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VectorWorks Design Series User's Guide

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The license agreement binding the use of this software can be found in the VectorWorks ReleaseNotes directory or by clicking "License" in the About VectorWorks dialog box.

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Preface

Welcome to the VectorWorks Design Series, a complete design and production management system for architects, landscape architects, lighting designers, and mechanical engineers. The VectorWorks Design Series includes the following VectorWorks products: Architect, Landmark, Spotlight, Machine Design, and Designer.

New Features

Product: Architect, Landmark, Spotlight, and Machine Design

This release includes many new features and significant enhancements to VectorWorks Architect, Landmark, Spotlight, Machine Design, and the standard workspaces, as described in the following sections.

The VectorWorks help system reflects the most up-to-date information; it may, therefore, be more current than the printed manuals.

The following table contains a list of new and improved features for this release, and indicates the section where the functionality is documented and the product to which the feature applies.

Feature	Purpose	Location	Product
Context-sensitive help	The VectorWorks help system has been updated to reflect version 2008 functionality.	Not applicable	Architect, Landmark, Spotlight, Machine Design
New Custom Modification command	A new command allows objects to be selected regardless of layer, class, scale, visibility, or selection status. Once selected, the object properties and attributes can be simultaneously modified. The operation can be saved as a VectorScript.	“Creating Custom Modification Scripts” on page 21	Architect, Landmark, Spotlight, Machine Design
Export resources	The Resource Browser can now export one or more selected resources to another file without having to open or save the file	“Exporting Resources” on page 23	Architect, Landmark, Spotlight, Machine Design
User folders for preferences and custom content	Users can now designate one or more folders where VectorWorks will look for additional content, such as shared project files and workgroup reference files.	“Workgroup Folders” on page 24	Architect, Landmark, Spotlight, Machine Design

Feature	Purpose	Location	Product
Space tool and space object improvements	<p>The Space tool now has three modes to create spaces: click an area that is bounded by existing walls, draw a rectangular object, or draw a polyline object. New options can automatically update space objects when the walls surrounding the spaces are changed. Much more of the data associated with a space can be selected to display on the space label. IFC (Industry Foundation Classes) data can now be attached to spaces, including extended properties used by the U.S. Government Services Administration (GSA); use the new Export IFC Data command to save the drawing in IFC format.</p> <p>The Create Walls from Spaces command has a new option to offset the exterior walls as determined by the selected exterior wall style.</p>	"Space Planning" on page 27	Architect
Create gross floor space	When creating spaces from walls, a new option allows a space to be created from the gross wall area	"Creating Spaces from Walls" on page 40	Architect
Classable wall components	Wall components can now be classed, and observe class attribute and visibility settings. With class overrides, different configurations of the same wall can be shown in viewports. Wall components can also be displayed in section viewports.	"Creating Walls in Architect" on page 53, and "Advanced Section Viewport Properties" on page 473	Architect
Wall replacement improvement	When replacing wall styles, the wall height, class, and/or texture can also be replaced	"Replacing Wall Styles" on page 58	Architect
Create and edit walls in a 3D view	Both the 2D Selection and 3D Selection tools now contain an Enable Connected Walls mode, for moving connected walls in 2D as well as 3D	"Moving Connected Walls" on page 59	Architect, Landmark, Spotlight
2D dashed stairs beyond break	A new option allows stairs to be drawn with dashed lines above or below a stair break	"Creating a Stair" on page 106	Architect, Landmark, Spotlight, Machine Design
Improved plant object	Plants now behave like symbols, and are easier to create, edit, and manage	"Defining Plants" on page 198	Landmark

Feature	Purpose	Location	Product
Plant data management	The new plant database is a stand-alone application that is much easier to use for locating and creating botanical data for use in VectorWorks	"The Plant Database" on page 212, "Plant Database Field Mapping" on page 552	Landmark
Light position awareness	The association between lighting instruments and lighting positions has been strengthened. If a lighting instrument is moved to a new position, its position data automatically updates based on the new lighting position. Lighting instruments now move along with the lighting position.	"Lighting Position Properties" on page 234, and "Inserting Instruments" on page 243	Spotlight
Improved label scaling	Label legends allow scaling of the label locations on the sides of the instrument so they are placed relative to the instrument size	"Formatting the Label Legend" on page 239	Spotlight
Improved label handling	Non-rotated label legends are easier to adjust on the lighting plot	"Repositioning Labels" on page 240	Spotlight
Advanced beam geometry	The draw beam function now includes elliptical light sources, and the beam can be projected beyond the focus point, as well as horizontally or at an upward angle. A light beam can be drawn as a 3D solid. Shutter cuts can now be specified for lighting instruments, and are reflected in the drawn or rendered light.	"Lighting Instrument Properties" on page 246 "Editing Instruments and Objects" on page 250 "Drawing Light Beam Representations" on page 263	Spotlight
Advanced light source	If in-depth control over lighting instrument parameters is required, the embedded light source can now be edited. A distribution file can now be associated with a lighting instrument.	"Advanced Light Properties" on page 253	Spotlight
Configuration dialog box for screw and nut object	A new configuration dialog box is available from the Object Info palette for screw and nut objects; it allows selection of only those screw/bolt, washer, and nut types that are valid for a specified size	Available in the VectorWorks help system	Machine Design
New spur gear rack objects	New 2D and 3D spur gear rack objects are available	Available in the VectorWorks help system	Machine Design

Feature	Purpose	Location	Product
New pulley objects	New 2D and 3D pulley objects are available	Available in the VectorWorks help system	Machine Design
Updated Shaft tool	The updated tool allows the creation and modification of a shaft composed of various segments	Available in the VectorWorks help system	Machine Design
Mechanical Design marker attributes	Marker attributes that used to be modified in the Object Info palette are now modified in the Attributes palette for detail bubbles, datum feature symbols, datum target symbols, feature control frames, geometric dimensioning and tolerancing notes, and welding symbols, where they can take advantage of the new marker functionality	“Dimensioning and Tolerancing” on page 363 Welding symbols are available in the VectorWorks help system	Machine Design
Improved drawing border title block	A parts list can be added to drawing border title blocks	“Drawing Border Properties” on page 335	Machine Design
Exterior wall dimensioner improvements	The exterior wall dimensioner can now dimension to visible wall components (such as framing components), dimension exterior walls by outside edge or center line, dimension doors and windows to center line or rough opening, dimension to intersecting walls, and associate dimensions with walls	“Dimensioning Exterior Walls” on page 347	Architect
Edit records in worksheets	Record field and plug-in object information can now be edited from the database rows of a worksheet, and automatically update the associated drawing objects	“Editing Record Information with Worksheets” on page 384	Architect, Landmark, Spotlight, Machine Design
Tile command improvement	The Tile command can now convert tile symbols to a group	“Tiling” on page 425	Architect, Landmark
Sketch styles added to default content	The five default sketch styles are now included among the default content files	“Sketch Rendering” on page 426 and “VectorWorks Design Series Default Resources” on page 570	Architect, Landmark, Spotlight, Machine Design

Feature	Purpose	Location	Product
Plan view rotation	Drawings can now be rotated, creating a rotated top/plan view for drawing at an angle (orthogonal to the screen). A rotated plan view can be saved and restored. The Constrain Angle constraint can snap to the rotated plan angle. (The new VectorWorks Fundamentals rotation modes of rectangular objects and text facilitate their creation while in a rotated view.)	“Rotating the Plan” on page 454, “Creating Saved Views” on page 104 in the VectorWorks Fundamentals User’s Guide, and “Constrain Angle” on page 121 in the VectorWorks Fundamentals User’s Guide	Architect, Landmark, Spotlight, Machine Design
Design layer viewports	Viewports can now be created on design layers, in addition to sheet layers. Design layer viewports can display design layers in the current file, or they can reference layers in other files. These viewports can exist on a design layer with other 2D and 3D objects, and they have the same scale, view, and render mode as the rest of the layer.	“Presenting Drawings with Design Layer Viewports” on page 456	Architect, Landmark, Spotlight, Machine Design
Section viewport enhancements	A new Display tab for section viewports advanced properties sets the 3D conversion resolution of curved surfaces separately from VectorWorks preferences	“Advanced Section Viewport Properties” on page 473	Architect, Landmark, Spotlight, Machine Design
View bar improvements	Added a button on the View bar for access to the Stack Layers command	“Stacking Layers” on page 485	Architect
Stack layers improvements	New stack layer options are now available with the Stack Layers Options command. Also, the stack layer status can now be saved and restored with a saved view.	“Stacking Layers” on page 485 in this guide, and “Managing Saved Views” on page 104 in the VectorWorks Fundamentals User’s Guide	Architect

Feature	Purpose	Location	Product
Workgroup referencing improvements	Most referencing improvements are described in the VectorWorks Fundamentals Guide. The Design Series has additional new features. Image files and PDF files can now be referenced. Also, one or more design layers from a source file can now be referenced into a viewport on a design layer. The referenced design layers and resources are truly referenced, rather than imported into the target file. For backward compatibility, the old method of referencing by layer import is still supported.	“Importing PDF Files” on page 491, “Referencing Imported Images” on page 533, “Creating a Referenced Design Layer Viewport” on page 458	Architect, Landmark, Spotlight, Machine Design
Bookmarks in exported PDF files	Each saved view and sheet layer that is exported to a PDF file with the Export PDF (Batch) command now has a bookmark for easy navigation	“Exporting PDF Files” on page 493	Architect, Landmark, Spotlight, Machine Design
Industry Foundation Classes (IFC) support	VectorWorks supports Building Information Model (BIM) interoperability using the IFC file format	“IFC Format Interoperability” on page 498	Architect
World file support	Georeferenced raster images with associated world files are automatically translated and scaled upon import	“World File Support” on page 519	Landmark
New British and Japanese Standard structural shapes	Structural shapes have been consolidated into nine plug-in objects for AISC (inch and metric), British Standard (BSI), and Japanese Standard (JIS) structural shapes; the new consolidated shapes are: angle, bulb flat, channel, I-beam, rectangular tubing, round tubing, square tubing, tee, and wide flange	“Migrating Structural Shape Objects from Previous Versions” on page 542	Architect, Landmark, Spotlight, Machine Design
Furnishings and scenic elements libraries	Libraries include an assortment of 47 generic furniture symbols for stage and general use	“Object Libraries” on page 565	Architect, Spotlight
New Herman Miller® furniture libraries	Libraries include a variety of furniture from Herman Miller Modern Classics and systems furniture Typicals	“Object Libraries” on page 565	Architect

Feature	Purpose	Location	Product
New arcitex® wood textures and image fills library	Libraries include 111 wood textures and 76 image fills from arcitex	“Object Libraries” on page 565 and “Object Libraries” on page 729 in the VectorWorks Fundamentals User’s Guide	Architect
New Sub-Zero® and Wolf® appliance symbol libraries	Libraries include 25 Sub-Zero refrigerators and 55 Wolf appliances	“Object Libraries” on page 565	Architect
New virtual wall style	Wall Styles Imperial and Wall Styles Metric libraries contain a new virtual wall style	“Object Libraries” on page 565	Architect
Updated Xfrog® plant symbols libraries	Libraries include 652 new color images, including 84 new plant species and 166 of these images are stylized watercolor versions	“Object Libraries” on page 565	Landmark
New Unilock® paver hatch pattern libraries	Libraries include 185 new paver hatch patterns in both the hatches libraries and default hardscape hatches library	“Object Libraries” on page 565 and “VectorWorks Design Series Default Resources” on page 570	Landmark
New gobo textures	993 new gobo textures are available from GOBOLAND®	“Object Libraries” on page 565	Spotlight
New audio-related symbols	New Spotlight imperial and metric libraries include generic audio-related symbols	“Object Libraries” on page 565	Spotlight
Updated Electronic Theatre Controls symbols	Libraries include updated lights	“Object Libraries” on page 565	Spotlight
New PANTONE® color palettes	Seven default PANTONE color palettes are now available for use	“VectorWorks Design Series Default Resources” on page 570	Architect, Landmark, Spotlight
New Resene paint color palettes	A default Resene paint color palette is now available for use	“VectorWorks Design Series Default Resources” on page 570	Architect, Landmark, Spotlight
Benjamin Moore® and Sherwin Williams® paint color palettes	Default paint color palettes from Benjamin Moore and Sherwin Williams are now available for use	“VectorWorks Design Series Default Resources” on page 570	Architect, Landmark, Spotlight
New PPG paint color palette	Default architectural finish color palettes from PPG are now available for use	“VectorWorks Design Series Default Resources” on page 570	Architect, Landmark, Spotlight
New Japanese color palettes	Default Japanese Industrial Standard (color specification) color palettes are now available for use	“VectorWorks Design Series Default Resources” on page 570	Architect, Landmark, Spotlight

Feature	Purpose	Location	Product
Dynamic Spotlight paperwork schedules	Sample worksheets which approximate the output of the Generate Paperwork command have been added to Libraries\Defaults\Reports~Schedules. They contain editable database rows which allow direct changes to the drawing.	"VectorWorks Design Series Default Resources" on page 570	Spotlight
New Rosco paint color palettes	Two default Rosco paint color palettes are now available for use	"VectorWorks Design Series Default Resources" on page 570	Spotlight
Remove Create Editable Worksheets command from Spotlight	Now that worksheets include editing capabilities in VectorWorks, this Spotlight command is no longer needed. Sample worksheets for Spotlight have been added to the Libraries\Defaults\Reports~Schedules folder	Not applicable	Spotlight
Two alert dialog boxes demoted to minor alerts	Spotlight instrument numbering and creating a key to instrumentation now generate a minor alert instead of displaying an alert dialog box	Not applicable	Spotlight
Create Layer Link command removed	Since viewports can now be created on design layers, this command was removed from the Design Series workspaces	Not applicable	Architect, Landmark, Spotlight, Machine Design

Learning VectorWorks

There are a number of ways to learn how to use VectorWorks, including both printed and online user’s guides, training CDs, and both online and classroom training.

User’s Guides

- This guide is the VectorWorks Design Series User’s Guide, which describes the features in the VectorWorks Architect, Landmark, Spotlight, Machine Design, and Designer products. It is designed for users who have purchased one or more Design Series products.
- The VectorWorks Fundamentals User’s Guide is a comprehensive reference for all VectorWorks users describing the core tools, commands, and features in the VectorWorks Fundamentals product. The guide also describes the presentation capabilities of RenderWorks, for users who purchased RenderWorks.

The VectorWorks help system reflects the most up-to-date information; it may, therefore, be more current than the printed guides.

The following table describes the conventions used in the guides. All instructions in the guides are based on “click-click” drawing.

Convention	Meaning
(Macintosh)	Macintosh-specific instruction
(Windows)	Windows-specific instruction
bold text	Indicates a specific button, command, class, or explicitly named item
blue indented text	Indicates a note, tip, or warning
click	Click the mouse button and release. Left button always implied in Windows.
double-click	Click two times quickly on the mouse button and release
right click	Click with the right mouse button and release; on the Macintosh, hold down the Ctrl key while clicking the mouse
Shift-click	Hold down the Shift key and click
click-click	Click the mouse button once and release. Move the cursor to the desired location and click again. This is the default drawing preference for VectorWorks at installation.
click-drag	Click once with the mouse button and do not release. Drag (move) the cursor to a desired location and then release.
Control+letter key	Hold down the Ctrl key and press the specified key
select	Click on an object with the mouse, or click-drag over an object with marquee selection, to highlight it. The object is highlighted, and/or “handles” display on the object to indicate that it is currently active. This term also refers to executing menu commands.

VectorWorks Help System

The VectorWorks help system includes the following volumes:

- **Welcome to VectorWorks:** Instructions for using the help system within the VectorWorks program
- **VectorWorks Fundamentals:** Context-sensitive online version of the VectorWorks Fundamentals User’s Guide
- **Design Series:** Context-sensitive online version of the VectorWorks Design Series User’s Guide
- **VectorScript Guide:** Description of the VectorScript language, which can be used to automate routine tasks
- **VectorScript Reference:** Comprehensive listing of procedures and functions in the VectorScript language

To access the Help system, select **Help > VectorWorks Help** from within the VectorWorks program. In the help system Table of Contents, open the **Welcome** book for complete instructions on how to use the system.

The help system allows quick access to comprehensive reference information about VectorWorks. Program commands and tools are linked to the appropriate help topic, providing instant information.

The help system also offers links to related topics, allows full text searches, and contains an index and table of contents to topics across all products.

[The VectorWorks help system on Safari may not display the Favorites tab, and the Back button may be disabled, due to Safari limitations.](#)

Training

Visit www.nemetschek.net for details about the following training options:

- Training CDs
- Guided online training

- Onsite training
- Classroom training

Other Resources

Visit www.nemetschek.net for details about the following additional resources:

- Documentation updates
- Independent local user groups
- LISTSERV® user lists

Technical Support

Technical support is available for registered VectorWorks users in several ways. International users should contact their local reseller for details concerning technical support (see www.nemetschek.net for reseller information).

United States users can contact Technical Support using the following methods:

- Call 410.290.5114
- Send a fax to 410.290.8050
- Send an e-mail to tech@nemetschek.net
- Visit the technical support message board at <http://techboard.nemetschek.net>
- Visit the technical support knowledge base at <http://kbase.nemetschek.net>
- E-mail VectorScript-specific problems to vs_support@nemetschek.net

When you contact Technical Support, provide a brief description of the problem that includes specific details about what actions were taken prior to the problem's occurrence. The more information you can give your support representative, the easier it will be to solve your problem quickly.

When you contact Technical Support by phone, please have access to your computer and be ready to tell the representative:

- VectorWorks version number
- VectorWorks registration number
- Operating system
- Type of computer being used
- Amount of RAM installed in the computer
- List of any recent changes to the computer's setup (such as new fonts, software, or hardware)

Troubleshooting

Troubleshooting a problem prior to calling Technical Support will also aid in a speedy resolution. Basic troubleshooting tips include:

- Test to see if the problem occurs in a new, blank file
- Test to see if the problem occurs system wide (especially print and font problems)
- Copy and paste part of the document to a new file to see if the problem persists
- Run the computer in Safe Mode (Windows) to see if there is a system conflict
- Check the technical support message board to see if the problem has already been reported or resolved (<http://techboard.nemetschek.net>)

Using Standards

Structuring the CAD File

Product: Architect and Landmark

The Setup commands automatically create the necessary structure for a complete drawing based on either Architect/Landmark standards or custom file setup requirements.

Versions of VectorWorks Architect and Landmark prior to 11 relied on layers, classes, and views (called sheets) to create the necessary file structure. Since version 11, the standards are centered around the concept of design layers (for drawing and design), classes, and viewports on sheet layers (for final drawing presentation and printing). The Setup commands automatically provide the necessary visibility settings, as well as design layer, sheet layer, class, and viewport structure, for creating a complete file based on standards. See “Organizing the Drawing” on page 81 and “Presenting Drawings with Sheet Layer Viewports” on page 609 in the VectorWorks Fundamentals User’s Guide.

The Setup commands create the file structure necessary to fit the project; a small project (such as a residential garden) requires a smaller set of layers and classes than a larger, more complex project.

For VectorWorks Architect, United Kingdom drawing standards are available through the Organization dialog box for classes, layers, sheet layers, viewports, and saved views. However, only classes, layers, and sheet layers can be imported from another document.

Layers, Classes, and Viewports

Product: Architect and Landmark

The VectorWorks Architect and Landmark standards take advantage of layer and class characteristics.

Class Characteristics

Product: Architect and Landmark

Drawing objects are assigned to classes; a class is an attribute of an object. Classes apply to the entire file and control the visibility of objects. Classes can be set to be visible, invisible, or grayed when they are inactive. Complex objects, such as symbols or plug-in objects, may contain more than one class; different parts of the object can be hidden or shown. Classes can also be used to assign graphical attributes and textures to objects.

Many plug-in objects that are included with VectorWorks Architect and Landmark are set with pre-assigned classes. The appropriate classes are created by the Setup commands and by certain other commands (see “VectorWorks Architect and Landmark Classes” on page 14). The use of auto-classing is determined with the **Standard Naming** setup command. For more information, see “Creating Classes and Layers from Standards” on page 84 and “Managing Classes” on page 95 in the VectorWorks Fundamentals User’s Guide.

Layer and Viewport Characteristics

Product: Architect and Landmark

A VectorWorks layer is a named container that holds items. VectorWorks uses two types of layers: design layers and sheet layers. Design layers are used for drawing and modeling the elements of a project. Sheet layers are created for the presentation of a finalized drawing, and can contain viewports, title blocks, notes, and other annotations. A viewport, located on a sheet layer, is a particular combination of visible, grayed, and/or hidden design layers and classes.

Layers have certain characteristics that are used when drawing and structuring files:

- Design layers can automatically set default Z-values for objects they contain. They create natural structural divisions within a drawing for objects on different floors or different vertical locations within a floor.



- Design layers can be visible, invisible, or grayed. Sheet layers are always set to Active Only.
- Design layers, as well as viewports, can be displayed at different drawing scales, for the display of all aspects of a drawing plan from the site model to details.
- Design layers, as well as viewports, can have different 3D views. A building can be viewed in Plan view in one viewport and in an elevation or perspective view in another.
- Layers can be contained in different files and shared using workgroup referencing.

Drawings set up with the Setup commands contain both design layers and sheet layers with viewports. A project file contains, at a minimum, design layers for every level, as well as a number of viewports on sheet layers.

The Setup Commands

Product: Architect and Landmark

The Setup commands create a file that adheres to predefined VectorWorks Architect/Landmark standards, or alternatively, to user-defined standards. Running these commands in a project file ensures that the desired structure is in place. Each command can be run in either a new or existing file; the **Model Setup** command must be run prior to using the **Create Standard Viewports** command.

When a file is set up with the **Model Setup** and the **Create Standard Viewports** commands, the appropriate classes and layers are created automatically. The number and types of layers and classes created depend on the setup selections. Design layers are created by the **Model Setup** command and begin with “Mod-” (model layers, since this is where the model is designed). The **Create Standard Viewports** command creates the appropriate viewports and sheet layers for the viewports (beginning with “Sheet-”), along with the appropriate classes if they are not already in the file.

The **Standard Naming** command establishes or changes the naming conventions used for these classes, design layers, sheet layers, and viewports or saved views.

When using VectorWorks Landmark standards, landscape site plans are composed of shared model information on four layers:

- Mod-Site-Arch – contains any buildings or other improvements
- Mod-Site-Civil – contains topographic and survey information
- Mod-Site-DTMDData – contains the DTM output
- Mod-Site-Landscape – contains tree and planting data

In order to use the Task Manager, the file must be set up with the **Model Setup** and/or **Create Standard Viewports** commands. See “The Task Manager” on page 17 for more information.

Run the Setup commands in a new, blank file, and then save as a template for future use.

If an existing file already contains a set of custom standards (included as a series of worksheets), the Import LayerMap.G dialog box opens when selecting one of the Setup commands. Select whether to use the custom or standard setup. See “Using the Layermap Worksheet” on page 589 for more information.

Document Setup

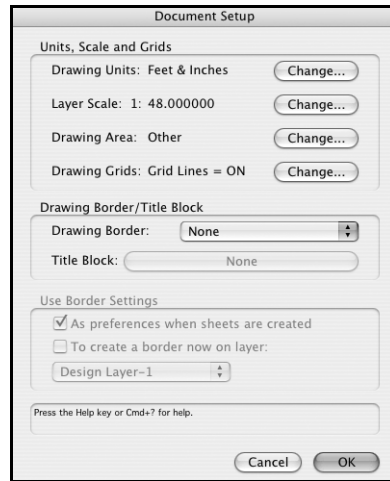
Product: Architect and Landmark

Use the **Document Setup** command to set up a file’s basic characteristics (units, scale, drawing area, and grid) as well as define the drawing border and title block settings.

To set up a drawing with the **Document Setup** command:

1. Select **File > Document Settings > Document Setup**.

2. The Document Setup dialog box opens. Set the parameters for the drawing. See “Setting Up the Drawing” on page 51 in the VectorWorks Fundamentals User’s Guide for more information on units, scale, drawing grids, and print area.



Parameter	Description
Units, Scale and Grids	
Drawing Units	Click Change to open the Units dialog box; specify the global unit settings for the project
Layer Scale	Click Change to open the Layer Scale dialog box. Specify the default layer scale for the project. This scale will be used for all floor design layers (Mod-Floor-#) and associated design layers such as Mod-Slab.
Drawing Area	Click Change to open the Page Setup dialog box; specify the drawing’s printable area
Drawing Grids	Click Change to open the Set Grid dialog box; specify the reference and snap grids
Drawing Border/Title Block	If not created during setup, drawing borders and title blocks can be added manually with the Drawing Border tool (see “Creating Drawing Borders” on page 335)
Drawing Border	Select the drawing border to automatically include as the drawing is set up, or leave the default selection of None to create no drawing border
Title Block	Select the title block from either the default resources or the current file’s resources to automatically include as the drawing is set up (see “VectorWorks Design Series Default Resources” on page 570), or leave the default selection of None to create no title block
Use Border Settings	
As preferences	Saves the drawing border and title block selections and applies them to the sheet layers when the Create Standard Viewports command is selected
To create a border now	Places the specified drawing border and title block on the selected layer immediately



3. Click **OK**.

To use the Issue Manager (see “The Issue Manager” on page 412), select one of the predefined drawing border styles.

Select the **Document Setup** command again to re-adjust a drawing border if the paper size has changed.

Model Setup

Product: Architect and Landmark

The **Model Setup** command creates the appropriate number of floors or levels and their corresponding design layers (Mod-Floor, Mod-Foundation, and Mod-Roof layers), as well as setting the Z and delta Z of each model design layer. It is required for running the **Create Standard Viewports** command.

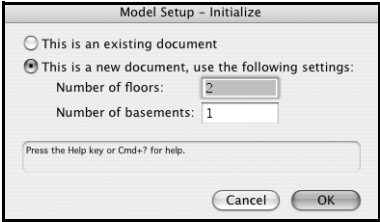
For Landmark users, if there is no floorplan geometry in the drawing, click **OK** in both Model Setup dialog boxes to accept the default settings.

To set up the model:

1. Select **File > Document Settings > Model Setup**.

The Model Setup - Initialize dialog box opens if the drawing is new, contains unrecognized layer/class names, or was created with VectorWorks Architect 9's Setup Assistant.

If the file was previously set up using the **Model Setup** command, the main Model Setup dialog box opens (go to step 3).

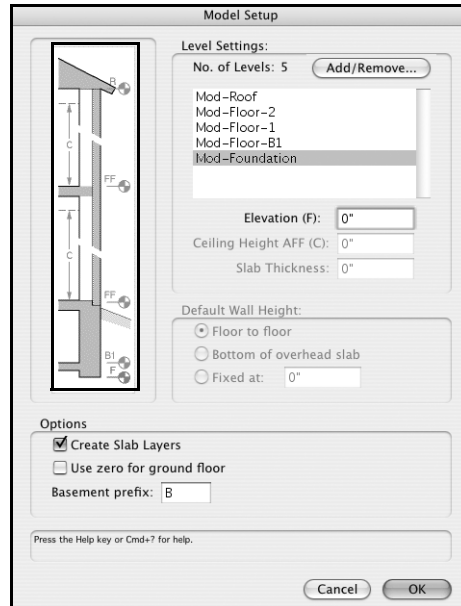


Parameter	Description
This is an existing drawing	Select this option if this is an existing drawing. The Model Setup command searches the drawing for model layers and uses the attributes of those layers to set up the model.
This is a new document	Select the option if this is a new drawing
Number of floors	Enter how many floors are in the building
Number of basements	Specify the number of basement(s) in the building (zero, one, or two)

2. Click **OK**.

The main Model Setup dialog box opens.

3. In the Model Setup dialog box, select a level from the **Level Settings** list, and then specify its parameters and click **OK**. The selected level is indicated in the graphic with a red bullet. A maximum of three floor levels are displayed. For buildings with more than three floors above ground, the middle floor indicator is highlighted for all intermediate floors.



Parameter	Description
Level Settings	
Add/Remove (Normally, Architect only)	Click to add levels (floors) to or remove levels from the model setup; see “Adding and Removing Levels” on page 6
No. of Levels	Displays the number of levels in the building, including the foundation and roof
Elevation (F)	Enter the elevation of the selected floor; this sets the Z value for the design layer
Ceiling Height AFF (C)	Enter the ceiling height of the selected floor
Slab Thickness	Enter the slab thickness of the selected floor; this value sets the delta Z of the associated slab layer
Default Wall Height	Sets the delta Z of the design layer
Floor to floor	Uses the height between the selected floor and the top of the slab of the floor above as the default wall height
Bottom of overhead slab	Uses the distance between the floor and the bottom of the slab above as the default wall height
Fixed at	Fixes the wall height to a specific dimension regardless of the floor-to-floor elevation; this is useful for special cases such as split-level homes
Options	
Create Slab Layers	Select this checkbox to create slab design layers



Parameter	Description
Use zero for ground floor	When selected, floor layer numbering begins with 0 instead of 1 (for example, Mod-Floor-1 and Mod-Floor-2 would instead be Mod-Floor-0 and Mod-Floor-1, respectively)
Basement prefix	Enter the prefix to append to layer names that represent basement levels; the default is B

Create Slab Layers, Use Zero for Ground Floor, and Basement Prefix can only be specified for new setups.

To set up a model for split-level homes, select the **Fixed at** option and enter a height greater than the distance to the next level.

Adding and Removing Levels

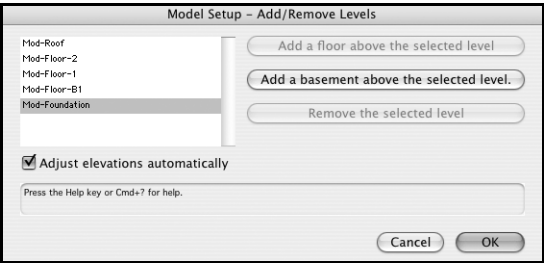
Product: Architect

Levels (floors) can be added to or removed from the model.

To add or remove a level:

1. Select **File > Document Settings > Model Setup**.
2. In the main Model Setup dialog box, click **Add/Remove**.

The Model Setup - Add/Remove Levels dialog box opens.



Parameter	Description
Add a floor above the selected level	Click to add a floor above the selected level from the list. This option appears dimmed if the selected level cannot have a floor added above it.
Add a basement above the selected level	Click to add a basement above the selected level from the list. A maximum of two basements are permitted in a drawing.
Remove the selected level	Click to delete the selected level from the list; all objects on the level are deleted. This button appears dimmed if the selected level cannot be deleted.
Adjust elevations automatically	Recalculates the elevation (Z value) of the remaining levels

3. Click **OK** to return to the Model Setup dialog box.
4. Click **OK** accept changes and return to the drawing.

An alert dialog box opens, recommending the re-running of the **Create Standard Viewports** command to apply model setup changes to the viewport setup.



5. Click **OK**.

When using the **Model Setup** command for the first time, floors are automatically numbered as they are added. When run again, the floors are not renumbered until after step 4.

Creating Standard Viewports

Product: Architect and Landmark

VectorWorks Architect and Landmark take advantage of the viewport functionality introduced in version 11.

Viewports are created on sheet layers, and display a specific portion of a drawing with a combination of visible, grayed, and/or hidden design layers and classes. Viewports can be cropped, rotated, and annotated, and the sheet layer print settings saved. Several viewports can be included on one sheet layer. The **Create Standard Viewports** command creates standards-compliant viewports and their associated sheet layers, with the layer and class visibilities of a standard drawing. See “Presenting Drawings with Sheet Layer Viewports” on page 609 in the VectorWorks Fundamentals User’s Guide.

If desired, views corresponding to the viewports can also be created. This allows easy navigation through the different drawing views (with set layer and class visibilities) during the design process.

Viewports are created in five categories. The available viewport types are:

- Site Plan Drawings
- Project Plan Drawings
- Floor Plan Drawings
- Auxiliary Plan Drawings
- Notation Drawings

The **Model Setup** command must be run prior to using this command.

Select the **Create Standard Viewports** command again to make changes to the project settings at any time. The column on the right shows the current viewports when the command is run again.

Setting Standard Viewport Preferences

Product: Architect and Landmark

The default viewport scale and drawing border settings can be set prior to adding standard viewports to a project.

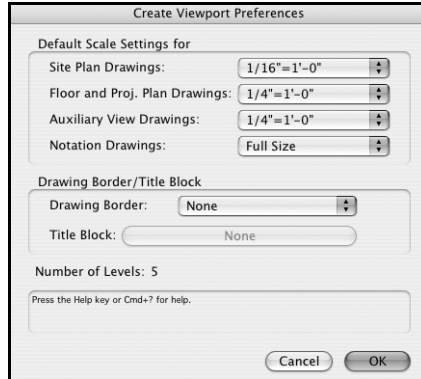
To set viewport preferences:

1. Select **File > Document Settings > Create Standard Viewports**.

The Create Standard Viewports dialog box opens.

2. Click **Preferences**.

The Create Viewport Preferences dialog box opens. The preferences apply as viewports are added to the list for inclusion in the drawing.



3. Set the default scale for each type of viewport and select a drawing border and, if desired, title block to add automatically to each sheet layer. The scale settings affect only the viewport scale, not the layer scale of any model layers. See “Creating Drawing Borders” on page 335 for more information on drawing borders.
4. Click **OK** to return to the Create Standard Viewports dialog box.

Creating Viewports

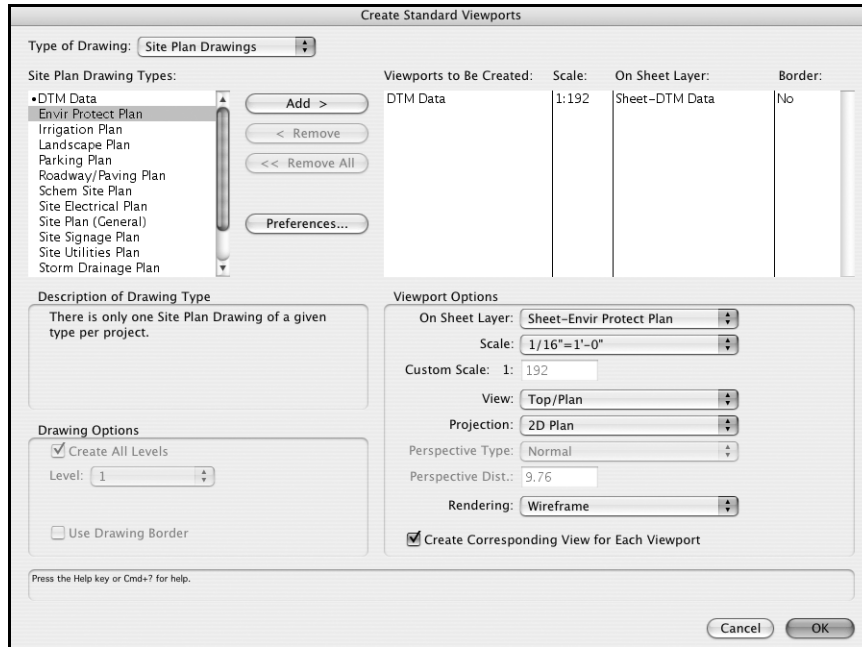
Product: Architect and Landmark

To create standard viewports:

1. Select **File > Document Settings > Create Standard Viewports**.

The Create Standard Viewports dialog box opens. Select a drawing category from the **Type of Drawing** list. The available drawing types display in the **Drawing Types** list on the left, with a short description beneath. Select the viewport to be created in the **Drawing Types** list and then click **Add** to move it to the **Viewports to Be Created** list on the right.

For auxiliary view viewports (sections and elevations), types with a -Man suffix (such as Sections-Man) typically indicate that the elements of the section or elevation are to be drawn manually on, for instance, Mod-Section or Mod-Elevation layers, which are created along with the viewports. The visibility of all other layers is set to Invisible for these viewports. Types with a -VP suffix (such as Sections-VP) are for creating a view or a section viewport of the model from existing Mod- layers. No new layers are created and the visibility of all existing Mod- layers is set to Visible for these viewports.



Parameter	Description
Type of Drawing	Lists the categories of viewport types
Drawing Types	Lists the available viewport types in the selected Type of Drawing category
Description of Drawing Type	Provides a description of the Type of Drawing category
Viewports to be Created	Lists the viewports that will be created, along with the specified scale, drawing border and sheet layer parameters
Add	Adds the selected viewport types from the Drawing Types list to the Viewports to be Created list, including them in the drawing setup
Remove	Removes the selected viewport from the Viewports to be Created list
Remove All	Removes all viewports from the Viewports to be Created list
Preferences	Specifies the scale and drawing border parameter preferences when adding viewports to the Viewports to be Created list
Drawing Options	
Create All Levels	For Floor Plan drawings, creates the selected viewport for each level of the floor plan; deselect to specify an individual Level instead
Level	For Floor Plan, Auxiliary or Notation drawings, specify the individual level for creating the viewport
Use Drawing Border	Places the drawing border specified in Create Viewport Preferences on the sheet layer when the viewport is added to the drawing



Parameter	Description
Viewport Options	Select a viewport from the Drawing Types list to set its parameters before adding it to the Viewports to be Created list. Alternatively, select a viewport in the Viewports to be Created list to set or change its options.
On Sheet Layer	Select a sheet layer where the viewport will be placed. A default sheet layer name is provided, but a different sheet layer can be selected. Alternatively, a new sheet layer name can be created, by selecting New Sheet Layer and providing the sheet layer name.
Viewport parameters	Sets the viewport scale, view, projection, perspective, and rendering as described in “Creating a Sheet Layer Viewport from a Design Layer” on page 610 in the VectorWorks Fundamentals User’s Guide
Create Corresponding View for Each Viewport	For each viewport in the Viewports to be Created list, creates a corresponding view with the same name. It is useful during the design process to navigate among the different project views, where the proper layer and class visibilities have already been set.

- Once the list of viewports is ready, click **OK**. Any sheet layers specified that do not already exist in the drawing are created along with the listed viewports (and views if the **Create Corresponding View** option was selected).

In a new drawing, the viewports display with a red X, indicating that they are currently empty. As the drawing is developed on the design layers, the viewports will display the contents appropriately. Depending on the rendering mode specified, some viewports may require updating with the **Update Selected Viewports** command.

Standard Naming

Product: Architect and Landmark

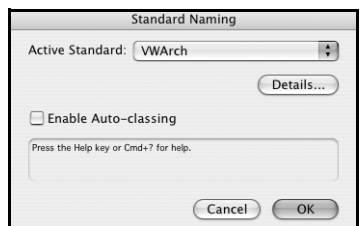
The **Standard Naming** command controls the layer, class, and viewport names used in a project. These names can be changed to a user-defined system other than the default VVArch naming system. Standards can be mapped for office-wide use or to convert an existing file to the office standard. This command can also be used to assign specific attributes to classes in standards, and to change the names of layers, viewports/views and classes in the current standard. The command does not create new layers, classes, or viewports/views.

If classes, layers, and viewports/views have not been set up according to VVArch standards, their names may not match the example layer and class names presented here.

To set the standard naming of layers, classes, and views:

- Select **File > Document Settings > Standard Naming**.

The Standard Naming dialog box opens. Select a naming standard for the file, and choose whether auto-classing should be enabled for objects.

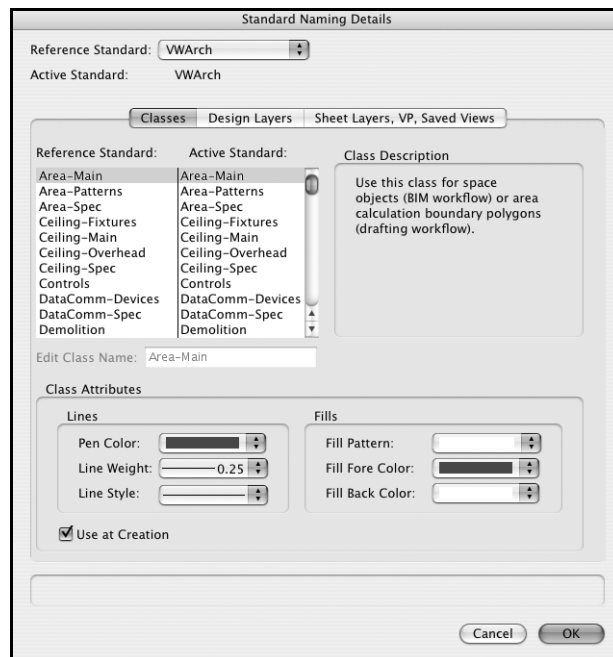


Parameter	Description
Active Standard	Select the naming standard to apply to classes, design layers, sheet layers, viewports, and saved views
Details	Opens the Standard Naming Details dialog box; to edit the names for a custom standard (User 1, User 2, and User 3), the standard must be selected as the Active Standard first
Enable Auto-classing	Turns on Auto-classing for the file and automatically places auto-classing objects into pre-assigned classes; see “Automatically Created Classes” on page 14. If objects were already present in the drawing when auto-classing is enabled, choose whether existing objects should be auto-classed when exiting this dialog box.

- Click **Details** to edit custom class, layer, and viewport/view names.

The Standard Naming Details dialog box opens, displaying class names on the **Classes** tab. Select the **Design Layers** tab to display design layer names, and the **Sheet Layers, VP, Saved Views** tab to display the names for viewports and their associated sheet layers, or for saved views.

Using the reference list, verify the mapping of standard names. Custom naming can be specified for custom active standards by entering a new name for each layer, class, or viewport/view. If desired, class attributes can also be specified for each standard or custom class name. See “The Attributes Palette” on page 229 in the VectorWorks Fundamentals User’s Guide.





Parameter	Description
Reference Standard	Select a reference naming standard from the list; the relevant class, layer, or viewport/view names are displayed below. Each active entry in the list is mapped to its corresponding reference list entry. User 1, User 2, and User 3 are custom standards. More custom standards can be defined (see “Creating Additional Custom Standards” on page 12).
Active Standard	Displays the overall naming standard currently in effect for the file (selected in the initial Standard Naming dialog box)
Reference Standard List	Lists the reference standard names for the class, design layer, viewport/sheet layer, or saved view
Active Standard List	Lists the standard name currently in effect and mapped to the reference standard for the class, design layer, or viewport/sheet layer, or saved view
Description of class/layer/view	Describes the currently selected class, layer, viewport/sheet layer, or saved view in the list
Edit Class/Layer/View Name	When a custom active standard is selected (User 1, User 2 or User 3), enter the custom name for the currently selected class, layer, or viewport/view
Class Attributes (Classes tab only)	Sets the attributes of a selected class in the Active Standard list
Lines	Select the line style class attributes
Pen Color	Choose a pen color from the color box
Line Weight	Select the line weight
Line Style	Select the line style
Fills	Select the fill style class attributes
Fill Pattern	Select the fill pattern
Fill Fore Color	Choose a fill foreground color from the color box
Fill Back Color	Choose a fill background from the color box
Use at Creation	Applies the class attributes as the classed item is created

- When the desired class attributes have been specified, and, for custom standards, the standard names have been established, click **OK**.
- In the Standard Naming dialog box, click **OK**. If custom viewports exist in the drawing, you are prompted to run the **Create Standard Viewports** command again to update the viewports/views with the new naming standard, and update any new class attributes. If auto-classing was selected and objects had already been placed in the drawing, select whether to auto-class those existing objects.

Creating Additional Custom Standards

Product: Architect and Landmark

A custom naming standard can be created rather than using the VVArch or AIA/NCS standard. Although three layer, class, and viewport/view standards are available from within the Standard Naming dialog box (User 1, User 2 and User 3), up to ninety-nine can be created for layers, classes, and viewport/views by editing the ClassNameStd,



LayerNameStd, and ViewNameStd worksheets. See “Using Worksheets” on page 566 in the VectorWorks Fundamentals User’s Guide.

To create a custom naming standard by worksheet:

1. In a new file, select **File > Document Settings > Standard Naming**.

The Standard Naming dialog box opens.

2. Without making any changes, click **OK**.

Three worksheets are created in the file, and are visible in the Resource Browser: ClassNameStd, LayerNameStd, and ViewNameStd.

3. Select one of the worksheets from the Resource Browser. From the **Resources** menu, select **Open**.

The worksheet opens for editing.

A1	B	C	D	E	F	G	H	I	J
	VWArch Simplified	AIA/NCS	User 1	User 2	User 3	Pen Color	LW	LS	
1	Areas	A-AREA	Area-Main	Areas	A-AREA	4	10	2	
2	Areas	A-AREA-PATT	Area-Patterns	Areas	A-AREA-PATT	4	10	2	
3	Areas	A-AREA-NOTE	Area-Spec	Areas	A-AREA-NOTE	255	10	2	
4	Ceiling	A-CLNG-SUSP	Ceiling-Fixtures	Ceiling	A-CLNG-SUSP	8	10	2	
5	Ceiling	A-CLNG	Ceiling-Main	Ceiling	A-CLNG	255	10	2	
6	Ceiling	A-FLOR-OVHD	Ceiling-Overhead	Ceiling	A-FLOR-OVHD	8	10	-2	
7	Ceiling	A-CLNG-IDEN	Ceiling-Spec	Ceiling	A-CLNG-IDEN	8	10	2	
8	Electrical/Communications	E-CTRL	Controls	Electrical/Communications	E-CTRL	18	10	2	
9	Electrical/Communications	E-COMM	DataComm-Devices	Electrical/Communications	E-COMM	18	10	2	
10	Electrical/Communications	E-COMM-IDEN	DataComm-Spec	Electrical/Communications	E-COMM-IDEN	255	10	2	
11	Demolition	A-DEMO	Demolition	Demolition	A-DEMO	7	10	-2	
12	Dimension	A-ANNO-DIMS	Dimension	Dimension	A-ANNO-DIMS	3	10	2	
13	Doors/Windows	A-DOOR	Door-Main	Doors/Windows	A-DOOR	4	10	2	
14	Door/Window Tags	A-DOOR-IDEN	Door-Spec	Door/Window Tags	A-DOOR-IDEN	255	10	2	
15	Electrical/Communications	E-POWR	Electrical-Devices	Electrical/Communications	E-POWR	7	10	2	
16	Lighting	E-LITE	Electrical-Lighting	Lighting	E-LITE	7	10	2	
17	Electrical/Communications	E-POWR-IDEN	Electrical-Spec	Electrical/Communications	E-POWR-IDEN	255	10	2	

ClassNameStd Worksheet

4. Highlight column **D (User 1)** and from the Worksheet menu select **Insert > Columns**. A new column is added in front of the selected one.

New columns must be inserted after the AIA/NCS column and before the Description or Pen Color column.

5. Enter a name in cell **D1** for the new standard.
6. Enter a new standard name for each cell below **D1**.

Cells left blank in the ClassNameStd worksheet will be assigned to the “None” class. Cells left blank in the LayerNameStd worksheet will be assigned to the “Layer-None” layer. Blank cells are not permitted in the ViewNameStd worksheet; if a worksheet with blank viewport/view names is attempted for use in Standard Naming, an error message is displayed.

7. The new standard is displayed in the Standard Naming dialog box.

To use these changes in other files, either save the file as a template to be used as the basis for new drawings, or import each worksheet into the other file before running the **Standard Naming** command.

Coarse and Fine Custom Standards

Product: Architect and Landmark

When creating custom standard naming, naming standards may contain fewer standard names (coarser) or additional standard names (finer).

A “coarser” custom standard names two or more of the standard class, layer, or view names with the same user-defined name. Except for auto-classing, this is an irreversible process.

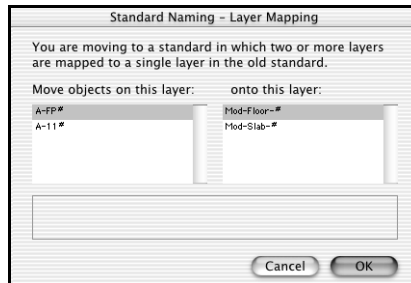


For example, the classes Area-Main, Area-Patterns, and Area-Spec can be combined into a single class called Areas. All objects assigned to the original three classes are reassigned to Areas.

When custom standard naming changes are complete, additional information displays to confirm any actions to be taken, such as merging changed class names to eliminate duplicates.

A “finer” standard maps a single class, layer, or view name to multiple names. Mapping is required to define the standard naming change, and the Standard Naming - Mapping dialog box opens automatically.

For example, the A-FP# layer AIA standard corresponds to two VectorWorks Architect layer standards: Mod-Floor-# and Mod-Slab-#. If switching from the AIA standard to the VWArch standard, select the A-FP# layer from the list on the left and indicate the mapping for objects currently on the A-FP# layer by selecting the mapping layer on the right.



All objects assigned to the A-FP# layer are assigned to the Mod-Floor-# layer. Unmapped layers are not created.

VectorWorks Architect and Landmark Classes

Product: Architect and Landmark

Automatically Created Classes

Product: Architect and Landmark

Several classes are created automatically by features in VectorWorks Architect and Landmark, regardless of whether standards have been established with the Setup commands. See “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide.

Several plug-in objects have an option to select one of 15 Style classes. If the selected Style class does not already exist in the file, Architect creates the class using the default settings. Edit the class settings in the Edit Class(es) dialog box.

- **NonPlot (Architect):** This class is created as part of doors and windows. The loci that define the window and door edges are created in this class, which is normally set to Invisible so that the loci are hidden.
- **Redlines (Architect, Landmark, Spotlight, Machine Design):** This class is created by the **Redline** tool. All redline objects are placed in this class, which allows all redlines in the file to be shown or hidden. This class is toggled to visible and invisible by the **Show or Hide Redlines** command.
- **Guides (Architect and Landmark):** This class is created and used by selecting **Modify > Guides > Make Guide**.
- The **Wall Frammer** command (Architect) creates the following classes: Frammer-Block, Frammer-Sole Plate, Frammer-Header, Frammer-Stud, Frammer-Sill, and Frammer-Top Plate.



- **Site-DTM-Modifier (Landmark):** This class is created by the Pad, Texture Bed, Grader, and Control Fence objects. The Landscape Walls and Roadway objects include pad and control fence objects if the **Use Site Modifiers** checkbox is selected on the Object Info palette. This class is toggled to visible and invisible by the **Show or Hide Site Modifiers** command.
- **Irrigation-SprayPat (Landmark):** This class is created by using the Irrigation Head and Drip Emitter objects. This class is toggled to visible and invisible by the **Show or Hide Spray Pattern** command.

Object Auto-classing

Product: Architect and Landmark

Auto-classing is the automatic assignment of certain objects to a default class. Many plug-in objects in the libraries provided have been pre-assigned to the proper class according to the Architect/Landmark drawing standard (VWArch) (for a list of auto-classing objects, see “Auto-classing Objects” on page 593).

If the **Use Auto-classing** checkbox is selected in Standard Naming (see “Standard Naming” on page 10), then these plug-in objects will be automatically placed in the designated class as they are added to the drawing. The object’s class is created automatically if it does not yet exist.

If a file has not been structured with the Setup commands, or the **Use Auto-classing** checkbox is not selected, the objects are placed in the active class. The objects, upon regeneration, are assigned to the proper class if the file is later set up. Any symbol, when created, can be set to default to a class from the Symbol Insertion Options dialog box.

The default class of the object libraries must be reset when using a naming standard other than the Architect/Landmark standard (VWArch).

[Save a backup version of the object libraries before editing them.](#)

To set the default class of all the symbols in a library file:

1. Select **File > Open**.

The standard Open dialog box opens.

2. Select the Libraries folder, and then click **Open**.

3. Select the first object library file to convert, and then click **Open**.

The selected file opens in the drawing window.

4. Select **Tools > Utilities > Set Default Symbol Class**.

A warning dialog box opens. Click **Yes** to acknowledge converting all symbol definitions in the file to the new default class name.

The Enter String dialog box opens.

5. Enter the default class name for the symbols, and then click **OK**.

Ensure that the name is spelled correctly to match the desired custom class standard. This command can be undone if necessary. If the name matches an existing name in the file other than a class, an alert dialog box opens.

6. Select **File > Save** to save the changes.

7. Repeat steps 1 through 6 for each object library.

Any time that symbols are used from this file, they will take on the specified class as their default class.

[The command does not distinguish between one symbol definition and another. All symbol definitions in the file will take on the new class name. For that reason, to use on custom libraries, run the command on a copy of the file.](#)



Imperial and Metric Object Libraries

Product: Architect, Landmark, Spotlight, and Machine Design

Several of the Design Series object libraries are available as Imperial and Metric dimensioned objects. See “Object Libraries” on page 565 for a complete list of object libraries.

Mapping Classes and Layers

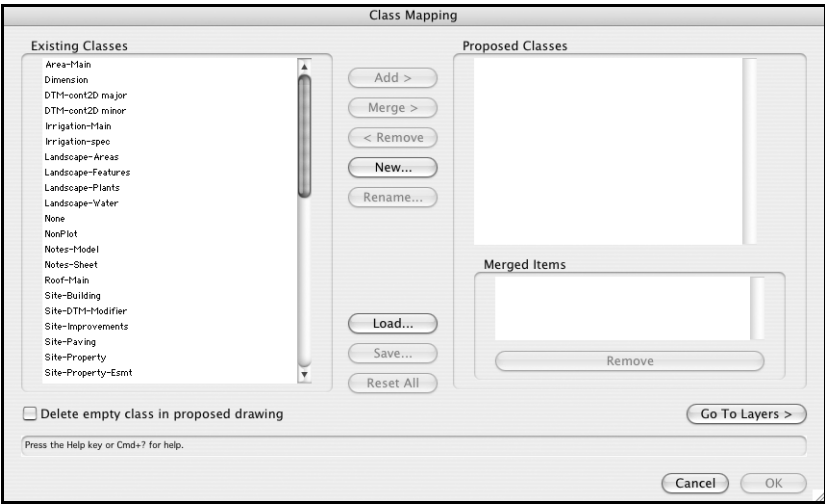
Product: Architect and Landmark

The **Class and Layer Mapping** command “maps” any set of layers and/or classes in a drawing into a new layer and/or class. The file structure can be simplified, condensed, and/or renamed. Use this feature, for example, when a consultant is using .DWG or .DXF files. Complex, multi-classed files imported from .DWG can be condensed or renamed, and empty classes deleted in a single operation. Mapping can be saved so the next time a file is received from that consultant, the file can be re-mapped in a single step. This same procedure can be revised for the process of providing files to consultants using a different file structure or drawing standard. See “Managing Layers” on page 84 in the VectorWorks Fundamentals User’s Guide and “Managing Classes” on page 95 in the VectorWorks Fundamentals User’s Guide.

To modify layers and classes:

- 1. Select **Tools > Class and Layer Mapping**.

The Class Mapping dialog box opens. Modify the existing classes, and then click **Go To Layers** to open the Layer Mapping dialog box. The Layer Mapping dialog box is identical in layout to the Class Mapping dialog box.



Parameter	Description
Existing Classes/Layers	Lists the existing classes or layers in the file; layers or classes that are not moved to the Proposed or Merged list are deleted
Proposed Classes/Layers	Lists the proposed layers or classes to be created in the file; layers or classes that remain in this list are deleted when the layers and classes are modified
Add >	Adds a layer or class from the list of existing layers or classes to the Proposed list



Parameter	Description
Merge >	Adds a layer or class to the Merged list; layers or classes in this list will be merged with the layer or class that is selected in the Proposed list
< Remove	Removes the selected item from the Proposed list
New	Creates a new class or layer in the Proposed list
Rename	Renames the selected proposed layer or class
Merged Items	Lists layers or classes to merge with the selected layer or class in the Proposed list. The merge occurs when the next action is performed in the dialog box, so that layers and classes are merged on an ongoing basis. Selecting a proposed layer or class lists its merged items again so that changes can be made, if desired.
Remove	Removes the selected item from the Merged list
Load	Opens a previously saved mapping file
Save	Saves the layer or class mapping as a file; layer and class mapping settings are saved separately. This saves time when making the same modifications to several drawings that are set up similarly.
Reset All	Moves all proposed and merged items back to the Existing list
Delete empty class/layer in proposed drawing	Deletes all layers and classes that have no items associated with them
Go To Layers/Go To Classes	Toggles between the Class Mapping and Layer Mapping dialog boxes

When selecting existing and proposed classes and layers, press and hold the Shift key to select multiple, contiguous items or press and hold the Ctrl key (Windows) or Command key (Macintosh) to select non-contiguous items.

2. Click **OK**.

The drawing is updated, using the new layer and class mapping. Layers and classes not moved to the Proposed or Merged list are deleted from the file, along with any objects in those layers or classes.

The Task Manager

Product: Architect and Landmark

The Task Manager provides an easy way to draw in accordance with a standard file structure by automatically setting the appropriate layer and class options for particular drawing tasks. The Task Manager contains a database of over 430 drawing tasks defined in accordance with the Architect/Landmark standard, and allows tasks to be added.

Using The Task Manager

Product: Architect and Landmark

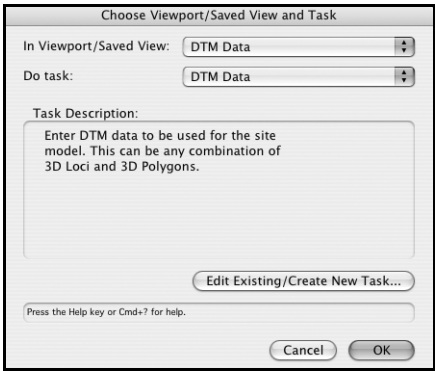
The Task Manager and its built-in database work only with files that have been set up with the **Model Setup** and **Create Standard Viewports** commands (see “Model Setup” on page 4 and “Creating Standard Viewports” on page 7). The Task Manager cannot be used on a blank file or a file set up using unrecognized standards.

To use the Task Manager:

1. Select **Tools > Task Manager**.



The Choose Viewport/Saved View and Task dialog box opens. Select the viewport or saved view and the associated task to be performed.



Parameter	Description
In Viewport/Saved View	Select the viewport or view where the task should be performed
Do task	Select the associated task to perform from the list of tasks relevant to the viewport or view
Task Description	Displays a summary of the task selected in Do task
Edit Existing/Create New Task	Changes the current task or allows new tasks to be added for the current viewport or view; see “Editing the Task Manager Database” on page 18

- 2. Click **OK**.

The Task Manager switches to the active design layer and class for the selected viewport or saved view and task. It also adjusts visibility options for layers and classes as necessary.

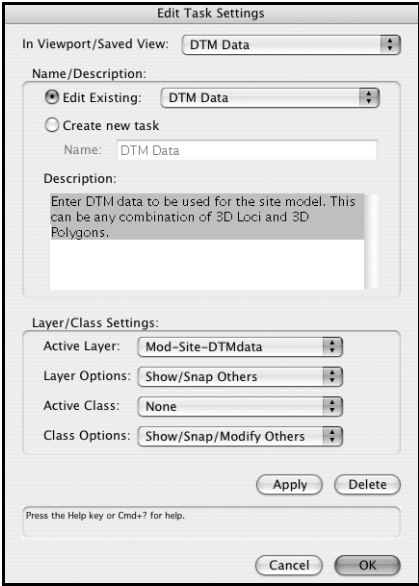
Editing the Task Manager Database

Product: Architect and Landmark

To edit the Task Manager database:

- 1. Select **Tools > Task Manager**.
- 2. Select a viewport or saved view, and select a task. Click **Edit Existing/Create New Task**.

The Edit Task Settings dialog box opens. Only layers and classes available for the selected viewport or saved view display for selection.



Parameter	Description
In Viewport/Saved View	Select the viewport or saved view for the task to be edited, added, or deleted
Name/Description	
Edit Existing	Edits an existing task; select the task to edit
Create new task	Creates a new task for the specified viewport or view
Name	Edit the task name or enter the new task name
Description	Edit the task description or enter the new task description
Layer/Class Settings	Specify the layer and class settings for the edited or new task
Active Layer	Sets the active layer for the task
Layer Options	Specifies the layer display options for the task
Active Class	Sets the active class for the task
Class Options	Specifies the class display options for the task
Apply	Applies the edit to the task, or creates the new task. More tasks can be edited or created.
Delete	Removes the current task from the Task Manager

3. Click **OK** to return to the Task Manager.



Machine Design Drawing Setup

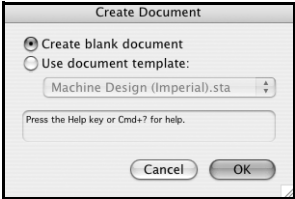
Product: Machine Design

Use the **Drawing Setup** command at the beginning of a VectorWorks Machine Design project to quickly set the drawing units, layer scale and print area from a single dialog box. A drawing border and title block can also be inserted automatically. An alternate method of setting up a document is to open one of the pre-configured Machine Design template files and use it as a starting point.

To set up a drawing with the **Drawing Setup** command:

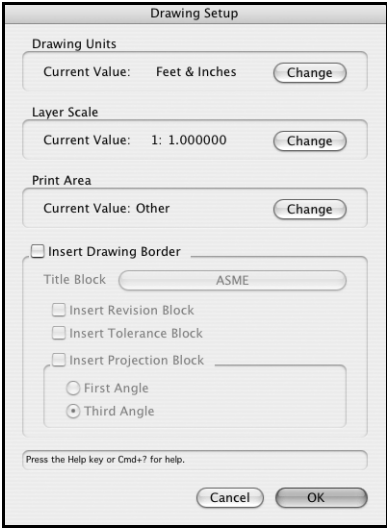
- 1. Select **File > New**.

The Create Document dialog box opens.



- 2. Select **Create blank document**, and then click **OK**.
- 3. Select **File > Document Settings > Drawing Setup**.

The Drawing Setup dialog box opens.



- 4. Specify the drawing units, layer scale, print area, and drawing border, and then click **OK**. For more information on Drawing Units, Layer Scale, and the Print Area, see “Setting Up the Drawing” on page 51 in the VectorWorks Fundamentals User’s Guide.



Parameter	Description
Drawing Units	The current drawing units value on the General Display tab of the Units dialog box displays; click Change to revise the current drawing units
Layer Scale	The current layer scale displays; click Change to set a different layer scale. <i>If the active layer is a sheet layer, the layer scale cannot be changed.</i>
Print Area	The current print area value displays; click Change to enter different print area parameters
Insert Drawing Border	Automatically inserts a drawing border
Insert Title Block	Select the title block to insert within the drawing border, or select None to leave out the title block; see “Creating Drawing Borders” on page 335
Insert Revision Block	Select to insert a revision history block within the drawing border; for more information, see “Creating Drawing Borders” on page 335
Insert Tolerance Block	Select to insert a tolerance specifications block within the drawing border (ASME title block required); for more information, see “Editing a Tolerance Block” on page 338
Insert Projection Block	Select to insert a projection block containing either a first angle or third angle projection symbol within the drawing border (ASME title block required)

The drawing setup parameters are saved with the file. Use the Object Info palette to make any changes to the drawing border once it has been placed in the drawing.

Creating Custom Modification Scripts

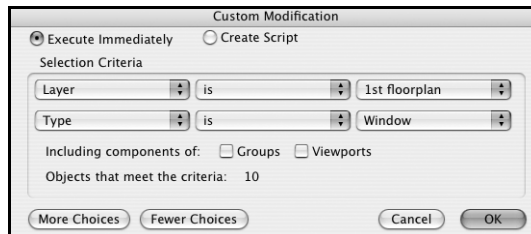
Product: Architect, Landmark, Spotlight, and Machine Design

Custom modification scripts can select multiple objects and modify their common properties and attributes in a single operation. Objects can be selected regardless of layer, layer scale, class, or current selection or visibility status. Several levels of selection criteria make it easy to target specific object sets for modification.

To create a custom modification script:

1. Select **Tools > Custom Modification**.

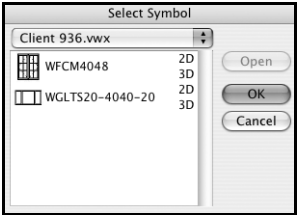
The Custom Modification dialog box opens.



Parameter	Description
Execute Immediately	Performs the specified selection operation immediately upon exiting the Custom Visibility dialog box; the operation criteria is not saved for future use
Create Script	Saves the criteria and command options as a VectorScript that can be reused as needed
Selection Criteria	Determines the objects to select and modify based on the selected criteria
Including components of	Applies the selection to objects that are grouped and/or included in viewports
Objects that meet the criteria	Displays the number of drawing objects that will be affected
More Choices/Fewer Choices	Specify additional criteria by clicking More Choices . To remove the most recently added level of criteria, click Fewer Choices .

2. Choose the desired criteria options. The number of objects that meet the criteria displays.

When symbols are selected as the criteria and symbol folders are present in the file, click the button available near the symbol type to open the Select Symbol dialog box. Select the specific symbol, and then click **OK** to return to the Custom Modification dialog box.

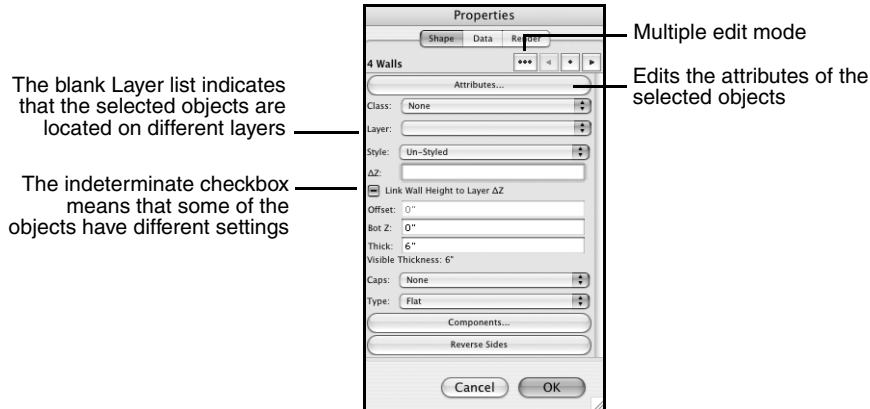


3. Click **OK**.

If the **Create Script** option was chosen, when prompted, name the VectorScript containing the modification commands. The script then displays in a script palette, and can be double-clicked to perform the operation.

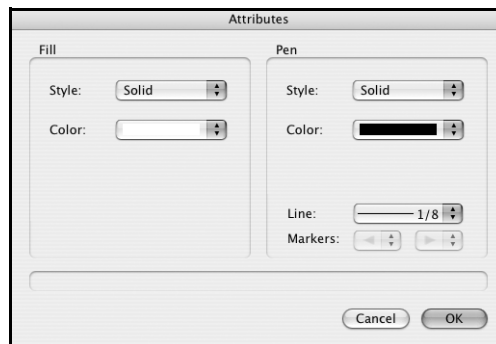
4. If the **Execute Immediately** option was chosen, the Properties dialog box opens.

The common properties of the selected objects are displayed and can be modified. Similar to a multiple selection, if the parameter settings for the objects are different, they display as a blank list or as a checkbox of indeterminate state. Parameter edits apply to all selected objects when in multiple edit mode.



5. To edit the object attributes, click **Attributes**.

The Attributes dialog box opens. Edit the available attributes of the selected objects, and click **OK**. See “The Attributes Palette” on page 229 in the VectorWorks Fundamentals User’s Guide for more information.



6. Click **OK** to return to the drawing.

Exporting Resources

Product: Architect, Landmark, Spotlight, and Machine Design

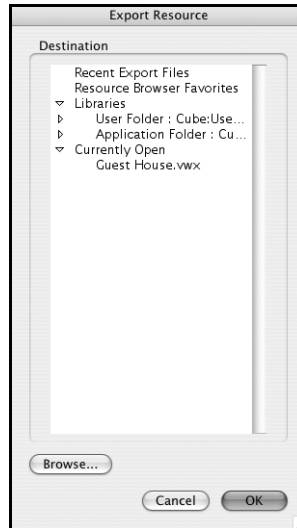
If you create custom resources and reuse them frequently, you may want to organize them into resource libraries. You and other users can add the libraries to the Resource Browser favorites, or add them to the default resources, and then easily use resources from them as needed. (For more information about resources, see “Resources” on page 565 in this guide, and “Using VectorWorks Resources” on page 141 in the VectorWorks Fundamentals User’s Guide.)

In VectorWorks Design Series, use the export function of the Resource Browser to export one or more resources from the current document to another file, without opening the file. If an older version of the resource is already in the target document, it can be updated with the new version.

To export resources:

1. In the Resource Browser, select the resource(s) to export.
2. Select **Export** from the Resources menu.

The Export Resource dialog box opens.



3. The **Destination** window displays Recent Export Files, Libraries, and Currently Open files. Either select a file from the window and click **OK**, or click the **Browse** button to select a file from another location.
4. If the target file already contains a resource with the same name, three options display: replace the resource, rename the resource, or do not export that resource (any other selected resources will be exported, if there are no further name conflicts). Select an option and click **OK**.

If there is a name conflict between two resources of different types (such as a symbol and an image), the option to replace the resource in the target file is not available.

Workgroup Folders

Product: Architect, Landmark, Spotlight, and Machine Design

In a workgroup environment, create folders on the network to hold custom content files that are shared by coworkers. These files might contain content that will be used by all users (such as templates, symbols, or hatches). Or they might contain custom content specific to different projects. Each VectorWorks Design Series user can then designate the appropriate workgroup folders in the VectorWorks Preferences, so that the custom content will be available in VectorWorks.

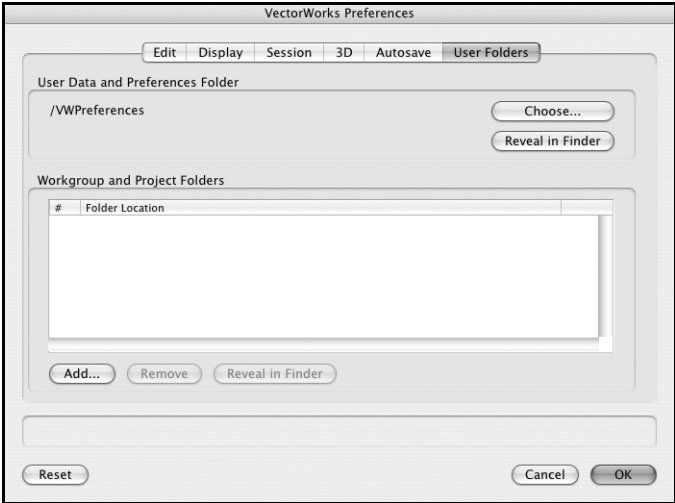
When VectorWorks presents data in the interface, it includes content from the user and workgroup folders as well as the content it ships with. For example, select **Modify > Hatch** to edit a hatch; the Hatches dialog box shows all default hatches from your VectorWorks, user, and workgroup folders.

A file in the user folder takes precedence if a file name is repeated in any of the folders. For example, if both of the following files exist, only the content from the user folder shows in VectorWorks.

- [User]\Libraries\Defaults\Walls\Wall Styles Imperial.vwx
- [Workgroup]\Libraries\Defaults\Walls\Wall Styles Imperial.vwx

To create workgroup folders:

1. Select **Tools > Options > VectorWorks Preferences**, and then click the User Folders tab.



Parameter	Description
User Data and Preferences Folder	Specifies the folder that contains VectorWorks preferences, log files, workspaces, and any personal content you create. This might be a folder on the local computer, or on a USB drive or network drive; this allows you to run VectorWorks from any computer.
Choose	Click Choose to change the user data folder. VectorWorks must be restarted if you change the location of the user data. See “User Data and Preferences Folder” on page 47 in the VectorWorks Fundamentals User’s Guide for details.
Explore (Windows) or Reveal in Finder (Macintosh)	To look at the contents of the current folder, click Explore (to open Windows Explorer) or click Reveal in Finder (to open Macintosh Finder)
Workgroup and Project Folders	<p>Specifies the folders where VectorWorks will look for additional content, such as shared project files and workgroup reference files. This might be a shared folder on a network drive, or a project-specific folder on the local computer.</p> <p>Folders are searched in order from the top of the list to bottom; if multiple files with the same name are found, only the first version of the file is shown in the program. To change the position of a folder, click in the # column and drag the folder up or down in the list.</p>
Add	Opens a dialog box to select a folder to add to the list
Remove	Deletes the selected folder from the list
Explore (Windows) or Reveal in Finder (Macintosh)	Displays the contents of the selected folder in either Windows Explorer or Macintosh Finder

2. To add content, create a subfolder that matches the standard VectorWorks subfolder for that type of data (Libraries, Plug-ins, Settings, Standards, Templates, or Workspaces). If necessary, create additional subfolders within those folders.

Do not modify the Plant Database subfolder, if present. Place custom plant symbols in one of the plant library subfolders (in the Libraries\Defaults folder).

3. Place the custom file in the folder. For example, to add custom hatches to the default content in VectorWorks, add the file of custom hatches to the folder Libraries\Defaults\Attributes - Hatches.

Space Planning and Programming

Product: Architect

VectorWorks Architect performs space planning and programming studies, and creates schematic floor plans.

These features can be combined in various ways depending on the required workflow:

- To begin the design process, draw the spaces. Reposition and reshape the spaces as needed to develop a schematic floor plan. Then create the walls automatically from those spaces.
- Begin with a solid model, and then create the exterior walls from the model.
- Create the walls first, and then create the space objects automatically to determine the areas enclosed by the walls.
- Import an adjacency matrix that was provided by a client, and automatically create a bubble diagram and a stacking diagram. Reshape and reposition the space objects in the bubble diagram to create a floor plan, and then create the walls automatically from the spaces.
- Create the initial schematic design with polylines instead of spaces, and then convert the polylines to spaces.

Space Planning

Product: Architect

Use the **Space** tool to create a schematic floor plan. VectorWorks Architect can then automatically create walls from those spaces. To track room finish data on a schedule, add finish information to the spaces. If necessary, IFC data (including extended space properties used by the General Services Administration) can be attached to the spaces.

If walls or polylines that represent spaces already exist in the drawing, use space planning commands to create spaces from the walls or polylines.

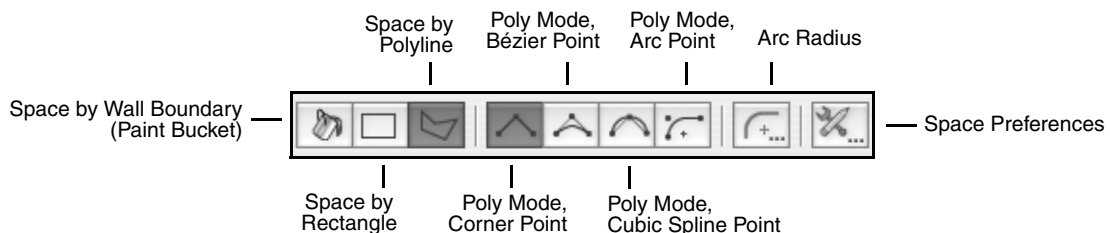
Creating Spaces with the Space Tool

Product: Architect

Spaces are path objects that have the characteristics of a building space or room, which include information such as the space name, number, finish information, and height. By default, the space label displays the space name and number, but many other pieces of information can be attached to a space and displayed on the drawing. Space objects automatically calculate their area, volume, and perimeter.

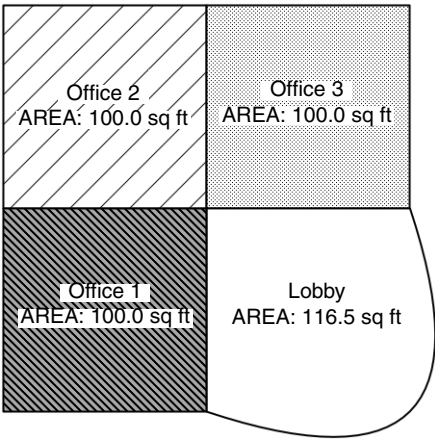
The **Room Name Simple** tool (in the Dims/Notes tool set) creates a text label only; it does not attach room finish, IFC, or GSA information to a space object.

To draw a space with the **Space** tool, select either the Space by Rectangle or the Space by Polyline mode. If the walls are already drawn, select the Space by Wall Boundary (Paint Bucket) mode to create a space from the current wall boundaries.





Mode	Description
Space by Wall Boundary	Creates a space object in a clicked area that is bounded by walls
Space by Rectangle	Draws a rectangular space object
Space by Polyline	Draws a polyline space object; as with a polyline, select one of four types of control points for the vertices from the tool bar
Corner Point	The polyline has straight lines and angled vertices at the control points
Bézier Point	The polyline curves are pulled toward the control points, but the curves do not touch the control points
Cubic Spline Point	The polyline curves pass through the control points
Arc Point	The polyline curves look like fillets placed at the control points
Arc Radius	Sets the radius of the arc when the Arc Point mode is selected
Space Preferences	Sets the default parameters that are used for each space object



Creating Spaces from Existing Walls

Product: Architect



To create a space from wall boundaries:

1. Click the **Space** tool from the Space Planning tool set.
2. From the tool bar, select the Space by Wall Boundary mode.
3. Click in an open area of the drawing that is bounded by walls; the walls must be on selectable layers.
4. The first time a space object is placed on the drawing, the Space Object Properties dialog box opens. Specify the default preferences, which apply to all space objects placed subsequently in this drawing. Click **OK**.
5. Use the Object Info palette to enter the properties for this space, such as label information or IFC data. See “Space Properties” on page 30 for details.
6. Use the Attributes palette to assign attributes to this space, such as the fill and the line weight.



Drawing Spaces with the Space Tool

Product: Architect



To draw a space with the **Space** tool:

1. Click the **Space** tool from the Space Planning tool set.
2. From the tool bar, either select the Space by Rectangle mode, or select the Space by Polyline mode and then select the type of control point for the polyline vertices.
3. Draw the space as follows:
 - For a rectangular space, click to begin the rectangle, and then click again to finish the rectangle and create the space.
 - For a polyline space, click to begin the polyline, and then click to set each polyline vertex. Click on the start point to end the polyline and create the space.
4. The first time a space object is placed on the drawing, the Space Object Properties dialog box opens. Specify the default preferences, which apply to all space objects placed subsequently in this drawing. Click **OK**.
5. Use the Object Info palette to enter the properties for this space, such as label information or IFC data. See “Space Properties” on page 30 for details.
6. Use the Attributes palette to assign attributes to this space, such as the fill and the line weight.

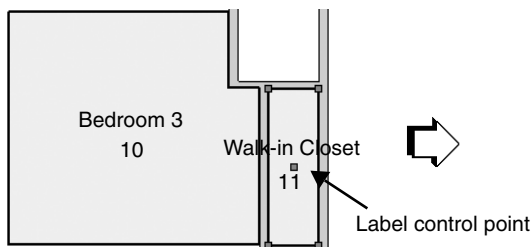
Editing Spaces

Product: Architect

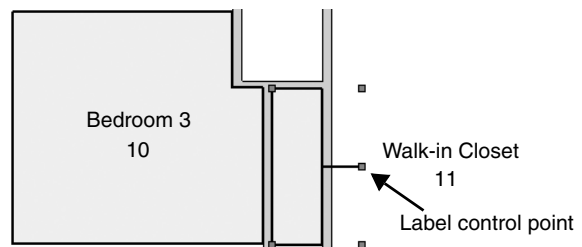
Once a space is created, its boundary is edited differently depending on the current **Auto-Boundary** setting. If **Auto-Boundary** is enabled, you can update the space boundary automatically when the walls that surround the space are changed. If **Auto-Boundary** is disabled, the space must be edited directly as a path object.

Each space has a control point that indicates the label location. If the space is auto-bounded, it also has a separate “anchor” control point that locates the space within its boundary. The anchor control point is typically in the center of the space’s bounding box, so it may be directly on top of the label control point. (If you create the space with Space by Wall Boundary mode, the anchor is placed where you click to create the space.)

To move a label or an anchor, click the control point and drag it to a new location; click again to move the point. If a label is moved outside of the space boundary, a line is drawn to connect the label to the space automatically.



Click the control point of the space label and drag it outside the space boundary



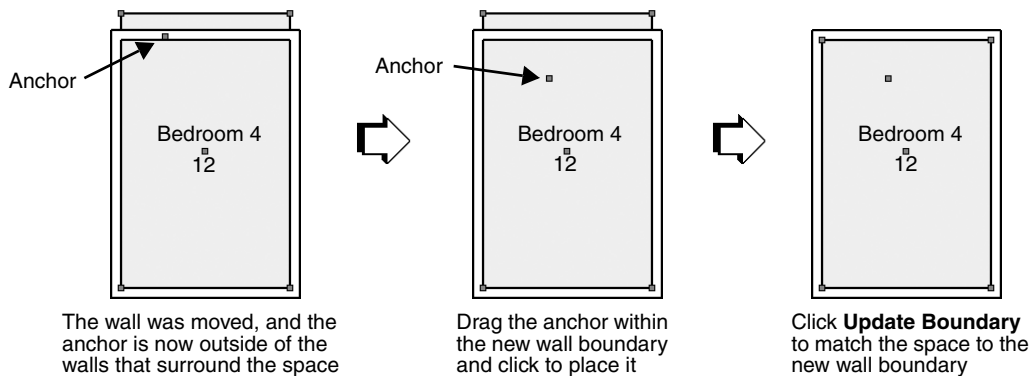
Click to place the label; a line is automatically drawn from the space boundary to the new position of the control point

To edit a space with **Auto-Boundary** enabled:

1. Add, delete, or move walls as necessary.



2. Select one or more spaces, and then click **Update Boundary** on the Object Info palette. Or, to update all of the spaces on the active layer at once, select **AEC > Space Planning > Update Space Boundaries**.
3. An alert displays if the anchor of the space object is not within the boundary of the walls that surround the space. The anchor indicates which set of walls the space belongs to. Move the anchor within the wall boundary, and then update the space boundary again.



4. The boundary of the space adjusts to match the surrounding walls. For example, if a wall between two spaces is removed, the spaces are combined. If a wall is added that divides an existing space, the space is divided into two spaces.

To edit a space with **Auto-Boundary** disabled:

- To add, subtract, and change vertices, edit the polyline with the **2D Reshape** tool.
- To make more sophisticated edits to the space object, select **Modify > Edit Group**. For example, you can add, clip, intersect, and combine into surfaces.

Space Properties

Product: Architect

Edit the space object parameters in the Object Info palette.

Parameter	Description
Rot	Rotates the space from its original location by the specified angle
Settings	Opens the Space Preferences dialog box to set preferences that apply to all space objects placed subsequently in this drawing
Config	Sets the room name and number format (ISO format is available)
Space Name	Indicates the space name; spaces in an adjacency matrix are listed by space name
Space Number	Specifies the space number
Occupant Name	Specifies the occupant name
Department	Specifies the department name or number; the spaces in the stacking diagram are grouped by the department number
Calc Dims	Automatically calculates the Length and Width dimensions of the space object; when deselected, the Length and Width can be entered manually

Parameter	Description
Length/Width/Room Dimensions	Displays the dimensions of the space; when Calc Dims is deselected, the Length and Width can be entered manually
Proposed Area	Specifies the desired area for the space
Text Alignment	Sets the text alignment for the space label (Left, Center, or Right)
Text Rotation	Specifies the number of degrees that text should be rotated; leave the value set to zero for horizontal text (rotate text to fit into areas such as vertical hallways)
Decimals	Indicates the number of decimals to use for the Perimeter , Actual Area , and Volume parameters (the maximum number of decimals is nine)
Underline Name	Underlines the Space Name on the drawing
Show Number Box	Displays the Space Number in a box on the drawing
Show Additional Data	Displays additional data fields on the label of the space object; click Set Additional Data to select the fields to display
Set Additional Data	Opens the Select Additional Data to Display on Space Object dialog box (see “Additional Data Fields for a Space Object” on page 32)
Auto-Boundary	Determines the boundary of the space by the surrounding walls instead of by a polyline that is drawn manually; if any walls are added, deleted, or moved, click Update Boundary to adjust the spaces to the new wall positions
Update Boundary	If Auto-Boundary is selected, updates the boundary of the space to match the surrounding walls
Show Poly	Displays the polyline that represents the space
Boundary Display	If Auto-Boundary is selected, sets whether to display the Net, Gross, or GSA BIM boundaries for the space. A Net boundary is defined by the inside face of the surrounding walls, and a Gross boundary is defined by the centerline of the surrounding walls. A GSA BIM boundary is the Net boundary minus any columns or pillars. If Auto-Boundary is not selected, the display is always the Net boundary and matches the polyline that defines the space.
Show 3D Detail	Select to display the space in 3D. The space height is the net (ceiling) height if Volume Display is set to Net, or it is the gross (floor-to-floor) height if Volume Display is set to Gross.
Volume Display	Select whether to display the Net or Gross value for the space volume
Height	Specifies the net (ceiling) height of the space
Floor-to-Floor Ht	Specifies the distance from this floor to the floor above
Finish Floor Elev	Specifies the finish floor elevation; the Space tool will try to set this to the Z value of the active layer when the space is inserted
Space Type	Identifies a space as either Normal (for example, a room) or Full Floor (the entire floor of a building)
Perimeter	Displays the net perimeter of the space. If Auto-Boundary is selected, this is the perimeter defined by the inside surface of the bounding walls; otherwise, it is the perimeter of the manually-entered polyline that bounds the space.



Parameter	Description
Actual Area	Displays the net area of the space. If Auto-Boundary is selected, this is the area defined by the inside surface of the bounding walls; otherwise, it is the area of the manually-entered polyline that bounds the space.
Volume	If Show 3D Detail is selected, displays the volume of the space object (actual area x height)
Gross Perimeter	Displays the gross perimeter of the space. If Auto-Boundary is selected, this is the area defined by the inside surface of the bounding walls; otherwise, it is the area of the manually-entered polyline that bounds the space.
Gross Area	Displays the gross area of the space. If Auto-Boundary is selected, this is the area defined by the inside surface of the bounding walls; otherwise, it is the area of the manually-entered polyline that bounds the space.
Gross Volume	If Show 3D Detail is selected, displays the gross volume of the space object (area x height)
Name Text Size	Specifies the font size for the Space Name
Number Text Size	Specifies the font size for the Space Number
Dims Text Size	Specifies the font size for the Length and the Width of the space
Matrix Order	Specifies the location of the space object in the adjacency matrix
On Schedule	Includes the space object in the Room Finish Schedule
Assign Room Finishes	Opens the Assign Room Finishes dialog box (see “Room Finishes” on page 34)
Use IFC Data	Includes the IFC data for the space object when the file is saved in IFC format
Set IFC Data	Opens the IFC Data dialog box to enter the data for various space properties (see “Viewing IFC Data” on page 501). When the drawing is complete, select Export > Export IFC Data to save the file in IFC format.
Use GSA Data	Includes the GSA data for the space object when the file is saved in IFC format
Set GSA Data	Opens the GSA Space Data dialog box to enter the data required for GSA projects (see “GSA Data” on page 37). When the drawing is complete, select Export > Export IFC Data to save the file in IFC format.
Polyline Parameters	Edits the path polyline of the space object. See “Reshaping Objects” on page 259 in the VectorWorks Fundamentals User’s Guide.

Additional Data Fields for a Space Object

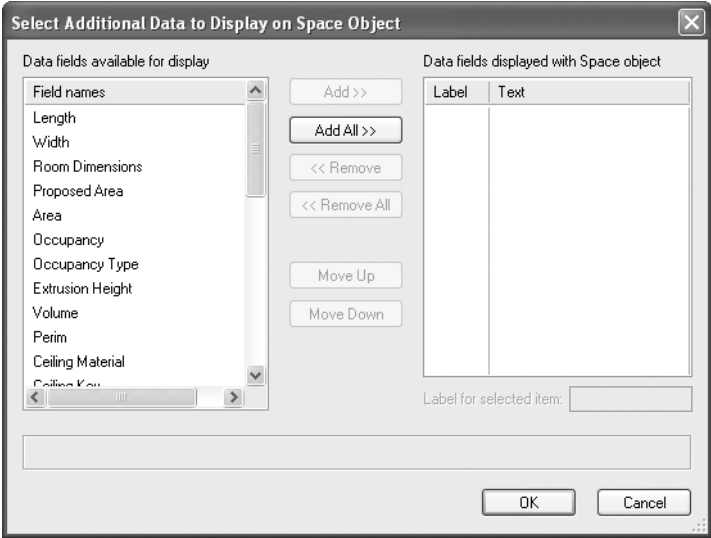
Product: Architect

Much of the data that is attached to a space object can be displayed on the drawing in the space label. Some of this information is calculated automatically, such as the volume and the perimeter. Other data is entered manually, such as the floor finish or the occupant.

To select additional data fields to display for a space object:

1. Click on an existing space object.
2. In the Object Info palette, click **Set Additional Data**.

The Select Additional Data to Display on Space Object dialog box opens.



Parameter	Description
Data fields available for display	Lists all fields that can be added to the label on the space object
Data fields displayed with Space object	Lists all fields that are currently selected to display on the label of the space object
Add	Select a field from the list of available fields (left side), and click Add to add it to the label on the space object
Add All	Adds all fields to the label on the space object
Remove	Select a field from the list of displayed fields (right side), and click Remove to remove it from the label on the space object
Remove All	Removes all fields from the label of the space object
Move Up / Move Down	Select a field from the list of displayed fields (right side), and click Move Up or Move Down to move the selected field up or down one position on the label of the space object
Label for selected item	Specifies the abbreviated label that displays on the space label for the currently selected data field (for example, DIM is the default label for the Room Dimensions data field)

3. Select fields, and click **OK** to close the dialog box. The selected fields display on the space object in the specified order.



Room Finishes

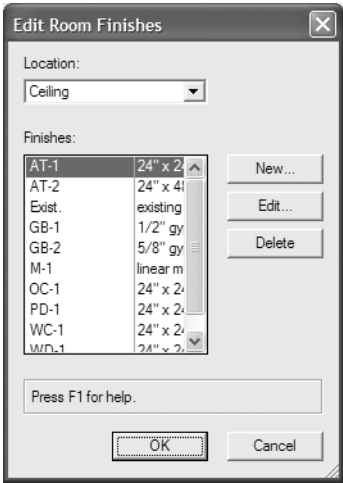
Creating, Editing, and Deleting Room Finishes

Product: Architect

Up to 1500 user-defined room finish definitions may be stored in a database called the Room Finish Library. The database is stored outside of the drawing file and is part of the project preference set (typically, VA Defaults).

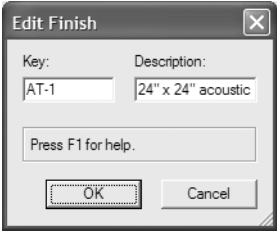
To create or edit a room finish:

1. Create a space as described in “Creating Spaces with the Space Tool” on page 27.
2. In the Object Info palette, click **Assign Room Finishes**.
The Assign Room Finishes dialog box opens.
3. Click **Edit Finishes** to add, modify, or delete the available room finishes.
The Edit Room Finishes dialog box opens.



Parameter	Description
Location	Select the location of the finish to be edited
Finishes	Lists all defined finish items for the selected Location ; select a finish and click Edit or Delete
New	Opens the Edit Finish dialog box to add a new finish
Edit	Opens the Edit Finish dialog box to edit an existing finish
Delete	Deletes the selected finish from the finishes list

4. To add a finish, click **New**; to edit an existing finish, select it and click **Edit**.
The Edit Finish dialog box opens.



Parameter	Description
Key	Displays the ID that appears in the Room Finish Legend and Room Finish Schedule
Description	Displays the specification text that appears in the Room Finish Legend

- 5. Enter information to add a new room finish, or edit the desired fields to change an existing room finish.
- 6. Click **OK** to add or edit the finish and return to the Edit Room Finishes dialog box.
- 7. When all editing is complete, click **OK** to close the Edit Room Finishes dialog box.
- 8. Click **OK** again to close the Assign Room Finishes dialog box.

Assigning a Room Finish

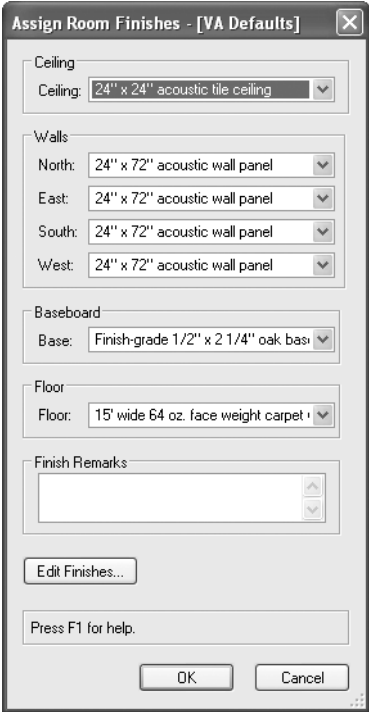
Product: Architect

Room finishes can be applied to space objects (see “Creating Spaces with the Space Tool” on page 27). The information displays in the Room Finish Schedule and in the Room Finish Legend (see “Records and Schedules” on page 371).

To assign finishes to a space object:

- 1. Click on an existing space object.
- 2. In the Object Info palette, click **Assign Room Finishes**.

The Assign Room Finishes dialog box opens.



Parameter	Description
Title Bar	Displays the name of the current preference set
Ceiling	Lists all of the defined finish items for ceilings
North, East, South, and West Walls	Lists all of the defined finish items for each wall
Base	Lists all of the defined finish items for baseboards
Floor	Lists all of the defined finish items for floors
Finish Remarks	Allows entry of additional remarks about the finishes
Edit Finishes	Opens the Edit Room Finishes dialog box (see “Creating, Editing, and Deleting Room Finishes” on page 34)

3. Select the desired finishes for each part of the room.
4. Click **OK**.
The information is associated with the selected space object.
5. On the Object Info palette, click **On Schedule** to add the finish information to the Room Finish Schedule.
6. The Room Finish Schedule can be added to the drawing from the **VA Create Schedule** command or the Resource Browser. From the Resource Browser, open the Libraries\Defaults\Reports~Schedules\Architectural Reports.vwx file that is included with Architect. Drag the Room Finish Schedule worksheet to the drawing. The worksheet is populated with information from the objects in the current drawing. (See “Creating Schedules” on page 378.)



7. To add a legend for the Room Finish Schedule, use the **Create Rm Finish Legend** command (see “Creating a Room Finish Legend” on page 380).

GSA Data

Product: Architect

The General Services Administration in the United States has set out deliverables standards that require that projects be delivered in IFC format. In addition, they require that certain additional GSA-specific data be included with spaces.

To specify GSA data for a space object:

1. Click on an existing space object.
2. In the Object Info palette, click **Use GSA Data**, and then click **Set GSA Data**.

The GSA Space Data dialog box opens.

Parameter	Description
Organization Abbreviation	Sets the federal agency abbreviation for the organization that will occupy the space
Organization Code/Name	Sets the federal agency code and name for the organization that will occupy the space
Sub-Organization Code	Sets the federal sub-agency code for the organization that will occupy the space



Parameter	Description
Billing ID	Sets the billing code for the organization that will occupy the space
STAR Space Type	Sets the GSA code that describes the usage of the space (kitchen, conference room, etc.); a description of the code displays to the right
STAR Space Category	Sets the GSA category for the space; the numeric code for the category displays to the right
Security Zone	Sets the GSA zone for the space, as related to building security
Preservation Zone	Sets the GSA zone for the space, as related to historical preservation
Privacy Zone	Sets the GSA zone for the space, as related to privacy
Project-Specific Zones	Specifies one or more zones specific to this project

3. Enter the GSA data for the space object and click **OK**.
4. When the drawing is complete, select **Export > Export IFC Data** to save the file in IFC format.

Creating Walls from Spaces

Product: Architect

Once the floor plan has been developed with multiple spaces, the interior and exterior walls can be automatically created.

To create walls from spaces:

1. Ensure that space objects are present in the drawing. To automatically create walls with a 3D height, specify a delta-Z value for the design layer where the walls will be created.
2. Select **AEC > Space Planning > Create Walls from Spaces**. The Create Walls from Spaces dialog box opens. Specify the style of walls to create and their location.

Create Walls from Spaces

☐ Create Walls From Selected Spaces Only

Source Layer: Design Layer-1

Destination Layer: Design Layer-1

Place Exterior Walls: Along Inside of Spaces

Exterior Wall Style: Ext-2x4-Brick veneer

Interior Wall Style: Ext-2x4-Brick veneer

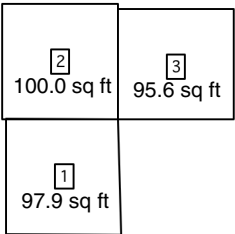
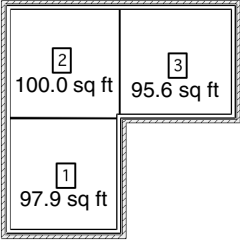
☒ Constrain straight walls to vertical or horizontal

If they are within: 5 degrees of vert/hor

☐ Combine colinear interior walls

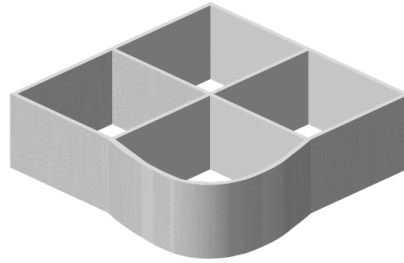
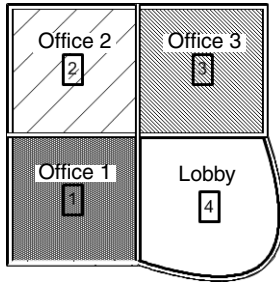
Press F1 for help.

OK Cancel

Parameter	Description
Create Walls from Selected Spaces Only	Select to allow walls to be created from selected spaces; deselect to create walls from all the spaces in the source layer
Source Layer	Specifies the layer containing the space objects
Destination Layer	Indicates the layer on which to create the walls
Place Exterior Walls	Select how to align the exterior walls with the spaces
Along Inside of Spaces	Creates the exterior walls along the inside of the space polylines; select this option if the spaces represent the gross area
Along Outside of Spaces	Creates the exterior walls along the outsides of the space polylines; select this option if the spaces represent the net area
Along Centerline of Spaces	Creates the exterior walls centered along the outside edges of the space polylines
Using Wall Control Offset	Creates exterior walls that are offset as determined by the Exterior Wall Style
Exterior / Interior Wall Style	Select a wall style for the exterior and interior walls from either the default resources or the current file's resources; see "VectorWorks Design Series Default Resources" on page 570
Constrain Straight Walls	Select to create straight vertical or horizontal walls out of spaces that are not perfectly vertical or horizontal
If they are within ___ degrees of vert/hor	<p>Indicates the threshold for constraining walls; walls that deviate from vertical or horizontal within the number of degrees specified are automatically straightened</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Original spaces not drawn straight</p> </div> <div style="text-align: center;">  <p>Resulting walls constrained horizontally and vertically</p> </div> </div>
Combine Colinear interior walls	Select to draw multiple, colinear interior walls as a single wall

The available wall styles are defined by wall style resources (see "Using Wall Styles" on page 55).

- Click **OK** to create the walls on the destination layer.



Exterior and interior walls are applied automatically to the spaces. Round walls approximating the curves are used for Bézier and cubic spline vertices in the space objects.

- After the walls are created, the original space objects can still be modified. To update the walls to conform to the new spaces, select the **Create Walls from Spaces** command again. This reshapes existing walls and adds new walls where necessary, but does not interrupt any wall design development that may already have been accomplished. For example, if windows and doors were inserted and configured, they will remain in place when the walls are regenerated.

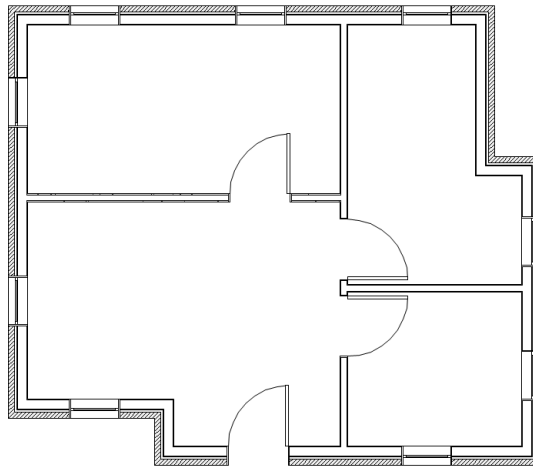
Creating Spaces from Walls

Product: Architect

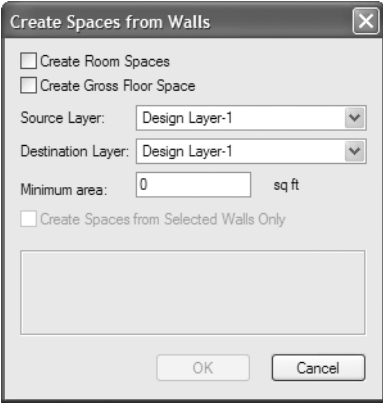
Another approach to creating floor plans is to start the design by creating walls, and then automatically create spaces to determine the area of each room or the gross area defined by the wall perimeter.

To create spaces from walls:

- Create the walls and ensure that they are properly joined.

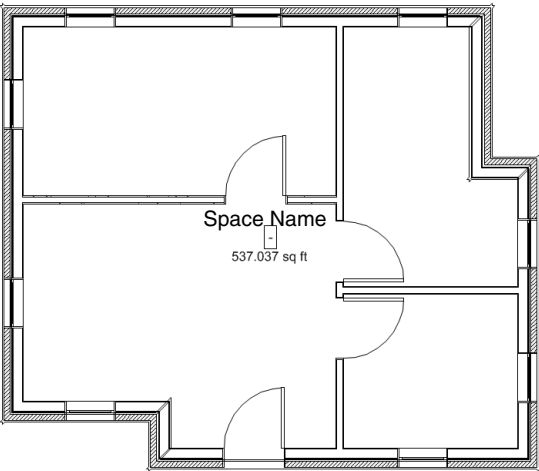


- Select **AEC > Space Planning > Create Spaces from Walls**. The Create Spaces from Walls dialog box opens. Specify how to create the spaces, the minimum area for creating spaces, and their location.



Parameter	Description
Create Room Spaces	Creates space objects for each room defined by the walls in the source layer
Create Gross Floor Space	Creates a single space object equivalent to the entire outer boundary of the walls in the source layer
Source Layer	Specifies the layer that contains the walls
Destination Layer	Indicates the layer on which to create the spaces
Minimum area	Specifies the threshold for creating a space; spaces will be created only for areas above this value
Create Spaces from Selected Walls Only	Creates spaces only from selected walls; deselect to create spaces from all the walls in the source layer

3. Click **OK** to create the spaces on the destination layer.





Spaces are created for all areas enclosed by walls, or for the gross area defined by boundary of the walls. Default room name information is set and should be edited to complete the floor plan (see “Space Properties” on page 30).

After the spaces are created, the original walls can still be modified. To update the spaces to conform to the new walls, select the **Create Spaces from Walls** command again. The existing spaces are reshaped without losing any space parameters that have already been specified.

If the original spaces were not drawn perfectly straight, select the **Create Walls from Spaces** command with the **Constrain Straight Walls** option. Now that the walls are straight, select the **Create Spaces from Walls** command to straighten the spaces.

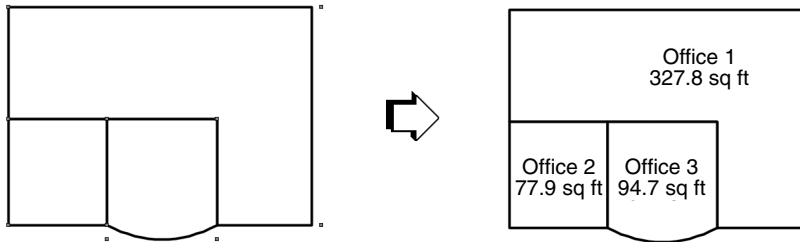
Creating Spaces from Polylines

Product: Architect

During the initial stages of a design, it may be easier to work with polylines instead of spaces. Use the **Modify > Add/Clip/Intersect/Combine into Surface** commands to modify the polylines to create the desired shapes. Once the polyline shapes are finalized, convert them into spaces to take advantage of the additional features that space objects provide, such as labels, area calculations, room finishes, and so on.

To convert polylines into spaces:

1. Select the polylines to convert into spaces. This command also converts rectangles, rounded rectangles, polygons, arcs, circles, and ovals into spaces.
2. Select **AEC > Space Planning > Create Spaces from Polys**. The selected items are converted into spaces.



Another option is to draw a polyline and then select the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441 in the VectorWorks Design Series User’s Guide and “Creating Polylines” on page 212 in the VectorWorks Fundamentals User’s Guide).

Getting Floorplan Information from a Solid Model

Product: Architect

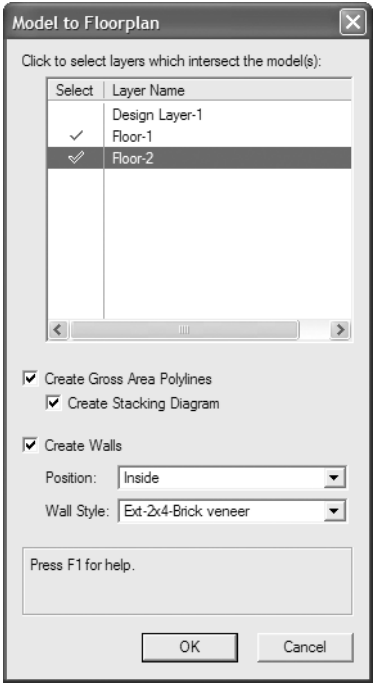
If a solid model has been used to develop a massing study, VectorWorks Architect can extract information from the model to begin work on the floorplans. Specifically, gross area polylines can be created automatically for each building level directly from the solid model with the **Model to Floorplan** command. A stacking diagram can display the sum of the areas of these polylines, which makes it easy to determine the amount of floor area provided by a solid model before creating the floorplans. In addition, exterior walls can be created automatically. If the model changes after the polylines and walls are created, run the **Model to Floorplan** command again to update the polylines and walls.

The **Model Setup** command must be run prior to using the **Model to Floorplan** command.

To create a floorplan from a model:

- 1. Select the model. The solid model should be a CSG solid (addition, subtraction, union), solid primitive (sphere, hemisphere, cone, cylinder), extrude, or multiple extrude.
- 2. Select **AEC > Space Planning > Model to Floorplan**.

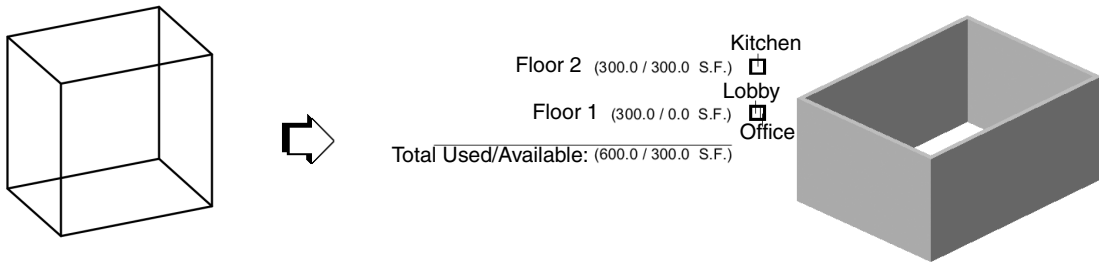
The Model to Floorplan dialog box opens. Specify the layers to include and set the type of floorplan elements to create.



Parameter	Description
Layer list	Lists the layers with heights that intersect the solid. Select the design layer(s) to include in the floorplan, and deselect layers, such as sheet layers or site model layers, which should not be included in the floorplan. A selected layer displays with a check mark.
Create Gross Area Polylines	For each selected layer, creates a polyline from the exterior perimeter of the model
Create Stacking Diagram	Creates a stacking diagram showing the available area on each layer (see “Creating a Stacking Diagram” on page 50)
Create walls	Creates walls based on the model perimeter
Position	Creates exterior walls based on the model perimeter, along the inside, outside, or center of the perimeter
Wall Style	Specify a wall style to use for the exterior walls from either the default resources or the current file’s resources; see “VectorWorks Design Series Default Resources” on page 570



- Click **OK** to create the floorplan objects. If selected, polylines, walls, and a stacking diagram are placed on the drawing. To update the floorplan objects based on model changes, select the **Model to Floorplan** command again.



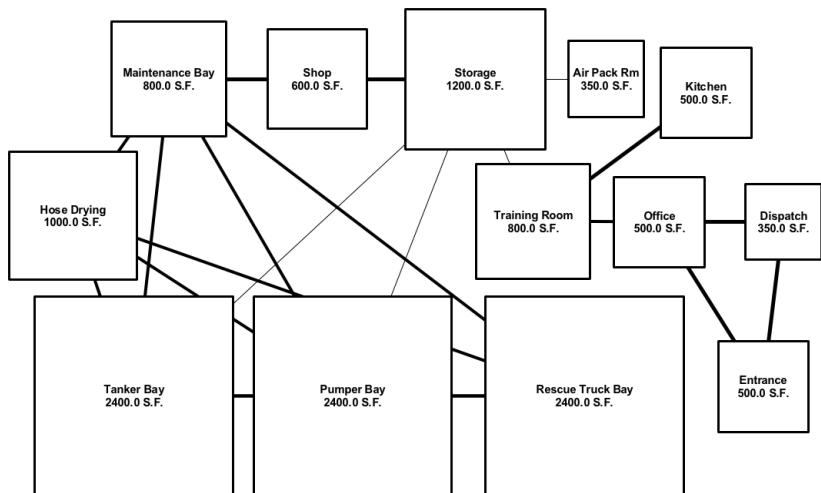
Programming Studies

Product: Architect

VectorWorks Architect provides several tools for creating and managing space programming study information in both tabular and graphical formats, including an adjacency matrix, bubble diagram, and stacking diagram.

In an adjacency matrix worksheet, information is used to automatically create the following items in the drawing:

- a bubble diagram, containing: space objects for each space in the matrix, with the appropriate area and department information, and space links connecting the spaces, with line weights indicating the strength of the relationship between the spaces
- an adjacency matrix diagram
- an adjacency score object, showing the total lengths of all the space links
- a stacking diagram



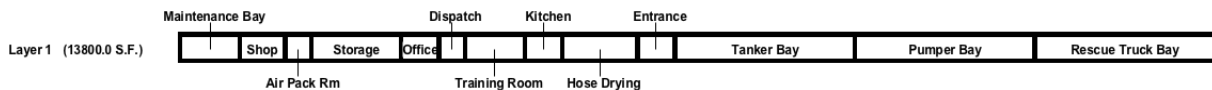
Bubble diagram

Maintenance Bay	5
Shop	5
AirPack Room	1
Storage	5
Office	5
Dispatch	5
Training Room	5
Kitchen	5
Hose Drying	5
Entrance	5
Tanker Bay	5
Pumper Bay	5
Rescue Truck Bay	5

Adjacency matrix

Score: 61940

Adjacency score



Stacking diagram

The space objects are square when they are first created, but they can be reshaped with the **2D Reshape** tool. The spaces can be repositioned to create clusters of related spaces.

Creating an Adjacency Matrix

Product: Architect

Adjacency matrices specify, in tabular format, the spaces and area requirements that must be incorporated into a design. In addition, the relationships among the various spaces are identified. Spaces which should be located next to each other are strongly related, while spaces which can or should be separated have a weak relationship.

An adjacency matrix is typically developed in a spreadsheet program and imported into VectorWorks. An adjacency matrix can also be created in a VectorWorks worksheet, exported as a tab-delimited file, and then imported back into VectorWorks to create an adjacency matrix.

