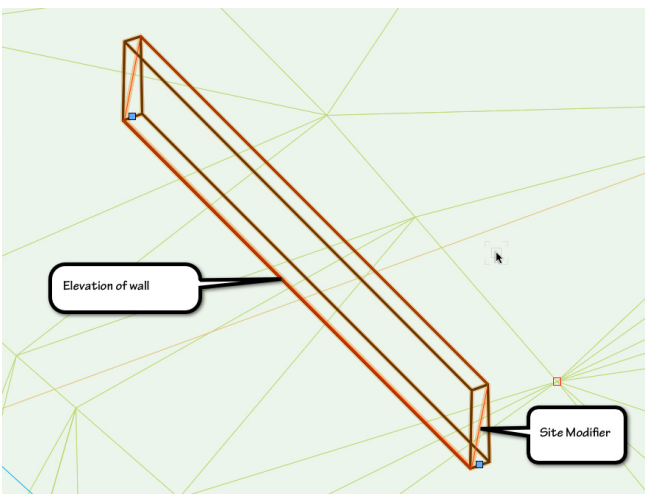
Stake Object

You can use the steak object to help create a site model. You can use the stake object on a site model to give the spot height. And you can use the stake object to edit your site, or modify the site.



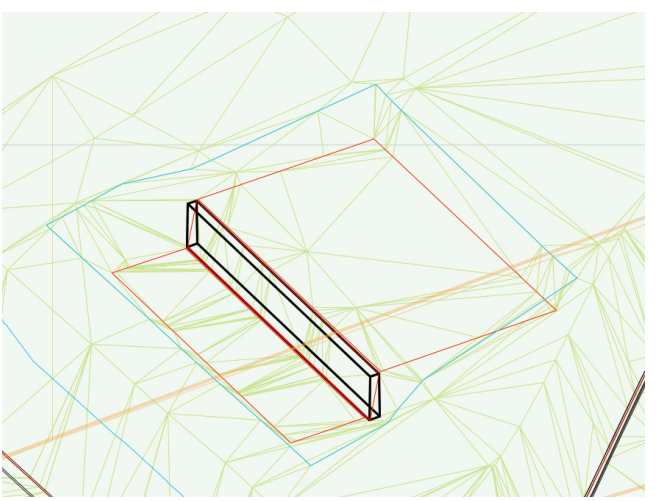
Landscape Wall

The landscape wall is only available if you have Vectorworks Landmark or Designer. The tool is useful because it can place a wall and modify the site at the same time, but it does not draw a wall in the same way as the wall tool. You just get a single wall, and you can not join the wall neatly to other walls. It does not have a fit walls to 3D geometry function like the regular wall does.



- Update the site model.

Creating extra pads and a boundary of you choice gives you more control over the site modifying.

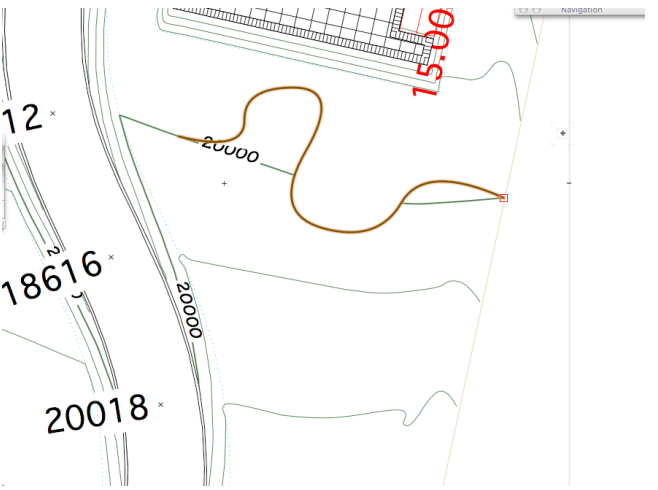


The Landscape Wall Arc is similar to the straight landscape wall.

3D Polylines

You can use a 3D polyline to create a site modifier, you do not always have to use the standard Vectorworks tools. If you use a 3D object it does not have to be planar, you can follow or use other 3D object to create the 3D polyline.

