2.0 Mechanics of Running VSP

2.1 Getting Started and Navigational Aids

Upon launching VSP, the first screen you will see is "Welcome to Visual Sample Plan" overlain with the initial navigational screen, **"Select"** (Figure 2.1).
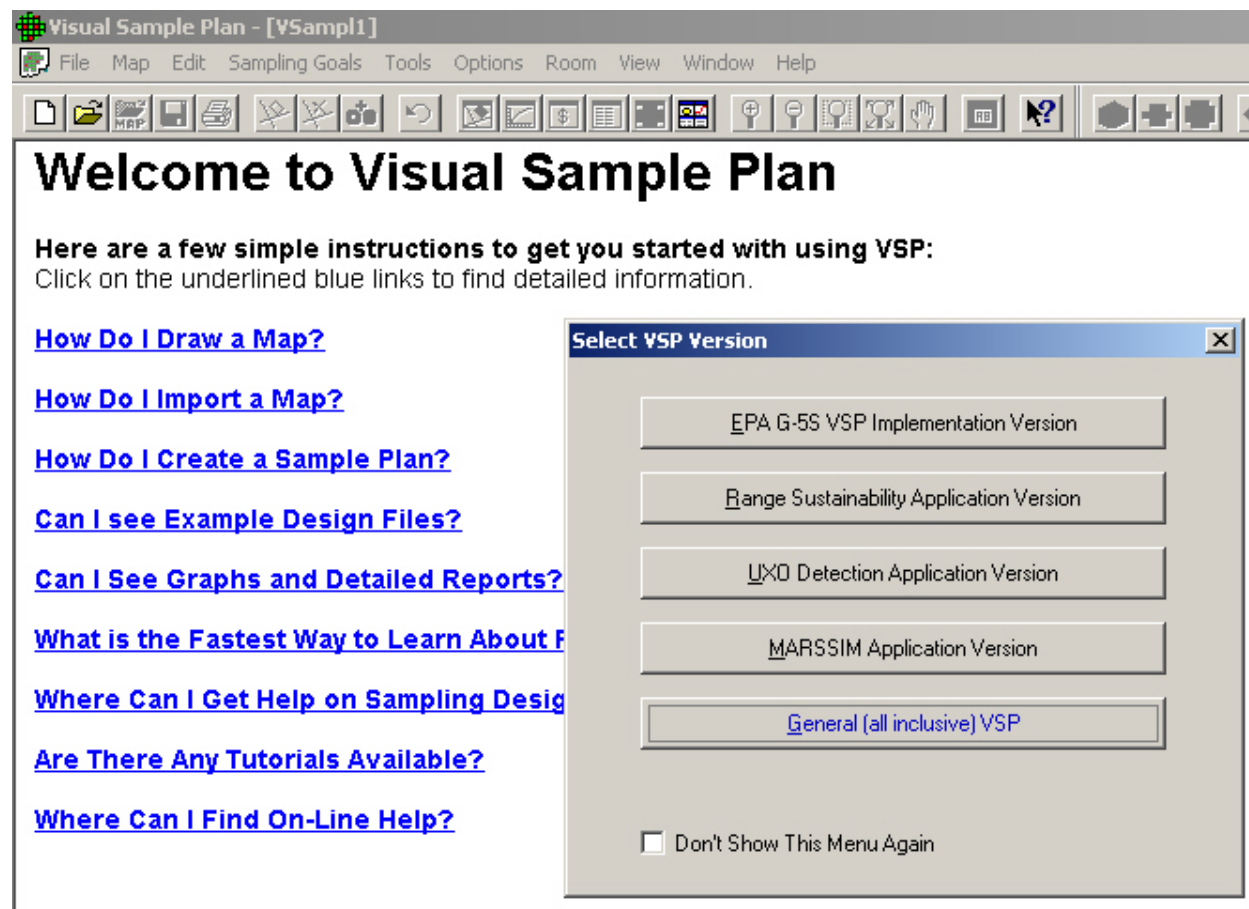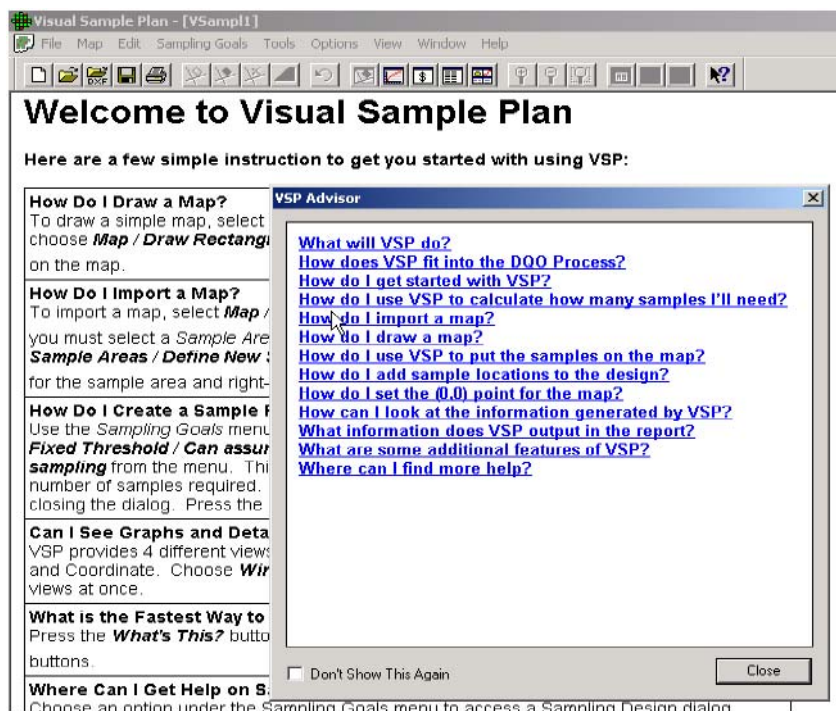

Figure 2.1. VSP Welcome Screen with Version Selection Menu

The choice of VSP versions is offered because different versions of VSP have been developed for different sponsors. Versions were designed to simplify the options presented to the single-purpose user as VSP became more complex. For example, users interested only in MARSSIM applications can select the MARSSIM version. That version contains menu items relating to only rooms and surfaces, and its statistical tests and sampling design options are limited to only those that are MARSSIM-approved. The **EPA G-5S VSP Implementation Version** implements only those sampling designs discussed in *Guidance for Choosing a Sampling Design for Environmental Data Collection* (EPA 2001). The **General (all inclusive) VSP** version provides access to all sampling designs and options.

Once a version has been selected, the second navigational menu pops up: **VSP Advisor**. This Help screen appears when VSP is first launched and again whenever **Advisor > Show Advisor** is selected from the main menu (Figure 2.2). Clicking any of the items under **VSP Advisor** will bring up a screen with brief explanation of the topic. Each topic description screen has a **Return to Main** that brings you back to **VSP Advisor**. You can close the **VSP Advisor** screen by either clicking in the "X" button on the top bar or selecting **Close** at the bottom of the screen.

Figure 2.2. VSP Welcome Screen with VSP Advisor

Having closed **VSP Advisor**, you are now at the third navigational aid, the "Welcome to Visual Sample Plan" screen. The instructions on this page give answers to the most commonly asked questions from new VSP users. This screen will stay up until it is overlain with one of the View options, for example, when a map is loaded and you are in Map View.

You now are ready to begin using VSP after understanding one more piece of housekeeping. You have two ways to use VSP: pull-down menus from the top list of menu items, or the buttons on the main tool bar (select **View > Main Toolbar** to see the buttons). The pull-down menus offer a wider range of options. The buttons offer a quick one-click method for performing the primary VSP functions. Pull-down menus and buttons are shown in Figure 2.3. Holding the mouse over a button will reveal in text what that button does. For example, the Undo button is for undoing a key stroke during a map drawing session.
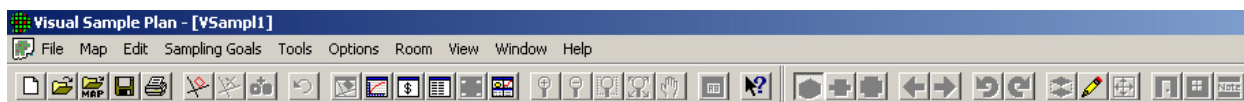
Figure 2.3. Main Menu Items (top row) and Buttons on the Toolbar (bottom row)

There are 4 separate toolbars: the main toolbar, map drawing toolbar, ranked set toolbar, and room toolbar. These toolbars can be moved around the screen by placing the mouse above the buttons on the toolbar and dragging to another place. Toolbars can be displayed or hidden depending on whether they are checked or not (see **View** pulldown list).

Starting with the **File** menu item on the top menu bar, the pull-down menu shows the various options for dealing with Projects.

VSP uses the term Project to refer to the map, report, sample information, and cost information associated with one sampling design. All this information is contained in the 'filename.VSP' created or selected by the user and is in a special VSP format file. Upon starting VSP, you either create a new project, **File > New Project**, or open an existing project, **File > Open Project** (Figure 2.4). If you are creating a new project, you will automatically be put into the "Welcome to Visual Sample Plan" screen after selecting **File > New Project**. If you are opening an existing project, you will be shown a list of existing VSP files and asked to select one.
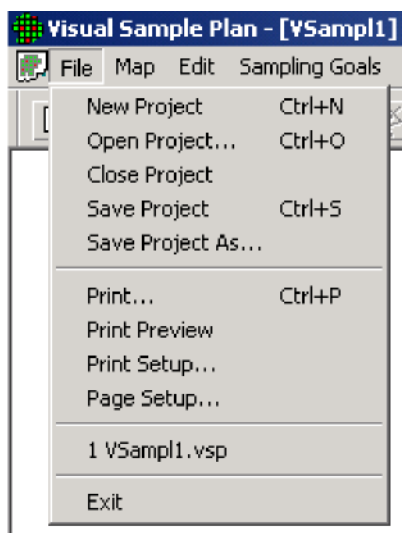
Figure 2.4. Pull-Down Menu Items Under File

2.2 Setting Up a Map

If you are starting a new project, you may obtain a map (drawing) of the site in any of three ways:

1. Import the site map from a drawing interchange format (DXF) file or ArcView SHP file. VSP supports the following DXF Objects: POLYLINE, LWPOLYLINE, LINE, ARC, CIRCLE, ELLIPSE, and TEXT. If you are having problems loading a DXF file into VSP, try converting your file to these types of objects.

2. Import the site map from a previous VSP project that was saved in VSP format (i.e., a .VSP file).

3. Draw the map or Sample Area using VSP's drawing tools.

These three methods are illustrated below. VSP uses the coordinate system associated with the imported map. Because neither DXF nor SHP files contain the distance units, VSP will assume your map is in feet until you change it to some other unit. This is done by selecting **Map > Set Map Extents** from the Main Menu. If you want to use a local origin in your design, use **Map > Set Origin** to click on the map at the location you want to become the new origin (0,0 point). You can also input the current location via the keyboard to become the new origin.

2.2.1   Importing a Site Map from a File

You can draw a complex site map in an architectural drawing program such as Autodesk Map~ AutoCAD~, or ArcView~ and save the drawing to a .DXF or SHP formatted file in that software package. The resulting file can be imported into VSP. The Millsite.dxf file is a sample DXF file provided with VSP. The following steps illustrate how to use this file in VSP:

1. From the main menu, select **Map > Load Map from File**. A quick alternative is to click on the **Load Map** button on the VSP toolbar.

2. A list of available files in the Visual Sample Plan folder is displayed. Select Millsite.dxf. You may change folder names to search for the desired file using standard Microsoft file-searching if the file is not in the Visual Sample Plan folder. Double-click on Millsite.dxf.

3. Choose whether or not you want to import the text embedded in the DXF file.

The site map should appear on your screen as illustrated in Figure 2.5.

2.2.2   Importing a Site Map File in the VSP Format

To open a VSP-formatted file, from the main menu select **File > Open Project** or use the Open button on the VSP toolbar. A list of available .VSP files is displayed. Double click on the .VSP file to be opened. Switch folders and/or directories if the desired file is in another folder or directory.