Creating an Adjacency Matrix Worksheet

Product: Architect

To create an adjacency matrix worksheet in VectorWorks:

1. From the Resource Browser **Resources** menu, select **New Resource** and then select **Worksheet**. See “Creating Worksheets” on page 563 in the VectorWorks Fundamentals User’s Guide.
2. Create the adjacency matrix, using every other row for space names and areas, and alternate rows for specifying the relationships among the spaces.



	A	B	C	D	E	F	G	H	I	J	K	L
1	Space Name	Area										
2												
3	Maintenance Bay	800										
4			5									
5	Shop	400										
6			5		5							
7	Air Pack Room	100		1								
8												
9	Storage	100										
10			1									
11	Office	200								4		
12											4	
13	Dispatch	150										4
14			5						1			
15	Training Room	300		4								
16												
17	Kitchen	300										
18			5									
19	Hose Drying	300				5						
20					4							
21	Entrance	100		4								
22												
23	Tanker Bay	1500		4								
24												

Any third-party spreadsheet program that can save a tab- or comma-delimited text file can be used to create the adjacency matrix. Ensure that there is at least one cell containing data on each spreadsheet row. Certain spreadsheet programs do not export rows without data, which could disrupt the expected sequence of data in the file as it is imported into VectorWorks.

- 3. Click **File > Export > Export Worksheet** to export the worksheet as a tab- or comma-delimited file.



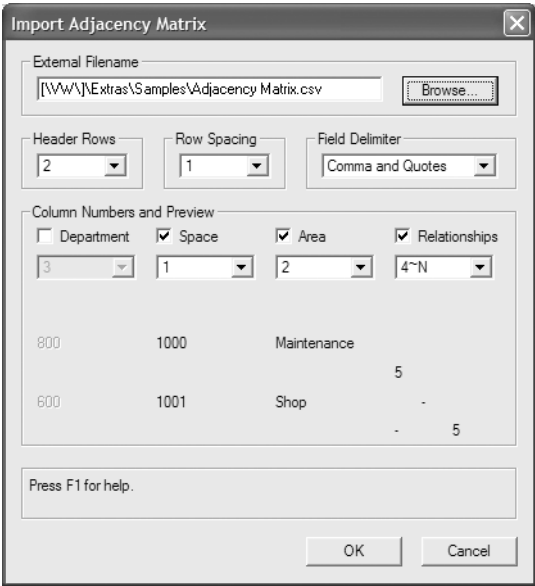
- 4. Click **OK** and specify the name and location of the file.

Importing an Adjacency Matrix Spreadsheet

Product: Architect

To import an adjacency matrix:

- 1. Ensure that the file to be imported is a tab- or comma-delimited file.
- 2. Select **AEC > Space Planning > Import Adjacency Matrix**. The Import Adjacency Matrix dialog box opens. Specify the adjacency matrix file import options.



Parameter	Description
External Filename	Enter the name of the adjacency matrix file or click Browse to specify its location; a sample file is specified by default
Header Rows	Specifies the number of rows in the spreadsheet that do not include space or space relationship information
Row Spacing	Set this to 0 (zero) if there is a space name on every row or set this to 1 if there is a space name on every other row in the drawing file
Field Delimiter	Specifies the delimiter that was used to separate fields for the spreadsheet
Column Numbers and Preview	Specifies the columns to include in the adjacency matrix as well as their position
Department	Select to include department number information and specify its column number
Space	Select to include area name information and specify its column number
Area	Select to include the space area information and specify its column number
Relationships	Select to include the space relationship information and specify its column number
Preview	Displays the data in the selected columns

3. Click **OK** to import the adjacency matrix. If this is the first time an adjacency matrix, stacking diagram, spaces, or space links are placed in the file, the object properties dialog box opens for each type of object. Accept the default values and click **OK**.



Inserting an Adjacency Matrix

Product: Architect

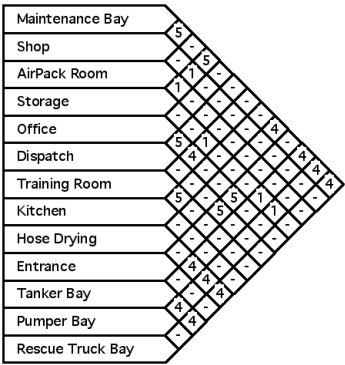
An adjacency matrix diagram can also be created manually with the **Adjacency Matrix** tool, based on spaces and space relationships currently in the file.



To insert an adjacency matrix diagram:

1. Click the **Adjacency Matrix** tool from the Space Planning tool set.
2. Click at the desired location for the adjacency matrix.
3. Click again to set the matrix rotation. If this is the first time an adjacency matrix diagram is placed on the drawing, the object properties dialog box opens. Specify the default preferences, which apply to all adjacency matrix diagrams placed subsequently in this drawing. Properties can be edited later in the Object Info palette. Click **OK**.

The adjacency matrix is created.



If no space objects currently exist in the drawing, an adjacency matrix place holder is created.

Adjacency Matrix Properties

Product: Architect

The adjacency matrix is more than just a presentation graphic, because it dynamically shows what is in the drawing. The adjacency matrix updates automatically when spaces or space links change.

The **Rotation**, **Height Scale** and **Width Scale** parameters of an adjacency matrix can be edited in the Object Info palette.

To adjust the order of adjacency matrix spaces, change the **Matrix Order** number in the Object Info palette for the relevant space object (see “Space Properties” on page 30).

Creating a Bubble Diagram

Product: Architect

A bubble diagram is a graphical view of the data from a space planning spreadsheet. Spaces are connected by space links that represent the relationships among the spaces. Thick links indicate a strong relationship between the spaces, while weak relationships are drawn with thin lines. The efficiency of the bubble diagram layout can be determined by calculating its adjacency score.



A bubble diagram is inserted into a drawing automatically when an adjacency matrix is imported (see “Importing an Adjacency Matrix Spreadsheet” on page 46). A bubble diagram can also be created manually by linking spaces with the **Space Link** tool.

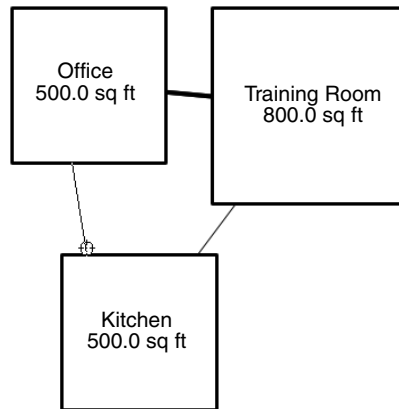
Linking Spaces

Product: Architect



To link spaces:

1. Create spaces as described in “Creating Spaces with the Space Tool” on page 27.
2. Click the **Space Link** tool from the Space Planning tool set.
3. Click on the first space to link, and then on the second space. The space link is automatically created.



Space Link Properties

Product: Architect

The space links update dynamically as the spaces are moved around in the drawing.

To change the strength of a link, select it and change the **Strength** value (from 1 to 18) in the Object Info palette.

Calculating the Adjacency Score

Product: Architect

The adjacency score object displays a numerical value that represents the efficiency of the space layout. The score value is determined by first multiplying the link length times strength for each space link, and then calculating the sum of these values for all the space links in the file. The lower the score, the more efficient the layout.



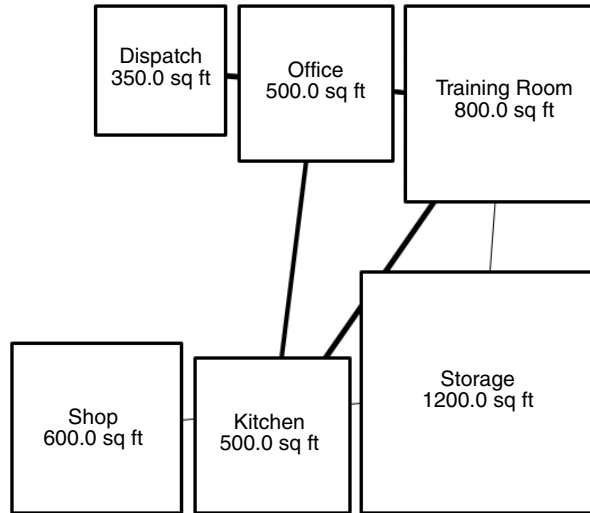
To insert an adjacency score object:

1. Click the **Adjacency Score** tool from the Space Planning tool set.
2. Click in the document to set the object location.
3. Click a second time to set the object rotation.

If spaces or space link objects are deleted, the adjacency score object value is not automatically updated. Slightly move any space or adjacency score object in the document to reset the adjacency score object value.



Score: 11085



Creating a Stacking Diagram

Product: Architect

A stacking diagram provides a floor-by-floor representation of the total amount of area taken up by all the spaces on the floors. It is useful for balancing the allocation of spaces among several floors.

A stacking diagram is inserted into a drawing automatically when an adjacency matrix is imported (see “Importing an Adjacency Matrix Spreadsheet” on page 46). A stacking diagram can also be inserted manually with the **Stacking Diagram** tool. The stacking diagram is based on spaces and space relationships currently in the file.

Inserting a Stacking Diagram

Product: Architect



To insert a stacking diagram:

1. Click the **Stacking Diagram** tool from the Space Planning tool set.
2. Click at the desired location for the stacking diagram. Click again to set the diagram rotation. If this is the first time a stacking diagram is placed on the drawing, the object properties dialog box opens. Specify the default preferences, which apply to all stacking diagrams placed subsequently in this drawing. Properties can be edited later in the Object Info palette. Click **OK**.
3. The stacking diagram is created.

The layers are “stacked” on the basis of their layer Z values, which can be changed in the Organization dialog box (**Tools > Organization**).

If no space objects currently exist in the drawing, a stacking diagram place holder is created.



Stacking Diagram Properties

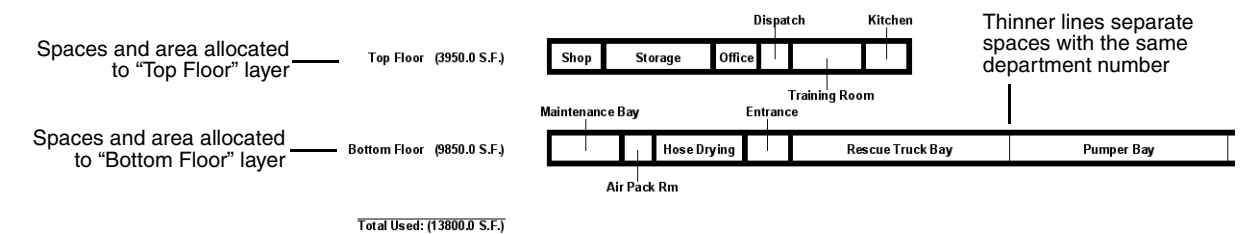
Product: Architect

Like the adjacency matrix, the stacking diagram dynamically shows what is in the drawing. The stacking diagram updates automatically when spaces or space links are changed. In addition, fill attributes assigned to spaces are reflected in the stacking diagram automatically.

The **Rotation**, **Height Scale** and **Width Scale** parameters of an adjacency matrix can be edited in the Object Info palette. In addition, the **Gap Scale** parameter controls the distance between the stacking diagram rows. **Show Totals** toggles the display of the total amount of space used.

The stacking diagram is arranged in rows that correspond to the layers of the drawing. The spaces present in each layer are shown in separate rows; the layer name and total area used are displayed to the left of each row.

Spaces in the stacking diagram are grouped by **Department** name (set for each space in the Object Info palette). Adjacent spaces with the same **Department** name are separated by thin lines.



Creating Architectural Drawings

Once a VectorWorks Architect drawing file has been set up according to standards, and space planning and programming has established the floorplan, Architect tools are used to create the walls, roof, and framing elements.

Some of the Architect tools and commands are similar to those available in the standard VectorWorks program, but with extended capabilities required for architectural design. Certain commands which display in the **Model > AEC** menu in VectorWorks are also located in the **AEC** menu in the VectorWorks Architect workspace, but they may have enhanced functionality in Architect.

VectorWorks	VectorWorks Architect (or Landmark)
Model > AEC > Pillar	AEC > Pillar (or Landmark > AEC > Pillar)
Model > AEC > Floor	AEC > Floor (or Landmark > AEC > Floor)
Model > AEC > Roof Face	AEC > Roof Face (or Landmark > AEC > Roof Face)
Model > AEC > Create Roof	AEC > Create Roof (or Landmark > AEC > Create Roof)
Modify > Create Polys from Walls	AEC > Create Polys from Walls (or Landmark > AEC > Create Polys from Walls)
Modify > Create Walls from Polygon	AEC > Objects from Polyline, with extended capabilities in VectorWorks Architect
Wall tool and Round Wall tool located in the Walls tool set	Wall tool and Round Wall tool, located in the Building Shell tool set, with extended capabilities in VectorWorks Architect

Creating Walls in Architect

Product: Architect

VectorWorks Architect uses the same straight and round wall tools that are part of VectorWorks Fundamentals, but with expanded capabilities. Additional wall parameters are available only in VectorWorks Architect. Architect also adds the ability to create, save, and use wall styles and to create new wall or component classes during wall creation and editing. See “Creating Walls” on page 471 in the VectorWorks Fundamentals User’s Guide.

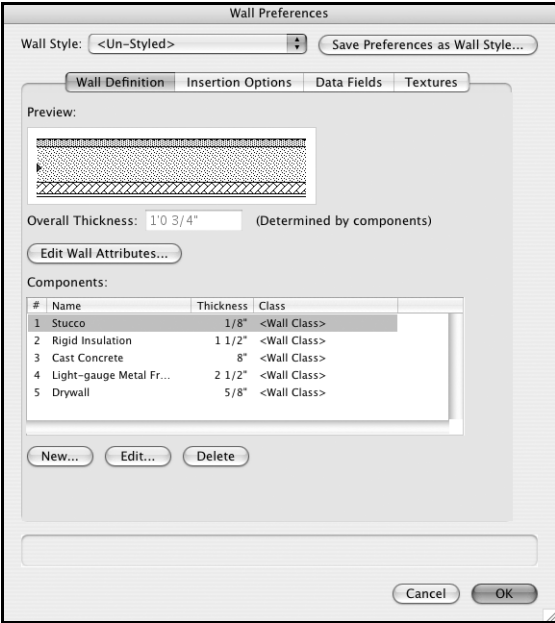
Walls in Architect can also be created by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).



To create walls in VectorWorks Architect:

1. Click the **Wall** or **Round Wall** tool from the Building Shell tool set.
2. To draw with an unstyled wall, select <Un-Styled> from the Wall Style list on the Tool bar. If the desired styled wall resource has already been created, select it from the Tool bar list or double-click on the resource in the Resource Browser. Proceed to Step 7.
3. To create or edit a wall style, or change the parameters of an un-styled wall, click the **Wall Preferences** mode button.

The Wall Preferences dialog box opens. This dialog box can be accessed any time afterward to modify default wall settings. Walls can also be drawn first, and then the parameters can be set later from the Object Info palette. Most of the parameters in the Wall Preferences dialog box are documented in “Creating Walls” on page 471 in the VectorWorks Fundamentals User’s Guide. Only the parameters that apply to VectorWorks Architect are described here.

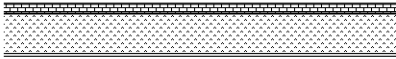


Parameter	Description
Wall Style	Select a wall style for the wall; see “Using Wall Styles” on page 55. Alternatively, select <Un-Styled> to create the wall without linking the parameters to a wall style.
Save Preferences as Wall Style	Opens the Assign Name dialog box; enter a wall style name and click OK (see “Creating Wall Styles” on page 55)

4. Click **New** to specify wall components.

In Architect, wall components can be assigned to a class; this allows maximum flexibility since the component classes can be shown or hidden separately from the wall class. By default, components are assigned to the wall class.

When a component is in an invisible class, its fill and lines are hidden. Invisible components on the interior and exterior of a wall cause the wall’s lines and fill to adjust to the visible components only, making the wall appear thinner than its actual width. This allows walls to show only their structural components, for example. If all components are invisible, the wall displays at its full thickness, without components.



Wall with all components visible



Wall with only structural component visible



Wall with only finish components visible

5. Click the Data Fields tab to specify wall record information, which can be included in a wall style schedule. These fields are optional; enter text only where desired.
6. When the wall parameters have been specified, and any changes saved as a wall style resource if desired, click **OK**.
7. A saved or selected wall style is saved as a resource in the file, and appears in the Resource Browser and in the Wall Style list on the Tool bar.
8. Click at the desired location to start drawing.
9. Click to end the segment and begin another, or double-click to end the wall.

Using Wall Styles

Product: Architect

Un-styled walls can be used in Architect. The use of wall styles, however, facilitates drawing walls by saving the wall preferences settings so that they can be easily applied to other walls. Wall styles are resources that can be imported into other files and shared as office standards. Wall styles, textures, and hatches are provided as default resources (default resources are automatically imported into the current file at the point of use and display in the Resource Browser; see “VectorWorks Design Series Default Resources” on page 570).

If a selected wall style’s parameters are edited, the wall style automatically changes to un-styled, indicating that the edited style must be saved as a new style to save changes (alternatively, the changes can be applied as an un-styled wall, and not get saved).

The basic properties of a styled wall (such as wall height and caps) can be changed from the Object Info palette without requiring a new style definition.

Unused wall styles can be purged; see “Purging Unused Objects” on page 373 in the VectorWorks Fundamentals User’s Guide.

Creating Wall Styles

Product: Architect

To create a wall style:

1. Select the **Wall or Round Wall** tool from the Building Shell tool set, and then click **Wall Preferences** from the Tool bar.
The Wall Preferences dialog box opens.
2. To modify an existing wall style, select the **Wall Style** from either the default resources or the current file’s resources; see “VectorWorks Design Series Default Resources” on page 570. Alternatively, select Un-Styled as the wall style and set the parameters.
3. Specify the wall and component parameters as described in “Creating Walls in Architect” on page 53, and “Drawing Straight Walls” on page 472 in the VectorWorks Fundamentals User’s Guide.
4. Click **Save Preferences as Wall Style**.



The Assign Name dialog box opens.

- 5. Enter a unique name for the wall style and click **OK**.

If the wall style name already exists, you are prompted to cancel and select a different name, or replace existing walls with the wall style applied with the edited wall style. If replacing wall styles, the Wall Replacement dialog box opens; specify the wall alignment properties.

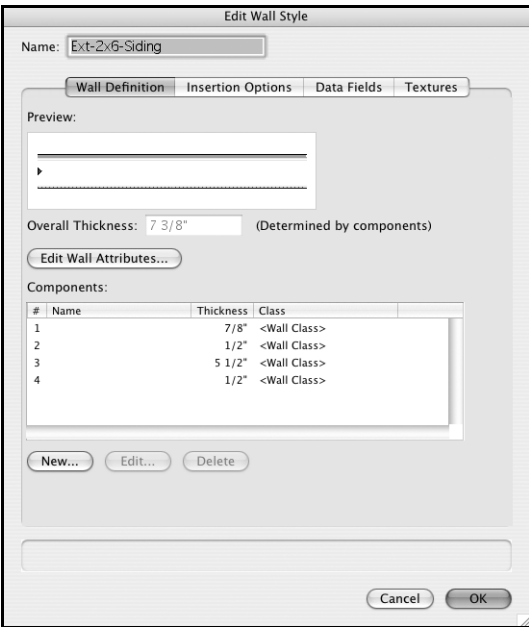
- 6. The new wall style is saved with the file and is listed under Wall Styles in the Resource Browser as well as the Wall Style list in the Tool bar.
- A new wall style can also be created by clicking **New Resource > Wall Style** from the Resources menu in the Resource Browser. A wall style created in this way is not associated with the current wall preference setting, but can be applied later.
- 7. Worksheets listing the current wall styles and wall areas in the drawing can be added to the drawing from the **VA Create Schedule** command or the Resource Browser. From the Resource Browser, open the Libraries\Defaults\Reports~Schedules\Architectural Reports.vwx file that is included with Architect. Drag the Wall Area and/or Wall Style Report worksheet to the drawing. The worksheet is populated with information from the objects in the current drawing.

Editing Wall Styles

Product: Architect

To edit a wall style:

- 1. Select the wall style from the Resource Browser and click **Edit** from the Resources menu.
- The Edit Wall Style dialog box opens.



- 2. Edit the wall and component parameters as described in “Creating Walls in Architect” on page 53, and “Drawing Straight Walls” on page 472 in the VectorWorks Fundamentals User’s Guide.
- If a new wall style **Name** is specified, it replaces the selected wall style name.



3. Click **OK**.
4. If walls with that style already exist in the drawing, the Wall Replacement dialog box opens (see “Replacing Wall Styles” on page 58).
The wall style to apply cannot be selected (the edited style is applied). Select the wall alignment properties.
5. Click **OK** to edit the wall style.
Changes apply to any existing walls in the drawing with the edited wall style, and will be used for any subsequent walls created with that wall style.

Applying Wall Styles

Product: Architect

By a variety of methods, wall styles can be selected for a wall before drawing it, or applied to existing walls. Once a wall style has been selected for a wall, the Attributes palette is no longer available for changing wall attributes; attributes are set as part of the style.

To apply a wall style prior to drawing the wall:

1. Select the **Wall or Round Wall** tool from the Building Shell tool set.
2. Select the desired style from the Wall Style list on the Tool bar.
Alternatively, click **Wall Preferences** from the Tool bar. In the Wall Preferences dialog box, select the **Wall Style** from either the default resources or the current file’s resources; see “VectorWorks Design Series Default Resources” on page 570.

To apply a wall style from the Resource Browser prior to drawing the wall:

1. Ensure that no walls are selected.
2. Select a wall style in the Resource Browser, and click **Apply** from the Resources menu.
Alternatively, double-click on the wall style in the Resource Browser.
3. The **Wall** tool is automatically made active and the selected wall style is applied to the wall as it is drawn. (If a round wall is desired, select the **Round Wall** tool from the Building Shell tool set.)

To apply a wall style to an existing wall from the Object Info palette:

1. Select one or more walls.
2. From the Object Info palette, select the wall **Style** from either the default resources or the current file’s resources; see “VectorWorks Design Series Default Resources” on page 570.

To apply a different (default) style, select **Replace** (see “Replacing Wall Styles” on page 58).

To apply a wall style to an existing wall from the Resource Browser:

1. Select one or more walls.
2. Select the wall style from the Resource Browser and click **Apply** from the Resources menu. Alternatively, drag the selected wall style from the Resource browser to the wall and click on the wall selection.
The Wall Replacement dialog box opens (see “Replacing Wall Styles” on page 58).
3. Select the wall alignment properties. The wall style list is disabled (the style selected in the Resource Browser is applied).



A styled wall can be converted to an un-styled wall.

To remove a wall style:

- 1. Select one or more walls to un-style.
- 2. From the Object Info palette, select **Convert to Un-Styled Wall**.

The wall is released from its style; its attributes can be edited from the Attributes palette.

Replacing Wall Styles

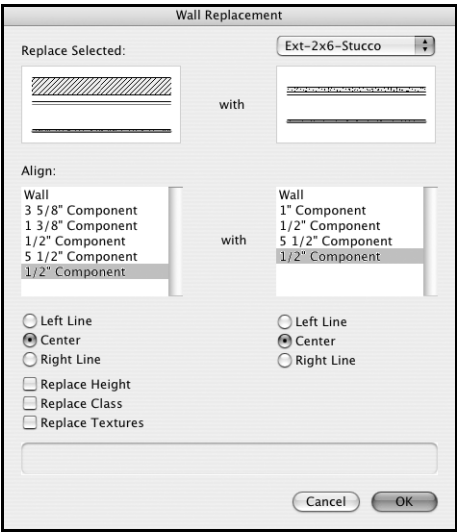
Product: Architect

Wall styles applied to existing walls can be replaced with a different wall style.

To replace a wall style:

- 1. Select one or more walls.
- 2. From the Object Info palette, select Replace from the **Style** list.

The Wall Replacement dialog box opens. Specify the new wall style, and then select a component (or the wall) from the current and replacement structure lists. Specify the alignment option for each selection; the preview updates, with a red line showing the replacement alignment.



Parameter	Description
Wall style list	From the list, select the wall style that will replace the current style
Previews	The left preview shows the current wall style, and the right preview shows the replacement wall style selected in the wall style list. Preview walls are drawn from left to right, so the “top” of the preview, by default, indicates the left part of the wall as it will be drawn.
Align lists	On the left, the current wall structure is listed; the right list displays the replacement wall structure. Select one wall component from each list and specify its alignment options. The previews update with red lines to show how the replacement wall will align with the current wall.



Parameter	Description
Alignment options	Select an option for aligning the current structure to the replacement structure
Replacement options	Select whether to replace the current settings for wall height, class, and texture (RenderWorks required for textures) with those of the new wall

If walls with different wall styles were selected for replacement, the current wall preview is blank and components are not listed. Wall alignment can only occur for the left, center, or right of the selected wall(s).

- Click **OK** to replace the wall style of the selected wall(s).

Moving Connected Walls

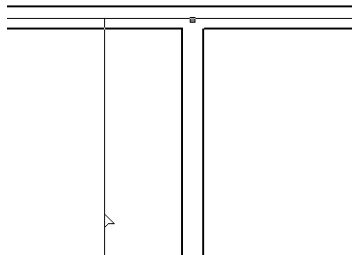
Product: Architect, Landmark, and Spotlight

The **2D Selection** and **3D Selection** tools have an additional mode, **Enable Connected Walls**, in the Design Series. This mode automatically maintains the connection between the wall being moved and adjoining walls. The involved wall angles remain constrained throughout the move. While dragging a wall, precise offset distances can be entered in the **Offset** field of the Tool bar.

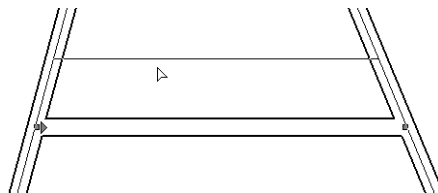


To move a wall while maintaining its connection to adjacent walls:

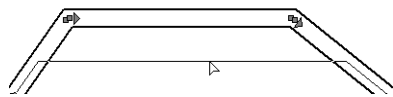
- Click the **2D Selection** or **3D Selection** tool from the Basic palette.
- Select **Enable Connected Walls** from the Tool bar.
- Click on the desired wall and drag it to a new location; the walls stay connected during the move.



When moving a wall connected between two other walls, the wall being moved is resized to maintain the connection. A wall cannot be moved beyond the ends of adjacent walls.



For corner joined walls, all involved walls are resized to maintain the connection. A wall cannot be moved in such a way that its length equals zero.

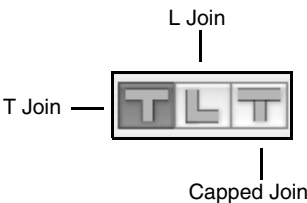


To move a collection of walls without changing the walls relative to each other, deselect the **Enable Connected Walls** mode, and then move the walls.

Joining Wall Components

Product: Architect

The **Component Join** tool joins the selected components between two straight wall segments; components within pre-existing joined wall segments can also be joined. There are three modes for joining wall components.



Mode	Description
T Join	Extends or shortens one wall component segment until it intersects with a second wall component segment
L Join	Joins the closest ends of two wall components to create a corner
Capped	Applies a capped join to the component being joined

Components can be joined to the edge of walls instead of specific components if desired, using any of the modes. The **Component Join** tool cannot be used on Y joined walls.

T Join Mode

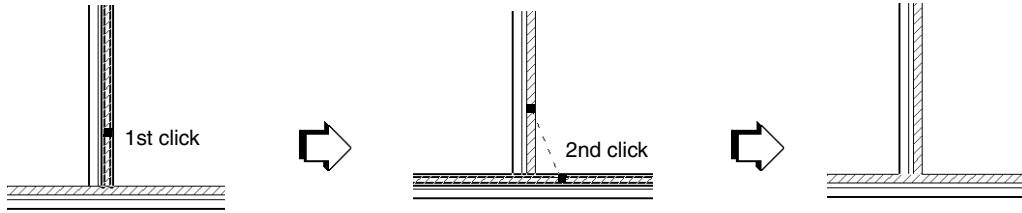
Product: Architect

The **T Join** mode extends or shortens one wall component segment until it intersects with a second wall component segment. As only the first component is extended, this mode will not create corner type joins. (For those, use the **L join** mode. See “L Join Mode” on page 61 for more information.)

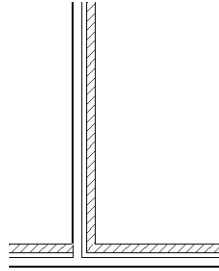


To join wall components with the **T Join** mode:

1. Click the **Component Join** tool from the Building Shell tool set.
2. Click **T Join** from the Tool bar.
3. Select the component within the wall segment to join.
4. Select the second wall segment to join. The component to be joined is highlighted.



5. Repeat steps 3 and 4 for each component within the wall segment that needs to be joined.



L Join Mode

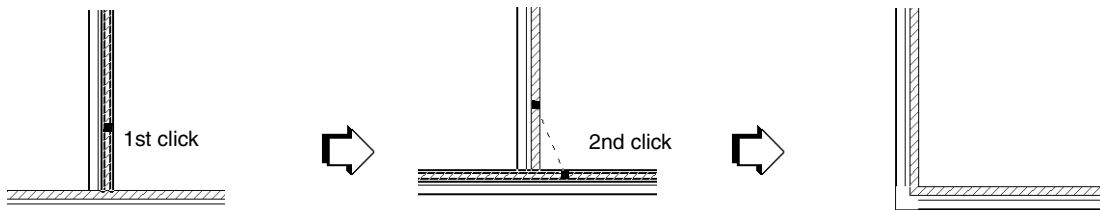
Product: Architect

The **L Join** mode joins the closest ends of two wall components to create a corner. Both component lengths are extended or shortened, as necessary, until they meet cleanly.

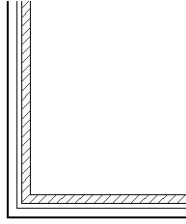


To join wall components with the **L Join** mode:

1. Click the **Component Join** tool from the Building Shell tool set.
2. Click **L Join** from the Tool bar.
3. Select the component within the wall segment to join.
4. Select the second wall segment to join. The component to be joined is highlighted.



5. Repeat steps 3 and 4 for each component within the wall segment that needs to be joined.



Capped Join Mode

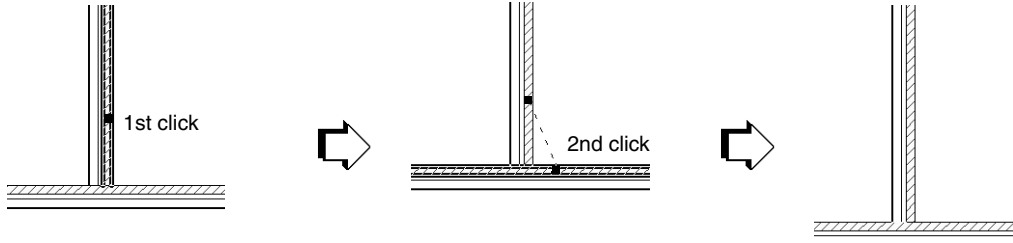
Product: Architect

Like the **T Join** mode, the **Capped Join** mode extends or shortens one wall component until it intersects with a second component. The component end is capped at the point where it joins the other wall.

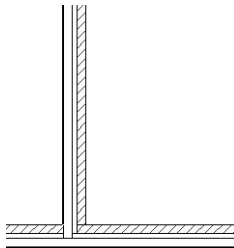


To join wall components with the **Capped Join** mode:

1. Click the **Component Join** tool from the Building Shell tool set.
2. Click **Capped Join** from the Tool bar.
3. Select the component within the wall segment to join.
4. Select the second wall segment to join. The component to be joined is highlighted.



5. Repeat steps 3 and 4 for each component within the wall segment that needs to be joined.





Hiding Wall Components

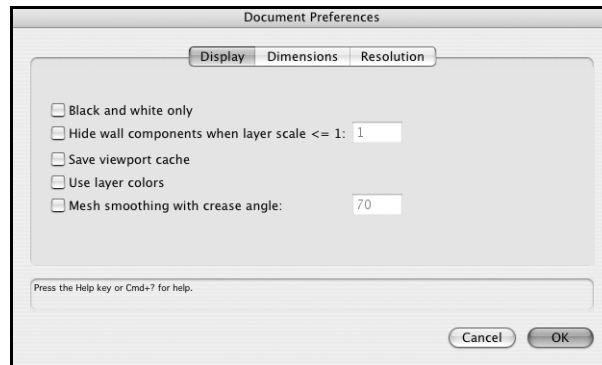
Product: Architect

The **Hide wall components** preference prevents wall components from being drawn at or below a pre-set layer scale factor, creating a cleaner drawing when printing at small scales. For example, if the scale factor is set to 1:48, components in walls do not display on any layer set to 1/4" or smaller.

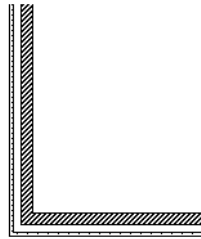
To hide wall components:

1. Select **File > Document Settings > Document Preferences**.

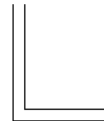
The Document Preferences dialog box opens.



2. Select **Hide wall components**. Enter a scale factor in the scale field.
3. Click **OK**.



Wall components shown at 1:2 scale



Wall components hidden at 1:48 scale

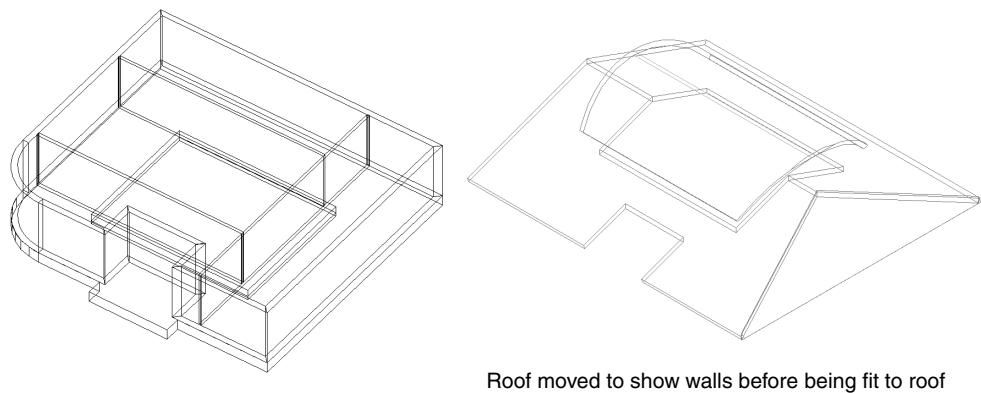
Fitting Walls to Defined Geometry

Product: Architect

VectorWorks Architect walls can be set to the layer height at creation. After creation, they can be automatically extended upward or downward to fit to defining geometry such as roofs, floors, or NURBS surfaces.

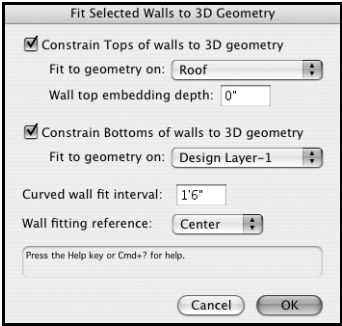
To fit walls to defined geometry:

1. Select the straight or curved wall(s) to be fit.



2. Select **AEC > Fit Walls to Roof**.

The Fit Selected Walls to 3D Geometry dialog box opens. Specify the location of the wall geometry and indicate the fit parameters.

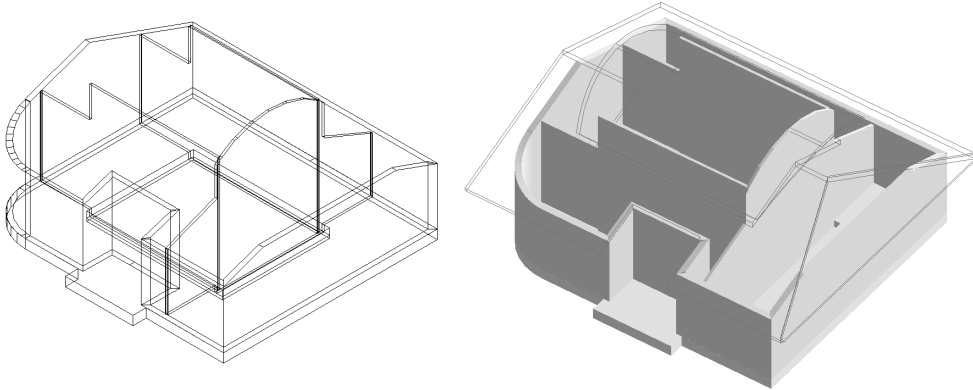


Parameter	Description
Constrain Tops of walls to 3D geometry	Fits walls to geometry at the top of the wall(s)
Fit to geometry on	Specifies the layer of the defining geometry for the tops of the wall(s); this geometry can consist of roofs, floors, slabs, 3D polygons, extrusions, or NURBS surfaces
Wall top embedding depth	Specifies the distance that the wall penetrates the geometry. This can avoid problems such as gaps; for very thick walls, a negative embedding depth may be necessary so that the wall does not protrude from the geometry.
Constrain Bottoms of walls to 3D geometry	Fits walls to geometry at the bottom of the wall(s)
Fit to geometry on	Select the layer of the defining geometry for the bottom of the wall(s)
Curved wall fit interval	For curved walls, sets the increment for fitting the wall
Wall fitting reference	Select the part of the wall to fit to the constraining geometry (Center, Left, or Right)



3. Click **OK** to fit the wall(s) to the constraining 3D geometry indicated.

Walls or portions of walls which lie outside the constraining geometry retain their height as set in the Object Info palette. Walls which have had peaks added (with the **3D Reshape** tool) do not have the peaks reset if the peaks lie outside the constraining geometry.



Adding Roof Accessories

Product: Architect

Attic, soffit, and fascia roof accessories can be inserted when a roof object is being created, or they can be added, modified, or deleted later on. If the roof is reshaped, the accessories are automatically regenerated to suit the new shape.

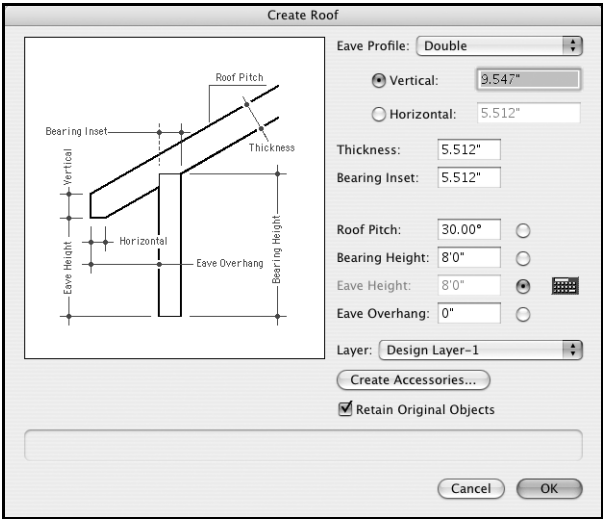
The accessories are part of the roof object. To modify or remove them later on, select the roof object, and change the accessory settings from the Object Info palette.

Roof accessories cannot be added to roof face objects. See “Creating Roof Objects” on page 500 in the VectorWorks Fundamentals User’s Guide.

To add roof accessories:

1. With the appropriate walls selected, select **AEC > Create Roof**.

The Create Roof dialog box opens.



2. Click **Create Accessories**.

The Create Roof Accessories dialog box opens.

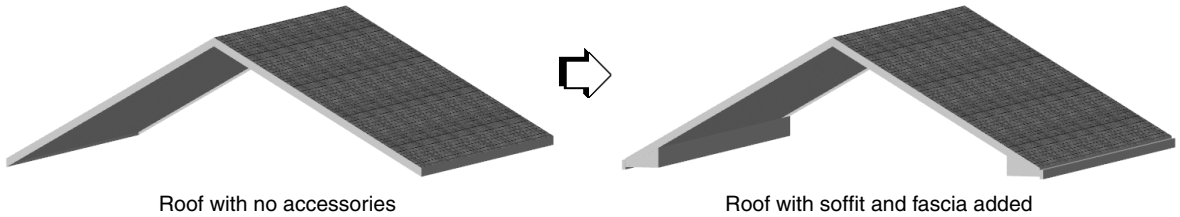


Parameter	Description
Insert Attic	Select to add an attic to the roof
Attic Settings	Opens the Edit Attic Settings dialog box for specification of attic parameters; see “Inserting an Attic” on page 67
Insert Soffit	Select to add a soffit to the roof
Soffit Settings	Opens the Edit Soffit Settings dialog box for specification of soffit parameters; see “Inserting a Soffit” on page 68
Insert Fascia	Select to add fascia to the roof
Fascia Settings	Opens the Edit Fascia Settings dialog box for specification of fascia parameters; see “Inserting Fascia” on page 68

3. Select the accessories to be added to the roof object.
4. For each selected accessory, click the corresponding settings button.
- A dialog box displays with parameters for that accessory.
5. Enter accessory parameters as described in the following sections and click **OK** to return to the Create Roof Accessories dialog box.



- Repeat steps 4 and 5 until all desired accessory parameters have been entered.
- From the Create Roof Accessories dialog box, click **OK** to return to the Create Roof dialog box; click **OK** again to create the roof object with the selected accessories.



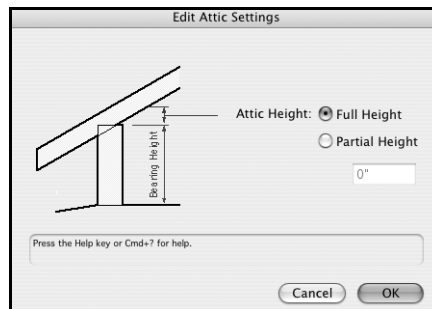
Inserting an Attic

Product: Architect

To add an attic accessory to a roof:

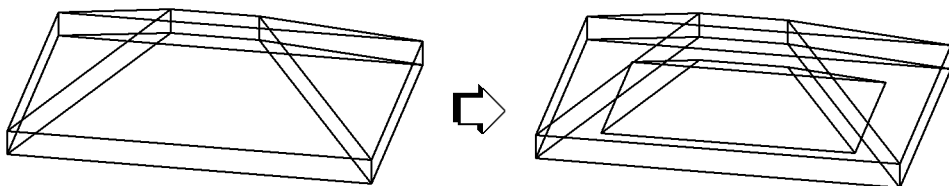
- From the Create Roof Accessories dialog box, select **Insert Attic**, and click **Attic Settings**.

The Edit Attic Settings dialog box opens.



Parameter	Description
Full Height	Specifies that the attic space is the full height of the attic area
Partial Height	Specifies that the attic space is the height entered in the box provided

- Enter the attic parameters and click **OK** to return to the Create Roof Accessories dialog box.





Inserting a Soffit

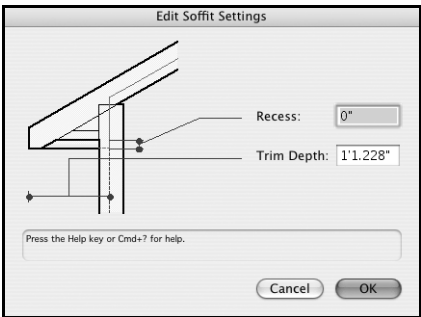
Product: Architect

The soffit accessory has a “pork chop” profile.

To add a soffit accessory to a roof:

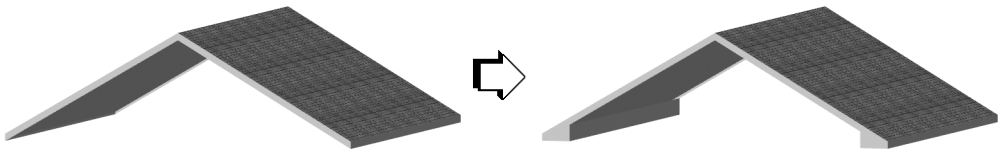
1. From the Create Roof Accessories dialog box, select **Insert Soffit**, and click **Soffit Settings**.

The Edit Soffit Settings dialog box opens.



Parameter	Description
Recess	Specifies the distance between the bottom edges of the roof rafters and the soffit
Trim Depth	Specifies the distance between the outer edges of the rafters and inside edge of the soffit

2. Enter the soffit parameters and click **OK** to return to the Create Roof Accessories dialog box.



Inserting Fascia

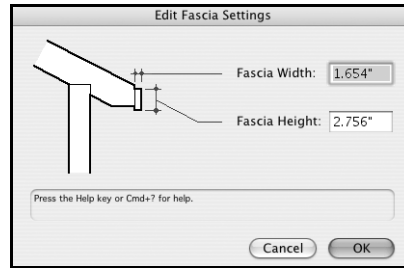
Product: Architect

The fascia accessory has a rectangular profile.

To add a fascia accessory to a roof:

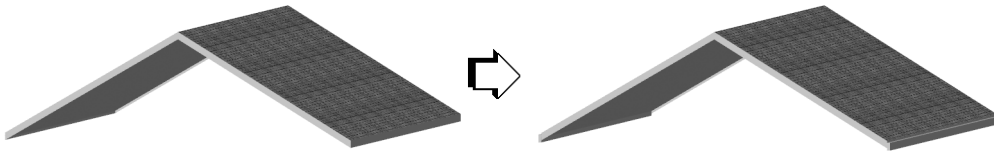
1. From the Create Roof Accessories dialog box, select **Insert Fascia**, and click **Fascia Settings**.

The Edit Fascia Settings dialog box opens.



Parameter	Description
Fascia Width	Specify a width for the fascia accessory
Fascia Height	Specify a height for the fascia accessory

2. Enter the fascia parameters and click **OK** to return to the Create Roof Accessories dialog box.



Framing

Product: Architect

Architect includes a suite of tools for developing framing plans. There are tools for framing roofs, walls, and floors. Both architects and builders can take advantage of these tools to visualize framing details while still in the design stage of a project, to generate framing detail drawings, and to develop material take-off lists. The **Simple Beam Calculator** command is also available for analysis of a simply-supported beam with a single load.

A roof face area worksheet can also be added to the drawing from the **VA Create Schedule** command or the Resource Browser. From the Resource Browser, open the Libraries\Defaults\Reports~Schedules\Architectural Reports.vwx file that is included with Architect. Drag the Roof Face Area worksheet to the drawing. The worksheet is populated with information from the objects in the current drawing.

Framing a Roof

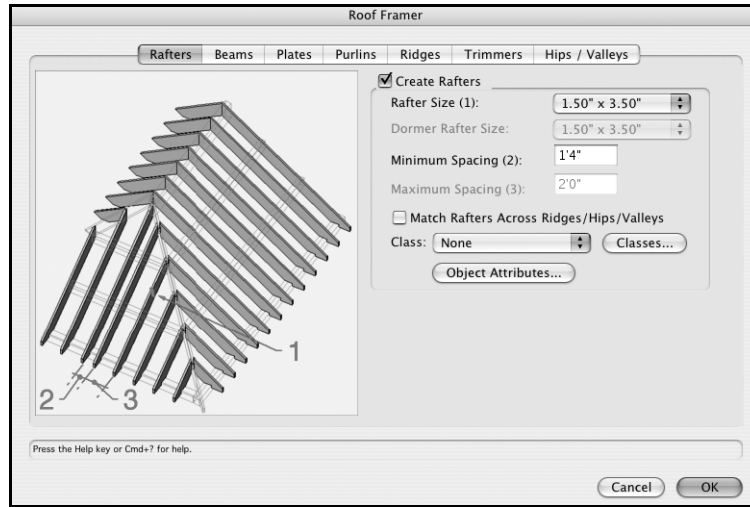
Product: Architect

A roof object can be automatically framed with rafters, beams, ridges, and other roof elements with the **Roof Framer** command. This command does not work on roof face objects.

To automatically frame a roof:

1. Select the roof object.
2. Select **AEC > Framing > Roof Framer**.

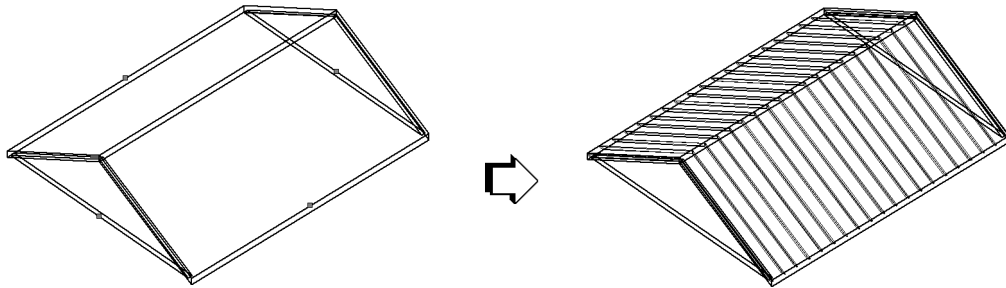
The Roof Framer dialog box opens.



3. Select the tab for the type of roof framing element to create, and select the checkbox to create the framing element. More than one type can be selected at the same time; other framing elements can be added later.

An individual framing element can be added with the **Framing Member** tool, available from the **Detailing** tool set.

4. Enter the framing parameters as described in the following sections.
5. Click **OK** to frame the roof.



Creating Rafters

Product: Architect

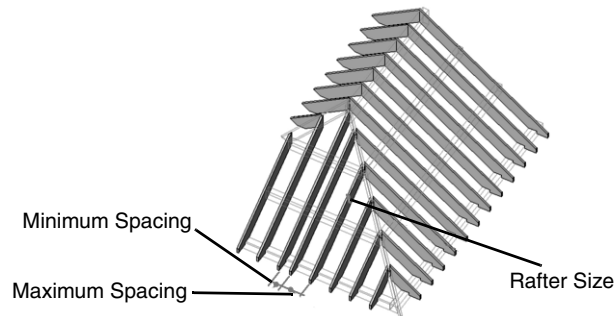
To create rafters:

1. In the Roof Framer dialog box, click the **Rafters** tab, and select **Create Rafters**.
2. Specify the rafter parameters.



Parameter	Description
Rafter Size	Specifies the rafter size in Width x Height, in current file units. Sizes can be edited by selecting Edit List (see “Custom Frame Element Sizes” on page 76)
Dormer Rafter Size	If the roof contains dormer windows, enter the size, in Width x Height, of the dormer rafters
Minimum Spacing	Specifies the minimum distance allowed between rafters
Maximum Spacing	Specifies the maximum distance allowed between rafters; for consistent rafter spacing of the entire roof, the Minimum and Maximum Spacing values should be equal
Match Rafters across Ridges/Hips/Valleys	Select to ensure that opposing rafters meet on the roof ridges, hips, and valleys
Class	Specifies the class for the rafters
Classes	Edits classes attributes; see “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide
Object Attributes	Specifies the rafter attributes

3. Click **OK** to create the rafters.



Creating Beams

Product: Architect

To create beams:

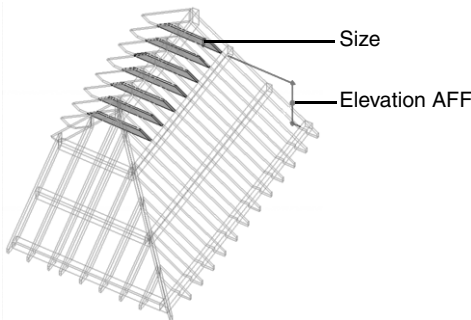
1. In the Roof Framer dialog box, click the Beams tab, and select **Create Beams**.
2. Specify the beam parameters.

Parameter	Description
Style	Select the beam style <ul style="list-style-type: none">• Joist (tie beam that rests on the bearing wall)• Flush Beam (tie beam that is flush to the rafters, usually attached to the rafters with metal plates)• Collar Tie (tie beam that scabs onto the rafters and is attached with nails, bolts, etc.)



Parameter	Description
Size	Specifies the beam size in Width x Height, in current file units. Sizes can be edited by selecting Edit List (see “Custom Frame Element Sizes” on page 76)
Spacing	Select the beam spacing (Every Rafter, Every Other Rafter, and Every Third Rafter)
Elevation AFF	Specifies the elevation above finished floor of the bottom of the beams
Class	Specifies the class for the beams
Classes	Edits classes attributes; see “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide
Object Attributes	Specifies the beam attributes

3. Click **OK** to create the beams.



Creating Plates

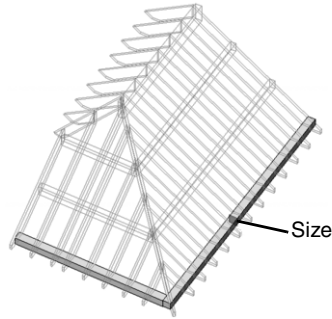
Product: Architect

To create plates:

1. In the Roof Framer dialog box, click the Plates tab, and select **Create Plates**.
2. Specify the plate parameters.

Parameter	Description
Size	Specifies the plate size in Width x Height, in current file units. Sizes can be edited by selecting Edit List (see “Custom Frame Element Sizes” on page 76)
Class	Specifies the class for the plates
Classes	Edits classes attributes; see “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide
Object Attributes	Specifies the plate attributes

3. Click **OK** to create the plates.



Creating Purlins

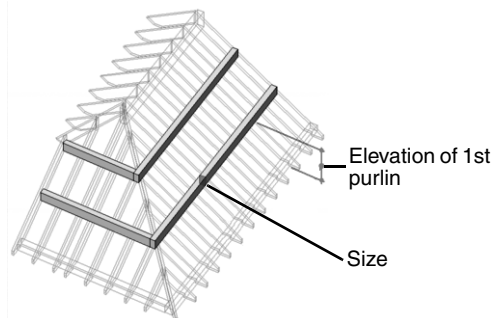
Product: Architect

To create purlins:

1. In the Roof Framer dialog box, click the Purlins tab, and select **Create Purlins**.
2. Specify the purlin parameters.

Parameter	Description
Purlin Size	Specifies the purlin size in Width x Height, in current file units. Sizes can be edited by selecting Edit List (see “Custom Frame Element Sizes” on page 76)
Number of Purlins	Indicates the number of purlins to create between the ridge and the foot of the roof
Elevation of 1st Purlin	Specifies the elevation above finished floor of the bottom of the lowest purlin. The rest of the purlins will be evenly spaced between this height and the bottom of the ridge.
Bearing inset	Specifies the depth at which the purlin is notched into the rafters
Class	Specifies the class for the purlins
Classes	Edits classes attributes; see “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide
Object Attributes	Specifies the purlin attributes

3. Click **OK** to create the purlins.





Creating Ridges

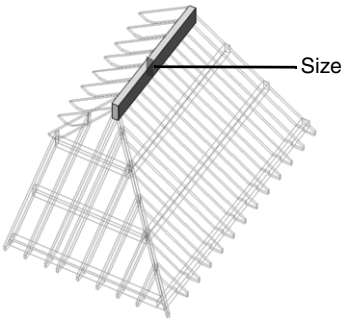
Product: Architect

To create ridges:

1. In the Roof Framer dialog box, click the Ridges tab, and select **Create Ridges**.
2. Specify the ridge parameters.

Parameter	Description
Ridge Size	Specifies the ridge size in Width x Height, in current file units. Sizes can be edited by selecting Edit List (see “Custom Frame Element Sizes” on page 76)
Ridge Elevation	Specifies the ridge elevation options
Flush to Top of Rafters	Indicates that the top of the ridge should be the same as the top of the rafters
Notched into rafters, depth	Specify the depth that the ridge is notched into the rafters
Flush to Bottom of Rafters	Indicates that the bottom of the ridge should be the same height as the bottom of the plumb cut on the rafters
Specify AFF	Indicates the height of the bottom of the ridge, above the finished floor
Class	Specifies the class for the ridges
Classes	Edits classes attributes; see “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide
Object Attributes	Specifies the ridge attributes

3. Click **OK** to create the ridges.



Creating Trimmers

Product: Architect

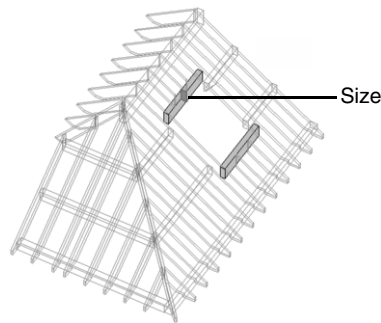
To create trimmers:

1. In the Roof Framer dialog box, click the Trimmers tab, and select **Create Trimmers**.
2. Specify the trimmer parameters.



Parameter	Description
Trimmer Size	Specifies the trimmer size in Width x Height, in current file units. Sizes can be edited by selecting Edit List (see “Custom Frame Element Sizes” on page 76)
Class	Specifies the class for the trimmers
Classes	Edits classes attributes; see “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide
Object Attributes	Specifies the trimmer attributes

3. Click **OK** to create the trimmers.



Creating Hip and Valley Rafters

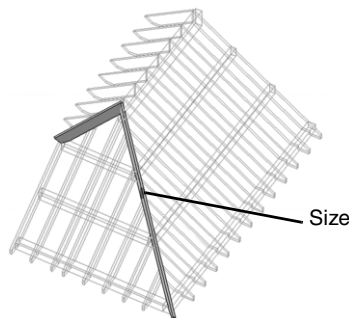
Product: Architect

To create hip and valley rafters:

1. In the Roof Framer dialog box, click the Hips/Valleys tab, and select **Create Hips and Valleys**.
2. Specify the hip and valley rafter parameters.

Parameter	Description
Hip/Valley Size	Specifies the size of the hip and valley rafters in Width x Height, in current file units. Sizes can be edited by selecting Edit List (see “Custom Frame Element Sizes” on page 76)
Class	Specifies the class for the hips and valley rafters
Classes	Edits classes attributes; see “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide
Object Attributes	Specifies the hip and valley rafter attributes

3. Click **OK** to create the hip and valley rafters.



Custom Frame Element Sizes

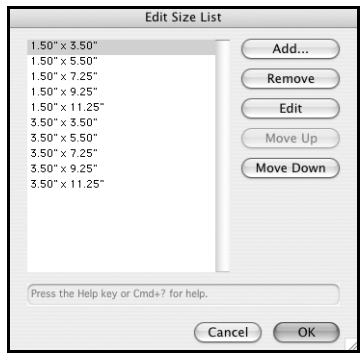
Product: Architect

The size of the framing elements can be selected from a pre-set list, or the list can be edited to contain desired or custom sizes.

To edit the size list of the frame elements:

1. From the **Size** field in one of the framing element tabs of the Roof Framer dialog box, select **Edit List**.

The Edit Size List dialog box opens, listing the currently available sizes of the roof element.



Parameter	Description
Add	Adds a size to the list; specify the width and height of the new size
Remove	Deletes the currently selected size
Edit	Edits the currently selected size; enter the new width and height parameters
Move Up/Move Down	Changes the order of the sizes by moving the selected size up or down in the list

2. Click **OK** to edit the size list.

The text files which populate the size lists in the framing element dialog boxes can also be edited. The text files are located in [VectorWorks]\Plug-ins\VW_Arch\Data.



Framing a Floor

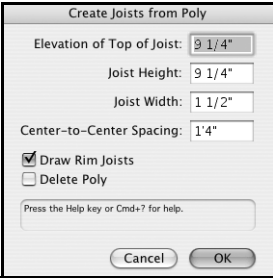
Product: Architect

Use the **Create Joists from Poly** command to create the joist objects necessary to frame a floor.

To frame a floor:

- 1. Select a polygon, polyline or floor object.
- 2. Select **AEC > Framing > Create Joists from Poly**.

The Create Joists from Poly dialog box opens.

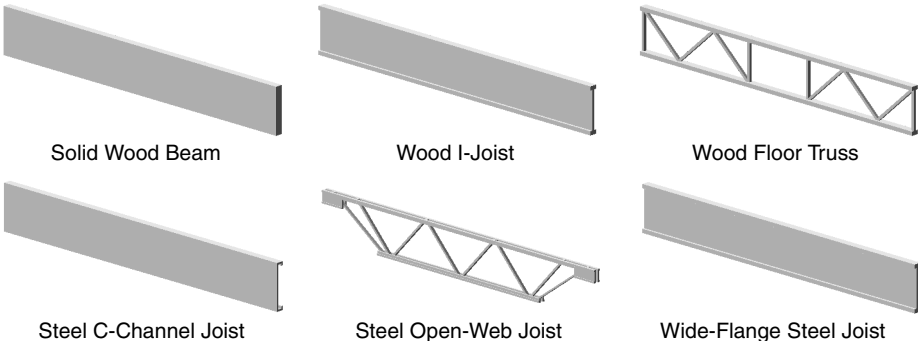


Parameter	Description
Elevation of Top of Joist	Sets elevation for top of joist
Joist Height	Sets overall joist height
Joist Width	Sets width of joist
Center-to-Center Spacing	Sets joist spacing
Draw Rim Joists	Creates joists around entire perimeter
Delete Poly	Deletes selected polygon/polyline after joists created

- 3. Enter the desired values.
- 4. Click **OK**.
- 5. An alert dialog box requests the selection of two points to set the joist orientation. Click **OK** to close the dialog box and click two points anywhere in the drawing to indicate the desired joist orientation.
- 6. The joists are created. In addition, a Joist Take-off worksheet is automatically created and added to the Resource Browser.

If a stairwell hole exists in the floor, board objects are used for the headers.

The joist parameters can be edited in the Object Info palette.

Parameter	Description
Config	<p>Select the type of joist used for framing</p>  <p>Solid Wood Beam Wood I-Joist Wood Floor Truss</p> <p>Steel C-Channel Joist Steel Open-Web Joist Wide-Flange Steel Joist</p>
Length (o.c.)	Enter the length (measured on center) of the joist
Width	Enter the joist width
Height	Enter the joist height
Begin Bevel°	Enter the angle of the bevel at the beginning of the joist
End Bevel°	Enter the angle of the bevel at the end of the joist
Flange height	Enter the flange height
Web width	Enter the web width
Web height	Enter the web height
Gauge	Enter the gauge of the joist
Panel spacing	Enter the distance between each panel
Draw verticals	Select to draw the vertical elements of the joist
Bottom bearing	Select to draw the bottom bearing configuration
2D Display	Select the type of 2D joist displays (Solid, Centerline, Width, or Width with Centerline)
Use Standard Sizes	Select whether to use Imperial or Metric sizes
Imperial Standard Size	Select the Imperial standardized joist size
Metric Standard Size	Select the Metric standardized joist size
Start Joist Hanger	Displays joist hangers at the start of the joist
End Joist Hanger	Displays joist hangers at the end of the joist
Show Label	Select to display the Label Text next to the joist
Label Text	Enter the text to display next to the joist
Nominal Size (read only)	Displays the nominal size of the joist



Framing a Wall

Product: Architect

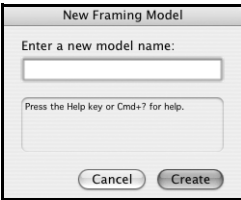
VectorWorks Architect creates a highly detailed estimate of the placement and number of studs needed to frame walls. In addition to showing stud placement in a framing diagram, the **Wall Framing** command also automatically generates frame elevation drawings and two different worksheets, Frame TakeOff and Frame Wall Info.



To use the wall framer:

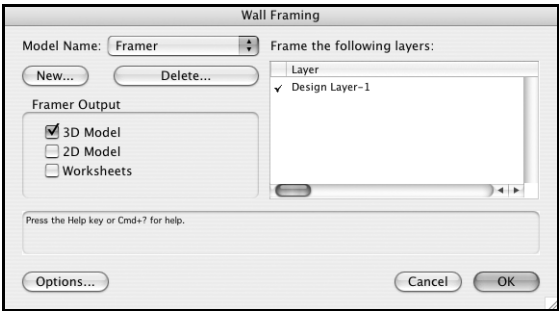
- 1. Ensure that the walls have the desired height. If necessary, change the wall height.
- 2. Select **AEC > Framing > Wall Framing**.

If a framing model has not yet been created, the New Framing Model dialog box opens. Enter a name for the framing model design layer (up to eight characters).



- 3. Click **Create**.

The Wall Framing dialog box opens. Select the desired settings for the framing model.



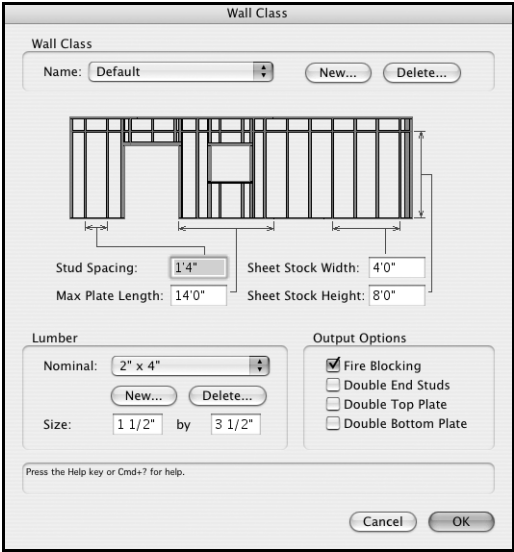
Parameter	Description
Model Name	Select the framing model layer to be used
New	Opens the New Framing Model dialog box to create a new model

Parameter	Description
Delete	Deletes the currently selected model. Click Yes to delete the selected model. This operation cannot be undone. This command cannot be used if there is only one model in the document.
Framer Output	
3D Model	Creates a 3D model layer, complete with the placement of studs, top plates, sole plates, and other components required for framing
2D Model	Creates framing plan and framing diagram layers. The framing plan is a top view of the wall showing the sole plate and stud placement and is drawn in a layer that parallels the layers in the framing model. The top plates are removed to show the stud placement. The framing diagram is an elevation view showing the sole plate, top plates, and stud placement. The framing diagram is drawn in a new design layer and generates as many layers as needed.
Worksheets	Creates two sets of worksheets. The first set provides details on the framing results, including a list of studs sorted by layer, class, frame, and size (Frame TakeOff). The second set provides a summary of frame information, sorted similarly, but providing area and linear footages itemized for each framed wall (Frame Wall Info).
Frame the following layers	Select which layer(s) contain wall data to frame
Options	Opens the Wall Class dialog box to allow the editing of wall class values

The framing diagram and the 3D model representations also include symbols and inserted items, such as doors and windows.

4. Click **Options**.

The Wall Class dialog box opens. Enter the framing parameters for each wall class.



Parameter	Description
Wall Class	
Name	Lists the classes that contain walls to be framed; walls in the classes in this list are included in the framing model. The framing parameters for each class are displayed beneath.
New	Click to add an additional wall class to the list to be framed
Delete	Deletes the currently selected wall class from the list to be framed. Click Yes to delete the selected class. This operation cannot be undone.
Stud Spacing	Enter the center-to-center distance between studs in this wall class
Sheet Stock Width	Enter the width of the wall sheathing; this is the horizontal sheathing dimension
Max Plate Length	Enter the length of lumber to be used for top and bottom frame members in this wall class
Sheet Stock Height	Enter the width of the wall sheathing; this is the vertical sheathing dimension
Lumber	
Nominal	Select the lumber type to use for this wall class; the default types are 2" x 4", 2" x 6", and 2" x 10"
New	Click to create a new nominal lumber type
Delete	Deletes the currently selected nominal lumber type. Click Yes to delete the selected lumber type. This operation cannot be undone. This command cannot be used if there is only one lumber type in the document.
Size	Enter the true short dimension for the lumber
by	Enter the true long dimension for the lumber
Output Options	
Fire Blocking	Select to have extra blocking added to this wall class between studs on walls that are shorter than the sheet stock height
Double End Studs	Select to have two studs, rather than one stud, placed at each wall end in this wall class
Double Top Plate	Select to have two plates, rather than one plate, placed at top of each wall in this wall class
Double Bottom Plate	Select to have two plates, rather than one plate, placed at the bottom of each wall in this wall class

- Click **OK** to return to the Wall Framing dialog box.
- Click **OK** to create the framing model.

Architect creates the estimated framing for the walls and any other output information requested.

The 2D results display in Top/Plan view without a top plate. To view the results with a top plate, switch to another view such as Front, Back, Left, or Right.

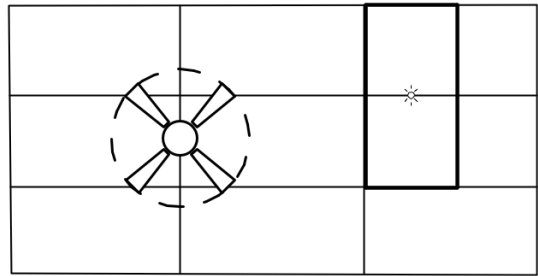
To view the 3D results, switch to a view such as Left Isometric or Right Isometric.



The Framer TakeOff and Framer Wall Info worksheets, if created, display in the drawing area.

Inserting Ceiling Grid Objects

Product: Architect



Use the **Ceiling Grid** tool to insert a ceiling grid object containing tiles with user-specified length, width, and placement angle. A ceiling grid object can also be created by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).



To insert a ceiling grid object:

1. Click the **Ceiling Grid** tool from the MEP tool set.
2. Click in the drawing file to set the start point of the ceiling grid object, and then click to set the position of each additional vertex. Click the last point to complete creation of the ceiling grid object. If the polyline is open, Architect automatically completes it.

The Ceiling Grid object properties dialog box opens. Click **OK** to accept the default settings.

3. Use the **2D Reshape** tool to modify the locations of the vertices after object creation, or use the vertex editing controls on the Object Info palette to move the vertices or change the degree of vertices. The tiles are automatically adjusted to fit the new shape.

Parameter	Description
Angle	Specify the tile placement angle
Tile Width	Specify the tile width
Tile Length	Specify the tile length
Polyline parameters	Edits the ceiling grid object path polyline

For information on editing object vertices, see “Reshaping Objects” on page 259 in the VectorWorks Fundamentals User’s Guide.

Creating Architectural Elements

Once the initial structure has been established, a variety of tools are available to add the architectural elements, such as windows, doors, stairs, and furniture to the drawing.

Inserting Windows

Product: Architect and Landmark

VectorWorks Fundamentals and all VectorWorks Design Series products include a limited window object containing parameters similar to those described here. In VectorWorks Fundamentals, the window object is inserted through the Resource Browser. In the VectorWorks Design Series products, the window object is inserted with the **Window** tool.

VectorWorks Architect and Landmark include window symbols in standard sizes and various configurations, ready to install in walls.

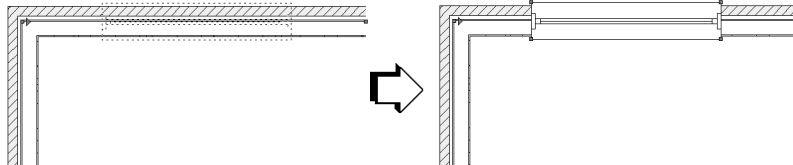
Window objects can be saved as editable red symbols that become plug-in objects when inserted into a wall (see “Creating a Window or Door Symbol” on page 105). The window options can be customized in the Object Info palette. Customized windows can then be made into symbols and used in the file without having to reset the parameters. See “Accessing Existing Resources” on page 147 in the VectorWorks Fundamentals User’s Guide.

[The Update Plug-in Objects command may need to be run on files containing windows that were created in an earlier version of VectorWorks Architect. This command converts the windows to the latest format; see “Migrating from Previous Versions” on page 5 in the VectorWorks Fundamentals User’s Guide.](#)



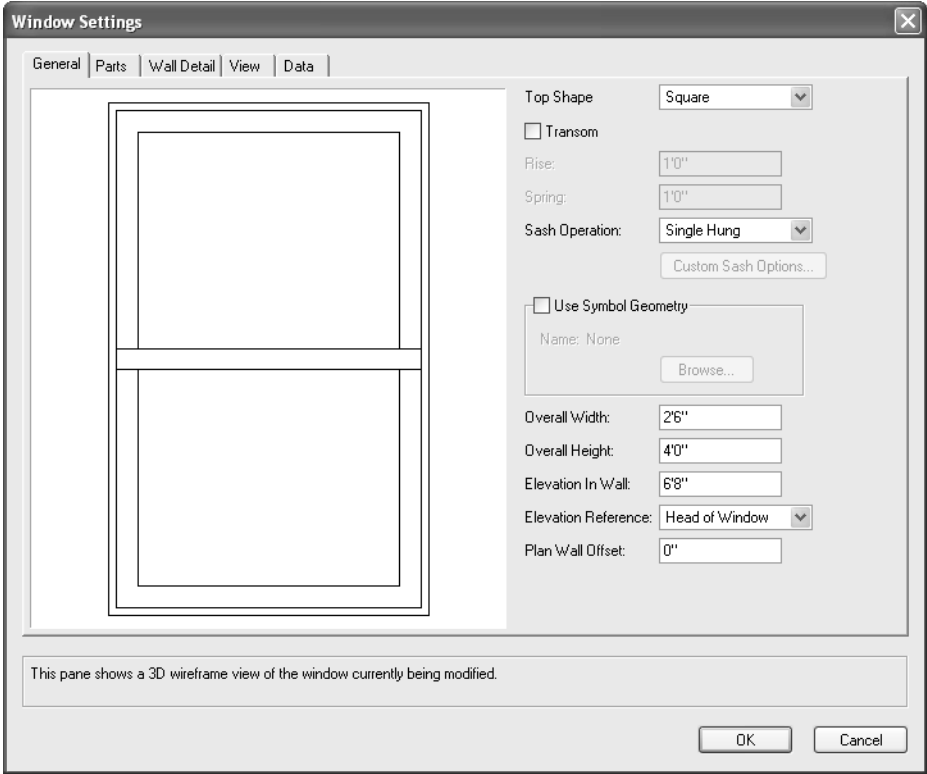
To insert a window:

1. Select the **Window** tool from the Building Shell tool set.
2. Click in the drawing file or wall to set the insertion point of the window, and click again to set the rotation.

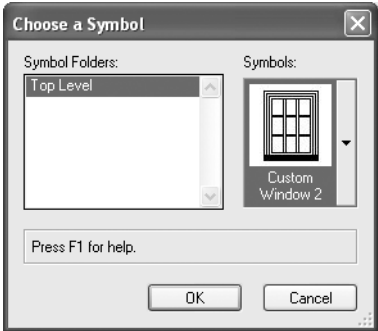


If this is the first time a window is inserted into the drawing, the Window Settings dialog box opens. Otherwise, click **Preferences** from the Tool bar. Specify the default preferences which apply to all windows placed subsequently in this file.

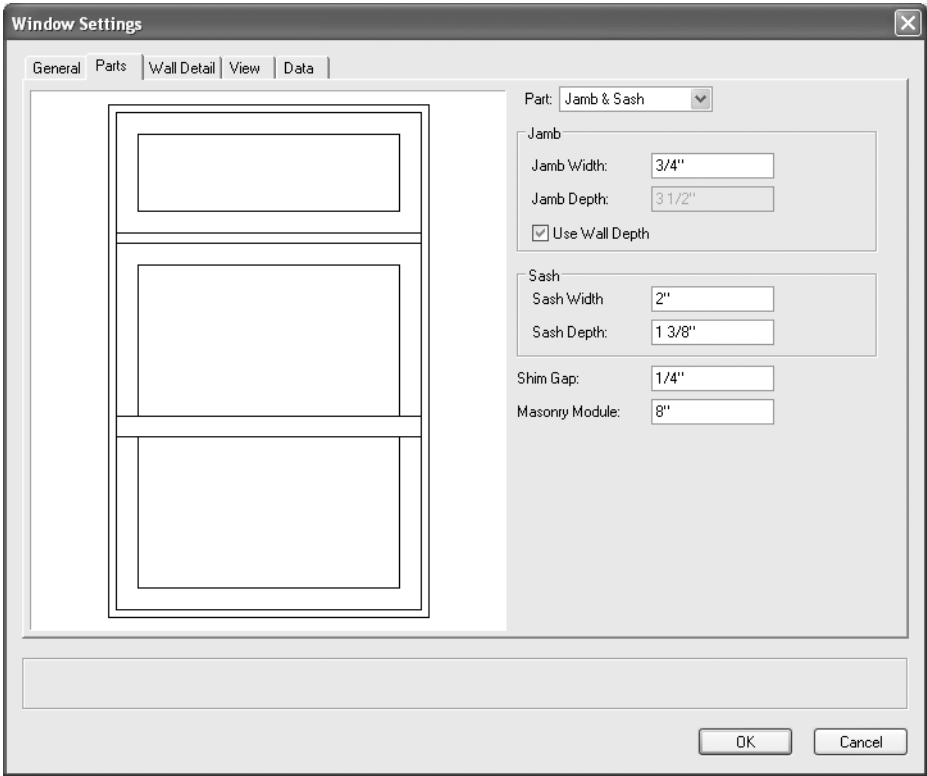
3. Specify the window parameters on each tab to define the window. As the parameters are defined, the preview dynamically displays the window appearance.



Parameter	Description
Top Shape	Select the shape of the top of the window
Transom	Select whether to add a transom above the window; the transom light is separated from the window
Rise	When applicable for the selected Top Shape , enter the distance between the start of the top shape to the top of the window
Spring	Enter the distance traveled above the bottom pane before the top shape starts; if Square is selected as the Top Shape , the spring is the total height
Sash Operation	Select the window type. To define a custom window sash, select Custom Sash Operation and click Custom Sash Options to open the Custom Sash Options dialog box; see “Creating a Custom Window Sash Opening” on page 92.

Parameter	Description
Use Symbol Geometry	<p>Select Use Symbol Geometry and click Browse to select a window symbol from the current file's resources. Select a symbol from the graphical list of Symbols and click OK.</p> <div></div> <p>The symbol Name displays in the Window Settings dialog box and the preview is updated with the selected symbol.</p> <p>When a symbol is selected, all fields pertaining to the window's geometry are disabled.</p>
Overall Width	Enter the window width measured to the jamb exterior face
Overall Height	Enter the window height measured to the jamb exterior face
Elevation in Wall	Enter the window elevation
Elevation Reference	Select either the sill or the head of the window as the elevation reference point
Plan Wall Offset	Enter the distance to offset the window insertion point from the centerline of the wall

4. Click the Parts tab to specify the configuration of the window component geometry.
- Several features of the window are described as “interior” or “exterior.” These include trim, shutters, and wall-wrap components. These elements determine the internal and external face of the wall from the wall itself. The left side of the wall (as viewed along the wall direction) is always “exterior,” and the right side is “interior.” Flipping the window does not flip these elements.

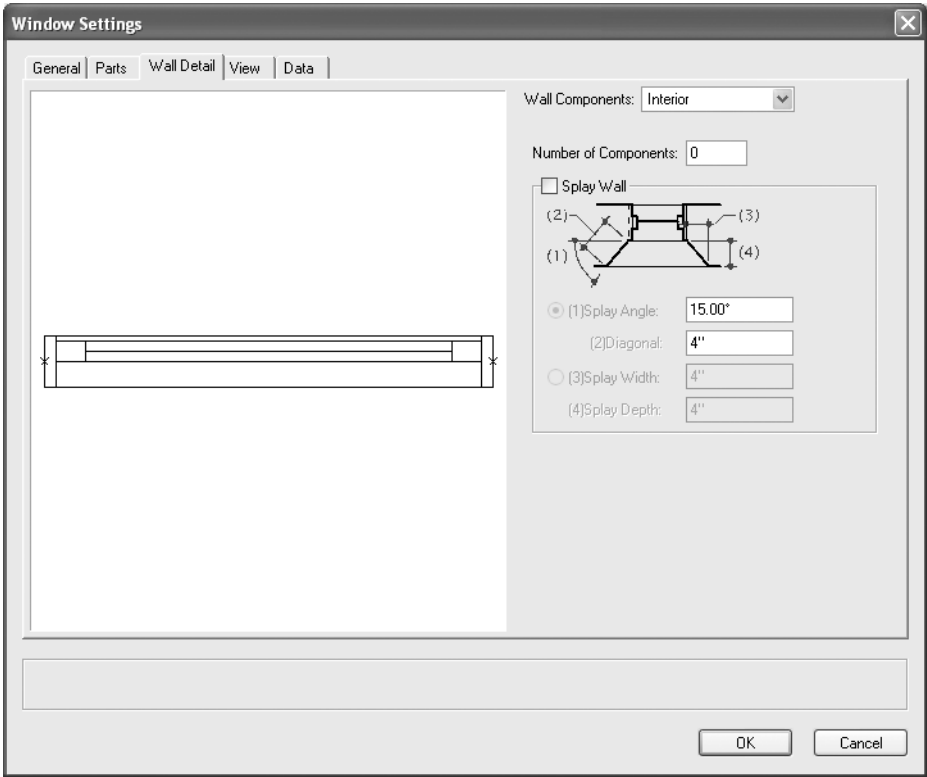


Parameter	Description
Part	Select to edit the settings for various window parts (jamb and sash, transom, sill, trim, muntins, interior/exterior shutters, and lintel)
Jamb & Sash	
Jamb Width	Enter the face width of the window jamb (parallel to the wall)
Jamb Depth	Enter the depth of the window jamb (perpendicular to the wall)
Use Wall Depth	Select to set the jamb depth to the overall wall depth
Sash Width	Enter the sash width
Sash Depth	Enter the sash depth
Shim Gap	Enter the distance between the jamb exterior face and the rough opening
Masonry Module	Enter the masonry module dimension
Transom	
Sash Width	Enter the transom sash width
Sash Depth	Enter the transom sash depth
Mullion Width	Enter the transom mullion width

Parameter	Description
Mullion Depth	Enter the transom mullion depth
Sill	
Include Sill	Select whether to include a sill and select the sill style type
Timber	Specify the sill lip thickness, amount of keep for the sill, sill height, total sill depth, sill extension width, stool lip thickness, and stool nose dimension
Masonry	Specify the sill lip thickness, amount of keep for the sill, rise dimension, sill height, total sill depth, and sill extension width
Brick	Specify the sill lip thickness, rise dimension, total sill depth, sill extension width, stool lip thickness, and stool nose dimension
Trim	
Include Interior/Exterior Trim	Select whether to include interior/exterior trim
Width/Depth	Enter the interior/exterior trim width and depth
Trim Under Stool/Sill	Select whether to include interior/exterior trim along the window bottom
Muntins	
Apply to	Select which sashes should have muntins applied
Pattern	Select the muntin pattern
Vertical/Horizontal bars	Enter the number of vertical/horizontal muntin bars
Bar Width/Depth	Enter the muntin bar depth/width
Bar Offset	Enter the muntin bar offset
Number of Rays	Enter the number of muntin rays
Interior/Exterior Shutters	
Include Interior/Exterior Shutters	Select whether to include interior/exterior shutters
Frame Depth	Enter the depth for the interior/exterior shutters
Offset from Jamb	Enter the offset distance from the interior edge of the window jamb that shutters will be positioned when fully opened
Panel	Select to create paneled shutters
Divisions w/Sashes	Select to divide shutters at sash divisions
Equal Divisions	Select to divide panels equally by the number of Panels specified
Frame Width	Enter the rail and stile width of the paneled shutter
Custom	Click Choose Symbol to select a custom shutter symbol from default resources; see “VectorWorks Design Series Default Resources” on page 570 Custom shutters must be 3D-only symbols made from generic solids, saved in the default content location.

Parameter	Description
Lintel	
Include Lintel	Select to add a lintel above the window or transom
Int./Ext. Protrusion	Enter the interior and exterior lintel protrusion
(1)Thickness	Enter the lintel thickness
(2)Angle	Enter the lintel angle
(3)Drop	Enter the length of the lintel drop

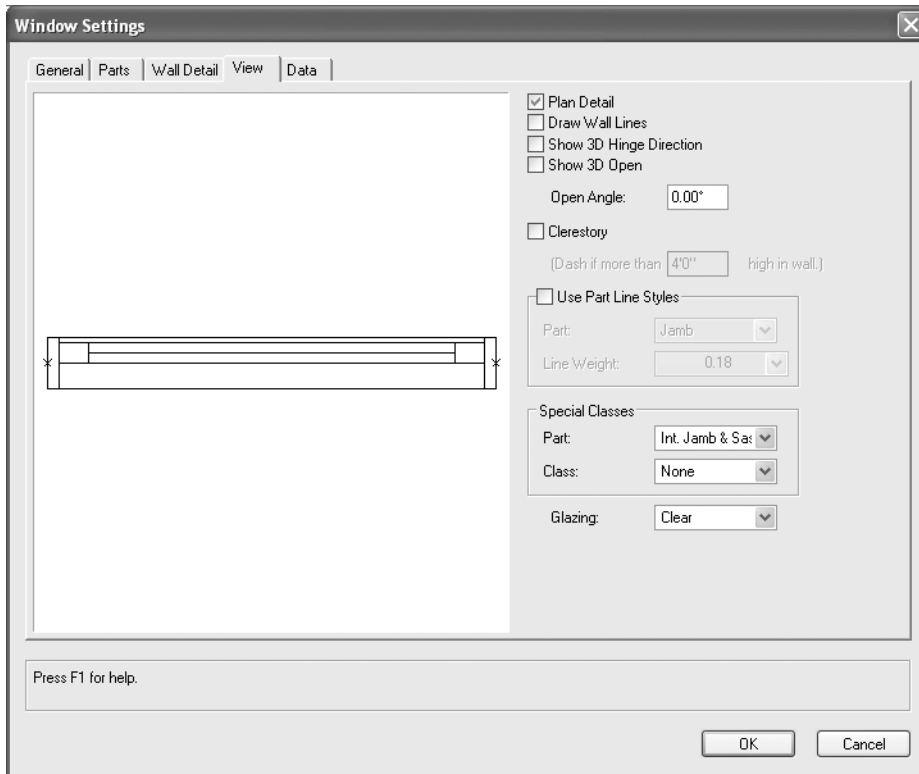
5. Click the Wall Detail tab to specify the interior and exterior wall component settings.
- When wall components are wrapped with the window, the window enables control points that set the exact wrapping point.



Parameter	Description
Wall Components	Select to establish interior or exterior wall component settings
Number of Components	Specify the number of interior/exterior wall components to wrap
Splay Wall	Select whether to splay the interior/exterior wall
(1)Splay Angle	Enter the interior/exterior wall splay angle

Parameter	Description
(2)Diagonal	Enter the interior/exterior wall splay diagonal value
(3)Splay Width	Enter the interior/exterior wall splay width
(4)Splay Depth	Enter the interior/exterior wall splay depth

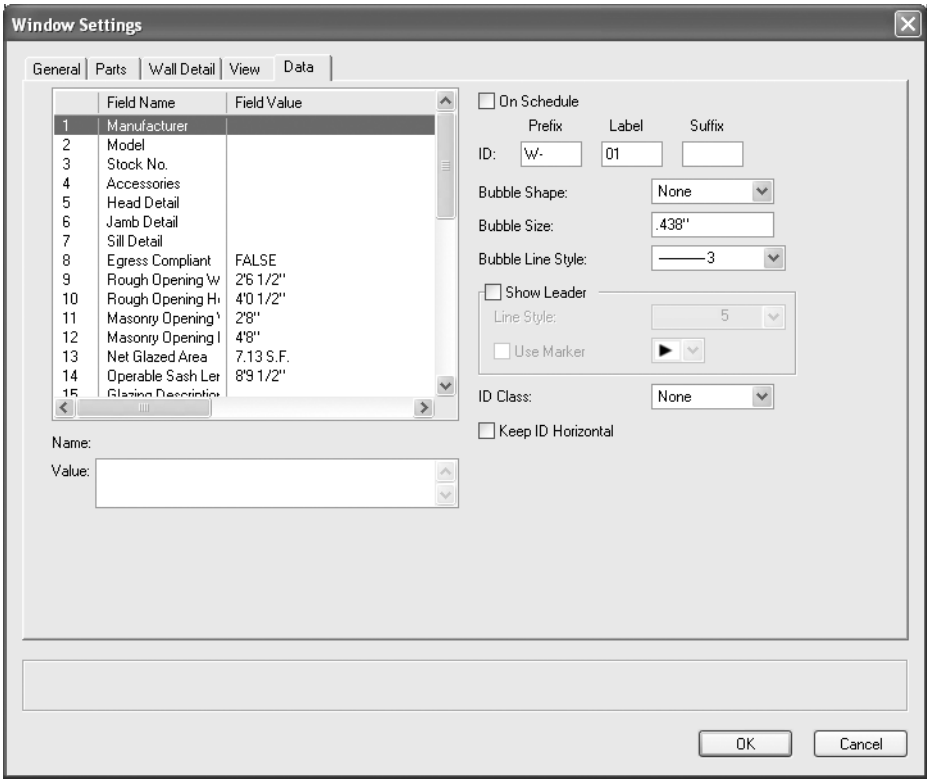
6. Click the View tab to specify the 2D line attributes and assign style classes to parts for applying textures and 3D attributes.



Parameter	Description
Plan Detail	Select to display all the window details in a 2D view
Draw Wall Lines	Select whether to draw wall lines at all times; wall lines are drawn in the Ceiling-main class to easily create reflected ceiling plans
Show 3D Hinge Direction	Select to draw lines representing the 3D hinge direction
Show 3D Open	Select to draw 3D window sashes as open at the specified Open Angle
Clerestory	Enabling Clerestory draws the window as dashed if the sill is higher than the specified elevation and draws the window as non-breaking (solid) if the sill is below the specified height

Parameter	Description
Use Part Line Styles	Settings controlling 2D line styles and weights for the window part; if this group is selected, these settings override the line style and weight settings from the Attributes palette
Part	Choose the line style and weight to use for the selected part (jamb, sash, trim, sill, glazing, wall lines, or swing) or select Set Thickness to open the Set Thickness dialog box for creating a custom line thickness; see “Pen Attributes” on page 231 in the VectorWorks Fundamentals User’s Guide
Special Classes	Settings controlling classes for application of 3D finishes and textures
Part	Select the style Class to assign to the selected Part (interior and exterior jamb and sash, trim, and shutter; stool, sill, and lintel), or select None; see “Using Style Classes” on page 120
Glazing	Select the glazing style or specify the desired glazing style class; see “Using Style Classes” on page 120

7. Click the Data tab to specify the window record information to include on the window schedule.



Parameter	Description
On Schedule	Select whether to include this window's information in the window schedule and also set the window ID label to visible
Prefix	Assigns alphanumeric information before the numerical label value; adding prefix information is optional
Label	Assigns a numerical value to the ID; this number increments automatically if the auto-increment option is chosen in the ID Settings dialog box
Suffix	Assigns alphanumeric information after the label value; adding suffix information is optional
Bubble Shape	Select the ID label bubble shape
Bubble Size	Enter the minimum ID label bubble size (this value represents the bubble size times the layer scale; the bubble shape is maintained relative to the text inside it for ID bubble uniformity throughout the drawing file)
Bubble Line Style	Select the bubble line style and weight, or select Set Thickness to open the Set Thickness dialog box for creating a custom line thickness; see "Pen Attributes" on page 231 in the VectorWorks Fundamentals User's Guide
Show Leader	Select to draw a leader from the ID label to the object; see "Attribute Types" on page 229 in the VectorWorks Fundamentals User's Guide
Line Style	Select the leader line style and weight, or select Set Thickness to open the Set Thickness dialog box for creating a custom line thickness; see "Pen Attributes" on page 231 in the VectorWorks Fundamentals User's Guide
Use Marker	Select whether to use a marker for the ID leader line and choose the desired style from the marker list, or select Custom to create a custom marker. Select Edit Marker List to open the Edit Marker List dialog box; see "Setting Default Marker Types" on page 60 in the VectorWorks Fundamentals User's Guide.
ID Class	Select the ID label class, or select None (which sets the ID to the same class as the window), the standard class for the ID, or any other class in the document
Keep ID Horizontal	When selected, automatically rotates the ID label so that it is horizontal
Name	Select the data field from the list and its Name displays beneath the list; select the user fields to include additional user-defined information with the window
Value	Enter the data field Value for use in the window schedule

8. Click **OK** to set the window parameters and close the Window Settings dialog box.
9. To edit parameters, double-click the window to open the Window Settings dialog box.

Window objects can also be edited in the Object Info palette. If the window has been inserted as a plug-in object, most settings from the Window Settings dialog box display. If the window is a black symbol made from a window object, fields pertaining to window geometry do not display.

Two additional Object Info palette parameters are available for windows inserted in a wall: click **Flip** to flip the window orientation, or click **Position** to open the Position Symbol in Wall dialog box to enter the distance from the symbol's insertion point to the corner of the selected wall.



The Object Info palette display order can be changed by advanced users through the VectorScript Plug-in Editor; however, this is not recommended.

- 10. The Window Schedule can be added to the drawing from the **VA Create Schedule** command (see “Records and Schedules” on page 371) or the Resource Browser. From the Resource Browser, open the Libraries\Defaults\Reports~Schedules\Architectural Reports.vwx file that is included with Architect. Drag the Window Schedule worksheet to the drawing. The worksheet is populated with information from the window objects in the current drawing. To edit the worksheet after it has been created, see “Using Worksheets” on page 566 in the VectorWorks Fundamentals User’s Guide.

Creating a Custom Window Sash Opening

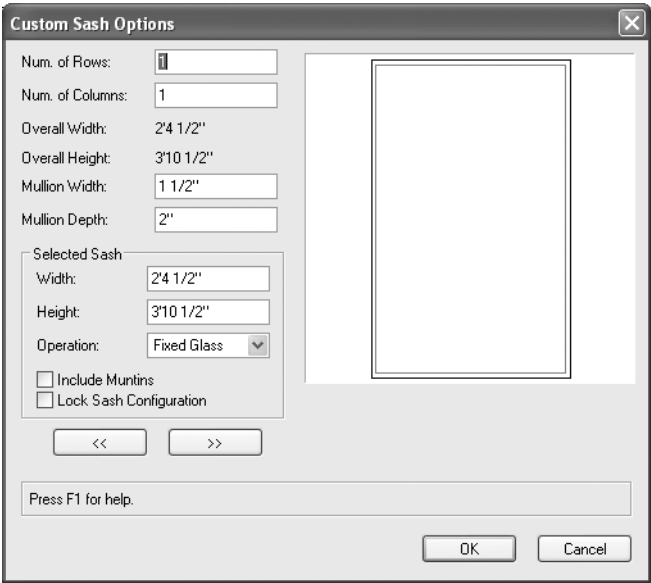
Product: Architect and Landmark

A custom window sash opening can be created for selection in the Window Settings dialog box. A rectangular sash opening can contain any number of rectangular sashes.

To create a custom window sash opening:

- 1. From the General tab of the Window Settings dialog box, select the Custom **Sash Operation** and click **Custom Sash Options**.

The Custom Sash Options dialog box opens for selecting a specifying the sash opening parameters. As parameters are defined, the preview dynamically displays the configuration operations of the sashes filling the opening.



Parameter	Description
Num. of Rows/Columns	Specify the number of rows and columns in the sash opening
Overall Width/Height	Displays the overall width and height of the custom sashes
Mullion Width/Depth	Displays the mullion width and depth



Parameter	Description
Selected Sash	The currently active sash displays in red to indicate that it is selected
Width/Height	For the active sash, specify the desired Width and Height
Operation	For the active sash, choose the desired window type
Include Muntins	Select whether to include muntins for each sash
Lock Sash Configuration	When selected, locks the sash dimensions and operation
<< or >>	Click << or >> to move backward or forward to activate sashes for dimension and operation specification

- Click **OK** to close the Custom Sash Options dialog box and return to the Window Settings dialog box. The Window Settings dialog box preview is updated with the customization results.

Inserting Doors

Product: Architect and Landmark

VectorWorks Fundamentals and all VectorWorks Design Series products include a limited door object containing parameters similar to those described here. In VectorWorks Fundamentals, the door object is inserted through the Resource Browser. In the VectorWorks Design Series products, the door object is inserted with the **Door** tool.

The VectorWorks Design Series includes door symbols in standard sizes and various configurations, ready to install in walls. VectorWorks Architect and Landmark provide extensive libraries of door symbols, listed by configuration and size.

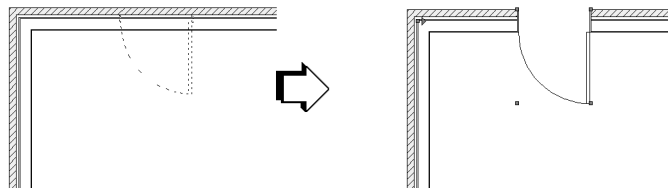
Door objects can be saved as editable red symbols that become plug-in objects when inserted into a wall (see “Creating a Window or Door Symbol” on page 105). The door options can be customized in the Object Info palette. Customized doors can then be made into symbols and used in the file without having to reset the parameters. See “Accessing Existing Resources” on page 147 in the VectorWorks Fundamentals User’s Guide.

The **Update Plug-in Objects** command may need to be run on files containing doors that were created in an earlier version of VectorWorks Architect. This command converts the doors to the latest format; see “Migrating from Previous Versions” on page 5 in the VectorWorks Fundamentals User’s Guide.



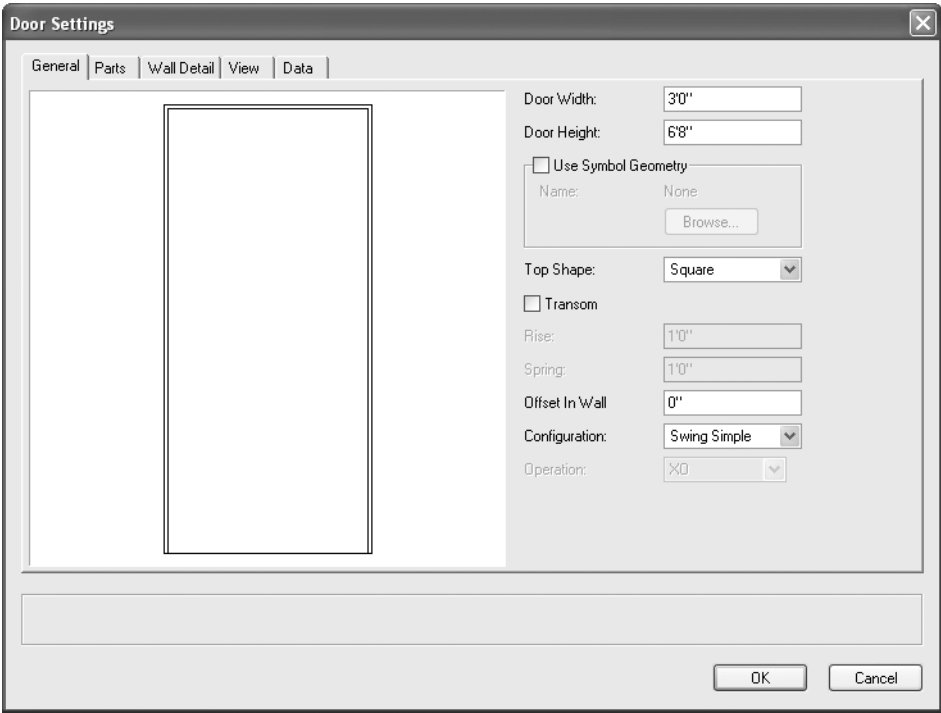
To insert a door:

- Select the **Door** tool from the Building Shell tool set.
- Click in the drawing file or in a wall to set the insertion point of the door, and click again to set the rotation.

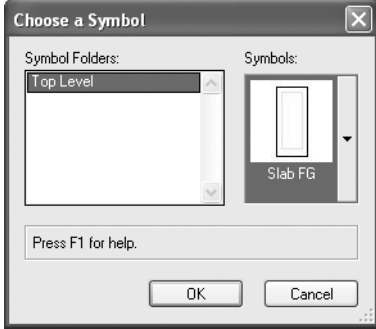


If this is the first time a door is placed on the drawing, the Door Settings dialog box opens. Otherwise, click **Preferences** from the Tool bar. Specify the default preferences, which apply to all doors placed subsequently in this file.

3. Specify the door parameters on each tab to define the door. As the parameters are defined, the preview dynamically displays the door appearance.

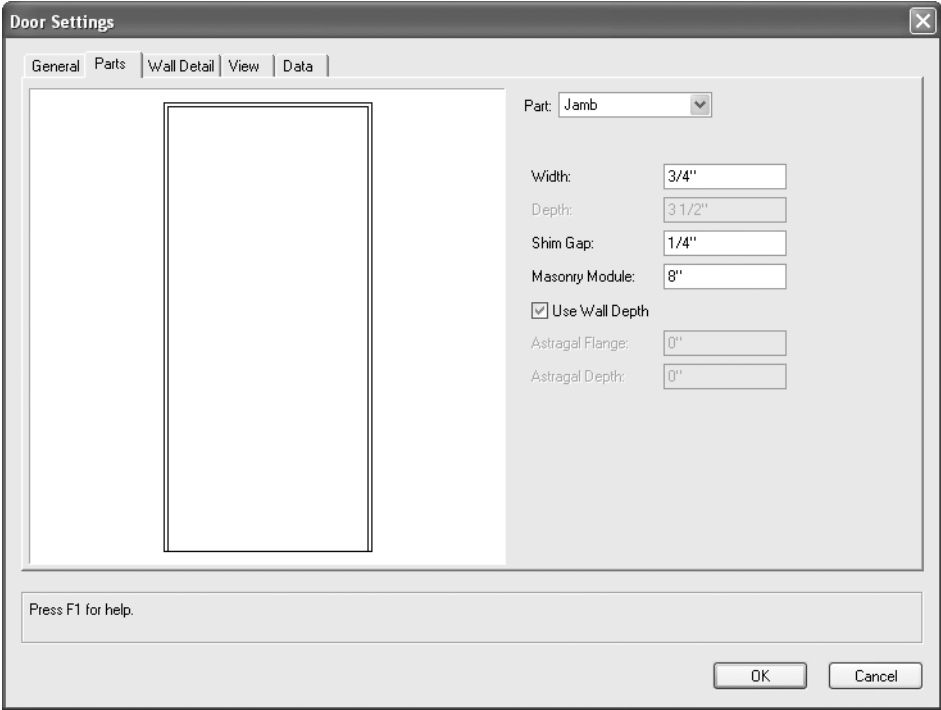


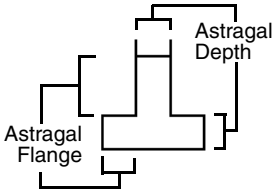
Parameter	Description
Door Width	Enter the door width measured to the inside of the jamb
Door Height	Enter the door height measured from the floor to the inside of the head jamb

Parameter	Description
Use Symbol Geometry	<p>Select Use Symbol Geometry and click Browse to select a door symbol from the current file's resources. Select a symbol from the graphical list of Symbols and click OK.</p>  <p>The symbol Name displays in the Door Settings dialog box and the preview is updated with the selected symbol.</p> <p><i>When a symbol is selected, all fields pertaining to the door's geometry are disabled.</i></p>
Top Shape	Select the shape of the top of the door
Transom	Select whether to add a transom above the door; the transom light is separated from the door
Rise	Enter the distance between the start of the top shape to the top of the door (not applicable for Square and Round Top Shape)
Spring	Enter the distance traveled above the floor before the Top Shape begins
Offset in Wall	Enter the distance to offset the door insertion point from the centerline of the wall
Configuration	Select the general door configuration
Operation	Select the advanced operation for a sliding or complex swing door, where "O" represents a fixed door and "X" represents an operating door

- Click the Parts tab to specify the configuration of door component geometry.

Several features of the door are described as "interior" or "exterior." These include trim and wall-wrap components. These elements determine the internal and external face of the wall from the wall itself. The left side of the wall (as viewed along the wall direction) is always "exterior," and the right side is "interior." Flipping the door does not flip these elements.

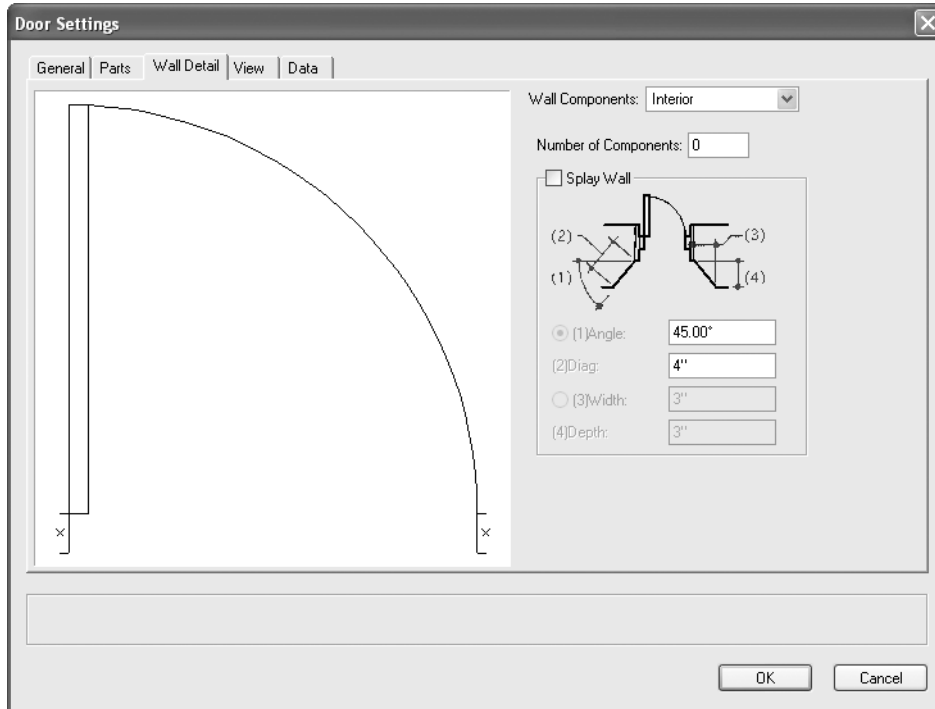


Parameter	Description
Part	Select to edit the settings for various door parts (jamb, leaf, lights, transom, trim, lintel, and threshold)
Jamb	
Width	Enter the face width of the door jamb (parallel to the wall)
Depth	Enter the depth of the door jamb (perpendicular to the wall)
Shim Gap	Enter the distance between the jamb exterior face and the rough opening
Masonry Module	Enter the masonry module dimension
Use Wall Depth	Select to set the jamb depth to the overall wall depth
Astragal Flange / Depth	Use these two dimensions to determine the size of the astragal flange or depth (enter zero to display without an astragal flange); enabled if Swing Bi-part is selected in the Configuration field on the General tab <div></div>

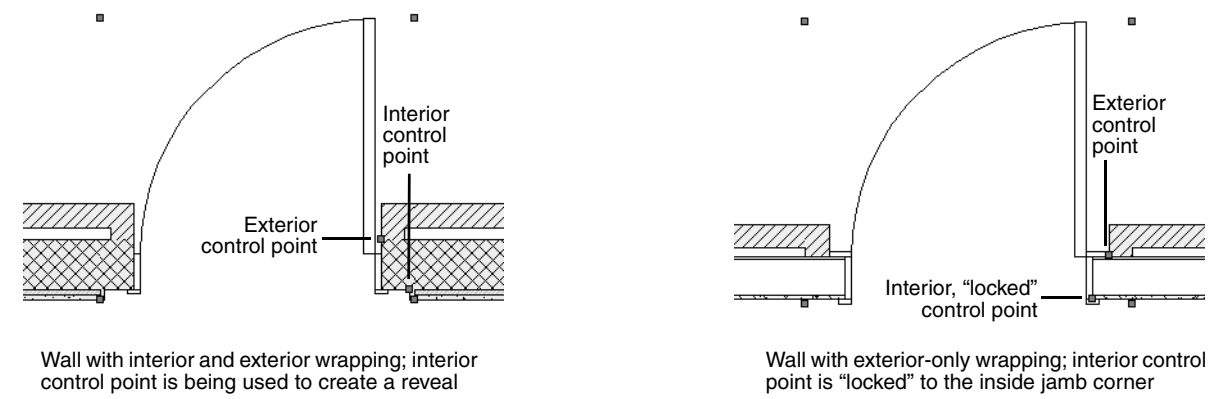
Parameter	Description
Leaf	Select to edit the stile and rail settings
Leaf Type	Select the desired leaf type
Thickness	Enter the thickness of the door slab
Top Rail Width	Enter the width of the top door rail
L/R Stile Width	Enter the width of the left and right stile
Bottom Rail Width	Enter the width of the bottom door rail
Custom Leaf	For Custom Leaf Type , select the leaf type from the default resources; see “VectorWorks Design Series Default Resources” on page 570. Custom leaves must be 3D-only symbols made from generic solids, saved in the default content location.
Muntin Style	For Glass Leaf Type , select the muntin style
Vertical/Horizontal Bars	For Glass Leaf Type , enter the number of vertical/horizontal muntin bars
Bar Width	For Glass Leaf Type , enter the muntin bar width
Vertical/Horizontal Panels	For Panel Leaf Type , enter the number of vertical/horizontal panels in the door
Mid Stile Width	For Panel Leaf Type , enter the width of any interim stiles
Set Top Panel	For Panel Leaf Type , select to set the top door panel at a different height than the other panels and specify the desired Panel Height
Lights	
Include Side Lights	Select whether to include side lights
Left/Right Width	Enter the left/right side light width
Sash Width	Enter the side light and transom sash width
Sash Depth	Enter the side light sash depth
Mullion Width	Enter the side light mullion width
Mullion Depth	Enter the side light mullion depth
Include Muntins	Select whether to add muntins to the side lights
Style	Select the side light muntin style
Vertical/Horizontal Bars	Enter the number of vertical/horizontal muntin bars
Bar Width	Enter the muntin bar width
Transom	
Sash Width	Enter the transom sash width
Sash Depth	Enter the transom sash depth
Mullion Width	Enter the transom mullion width
Mullion Depth	Enter the transom mullion depth
Include Muntins	Select whether to add muntins to the transom

Parameter	Description
Style	Select the transom muntin style
Vertical/Horizontal Bars	Enter the number of vertical/horizontal muntin bars
Bar Width	Enter the muntin bar width
Offset	Enter the muntin bar offset
Trim	
Include Interior/Exterior Trim	Select whether to add interior and/or exterior trim
Width	Enter the interior/exterior trim width
Depth	Enter the interior/exterior trim depth
Lintel	
Include Lintel	Select to add a lintel above the door or transom
Int. / Ext. Protrusion	Enter the interior and exterior lintel protrusion
(1)Thickness	Enter the lintel thickness
(2)Angle	Enter the lintel angle
(3)Drop	Enter the length of the lintel drop
Threshold	
Include Threshold	Select whether to include a threshold
(1) Depth(Int) / (2) Depth(Ext)	Enter the interior and exterior threshold depth
(3) Overall Depth	Enter the overall threshold depth
(4) Offset	Enter how far to offset the threshold from the center of the door jamb
(5) Thickness	Enter the threshold thickness
(6) Nosing	Enter the threshold nosing height

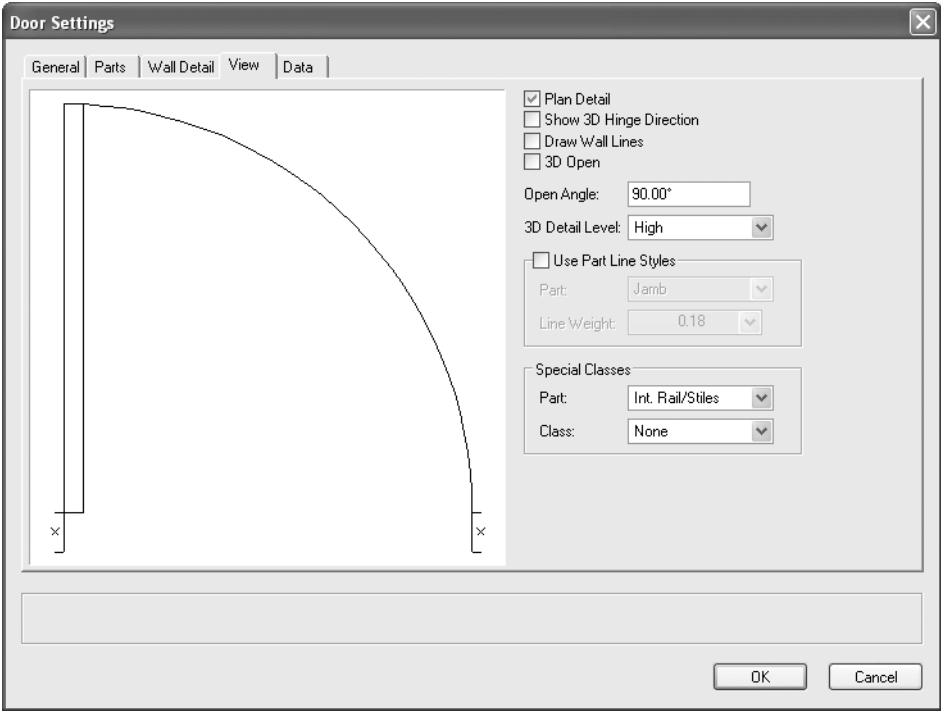
5. Click the Wall Detail tab to specify the interior and exterior wall component settings.
- When wall components are wrapped with the door, the door enables control points that set the exact wrapping point.