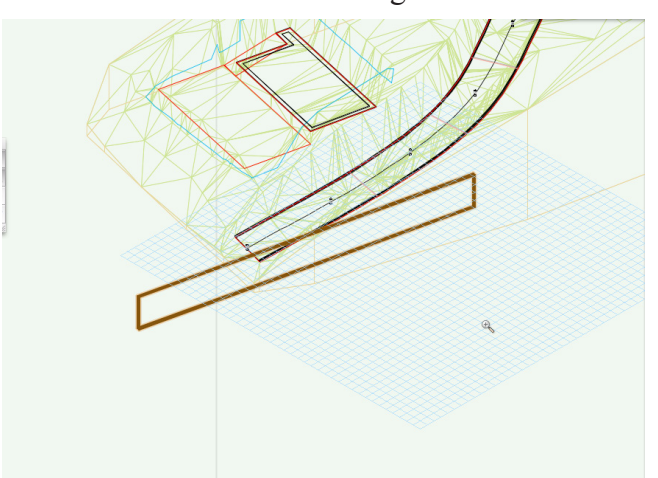
- Create a polyline, polygon, or other shape. You can use any shape with this technique.



Stepped Wall

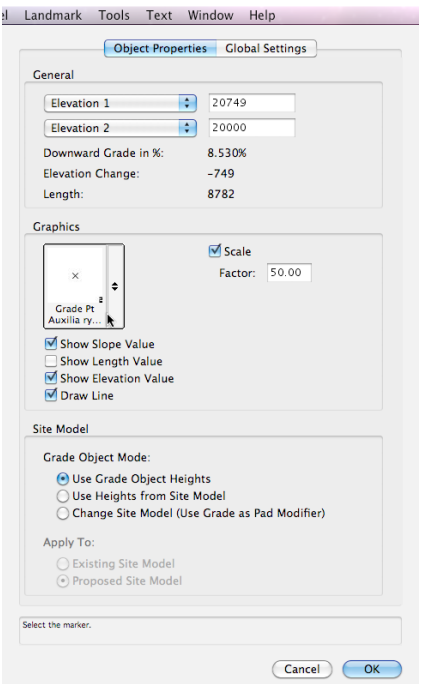
This is not a site modifier, it does not affect the site, but it uses the site to create a stepped wall. The command to create a stepped wall is in the Landmark or AEC menu.

- Draw a wall on a site model.
- Set the wall to the desired height.



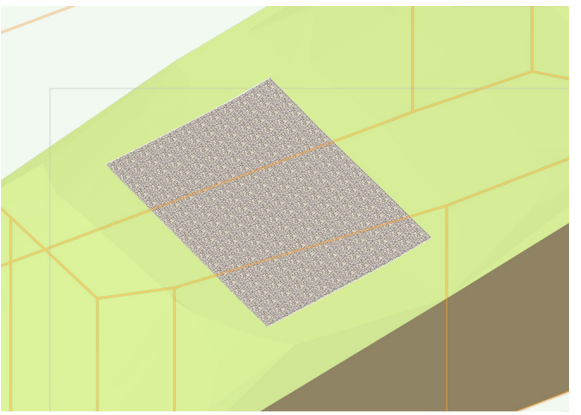
Grade Tool

The grade tool can be used to show the existing grade (or slope) of the site from the start to the end of the grade line. This is a reporting mode. You can also use the grade object to define the grade (slope) that you want, and Vectorworks will change the site model to suit.



Texture Bed

The texture bed can be used to show areas of the site colored or textured. This could be useful if you want to show areas on the site. An example might be if you wanted to show different stages of the project.



Thank you

We trust that you have enjoyed working through this manual and that it has been informative and constructive.

For more information, please visit: http://learn.archoncad.com. If you just want someone to help you learn Vectorworks, to carry out some Vectorworks contract work, or you want someone to make Vectorworks easier, contact us, as this is a service that we also offer:

jon@archoncad.com.

Thank you again,
Jonathan Pickup
April 2015