2.2.3   Draw Map Using VSP Drawing Tools

VSP provides a basic set of drawing tools for users who do not have a drawing program to create a site map. You can experiment with the drawing tools as follows:

- Create a new project by choosing **File > New Project** on the Main Menu or by clicking the New button on the main toolbar. To dismiss the "Welcome to Visual Sample Plan" displayed upon opening a new project, simply commence one of the drawing operations outlined below or **Map / Set Map Extents**. If the project window is not full screen, expand the project window by pressing the **Maximize** button on the upper right corner of the project window.

- Choose **View > Map Drawing Toolbar** from the Main Menu. This displays a toolbar used specifically for drawing a map. This toolbar also may be docked if you prefer to remove it from the project window. To dock the drawing toolbar, place the mouse cursor on the blue title bar and drag the drawing toolbar onto the VSP toolbar.

All the drawing functions described below also are available from the Main Menu option **Map**.

Draw Line. Click the **Draw Line** button on the toolbar. The cursor will become a cross, indicating that you are in drawing mode. Click a point on the map. You will now see a line between the cursor and point you clicked. Continue clicking points to make a complex polygon. If you make a mistake, click the Undo button on the VSP toolbar (or select **Edit > Undo** from the Main Menu or press Ctrl-Z on the keyboard). This will remove the last point you entered.
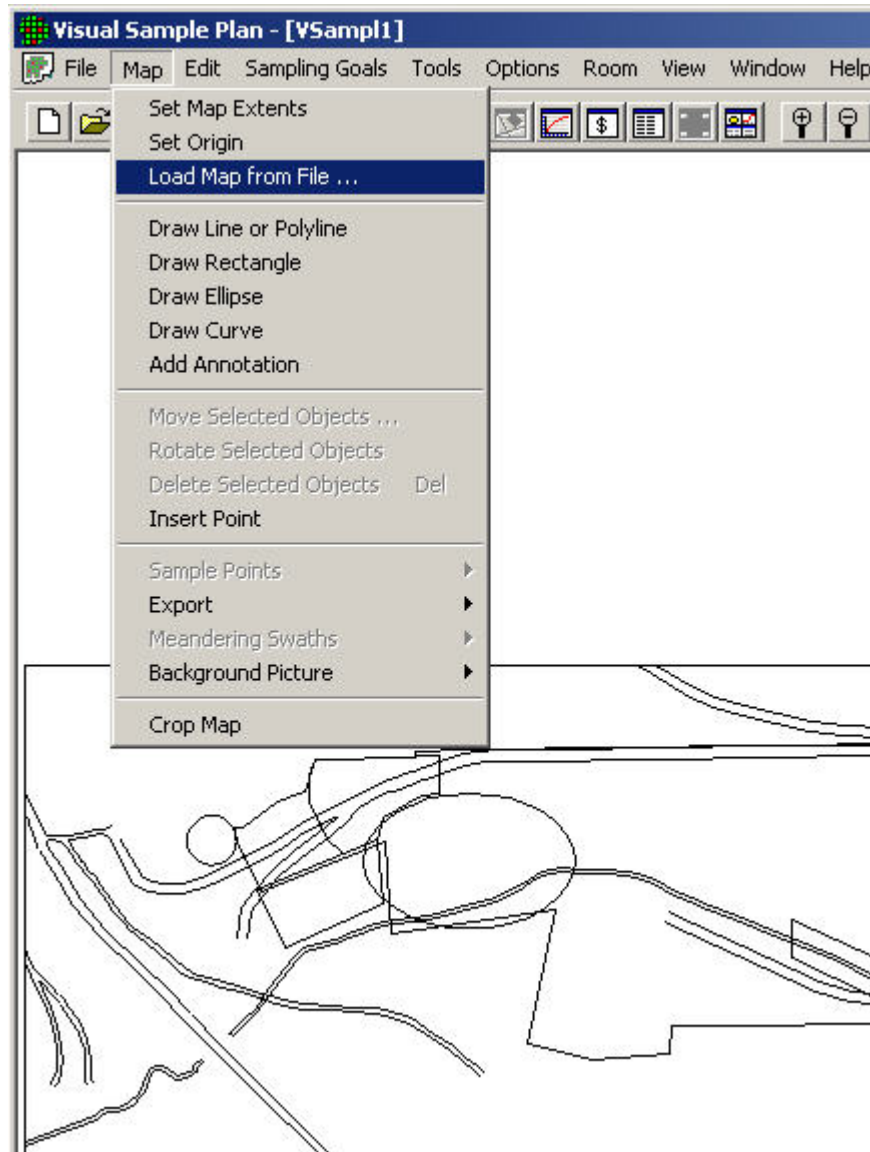
Figure 2.5. The Millsite.dxf File Opened in VSP, showing **MAP** Pull-down Menu

Points can be entered also on the keyboard. Just enter the x, y coordinates for each point (for example: type **32,48** and press the Enter key). You can see the coordinates that you are entering on the status bar at the bottom of the window. To connect a line to a point already entered (for example, to connect the last line to the first point to create a closed polygon), hold the Shift key while clicking with the mouse. Holding the Shift key can be used in most drawing operations to select the nearest point on the map without having to carefully position the cursor. Holding the Ctrl key while moving the mouse allows you to draw a horizontal or vertical line without having to be careful. To finish the line, right-click the mouse or click the **Draw Line** button on the toolbar again.

Draw Rectangle. Click the **Draw Rectangle** button on the toolbar. Click on a point on the map that you want to be one corner of a rectangle. Holding the Shift key while clicking causes that point to be attached

to an existing point on the map. Move the cursor to the opposite corner of the rectangle and click the mouse button. Holding the Ctrl key while moving and clicking forces the rectangle to be a square. The x, y coordinates of the corner points can be entered on the keyboard also.

Draw Ellipse. Click the **Draw Ellipse** button on the toolbar. Drawing an ellipse is basically the same as drawing a rectangle. Holding the Ctrl key forces the ellipse to be a circle.

Draw Curve. Click the **Draw Curve** button on the toolbar. Click a point on the map. Click a second point on the map. A line is drawn between these first two points. As you move the cursor around the map, this line is stretched to become a curve. When the curve has the shape you want, click the mouse (this is the control point). The x, y coordinates for the three points also can be entered on the keyboard.

Add Annotation. Notes (also called note objects) can be added to maps using the annotation tool. Select **Map > Add Annotation**, and the cursor becomes a crosshair. Click on the map at the location where you want to add the note object. The location may also be entered on the keyboard. A default object containing the text "Right-Click Here" is added to the map.

After the default object is added, use the mouse to right-click on the note object. A **Map Label Information** dialog box pops up, as shown in Figure 2.6. You will be able to change the following parameters:

Figure 2.6. Map Label Information Dialog Box

- Note text
- Anchor point on map
- Anchor point to screen
- X and Y coordinates of anchor point (map or screen)
- Border, background color, and font
- Alignment (left/center/right, top/center/bottom)

2.2.4 Working with Maps

2.2.4.1 Selecting Lines and Notes on the Map

VSP imports DXF and SHP files and turns the objects into polylines or a series of connected points. Lines and note objects on the map can be selected by clicking on them with the mouse. When an object is selected, a small black box appears at each vertex, or point, on the object. Polylines appear as a series of vertices. Use the Ctrl key to toggle the selected status of a single line of note object.

Several lines may be selected by using a rectangular area. To do this, position the mouse at one corner of the rectangle then press and hold the left mouse button down while moving the mouse to the opposite corner of the rectangle. When the mouse button is released, all the lines and notes that pass through the rectangle will be selected. Use the Ctrl key to keep previously selected lines and note objects.

Move Selected Objects. Use this dialog to move the selected objects by the given offsets. Objects may also be moved by using the mouse. Position the mouse over a selected line or note object. Press and hold the left mouse button while moving the mouse to the new position. When the mouse button is released, the selected lines will be placed at the new position. This command applies to both map lines and annotation objects.

Rotate Selected Objects. After selecting this command from the menu, enter the pivot point by clicking with the mouse or entering the coordinates on the keyboard. Then enter the angle of rotation by moving the mouse and clicking or entering the degrees on the keyboard. This command affects all selected objects on the map.

Delete Selected Objects. This command deletes selected objects from the map. This action cannot be undone.

Insert Point. After selecting this command from the menu, click on the map with the mouse. A new vertex point is inserted in the nearest polyline on the map. If the polyline matches a sample area, then a matching vertex is also inserted into the sample area. After inserting a point into a polyline, it can be dragged with the mouse to a new location. See VSP's **Help > Help Topics > Map Menu > Insert Point >** selecting and moving points and segments for more information.

Deleting Segments of a Map. If you want to remove a segment from either an imported map or a user-drawn map, you may click on a segment and hit the Delete key on your keyboard. Right-clicking on any segment in a map displays the vertices of the polyline in a outline of bold squares. With the outline in bold squares displayed, hit the Delete key on your keyboard and that segment is removed.

Map Buttons on the Toolbar. The **Zoom In**, **Zoom Out**, and **Zoom Window**, **Zoom Max, and Pan** buttons in the middle of the VSP toolbar (and as pulldown items under Main Menu option **View**) provide methods to focus in on a Sample Area or other region of a site map. Press once on the **Zoom In** button and then click on the site map to make it grow larger. Turn off this mode by pressing the **Zoom In** button again. The **Zoom Out** button works the same way except that it makes the site map shrink. The location on the site map where you click determines the area of the new focus.

The **Zoom Window** button allows you to create an expanded rectangular window into the site map. For an example, press the **Zoom Window** button, drag the cursor across part of the screen, and release. The dashed lines illustrate the final window focus.

The **Zoom Max** button displays the map at the largest size that will fit the current view. VSP uses the current map extents to determine how the map will be positioned. Use **Map / Set Map Extents** to adjust the minimum / maximum x and y coordinates to use for this operation.

The **Pan** button repositions the map in the view window. Hold the left mouse button while dragging the map to a new location. When the left mouse button is released, the map will be redrawn at the new position.

2.2.5   Additional Map Features

The remaining pull-down menu items under **MAP** are specialty topics discussed in other sections of this manual. They will be briefly defined here.

Sample Points imports and exports sample points to text files. It is discussed in Section 2.4. **Export** exports a map and/or samples to various file formats. **Meandering Swaths** draws or imports meandering swaths from an ASCII text file to VSP. To draw meandering swaths on the map you must first enter the width of the swaths in the dialog that appears. Meandering swaths will only be added inside of existing sample areas. If you draw outside sample areas, the swaths will be clipped at the edge of the sample areas. This command works similar to the **Draw Line** command. Right-click with the mouse or re-select this command to stop drawing. This command is useful for creating swaths to be analyzed with **Sampling Goals > Find UXO Target Areas > Post-survey target detection evaluation**.

Map> Background Picture > Load from file loads a background picture from a graphics file into VSP. VSP comes with two sample pictures: VSPEx1 and VSPEx2. Once a picture file is loaded into VSP, sample areas can be located on the picture similar to how they are located on a map. **Map > Background Picture > Calibrate with Map** matches the background picture to the sampling map. **Map >Background Picture > Load World Map** can be used if a Picture World File is available for the background picture. VSP's **Help > Help Topics > Map Menu > Background Picture > Calibrate with Map** describes this process in detail. Figure 2.7 shows the background picture VSPEx1 loaded into VSP with a yellow sample area labeled "Sample area 1" placed on the picture.

Figure 2.7. Background Picture VSPEx1 (JPEG Image) With Label Added

Crop Map removes portions of a map that are not currently visible on the view window. It is useful for removing large amounts of extraneous map lines that tend to slow down the display and other map functions.

2.3   Sample Areas in VSP

2.3.1   Creating a Sample Area

Once a map is created, a Sample Area must be created. A Sample Area is a region in which to locate samples. While most sample areas are enclosed, one of the new Sampling Goals in VSP Version 3.0, Establish Boundary of Contamination, allows for an open type of sample area -- samples are located along a boundary. The user must identify the area to VSP in order to make sampling locations available. (Note: You can use any of the sampling designs except Judgement Sampling without a Sample Area defined, but they will not create sampling locations, only sample sizes.)