Parameter	Description
Wall Components	Select to establish interior or exterior wall component settings
Number of Components	Specify the number of interior/exterior wall components to wrap
Splay Wall	Select whether to splay the interior/exterior wall
(1)Angle	Enter the interior/exterior wall splay angle
(2)Diag	Enter the interior/exterior wall splay diagonal value
(3)Width	Enter the interior/exterior wall splay width
(4)Depth	Enter the interior/exterior wall splay depth



6. Click the View tab to specify the 2D line attributes and assign style classes to parts for applying textures and 3D attributes.



Parameter	Description
Plan Detail	Select to display all the door details in a 2D view
Show 3D Hinge Direction	Select to draw lines representing the 3D hinge direction
Draw Wall Lines	Select whether to draw wall lines at all times; wall lines are drawn in the Ceiling-main class to easily create reflected ceiling plans

Parameter	Description
3D Open	Select to draw 3D doors as open at the specified open Angle
3D Detail Level	Select the level of detail to include for 3D doors
Use Part Line Styles	Settings controlling 2D line styles and weights for the door part; if enabled, these settings override the line style and weight settings from the Attributes palette
Part	Choose the line style and weight to use for the selected part (jamb, leaf, trim, swing, sash, glazing, astragal, or wall lines) or select Set Thickness to open the Set Thickness dialog box for creating a custom line thickness; see “Pen Attributes” on page 231 in the VectorWorks Fundamentals User’s Guide
Special Classes	Settings controlling classes for application of 3D finishes and textures
Part	Select the style Class to assign to the selected Part (interior and exterior rail/stile, panel, jamb, trim, and sash; lintel, threshold, and side light glazing), or select None; see “Using Style Classes” on page 120

7. Click the Data tab to specify the door record information to include on the door schedule and door hardware legend.

Door Settings

General | Parts | Wall Detail | View | **Data**

	Field Name	Field Value
1	Manufacturer	
2	Model	
3	Stock No.	
4	Accessories	
5	Head Detail	
6	Jamb Detail	
7	Threshold Detail	
8	Rough Opening W	3'2"
9	Rough Opening H	6'9"
10	Masonry Opening W	3'4"
11	Masonry Opening H	7'4"
12	Net Glazed Area	0.00 S.F.
13	Frame Fire Rating	
14	Door Fire Rating	
15	Notes	

Name: Manufacturer
Value:

☐ On Schedule

ID: Prefix Label Suffix

Bubble Shape:

Bubble Size:

Bubble Line Style:

☐ Show Leader

Line Style:

☐ Use Marker

ID Class:

☐ Keep ID Horizontal

☐ Include Hardware

Name: <None>

Parameter	Description
On Schedule	Select whether to include this door's information in the door schedule and also set the door ID label to visible
Prefix	Assigns alphanumeric information before the numerical label value; adding prefix information is optional
Label	Assigns a numerical value to the ID; this number increments automatically if the auto-increment option is chosen in the ID Settings dialog box
Suffix	Assigns alphanumeric information after the label value; adding suffix information is optional
Bubble Shape	Select the ID label bubble shape
Bubble Size	Enter the minimum ID label bubble size (this value represents the bubble size times the layer scale; the bubble shape is maintained relative to the text inside it for ID bubble uniformity throughout the drawing file)
Bubble Line Style	Select the bubble line style and weight, or select Set Thickness to open the Set Thickness dialog box for creating a custom line thickness; see "Pen Attributes" on page 231 in the VectorWorks Fundamentals User's Guide
Show Leader	Select to draw a leader from the ID label to the object; see "Attribute Types" on page 229 in the VectorWorks Fundamentals User's Guide
Line Style	Select the leader line style and weight, or select Set Thickness to open the Set Thickness dialog box for creating a custom line thickness; see "Pen Attributes" on page 231 in the VectorWorks Fundamentals User's Guide
Use Marker	Select whether to use a marker for the ID leader line and choose the desired style from the marker list, or select Custom to create a custom marker. Select Edit Marker List to open the Edit Marker List dialog box; see "Setting Default Marker Types" on page 60 in the VectorWorks Fundamentals User's Guide.
ID Class	Select the ID label class, or select None (which sets the ID to the same class as the door), the standard class for the ID, or any other class in the document
Keep ID Horizontal	When selected, automatically rotates the ID label so that it is horizontal
Include Hardware	Select to include a door hardware set with the door object, and click Browse to open the Door Hardware Library dialog box; see "Assigning, Creating, Editing, and Deleting Door Hardware Sets" on page 103. The door hardware set selected in the Door Hardware Library box displays in the hardware Name field of the Door Settings dialog box.
Name	Select the data field from the list and its Name displays beneath the list; select the user fields to include additional user-defined information with the door
Value	Enter the data field Value for use in the door schedule

8. Click **OK** to set the door parameters and close the Door Settings dialog box.
9. To edit parameters, double-click the door to open the Door Settings dialog box.



Door objects can also be edited in the Object Info palette. If the door has been inserted as a plug-in object, most settings from the Window Settings dialog box display. If the window is a black symbol made from a window object, fields pertaining to window geometry do not display.

Two additional Object Info palette parameters are available for windows inserted in a wall: click **Flip** to flip the window orientation, or click **Position** to open the Position Symbol in Wall dialog box to enter the distance from the symbol's insertion point to the corner of the selected wall.

The Object Info palette display order can be changed by advanced users through the VectorScript Plug-in Editor; however, this is not recommended.

10. The door schedule and/or door hardware legend can be added to the drawing from the **VA Create Schedule** command (see “Creating Schedules” on page 378) or the Resource Browser. From the Resource Browser, open the Libraries\Defaults\Reports~Schedules\Architectural Reports.vwx file that is included with Architect. Drag the door schedule or door hardware legend worksheet to the drawing. The worksheet is populated with information from the objects in the current drawing. To edit the worksheet after it has been created, see “Using Worksheets” on page 566 in the VectorWorks Fundamentals User's Guide.

Assigning, Creating, Editing, and Deleting Door Hardware Sets

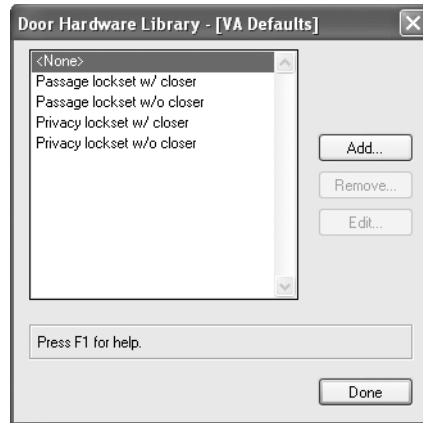
Product: Architect and Landmark

A door hardware set can be assigned to the door, and a door operator device (such as a knob or lever) can be selected to display on the 3D door from default resources; see “VectorWorks Design Series Default Resources” on page 570.

To assign, create, edit, or delete a door hardware set:

1. From the Data tab of the Door Settings dialog box, select **Include Hardware** and click **Browse**.

The Door Hardware Library dialog box opens for selecting a door hardware set and door operator device.



Parameter	Description
Title Bar	Displays the name of the current preference set
Door Hardware Set list	Lists all defined door hardware sets
Add	Creates a new hardware set

Parameter	Description
Remove	Removes the selected hardware set from the library (this action cannot be undone)
Edit	Edits the currently selected hardware set

2. Select **Edit** or **Add**.

The Edit or Add Door Hardware Set dialog box opens. The Add dialog box is similar to the Edit dialog box except that all fields are blank.

Edit Door Hardware Set

Field Value:

Value:

Description:Passage lock-set w/ closer

Hdw Set ID:HDW-3

Hinge Qty:1 1/2 pair

Hinge Type:Hager #1279

Lockset Type:Schlage S10D x SAT x 626


Closer Type:"L.C.N. 40"" Regular Arm"

Stop Type:Ives #407 1/2 x US 26D

Key Code:101D

Notes:brushed chrome finish

Symbol:



Ball-Ball SB

Press F1 for help.

OK

Cancel

Parameter	Description
Description	Indicates the name of the door hardware set
Hdw Set ID	Indicates the unique ID value assigned to the door HW Set field in the door schedule
Hinge Qty	Indicates the number of hinges
Hinge Type	Indicates the hinge type
Lockset Type	Indicates the lockset type
Closer Type	Indicates the closer type
Stop Type	Indicates the stop type
Key Code	Indicates the key code
Notes	Contains any pertinent notes about the door operator device
Symbol	List the available door hardware to assign to the door from the default resources (see “VectorWorks Design Series Default Resources” on page 570)



3. Complete each field with the desired information to add a new door hardware set, or edit the desired fields to change an existing door hardware set.
4. Click **OK**, and then click **Done** to return to the Door Settings dialog box.

The applied information appears in the door hardware legend generated (see “Creating Schedules” on page 378).

Creating a Window or Door Symbol

Product: Architect and Landmark

If the same customized style of window or door is to be used numerous times in a drawing, consider turning a single instance of the object into a symbol. This eliminates the need to repeatedly apply parameters, maximizes memory efficiency, and allows global editing of symbols. See “Creating New Symbols” on page 156 in the VectorWorks Fundamentals User’s Guide.

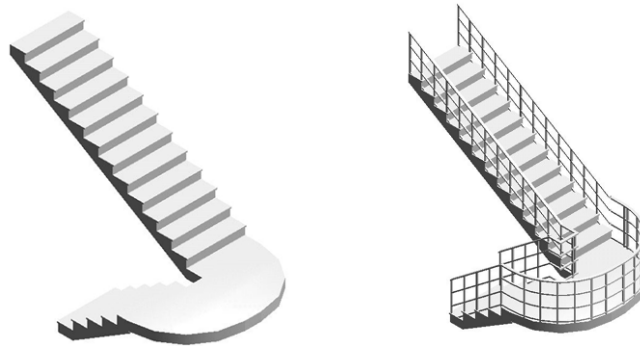
If a custom window or door is unique (i.e., it has only one instance) in a project, creating a symbol from it is unnecessary. However, making a symbol of the installed window or door makes it easy to reuse it in other drawings should there be a need to do so in the future.

After the symbol is created, it can be selected from the Window or Door Settings dialog box (by selecting **Use Symbol Geometry** as described in “Inserting Windows” on page 83 and “Inserting Doors” on page 93), where it can take advantage of functionality such as embedded IDs and data, cavity wrapping, splays, and wall offsets. To enable automatic ID labeling, from the Data tab of the settings dialog box, select **On Schedule**, and specify the ID parameters. If necessary, set the class to which the ID is assigned to visible. Alternatively, set the automatic ID labeling through the **ID Label** tool; see “ID Label Tool” on page 381.

Inserting Stairs

Product: Architect, Landmark, Spotlight, and Machine Design

VectorWorks Architect contains a customizable stair object, which allows a user to build up a stair from a user-defined series of flights and platforms (landings) in various geometries. The stair is a hybrid object, offering complete control over the 2D appearance for both the lower and upper floors, as well as a 3D component for presentation drawings.



In VectorWorks Fundamentals, the stair object has limited capabilities and configurations. In the Design Series products, the stair object includes many more options, can be put into an unlimited number of configurations, and performs many stair design chores automatically.

The stair is most effectively used in drawings that have layers set up according to the building levels in the project. The stair object can then be set to determine its own floor-to-floor height, on the basis of the difference between the layer Z heights. When layers with set Z heights are present, the stair automatically calculates the number of risers it needs,



given the floor-to-floor height and the maximum riser height. More importantly, the stair creates a “going up” representation of itself on the lower floor, and a “coming down” representation of itself on the upper floor. This avoids having to draw stairs on two different layers, and edit them separately, to completely represent the same physical staircase. Stair break options can be set differently on each layer, to get exactly the desired look in plan view.

Instead of having a limited number of predetermined configurations, the stair supports a variable number of flights and landings, making it possible to create any combination of elements required by the stair design.

Creating a Stair

Product: Architect, Landmark, Spotlight, and Machine Design

The stair obtains some of its parameters based on the layer where it is placed and, if it is configured to do so, displays on both the lower layer and upper layer; stairs should be placed in a drawing with layers set up according to the project building levels.

A stair should be inserted on the layer representing the lower of the two floors it connects.

Stairs are made up of flight and platform “components,” and are assembled to create unlimited possible configurations.

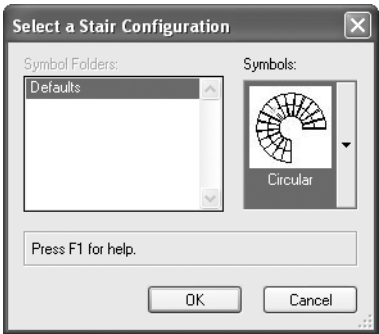


To insert a stair:

- 1. Click the **Stair** tool from the Building Shell tool set.
- 2. Click to insert the stair.

The first time a stair is placed in a drawing file, the Select a Stair Configuration dialog box opens automatically. Otherwise, click **Preferences** from the Tool bar before placing the stair to set the default stair parameters.

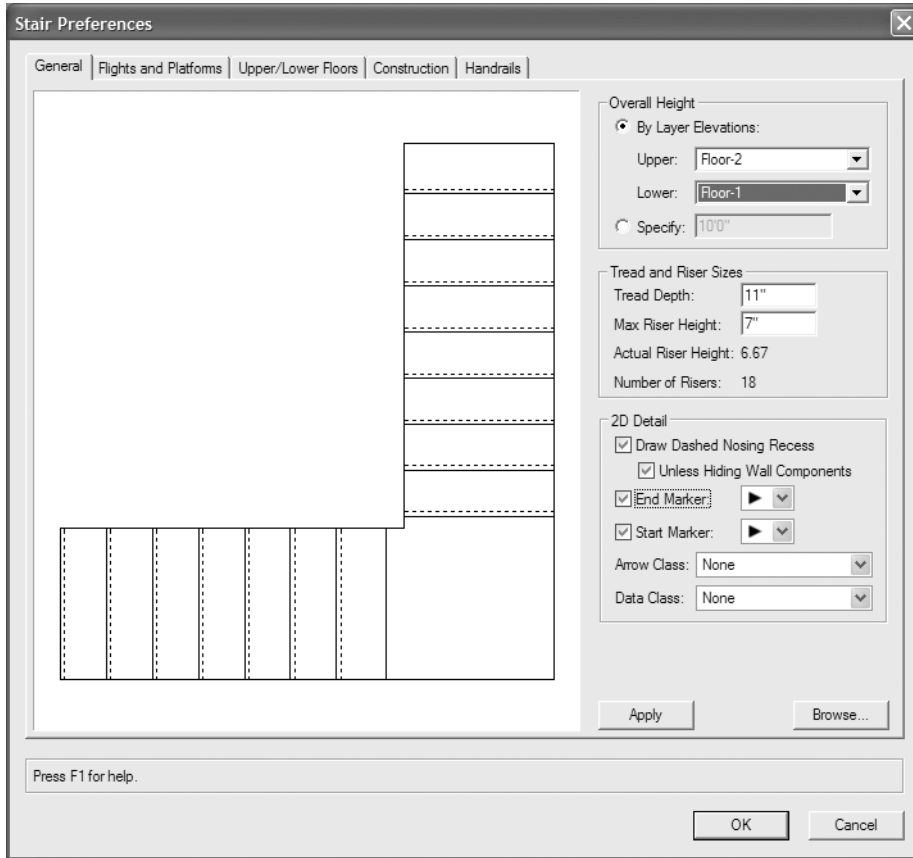
Select an initial stair configuration from the default resources (see “VectorWorks Design Series Default Resources” on page 570). Components can be edited and added to the initial configuration.



Parameter	Description
Symbol Folders	Specifies the location of stair symbols
Symbols	Provides a graphical list of available stair symbols

- 3. Click **OK**.

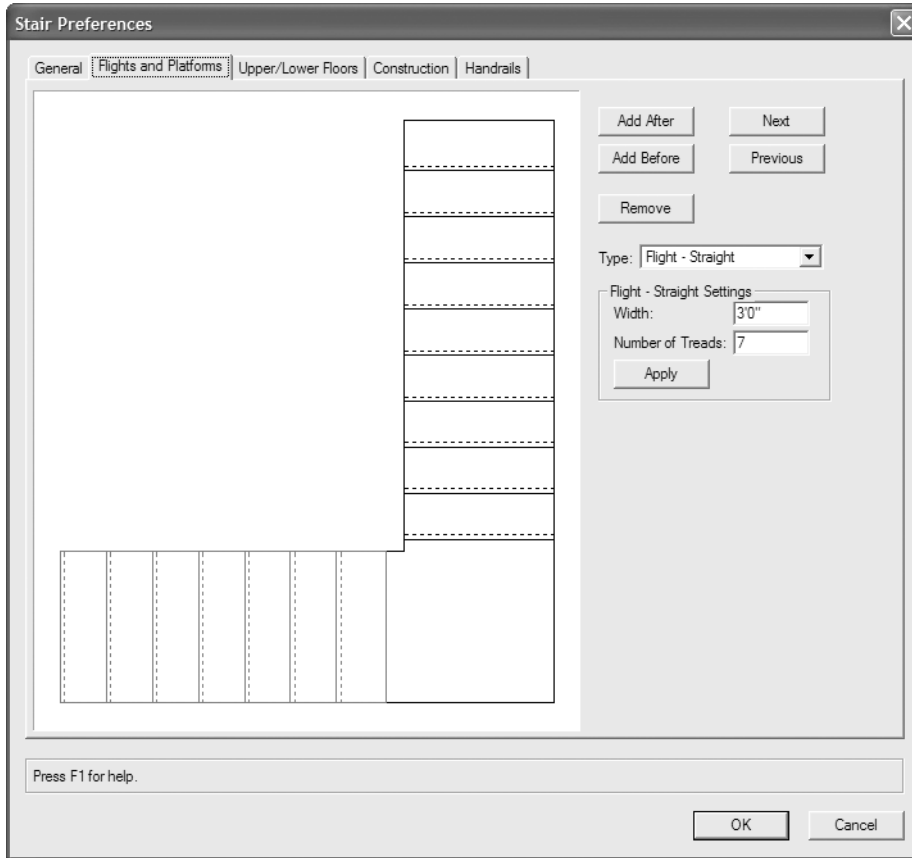
The Stair Preferences dialog box opens. Click the General tab to set the overall stair height, tread and riser information, and 2D parameters.



Parameter	Description
Overall Height	Specify whether the stair height is obtained according to its upper and lower layer elevation or with a set value
By Layer Elevation	Sets the stair height according to the distance between its lower and upper layers. Select the upper and lower layers. If the layers set here are different from the active layer where the stair was originally placed or when the Stair tool was selected, the stair is placed on the layers specified here, and not on the active layer.
Specify	Sets the stair's height to a specific value, regardless of layer height
Tread and Riser Sizes	
Tread Depth	Sets the tread width
Max. Riser Height	Specifies the maximum allowable riser height
Actual Riser Height	Displays the actual riser height, in the current file units, based on stair height
Number of Risers	Displays the number of risers, based on riser and stair height

Parameter	Description
Draw Top Tread	Specify whether the stair should include a tread at the same level as the upper floor it serves
2D Detail	
Draw Dashed Nosing Recess	Specifies whether to indicate the riser position with dashed lines
Unless Hiding Wall Components	If drawing dashed lines indicating the nosing recess of risers, specify whether to hide the lines when also hiding wall components with the Hide wall components document preference
End/Start Marker	Specify a starting and ending marker style for the path-of-travel marker (arrow)
Arrow Class	If desired, select a class for the path-of-travel marker
Data Class	If desired, select a class for stair data that displays with the path-of-travel marker
Apply	Applies the current settings to the preview image; use the preview to judge the effect of the parameter changes
Browse	Opens the Select a Stair Configuration dialog box, to select a different stair symbol from the default resources

4. Click the Flights and Platforms tab.
- The selected stair configuration displays in the preview, with the current component displayed in red. Stair components can be added and removed, and the stair configuration is automatically adjusted to meet the stair height.
- If adjacent flights and platforms (landings) do not have the same width, they are aligned by the center of the adjacent edges.

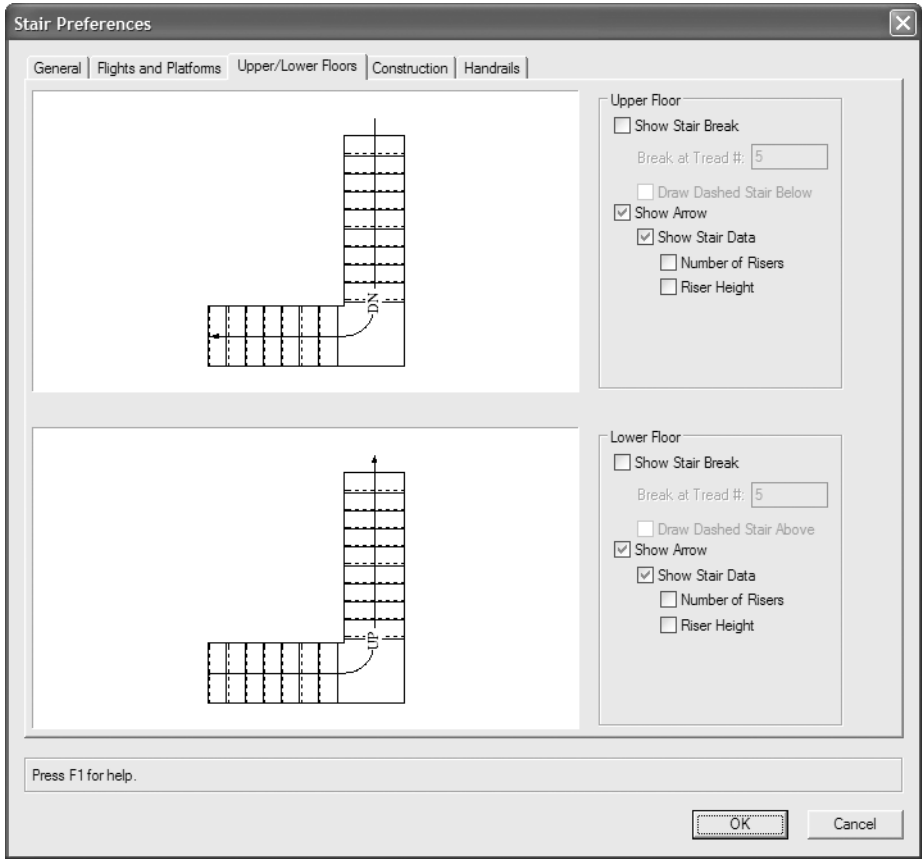


Parameter	Description
Add After	Opens the Add Stair Component dialog box, for adding a stair component (stair flight, winder, or platform) after the currently highlighted component. Select the component to add and click OK . If treads need to be removed to meet the stair height requirement, they are removed from the next flight.
Add Before	Opens the Add Stair Component dialog box, for adding a stair component (stair flight, winder, or platform) before the currently highlighted component. Select the component to add and click OK . If treads need to be removed to meet the stair height requirement, they are removed from the previous flight.
Next/Previous	Highlights the next or previous stair component, for adding or removing components, or changing parameters
Remove	Removes the currently highlighted stair component
Type	When adding or editing a stair component, sets the type of component and its associated parameters. Edits are applied to the currently highlighted component.
Apply	Applies the current stair component parameters to the preview image; use the preview to judge the effect of parameter changes

5. Click the Upper/Lower Floors tab to set the stair appearance in Top/Plan view for both the upper and lower floor layers.

The appearance of the stair line style, line weight, and fill style can be set in the Attributes palette. If style classes are selected for the appearance of the 3D components on the Construction tab, the fill style set here is overridden.

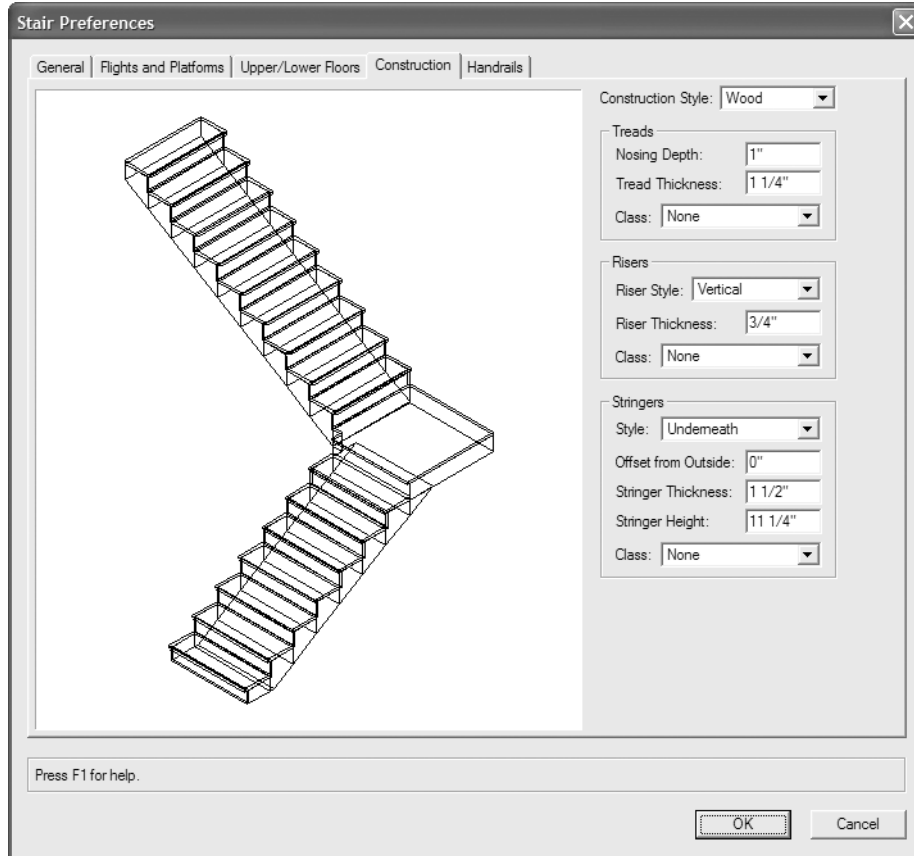
The drawing must have an upper and lower layer and have height set by layer elevation to display parameters for each floor. Otherwise, only lower floor parameters can be set.



Parameter	Description
Show Stair Break	Hides a portion of the stair with a stair break, so that the upper/lower portion of the stair can be displayed in 2D
Break at Tread #	Specifies where to begin the stair break; if the stair break is a platform, the break is drawn at the last tread going up (for the lower floor) or the last tread going down (for the upper floor)
Draw Dashed Stair Below/Above	When the stair break is shown, draws the portion of the stair above or below the break with dashed lines; deselect to hide the stairs above or below the break
Show Arrow	Select to display the path-of-travel arrow
Show Stair Data	Select to display stair data with the path-of-travel arrow

Parameter	Description
Number of Risers	Displays the number of risers
Riser Height	Displays the riser height

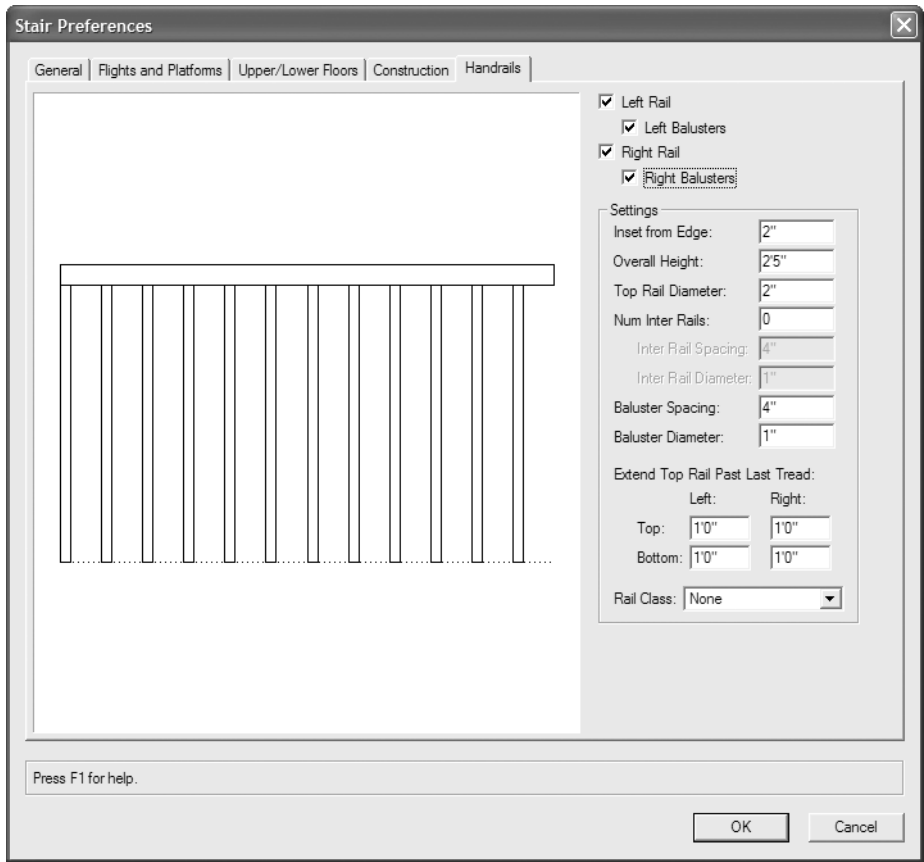
6. Click the Construction tab to set the 3D stair appearance, including construction style, and tread, riser, and stringer parameters and style classes (see “Using Style Classes” on page 120).



Parameter	Description
Construction Style	Select the construction material of the stairs
Treads	
Nosing Depth	Specify the nosing depth
Tread Thickness	Specify the vertical thickness of the nosing
Class	Select a tread style class
Risers	
Riser Style	Specify whether risers are open or vertical

Parameter	Description
Riser Thickness	Indicates the horizontal thickness for vertical riser styles (for wood stairs, this refers to the grade of lumber used to construct the stair)
Class	Select a riser style class for vertical riser styles
Stringers	
Style	Specify whether stringers are underneath or outside the stair
Offset from Outside	For Underneath stringer styles, specifies the distance between the outside of the stair tread to the outside of the stringers
Stringer Thickness	Specifies the stringer width
Stringer Height	Specifies the stringer height; if the stringers are underneath the treads, this height includes notches and cannot be less than the notch depth +2
Class	Select a stringer style class

7. Click the Handrails tab to specify handrail settings for the left and right sides of the stair. The preview displays the handrails on one side.

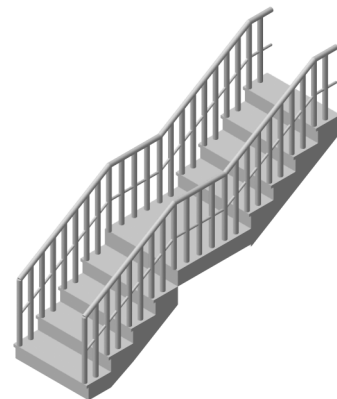
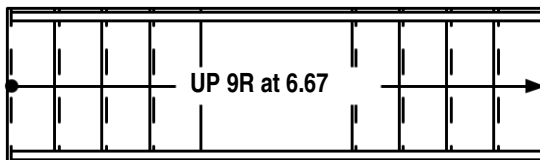




Parameter	Description
Left/Right Rail	Select to add a rail to the left or right side of the stair (going up)
Left/Right Balusters	When selecting a rail, specify whether it contains balusters (upright supporting posts)
Settings	Specify the handrail settings, which apply to both the left and right handrails except where indicated
Inset from Edge	Indicates the horizontal distance of the handrails from the outside edge of the stairs
Overall Height	Specifies the height of the top rail
Top Rail Diameter	Specifies the diameter of the top rail
Num Inter Rails	Indicates the number of horizontal intermediate rails (parallel to the top rail)
Inter Rail Spacing	Sets the distance between the intermediate rails (when there are more than one)
Inter Rail Diameter	Sets the diameter of the intermediate rails
Baluster Spacing	Specifies the distance between the balusters; baluster spacing cannot exceed the Tread Depth (specified on the General tab)
Baluster Diameter	Specifies the diameter of the balusters
Extend Top Rail Past Last Tread	For the left and right rails, specify the distance to extend the top stair rail past both the top and/or bottom of the stair
Rail Class	Select a rail style class

Stairs with multiple horizontal rails can take a long time to regenerate. Temporarily deselect **Detail 3D Handrails** in the Object Info palette to speed up performance.

- Click **OK**.
- Click in the drawing to insert the stair. Click again to set the stair rotation.



Stair Properties

Product: Architect, Landmark, Spotlight, and Machine Design

The properties of a stair object can be edited in the Object Info palette. Frequently-accessed parameters are available directly in the palette; click **Settings** to access the rest of the stair parameters.



If moving a stair object, temporarily deselect **Detail 3D Handrails** from the Object Info palette to decrease regeneration time.

Parameter	Description
Flr-Flr Height	Sets the stair’s height to a specific value, regardless of layer height
Max Riser	Specifies the maximum possible riser height
Tread Depth	Sets the horizontal (front to back) tread width
Tread Height	Sets the vertical tread thickness
Nosing Depth	Specifies the depth of the stair nosing
Stringer Width	Specifies the stringer width
Draw Top Tread	Specify whether the stair should include a top tread
Detail 3D Handrails	For speedier performance, draws handrails as NURBS curves, rather than extrude-along-path objects
Left Rail	Select to include a handrail on the left side of the stair (going up)
Right Rail	Select to include a handrail on the right side of the stair (going up)
Rail Height	Specifies the height of the top rail
Rail Width	Indicates the rail diameter
Upper Break	Specifies where to begin the stair break on the upper portion of the stair
Lower Break	Specifies where to begin the stair break on the lower portion of the stair
Settings	Opens the Stair Settings dialog box, for editing stair parameters. The tabs and settings on this dialog box are the same as those in stair preferences; see “Creating a Stair” on page 106.

Inserting Cabinets

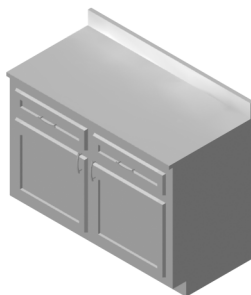
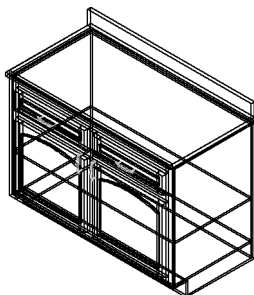
Product: Architect, Landmark, Spotlight, and Machine Design

VectorWorks Fundamentals and all VectorWorks Design Series products include three types of cabinets for inserting in a drawing file—base, wall, and utility cabinets. In VectorWorks Fundamentals, the cabinet objects are inserted through the Resource Browser. In the VectorWorks Design Series products, the cabinet objects are inserted with the various cabinet tools. Cabinet door and drawer handles are provided as default resources (default resources are automatically imported into the current file at the point of use and display in the Resource Browser; see “VectorWorks Design Series Default Resources” on page 570).



Inserting Base Cabinets

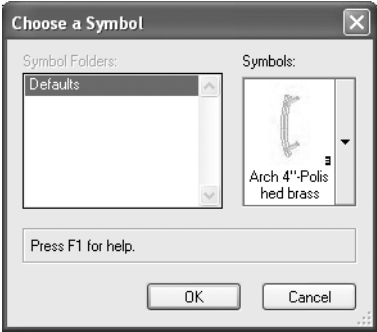
Product: Architect, Landmark, Spotlight, and Machine Design



To insert a base cabinet:

1. Select the **Base Cabinet** tool from the Furn/Fixtures tool set.
2. Click in the drawing file or wall to set the insertion point of the cabinet, and click again to set the rotation.
If this is the first time a base cabinet is placed in the drawing, the Object Properties dialog box opens.
3. Specify the default properties which apply to all base cabinets subsequently placed in this document. Cabinet properties can be edited later in the Object Info palette.

Parameter	Description
Flip	When inserting a cabinet in a wall, click to flip the cabinet orientation
Position	When inserting a cabinet in a wall, click to set the position of the cabinet; in the Position Symbol in Wall dialog box, enter the distance from the symbol's insertion point to the selected corner of the wall
Style	Select the cabinet style
End Finish	Select the cabinet finish
Blind	Specify the direction of the blind, or none
Length	Enter the cabinet length
Uneven Length Corner	Select whether the cabinet has an uneven length corner, and if so, enter the left corner length
Height / Depth	Enter the cabinet height and depth
Door mounting	Select the cabinet door mounting style
Draw Drawer	Select whether to draw the cabinet drawer(s)
Drawer Style	Specify the drawer style
Number of Doors	Select the number of cabinet doors
Door Style	Select the cabinet door style
Panel Style	Select the door panel style

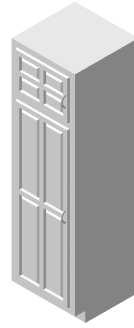
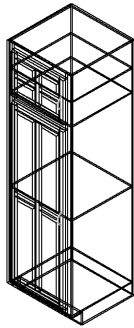
Parameter	Description
Arch Height Factor	Specify the proportion of the arch height in relation to the door width (a larger value produces a taller arch)
Door Swing	Specify the door swing direction
Rail and Stile Width	Select the rail and stile width
Bevel Edge	Select whether to bevel the outside door and drawer edges
Bevel Inside	Select whether to bevel the inside door and drawer edges
Reveals	Enter the Top, Mid, Bottom, Side, and Center reveal height or width
Number of Shelves	Enter the number of shelves
Draw Kick	Select whether to draw a kick
Kick Height / Depth	Specify the kick height and depth
Draw Counter	Select whether to draw a counter
Back Splash	Specify where to place the back splash, or none
Splash Height	Enter the back splash height
Splash Thickness	Enter the back splash thickness
Counter Thickness	Enter the counter thickness
Overhang	Enter the counter overhang length
Reveal	Enter the thickness for the bottom portion of the counter
Show Detail	Select whether to draw various cabinet details. Select the cabinet door, kick, and/or counter style class, or none; see “Using Style Classes” on page 120
Door Handle Height	Enter the door handle height
Door / Drawer Handles	<div><p>Click Door Handles or Drawer Handles to select a handle from the default resources (see “VectorWorks Design Series Default Resources” on page 570); select a symbol from the graphical list of Symbols and click OK (or select the No Pull symbol to remove the door or drawer handles)</p></div>

4. Click **OK** to set the cabinet parameters and close the Object Properties dialog box.



Inserting Utility Cabinets

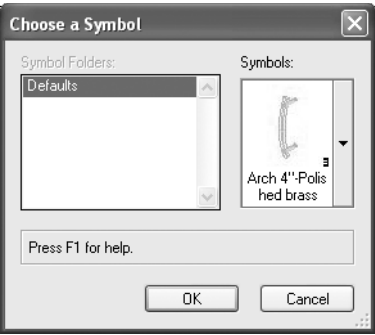
Product: Architect, Landmark, Spotlight, and Machine Design



To insert a utility cabinet:

1. Select the **Utility Cabinet** tool from the Furn/Fixtures tool set.
2. Click in the drawing file or wall to set the insertion point of the cabinet, and click again to set the rotation.
If this is the first time a utility cabinet is placed in the drawing, the Object Properties dialog box opens.
3. Specify the default properties which apply to all utility cabinets subsequently placed in this document. Cabinet properties can be edited later in the Object Info palette.

Parameter	Description
Flip	When inserting a cabinet in a wall, click to flip the cabinet orientation
Position	When inserting a cabinet in a wall, click to set the position of the cabinet; in the Position Symbol in Wall dialog box, enter the distance from the symbol's insertion point to the selected corner of the wall
Length	Enter the cabinet length
Height / Depth	Enter the cabinet height and depth
Door Mounting	Select the cabinet door mounting style
Number of doors	Select the number of cabinet doors
Door Swing	Specify the door swing direction
Door Style	Select the cabinet door style
Panel Style	Select the door panel style
Mullion Style	Select the cabinet mullion style, or none
Handle Height	Enter the door handle height
Number of Shelves	Enter the number of shelves
Upper Door Height	Enter the upper cabinet door height
Upper Door Style	Select the upper cabinet door style

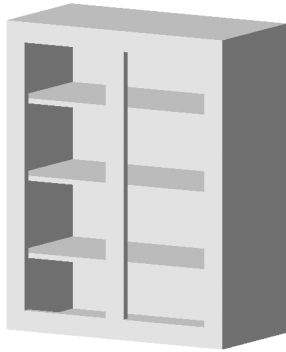
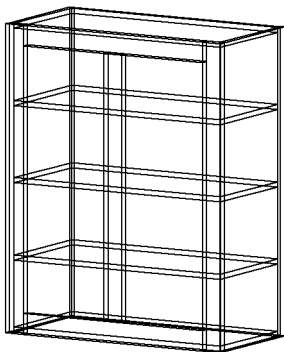
Parameter	Description
Upper Panel Style	Select the upper cabinet door panel style
Upper Mullion Style	Select the upper cabinet mullion style, or none
Upper Handle Height	Enter the upper cabinet door handle height
Upper Number of Shelves	Enter the number of shelves in the upper cabinet
Arch Height Factor	Specify the proportion of the arch height in relation to the door width (a larger value produces a taller arch)
Rail and Stile Width	Select the rail and stile width
Bevel Edge	Select whether to bevel the outside door and drawer edges
Bevel Inside	Select whether to bevel the inside door and drawer edges
Reveals	Enter the Top, Mid, Bottom, and Side reveal measurement height or width
Draw Kick	Select whether to draw a kick
Kick Height / Depth	Specify the kick height and depth
Show Detail	Select whether to draw various cabinet details. Select the cabinet, door, kick, and/or glazing style class, or none; see "Using Style Classes" on page 120
Handles	<p>Click Door Handles or Drawer Handles to select a handle from the default resources (see "VectorWorks Design Series Default Resources" on page 570); select a symbol from the graphical list of Symbols and click OK (or select the No Pull symbol to remove the door or drawer handles)</p> 

4. Click **OK** to set the cabinet parameters and close the Object Properties dialog box.



Inserting Wall Cabinets

Product: Architect, Landmark, Spotlight, and Machine Design

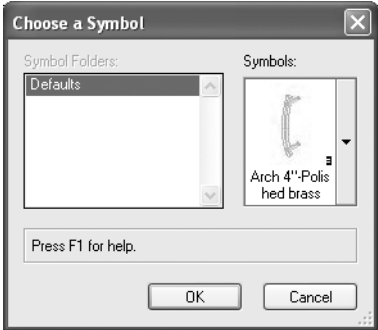


To insert a wall cabinet:

1. Select the **Wall Cabinet** tool from the Furn/Fixtures tool set.
2. Click in the drawing file or wall to set the insertion point of the cabinet, and click again to set the rotation.
If this is the first time a wall cabinet is placed in the drawing, the Object Properties dialog box opens.
3. Specify the default properties which apply to all wall cabinets subsequently placed in this document. Cabinet properties can be edited later in the Object Info palette.

Parameter	Description
Flip	When inserting a cabinet in a wall, click to flip the cabinet orientation
Position	When inserting a cabinet in a wall, click to set the position of the cabinet; in the Position Symbol in Wall dialog box, enter the distance from the symbol's insertion point to the selected corner of the wall
Style	Select the cabinet style
End Finish	Select the cabinet finish
Blind	Specify the direction of the blind, or none
Length	Enter the cabinet length
Uneven Length Corner	Select whether the cabinet has an uneven length corner, and if so, enter the Left Corner Length
Height / Depth	Enter the cabinet height and depth
AFF	Enter the cabinet height above the finished floor
Door mounting	Select the cabinet door mounting style
Number of Doors	Select the number of cabinet doors
Door Swing	Specify the door swing direction
Door Style	Select the cabinet door style



Parameter	Description
Panel Style	Select the door panel style
Mullion Style	Select the cabinet mullion style, or none
Number of Shelves	Enter the number of shelves
Arch Height Factor	Specify the proportion of the arch high in relation to the door width (a larger value produces a taller arch)
Handle Height	Enter the door handle height
Rail and Stile Width	Select the rail and stile width
Bevel Edge	Select whether to bevel the outside door and drawer edges
Bevel Inside	Select whether to bevel the inside door and drawer edges
Reveals	Enter the Top, Mid, Bottom, and Side reveal measurement height or width
Glazing	Select the glazing style class, or none; see “Using Style Classes” on page 120
Show Detail	Select whether to draw various cabinet details. Select the cabinet and/or door style class, or none; see “Using Style Classes” on page 120
Handles	<p>Click Door Handles or Drawer Handles to select a handle from the default resources (see “VectorWorks Design Series Default Resources” on page 570); select a symbol from the graphical list of Symbols and click OK (or select the No Pull symbol to remove the door or drawer handles)</p> 

4. Click **OK** to set the cabinet parameters and close the Object Properties dialog box.

Using Style Classes

Product: Architect

Certain plug-in objects in VectorWorks Architect, such as windows, doors, stairs, and cabinets, offer the ability to set portions of the object to style classes (Style-1, Style-2, etc.).

When a style class is selected, the class is automatically added to the file, and the plug-in object component is assigned to that class. Select **Tools > Organization** to set the class properties from the Classes tab. See “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide.

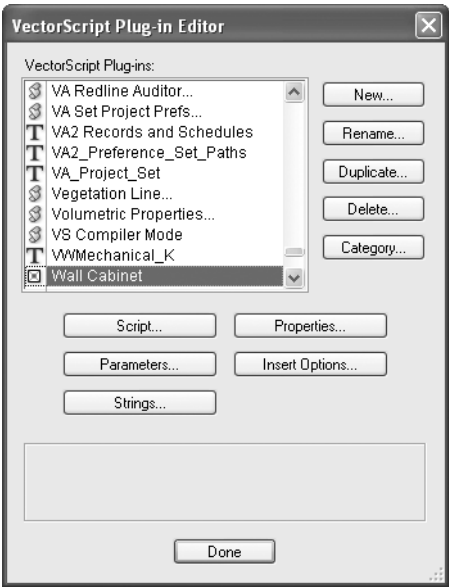
Certain plug-in objects, such as the wall cabinet, allow class styles to be set from the Object Info palette. The plug-in object style class names for these types of objects can be edited to provide a more meaningful name for office standards.

When a newer version of VectorWorks is installed, this procedure must be repeated. Before editing any plug-in objects, create a backup of the file.

To edit the class style names of a plug-in object:

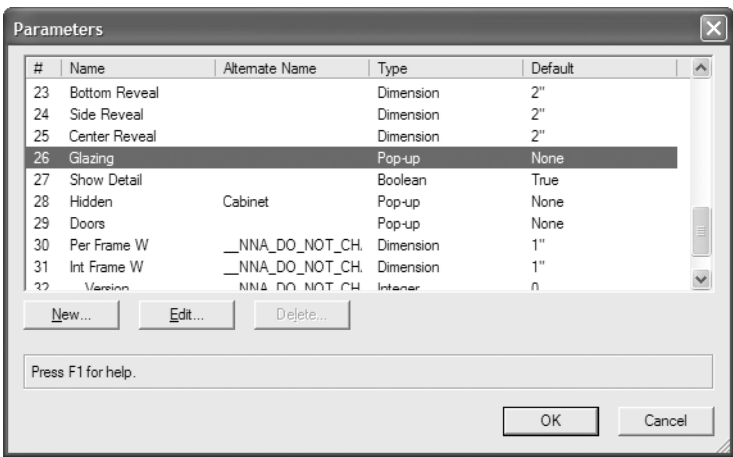
- 1. Select **Tools > Scripts > VectorScript Plug-In Editor**.

The VectorScript Plug-In Editor dialog box opens.



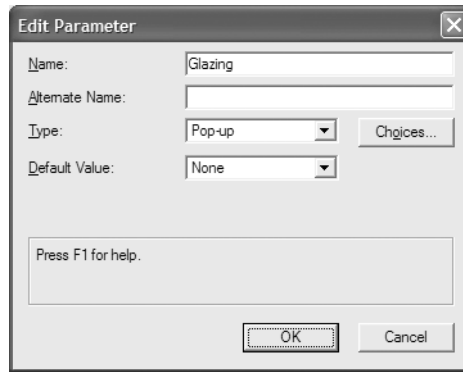
- 2. Select the plug-in object to edit, and click **Parameters**.

The Parameters dialog box opens.



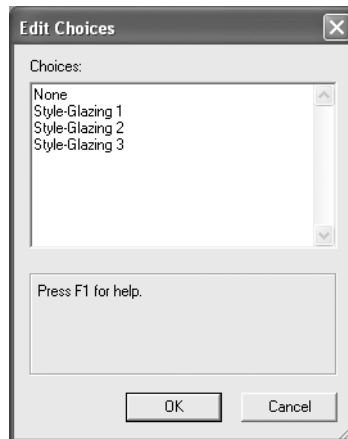
3. Locate the parameter that displays in the Object Info palette and is associated with the object's class style names and click **Edit**.

The Edit Parameter dialog box opens.

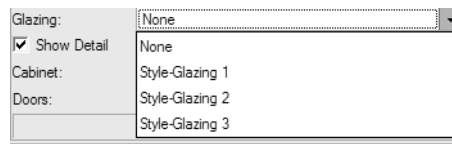


4. The **Type** of this parameter is Pop-Up. Click **Choices** to add or change class style names.

The Edit Choices dialog box opens.



5. Add additional choices to the list of class names. Editing the current choices is also possible, but is not recommended, since existing objects may still use those class style names.
6. When the list of class style name choices is complete, click **OK**. Click **OK** to close all the plug-in editor dialog boxes and return to the drawing.
7. The new choices are available from the style class list of the Object Info palette.



Adding MEP Information to the Design

Product: Architect

VectorWorks Architect includes the Mechanical, Electrical, and Plumbing (MEP) components required to complete the design. With menu commands, tools, and symbols, Architect facilitates the addition of plumbing, circuit, and HVAC elements to a project.

Plumbing and Piping Objects

Product: Architect

Plumbing and piping objects are available from the MEP tool set and [VectorWorks]\Libraries (see “Object Libraries” on page 565). These objects are accessed through the Resource Browser and consist of hybrid 2D/3D representations of common plumbing fixture elements. See “Using the Resource Browser” on page 142 in the VectorWorks Fundamentals User’s Guide.

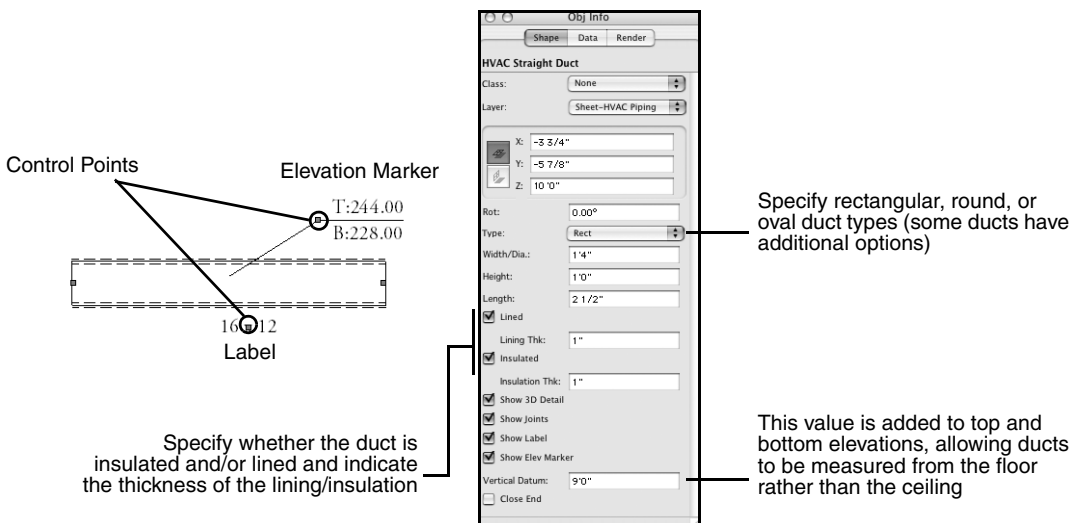
HVAC

Product: Architect

The Heating, Ventilating, and Air Conditioning (HVAC) tools and objects add HVAC ducts and diffusers in a variety of configurations to a drawing. These geometric models can represent a variety of actual items. For example, the diffuser object can have its dimensions and parameters set to develop many differently sized diffusers, including industry standard sizes that can be predefined.

HVAC objects are available in [VectorWorks]\Libraries (see “Object Libraries” on page 565). These objects are accessed through the Resource Browser and consist of hybrid 2D/3D representations of common HVAC ductwork elements. See “Using the Resource Browser” on page 142 in the VectorWorks Fundamentals User’s Guide.

Ductwork objects include optionally displayed labels and elevation marker tags. The label contents are determined by a user-defined string of values, such as width and height (obtained automatically) and any text desired. The elevation marker tag indicates the top and bottom above the finish floor of an HVAC ductwork item; **Show 3D Detail** must be enabled to display the elevation marker tag. Both the HVAC label and elevation marker tag can be easily moved by dragging its control point to the correct location.





A diffuser report, containing a diffuser, register, and grille schedule, can be included. It can be added to the drawing from the **VA Create Schedule** command or the Resource Browser. From the Resource Browser, open the Libraries\Defaults\Reports~Schedules\HVAC Reports.vwx file that is included with Architect. Drag the Diffuser Report worksheet to the drawing. An HVAC Diffuser, Register and Grille worksheet, populated with information from the objects in the current drawing, is automatically created.

For more information on labels, elevation marker tags, and HVAC reports, refer to the Duct_Object.pdf file included in [VectorWorks]\Extras.

Electrical and Communication Circuiting

Product: Architect

The communications and electrical circuiting tools and objects add electrical and communication objects, including panels and disconnects, to a drawing. The circuiting tools link these objects, creating a communication or electrical circuit.

Electrical and Communication Objects

Product: Architect

Electrical and communication objects are available from the MEP tool set and in specific object libraries (see “Object Libraries” on page 565). These objects are accessed through the Resource Browser, and consist of hybrid 2D/3D representations of common electrical devices. These symbols already have the correct records attached for proper circuiting. See “Using the Resource Browser” on page 142 in the VectorWorks Fundamentals User’s Guide.

It is also possible to create custom electrical symbols, panels and disconnects; attaching the correct record to these symbols makes them circuitable. See “Creating Custom Electrical and Communication Symbols” on page 543 for information.

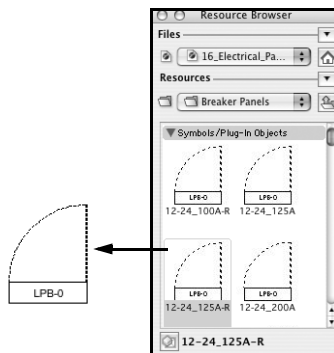
Naming Panels

Product: Architect

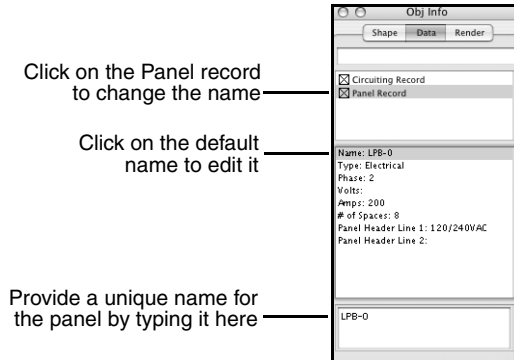
When inserting panels (electrical or communication) from object libraries, give each panel its own name so that it can be uniquely identified by the **Circuiting** tool.

To identify an inserted panel with a unique name:

1. Insert the panel from the Resource Browser.



2. With the panel still selected, click the Data tab in the Object Info palette. Provide the unique panel name under the Panel record information.



Circuiting Tool

Product: Architect

Once electrical or communication panels and objects have been inserted, the **Circuiting** tool links the objects by assigning each item a circuit number and associating it with a panel board.

The symbol or object that is being circuited must be on a visible (not grayed) layer. If the symbol is not on the active layer, the symbol is copied to the active layer, and then the record information is attached. This is designed so that an electrical engineer can use workgroup referencing to access architectural layers with preliminary outlet locations. The engineer can then copy those outlets to the proper layer without re-entering data.

Creating a Circuit

Product: Architect

When creating a circuit, do not include the panel symbol.



To create a circuit:

1. Click the **Circuiting** tool from the MEP tool set.
2. Click on the first item to be circuited.

If selecting a custom symbol without a Circuiting record attached, the tool attaches the record to the current symbol, as well as to all subsequent symbols in the circuit. In this case, specify whether an electrical or communication circuit is being created.

Based on the item's record, the tool determines whether this is an electrical or communication device. The Circuiting Tool dialog box opens.

Circuiting Tool

Circuit Information

Panel Name : Elec Panel

Circuit # : 3

Trip : 20

Wire Size : #12

Conduit Size : 1/2"

V.A./Watts : 2000

Remarks : Receptacles

☐ Check Voltage and Phase of Circuit Items

☒ Draw circuiting lines
☐ Overwrite existing object data

Object Data

Phase/Pole : 0

Voltage :

V.A./Watts : 0

Remarks : Remarks

Press the Help key or Cmd+? for help.

Cancel

OK

Parameter	Description
Circuit Information	Enter the circuit information (used on the panel schedule)
Panel	Select the associated panel
Circuit #	Enter the circuit number
Trip	Enter the trip rating
Wire Size	Enter the size of the wire
Conduit Size	Enter the conduit size
V.A./Watts	Enter the total V.A./Watts rating
Remarks	Enter remarks for the circuit
Check Voltage and Phase of Circuit Items	Select to verify that the voltage and phase of circuted items is correct
Draw circuiting lines	Select to draw connecting circuiting lines
Overwrite existing object data	Select to apply the current object information to all objects in the circuit
Object Data	Enter parameters for the object being circuted
Phase/Pole	Enter the number of phases/poles
Voltage	Enter the voltage
V.A./Watts	Enter the V.A./Watts for this object
Remarks	Enter remarks for the object

3. Enter the desired information for the circuit and the objects in the circuit.

4. Click **OK**.

The information is transferred to the object’s record.



- Continue clicking on the items to be circuited in the order the circuit loop should be drawn.
- To complete the circuit, click in an empty area of the drawing. Confirm that you wish to place the Home Run marker.

The **Circuiting** tool generates a Home Run marker and phases are denoted as specified.



Adding to a Circuit

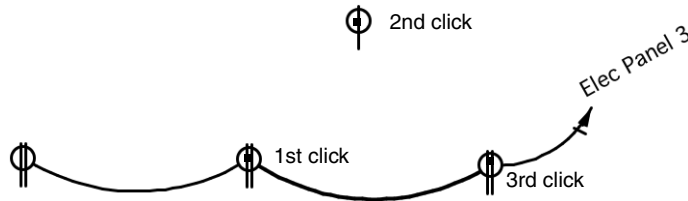
Product: Architect



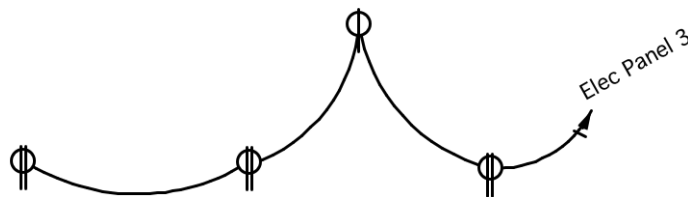
To add an item to an existing circuit:

- Click the **Circuiting** tool from the MEP tool set.
- Click the communication or electrical device from which to begin the new circuit connection.

A notice displays, asking if additional items are to be added to this circuit. Click **Yes**.



- Click the item to add to the circuit, and then select the next item in the circuit.



To complete the circuit, click away from any selectable objects. A notice displays asking if you wish to continue. Click **No** to end this procedure.

If adding an item at the end of a circuit, place the third click anywhere on the drawing. The item is chained to the item that previously had the Home Run marker attached. A notice displays, confirming whether to place the Home Run. Click **Yes**. The **Circuiting** tool generates a Home Run marker and phases are denoted.

Editing Circuits

Product: Architect

The **Edit Circuiting** tool modifies existing circuit information. Use this tool to reassign circuit numbers and update the information attached to the circuited elements.



To edit existing circuits or a circuited item:

- 1. Click the **Edit Circuiting** tool from the MEP tool set.
- 2. Click on the circuited item to be edited.

The Edit Circuit Tool dialog box opens.

Edit Circuit Tool

Edit circuit Information only

Circuit to Edit : Circuiting Record

Circuit Information

Panel Name : Comm

Circuit # : 3Trip : 20

Wire Size : #12Conduit Size : 1/2"

V.A./Watts : 2000

Remarks : Receptacles

☐ Check Voltage and Phase of Circuit Items.

Item Data

Phase/Pole : 2Voltage : 0

V.A./Watts : 0

Remarks : Panel

Press the Help key or Cmd+? for help.

CancelOK

Parameter	Description
List of editing operations	Selects the editing operation to perform. Select Edit circuit information only to edit the information which applies to the entire circuit. Select Edit selected item only or Edit all items on the circuit to enter edits which apply only to the selected circuiting item or edit both circuit and circuited object information. Select Delete selected item only or Delete entire circuit to delete the circuited item from the circuit or delete the entire circuit (the circuited items remain on the drawing).
Circuit to Edit	Selects the specific circuit to edit; available if selected item has multiple circuit assignments associated with it
Circuit Information	Enter the circuit information (used on the panel schedule)
Panel Name	Select the associated panel
Circuit #	Enter the circuit number
Trip	Enter the trip rating
Wire Size	Enter the size of the wire
Conduit Size	Enter the conduit size
V.A./Watts	Enter the total V.A./Watts rating
Remarks	Enter remarks about the circuit



Parameter	Description
Check Voltage and Phase of Circuit Items	Select to verify that the voltage and phase of circuit items is correct
Item Data	Enter parameters for the object being circuited
Phase/Pole	Enter the number of phases/poles
Voltage	Enter the voltage
V.A./Watts	Enter the V.A./Watts for this object
Remarks	Enter remarks for the object

3. Select the operation to perform.

If there are multiple records attached to this item, select the record to edit from the **Circuit To Edit** list. The record information displays in the Circuit Tool dialog box.

4. Click **OK**.

Sizing Calculators

Product: Architect

VectorWorks Architect provides sizing calculators for performing calculations and adding drawing specifications without leaving the program.

Architect includes a standard database of wire specifications used for the Conductor Sizing and Conduit Sizing calculators. The database contains the names, dimensions, and physical properties of a selected group of wiring types.

Conductor Sizing Calculator Command

Product: Architect

The Conductor Sizing Calculator reports the correct wire size for a given load, based on a single conductor and the length of travel.

To perform conductor sizing calculations:

1. Select **AEC > Electrical > Conductor Sizing Calc.**

The Conductor Sizing Calculator dialog box opens.

Conductor Sizing Calculator

Calculate:

Ohms/ft/cmil-ft

Phase Factor:

1.0

Wire Properties

Type / Manuf.:

AF

Type

Size / Part Number:

18

1620

Sectional area of wire, cmil

18

Approximate AWG

Resistance of conductor material at 75C

75

Temperature (c)

30

Amps

100

Length (ft)

☒ Aluminum

☐ Copper

Alpha:

.00330

☒ Percentage

☐ Absolute

3

%

Voltage Drop

Voltage

117

Calculate

Close

Parameter	Description
Calculate	Select the type of calculation to perform
Phase Factor	Specifies the phase factor
Wire Properties	Enter the known conductor parameters; values returned by the calculation will appear dimmed
Type/Manuf.	Select the wire type or manufacturer
Size/Part Number	Select the wire size or the manufacturer part number
Sectional area of the wire, cmil	Enter the cross sectional area of the conductor wire in cmils
Approximate AWG	Enter the approximate AWG (American Wire Gauge) of the conductor
Resistance of conductor material at 75c	Enter the resistance of the conductor material at 75c
Temperature (c)	Enter the operating temperature in Celsius
Amps	Enter the amp rating
Length (ft.)	Enter the conductor length in feet
Type	Select whether the conductor type is Aluminum or Copper , and then enter an Alpha value if other than standard
Voltage Drop	Select whether the voltage drop is a Percentage or Absolute . If a percentage, enter the value.
Voltage	Enter the working voltage
Calculate	Performs the selected calculation

2. Select the type of calculation to perform, based on the current parameters, from the **Calculate** list.



Calculation	Description
Wire Size	Provides the sectional area of the wire (cmil) and the approximate AWG for wire sizes below 250 kcmil
Ohms/ft/cmil-ft	Calculates the resistance per sectional area of wire
Voltage Drop	Calculates the voltage drop across the length of the conductor, either as a percentage or absolute value
Phase Factor	Provides the phase factor value of the conductor
Voltage	Calculates the voltage value of the conductor
Ampacity	Determines the amp rating of the conductor
Length of Run	Calculates the allowable length of the conductor specified for the load given

3. Enter the required values in the fields. Fields where the result will be displayed appear dimmed. Some calculations require the selection of the wire type or manufacturer, as well as the wire size or part number. When all the required parameter values are complete, the **Calculate** button becomes available; click to perform the calculation.
4. The calculation results are displayed. Select another calculation to perform or click **Close** to exit.

Conduit Sizing Calculator Command

Product: Architect

The Conduit Sizing Calculator reports the proper size conduit(s) required for a given set of wires.

To perform conduit sizing calculations:

1. Select **AEC > Electrical > Conduit Sizing Calc.**

The Conduit Sizing Calculator dialog box opens.

2. Using the information contained in the wire specifications database, select a wire type or manufacturer and a wire size or part number.

The cross-sectional area of the wire is displayed.

3. Enter the number of conductors of this type and size.



4. Click **Add** to include the conductor type in the conduit.
Repeat steps 2 – 4 to add more conductors to the conduit.
5. Click **Remove** to remove a selected conductor from the **Conductors Currently in Conduit** list; click **Clear All** to remove all conductors from the list.
6. Select a **Conduit Type** from the list and specify the **Number Of Conduits** and **Conduit stuff percentage**. Though a percentage is suggested, this can be modified.
7. The Results section of the dialog box displays the actual and nominal conduit sizes required.
8. When calculations are complete, click **Close**.

Creating Piping Runs

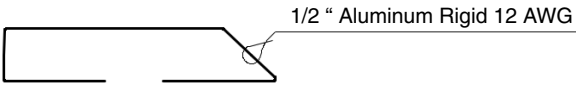
Product: Architect

Determine the section lengths and amount of material required for piping runs. Piping runs can be drawn by clicking the **Piping Run** tool on the Objects palette, by drawing a polygon and selecting the **Create Piping Runs** command, or by drawing a polyline and selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).

To create a piping run:

1. Draw one or more polygons to represent the piping run.
2. With the polygon(s) selected, choose **AEC > Electrical > Create Piping Runs**.

The piping run results are displayed and can be edited in the Object Info palette. An existing piping run can be reshaped with the **2D Reshape** tool, and the path polyline can be edited by selecting **Edit** from the context menu (see “Editing a Group” on page 397 in the VectorWorks Fundamentals User’s Guide).

Parameter	Description
Conduit Size	Specifies the diameter of the conduit
Material	Select the piping run material from the list; this selection can be displayed in the piping run tag
Remarks	Specify any remarks to be displayed in the piping run tag
Show Tag	Select to display the piping run Conduit Size and Material 
Show Remarks	Select to display the piping run Remarks ; Show Tag must be selected in order to display the remarks
Length	Displays the length of the piping run
Section Length	Specifies the length of piping run sections; edit this parameter to determine various piping run requirements
Num of Runs	Specify the number of runs; increase the number to estimate the additional material required
Num of Sections	Displays the number of sections required
Couplings	Displays the number of couplings required



Parameter	Description
Turns	Specifies the type of turns to use for the piping run corners
Use Bends	Bends the conduit and includes the bend in the length
Use Elbows	Counts the number of 45° and 90° elbows and displays the number
Radius	Specify the bend radius
45s / 90s	Displays the number of elbow turns (when Use Elbows is selected)

The piping run does not count turns at a junction box (at the location of an electrical object).

Panel Scheduling and Diagramming

Creating a Panel Schedule

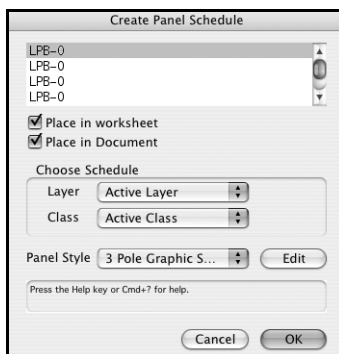
Product: Architect

The **Create Panel Schedule** command generates panel schedules based on the circuiting information assigned to the file. If necessary, modify the dimensions and layout of the panel to conform to existing office standards.

To create a panel schedule:

1. Select **Tools > Reports > Create Panel Schedule**.

The Create Panel Schedule dialog box opens. Specify the panel schedule criteria and click **OK**.



Parameter	Description
Panel list	Select a panel from the list of available panels for creating the schedule
Place in worksheet	Select to place scheduling information in a worksheet resource named with the panel name
Place in Document	Select to place a panel schedule on the drawing
Choose Schedule	Indicates the location for placing the panel schedule on the drawing
Layer	Specifies the layer for placing the schedule
Class	Specifies the class for the schedule



Parameter	Description
Panel Style	Select the panel formatting style from the list
Edit	Changes the panel schedule formatting

2. If placing the schedule on the drawing, click at the desired location.

400A 3 Phase 4 Wire Recessed Room 102														
Watt	Pole	Trip	Con	Wire	Remarks	Ckt		Ckt	Remarks	Wire	Con	Trip	Pole	Watt
						1	●	2						
2000	0	20	1/2"	#12	Receptacles	3	●	4						
2000					(Receptacles)	5	●	6	Receptacles	#12	1/2"	20	1	2000
						7	●	8						
						9	●	10		#12	1/2"	20	0	0
						11	●	12	Receptacles	#12	1/2"	20	1	2000
						13	●	14						
						15	●	16						
						17	●	18						
						19	●	20						
						21	●	22						
						23	●	24						
Phase 1 Total						0								
Phase 2 Total						2000								
Phase 3 Total						6000								

If placing the panel schedule in a worksheet, a worksheet is created with the panel name.

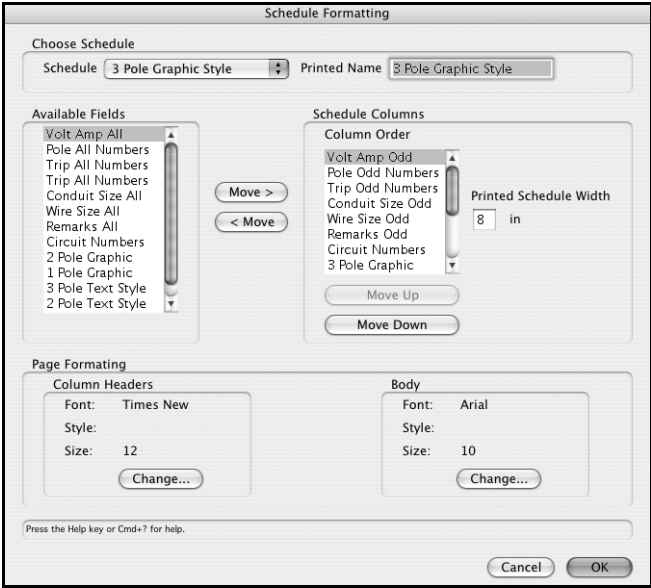
If circuiting changes are made, delete the outdated panel schedule and repeat the create panel schedule procedure.

Changing the Panel Schedule Format

Product: Architect

To format a panel schedule:

- 1. Select **Tools > Reports > Create Panel Schedule**.
The Create Panel Schedule dialog box opens.
- 2. Select the panel schedule and its location as described in “Creating a Panel Schedule” on page 133.
- 3. Click **Edit**.
- 4. The Schedule Formatting dialog box opens. Select the schedule to format from the **Schedule** list. A list of available fields and, if applicable, the schedule’s printed name displays.



Parameter	Description
Schedule	Select the schedule to format
Printed Name	Specifies the name that is printed on the schedule
Available Fields	Lists all possible schedule column items
Schedule Columns	Lists, in order, all included schedule columns
Move >	Moves a selected item from the Available Fields list to the Schedule Columns list
< Move	Moves a selected item from the Schedule Columns list back to the Available Fields list
Move Up / Move Down	Moves a selected item in the Schedule Columns list to adjust the list order
Printed Schedule Width	Specifies the total width of all schedule columns when printed
Column Headers	Displays the current font, style, and size for header information in the schedule. Click Change to edit the font format.
Body	Displays the current font, style, and size for body text in the schedule. Click Change to edit the font format.

The columns shown in the **Column Order** list appear in the schedule in order.

Panel schedule formatting is stored as a worksheet named “Panel Schedule Fmt.” This worksheet can be imported, using the Resource Browser, into other files where the same formatting is desired.

5. Click **OK** to return to the Create Panel Schedule dialog box. Click **OK** to place the schedule with the specified format.



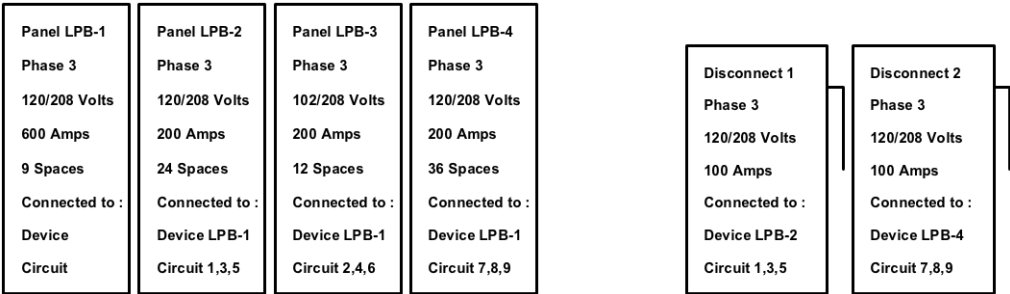
Creating Panel Riser Diagrams

Product: Architect

Panel riser diagrams summarize the electrical panels and disconnects in a project file.

To create a panel riser diagram:

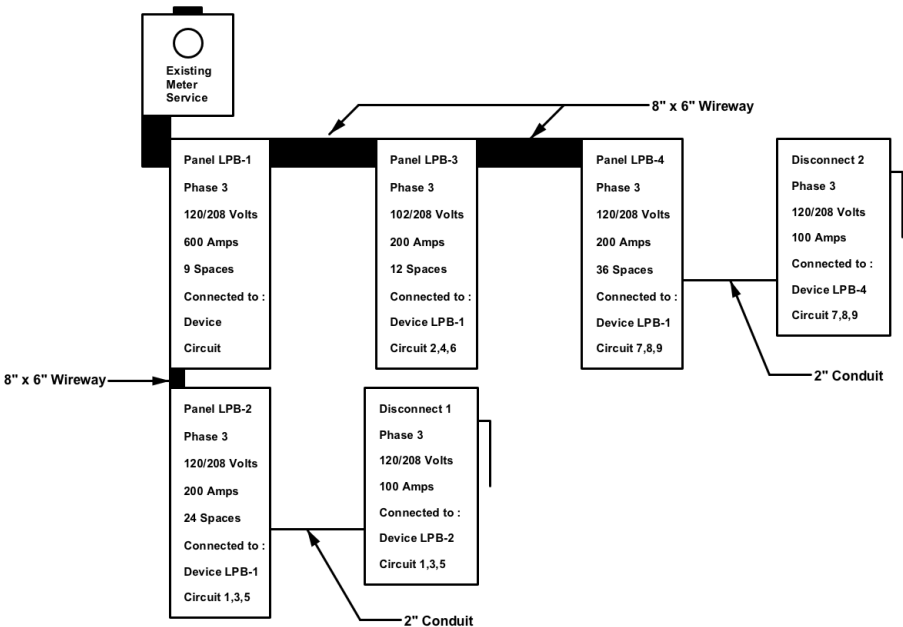
- 1. Select **Tools > Reports > Create Panel Riser Diag.**
- 2. Click on the drawing to place the panel(s) at that location.



A panel displays the Panel Name, Number of Phases/ Poles, Voltage, Amps, Number of spaces, Device Name, and Circuit where it is connected

A disconnect displays the Disconnect Name, Number of Phases/Poles, Voltage, Amps, Device Name, and Circuit where it is connected

Panels and disconnects can be rearranged, edited and annotated; graphics can be added to complete the panel riser diagram. If the panels are regenerated, any edits are lost. Once the panels have been generated, they can be arranged into a completed panel diagram, as seen in the following illustration:



Site Modeling

Sitework Overview

Product: Architect and Landmark

The sitework-related commands allow the development of complex 2D and 3D models of site terrain in VectorWorks Architect and Landmark. Landmark contains certain additional commands.

The source data for a site model is the 3D information used to create a representation of the existing site. The information can be in the form of 3D loci, 3D polygons, or surveyor data. The site model object created from the source data contains both 2D and 3D site information, and it can be copied to other layers and files. Special “snapshot” copies of the site model allow different forms of site model to be shown side by side.

When the site model is generated, two forms of the digital terrain model (DTM) are created and can be displayed—the existing DTM and the proposed DTM. The existing DTM is a direct representation of the source data. The proposed DTM is the existing DTM, plus the geometric effects of site modifiers, such as roads and pads. The existing and proposed DTM can be displayed or hidden at creation or from the Object Info palette.

Site models use the Triangulated Irregular Network (TIN) method to connect input data. This method can work with data that are scattered and in clumps—they do not have to be organized in a rectangular grid. The model uses all the data, without doing approximations, to create a network of triangles. These triangles form the terrain model; the model then performs interpolation to calculate the threading of contour lines.

When upgrading a DTM from a previous version of VectorWorks, see “Migrating Structural Shape Objects from Previous Versions” on page 542.

Site Model Source Data

Product: Architect and Landmark

Four commands can be used to input source data into the drawing for the development of a site model: **Import Survey File**, **2D Polys to 3D Contours**, **3D Polys to 3D Loci** (Landmark only), and **Grid Method Entry**. The selection of a method depends on the type of source information.

In addition, 3D loci or 3D polygons can be used directly as the source data for the site model. No conversion is necessary before using this type of source data.

Before creating the site model, the source data can be checked with the **Validate 3D Data** command to ensure that a valid DTM will be created.

Importing Source Data from an External File

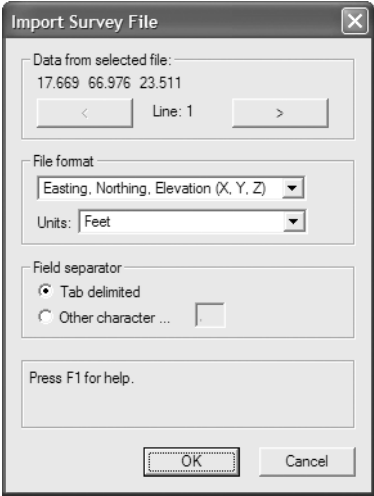
Product: Architect and Landmark

Site model source data can be generated by tabular coordinate information from an external file. This file must be a text file with fields delimited by separators in one of the formats available.

To import survey information for use as source data:

1. On the layer to receive the imported data, select **Active Layer Scale** from the drawing context menu to set the scale, or select the **File > Document Settings > Document Setup** command (see “Document Setup” on page 2).
2. Select **Landmark > Survey Input > Import Survey File** (Landmark workspace) or **AEC > Survey Input > Import Survey File** (Architect workspace). The standard Open File dialog box opens. Select the file to import.

The Import Survey File dialog box opens. Specify the file format options, and click **OK**.



Parameter	Description
Data from selected file	Displays the first line of data in the selected file
Line #	Displays the line number of the data displayed; click the < or > button to check each line in the file
File format	Select the file format of the imported file
Units	Select the unit of the imported file
Field separator	Specifies the file field delimiter
Tab delimited	Select if fields are separated by tabs
Other character	If fields are not separated by tabs, select Other character and then enter the character separating each field

As each line of the file is read, a stake object is inserted into the drawing with the appropriate Easting, Northing, and Elevation values. If this is the first time a stake object has been inserted in the drawing, the Stake Object Preferences dialog box opens. Accept the defaults and click **OK**.

Stake objects are simple objects that represent a 3D point in space, with text to display the elevation when in Plan view (see “Determining the Elevation of a Point on the Site Model” on page 191). In addition to stake objects, 3D polygons and 3D loci can be used as source data for a site model.

Adding Source Data with 2D Polygons

Product: Architect and Landmark

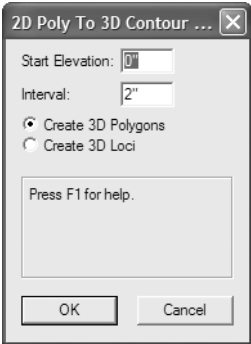
Another way of generating the site model source data is to draw, trace, or import 2D polygons representing contours; then use the **2D Polys to 3D Contours** command to convert the polygons to 3D polygons.

To generate source data with the **2D Polys to 3D Contours** command:

1. Create or import the 2D polygons representing contour lines.

Polylines cannot be used. If contours are drawn with polylines, convert them to polygons first with the **Modify > Convert to Polygons** command.

- 2. Select **Landmark > Survey Input > 2D Polys to 3D Contours** (Landmark workspace) or **AEC > Survey Input > 2D Polys to 3D Contours** (Architect workspace). The 2D Poly to 3D Contour Setup dialog box opens. Enter the first elevation and change in elevation between contour lines, and then select the type of object to be created.



Parameter	Description
Start Elevation	Indicates the elevation of the lowest contour in the drawing
Interval	Specifies the change in elevation from one contour line to the next
Create 3D Polygons/3D Loci	Select whether to create 3D polygons or 3D loci

- 3. Click **OK**.

The Set Elevation dialog box opens, and the first polygon in the drawing order is highlighted. If necessary, use the **Up** or **Dn** buttons to set the elevation of the highlighted polygon, and then click **Next**. When prompted, indicate whether to delete the original 2D polygons.



Parameter	Description
Up/Dn	Changes the elevation of the selected polygon
Use same height as prev.	Sets the elevation for successive polygons to the same value
Next	Selects the next polygon



Parameter	Description
Done	Stops setting polygon elevations; click when all the polygon elevations have been specified

4. Repeat for all of the polygons in the drawing.

This process can be interrupted by clicking **Done**. Resume setting elevations by selecting the starting polygon and selecting the **2D Polys to 3D Contours** command.

Either 3D polygons or loci are created from the 2D polygons, with Z values equal to the assigned elevations. These Z values can be edited in the Object Info Palette if they are incorrect.

Converting 3D Polygons to 3D Loci

Product: Landmark

The **3D Polys to 3D Loci** command converts the vertices of 3D polygons into 3D loci. These loci can then be used to create the site model.

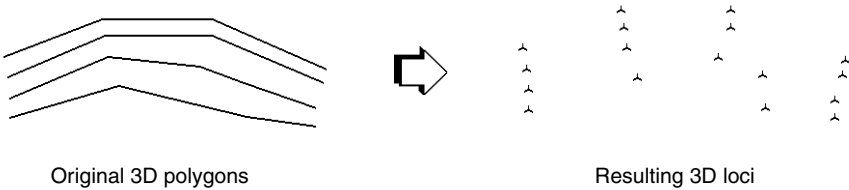
To create 3D loci from 3D polygons:

1. Select **Landmark > Survey Input > 3D Polys to 3D Loci** (Landmark workspace) or **AEC > Survey Input > 3D Polys to 3D Loci** (Architect workspace).

The 3D Poly to 3D Loci Command dialog box opens.



2. To remove the 3D polygons, select **Delete original 3D polygons**.
3. Click **OK**. The vertices of any 3D polygons located in the current layer are converted to 3D loci. The loci retain the Z values of the original polygons. These 3D loci can then serve as source data for the site model.





Adding Source Data by Grid Method Entry

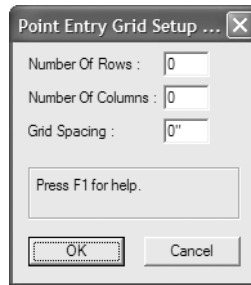
Product: Architect and Landmark

The **Grid Method Entry** command creates a rectangular grid of points on the screen, and prompts you to enter the elevations of those points. The **Create Site Model** command then creates a topographical model based on those points.

Use this method when the source data is extracted from a paper map. Draw a grid on the map, and then determine the elevation of each grid intersection by interpolation between adjacent contour lines. Use these elevation values to create the grid.

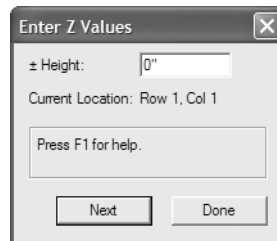
To generate source data with the **Grid Method Entry** command:

1. Select **Landmark > Survey Input > Grid Method Entry** (Landmark workspace) or **AEC > Survey Input > Grid Method Entry** (Architect workspace). When prompted, click at the upper left corner of the grid.
2. After the starting point is picked, the Point Entry Grid Setup dialog box opens.



Enter the number of rows and columns of points to be created, as well as the distance between the points (**Grid Spacing**), and then click **OK**. A grid of red 3D loci is created.

3. The Enter Z Values dialog box opens.



The first point on the drawing, at the upper left hand corner, is automatically selected. Enter the elevation of the point, and click **Next**. The elevation is applied to that point, and then the second point in that row is automatically selected. Enter the elevation for that point; continue until elevations have been entered for all of the points in the grid, and then click **Done**.

Validating 3D Source Data

Product: Architect and Landmark

Prior to creating the site model, problems can be avoided by checking the 3D source data for errors with the **Validate 3D Data** command.

Even if a site model already exists, the source data can be checked. If problems occur due to erroneous DTM source data, error alerts are automatically displayed.



A site model with errors can still be created; however, results may not be as expected.

The following problems can generate errors:

- Duplicate 3D data points or polygons
- 3D data points that are coincident or vertically placed
- Crossing contours (3D polygons) in the 3D source data

To validate 3D source data:

1. Select the source data (3D loci, 3D polygons, or stake objects) to be checked.
2. Select **Landmark > Validate 3D Data** (Landmark workspace) or **AEC > Terrain > Validate 3D Data** (Architect workspace).
3. If the source data are valid, a dialog box states that no problems were found. Proceed with creating the site model as described in “Creating the Site Model” on page 143.
4. If there are errors in the source data, the Problems with DTM Source Data dialog box opens.

Problems encountered are listed, and some conditions have an associated button for correcting each error by modifying or deleting the erroneous data.

If a site model already exists, the problem data can be viewed by selecting the site model and selecting **Modify > Edit Group**, or selecting **Edit Source Data** from the Site Model context menu. Problem data conditions are highlighted and annotated.

5. When problem correction is complete, click **Close**.

Select **Validate 3D Data** again to ensure that the errors have been corrected.

Filtering 3D Polygons

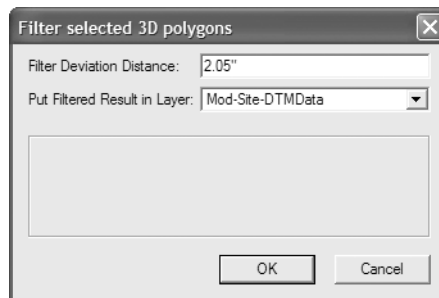
Product: Architect and Landmark

If the existing site model is created from 3D polygons (not 3D loci), processing time can be decreased by removing redundant polygon vertices within a specified tolerance. For example, this removes extra vertices in straight or nearly-straight segments of imported 3D polygons used as source data. This feature does not significantly change the appearance of the site model, but can dramatically decrease the time it takes to process the model.

To filter redundant 3D polygon vertices:

1. Select the 3D polygon(s). (The original polygons remain unchanged.)
2. Select **Landmark > Filter 3D Polygons** (Landmark workspace) or **AEC > Terrain > Filter 3D Polygons** (Architect workspace).

The Filter Selected 3D Polygons dialog box opens.





Parameter	Description
Filter Deviation Distance	Specifies the tolerance for removing unnecessary vertices
Put Filter Results on Layer	Select the layer where the filtered polygons will be placed

3. Click **OK**.

Redundant vertices are removed from the 3D polygon(s) and the results are sent to the layer specified.

Creating the Site Model

Creating a Site Model from the Source Data

Product: Architect and Landmark

Once source data has been obtained for the site model, the site model can be created.

To create a site model from source data:

1. Ensure that valid source data exists. The site model can be created from 3D loci, 3D polygons, stake objects, or by one of the methods described in “Site Model Source Data” on page 137. Verify that there are no problems with the source data with the **Validate 3D Data** command (see “Validating 3D Source Data” on page 141).
2. Select the source data.
3. Select **Landmark > Create Site Model** (Landmark workspace) or **AEC > Terrain > Create Site Model** (Architect workspace).

The Create Site Model dialog box opens. Specify the site model settings.

Create Site Model

Site Model Name: Site Model

☒ Keep Original Source Data in Layer

Settings:

Minor Contour Interval: 2'5.24"

Maximum Elevation: 36'11.064"

Flow Arrow Spacing: 12'11.434"

Major Contour Multiplier: 5

Minimum Elevation: 12'6.66"

3D Grid Spacing: 12'11.434"

Start Contour Offset: 0"

Datum Elevation: 0"

Smoothing Interval: 0"

2D Display Settings

Display: Existing Only

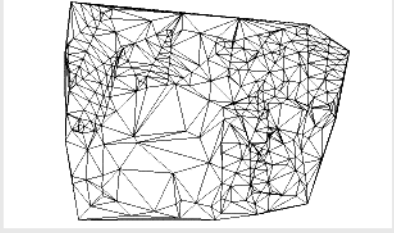
Style: 2D Triangulated Contours

☐ Show Flow Arrows

☒ Show Labels

☐ Parallel to the topo line

☒ Draw Hull



Graphic Properties...

3D Display Settings

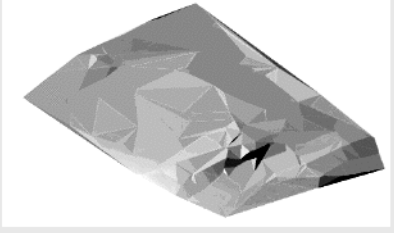
Display: Existing Only

Style: 3D Triangulated Contours

☐ Show 3D Grid

☒ Fill

☐ Show 3D Contour



Use Site Modifiers on

☐ All Layers

☒ Same Layer as Site Model only

OK

Cancel

Parameter	Description
Site Model Name	Enter a name for the site model object
Keep Original Source Data in Layer	Leaves a copy of the source data in the layer (the site model always retains a copy of the source data in its profile group). This parameter displays only during initial site model creation.
Settings	
Minor Contour Interval	Specifies the standard contour line placement interval
Major Contour Multiple	Specifies the placement interval of major (heavy) contour lines
Start Contour Offset	Indicates the creation offset for the first contour line. The contours are measured from this point. (Usually this number is 0; entering an odd value allows contour intervals to be set with odd numbers)
Maximum Elevation	Specifies the highest contour elevation to be displayed. No contours are created if the maximum elevation is lower than the minimum elevation, but this can be useful for cut and fill calculations (for example, for pond or backfill volumes).
Minimum Elevation	Specifies the lowest contour elevation to be displayed

Parameter	Description
Datum Elevation	Indicates the reference elevation used to define the bottom of a site model when the 3D Mesh Solid style is selected in 3D Display Settings ; set to zero for normal cut and fill calculations
Flow Arrow Spacing	Determines the placement of the flow arrows
3D Grid Spacing	Sets the grid (mesh) size; also determines flow arrow placement
Smoothing Interval	When selecting a triangulation method for 2D and/or 3D site model display, sets the distance for adding new points to the contours. Enter zero to use the original contour points for triangulation. Entering a value that is too low may result in long calculation times.
2D Display Settings	
Display	Select whether to display the existing site model only, proposed site model only, or both existing and proposed site models. The display option can be changed later from the Object Info palette.
Existing Only	Displays only the current model
Proposed Only	Displays only the proposed model (the current model changed by any site modifiers)
Proposed + Existing	Displays both the proposed model and the existing model; this option is useful when using the site model for a grading plan, with different existing and proposed topographical line styles
Style	Select a 2D DTM display mode
2D Contour	Draws contour lines
2D Contour (smoothed)	Smooths contour lines
2D Contour (colored elevations)	Draws contour lines and colors the elevations for conducting an elevation analysis (elevation analysis parameters are specified by clicking Graphic Properties and selecting the Site Analysis tab; see “Setting Site Model Graphic Properties” on page 147)
2D Triangle	Represents the surface as triangular facets
2D Triangle (colored slopes)	For 2D triangle display, colors the slopes within specified angle ranges for conducting a slope analysis (slope analysis parameters are specified by clicking Graphic Properties and selecting the Site Analysis tab; see “Setting Site Model Graphic Properties” on page 147)
2D Triangulated Contours	Draws 2D contour lines by triangulation, according to the specified Smoothing Interval
2D Triangulated Contours (colored slopes)	Draws 2D contour lines by triangulation, according to the specified Smoothing Interval , and colors the slopes within specified angle ranges for conducting a slope analysis
Show Flow arrows	Adds arrows to show the downward direction for drainage analysis
Show Labels	Labels major 2D contour line elevations
Parallel to the topo line	When labels are selected for display, labels are parallel to the topography lines

Parameter	Description
Draw Hull	Draws a closed 2D polygon along the hull (outer edge) of the DTM
3D Display Settings	
Display	Select the 3D site model display. The display option can be changed later from the Object Info palette.
No 3D Display	Displays only the 2D site model, with no 3D component
Existing Only	Displays the existing 3D site model
Proposed Only	Displays the proposed 3D site model
Style	Select a 3D DTM display mode
3D Contour	Draws the DTM using horizontal 3D polygons
3D Grid	Draws the DTM using a regular grid (mesh) of squares (closed 3D polygons); allows the mesh to be colored, filled, and rendered with shadows
3D Mesh solid	Groups 3D triangles to form a VectorWorks mesh; a skirt and bottom are added to create a valid solid
3D Triangle	Generates 3D triangles with the Triangulated Irregular Network (TIN) method; this method is the most accurate, as it involves no interpolation
3D Triangles (colored slopes)	Generates 3D triangles with the Triangulated Irregular Network (TIN) method, and colors the slopes within specified angle ranges for conducting a slope analysis
3D Extruded Contour	Creates horizontal solids with a thickness equal to the contour interval; top edges run along contour lines or the hull. This creates a “layer cake” or “chipboard model” effect.
3D Triangulated Contours	Draws 3D contour lines by triangulation, according to the specified Smoothing Interval
3D Triangulated Contours (colored slopes)	Draws 3D contour lines by triangulation, according to the specified Smoothing Interval , and colors the slopes within specified angle ranges for conducting a slope analysis
Show 3D Grid	Superimposes a 3D grid on the model; specify the grid spacing value in Spacing
Fill	Displays 3D grid squares with a fill; Show 3D Grid does not need to be selected to display a filled grid
Show 3D Contour	Superimposes a 3D contour on the model
Use Site Modifiers on	
All Layers	Modifies the proposed site model with modifiers from any layer in the file
Same Layer as Site Model only	Modifies the proposed site model with modifiers that exist only on the site model layer
Graphic Properties	Specifies the DTM appearance, along with slope and elevation analysis parameters (see “Setting Site Model Graphic Properties” on page 147)

4. Click **OK**.

A site model is created in the active layer and displays as specified.



Setting Site Model Graphic Properties

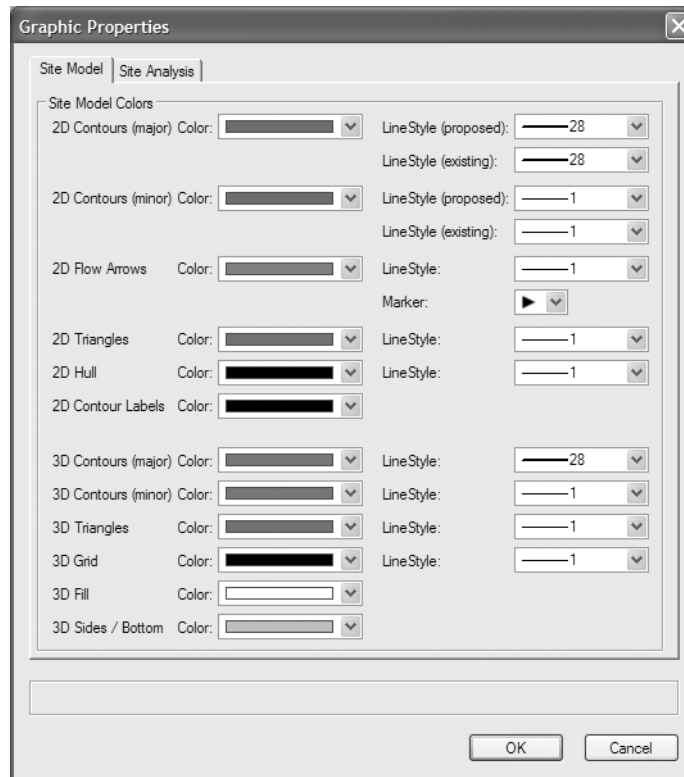
Product: Architect and Landmark

The site model 2D and 3D graphic display properties can be specified to obtain the desired graphic component colors and line styles. In addition, the colors can be specified for conducting elevation and slope analyses. These graphic properties can be set when the site model is first created, or changed later from the Object Info palette.

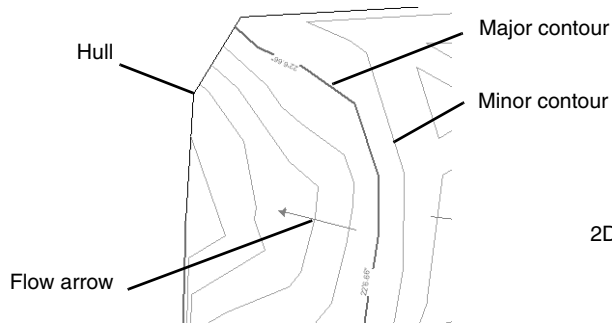
To set the site model graphic properties:

1. If creating a new site model, click **Graphic Properties** from the Create Site Model dialog box. If editing a current site model, click **Site Model Settings** from the Object Info palette, and then click **Graphic Properties** from the Site Model Settings dialog box.

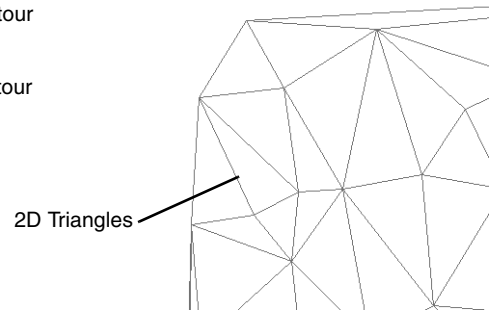
The Graphic Properties dialog box opens.



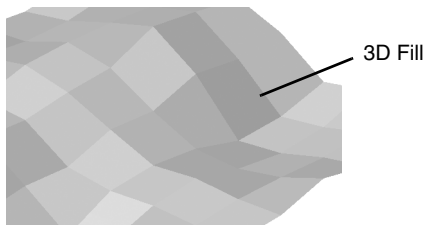
2. On the Site Model tab, the 2D (existing and proposed) and 3D site model display can be completely customized by selecting the color and line style for all components, and the marker style for flow arrows.



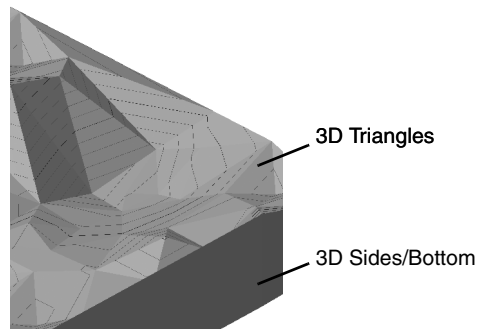
2D Contour Style



2D Triangle Style



3D Grid Style



3D Mesh Solid Style

3. On the Site Analysis tab, set the slope and elevation analysis graphic parameters. A slope analysis shows the slope change of the DTM with color ranges indicating the steepest to the shallowest slope. An elevation analysis shows the elevation change of the DTM as a gradient of color from the minimum to the maximum elevation.

Graphic Properties

Site Model | Site Analysis

Slope Colors

Number of slope categories: 2

Category 1 maximum slope (%): 5 Color: [Dark Gray]

Category 2 maximum slope (%): 15 Color: [Medium Gray]

Category 3 maximum slope (%): 0 Color: [Light Gray]

Category 4 maximum slope (%): 0 Color: [Light Gray]

Slopes exceeding maximum category: Color: [Dark Gray]

Elevation Colors

Minimum Elevation Color: [White]

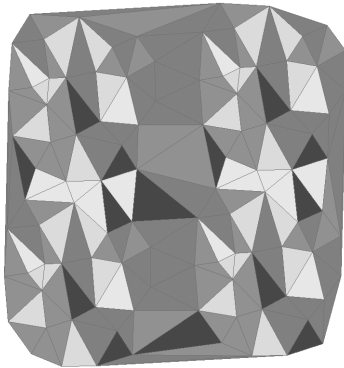
Maximum Elevation Color: [Black]

Press F1 for help.

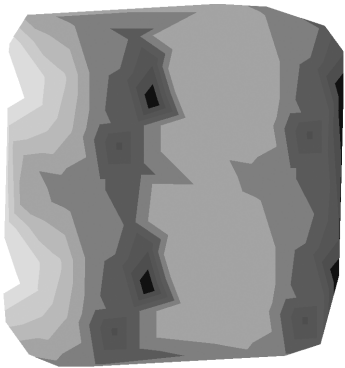
OK Cancel

Parameter	Description
Slope Colors	Specify the slope analysis settings
Number of slope categories	Indicate the number of slope levels to use in the analysis
Category __ maximum slope %	For each category, indicate the maximum slope percentage and its associated color; slopes below the specified percentage will be colored as specified
Slopes exceeding maximum category	Slopes above the maximum category's percentage will receive the selected color
Elevation Colors	Specify the elevation analysis color settings; a color gradient from the minimum to the maximum elevation is applied to the site mode for the elevation analysis
Minimum Elevation Color	Select the starting color for the lowest elevation
Maximum Elevation Color	Select the starting color for the highest elevation

- Click **OK** to close the Graphic Properties dialog box.
- To display a slope analysis, select a 2D display Style of 2D or 3D Triangle (colored slopes) or 2D or 3D Triangulated Contours (colored slopes) for the site model. To display an elevation analysis, select a 2D display Style of 2D Contour (colored elevations) for the site model.



Slope analysis



Elevation analysis

Create a snapshot of the site model to easily display a slope or elevation analysis along with the site model (see “Creating a Site Model Snapshot” on page 151).

Setting Site Model Properties

Site Model Properties

Product: Architect and Landmark

The site model object can be copied, cut, pasted, rotated, and deleted like other objects. In 2D Top/Plan view, the **2D Display** selected for the site model is shown; if both existing and proposed models are selected for display, they are superimposed. In any 3D view, the **3D Display** selected (if any) is shown.

If RenderWorks is installed, the site model can be textured from the Render tab of the Object Info palette. The texture is applied to the surface of the site model, and is scaled to fit the site model bounding box.

To see the original source data that were used to create the site model, select **Modify > Edit Group**, or select **Edit Source Data** from the site model context menu. Changes can be made to the source data, and the source data can be validated (see “Validating 3D Source Data” on page 141). Return to the site model by clicking **Exit Group** at the top right of the drawing window. Click **Update** in the Object Info palette, or select **Update** from the site model context menu, to reflect any source data changes in the site model.

Double-click on a site model to access the Site Model settings dialog box.

Select the **Create Draped Surface** command to create a “smoothed” version of the DTM contours (see “Creating a Draped Surface” on page 324 in the VectorWorks Fundamentals User’s Guide).

The parameters of a selected site model can be changed from the Object Info palette.

Parameter	Description
Site Model Settings	Opens the Site Model Settings dialog box. The settings here (and the related graphic properties settings) are identical to those specified at site model creation, and are described in “Creating the Site Model” on page 143. The option to keep or delete original source data is only available at site model creation.

Parameter	Description
Update	Updates the site model and any associated snapshots, when the existing site data has changed or site modifiers have been added or changed
Create a Snapshot	Creates a snapshot of the site model with the current site model settings, for displaying different versions of the site model (see “Creating a Site Model Snapshot” on page 151)
2D Display	Select the display type for the 2D site model
2D Style	Select the display style for the 2D site model
3D Display	Select the display type (or no display) for the 3D site model
3D Style	Select the display type for the 3D site model
Area Display Type	Select the units for displaying the projected and surface areas for existing and proposed site models
Projected Area (Existing)	Displays the projected area (the area projected in plan view) of the existing site model
Projected Area (Proposed)	Displays the projected area of the proposed site model (when one exists)
Surface Area (Existing)	Displays the 3D surface area of the existing site model
Surface Area (Proposed)	Displays the 3D surface area of the proposed site model (when one exists)
Volume Display Type	Select the units for displaying the cut and fill volumes (or allows cut and fill volumes to be hidden, if desired)
Cut Volume	When the proposed site model has been modified by a site modifier, displays the volume cut from the site model
Fill Volume	When the proposed site model has been modified, displays the volume of fill added to the site model
Net C&F Volume	Displays the net cut or fill volume, indicating whether fill is required or extra cut volume needs to be removed from the site

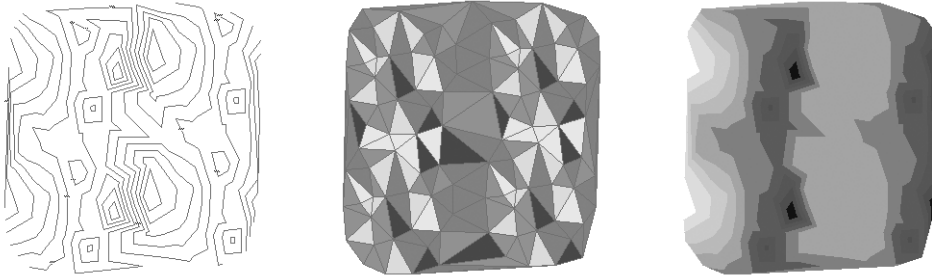
To change the font size of the contour labels, set the size from the **Text > Size** menu, and then click **Update** in the Object Info palette of a selected site model.

To create a custom hull shape for the DTM, select the site model and select **Modify > Edit Group**. Using the **2D Polygon** tool, draw the desired hull. Exit the group and update the site model; with a contour style of 2D display and the **Draw Hull** option selected, the custom hull displays.

Creating a Site Model Snapshot

Product: Architect and Landmark

Creating a snapshot of the site model allows several display styles of the DTM to be viewed at one time. The snapshot views cannot be edited directly; however, if the original site model is modified, the changes apply to all related snapshots automatically upon updating.



To create a site model snapshot:

1. Set the properties of the site model as desired for the snapshot. The snapshot is created based on the current site model settings.
2. From the Object Info palette of a selected site model, click **Create a Snapshot**.
3. The snapshot is created on the active layer, over the original site model. The Object Info palette of a selected snapshot displays the parameters of the original site model, and cannot be changed for the snapshot (with the exception of the display units).
4. Any changes to the original site model are reflected in associated snapshots when clicking **Update** in the Object Info palette of the selected original site model.

Sending Objects to the Model Surface

Product: Architect and Landmark

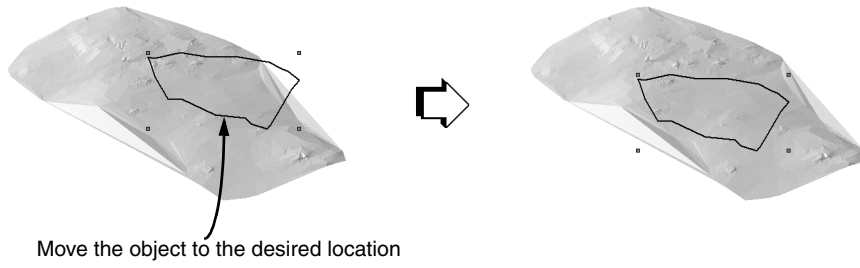
Once the site model is complete, objects, such as cars, trees, or other site fixtures, may need to be placed on the surface of the model. For this purpose, use the **Send to Surface** command.

This command is effective for 3D loci, 3D polygons, extrudes, sweeps, meshes, slabs, light objects, and symbols with a 3D component. If a 2D polyline or 2D polygon is selected, it will first be converted into its 3D equivalent before being sent to the surface.

To send an object to the surface:

1. Make the layer with the site model object the active layer.
2. Place the object on the ground plane or change to Top view. Move the object to the desired location on the site model.
3. Select **Landmark > Send to Surface** (Landmark workspace) or **AEC > Terrain > Send to Surface** (Architect workspace).

The correct Z value is given to place the object on the surface of the site model.



Modifying the Site Model

Modifying the Site Model

Product: Architect and Landmark

As discussed in “Sitework Overview” on page 137, when the site model is generated, two different display modes of the site model object are available—existing and proposed. The proposed DTM is a calculation of the existing data altered by site modifiers. Site modifiers are specific objects with capabilities to modify the site model. Site modifiers can be placed on any layer; however, the site model properties specify whether modifiers in another layer can affect the site model (see “Creating the Site Model” on page 143).

Creating a Pad

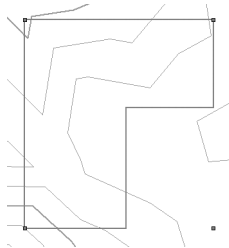
Product: Architect and Landmark

A pad is a 3D polygon representing the shape of an element which is to be added to, and normally, modifies, the site model. The proposed site model is modified when the site model is updated. Pads can be drawn with the **Site Modifier** tool, or by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).



To create a pad:

1. Click the **Site Modifier** tool from the Site Planning tool set.
2. Draw the pad object. Pads can be drawn closed or open (open pads are sometimes called “break lines”).



If this is the first time the **Site Modifier** tool has been used, the Object Properties dialog box opens. Accept the defaults and click **OK**.

3. In the Object Info palette, select **Pad** in the **Config** field.
4. If the pad is sloping, enter the **Slope** value (positive for rising, negative for falling), and select the slope definition unit (**Angle** or **Percent** in the **SlopeDef** field).

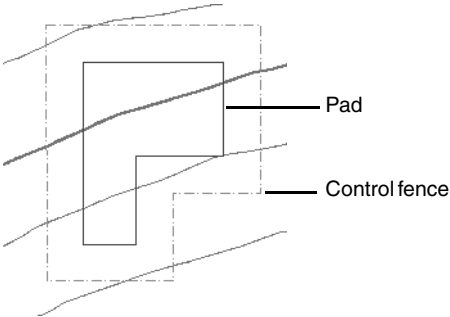
A slope arrow is automatically drawn on the pad, indicating the direction of the slope. The bull’s-eye at the start of the slope arrow indicates the zero elevation point of the sloping pad. Select the control points of the slope arrow to move either end. Deselect **Show Slope Arrow** to hide the slope arrow.

Parameter	Description
Config	Indicates the type of modifier object
Elevation	Sets the reference elevation of the pad

Parameter	Description
Slope	Determines the angle of the pad; if the value is zero, the pad has no slope, and the following two parameters are not displayed
SlopeDef	Select Angle or Percent to determine the slope units
Show Slope Arrow	If selected, displays a modifiable slope arrow and the current slope in Top/Plan view; Show Slope Arrow only displays if the slope value is other than zero

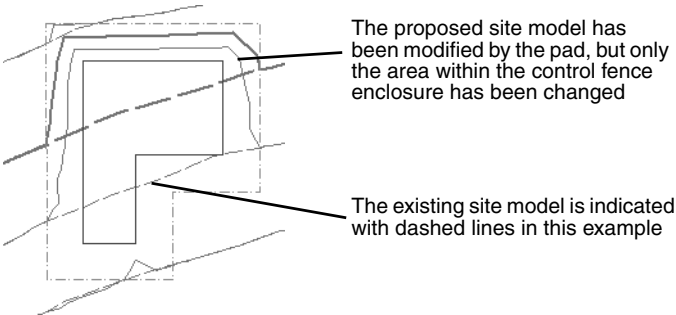
The **Site Modifier** tool generates a 3D pad polygon modifier that is always planar.

5. Normally, create a control fence around the pad (see “Creating a Control Fence” on page 157).



Site modifiers before updating the site model

6. The proposed DTM requires updating to reflect the pad modification. Select the site model and click **Update** from the Object Info palette.



2D view



Rendered 3D view



For predictable results, pads should not overlap. All pads should be either completely inside or completely outside of all control fences. Pads, including those that may be incorporated into plug-in objects (such as landscape walls) cannot cross outside a control fence.

Creating a Control Fence

Product: Architect and Landmark

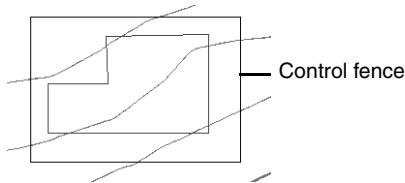
A control fence is a 2D polygon which limits the area of topographical transition between existing site data and site modifiers enclosed in the fence; it can be thought of as a “limit of construction.” Outside the fence, the site remains unchanged; within the fence, the site model is defined by the pads contained within the fence. A control fence can overlap another control fence, but cannot completely enclose another control fence. A control fence should not cross a pad or grader.

Control fences are created automatically around certain site modifiers, such as roads. Control fences can also be drawn with the **Site Modifier** tool, or by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).



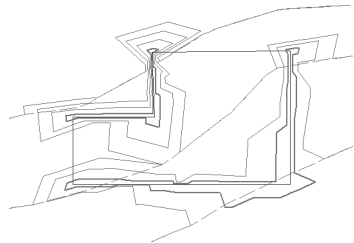
To create a control fence:

1. Click the **Site Modifier** tool from the Site Planning tool set.
2. Draw the control fence.

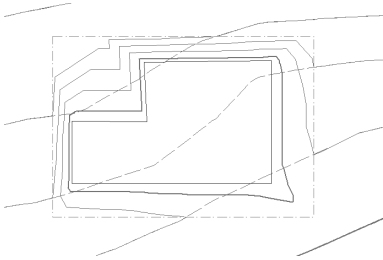
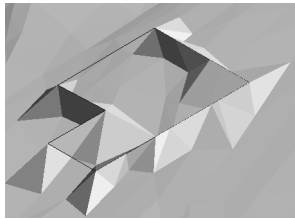


If this is the first time the **Site Modifier** tool has been used, the Object Properties dialog box opens. Accept the defaults and click **OK**.

3. In the Object Info palette, select **Fence** from the **Config** field.
4. The proposed DTM requires updating to reflect the control fence modification. Select the site model and click **Update** from the Object Info palette.



Without control fence



With control fence



Creating a Control Fence Automatically

Product: Landmark

Because a control fence is often associated with a pad or other type of site modifier, VectorWorks Landmark can create a control fence automatically around a site modifier, based on specific parameters. A control fence can be created with a gradual sloping transition from the existing site contours to the modifier, placed at a variable or fixed distance from the modifier. The control fence cuts and fills the site model to create a constant slope (batter slope).

To create a control fence automatically around one or more site modifier(s):

1. Select the site modifier(s) which require a control fence. Valid modifiers include pads, road objects, massing models, and landscape walls.
2. Select **Landmark > Create Fence from Pad**.
3. The Create Fences from Pads dialog box opens. Select the control fence parameters.

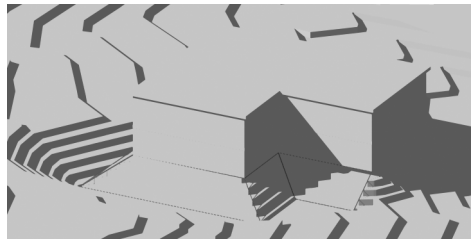
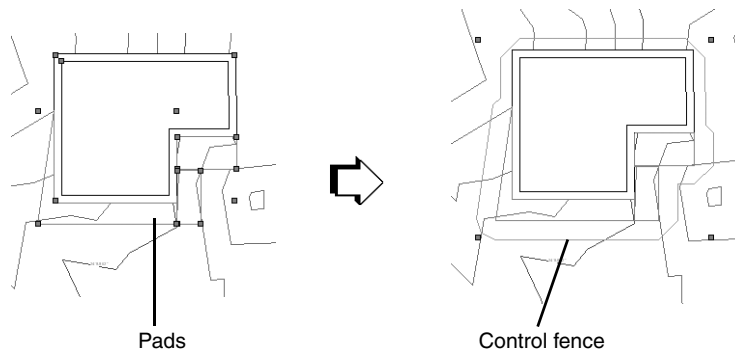


Parameter	Description
Fence Offset Control	
Distance	Creates a control fence at a fixed offset distance



Parameter	Description
Batter Slope	Creates a variable offset fence based on slope (the slope variation determines the offset; the fence is located at the intersection of the slope and the existing terrain)
Max. Offset	Sets the fixed offset distance for Distance offset control, or specifies the maximum offset distance allowed for Batter Slope offset control
Max. Slope	For Batter Slope offset control, specifies the maximum allowable slope (in degrees)
Slope Control Options	
Use Midpoints	Enables additional testing points for a more uniform slope
Test Increment	Specifies the number of midpoints to test; a smaller increment distance increases the accuracy of the slope calculations, but can also increase the time to create the control fence (the minimum increment is 12")

- Click **OK** to create the control fence.
- Select the site model and click **Update** from the Object Info palette.



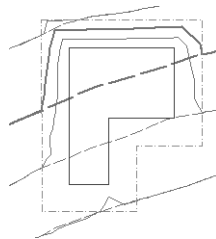
Creating a Grading Area

Product: Architect and Landmark

The grader object helps to balance the cut and fill so that the site does not require earth to be moved in or out. A grader applies an even thickness of fill for the site over its area. Graders can be drawn with the **Site Modifier** tool, or by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).

To create a grading area:

- 1. Create the site model and add any modifiers, such as pads and roads, and update the proposed site model by clicking **Update** from the Object Info palette of the selected site model.



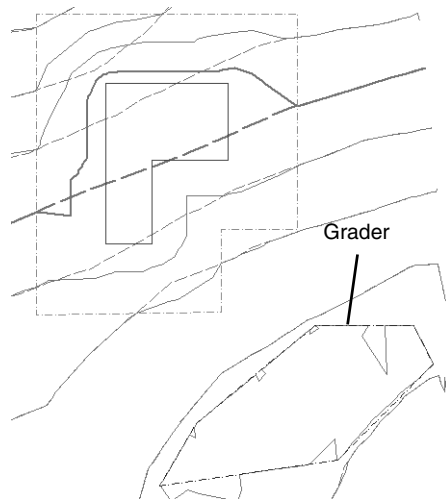
- 2. The initial cut and fill volumes are displayed in the Object Info palette (see “Site Model Properties” on page 150).
- 3. Click the **Site Modifier** tool from the Site Planning tool set.
- 4. Draw the grader area.

If this is the first time the **Site Modifier** tool has been used, the Object Preferences dialog box opens. Accept the defaults and click **OK**.

- 5. In the Object Info palette, select **Grader** from the **Config** field. Adjust the elevation of the grader up or down depending on whether fill is required or excess fill is present.

Parameter	Description
Config	Indicates the type of modifier object
Elevation	Sets the reference elevation of the grader

- 6. Select the site model and click **Update** from the Object Info palette.



- 7. Evaluate the results of the grader by checking the **Net C&F Volume** results in the Object Info palette of the selected site model. If the grader value needs adjustment, select the grader and enter a new **Elevation** value in the Object Info palette.



- Continue adjusting the grader elevation until a balanced cut and fill volume is achieved.

Creating a Texture Bed

Product: Architect and Landmark

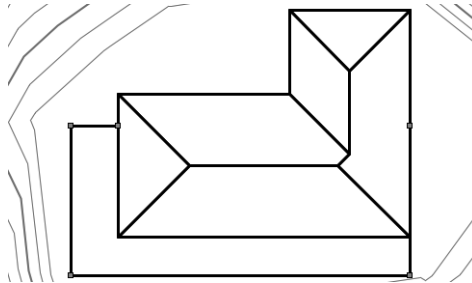
The texture bed site modifier converts a 2D polygon into an area of the drawing that can be textured. For example, texture a lawn with grass, a terrace with bricks, or a sand trap with sand for a photorealistic rendered appearance. Texture beds can be drawn with the **Site Modifier** tool, or by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).

[RenderWorks is required for creating and rendering texture beds.](#)



To create a texture bed:

- Click the **Site Modifier** tool from the Site Planning tool set.
- Draw the texture bed.



- In the Object Info palette, select **Texture Bed** from the **Config** field.

Parameter	Description
Config	Indicates the type of modifier object
Elevation	Sets the reference elevation of the texture bed above the DTM surface
Class	Specify the class for the texture bed; the indicated class should have a texture applied, with Use Textures At Creation selected

See “Textures and Shaders” on page 635 in the VectorWorks Fundamentals User’s Guide for more information on textures.

- The proposed DTM requires updating to reflect the texture bed modification. Select the site model and click **Update** from the Object Info palette.
- Render the model with a RenderWorks rendering mode to see the texture bed.

Creating a Massing Model

Product: Architect and Landmark

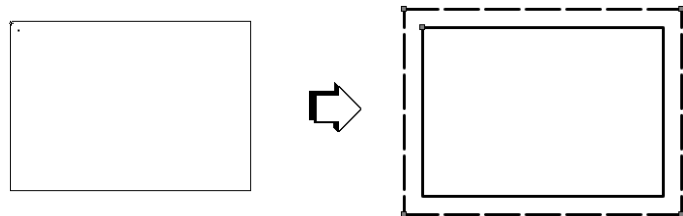
The **Massing Model** tool creates a building shell for illustrative purposes. This is an easy way to create a representative or context building when a detailed building is not required. Building models can also be created by

drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441). A massing model can be a site modifier.

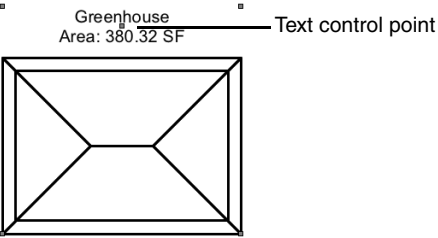


To create a building model:

- 1. Click the **Massing Model** tool from the Site Planning tool set.
- 2. In Top/Plan view, click to begin drawing the outline of the building. Continue clicking to draw the shell polyline. Double-click, or click once at the start point, to end the polyline.



- 3. The massing model parameters can be edited in the Object Info palette.

Parameter	Description
Name	Enter a building name for labeling
Show in Plan	Select whether to show the building roof or footprint in Plan view
Label	Select a text label, if any, for the building shell in Plan view; move the text control point to reposition the text <div></div>
Height	Specifies the building height (to the eave)
NumFloors	Specifies the number of floors in the building
Wall Class	Select a class to use for wall style attributes
Roof Overhang	Specifies the distance the roof extends from the building
Roof Thickness	Indicates the roof thickness
Roof Class	Select a class to use for hipped roof style attributes
Pitched Roof	Select to add a roof to the building shell
Eave Style	Select an eave style from the list
Roof Slope	Specifies the roof pitch angle in degrees
Draw Floors	Select to draw floors in the building



Parameter	Description
Slab Thickness	Specifies the floor thickness
Use Site Modifiers	Adds a pad and control fence to the base of the building and allows the building to modify the site model
Gross Area	Displays the gross area value for all the floors
Polyline parameters	Edits the object vertices. See “Reshaping Objects” on page 259 in the VectorWorks Fundamentals User’s Guide.

4. If the massing model is used as a site modifier, the proposed DTM requires updating. Select the site model and click **Update** from the Object Info palette.

Creating a Road

Product: Landmark

A road object can be set to be a site model modifier, and changes the proposed DTM when the site model is updated.

Creating a road is a multi-step procedure. The centerline of the road is defined with a polyline, and then stakes are added. The elevation of the stakes, which are initially set to the surface of the site model, can be modified before the road is created. Finally, the site model is updated and modified by the road object.

[A Roadway \(NURBS\) object offers a simpler, but less exacting, way of inserting a road on a DTM, and is available in both VectorWorks Architect and Landmark. See “Creating NURBS Roadways” on page 168 for more information.](#)

Creating the Road Centerline

Product: Landmark

The road design elements can be created on a separate layer to facilitate modifications later.



To create the road centerline:

1. If desired, create a new layer for the road by selecting **Tools > Organization**. The layer scale should be the same as the site model layer scale. Set the site model layer to visible, and select **View > Layer Options > Show/Snap Others**.
2. Using the **Polyline** tool, create a polyline that represents the road shape.

For more information on polylines, see “Creating Polylines” on page 212 in the VectorWorks Fundamentals User’s Guide.

Interior vertices of the polyline must be arc-smoothed (no Bézier or cubic vertices).



The road must be contained within the site model boundary.

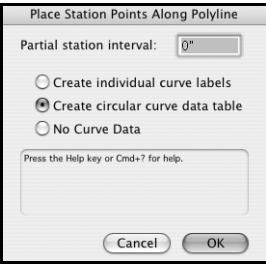
Placing Station Points Along the Road Polyline

Product: Landmark

VectorWorks Landmark places station points (stake objects) along the selected polyline at a specified interval.

To place station points:

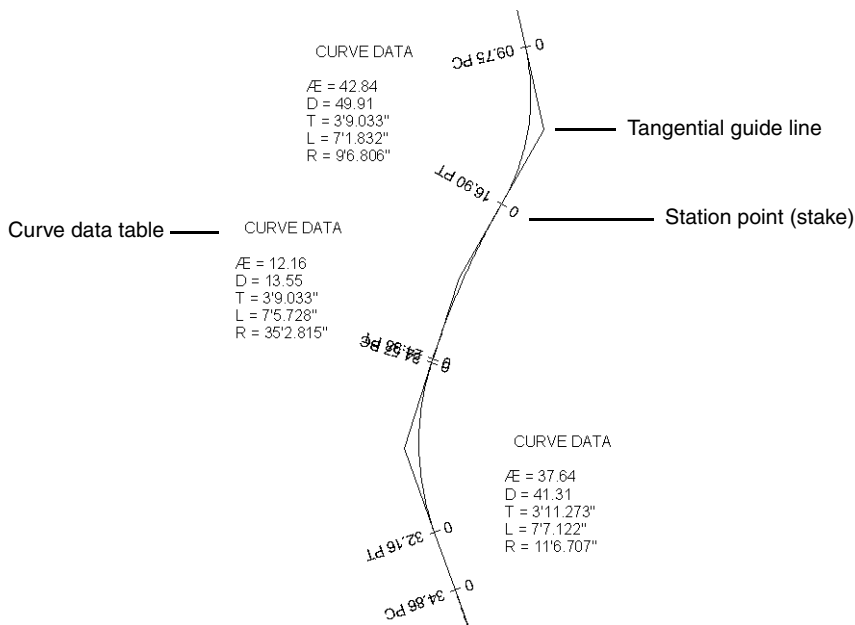
1. Select the polyline, and then select **Landmark > Roads > Station on Polyline**. The Place Station Points Along Polyline dialog box opens. This command places stations at 100' (or 30.48 m) intervals. In addition, partial station points can be placed at smaller intervals. Enter the interval between partial stations and select a labeling option for the curve information.



Parameter	Description
Partial Station Interval	Indicates the spacing interval between partial station points
Create individual curve labels	Creates curve data tables at each polyline curve
Create circular curve data table	Creates a Station Worksheet with the curve data; the worksheet number corresponds to the polyline number
No curve data	No curve data tables or tangent guide lines are created

2. Click **OK** to create the station points along the polyline. If this is the first time a stake has been placed in the file, the Object Properties dialog box opens. Accept the default values and click **OK**. Stake properties are described in “Determining the Elevation of a Point on the Site Model” on page 191.

Each station point is labeled. If curve data tables were created, they can be selected and moved if necessary.



3. The stakes have all been set to the elevation of the site model; the next step is to automatically set the road stake elevations as described in "Setting Stake Elevations" on page 165.

Setting Stake Elevations

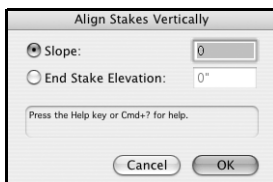
Product: Landmark

In "Placing Station Points Along the Road Polyline" on page 164, the stake elevations were set according to the site model; in real situations, a road is often set to a grade other than natural grade. The **Align Stakes Vertically** command sets the elevation of the stakes to a specific plane.

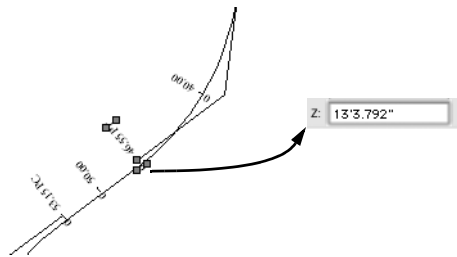
To set the stake elevations (with a linear alignment):

1. Set the elevation of only one of the terminal stakes (one of the stakes at the ends of the segment to align) by selecting the stake and entering its elevation in the Object Info palette. If a DTM was present when the **Station on Polyline** command was executed, the elevation of the stake is set to the proposed DTM elevation for reference.
2. In the segment to align, press the Shift key to select both the first and last stake (the stakes at either end of the desired elevation alignment), and then select **Landmark > Roads > Align Stakes Vertically**.

The Align Stakes Vertically dialog box opens.



3. Enter either a slope value in percentage for the road or the elevation of the last stake, and click **OK**.
The elevations of the stakes located between the selected stakes are set to the specified plane.



Creating the Road

Product: Landmark

This procedure creates the road by automatically making an individual road object between each stake. The road follows the centerline polyline, and is set to the elevations specified by the stakes.

To create the road:

1. Select the center polyline or any of the station points, and select **Landmark > Roads > Create Road from Stakes**.
The Create Road from Stakes dialog box opens. Enter the road parameters.

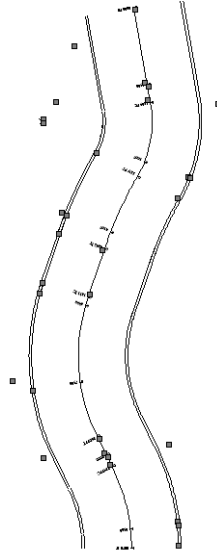


Parameter	Description
Width	Specifies the road width between the curbs
Curb Height/Width	Specifies the height and width of the road curbs
Paving Thickness	Indicates the thickness of the road paving

2. Click **OK**. The polyline and stakes are used to create a road section between adjacent stakes. If this is the first time a road has been created in the file during this session, the Object Properties dialog box opens for creating straight and curved roads. Accept the default values and click **OK** in both dialog boxes.
3. Once created, the straight and curved sections of the road need to become site modifiers by selecting the road sections and then selecting **Use Site Modifiers** in the Object Info palette.

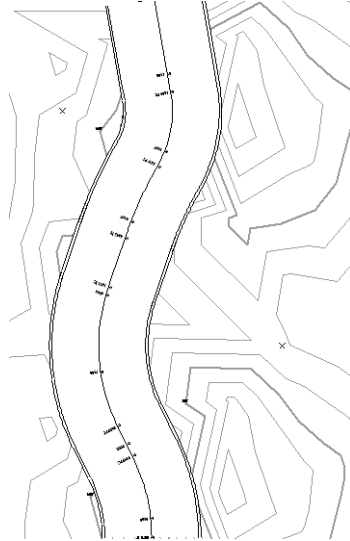
Use the **Custom Selection** command to select the straight and curved road sections; see “Creating Custom Selection Scripts” on page 593 in the VectorWorks Fundamentals User’s Guide.

The fence offset can be set manually, or fences can be turned off and created separately using the **Create Fence from Pad** command (see “Creating a Control Fence Automatically” on page 158). When site modifiers are used, each road section contains a pad (see “Creating a Pad” on page 155 and “Creating a Control Fence” on page 157).



Parameter	Description
Z	Elevation of the first stake in the segment
Radius (curved roads)	Arc radius of the segment (set by the command)
Width (curved roads)	Width of the segment (set by the command)
Road Length (straight roads)	Length of segment (set by the command)
Paving Width (straight roads)	Width of the segment (specified in the Create Road from Stakes dialog box)
Curb Height	Sets the height of the curb (specified in the Create Road from Stakes dialog box)
Curb Width	Sets the width of the curb (specified in the Create Road from Stakes dialog box)
Paving Thickness	Sets the thickness of the road (specified in the Create Road from Stakes dialog box)
Rise	Difference in height between stake elevations
Show Joints	Displays the connecting joint between road sections
Use Site Modifiers	When selected, creates a pad and control fence for each section to modify the site
Use Fence	Places a control fence with the road
Left/Right Fence Offset	Controls the fence offsets on either side of the road
Sweep (curved roads)	Sets the degree (arc angle) of the sweep of the segment

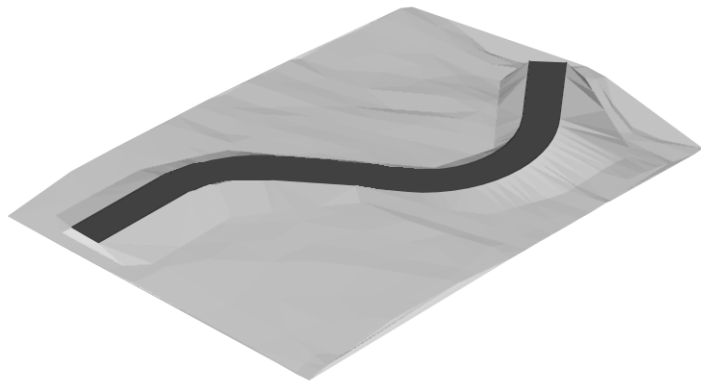
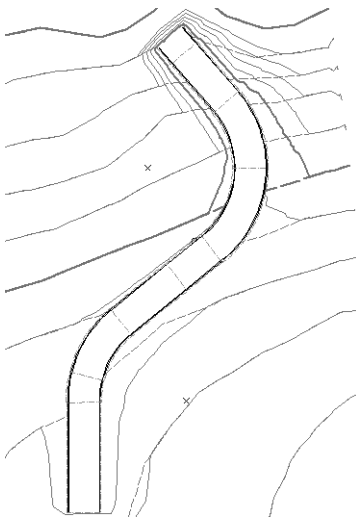
Stakes should not be moved (except in elevation) when using the **Create Road from Stakes** command. If an additional stake is required, add a vertex point to the polyline, provide an elevation value, and run the **Create Road from Stakes** command again.



4. The proposed DTM requires updating. Select the site model and click **Update** from the Object Info palette.

If the road was created on a different layer from the site model, click **Site Model Settings** from the Object Info palette and ensure that **Use Site Modifiers on All Layers** is selected.

The proposed site model is updated. If **Use Site Modifiers** was selected for the road sections, the contour lines are adjusted to rise or fall to meet the level of the road.



Use the Attributes palette to add a solid fill color to the road

Creating NURBS Roadways

Product: Architect and Landmark

Roadway objects can be used to modify the site model. Roadway objects can be drawn with the various roadway tools on the Objects palette, or by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).

One of the most flexible roadway objects is the **Roadway (NURBS)** tool, which uses NURBS curves to define the road shape. The Roadway (NURBS) object, while easy to edit, does not represent accurate alignments of low-speed roadways, which are typically constructed with arcs (constant radius) and tangents (straight lines); VectorWorks Landmark provides these roadway objects (see “Creating a Road” on page 163).

A suggested process for using the Roadway (NURBS) object is:

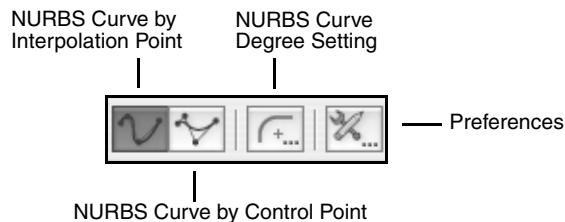
- Create the road in Top/Plan view
- Select the **Send to Surface** command to set the road to the existing terrain
- Select **Redistribute and Smooth Curve** from the Object Info palette of the selected roadway once or twice to smooth out the road slightly, so it does not follow every hill and valley in the existing terrain
- Manually reshape the road in 3D as required (to match other road elevations, garage elevations, etc.)
- Only select **Redistribute Stations** for more or fewer stations annotated in Top/Plan view. Fewer stations are easier to work with when sketching and reshaping, but a road construction company might require more stations to be specified. **Redistribute Stations** is also useful to ensure that the station spacing is equal after reshaping the road.



To create a road with the **Roadway (NURBS)** object:

1. Click the **Roadway (NURBS)** tool from the Site Planning tool set.

The following modes are available.



See “NURBS Curves” on page 301 in the VectorWorks Fundamentals User’s Guide.

2. Click in the drawing file to set the start point of the road, and then click to set the position of each additional NURBS vertex. Double-click the last point to complete creation of the roadway (NURBS) object.

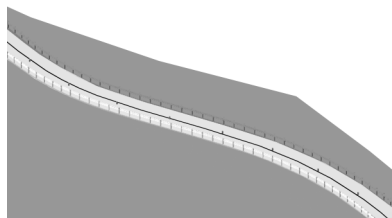
The roadway (NURBS) object properties dialog box opens. Click **OK** to accept the default settings.

3. The roadway (NURBS) properties can be edited in the Object Info palette.

Parameter	Description
Z height	Adjusts the elevation of the entire road
Road Length	Displays the length of the road
Paving Width	Specifies the overall width of the paved road surface (without curbs)
Paving Height	Specifies the road paving thickness (without curbs)
Curb Width	Specifies the curb or shoulder width
Curb Height	Specifies the curb or shoulder height
Left Guardrail	Adds a guardrail to the left side of the road

Parameter	Description
Right Guardrail	Adds a guardrail to the right side of the road
Show Stations	The NURBS curve vertices are used as the station points; select to display the station points. In 2D, stations display as loci with text displaying the point elevation. In 3D, the stations display as round stakes.
Create Pad for DTM	Select for the Roadway (NURBS) object to create its own pad modifier
Create Fence for DTM	Select for the Roadway (NURBS) object to create its own fence modifier, which controls the zone in which the terrain transitions between the existing elevation and the road elevation
Fence Method	Specify whether to create an offset or slope fence
Fence Offset	When creating an offset fence, specify the distance from the road to the control fence
Fence Slope	When creating a slope fence, specify the batter slope
Paving Class	Select the class for the paved portion of the road
Curb Class	Select the class for the curb or shoulder
Redistribute Stations	Redistributes the stations at a specified spacing interval
Redistribute and Smooth Curve	Redistributes the station points at a specified spacing interval and smooths the NURBS curve
Send Stations to Surface	Click to set the Z value of the stations to the surface of the DTM. The stations can be set to either the surface of the existing DTM, or to the surface of the proposed DTM, which may have been altered by modifiers. If the stations are sent to the surface of a proposed DTM which has been changed by modifiers, it may be necessary to deselect Create Pad for DTM and Create Fence for DTM for the Roadway (NURBS) in order to prevent site modifier errors caused by crossing pads or fences.
Align Stations Vertically	Sets the elevation of the indicated station points to a specific plane. As the starting and ending stations are indicated, a red line previews the included station points. The % Grade indicates the grade that will be set between station points.
NURBS curve parameters	Edits the roadway NURBS curve

- If necessary, use the **3D Reshape** tool to modify the locations of the vertices after object creation, or use the vertex editing controls on the Object Info palette to move the vertices or change the degree of vertices.
- Update the site model. Select the site model and click **Update** from the Object Info palette.





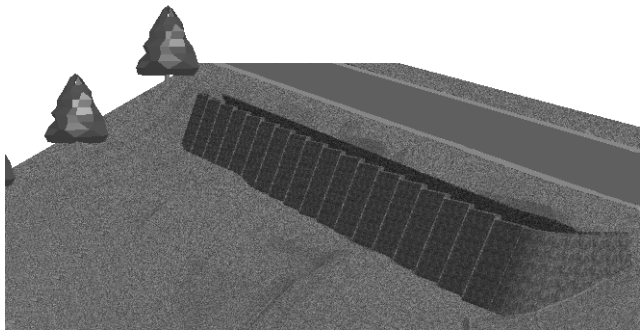
Creating Landscape Walls

Product: Landmark

A landscape wall object (retaining wall) can be set to be a site model modifier. It changes the proposed DTM when the site model is updated.

Straight, arc, and Bézier landscape walls can be drawn using the landscape walls tools, or by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441). Place the different types of landscape walls next to each other to achieve a particular design or effect.

To create a row of straight and curved landscape walls, use the **Objects from Polyline** command.



Straight Landscape Walls

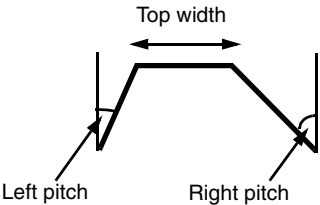
Product: Landmark



To insert a straight landscape wall:

1. Click the **Landscape Wall** tool from the Site Planning tool set.
2. Click and drag to define the length and angle of the landscape wall. Click again to set the end point. If this is the first time the tool is used during this session, the Object Properties dialog box opens. Accept the default values and click **OK**.

The straight landscape wall parameters can be edited in the Object Info palette.



Cross section

Parameter	Description
Z	Elevation of starting point of wall
Rot	Angle of rotation of wall



Parameter	Description
Length	Total length of all wall sections in the object
Top Width	Width of wall at top (see diagram)
Step Height	When the wall starting point and ending point are different, this parameter indicates the height of the step between sections
Wall Height	Wall height above Z value
Rise	Difference in height between wall starting and ending points
Left/Right Pitch	Angle of wall on left and right sides (see diagram); for a straight wall with site modifiers, the left side is always the side that retains earth
Use Site Modifiers	Adds a pad and control fence to each wall section and allows the landscape wall to modify the site model
Use Fence	Places a control fence with the wall
Left/Right Fence Offset	Controls the fence offsets on either side of the wall (applies only when site modifiers are used)
Show Joints	Displays the connecting joints between wall sections

Arc Landscape Walls

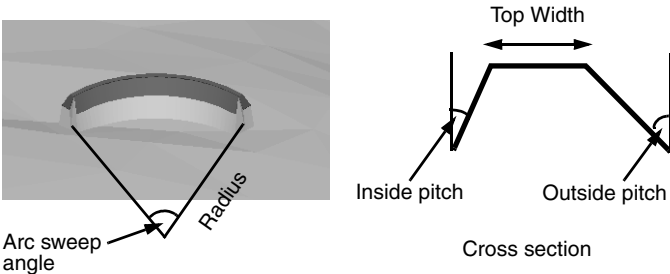
Product: Landmark



To insert an arc landscape wall:

- 1. Click the **Landscape Wall Arc** tool from the Site Planning tool set.
- 2. Click to define the placement of the arc landscape wall and click again to set the rotation. If this is the first time the tool is used during this session, the Object Properties dialog box opens. Accept the default values and click **OK**.

The landscape wall arc parameters can be edited in the Object Info palette.



Parameter	Description
Z	Elevation of starting point of wall
Radius	Radius of all wall sections
Top Width	Width of wall at top (see diagram)



Parameter	Description
Step Height	When the wall starting point and ending point are different, this parameter indicates the height of the step between sections
Wall Height	Wall height above Z value
Rise	Difference in height between wall starting and ending points
Inside/Outside Pitch	Angle of wall on the inside and outside (see diagram); for an arc wall with site modifiers, the side of the wall that retains earth must be selected in Retained Side
Show Joints	Displays the connecting joints between wall sections
Retained Side	For an arc wall with site modifiers, select the side of the wall that retains earth
Arc Sweep	Angle, in degrees, of arc (see diagram)
Use Site Modifiers	Adds a pad and control fence to each wall section and allows the landscape wall to modify the site model
Use Fence	Places a control fence with the wall
Left/Right Fence Offset	Controls the fence offsets on either side of the wall (applies only when site modifiers are used)

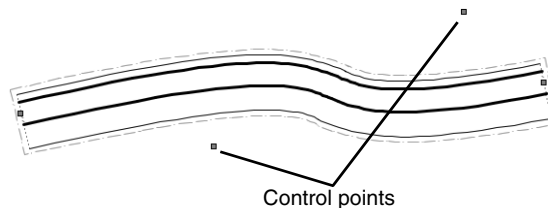
Bézier Landscape Walls

Product: Landmark

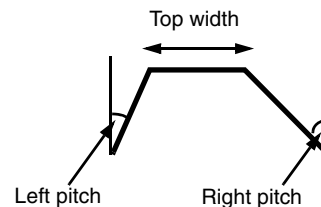
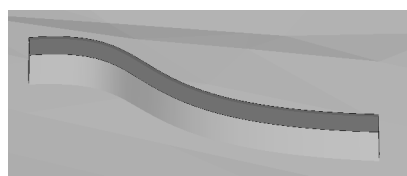


To insert a Bézier landscape wall:

1. Click the **Landscape Wall Bézier** tool from the Site Planning tool set.
2. Click and drag to define the length and angle of the landscape wall. Click again to set the end point. If this is the first time the tool is used during this session, the Object Properties dialog box opens. Accept the default values and click **OK**.
3. Adjust the control points of the Bézier wall by clicking and dragging to obtain the desired curvature.



The Bézier landscape wall parameters can be edited in the Object Info palette.



Cross section



Parameter	Description
Z	Elevation of starting point of wall
Wall Length	Total length of all wall sections
Top Width	Width of wall at top (see diagram)
Wall Height	Wall height above Z value
Resolution	Select a 3D display resolution; low resolution displays fastest, but high resolution provides the best quality
Rise	Difference in height between wall starting and ending points
Left/Right Pitch	Angle of wall on left and right sides (see diagram); for a Bézier wall with site modifiers, the left side is always the side that retains earth
Show Joints	Displays the connecting joints between wall sections
Use Site Modifiers	Adds a pad and control fence to each wall section and allows the landscape wall to modify the site model
Use Fence	Places a control fence with the wall
Left/Right Fence Offset	Controls the fence offsets on either side of the wall (applies only when site modifiers are used)

Creating Hardscape Objects

Product: Landmark

A hardscape object is comprised of paved areas with joint patterns and optional borders. A hardscape object can be drawn with the **Hardscape** tool, or by creating a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441). The hardscape object can modify the site model.



To create a hardscape object:

1. Click the **Hardscape** tool from the Site Planning tool set.
2. Click **Preferences** from the Tool bar to specify the default **Hardscape** tool parameters for this session.
The Hardscape Object Settings dialog box opens.

Hardscape Object Settings

Definition

Name:

Hardscape-1

ID Tag Style:

ID Only

Configuration

Boundary

Pathway

Width:

5'0"

Offset:

0"

Joint Pattern:

None

Draw Border

Width:

1'0"

Joint Pattern:

None

Border Background Color:

Path Border at Ends:

Both

Draw 3D

3D Type:

Slab

Thickness:

8"

Class:

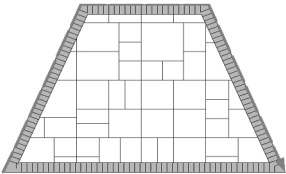
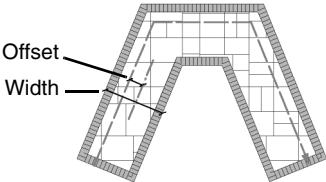
Sketch Style:

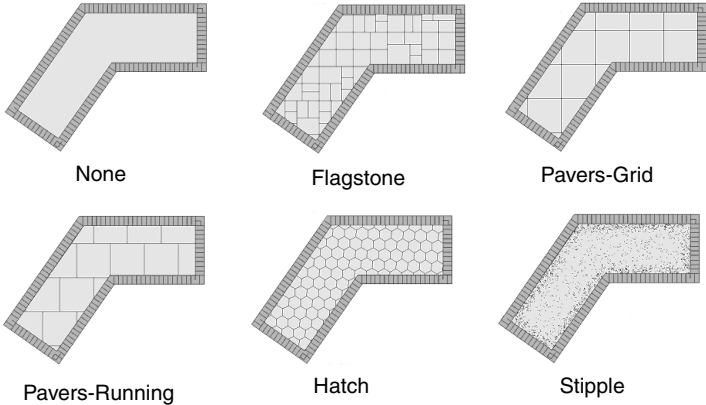
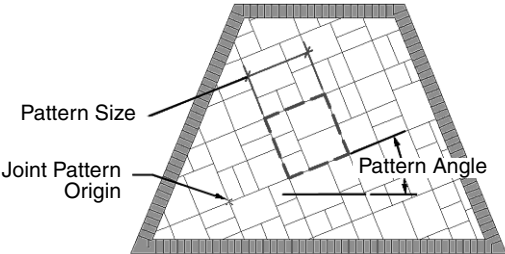
Single-sketch

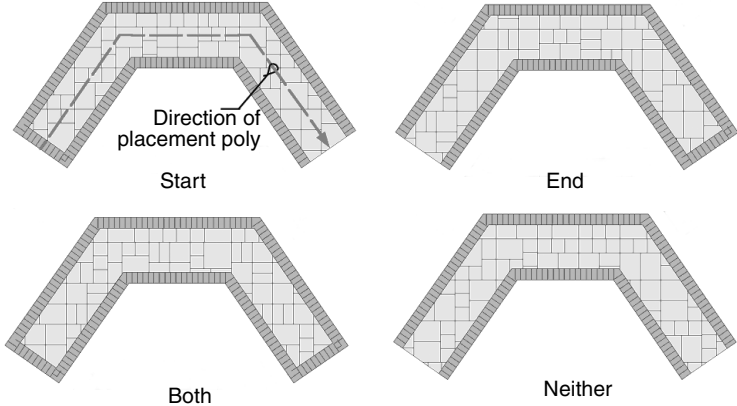
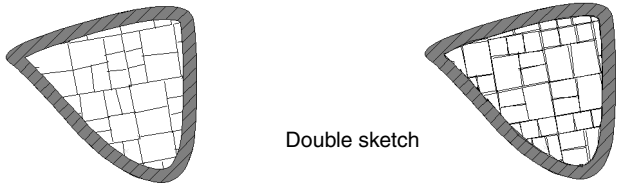
Press the Help key or Cmd+7 for help.

Cancel

OK

Parameter	Description
Definition	
Name	Enter a name for the hardscape object, which displays as the ID in the ID tag
ID Tag Style	Select the ID tag display style. Select ID Only to display the name of the hardscape object only (as defined in the Name field). Select ID-Area(s) to display the hardscape object name, area and, if applicable, the area of the border. Select ID-Area(s)-Perim to display the hardscape object name, perimeter length and, if applicable, the area of the border. To display the ID tag, select Right or Left in the Tag Display field of the Object Info palette. The ID tag is automatically classed to the Landscape-Spec class.
Configuration	Sets the boundary and pathway parameters for the hardscape object
Boundary/ Pathway	Boundary defines the hardscape object with a user-defined polyline as the outer edge of the hardscape object (e.g. define regular or irregular patio areas), while Pathway defines the hardscape object with a user-defined polyline as an alignment for a linear path <div><div><div>Boundary</div></div><div><div>Pathway</div></div></div>

Parameter	Description
Width	Width of the pathway hardscape object
Offset	Offset of the pathway centerline from the placement line
Joint Pattern	<div>Select the main joint pattern</div> <div><p>None Flagstone Pavers-Grid</p><p>Pavers-Running Hatch Stipple</p></div> <div>The Set Joint Pattern Options dialog box opens when Flagstone, Pavers-Grid, or Pavers-Running is selected. Enter the pattern size and angle and click OK.</div> <div>The joint pattern origin has a control point marked with a red locus for identification. The joint pattern origin is editable.</div> <div><p>Pattern Size</p><p>Joint Pattern Origin</p><p>Pattern Angle</p></div> <div>The Choose Fill dialog box opens when Hatch or Stipple is selected. The stipple patterns displayed are saved symbols in the current file (see “Saving the Stipple Object Settings” on page 424). The displayed hatches are from either the default resources or the current file’s resources (see “VectorWorks Design Series Default Resources” on page 570 or “Defining Hatches” on page 237 in the VectorWorks Fundamentals User’s Guide). Select the desired hatch or stipple pattern and click OK. The selected resource’s name displays beneath the Joint Pattern list.</div>
Draw Border	Select to include a border pattern along the edges of the hardscape object
Width	Enter the width of the border

Parameter	Description
Joint Pattern	<p>Similar to the main hardscape Joint Pattern, select the border paving pattern. The Enter Value dialog box opens when Spaced Joints is selected. Enter the desired joint spacing value.</p> <p>The Choose Fill dialog box opens when Hatch or Stipple is selected. The stipple patterns displayed are saved symbols in the current file. The displayed hatches are from either the default resources or the current file's resources. Select the desired hatch or stipple pattern and click OK. The selected resource's name displays beneath the Joint Pattern list.</p> <p>The joint pattern origin has a control point marked with a green locus for identification. The joint pattern origin is editable.</p>
Border Background Color	Click the color box to select the desired border color
Path Border at Ends	<p>Select the border configuration for pathway hardscape objects with borders</p> 
Draw 3D	Select to draw a 3D hardscape object
3D Type	The hardscape object can act as a 3D slab object or as a pad or texture bed site modifier for a DTM. Select the type of 3D element to create. Select Slab or Pad if the paving area is flat. Select Texture Bed if the paving area is a pathway that covers a large area of a site with some topographical changes. For more information, see "Modifying the Site Model" on page 155.
Thickness	For a slab or texture bed, enter the thickness parameter (for texture beds, this is the distance of the bed above the site)
Class	Enter the class for the texture bed
Sketch Style	<p>Select the joint display option to use when sketch rendering is applied to the hardscape</p> 



Both the **Flagstone** and **Stipple** joint patterns are processor-intensive actions for large hardscape objects and can significantly increase regeneration time. To decrease the regeneration time for large flagstone areas, increase the pattern size.

When drawing a hardscape object with a curved boundary, speed the regeneration time by setting the **2D conversion resolution** in VectorWorks preferences to low (see “Edit Preferences” on page 39 in the VectorWorks Fundamentals User’s Guide).

- 3. Click **OK**.
- 4. Click the appropriate mode in the Tool bar to specify the creation method of the hardscape object.
For information on the **Polyline** tool modes, see “Creating Polylines” on page 212 in the VectorWorks Fundamentals User’s Guide.
- 5. Click to set the hardscape object’s start point.
- 6. Click to set the end of the segment and the beginning of the next. Continue drawing segments in this manner until the hardscape object is complete.
- 7. Update the site model. Select the site model and click **Update** from the Object Info palette.

Editing the Hardscape Object Settings

Product: Landmark

The parameters can be edited for selected hardscape objects through the **Hardscape Settings** button on the Shape tab of the Object Info palette. To modify the default hardscape object settings, click the **Preferences** button on the Tool bar.

Many of the parameters are identical to those used to create the hardscape object (see “Creating Hardscape Objects” on page 174). However, certain parameters are accessible in the Object Info palette only.

Parameter	Description
Hardscape Settings	Click to edit the selected hardscape object; for more information, see “Creating Hardscape Objects” on page 174
Save Hardscape	Click to save the selected hardscape object as a symbol; for more information, see “Saving the Hardscape Object Settings” on page 179
Tag Display	Determine the method of displaying ID tags for the hardscape object; select Right or Left to display the text to the right or left of the tag control point. Select None to display the hardscape object without an ID tag.
Joint Pattern Size	Specifies the size of the joint pattern units
Joint Pattern Angle	Specifies the rotation angle of the joint pattern
Border Pattern Angle	Enter the angle of the pattern inside the border
Main Area	Displays the size of the main area
Border Area	Displays the size of the border area
Perimeter	Displays the perimeter measurement

Reshaping the Hardscape Object

Product: Landmark

Double-click the hardscape object to activate the **2D Reshape** tool. Select the object handles to reshape the hardscape object. For more information, see “Reshaping Objects” on page 259 in the VectorWorks Fundamentals User’s Guide.



Saving the Hardscape Object Settings

Product: Landmark

Once the hardscape object is set to the desired appearance, the settings can be saved for future use or importing into other files, by saving the hardscape object. When inserted from the Resource Browser, all the hardscape object settings are preset.

To save the selected hardscape object settings:

1. Select a hardscape object.
2. In the Object Info palette, click **Save Hardscape**.

The Enter String dialog box opens.

3. Enter a unique name.
4. Click **OK**.

The hardscape object is saved in the “Hardscapes” symbol folder in the Resource Browser. Boundary and pathway hardscape objects are assigned unique thumbnail view icons for easy identification. For more information on the Resource Browser, see “Using the Resource Browser” on page 142 in the VectorWorks Fundamentals User’s Guide.

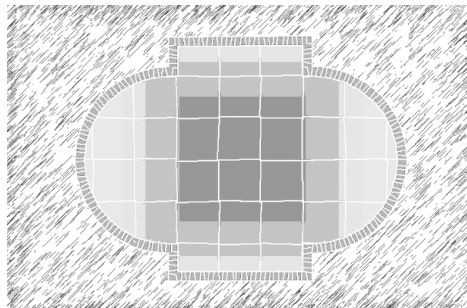
5. To use a saved hardscape object, double-click on it in the Resource Browser.

Editing Hardscape Object Fills

Product: Landmark

Hardscape object fills can be changed through the Attributes palette. If a joint pattern was specified, the joint pattern is drawn over the fill attribute of the hardscape object. Hardscape objects can also use images and gradients as fills. Use the **Attribute Mapping** tool to adjust the fill direction and size.

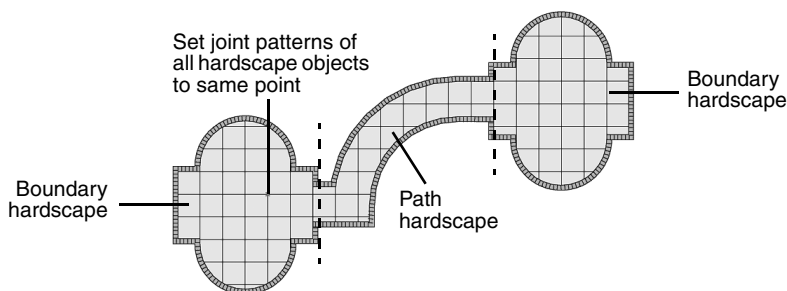
For more information on using image or gradients, see “The Attributes Palette” on page 229 in the VectorWorks Fundamentals User’s Guide; for more information on using the **Attribute Mapping** tool, see “Editing Gradient and Image Fills” on page 250 in the VectorWorks Fundamentals User’s Guide.



The angle or origin point of a hardscape fill can be adjusted. Move the control point at the center of the hardscape to control the origin point of the paving pattern (including a hatch) and change the **Joint Pattern Angle** value to adjust the angle.

When joining bordered hardscape objects with similar borders, the top hardscape object should use a pathway configuration. Draw the path from the inside edge of the bottom hardscape object, so that the borders meet cleanly, with the bottom object’s border covered.

To coordinate the joint patterns of several hardscape objects, configure the hardscape objects with the same settings and drag their main pattern origin control points (marked with the red locus) to a common location.



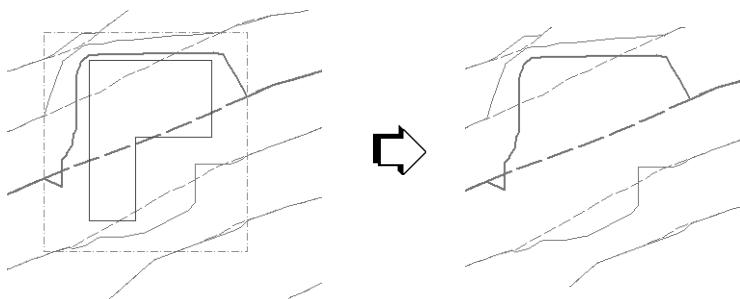
Showing and Hiding Site Modifiers

Product: Landmark

Site modifiers, such as pads, control fences, and portions of roads and landscape walls can be made hidden or visible. The modifications to the proposed site model are still visible even when the modifier is hidden.

To show or hide site model modifiers:

1. Select **View > Show > Show or Hide Site Modifiers**.
2. If site modifiers were hidden, they are displayed; if they were visible, they become hidden.



Correcting Site Modifier Errors

Product: Architect and Landmark

When the site model has been modified, if errors or problems are detected with the site modifiers, the Problems with DTM Modifiers dialog box automatically opens when the site model is updated.

The following modifier problems can generate errors:

- Intersecting pad objects
- Intersecting fence objects
- Grader intersecting texture bed
- Grader intersecting fence
- Texture bed intersecting fence
- Pad intersecting fence object or the hull

If these errors exist, the DTM can still be modified; however, results may not be as expected. Resolve the errors by locating the offending modifier and making adjustments to prevent intersecting modifiers.



If a site model already exists, the problem data can be viewed by selecting the site model and selecting **Modify > Edit Group**, or selecting **Edit Source Data** from the site model context menu. Problem data conditions are highlighted and annotated.

Update the site model to ensure that the errors have been corrected.

Drawing Property Lines

Product: Architect and Landmark

Property lines can be drawn with the **Property Line** tool, or by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).

Property Line Tool

Product: Architect and Landmark

The **Property Line** tool interactively creates property boundaries from surveyor’s descriptions. The resulting polyline is composed of line and/or arc segments. The closing error can be automatically drawn and measured. Each segment can be individually labeled with distance and bearing; a curve data worksheet displays curve data.



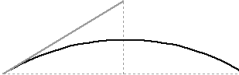
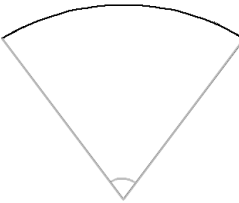


To create property lines using the **Property Line** tool:

1. Click the **Property Line** tool from the Site Planning tool set.
2. Click to set the starting point of the first property segment.

A red bull’s-eye is placed on the drawing to mark the starting point; the Define Property Line dialog box opens.

3. Specify the segment parameters and click **Add** to update the drawing file; the bull’s-eye cursor moves to the end of the segment. Continue to add or remove segments as needed.

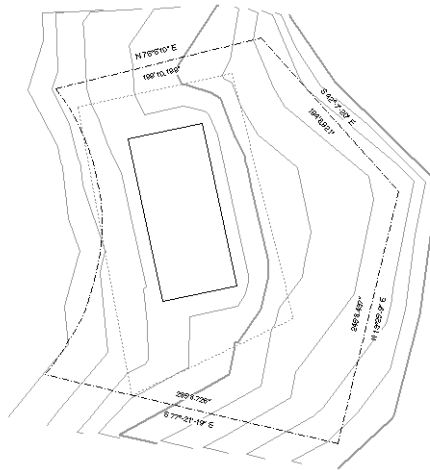
Parameter	Description
Line	Specify whether the current segment is a line
Bearing	Enter the azimuth or bearing of the line segment; if entering a bearing, a variety of formats are supported. Use spaces (N 10 30 0 E), degrees—d for degrees, m for minutes, and s for seconds (N10d0m0s E), or decimal degrees (N 10.5d 0m 0s E).
Distance	Enter the distance of the line segment
Curve	Specify whether the current segment is a curve
Start Tangent to Previous	Forces the back tangent to be collinear with the previous segment
Back Tangent	Enter the azimuth of the back tangent of this curve; a variety of formats are supported. Use spaces (10 30 0), degrees—d for degrees, m for minutes, and s for seconds (10d0m0s), or decimal degrees (10.5d 0m 0s).
Radius	Enter the radius of the curve segment
Arc Dist	Select to use the distance along the arc 
Chord Dist	Select to use the distance between the point of tangency and the point of curvature 
Tangent Dist	Select to use the distance from the end point of the last segment to the point of the intersection of the curve 
Delta Angle	Select to use the central angle of the curve as measured from the center of the arc 
Chord Bear.	Select to use the bearing of the arc chord
Forward Tangent	Displays the forward tangent value
Counter-Clockwise	Select to draw the curve Counter-Clockwise
Remove	Click to remove the selected segment from the property line
Update	Click to update the parameters for the current segment



Parameter	Description
Add	Click to add a segment to the property line
Previous / Next	Click to move backward and forward through the segments
Automatically create closing segment	Select to automatically create the final segment between the last point and the first

- Click **OK** to create the property line.

If this is the first time the **Property Line** tool has been used, the Object Preferences dialog box opens. Accept the defaults and click **OK**.



To create property lines by drawing a path object, rather than specifying parameters in a dialog box, add the Property Line object to the workspace through the Workspace Editor; see “Modifying Tool Palettes and Tool Sets” on page 724 in the VectorWorks Fundamentals User’s Guide. Once added to the workspace, click the Property Line object and draw the path object(s) as desired.

Editing Property Lines

Product: Architect and Landmark

Property lines can be edited using the **2D Reshape** tool after creation, or by clicking the **Edit with Dialog** button in the Object Info palette. Additional parameters can also be modified in the Object Info palette. See “Reshaping Objects” on page 259 in the VectorWorks Fundamentals User’s Guide for information on using the **2D Reshape** tool for editing.

To edit property lines using the Object Info palette:

- Select the property line.
- Modify the parameters in the Object Info palette.

Parameter	Description
Name	Enter a property line name
Number	Enter a property line number
Area	Displays the area of the property line



Parameter	Description
Perimeter	Displays the length of the property line perimeter
Show Name	Select to display the property line name
Show Number	Select to display the property line number
Show Area	Select to display the area of the property line, along with a leader line
Area Units	If using Imperial drawing units, select Acres or Square Feet; if using metric drawing units, select Hectares or Square Meters
Decimals	Indicates the number of decimal places to display for the property line area
Text Rotation	Specifies the text rotation degrees
Fill Behind Text	Select to display a fill behind text
Annotate Segments	Select to annotate each segment of the property line
Annotation Style	When Annotate Segments is selected, indicate the annotation information to display
Angle Format	Select whether the annotations display in Azimuth or Bearing angle format
Show as Texture Bed on DTM	Select to display the property line as a texture bed on a DTM (see “Creating a Texture Bed” on page 161)
Texture Bed Class	If Show as Texture Bed was selected, specify the texture bed class
Edit with Dialog	Click to display the Define Property Line dialog box for editing the property line; see “Drawing Property Lines” on page 181 for information on parameters
Polyline parameters	Edits the property line path polyline

For information on editing object vertices, see “Reshaping Objects” on page 259 in the VectorWorks Fundamentals User’s Guide.

- If the property line was designated to be a texture bed on the DTM, select **Tools > Organization**. On the Classes tab, select the class designated as the texture bed class, and assign it a distinctive fill color, or, if RenderWorks is installed, a texture. Select the site model and click **Update** from the Object Info palette; the property line displays as a texture bed on the DTM. Switch to a 3D view and render for the full effect.
- When **Annotate Segments** is selected and curve data exists, a curve data worksheet is automatically created, showing curve data in worksheet form. Select **Window > Worksheets** to display the worksheet, or view it from the Resource Browser.

Analyzing the Site Model

Zone of Visual Influence Analysis

Product: Landmark

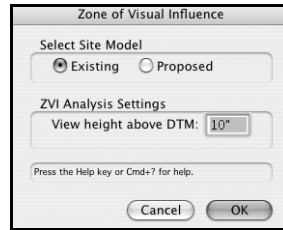
This type of analysis creates a representation of shadowed and lighted areas as seen from a specified point of view.

To perform a zone of visual influence analysis:

- Select the site model to analyze.
- Select **Landmark > Zone of Visual Influence**.



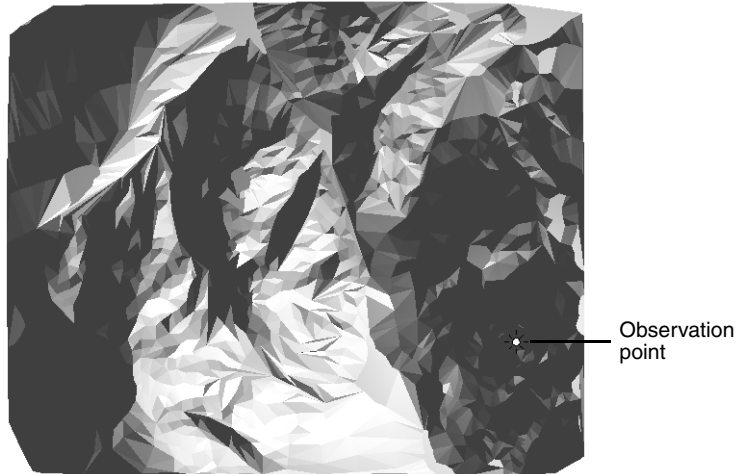
The Zone of Visual Influence dialog box opens. Specify the analysis parameters.



Parameter	Description
Select Site Model	Select the site model to analyze
View height above DTM	Represents the view point elevation for the study. For example, 60 inches (152.4 cm) is often used as a standard eye level when standing.

- Click **OK** to perform the analysis. Click on the site model to indicate the observation point.
- Click again to complete the analysis.

A light source is automatically inserted, and the layer is rendered to complete the analysis. Dark regions indicate areas that cannot be seen from the specified observation point at that viewing level.



Zone of Visual Influence analysis

- Click again to end the analysis and return to the original view.

Shadow Analysis

Product: Landmark

A shadow analysis can help determine the areas of the drawing that will receive less sunlight or remain in a shadow during a particular time of the year. By inserting several directional light sources, each representing a different time of day, an overlapping range of shadows is created which indicates the amount of time a particular area is in the shade over the course of the day.

RenderWorks is required to conduct a shadow analysis.

To perform a shadow analysis:

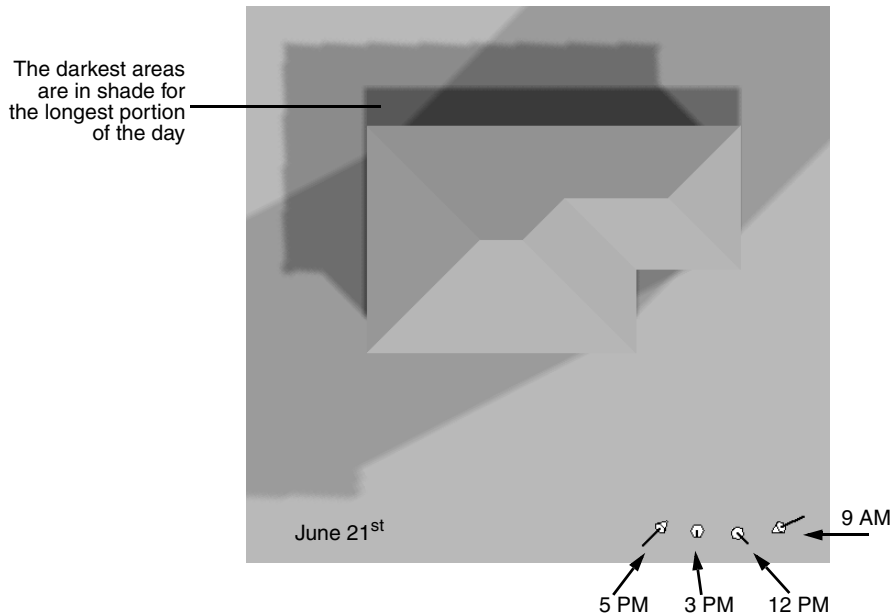
1. Add the objects to the drawing that will cast a shadow on the site (a house, for example).
2. Orient the drawing to page north. If the drawing was not created with this orientation, this can be compensated through the Set Sun Position dialog box described in the next step.
3. Insert each directional light source by selecting **View > Lighting > Set Sun Position**. Inserting one light source provides shadow information for that time of day only; several light sources set to different times of day yield an actual shadow analysis with overlapping shadows.

The Set Sun Position dialog box opens. See “Adding Sunlight” on page 422 in the VectorWorks Fundamentals User’s Guide.

For each light source inserted with this command, specify the same parameters except for time of day. At a minimum, a light source for morning, noon, afternoon, and evening should be inserted.

4. Verify the parameters of each directional light source in the Object Info palette. Ensure that **Cast Shadows** is selected, and decrease the **Brightness** so that the combination of lights is not too harsh.
5. Render the drawing with the **Fast RenderWorks with Shadows**, **Custom**, or **Final Quality RenderWorks** option. Use the **Render Bitmap** tool to render a portion of the image for presentations.

See “Rendering a Selected Area” on page 705 in the VectorWorks Fundamentals User’s Guide for more information on the **Render Bitmap** tool.



Top view – Shadow analysis



Creating Solar Animations

Product: Architect and Landmark

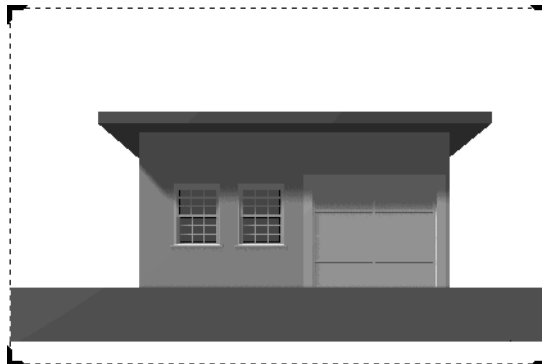
A sun study is an animated movie of sunlight over a specified day of the year. It illustrates the way shadows are cast over a project as the sun's position changes.

One of the most dramatic ways to present results from a sun study is to create a solar animation. The solar animator can transform a series of frames into a movie file that can then be played with the QuickTime™ movie viewer supplied with VectorWorks. Each frame of the movie is a rendered image from the current view and shows, in succession, the model lighted by the sun over the course of a day. This demonstrates the sunlight and shadows cast on the model as the sun's position changes for any day of the year from any location on earth. The solar animator, combined with a top view of a project, can illustrate shadows cast over a site or onto adjacent properties.

[In order to create QuickTime movies, QuickTime must be installed. This is available on the VectorWorks CD. In order to show shadows, RenderWorks is required.](#)

To create a solar animation:

1. Set the active window to the desired view and rendering mode. (Specify the image size using the view clipping frame if in Perspective mode.) Resize the active window to the desired frame size.



2. Create and select a directional light source. If there is none, the solar animator will create one. See "Adding Light" on page 420 in the VectorWorks Fundamentals User's Guide for information on light sources.
3. Select **Model > Create Solar Animation**.

The Create Solar Animation dialog box opens. Enter the solar animation criteria.

Create Solar Animation

Site

Latitude: 39° 0' 0" ☒ N ☐ S

Longitude: 77° 0' 0" ☐ E ☒ W

Time Zone Meridian: Eastern 75° W

Date

Month: January

Day: 1

Settings

Page North: 0° 0' 0"

☐ Show Frame Counter

☐ Daylight Savings

Daylight minutes per QT Frame: 5

(will run about 7 secs long at 15 fps)

Press the Help key or Cmd+? for help.

Cancel Save Movie

Parameter	Description
Site	Specifies the site location information. Time Zone Meridian must agree with Longitude unless the time zone of the location is not within the generalized 15 degree increment from Greenwich Mean Time. It cannot be more than one time zone out of agreement with the Longitude.
Date	Indicates the animation month and day
Page North	Indicates the angular difference between page north and true north
Show Frame Counter	Select to create a time stamp in the rendered scene using the current attributes
Daylight Savings	Select if Daylight Saving Time is in effect
Daylight minutes per QT frame	Specifies the number of minutes per movie frame (length of movie)

- 4. Click **Save Movie**, and then enter a name and location for the QuickTime file when prompted.
- 5. The Compression Settings dialog box opens.



- 6. Enter the compression settings for the movie file. For the video **Compression type**, **Motion JPEG A** may provide the best results.

See “Animating Drawings with QuickTime” on page 601 in the VectorWorks Fundamentals User’s Guide. Also, see Apple’s Quicktime website for more information on QuickTime.

[QuickTime is a complex program which offers great flexibility in selecting settings. Consult QuickTime documentation before changing Compression Settings.](#)

- 7. If **Show Frame Counter** was selected in the Create Solar Animation dialog box, enter a click point to locate the time-stamp text in the frame. The frame counter feature uses the current text size to calculate the proper text size based on the current view clip frame.
- 8. When the rendering is complete, close or hide VectorWorks.
- 9. View the movie in an application such as the QuickTime Player to watch the solar animation.



Obtaining Site Model Data

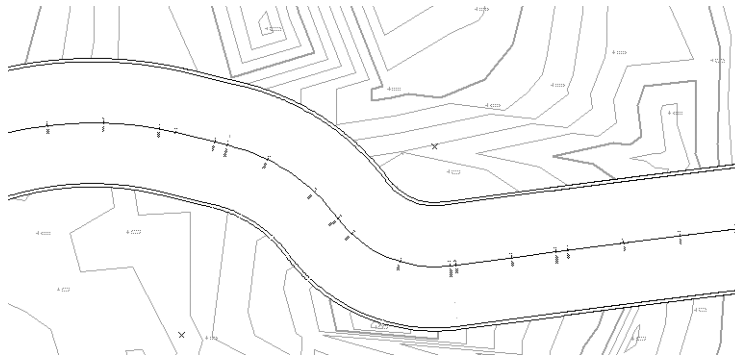
Site Model Section

Product: Architect and Landmark

Use the **Site Model Section** command to create a profile or sectional views of the site.

To create a site model section:

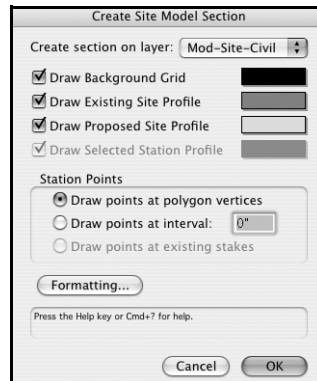
1. Draw or select a 2D polygon or polyline to define the section alignment. In Landmark, if selecting a previously drawn polyline with station points, a station point profile can be created.



The polygon or polyline vertices must be contained within the limits of the site model.

2. With the polygon or polyline selected, click **Landmark > Site Model Section** (Landmark workspace) or **AEC > Terrain > Site Model Section** (Architect workspace).

The Create Site Model Section dialog box opens. Specify the site model section parameters.



Parameter	Description
Create section on layer	Specify the layer where the section will be placed or click New Layer to create a new layer for the section
Draw Background Grid	Select to draw a background grid, and click the color box to specify the grid color

Parameter	Description
Draw Existing Site Profile	Select to draw a profile for the existing site model, and click the color box to specify the profile color
Draw Proposed Site Profile	Select to draw a profile for the proposed site model, and click the color box to specify the profile color
Draw Selected Station Profile (Landmark required)	Select to draw a profile of the station points, and click the color box to specify the profile color; this option is available only if a polyline associated with station points is selected
Station Points	
Draw points at polygon vertices	If the selected polygon does not contain stake objects, select to create station points at the polygon vertices; this option is available only if a station polyline is selected
Draw points at interval	If the selected polygon does not contain stake objects, select to create station points at the specified interval
Draw points at existing stakes (Landmark required)	When stakes exist along the profile polygon, station points are automatically created for the stakes; this option is available only if a polyline with station points is selected
Formatting	Click to specify the section graphic formatting

3. Click **Formatting**.

The Site Model Section Formatting dialog box opens. Specify the formatting for the site model section graphic.

Site Model Section Formatting

Display Scale Factor:

48

Vertical Magnification Factor:

1

Vertical Margin:

1"

Horizontal Margin:

1"

☒ Draw Legend Text

Legend point size: 10

☒ Draw Elevations

Elevation point size: 10

Station Point Labels:

None

Profile Line Weight:

1

Station Line Weight:

1

Press the Help key or Cmd+? for help.

Cancel

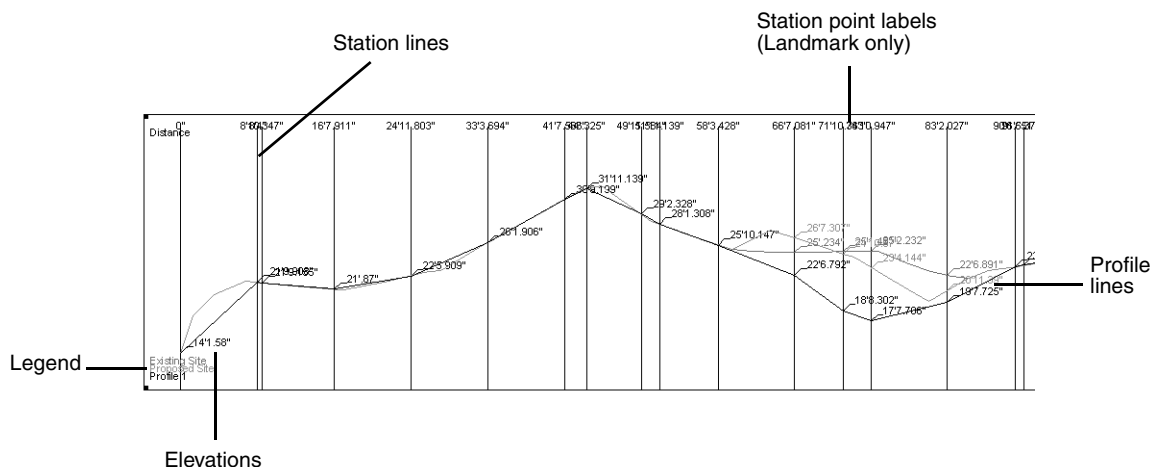
OK

Parameter	Description
Display Scale Factor	Specifies the site model scale factor; the layer scale factor is entered by default
Vertical Magnification Factor	Sets an independent scale factor for the Y axis of the graphic



Parameter	Description
Vertical Margin	Specifies the distance, in page units, between the highest and lowest points in the graph and the graph margins
Horizontal Margin	Specifies the distance, in page units, between the graph start and end and the graph margins
Draw Legend Text	Indicates whether to create a legend for the graph; legend text is color coded to match the section profiles
Legend point size	Specifies the size, in points, of the legend text
Draw Elevations	Indicates whether to display the elevation of the profiles along the station points
Elevation point size	Specifies the size, in points, of the elevation text
Station Point Labels (Landmark required)	Sets the type of label, if any, to apply to the station points on the background grid
Profile Line Weight	Specifies the thickness of the profile lines
Station Line Weight	Specifies the thickness of the station lines

- Click **OK** to return to the Create Site Model Section dialog box.
- Click **OK** to create the sectional view of the site. If the site model changes, the site model section needs to be recreated.



Determining the Elevation of a Point on the Site Model

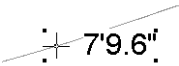
Product: Architect and Landmark

Stake objects represent a 3D point in space, with text to display the elevation when in Plan view. Using a stake object, the elevation information for a point on the site model can be determined and labeled.



To insert a stake object with an elevation label:

1. Click the **Stake Object** tool from the Site Planning tool set.
2. Click on the site model where the elevation needs to be determined.
3. Click again to set the rotation of the stake and its label. The stake properties can be edited in the Object Info palette.



Parameter	Description
Z-value	Specifies the stake elevation. For Landmark road stakes, set the elevation of the first stake along the polyline, and the elevation of the remaining stakes is automatically calculated (as described in “Setting Stake Elevations” on page 165)
Mode	
Include as site model data	Uses the stake as DTM data if it is located in the source data layer (select when using stakes to create a site model)
Set elev to site model	Sets the stake elevation to the existing DTM elevation
Use as 2D graphic only	Treats the stake like a 2D text box and does not create a 3D locus for the stake
Site modifier object	Treats the stake object as a site modifier, which has an effect on the proposed site model
Style	Selects the graphic style of the stake object <div>△ 6'0" ○ 6'0" ● 6'0" + 6'0" — 6'0"</div> <div>Triangle Circle Dot Cross Tick Mark</div>
Label Reference	Selects the type of information to display in the label; select No Label to display no text. The available label fields depend on the label reference selected.
Description	For Description and ID/Description labels, enter description text
ID Prefix	For ID/Elevation labels, enter a prefix to display with the ID
ID Number	For ID/Elevation labels, specify the ID number
Stationing Data	For Stationing Data labels, indicates the station point data for the selected stake object
Scale Factor	Determines the size of the label display

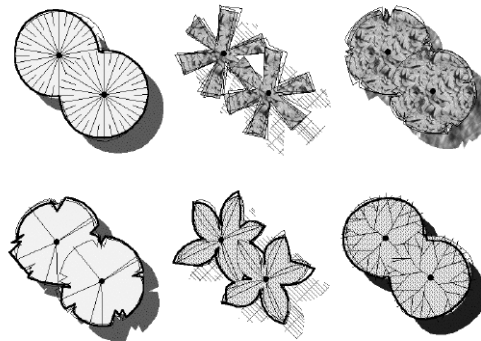
Planting and Irrigation Design

Product: Landmark

VectorWorks Landmark provides a complete set of commands, tools, and symbols for adding plants and irrigation to the design.

The **Place Plant** tool both defines and places plant objects. The plant database maintains an extensive set of plant data that can be attached to plant definitions.

Placing plants is extremely flexible. Place plants pre-defined with species information and appearance settings, or add generic plants to the drawing and re-assign them to a specific plant species later in the design process. A selected plant can be placed individually or in multiples. Once placed, a plant group can be changed into individual plants, or individual plants can be grouped. In addition, undefined plant masses can be created according to several methods.



Add irrigation heads, drip emitters, and irrigation lines with specific parameters to complete the drawing. Planting plans and irrigation plans generate worksheets to calculate project costs, materials required, and other factors. Landscape and irrigation plans are easily set up by using the **Create Standard Viewports** command to create typical standard plans (see “The Setup Commands” on page 2); however, this is not a requirement—Landmark functions with custom file setup parameters as well.

Adding Plants to the Design

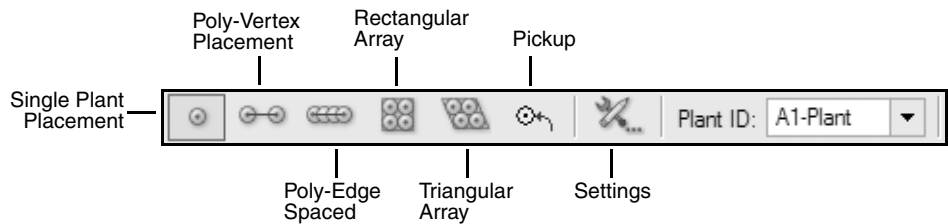
Product: Landmark

Placing Single or Multiple Plants

Product: Landmark

The **Place Plant** tool places a selected plant definition in a single or multiple arrangement on the drawing. Plants can also be created by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).

Seven modes are available.



Mode	Description
Single Plant Placement	Places a single specified plant at each mouse click
Poly-Vertex Placement	Places plants at each clicked polygon vertex
Poly-Edge Spaced	Specify the Spacing distance in the plant definition or Object Info palette; plants are spaced along the user-entered polygon at the spacing distance specified
Rectangular Array	Specify the Spacing distance in the plant definition or Object Info palette; plants fill the polygon in a rectangular array at the spacing distance specified
Triangular Array	Specify the Spacing distance in the plant definition or Object Info palette; plants fill the polygon in a triangular array at the spacing distance specified

Mode	Description
Pickup	Sets the default plant settings to match those of a selected existing plant
Settings	Opens the Place Plant Preferences dialog box, for specifying the plant to place, its placement options, and its definition
Plant ID	Selects a plant for placement by its ID



To place plants on the drawing:

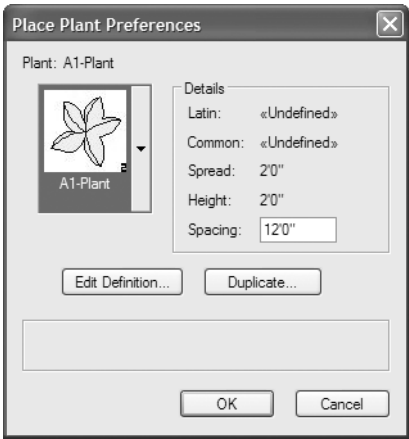
1. Click the **Place Plant** tool from the Site Planning tool set.

The Place Plant Preferences dialog box opens automatically if there are no plants in the Resource Browser. Otherwise, click **Settings** from the Tool bar to select the plant to place.

The plant to place can also be selected by its plant ID with the **Plant ID** list on the Tool bar. The plant resources in the active drawing display alphabetically at the top of the list; the remaining plants are from the default content resources.

[Double-click a plant from the Resource Browser to activate the **Place Plant** tool and place the selected plant.](#)


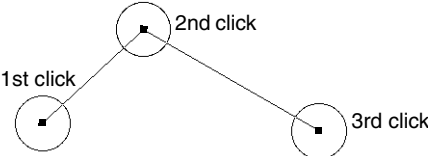
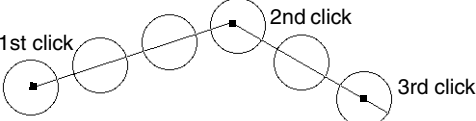
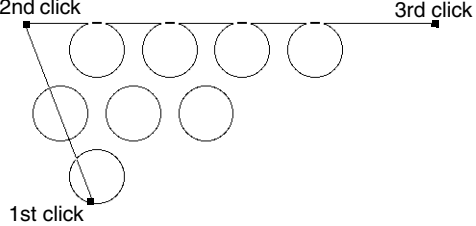
For rapid plant placement, select a plant symbol from the current file, or default content plant from the **Plant** list, specify the **Spacing** value, and click **OK** to begin placement. The plant can be defined or replaced at a later time. Alternatively, create a plant definition prior to placement. Plants are also defined from this dialog box, as described in “Creating Plant Definitions” on page 199.



Parameter	Description
Plant	Displays the currently selected plant name
Graphical plant list	Displays a graphical list of available plants, with the 2D symbol and the plant ID. The currently displayed plant is selected for placement.
Details	Summarizes the plant definition information (or default information, if the plant has not yet been defined) to help distinguish one plant from another
Latin/Common	Plants which have been defined display their Latin and common names

Parameter	Description
Spread	Displays the plant spread diameter (the maximum width of the mature plant, as drawn) for both single and multiple plant placement; the symbol is scaled by this parameter, along with the Height
Height	Displays a typical mature plant height; the symbol is scaled by this parameter, along with the Spread
Spacing	Indicates the plant spacing distance for the Poly-Edge Spaced, Rectangular Array, and Triangular Array cluster placement methods
Edit Definition	Edits the definition of the currently selected plant (see “Creating Plant Definitions” on page 199)
Duplicate	Creates a new plant definition based on the current plant symbol (see “Creating Plant Definitions” on page 199)

- 2. Click **OK**. The **Place Plant** tool uses these settings until they are changed again by selecting a different plant ID from the Tool bar, clicking **Settings** from the Tool bar, or until **Pickup** mode is selected, which changes the default settings to those of a selected existing plant.
- 3. Select the plant placement mode from the Tool bar. Depending on the placement method selected, either click in the drawing to place a single plant, or draw a polygon. As the **Place Plant** tool is clicked in the drawing, a preview of the plant spread is displayed to help with plant placement.

Placement	Preview
Single Plant	
Poly-Vertex Placement	
Poly-Edge Spaced	
Rectangular/Triangular Array	

- 4. The specified plant symbol is placed in the drawing as indicated.



The **Place Plant** tool parameters are retained so that the successive placement of plants is easily accomplished.

For multi-plant placement options, edit the polygon defining the plant with the **2D Reshape** tool if necessary, and the plant placement is automatically adjusted to fit the new shape.

Plant Properties

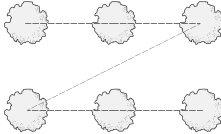
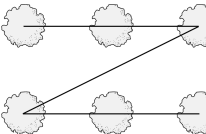

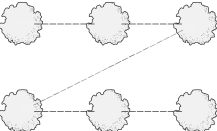
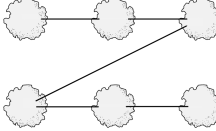
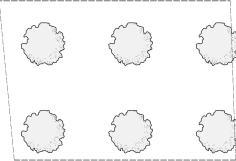
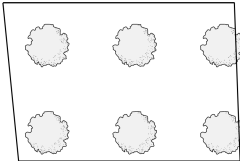
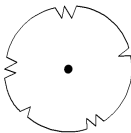
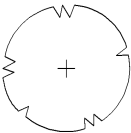
Product: Landmark

The plant properties are displayed, and certain parameters can be edited, in the Object Info palette.

As plants are placed, they take on the properties of the associated plant definition. Changes made in the Object Info palette for the selected plant(s) apply to those individual plants only; changes are not reflected in the plant definition.

Parameter	Description
Plant ID	Displays the plant's unique ID code; this code identifies the plant definition and appears in the plant list
Plant Description	Displays the plant definition name
Spread	Displays the plant spread diameter (the maximum width of the mature plant, as drawn) for both single and multiple plant placement; the symbol is scaled by this parameter, along with the Height
Height	Displays the typical mature plant height; the symbol is scaled by this parameter, along with the Spread
Replace Plant	Opens the Replace Plant dialog box; select the plant to replace the currently selected plant or all plant instances. (Alternatively, select Replace Plant from the plant context menu.) See "Replacing Plants" on page 208.
Spacing	Indicates the plant spacing distance for the Poly-Edge Spaced , Rectangular Array , and Triangular Array cluster placement methods
Mode	Specifies the plant insertion mode (see "Placing Single or Multiple Plants" on page 193); a different insertion mode can be selected for multi-placement plants
Tag Display	Select whether to display the plant tag to the right or left of the leader line, or not at all
Tag Class	Specifies the plant tag class name, to facilitate hiding and showing plant tags



Parameter	Description
Polygon display	<p>For multiple plant placements, selects the display type of the boundary or center polygon defining the plant cluster shape. The polygon uses the class attributes (line weight, color, and visibility) of the tag class.</p> <div> <div><p>None</p><p>Centers - solid</p><p>Centers - dashed</p></div><div> <div><p>Boundary - solid</p><p>Boundary - dashed</p><p>Gapped - solid</p><p>Gapped - dashed</p></div></div></div>
Tick Style	<p>Select a tick mark (plant center mark) style</p> <div> <div><p>Cross</p><p>Dot</p></div></div>
Tick Size	Specifies the tick mark size
Random Plant Rotation	Randomly rotates the plants within a selected cluster for a more natural appearance
On Plant List	Select to include the plant object in the Plant List worksheet
Enable 2D Plant Rendering	Select to display the plant style settings associated with the plant (see “Creating Plant Definitions” on page 199); showing plant styles in a complex drawing can cause slower display times
Polyline parameters	Edits the plant polyline for multi-plant placements

Defining Plants

Product: Landmark

The **Place Plant** tool defines or edit specific plants for placement, and then places those defined plants.



Creating Plant Definitions

Product: Landmark

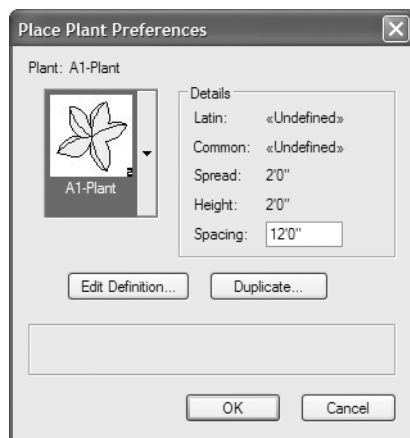
Plants can be defined by entering parameters or by loading (and editing) botanical data from the plant database. The parameters specified apply by default when the selected plant is inserted on the drawing; after placement, certain plant parameters can be edited on an individual basis.



To create new plant definitions:

1. Click the **Place Plant** tool from the Site Planning tool set.
2. The Place Plant Preferences dialog box opens automatically if plants have not yet been placed in the drawing. Otherwise, click **Settings** from the Tool bar.

The Place Plant Preferences dialog box opens.



3. Select a plant symbol that is close in appearance to the new plant.

Plants can be placed with just this basic information; see “Adding Plants to the Design” on page 193. The plant definition can be edited later.

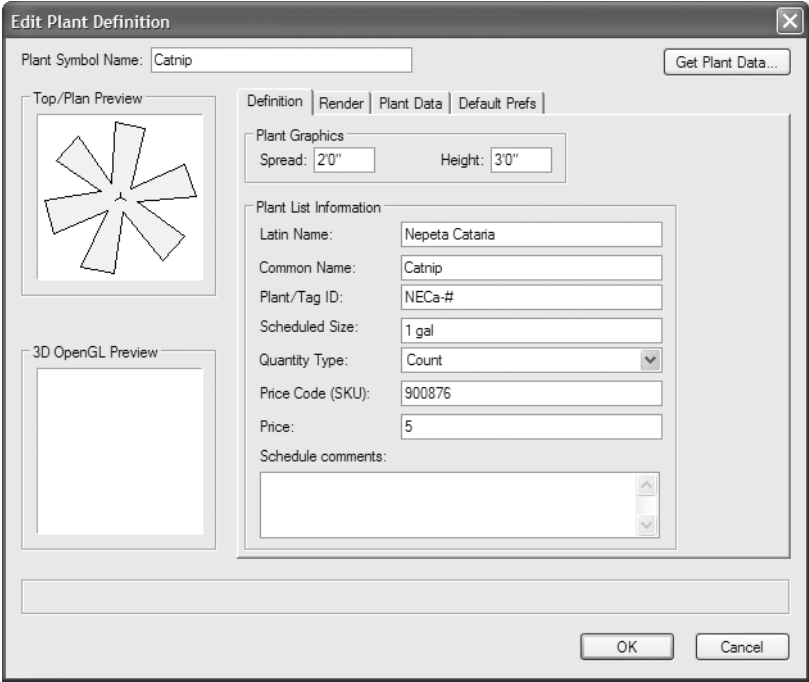
4. Click **Duplicate** to create a new plant definition based on the selected plant.

To edit a plant definition rather than create a new one, click **Edit Definition**. Alternatively, select a plant from the drawing, click **Edit** from the Resource menu or the plant context menu, and select **Definition**.

Whether creating a new plant from a duplicate, or editing a current plant definition, the Edit Plant Definition dialog box opens, displaying the selected 2D plant symbol. Provide a name for the plant symbol, and then specify the plant parameters on each tab to define the plant. As the parameters are defined, the preview dynamically displays the plant appearance.

The plant attributes are set from the Attributes palette while editing the symbol components as described in “Editing Plant Attributes” on page 207.

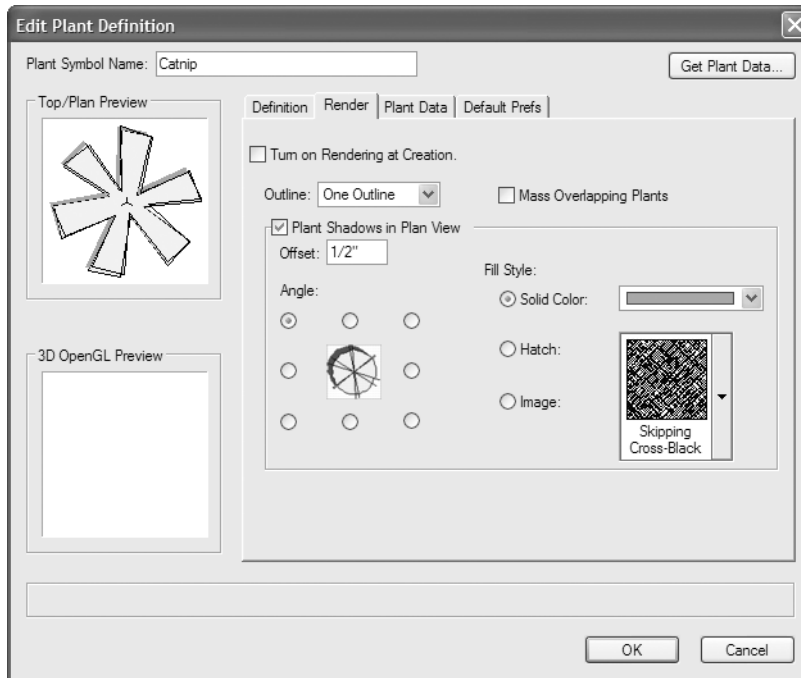
To automatically add plant information from the plant database, click **Get Plant Data** (see “Using Plant List Data in VectorWorks Landmark” on page 220).

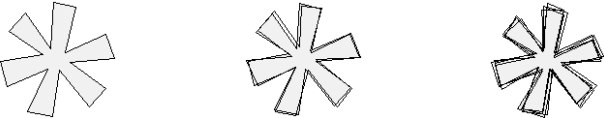
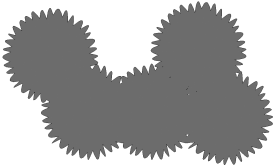




Parameter	Description
Plant Symbol Name	Enter a name for the plant symbol; this name displays in the Resource Browser
Preview	Dynamically previews the plant appearance, showing how it will appear when added to the drawing with the Place Plant tool
Top/Plan Preview	Displays the 2D component of the plant symbol
3D OpenGL Preview	Displays the 3D component of the plant symbol, if one has been added to the symbol definition
Get Plant Data	Opens the Get Plant Data dialog box; select a plant to add its data to the current plant definition (see “Using Plant List Data in VectorWorks Landmark” on page 220)
Plant Graphics	The 2D and 3D components of the plant symbol are scaled based on these values
Spread	Specifies the plant spread diameter (the maximum width of the mature plant, as drawn) for both single and multiple plant placement.
Height	Indicates the typical mature plant height
Plant List Information	If plant information was obtained from the plant database, this information is automatically entered if available
Latin Name	Specifies the plant genus and species
Common Name	Specifies the plant common name or names
Plant/TagID	Identifies the plant with a unique code; this code appears in the plant list and on ID tags, if selected (see “Plant ID Codes” on page 551 for the definition of common code categories)

Parameter	Description
Scheduled Size	Indicates the plant caliper or container size; displays in the Plant List worksheet
Quantity Type	Select the quantity unit for the plant; quantity can be defined as unit count, dripline area, or border area
Price Code (SKU)	Specifies the price code entry in Stock Keeping Units (SKU)
Price	Indicate the plant cost per unit of quantity; the plant cost and quantity are reflected in the Extended Price calculation in the Plant List worksheet
Schedule comments	Specifies default comments about the plant that display in the Plant List worksheet

5. Click the Render tab to specify the 2D plant styles. These effects display in Top/Plan view only. In a complex drawing with many plants, these settings can take a significant amount of time to display and edit, so they are not on by default at plant placement. They can be turned on after placement for selected plants by choosing **Enable 2D Plant Rendering** from the Object Info palette, or for all plants by selecting **View > Show > Show or Hide Plant Styles**.

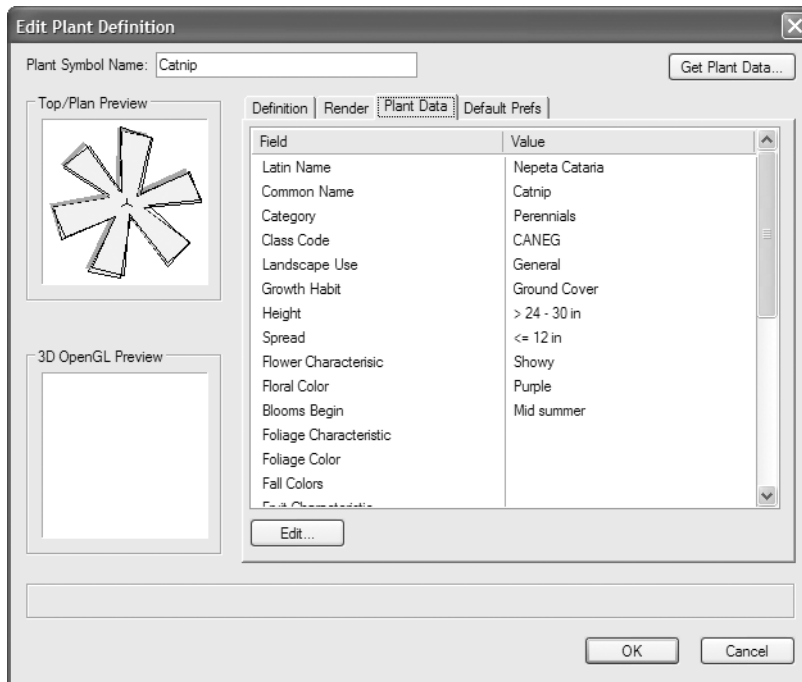


Parameter	Description
Turn on Rendering at Creation	Enables plant style display at plant placement; in a complex drawing, this may require a significant amount of time
Outline	Select up to three offset plant outlines <div><div>No outlineOne outlineThree outlines</div></div>
Mass Overlapping Plants	Joins the outlines, and removes the interior lines, of plants that overlap to easily create a plant mass. Plants that contain bitmap images cannot be massed. <div></div>
Plant Shadows in Plan View	Specifies special shadow effects that display in Top/Plan view only
Offset	Specifies the offset distance of the shadow from the plant
Angle	Controls the plant shadow location; select an angle for the shadow
Fill Style	Select the type of shadow to display
Solid Color	Click the color box to select a solid shadow color
Hatch	Select a hatch for the plant shadow from the either the default resources or the current file's resources; see "VectorWorks Design Series Default Resources" on page 570 <div></div>
Image	Select an image for the plant shadow from either the default resources or the current file's resources; see "VectorWorks Design Series Default Resources" on page 570 <div></div>

- Click the Plant Data tab to view the plant database information for the plant.

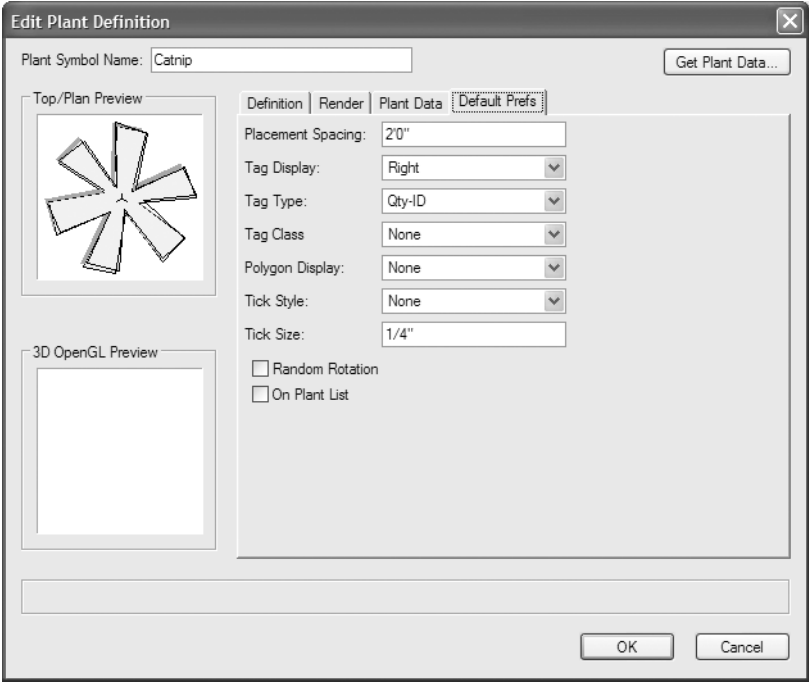
To add botanical data from a plant list to the plant definition, click **Get Plant Data** and select a plant name (see “Using Plant List Data in VectorWorks Landmark” on page 220).

To change the plant data for the current plant definition only (without changing the plant list data), click on the parameter and click **Edit**. Enter the new value in the Edit Field dialog box and click **OK**.



- Click the Default Prefs tab to specify default plant values and options.

Values and settings entered on this tab become the default for the plant definition; however, they can be changed for individual plant instances on the Object Info palette.



Parameter	Description
Placement Spacing	Indicates the plant spacing distance for the Poly-Edge Spaced , Rectangular Array , and Triangular Array cluster placement methods
Tag Display	Select whether to display the plant tag to the right or left of the leader line, or not at all
Tag Type	Determine the method of displaying ID tags for the plant; select Custom to define a custom ID text string formula
Tag Class	Specifies the default class for the plant ID tag, or allows a new class to be created for the plant ID tag



Parameter	Description
Polygon Display	<p>For multiple plant placements, changes the display of the boundary or center polygon defining the plant cluster shape. The polygon uses the class attributes (line weight, color, and visibility) of the tag class.</p> <p>None Centers - solid Centers - dashed</p> <p>Boundary - solid Boundary - dashed Gapped - solid Gapped - dashed</p>
Tick Style	<p>Select a tick mark (plant center mark) style</p> <p>Cross Dot</p>
Tick Size	Specifies the tick mark size
Random Rotation	Randomly rotates the plants within a selected cluster for a more natural appearance
On Plant List	Includes the plant object in the Plant List worksheet

8. When the default plant parameters have been defined, click **OK** to return to the Place Plant Preferences dialog box. From there, additional plants can be defined or edited, and a plant can be selected for placement.

When using workgroup referencing, the plant definitions should exist in the same file as the site model they reference, so that their Z values can be set to the DTM surface.

Plant resources can be exported from the Resource Browser or by clicking **Export Plant** from the plant context menu; see “Exporting Resources” on page 23.

Creating Plant Symbols

Product: Landmark

Plant symbols can easily be created from 2D geometry or another plant.

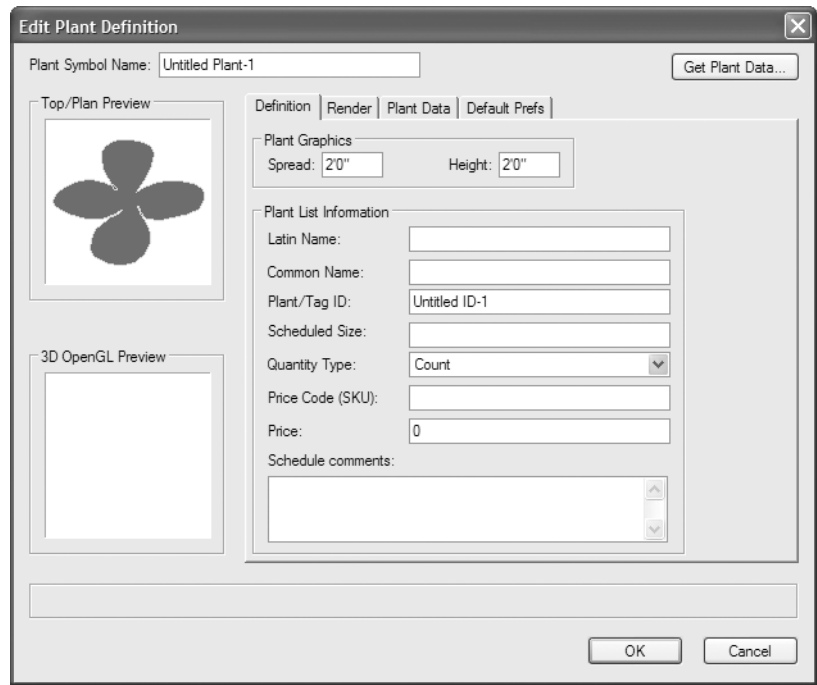
To create a plant symbol from 2D geometry:

1. Select the 2D geometry to convert to a new plant symbol.

A plant symbol can be created from another symbol. The xFrog plant images can be used as a basis for the 2D geometry; see “VectorWorks Design Series Default Resources” on page 570.

2. Select **Landmark > Create New Plant**.

The Edit Plant Definition dialog box opens. Specify the plant definition parameters, similar to creating a new plant (see “Creating Plant Definitions” on page 199).



3. Click **OK** to create the new plant.

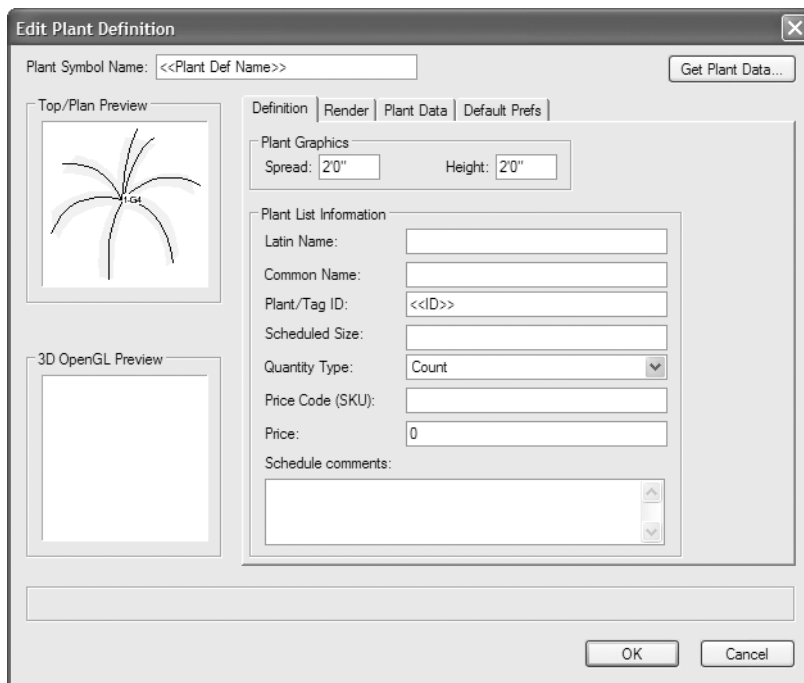
The plant symbol contains a 3D locus by default. Once the plant has been created, edit the 3D component of the plant symbol to add the 3D geometry. See “Editing Symbol Definitions” on page 166 for information on editing symbol components. Image props, such as those provided by xFrog, can be used as 3D plant geometry.

To create a plant symbol from an existing plant:

- 1. Select the existing plant to convert to a new plant symbol.
- 2. Select **Landmark > Create New Plant**.

Alternatively, select **Create Plant from Object** from the plant context menu, or select the plant to duplicate from the Resource Browser, and select **Edit** from the Resources menu.

The Edit Plant Definition dialog box opens



3. The plant graphics are based on the original plant. Specify the plant definition parameters, similar to creating a new plant (see “Creating Plant Definitions” on page 199).
4. Click **OK** to create the new plant.

Editing Plants

Product: Landmark

Editing Plant Attributes

Product: Landmark

Plants are hybrid symbols, containing a 2D symbol, and optionally, a 3D symbol. As plant definitions are created, the plant symbol is automatically imported into the current file and appears in the Resource Browser. Plants are “red” plug-in object symbols (see “Understanding Symbols” on page 153 in the VectorWorks Fundamentals User’s Guide for information on symbol types). The 2D and 3D plant graphics are scaled by the plant definition height and spread parameters.

When VectorWorks Landmark is installed, 2D and 3D plant symbols are provided as default resources (default resources are automatically imported into the current file at the point of use and display in the Resource Browser; see “VectorWorks Design Series Default Resources” on page 570). The resources in the Plant Defaults.vwx file are available in the Place Plant Preferences dialog box.

Custom plant symbols can also be created; see “Creating Plant Symbols” on page 205.

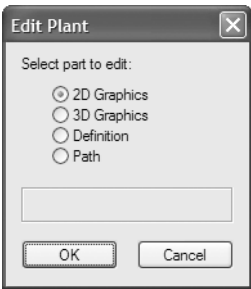
Because plants are red symbols, plant attributes cannot be directly set or modified from the Attributes palette. Instead, edit the plant symbol components.

To edit plant symbol attributes:

1. Select the plant symbol in the Resource Browser. From the Resources menu, select **Edit**, or select **Edit** from the Resource Browser context menu.

Alternatively, select a plant in the drawing window, and double-click or select **Edit** from the context menu.

The Edit Plant dialog box opens.



Parameter	Description
2D/3D Graphics	Edits the 2D or 3D symbol components (geometry, or shape, and attributes like color and line weight) as described in “Editing Symbol Definitions” on page 166 in the VectorWorks Fundamentals User’s Guide
Definition	Edits the definition of the plant symbol as described in “Creating Plant Definitions” on page 199)
Path	For multiple plant placements, selects the boundary or center polygon defining the plant cluster shape, and automatically activates the 2D Reshape tool for editing the path

2. Edits to the 2D or 3D components immediately affect all instances of the symbol. Changes to the plant definition affect all future instances of the plant.

Replacing Plants

Product: Landmark

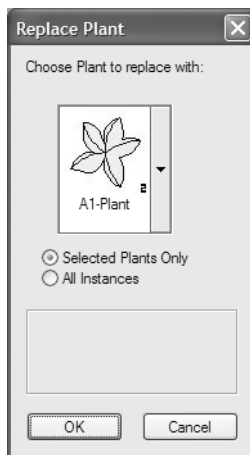
When replacing plants, select whether to replace the current plant only, or all instances of the selected plant.

To replace plants:

1. Select the plant(s) to replace, or select a plant that is a representative of the plant instances to replace.
2. From the Object Info palette, click **Replace Plant**.

Alternatively, select **Replace Plant** from the plant context menu.

The Replace Plant dialog box opens.



Parameter	Description
Plant list	Select the replacement plant from the list of plant symbols in the file and in default resources
Selected Plants Only	Replaces the selected plant(s) with the new plant
All Instances	Replaces all instances of the plant with the new plant. This does not affect the plant definition of the replaced plant, but simply replaces all plants of one type with another.

3. Click **OK** to replace the plant(s) or all the plant instances with the new plant.

Modifying Plant Clusters

Product: Landmark

Plants placed in a multiple placement mode of the **Place Plant** tool are associated as a cluster. The cluster moves together, and parameter changes affect all plants in the cluster. However, it is possible to dissociate the cluster to make individual plant changes. In addition, new clusters can be created with different combinations of plants. Clustering identical plants which are in close proximity can be desirable for labeling and identification purposes.

Converting Plant Clusters

Product: Landmark

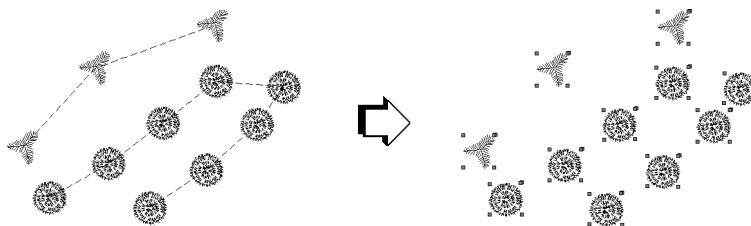
One or more plant clusters can be disassociated to change individual plant parameters or location.

To convert a plant cluster to individual plants:

1. Select the plant cluster or clusters to convert.
2. Select **Landmark > Change Plant Grouping**.
3. If one plant cluster is selected, the plants in the cluster are automatically converted to individual plants.
4. If more than one plant cluster is selected, the Choose Mode dialog box opens.



5. Select **Convert Selection into Individual Plants**.
6. Click **OK**. The plants are converted, retaining their original plant type; they can be moved and changed individually.



Combining Plants

Product: Landmark

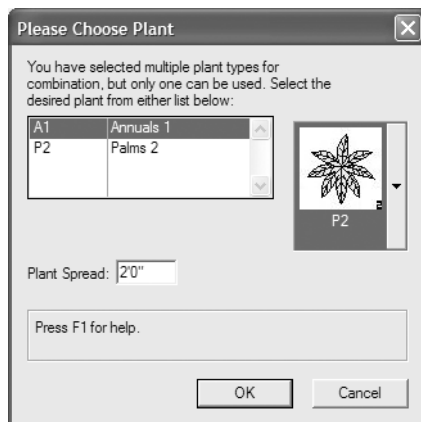
Individual plants and plant clusters can be combined into a single plant cluster. The converted cluster will be a multi-plant placement at polygon corners.

To convert plants to a plant cluster:

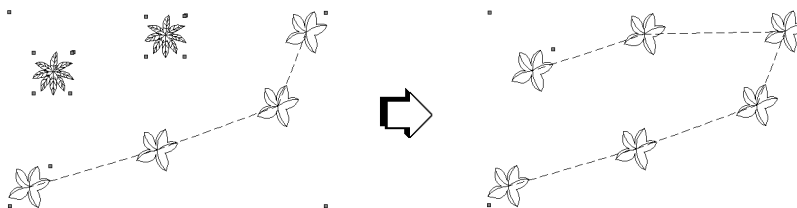
1. Select the individual plants, plant clusters, or combination of individual plants and clusters to convert.
2. Select **Landmark > Change Plant Grouping**.
3. If the selection consists of individual plants of the same type, they are automatically converted to a single plant cluster.
4. If individual and clustered plants are selected, the Choose Mode dialog box opens.



5. Select **Combine Plants into One Single Plant**.
6. Individual and clustered plants of the same type are automatically converted to a single plant cluster.
7. If the selection consists of more than one plant type, the Please Choose Plant dialog box opens.



8. All the plants in the selection will be converted to one of the plant types. Select the plant type from the list and specify the **Plant Spread** value. Click **OK**.
9. The selected plants are converted to a single cluster of identical plant types.



Plants are clustered based on their drawing order. If the joining polygon of the resulting plant is not as expected, change the drawing order of the plants prior to joining them.

Adding Plant List Worksheets

Product: Landmark

Plants to be included in the Plant List must have **On Plant List** selected in the Object Info palette.

To add plant lists to the design:

1. From the Resource Browser, open the [VectorWorks]\Libraries\Defaults\Reports-Schedules\Plant Lists.vwx object library that is included with Landmark. Four types of worksheets are included (Basic, Colors, Costing, and Simple).
2. Select one of the worksheet symbols and choose **Make Active** from the **Resources** menu. Click to place the symbol in the drawing, and again to set the symbol rotation.

The worksheet, populated with information from the plants in the current drawing, is automatically created.



Plant List - Costing							
A2 X ✓ ID							
	A	B	C	D	E	F	G
1	Plant List - Costing						
2	ID	Qty	Schedule	Common Name	Unit Price	Ext Price	Remarks
3	BEPA	2	25 gal	Paper Birch, Canoe Bir	100.00	200.00	
3.1	CTNP	10	1 gal	Catmint, Catnip	5.00	50.00	Mint family, attracts cats
3.2	ILOP	8	2 gal	American Holly	50.00	400.00	
3.3	OEBI	14	0.5 gal	Evening Primrose	5.00	70.00	Wildflower
3.4	VRBN	21	2 gal	Verbena, vervain	10.00	210.00	

For more information on worksheets, see “Worksheets” on page 563 in the VectorWorks Fundamentals User’s Guide.