2.3.1.1   Define New (Closed) Sample Area

Press the **New Area** button on the VSP toolbar (or from the Main Menu select **Edit > Sample Areas > Define New Sample Area**). A **Color** dialog box appears. Use this dialog to choose the color of the Sample Area. After the color is selected, a tooltip box appears on the map to provide information on the selection method. Figure 2.8 shows a red Sample Area along with the dialog boxes for creating it. Repeat the operation to create a second Sample Area.

There are two basic ways in which to create the Sample Area:

1. **One-Step Method**. Position the cursor inside one of the enclosed areas on the map and right-click with the mouse. The Sample Area is created, and a dialog box appears. This dialog box shows the size of the Sample Area and allows you to change the units of the map. Click the **OK** button on the dialog when done.

2. **Corner-Selection Method**. Position the cursor on each corner of the Sample Area and left-click with the mouse. If you hold down the Shift key while clicking, the nearest point on the map will be selected. If you make a mistake in choosing a corner, use the **Undo** feature. When you have finished defining the Sample Area, either click the **Finish Area** button on the VSP toolbar, select Main Menu option **Edit > Sample Areas > Finish New Sample Area**, or right-click the last segment in the corner selection method. The area dialog box appears, allowing you to change the map units. Note: A Sample Area cannot cross over itself. If this happens, an error message—"This area is invalid and will be removed"—appears.

Figure 2.8a. Map with a Single Sample Area
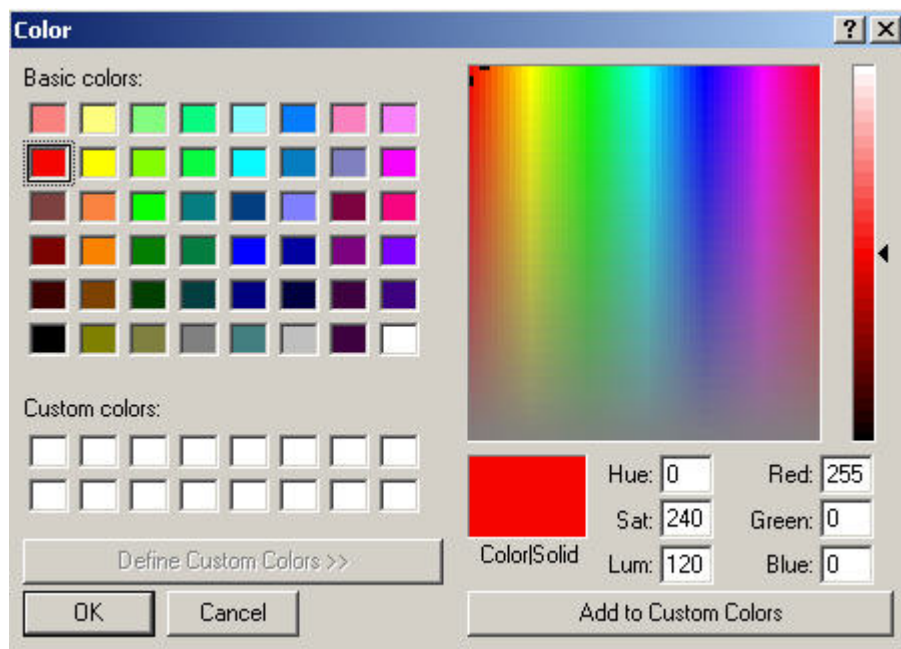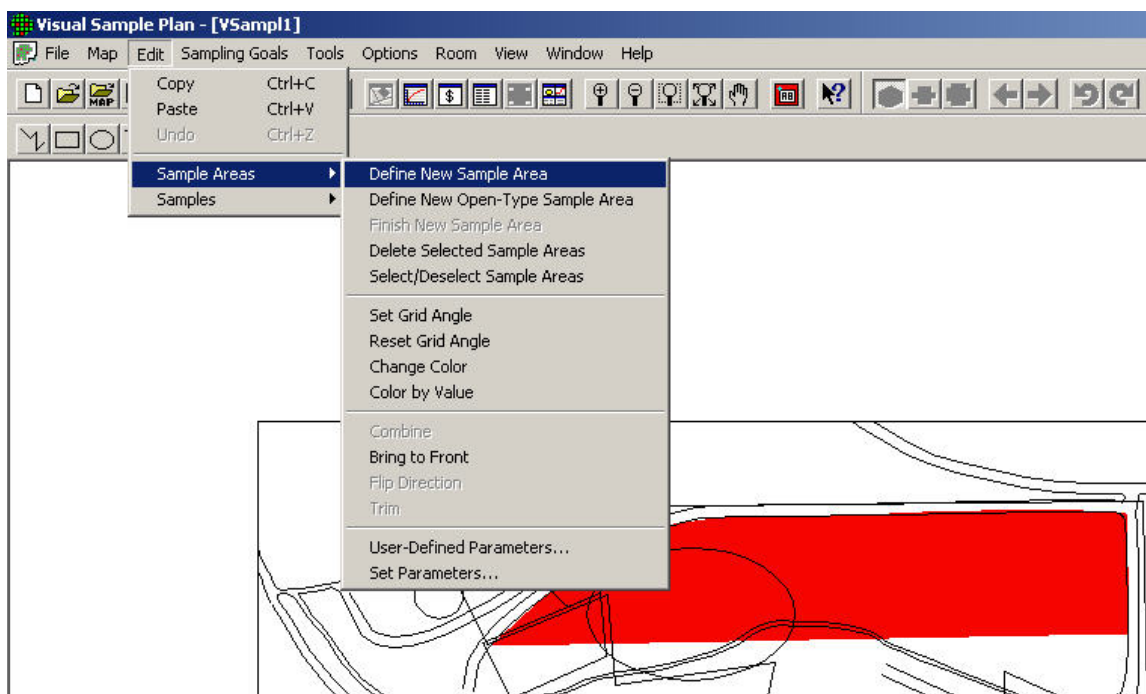
Figure 2.8b. (contd)

Figure 2.8c. (contd)

A map may contain a single Sample Area or multiple Sample Areas. For example, OneAcre.VSP (an example of a VSP file included with the program) is a single Sample Area, while Example1.VSP could have multiple Sample Areas because the map consists of several enclosed areas that could be selected as Sample Areas. When multiple Sample Areas are selected, samples located on the map by VSP are distributed across all the areas. When multiple samples area are combined using the VSP **Combine Areas** toolbar button or the **Edit > Sample Areas > Combine** menu selection, the combined area is treated as a single area (see Section 2.3.5 for a discussion of combining sample areas).

2.3.1.2   Define New Open-Type Sample Area

VSP provides sample design support for boundaries that do not completely surround a sample area. For instance, suppose it is reasonable to assume that the only portion of the boundary that could be breached by soil contamination is along the downhill side of the Sample Area. In that situation, the VSP user first clicks **Edit > Sample Areas > Define** New Open-Type Sample Area. Then the user places the cursor at the starting location of the desired partial boundary and clicks on each vertex along the boundary line until the end of the boundary of interest is reached. Then a click of the right mouse button finishes the creation of this partial boundary. An example of a partial boundary is shown as a red line in Figure 2.9.
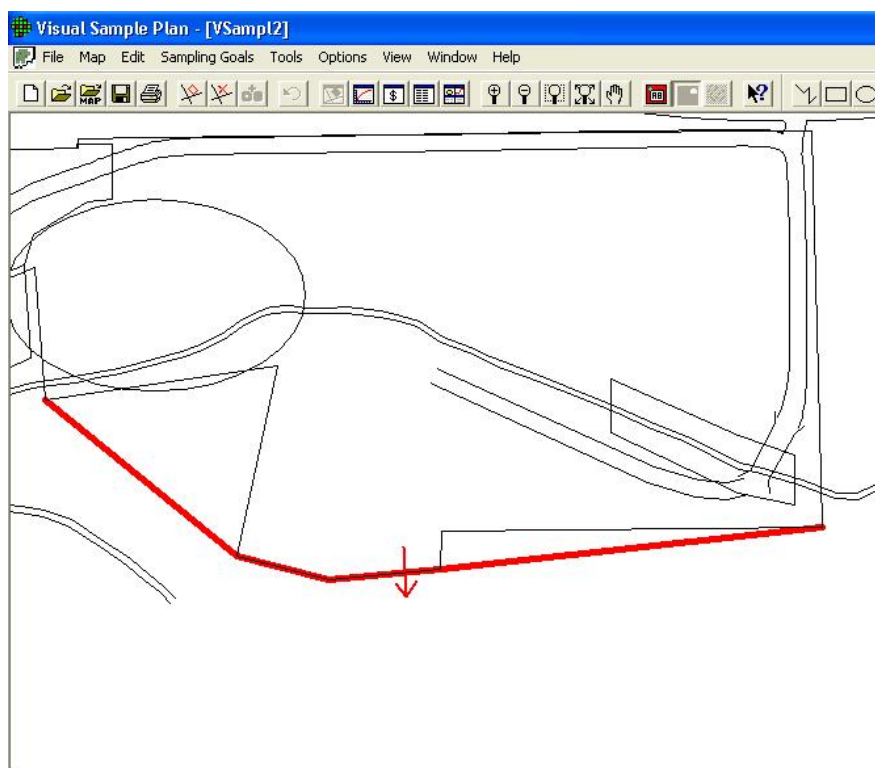

Figure 2.9. Example of an Open Boundary with an Arrow to Show the Direction the Soil Contamination would be Expected to Move (note that the arrow points toward the "clean" side)

Alternatively, the user may create an open-type sample area (partial boundary) using the single-click method. This is accomplished by selecting **Edit > Sample Areas > Define New Open-Type Sample Area** from the menu and then right clicking on an existing line on the map. The boundary may be shortened by selecting the **Edit > Sample Areas > Trim** from the menu and then clicking on two points on the boundary.

During the boundary selection process, VSP places an arrow on the boundary. This arrow points in the direction that contamination in soil may be expected to move, if such movement has or were to take place. If VSP points the arrow in the wrong direction, the direction of the arrow can be reversed by clicking **Edit > Sample Areas > Flip Direction**.

2.3.2 Selecting or Deselecting Sample Areas

VSP allows the user to control which Sample Areas are available for locating samples. Creating a Sample Area automatically "selects it" for locating samples. You know it is "selected" because it appears in a solid color on the map. "Deselected" Sample Areas appear with only the outline of the Sample Area in color and the interior blanked out. You may Select or Deselect a Sample Area in three ways: 1) left click within the Sample Area, 2) right-click on a sample area and change the **Selected** checkbox on the **Sample Area Information** dialog box, or 3) from the Main Menu select **Edit> Sample Areas > Select/Deselect Sample Areas**. The latter method brings up a dialog box that allows you to choose which areas to select or deselect. Figure 2.10 shows a VSP map with three areas selected and one area deselected, and the dialog box where the selections are made. Note that VSP automatically names the Sample Areas: Area 1, Area 2, Area 3, and Area 4 according to the sequence in which the areas were created. The names can be changed in the **Sample Area Information** dialog box discussed in Section 2.3.4.
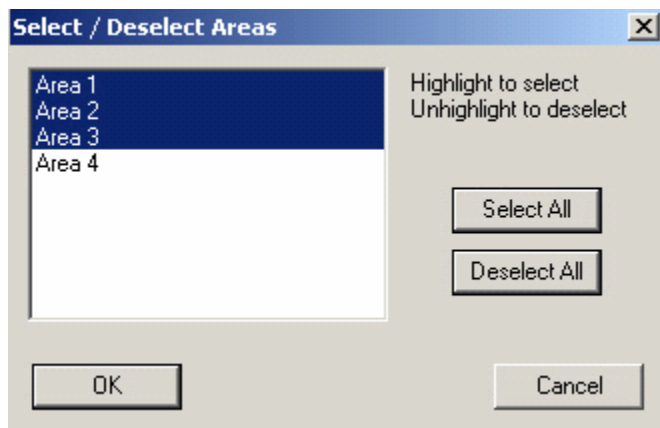
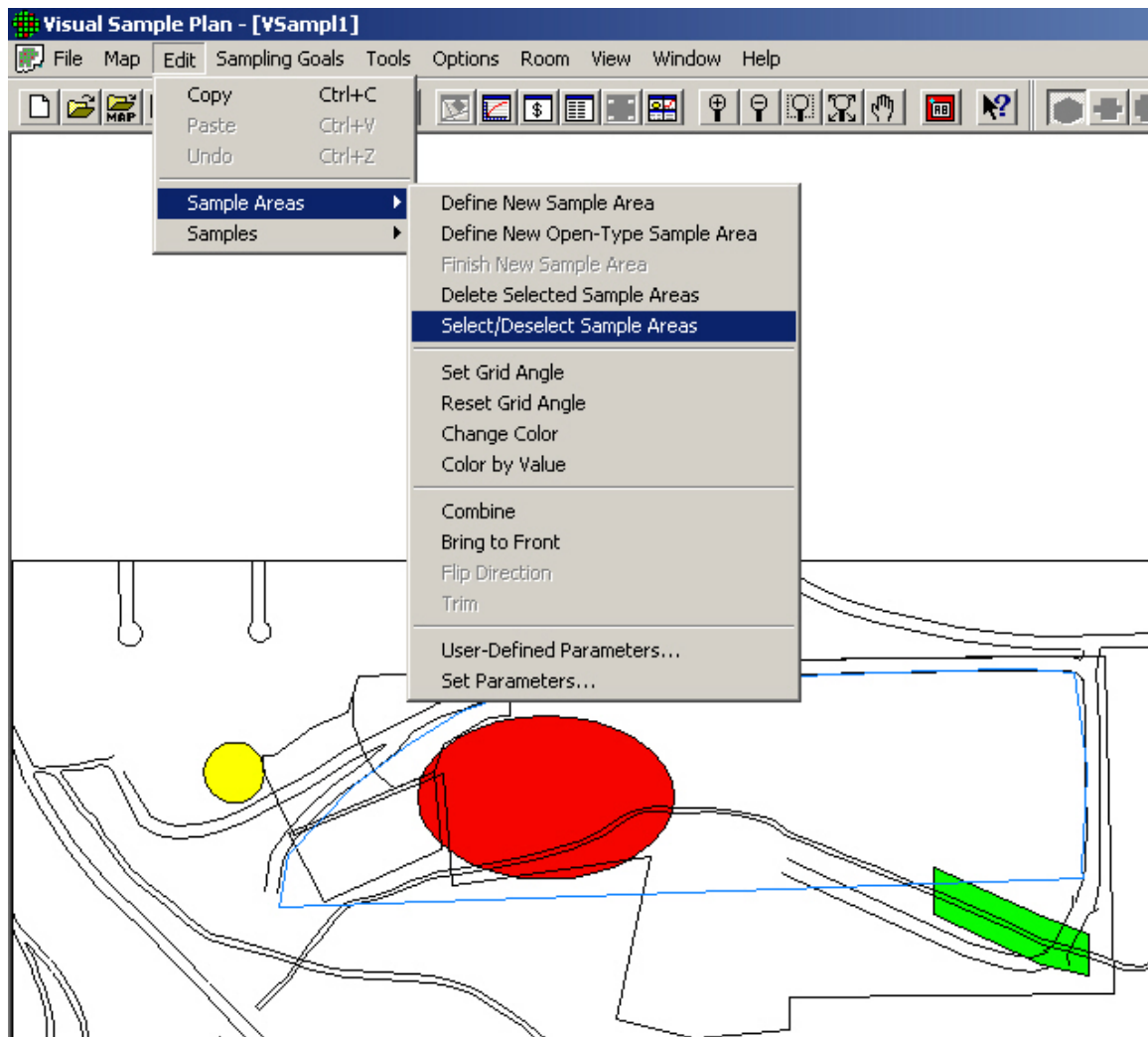**Figure 2.10a**. Map with Multiple Sample Areas Selected

Figure 2.10b. (contd)

2.3.3   Deleting Selected Sample Areas

If you make a mistake, or just want to delete one or more of the Sample Areas you created, you must first make sure the Sample Area(s) is Selected (see above). Then, from the Main Menu, choose **Edit > Sample Areas > Delete Selected Sample Areas**. Be sure to deselect any sample areas that you want to save.

2.3.4   Sample Area Parameters

VSP automatically generates certain parameters for Sample Areas, such as the name, area and perimeter. This information can be accessed by right-clicking on the sample area on the map. The **Sample Area Information** dialog box for Area 3, the big red ellipse, is shown in Figure 2.11.
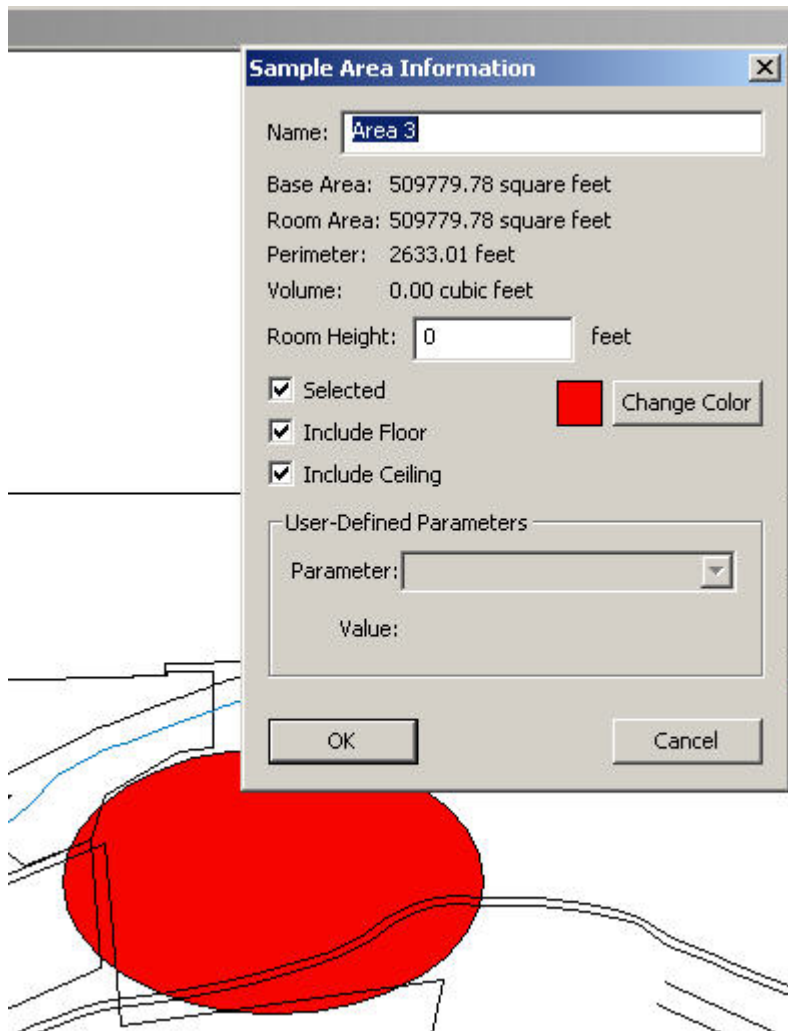
Figure 2.11. Sample Information Dialog Box for a Sample Area

Some parameters such as Name and Selected status can be changed in this dialog box. You will note parameters that refer to rooms in this dialog box. These will be discussed in Section 2.5. Briefly, Rooms are just Sample Areas with height greater than 0, so the same dialog box is used for both Sample Areas and Rooms.

VSP allows the user to define parameters for Sample Areas. These are called User-Defined Parameters. To create User-Defined Parameters, from the Main Menu select **Edit > Sample Areas > User-Defined Parameters**. A dialog box as shown in Figure 2.12 is displayed.

Press the **Insert New** button, and default values appear in the windows. Say you want to define a new parameter for Sample Areas and name it "Regulatory Status". Type "Regulatory Status" in the **Name** box. Say you select "Integer" for **Type**, and check the **List** option. **List** lets you limit the values assigned to Regulatory Status to those you supply. Figure 2.13 displays dialog box.
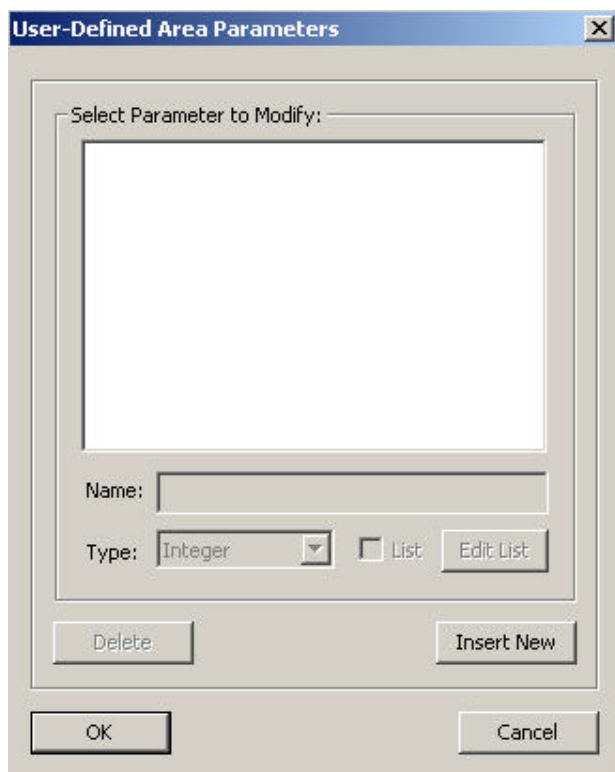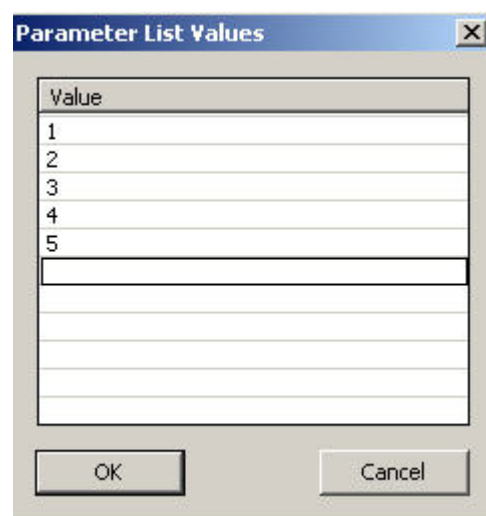
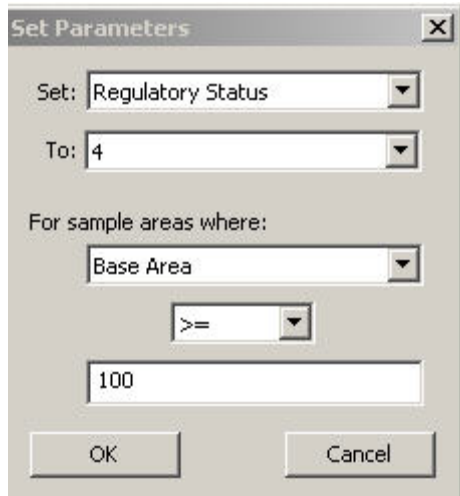**Figure 2.12**. User-Defined Area Parameters Dialog Box
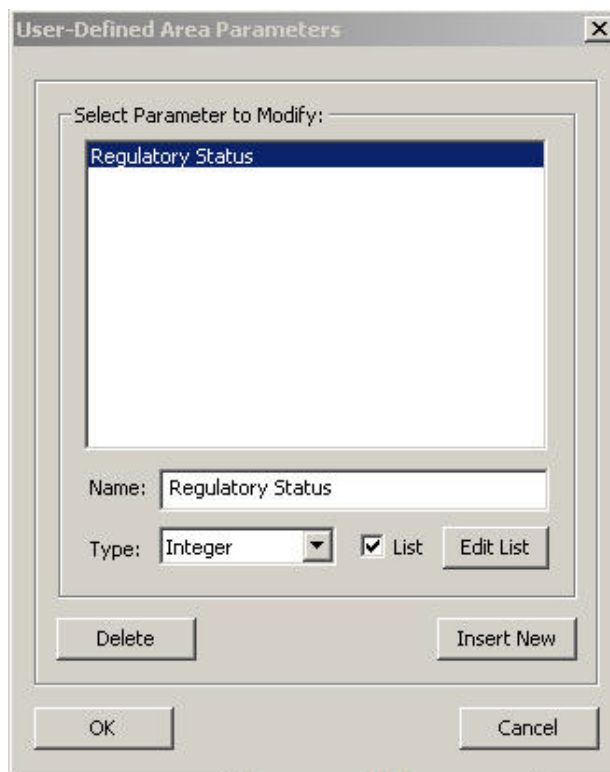
Figure 2.13. User-Defined Area Parameters Dialog Box with Edit List

With a parameter highlighted in the Select Parameter to Modify window, hit the **Edit List** button. A new dialog box titled **Parameter List Values** comes up (see Figure 2.14). The user inputs values to this list by putting the mouse on an current value, hitting return, and typing the next value into the list. The list contains the valid arguments for that parameter.