The Plant Database

Product: Landmark

The VectorWorks Landmark plant database manages an extensive list of plant names and botanical information which can be used to associate specific plant data with plant definitions.

The plant database has been completely replaced for VectorWorks 2008. The new database is a stand-alone FileMaker® application that opens in a separate window. The benefits of using the FileMaker database for plant data management include improved navigation, editing, searching, and filtering, as well as the ability to import data from industry-standard sources. At installation, a large set of plant records is provided.

FileMaker is a comprehensive data-management program. The details of every menu command and option are beyond the scope of this manual. However, all relevant information for using FileMaker in conjunction with VectorWorks Landmark is presented. Familiarity with FileMaker is not required to use the database or to manage botanical data, and to use that data in VectorWorks. The full version of FileMaker can also be used when working with the plant database. For in-depth information about FileMaker, including product documentation, visit www.filemaker.com and navigate to the Support area. (The plant database may not contain all the functionality documented for the full version of FileMaker.)

The general workflow consists of managing the botanical information in the plant database application, and from there, creating the plant lists to be used in VectorWorks Landmark.

Accessing the Plant Database

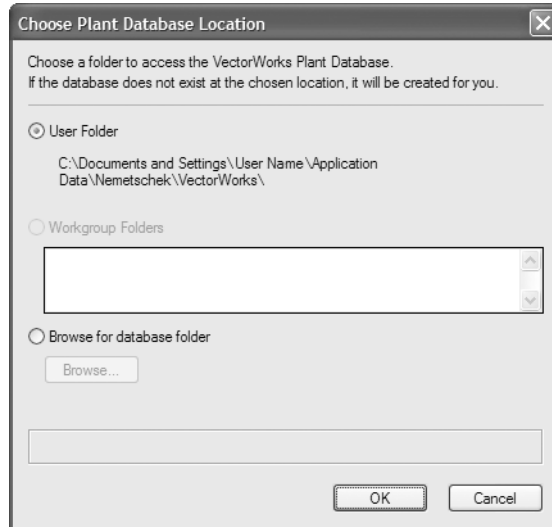
Product: Landmark

Accessing the plant database for the first time requires initial setup.

To access the plant database for the first time:

1. Select **Landmark > VW Plants Database**.

The Choose Plant Database Location dialog box opens.



2. Indicate where the plant database information is to be located. By default, the plant database is stored locally, in the user folder of the computer where VectorWorks is installed. Larger offices that wish to share the plant database among several computers can store and access the plant database from a workgroup folder located on a central computer or server. Alternatively, select **Browse for database folder** and then click **Browse** to specify the desired location.

If this is the first time the plant database is being accessed and it does not yet exist in the specified location, the database is automatically created in that location. Whenever the plant database is opened in the future, it will use the data from that location. The location can be changed at any point by selecting **Landmark > Choose VW Plants**. It is possible to maintain several plant databases and switch among them with this command.

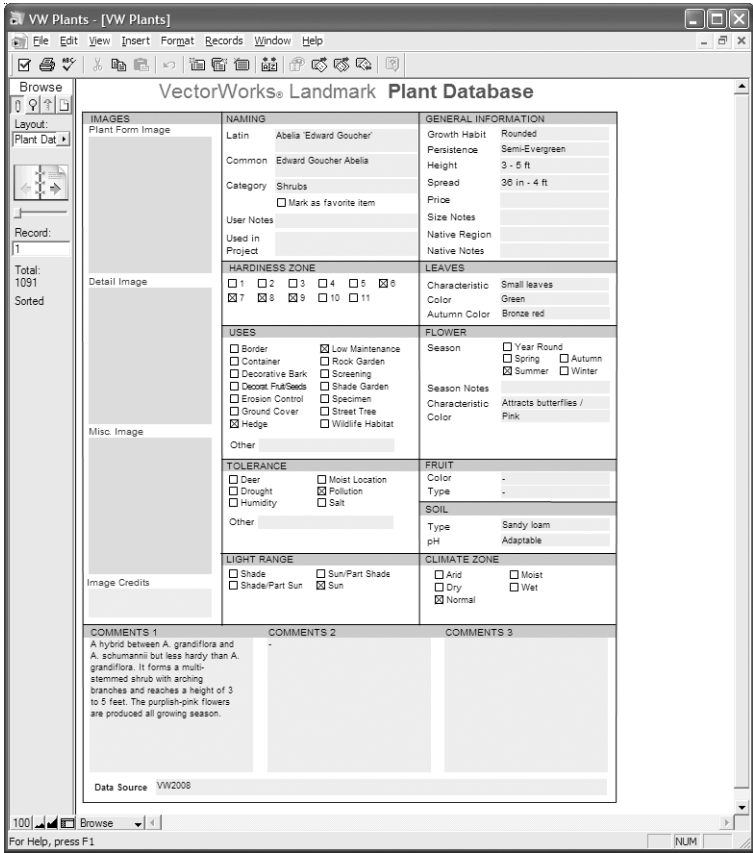
3. Click **OK**. The creation of a new plant database location may take a few moments.

The VW Plants dialog box opens. Specify a user name for the FileMaker application.



4. Click **OK**.

The VectorWorks Landmark plant database opens, in a separate window.



Once the plant database has been set up, it is accessed immediately when selecting **Landmark > VW Plants Database**. The plant database can also be accessed when creating a plant definition, by clicking **Open VW Plants** from the Get Plant Data dialog box.

Importing Plant Database Information

Product: Landmark

A default set of plant database records is provided at installation. The plant database supports several data formats for import, including tab-delimited files, Excel® spreadsheets, .xml files, and many others. The import folder feature allows movies and images to be imported. In addition, plant lists from previous version of VectorWorks can be imported.

To import plant database information:

1. Open the plant database as described in “Accessing the Plant Database” on page 212.
2. Select the **File > Import Records** database command, and choose the import option. Files, folders, or .xml files can be imported. Select this command to import plant lists from VectorWorks versions prior to 12.
To import plant lists from VectorWorks 12.x, select the **File > Import VectorWorks Plant List** database command.
3. After specifying the location of the file(s) to import, field mapping is required to import the data correctly into the current database. (For VectorWorks 12.x plant lists, field mapping is automatically performed.)



The important mapping fields for proper use in VectorWorks are described in “Plant Database Field Mapping” on page 552. Consult the Support area of www.filemaker.com if more information is required.

Adding Additional Plant Data

Product: Landmark

Additional plant datasets may be located in the Plant Database\ VW Plants\ Additional Datasets folder. These files typically contain regional plant sets provided by a distributor or other plant sets installed with VectorWorks Landmark. The field matching has already been performed for these data sets, and they are easy to add to the plant database.

To add plant data from the Additional Datasets folder:

1. Open the plant database as described in “Accessing the Plant Database” on page 212.
2. Select the **File > Add Additional Plant Data** database command.

Select the file to import. Field mapping is automatic, and the plant information is added to the plant database.

Viewing Plant Database Records

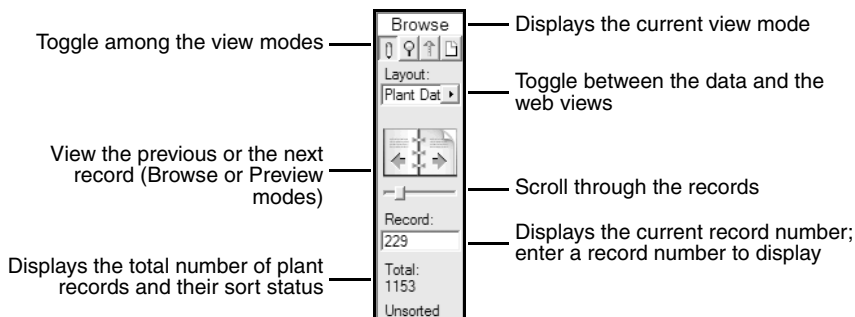
Product: Landmark

Each plant entry and its associated botanical information is considered a “record” in FileMaker. Several view modes display the records in ways designed to facilitate performing related tasks. When the plant database first opens, the records operate in Browse mode, with Forms displayed.

To familiarize yourself with the different display modes, and view the plant records in a variety of ways:

1. Open the plant database as described in “Accessing the Plant Database” on page 212.
2. Select the **View > Status Area** database command to enable viewing controls and status to the left of the record form.

These items can also be found on the **View** menu.



3. Select the view mode and layout depending on the task to accomplish.

Mode or View	Description
Browse	Displays plant record information and allows editing
Find	Displays a blank form for specifying search criteria
Preview	Displays plant record information as it will be printed
Form	Displays each record as an individual form or “page”



Mode or View	Description
List	Displays records consecutively in a scrollable list
Table	Displays each record as an item in a table, for sorting and reordering
Data View	Displays plant record information
Web View	Displays a special browser (using the default system browser) for locating plant images and information

Searching for Plants

Product: Landmark

The plant database can be searched when in Find mode (see “Viewing Plant Database Records” on page 215). Flexible, sophisticated searches can be conducted by combining search criteria.

To search for plants:

1. Open the plant database as described in “Accessing the Plant Database” on page 212.
2. Select the **View > Find Mode** database command or click Find mode from the Status Area controls.

A blank form opens.

3. Enter the criteria for searching.

Examples include searching for the Latin name “Liatris,” Light Range “Sun,” with a Height > 3-5 ft.

[Click the **Omit** button in the Status Area to exclude, rather than search for, the criteria. Use the Symbols list for even more specific searches.](#)

4. Click **Find**.
5. The view mode automatically switches to Browse, and the records that meet the search criteria are displayed.

The results of a search can be saved to a VectorWorks plant list. To return to viewing all the plant records, select the **Records > Show All Records** database command.

Managing Plant Database Records

Product: Landmark

Editing Plant Records

Product: Landmark

Plant database records can be edited in Browse mode, whether in form, list, or table view (see “Viewing Plant Database Records” on page 215).

To edit plant records:




1. Open the plant database as described in “Accessing the Plant Database” on page 212.
2. Select the **View > Browse Mode** database command or click Browse mode from the Status Area controls.
3. Select the plant record to edit by scrolling or searching.
4. Changes made to the fields and checkboxes are automatically saved.

Useful edits include:

- Marking a plant as a Favorite (to search for favorite plants later)

- Indicating the Project Information (to track plants by project)
- Adding custom information to drop-down lists
- Placing an image, video, audio, pasted text, or link to an embedded object into one of three containers; right-click on an image container to access the options
- Adding image credits and data source information to avoid copyright issues
- Adding extra plant or project information that is useful in VectorWorks

Switch between metric and imperial units for the Height and Spread fields with the **Edit > Options > Use Imperial Value Lists** or **Use Metric Value Lists** database commands.

IMAGES		NAMING		GENERAL INFORMATION	
Plant Form Image		Latin	Abies concolor	Growth Habit	Pyramidal
Detail Image		Common	White Fir	Persistence	Evergreen
Misc. Image		Category	Coniferous Trees <input type="checkbox"/> Mark as favorite item	Height	35 - 60 ft
Image Credits	Rose US Forest Service	User Notes		Spread	12 - 20 ft
		Used In Project		Price	
		HARDINESS ZONE	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 <input checked="" type="checkbox"/> 6 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11	Size Notes	
		USES	<input type="checkbox"/> Border <input type="checkbox"/> Low Maintenance <input type="checkbox"/> Container <input type="checkbox"/> Rock Garden <input type="checkbox"/> Decorative Bark <input type="checkbox"/> Screening <input type="checkbox"/> Decort. Fuel/Sawdust <input type="checkbox"/> Shade Garden <input type="checkbox"/> Erosion Control <input checked="" type="checkbox"/> Specimen <input type="checkbox"/> Ground Cover <input type="checkbox"/> Street Tree <input type="checkbox"/> Hedge <input type="checkbox"/> Wildlife Habitat	Native Region	United States
		TOLERANCE	<input type="checkbox"/> Deer <input type="checkbox"/> Moist Location <input type="checkbox"/> Drought <input type="checkbox"/> Pollution <input type="checkbox"/> Humidity <input type="checkbox"/> Salt	Native Notes	See Comments 3
		LIGHT RANGE	<input type="checkbox"/> Shade <input type="checkbox"/> Sun/Part Shade <input type="checkbox"/> Shade/Part Sun <input checked="" type="checkbox"/> Sun	LEAVES	Characteristic Needles Color Blue/green Autumn Color None
		COMMENTS 1	<p>White Fir offers soft foliage, can take exposure and will withstand heat and drought better than most firn but avoid high pH soils. As a Christmas tree, White Fir remains fresh and retains its needles for two weeks or more if provided with water.</p>		
		COMMENTS 2	-	FLOWER	Season <input type="checkbox"/> Year Round <input type="checkbox"/> Spring <input type="checkbox"/> Autumn <input type="checkbox"/> Summer <input type="checkbox"/> Winter
		COMMENTS 3	Native to the following states: AZ, CA, CO, ID, NM, NV, UT, WY, OR, ME, MA		
		FRUIT	Color brown Type Cones	Soil	Type Sandy loam pH Acidic
		CLIMATE ZONE	<input type="checkbox"/> Arid <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Normal		

Project ID numbers and favorites can be easily be added to all plants found by a search, with the **Records > Add Project ID** and **Records > Mark As Favorite** database commands. These fields export to VectorWorks and are useful for tracking and finding plants. If the Project ID is no longer needed at the completion of a project, search for all plants with that ID and then select the **Records > Delete Project ID** database command to remove it.

Adding Plant Records

Product: Landmark

To add a plant to the plant database list:

1. Open the plant database as described in “Accessing the Plant Database” on page 212.
2. Select the **View > Browse Mode** database command or click Browse mode from the Status Area controls.
3. Select the **Records > New Record** database command.

New records are appended to the end of the record set.

4. Enter the plant information. Information is saved automatically.



Deleting Plant Records

Product: Landmark

To remove a plant from the plant database list:

1. Open the plant database as described in “Accessing the Plant Database” on page 212.
2. Locate the record or records to delete, by searching or scrolling.
3. Select the **Records > Delete Record** database command to delete an individual record, or **Records > Delete Found Records** to delete a found set of records.

Confirm the deletion; this action cannot be undone.

Accessing Plant Information from the Internet

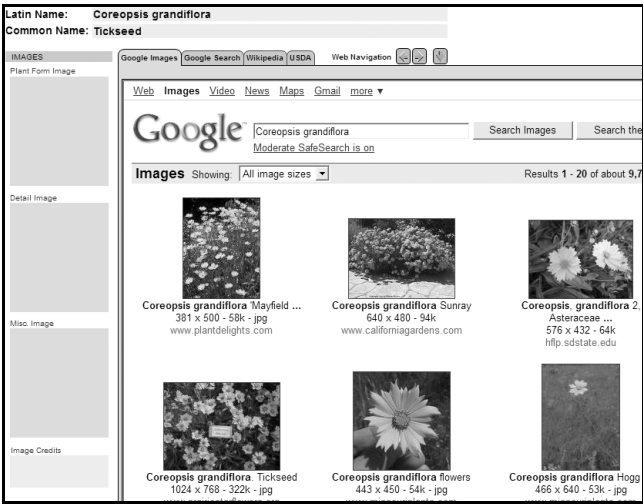
Product: Landmark

If access to the Internet is available, plant images and information are easily obtained from within the plant database window. Images can be copied directly into the database (image credits can also be specified).

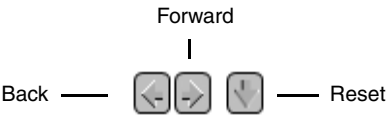
To access plant information from the Internet:

1. Open the plant database as described in “Accessing the Plant Database” on page 212.
2. Locate the plant record that requires images or information.
3. Select the **View > Swap Data View/Web View** database command to toggle to web view.

In web view, a search is automatically conducted for the current plant, and its information and images are displayed.



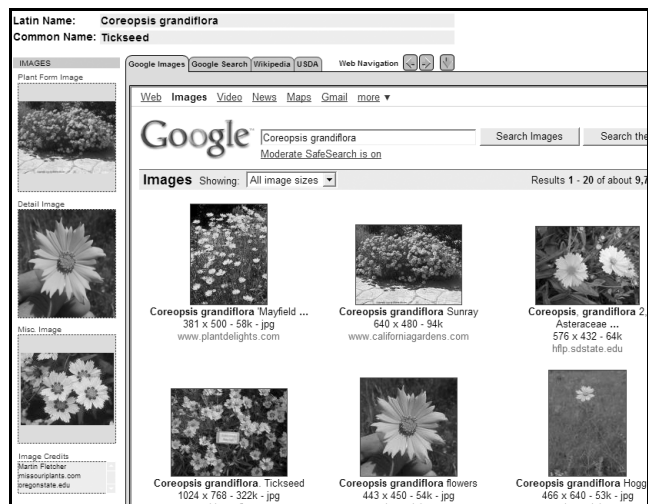
4. Click on the web view tabs to find plant information from four different sources.
5. Click the buttons to navigate through the web pages of each tab or to reset the view to the initial search (based on the Latin name).





6. To easily copy an image from the Internet to the plant database, select **Copy** from the image context menu. Then select **Paste Bitmap** from the image container context menu. Image credits can be added in the Image Credits area under the images, to avoid copyright issues.

Image files can also be saved and inserted into the database later, as described in “Editing Plant Records” on page 216.



7. Select the **View > Swap Data View/Web View** database command to return to the database view.

Creating Plant Lists for VectorWorks Landmark

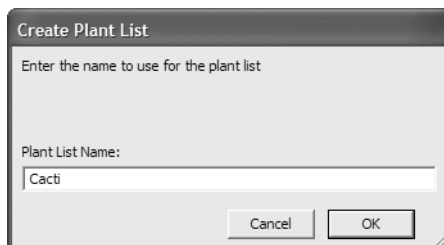
Product: Landmark

Plant lists are the connection between the FileMaker plant database and VectorWorks Landmark. Creating plant lists from the entire set, or from found sets, in the plant database allows that data to be attached to plants in VectorWorks. Create as many plant lists as necessary; the appropriate plant list is selected for the plant definition. The data attached to a plant becomes part of the plant definition, and can be added to planting plans and displayed by plant ID tags.

To create a plant list from the plant database:

1. Open the plant database as described in “Accessing the Plant Database” on page 212.
2. Search for the plants to include in the plant list (see “Searching for Plants” on page 216). The plant list is created from a found set of records, or from all the plant records. Larger plant lists take longer to load into VectorWorks.
3. Select the **File > Create VectorWorks Plant List** database command.

The Create Plant List dialog box opens. Provide a name for the plant list.





4. Click **OK**.

The plant list file is a tab-delimited file saved in the location of the plant database.

Using Plant List Data in VectorWorks Landmark

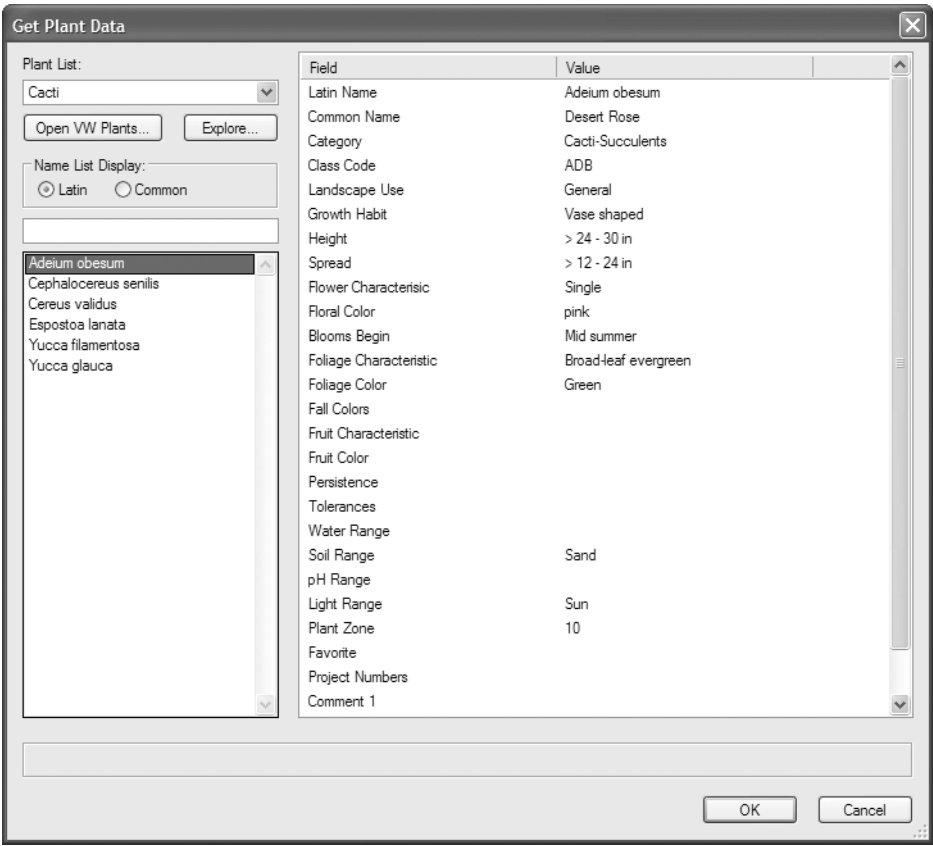
Product: Landmark

Plant list information is available to plant definitions from the Plant Data tab.

To use plant list data in a plant definition:

- 1. Create the plant definition as described in “Defining Plants” on page 198.
- 2. In the Edit Plant Definition dialog box, click **Get Plant Data**.

The Get Plant Data dialog box opens.

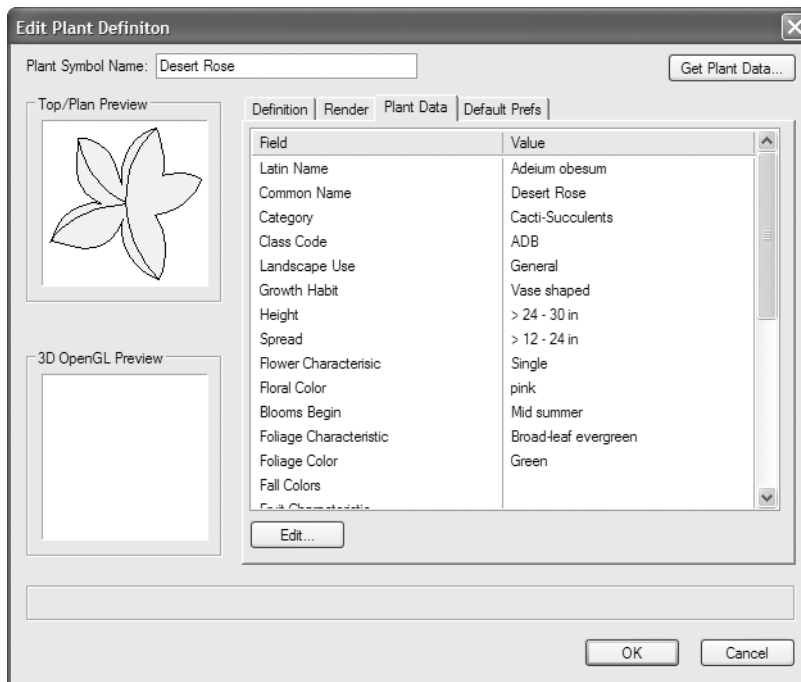


Parameter	Description
Plant List	Select the plant list that contains the required plant information; all plant lists created from the plant database and saved in the database location are listed. A progress bar indicates the status of the plant list import when it is used for the first time, and allows the import to be canceled.



Parameter	Description
Open VW Plants	Opens the VectorWorks plant database, for locating plant information and creating plant lists
Explore	Opens Explorer (Windows) or Finder (Macintosh) to the folder containing generated plant lists
Name List Display	Toggles between plant list display by Latin name or common name
Name Find	Finds a plant in the plant name list by matching typed characters
Name List	Lists the plants included in the currently selected plant list. Select a plant to view its botanical information on the right, and to use that data in the plant definition.
Plant Data	Displays the botanical information (from the plant database) for the plant selected in the name list

3. Select the plant name and data to include in the plant definition, and click **OK**.
4. The Plant Data tab displays the data from the plant database.



Plant Graphics

Product: Landmark

Undefined plant masses and groups can be added with the **Plant Line** and **Vegetation Line** commands. Plant styles and ID tags can be displayed or hidden.



Creating a Plant Line

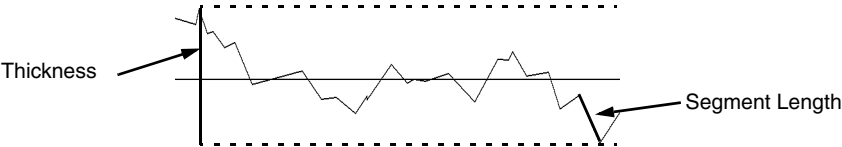
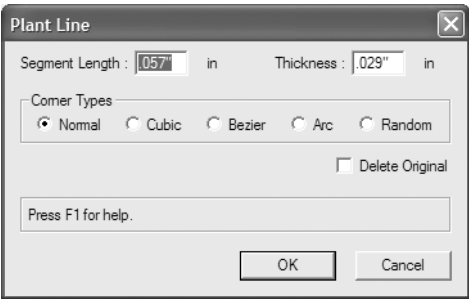
Product: Landmark

The **Plant Line** command creates a freehand plant line along a line, polyline, or polygon. It can be used to represent a single plant, line of plants, or general plant mass.

To create a plant line:

- 1. Select the object (line, polyline, or polygon) with the **2D Selection** tool.
- 2. Select **Landmark > Plant Line**.

The Plant Line dialog box opens. Suggested values are based on the selection's perimeter.



Parameter	Description
Segment Length	Maximum length of each plant line segment; longer segments create a rougher plant line appearance
Thickness	Maximum perpendicular distance of each segment; a higher thickness value results in a rougher plant line appearance
Corner Types	Specifies the type of corner to create between segments; each type produces a different plant line effect
Delete original	Select to remove the object that forms the basis of the plant line

- 3. Select the desired plant line parameters and click **OK**. The plant line is created. If desired, apply colors, textures, and other attributes to the plant line with the Attributes palette.



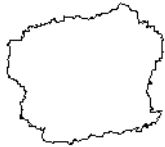
Normal Corner Type
Segment Length: 0.16
Thickness: 0.0251



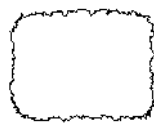
Cubic Corner Type
Segment Length: 0.0516
Thickness: 0.251



Bézier Corner Type
Segment Length: 0.16
Thickness: 0.251



Arc Corner Type
Segment Length: 0.0516
Thickness: 0.251



Random Corner Type
Segment Length: 0.0516
Thickness: 0.0251



Plant Line command
executed twice



Plant Line command
executed three times

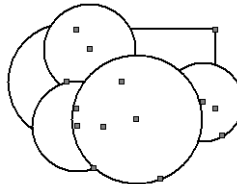
Creating a Vegetation Line

Product: Landmark

The **Vegetation Line** command creates a vegetation line around a selection of closed objects or symbols. It can be used to represent a massed collection of vegetation.

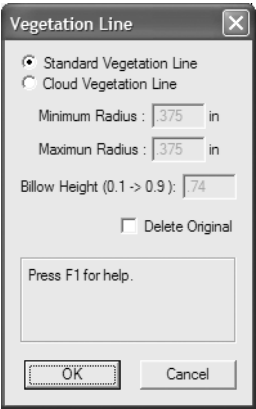
To create a vegetation line:

1. Select the closed objects or symbols that will form the basis of the vegetation line. The items should overlap.



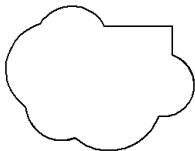
2. Select **Landmark > Vegetation Line**.

The Vegetation Line dialog box opens.

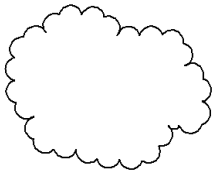


Parameter	Description
Minimum/Maximum Radius	Specifies the minimum and maximum radius of each arc in the cloud
Billow Height	Specifies the cloud billow height factor
Delete Original	Select to delete the original selection of objects when creating the vegetation line

3. Either a standard or cloud type of vegetation line can be created. The standard line creates an outline based on the outer perimeter of the selections. A cloud vegetation line creates a cloud outline of the selections, based on the radius and billow height specified. The original items can be deleted by selecting **Delete Original**.



Standard Vegetation Line



Cloud Vegetation Line

4. Click **OK** to create the vegetation line. If desired, apply colors, textures, images, hatches, gradients and other attributes to the vegetation line with the Attributes palette. See “The Attributes Palette” on page 229 in the VectorWorks Fundamentals User’s Guide for more information on applying attributes.

The vegetation line can be assigned to a class (with the desired attributes). The original plant symbols can remain hidden by a vegetation line with a solid fill; however, the underlying vegetation can be revealed by hiding the vegetation line class.

Show/Hide Plant Styles

Product: Landmark

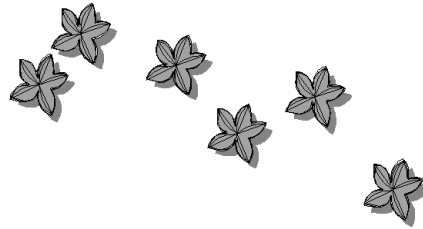
The **Show or Hide Plant Styles** command controls the visibility of the plant styles set on the Render tab of a plant definition (see “Creating Plant Definitions” on page 199).

To show or hide the plant styles:

1. Select **View > Show > Show or Hide Plant Styles**.



2. If the plant styles are currently hidden, this command causes the plant styles of all plant objects with a defined style to become visible. In the Object Info palette, **Enable Plant 2D Rendering** is selected automatically.



If the plant styles are currently visible, this command causes the styles of all plant objects to become hidden. In the Object Info palette, **Enable Plant 2D Rendering** is automatically deselected.

Irrigation

Product: Landmark

Irrigation Tools

Product: Landmark

The irrigation tools on the Landmark palette insert generic drip emitters, irrigation heads, and irrigation lines into the drawing.

A selection of standard pre-configured manufacturer's irrigation products are available through the Resource Browser, and are located in the following three libraries:

- 02_Sitewk_Irrigation heads
- 02_Sitewk_Drip Emitters
- 02_Sitewk_Irrigation Pipe

For more information on the Resource Browser, see "Using the Resource Browser" on page 142 in the VectorWorks Fundamentals User's Guide.

Inserting a Drip Emitter

Product: Landmark

A generic drip emitter can be inserted into the drawing with the **Drip Emitter** tool. Alternatively, use a drip emitter from one of the irrigation object libraries.



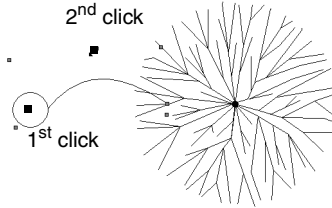
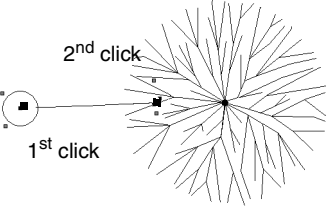
To insert a drip emitter:

1. Click the **Drip Emitter** tool from the Site Planning tool set.
2. Click in the drawing to insert the drip emitter. Click again to set the rotation.

The first time the tool is used, the Drip Emitter Properties dialog box opens. Accept the default parameters and click **OK** to insert the drip emitter.

3. The drip emitter properties can be changed in the Object Info palette.



Parameter	Description
Manufacturer	Displays the manufacturer’s name or “Generic”
Model	Displays the manufacturer’s model number
Type	Options include Pressure Compensating and Non-Pressure Compensating
Head Style	Selects the type of emitter head (Micro-Spray, Drip Manifold, or Sub-surface Drip)
Spray Nozzle	For Micro-Spray head style, indicates the arc degrees of spray
Working Pressure	Displays the water line pressure, for use in worksheets
Flow Rate	Displays the flow rate per hour in either metric or imperial units
Unit	Selects the units for the display of flow rate
Scale Factor	Determines the size of 2D drip emitter display
Microtube Control	<p>For Sub-surface Drip head style only, displays the coordinates of microtube placement (1 is the microtube curvature, and 2 is the end point)</p> <div></div> <p>Click in the center of the drip emitter to obtain the control point, and then on the end point</p> <p>Click in the center of the drip emitter again to obtain the second control point, and then define the curvature</p> <p>The Sub-surface drip emitter contains control points in the center of the symbol; click and drag first to determine the microtube end point, and then again to define the curvature</p>

Inserting an Irrigation Head

Product: Landmark

A generic irrigation head can be inserted into the drawing with the **Irrigation Head** tool. Alternatively, use an irrigation head from one of the irrigation object libraries.



To insert an irrigation head:

1. Click the **Irrigation Head** tool from the Site Planning tool set.
2. Click in the drawing to insert the irrigation head. Click again to set the rotation.

The first time the tool is used, the Irrigation Head Properties dialog box opens. Accept the default parameters and click **OK** to insert the irrigation head.
3. The irrigation head properties can be changed in the Object Info palette.



Parameter	Description
Manufacturer	Manufacturer's name or "Generic"
Model	Manufacturer's model number
Spray Pattern	Selections include Circular, Rectangular, and Special
Head Type	Indicates a Fixed Spray or Rotary sprinkler
Body	Spray head height (for use in worksheets)
Nozzle	Manufacturer's nozzle type
Spray Radius or Width	For circular spray patterns, displays the radius of the spray; for rectangular spray patterns, displays the spray width
Length of Rect Spray	Displays the length of a rectangular spray pattern
Show Spray Pattern	Select to display the irrigation spray pattern
Spray Arc	Indicates the arc of the spray pattern and determines the spray pattern display
Trajectory	Angle (in degrees) of water as it is thrown from the spray head (for use in worksheets)
Working Pressure	Water line pressure (in psi or kg/cm ³) for use in worksheets
Spacing	Indicates triangular or square spacing
Precipitation Rate	Number of inches or millimeters of water placed over a certain area per hour, for use in worksheets
Head Scale Factor	Determines the size of 2D irrigation head display
Unit	Specify either Metric or Imperial units

The spray pattern can be hidden and displayed with the **Show or Hide Spray Pattern** command (see "Show/Hide Spray Pattern" on page 228).

Inserting an Irrigation Line

Product: Landmark

An irrigation line can be inserted into the drawing with the **Irrigation Line** tool. Alternatively, use an irrigation line from one of the irrigation object libraries.



To insert an irrigation line:

1. Click the **Irrigation Line** tool from the Site Planning tool set.
2. Click and drag to define the length of the irrigation line.

The first time the tool is used, the Irrigation Line Properties dialog box opens. Accept the default parameters and click **OK** to insert the irrigation line.

3. The irrigation line properties can be changed in the Object Info palette.



Parameter	Description
Length	Displays irrigation line length
Type	Indicates the irrigation line material (PVC, PE, Galvanized Steel, or Copper)
Diameter	Displays irrigation tubing diameter
Has Sleeve	Select if the irrigation line has a sleeve
Sleeve Diameter	When the Has Sleeve option is selected, indicates the tubing diameter of the sleeve

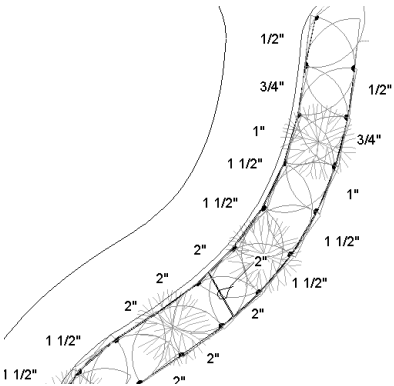
Irrigation Plans

Product: Landmark

Once the drip emitters, irrigation heads, and irrigation lines have been placed in the drawing, as required, irrigation plans are created by using the **ID Label** tool and worksheets together.

To create irrigation plans:

1. Use the Irrigation tools to add irrigation to the design. (See “Irrigation Tools” on page 225.)
2. Select the ID label type and style. Place ID labels on the drawing with the **ID Label** tool. (See “ID Label Tool” on page 381.)



3. From the Resource Browser, open the Libraries\Defaults\Reports~Schedules\Irrigation Reports.vwx file that is included with Landmark. Drag the Irrigation Head Schedule or Irrigation Line Schedule worksheet to the drawing. An Irrigation Schedule worksheet, populated with information from the irrigation in the current drawing, is automatically created. For more information on worksheets, see “Worksheets” on page 563 in the VectorWorks Fundamentals User’s Guide.

Show/Hide Spray Pattern

Product: Landmark

The **Show or Hide Spray Pattern** command controls the visibility of the spray pattern of irrigation head objects.

To show or hide the spray pattern:

1. Select **View > Show > Show or Hide Spray Pattern**.

2. If the spray patterns are currently hidden, this command causes the spray pattern of all irrigation head objects to become visible. In the Object Info palette, **Show Spray Pattern** is selected automatically.

If the spray patterns are currently visible this command causes the spray pattern of all irrigation head objects to become hidden. In the Object Info palette, **Show Spray Pattern** is automatically deselected.

Lighting Positions and Labels

Product: Spotlight

Before placing lighting instruments on the light plot, the basic elements of the plot must be defined. It is easiest to create design layers, create classes, define the lighting positions, and establish the legends (and legend format) before creating the rest of the plot.

Light Plot Structure

Product: Spotlight

A structured system of layers and classes makes selecting, viewing and printing items considerably easier. When creating a light plot, develop a standard layer and class structure, along with a system for assigning items to the appropriate layers and classes.

For more information on layers and classes, see “Managing Layers” on page 84 in the VectorWorks Fundamentals User’s Guide and “Managing Classes” on page 95 in the VectorWorks Fundamentals User’s Guide.

Placing the stage, lighting positions, lighting instruments, focus points, and scenic elements in separate design layers is recommended. Select **Tools > Organization** and click the Design Layers tab to create and manage layers.

[Use the same scale for all the layers.](#)

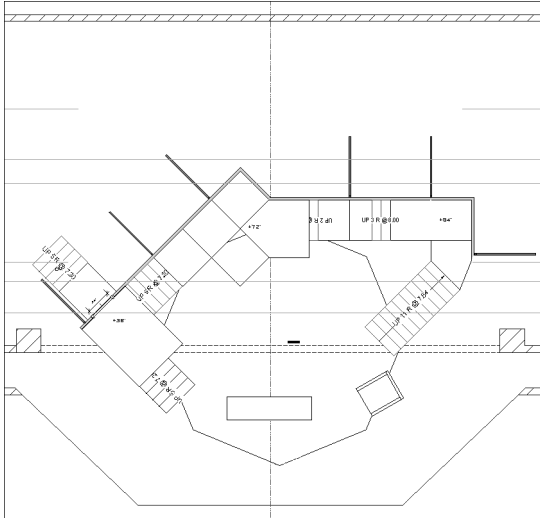
Place light plot items in their own classes. This allows you to globally turn off the display of certain classes for viewing and printing. Select **Tools > Organization** and click the Classes tab to create and manage classes.

Spotlight automatically creates certain classes to control instrument label visibility. These include the Label class and its sub-classes, and the Setup Notes class.

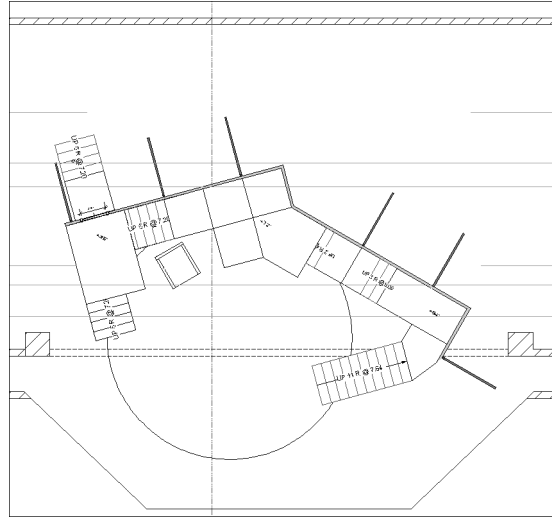
Layer and Class Examples

Product: Spotlight

An example of the use of layers and classes would be a show file with all of the scenery on a single design layer, and classes created to represent Act 1 and Act 2. When adding scenic elements, place them on the scenery design layer, and assign them to either the Act 1 or Act 2 class. With this structure, use layer visibility to view only the scenery design layer, and class visibility to turn the Act 1 or Act 2 classes on and off. This method allows the position of the set pieces in each act to be viewed independently.



Scenery position for Act 1



Scenery position for Act 2

Another way to take advantage of structuring is to also use classes for the lighting instruments. In a situation with multiple shows in repertory, assign each instrument to the class of the show where it is used. This allows you to display each show's instrumentation independently of the other shows.

Adding Lighting Positions

Product: Spotlight

Lighting positions represent the hanging points for instruments; they should be placed on the light plot before the instruments are added. Lighting positions manage the numbering of instruments according to the instruments' location on the lighting position.

Defining the lighting positions first is useful because once the space has been created, with the stage and lighting positions defined, the file can be used as a template for future light plots in that space. For more information on creating templates, see "Creating Templates" on page 73 in the VectorWorks Fundamentals User's Guide.

[Place the lighting positions in their own design layer and in their own classes. A drawing structure based on layers and classes facilitates selecting, viewing, and printing the light plot.](#)

Symbols can have a separate 2D and 3D representation. The lighting position object automatically uses the appropriate portion of the symbol. At a minimum, the symbol must have at least a 2D component, though it may not display correctly in all the views. Correct this by editing the symbol definition and adding a 3D component. For more information on symbols, see "Understanding Symbols" on page 153 in the VectorWorks Fundamentals User's Guide.

Lighting positions can be placed on the light plot in two ways.

- In the Resource Browser, either select one of the lighting symbols from the symbol libraries or one of the symbols you have created in this file or a Favorites file. Insert the symbol with the **Light Position Obj** tool to place a lighting position on the light plot. This method is described in "Inserting Lighting Positions" on page 233.
- Symbols that have already been placed on the plot can be converted to lighting positions. This method is described in "Creating a Lighting Position" on page 233.



Inserting Lighting Positions

Product: Spotlight

When a lighting position is to be used in several locations, insert the symbol from the Resource Browser with the **Light Position Obj** tool. This can be a symbol that you have created, located in a Favorites file or the current file, or it can be one of the symbols imported from the libraries included with Spotlight ([VectorWorks]\Libraries); see “Object Libraries” on page 565.

For information on importing and creating symbols, see “Using the Resource Browser” on page 142 in the VectorWorks Fundamentals User’s Guide.

For example, a generic 42’ electric batten may be used to represent each stage electric. Create a single symbol for the 42’ electric. Place this lighting position as many times as required by inserting it with the **Light Position Obj** tool.



To insert lighting positions:

Lighting positions must be inserted in Top/Plan view.

1. Select **View > Standard Views > Top/Plan**.
2. Click the **Light Position Obj** tool from the Spotlight tool set.
3. Select the desired lighting position symbol from the Resource Browser and choose **Make Active** from the Resources menu to make it the active symbol definition. Alternatively, double-click on the symbol to activate it.
4. Click in the drawing to insert the active lighting position symbol definition, and then click again to set the lighting position rotation.

If the lighting position symbol is inserted without first clicking on the **Light Position Obj** tool, the symbol will be inserted by the **2D Symbol Insertion** tool. However, the lighting position functionality will not be present. When correctly inserted, the Object Info palette displays “Light Position Obj” for the selected lighting position.

Once the **Light Position Obj** tool has been selected, it remains selected by default so that lighting positions can be repeatedly inserted. To place non-lighting position symbols after placing lighting positions, switch to the **2D Symbol Insertion** tool.

5. A different type of lighting position can be placed by changing the active symbol definition and continuing to use the **Light Position Obj** tool.

Creating a Lighting Position

Product: Spotlight

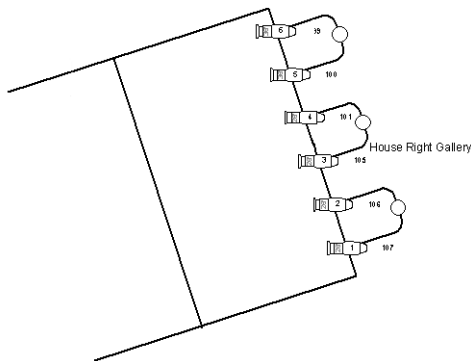
Creating a lighting position from a selected object is suggested when only one instance of a lighting position is to be used. For example, a special box boom used only on the right side of the stage can be drawn and converted to a lighting position.

To create a lighting position:

1. Draw the object, and then select it. The object must contain, at a minimum, a 2D representation of the lighting position.
2. If multiple objects are to be converted to a single lighting position, group the objects first by selecting **Modify > Group**. Only one lighting position can be created at a time.
3. Select the **Modify > Convert > Convert to Light Position** command.
4. The Enter String dialog box opens; specify the name of the lighting position, and then click **OK**.



The selected object is converted to a symbol, and a lighting position of the same name is inserted in the file. Instruments can then be placed on the lighting position.



- 5. Once the object has been converted into a lighting position, it is saved as a symbol in the file. Select it as an active symbol definition and use the **Light Position Obj** tool to insert it again if required.

Lighting Position Properties

Product: Spotlight

The lighting position object information can be viewed and edited in the Object Info palette.

Parameter	Description
Z (Height)	For 3D lighting positions, specifies the height
Position Name	Displays the name of lighting position symbol; this name is editable
Position Summary	Select to display the lighting position summary; see “Displaying the Lighting Position Summary Label” on page 235
Sum Insts	Displays the total number of instruments in the summary label
Sum Colors	Displays a summary of color gels sorted by color in the summary label
Sum Circuits	Displays a summary of circuiting information in the summary label
Auto Number	Select to automatically number instruments and multi-circuit instruments on the lighting position
Starting Number	Specifies the starting number for instrument auto-numbering
Increment	Specifies the increment for auto-numbering instruments
Numbering Direction	Specifies the page relative numbering direction
Multi Circ Num Style	Specifies the multi-circuit numbering format for multi-circuit instruments (see “Instrument Auto-numbering” on page 235)
Symbol Name	For reference, displays the name of the symbol used to create the lighting position

The Z-value of a lighting position can only be specified for lighting positions with 3D geometry. However, the Z-value can be specified for the lighting instruments placed on any type of lighting position (2D, 3D, or hybrid).



If a lighting position is copied, only the position is duplicated; associated lighting instruments are not copied.

Instrument Auto-numbering

Product: Spotlight

The lighting position controls the auto-numbering of the instruments and multi-circuit instruments that are placed on the position. Define the numbering preferences in the lighting position Object Info palette.

- To automatically number the lighting instruments according to their location on the lighting position object, select **Auto Number**. Enter the starting instrument number and increment value, and then select the numbering direction from the **Numbering Direction** list. The numbering direction is page relative.
- For Multi-circuit numbering, specify the numbering format by selecting the **Multicirc Num Style** from the list.

Numbering Format	Description
AlphaNum	Numbers the multicircuit instruments with A1, A2, A3...
Num.Alpha	Numbers the multicircuit instruments with 1.A, 1.B, 1.C...
Num.Num	Numbers the multicircuit instruments with 1.1, 1.2, 1.3...

- Deselect **Auto Number** to manually number the instruments (see “Numbering Instruments Manually” on page 255).

After changing Auto Number settings, select **Modify > Refresh Instruments** to view the results.

Displaying the Lighting Position Summary Label

Product: Spotlight

A Position Summary can be appended to the lighting position by selecting **Position Summary** in the Object Info palette and specifying the summary information to display.

FOH 2		
Instrument Summary		
		4
Total Num Insts:		4
Color Summary		
Color	Size	# Cuts
R 26	7.5	1
R 365	7.5	1
R 76	10	1
R 77	7.5	1

Position Summary

Select whether instruments, colors, and circuits will be included in the summary by selecting the appropriate checkboxes in the Object Info palette. The position summary uses the current text attributes from the **Text** menu by default; to change the text format, select the lighting position and choose the format (font, size, and style) from the **Text** menu. If desired, change the color of a selected position summary in the Attributes palette. To hide the position name and summary, deselect **Position Summary**.



Setting Up Instrument Label Legends

Product: Spotlight

Label legends specify the labels and label formatting for lighting instruments on the light plot. Multiple label legends can be defined and then selectively applied to different instruments. The active label legend is applied to instruments as they are placed.

Label Classes

Product: Spotlight

Each label is automatically placed in its own VectorWorks Label class. This allows the labels to be globally turned on and off. For example, if the designer is printing the light plot for an electrician, the “Label-Purpose” class of labels can be hidden so that only electrical information labels are shown.

The labels display the lighting instrument object information. The instrument Object Info palette also shows this information (see “Lighting Instrument Properties” on page 246).

Using the Label Legend Manager

Product: Spotlight

The Label Legend Manager controls the setup and modification of the instrument label styles. Select **Tools > Label Legend Manager** to set up the legends for the light plot. The Label Legend Manager dialog box opens.



Parameter	Description
Active	To activate the default legend for lighting instruments, select the label legend and click in the Active column. The active legend is indicated with a check mark. Any new instruments created will use the active legend as the default label legend; the legend name is displayed in the instrument Object Info palette, and can be changed at any time (see “Changing the Instrument Label Legend” on page 256).
Legend Name	Lists the file’s current legends
Add	Creates a new label legend and specifies the labels to include, as well as their attributes (see “Creating Label Legends” on page 237)
Remove	Deletes the selected label legend; the active label legend cannot be removed
Edit Fields	Edits the labels included in the selected legend, along with their attributes (see “Editing Label Legends” on page 238)
Edit Layout	Specifies the position of the labels in relation to an instrument (see “Formatting the Label Legend” on page 239)



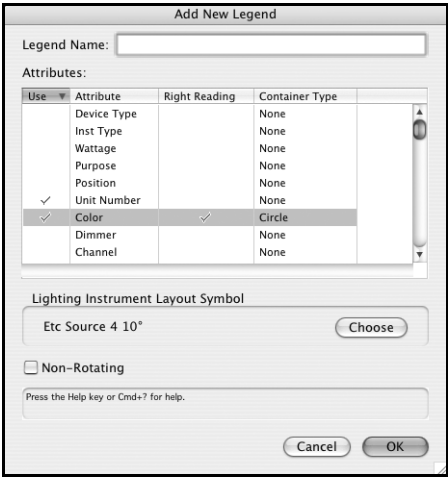
Creating Label Legends

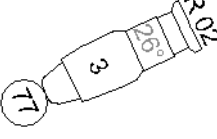
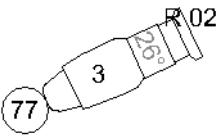
Product: Spotlight

To create a new legend:

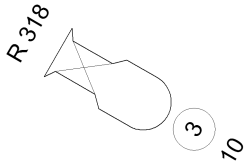
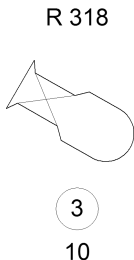
1. In the Label Legend Manager dialog box, click **Add**.

The Add New Legend dialog box opens. Select the labels for placement and specify their attributes. Indicate the instrument symbol to use when formatting the label legend, and select whether the legend rotates with the instrument.



Parameter	Description
Legend Name	Provide a name for the new legend by typing it in the Legend Name field. A name must be entered before closing the dialog box.
Attributes	
Use	Click to select an item to appear in the label legend; up to eight labels can be selected. A check mark indicates the label is included. Click again to remove the label from use.
Attribute	Lists the possible labels that can be selected for inclusion in the label legend
Right Reading	For each label, select whether it will always be right-reading or allowed to rotate with the instrument. A check mark indicates the field is right-reading; deselect to allow the field to rotate with the instrument. <div><div>Right Reading selectedRight Reading deselected</div></div>



Parameter	Description
Container Type	<p>Select the container for each label by clicking in the Container field until the desired container is displayed.</p> <p>Custom container symbols can be added to the list of available containers. Draw a container object, and then click Modify > Create Symbol. Enter a name for the container; click OK. In the Move Symbol dialog box, specify the location of the Containers folder and click OK. The symbol is added to the list of available containers. Any symbol can be placed in the containers folder and used as a label container. The pre-defined container symbols can also be edited and customized.</p>
Lighting Instrument Layout Symbol	<p>Specifies a symbol to use for label placement when editing the label layout (see “Formatting the Label Legend” on page 239); by default, the active symbol is selected. Click Choose to open the Choose an Instrument dialog box, where a different symbol can be selected from the current file’s resources.</p>
Non-Rotating	<p>Specifies whether the label legend rotates with the instrument, or remains stationary as the instrument rotates</p> <div style="text-align: center;">   </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> Non-Rotating deselected Non-Rotating selected </div>

- When all the label items and attributes have been specified for the legend, click **OK**. The new legend name displays in the **Legend Name** list in the Label Legend Manager dialog box.

Editing Label Legends

Product: Spotlight

To edit a legend:

- In the Label Legend Manager dialog box, select the legend, and then click **Edit Fields**. The Edit Label Legend dialog box opens.



The legend name displays at the top of the dialog box, and cannot be changed. In addition, the layout symbol for the legend cannot be changed; it can only be specified at legend creation. See “Creating Label Legends” on page 237 for a description of the legend parameters.

2. The currently selected label items have a check mark next to the label name. Select any additional label items to appear in the legend by clicking in the **Use** column; up to eight labels can be selected. To deselect a label item, click in the **Use** column; the check mark is removed.
3. Click **OK**.

To rename a label legend, locate it in the Resource Browser in the Label Legends folder of the current file, and select **Rename** from the Resources menu. (Any existing instruments that use the old legend name will lose their labels.)

Formatting the Label Legend

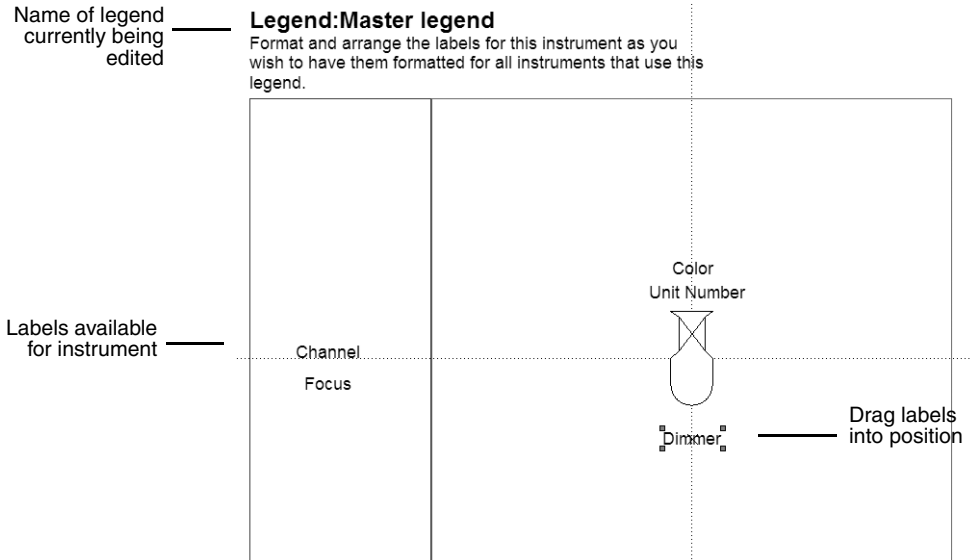
Product: Spotlight

Once a legend has been created, format it so that the labels are displayed in specific positions. The labels, containers, and layout symbol are selected when creating the label legend; see “Creating Label Legends” on page 237.

To format the label legend:

1. In the Label Legend Manager dialog box, select the legend, and then click **Edit Layout**.

The Edit Symbol window opens, where the default position and format of the labels is specified for instruments that use this label legend. The name of the current label legend is displayed at the top of the Edit Symbol window. The instrument used for the layout is either the symbol selected in **Lighting Instrument Layout Symbol** or the active symbol at the time the legend was created.



- The labels selected for the legend display to the left of the instrument diagram. Drag each label to its position on or around the instrument. The label's formatting can be set by selecting the label, and then using the Object Info palette or the **Text** menu to select the label's font, size, style, and justification. The label stacking order can be changed with the **Modify > Send** commands; the instrument is part of the stacking order. Change the color of the label by selecting it and applying a solid pen color from the Attributes palette.

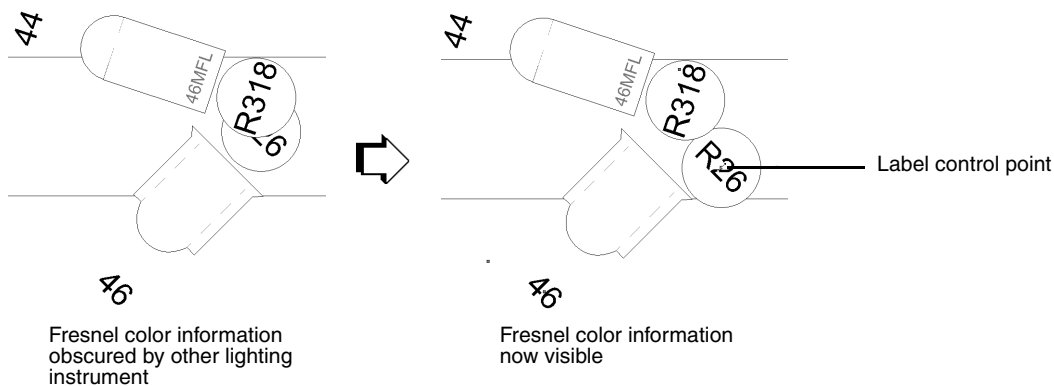
If necessary, the labels placed outside the bounding box of the instrument are adjusted so they are always placed at an absolute distance from the instrument. For example, a label placed six inches in front of an instrument always appears six inches in front of any instrument to which the label is applied. The position of a label placed upon an instrument is scaled so it is in the same relative position whether the instrument is larger or smaller than the one used for formatting. A label placed at the center of the instrument is always at the center.

- When the labels are set, click **Exit Symbol** in the upper right corner of the window to return to the drawing. The formatting and position of the labels applies to all instruments that use this legend.

Repositioning Labels

Product: Spotlight

Labels should normally be repositioned through the Label Legend Manager. On a complex light plot, however, a label can be hidden by the nearest object. If that occurs, click on the instrument to select it, and then click on the instrument label control point, located at the center of the label, with the **2D Selection** tool. Drag the label to another location. This one-time repositioning does not affect the label legend.



Importing Label Legends from Another File

Product: Spotlight

Label legends from another VectorWorks Spotlight file can be imported into the current file. Import the Label Legends symbol folder contents from the original file into the new file with the **Import** command in the Resource Browser; place the legends into the Legends folder. The imported label legends are listed in the Label Legend Manager. See “Importing a Symbol Folder” on page 170 in the VectorWorks Fundamentals User’s Guide.

Creating and Editing Instruments

Product: Spotlight

VectorWorks Spotlight lighting instruments represent more than simply a graphical symbol. An instrument contains design information, such as labels, focus, position, channel, and color. Instruments are labeled with lighting information according to the label legend format.

When placing instruments, either use one of the standard instrument symbols, or convert your own custom symbols to instruments.

[Place the lighting instruments in their own design layer and in their own classes. A drawing structure based on layers and classes facilitates selecting, viewing, and printing the light plot.](#)

Once the lighting positions have been created and the lighting instruments have been defined and placed, the instruments can be edited to conform to changes in the lighting design. The instruments can be combined into multi-circuit instruments. In addition, the focus point of the instruments can be defined, and photometric data can be obtained.

Adding Lighting Instruments

Product: Spotlight

Instruments can be placed on the light plot in three ways.

- In the Resource Browser, either select one of the lighting symbols from the symbol libraries or one of the symbols you have created in this file or a Favorites file. Insert the symbol with the **Inst Insertion** tool to place a lighting instrument object on the light plot. This method is described in “Inserting Instruments” on page 243.
- Symbols that have already been placed on the plot can be converted to lighting instruments. This method is described in “Creating a Lighting Instrument” on page 244.

[The instrument symbols from the libraries included with Spotlight contain all the required attribute information. When creating or using your own symbols with Spotlight, see “Lighting Instrument Specifications” on page 553.](#)

- Existing lighting instruments with specific parameters can be saved as symbols. These “red” symbols can be easily placed from the Resource Browser, picking up the active label legend at placement. This method is described in “Creating and Inserting Lighting Resources” on page 245.

Inserting Instruments

Product: Spotlight

Existing instrument symbols are inserted with the **Inst Insertion** tool. This can be a symbol that you have created, located in a Favorites file or the current file, or it can be one of the symbols imported from the libraries included with Spotlight ([VectorWorks] \Libraries); see “Object Libraries” on page 565. When Spotlight is installed, lighting instrument symbols are also provided as default resources. Default resources are automatically imported into the file (when selected while changing instrument properties) and display in the Resource Browser; see “Changing Instrument Properties” on page 250 and “VectorWorks Design Series Default Resources” on page 570.

For information on importing symbols, see “Accessing Existing Resources” on page 147 in the VectorWorks Fundamentals User’s Guide.



To insert a lighting instrument:

1. Click the **Inst Insertion** tool from the Spotlight tool set.



2. Select the instrument symbol from the Resource Browser and choose **Make Active** from the Resources menu to make it the active symbol definition. Alternatively, double-click on the symbol to activate it.
3. Click once to insert the active instrument symbol definition, and then again to determine the instrument rotation. By default, the active Label Legend is applied to the instrument.



If the instrument symbol is inserted without first clicking on the **Inst Insertion** tool, the symbol will be inserted by the **2D Symbol Insertion** tool. However, the instrument functionality will not be present. When correctly inserted, the Object Info palette displays “Lighting Device” (with a **Device Type** of Light) for the selected instrument.

Once the **Inst Insertion** tool has been selected, it remains selected by default so that instruments can be repeatedly inserted. To place non-instrument symbols after placing instruments, switch to the **2D Symbol Insertion** tool.

4. Place instruments on a lighting position to add them to that lighting position and enable numbering.

As instruments are placed, their unit number is automatically determined and they are numbered according to the lighting position numbering format (see “Instrument Auto-numbering” on page 248). To view the numbering, select **Modify > Refresh Instruments**. If instruments are moved to a different lighting position, the lighting position name is automatically updated for the instruments and the Z-height of the instruments is calculated automatically based on the lighting position Z-height.

To change the numbering format, turn off instrument auto-numbering by the lighting position (deselect **Auto Number** in the lighting position Object Info palette). Then, select the **Modify > Number Instruments** command as described in “Numbering Instruments Manually” on page 255.

5. A different type of instrument can be placed by changing the active symbol definition and continuing to use the **Inst Insertion** tool.

Creating a Lighting Instrument

Product: Spotlight

Spotlight provides hundreds of lighting symbols; however, it is not necessary to use only these pre-defined symbols. Create a Spotlight instrument out of a currently selected symbol—once the symbol is converted to an instrument, the instrument functionality is present and the label legend is attached.

See “Lighting Instrument Specifications” on page 553 for more information and restrictions on using custom symbols for lighting instruments, and information on attaching the Light Info Record.

To create a lighting instrument:

1. Convert the object to a symbol by selecting **Modify > Create Symbol**.

For information on symbols, see “Creating New Symbols” on page 156 in the VectorWorks Fundamentals User’s Guide.

2. Select the symbol(s).



Symbols can have a separate 2D and 3D representation. The lighting instrument object automatically uses the appropriate portion of the symbol. At a minimum, the symbol must have at least a 2D component, though it may not display correctly in all the views. Correct this by editing the symbol definition and adding a 3D component.

3. Select **Modify > Convert > Convert to Instrument**.

The selected symbol(s) is converted into a lighting instrument. The active label legend, if any, is applied to the instrument(s); see “Using the Label Legend Manager” on page 236 for more information. The instrument properties can be changed through the Object Info palette; some of the instrument parameters may need to be entered.

If creating multi-circuit instruments, first create each instrument’s symbol (see “Multi-circuit Instrument Specifications” on page 556). Then insert the multi-circuit instruments as described in “Inserting Multi-circuit Instruments” on page 259.

4. Once the instrument has been converted, it is saved as a symbol in the file. Select it as an active symbol definition and use the **Inst Insertion** tool to insert it again if required.

Creating and Inserting Lighting Resources

Product: Spotlight

Instruments created with the **Convert to Instrument** command (see “Creating a Lighting Instrument” on page 244) are “black” symbols. They must be inserted with the **Inst Insertion** tool and their parameters specified.

Any instrument that has been inserted from a library or converted from a symbol can be saved as a “red” plug-in object resource. Its appropriate default values are retained, and when inserted from the Resource Browser, the instrument picks up the lighting position and active label legend. For more information on red symbols, see “Symbol Types” on page 154 in the VectorWorks Fundamentals User’s Guide.

To create a lighting instrument resource with pre-defined parameters:

1. Select a current instrument and ensure that all its parameters have been specified as desired.

In the Object Info palette, delete the label legend name (**Use Legend** parameter) and lighting position (**Position** parameter). Set the Z height of the instrument to 0.

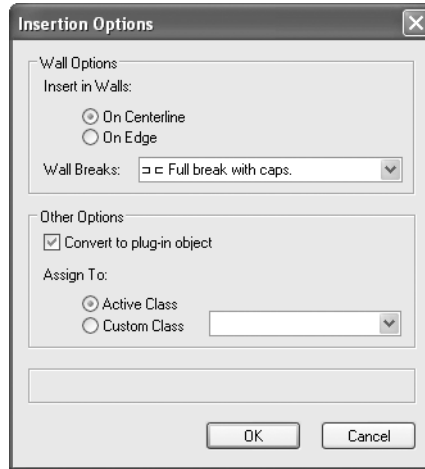
Set a label legend name to use a specific label legend, rather than the current one, upon insertion. If the label legend is not in the file at the time of symbol insertion, it is automatically imported.

2. With the instrument selected, select **Modify > Create Symbol**.

The Create Symbol dialog box opens. Provide a name for the new symbol. For information on symbols, see “Creating New Symbols” on page 156 in the VectorWorks Fundamentals User’s Guide.

3. Click **Options**.

The Insertion Options dialog box opens.



4. Select **Convert to Plug-in Object**, and then click **OK**.
5. Click **OK** to create the symbol.

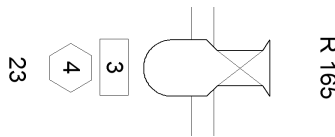
If the Move dialog box opens, specify the location of the resource.

6. The lighting symbol is saved in the Resource Browser as a red symbol. When the symbol is inserted, it functions as a plug-in object and the saved parameters are retained.

A lighting instrument that has been saved as a red symbol can be inserted with the **2D Symbol Insertion** tool.

To insert a lighting instrument resource as a plug-in object:

1. In the Resource Browser, locate the red symbol instrument resource.
2. Double-click on the resource to make it the active symbol and to activate the **2D Symbol Insertion** tool.
3. Click in the drawing to insert the instrument. The active label legend and lighting position are applied, and the parameters that were saved with the instrument are retained.



Lighting Instrument Properties

Product: Spotlight

The instrument parameters can be viewed and edited in the Object Info palette.

Double-click on an instrument, or click **Edit** from the Object Info palette or the context menu of one or more selected instruments. The Lighting Device dialog box opens, facilitating instrument parameter modifications; see “Editing Instruments and Objects” on page 250. Advanced light properties are available by editing the light source embedded within the instrument; see “Advanced Light Properties” on page 253.

For a custom instrument symbol without an information record attached, enter the required instrument object parameters (see “Attaching the Light Info Record” on page 555). An entry is not required for every field.

Parameter	Description
XYZ/IJK Location/Rotation	Changes the instrument's location and rotation; the instrument labels rotate with the instrument unless Right Reading was selected in the Label Legend Manager (see "Formatting the Label Legend" on page 239)
Edit	Opens the Lighting Device dialog box, for editing instrument parameters of one or more lighting instruments; see "Editing Instruments and Objects" on page 250
Device Type	Displays the type of object that is selected; normally, instruments are "Light" device types
Inst. Type	Displays the specific type of lighting instrument
Wattage	Indicates the power consumed by the instrument
Purpose	Specifies the purpose for using
Position	Displays the name of the lighting position
Unit Number	Identifies the instrument location on the lighting position
Color	Specifies the gel color number; if Light On is selected for the lighting instrument, Color specifies the actual light color
Dimmer	Specifies the dimmer or DMX address number of the instrument
Channel	Specifies the channel number of the instrument
Universe	Indicates the DMX group of the dimmer
Circuit Number	Indicates the circuit number where instrument is plugged in
Circuit Name	Specifies the name of bundled circuit group
System	Specifies the letter describing the control system (Lightwright-compatible parameter)
User Field 1 – 6	Provides user-defined fields; use these extra fields to keep track of any desired data
Num Channels	Identifies the number of control channels used by the instrument
Frame Size	Indicates the dimensions of the color cut
Field Angle	Sets the field angle of the instrument
Field Angle 2	Specifies the second field angle for an elliptical light source
Beam Angle	Sets the beam angle of the instrument
Beam Angle 2	Specifies the second beam angle for an elliptical light source
Weight	Specifies the instrument weight
Gobo 1	Indicates the gobo texture number for the first gobo Specifying the gobo texture by clicking Edit in the Object Info palette provides a graphical method of selecting textures from the default resources (see "Editing Instruments and Objects" on page 250)
Gobo 1 Rotation	Sets the rotation angle of gobo texture 1
Gobo 2	Indicates the gobo texture number for the second gobo
Gobo 2 Rotation	Sets the rotation angle of gobo texture 2
Gobo Shift	Adjusts the position of the instrument gobos to the front or rear



Parameter	Description
Mark	Provides a user-defined label (Lightwright-compatible parameter)
Draw Beam	Select to draw an accurate wireframe representation of the light beam; the light beam is drawn based on the instrument parameters, and can be used to check whether the stage and focus areas have been adequately lit (see “Drawing Light Beam Representations” on page 263)
Draw Beam as 3D Solid	Generates a light beam that appears solid when rendered
Show Beam at	In a 2D view, select whether to draw the beam as it crosses the focus point, at the falloff distance as projected through the focus point, or in both areas
Falloff distance	Specifies how far the wireframe light beam is drawn beyond the focus point; the Focus Instruments command sets this value to the distance between the focus point object and 0
Replace with Active Symbol	Replaces the selected instrument with the current active symbol (see “Replacing Instruments” on page 254)
Refresh Labels	Refreshes instrument labels if label changes have been made
Lamp Rotation Angle	Indicates the rotation angle of the virtual elliptical light source, from 0 to 90°
Shutter parameters	Controls the angle and depth of top, left, right, and bottom shutter cuts. Each shutter is located at 90° intervals around the lighting instrument, and can be adjusted +/- 45°. The shutter depth ranges from 0 to 100%, with 100% cutting through the center of the light source.
Symbol Name	Displays the name of the symbol used to create the instrument
Use Legend	Shows the label legend applied to the instrument; the active label legend name is shown when an active Label Legend has been selected (see “Using the Label Legend Manager” on page 236)
Focus	Specifies the focus point for the lighting instrument. The focus point must be defined first (see “Focusing Instruments” on page 261).
Set 3D Orientation	Specifies the X/Y position of the instrument at the hanging point, for 3D views only
ShowData	Select to display additional object data for technical support use; do not edit these fields

For instruments and accessories, do not provide a name on the Data tab. The instrument or accessory Unique ID Number (UID) is automatically entered and must be used as the instrument or accessory name.

Instrument Auto-numbering

Product: Spotlight

As the instruments are placed, they are numbered according to the lighting position auto-numbering format (see “Lighting Position Properties” on page 234). To view the numbering, select **Modify > Refresh Instruments**.

Select **Tools > Options > Toggle Auto Numbering** to globally set the Auto-numbering value for all lighting positions to “on” or “off.” The instruments can then be numbered manually (see “Numbering Instruments Manually” on page 255).



Aligning Instruments

Product: Spotlight

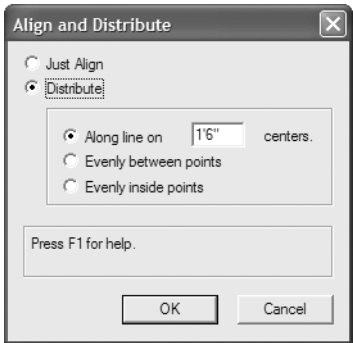
Lighting instruments can be automatically aligned and distributed along a specified guide line with the **Align and Distribute Items** tool.



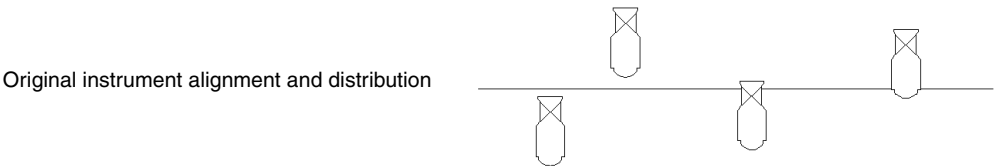
To align and/or distribute instruments along a line:

- 1. Select the objects to be aligned or distributed.
- 2. Click the **Align and Distribute Items** tool from the Spotlight tool set.
- 3. Click to define the beginning of the guide line, and click to end.

The Align and Distribute dialog box opens.

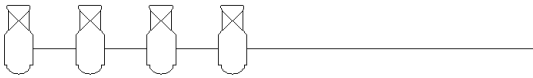

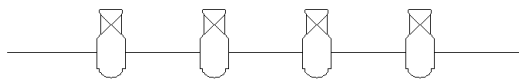


The instruments can be aligned and distributed according to several options.



Parameter	Description
Just Align	The instruments are aligned, but their distribution is not changed



Parameter	Description
Along line on centers	Aligns and distributes selected objects along the guide line using a specified spacing setting between the center point of the instruments 
Evenly between points	The instruments are aligned and distributed evenly between the guide line points, starting with instruments at the beginning of the guide line 
Evenly inside points	The instruments are aligned and distributed evenly between the guide line points, starting with spacing at the beginning of the guide line 

- Click **OK** to align or distribute the instruments according to the selected option.

Editing Instruments and Objects

Product: Spotlight

Changing Instrument Properties

Product: Spotlight

To edit the properties of a lighting instrument:

- Select one or more lighting instruments.
- From the Object Info palette or the context menu, select **Edit**, or simply double-click a single instrument selection.

The Lighting Device dialog box opens. The lighting device parameters are described in “Lighting Instrument Properties” on page 246. Only the parameters which are different are described here.

Lighting Device

Instrument Properties

Light Information

Shutters

Position:

2nd Cove

Unit Number:

11

Purpose:

Top Area 2

Channel:

29

Color:

R 365

Dimmer:

110

Universe:

A

Circuit Number:

110

Circuit Name:

System:

TL

Mark:

Done

User Field 1:

Rep System

User Field 2:

Rental Unit

User Field 3:

12569

User Field 4:

\$ 30.25

User Field 5:

User Field 6:

Focus:

Area 2

Legend:

Imported Legend

Instrument Symbol

Strand 6x16

Get Resource...

Previous

Apply To All

Next

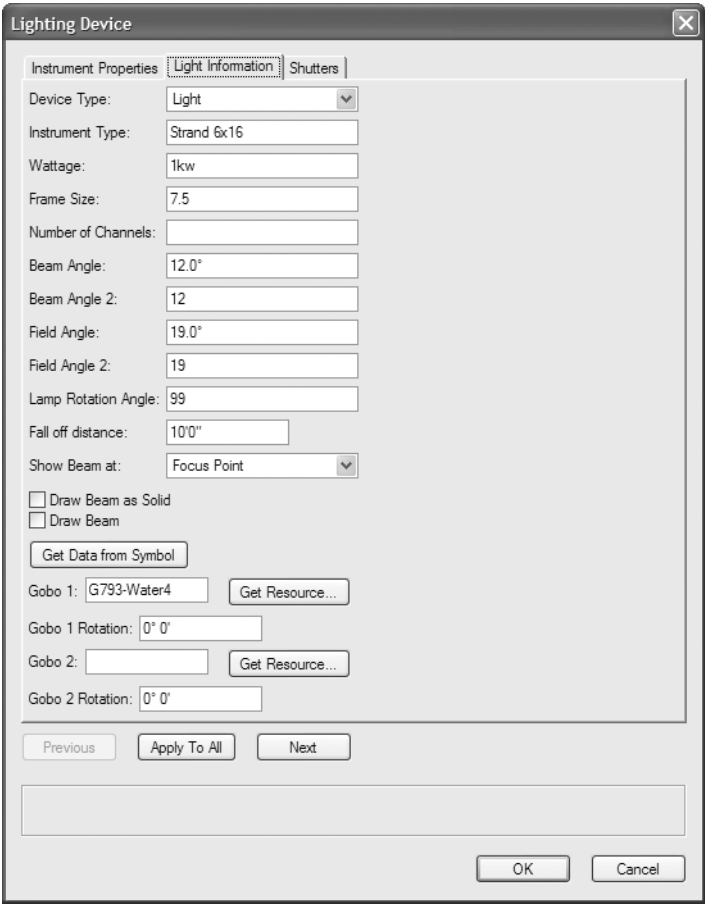
OK

Cancel

Parameter	Description
Position	<p>Lists the lighting positions in the file; select one for the lighting instrument, or select the ellipsis (...) to create a new lighting position name</p> <p><i>If a new position is named, a lighting position of that name must then be created in the file</i></p>
Focus	<p>Lists the focus points in the file; select one for the lighting instrument, or select the ellipsis (...) to create a new focus point name</p> <p><i>If a new focus point is named, a focus point of that name must then be created in the file</i></p>
Legend	<p>Lists the label legends in the file; select one for the lighting instrument</p>
Instrument Symbol	<p>Lists the instrument symbols from the current file's resources; select a different symbol for the lighting instrument from the resources imported into the file</p>
Get Resource	<p>Opens the Get External Resource (Macintosh) or Import External Resource (Windows) dialog box; select an instrument symbol from either the default resources or the current file's resources (see "VectorWorks Design Series Default Resources" on page 570)</p>
Previous/Next	<p>When more than one instrument is selected, displays the parameters of the previous or next instrument in the selection</p>

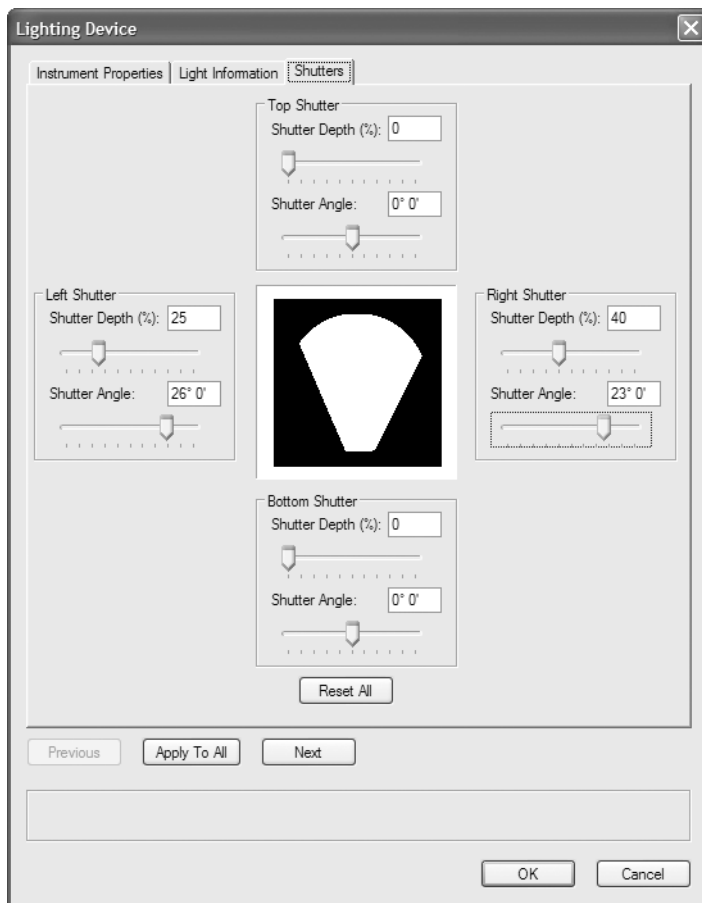
Parameter	Description
Apply to All	When more than one instrument is selected, and the parameters of the first instrument in the selection are displayed, applies only the parameters that have been modified to all the instruments in the selection

3. Click the Light Information tab.



Parameter	Description
Get Data from Symbol	Obtains the light information from the Light Info record attached to the symbol definition
Get Resource	Opens the Get External Resource (Macintosh) or Import External Resource (Windows) dialog box; select a gobo texture symbol from either the default resources or the current file's resources (see "VectorWorks Design Series Default Resources" on page 570 and "Inserting Gobo Projections" on page 291)

4. Click the Shutters tab to set the shutter cut information.



Specify the depth and angles for the top, left, right, and/or bottom shutters. Each shutter is located at 90° intervals around the lighting instrument, and can be adjusted +/- 45°. The shutter depth ranges from 0 to 100%, with 100% cutting through the center of the light source.

5. Click **OK** to apply the changes to the selection.

The properties of one or more selected instruments or objects can also be edited from the Shape tab of the Object Info palette (see “Lighting Position Properties” on page 234).

A selected instrument or a selection of instruments can be cut, copied, and pasted with the **Edit** menu commands. See “Editing 2D Objects” on page 255 in the VectorWorks Fundamentals User’s Guide for more information on the basic editing commands.

Advanced Light Properties

Product: Spotlight

More advanced control over the lighting instrument properties is possible by editing the light source embedded within the instrument.



To edit the embedded light source:

1. Select the lighting instrument(s).
2. From the lighting instrument context menu, select **Edit Light**.

The Light Properties dialog box opens. These parameters offer full control over the light source, and are described in “Light Source Properties” on page 427 in the VectorWorks Fundamentals User’s Guide. RenderWorks is required for certain parameters.

Various light parameters are disabled, because they are controlled by the lighting device object instead.

Select a light **Kind** of Custom to associate a light distribution file with the light. Note that light distribution files and theatrical lighting manufacturers may not specify output in the same way.

3. To enable the light properties, turn the light on in the Properties dialog box or from the Visualization palette.

Replacing Instruments

Product: Spotlight

An individual instrument can be replaced by another type of instrument by choosing the new active symbol in the Resource Browser, and then selecting **Replace with Active Symbol** in the Object Info palette.

However, this process would be tedious for multiple instruments. By using the **Replace Instrument** command, all the instruments of a particular type can easily be replaced with another type of instrument. Alternatively, a selection of instruments can be replaced with another type of instrument.

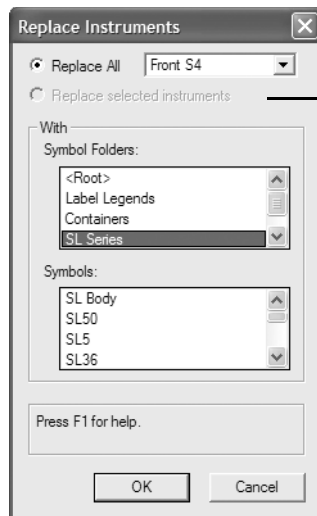
Replacing All Instruments of One Type

Product: Spotlight

To replace all the instruments of one type:

1. Select **Modify > Replace Instrument**.

The Replace Instruments dialog box opens.



This option is unavailable when no instruments are selected

2. Click **Replace All**, and then specify the instrument type to be replaced by selecting it from the list.



3. In the **Symbol Folders** list, select the location of the replacement instrument type. Select the specific instrument type from the **Symbols** list.
4. Click **OK**. All instruments of the type specified are replaced with the selected instrument type.

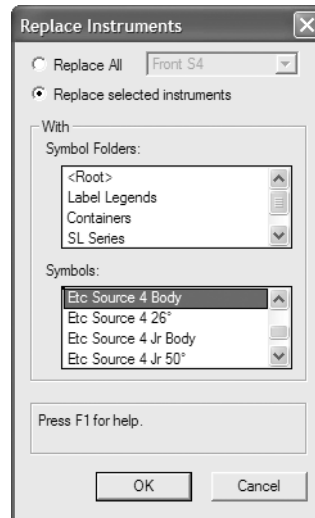
Replacing Selected Instruments

Product: Spotlight

To replace selected instruments:

1. Select the instruments to be replaced.
2. Select **Modify > Replace Instrument**.

The Replace Instruments dialog box opens.



3. Click **Replace selected instruments**.
4. Specify the location of the replacement instrument type in the **Symbol Folders** list. Select the specific instrument type from the **Symbols** list.
5. Click **OK**. The selected instruments are replaced with the specified instrument type.

Numbering Instruments Manually

Product: Spotlight

Instruments do not have to be numbered according to the lighting position's auto-numbering feature. They can be manually numbered.

Numbering Individual Instruments

Product: Spotlight

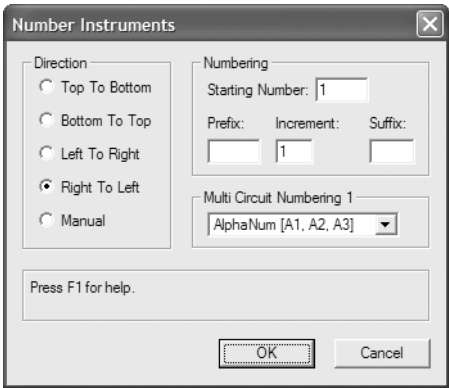
To number selected instruments manually:

1. Select the lighting position object.
2. Disable auto-numbering by deselecting **Auto Number** in Object Info palette.



3. Select the instrument(s) to be numbered.
4. Select **Modify > Number Instruments**.

The Number Instruments dialog box opens.



Parameter	Description
Direction	The numbering direction is relative to the page; click the desired numbering direction
Numbering	Specifies the Starting Number and Increment value; if desired, a Prefix and/or Suffix can be attached to the number
Multi-circuit Numbering	Select the numbering format for multi-circuit instrument numbering; these items are identical to the selections made when specifying auto-numbering for multi-circuit instruments (see “Instrument Auto-numbering” on page 248)

As an example, a **Starting Number** of 2, **Increment** of 2, and **Suffix** of A numbers the instruments as follows: 2A, 4A, 6A, and so on.

Numbering Instruments Manually by Selection

Product: Spotlight

To number instruments manually in the order they are selected:

1. Select **Modify > Number Instruments**.
2. In the Number Instruments dialog box, select **Manual** (the **Manual** direction is selected automatically if no instruments were selected).
3. Click **OK**, and select the instruments to be numbered one by one. To stop numbering instruments, click in an empty area of the drawing.

Changing the Instrument Label Legend

Product: Spotlight

As instruments are placed on the light plot, the active label legend is assigned to them by default. However, the legend can be changed for a selection of instruments.

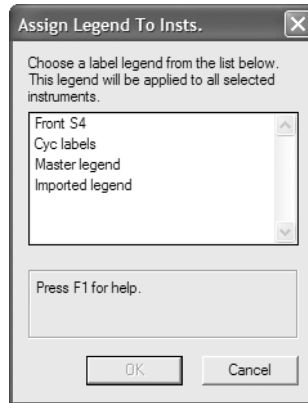
To change the instrument label legend:

1. Select one or more instruments.



2. Click on the **Modify > Assign Legend to Insts** command.

The Assign Legend to Insts dialog box opens.



3. Select the new label legend for the instruments.
4. Click **OK**; the new label legend is applied to the selection.

The label legend can also be changed for an individual instrument by selecting the instrument, and then changing the legend name in the **Use Legend** field of the **Object Info** palette.

Use the **Find and Modify** command to quickly generate a custom selection of specific instruments and apply the new legend to the selected instruments (see “Find and Modify” on page 257).

Refreshing Instrument and Light Position Data

Product: Spotlight

The **Modify > Refresh Instruments** command updates light position information and instrument labels to reflect any changes that have been made. This ensures that all current data is displayed; it is a good idea to select this command before printing the light plot.

Two-fers do not get updated with the instrument information when the **Refresh Instruments** command is selected.

Find and Modify

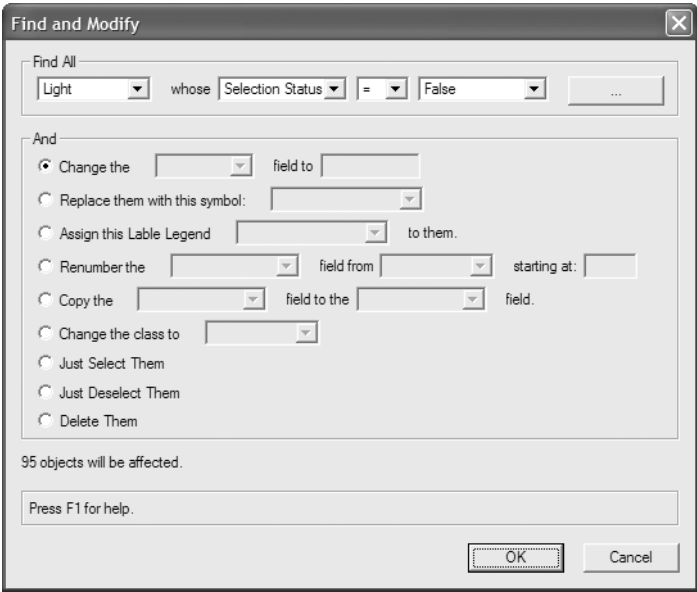
Product: Spotlight

Custom selection criteria can be defined to quickly and easily search for instruments, lighting positions, and accessories and to perform an action upon the search results.

To find and modify objects:

1. Select **Modify > Find and Modify**.

The Find and Modify dialog box opens.



2. Select the type of object to be searched and specify the change(s) to occur to the items found.

Parameter	Description
Find All	Select the type of object to be searched, and then specify the criteria for the search. For example, find all instruments with a circuit number of 66. The list of values is filtered as the criteria are defined.
Change the __ field to __	A specific parameter value can be changed to a new value by clicking Change , selecting the parameter, and entering the new value. Instruments on a particular circuit can be changed to another circuit, for example.
Replace them with this symbol	Click Replace to change the found items to the item specified in the list. For example, find all instruments with a particular purpose, and change them to be of the same instrument type.
Assign this Label Legend	The label legend for found instruments can be changed by clicking Assign and selecting the new label legend
Renummer the __ field from __ starting at __	The renumber operation changes the numbering values for the specified item and location. Enter the starting number value for the change. For example, change the numbering for all PAR instruments on Electric #2 to begin with 12.
Copy the __ field to the __ field	One parameter from the searched item can be copied to another parameter by selecting the parameters from the lists in the Copy operation. For example, copy the circuit number to the dimmer number or the dimmer number to the channel number.
Change the class to __	Change the class of the found items by clicking Change the Class to
Just Select Them	The found item(s) can simply be selected by clicking Just Select Them
Just Deselect Them	Deselect the items found by the custom search by clicking the Just Deselect Them option



Parameter	Description
Delete Them	Delete the items found by the custom search by clicking the Delete Them option
Item Count	Displays an item count of the objects meeting current criteria at the bottom of the Find and Modify dialog box

- Once the find and modify criteria have been defined and action(s) specified, click **OK**. The selected change(s) will occur to the items located by the search.

Using Circuit Tools

Product: Spotlight

Inserting Multi-circuit Instruments

Product: Spotlight

Lighting instruments can be inserted as multi-circuit instruments that act as a group while retaining their individual parameters and labels.

As an example, a six-foot striplight consisting of Cyc lamps of different colors can be inserted as a single multi-circuit instrument that can be easily positioned. However, each light in the multi-circuit instrument retains its own information, which is displayed in its label legend. When generating paperwork, each cell of the instrument is listed individually.

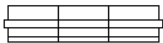
The **Inst Insertion** tool inserts multi-circuit instruments.

The **Modify > Convert > Convert to MultiCircuit** command is no longer required when inserting multi-circuit instruments, although it is still available.



To insert a multi-circuit instrument:

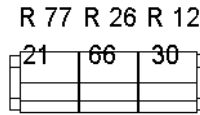
- Create a multi-circuit symbol out of instrument symbols (left, center, and right components), or locate a multi-circuit symbol in the Resource Browser.
See “Creating New Symbols” on page 156 in the VectorWorks Fundamentals User’s Guide.



Multi-circuit symbol

The multi-circuit symbol must consist only of other symbols to be properly inserted as a multi-circuit instrument. Otherwise, the **Inst Insertion** tool treats it as a single circuit instrument.

- Click the **Inst Insertion** tool from the Spotlight tool set.
- Select **Make Active** from the Resources menu to make the multi-circuit symbol the active symbol definition. Alternatively, double-click on the symbol to activate it.
- Click once to insert the active multi-circuit instrument symbol definition, and then again to determine the multi-circuit instrument rotation. By default, the active Label Legend is applied to each part of the multi-circuit instrument.



The instruments retain their individual information but move as a single unit

If one of the multi-circuit components is not aligned properly, temporarily change its **Device Type** to Accessory in the Object Info palette. Adjust it in relation to the other instruments by dragging it, and then change its **Device Type** back to Light.

The **Modify > Convert > Convert to MultiCircuit** command can add a selected instrument to the multi-circuit instrument. To undo a conversion to a multi-circuit instrument, select the multi-circuit instrument and then the **Convert to MultiCircuit** command.

Ganging Instruments

Product: Spotlight

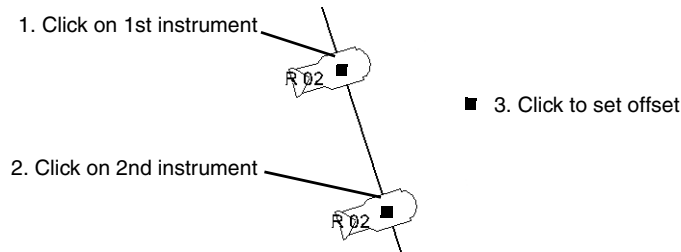
Two-fers gang two or more instruments together on one circuit, dimmer, or channel.

The value in the ganging field should match. If it does not, the value from the first selected instrument is used.



To gang two or more instruments:

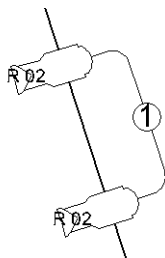
1. Click the **Ganging** tool from the Spotlight tool set.
2. Click on the first, and then the second, instrument to be ganged together. If more than two instruments are to be ganged together, continue clicking on each instrument in succession.



3. Click to set the offset distance of the two-fer label.

If the field values of the instruments do not match, confirm that this is acceptable in the Notice dialog box which opens.

4. Click **OK**. The instruments are ganged together with one or more Two-Fer objects.



The properties of a two-fer are displayed, and can be edited, in the Object Info palette.

Parameter	Description
Update Insts	Select to update the ganged instruments. Changes to one instrument are updated for the other ganged instrument. Also updates two-fer counts in the position summary inventory report.
Corner Style	Select the corner style for the two-fer object (Square, Arc, or Bézier)
Gang By	Indicate whether to gang by Channel, Dimmer, or Circuit (name and number)
Field Value	Enter the value for the two-fer label. (For example, if ganging by channel number, enter a channel number of 80.) This new value updates the former value for dimmer, circuit, or channel in the instrument record.
Show Label	Select to display the two-fer label
Use Container	Select to place the label in a container, and then specify the container name
Container Name	The container name must exactly match the container symbol names located in the Containers folder of the Resource Browser. Use this option to override the container specified in the Label Legend.

Focusing Instruments

Product: Spotlight

To focus a lighting instrument on a particular area or object, a focus point needs to be defined.

Creating a Focus Point Object

Product: Spotlight

An object defined as a focus point specifies where instruments should be directed. If the focus point is moved, any instruments that are aimed at it will update their focus position based on the focus point information.

Like lighting positions and instruments, focus points should be inserted on their own design layer, to facilitate selection, viewing, and printing. Alternatively, it is acceptable to insert the focus points on the same design layer as the scenic elements. Focus points can also be inserted into their own classes.

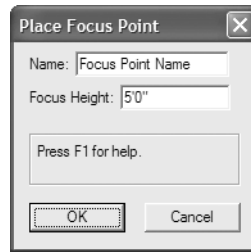


To insert a focus point object:

1. Click the **Focus Point** tool from the Spotlight tool set.
2. Click on the plot to insert the focus point object.



3. The Place Focus Point dialog box opens. Enter the name of the focus point, the focus height above the stage floor, and then click **OK**.



The focus point name is required later to specify the focus point for the lighting instruments.

The name of a focus point can be changed on the **Data** tab of the **Object Info** palette, and can be updated in the drawing file by selecting **Reset** on the **Shape** tab of the **Object Info** palette. Place focus points in their own class so they can be easily hidden for a 3D rendering. Alternatively, set a focus point's fill and pen attributes to **None** to hide a focus point.

Assigning a Focus Point to a Lighting Instrument

Product: Spotlight

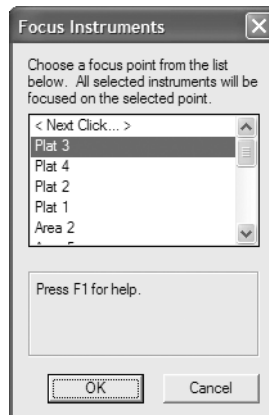
One or more instruments can be focused on a focus point. The instrument focus point is used to draw light beam representations (see "Drawing Light Beam Representations" on page 263), calculate photometric values (see "Obtaining Photometric Data" on page 263) and for rendering gobo projections (see "Gobo Projection Requirements" on page 294).

The focus point can also be used to create Magic Sheets that show the instruments focused on a particular area (see "Magic Sheets" on page 285). In addition, the focus point can be used as one of the criteria for finding instruments with the **Find and Modify** command (see "Find and Modify" on page 257).

To focus the lighting instrument(s) on a focus point:

1. Select the instrument(s).
2. Select **Modify > Focus Instruments**.

In the **Focus Instruments** dialog box, specify the name of the focus point, or select **Next Click** to create a new focus point with the next mouse click (you will be prompted for the name of the focus point object).





To change the focus point of a single instrument, enter the name of the new focus point in the **Focus** field of the Object Info palette (see “Lighting Instrument Properties” on page 246).

Drawing Light Beam Representations

Product: Spotlight

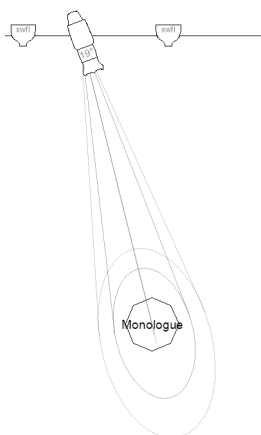
Once the focus point of instruments has been specified, light beam representations can be drawn.

To turn on the light beam for one or more instruments:

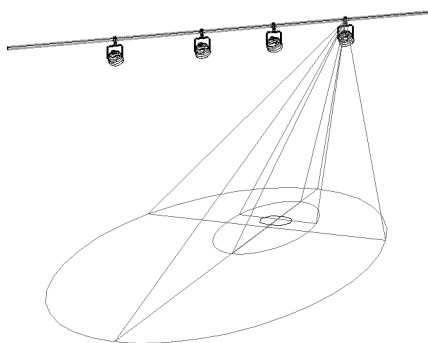
1. Select the instrument(s).

An instrument must have a focus point in order to draw a light beam representation (see “Assigning a Focus Point to a Lighting Instrument” on page 262). Elliptical light sources require secondary beam and field angles. The **Focus Instruments** command inserts a default falloff distance for elliptical light sources.

2. Select **Draw Beam** from the instrument Object Info palette (see “Lighting Instrument Properties” on page 246).



Light beam
Top/Plan view



Light beam
3D view

An accurate wireframe representation of the light beam’s spread and location on the stage is drawn. The light beam of instruments used for general wash lighting can also be drawn; however, a focus point is still required in order to draw the light beam representation.

3. Select **Draw Beam as 3D Solid** from the instrument Object Info palette to see the light beam as a solid cone of light. The Color specified in the Object Info palette determines the solid color.

Obtaining Photometric Data

Product: Spotlight

Spotlight can determine and display the surface illumination values of the stage at a specific location (Photometer object) or along a grid (Photometric Grid object).

For photometric values to be measured, the lighting instrument(s) must have a designated focus point.



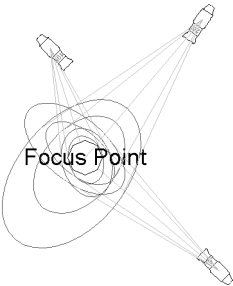
Inserting a Photometric Grid

Product: Spotlight



To insert a photometric grid:

1. Ensure that each lighting instrument contributing to the illumination is focused.



The light beams do not have to be drawn for calculations to be made.

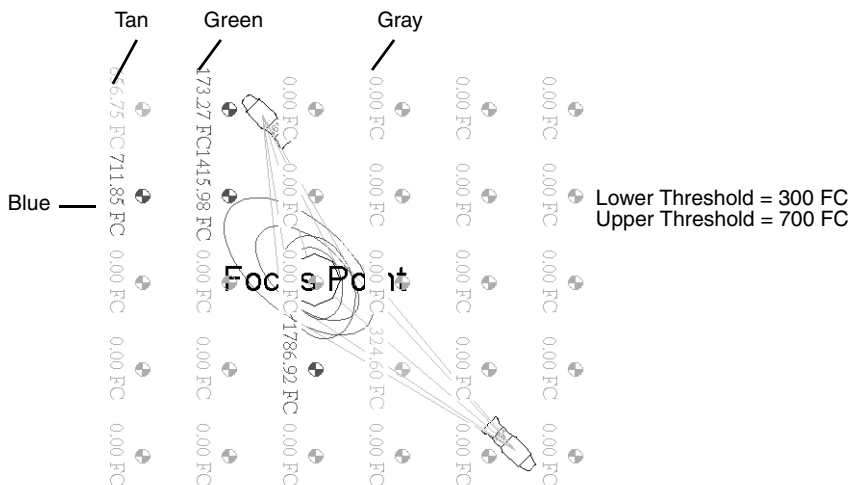
2. Click the **PhotoGrid** tool from the Spotlight tool set.
3. Click on the plot to insert the photometric grid. The grid is a rectangular object, and can be inserted in Center-line Placement mode or Edge Placement mode.

Placement Mode	Description
Center-line	Click once, and then again, to define the width through the center of the grid. Click again to specify the width of half the grid.
Edge	Click once, and then again, to define the length along the edge of the grid. Click again to specify the grid width.

The photometric grid calculates and displays the illumination values at its elevation point. The values are displayed in either foot candles (Imperial) or lux (Metric), depending on the units selected in **File > Document Settings > Units**. If **Use Threshold Settings** is selected, colors indicate the illumination range according to the **Threshold** values set in the Object Info palette.

Color	Description
Gray	Illumination value of zero
Green	Illumination value between zero and Lower Threshold
Tan	Illumination value between Lower and Upper Threshold
Blue	Illumination value above Upper Threshold

The photometric grid range colors can be changed. See “Customizing Photometric Threshold Colors” on page 556.



- To evaluate the illumination values at different heights, change the elevation of the photometric grid in the Object Info palette.

Photometric Grid Properties

Product: Spotlight

The photometric grid properties can be changed in the Object Info palette.

Parameter	Description
Z	Sets the elevation value of the grid; illumination values vary depending on the elevation
Show Elevation	Select to display the grid elevation along with the photometric values
Show Zero	Select to display elevation values of zero
Calculate using only visible beams	Select to determine the photometric values based on only instruments with Draw Beam selected; this reduces calculation time
Use Threshold Settings	Select to display the grid with colors that correspond to the specified threshold ranges
Lower Threshold	Specify the illumination value at the lower end of the range; values below this level are displayed in green, and values between the lower and upper threshold are displayed in tan
Upper Threshold	Specify the illumination value at the upper end of the range; values above this level are displayed in blue
Grid Spacing X	Specifies the spacing of photometric values in the X direction
Grid Spacing Y	Specifies the spacing of photometric values in the Y direction
Grid Width X	Specifies the length of the grid in the X direction
Grid Width Y	Specifies the length of the grid in the Y direction
Reset	Refreshes the grid display after changes have been made to the lighting conditions



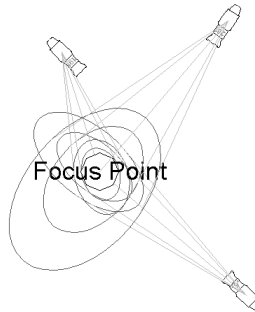
Inserting a Photometer

Product: Spotlight



To insert a photometer:

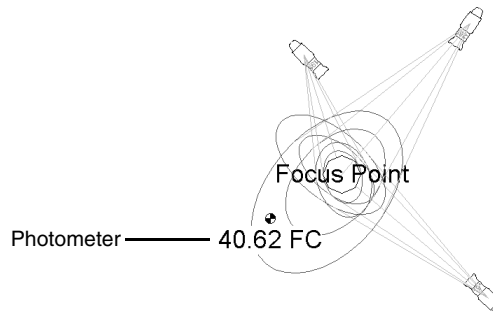
1. Ensure that each lighting instrument contributing to the illumination is focused.



The light beams do not have to be drawn for calculations to be made.

2. Click the **Photometer** tool from the Spotlight tool set.
3. Click on the plot to insert the photometer. Click again to set the photometer rotation.

The photometer calculates and displays the illumination values at its elevation point. The values are displayed in either foot candles (Imperial) or lux (Metric), depending on the units selected in **File > Document Settings > Units**. See “Inserting a Photometric Grid” on page 264 for information on indicating threshold limits with a color.



4. To evaluate the illumination values at different heights, change the elevation of the photometer in the Object Info palette.

Photometer Properties

Product: Spotlight

The photometer properties can be changed in the Object Info palette.

Parameter	Description
Z	Sets the elevation value of the photometer; illumination values vary depending on the elevation
Show Elevation	Select to display the object's elevation along with the photometric value
Show Zero	Select to display an elevation value of zero
Calculate using only visible beams	Select to determine the photometric value based on only instruments with Draw Beam selected; this reduces calculation time
Use Threshold Settings	Select to display the object in a color that corresponds to the specified threshold ranges
Lower Threshold	Specify the illumination value at the lower end of the range; values below this level are displayed in green, and values between the lower and upper threshold are displayed in tan
Upper Threshold	Specify the illumination value at the upper end of the range; values above this level are displayed in blue
Reset	Refreshes the photometer display after changes have been made to the lighting conditions

Adding Accessories and Objects

Product: Spotlight

Once the lighting positions, instruments, and focus points have been created, the basic light plot exists. Next, lighting accessories and stage objects can be added.

Adding Accessories

Product: Spotlight

Accessories can be placed on the light plot in two ways.

- In the Resource Browser, either select one of the accessory symbols from the existing symbol libraries or one of the symbols you have created in this file or a Favorites file. Insert the symbol with the **Accessory Insertion** tool to place the accessory object on the light plot. This method is described in “Inserting Accessories” on page 269.
- Symbols that have already been placed on the plot can be converted into accessories. This method is described in “Creating an Accessory” on page 270.

The accessory symbols from the libraries included with Spotlight include all the required attribute information and have the correct accessory type assigned (Accessory or Static Accessory). When creating or using your own symbols with Spotlight, see “Accessory Specifications” on page 556.

Lighting instrument accessories, such as color frames, barn doors, and top hats, are placed on the same design layer as the instruments, in the Accessories class. Accessories such as color frames, barn doors, and top hats have a **Device Type** of Static Accessory. Accessories that require a control channel, such as color scrollers, have a **Device Type** of Accessory.

An instrument can have multiple accessories in the same location (most accessories are placed at the front of an instrument). It can also have several accessories in different locations. Once an accessory has been associated with an instrument, the instrument controls the accessory.

Inserting Accessories

Product: Spotlight

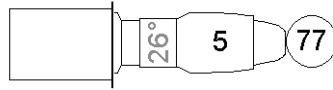
Existing accessory symbols are inserted with the **Accessory Insertion** tool. These can be symbols that you have created, located in a Favorites file or the current file, or they can be one of the symbols imported from the libraries included with Spotlight ([VectorWorks]\Libraries); see “Object Libraries” on page 565.

For more information on importing symbols, see “Importing a Symbol Folder” on page 170 in the VectorWorks Fundamentals User’s Guide.



To insert an accessory:

1. Click the **Accessory Insertion** tool from the Spotlight tool set.
2. Select the accessory symbol from the Resource Browser and choose **Make Active** from the Resources menu to make it the active symbol definition. Alternatively, double-click on the symbol to activate it.
3. Click once to insert the active accessory symbol definition, and then again to determine the accessory rotation. The cursor changes to a bull’s eye. Click on the instrument which will be associated with the accessory.



Because the accessory is controlled by the associated instrument, the items move together. However, an accessory can be positioned on its own by selecting it and dragging.

If the accessory symbol is inserted without first clicking on the **Accessory Insertion** tool, the symbol will be inserted by the **2D Symbol Insertion** tool. However, the accessory functionality will not be present. If correctly inserted, the Object Info palette displays “Lighting Device” (with a **Device Type** of Accessory or Static Accessory) for the selected accessory.

Once the **Accessory Insertion** tool has been selected, it remains selected by default so that accessories can be repeatedly inserted. To place non-instrument symbols after placing accessories, switch to the **2D Symbol Insertion** tool.

4. A different type of accessory can be placed by changing the active symbol definition and continuing to use the **Accessory Insertion** tool.

Creating an Accessory

Product: Spotlight

It is not necessary to use only the pre-defined symbols. Create an accessory out of a currently selected symbol—once the symbol is converted to an accessory, the accessory functionality is present. See “Accessory Specifications” on page 556 for restrictions on using symbols for accessories.

To create an accessory:

1. First, draw the accessory, and then convert the object to a symbol by selecting **Modify > Create Symbol**.

For information on symbols, see “Creating New Symbols” on page 156 in the VectorWorks Fundamentals User’s Guide.

2. Select the symbol(s).

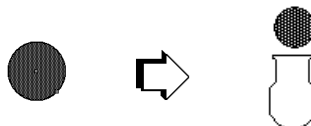
Symbols can have a separate 2D and 3D representation. The accessory object automatically uses the appropriate portion of the symbol. At a minimum, the symbol must have at least a 2D component, though it may not display correctly in all the views. Correct this by editing the symbol definition and adding a 3D component.

3. Select **Modify > Convert > Convert to Accessory**.

The selected symbol is converted into an accessory. The accessory properties can be changed through the Object Info palette; some of the accessory information may need to be entered.

Accessories such as color frames, barn doors, and top hats should have a **Device Type** of Static Accessory. Accessories that require a control channel, such as color scrollers, should have a **Device Type** of Accessory.

An accessory inserted by this method is not associated with an instrument. Use the **Accessory Insertion** tool to associate an accessory with an instrument.





4. Once the accessory has been converted, it is saved as a symbol in the file. Select it as an active symbol definition and use the **Accessory Insertion** tool to insert it again if required.

Accessory Properties

Product: Spotlight

The accessory Object Info palette is nearly identical to the instrument palette format, because it requires many of the same parameters. The **Device Type** is Static Accessory or Accessory instead of Light.

Entering a parameter in the accessory Object Info palette will not change the associated instrument parameters.

For more information on the fields in the Object Info palette, see “Lighting Instrument Properties” on page 246.

Placing Stage Objects on the Light Plot

Product: Spotlight

Stage objects, such as trusses, curtains, and other scenic objects are used in VectorWorks Spotlight to aid in developing the lighting design.

A 3D stage object can be used as a focus point for lighting instruments by naming it as the focus point in the instrument Object Info palette (see “Lighting Instrument Properties” on page 246).

To facilitate viewing and printing the light plot, place the stage objects in their own design layer, apart from lighting positions, instruments and the theater ground plan, and in their own classes.

Placing Trusses

Product: Spotlight

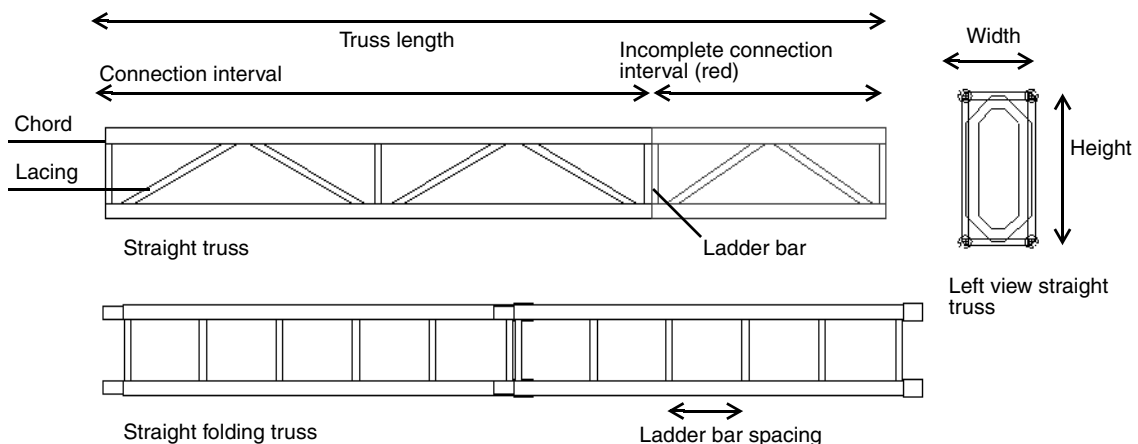
Lighting instruments are not always placed on lighting positions. Some types of shows require the addition (or the exclusive use of) trusses. VectorWorks Spotlight supports nearly any configuration of trusses and towers.

To use a truss as a lighting position, place the truss symbol on the plot, and then convert it to a lighting position by selecting **Modify > Convert > Convert to Light Position** (see “Creating a Lighting Position” on page 233).

Inserting a Straight Truss

Product: Spotlight

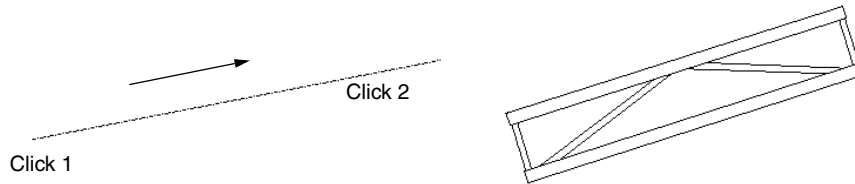
Straight truss parameters are illustrated by the following diagram.





To add a straight truss to the light plot:

1. Click the **Straight Truss** tool from the Spotlight tool set.
2. Click in the drawing area where the truss will be located and draw a line to indicate the length of the truss.



Trusses are 2D/3D hybrid objects. Complex trusses can increase the time required to render the model in 3D.

Straight Truss Properties

Product: Spotlight

The straight truss properties can be edited in the Object Info palette.

Parameter	Description
Length	Specifies the length of the truss in drawing units
Profile	Select the truss profile from the list
Connection	Select the type of connection from the list
Connection Interval	Indicates the distance for dividing the truss into component sections
Folding	Select to indicate a folding truss
Pre Rigged	Select whether to include a light bar
Height/Width	Shows height and width values for the truss
Chord Profile	Select round or square chord tubing
Chord Width	Shows the diameter of round chords or the width of square chords
Ladder Bar Spacing	Specifies the interval of the ladder bars
Ladder Bar Profile	Select round or square ladder bar tubing
Top/Side Ladder Bar Diameter	Indicates the diameter of the top and side ladder bar tubing; enter 0 to draw no ladder bar
Lacing Profile	Select round or square lacing tubing
Top/Side Lacing Diameter	Indicates the diameter of the top and side lacing tubing. Enter 0 to draw no lacing.
Hanging Angle	Indicates the angle of the truss between the stage or floor and the hanging point
Rotation	Specifies the rotation about the truss axis
Show 3D Detail	Select to render the truss with greater 3D detail
Highlight	Displays odd sized truss divisions in red



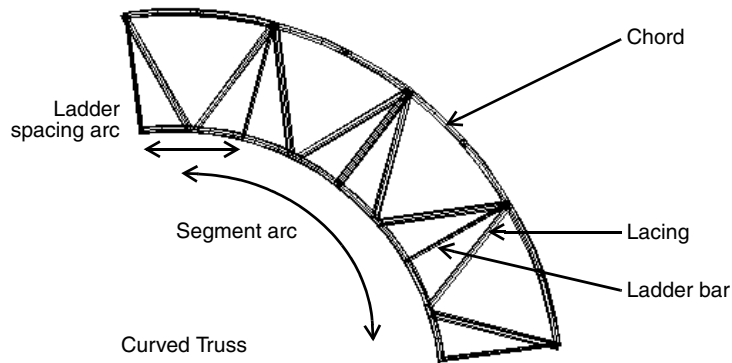
Parameter	Description
Message	Provides information about the truss placement and indicates successful placement

A connection interval shorter than the defined interval length is displayed in red when **Highlight** is selected.

Inserting a Curved Truss

Product: Spotlight

Curved truss parameters are illustrated by the following diagram.



To add a curved truss to the light plot:

1. Click the **Curved Truss** tool from the Spotlight tool set.
2. Click to define the truss insertion point. Click again to set the rotation of the curved truss.

Trusses are 2D/3D hybrid objects. Complex trusses can increase the time required to render the model in 3D.

Curved Truss Properties

Product: Spotlight

The curved truss properties can be edited in the Object Info palette.

Parameter	Description
Radius	Specifies the radius of the truss measured from the truss center line
Total Arc	Indicates the total angle covered by the truss in degrees
Segment Arc	Specifies the interval in degrees for dividing the truss into component sections
Connection	Select the type of connection from the list
Profile	Select the truss profile from the list
Height/Width	Shows height and width values for the truss
Chord Profile	Select round or square chord tubing
Chord Width	Specifies the diameter of round chords or the width of square chords



Parameter	Description
Ladder Spacing Arc	Specifies the interval of the ladder bars in degrees
Ladder Profile	Select round or square ladder bar tubing
Top/Side Ladder Bar Diameter	Specifies the diameter of the top and side ladder bar tubing. Enter 0 to draw no ladder bar.
Lacing Profile	Select round or square lacing tubing
Top/Side Lacing Diameter	Specifies the diameter of the top and side lacing tubing. Enter 0 to draw no lacing.
Show 3D Detail	Select to render the truss with greater 3D detail
Highlight	Displays odd sized truss divisions in red
Message	Provides information about the truss placement and indicates successful placement
Draw 3D only	Select to display only the 3D component of the truss

If the final segment of a truss is shorter than the defined interval length, it is displayed in red when **Highlight** is selected.

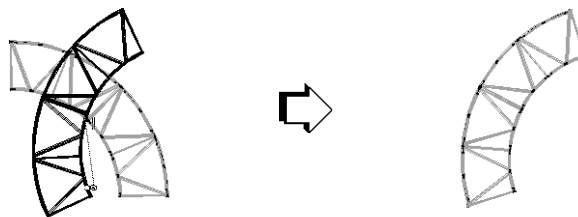
Rotating a Curved Truss

Product: Spotlight

A curved truss can be rotated with the **Rotate** tool.

To rotate a curved truss:

1. Select the truss. In the Object Info palette, select **Draw 3D Only**.
2. Click the **Rotate** tool from the Basic palette.
3. Click to set a fulcrum line; click to end. Move the cursor to rotate the truss, and then click to set the rotation.



Truss Configuration Requirements

Product: Spotlight

A great deal of flexibility is incorporated in the Spotlight truss object. However, in order to create a valid truss, the wide variety of configurations leads to certain restrictions in the application of truss properties.



Truss Requirements
The width and height of the truss must be greater than three times the chord width
The truss hanging angle must be between -90° and $+90^{\circ}$
A triangular truss must form a valid triangle
The chord diameter must be greater than zero
A pre-rigged truss cannot have lacing
A pre-rigged truss cannot be folding
Only box trusses can be pre-rigged
A folding truss cannot have top lacing
Folding is not allowed on a stacking truss
Top lacing is not allowed on a stacking truss
The top brace diameter must be less than or equal to the chord width
The side brace diameter must be less than or equal to the chord width
The connection interval must be greater than the ladder bar spacing
Ladder bar spacing must be greater than three times the top brace size
If the section is too small, lacing may not be drawn

If a truss is drawn that does not meet these requirements, an alert message is generated.

Inserting Curtains

Product: Spotlight

The **Curtain** object is a 2D/3D hybrid representation of a stage curtain.



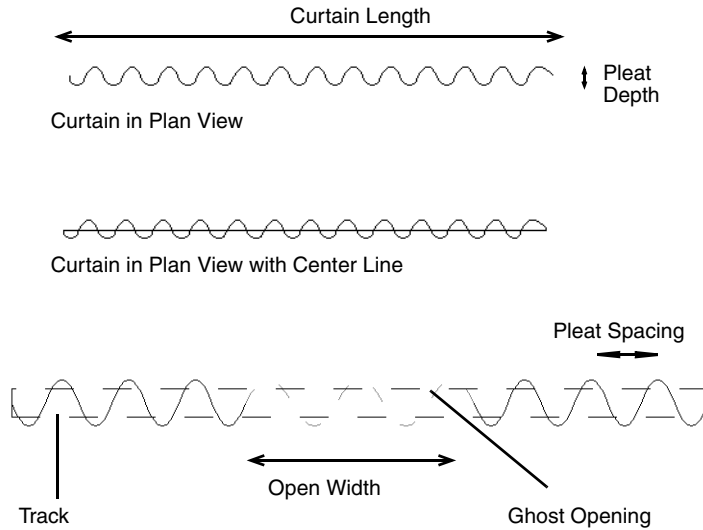
To place a curtain on the light plot:

1. Click the **Curtain Object** tool from the Spotlight tool set.
2. Click on the drawing and drag to indicate the length of the curtain. Click again to finish the curtain.



Curtain Properties

Product: Spotlight



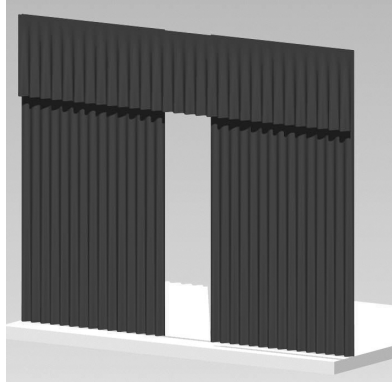
The **Curtain Length** is based on the length of the line specified. Set the curtain fullness and height, and indicate whether a center line or track should be drawn in Plan view.

The curtain parameters can be edited in the Object Info palette.

Parameter	Description
Curtain Length	Specifies the length of the curtain
Draw Options	Select whether to draw a 2D center line or show the curtain track
Track Width	Specifies the width of the curtain track (when Show Track is selected)
Pleat Spacing	Indicates the distance between pleats
Pleat Depth	Indicates the width of the curtain pleats
Curtain Height	Specifies the height of the curtain from Z-value up
Open From	Specifies an end or center opening
Open Width	Indicates the distance, if any, that the curtain is open
Ghost Opening	When selected for open curtains, the open section of the curtain appears dimmed

To create borders or teasers, specify a Z-height for the curtain and decrease its **Curtain Height** value.

The curtain can be rendered and textured (RenderWorks required) to obtain the best visual effect. For more information on adding textures, see “Textures and Shaders” on page 635 in the VectorWorks Fundamentals User’s Guide.



Curtains are 2D/3D hybrid objects. Several curtains can increase the time required to render the model in 3D. To render complex curtains, it may be necessary to use the Custom RenderWorks option, with **Detail** set to High.

Paperwork and Schedules

Product: Spotlight

Generating accurate and complete paperwork allows the electricians hanging the show to transform the light plot into the components required to create the lighting design on stage. VectorWorks Spotlight eliminates the arduous job of manually creating the instrument keys, schedules, inventory reports, magic sheets, and other paperwork.

Sample Spotlight worksheets are available in Libraries\Defaults\Reports-Schedules\Spotlight Schedules.vwx.

Creating a Key to Instrumentation

Product: Spotlight

Statistics on the instruments and accessories used in the light plot help with show organization. The key to instrumentation can show the number of each kind of instrument in use, display an account of the accessories, and record the labels used to show instrument parameters. In addition, the key can compare its information to the current inventory so that the designer can determine how many instruments remain in the inventory, or whether more instruments have been specified than are currently present in the inventory.

If the key is to display inventory items, create the inventory report first (see “Inventory Reports” on page 283).

To create a key to instrumentation:

1. Select the **Tools > Reports > Key to Instrumentation** command.
2. Select one or more items to include in the key from the Key to Instrumentation dialog box.



Parameter	Description of Key Generated
Instruments	Lists the instruments used in the light plot
Accessories	Lists the accessories used in the light plot
Inventory and Counts	Shows the instruments and accessories used in the plot and an inventory of remaining instruments and accessories
Active Label Legend	Shows the layout of labels from the active label legend; if the layout from the current active legend is not desired for the key, select a different active label legend before choosing the Key to Instrumentation command





3. When the items to be included in the key have been selected, click **OK**.



4. Select the location of the key to instrumentation by clicking on the plot where the top left corner of the key is to be placed.

The key to instrumentation is a grouped object. If desired, the group can be edited and the elements of the key repositioned as desired. The color of the key can be changed through the Attributes palette.

The key to instrumentation does not reflect changes made to the light plot after the key is generated. If changes are made, such as instruments added or deleted, select the **Key to Instrumentation** command to regenerate the key. The existing key is replaced by a new key in the same location.

Instruments	Num In Inventory	Used	Remaining
	12	10	2
	8	8	0
	36	4	32
	25	2	23

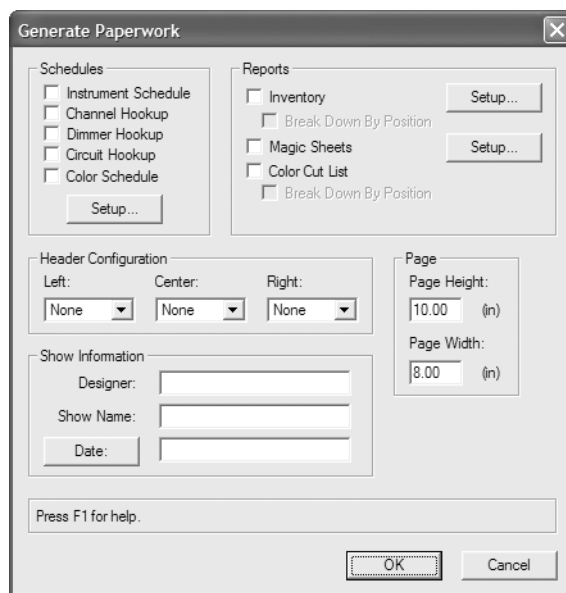
Generating Paperwork

Product: Spotlight

The information to be included in the various schedules and reports, as well as the format of the reports, is specified in the Generate Paperwork dialog box.

To set up the schedule and report information:

1. Select **Tools > Reports > Generate Paperwork**. The Generate Paperwork dialog box opens.



2. Select the desired **Schedules** and **Reports**. Each schedule and report selected must be set up by clicking on its **Setup** button. The setup procedure is described in the following sections.
3. Configure the rest of the paperwork setup by entering the **Header Configuration**, **Show Information** and the **Page Properties** (see “Header Configuration” on page 286). Click **OK** to generate the desired paperwork with the specified settings.

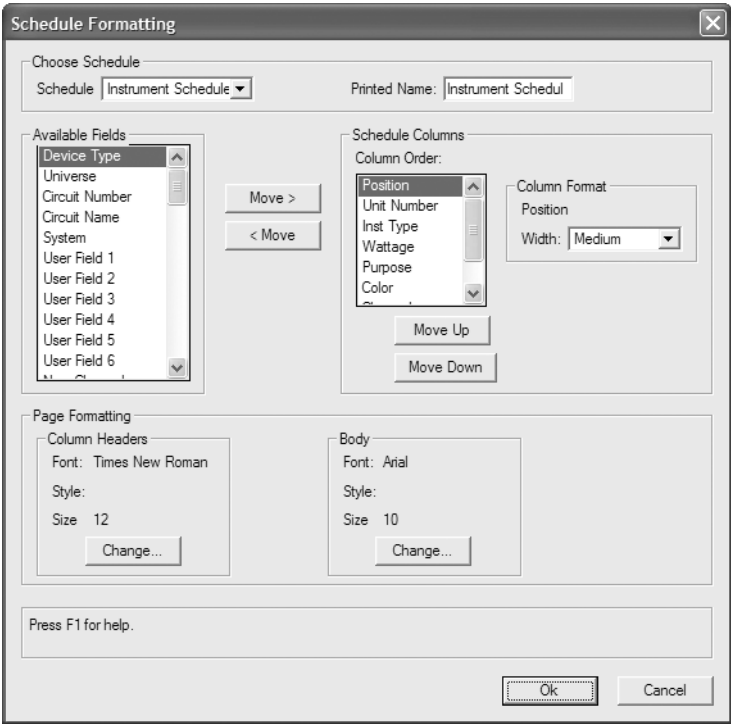
Schedule Setup

Product: Spotlight

The information to be included in the various schedules, as well as the format of the schedules, is specified in the Schedule Formatting dialog box.

To set up the schedule contents and formatting:

1. Select **Tools > Reports > Generate Paperwork**. The Generate Paperwork dialog box opens.
2. Click the **Setup** button under the Schedules list. The Schedule Formatting dialog box opens.



Each schedule in the **Schedule** list is formatted in the same way. The formatting must be specified for each schedule by first selecting the schedule from the list and then specifying the format.

When selecting **Available fields** and **Column Order**, press and hold the Shift key to select multiple, contiguous items or press and hold the Ctrl key (Windows) or Command key (Macintosh) to select non-contiguous items.

Parameter/Button	Description
Printed Name	Suggests a title for the top of the report of the selected schedule. Change the title, if desired, by typing in a new title for that schedule.
Available Fields	Displays the items that can be included in the schedule
Schedule Columns	Displays, in order, the columns that have been selected to appear in the schedule
Move >	Adds a selected available item to the list of schedule columns
Move <	Removes a column from the Schedule Columns list
Move Up/Move Down	The most recently added item displays at the bottom of the Schedule Columns list, indicating that it is the last column in the report; to change the column order, select a column and click on the Move Up and Move Down buttons until it is in the desired order
Column Format	For each column in the Schedule Columns list, select Wide , Medium , or Narrow from the Width list. These selections represent the relative widths of the columns in relation to the other columns. Since the schedule is automatically fit to the page, specifying the actual widths is unnecessary. The actual width of the column is dependent upon the number of columns as well as the final printed schedule size.



Parameter/Button	Description
Page Formatting	Specifies the formatting of the Column Headers and report Body text; select the Font , Style , and Size for each. Click the Change button to open the Format Text dialog box for editing text parameters (see “Formatting Text” on page 189 in the VectorWorks Fundamentals User’s Guide).

- After specifying the column information, order, and width, as well as the page formatting for each type of schedule to be generated, click **OK** to return to the Generate Paperwork dialog box. The schedule formatting is used when the paperwork is generated.

The Schedule formatting settings are saved in the file’s Schedule Formats worksheet. The worksheet, and all the formatting, can be imported into another file through the Resource Browser.

Inventory Reports

Product: Spotlight

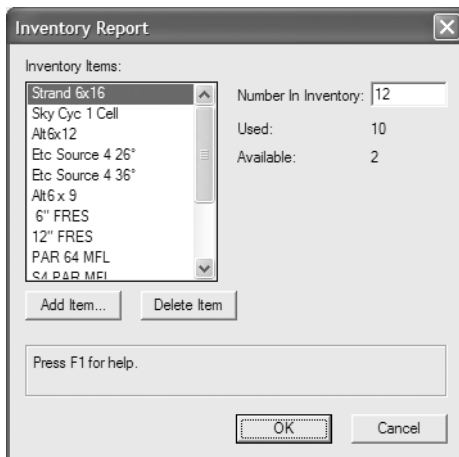
To create an inventory of items currently placed in the light plot and items available, set up an Inventory Report.

To set up an inventory report:

- Select **Tools > Reports > Generate Paperwork**, and then select **Inventory** in the Generate Paperwork dialog box. To create an inventory report that will separate instrument information according to lighting position, select **Break Down By Position**.

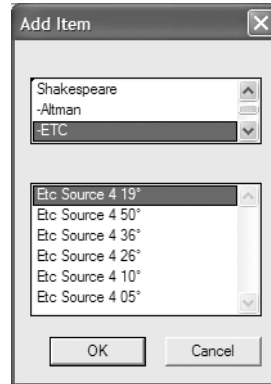


- Click the **Setup** button next to **Inventory**. The Inventory Report dialog box opens.

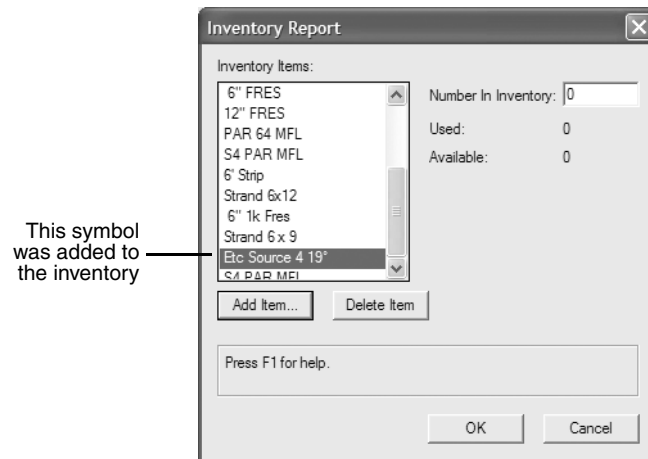


- The **Inventory Items** are listed on the left. These items are based on symbol definitions used in the VectorWorks Spotlight file. If an item that needs to be inventoried is not in the list, click **Add Item**.

The Add Item dialog box opens.



4. Browse through the symbol folders of the current file (listed at the top of the Add Item dialog box) and select the desired folder. The symbols that are contained in the folder are listed at the bottom of the Add Item dialog box. Select the item to be added to the inventory list, and click **OK**. The selected symbol is added to the **Inventory Items** list in the Inventory Report dialog box.



5. Click on each item in the list, and enter its **Number in Inventory** value. The number of units used in the light plot, as well as the number available for use, are displayed.

Use the Resource Browser to copy the inventory information from another file by importing the Inventory report worksheet into the current file's resources (see "Importing Worksheets from Another VectorWorks file" on page 584 in the VectorWorks Fundamentals User's Guide).

6. Click **OK** to close the Inventory Report dialog box and return to the Generate Paperwork dialog box.

Deleting Inventory Items

Product: Spotlight

Items can be deleted from the inventory list.

To delete an item from the inventory:

1. Select **Tools > Reports > Generate Paperwork**, and then select **Inventory** and click **Setup**.

The Inventory Report dialog box opens.



2. Select the inventory item to delete, and then click **Delete Item**.
3. Click **OK**. The item is removed from the inventory report.

This action does not remove the item from the drawing. If the lighting device is still present in the file when the **Setup** button is clicked, the item returns to the inventory list. However, the number of items in inventory must be re-entered.

Magic Sheets

Product: Spotlight

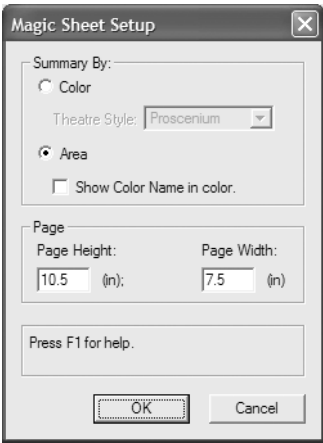
Magic sheets are graphical representations of instruments on the plot; they can be broken down either by focus point or color. Magic sheets are invaluable for cueing a show. They are simple to set up and generate in VectorWorks Spotlight.

To create a magic sheet:

1. Select **Tools > Reports > Generate Paperwork**, and then select **Magic Sheets** in the Generate Paperwork dialog box.



2. Click the **Setup** button next to **Magic Sheets**. The Magic Sheet Setup dialog box opens. Specify the magic sheet setup parameters.



Action	Description
Generates the magic sheets with lighting summarized by color	Click Color ; each instrument of a particular color is shown in one view. The general Theatre Style needs to be selected from the list to be used as a reference for the color summaries.
Generates the magic sheets with lighting summarized by focus area	Click Area . All instrumentation that has a specified focus point will be included in the report. If desired, the magic sheet color number value can be displayed in an approximation of its gel color. Select Show Color Name in color .

The Theatre Styles are editable symbols. Custom styles can be added into the file's Theater Types folder using the Resource Browser.



3. Click **OK** to close the Magic Sheet Setup dialog box and return to the Generate Paperwork dialog box.

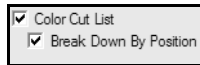
Color Cut List

Product: Spotlight

A color cut list shows all the colors required by the show, and calculates the number of each cut size required per color.

To create a color cut list:

1. Select **Tools > Reports > Generate Paperwork** and then select **Color Cut List** in the Generate Paperwork dialog box.
2. If desired, select **Break Down By Position** to further break the color cut list down by lighting position.



Header Configuration

Product: Spotlight

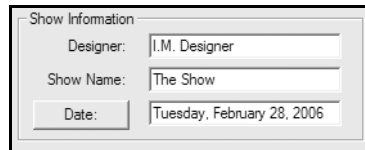
In the Generate Paperwork dialog box, select the position of the header information specified in **Show Information**. For the **Left**, **Center**, and **Right** header positions, select the information to be displayed from the list (Designer, Show Name, and/or Date). If no header information is desired for the location, select **None**.



Show Information

Product: Spotlight

In the Generate Paperwork dialog box, enter the name of the lighting **Designer** and the **Show Name**, if desired. Type the date of the show or event. To use today's date, click **Date**.



Page Properties

Product: Spotlight

In the Generate Paperwork dialog box, enter the **Page Height** and **Page Width** values in the default file units. These values specify the print area (page width with printer margins). The width of the schedule columns is affected by this value.



Page
Page Height:
10.00 (in)
Page Width:
8.00 (in)

If desired, a different unit can be used by specifying the value and the unit. For example, even if the default file units are centimeters, specify eight inches for the Page Properties by entering 8". Click **OK** to generate the selected schedules and reports in the format specified.

Reviewing Generated Paperwork

Product: Spotlight

Once the paperwork has been formatted and generated, it can be checked and printed.

Generated Magic Sheets

Product: Spotlight

If Magic Sheets were generated, a new design layer is added to the file. Depending on the type of Magic Sheet generated, the new design layer is called **Magic Sheet-Area** or **Magic Sheet-Color**. The magic sheets are placed on this design layer, and formatted to the specified page size (select **View > Zoom > Fit to Window** if the Magic Sheet items cannot be seen). If the light plot parameters are changed, the magic sheets must be regenerated to reflect the updates.

Paperwork Worksheets

Product: Spotlight

The specified reports and schedules, once generated, display in the Resource Browser under the Worksheets heading of the current file.

For more information on worksheets, see "Worksheets" on page 563 in the VectorWorks Fundamentals User's Guide.

	A	B	C	D	E	F	G	H
1	The Show			I.M. Designer				
2				Channel Hookup				
3								
4	Chan	Dim	Inst Type	Watt	Purpose	Color	Position	Unit
5	25			750	Top Area 2		1st Electric	13
6	26			1KW	The Play		2nd Electric	8
7	27			1KW	The Play		1st Electric	12
8	28			1kw	Top Area 2	R 365	1st Cove	9
9	29			1kw	Top Area 2	R 365	2nd Cove	11
10	30			750	Top Area 2		FOH 1	11
11	31			1KW	Midstage Backlight		1st Electric	11
12	32			750	Top Area 2		1st Electric	12

The following points should be remembered when working with generated paperwork:

- Edits to this type of worksheet do not update the light plot parameters.
- If the light plot parameters are edited, this type of report or schedule must be regenerated to reflect the updates.



Creating Hanging Cards

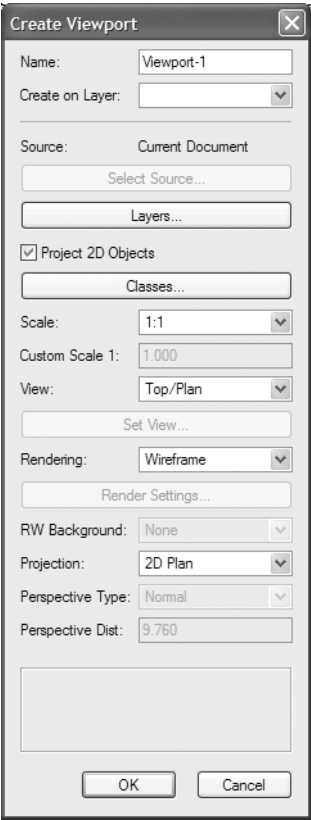
Product: Spotlight

Lighting position hanging cards can be created in Spotlight.

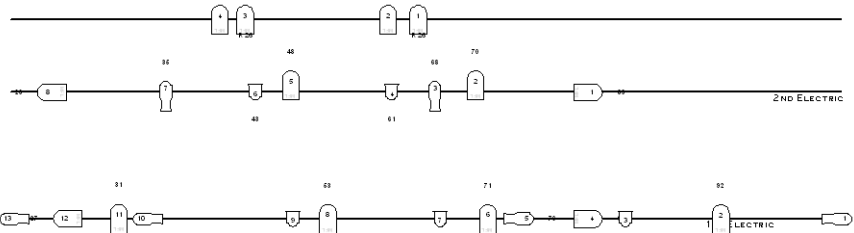
To create hanging cards:

1. Set the design layer visibility by selecting **Window > Navigation** and clicking the Design Layers tab. Set only the design layers with the desired lighting positions and instruments to visible.
2. Similarly, set class visibility by clicking the Classes tab and setting only the desired classes to visible.
3. Select **View > Create Viewport**.

The Create Viewport dialog box opens. For more information on viewports, see “Presenting Drawings with Sheet Layer Viewports” on page 609 in the VectorWorks Fundamentals User’s Guide.

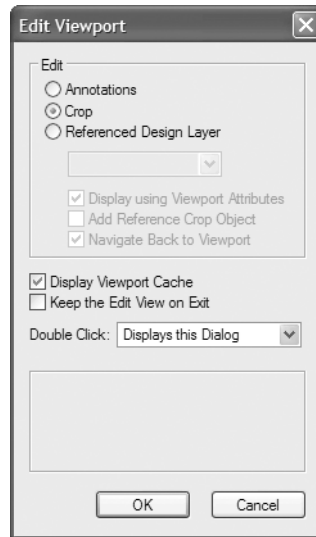


4. From the **Create on Layer** field, selet the sheet layer for the viewport (or create a new sheet layer).
5. Select **Project 2D Objects**, with Top/Plan view and Wireframe rendering. Click **OK**.
6. The viewport is created and the sheet layer displays.



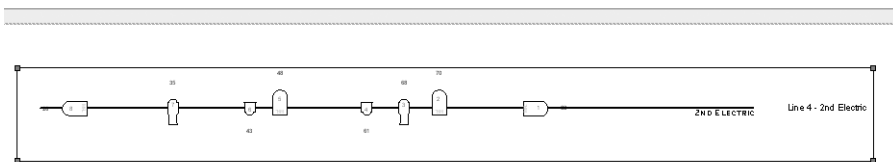
7. Select **Modify > Edit Viewport**.

The Edit Viewport dialog box opens. Select **Crop** and click **OK**.



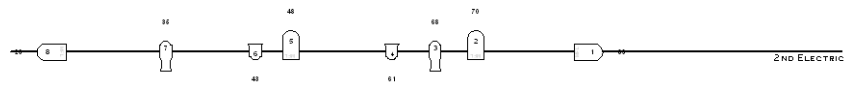
Alternatively, right-click (Windows) or Ctrl-click (Macintosh) the viewport and select **Edit Crop** from the context menu to crop the viewport.

8. In crop viewport mode, draw a 2D shape to crop the desired lighting position.



To hide the cropping shape, set its line thickness to zero in the Attributes palette. Click **Exit Viewport Crop** at the top right of the drawing window to crop the viewport.

9. The cropped viewport displays on the sheet layer.



10. Several viewports can be created on the same sheet layer to display all the desired hanging cards. Changes to the design layer(s) are automatically reflected in the viewport.

Visualizing the Lighting Design

Product: Spotlight

VectorWorks Spotlight contains gobo projection and scene visualization features which assist in previewing the lighting design. The lighting levels for a particular scene can be saved and later recalled, and a QuickTime movie of the scenes can simulate scene transitions.

These features cannot be used to accurately render all the lighting instruments on the stage for every scene.

Inserting Gobo Projections

Product: Spotlight

A pattern, texture, or color can be placed on a lighting instrument and projected onto the stage. This special light source and instrument combination is a gobo projection.

Lighting instruments with gobo projections cast a light beam that can be rendered by RenderWorks. You can then preview the effect of the gobo projection texture(s) on the stage.

RenderWorks must be installed to render gobo projections. For more information on rendering, see “Rendering with VectorWorks” on page 431 and “Rendering with RenderWorks” on page 679 in the VectorWorks Fundamentals User’s Guide.

Gobo Texture Libraries

Product: Spotlight

VectorWorks Spotlight includes thousands of commercial gobo textures from Rosco, Apollo, Lee, and GAM. Through the Resource Browser, import the texture into the current file from one of the files located in the Libraries\Textures-Gobo folder. To use the texture in a gobo projection, specify its name in the Object Info palette (see “Creating Gobo Textures” on page 292).

When Spotlight is installed, gobo textures are also provided as default resources (default resources are automatically imported into the file when selected while changing instrument properties, and display in the Resource Browser; see “Changing Instrument Properties” on page 250, and “VectorWorks Design Series Default Resources” on page 570.)

Inserting a Gobo Projector

Product: Spotlight

A gobo projector is a lighting instrument with a light source and gobo projector specified.

1. Insert a lighting instrument as described in “Inserting Instruments” on page 243.
2. In the Object Info palette of the selected instrument, click **Edit**.

The Lighting Device dialog box opens. This provides a convenient way of specifying parameters (see “Editing Instruments and Objects” on page 250), although the parameters can also be entered directly in the Object Info palette.

3. On the Instrument Properties tab, specify a focus point for the instrument.
4. On the Light Information tab, select **Light On** to add a spot light to the instrument.
5. For **Gobo 1**, enter the name of the gobo projection texture (if it has been imported into the file as a resource), or click **Get Resource** to select a gobo texture from the default resources. Specify the **Gobo 1 Rotation** angle, if any.
6. If there is a second gobo texture, specify its parameters in **Gobo 2**.



7. Click **OK**.

To preview the effect of a color projection on the stage, indicate the **Color** name in the Object Info palette of a selected instrument, without specifying a gobo texture. Render the gobo projection to project the light on the focus point with the specified color. The colors can be selected from the color libraries installed with Spotlight. The color code must be entered in a “Manufacturer color value” format (for example, R 101). If the color value cannot be found, the color defaults to white.

Creating Gobo Textures

Product: Spotlight

In addition to the gobo images available in the pre-defined commercial gobo projection libraries, any square image can be converted into a gobo projection texture.

QuickTime and RenderWorks must be installed in order to create gobo textures.

Most image-based textures are automatically compressed when imported into VectorWorks. Imported JPEG files retain the original JPEG data; all other image files are compressed using lossless PNG format.

To create a gobo texture:

1. Select **Modify > Convert > Create Gobo Texture**.

The Create Gobo Texture dialog box opens.



Parameter	Description
Enter a name for this texture	Specifies the gobo texture name
Edit Texture	Edits the gobo texture transparency settings at creation. Once an image has been selected (as described in the following steps), the Edit Texture dialog box opens for editing texture transparency settings.

For more information on editing textures, see “Editing Textures and Shaders” on page 649 in the VectorWorks Fundamentals User’s Guide.

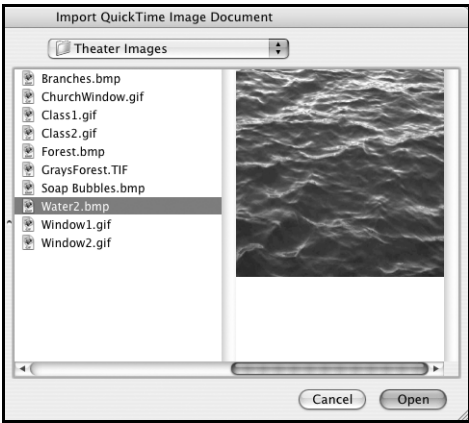
2. Click **OK**.

If a resource with an image is already present in the file, the Choose Image dialog box opens.



Parameter	Description
Import an Image File	Imports a new image. Click OK and proceed to Step 3.
Reuse an Image from Another Resource	Reuses a previously imported image; select the resource that contains the image. Click OK and proceed to Step 4.

3. Select the desired image file in the Open (Windows) or Import QuickTime Image Document (Macintosh) dialog box. Click **Open**.



4. If **Edit Texture** was selected in Step 1, the Edit Texture dialog box opens. Select the desired options and click **OK**. Click **OK** again to close the Create Gobo Texture dialog box.

The texture resource is created and is listed in the Resource Browser.

5. Associate a defined texture with an instrument by entering the texture name in the **Gobo 1** or **Gobo 2** field of a selected instrument's Object Info palette, and specify the **Gobo Rotation**, if any.

A texture can be saved in the default resources file, located in Libraries\Defaults\Lighting Instruments - Gobos\Gobo Textures.vwx. Import the texture into the default file, or save a new default file within the folder.

Editing Gobo Texture Transparency Settings

Product: Spotlight

A gobo texture is a transparent image resource listed in the Resource Browser. The transparency settings can be edited after the gobo image has been specified, or at creation.

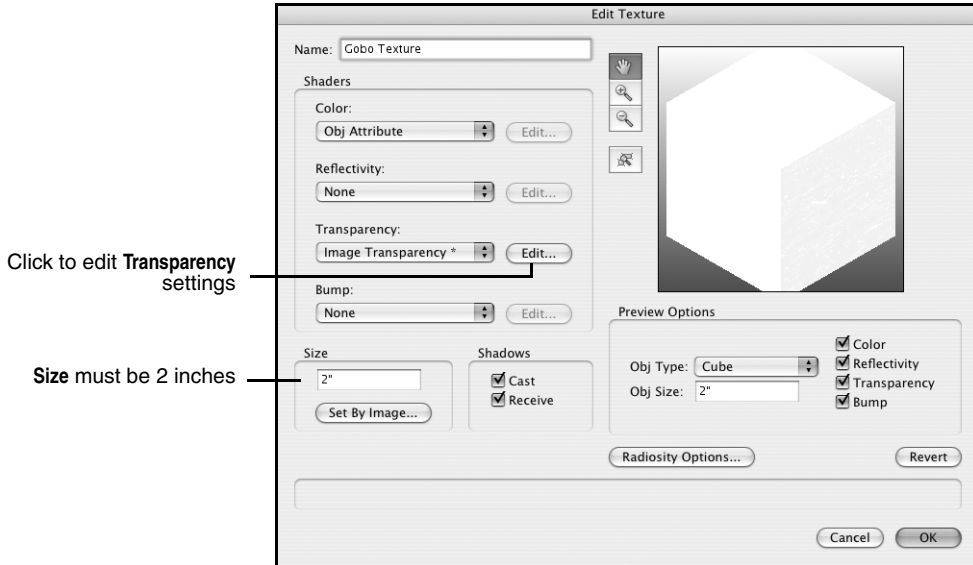
To edit a created gobo texture's transparency:

1. Select the resource in the Resource Browser.



2. Select **Edit** from the Resources menu to open the Edit Texture dialog box. The Image Transparency settings can be edited. For more information on editing textures, see “Editing Textures and Shaders” on page 649 in the VectorWorks Fundamentals User’s Guide.

The texture **Size** must be 2 inches.



Showing Gobo Projections

Product: Spotlight

The gobo textures and color of a selected light instrument can be projected in a rendered simulation. This rendered image allows you to preview the effect of the gobo texture.

Gobo Projection Requirements

Product: Spotlight

To be able to project a gobo texture, the lighting instrument must:

- Have one or two gobo textures specified
- Be aimed at an existing focus area specified in the **Focus** field of the Object Info palette
- Have **Light On** selected in the Object Info palette

The following VectorWorks requirements must be met:

- The design layer containing the instrument with gobo texture must also contain 3D geometry (any 3D object that is capable of accepting a RenderWorks light) to project the texture
- RenderWorks must be installed
- Certain custom RenderWorks settings must be in effect

To select the custom settings, select **View > Rendering > Custom RenderWorks Options**. For more information on Custom RenderWorks settings, see “Custom RenderWorks Options” on page 689 in the VectorWorks Fundamentals User’s Guide.

In the Custom Render Settings dialog box, ensure that the following settings have been made.



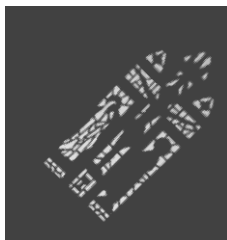
Custom RenderWorks Options	Setting for Gobo Projector
Texturing	
Use Textures	Selected
Use Transparency	Selected
Geometry	
Curve Detail	Select the required level of detail
Use NURBS	De-selected
Lighting	
Use Shadows	Selected
Ray Traced Shadows	De-selected
Shadow Mapped Shadows	Selected
Map Detail	Select the required level of detail
Sampling Quality	Select the required sampling quality
Final Gather	
Use Final Gather	De-selected
Rendering	
Use Anti-Aliasing	Selected
Use Ray Tracing	Selected; set Max Refractions to 32 and Max Reflections to 6
Auto-Adjust Exposure	Selected

Projecting a Gobo Texture

Product: Spotlight

To project a gobo texture:

1. Make all the settings and meet all the requirements described in the previous sections (see “Inserting a Gobo Projector” on page 291, and “Gobo Projection Requirements” on page 294).
2. Select **View > Rendering > Custom RenderWorks**.





Artistic RenderWorks can also be used to render gobo projections. The gobo projector cannot render the following Artistic RenderWorks styles: Ink Print, Lines and Shadows, Soft Lines, Overlapping Lines, Tapered Lines, and Color Wash.

Managing Scenes

Product: Spotlight

The levels, colors, positions, and focusing of all the VectorWorks Spotlight instrument objects can be saved as a lighting scene. The scenes can then be used to create QuickTime movies of the scene transitions.

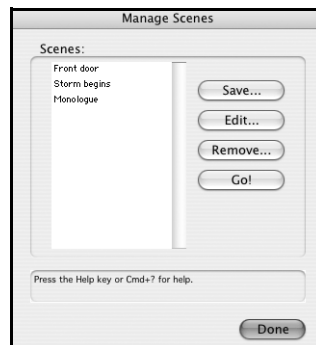
QuickTime must be installed to create scene transitions.

Saving Scenes

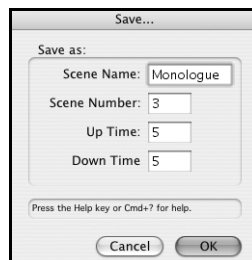
Product: Spotlight

To save a scene:

1. After the lighting properties for all the instruments have been set correctly, select **Model > Manage Scenes**. The Manage Scenes dialog box opens.



2. In the **Scenes** list, the list of saved scenes is displayed. The scenes are sorted by the order in which they are entered. To save the current settings as a scene, click **Save**. The Save dialog box opens.



3. Enter a **Scene Name** and **Scene Number**. Also, specify the **Up Time** and **Down Time** for the scene, in seconds. The **Up Time** is the time allotted for the lights to increase in intensity, and the **Down Time** is the time allotted for the lights to decrease in intensity.
4. Click **Done** to save the scene. It is added to the **Scenes** list.



Editing Scenes

Product: Spotlight

To edit a scene:

1. Select the scene from the list in the Manage Scenes dialog box and click **Edit**.
2. Make the desired change to the **Scene Name** or **Number**, or the **Up/Down Time**, then click **Done** to save the change. Confirm the changes.

Removing Scenes

Product: Spotlight

To remove a scene:

1. Select the scene from the list in the Manage Scenes dialog box and click **Remove**.
2. Confirm that you wish to remove the scene, then click **Yes**. The scene is removed from the **Scenes** list.

Restoring Scene Lighting Parameters

Product: Spotlight

To restore lighting parameters from a scene:

1. Select the scene from the list in the Manage Scenes dialog box and click **Go!**.
2. Confirm that the parameters are to be restored. The current light parameters are replaced by those from the scene.

All current levels, colors, positions, and focus points for all the instruments will be replaced. Any information that has not been saved will be lost.

Animating Scenes

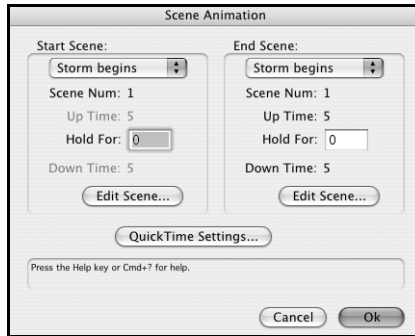
Product: Spotlight

A QuickTime movie of scene settings can be created to preview the cue transition between the scenes. The contents of the active window, exactly as they display, are used to create the movie. Therefore, the images must be rendered before animating the scenes to accurately preview the lighting effect.

QuickTime should have been installed during the VectorWorks Spotlight installation. If not, it can be installed from the VectorWorks installation disk(s).

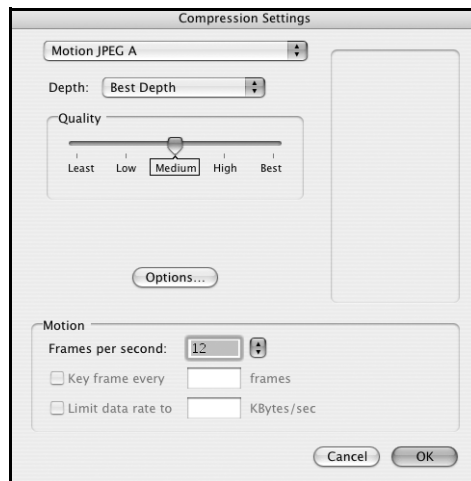
To animate the scenes:

1. Set the rendering option parameters described in “Gobo Projection Requirements” on page 294.
2. Save the scenes as described in “Managing Scenes” on page 296.
3. Select **Model > Animate Scenes**.
4. In the Choose Path dialog box, select a location and file name for the movie. Click **Save** to open the Scene Animation dialog box.



5. Enter the parameters for the **Start** and **End Scenes**. Select the scene name from the list; its parameters display underneath.
6. If desired, the scene can be edited by clicking the **Edit Scene** button. Change the **Scene Name**, **Scene Number**, **Up Time** and **Down Time**, and then click **OK** to confirm the changes. The **Up Time** and **Down Time** used to animate the scenes is taken from the End Scene.
7. To create the animation, enter the scene **Hold For** time in seconds for both the starting and ending scenes.
8. Edit the QuickTime movie settings by clicking the **QuickTime Settings** button. The Compression Settings dialog box opens.

Enter the Compression settings for the movie file. For the video compressor, **Motion JPEG A** may provide the best results. See “Animating Drawings with QuickTime” on page 601 in the VectorWorks Fundamentals User’s Guide, as well as Apple’s QuickTime web site, for more information on QuickTime.



QuickTime is a complex program which offers great flexibility in selecting settings. Consult QuickTime documentation before changing Compression Settings.

9. Click **OK** to exit the QuickTime settings.
10. When the scene animation settings are complete, click **OK**. The progress is displayed on the screen as the QuickTime movie is created in the specified location, based on the settings that were entered.
11. To see the movie, locate the .mov file and double-click to play it in the QuickTime Movie Player.

Drafting and Design Aids

Product: Machine Design

VectorWorks Machine Design includes a variety of tools and utilities to assist you during the drafting and design process.

Creating 3D Objects from 2D Objects

Product: Machine Design

The **Create 3D Object from 2D** command places a 3D version of a 2D object in a drawing. The 3D object is created with the same parameters as the 2D object. The command applies to the following 2D objects with 3D counterparts.

- Acorn nut (Inch)
- Bevel gears
- Conical compression spring
- Dowel pin (Inch)
- Flanged bearing - 2 and 4 hole
- J-Bolt (Inch, Metric)
- Lock washer (Inch, Metric, DIN, ISO)
- Parallel pin (DIN)
- Pulley *
- Rivet - large (Inch)
- Roller bearing
- Roller chain - offset link
- Shaft
- Spur gear *
- Swing eye bolt
- T-bolt
- Thumb screw (Inch)
- U-bolt
- Woodruff Key
- Ball bearing
- Clevis pin (Inch, Metric, DIN, ISO)
- Cotter pin (Inch)
- Extension spring - Front, End
- Hole - drilled
- Key
- Needle bearing
- Pillow block bearing
- Retaining ring (Inch, DIN)
- Rivet - small (Inch)
- Roller chain - circular
- Screw and nut (Inch, Metric, DIN, ISO)
- Shoulder screw (Inch, Metric, DIN, ISO)
- Spur gear rack
- Taper pin (Inch, DIN)
- Threaded shaft
- Torsion spring - Front, End
- Wing Nut (DIN)
- Worm
- Bearing Lock Nut
- Compression spring - 1 and 2
- Die spring
- Eye bolt
- Hole - tapped (Inch, Metric)
- Knurled thumb nut (Inch, DIN)
- Nut (Inch, Metric, DIN, ISO)
- Plain washer (Inch, Metric, DIN, ISO)
- Retaining washer (DIN)
- Rivet (DIN)
- Roller chain - linear
- Set screw (Inch, Metric, DIN, ISO)
- Sprocket *
- Swing bolt
- Tapered roller bearing
- Thrust bearing
- Tubular rivet (DIN)
- Wing Nut Type A, B, C, D (Inch)
- Worm gear *

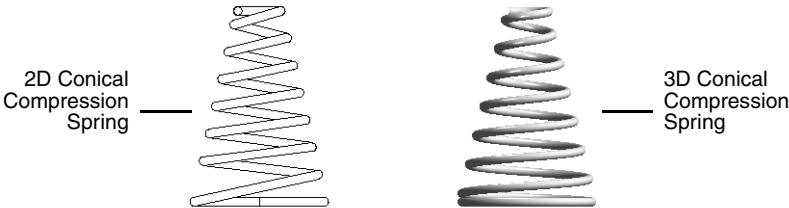
* The spur gear, worm gear, sprocket, and pulley convert to a 3D object and 3D hub object.

This command creates the 3D equivalent of a selected 2D object. If a 2D object with no 3D equivalent is selected, a beep sounds, a notice indicates that the object cannot be converted, and the object is deselected.

To create a 3D object from a 2D object:

1. Select the 2D object. Several 2D objects can be selected at one time.
2. Select **Machine Design > Create 3D Object from 2D**.

The 3D object is created with the same parameters as the 2D object.



Creating Multiple Views Using Viewports

Product: Machine Design

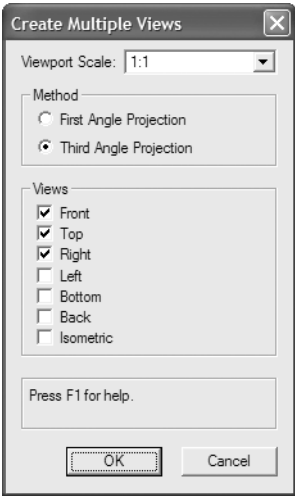
The **Create Multiple Views** command generates 2D drawings from a 3D model and creates up to seven viewports configured with several orthographic views and one isometric view of the model.

If the command is run while on a sheet layer, the viewports are added to that sheet layer. If the command is run while on a design layer, the viewports are added to an automatically created sheet layer.

To create multiple views:

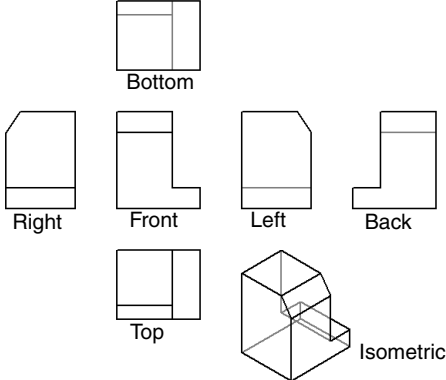
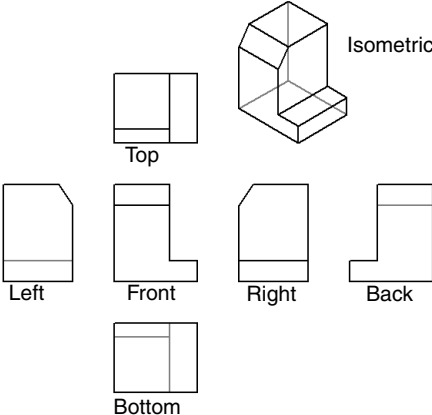
1. Select **Machine Design > Create Multiple Views**.

The Create Multiple Views dialog box opens. Specify the desired settings.



2. Specify the desired viewport scale, views, and angle projection method, and then click **OK**.

Parameter	Description
Viewport Scale	Select the viewport scale relative to the page
Method	

Parameter	Description
First Angle Projection	<p>Create views using the first angle projection method; by default, the front, top, and left views are selected when the drawing units are metric</p> 
Third Angle Projection	<p>Create views using the third angle projection method; by default, the front, top, and right views are selected when the drawing units are imperial</p> 
Views	
Front, Top, Right, Left, Bottom, Back, Isometric	Select the view(s) to create in the drawing

Viewports are created at the designated layer scale, using the current layer and class visibility and print area settings, with the rendered style set to dashed hidden line rendering (see “Machine Design Drawing Setup” on page 20). Viewports are aligned horizontally and vertically, separated by a fixed distance, and centered on the sheet layer.

- Optionally, configure the viewports’ layer and class settings (Active, Show, or Gray Others only), annotate the viewport, or modify the rendering style or other viewport parameters.



For more information, see “Setting Class and Design Layer Visibility for Viewports and Saved Views” on page 109 in the VectorWorks Fundamentals User’s Guide, “Creating Annotations for Sheet Layer Viewports” on page 621 in the VectorWorks Fundamentals User’s Guide, and “Properties of Sheet Layer Viewports” on page 614 in the VectorWorks Fundamentals User’s Guide.

Spring Calculator

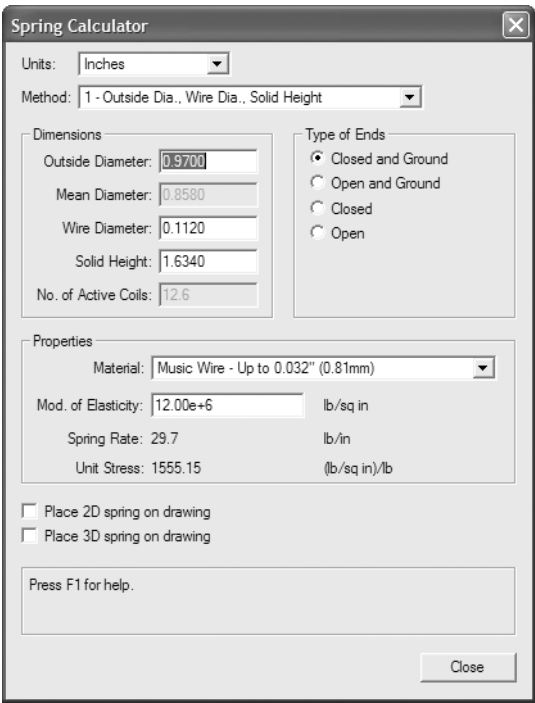
Product: Machine Design

The **Spring Calculator** command solves for spring rates and unit stresses based on compression spring parameters.

To calculate a spring rate:

- 1. Select **Machine Design > Spring Calculator**.

The Spring Calculator dialog box opens.



- 2. Edit the compression spring parameters. To add to the list of available parameter values, see “Adding User-defined Information to Commands” on page 560.

Parameter	Description
Units	Sets the spring dimension units to Inches, cm, or mm
Method	Select the method; as data is entered, the other dimensions are automatically calculated
Dimensions	The fields available depend upon the Method and the Type of Ends selected
Outside Diameter	Enter the outside diameter
Mean Diameter	Enter the mean diameter



Parameter	Description
Wire Diameter	Enter the wire diameter
Solid Height	Enter the solid height
No. of Active Coils	Enter the number of active coils
Type of Ends	Select Closed and Ground , Open and Ground , Closed , or Open to set the type of ends on the spring
Properties	The properties of the spring can be selected from the list or manually entered
Material	Select the material to be used for the spring or select <Other> to set the Modulus of Elasticity manually
Mod. of Elasticity	Automatically entered based on the material selected; displayed in pounds per square inch, newtons per square centimeter, or newtons per square millimeter, depending on selected units. If <Other> was selected, enter the Modulus of Elasticity manually.
Spring Rate	Automatically calculated based on the spring parameters; displayed in the selected units
Unit Stress	Automatically calculated based on the spring parameters; displayed in the selected units
Place 2D spring on drawing	Select to draw a 2D spring according to the above parameters; if both checkboxes are selected, the 2D and 3D springs are automatically aligned in the drawing
Place 3D spring on drawing	Select to draw a 3D spring according to the above parameters; if both checkboxes are selected, the 2D and 3D springs are automatically aligned in the drawing

3. Click **Close** to exit the calculator.

Belt Length Calculator

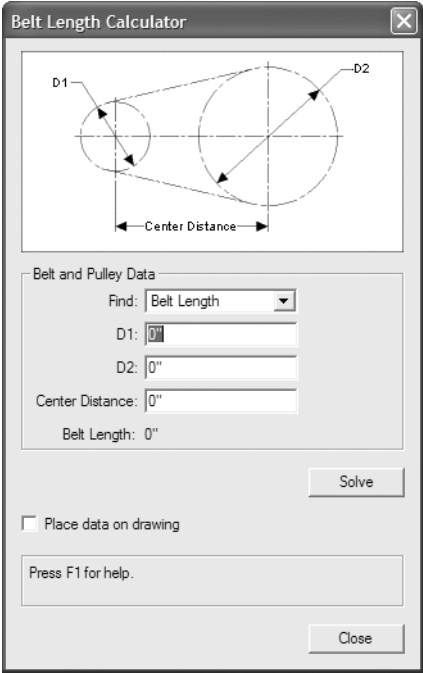
Product: Machine Design

The Belt Length calculator solves for either belt length or center distance between two pulleys.

To calculate belt length or center distance:

1. Select **Machine Design > Belt Length Calculator**.

The Belt Length Calculator dialog box opens.



Parameter	Description
Find	Select whether to calculate the Belt Length or the Center Distance between pulleys
D1	Enter the first pitch diameter
D2	Enter the second pitch diameter
Center Distance	If calculating the belt length, enter the Center Distance
Belt Length	If calculating the center distance, enter the Belt Length
Place data on drawing	Select to insert the calculated data on the drawing

2. Enter the known values, and then click **Solve**.
The belt length or center distance value displays.
If the center distance value is unknown, leave the field blank, and then click **Solve**. The minimum distance is displayed. Click **Solve** again to solve for the belt length based on the minimum center distance.
3. Click **Close** to exit the calculator.

Chain Length Calculator

Product: Machine Design

The Chain Length calculator solves for either the length of a chain or center distance between two sprockets.


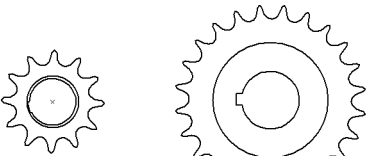
To calculate chain length or center distance:

1. Select **Machine Design > Chain Length Calculator**.

The Chain Length Calculator dialog box opens.

Parameter	Description
Chain and Sprocket Data	
Find	Select whether to calculate the Chain Length or the Center Distance between sprockets
Std.Chain No. (Pitch)	Select the pitch of the chain
N1	Enter the number of teeth of sprocket #1
N2	Enter the number of teeth of sprocket #2
Center Distance or Chain Length	If calculating the chain length, enter the Center Distance ; if calculating the center distance, enter the Chain Length
Chain Length or Center Distance	Depending on the Find selected, the chain length or center distance calculation is displayed



Parameter	Description
Placement Options	
Place chain on drawing	Inserts the continuous chain onto the drawing, based on the specified and calculated values 
Place sprockets on drawing	Inserts the two sprockets onto the drawing based on the specified and calculated value  Sprocket #1 (N1) Sprocket #2 (N2)
Group the objects	Select to group the objects when inserted onto the drawing; if deselected, the objects are ungrouped when inserted onto the drawing and are editable in the Object Info palette
Place data on drawing	When selected, inserts the calculated data onto the drawing

The **Chain Length** value can be entered based on the number of pitches multiplied by the pitch value.

2. Enter the known values, and then click **Solve**.

The chain length or center distance value displays.

If the center distance value is unknown, leave the field blank, and then click **Solve**. The minimum distance is displayed. Click **Solve** again to solve for the chain length based on the minimum center distance.

3. Select the desired placement options.
4. Click **OK**.
5. If placement options were selected, the cursor changes to a bull's eye. Click in the drawing to insert the chain and/or sprockets. If **Place data on the drawing** was selected, click again to insert the calculated data.
6. Click **OK** to close the calculator.

Control Values for Keys

Product: Machine Design

The Control Values for Keys calculator solves for the key depths of a given shaft and the key size.

To calculate the control values:

1. Select **Machine Design > Control Values for Keys**.

The Depth Control Values for Keys dialog box opens.

2. Select **Recommended Key Size** to use the recommended key size according to the ASME or ISO standard; otherwise, select **Custom Key Size** to enter custom key sizes.

Nom. Shaft Diameter (D):

☐ Recommended Key Size

☒ Square
☐ Rectangular

Key Width (W):

Key Height (H):

☐ Custom Key Size

Key Width (W):

Key Height (H):

Solution

Depth to Bottom of Key (S):

Depth to Top of Key (T):

Solve

☐ Place data on drawing

OK

Cancel

Parameter	Description
Nom. Shaft Diameter (D)	Enter the size of the shaft
Recommended Key Size	Select to use the recommended key size according to the ASME or ISO standard
Square	Select to use the recommended square key
Rectangular	Select to use the recommended rectangular key
Key Width (W)/Height (H)	Displays the dimensions of the recommended key
Custom Key Size	Select to use custom key sizes
Key Width (W)	Enter the width of the key
Key Height (H)	Enter the height of the key



Parameter	Description
Solution	
Depth to Bottom of Key (S)	Displays the dimension from the bottom of the shaft to the bottom of the key
Depth to Top of Key (T)	Displays the dimension from the bottom of the shaft to the top of the key
Place data on drawing	Select to insert the calculated data on the drawing

- 3. Click **Solve**.
The key depth values for the given shaft diameter and key size are displayed.
- 4. Click **Close** to exit the calculator.

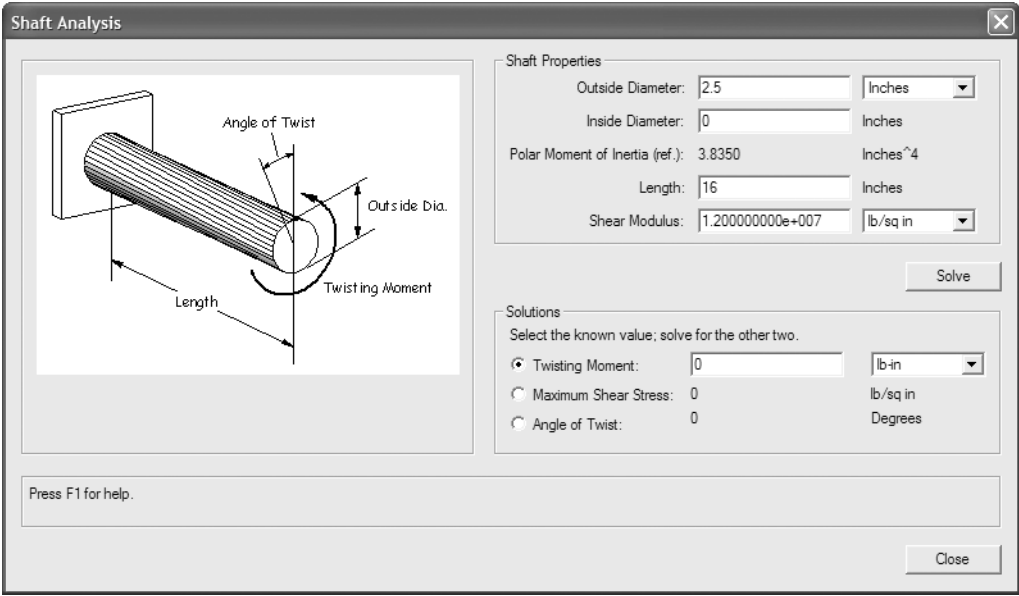
Shaft Analysis

Product: Machine Design

VectorWorks Machine Design includes a utility to analyze the results of a twisting moment being applied to a round solid or hollow shaft.

To perform the analysis:

- 1. Select **Machine Design > Shaft Analysis**.
The Shaft Analysis dialog box opens.



- 2. Enter the shaft properties and the known value in the Solutions section. To add to the list of available units, see “Adding User-defined Information to Commands” on page 560.



Parameter	Description
Shaft Analysis	Enter the shaft properties; the analysis results are based on the properties provided
Outside Diameter	Enter the outside diameter of the shaft; select the desired units from the menu
Inside Diameter	Enter the inside diameter of the shaft; enter zero for a solid shaft
Polar Moment of Inertia	Automatically calculated from the outside and inside diameters
Length	Enter the length of the shaft
Shear Modulus	Enter the value of the shear modulus; select the desired units from the menu
Solutions	Select and enter the known value
Twisting Moment	Enter the twisting moment; select the desired units from the menu
Maximum Shear Stress	Enter the maximum shear stress; the units are set by the Shear Modulus value
Angle of Twist	Enter the angle of twist in degrees

3. Click **Solve**.

The unknown values in the Solutions section are solved based on the information given.

4. Click **Close** to exit the shaft analysis calculator.

Centroid

Product: Machine Design

VectorWorks Machine Design includes a utility to calculate the centroid, or center of gravity, of a 2D shape. The utility shows the location of the centroid and can place a locus at that point. For more information, see “Engineering Properties” on page 285 in the VectorWorks Fundamentals User’s Guide.

To place a centroid locus point on an object:

1. Select the object.
2. Select **Machine Design > Centroid**.

The Centroid dialog box opens.



3. The location of the centroid is displayed. Select **Place locus at centroid** to place a locus marker at the centroid of the object.
4. Click **OK**.



If the object is moved, the locus point does not remain centroidal unless the object and locus point are grouped and then moved.

Conversion Factors

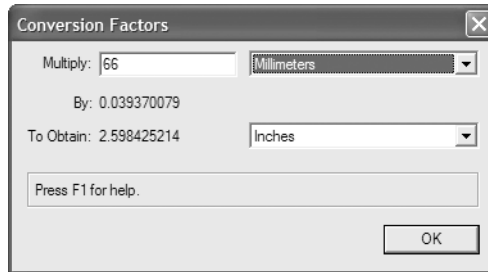
Product: Machine Design

VectorWorks Machine Design includes a conversion factor utility that provides the conversion factor between units.

To perform a conversion factor calculation:

1. Select **Machine Design > Conversion Factors**.

The Conversion Factors dialog box opens.



2. In the **Multiply** field, enter the number of units to convert. Select the original unit of measure from the **Multiply** list.
3. Select the target unit of measure from the **To Obtain** list. The conversion results display in the **To Obtain** field and the conversion factor displays in the **By** field.
4. Click **OK** to exit the utility.

Solution of Triangles

Product: Machine Design

VectorWorks Machine Design includes a utility to solve for unknown values of a triangle.

To solve for the unknown values of a triangle:

1. Select **Machine Design > Solution of Triangles**.
The Solution of Triangles dialog box opens.
2. Select the format of the known values, and then enter them in the fields below.
3. Click **Solve**. The calculated values display in the **Solution** fields.



Problem: Find the distance c for any angle A .

Given:
Crank Length = 1.500"
Arm Length = 4.625"

Find: c

Let:
Side a = Arm Length = 4.625
Side b = Crank Length = 1.500
Angle $A = 60^\circ$

Solving:
 $c = 5.189$ (Ans.)

Similarly:
A = 15 $c = 6.058$
A = 30 $c = 5.863$
A = 45 $c = 5.562$
A = 60 $c = 5.189$
A = 75 $c = 4.780$
A = 90 $c = 4.375$

Solution of Triangles

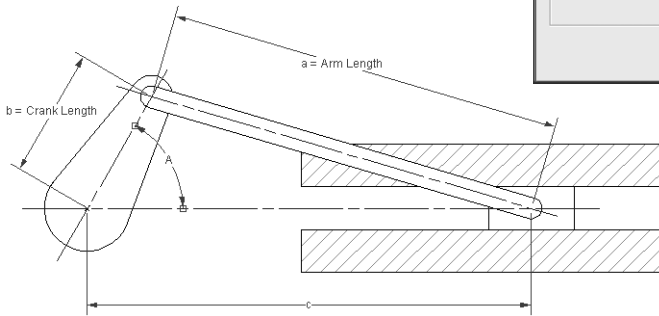
Given:

☐ Side a, Side b, Side c
☒ Side a, Side b, Angle A
☐ Side a, Angle B, Angle C
☐ Side a, Angle A, Angle B
☐ Side a, Side b, Angle C

Side a:
Side b:
Angle A:

Solution:

Side c:
Angle B:
Angle C:
Area:
Perimeter:
Inscr. Circle R:



4. Click **Close** to exit the utility.

3D Properties

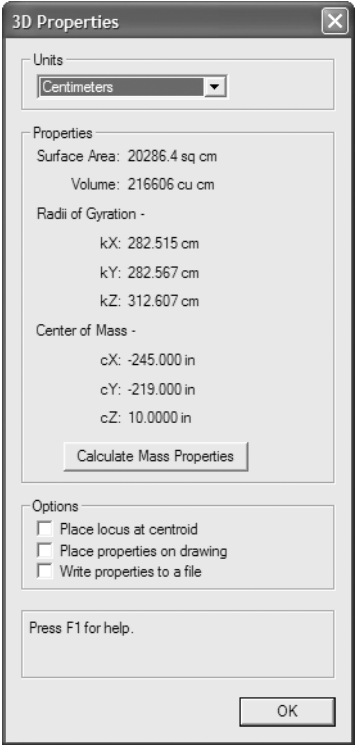
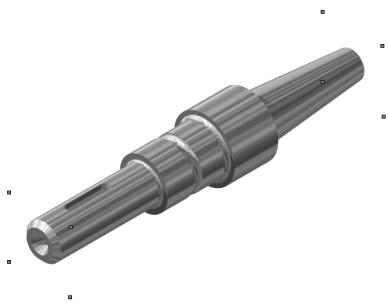
Product: Machine Design

VectorWorks Machine Design includes a utility to calculate the center of mass, radii of gyration, mass properties based on density or specific gravity, surface area, and volume of a 3D object, such as a sweep, extrude, or solid.

To display the 3D properties of an applicable object:

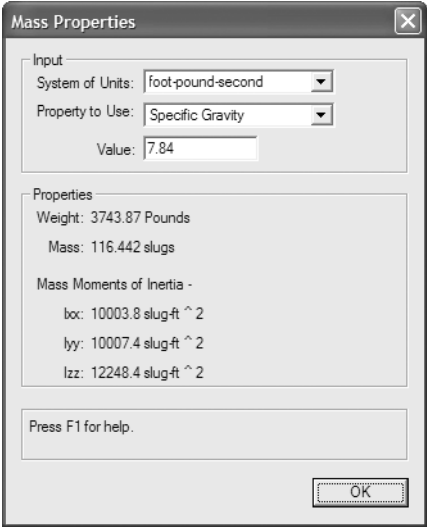
1. Select the 3D object.
2. Select **Machine Design > 3D Properties**.

The 3D Properties dialog box displays the object surface area, volume, radii of gyration, and center of mass.



Parameter	Description
Units	Select the unit for displaying values
Places locus at centroid	Select to place a locus point at the 3D center of the object
Place properties on drawing	Select to place a grouped text block containing the 3D property values on the drawing at the next mouse click
Write properties to a file	Select to create a text file containing the 3D property values

- 3. Click **Calculate Mass Properties**.
The Mass Properties dialog box displays the weight, mass, and mass moments of inertia of the object.
- 4. Specify the system of units to use when calculating the mass properties.
The mass properties calculations display.



Parameter	Description
Input	
System of Units	Select the units to use for the calculation
Property to Use	Select whether to display properties based on the density or specific gravity
Value	Enter the material density or gravity value

5. Click **OK** to return to the 3D properties dialog box.

Simple Beam

Product: Machine Design

VectorWorks Machine Design includes a design template containing the components needed to analyze a simple beam with one or two supports.

The **Simple Beam** command creates a diagram which shows reactions, stresses and deflection of a simple beam. This information is also available in two worksheets included in the template.

Simple Beam Template File

Product: Machine Design

To open the simple beam template:

1. Select **File > New**.
The Create Document dialog box opens.
2. Select **Use document template**, and choose the Simple Beam (Imperial).sta or Simple Beam (Metric).sta template.
3. Click **OK**.
The new file opens with a blank simple beam diagram.



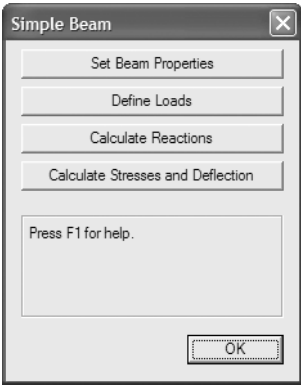
Simple Beam Properties

Product: Machine Design

To analyze a simple beam and create the diagrams:

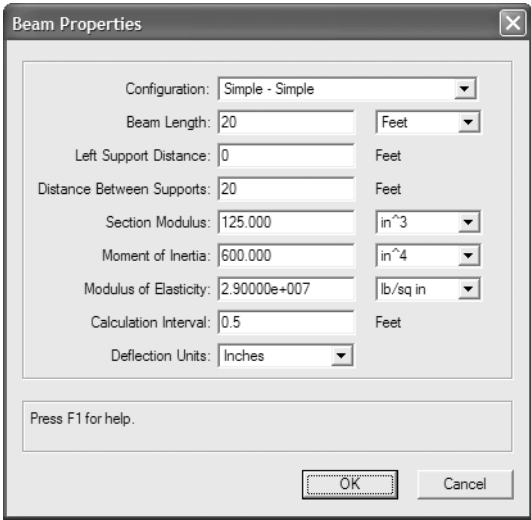
- 1. Select **Machine Design > Simple Beam**.

The Simple Beam dialog box opens.



- 2. Click **Set Beam Properties**.

The Beam Properties dialog box opens.



- 3. Specify the beam properties, and then click **OK** to close the Beam Properties dialog box. The simple beam graphic is automatically updated.

To add to the list of available units choices, see “Adding User-defined Information to Commands” on page 560.

Parameter	Description
Configuration	Select the support configuration
Beam Length	Enter the beam's length and select the units
Left Support Distance	Enter the distance of the left support from the left side of the beam
Distance Between Supports	Enter the distance between the supports
Section Modulus	Enter the section modulus value and units for the beam
Moment of Inertia	Enter the moment of inertia and units for the beam
Modulus of Elasticity	Enter the value of the modulus of elasticity and units for the beam
Calculation Interval	Enter the value at which to calculate and display stresses and other information
Deflection Units	Set the units for calculating the deflection

- Click **Define Loads** on the Simple Beam dialog box.

The Add/Remove/Change Loads dialog box opens.

Add/Remove/Change Loads

Units
 Load Units: **Pounds** Distributed Load Units: Pounds/Foot
 Length Units: Feet Moment Load Units: Pound-Feet

Load #	Type	Dist. from Left End	Load Value 1	Width	Load Value 2
<input checked="" type="checkbox"/> 1	Concentrated Load	20	7500	0	0
<input checked="" type="checkbox"/> 2	Uniformly Distributed Load	0	3000	15	0
<input type="checkbox"/> 3	Concentrated Load	0	0	0	0
<input type="checkbox"/> 4	Concentrated Load	0	0	0	0
<input type="checkbox"/> 5	Concentrated Load	0	0	0	0
<input type="checkbox"/> 6	Concentrated Load	0	0	0	0
<input type="checkbox"/> 7	Concentrated Load	0	0	0	0
<input type="checkbox"/> 8	Concentrated Load	0	0	0	0
<input type="checkbox"/> 9	Concentrated Load	0	0	0	0
<input type="checkbox"/> 10	Concentrated Load	0	0	0	0

Press F1 for help.

OK Cancel

- Select the **Load Units**.

The **Length Units** value defaults from the Beam Properties dialog box. The **Distributed Load Units** and **Moment Load Units** values default from both the **Load Units** field and Beam Properties dialog box.

- Select the checkbox next to **Load # 1**. Select the load **Type** from the list. Enter a value for each of the available fields for this load.
- Enter the necessary values for each additional load, and then click **OK**.

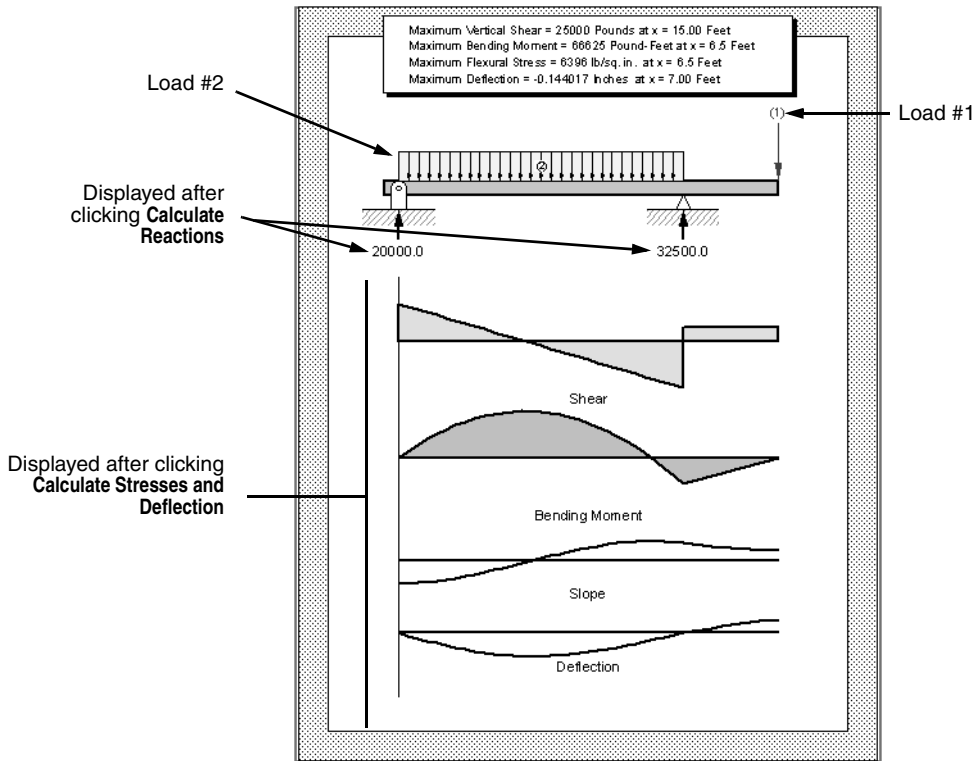
The simple beam graphic is automatically updated.



8. In the Simple Beam dialog box, click **Calculate Reactions**, and then click **Calculate Stresses and Deflection**. Click **OK**.

Shear, Bending Moment, Slope, and Deflection diagrams are created based on the information provided. The maximum values of vertical shear, bending moment, flexural stress, and deflection are calculated and displayed.

Click any of the buttons on the Simple Beam dialog box to enter new drawing parameters. The simple beam diagram is automatically updated for analysis.



Simple Beam Worksheets

Product: Machine Design

Two worksheets are supplied with the Simple Beam (Imperial).sta and Simple Beam (Metric) templates:

Worksheet	Description
Beam & Load Data	This worksheet contains the information from the Beam Properties and Add/Remove/Change Loads dialog boxes, as well as the reactions that were calculated when Calculate Reactions was clicked. This information is used to calculate the shear, bending moment, deflection, and stresses, and should not be manually edited.
Results	This worksheet contains the calculated values for shear, bending moment, stresses, slope, and deflection at the Calculation Interval specified in the Beam Properties dialog box.



The worksheets are accessed by selecting them from the **Window > Worksheets** menu. They automatically update to show the current calculations each time the **Simple Beam** command is run.

Beam and Load Data Wks						
A1						
1	< Beam Data * >					
2	Beam Length	20 Feet		2	0.083333333	
3	Left Support Type	2 Pivot				
4	Dist. from Left End	0 Feet				
5	Left Support Type	1 Simple				
6	Dist. between Supports	20 Feet				
7	Section Modulus	125.000000000 in ³		1	1.000000000	
8	Moment of Inertia	600.000000000 in ⁴		1	1.000000000	
9	Mod. of Elasticity	29000000.00000 lb/sq in		1	1.000000000	
10	Calculation Interval	0.5 Feet				
11	Deflection Units	Inches		1	1.000000000	
12						
13	< Reactions * >					
14	Reaction at Left Support	28125				
15	Moment at Left Support	0				
16	Reaction at Right Support	24375				
17	Moment at Right Support	0				
18						
19	< Load Data * >					
20	Length Units	Feet	Foot			
21	Load Units	Pounds	Pound	2	1.000000000	
22	Load #	Load Type	Description	Dist. from Left End	Value-1	Value-2
23	1	1	Concentrated Load	20	7500	0
24	2	2	Uniformly Distribute	0	3000	0

Results						
A1						
1	No. of Points =	41				
2	x	Shear (v)	Bending Moment (m)	Shearing Stress (s)	Slope (e)	Deflection (y)
3	Feet	Pounds	Pound-Feet	lb/sq in	Radians	Inches
4						
5	0.00	28125.00	0.00	0.00	-0.007269	0.000000
6	0.50	26625.00	13687.50	1314.00	-0.007241	-0.043528
7	1.00	25125.00	26625.00	2556.00	-0.007157	-0.086721
8	1.50	23625.00	38812.50	3726.00	-0.007022	-0.129258
9	2.00	22125.00	50250.00	4824.00	-0.006837	-0.170836
10	2.50	20625.00	60937.50	5850.00	-0.006607	-0.211170
11	3.00	19125.00	70875.00	6804.00	-0.006335	-0.249997
12	3.50	17625.00	80062.50	7686.00	-0.006022	-0.287068

Simple Beam Analysis

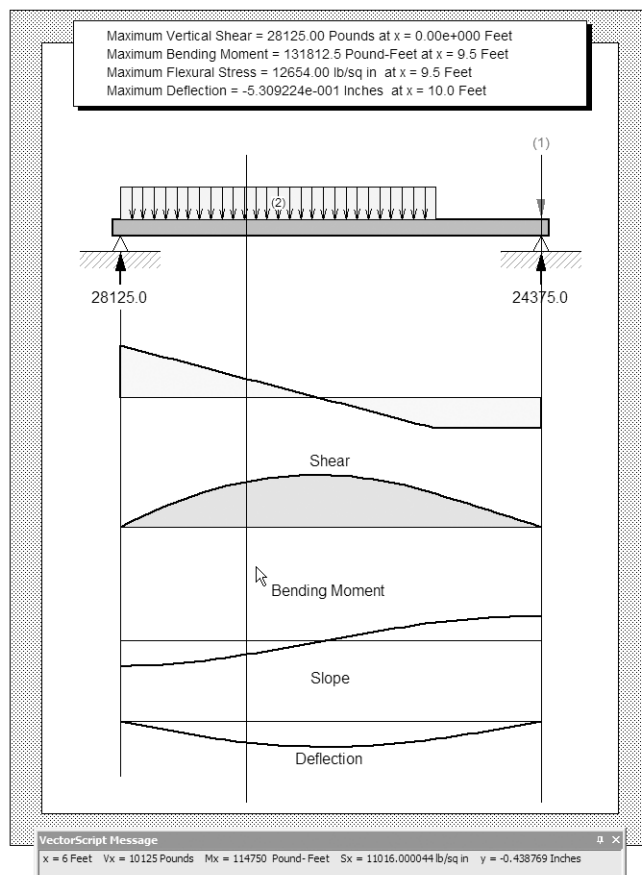
Product: Machine Design

The **Simple Beam Analysis** command opens a message box displaying the calculated values that correspond to the cursor position.

To analyze a simple beam:

1. Create the beam and diagrams as described in “Simple Beam” on page 313.
2. Select **Machine Design > Simple Beam Analysis**.

A VectorScript message dialog box opens at the bottom of the screen, displaying x (location on the beam), vx (shear), mx (bending moment), sx (shearing stress), and y (deflection) values.



The values displayed depend on the location of the cursor along the beam and the **Calculation Interval** specified in the Beam Properties dialog box.

- Click on a blank area of the drawing to stop the analysis. Close the VectorScript message dialog box.

To lock the values in the VectorScript message dialog box, click on a point along the beam. The values at this point can then be studied or written down for future analysis. Select the **Simple Beam Analysis** command again to continue checking values along the beam.

Simple Beam Calculator

Product: Architect, Landmark, Spotlight, and Machine Design

The **Simple Beam Calculator** command provides a quick way to analyze a simply-supported beam with a single load.

To use the Simple Beam Calculator:

- Select the appropriate command.

Product	Command
Architect	AEC > Framing > Simple Beam Calculator
Landmark	Landmark > AEC > Simple Beam Calculator
Spotlight	AEC > Simple Beam Calculator
Machine Design	Machine Design > Simple Beam Calculator

The Simple Beam Calculator dialog box opens.

2. Select the desired configuration, and then enter the values to be calculated.

Simple Beam Calculator

Configuration

Simple supports, concentrated load.



Input

Units: Imperial

L: 20 feet

P: 2500 pounds

a: 10 feet

w: 300 pounds/foot

E: 29000000 Lb/sq in

I: 68.95 in^4

s: 13.8 in^3

Solution

rL = 0.00000e+000 pounds

rR = 0.00000e+000 pounds

mL = 0.00000e+000 pound-feet

mR = 0.00000e+000 pound-feet

vMax = 0.00000e+000 pounds

mMax = 0.00000e+000 pound-feet

sMax = 0.00000e+000 Lb/sq in

yMax = 0.000e+000 in

at x = 0.00000e+000 feet

These are the input values.

Solve

Close

Parameter	Description
Configuration	Select the simple beam configuration to analyze
Input	
Units	Select Imperial or Metric (SI) as the displayed unit value
L	Enter the length of the beam
P	Enter the value of a concentrated load or loads
a	Enter the distance as represented by "a"
w	Enter the value per unit length of a distributed load
E	Enter the modulus of elasticity of the beam
I	Enter the moment of inertia of the beam
s	Enter the section modulus of the beam



Parameter	Description
Solution	
rL	Displays the reaction at the left support
rR	Displays the reaction at the right support
mL	Displays the bending moment at the left support
mR	Displays the bending moment at the right support
vMax	Displays the maximum vertical shear
mMax	Displays the maximum bending moment
sMax	Displays the maximum shear stress
yMax	Displays the maximum deflection
at x	Displays the point from the left end of the beam at which the maximum deflection occurs

Certain input fields may appear dimmed depending on the configuration selected.

- Click **Solve**.
The results are displayed in **Solution**.
- Click **Close** to exit the Simple Beam Calculator dialog box.

Cam Design

Product: Machine Design

VectorWorks Machine Design includes a cam design tool that can be animated and generates cam data worksheets and diagrams.

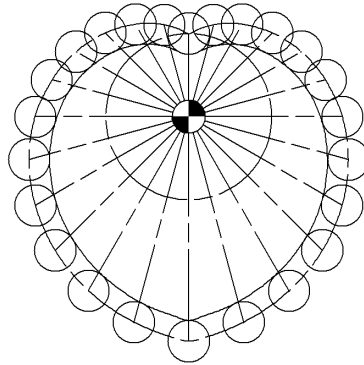
Cam Template

Product: Machine Design

To use the cam design tool, open a new file and select the Cam (Imperial).sta or Cam (Metric).sta template.

To open the cam template:

- Select **File > New**.
The Create Document dialog box opens.
- Select **Use document template**, and choose the Cam (Imperial).sta or Cam (Metric).sta template.
- Click **OK**. The new file opens, with a cam inserted by default. The file contains Cam and Diagrams layers.

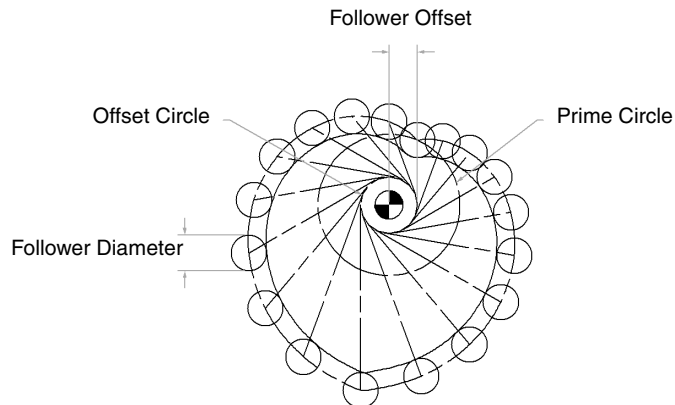


The recommended procedure to include a cam in a VectorWorks drawing is to copy and paste it into the drawing, and convert it to a group by selecting it and selecting **Modify > Convert > Convert to Group**.

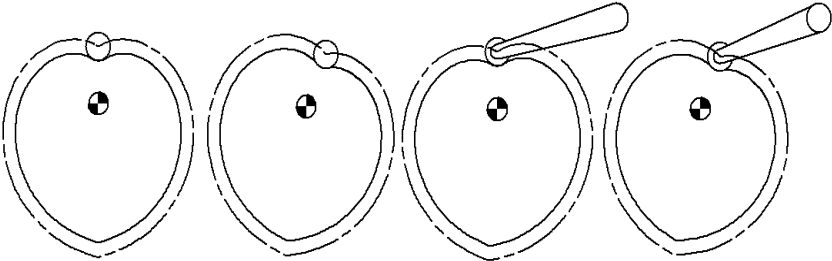
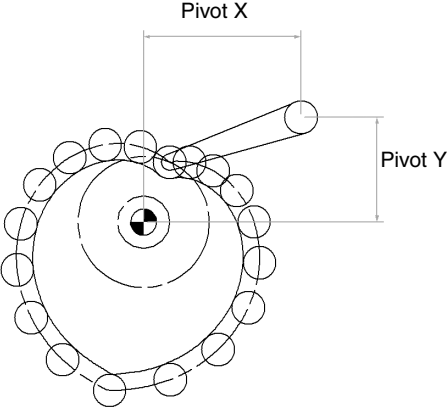
Cam Properties

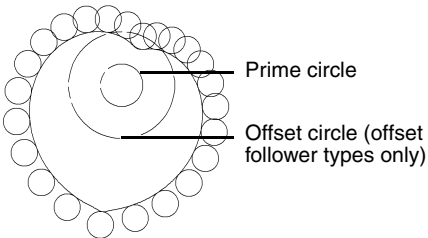
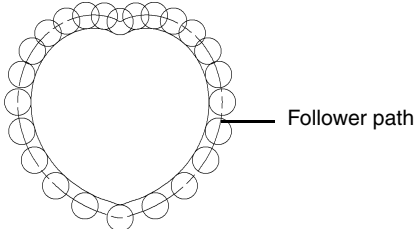
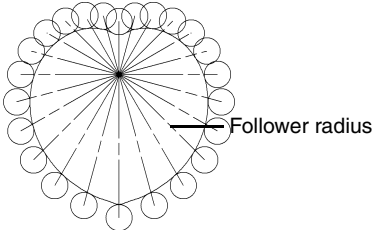
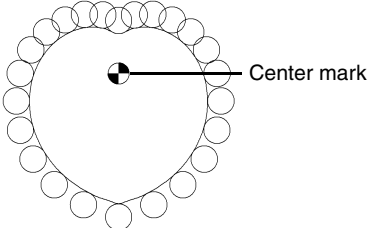
Product: Machine Design

The cam object is a point object located in the Cam (Imperial).sta and Cam (Metric).sta templates. Cam properties can be edited in the Object Info palette.



Parameter	Description
Prime Circle Radius	Specify the prime circle radius
Cam Type	Select plate or groove
Outside Dia.	Enabled if Groove is selected in Cam Type . Enter the outside diameter for groove cam types.
Cam Drawing Incr. (Deg.)	Enter the cam drawing increment, in degrees; this parameter affects how the cam is drawn. The larger the value, the less smoothly the cam is drawn.
Cam Speed (rpm)	Specify the cam rotation in revolutions per minute (rpm); this value is used to calculate the velocity and acceleration of the cam follower

Parameter	Description
Follower Type	<p>Select one of the follower types</p> <div><p>Radial Translating Offset Translating Pivot Offset Pivot</p></div>
Follower Dia.	Enter the follower diameter
Follower Offset	Enabled if Offset Translating Roller or Offset Pivot Roller is selected in Follower Type . Indicate the distance between the center of the cam and the follower center for the offset follower types.
Pivot X/Y (from cam center)	<p>Enabled if Pivot Roller is selected in Follower Type. Specify the x and y distance from the cam center to the pivot arm for pivot roller follower types.</p> <div></div>
Draw Followers	Select to display the followers
Follower Incr. (Deg.)	Determine at what angles to display followers by entering the follower increment in degrees (to show only the actual follower, enter 360). If a segment of the cam ends on an angle that does not correspond to the follower increment, the additional follower is also displayed.

Parameter	Description
Draw Prime and Offset Circles	<p>Select to display both the prime and offset circles</p> 
Draw Follower Path	<p>Select to display the follower path</p> 
Draw Radii	<p>Select to draw a radius from each follower to the center mark</p> 
Draw Center Mark	<p>Select to draw a center mark</p> 
Write Data to File	<p>Select to write the current cam data and results to a text file; by default, the file name is Cam Data.txt, and it is located in the application folder</p>
Data Incr. (Deg.)	<p>Specify the increment at which the displacement, velocity, and acceleration of the cam follower are calculated</p>



Parameter	Description
Define Cam Profile	Click to specify the profile of each cam segment; for more information, see “Defining the Cam Profile” on page 324
Animate	Click to animate the cam; for more information, see “Animating Cam Movement” on page 324
Reset Cam to 0	Click to position the cam back to zero degrees; for more information, see “Resetting the Cam to Zero Degrees” on page 325

Defining the Cam Profile

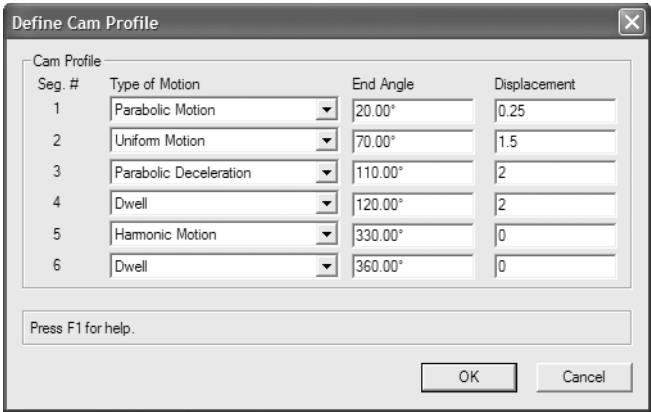
Product: Machine Design

Specify the profile of each cam segment in the Define Cam Profile dialog box.

To define the cam profile:

- 1. Select the cam, and click **Define Cam Profile** on the Shape tab of the Object Info palette.
The Enter Value dialog box opens.
- 2. Enter the number of cam segments and click **OK**.

The Define Cam Profile dialog box opens for specifying the parameters for each segment. Click **OK** to update cam diagram.



Parameter	Description
Type of Motion	Select the type of motion for each segment
End Angle	Specify the end angle for the segment
Displacement	Specify the displacement at the end point of the segment

Animating Cam Movement

Product: Machine Design

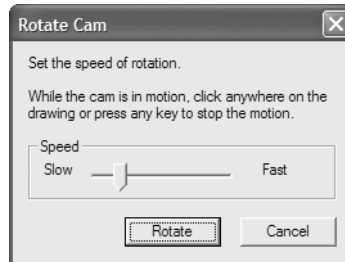
The effect of parameter changes to the cam design can be evaluated by animating the cam.



To animate the cam:

1. Select the cam, and in the Object Info palette, click **Animate**.

The Rotate Cam dialog box opens.



2. Adjust the relative speed by moving the slider along the Speed bar.
3. Click **Rotate**.

The cam rotates at the relative speed specified and the follower moves accordingly.

Since the animation is for illustrative purposes only, the **Cam Speed** parameter does not affect the animation. However, the animation is affected by the selected speed in the Rotate Cam dialog box; the larger the increment, the faster the cam appears to rotate. In addition, the computer processor speed also affects the apparent animation speed.

4. To stop the cam rotation, press any key or click anywhere on the screen.

Resetting the Cam to Zero Degrees

Product: Machine Design

Once the cam rotation stops, the position of the cam remains where it was when it was stopped. To reset the cam to zero degrees (original position), click **Reset Cam to 0** on the Shape tab of the Object Info palette.

Cam Data Worksheets

Product: Machine Design

Two worksheets are defined in the Cam (Imperial).sta and Cam (Metric).sta templates:

- **Cam Data** – lists cam data, such as rotation angle, follower displacement, velocity, and acceleration
- **Cam Properties** – lists the cam parameters from the Object Info palette

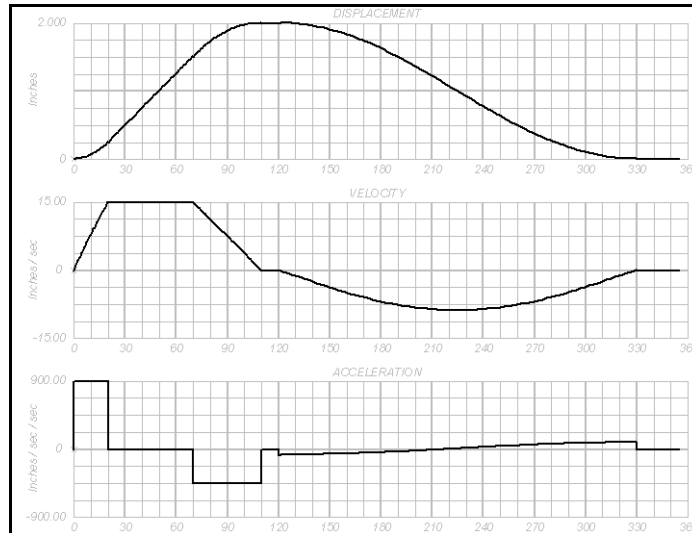
The worksheets are accessed by selecting them from the **Window > Worksheets** menu. The Cam Properties worksheet updates when the Define Cam Profile dialog box is exited (see “Defining the Cam Profile” on page 324). The Cam Data worksheet updates when the cam properties are changed.

To prevent slower performance, when changing cam properties, keep the Cam Data worksheet closed.

Cam Diagrams

Product: Machine Design

Diagrams of the cam follower displacement, velocity and acceleration are created automatically from the current cam properties.



The diagrams exist on the Diagrams layer.

To display or update the diagrams:

1. Select **Machine Design > Draw Cam Diagrams**.
2. The cam diagrams are displayed. To return to the cam, select **Cam** from the Views menu.

Geneva Mechanism

Product: Machine Design

VectorWorks Machine Design includes a Geneva mechanism device that produces intermittent rotational motion of the driven part (index plate) while the driver rotates at a constant speed.

Geneva Mechanism Template

Product: Machine Design

The Geneva mechanism is available in the Geneva Mechanism (Imperial).sta and Geneva Mechanism (Metric).sta template files.

To open the Geneva mechanism template:

1. Select **File > New**.
The Create Document dialog box opens.
2. Select **Use document template**, and choose the Geneva Mechanism (Imperial).sta or Geneva Mechanism (Metric).sta template.
3. Click **OK**.

The new file opens with a Geneva mechanism inserted by default.

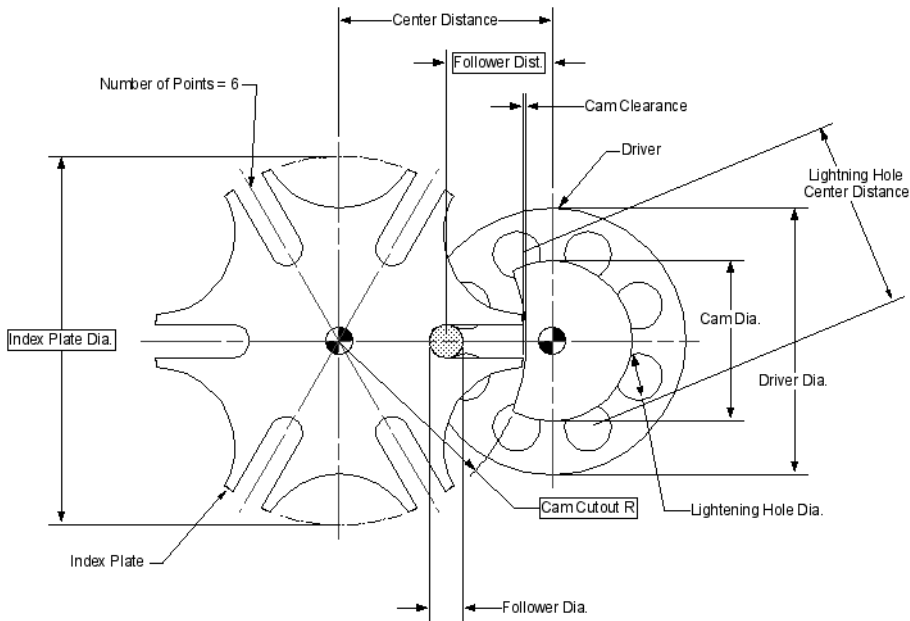
The recommended procedure to include a Geneva mechanism in a VectorWorks drawing is to copy and paste it into the drawing and convert it to a group by selecting it and selecting **Modify > Convert > Convert to Group**.



Geneva Mechanism Properties

Product: Machine Design

The Geneva mechanism's properties can be edited in the Object Info palette.



Parameter	Description
Number of Points	Enter the number of points on the index plate
Center Distance	Enter the distance between the center of the index plate and the driver
Follower Dia.	Enter the follower diameter
Cam Clearance	Enter the cam clearance
Cam Dia.	Enter the cam diameter
Driver Dia.	Enter the driver diameter
Index Plate Dia. (Ref.)	Displays the diameter of the index plate
Follower Dist. (Ref.)	Displays the follower distance
Cam Cutout Radius (Ref.)	Displays the cam cutout radius
Lighting Holes	Select to place lighting holes on the driver
Number	Enter the number of lighting holes
Diameter	Enter the diameter of the lighting holes
Center Distance	Enter the distance between the center of the lighting holes about the driver
Show Center Marks	Select to place center mark symbols on the index plate and cam/driver
Show Center Lines	Select to draw the index plate and cam/driver with center lines



Animating Geneva Mechanism Movement

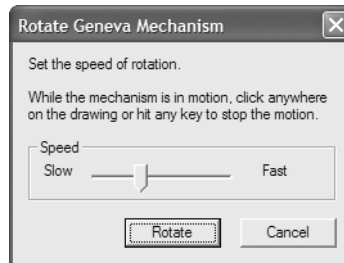
Product: Machine Design

The effect of parameter changes to the Geneva mechanism design can be evaluated by animating the Geneva mechanism.

To animate the Geneva mechanism:

1. Select the Geneva mechanism, and in the Object Info palette, click **Animate**.

The Rotate Geneva Mechanism dialog box opens.



2. Adjust the relative speed by moving the slider along the Speed bar.
3. Click **Rotate**.

The Geneva mechanism rotates at the relative speed specified.

4. To stop the Geneva mechanism rotation, press any key or click anywhere on the screen.

Resetting the Geneva Mechanism to Zero Degrees

Product: Machine Design

Once the mechanism rotation stops, the position of the mechanism remains where it was when it was stopped. To reset the mechanism to zero degrees (original position), click **Reset Mechanism to 0** on the Shape tab of the Object Info palette.

Drawing Notation

Error/Revision Management Using Redlines

Product: Architect, Landmark, Spotlight, and Machine Design

The **Redline** tool and redline commands help control errors and revisions by providing the ability to annotate drawings with redlines and sketches, and to keep track of redline objects and any changes, corrections, and revisions that occur in a drawing.

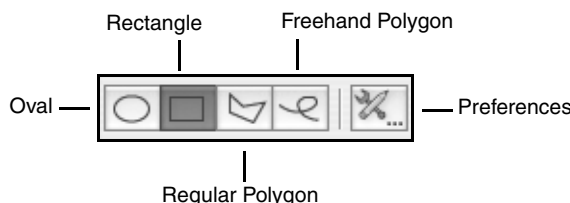
The **Redline** tool and redline commands are compatible with redlines drawn in previous versions and will correctly handle both types of redlines.

Redline Tool

Product: Architect, Landmark, Spotlight, and Machine Design

Use the **Redline** tool to create Redline objects, which are graphical time-stamped change requests on the drawing.

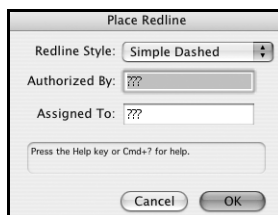
Five modes are available.

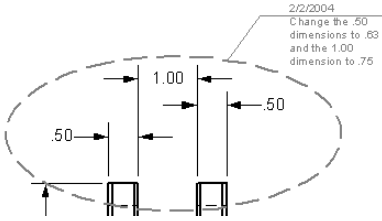
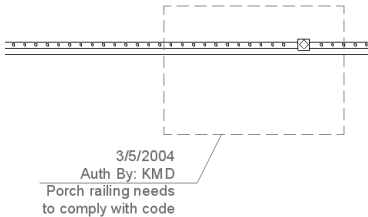


To redline an object or area:

1. Click the **Redline** tool from the Dims/Notes tool set, and select the desired drawing mode from the Tool bar.
2. Click **Redline Preferences** from the Tool bar to specify the **Redline** tool parameters for this session.

For information on drawing freehand, ovals, polygons, and rectangles, see “Creating 2D Objects” on page 183 in the VectorWorks Fundamentals User’s Guide.

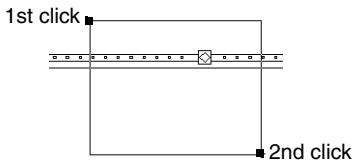


Parameter	Description
Redline Mode	<p>Creates a redline object using an oval, rectangle, polygon, or freehand drawing</p>  <p>Example of oval redline mode</p>
Redline Style	<p>Select the style to apply to the redline object</p> <ul style="list-style-type: none">• Cloud - applies a cloud style• Radius - applies corner smoothing with a solid line style• Radius Dashed - applies corner smoothing with a dashed line style• Simple - applies a simple solid line with no smoothing• Simple Dashed - applies a simple dashed line with no smoothing  <p>Example of simple dashed redline style</p>
Authorized by	<p>Specifies the default name or initials of the person who authorized the change; this name is used for the redlines created in this file</p>
Assigned to	<p>Specifies the default name or initials of the person who has been assigned the task; this name is used for the redlines created in this file</p>

3. Click **OK**. Draw the redline around the area to be revised or corrected.

Based on the selected creation method, the appropriate VectorWorks tool creates the redline. This allows the use of SmartCursor cues, object snapping, and boomerang mode when drawing redlines.

Draw redlines on the design layer where the error occurred or where the desired revision is to be performed.



Rectangle mode depicted

4. The Place Redline dialog box opens. Enter the redline information and authorization.



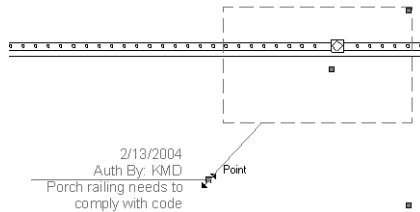
The 'Place Redline' dialog box contains the following fields and options:

- Redline Notation:** A text area containing 'Porch railing needs to comply with code'.
- Authorized By:** A text field containing 'SC'.
- Assigned To:** A text field containing 'IJD'.
- ☐ **Attach the current selection as a sketch.**
- A small text box with the instruction: 'Press the Help key or Cmd+? for help.'
- Buttons:** 'Cancel' and 'OK' at the bottom right.

Parameter	Description
Redline Notation	Enter text describing the redline condition (and/or specifying the recommended action)
Authorized By	Specifies the name or initials of the person who authorized the change; this originates from the redline preferences and is retained with the file
Assigned To	Specifies the name or initials of the person who has been assigned the task; this originates from the redline preferences and is retained with the file
Attach the current selection as a sketch	Attaches any current selected item(s) to the redline as a symbol to provide more information about the redline (see "Attaching a Sketch to a Redline" on page 331 for more information)

5. Click **OK**.

The Redline object is drawn as specified, surrounding the drawing condition to be corrected. The date of the redline is automatically provided. Position redline text by clicking on the tag control point and dragging the tag to the desired location.



Rectangle mode with control point depicted

Attaching a Sketch to a Redline

Product: Architect, Landmark, Spotlight, and Machine Design

One or more selected objects can be attached to a redline object to illustrate the redline comments. The object to be attached as a sketch must be selected before drawing the redline; this process converts the selected object to a sketch symbol and places it in a Redline Sketches symbol folder saved with the file.



To attach a selected object as a redline sketch:

1. Select the object to be converted to a sketch.
2. Click the **Redline** tool from the Dims/Notes tool set, and draw the redline as described in “Redline Tool” on page 329.

The Place Redline dialog box opens.



3. Select **Attach the current selection as a sketch** and click **OK**.
4. The selection is converted to a symbol that is attached to and moves with the redline object.

The sketch can be hidden by deselecting **Show Sketch** in the Object Info palette.

Redline Parameters

Product: Architect, Landmark, Spotlight, and Machine Design

The parameters of one or more selected redline objects can be edited in the Object Info palette.

Parameter	Description
Redline Style	Select a redline style from the list (see “Redline Tool” on page 329 for a description of the styles)
Tag Alignment	<p>Specifies the alignment of the redline tag:</p> <ul style="list-style-type: none">• Auto: Justifies the text away from the center of the redline object• Left: Places the text to the left of the tag control point and right-justifies the text• Right: Places the text to the right of the tag control point and left-justifies the text <div><div><div>2/4/2004 Auth: By: SC Attn: KF Reverse the order of the color gels</div><div>Tag control point</div><div><div>R 77 9</div><div>R 26 8</div><div>R 12 7</div></div><div>Left alignment</div></div><div><div>2/4/2004 Auth: By: SC Attn: KF Reverse the order of the color gels</div><div><div>R 77 9</div><div>R 26 8</div><div>R 12 7</div></div><div>Right alignment</div></div></div>



Parameter	Description
Picked Up	Selecting Picked Up indicates that the redline has been resolved or “picked up.” The redline color changes to yellow and the pick-up date is automatically assigned. Deselect to indicate that a previously resolved redline has been restored.
Show Authorizer	Select to display the Authorized By information on the redline
Authorized By	Displays the initials or name of the person authorizing the change; can be edited
Show Assignee	Select to display the Assigned To information on the redline
Assigned To	Displays the initials or name of the person assigned to correct the condition; can be edited
Show Sketch	Select to display the sketch attached to the redline (if any)
Creation Date	Displays the redline creation date
Pick Up Date	Displays the redline pick-up date
Notation	Redline comment information is displayed and can be changed
Tag Length	Controls the length of the line separating the redline comments from the redline information, and changes the redline comment text wrapping

Show or Hide Redlines

Product: Architect, Landmark, Spotlight, and Machine Design

Over the course of a project, most drawings receive a large number of redlines, which, if left visible, would clutter the drawing. Select **Text > Redlines > Show or Hide Redlines** to toggle redline visibility.