Once a new parameter is defined, that parameter is attached to (or defined for) all Sample Areas. You may want some Sample Areas to have one value for the parameter, and other Sample Areas have another value. Parameter values may be set in the **Sample Area Information** dialog or by the **Edit > Sample Areas > Set Parameters** menu command. Shown in Figure 2.15, the **Set Parameters** dialog box allows the user to assign parameter values to Sample Areas based on a condition. The example shown in Figure 2.15 says to set the parameter Regulatory Status to the value 4 for Sample Areas that have a Base Area (one of the VSP-defined Sample Area parameters)

Figure 2.12. Parameter List Values Dialog Box

greater than or equal to 100 square feet. The Set Parameters dialog box has many pull-down lists, making it easy for the user to quickly set parameter values for Sample Areas.

Figure 2.13. User-Defined Area Parameters Dialog Box with Edit List

2.3.5   Extended Sample Area Topics

There are several other features that deal with Sample Areas:

Set/Reset Grid Angles. Use this command to align gridded samples for selected sample areas. Left-Click with the mouse on one vertex of a sample area, then Left-Click on an adjacent vertex of a sample area. (Hold the shift key while clicking to select the exact point on the map.) Use the Reset Grid Angle command to change the grid angle back to its default setting.

Change Color. Use this command to change the color of all selected sample areas. The chosen color will also be the default color for subsequent new sample areas.

Combine. This command combines sample areas or creates interior holes in sample areas. To combine sample areas, select 2 or more non-overlapping sample areas on the map and use this command. The sample areas are combined so that they are treated as a single sample area. Clicking on one part of the sample area will select or deselect all the attached parts of the sample area. All the attached parts are treated as a single sample area for the purpose of sample placement. See **Help > Help Topics > Edit menu > Sample Areas > Combine** for an example.

Bring to Front. Use this command to bring the selected sample areas to the end of the draw list causing them to be drawn last. This will, in effect, cause them to appear in front of other sample areas. Use this command for sample areas that exist inside the hole of another sample area and cannot be seen. Note that this command changes the sample area numbers.

Flip Direction. This command switches the contaminated / uncontaminated side of the open-type sample area. The arrow points toward the uncontaminated side.

Trim. This command allows you to shorten the open-type sample area. After selecting this command, the cursor becomes a cross-hair. Use the mouse to click on two points on the open-type area. After the second point is selected, the area will be truncated at the two points.

2.4   Individual Samples (Importing, Exporting, Removing, and Labeling Them as Historical)

Individual samples have several attributes within VSP:

- location (x, y, z coordinates) and local coordinates (lx, ly)
- type (sampling design used to collect them)
- label (descriptive text)
- value (numerical value)
- Shape (marker symbol)
- historical sample indicator (true/false indicator).

Some of these attributes are relevant for only certain functions within VSP and are explained in future sections.

The primary way you will locate samples within a Sample Area is by pressing the **Apply** button from one of the dialogs once a **Sampling Goal** is selected from the Main Menu. This process is described in Section 3. Samples located in this way are automatically assigned Location, Type, and Shape. Samples that are imported and samples that are located manually do not have the same status as those located by VSP using a statistical approach. Imported samples and manually located samples must be assigned attributes by the user.

Sample attributes can be displayed using the **Sample Information** dialog box. With the map displayed, right-click on an individual sample. A Sample Information dialog box appears that displays current sample information. Information such as Label and Value can be assigned using this dialog box. In Figure 2.16, we see the VSP file Example 2, after right-clicking the right-most sample in the third row up from the bottom. We assigned that sample a Label of "A-24", and a value of "6.1". The fact that the **Historical** box is not checked means this sample originated from VSP by Applying one of the VSP Sampling Goals (rather being imported into VSP as part of an earlier sampling effort).
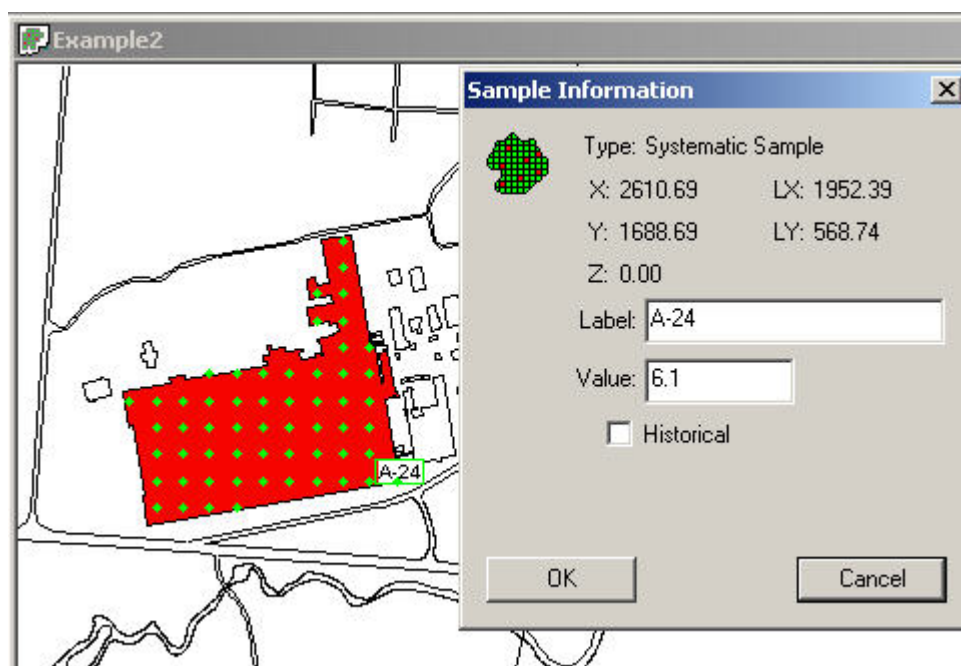
Figure 2.14. Sample Information Dialog Box for a sample in Example2.VSP

2.4.1 Importing Samples

There are two ways to import sampling locations:

1. Copy them from the Windows Clipboard. Edit the coordinates in a text editor, a word processor, or a spreadsheet. Each line (or row) represents a different sampling location. The first column is the x

coordinate; the second column is the y coordinate. The third column is the sample Type and is optional. Valid sample Types are Random, Systematic, Hotspot, Manual, Adaptive-Fill, or Unknown. The fourth column is the sample label and is optional. Spaces or tabs should separate columns. (Tabs are preferable.) The coordinates must lie inside a selected Sample Area.

Example: Type the following coordinates into a text editor such as Notepad:

10	10	Random
50	10	Systematic
10	50	Hotspot
95	60	Manual
99	99	Adaptive-Fill
150	150	Unknown

Now press Ctrl-A to select all the text and Ctrl-C to copy the text to the Windows Clipboard. Run VSP and load OneAcre.Vsp. Select the Main Menu option **View > Coordinates**. Paste the coordinates into VSP using either **Ctrl-V** or Main Menu option **Edit > Paste**. View the new sampling locations using Main Menu option **View > Map or Window > Quad Window**. Your map view should now look like Figure 2.17.
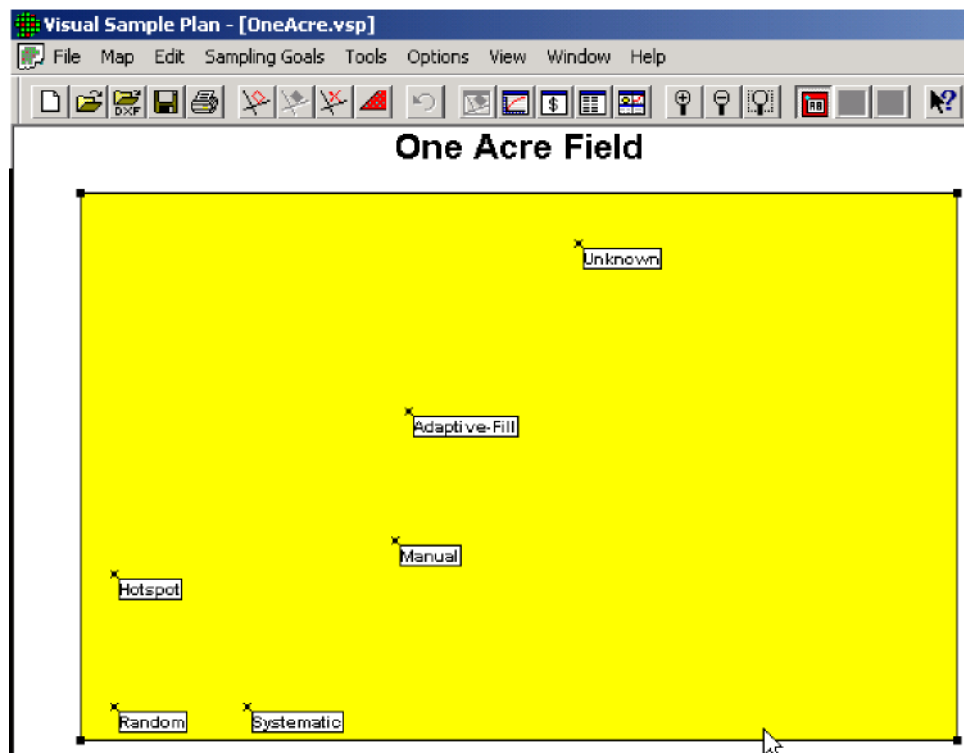

Figure 2.15. The OneAcre.VSP Project with Sampling Locations Added from Windows Clipboard

You can place the mouse on any sample point and right-click to see the attributes of the sample at that sample Location. Figure 2.18 shows the Sample Information VSP has for the sample near the arrow.

2. Import sampling locations from a text file. The text file must be formatted as described above. Choose Main Menu option **Map > Sample Points > Import** and enter the file name in the dialog box.

Samples that are imported are assigned Shapes depending on the Type attribute assigned. Sample Type can be edited by selecting **Edit > Samples > Shapes** from the Main Menu. The Dialog box that appears shows both the shapes assigned to valid Types (use the pull-down menu to select among valid Types), and gives a picture of the Shape. Figure 2.18 shows that when a sample was collected according to a **Random** design, it will be displayed with a **Small Cross** within a **Circle** Shape.
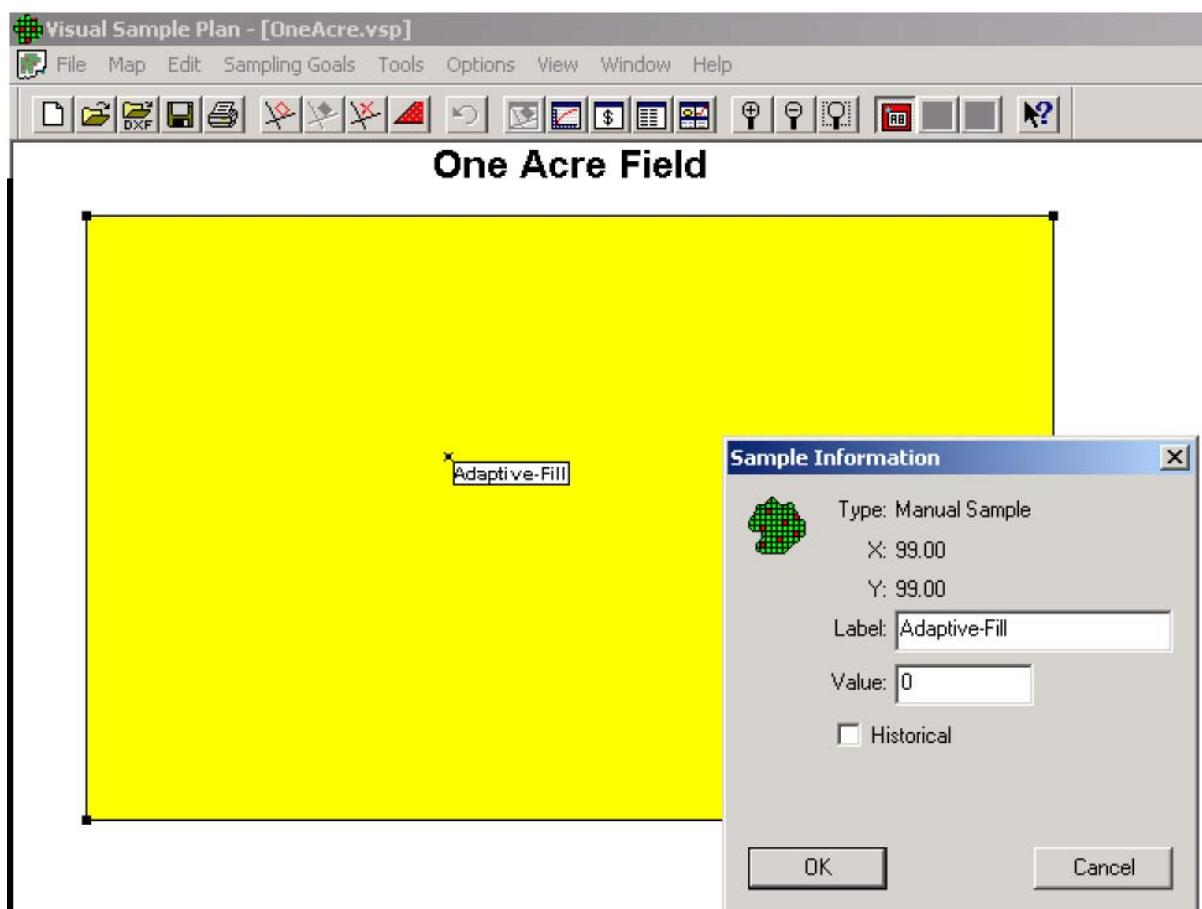
Figure 2.16. Example of Sample Information Box

2.4.2   Historical Samples

Sample locations with the Historical box checked (see Figure 2.18) have a unique role in VSP. VSP gives you "credit" for them in accounting for the total number of new samples needed. This is explained in Section 3.2. The important point to remember here is that if you import samples, manually add

samples, or have a sampling design previously created within VSP, you can give specific samples a "Historical" status by placing your mouse over the sample location while in Map View and, in the dialog that comes up, checking the Historical box.
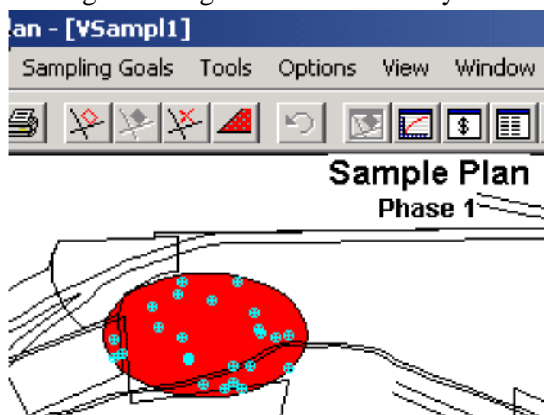
2.4.3   Exporting Sampling Locations

To export sampling locations to a text file (for example, to use the coordinates in a ground penetrating radar system),

1. Select the Sample Area as described above and develop the sampling design as described in Section 3.

2. Choose Main Menu option **Map > Sample Points > Export**. Provide a name for the text file and click Save.

2.4.4   Removing Sampling Locations

This option is best explained with an example:

1. Start VSP and open a new project using Main Menu option **File > New Project**

2. Open the Millsite.dxf file using Main Menu option **Map > Load Map from File.** ********formatting problems**********

3. Click the **New Area** button on the toolbar and, after choosing a color, select the large ellipse by rightclicking inside the oval. If you accidentally get some other area, click the **Remove Areas** button and start over. Place the cursor as far from other objects as possible but still inside the ellipse.

4. Choose the Main Menu; select **Sampling Goals > Compare Average to Fixed Threshold > Data not required to be normally distributed > Simple Random Sampling (Wilcoxon signed ranks test)**. Click the Apply button to place samples in the Sample Area. You should now have a Sample Area with 24 sampling locations similar to that shown in Figure 2.19.

5. Using the Main Menu option **Map > Sample Points > Export**, save all the sampling locations to a text file named ***Points.txt***.

Figure 2.17. Example Sample Area with Sampling Locations

6. Now we are ready to remove some of the sampling locations. First, delete the first 16 rows (sampling locations) from file ***Points.txt*** using a text editor like Notepad. Save the remaining 5 rows to a new file named ***Remove.txt***. These are the locations that will be *removed* from the Sample Area.

7. Finally, to remove the sampling locations listed in Remove.txt from the Sample Area, choose Main Menu option **Map > Sample Points > Remove**. Select the file ***Remove.txt*** and click the **Open** button. You will see in Figure 2.20 there now are only 16 sample points instead of the original 24 shown in Figure 2.19.
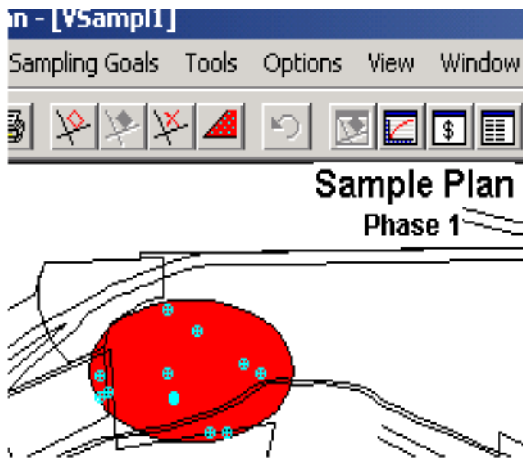
Figure 2.18. Example Study Area after Sampling

In other words, the coordinates in the ***Remove.txt*** file are the sampling locations that are deleted from the Sample Area. Just one location or all the locations can be removed.

2.5 Rooms and Buildings in VSP

One of the major enhancements in VSP version 3.0 is the ability to draw and apply sampling designs to rooms and hence, buildings. Rooms have height, spatial relationships with other rooms (i.e., can be assigned to floors within buildings), and a unique set of objects associated with them (e.g., doors and windows). They also have a unique set of parameters that are VSP-assigned (e.g., volume, floors, ceilings, walls) and user-assigned (e.g., zones, class, HVAC system, release point of threat agent, etc.).

The motivation for expanding the room functionality beyond that which was provided in release VSP 2.0 in the new interest in homeland security; threat assessment for buildings; sampling designs for floors, ceilings, and surfaces; and cleanup and release criteria for contaminated buildings.

At the most basic level, a Room is just an enclosed Sample Area with height greater than 0. As such, many of the VSP functions and screens associated with Sample Areas are the same for Rooms. However, there are also many new VSP functions for Rooms.

2.5.1 Drawing a Room

Start a new project using Main Menu option **File > New Project**. Click the **Draw Room** button on the drawing toolbar or select Main Menu option **Room > Draw**. (Use **View / Room Toolbar** to show the Room Toolbar.) A tooltip box displays the three ways to draw a room using this tool:

- Enter the room dimensions on the keyboard: LxWxH. (e.g., 12x10x8 <enter>)

- Enter the corners of the room on the keyboard: X, Y (e.g., 50, 50 <enter> 90,90 <enter>).

- Left-click the mouse at the upper-left hand corner of the room, and drag the mouse to the lower-right hand corner. Left-click the mouse to finish the room. This is similar to drawing a rectangle, except that VSP automatically sets a wall height of 8 ft. Room height can be changed using Main Menu item **Room > Set Room Height** or by clicking on the **Set Height** button on the drawing toolbar.

With the room displayed, right-click anywhere within the room. The **Sample Area Information** dialog box appears (Figure 2.21).
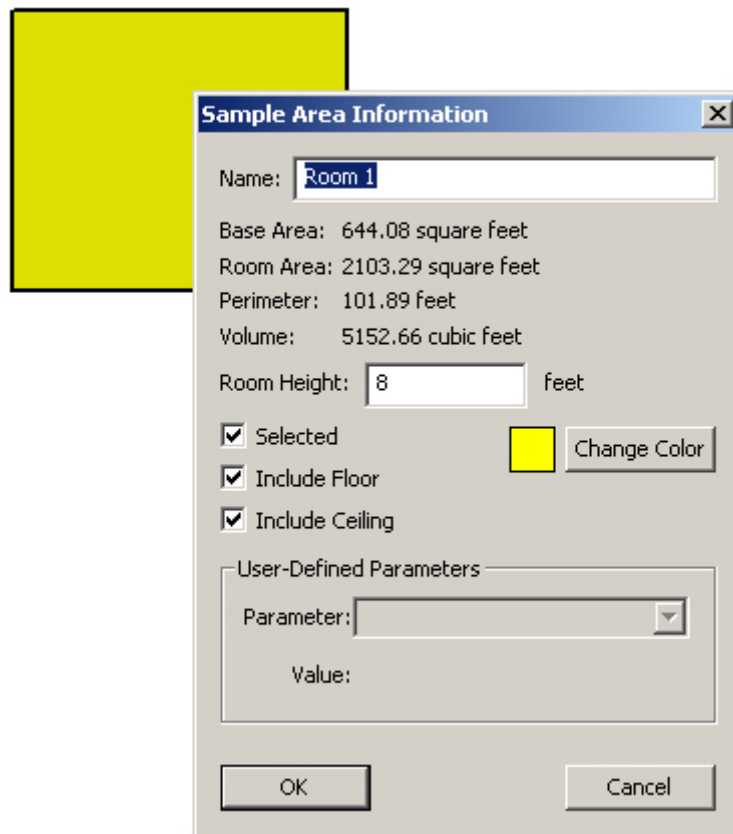
Figure 2.19. Room Information Dialog Box

This dialog box can be used to view parameters of the room such as base and room area, perimeter, and volume. The name of the room is set to "Room n" until changed by the user. The user can set and change other parameters such as room height, color, whether the floor and ceiling are included as part of the room (and hence samples will be applied to the floor and ceiling as well as the room walls). Any User-Defined Parameters set will be displayed in the pull-down list.. User-Defined Parameters for Rooms are set in the same way as User-Defined Parameters for Sample Areas (see Section 2.3.4). Note that you are in Map View when drawing the room.

The room can be modified in the Map View by inserting a point into a wall and then moving the wall section (see Figure 2.22). This is used to create L-shaped rooms, or irregular-shaped rooms.
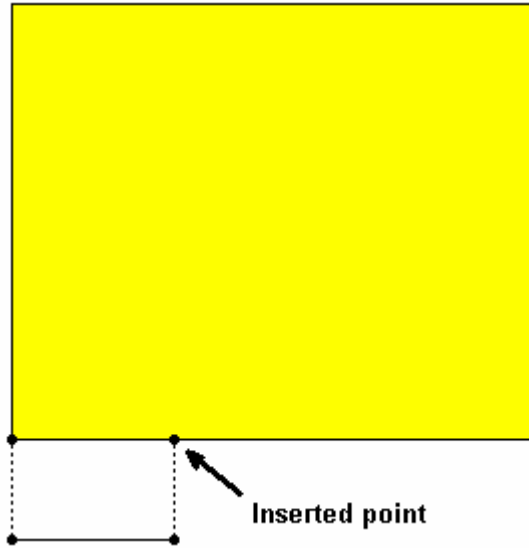
Figure 2.20. Room with Inserted Point

You can set the exact length of a line segment by right-clicking on it. First select the segment (hold the Shift key while clicking between two points on the map), then right-click on the selected segment. A dialog will appear that allows you to enter the exact length of the line segment. If the segment is attached to other segments at right angles, those other segments are moved or adjusted as well.