All Redline objects are drawn in the Redlines class. If redlines are hidden when a new redline is drawn, the Redlines class visibility is automatically turned on and all the redlines become visible. Use the **Show or Hide Redlines** command to hide them again.

Pick up Redline

Product: Architect, Landmark, Spotlight, and Machine Design

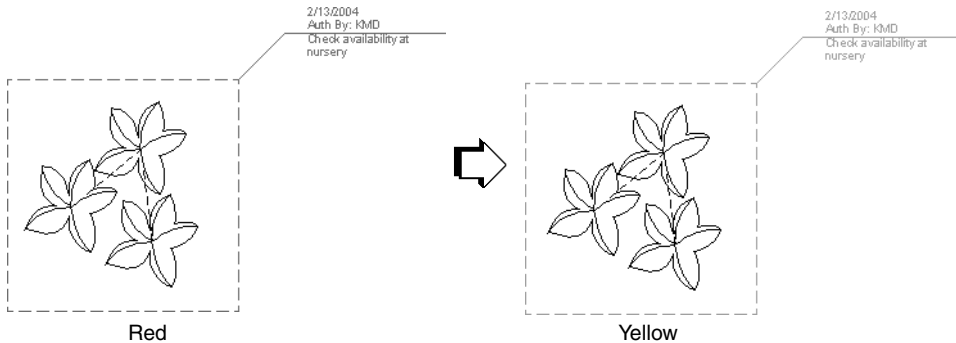
Once the change or correction indicated by the redline has been resolved, the redline needs to be “picked up” or changed to a closed state.

To pick up a redline:

1. Select the redline object or objects.
2. Select **Text > Redlines > Pick Up Redline**.

[Right-click on the redline and select **Pick Up Redline** from the context menu.](#)

This sets the status of all selected redline objects to closed. The redline color changes from red to yellow, and the pick-up date is set.



Redlines can be picked up by selecting one or more redline objects and selecting **Picked Up** in the Object Info palette.

Restore Redline

Product: Architect, Landmark, Spotlight, and Machine Design

A selected closed redline object can be restored to an open status. A redline object may need to be restored when a revision has not been performed satisfactorily.

To change the state of a closed redline back to open:

1. Select the redline object or objects.
2. Select **Text > Redlines > Restore Redline**.

[Right-click on the redline and select **Restore Redline** from the context menu.](#)

The selected redlines are returned to an open status and the redline color changes back to red. The original redline creation date is displayed. Redlines can also be restored by selecting one or more redline objects and deselecting **Picked Up** in the Object Info palette.

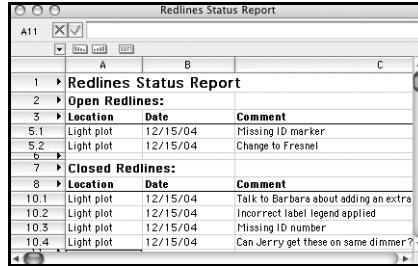
Redline Status Worksheet

Product: Architect, Landmark, Spotlight, and Machine Design

The redline worksheet lists the status of all redlines in the current file. The Open Redlines section lists all redlines that require resolution; the Closed Redlines section shows all resolved redlines. For each redline item, the design layer location, date, and redline comment displays.

To create or open the redline status worksheet:

1. Select **Text > Redlines > Create Redline Status WS**.
2. The Redlines Status Report worksheet is created and opens automatically. It is added to the **Window > Worksheets** menu and is listed in the Resource Browser.



Redlines, both open and closed, are listed in the report even if they are hidden in the current view of the file.

Creating Drawing Borders

Product: Architect, Landmark, Spotlight, and Machine Design

Drawing borders are pre-formatted borders for project viewports or views; they can be added to a file in various ways.

Product	Drawing Border Creation Method	Reference
Architect and Landmark (using drawing standards)	Document Setup or Create Standard Viewports command	"The Setup Commands" on page 2
Architect and Landmark (not using drawing standards)	Drawing Border tool from Dims/Notes tool set	"Adding a Drawing Border" on page 458 in the VectorWorks Fundamentals User's Guide
Spotlight	Drawing Border tool from Dims/Notes tool set	"Adding a Drawing Border" on page 458 in the VectorWorks Fundamentals User's Guide
Machine Design	<ul style="list-style-type: none">Drawing Setup commandDrawing Border tool from Dims/Notes tool set	<ul style="list-style-type: none">"Machine Design Drawing Setup" on page 20"Adding a Drawing Border" on page 458 in the VectorWorks Fundamentals User's Guide

The VectorWorks Design Series products use the **Drawing Border** tool that is part of VectorWorks Fundamentals, but with expanded capabilities. Additional default resources and parameters are available only in the Design Series products.

Various types of drawing borders can be created, including ConDoc, GSA, AEC, ASME, and ISO formats and their associated title blocks, revision blocks, tolerance blocks, projection blocks, and issue and revision data.

When creating custom title blocks, special considerations apply for the title block to associate with the Issue Manager. See "Adding a Drawing Border" on page 458 in the VectorWorks Fundamentals User's Guide.

Drawing Border Properties

Product: Architect, Landmark, Spotlight, and Machine Design

Whether placed by a drawing setup command or by the **Drawing Border** tool, drawing border properties are displayed in the Object Info palette, where they can be edited.

Most of the drawing border properties are documented in “Adding a Drawing Border” on page 458 in the VectorWorks Fundamentals User’s Guide. Only the parameters which apply to VectorWorks Design Series products are described here.

Parameter	Description																		
Title Block	<p>Opens the Import Title Block dialog box, for selecting a title block symbol to insert (see “Adding a Title Block” on page 463 in the VectorWorks Fundamentals User’s Guide). ASME title blocks are required to insert a tolerance or projection block.</p> <div><table><tr><td>DESIGNED BY J. M. Designer</td><td colspan="4" rowspan="4"><div>TITLE Mounting Bracket</div></td></tr><tr><td>DRAWN BY J. M. Drafter</td></tr><tr><td>CHECKED BY J. M. Checker</td></tr><tr><td>APPROVED BY J. M. Approver</td></tr><tr><td>OTHER APPROVALS</td><td>SIZE C</td><td>CAGE CODE</td><td>DRAWING NO. P - 01234222</td><td>REV 2</td></tr><tr><td>CAD FILE NAME Mounting Bracket</td><td>SCALE 1:2</td><td>EST. WGT</td><td>SHEET 1</td><td>OF 1</td></tr></table></div> <p>Additional default title blocks are available with the Designer Series products; for US Arch title blocks, information is linked to the Issue Manager.</p>	DESIGNED BY J. M. Designer	<div>TITLE Mounting Bracket</div>				DRAWN BY J. M. Drafter	CHECKED BY J. M. Checker	APPROVED BY J. M. Approver	OTHER APPROVALS	SIZE C	CAGE CODE	DRAWING NO. P - 01234222	REV 2	CAD FILE NAME Mounting Bracket	SCALE 1:2	EST. WGT	SHEET 1	OF 1
DESIGNED BY J. M. Designer	<div>TITLE Mounting Bracket</div>																		
DRAWN BY J. M. Drafter																			
CHECKED BY J. M. Checker																			
APPROVED BY J. M. Approver																			
OTHER APPROVALS	SIZE C	CAGE CODE	DRAWING NO. P - 01234222	REV 2															
CAD FILE NAME Mounting Bracket	SCALE 1:2	EST. WGT	SHEET 1	OF 1															
Use Revision Block	Adds a revision history block to the drawing border																		
Rev. Block Position	Specifies the revision block location relative to the drawing border																		
Rev. Block Height	Specifies the height of the revision block																		
Rev. Block Width	Specifies the width of the revision block																		
Use Tolerance Block	<p>For ASME drawing borders, adds a tolerance specifications block to the title block. The tolerance block creates a legend containing the drawing tolerances, including both angular and linear accuracy.</p> <div><p>UNLESS OTHERWISE SPECIFIED DIM ARE IN INCHES TOL ON ANGLE ± .25° 2 PL ± .01 3 PL ± .005 INTERPRET DIM AND TOL PER ASME Y14.5M-1994</p></div> <p>To edit the title block, see “Editing a Tolerance Block” on page 338.</p> <p>Tolerance block details are text objects, and do not affect the actual dimensional tolerances.</p>																		
Use Projection Block	For ASME title blocks, adds a projection block area to the title block; specify the First Angle or Third Angle projection																		
Add Parts List (Machine Design required)	Adds a parts list to the title block (this is intended for ASME title blocks, but can be added to any title block). Information from detail bubbles populates the parts list; see “Creating Detail Bubbles” on page 359. If a parts list worksheet does not yet exist, it is created.																		



Parameter	Description
Edit Title Block	Opens the Edit Title Block dialog box, for specifying the title block information. Depending on the selected title block, different fields and tabs are available. ASME title blocks include a tolerance tab, for editing the tolerance block information. US Arch title blocks include Project and Sheet tabs; information is entered from the Issue Manager but can be edited manually. Any title block that contains a Project tab can have the same Project tab information applied to all title blocks in the file by selecting Apply these values to all title blocks .
Edit Revision Data	Opens the Edit Revision Data dialog box, for specifying revision information and format (see “Editing Revision Block Data” on page 337)
Edit Issue Data	Opens the Edit Issue Data dialog box, for specifying issue data on US Arch title blocks; see “Editing Issue Data” on page 339

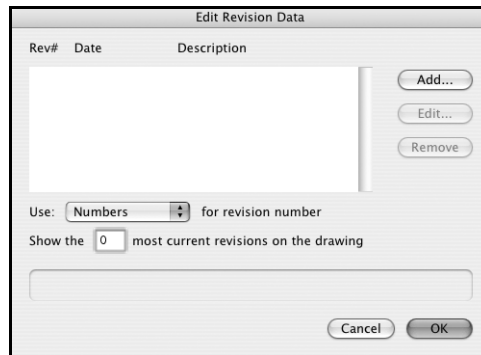
Editing Revision Block Data

Product: Architect, Landmark, Spotlight, and Machine Design

Selecting **Use Revision Block** from the Object Info palette of a selected drawing border adds a revision block to the drawing border. The revision block parameters (such as height and width) are specified from the Object Info palette, but the actual revisions are specified in a separate dialog box.

To add or edit revision block data:

1. From the Object Info palette of a selected drawing border with a revision block, click **Edit Revision Data**.
2. The Edit Revision Data dialog box opens.



Parameter	Description
Revisions list	Lists the current revisions displayed in the revision block
Add	Opens the Add New Revision dialog box, for adding a revision to the block
Edit	Opens the Edit Existing Revision dialog box, for editing the currently selected revision
Remove	Deletes the currently selected revision
Use	Select Letters or Numbers for the Rev# format
Show the	Specifies how many revisions to display in the revision block, from recent to oldest



- 3. Click **Add** to create a revision entry.

The Add New Revision dialog box opens. Specify the revision data.

Add New Revision

Revision Number: 1

Revision Date: 5/2/07

Approval: AD

Zone: C6

Description:

Removed columns from living room

Cancel

OK

- 4. Click **OK** to return to the Edit Revision Data dialog box. Existing revisions can also be edited or deleted.
- 5. Click **OK**. The revision block is updated.

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
C2	1	Removed columns from living room	8/31/05	AD

Editing a Tolerance Block

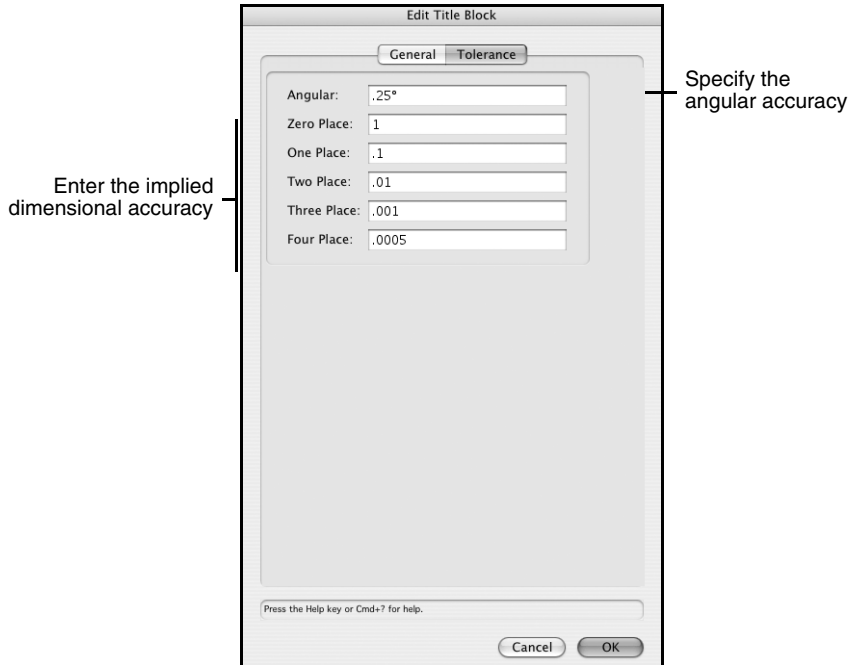
Product: Architect, Landmark, Spotlight, and Machine Design

When an ASME title block is added to a drawing border, an area for tolerance specifications data is included. The tolerance data is specified in a separate dialog box.

To edit the tolerance block data:

- 1. Select the drawing border from the drawing area.
- 2. In the Object Info palette, click **Edit Title Block**.

The Edit Title Block dialog box opens. Click the Tolerance tab.



3. Enter the angular and dimensional tolerances to be displayed in the tolerance block.

Only the angular accuracy, two place, and three place parameters apply to the ASME tolerance block. The remaining tolerances might apply to a custom title block.

4. Click **OK**.

The tolerance block is updated with the new information.

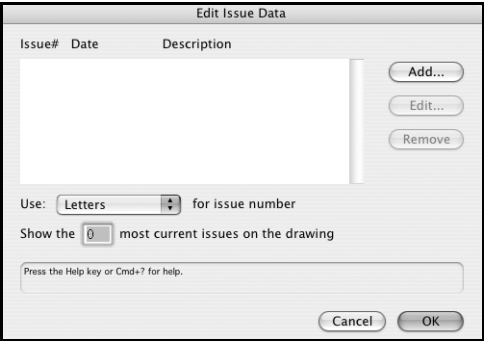
Editing Issue Data

Product: Architect, Landmark, Spotlight, and Machine Design

When a US Arch title block is added to a drawing border, an area for issue data is included. The issue notes are specified in a separate dialog box.

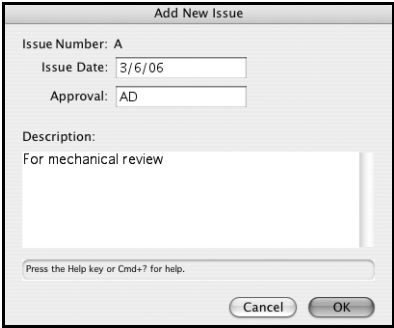
To add or edit issue data:

1. From the Object Info palette of a selected drawing border with a revision block, click **Edit Issue Data**.
2. The Edit Issue Data dialog box opens.



Parameter	Description
Issue list	Lists the current issues displayed in the title block
Add	Opens the Add New Issue dialog box, for adding an issue note
Edit	Opens the Edit Existing Issue dialog box, for editing the currently selected issue note
Remove	Deletes the currently selected issue note
Use	Select Letters or Numbers for the Issue# format
Show the	Specifies how many issues to display in the title block, from recent to oldest

3. Click **Add** to create an issue entry.
The Add New Issue dialog box opens. Specify the issue note.



4. Click **OK** to return to the Edit Issue Data dialog box. Existing issue notes can also be edited or deleted.
5. Click **OK**. The issue data is updated.

B	9/1/05	For permit
A	9/1/05	For mechanical review
No.	Date	Issue Notes



Creating a Custom Title Block in the Design Series

Product: Architect, Landmark, Spotlight, and Machine Design

Creating a custom title block in the Design Series products requires additional steps, if the custom title block is to be used with the Issue Manager (see “The Issue Manager” on page 412), or contain issue fields or revision fields.

For information on creating a custom title block, see “Creating a Custom Title Block” on page 464 in the VectorWorks Fundamentals User’s Guide. Only the procedures which apply to VectorWorks Design Series products are described here.

When creating the record format to attach to the custom title block, fields linked to the Issue Manager require special prefixes or suffixes. If creating issue or revision fields, special text strings are added to the title block design.

Title Block Area	Prefix Required
Issue Manager	<p>If creating a US Arch-style title block with issue data linked to the Issue Manager:</p> <ul style="list-style-type: none">• Project fields (which contain the same value in all drawing set title blocks) must be prefaced with P_ (example: P_Project Title)• Sheet fields (which contain different values in different drawing set title blocks) must be prefaced with S_ (example: S_Sheet Scale)• Multi-line text fields (which contain multiple lines of text) must be appended with a # (pound sign) (example: P_Drawing Title#)
Issue Data	<p>To add issue fields, such as issue number, date, note, and/or approvals to a drawing border which can be populated by the Issue Manager and edited manually, create special text fields with text strings to represent the issue fields and place these fields in the title block. The issue history is a property of the drawing border, not the title block, so a title block is not required to enter issue data.</p> <ul style="list-style-type: none">• Issue note :iNote• Issue number :iNo• Issue date :iDate• Issue approval :iAppr <p>The text fields can have any justification, and should have word wrap on. The vertical alignment must be set to Top for the issue text to flow down, and to Bottom for the issue text to flow up.</p> <p>To enter or edit issue text, click Edit Issue Data from the Object Info palette of a selected drawing border (see “Editing Issue Data” on page 339), or use the Issue Manager.</p>



Title Block Area	Prefix Required
Revision Data	<p>To add revision fields, such as revision number, date, zone, and/or approvals to a drawing border, create special text fields with text strings to represent the revisions and place these fields in the title block. The revision history is a property of the drawing border, not the title block, so a title block is not required to enter revision data.</p> <ul style="list-style-type: none">• Revision note :rNote• Revision number :rNo• Revision date :rDate• Revision zone :rZone• Revision approval :rAppr <p>The text fields can have any justification, and should have word wrap on. The vertical alignment must be set to Top for the revision text to flow down, and to Bottom for the revision text to flow up.</p> <p>To add revision text to a drawing border, select Use Revision Block from the Object Info palette of a selected drawing border. To enter or edit the revision text, click Edit Revision Data (see “Editing Revision Block Data” on page 337).</p>

Construction Documents

Product: Architect

VectorWorks Architect includes powerful tools for developing construction documents. For the typical architectural project, this involves detailing, annotating, and dimensioning.

A library of flexible detailing objects is provided for drawing well-delineated detail graphics, creating detail sheets, and blocking out detail views. In addition, VectorWorks Architect provides an automated method for dimensioning exterior walls and creating a drawing list index. Special considerations apply when using workgroup referencing with Architect.

Detail Drawings

Product: Architect and Landmark

To effectively create detail drawings with VectorWorks Architect, using the **Create Standard Viewports** command is recommended to automatically create the necessary detail sheet layers. Details can be effectively presented and annotated when using VectorWorks viewport feature.

For a complete description of viewports, see “Presenting Drawings with Sheet Layer Viewports” on page 609 in the VectorWorks Fundamentals User’s Guide.

When using viewports:

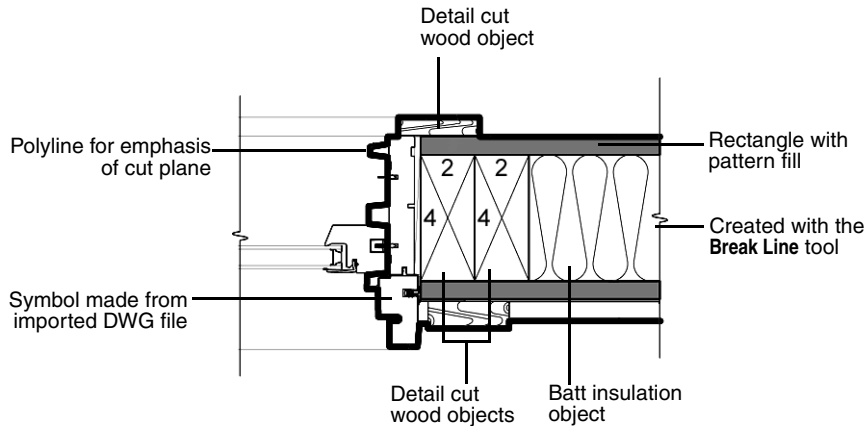
- The **Create Standard Viewports** command can automatically create the necessary detail sheet layer.
- Because sheet layer viewports can be easily copied and pasted, duplicate the floorplan viewports, and then copy them to the detail sheet layer. They can be rescaled and cropped to create plan detail drawings.
- When annotating a sheet layer viewport, keep in mind that “annotations” refer to any 2D element, including detail objects.



Using Detail Objects

Product: Architect and Landmark

Once the sheet layers and geometric basis for a detail have been defined, use the included detail objects from the 00_Detailing.vwx library and the Detailing tool set to refine the detail drawing. Using detail objects can significantly reduce the amount of time necessary to make an accurate representation of an object. Architect detail objects can be used in conjunction with other VectorWorks objects, like groups, symbols, and primitives like rectangles and polylines. The following illustration shows several examples of each, used in conjunction to create a fully-developed detail form.



VectorWorks Architect and Landmark also include two tools to facilitate the creation of linear materials (such as plywood, gypsum board, and stucco) and repetitive building elements (like shingles and siding) which are common in detail drawings.

Creating Linear Material Details


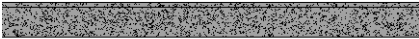






Product: Architect and Landmark

The **Linear Material** tool draws a standard representation of sheet building materials along a path. Create linear material details either by using the **Linear Material** tool, or by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).

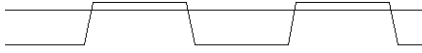



To draw linear material details:

1. Click the **Linear Material** tool from the Detailing tool set.
2. If desired, set the linear material attributes in the Attributes palette (fill style, pen style, and line style). The linear material attributes can also be specified after creation.
3. Click to begin drawing the linear material detail polyline. Click the mouse at the start point to complete a closed polyline, or double-click the mouse to create an open polyline. For more information on polylines, see “Polyline Tool” on page 212 in the VectorWorks Fundamentals User’s Guide.
4. The linear material parameters can be edited in the Object Info palette.

Parameter	Description
Offset	Sets the distance of the object baseline from the drawn path
Type	Select the kind of linear material to draw; available parameters depend on the type of linear material selected
Board (generic)	Creates two polyline edges; the space between the edges can be specified with a fill color from the Attributes palette 
Gyp. Bd. (detail)	Creates a board object with an additional offset line and fills the space with a stipple pattern 
Plaster/Stucco	Draws an irregular top line for the object 
Plaster/Stucco (detail)	Draws an irregular top line for the object, and fills the space with a stipple pattern 
Plywood/OSB	Creates a board object with evenly spaced parallel lines 
Plywood/OSB (detail)	Creates a plywood object with additional diagonal slashes 
Built-up Roof	Draws a filled band over a coarse, oval-shaped stipple pattern 
Corrugated Deck	Draws a zig-zag deck pattern 



Parameter	Description
Corrugated Deck w/fill	Creates a corrugated deck and fills the depth of the deck 
Corrugated Deck w/fill (detail)	Creates a corrugated deck, fills the depth of the deck, and adds a stipple pattern 
Thickness	Specifies the thickness of the linear material
Pitch	For corrugated deck details, determines the corrugation spacing
Corrugation Depth	For corrugated deck details, determines the corrugation height
Closure	Specifies which sections of the linear material object should have a closed end (does not apply to Built-up Roof details)
Density	For details with stipple patterns, sets the stipple density
Polyline parameters	Edits the linear detail path polyline

Linear material details with stipple patterns may require a significant amount of time to draw.

Create a plug-in symbol from a linear material object (see “Creating New Symbols” on page 156 in the *VectorWorks Fundamentals User’s Guide*) with **Convert to Plug-in** selected. Activate the symbol in the Resource Browser to draw the linear material detail with the saved symbol parameters.

Creating Repetitive Unit Details

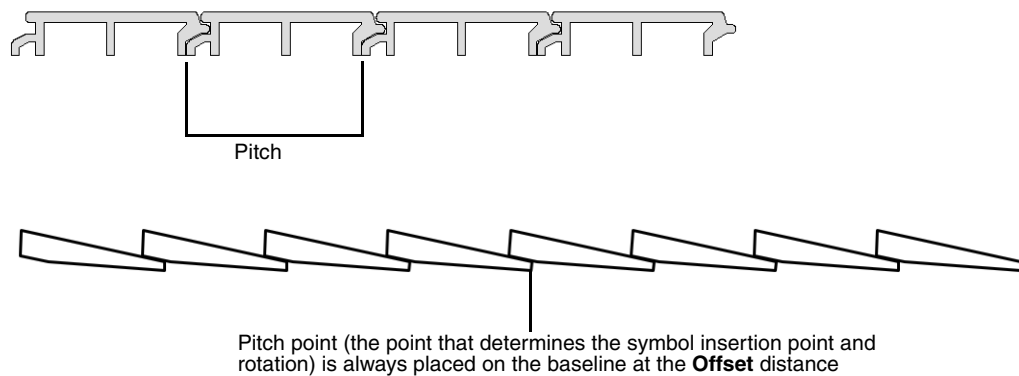
Product: Architect and Landmark

The **Repetitive Unit** tool draws world-scale symbols along a path, creating repetitive elements such as masonry units, shingles, and siding. Create repetitive unit details either by using the **Repetitive Unit** tool, or by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).



To draw repetitive unit details:

1. Click the **Repetitive Unit** tool from the Detailing tool set.
2. Click **Preferences** from the Tool bar to select the detail symbol. The detail symbol can also be specified after creation.
3. Click to begin drawing the detail polyline. Click the mouse at the start point to complete a closed polyline, or double-click the mouse to create an open polyline. For more information on polylines, see “Polyline Tool” on page 212 in the *VectorWorks Fundamentals User’s Guide*.
4. Click **Choose Symbol** from the Object Info palette to select the unit to repeat.



Each unit is always drawn in its entirety; the last unit is not clipped, even if it exceeds the path drawn. The repetitive unit offset path is drawn in the object’s assigned line style (the path always has a fill style of None).

The repetitive unit parameters can be edited in the Object Info palette.

Parameter	Description
Offset	Sets the distance of the object baseline from the drawn path; the symbol is rotated so that its first point (its “pitch point”) is always placed on the baseline at the offset distance
Use Symbol Pitch	Sets the pitch according to the symbol definition; deselect to scale the pitch manually
Use Vertical Pitch	Rotates the symbol 90 degrees counter-clockwise and sets the pitch vertically; this is useful for symbols that are to be stacked vertically rather than arrayed vertically, as they can be drawn in a more natural way
Pitch	Sets the distance from the start of one unit to the start of the next unit
First Pitch Differs	Allows a different pitch to be specified for the first unit
First Pitch	Specifies the pitch for the first unit
Flip Vertically	Flips the unit symbol vertically
Flip Horizontally	Flips the unit symbol horizontally
Choose Symbol	Opens the Choose Symbol dialog box. Select the unit Category , and then select the unit symbol from either the default resources or the current file’s resources (see “VectorWorks Design Series Default Resources” on page 570); the selected symbol is imported into the file and appears in the Resource Browser.
Polyline Parameters	Edits the repetitive unit detail path polyline

Create a plug-in symbol from a repetitive unit object (see “Creating New Symbols” on page 156 in the VectorWorks Fundamentals User’s Guide) with **Convert to Plug-in** selected. Activate the symbol in the Resource Browser to draw the repetitive unit with the saved symbol parameters.

Creating an Interior Elevation

Product: Architect

An interior elevation can be created by a variety of methods.



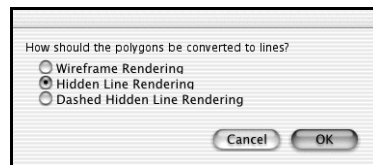
- Create a section viewport of the interior with a finite depth range (see “Advanced Section Viewport Properties” on page 473).
- Create a viewport with hidden line rendering and annotate the elements with the polygon boundary modes of the **2D Polygon** tool. See “Creating Boundary Polygons in a Hidden Line Rendered Viewport” on page 224 in the VectorWorks Fundamentals User’s Guide.
- Create a group with the Convert Copy to Lines command as described below. (A group created from the **Convert Copy to Lines** command can quickly provide a basis for interior elevations.) See “Convert Copy to Lines” on page 395 in the VectorWorks Fundamentals User’s Guide.

To create an interior elevation:

1. From the floor plan, select the wall for creating the elevation. If it has millwork or fixtures attached to or adjacent to it, ensure that they are selected.

Fixtures inserted in (attached to) the wall are automatically selected.

2. Select the view from which to create the elevation. For example, to view the wall from the right side of the plan, select **View > Standard Views > Right**.
3. Select **Modify > Convert > Convert Copy to Lines** and choose **Hidden Line Rendering**.



4. Select **View > Rendering > Hidden Line**. Architect creates a hidden line group of the selection and selects it. Select **Edit > Cut**.
5. Select the detail sheet layer from the **Layers** menu and select **Edit > Paste**. Move the newly created interior elevation to the desired location on the detail sheet layer and add graphics, notes, and dimensions as required.

Dimensioning Exterior Walls

Product: Architect

The exterior walls of a building can be automatically dimensioned with the **Dimension Exterior Walls** command. The exterior wall dimensioner can:

- dimension exterior walls by outside edge or center line;
- associate dimensions with walls;
- dimension only visible wall components; and
- dimension all windows and doors in the exterior walls by center line or rough opening.

For window objects, the rough opening is calculated as the unit/width plus 2 times the shim gap. For door objects, the rough opening is calculated as the width plus 2 times the jamb width plus 2 times the shim gap.

The exterior wall dimensioner uses the dimension standard specified on the Dimensions tab of the document preferences (**File > Document Settings > Document Preferences**) and the unit selection and precision settings in **File > Document Settings > Units**.

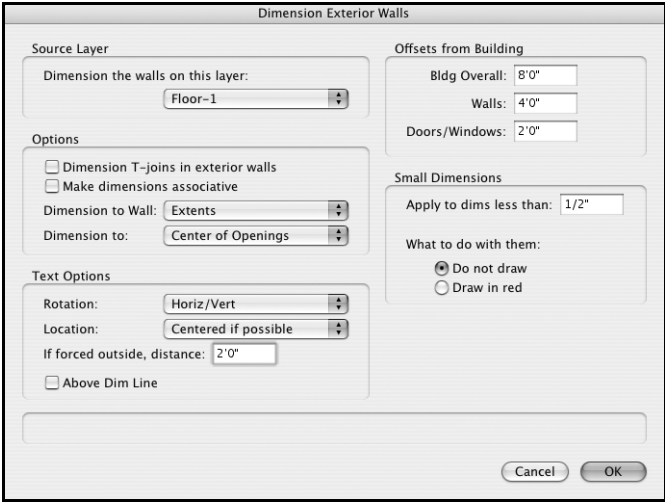
To generate exterior wall dimensions:

1. In a file with exterior walls, determine whether you wish to dimension to the structural or non-structural components of the wall. To dimension to the structural components, such as framing components, make the classes of the non-structural components invisible.

The wall styles available in VectorWorks Architect contain pre-classed components, making it easy to show and hide the desired portions of the wall.

- 2. Select AEC > Dimension Exterior Walls.

The Dimension Exterior Walls dialog box opens.



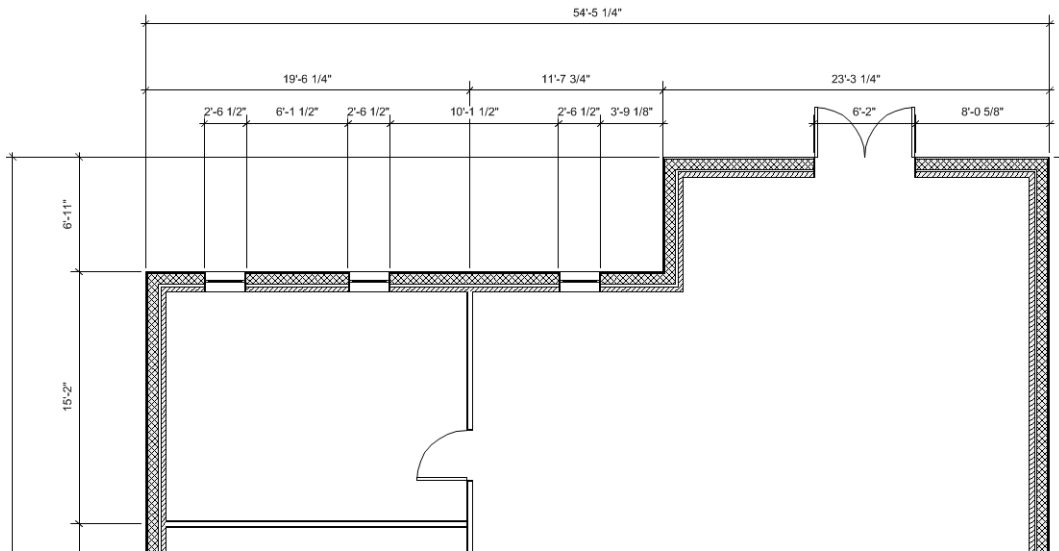
Parameter	Description
Source Layer	Specifies the location of the walls to be dimensioned
Options	Specify the dimension methods
Dimension T-joins in exterior walls	Interior walls which intersect with the exterior walls are dimensioned
Make dimensions associative	Associates dimensions with the wall or wall component; dimensions move and update with the wall or wall component
Dimension to Wall	Specifies whether to dimension to the wall extents or center lines
Dimension to	Specifies whether to dimension rough openings or center lines Rough openings are automatically defined in VectorWorks door and window objects. To add a rough opening to a symbol inserted in a wall, draw an invisible polygon (line weight 0, no fill) with three vertices to the extents of the rough opening.
Text Options	Specifies dimension text properties
Rotation	Controls the orientation of the dimension text <ul style="list-style-type: none">Horiz/Vert places text horizontally for horizontal dimensions and vertically for vertical dimensionsHorizontal keeps text always horizontalAligned places text according to the dimension angle
Location	Specifies whether the text should be centered between the witness lines if space permits, or always placed outside the witness lines



Parameter	Description
If forced outside, distance	Indicates the offset for text forced outside the witness lines
Above Dim Line	Select to always place text above the dimension line
Offsets from Building	Specifies the distance of the dimensions from the building, walls, doors and windows
Small Dimensions	Specifies the limit for drawing small dimensions, which can help detect inaccuracies in the drawing; dimensions less than the value specified will be considered "small." Select Draw in red to detect problems such as minute misalignments in layout; to overlook any inaccuracies, select Do not draw .

3. Click **OK**.

The exterior wall dimensions are drawn automatically.



Drawing List Indexing

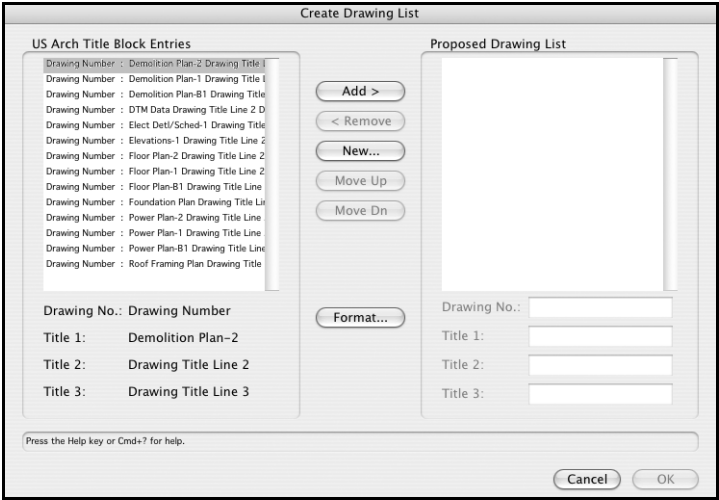
Product: Architect

The **Create Drawing List** command compiles the current drawing border information for use as a drawing list index or worksheet.

To create a Drawing List Index:

1. Select **Tools > Reports > Create Drawing List**.

The Create Drawing List dialog box opens.



Parameter	Description
US Arch Title Block Entries	Lists the current US Arch title blocks
Drawing No.	Displays the contents of the current title block selection
Add	Moves a selected item from the US Arch Title Block Entries list to the Proposed Drawing list
Remove	Removes a selected item from the Proposed Drawing list and displays it in the US Arch Title Block Entries list
New	Click to open the New List Entry dialog box and add the drawing and title block information to the Proposed Drawing list.
Move Up/Move Dn	Moves the selected title up or down in the Proposed Drawing list
Format	Click to open the Drawing List Index Preferences dialog box and specify whether to create the drawing index as a title block or worksheet; also specify formatting criteria
Proposed Drawing List	Lists the proposed drawing borders to include in the Drawing Index
Drawing No./Title	Displays the contents of the current selection for editing

2. Move the desired title block entries to the proposed drawing list to create the drawing list, and format the list.
3. Click **OK**.
4. If the drawing list index is formatted as a title block, click to select the top left and bottom right corners of the drawing list area; the text wraps to fit within this width. If the drawing list index is formatted as a worksheet, click to add the worksheet to the file.

The drawing list index worksheet is also be added to the drawing from the **VA Create Schedule** command or the Resource Browser. From the Resource Browser, open the Libraries\Defaults\Reports~Schedules\ Architectural Reports.vwx file that is included with Architect. Drag the Drawing List worksheet to the drawing. The worksheet is populated with information from the objects in the current drawing.



Using Notation Objects

Product: Architect and Landmark

The notation objects add information to a VectorWorks Architect or Landmark drawing with pre-formatted objects that maintain a constant size regardless of the drawing scale.

To insert a section-elevation marker, see “Section Lines and Section-elevation Markers” on page 479.

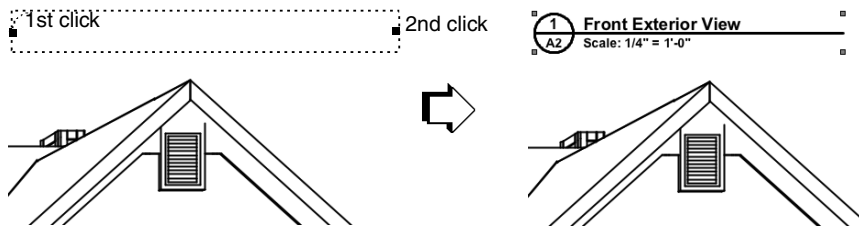
The North Arrow, Drawing Label, Reference Marker, Revision Marker, and Elevation Benchmark notation objects are inserted on the drawing in a similar manner.

To place a notation object:

1. Ensure that the appropriate layer is active.
2. Click the desired notation object from the Dims/Notes tool set.
3. Click on the drawing at the desired location. Click to set the length and/or rotation of the object.


If this is the first time the object is inserted in this session, the Object Properties dialog box opens. These parameters apply to subsequent placements of the object and can be changed in the Object Info palette. Click **OK**.










4. Click again to place the object on the drawing, using the default document attributes.



North Arrow

Product: Architect, Landmark, Spotlight, and Machine Design

The **North Arrow** tool,  located on the Dims/Notes tool set, indicates the drawing orientation; several different styles can be selected. The deviation from true magnetic north can be displayed on some of the configurations.


Parameter	Description
2D Scale Factor	Specifies the marker size; increase the scale value to obtain a larger marker
Config	Select the arrow style from the list <div> Config 1 Config 2 Config 3 Config 4 Config 5  Config 6 Config 7 Config 8 Config 9</div>



Parameter	Description
Arrow Graphics	Select an arrow style from the list; arrow styles include filled and unfilled versions
Show MN Declination	Select to add the deviation from true magnetic north for some styles
Declin Deg Offset	Specifies the degree of offset from true north

Drawing Label

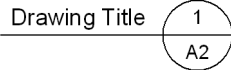
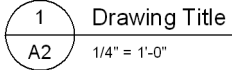
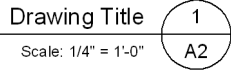

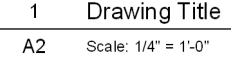
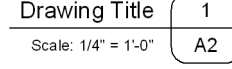
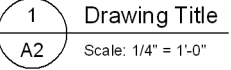
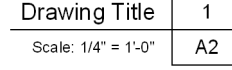
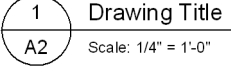
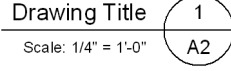
Product: Architect, Landmark, Spotlight, and Machine Design

The **Drawing Label** tool,  located on the Dims/Notes tool set, is a point object that provides descriptive information for the drawing.

By default, a label object includes a title, the scale of the drawing, and an automatically assigned item number. The number of the sheet containing the drawing can also be included in the label.

VectorWorks defaults many of these values, depending on where the label was created: on a design layer, or in a viewport annotation, for example.

Parameter	Description
Rot	Specifies the number of degrees to rotate the label (0.00 is horizontal)
Dwg Title	Specifies the title text that displays above the label's horizontal line; defaults to the file name (on a design layer), to the sheet layer name (on a sheet layer), or to the viewport name (in a viewport), but it can be edited
Item	Identifies this drawing on the current sheet. This value displays in the top half of the label bubble, unless Number Style is set to None. If the label is in a viewport or sheet layer, VectorWorks automatically numbers items and updates this field; if the label is on a design layer, enter an item identifier manually.
Sheet	Identifies the sheet containing the drawing. This value displays in the bottom half of the label bubble, if Number Style is set to Drawing and Sheet. On a design or sheet layer that has a drawing border object, VectorWorks automatically obtains this value from the border's Part Number field; if there is no border, enter a sheet identifier manually.
Number Style	<div>Specifies which drawing identifier numbers (from the Item and Sheet fields) display in the label</div> <div><div><div>Drawing Title</div><div>Scale: 1/4" = 1'-0"</div><div>None (Bubble Style=None)</div></div><div><div>Drawing Title</div><div>Scale: 1/4" = 1'-0"</div><div>Drawing only</div></div><div><div>Drawing Title</div><div>Scale: 1/4" = 1'-0"</div><div>Drawing and sheet</div></div></div>


Parameter	Description
Scale Display Style	<p>Specifies which scale information displays beneath the label's horizontal line</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>None</p> </div> <div style="text-align: center;">  <p>Numbers only</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Scale label</p> </div> <div style="text-align: center;">  <p>Custom</p> </div> </div>
Custom Scale	If Scale Display Style is set to Custom, enter information to display in the scale area
Use Architectural Scale	Select this option to use the US Architect scale style (as in 1/4" = 1'-0"); deselect the option to use the Engineering style (as in 1:48)
Bubble Style	<p>Select the style of the label bubble graphic, which can contain item and sheet numbers identifying the drawing</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>None</p> </div> <div style="text-align: center;">  <p>Round rect</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Circle</p> </div> <div style="text-align: center;">  <p>Rectangle</p> </div> </div>
Draw Full-width Bubble	Select this option to extend the bubble graphic to the full length of the label; not available if Bubble Style is set to None
Title / Scale / Item# / Sheet# Text Size	Select the font sizes for the various elements of the drawing label
2D Scale Factor	Specifies the label's bubble size; enter a larger value to increase the size (the number must be greater than zero)
Printed Length	Specifies the length of the drawing label on the printed page
Flip	<p>Select this option to move the bubble (including the item and sheet identifiers) to the right side of the label:</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Default label</p> </div> <div style="text-align: center;">  <p>Flipped label</p> </div> </div>



Parameter	Description
Rule Offset	Specifies the vertical offset between the label's bubble and horizontal line on the printed page (0 is centered); enter a negative number to move the line, title, and scale below the center line of the bubble
Text Margin	Specifies the distance between the label's horizontal line and the text above and below it on the printed page. If Number Style is set to Drawing and Sheet, the text blocks are automatically aligned, so this setting has no effect.

Reference Marker

Product: Architect, Landmark, Spotlight, and Machine Design

The **Reference Marker** tool,  located on the Dims/Notes tool set, displays the drawing item and sheet information of the referenced drawing. Select from a variety of configurations.

Parameter	Description
2D Scale Factor	Specifies the marker size; increase the scale value to obtain a larger marker
Type/Config	Select one of the types and configurations from the list <div><div>Elevation</div><div><div><div>1</div><div>A1</div></div><div>Config 1</div></div><div><div>1</div><div></div></div><div>Config 2</div></div> <div><div>1/A1</div><div></div></div> <div>Config 3</div>

Detail

1

A1

Config 1

1

Config 2

1/A1

Config 3

Section

1

A1

Config 1

1

Config 2


1/A1

Config 3



Revision Marker

Product: Architect and Landmark

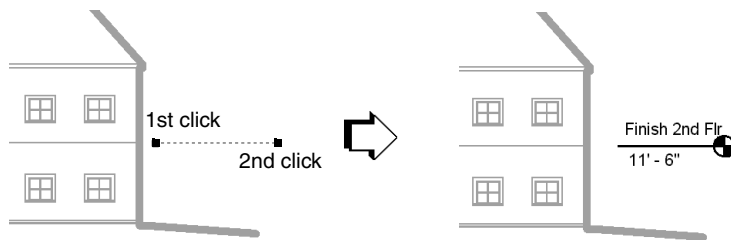
The **Revision Marker** tool,  located on the Dims/Notes tool set, displays the drawing revision number.

Parameter	Description
2D Scale Factor	Specifies the marker size; increase the scale value to obtain a larger marker
Revision Number	Specifies the revision number

Elevation Benchmark

Product: Architect and Landmark

The linear object **Elevation Benchmark** tool,  located on the Dims/Notes tool set, represents different levels in elevation drawings.



Select from two different elevation benchmark configurations.

Parameter	Description
Title/Elevation	Specifies the benchmark title and elevation value
Marker Orientation	Select the marker orientation (left or right)
Marker Graphics	Select a marker style from the list; styles include filled and unfilled versions
Style	Select the marker style <div><div><div>Benchmark Title</div><div>Benchmark Elevation</div><div>Floor level — — — — —</div><div>ISO style</div></div><div><div>Benchmark Title</div><div>Benchmark Elevation</div><div>— — — — —</div><div>US style</div></div></div>
Auto-Set Relative to Ref Elev	Select to specify a reference elevation, and enter the Reference Elevation value
Use Control Point	When selected, displays a control point on the drawing and allows the elevation value to be adjusted using that control point
Reference Elevation	The reference elevation value is relative to the ground plane

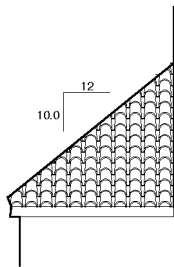


Parameter	Description
2D Scale Factor	Specifies the elevation benchmark size; increase the scale value to obtain a larger object
Marker Size	For ISO style, specifies the marker size; increase the size value to obtain a larger marker
Extension Length	Specifies the length of the object line

Dimensioning the Slope of Surfaces

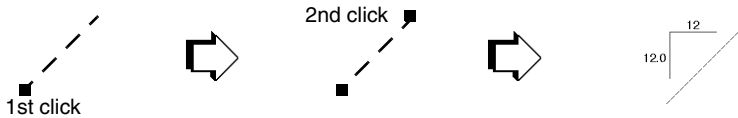
Product: Architect and Landmark

The **Slope Dimension** tool creates a rise over run indicator that displays the slope (rise/run) of any angle on any surface in the drawing.



To create a slope indicator:

- Click the **Slope Dimension** tool from the Dims/Notes tool set.
- Click to mark the beginning of the slope. Click again to mark the end of the slope.
If this is the first time the tool is used in this session, the Slope Dimension Properties dialog box opens. Specify the preferences to use for this tool during this session, and then click **OK**. The preferences can be changed later in the Object Info palette.
- The rise / run indicator is drawn.



Use the control point at the “elbow” of the slope indicator to move it; change the appearance of the rise / run indicator by editing its parameters in the Object Info palette.

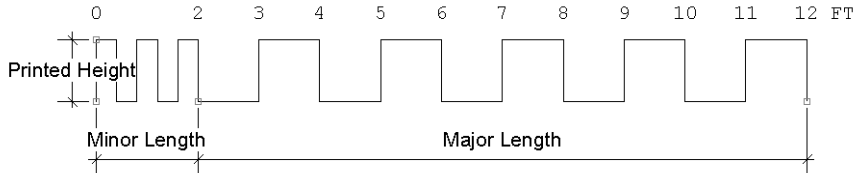
Parameter	Description
Draw Roof Surface	Draws the defining line as a dashed line
Scale Factor	Determines the size of the indicator
Base	Specifies a numerical denominator to indicate the “run” portion of the rise/run ratio
Line Length	Specifies the slope line length
Control Points	Normally, do not edit; position the indicator graphically instead



Inserting a Scale Bar

Product: Architect, Landmark, Spotlight, and Machine Design

A scale bar can be placed on the drawing to define the scale of the drawing objects.



To add a scale bar to the drawing:

1. Ensure that the appropriate design layer is active.
2. Click the **Scale Bar** tool from the Dims/Notes tool set.
3. Click on the drawing to insert the scale bar.
4. Click again to determine the rotation of the scale bar and to place it on the drawing.
5. Position the scale bar as desired. The scale bar properties can be edited later by selecting the scale bar and changing the properties in the Object Info palette.

Parameter	Description
Printed Height	Specify the printed height of the scale bar
Minor Length	Specify the minor length
# of Min Divs	Specify the number of minor divisions (the first division is split into minor divisions; the remainder of the scale bar is in major divisions)
Major Length	Specify the major length
# of Major Divs	Specify the number of major divisions
Style	Select the scale bar style: Zigzag, Box, Line, Checker, or Flip
Adjust Units	Select to switch between units specified for the drawing file (File > Document Settings > Units); for example, switch between feet and inches
Decimal Points	Select to display units with up to four decimal places

Using Notation Bubbles

Creating Grid Bubbles

Product: Architect and Landmark

Grid bubble objects are dimensioned grid lines with bubble markers. This type of drawing notation can help locate columns and other primary building features on construction documents.



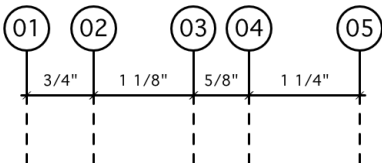
Drawing a Grid Bubble Object

Product: Architect and Landmark



To draw a grid bubble object:

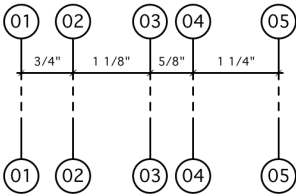
1. Click the **Grid Bubble** tool from the Dims/Notes tool set.
2. Place a line of grid bubbles by drawing an open polygon with the tool. The first click starts the grid line; the second click determines the angle of the grid line and sets a marker at that location. Each remaining click sets a grid marker.
3. Double-click to end the grid line. The first time the object is inserted in this session, the Preferences dialog box opens. These parameters apply to subsequent placements of the object and can be changed in the Object Info palette.



Grid Bubble Properties

Product: Architect and Landmark

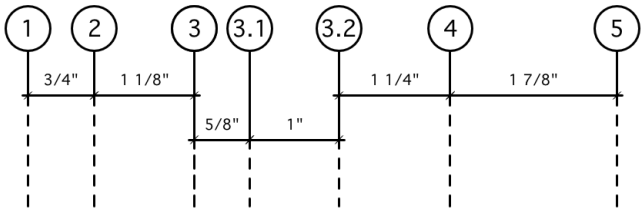
The grid bubble parameters can be edited in the Object Info palette.

Parameter	Description
Starting Mark	Indicates the starting number or letter for grid labeling; labels are automatically incremented
Prefix	Specifies a prefix, if any, to apply to the grid labels
Dim Text Size	Specifies the point size of the dimension text
Item Text Size	Specifies the point size of the bubble label text
Show Dimensions	Select to display the dimensions on the grid
Flip	Select to flip the bubble labels to the other side of the dimension string
Rotate Text	Select to rotate the bubble label text with the grid
Draw First Grid	Select to display the first bubble grid; deselect to hide it (useful when creating nested grids)
Bubbles Both Ends	Select to draw bubble labels at both ends of the grid line 
Line Style	Select the grid line style



Parameter	Description
Size Factor	Scales the size of the bubbles
Bubble Offset	Specifies the offset distance of the bubbles from the dimension string
Grid Length	Indicates the grid length
Polyline parameters	Edits the bubble grid line; while editing the bubble grid line in this way is possible, it may be preferable to use the 2D Reshape tool instead. See “Reshaping Objects” on page 259 in the VectorWorks Fundamentals User’s Guide.

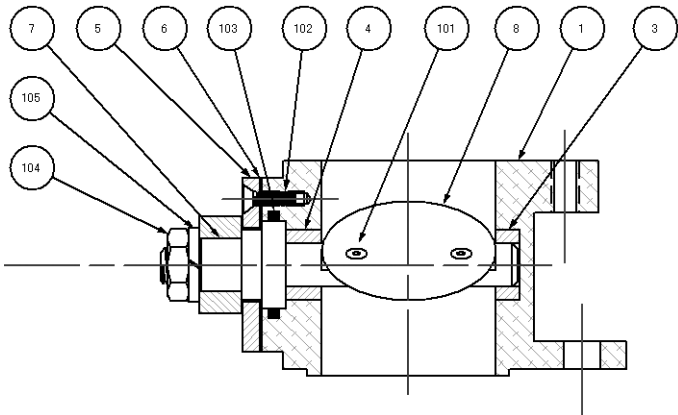
By combining several bubble grids and adjusting labeling properties, hierarchical (nested) grids can be created.



Creating Detail Bubbles

Product: Machine Design

A detail bubble assigns a detail number to the parts of an assembly drawing.



The information associated with the detail bubble can be used to create both parts lists and bill of materials lists.

Adding Detail Bubbles

Product: Machine Design



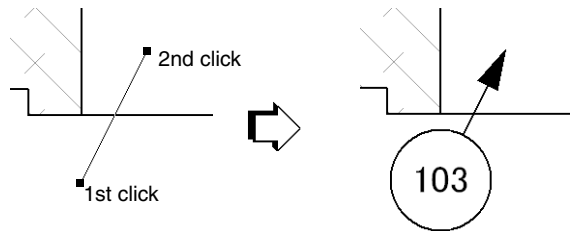
To add a detail bubble:

1. Click the **Detail Bubble** tool from the Dims/Notes tool set.
2. Click on the drawing to place the bubble portion of the object. Click again to place the marker.



If this is the first time the object has been inserted in this session, the Object Properties dialog box opens. If the Attributes palette has not been set to use end markers, select the marker style, size, and angle from the Object Properties dialog box.

If no Part Info record exists, one is created automatically the first time a detail bubble is placed in the drawing.



The detail bubble number automatically increments as the bubbles are placed. Change the auto-incrementing number by editing the **Item Number** field in the Object Info palette. When detail bubble placement resumes, the last number entered becomes the starting number.

Detail Bubble Record Format

Product: Machine Design

The Part Info record format stores the information for the detail bubble. This record format can be edited to add new fields or to delete existing fields. To edit the record format, right-click on the record format in the Resource Browser and select **Edit**. For more information on record formats, see “Record Formats” on page 170 in the VectorWorks Fundamentals User’s Guide.

If new fields are created, the existing Bill of Materials and Parts List worksheets need to be modified to reflect the changes. Alternatively, create new worksheets to accommodate the new fields. For more information on using worksheets, see “Using Worksheets” on page 566 in the VectorWorks Fundamentals User’s Guide.

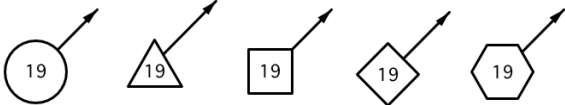
Editing Detail Bubbles

Product: Machine Design

Detail Bubble Properties

Product: Machine Design

Edit the detail bubble properties in the Object Info palette.

Parameter	Description
Min. Bubble Size	Enter the minimum bubble size
Shape	Select one of the bubble shapes <div><div>RoundTriangleSquareDiamondHexagon</div></div>
Item Number	Specify the number to display in the detail bubble; the item number is used for bill of materials and parts list worksheets
Change Bubble Info	Click to edit the bubble detail; for more information, see “Editing Detail Bubble Record Information” on page 361



Once the detail bubble has been placed, its marker can be selected from the Attributes palette (see “Marker Attributes” on page 233 in the VectorWorks Fundamentals User’s Guide).

Editing Detail Bubble Record Information

Product: Machine Design

To edit the record information associated with a detail bubble:

1. Select the bubble, and then click **Change Bubble Info** on the Object Info palette.

The Edit Detail Bubble dialog box opens.

The dialog box titled "Edit Detail Bubble" contains the following fields and values:

Field	Value
Item #:	102
Description:	M4 x 0.7 Flat Head Soc Cap Scr x 15 Lg. Steel
Part #:	FHSCS-04007-15
Supplier:	Supply Co.
Cost:	0.55
Quantity:	3

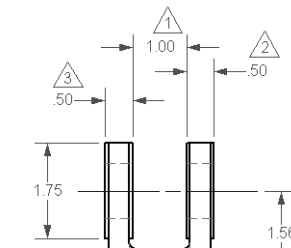
Below the fields is a note: "Press the Help key or Cmd+? for help." At the bottom right are "Cancel" and "OK" buttons.

2. Enter the information associated with the detail bubble. The information can be used to complete the parts list and bill of materials worksheets.
3. Click **OK** to return to the Object Info palette. If the **Item #** was changed, the change is automatically made to the Object Info palette and the object.

Revision Bubbles

Product: Machine Design

The revision bubble notation object, located in the Dims/Notes tool set, displays a revision number for an object or drawing. The revision bubble automatically resizes depending on the text size, but does not become smaller than the minimum bubble size set.








To place a revision bubble:

1. Click the **Revision Bubble** tool from the Dims/Notes tool set.
2. Click in the drawing to place the bubble. Click again to set the bubble rotation.

The revision bubble properties can be edited in the Object Info palette.

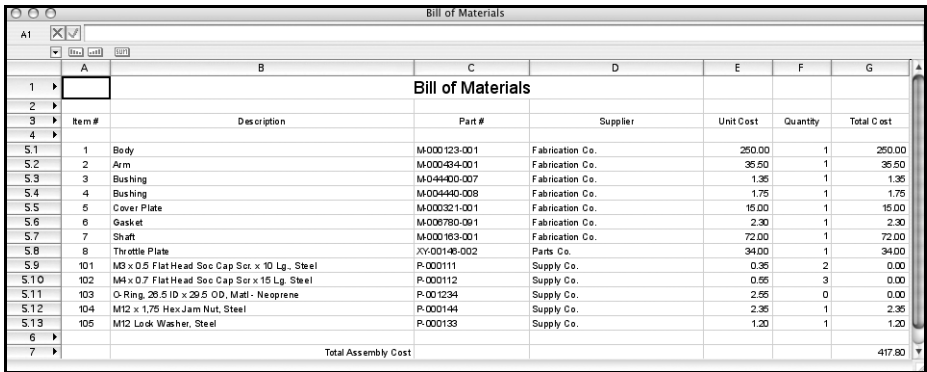


Parameter	Description
Min. Bubble Size	Enter the minimum bubble size
Shape	Select one of the revision bubble shapes <div>    </div> <div>Round Triangle Square Diamond Hexagon</div>
Revision Number	Enter the revision bubble number

Creating a Bill of Materials

Product: Machine Design

The information associated with the detail bubbles can be included in a worksheet which automatically generates a bill of materials list.



Bill of Materials						
Item #	Description	Part #	Supplier	Unit Cost	Quantity	Total Cost
1	Body	M-000123-001	Fabrication Co.	250.00	1	250.00
2	Arm	M-000494-001	Fabrication Co.	35.50	1	35.50
3	Bushing	M-044400-007	Fabrication Co.	1.35	1	1.35
4	Bushing	M-004440-008	Fabrication Co.	1.75	1	1.75
5	Cover Plate	M-000321-001	Fabrication Co.	15.00	1	15.00
6	Gasket	M-000780-001	Fabrication Co.	2.30	1	2.30
7	Shaft	M-000163-001	Fabrication Co.	72.00	1	72.00
8	Throttle Plate	XY-00140-002	Parts Co.	34.00	1	34.00
9	M3 x 0.5 Flat Head Soc Cap Scr x 10 Lg. Steel	P-000111	Supply Co.	0.35	2	0.00
10	M4 x 0.7 Flat Head Soc Cap Scr x 15 Lg. Steel	P-000112	Supply Co.	0.55	3	0.00
11	O-Ring, 26.5 ID x 26.5 OD, Matl - Neoprene	P-001234	Supply Co.	2.55	0	0.00
12	M12 x 1.75 Hex Jam Nut, Steel	P-000144	Supply Co.	2.35	1	2.35
13	M12 Lock Washer, Steel	P-000133	Supply Co.	1.20	1	1.20
Total Assembly Cost						417.80

To create a bill of materials:

- Once the detail bubble record information has been completed, select **Tools > Reports > Create Bill of Materials**.
- With the bull's-eye cursor, click in the drawing to place the worksheet.
Alternatively, access the Bill of Materials worksheet object with the Resource Browser from [VectorWorks]\Libraries\Defaults\Drawing Border - Title Blocks\ASME Title Blocks.vwx and double-click the Bill of Materials worksheet object in the Resource Browser to place the worksheet graphic object.
- Double-click on the worksheet, or select **Window > Worksheets > Bill of Materials**, to open the worksheet. From the worksheet menu, select **Recalculate**. The record information from the detail bubbles automatically fills the worksheet, and all calculations are performed. For more information on worksheets, see "Using Worksheets" on page 566 in the VectorWorks Fundamentals User's Guide.
- Close the worksheet. The worksheet graphic object on the drawing reflects the changes.
- Reopen the worksheet and select **Recalculate** from the worksheet menu to update the worksheet when any changes are made to the record information.

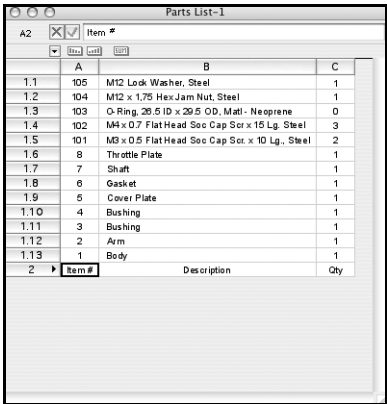
A parts list can be added to an ASME title block; see "Drawing Border Properties" on page 335.



Creating a Parts List

Product: Machine Design

The information associated with the detail bubbles can be included in a worksheet which automatically generates a parts list.



	A	B	C
1.1	105	M12 Lock Washer, Steel	1
1.2	104	M12 x 1.75 Hex Jam Nut, Steel	1
1.3	103	O-Ring, 26.5 ID x 29.5 OD, Matl - Neoprene	0
1.4	102	M4 x 0.7 Flat Head Soc Cap Scr x 15 Lg, Steel	3
1.5	101	M3 x 0.5 Flat Head Soc Cap Scr x 10 Lg, Steel	2
1.6	8	Throttle Plate	1
1.7	7	Shaft	1
1.8	6	Gasket	1
1.9	5	Cover Plate	1
1.10	4	Bushing	1
1.11	3	Bushing	1
1.12	2	Arm	1
1.13	1	Body	1
2	Item #	Description	Qty

To create a parts list:

1. Once the detail bubble record information has been completed, select **Tools > Reports > Create Parts List**.
2. With the bull's-eye cursor, click in the drawing to place a Parts List worksheet.

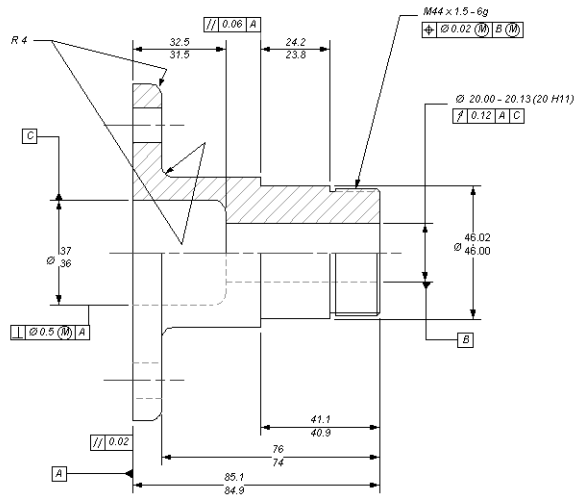
Alternatively, select the appropriate parts list worksheet object with the Resource Browser from [VectorWorks]\Libraries\Defaults\Drawing Border - Title Blocks\ASME Title Blocks.vwx. Double-click the appropriate parts list worksheet object in the Resource Browser to place the worksheet graphic object.

The Parts List-1 worksheet object is formatted to fit the ASME title blocks for ASME A, B, and C and ISO A2, A3, A4, and A5 drawing sizes. The Parts List-2 worksheet object is formatted to fit the ASME title blocks for ASME D, E, and F, and ISO A0 and A1 drawing sizes.
3. Double-click on the worksheet, or select **Window > Worksheets > Parts List** to open the worksheet. From the worksheet menu, select **Recalculate**. The record information from the detail bubbles automatically fills the worksheet, and all calculations are performed. For more information on worksheets, see "Using Worksheets" on page 566 in the VectorWorks Fundamentals User's Guide.
4. Close the worksheet. The worksheet graphic object on the drawing reflects the changes.
5. Reopen the worksheet and select **Recalculate** from the worksheet menu to update the worksheet when any changes are made to the record information.

Dimensioning and Tolerancing

Product: Machine Design

VectorWorks Machine Design provides the tools required for dimensioning a drawing according to ISO and ANSI/ASME geometric dimensioning and tolerancing standards.



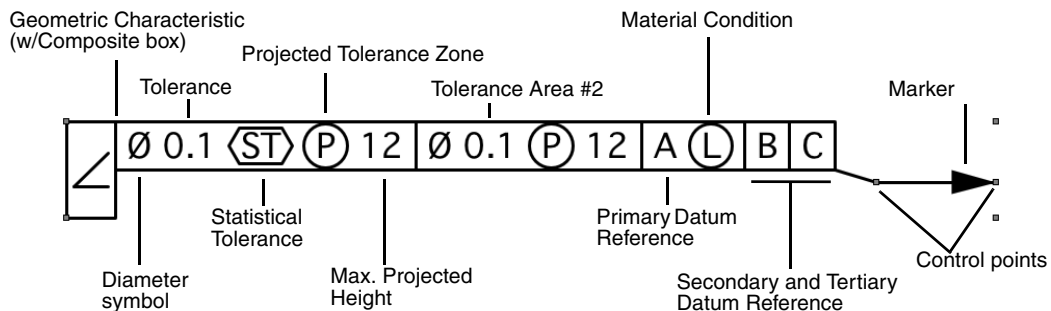
The Feature Control Frame, Datum Feature Symbol, and Datum Target Symbol are inserted into the Dimension class by default; control the appearance of these markers globally by editing the parameters of this class. The text characteristics (font size and style) can be controlled with the **Text** menu.

For more information on editing class attributes and formatting text, see “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide and “Formatting Text” on page 189 in the VectorWorks Fundamentals User’s Guide.

Feature Control Frame

Product: Machine Design

A geometric tolerancing feature control frame consists of a geometric characteristic symbol, up to two tolerance areas, and up to three datum reference areas.

















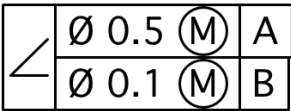






To insert a feature control frame:

1. Click the **Feature Control Frame** tool from the Dims/Notes tool set.
2. Click on the drawing to insert the feature control frame. Click again to set the rotation of the object.

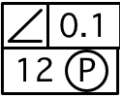


If this is the first time the object has been inserted in this session, the Object Properties dialog box opens. If the Attributes palette has not been set to use end markers, select the marker style, size, and angle from the Object Properties dialog box.

- Set the feature control frame parameters in the Object Info palette.

If the leader is not immediately visible, drag it from the frame using the leader control points.

Parameter	Description
Geometric Characteristic	<p>Select the geometric characteristic symbol, if any</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around; text-align: center;"> <div> Angularity</div> <div> Circularity</div> <div> Concentricity</div> <div> Cylindricity</div> <div> Flatness</div> <div> Parallelism</div> <div> Perpendicularity</div> <div> Position</div> <div> Profile-Line</div> <div> Profile-Surface</div> <div> Simple Runout</div> <div> Total Runout</div> <div> Straightness</div> <div> Symmetry</div> </div>
Composite Box	<p>Select to increase the size of the geometric characteristic box; this is used when placing a second feature control frame</p> <div style="text-align: center;">  </div>
Tolerance Area #1/#2	Select to include Tolerance Area #1 and/or Tolerance Area #2
Tolerance	Enter the tolerance value
Show Diameter Symbol	<p>Select to display a diameter symbol along with the tolerance value</p> <div style="text-align: center;"></div>
Material Condition	<p>Choose the material condition, if any</p> <div style="display: flex; justify-content: space-around; text-align: center;"> <div> Free State</div> <div> LMC (Least Material Condition)</div> <div> MMC (Maximum Material Condition)</div> <div> Tangent Plane</div> </div>
Statistical Tolerance	<p>Select to display a statistical tolerance symbol</p> <div style="text-align: center;"></div>
Projected Tolerance Zone	Select to display a projected tolerance zone symbol



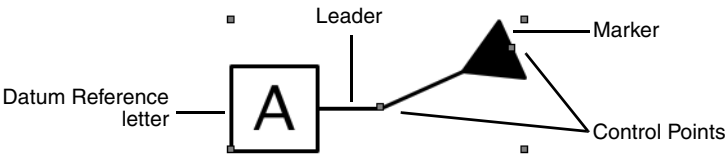
Parameter	Description
Zone Height	Enter the maximum projected tolerance zone height when a projected tolerance zone symbol is displayed
Place the PTZ symbol outside the FCF	Select to place the projected tolerance zone symbol outside and to the bottom of the feature control frame <div></div>
Primary/Secondary/Tertiary Datum Reference	Select to include the primary, secondary, and/or tertiary datum reference
Reference	Enter the desired reference letter
Material Condition	Select a material condition, if any <div><div> LMC (Least Material Condition)</div><div> MMC (Maximum Material Condition)</div></div>
Leader Position	Select left or right

Once the feature control frame has been placed, its marker can be selected from the Attributes palette (see “Marker Attributes” on page 233 in the VectorWorks Fundamentals User’s Guide).

Datum Feature Symbol

Product: Machine Design

A datum feature symbol consists of a marker, leader, and datum reference letter.



To insert a datum feature symbol:

1. Click the **Datum Feature Symbol** tool from the Dims/Notes tool set.
2. Click on the drawing to insert the datum feature symbol. Click again to set the rotation of the object.
If this is the first time the object has been inserted in this session, the Object Properties dialog box opens. If the Attributes palette has not been set to use end markers, select the marker style, size, and angle from the Object Properties dialog box.
3. Enter the datum reference letter (which corresponds to the Feature Control Frame reference letter).

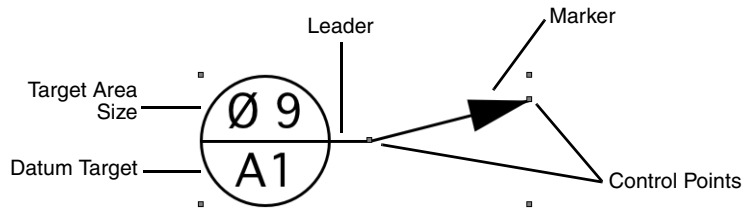
Once the datum feature symbol has been placed, its marker can be selected from the Attributes palette (see “Marker Attributes” on page 233 in the VectorWorks Fundamentals User’s Guide).



Datum Target Symbol

Product: Machine Design

A datum target symbol consists of a marker, leader, and target with datum target letter and target area size.



To insert a datum target symbol:

1. Click the **Datum Target Symbol** tool from the Dims/Notes tool set.
2. Click on the drawing to insert the datum target symbol. Click again to set the rotation of the object.
If this is the first time the object has been inserted in this session, the Object Properties dialog box opens. If the Attributes palette has not been set to use end markers, select the marker style, size, and angle from the Object Properties dialog box.
3. Set the leader and marker position by dragging the symbol control points with the mouse. Specify the remaining datum target parameters in the Object Info palette.

Parameter	Description
Datum Target	Specify the datum target letter/number combination
Target Area Size	Enter the size of the target area
Show Diameter Symbol	Select to display the diameter symbol with the target area size <div>Ø</div>
Place target size outside of symbol	When necessary, the target size can be displayed outside the symbol; specify right or left Placement <div></div>

Once the datum target symbol has been placed, its marker can be selected from the Attributes palette (see “Marker Attributes” on page 233 in the VectorWorks Fundamentals User’s Guide).



Geometric Dimensioning and Tolerancing Note

Product: Machine Design

The **Geom Dim and Tol Note** tool is used to insert a notation symbol and text specifying the dimension of round, square, counterbore, and/or countersink holes, and unit ratio for conical and/or flat tapers. Alternatively, a depth symbol and associated text can be inserted.



To insert a geometric dimensioning and tolerancing note:

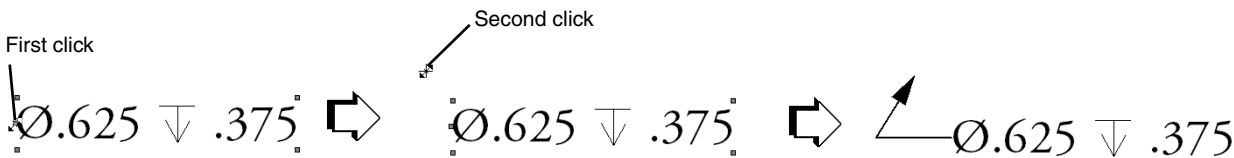
1. Click the **Geom Dim and Tol Note** tool from the Dims/Notes tool set.
2. Click in the drawing to insert the note. Click again to set the rotation of the object.
If this is the first time the object has been inserted in this session, the Object Properties dialog box opens. If the Attributes palette has not been set to use end markers, select the marker style, size, and angle from the Object Properties dialog box.
3. Specify the geometric dimensioning and tolerancing note parameters in the Object Info palette.

Parameter	Description
Precision	Select the decimal place rounding value for the hole size and depth
Note Type	Select the style of the note marker <div><div>$\varnothing.625 \downarrow .375$ Round Hole (and Depth)</div><div>$\square .625 \downarrow .375$ Square Hole (and Depth)</div><div>$\square \varnothing.625 \downarrow .375$ Counterbore (and Depth)</div><div>$\sphericalangle \varnothing.625 \times 90^\circ$ Countersink</div><div>$\triangle .3:1$ Conical Taper</div><div>$\triangle .3:1$ Flat Taper</div><div>$\downarrow .375$ Depth</div></div>
Hole Size/Taper	Enter the diameter for round, square, counterbore, and countersink holes; enter the unit ratio for conical and flat tapers
Tolerance	Sets whether the hole size/taper has a single, double, limited, or no tolerance <div><div>$\varnothing.625 \downarrow .375$ None</div><div>$\varnothing.625 \pm .002 \downarrow .375$ Single</div><div>$\varnothing.625^{+.002}_{+.002} \downarrow .375$ Double</div><div>$\varnothing.627_{.627} \downarrow .375$ Limit (1)</div><div>$\varnothing.627 - .627 \downarrow .375$ Limit (2)</div></div>
Top/Bottom	Enter the value that is added to or subtracted from the base dimension to determine the upper/lower limit of the dimension
Depth/Angle	Enter the depth for round, square, and counterbore holes (if the depth is zero or less, it is not displayed); enter the angle for countersink holes

Parameter	Description
Tolerance	Sets whether the depth/angle has a single, double, limited, or no tolerance <div><div>$\varnothing.625 \downarrow .375$ None</div><div>$\varnothing.625 \downarrow .375 \pm .002$ Single</div><div>$\varnothing.625 \downarrow .375^{+.002}_{+.002}$ Double</div><div>$\varnothing.625 \downarrow \begin{smallmatrix} .377 \\ .377 \end{smallmatrix}$ Limit (1)</div><div>$\varnothing.625 \downarrow .377 - .377$ Limit (2)</div></div>
Top/Bottom	Enter the value that is added to or subtracted from the base dimension to determine the upper/lower limit of the dimension
Leader	Enter text to display before the dimension
Trailer	Enter text to display after the dimension
Leader Line Position	Select to place the dimension leader line to the right or left side of the object

Once the geometric dimensioning and tolerancing note has been placed, its marker can be selected from the Attributes palette (see “Marker Attributes” on page 233 in the VectorWorks Fundamentals User’s Guide).

4. If desired, create and set a leader line using the **2D Selection** tool. Click the symbol control point. Crosshairs display to indicate the leader endpoint position. Click at the desired endpoint location; the leader line is drawn with the marker style, size, angle, and the shoulder length specified in the object preferences.



Managing Project Information

Records and Schedules

Product: Architect

Some architectural elements (doors and spaces, for example) have pre-defined data that is automatically attached to them as they are created. Pre-formatted schedules are available for reporting this data, as well as data from other Architect and Landmark elements.

Typically, custom data records and schedules are created and edited with the Resource Browser. The Record and Schedule Management suite provides an alternate method for managing data in architectural documents.

For information about using the Resource Browser to create and edit record formats and schedules (worksheets), see “Record Formats” on page 170 in the VectorWorks Fundamentals User’s Guide and “Creating Worksheets” on page 563 in the VectorWorks Fundamentals User’s Guide. Record formats and schedules created in this way cannot be used with VectorWorks Architect’s Record and Schedule management suite, however.

The records and schedules suite includes the following commands:

- **VA Records and Schedules:** Establishes default formats for records that can be attached to objects, and for schedules that can be generated from those records
- **VA Create Record:** Adds selected record formats to the current file
- **VA Create Schedule:** Adds selected schedules to the current file

By default, records and schedules created with **VA Records and Schedules** are added to the VA Defaults project preference set, and new files use that VA Defaults set. If additional sets of records and schedules are needed, create a new set of preferences and select that set before setting up a new drawing file. See “Working with Project Preference Sets” on page 387 for more information.

Defining Records and Schedules

Product: Architect

Use the **VA Records and Schedules** command to create and modify a set of record format and schedule definitions that can be used in any file.

After defining record formats and schedules, make them available in the current file using the **VA Create Record** and **VA Create Schedule** commands.

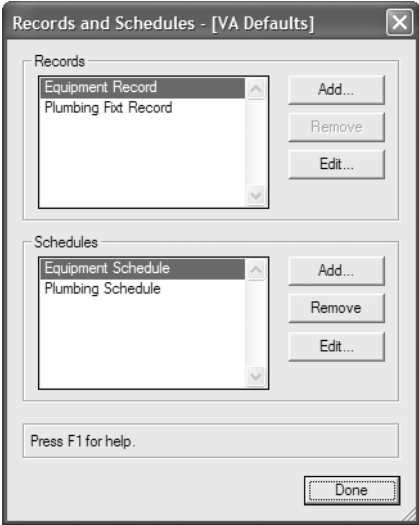
Editing Record Definitions

Product: Architect

To edit a record definition:

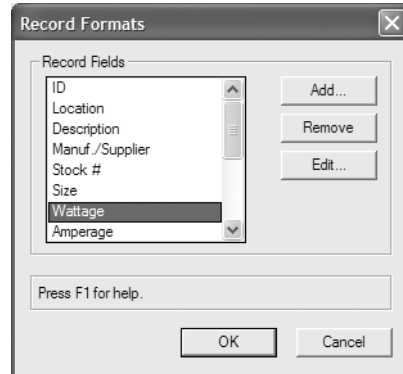
1. Select **Tools > Reports > VA Records and Schedules**.

The Records and Schedules dialog box opens.



Parameter	Description
Records	Lists currently defined record formats
Add	Adds a new record to the current preference set
Remove	Deletes the selected record
Edit	Opens the selected record for editing
Schedules	Lists currently defined schedule formats
Add	Adds a new schedule to the current preference set
Remove	Deletes the selected schedule
Edit	Opens the selected schedule for editing

- 2. Select the record to edit.
- 3. Click **Edit** in the Records section of the Records and Schedules dialog box.
The Record Formats dialog box opens.



Parameter	Description
Record Fields	Lists the current fields of the selected record
Add	Creates a new record field
Remove	Deletes the selected record field (cannot be undone)
Edit	Opens the selected record field for editing

- Click **Add** to add a new record field or click **Edit** to edit the selected field.

The Edit Field dialog box opens. Add or edit the field information.



Parameter	Description
Name	Specifies the name of the selected record field
Default	Enter a default value for the field, if desired
Type	Specifies the type of field: Integer, Boolean, Number, or Text

- Click **OK** to close the Edit Field dialog box.
- In the Record Formats dialog box, continue to modify, add, or remove record items.
- Click **OK** to close the Record Formats dialog box, and then click **Done** to close the Records and Schedules dialog box.



Once a record definition has been updated, instances of the new record format cannot co-exist in the same file with instances of the old record format. If an object is inserted into a drawing with a record format that differs from the current record of the same name, a dialog box opens requesting which format to retain. Records in the un-retained format will be purged, and their information will be lost. For this reason, it is recommended that any changes be made to record formats prior to beginning a project.

Adding Record Definitions

Product: Architect

To add a record definition:

1. Select **Tools > Reports > VA Records and Schedules**.

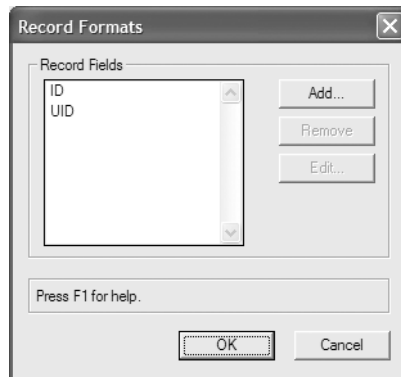
The Records and Schedules dialog box opens.

2. Click **Add** in the Records section of the Records and Schedules dialog box.

The Enter String dialog box opens. Enter the name of the new record.

3. Click **OK**.

The Record Formats dialog box opens, listing the default fields of the new record; only the **Add** button is enabled.



4. Click **Add** to add a new field to the current record definition. Enter a **Name** and **Default** value for the field. Select the field **Type** from the list.
5. Click **OK** to close the Edit Field dialog box.
The new field displays on the Record Formats dialog box. If more fields are needed, repeat steps 4 and 5.
6. Click **OK**.
The new record and its fields are added to the record definition list.
7. Click **Done** to close the Records and Schedules dialog box.

Removing Record Definitions

Product: Architect

To remove a record definition:

1. Select **Tools > Reports > VA Records and Schedules**.

The Records and Schedules dialog box opens.



2. Select the record to remove.
3. Click **Remove** in the Records section of the Records and Schedules dialog box. This operation cannot be undone; click **Yes** to confirm that the record should be removed.

The record definition is removed from the record list.

4. Click **Done** to close the Records and Schedules dialog box.

Editing Schedule Definitions

Product: Architect

The Schedule definitions detail the column heading text, width, and border attributes for each record field being reported.

To edit a schedule definition:

1. Select **Tools > Reports > VA Records and Schedules**.

The Records and Schedules dialog box opens.

2. Select the schedule to edit.

3. Click **Edit** in the Schedules section of the Records and Schedules dialog box.

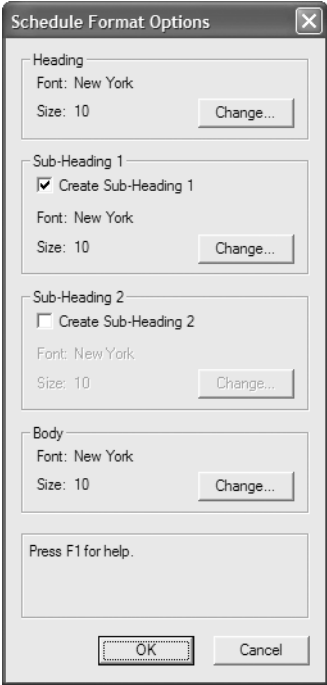
The Edit Schedule Format dialog box opens. Specify the schedule appearance by selecting the column order and formatting.

Parameter	Description
Schedule Information	Select the record to format, defining the data to be reported in the schedule
Available Record Fields	Select the record field(s) to include in the schedule
Schedule Columns	Displays the fields that will be included in the schedule
Add >	Moves the selected available record field into the Schedule Columns list

Parameter	Description
< Remove	Deletes a selected field from the Schedule Columns list
Move Up	Moves the selected field up in the Schedule Columns list order
Move Dn	Moves the selected field down in the Schedule Columns list order
Heading	Enter a title for the selected Schedule Column item, if desired. The title displays in row 2 of the column corresponding to the field.
Sub-Heading 1	Enter a sub-heading for the selected Schedule Column item if desired. The title displays in row 3 of the column corresponding to the field.
Sub-Heading 2	Enter a sub-heading for the selected Schedule Column item, if desired. The title displays in row 4 of the column corresponding to the field.
Width (chars)	Specifies the width, in characters, for the selected Schedule Column item
Borders	Specifies the column border display for the selected Schedule Column
Options	Opens the Schedule Format Options dialog box

4. Click **Options** to edit the schedule font style and size.

The Schedule Format Options dialog box opens. Click the appropriate **Change** button to open the Format Text dialog box and modify the font type and size for the heading, sub-headings, and body of schedule items.





Parameter	Description
Heading	Specifies the font type and size for the schedule headings; click Change to edit the font format
Sub-Heading 1 and 2	Select to create sub-headings in the first or second column; click Change to edit the font format
Body	Specifies the font type and size for the schedule item body text; click Change to edit the font format

- Click **OK** to close the Schedule Format Options dialog box, and then click **OK** to close the Edit Schedule Format dialog box.
- Click **Done** to close the Records and Schedules dialog box.

Adding Schedule Definitions

Product: Architect

To add a schedule definition:

- Select **Tools > Reports > VA Records and Schedules**.
The Records and Schedules dialog box opens.
- Click **Add** in the Schedules section of the Records and Schedules dialog box.
The Enter String dialog box opens.
- Enter the name for the new schedule.
- Click **OK**.
The Edit Schedule Format dialog box opens. For details on the Edit Schedule Format dialog box parameters, see “Editing Schedule Definitions” on page 375.
- Select the record that defines the data to be reported in the new schedule, and then add the desired fields to use for the schedule.
- Select a schedule column, and then enter the column formatting information. If desired, click **Options** and set the font formatting for the column, and then click **OK**.
- Click **OK** to save the new schedule.
The new schedule definition is added.
- Click **Done** to close the Records and Schedules dialog box.

Removing Schedule Definitions

Product: Architect

To remove a schedule definition:

- Select **Tools > Reports > VA Records and Schedules**.
The Records and Schedules dialog box opens.
- Select the schedule definition to remove.
- Click **Remove** in the Schedules section of the Records and Schedules dialog box. This operation cannot be undone; click **Yes** to confirm that the schedule should be removed.



The schedule definition is removed from the schedule list.

4. Click **Done** to close the Records and Schedules dialog box.

Creating Records

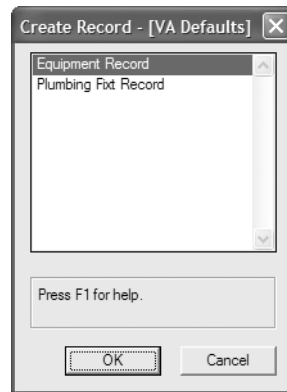
Product: Architect

The **VA Create Record** command adds record formats created with the **VA Records and Schedules** command to the current file. Once the records are added, they can be attached to items in the drawing using the **ID Label** tool. They can also be attached by selecting an object and then selecting the checkbox next to the record format in the Data tab of the Object Info palette.

To create a record:

1. Select **Tools > Reports > VA Create Record**.

The Create Record dialog box opens, listing the available records that can be added to the file.



2. Select the record to add to the file.
3. Click **OK** to add the specified record to the file.

Creating Schedules

Product: Architect

The **VA Create Schedule** command generates worksheets for the current file. Any schedule definitions that were created with the **VA Records and Schedules** command display in the list, as well as several pre-formatted schedules provided as default resources with VectorWorks Architect.

The **Display default content** option must be selected on the Session tab of VectorWorks preferences to see the pre-formatted schedules. (See “Session Preferences” on page 42 in the VectorWorks Fundamentals User’s Guide.)

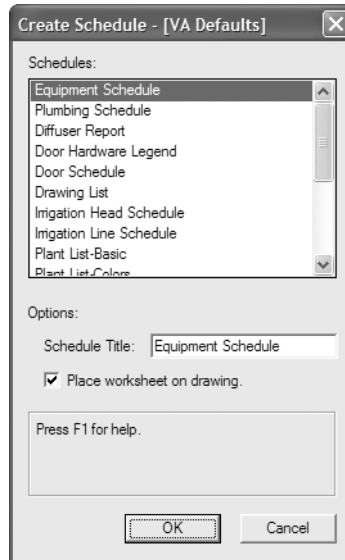
Pre-formatted schedules include:

- Equipment Schedule
- Door Schedule
- Roof Face Area
- Wall Style Report
- Diffuser Report
- Drawing List
- Room Finish Schedule
- Window Schedule
- Door Hardware Legend
- Plumbing Schedule
- Wall Area

To generate a schedule:

1. Select **Tools > Reports > VA Create Schedule**.

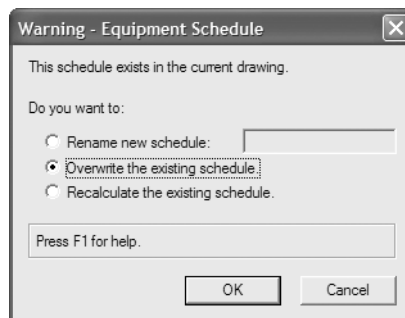
The Create Schedule dialog box opens, listing the schedules that can be added to the file.



2. Select the desired schedule to be created. Enter a new **Schedule Title** if desired. Select **Place worksheet on drawing** to place the worksheet on the drawing for printing.
3. Click **OK**.

Each schedule has a record format associated with it. If there is a difference between the record definition currently in the file and the record definition in the current preference set, a notice displays with the option to continue or fix the record.

If the selected schedule already exists in the file, a warning dialog box opens. Select whether to replace or rename the new schedule (some schedules also have a recalculate option), and click **OK**.



4. Click on the drawing area where the top left corner of the schedule is to be located.

The worksheet opens, displaying the schedule information. If the option to place the worksheet on drawing was selected, the worksheet is included on the drawing.



If the “on drawing” worksheet is accidentally deleted, select the worksheet name from the Resource Browser and select **Worksheet On Drawing** from the **Resources** menu.

Creating a Room Finish Legend

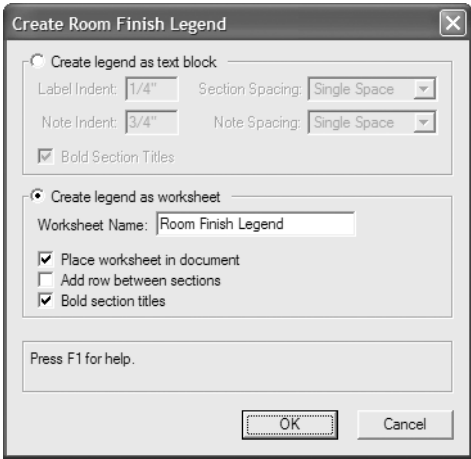
Product: Architect

There can be dozens of room finishes assigned within a project file. To obtain a detailed report of all room finish data, first generate a room finish schedule as described in “Creating Schedules” on page 378. Then generate a detailed legend showing a full description of the finishes using the **Create Rm Finish Legend** command. This command can only be used after room finishes have been assigned to space objects.

To generate a room finish legend:

- 1. Select **Tools > Reports > Create Rm Finish Legend**.

The Create Room Finish Legend dialog box opens.



Parameter	Description
Create legend as text block	Adds the legend to the drawing as a text block
Label Indent	Sets the offset from the location title to the item title
Note Indent	Sets the offset from the location title to the item description
Section Spacing	Sets the text spacing between each section
Note Spacing	Sets the text spacing between each item description
Bold Section Titles	Displays the location titles in bold face text
Create legend as worksheet	Adds the legend to the drawing as a worksheet
Worksheet Name	Sets the name of the worksheet
Place worksheet in document	Places the worksheet on the drawing at the next mouse click
Add row between sections	Adds a worksheet row between each location section
Bold section titles	Displays the location titles in bold face text



2. Select whether the legend should be displayed as a text block or as a worksheet. See “Creating Text Blocks” on page 186 in the VectorWorks Fundamentals User’s Guide and “Creating Worksheets” on page 563 in the VectorWorks Fundamentals User’s Guide.

Display Method	Description
Text block	Define the area for the legend to occupy. Click to set the top left corner of the text block, and then click to set the bottom right of the text block. The text legend is generated within the defined rectangle.
Worksheet	The worksheet is created with the legend information. If the Place worksheet in document option is selected, click on the drawing to set the top left corner of the worksheet.

3. Click **OK**.

ID Label Tool

Product: Architect and Landmark

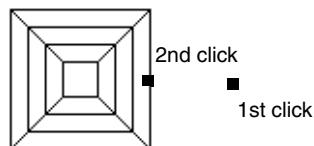
The **ID Label** tool labels drawing objects with an identifier so they can be properly referenced on an associated schedule. These labels can be applied to specific objects with attached data records, such as doors, windows, equipment, plumbing fixtures, electrical items, and irrigation objects. This tool also provides a convenient way to specify or edit attached record data. The ID labels can be customized using special symbols (see “Creating Custom ID Label Symbols” on page 535 for more information).

For doors and windows, the ID label bubble size is independent of text size. The ID bubble is drawn at the size specified in the **ID Label Size** field of the Object Info palette, unless the text exceeds the ID bubble size; in this case, the bubble automatically expands to fit the text. To restore the ID bubble to a fixed size, reduce the text size to fit within the ID bubble.



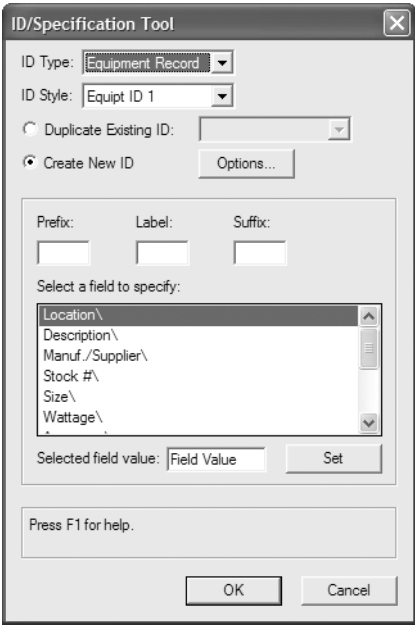
To place an ID label:

1. Click the **ID Label** tool from the Dims/Notes tool set.
2. Click to set the location of the ID label.



3. Click on the object to associate with the ID label.

The ID/Specification Tool dialog box opens. Set the ID parameters.

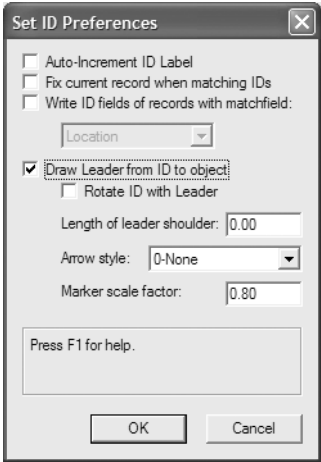


Parameter	Description
ID Type	Select the record associated with the ID; this is automatically selected if the object is associated with one of the available records
ID Style	Select the graphical ID style to display If a styled wall is being labeled, this is the only field available; data fields must be added and edited via the Resource Browser, as described in “Editing ID Labels and Records for Wall Styles” on page 385.
Duplicate Existing ID	Click to associate an existing ID to this label; select the ID from the list
Create New ID	Click to create a new ID label
Prefix	Assigns alphanumeric information before the numerical label value; adding prefix information is optional
Label	Assigns a numerical value to the ID; this number increments automatically if the auto-increment option is chosen in the Set ID Preferences dialog box
Suffix	Assigns alphanumeric information after the label value if the auto-increment option is chosen; adding suffix information is optional
Select a field to specify	Select a record field associated with the object to edit its value
Selected field value	Enter or edit a field value and then click Set to confirm the change
Options	For windows or doors, opens the ID Settings dialog box; for other objects, opens the Set ID Preferences dialog box

4. Click **Options** to set specific preferences for this ID.

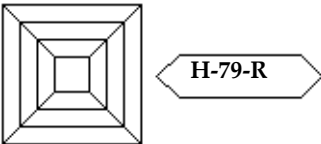
If the object being labeled is a window or door, complete the fields in the ID Settings dialog box as described in the Data tab section of “Inserting Windows” on page 83 and “Inserting Doors” on page 93. Select **Auto-Increment ID Label** in the ID Settings dialog box to automatically increment the numerical ID value each time the label is placed. Continue with step 6. For all other objects, go to step 5.

- 5. If the object being labeled is something other than a window or door, complete the fields in the Set ID Preferences dialog box.



Parameter	Description
Auto-Increment ID Label	Automatically increments the numerical ID value each time the label is placed; not available for styled walls
Fix current record when matching IDs	Automatically overwrites the current record information when applying an existing ID label; not available for styled walls
Write ID fields of records with matchfield	Finds records with matching value in match field and writes ID value to match; not available for styled walls
Draw Leader from ID to object	Draws a leader from the ID label to the object
Rotate ID with Leader	Rotates the ID symbol to the angle of the leader line
Length of leader shoulder	Sets the length of the horizontal segment of the leader line
Arrow style	Sets the style of arrow to use with the leader line
Marker scale factor	Sets the size of the leader’s arrow; a factor of less than one decreases the size of the arrow while a factor of more than one increases its size

- 6. Click **OK**.
The ID is drawn.





To bypass the ID Label dialog boxes and automatically place an existing ID label repeatedly, hold down the Alt (Windows) or Option (Macintosh) key while applying additional labels.

To easily convert any object into a door or window, place an ID label on the object and select the Window Object or Door Object **ID Type** in the ID/Specification Tool dialog box. A symbol is automatically created for the object and displays in the Resource Browser, and is available to use as symbol geometry for subsequently placed windows or doors. Select the window or door object and click **Settings** in the Object Info palette to open the Window or Door Settings dialog box to attach record information to include in the window or door Schedule (see “Inserting Windows” on page 83 and “Inserting Doors” on page 93).

Editing Existing ID Labels and Record Information

Product: Architect and Landmark

After placement, objects with record information and ID labels can be edited to change the record or ID data. Worksheets, including schedules, and the **ID Label** tool can change the record information of multiple objects at once.

Editing Record Information with Worksheets

Product: Architect and Landmark

Global changes to symbol and plug-in object record information can be made using database rows in VectorWorks worksheets. During a schedule review, it is often necessary to make changes to objects and update them automatically on the drawing.

Only database rows are directly associated with drawing elements, and can update the drawing in this way. Fields which result from a calculation, or from locked objects, workgroup-referenced items, or control points, cannot edit drawing elements. For more information on worksheets, see “Using Worksheets” on page 566.

To edit record information from a worksheet:

1. Open the worksheet that contains the record information to be edited, by selecting the worksheet in the Resource Browser and selecting **Edit** from the Resources menu or the context menu. Alternatively, select the worksheet from the **Window > Worksheets** menu.

For example, a Window Schedule worksheet contains record information for the windows in the drawing.

2. Select the database row cell to be edited.

Text and number fields can be edited directly, while popup fields allow a selection to be made, either from the edit list at the top of the worksheet, or from the **Pick Value from List** context menu item.

To repeat the same value in several text or number fields of the same record, copy the desired value from one field, select multiple rows, and paste. (Pasting cannot be performed for popup fields.)

3. The drawing records automatically update with the new information, and the drawing objects reflect the changes.

If record field from a summarized database row has been edited, all objects referenced by the row are edited.



Window Schedule												
Timber												
	A	B	C	D	E	F	G	H	I	J	K	L
1	Window Schedule											
2			Nominal Si		Window Style			Sill		Shutte		Glass
3			O.A. Width	O.A. Height	Sash Operation	Top Shape	Transom Sash	Muntin Pattern		Interior	Exterior	
4	Mark											
4.1	# 10 0	####	####		10	10	-	10	10	-	-	10
4.2	W 02	2 5/8	6 1/8	Double Hung	Square	-	Colonial	Timber				
4.3	W 03	2 5/8	6 1/8	Double Hung	Square	-	Colonial	Timber				
4.4	W 04	2 5/8	6 1/8	Double Hung	Square	-	Colonial	Timber				
4.5	W 05	2 5/8	6 1/8	Double Hung	Square	-	Colonial	Timber				
4.6	W 06	2 5/8	6 1/8	Double Hung	Square	-	Colonial	Timber				
4.7	W 07	2 5/8	6 1/8	Double Hung	Square	-	Colonial	Timber				
4.8	W 08	2 5/8	6 1/8	Double Hung	Square	-	Colonial	Timber				
4.9	W 09	1 5/8	3 3/8	Casement	Square	-	Colonial	Timber				
4.9	W 10	1 5/8	3 3/8	Casement	Square	-	Colonial	Timber				

Editing ID or Record Information with the ID Label Tool

Product: Architect and Landmark

The **ID Label** tool can be used to change ID or record information after placing an ID. Labels and records for styled walls are edited differently; see “Editing ID Labels and Records for Wall Styles” on page 385 for details.



To edit an existing ID label or record information:

1. Click the **ID Label** tool from the Dims/Notes tool set.
2. Double-click on the ID label to edit.

If the labeled object is a window or door, complete the fields as described in the Data tab section of “Inserting Windows” on page 83 and “Inserting Doors” on page 93. If editing the object through the Object Info palette, an additional parameter, **ID Label Size**, is available for controlling the size of the ID label bubble. Continue with step 4. For all other objects, go to step 3.

3. If the labeled object is something other than a window or door, edit the fields in the ID/Specification Tool dialog box, as described in “ID Label Tool” on page 381.
4. Click **OK**.

The edits are applied to the ID label and record attached to the object.

Editing ID Labels and Records for Wall Styles

Product: Architect

Data fields (including an ID label) are specified for each wall style, which means that each wall with a particular style has the same label and record attached to it. Therefore, ID labels and records cannot be edited for individual styled walls with the **ID Label** tool. (See “Using Wall Styles” on page 55 for more information about creating, editing, and using wall styles.)

To edit ID label or record information for a wall style:

1. Select the wall style from the Resource Browser and click **Edit** from the Resources menu.
2. In the Edit Wall Style dialog box, click the Data Fields tab.

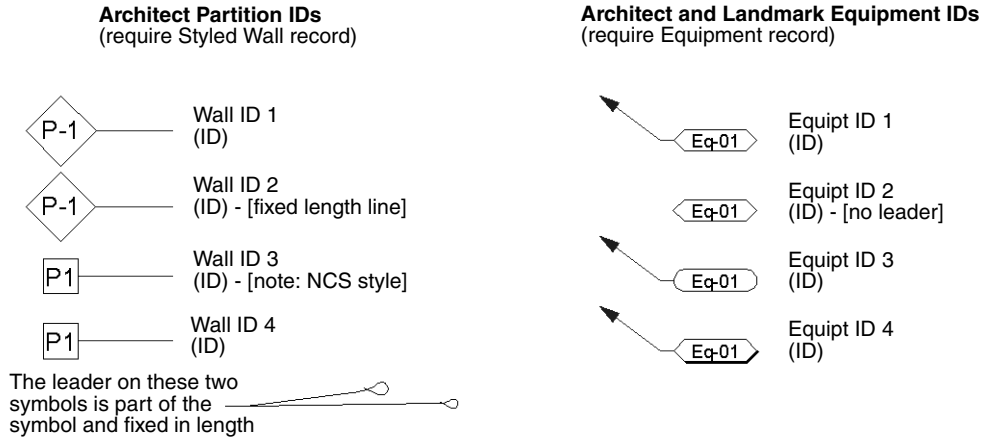


3. Enter a label ID in the **Mark** field, and enter other data fields as necessary.
 4. Click **OK** to close the Edit Wall Style dialog box, and click **OK** again to close the Wall Replacement dialog box.
- From this point forward, walls that are created with this style have the specified data record attached; when an ID label is added to a wall that has this style, the **Mark** entry displays in the label.

VectorWorks Architect and Landmark ID Symbols

Product: Architect and Landmark

The following ID symbols are provided with VectorWorks Architect and/or VectorWorks Landmark, and require the presence of the indicated record format in the drawing file. The **ID Label** tool creates the record format if it does not already exist.



Working with Project Preference Sets

Product: Architect

In most cases, the default project preference set (VA Defaults) is the only set needed. If additional sets of records and schedules are needed, create a new set of preferences and select that set before setting up a new drawing file.

A project preference set is a grouped configuration of record, schedule, and library information that is used by a drawing file. A project preference set can be customized for particular projects (residential, commercial, etc.) or different types of clients (restaurant, retail store, etc.). Different record and schedule formats can be assigned, as well as information in room finish libraries and door hardware libraries. These custom configurations are saved in external text files. The **VA Set Project Prefs** command assigns which set of external files to use within the current drawing. The settings files used by these commands, taken together, are called a “project preference set.”

Because the preference sets are stored as external files, they can be shared among many users to comply with office standards. The preference set folders can be copied to the same location for each user, or shared on a network location. Either select the **VA Set Project Prefs** command to designate the preference set location, or copy the following text file to each computer:

[VectorWorks]\Plug-Ins\VW_Arch\Data\VA2_Preference_Set_Paths.txt

See “Project Preference Sets” on page 597 for information on the files contained in the preference set folders.

Selecting a Project Preference Set

Product: Architect

The default preference set is named “VA Defaults,” and its files are located in [VectorWorks]\Plug-Ins\VW_Arch\Data\Prefs_Def.

To use a different project preference set, select it when setting up the file. The preference set selection is saved with the file. Changes to VA Records and Schedules, the Door Hardware Library, or the Room Finish Library are saved in the currently selected project preference set.

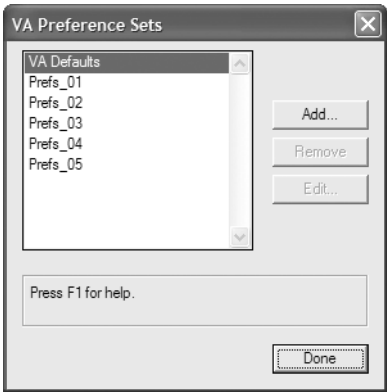
[When using template files for different types of projects, make a preference set selection before saving the template.](#)

To select a project preference set:

1. Select **Tools > Options > VA Set Project Prefs**.



The VA Preference Sets dialog box opens. The listed sets are available for use in the file.



Parameter	Description
Preference set list	Lists project preference sets that are available for use in the file
Add	Adds a project preference set to the list; specify the set location and name
Remove	Deletes the selected project preference set association (the file is not deleted, but cannot be selected for this project)
Edit	Changes the project preference set name or location

- 2. Select the project preference set to activate.
- 3. Click **Done**.

The selection “VA Defaults” cannot be deleted or edited; it contains the information that is used if no project preference set is designated or if there is an error finding the designated set.

Creating a New Project Preference Set

Product: Architect

While VectorWorks Architect installs six project preference sets, it supports the use of an unlimited number. To add preference sets beyond the default options, manually create additional preference folders and then add the set to the list of defined sets using the **VA Set Project Prefs** command.

The project preference set folder must contain the following files for correct operation:

- Door Hardware Library.txt
- Equipment Record.txt
- Equipment Schedule.txt
- Plumbing Fixt Record.txt
- Plumbing Schedule.txt
- Room Finish Library.txt
- VA2 Records and Schedules.txt
- VA_Project_Set.txt

If additional records and schedules are defined using the **VA Records and Schedules** command, their data files are stored in the project preference set folder.



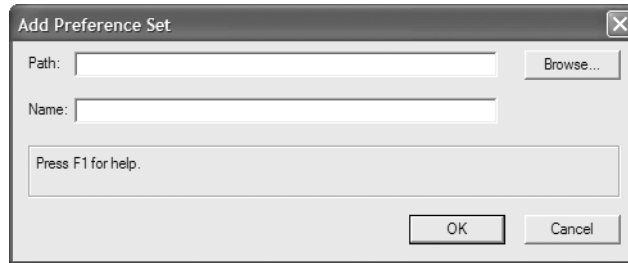
Adding a Project Preference Set

Product: Architect

After creating a project preference set, add it to the list of project preference sets available:

1. Select **Tools > Options > VA Set Project Prefs.**
2. The VA Preference Sets dialog box opens. Click **Add**.

The Add Preference Set dialog box opens.



Parameter	Description
Path	Enter or browse for the path to the project preference set folder
Name	Specifies a name for this project preference set

3. Click **OK** to return to the VA Preference Sets dialog box. To use the new project preference set, select it from the list and click **Done**.

Notes Management

Product: Architect, Landmark, Spotlight, and Machine Design

VectorWorks Design Series products provide a full set of features for managing and creating complete and fully-referenced annotation of project files. These features can streamline the annotation process by providing a central location for storing, selecting, and placing frequently-repeated notes. Notes can be reused across files, either within a project, or across separate projects.

A callout is text with a leader line, displaying information about an item in the drawing. A keynote is a callout that references a note contained in a keynote legend. Finally, general notes contain text not associated with a particular item in the drawing.

A callout object is included with the VectorWorks Fundamentals program, but its capabilities are extended in the Design Series, allowing it to be used for keynotes in addition to ordinary notes. For more information on the **Callout** tool, see “Inserting Callouts” on page 198 in the VectorWorks Fundamentals User’s Guide.

Placing callouts as keynotes also creates a keynote legend object. The keynote legend automatically numbers the notes, and ensures that multiple instances of the same note are assigned the same keynote number.

In addition to callouts, a general notes object places and automatically numbers general notes.

The callout, keynote legend, and general notes objects can be used with manually-entered text, or in conjunction with external databases which store and retrieve text. When a database is used, text is entered only once into the database, and then pulled from the database for notes in the drawing. After notes have been placed, if changes are made to the database or to the notes, the differences can be reconciled with the **Reconcile Notes** command.



Notes Management without Databases

Product: Architect, Landmark, Spotlight, and Machine Design

Keynotes and general notes can be placed on the drawing by manually entering the notes text; a database is not mandatory.