After the room is drawn (defined), it becomes the current room and can be displayed with Room view (**View > Room**). The current room is indicated on the map by a thick black outline and a darker shade. A room can be displayed in one of three view formats:

- Perspective
- Wall Strip
- Splayed

The display view format can be selected using one of the three buttons on the drawing toolbar, or by selecting one of the formats under the Main Menu item **Room** while in Room view. Figure 2.23 shows the three views of a room.
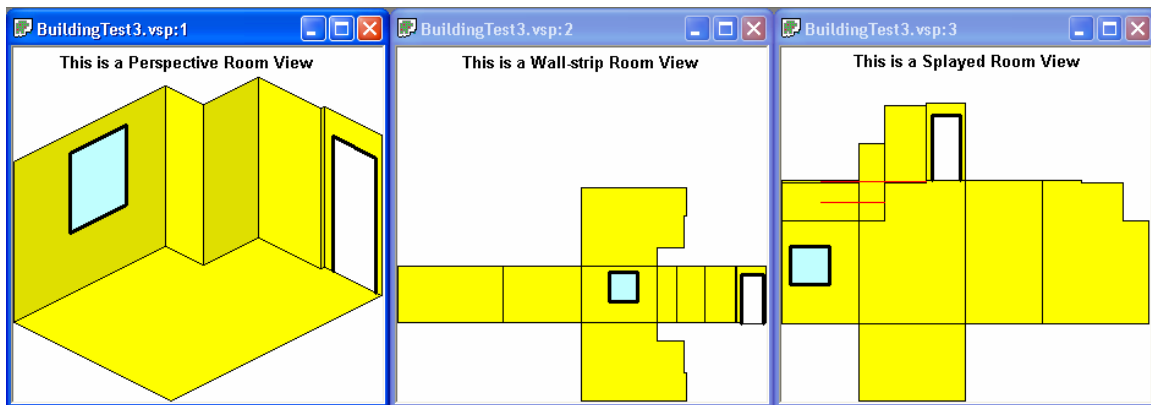

Figure 2.21. Three perspective views of a room

When rooms are defined using pictures or existing maps, the Delineate Rooms (Main Menu item **Room > Delineate Rooms**) mode allows the user to create rooms at right angles inside existing map shapes. Delineate Rooms is an on/off toggle switch. While in this mode (you must be in Map View), you can fill up the space inside an irregular-shaped area with individual rectangles. For more information on this tool, consult **Help > Help Topics (Contents) > Menus> Room> Delineate Rooms**.

Figure 2.24a is an imported CAD drawing of a floor layout with individual rooms delineated using the VSP **Delineate Rooms** tool. Figure 2.24a is the Map View of the room with Room Information displayed (right-click anywhere within the room to display information box). We also used the Main Menu item **Room > Insert Annotation** to put the label "Selected Room" on the map. Figure 2.24b is a Room View of the same room with **Perspective View** selected.
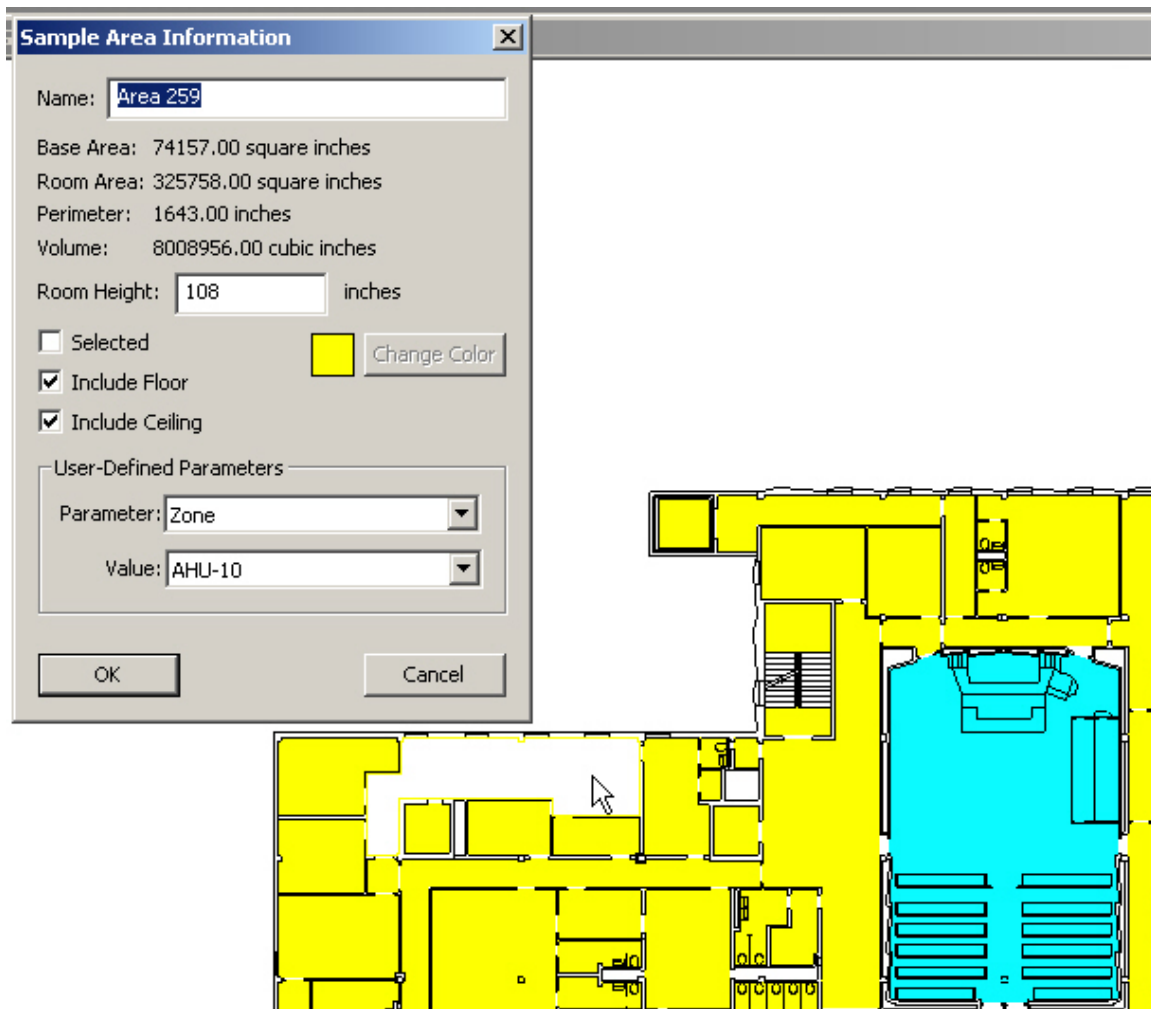
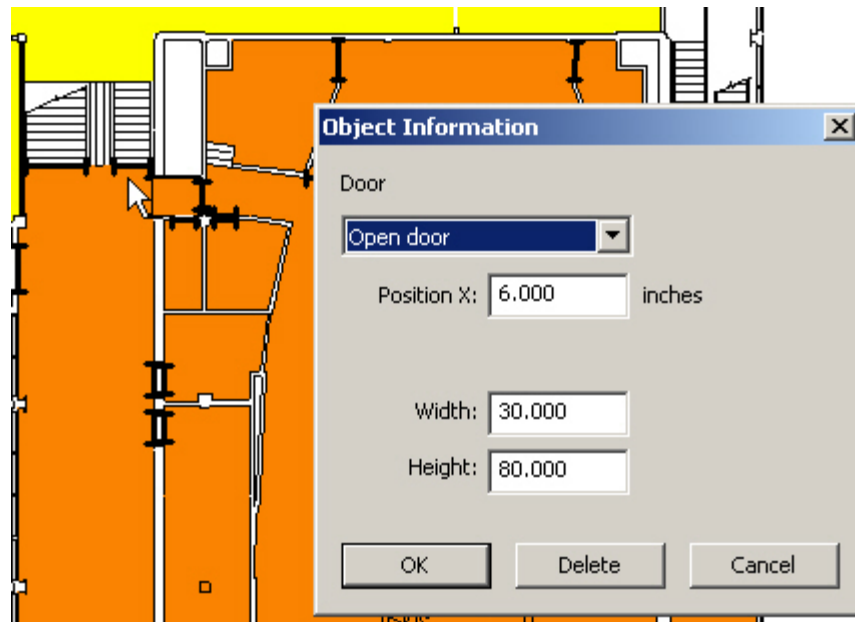**Figure 2.22a**. Room in Map View
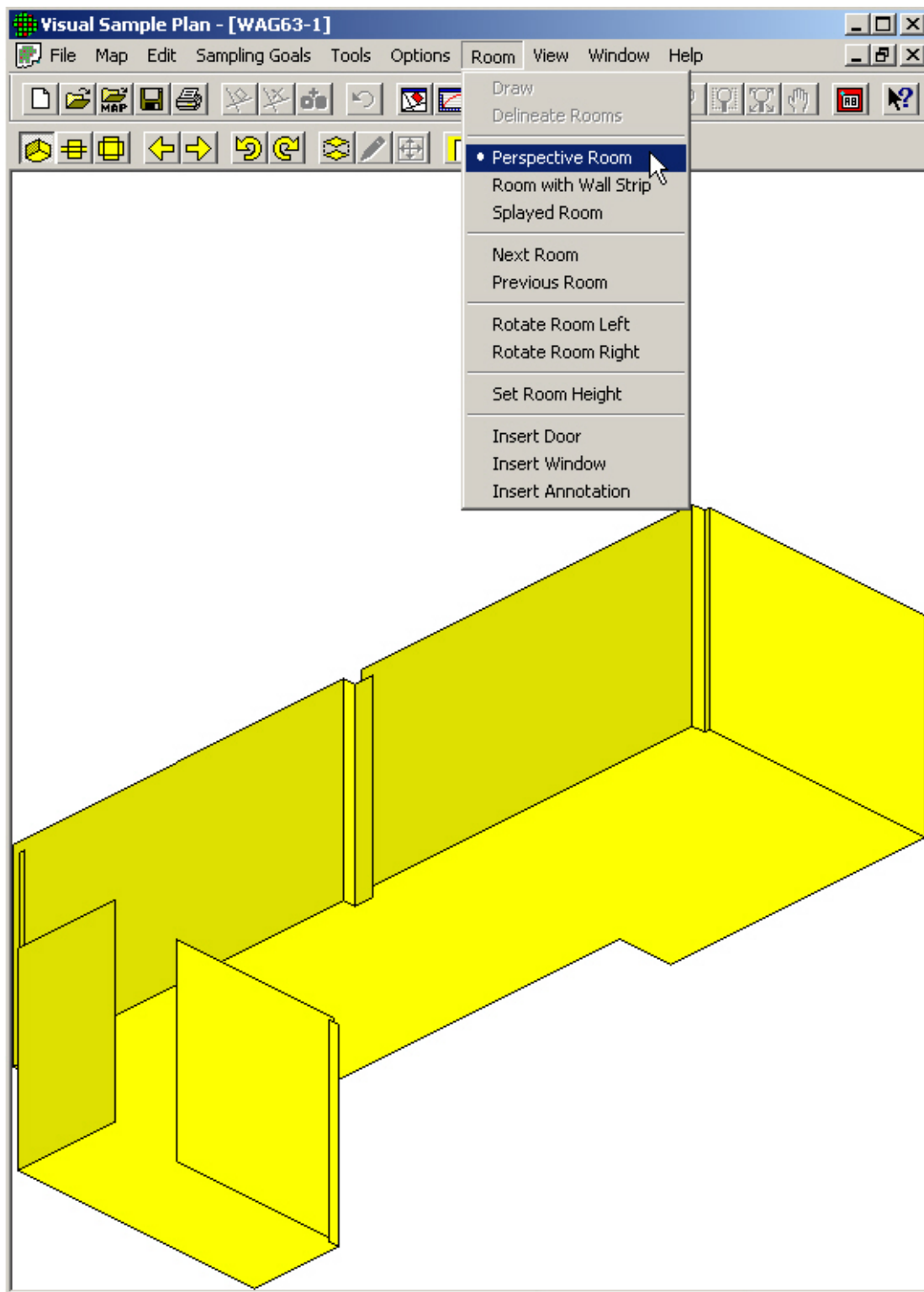
Figure 2.24b. Room in Room View

2.5.2   Extended Room Features

2.5.2.1   Room Objects

VSP Version 3.0 has two objects associated with rooms: doors and windows. There are two ways to view these objects: in Map View (see Figure 2.25) and in Room View (see Figure 2.26). Figure 2.25 is another section of the CAD drawing shown in Figure 2.24. A door in the CAD drawing was defined for VSP. Right-clicking on the Map where the arrow is pointing brings up the **Object Information** dialog box for the Door Object at that location.


Figure 2.23. Door Object Displayed Using Map View

Doors and windows can be added in Room View using Main Menu item **Room > Insert Door/Window** or by clicking on the door or window button on the Room Toolbar. Once added, the properties of the room objects can be viewed by right-clicking on the object, which brings up the **Object Information** dialog box. This is shown for a door in Figure 2.26 and for a window in Figure 2.27.
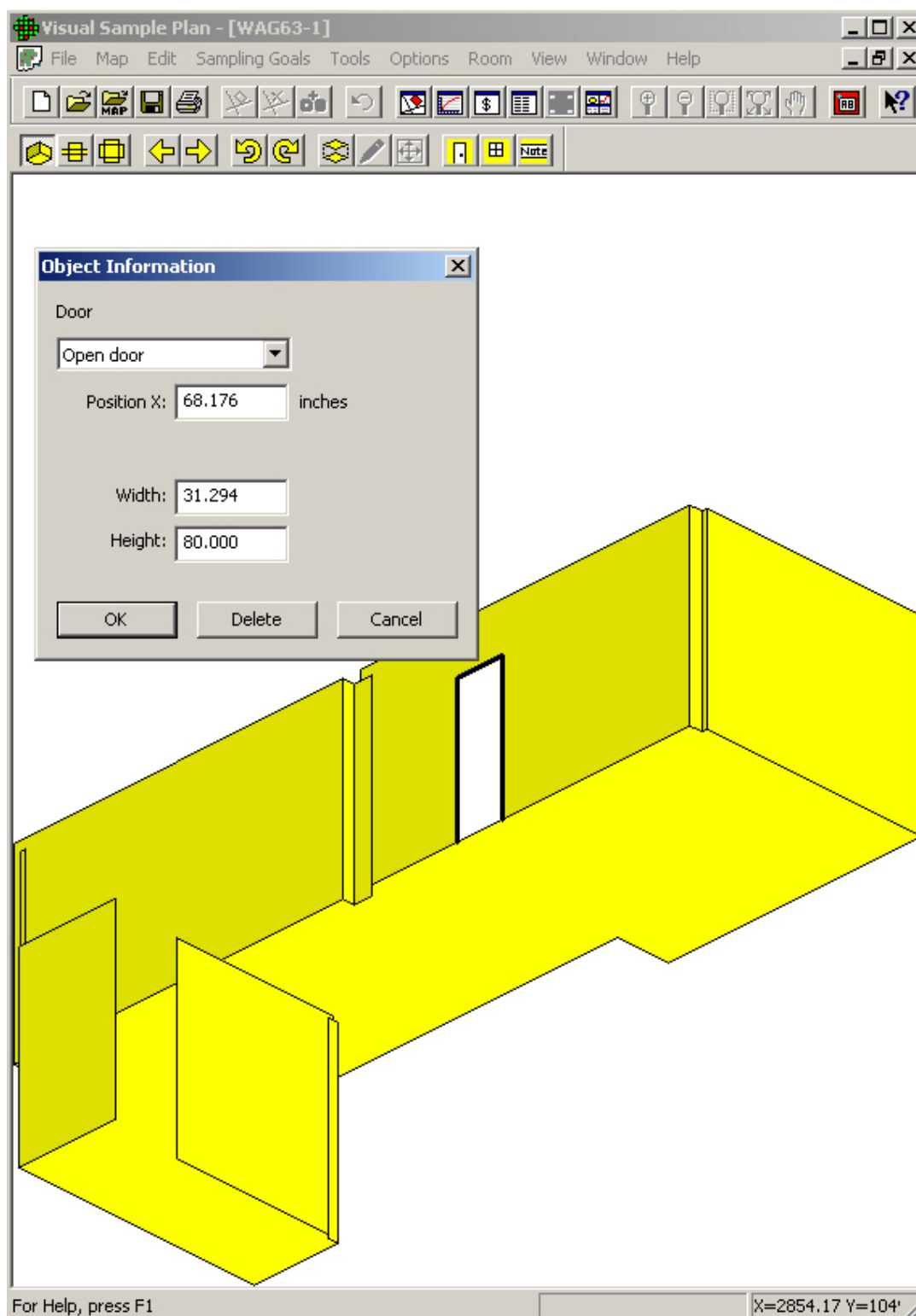
Figure 2.24. Door Room Object with Object Information Dialog Box Displayed
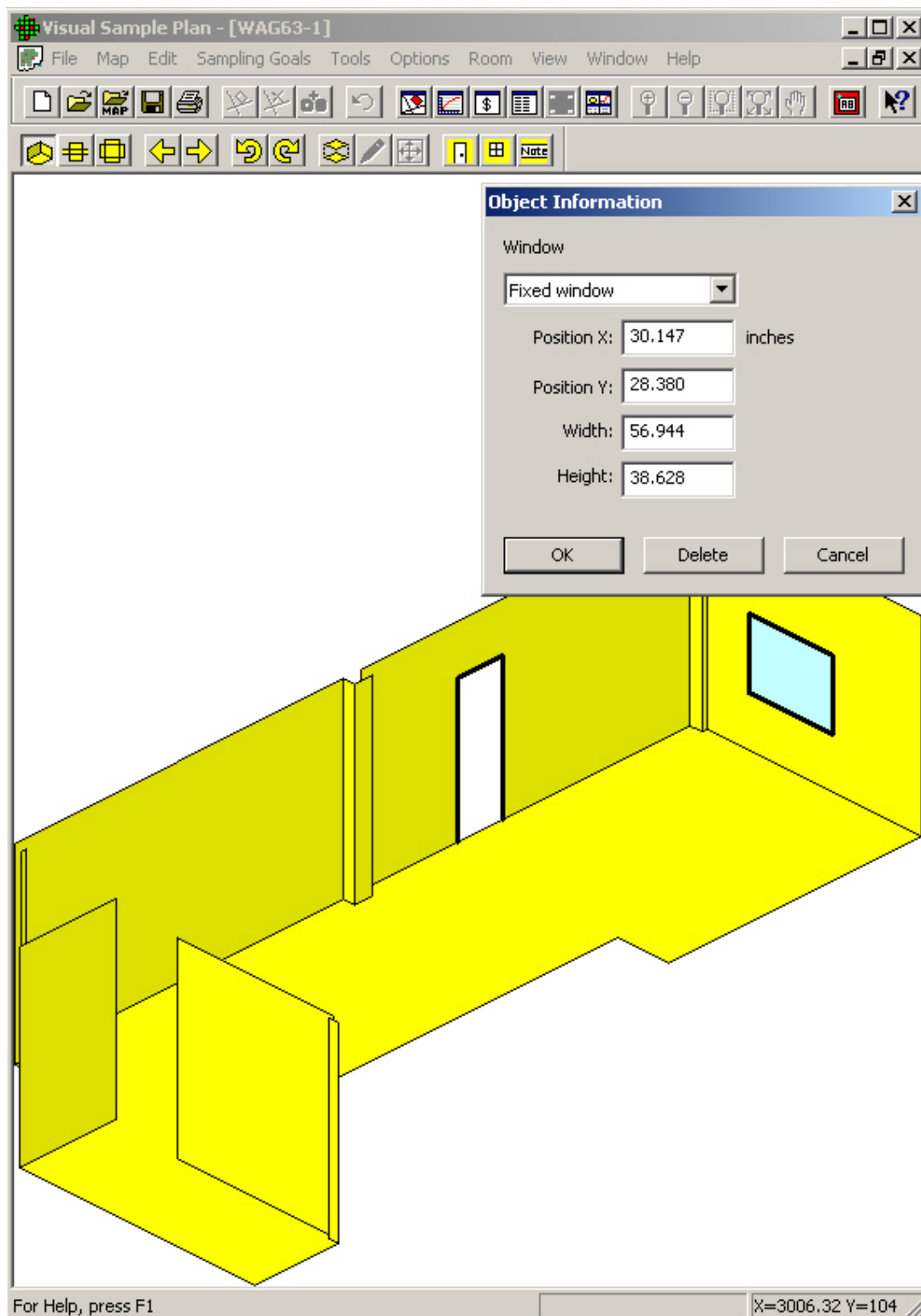
Figure 2.25. Window Room Object with Object Information Dialog Box Displayed

2.5.2.2   Room Parameters

Rooms can have VSP-defined parameters (e.g., Area, Perimeter, Volume, Name) and User-Defined Parameters (e.g., Zone, Class). The User-Defined Parameters are set in the **Sample Area Information** dialog box or with the Main Menu item **Edit > Sample Areas > Set Parameters**. This second option is a very powerful tool. Figure 2.24a shows that the room named "Area 259" is in Zone "AHU-10" (i.e., Air Handling Unit 10). All the rooms on AHU 10 are assigned to the same Zone so they are easily identifiable. In another example, rooms that exceed a release criteria could have a logical (yes/no) parameter assigned called "Contaminated", and coded red/green. Note that once a room parameter is set up using Main Menu item **Edit > Sample Areas > User-defined Parameters**, all rooms are given a default value for that parameter.

2.5.2.3   Room Color by Parameter

Rooms can be colored automatically based on the value of one of the built-in or user-defined parameters. Choosing the menu item **Edit > Sample Areas > Color by Value** displays the dialog shown in Figure 2.28. This dialog allows you to choose one of the predefined gradient or discrete color sets and one of the sample area parameters. Certain parameters can also be colored by the logarithm of the value. This dialog also allows the color by parameter function to be turned off or on.

2.5.2.4   Room Order

Clicking the button for **Next Room** from the Room Toolbar, or selecting **Room > Next Room** from the Main Menu changes the current room to the next selected room on the map. The current room is indicated by a thick black border and is a slightly darker hue in color-coded rooms. **Previous Room** changes the current room to the previously selected room on the map. The order of room selection is the order of creation. Note that the order for room and sample areas can be changed by the menu command **Edit / Sample Areas / Bring to Front**.

2.5.2.5   Room Rotation

Clicking the button for **Rotate Room Right** from the Room Toolbar, or selecting **Room > Rotate Room Right** from the Main Menu rotates the Perspective or Wall-Strip Room View clockwise 90 degrees. **Rotate Room Left** rotates the Perspective or Wall-Strip Room View counter-clockwise 90 degrees.

2.6   Saving a VSP File

No matter how you imported or created a site map or Sample Area for VSP, you can always save the information in VSP's own file format. From the Main Menu, select **File > Save Project** As and provide a name for the project. VSP will add the VSP file extension automatically. Alternatively, you can use the **Save** button with the disk icon on the VSP toolbar. After you have created a sampling design as discussed later in this guide, saving your project as a VSP file also will save the input data, cost data, and recommended sample sizes.