Placing Keynotes

Product: Architect, Landmark, Spotlight, and Machine Design

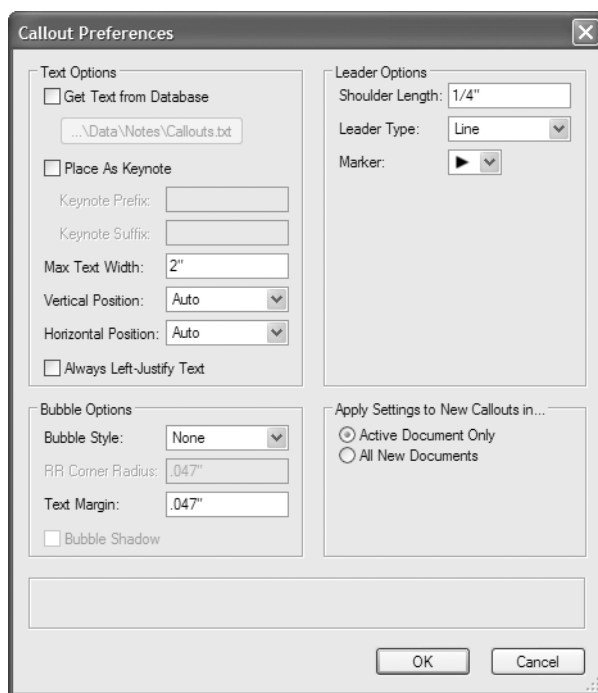
Keynotes are placed with the extended capabilities of the **Callout** tool. The keynote legend is automatically created.



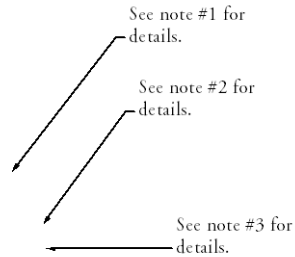
To place a keynote:

1. Click the **Callout** tool from the Basic palette.
2. Click the **Preferences** button on the Tool bar.

The Callout Preferences dialog box opens. For more information on the **Callout** tool, see “Inserting Callouts” on page 198 in the VectorWorks Fundamentals User’s Guide.



3. Select **Place As Keynote**. Specify the keynote prefix and suffix text, if desired.
4. Click **OK**.
5. Click in the drawing to place the callout object. Enter the keynote text in the Enter the Text of the Note dialog box.
6. The keynote is placed in the drawing; a keynote legend object is also created.

**Notes**

1. R-19 faced batt insulation typ.
2. 5 x 7 1/4" steel column
3. 4" concrete slab with 6" wire mesh

7. Continue placing any additional keynotes. Keynotes referencing the same text automatically use the same number; different text causes the keynote to be numbered sequentially and added to the keynote legend.

Editing Keynotes and the Keynote Legend

Product: Architect, Landmark, Spotlight, and Machine Design

Both the keynotes and keynote legend can be edited after placement. If only one keynote is to be edited, select it and make the changes in the Object Info palette. If the text of several keynotes is to be edited, select the keynote legend and make the edits from the Object Info palette.

Keynote legends are layer-specific; one legend is created per layer. To print several layers at the same time with one correctly numbered legend, the keynotes must be moved so that they are all on the same layer.

[Double-click a callout or keynote legend to edit it.](#)

Editing Keynotes

Product: Architect, Landmark, Spotlight, and Machine Design

To edit individual keynotes:

1. To change the text of a selected keynote, select the callout and click **Edit Note** in the Object Info palette.
2. Other callout parameters can be edited in the Object Info palette, like an ordinary callout object. For more information on the **Callout** tool, see "Inserting Callouts" on page 198 in the VectorWorks Fundamentals User's Guide.
3. After placement, a keynote can be converted into an ordinary callout object by deselecting **Place As Keynote** in the Object Info palette. The keynote is removed from the keynote legend.

Editing the Keynote Legend

Product: Architect, Landmark, Spotlight, and Machine Design

To edit the keynote legend:

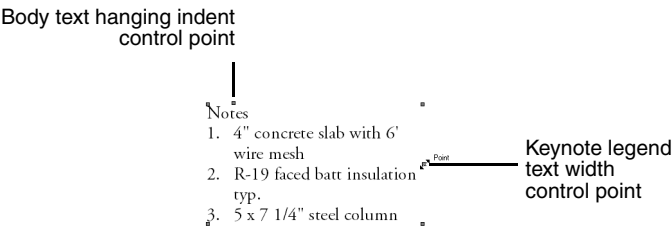
1. The keynote legend parameters can be edited from the Object Info palette.

Parameter	Description
Title	Specifies the keynote legend title
Indent	Adjusts the hanging indent value for the legend body text
Width	Sets the keynote legend text width
Spacing	Sets the spacing between each note

Parameter	Description
Edit Notes	Opens the Notes Manager:Keynote Legend dialog box, for editing the keynote text, description, or order
Format Title Text	Opens the Format Text dialog box, for changing the text format of the legend title
Format Body Text	Opens the Format Text dialog box, for changing the text format of the legend body text

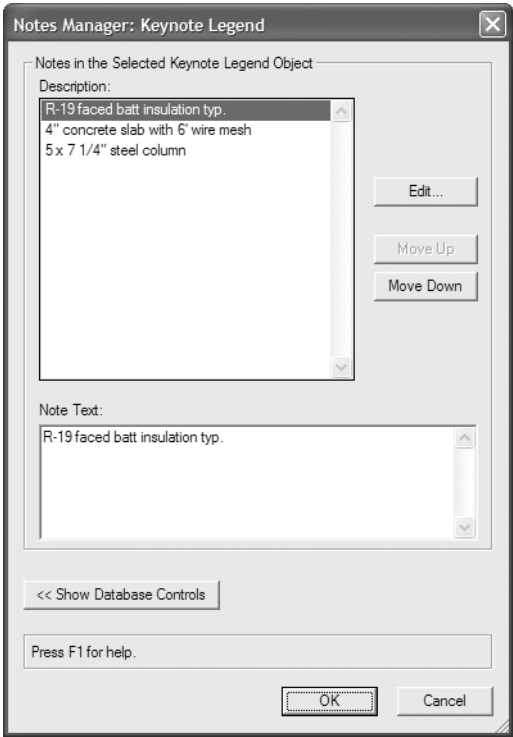
For information on formatting text, see “Formatting Text” on page 189 in the VectorWorks Fundamentals User’s Guide.

- 2. The keynote legend contains control points for adjusting the hanging indent and text width directly from the drawing.



- 3. To change keynote numbering or edit the text of all keynotes at the same time, select the keynote legend object and click **Edit Notes** in the Object Info palette.

The Notes Manager:Keynote Legend dialog box opens.

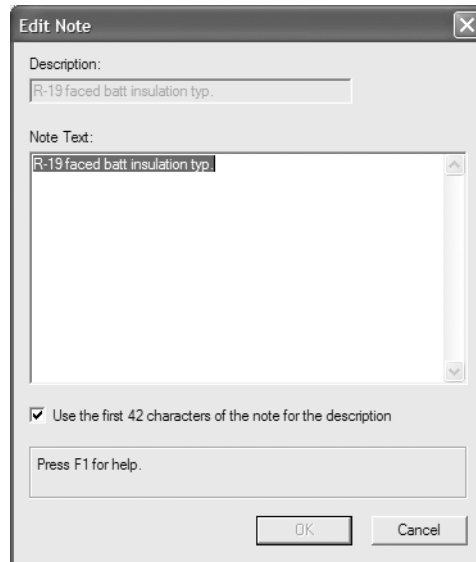




Parameter	Description
Description	Lists the keynotes (by description) in the keynote legend in numbering order
Edit	Select a keynote description and click Edit to edit the note text or change the keynote description
Move Up/Move Down	Changes the order of the keynotes in the keynote legend; move the selected keynote up or down in the list
Note Text	Select a keynote description and edit the text of the note
Show Database Controls	Displays the database-related portion of the dialog box; when working without a database, these controls are not necessary (see “Placing Database Callouts” on page 397)

- The keynotes are listed by a description. The description normally consists of the first 42 (Windows) or 38 (Macintosh) characters of the keynote, but this can be changed by selecting the description and clicking **Edit**.

The Edit Note dialog box opens. To enter a different note description, deselect **Use the first 42 characters** (Windows) or **Use the first 38 characters** (Macintosh), and change the **Description**. The note text can also be edited, if desired.



- Click **OK** to close the Edit Note dialog box.
- Click **OK** to close the Notes Manager:Keynote Legend dialog box and edit the keynote legend.

Placing General Notes

Product: Architect, Landmark, Spotlight, and Machine Design

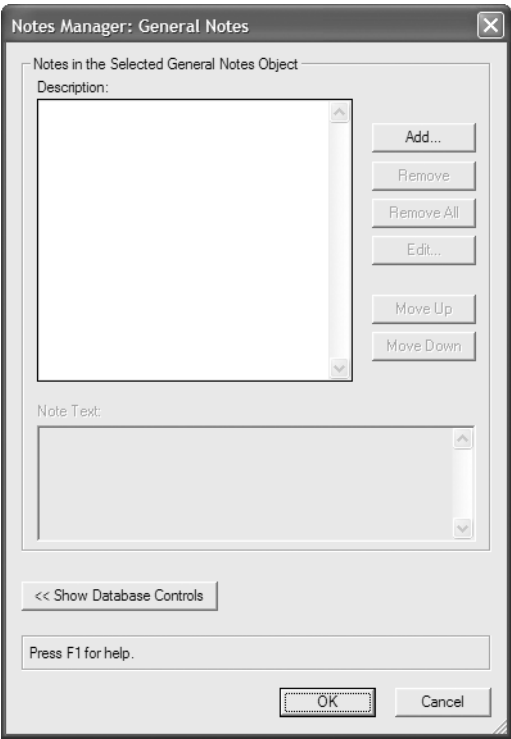
Notes management includes a **General Notes** tool, for placing and numbering general notes.



To place a general notes object:

1. Click the **General Notes** tool from the Dims/Notes tool set.
2. Click to place the general notes object in the drawing.

The Notes Manager:General Notes dialog box opens.

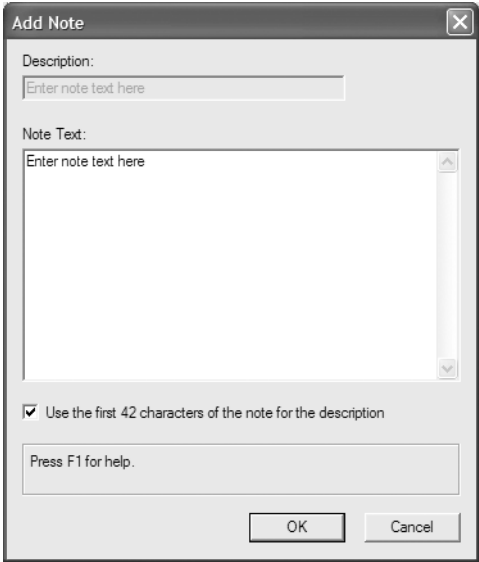


Parameter	Description
Description	Lists the general notes (by description) in numbering order
Add	Opens the Add Note dialog box, for adding a general note and specifying its description
Remove	Deletes the selected general note
Remove All	Deletes all general notes
Edit	Select a general note and click Edit to edit the note text or change the general note description
Move Up/Move Down	Changes the order of the general notes; move the selected general note up or down in the list
Note Text	Select a general note description and edit the text of the note

Parameter	Description
Show Database Controls	Displays the database-related portion of the dialog box; when working without a database, these controls are not necessary (see “Placing Database General Notes” on page 404)

3. To add a new general note, click **Add**.

The Add Note dialog box opens.



4. Enter the new general note text. The general notes are listed by a description. The description normally consists of the first 42 (Windows) or 38 (Macintosh) characters of the general note. To enter a different note description, deselect **Use the first 42 characters** (Windows) or **Use the first 38 characters** (Macintosh), and change the **Description**.
5. Click **OK** to add the new general note.
6. The note text can be edited, if desired. Select the note description and edit the text in the Note Text area. The note text and its description can be edited by clicking **Edit**. Delete selected notes by clicking **Remove**.
7. Order the general notes by clicking **Move Up** or **Move Down**.
8. Click **OK** to place the general notes object.

General Notes

1. All workmanship is to be performed in a professional manner.

2. The building inspector is to be notified at least two weeks in advance of each inspection event, to avoid delays.

3. The job site is to be kept free of excessive waste and litter.



Editing General Notes

Product: Architect, Landmark, Spotlight, and Machine Design

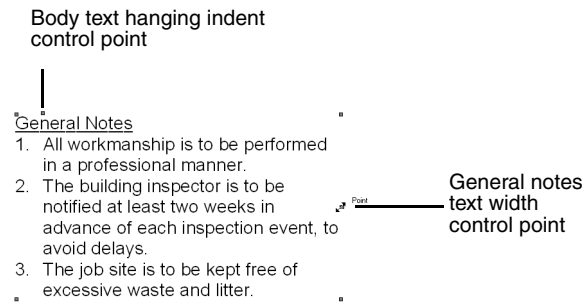
To edit a general notes object:

1. The general note parameters can be edited from the Object Info palette.

Parameter	Description
Title	Specifies the general notes title
Indent	Adjusts the hanging indent value for the general notes body text
Width	Sets the width of the general notes text
Spacing	Sets the spacing between each note
Edit Notes	Opens the Notes Manager:General Notes dialog box, for editing the general notes text, description or order (see “Placing General Notes” on page 393)
Format Title Text	Opens the Format Text dialog box, for changing the text format of the general notes title
Format Body Text	Opens the Format Text dialog box, for changing the text format of the general notes body text

For information on formatting text, see “Formatting Text” on page 189 in the VectorWorks Fundamentals User’s Guide.

2. The general notes object contains control points for adjusting the hanging indent and text width directly from the drawing.



Notes Management with Databases

Product: Architect, Landmark, Spotlight, and Machine Design

Instead of manually typing the text for every callout, keynote and general notes object, text that is used repeatedly—by one or many users—across projects and files can be stored in a tab-delimited text file (referred to as a “database”). The use of a database for storing notes saves time and prevents errors, and standardizes compliant notes usage across files.

There are no limits to the number of databases that can be used for annotating a drawing. The databases can have an unlimited number of notes of any length. After placement, notes can be easily updated if changes are made to a database.



Placing Database Callouts

Product: Architect, Landmark, Spotlight, and Machine Design

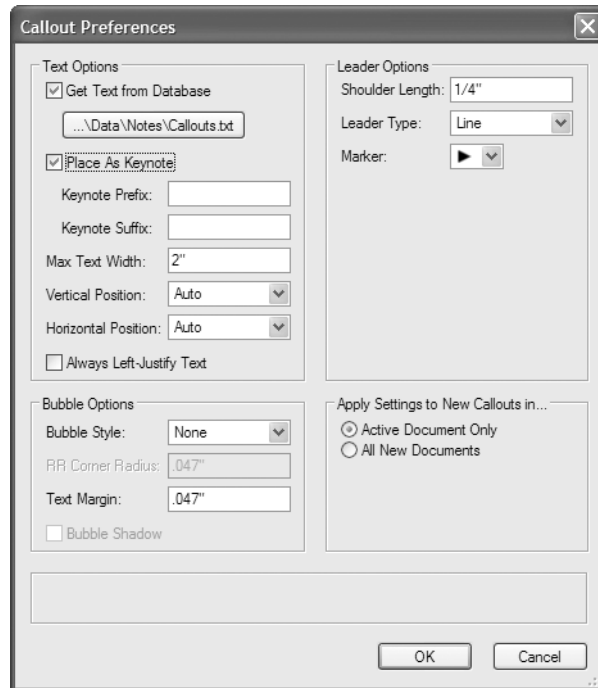
Callouts with database notes are placed with the extended capabilities of the **Callout** tool.



To place a database callout:

1. Click the **Callout** tool from the Basic palette.
2. Click the **Preferences** button on the Tool bar.

The Callout Preferences dialog box opens. For more information on the **Callout** tool, see “Inserting Callouts” on page 198 in the VectorWorks Fundamentals User’s Guide.



3. Select **Get Text from Database**; the current database file is displayed as a button.
4. To select a different database, click the database button.

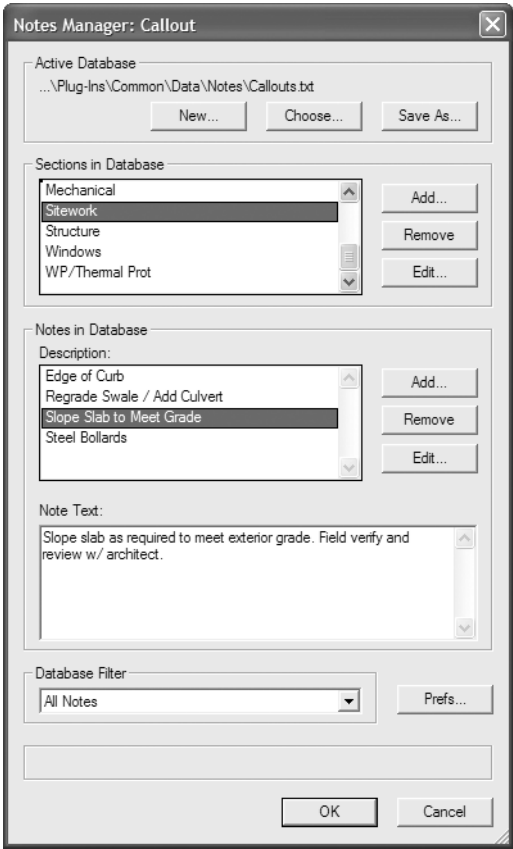
The standard Open dialog box allows a different database file to be selected. Select the database file, and click **Open**.

A sample database is located in [VectorWorks]\Plug-Ins\Common\Data\Notes\Callouts.txt

5. Click **OK**.
6. Click in the drawing to place the callout object.

Once the callout leader is drawn, the Notes Manager:Callout dialog box opens automatically, displaying the information from the selected database.

The notes in a selected section are listed by a description. The description normally consists of the first 42 (Windows) or 38 (Macintosh) characters of the note.



Parameter	Description
Active Database	Displays the currently selected database file
New	Creates a new, blank database
Choose	Selects a different, existing database. A database from a previous version of VectorWorks can be specified, but it must be converted to the current version format as prompted.
Save As	Saves the current database with a new name
Sections in Database	Lists the note sections; the associated notes in a selected section are displayed in Notes in Database
Add	Adds a new note section; enter the section name in the Enter String dialog box
Remove	Deletes the currently selected section and its associated notes
Edit	Renames the currently selected section; enter the new name in the Enter String dialog box
Notes in Database	Lists the notes associated with the current database section
Add	Opens the Add Note dialog box, for adding a note to the database section

Parameter	Description
Remove	Deletes the currently selected note(s)
Edit	Opens the Edit Note dialog box, for editing the selected note or its description
Note Text	Displays the note text of the currently selected note; the note text can be edited
Database Filter	Filters the database sections, descriptions, or notes with a search term, to more easily locate a note
Prefs	Sets the automatic save options for the database

7. To add a note to a selected section, click **Add** under **Notes in Database**.

The Add Note dialog box opens. Specify the section, description, and note text.

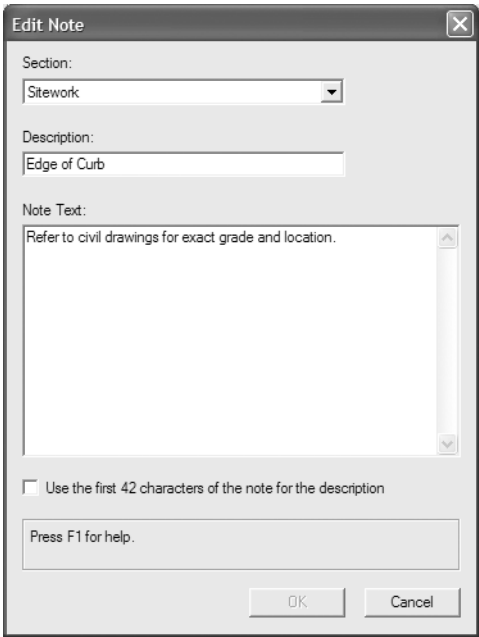
The 'Add Note' dialog box is shown. It has a title bar with a close button. Inside, there are three main input areas: 'Section' (a dropdown menu currently showing 'Sitework'), 'Description' (a single-line text field containing 'Note 1'), and 'Note Text' (a multi-line text area with 'Note 1' at the top). Below these is a checked checkbox with the label 'Use the first 42 characters of the note for the description'. At the bottom, there is a text box containing 'Press F1 for help.' and two buttons: 'OK' and 'Cancel'.

Parameter	Description
Section	Select the associated section for the note
Description	By default, consists of the first 42 (Windows) or 38 (Macintosh) characters of the note text; deselect Use the first 42 characters (Windows) or Use the first 38 characters (Macintosh), and enter a different note description, if desired
Note Text	Type the new note text
Use the first 42 characters (Windows) or Use the first 38 characters (Macintosh)	If the default description is not desired, deselect and enter a new Description

8. Click **OK** to add the note to the specified section and return to the Notes Manager:Callout dialog box.

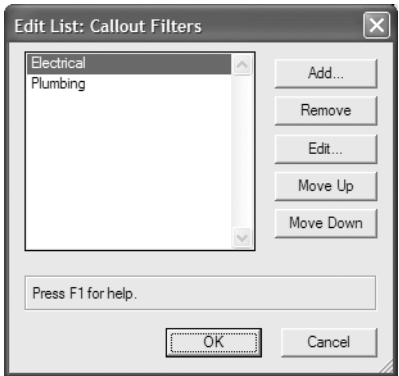
9. Change the note description by selecting the description and clicking **Edit**.

The Edit Note dialog box opens. To enter a different note description, deselect **Use the first 42 characters** (Windows) or **Use the first 38 characters** (Macintosh), and change the **Description**. The note text can also be edited, if desired, and the note can be associated with a different section.



10. Click **OK** to edit the note description and return to the Notes Manager:Callout dialog box.
11. The text of a selected note can be edited in **Note Text**.
12. To search easily for a note, section, or description, use a filter. Only notes, sections, or descriptions with the specified text are displayed. Select the desired filter from the **Database Filter** list in the Notes Manager:Callout dialog box. To display all notes, sections, and descriptions, select **All Notes**. In addition, if no items match a selected filter, all notes are displayed.
13. To edit the database search filters, select **Edit List** from the **Database Filter** list.

The Edit List:Callout Filters dialog box opens. The filters are listed in order.

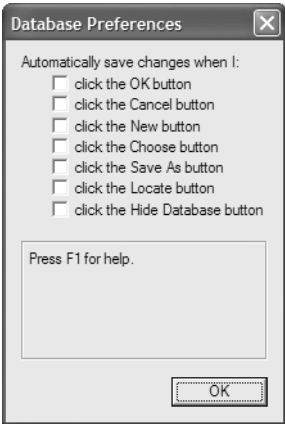




Parameter	Description
Filter list	Lists the search filters in the order they display in the database filter list
Add	Adds a search filter to the list; enter the new term in the Enter String dialog box
Remove	Deletes the currently selected search filter(s)
Edit	Renames the current search filter; enter the new name in the Enter String dialog box
Move Up/Move Down	Changes the filter list order; select the search filter and move it up or down in the list

- 14. Click **OK** to change the search filters and return to the Notes Manager:Callout dialog box.
- 15. Changes and additions to the notes database are saved automatically according to the preferences specified. Click **Prefs** to set these preferences.

The Database Preferences dialog box opens. Set the desired actions that automatically save database changes by selecting the associated checkbox(es). If no automatic saving is specified, you will be prompted frequently about saving the database.



The **Locate** and **Hide Database** options are available when editing a General Notes or Keynote Legend with database.

- 16. Click **OK** to return to the Notes Manager:Callout dialog box.
- 17. Once the desired note has been entered or located, select it and click **OK**. The selected note is used for the callout text.

Slope slab as required to meet exterior grade. Field
• verify and review w/architect.

Editing a Database Callout
Product: Architect, Landmark, Spotlight, and Machine Design
The database callout can be edited after placement.



To edit a database callout:

1. To change the note text, select the callout and click **Edit Note** in the Object Info palette.
2. The Notes Manager:Callout dialog box opens. Select a different note as described in “Placing Database Callouts” on page 397, and click **OK**.
3. Other callout parameters can be edited in the Object Info palette as for an ordinary callout object. For more information on the **Callout** tool, see “Inserting Callouts” on page 198 in the VectorWorks Fundamentals User’s Guide.
4. After placement, a database callout can be converted into an ordinary callout object by deselecting **Get Text from Database** in the Object Info palette. The callout text can then be edited by clicking **Edit Note** in the Object Info palette; the database text is not affected.

Placing Database Keynote Legends

Product: Architect, Landmark, Spotlight, and Machine Design

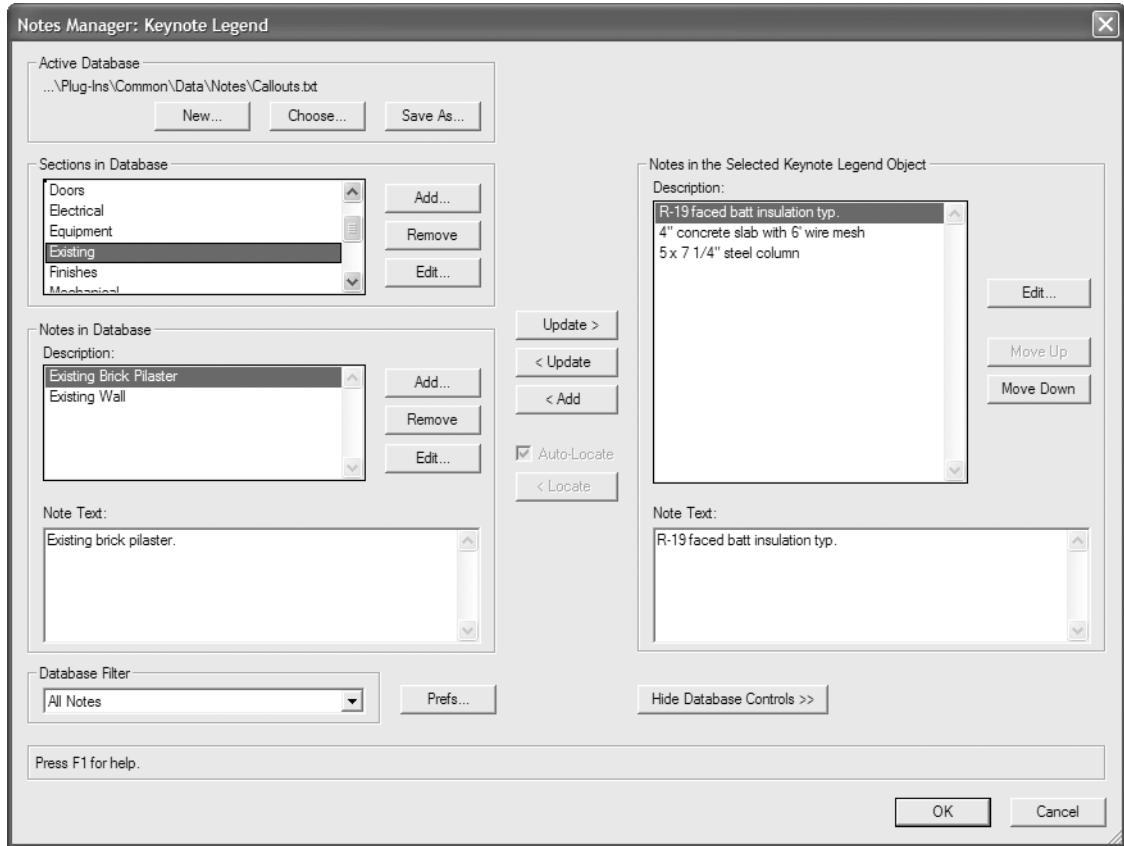
Keynote legends can take advantage of a notes database.



To place a database keynote legend:

1. Click the **Callout** tool from the Basic palette.
2. Click the **Preferences** button on the Tool bar.
The Callout Preferences dialog box opens. As described in “Placing Keynotes” on page 390, select **Place As Keynote** and click **OK**.
3. Place the callouts in the drawing area.
4. Select the keynote legend. In the Object Info palette, click **Edit Notes**.
5. The Notes Manager:Keynote Legend dialog box opens.
6. Click **Show Database Controls** to access the keynote legend database parameters.

The dialog box is divided into two sections, with the database information on the left and the keynote legend information on the right. The buttons in the center of the dialog box move information from the database to the legend and vice-versa.



Parameter	Description
Active Database, Sections in Database, Notes in Database, Note Text, Database Filter, and Prefs	Edits the database sections, notes, note text, search filters, and saving preferences as described in “Placing Database Callouts” on page 397
Notes in the Selected Keynote Legend Object	Edits the keynote legend notes and description as described in “Placing Keynotes” on page 390
Update >	Overwrites the selected keynote legend note with the selected database note
< Update	Overwrites the selected database note with the selected keynote legend note
< Add	Adds the selected keynote legend note to the database, placing it in the current database section
Auto-Locate	Automatically locates the database, section, and description of a selected keynote legend note, if the note originated from a database
< Locate	If the selected keynote legend note originated from a database, locates the note’s database, section, and description
Hide Database Controls	Hides the database portion of the keynote legend dialog box



- Click **OK** to change the keynote legend, replacing the notes with database notes.

Placing Database General Notes

Product: Architect, Landmark, Spotlight, and Machine Design

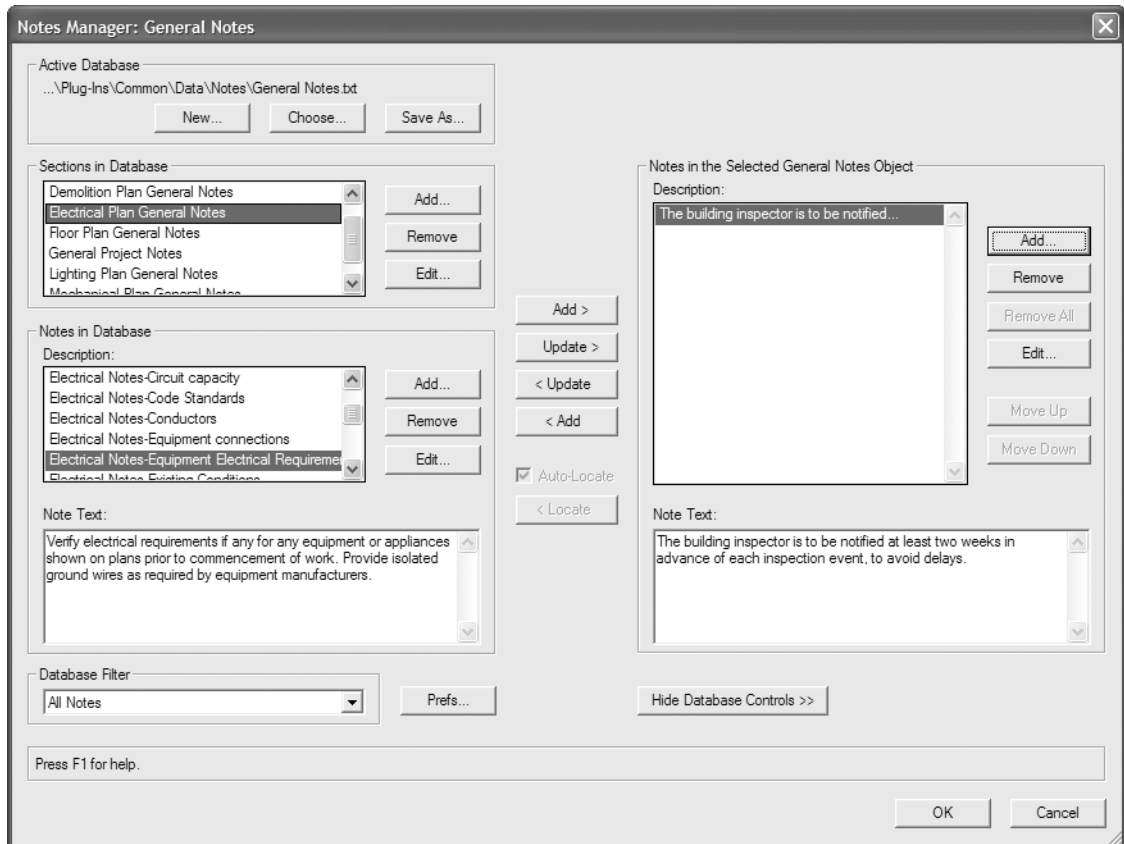
General notes can take advantage of a notes database.



To place a database general notes object:

- Click the **General Notes** tool from the Dims/Notes tool set.
- Click to place the general notes object in the drawing.
The Notes Manager:General Notes dialog box opens.
- Click **Show Database Controls** to access the general notes database parameters.

The dialog box is divided into two sections, with the database information on the left and the general notes information on the right. The buttons in the center of the dialog box move information from the database to the general notes and vice-versa.





Parameter	Description
Active Database, Sections in Database, Notes in Database, Note Text, Database Filter, and Prefs	Edits the database sections, notes, note text, search filters, and saving preferences as described in “Placing Database Callouts” on page 397
Notes in the Selected General Notes Object	Edits the general notes and description as described in “Placing General Notes” on page 393
Add >	Adds a database note to the general notes
Update >	Overwrites the selected general note with the selected database note
< Update	Overwrites the selected database note with the selected general note
< Add	Adds the selected general note to the database, placing it in the current database section
Auto-Locate	Automatically locates the database, section, and description of a selected general note, if the note originated from a database
< Locate	If the selected general note originated from a database, locates the note’s database, section, and description
Hide Database Controls	Hides the database portion of the general notes dialog box

4. Click **OK** to change the general note, replacing the notes with database notes.

Adding Text to a Database

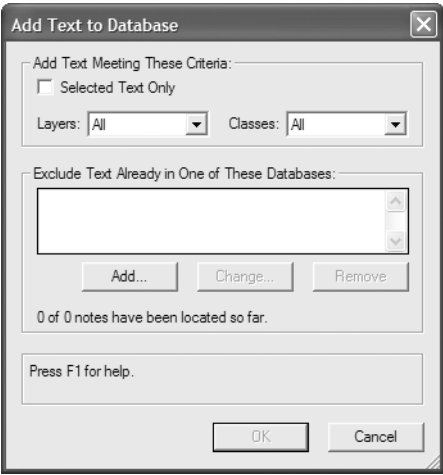
Product: Architect, Landmark, Spotlight, and Machine Design

Text objects can be added from the drawing to a selected database. This is convenient for retrieving text from older, converted files for use with the Notes Manager or when adding frequently-used text to a database for easy future insertion as an annotation.

To add drawing text to a database:

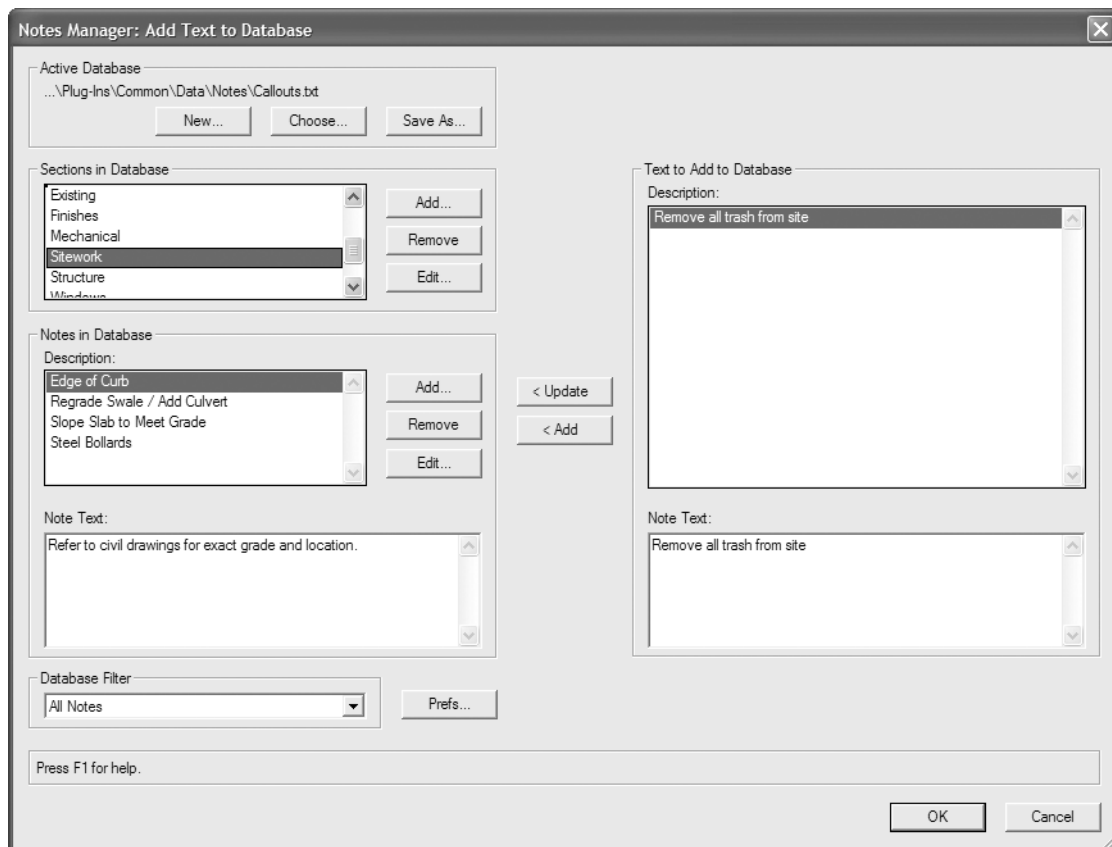
1. Select **Text > Add Text to Database**.

The Add Text to Database dialog box opens. Specify which text objects to select and indicate in which databases to search for duplicated text.



Parameter	Description
Add Text Meeting These Criteria	Specifies the criteria for selecting text objects to be added to a database
Selected Text Only	Adds only selected text to the database; when deselected, adds text from all text objects in the file
Layers/Classes	Adds only text from the specified layers and/or classes to the database; when deselected, adds text from text objects in all layers or classes in the file
Exclude Text Already in One of These Databases	Lists the databases in which to search for duplicated text; the text search is case sensitive and the match must be exact. If duplicated text is found, it is not added to the database.
Add	Adds a database to the text search database list
Change	Allows changes to a selected database's location
Remove	Removes a database from the text search database list

2. Click **OK**. If any of the text was not found in the text search database(s), the Notes Manager:Add Text to Database dialog box opens.



3. The text to be added is listed on the right. As described in “Placing Database Keynote Legends” on page 402, the text can be added to the active database in the desired section. Click **OK**.

Reconciling Database and Drawing Notes

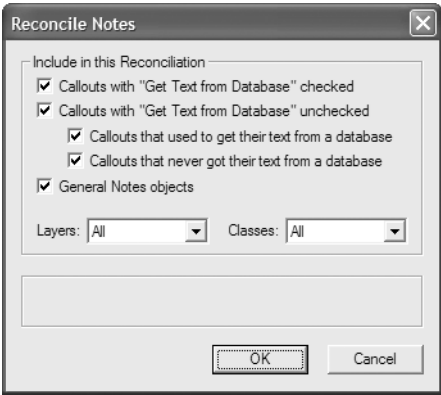
Product: Architect, Landmark, Spotlight, and Machine Design

The **Reconcile Notes** command handles differences between the database and the notes in the drawing. For example, if database callouts have been placed and the database is edited afterwards, differences must be reconciled.

To reconcile notes:

1. Select **Text > Reconcile Notes**.

The Reconcile Notes dialog box opens. Select the note objects to reconcile.

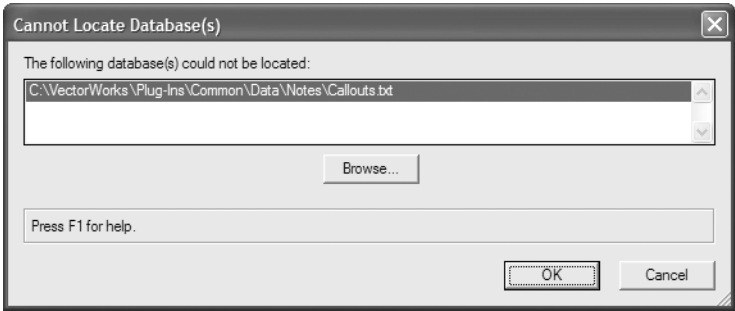


Parameter	Description
Callouts with “Get Text from Database” checked	Selects database callouts
Callouts with “Get Text from Database” unchecked	Selects ordinary callouts and keynote callouts
Callouts that used to get their text from a database	Selects callouts that were once database callouts and obtained note text from a database
Callouts that never got their text from a database	Selects callouts that did not obtain note text from a database
General Notes objects	Selects general notes
Layers / Classes	Select the layers and classes with notes to include for reconciliation

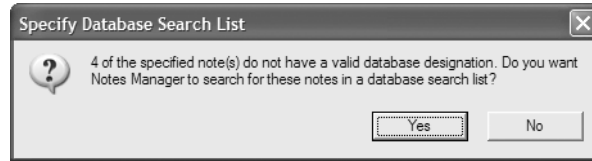
2. Click **OK** to reconcile the notes. If any of the notes reference databases, the Notes Manager attempts to locate those databases. It searches first in the same folder as the current file; if not found, it searches in the same place relative to the VectorWorks executable. If the databases still cannot be found, the Notes Manager tries to locate them with fully-qualified paths.

Place database files from another user in the same folder as the drawing file so that the Notes Manager can easily locate the databases.

3. If a database referenced by notes cannot be located, the Cannot Locate Database(s) dialog box opens. For each database that cannot be located, click **Browse** to specify the database location.

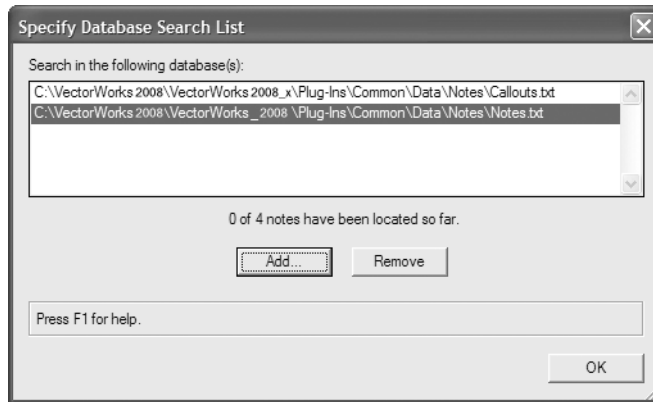


4. Click **OK**. Next, the Notes Manager searches the database(s) for the notes.
5. If one or more notes cannot be located in the database, the Specify Database Search List dialog box opens.



If there are no additional database files to be specified, click **No** and proceed to step 8. If the notes could be located in another database, click **Yes** to specify the database location.

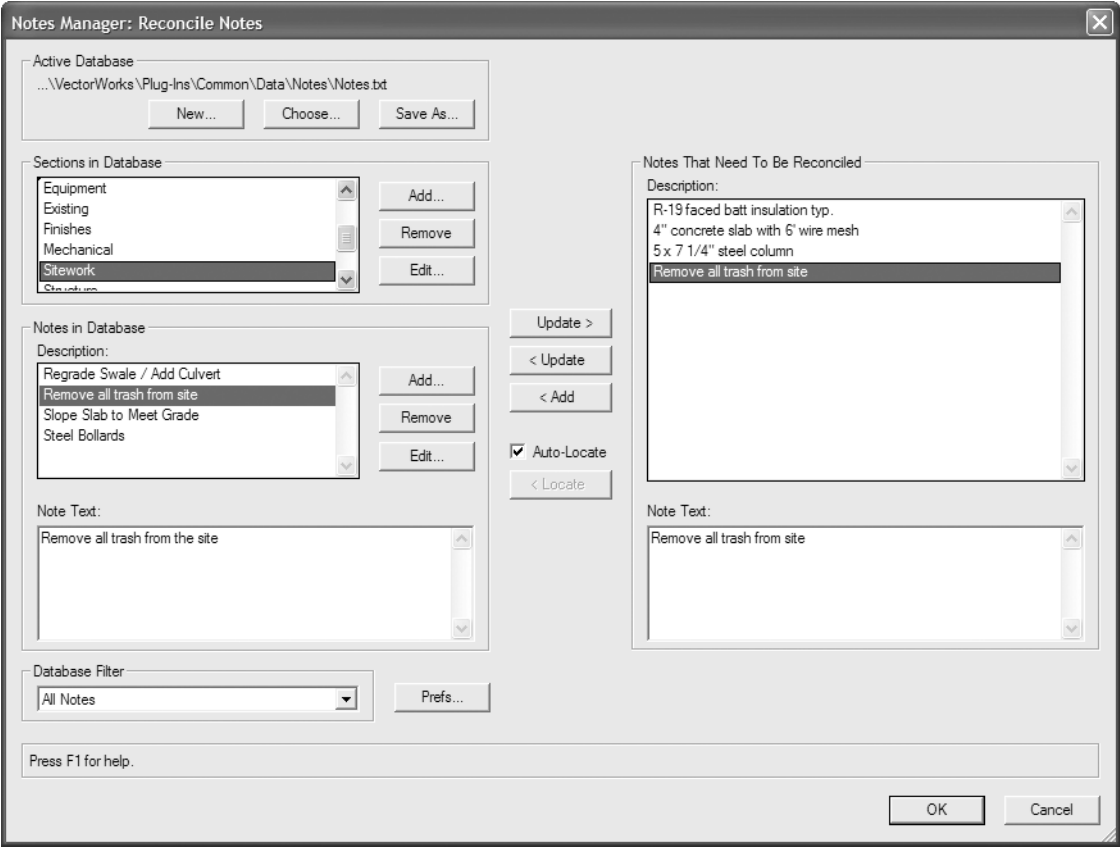
6. The Specify Database Search List dialog box opens. Click **Add** to specify additional databases where the notes are located. Click **Remove** to delete a selected database from the list. The number of notes which have been located is displayed.



7. Click **OK**.
8. If some notes have still not been located, the Notes Manager:Reconcile Notes dialog box opens.

The dialog box is divided into two sections, with the database information on the left and the notes to be reconciled on the right. The buttons in the center of the dialog box move information from the database to the general notes and vice-versa.

By using the center buttons, reconcile each note manually. As a note is reconciled, it is removed from the list.

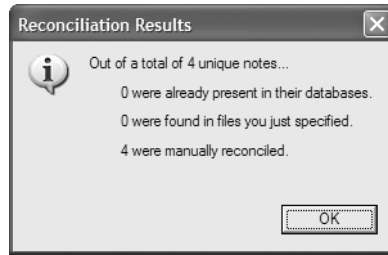


Parameter	Description
Active Database, Sections in Database, Notes in Database, Note Text, Database Filter, and Prefs	Edits the database sections, notes, note text, search filters, and saving preferences as described in “Placing Database Callouts” on page 397
Notes That Need To Be Reconciled	Displays the description and note text of the notes that have not been reconciled
Update >	Overwrites the selected note to be reconciled with the selected database note
< Update	Overwrites the selected database note with the selected note to be reconciled
< Add	Adds the selected note to be reconciled to the database, placing it in the current database section
Auto-Locate	Automatically tries to locate the database, section, and description of a selected note to be reconciled, if the note originated from a database
< Locate	If the selected note to be reconciled originated from a database, tries to locate the note’s database, section, and description

9. Click **OK**.



The Reconciliation Results dialog box opens, showing how the notes were reconciled.



Locating Databases on a Network

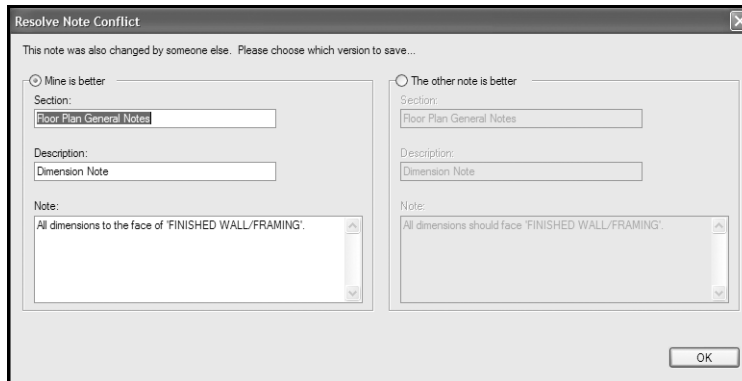
Product: Architect, Landmark, Spotlight, and Machine Design

To use databases efficiently in a multiple-user environment, the database files should be placed on a network. There, they can be accessed concurrently by several users who will then conform to office standards and will not need to retype notes.

Windows users should choose databases by browsing from Network Neighborhood (My Network Places) rather than from mapped drive letters. Otherwise, database references are dependent on drive mapping.

Database changes made by different users are merged automatically.

A conflict could arise if two different users edit the same note in the same database at the same time. If this occurs, the Resolve Note Conflict dialog box opens when closing the Notes Manager dialog box.



On the left, your version of the note displays, and on the right, the other user's version displays. Select which version of the note to save by selecting **Mine is better** or **The other note is better**. Click **OK** to resolve the conflict.

Converting Notes from Previous Versions

Product: Architect, Landmark, Spotlight, and Machine Design

Databases and notes created in versions of VectorWorks prior to version 11 can be converted for use in the current version.

Databases created in previous versions of the Notes Manager are automatically converted to the current version when they are selected by clicking **Choose** to select a database.

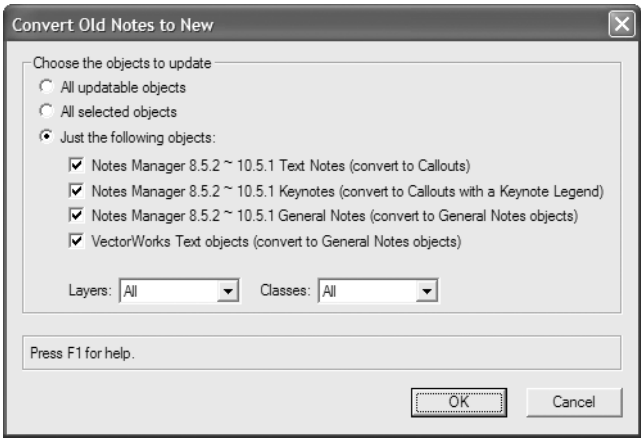
Callouts created in version 9 and above are automatically converted to the current format. They can be used as ordinary callouts, keynotes, or database callouts.



Other notes objects, such as Text Notes, Keynotes, and General Notes created by previous Notes Manager versions, as well as VectorWorks text objects, must be converted by command. VectorWorks text objects are converted to general notes.

To convert old objects to the current format:

- 1. Select **Text > Convert Old Notes to New**.
- 2. The Convert Old Notes to New dialog box opens. Select the type of old notes to convert.



Parameter	Description
All updatable objects	Converts any note-related items in the drawing
All selected objects	Converts any note-related items in the current selection
Just the following objects	Select the type of objects to be converted (Text Notes, Keynotes, General Notes from version 8.52 to 10, and text objects)
Layers/Classes	Specifies the layers and classes to be searched for objects to convert

- 3. Click **OK** to convert the objects to the current version Notes Manager format.
- 4. The Conversion Results dialog box displays a summary of the objects converted.

The Issue Manager

Product: Architect and Landmark

The Issue Manager accesses and displays information about drawing issue, dates, and history on a sheet-by-sheet basis. It interacts with the drawing border object by allowing the user to control the drawing border title block data and issue information. (Drawing borders can either be placed with the **Drawing Border** tool in the Dims/Notes tool set—see “Creating Drawing Borders” on page 335—or a drawing border can be created and placed by the **Document Setup** or **Create Standard Viewports** commands—see “The Setup Commands” on page 2.)

To use the Issue Manager:

- 1. Ensure that at least one drawing border with a title block is present in the drawing.
- 2. Select **File > Issue Manager**.

The Issue Manager dialog box opens.

The tabs and fields displayed depend on the title block inserted in the drawing border. Custom title blocks may not match the parameters or tabs shown here. The fields and tabs shown assume that an Arch-style title block is inserted.

- 3. Click the Project Data tab to configure the project information.

Leave a blank field to create an empty line in the title block.

The image shows a screenshot of the 'Issue Manager' dialog box. It has a title bar with a close button (X). Below the title bar are three tabs: 'Project Data', 'Sheet Data', and 'Issue Data'. The 'Project Data' tab is selected. The dialog contains several text input fields with labels to their left: 'Project ID:', 'Proj Title Line 1:', 'Proj Title Line 2:', 'Proj Title Line 3:', 'Proj Title Line 4:', 'Design Firm Name:', 'Design Firm Addr 1:', 'Design Firm Addr 2:', 'Design Firm Addr 3:', 'Project Manager:', 'Designed By:', 'Total Sheets:', and 'CAD File Name:'. Each field has a corresponding text box. At the bottom of the dialog, there is a text box that says 'Press F1 for help.' and two buttons: 'OK' and 'Cancel'.

Parameter	Description
Project ID	Specifies the company project ID code
Project Title	Indicates the project title, which can include name and address information
Design Firm	Describes the name and address of the design firm
Project Manager	Provides the project manager's name
Designed By	Specifies the name of the lead designer
Total Sheets	Indicates the total number of sheet layers (or design layers named "sheet-") in the project
File Name	Indicates the VectorWorks file name

The information on the Project tab applies to all drawing borders or title blocks in the set.

- 4. Enter the project information. If the project was created with the **Create Standard Viewports** command, some of the information has been automatically entered.
- 5. Click the Sheet Data tab to configure information about individual sheet layers in the set.

Issue Manager

Project Data

Sheet Data

Issue Data

Drawing Number:

Drawing Number

Dwg Title Line 1:

Drawing Title Line 1

Dwg Title Line 2:

Drawing Title Line 2

Dwg Title Line 3:

Drawing Title Line 3

Sheet Scale:

Sheet Scale

Consultant Name:

Consultant Name

Consultant Addr 1:

Consultant Address 1

Consultant Addr 2:

Consultant Address 2

Drawn By:

Drawn By

Reviewed By:

Reviewed By

Submitted By:

Submitted By

Checked By:

Checked By

Date:

00/00/00

☐ Include In Current Issue

< Prev

Next >

Press F1 for help.

OK

Cancel

Parameter	Description
Sheet Number	The information displayed applies to this sheet number
Sheet Title	The sheet title can contain up to three lines
Sheet Scale	Displays the scale of the major drawing on this sheet
Consultant	Specifies the name and address of any consultants involved with this particular sheet
Drawn By	Provides the draftsperson's initials
Rev/Checked By	Specifies the reviewer's initials
Submitted By	Specifies the submitter's initials
Record Date	Specifies the date of the issue
Include in Current Issue	Select to include this sheet in the current issue set
Prev / Next	Click Prev and Next to switch to each sheet and enter the relevant data

- 6. Complete the information for each sheet in the drawing set to be issued. Toggle among other sheets in the drawing with the **Next >** and **< Prev** buttons.

If the project was set up with the **Create Standard Viewports** command, some of the information has been automatically entered. For each sheet, specify sheet-specific information and indicate whether to include the sheet in the issue.

- 7. Click the Issue Data tab to specify information about the current issue.

Parameter	Description
Record the issue of this Drawing Set	Updates the title block issue data area
Issue Number	Specifies the number or letter of the current issue
Issue Date	Indicates the date of the current issue
Issue Note	Adds any comments or description of the issue
Record on checked sheets only	Updates only the issue data of sheets that were selected on the Sheet Data tab
Record on all sheets	Updates the issue data for all sheets in the file

- 8. Click **OK**.

The drawing border title blocks are updated for the selected sheets. If specified, the issue information is included in the title block.



Regardless of whether the title block contains fields for the issue data, the data is still written to a record attached to the drawing border, becoming a permanent part of the drawing border. If the title block changes later, the data can be displayed.

A		9/13/05	Print set
No.	Date	Issue Notes	
Design Firm			
Nemetschek NA 7150 Riverwood Dr Columbia, MD 21046 (410)290-5114			
Contract			
Heating and Plumbing, Inc. 123 Cold Road North Pole, ME 12345			
Project Title			
Customer Residence 1234 Anywhere Street Anytown, USA 12345			
Drawing Title			
HVAC Duct Plan			
Project Manager		Project ID	
M. Manager		A123456	
Drawn By		Scale	
SC		1:48	
Reviewed By		Drawing No.	
TH		1	
Date		_____ of _____	
CAD File Name		1	
Client.mcd			

Batch Printing

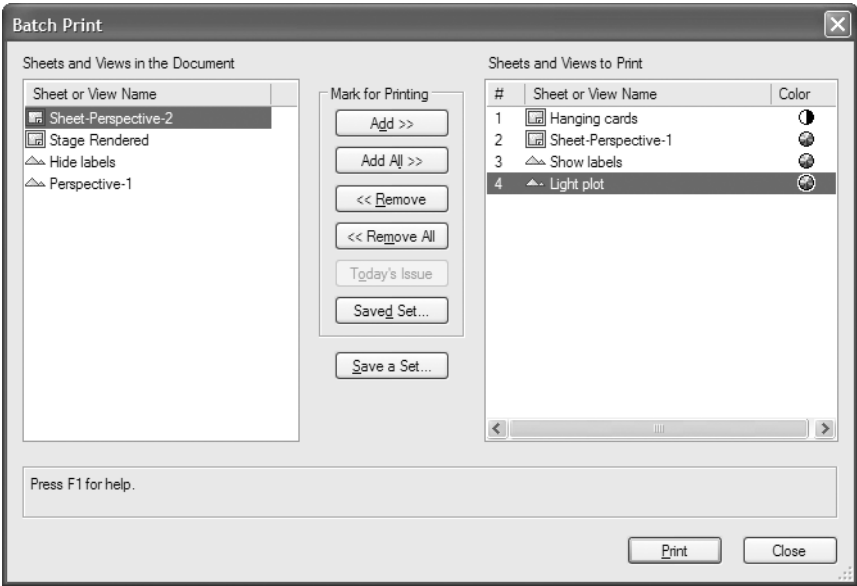
Product: Architect, Landmark, Spotlight, and Machine Design





The **Batch Print** command provides a convenient way of printing a set of sheet layers and/or saved views in a drawing file.

To print a batch of sheet layers and/or saved views in the current file:

1. Select **File > Batch Print**.

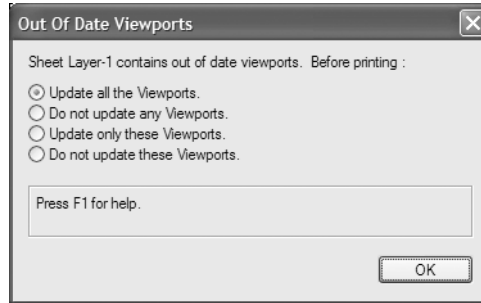
The Batch Print dialog box opens.



Parameter	Description
Sheets and Views in the Document	Lists the sheet layers  and saved views  present in the current file
Sheets and Views to Print	Lists the sheet layers/saved views to be printed; to change the list order, use the cursor to drag and drop the items to move in the # column. Click Color for each item to toggle between color  and black and white  printing.
Add	Adds one or more selected item(s) from the file list to the end of the print list
Add All	Adds all sheet layers/saved views in the file list to the end of the print list
Remove	Removes one or more selected item(s) from the print list
Remove All	Removes all sheet layers and saved views from the print list
Today's Issue	Selects for printing only sheet layers that have been marked as today's issue by the Issue Manager
Saved Set	Restores a previously-saved list for printing
Save a Set	Saves the current print set as a file that can be restored later

2. Click **Print** to send the selected sheet layers and/or saved views to the printer.

If viewports require updating before printing, the Out of Date Viewports dialog box opens for each sheet layer with out-of-date viewports. Specify whether or not to update all the drawing viewports or all printed viewports.



3. Click **OK**.

The Printer Setup (Macintosh) or Print (Windows) dialog box opens; specify the print setup to use. Sheet layers use the printer setup and print area specified in the Organization dialog box. For more information on configuring print options, see “Printing a File” on page 76 in the VectorWorks Fundamentals User’s Guide.

4. Click **OK** to print the set of sheet layers and saved views.

Saving a Print Set

Product: Architect, Landmark, Spotlight, and Machine Design

A set of sheet layers and saved views, along with their batch print settings, can be saved as a set and easily restored.

To save the print list as a set:

1. In the Batch Print dialog box, click **Save a Set**.

The Name this Print Set dialog box opens.



2. Enter the name of the set, and then click **OK**. The settings are saved with the file and available for future batch prints.

The set name entered must be unique. The maximum number of saved sets is ten.

Restoring a Saved Print Set

Product: Architect, Landmark, Spotlight, and Machine Design

To restore a saved print set:

1. In the Batch Print dialog box, click **Saved Set**.

The Recall Saved Print Set dialog box opens.



2. Select a saved set. (To delete a saved set, select a set and click **Delete**.)
3. Click **Select**. The settings for the selected saved set display in the Batch Print dialog box.

Managing Drawing Graphics

A variety of drawing enhancements, including drawing views, special fills, and sketch styles can be added to a drawing, both to provide information and improve its appearance.

Adding Fills to Drawings

Product: Architect, Landmark, Spotlight, and Machine Design

Drawings can be enhanced with the addition of special fill objects created with the **Stipple** tool and the **Tile** command.

Creating Stipple Objects

Product: Architect, Landmark, Spotlight, and Machine Design

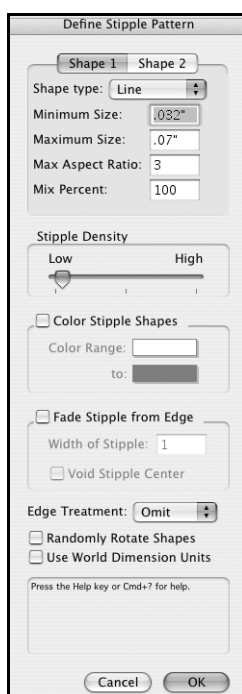
The **Stipple** tool creates a random pattern (different shapes, sizes, and, optionally, colors) within a defined boundary, which resembles a hand-drawn shaded effect. Stipple objects can also be created by drawing a polyline and then running the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441).

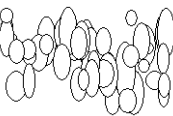
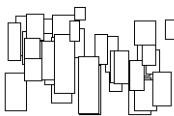
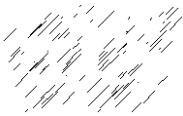


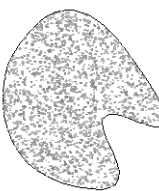
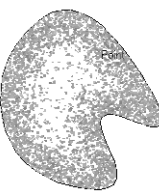


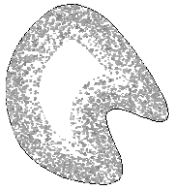
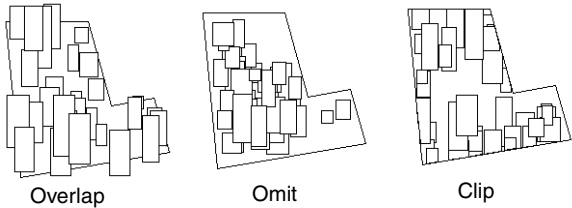
To create a stipple object:

1. Click the **Stipple** tool from the Dims/Notes tool set.
2. Click **Preferences** from the Tool bar to specify or change any default **Stipple** tool parameters.

The Define Stipple Pattern dialog box opens. Up to two different shapes can be specified to define the stipple pattern.

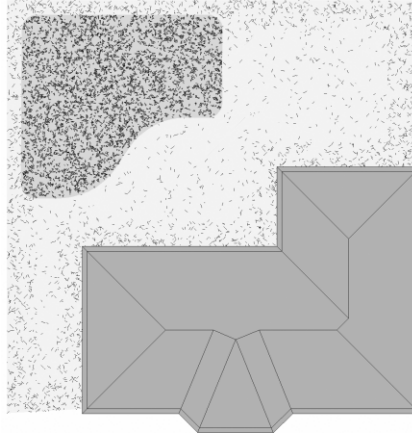


Parameter	Description
Shape 1/Shape 2	Click on the appropriate tab to define two different shapes, sizes, aspect ratios, and shape percentages
Shape type	<p>Select the stipple fill shape. For the polygon shape, specify the number of sides.</p> <div></div> <p>Line Rectangle Oval</p> <div></div> <p>Triangle Polygon (with five sides)</p>
Minimum/Maximum Size	Enter the minimum/maximum size of the stipple pattern
Max Aspect Ratio	Enter the maximum aspect ratio of the stipple shapes (enter 1 to display square aspects)
Mix Percent	Enter the fill shape mixture percentage. The percentage defines the contribution of each shape to the stipple pattern, up to 100% (e.g. enter 60% for shape one and shape two automatically displays 40%). If shape one is assigned 100%, then shape two cannot be defined.
Stipple Density	
Low/High	Adjust the density of the stipple fill shapes by dragging the slider along the Stipple Density bar
Color Stipple Shapes	Randomly fills the stipple shapes with colors in the specified color range
Color Range/to	Click the color boxes to select the desired color ranges
Fade Stipple from Edge	<p>Creates a stipple that fades in from the edge of the stippled shape</p> <div></div> <p>Fade from edge No fade</p>
Width of Stipple	Enter the width of the faded area in page dimensions

Parameter	Description
Void Stipple Center	Leaves the center of the stipple unshaded 
Edge Treatment	Determines how the stipple shapes are drawn at the edge of the stippled area 
Randomly Rotate Shapes	Select to randomly rotate the stipple shapes. De-select to speed drawing when using fill shapes that do not require rotation, such as ovals with an aspect ratio of 1.
Use World Dimension Units	Select to use real-world dimensions; otherwise, the entries are made in page dimensions (the size the elements display when printed)

Both the **Color Stipple Shapes** and **Fade Stipple from Edge** options are processor-intensive actions and can significantly increase stipple regeneration time.

- Click **OK**.
- Click on the appropriate mode in the Tool bar to select the boundary creation method of the stipple object.
For more information on the **Polyline** tool modes, see “Creating Polylines” on page 212 in the VectorWorks Fundamentals User’s Guide.
- Click to set the stipple object’s start point.
- Click to set the end of the segment and the beginning of the next. Continue drawing segments in this manner until the stipple object is complete.



Editing the Stipple Object Settings

Product: Architect, Landmark, Spotlight, and Machine Design

The parameters can be edited for selected stipple objects through the **Stipple Settings** button on the Shape tab of the Object Info palette (the parameters are described in “Creating Stipple Objects” on page 421). To modify default stipple settings, click the **Preferences** button on the Tool bar.

Reshaping the Stipple Object

Product: Architect, Landmark, Spotlight, and Machine Design

Double-click a stipple object to activate the **2D Reshape** tool. Select the object handles to reshape the stipple object boundary. For more information, see “Reshaping Objects” on page 259 in the VectorWorks Fundamentals User’s Guide.

Saving the Stipple Object Settings

Product: Architect, Landmark, Spotlight, and Machine Design

Once the stipple object is set to the desired appearance, the settings can be saved for future use or importing into other files, by saving the stipple object. When inserted from the Resource Browser, all the stipple object settings are preset.

To save the selected stipple object:

1. Select a stipple object.
2. In the Object Info palette, click **Save Stipple**.

The Enter String dialog box opens.

3. Enter a unique name.
4. Click **OK**.

The stipple object is saved in the Stipples symbol folder in the Resource Browser.

5. To use a saved stipple pattern, double-click it in the Resource Browser and begin drawing in Polyline mode. For more information, see “Inserting Symbols in 2D” on page 159 in the VectorWorks Fundamentals User’s Guide.



Tiling

Product: Architect and Landmark

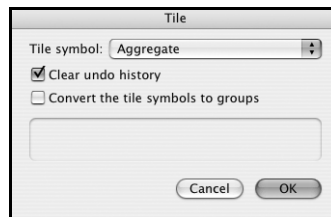
The **Tile** command provides a quick way to fill a polygon or rectangle with a pattern created from numerous copies of an arrayed 2D symbol. If part of a symbol instance falls outside of the polygon or rectangle, it is truncated.

Symbols created for tiling can contain only the following types of objects: lines, rectangles, polylines, circles, arcs, and polygons.

To fill a polygon or rectangle with tiled symbols:

1. Select the polygon or rectangle.
2. Select **Modify > Tile**.

The Tile dialog box opens.

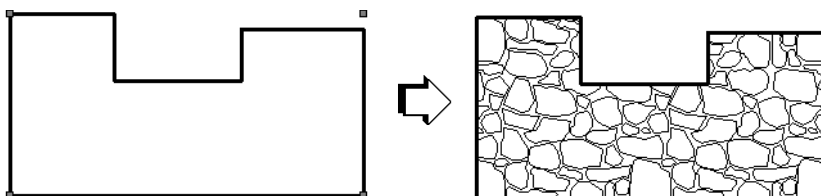


Parameter	Description
Tile symbol	Select the desired symbol for tiling from either the default resources or the current file's resources; see "VectorWorks Design Series Default Resources" on page 570. <i>VectorWorks does not distinguish between appropriate and inappropriate symbols. For example, if a bathtub symbol is selected to tile an area designated for concrete, it will be used.</i>
Clear undo history	When selected, speeds the tiling operation, but also clears the file's undo history (see "Session Preferences" on page 42 in the VectorWorks Fundamentals User's Guide for information on undoing an operation)
Convert the tile symbols to groups	When selected, the tile symbols are converted to a group, which can then be graphically modified using the Attributes palette (using this option may increase the file size)

3. Click **OK**.

A group of tiled symbols is created inside the selected object.

While the pattern is being created, a VectorScript message displays the percentage complete; if desired, press any key to cancel the action.





Drawing Enhancements

Product: Architect, Landmark, Spotlight, and Machine Design

A variety of tools and commands included with the Design Series products can be used to enhance the drawing with special objects during the design process and hand-drawn effects for final presentation.

Sketch Rendering

Product: Architect, Landmark, Spotlight, and Machine Design

The VectorWorks Design Series products include a sketch rendering mode that applies a hand-drawn or sketch effect to 2D and 3D objects in any projection. RenderWorks is not required. The vector-based sketch effects are saved as editable resources, and are applied directly to the objects in a drawing. The sketch effects can also be applied to hatches and viewports, and can be used in hidden line rendering.

Unlike Artistic RenderWorks, sketch rendering can be applied to 2D objects, and individual objects can have specific sketch styles. Sketch effects cannot be applied to worksheets, text, loci, or lights.

Setting the Default Sketch Style

Product: Architect, Landmark, Spotlight, and Machine Design

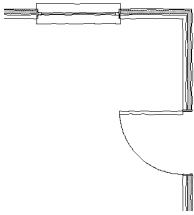
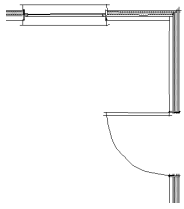
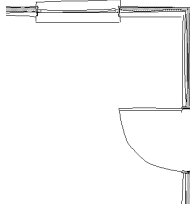
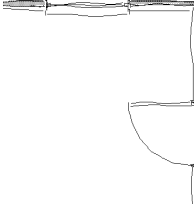
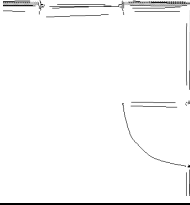
To quickly apply a sketch style to all objects in the current design or sheet layer, specify a default sketch style. Specifying the sketch style in a design layer applies the default to all layers in the file (design and sheet). For sheet layers, applying a default sketch style applies only to objects placed on the sheet layer, overriding the document default sketch style; viewports also have individual sketch style settings (see “Applying Sketch Styles to Viewports” on page 433).

Sketch styles are provided as default resources (default resources are automatically imported into the current file at the point of use and display in the Resource Browser; see “VectorWorks Design Series Default Resources” on page 570). The following sketch styles are pre-defined, and can be selected as a default sketch style. Custom sketch styles that have been added to the file also display in the Resource Browser and can be selected as a sketch style (see “Creating Custom Sketch Styles” on page 430).

Unused sketch styles can be purged; see “Purging Unused Objects” on page 373 in the VectorWorks Fundamentals User’s Guide.

Sketch resources do not display in the Resource Browser until a sketch-related option is selected for the first time.

Default Sketch Style	Description
No Sketch	<div>Does not apply a sketch style; useful for overriding an applied sketch style (see “Overriding Layer Sketch Styles” on page 431)</div> <div></div>

Default Sketch Style	Description
Careful	Uses many small wobble points and minor variations from the actual endpoints 
Certain	Uses many small wobble points and specifies more overstrike 
Quick	Uses few wobble points, with more distance between them 
Rough	Uses many wobble points 
Tentative	Uses many small wobble points and a high amount of understrike 



To specify the default sketch style:

- 1. Select **View > Rendering > Sketch Options**.
The Sketch Options dialog box opens.
- 2. Select the default sketch style from the list.



Design layer



Sheet layer

Parameter	Description
Document Default Sketch Style or Sheet Layer Default Sketch Style	Specifies the sketch style to apply when the Sketch command is selected
Edit	Opens the Sketch Style Editor dialog box, for changing the selected sketch style parameters (see “Editing Sketch Styles” on page 429)
Preview	Temporarily applies the current sketch style to objects in the current layer

- 3. Click **OK** to set the default sketch style.

Applying the Default Sketch Style

Product: Architect, Landmark, Spotlight, and Machine Design

To apply the default sketch style to the current design or sheet layer:

Select **View > Rendering > Sketch**.



Rough sketch style depicted



Editing Sketch Styles

Product: Architect, Landmark, Spotlight, and Machine Design

Sketch styles can be edited and renamed. The changes are saved as resources in the file.

Sketch resources do not display in the Resource Browser until a sketch-related option is selected the first time.

To edit a sketch style:

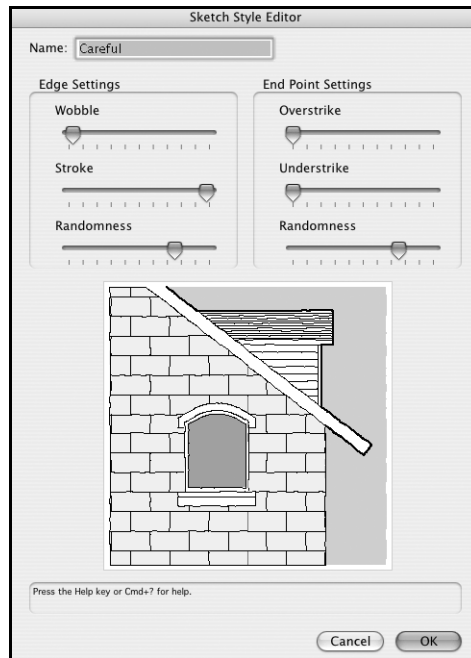
1. Select **View > Rendering > Sketch Options**.

The Sketch Options dialog box opens.

2. Select the sketch style to edit from the sketch style list.

3. Click **Edit**.

4. The Sketch Style Editor dialog box opens. The sketch edge and end point settings can be edited, and the style can be renamed. The preview graphic provides help with editing.



Parameter	Description
Name	Changes the default sketch style name, if desired
Edge Settings	
Wobble	Controls how much the sketched lines are offset from the true lines of an object; drag the slider to the right to increase the wobble
Stroke	Controls the length of the sketch drawing strokes; a short stroke distance increases the number of wobble points. Drag the slider to the right to increase the number of wobble points.
Randomness	Controls the amount of wobble and stroke variation



Parameter	Description
End Point Settings	
Overstrike	Extends sketched lines past their endpoints; drag the slider to the right to increase the overstrike
Understrike	Shortens sketched lines before their endpoints; drag the slider to the right to increase the understrike
Randomness	Controls the amount of overstrike and understrike variation

5. Click **Save**.

Alternatively, sketch styles can be edited by selecting the style in the Resource Browser and selecting **Edit** from the context menu. Sketch styles can also be deleted with the Resource Browser. For more information on the Resource Browser, see “Using the Resource Browser” on page 142 in the VectorWorks Fundamentals User’s Guide.

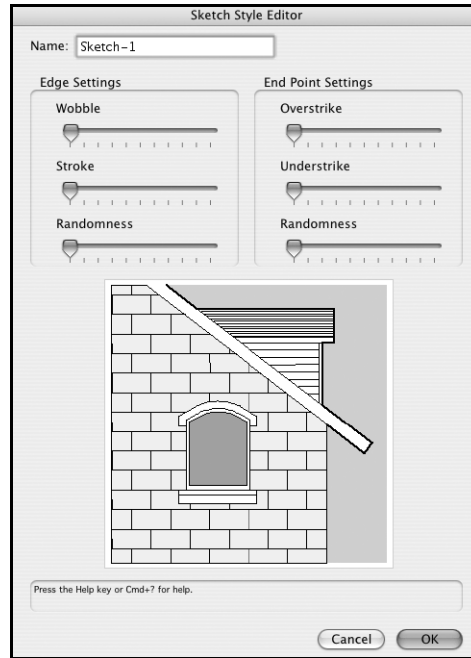
Creating Custom Sketch Styles

Product: Architect, Landmark, Spotlight, and Machine Design

VectorWorks includes several default sketch styles, but custom sketch styles can also be created

To create a custom sketch style:

1. In the Resource Browser, select **New Resource** from the **Resources** menu.
The New Resource menu opens. For more information on the Resource Browser, see “Using the Resource Browser” on page 142 in the VectorWorks Fundamentals User’s Guide.
2. Select **Sketch Style**.
The Sketch Style Editor dialog box opens. Specify the sketch style settings as described in “Editing Sketch Styles” on page 429.



3. Click **Save** to create the sketch style. The new style is listed in the Resource Browser and is available in sketch style lists.

Overriding Layer Sketch Styles

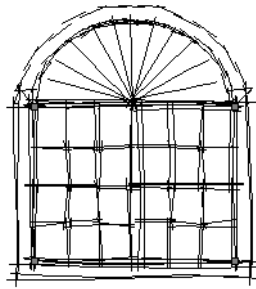
Product: Architect, Landmark, Spotlight, and Machine Design

Each object can have its own sketch style, overriding the sketch style applied to the current layer. Apply the “No Sketch” style to objects that should never be sketched.

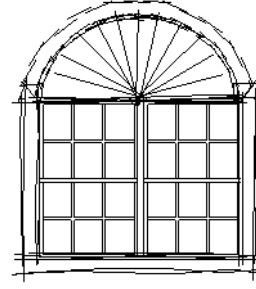
To apply a sketch style to an object:

1. Select the object or objects.
Groups and symbols cannot have a sketch style applied directly; edit the group or symbol first.
2. On the Render tab of the Object Info palette, the **Sketch** list displays the current document default sketch style. Select the desired sketch style for the object(s).

Alternatively, select the desired sketch style resource from the Resource Browser and click **Apply** from the resource context menu, or drag the sketch style from the Resource Browser to the object.
3. The selected object’s sketch style overrides the default sketch style.



Window muntins are selected

The **No Sketch** style is applied only to the muntins

Objects which override the default design layer sketch style also override the default sketch style on a sheet layer.

Applying Sketch Styles to Hatches

Product: Architect, Landmark, Spotlight, and Machine Design

There are several ways to create a unique look for drawing objects. In addition to the current layer's default sketch style and the object sketch style, each hatch can have a unique sketch style.

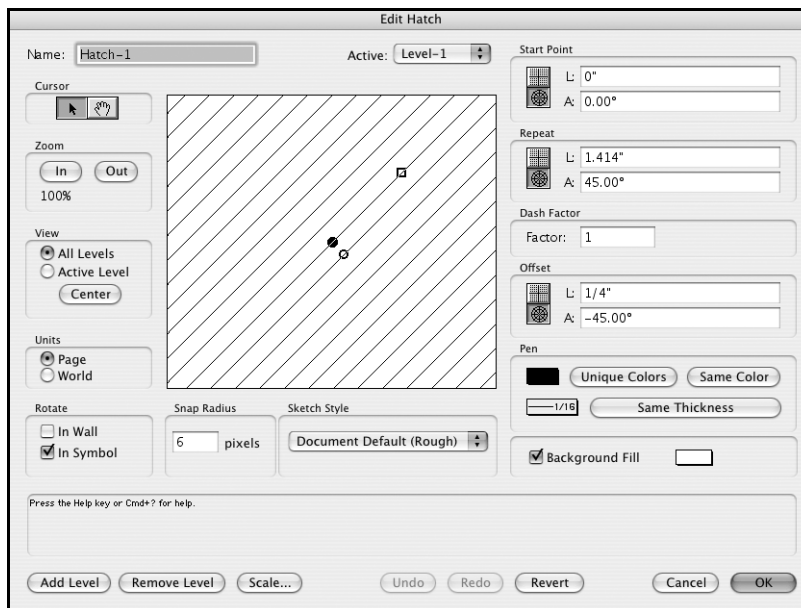
To specify a hatch sketch style:

1. Select **Modify > Hatch**.

The Select Hatch dialog box opens. For more information on hatches, see “Defining Hatches” on page 237 in the VectorWorks Fundamentals User's Guide.

2. Select the desired hatch to edit or click **New** to create a new hatch.

The Edit Hatch dialog box opens.





3. The document default sketch style is displayed in the **Sketch Style** list. Select the desired sketch style instead, or select No Sketch to never apply a sketch style to the hatch.

When the document default sketch style is applied, the hatch sketch style changes when the document default sketch style changes.

4. Click **OK** to exit the hatch editor.

Applying Sketch Styles to Viewports

Product: Architect, Landmark, Spotlight, and Machine Design

Sheet layers can have a document default sketch style applied, which changes the appearance of objects on the sheet layer, but does not sketch the viewports on the sheet layer. Each viewport can have its own sketch style, making it easy to present designs with different sketched looks.

To apply a sketch style to a viewport:

1. Select the viewport.
2. On the Shape tab of the Object Info palette, select Sketch from the **Rendering** list. Click **Render Settings** to select the viewport default sketch style.

If creating a viewport, select Sketch from the **Rendering** list in the Create Viewport dialog box, and then click **Render Settings** to select the viewport default sketch style.

The Sketch Render Settings dialog box opens. Select a sketch style for the viewport.



Parameter	Description
Viewport Default Sketch Style	Specifies the sketch style to apply to the viewport
Edit	Opens the Sketch Style Editor dialog box, for changing the selected sketch style parameters (see “Editing Sketch Styles” on page 429)
Preview	Temporarily applies the current sketch style to the viewport (disabled when accessed through the Create Viewport dialog box)

3. Click **OK**.

The selected viewport sketch style overrides the document default sketch style for any objects within the viewport, including the crop object, referenced design layers, and any annotations.

A sketch style cannot be directly applied to a viewport from the Render tab of the Object Info palette or by dragging the sketch style from the Resource Browser.



Sketching with Hidden Line Rendering

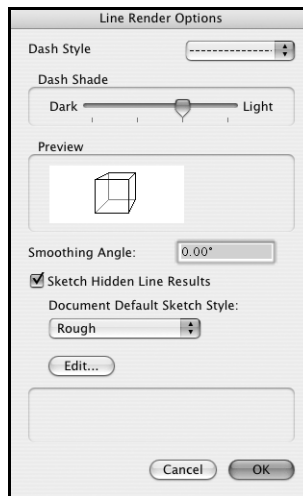
Product: Architect, Landmark, Spotlight, and Machine Design

The default document sketch style can be applied to hidden line, dashed hidden line, and final shaded polygon rendering modes.

To apply a sketch style to hidden line rendering:

1. Select the default document sketch style as described in “Setting the Default Sketch Style” on page 426.
2. Select **View > Rendering > Line Render Options**.

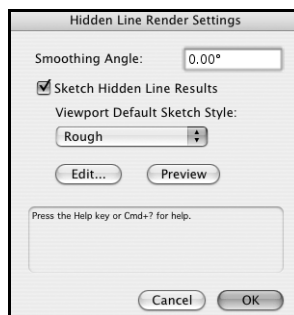
The Line Render Options dialog box opens.



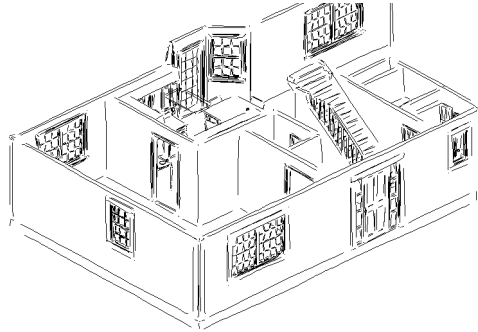
Select **Sketch Hidden Line Results**, and select the sketch style from the list. Click **Edit** to edit the sketch style parameters. Then click **OK** to apply the sketch style to hidden line rendering.

3. To sketch a viewport's hidden line rendering, select the viewport, and then choose a hidden line rendering mode from the **Rendering** list in the Object Info palette. Click **Render Settings** to access the associated hidden line render settings dialog box.

The Hidden Line Render Setting dialog box opens.



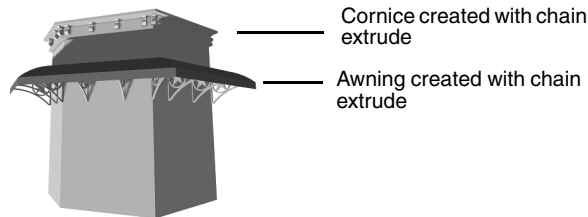
4. Select **Sketch Hidden Line Results**, and select the sketch style from the list. Preview or edit the sketch style if desired.
5. The hidden line, dashed hidden line, or final shaded polygon rendering displays with the selected sketch style.



Creating Chain Extrude Objects

Product: Architect, Landmark, and Spotlight

The **Chain Extrude** tool automatically creates extruded objects with both continuous and repetitive elements. Architectural features such as an awning contain a continuous element (the awning) and intermittently repetitive elements (the supports). By specifying the polygon or polylines to be extruded, and then indicating the path of the extrusion, the object(s) are automatically extruded along the path.



Creating the Profile Objects

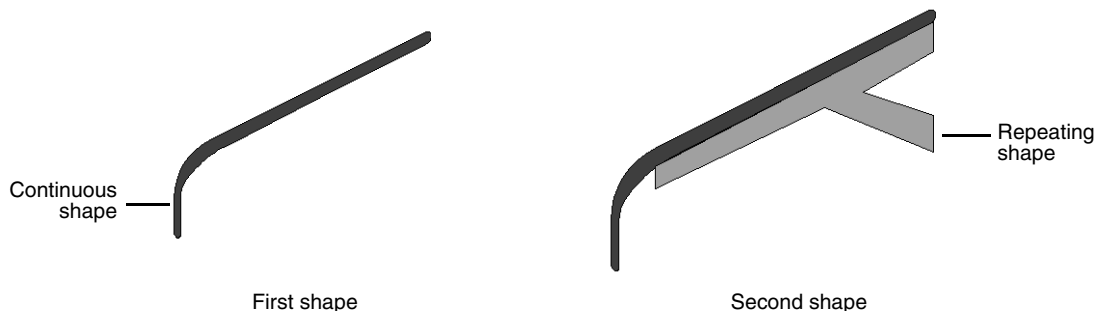
Product: Architect, Landmark, and Spotlight

The profile objects determine the shape of the chain extrude object. The profile objects can consist of up to three polygons/polylines or up to two polygons/polylines and one locus. For Architect and Landmark users, profile objects are contained in the [VectorWorks]\Libraries\Objects-Imperial\10_Wall Accessories.vwx file.

To create the profile objects:

1. Create the continuous shape first. The **Chain Extrude** tool considers the first, or back, polygon/polyline to be the continuous shape, and extrudes it along the path polygon.
2. Create the second shape; the front object is considered to be the repeating or intermittent object.

A second shape is not required.



The reference location of the chain extrude relative to the path is the upper right or lower right corner of the shape's bounding box. This location can be changed by including a locus in the profile group. The locus becomes the reference point for the path polygon in the profile group. This is useful if the bounding box of the repeating shape extends beyond the bounding box of the continuous shape.

3. Apply fill colors to the profile objects through the Attributes palette. The colors are applied to the continuous and repeating shapes in 3D.

Creating the Chain Extrude Object

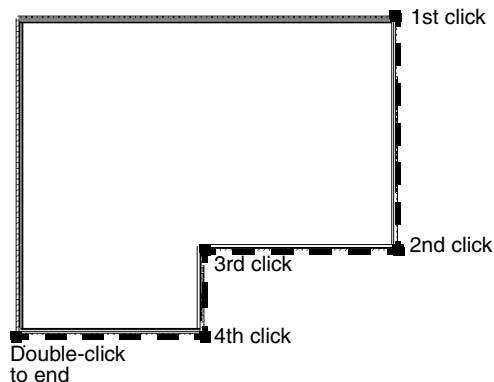
Product: Architect, Landmark, and Spotlight

Once the continuous and, if any, repeating shapes have been defined, specify the path for the chain extrude with the **Chain Extrude** tool.

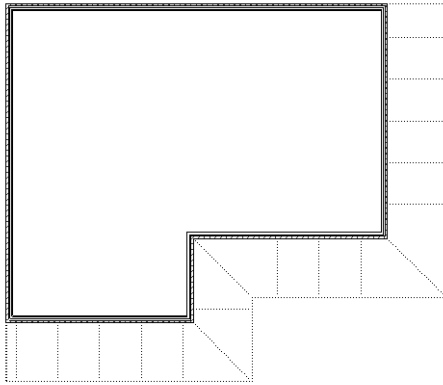


To create the chain extrude object:

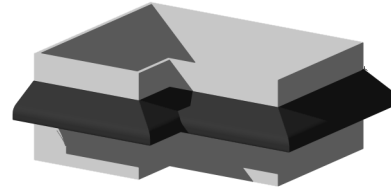
1. In Top/Plan view, select the continuous and, if any, repeating shapes.
2. Click the **Chain Extrude** tool from the Building Shell tool set.
3. Draw the chain extrude path polyline.



4. The chain extrude object is created based on the path drawn.



In 2D, the chain extrude object is displayed with dashed single lines



Chain Extrude Properties

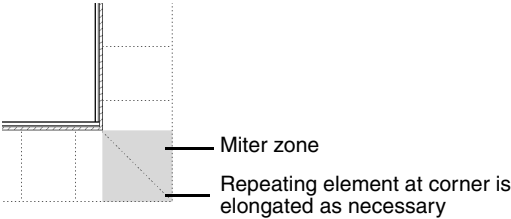
Product: Architect, Landmark, and Spotlight

The chain extrude object parameters can be edited in the Object Info palette.

Parameter	Description
Draw 3D	Select to display the chain extrude object in 3D view; deselect to display the object only in 2D view
Flip	Select to flip the orientation of the chain extrude object (for example, toward the inside of a room for a crown molding, instead of the outside of a building for a cornice)
Center Ribs	Select to draw the repeating element centered along the edges of the path
Corner Ribs	Select to draw the repeating element at the corners of the path
Vertical Datum	Specifies the reference point for the chain extrude object
Thickness	Specifies the thickness of the repeating elements of the object
Spacing	Indicates the spacing distance between the repeating elements of the object
Polyline parameters	Edits the chain extrude path polyline. See “Reshaping Objects” on page 259 in the VectorWorks Fundamentals User’s Guide.

The placement of the repeating elements of the chain extrude object depends on the path created by the **Chain Extrude** tool. In particular, special considerations apply to the “miter zones” at the corners of the path:

- No repeating elements perpendicular to the building face will be drawn in miter zones
- The miter zones are excluded from the length calculations of the sides (for spacing calculations, for example)
- Repeating elements at corners, if drawn, bisect the angle of the corner and are elongated accordingly



The chain extrude path can be reshaped with the **2D Reshape** tool to add, subtract, and change vertices. The continuous and repetitive elements are automatically adjusted to fit the new shape. The path polyline can be edited by selecting **Modify > Edit Group**, and selecting **Path**, or **Edit** or **Edit Path** from the context menu (see “Editing a Group” on page 397 in the VectorWorks Fundamentals User’s Guide).

Creating a Seating Layout

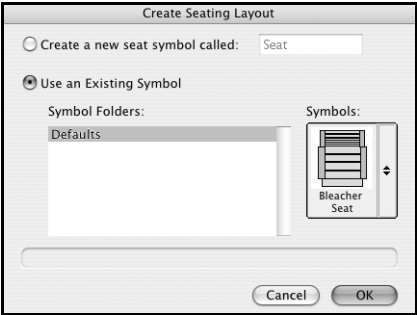
Product: Architect and Spotlight

The **Create Seating Layout** command creates a seating layout object from one or more selected polygons, rectangles, rounded rectangles, ovals, arcs/circles, or polylines. Seats fill the object(s) in a user-defined arrangement with a “look-to” location defined by a control point. Seating layout objects can also be created by drawing a polyline and then selecting the **Objects from Polyline** command (see “Creating Objects from Polylines” on page 441). Along with the seating layout, a Seating Count schedule is also created.

To create a seating layout object:

1. Create the shape defining the boundary of the seating area. Objects with one or more holes can be selected; seats will not be placed where a hole exists.
2. With the object(s) selected, select **AEC > Create Seating Layout**.

Multiple shapes can be selected at one time (to create several seating sections, for example). The Create Seating Layout dialog box opens.



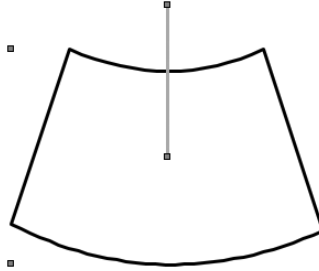
Parameter	Description
Create a new seat symbol called	Creates a new seat symbol; provide the symbol name
Use an Existing Symbol	Selects an existing seat symbol; specify the symbol from the list
Symbol Folders	Specifies the location of seat symbols
Symbols	Provides a graphical list of available seat symbols



3. A default seat symbol can be created to represent the seats; select **Create a new seat symbol called** and provide a symbol name. Alternatively, select an appropriate seat symbol from either the default resources or the current file's resources; see "VectorWorks Design Series Default Resources" on page 570.

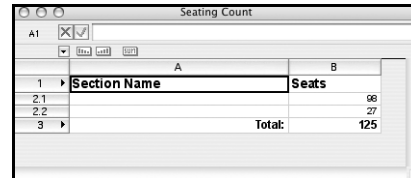
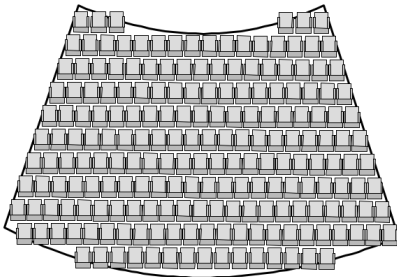
See "Accessing Existing Resources" on page 147 in the VectorWorks Fundamentals User's Guide for information on importing symbols into the Resource Browser.

4. When prompted, click on the focus point for the seats. All seats will face this point.



For concentric seat layouts, the distance of the seat focus point from the object determines the radius of the concentric layout. Click close to the object for a smaller radius.

The seating layout object and a Seating Count schedule are created.



	A	B
1	Section Name	Seats
2.1		98
2.2		27
3	Total:	125

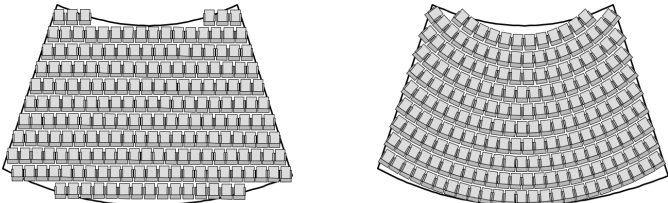
The Seating Count schedule displays the number of seats required for each seating layout section, as well as the total number of seats needed for all sections.

Editing the Seating Layout

Product: Architect and Spotlight

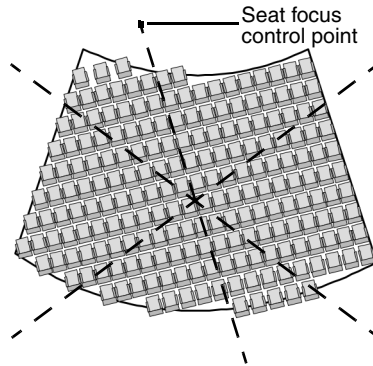
Seating layout parameters can be edited in the Object Info palette.

Parameter	Description
Seat Spacing	Specifies the distance between seats
Row Spacing	Specifies the distance between rows of seats
Section Name	Assigns a section name for use in the Seating Count schedule

Parameter	Description
Concentric	Select to draw a concentric seating arrangement  Linear Concentric
Focal Pt X/Y	Indicates the coordinates of the seating look-to point
Offset 1st Row	Specifies an offset distance for the first row of seats
Draw Boundary Line	Select to display the object used as the basis for the seating layout; deselect to hide the object and show the seats only
Draw Layout Lines Only	Select to display the seat locations without showing the actual seat symbols
Base Z Height	Specifies the initial elevation of the first row of seats
Rise per Row	Specifies the elevation increase for each row of seats (seating layout slope)
Seat Count	Displays the number of seats used in the layout
Symbol Name	Displays the seating symbol name used to create the seating layout
Select Symbol	Opens the Choose a Symbol dialog box. Select the desired seat symbol from either the default resources or the current file's resources, and then click OK ; see "VectorWorks Design Series Default Resources" on page 570
Polyline Parameters	Edits the seating layout path polyline. For information on editing object vertices, see "Reshaping Objects" on page 259 in the VectorWorks Fundamentals User's Guide.

The seating layout can be reshaped with the **2D Reshape** tool to add, subtract, and change vertices. The seats are automatically adjusted to fit the new shape. More sophisticated editing operations, such as adding, clipping, intersecting and combining into surfaces can be performed on the seating layout by selecting **Modify > Edit Group**, and then selecting **Path**.

If the seat orientation requires adjustment, the seat control point can be moved to readjust the seat focus point. The control point is referenced relative to the center of the seating layout. If two imaginary axis lines were placed over the seating layout as shown in the diagram, placing the control point in line with the center of the axes would orient the seats directly toward the control point.



A seating layout can also be created by clicking the **Seating Layout** tool on the Furn/Fixtures tool set. Draw a polygon with the tool and complete the parameters which are identical to those described in “Editing the Seating Layout” on page 439.

Creating Objects from Polylines

Product: Architect, Landmark, and Spotlight

The **Objects from Polyline** command uses an existing polyline or shape as the path for creating a variety of objects, as listed in the following table.

Object	Product
ceiling grids	Architect
guardrails	Architect, Landmark
handrails	Architect, Landmark
hardscape objects	Landmark
landscape walls	Landmark
linear material details	Architect, Landmark
massing models	Architect, Landmark
piping runs	Architect
plants	Landmark
property lines	Architect, Landmark
repetitive unit details	Architect, Landmark
revision clouds	Architect, Landmark, Spotlight
roadways	Architect, Landmark
roadways (NURBS)	Architect, Landmark
seating layouts	Architect, Spotlight
site modifiers	Architect, Landmark
spaces	Architect

Object	Product
stipple objects	Architect, Landmark, Spotlight
walls	Architect, Landmark, Spotlight
window walls	Architect

In addition to these standard objects, the **Objects from Polyline** command supports custom path objects (custom path plug-in objects with a .vso extension). For details, see “Creating Custom Path Objects” on page 548.

Walls created with the **Objects from Polyline** command use the current settings made active by the **Wall** tool (Architect only).

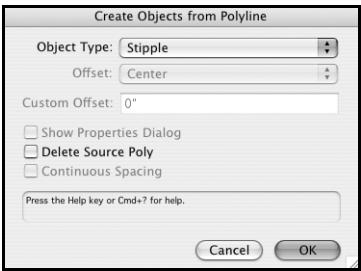
The **Create Walls from Polygon** command is no longer available from a Design Series workspace because the **Objects from Polyline** command can be used for creating walls, which contains more functionality than the **Create Walls from Polygon** command. The **Create Walls from Polygon** command is still available in the VectorWorks Standard workspace and can be added to a Design Series workspace if desired.

To create an object from a polyline:

1. Draw a polyline or select an existing polyline, rectangle, rounded rectangle, oval, polygon, or arc representing the path for creating the object.
2. With the item selected, select **Modify > Convert > Objects from Polyline**.

The Create Objects from Polyline dialog box opens.

3. Select the type of object and the creation parameters.



Parameter	Description
Object Type	Select the type of object to create based on the polyline path; the parameters available vary based on the object type selected
Offset	For guardrails, handrails, landscape walls, roadways, walls, and window walls, select whether to offset the object to the left, right, or centered on the polyline; select Custom to enter a custom offset distance
Custom Offset	For guardrails, handrails, landscape walls, roadways, walls, and window walls, specify the custom offset distance from the polyline, if any
Show Properties Dialog	Select to display the Object Properties dialog box for the specified object type prior to creating the object; this field is not applicable for plant objects because the default place plant settings are used
Delete Source Poly	Select to delete the polyline path after drawing the object



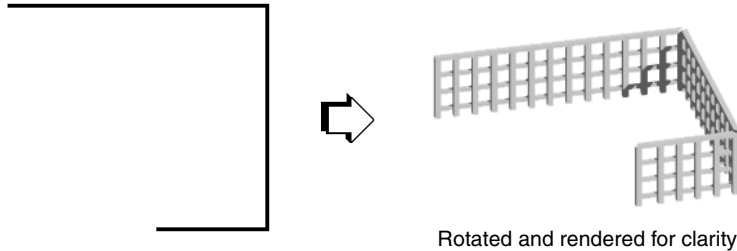
Parameter	Description
Continuous Spacing (Architect and Landmark only)	<p>Select to automatically maintain continuous spacing between</p> <ul style="list-style-type: none"> uprights from one object to the next based on the Upright Spacing value for guardrails or handrails; or mullions from one object to the next based on the Mullion Spacing value for window walls

- Click **OK**. If **Show Properties Dialog** was selected, the object properties dialog box for the specified object type opens. Enter the appropriate parameters, and then click **OK**.

If creating guardrails or handrails and **Continuous Spacing** was selected in the Create Objects from Polyline dialog box, enter the distance between the first upright and the start of the polyline in the **1st Upright Spacing** field of the object properties dialog box. If **Continuous Spacing** was not selected, this value is applied to the first upright at the beginning of each segment of the polyline. Also enter the spacing to maintain between uprights in the **Upright Spacing** field of the object properties dialog box.

If creating window walls and **Continuous Spacing** was selected in the Create Objects from Polylines dialog box, enter the distance between the first mullion and the start of the polyline in the **1st Mullion Spacing** field of the object properties dialog box. If **Continuous Spacing** was not selected, this value is applied to the first mullion at the beginning of each segment of the polyline. Also enter the spacing to maintain between mullions in the **Mullion Spacing** field of the object properties dialog box.

The object is created from the polyline and its parameters can be edited in the Object Info palette.

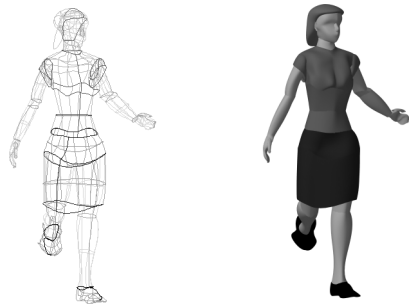


Rotated and rendered for clarity

Creating a Human Figure

Product: Architect, Landmark, Spotlight, and Machine Design

A 3D human figure object can be inserted for a realistic addition to the drawing. Constructed of NURBS surfaces for a high-quality model, the object contains a wide variety of parameters for full control over the figure type, position, and appearance.



The 00_Entourage_Figures.vwx object library also contains pre-configured human figure objects in a variety of poses and figure types.

Several figures can increase the time required to render the model in 3D.

Inserting the Figure and Setting Parameters

Product: Architect, Landmark, Spotlight, and Machine Design



To insert and configure a human figure:

- 1. Click the **Human Figure** tool from the Visualization tool set.
- 2. Click to place the human figure in the drawing.
- 3. The human figure parameters can be modified from the Object Info palette.

Parameter	Description
Height	Specifies the figure height, in the current unit
Body Type	Select the figure body type (Slight/Petite, Average, or Large)
Figure Type	Select the type of human figure (Man, Woman, Boy, or Girl)
Posture	Select the figure position; Custom is displayed when the figure posture has been adjusted in the Figure Custom Position dialog box (see “Specifying a Custom Figure Position” on page 446)
Hand Height	For the Standing (shaking hands) posture, specifies the height of the hands, in the current unit
Attire (Top)	Select the clothing for the top of the figure
Attire (Bottom)	Select the clothing for the bottom of the figure A dress overrides the selected top attire
Footwear	Select the figure’s footwear, or select None if the figure is barefoot
Hair	Select the figure’s hairstyle
Jacket	Places a jacket on the figure
Stockings	Places stockings on the figure
Tie	Places a tie on the figure



Parameter	Description
Set Attributes	Click to set the figure attributes more specifically (see “Setting Figure Attributes” on page 445)
Custom Position	Click to set a custom figure position (see “Specifying a Custom Figure Position” on page 446)

Setting Figure Attributes

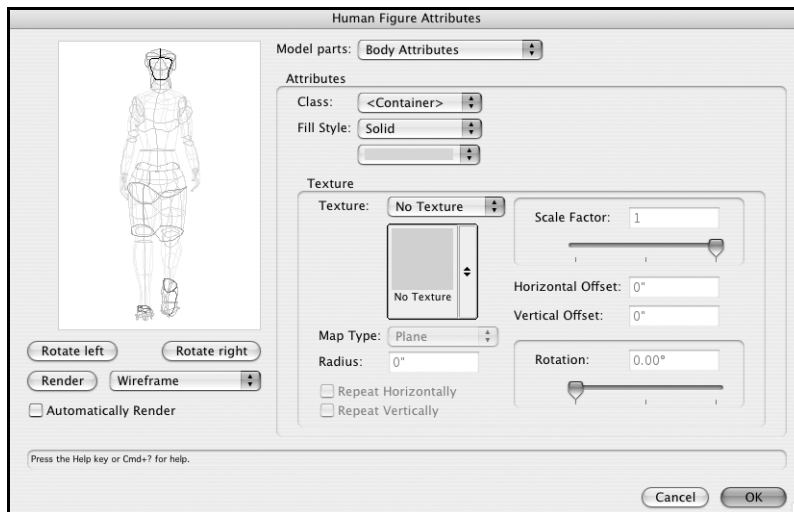
Product: Architect, Landmark, Spotlight, and Machine Design

Figure attributes can be set precisely to control the figure appearance.

To set figure attributes:

1. Select the desired figure.
2. In the Object Info palette, make the initial selections for the figure.
3. Click **Set Attributes** from the Object Info palette.

The Human Figure Attributes dialog box opens, with the figure set to the current Object Info palette parameters. Select each desired model part and then set its attributes.



Parameter	Description
Preview	Displays a preview of the figure in the specified posture, with a sample of the selected texture and attributes
Rotate Left/Right	Rotates the figure preview 90 degrees to the left or right
Render	Select a rendering mode for the preview figure. If Automatically Render is not selected, click Render after each attribute change to view a rendered preview.
Automatically Render	Renders the preview figure automatically, according to the selected mode, after an attribute change (depending on the selected rendering mode and the inclusion of attributes such as textures, this can take some time)
Model parts	Select each figure attribute to configure, and then set its parameters



Parameter	Description
Class	Select a class to apply to the attribute from the list of classes in the file, or select Container to apply the object's class to the selected attribute The class must have Use at Creation selected for the graphic attributes.
Fill Style	Select Class to use the class fill style for the selected attribute, choose None to apply no fill, or choose Solid to apply a solid color and then click on the color box to select the fill color
Texture	Sets the texture parameters for the selected attribute (RenderWorks required) from either the default resources or the current file's resources; see "VectorWorks Design Series Default Resources" on page 570
Texture	Select the texture to apply from either the default resources or the textures in the current file, or select Class to apply the class texture; select None to apply no texture
Map Type	Select the texture map type
Radius	For sphere and cylinder maps, sets the texture radius; the default radius is the same as the 3D object radius. Increasing this value reduces the size of the texture on the object.
Repeat Horizontally/Vertically	Repeats the texture in a horizontal and/or vertical direction
Scale Factor	Determines the texture size when projected onto the object; either enter a scale value or use the slider to change the scale
Horizontal/Vertical Offset	Sets the start location of the texture horizontally and vertically
Rotation	Sets the angle of texture rotation; either enter a rotation value from 0 to 360 degrees or use the slider to change the rotation angle

For more information on texture parameters and mapping, see "Applying and Mapping Textures" on page 661 in the VectorWorks Fundamentals User's Guide.

4. Click **OK** to apply the attributes to the figure.

Specifying a Custom Figure Position

Product: Architect, Landmark, Spotlight, and Machine Design

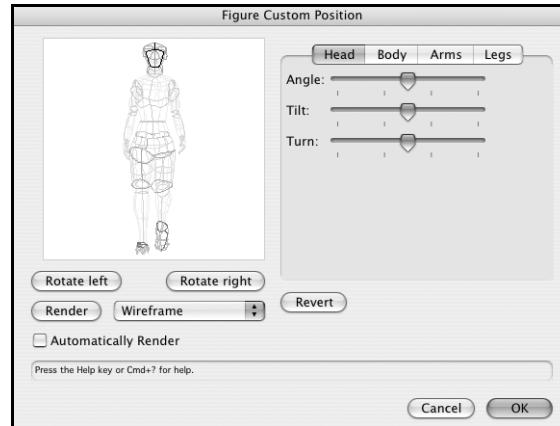
If the **Posture** selection is not sufficient to position the figure exactly as desired, a custom figure pose can individually position the figure's head, body, arms, and legs.

Use the **Rotate** tool to set the overall position of the figure.

To specify a custom figure pose:

1. Select the desired figure.
2. In the Object Info palette, make the initial parameter selections for the figure.
3. Click **Custom Position** from the Object Info palette.

The Figure Custom Position dialog box opens, with the figure set to the current Object Info palette parameters. Select the body part tab to change, and then set the part parameters by dragging the slider for the desired settings.



Parameter	Description
Preview	Displays a preview of the figure with the specified figure pose
Rotate Left/Right	Rotates the figure preview 90 degrees to the left or right
Render	Select a rendering mode for the preview figure. If Automatically Render is not selected, click Render after each position change to view a rendered preview.
Automatically Render	Renders the preview figure automatically, according to the selected mode, after a position change (depending on the selected rendering mode and the inclusion of attributes such as textures, this can take some time)
Revert	Returns the figure to its original position
Head	Specifies the head parameters
Angle	Indicates where the head is positioned along a vertical axis (looking "up" or "down")
Tilt	Specifies how much the head tilts to the left or right
Turn	Sets the amount that the head turns to the left or right
Body	Specifies the body trunk parameters
Hip Bend	Sets the bend of the lower torso and legs
Waist Bend	Indicates the bend of the upper torso
Waist Tilt	Indicates how much the upper torso tilts to the left or right
Waist Twist	Specifies how much the upper torso twists to the left or right
Arms	Specifies the arm parameters
Arm Selector	For each parameter, select the arm for the position change, or select Both Arms to mirror the position change to both sides of the body
Arm Rotation	Specifies the arm position at the front or back of the body
Arm Twist	Specifies the arm position as it twists along the arm axis
Arm Angle	Sets the up and down position of the arm
Elbow Bend	Specifies the amount that the elbow is bent

Parameter	Description
Wrist Twist	Sets the angle of the wrist
Hand Twist	Sets the flex of the hand
Legs	Specifies the leg and foot parameters
Leg Selector	For each parameter, select the leg for the position change, or select Both Legs to mirror the position change to both sides of the body
Leg Rotation	Specifies the leg position at the front or back of the body
Leg Twist	Specifies the leg position as it twists along the leg axis
Leg Angle	Sets the up and down position of the leg
Knee Bend	Specifies the amount that the knee is bent
Foot Rotation	Indicates the angle of the foot
Foot Flex	Sets the flex of the foot

4. Click **OK** to apply the custom position to the figure.

Creating Drawing Views

Product: Architect, Landmark, Spotlight, and Machine Design

As drawings are developed, they may contain viewports on both design layers and sheet layers, section viewports, and various ways of viewing layers such as stacked views and model views. The Navigation palette provides a way to access these features quickly and easily.

Navigating Within Drawings

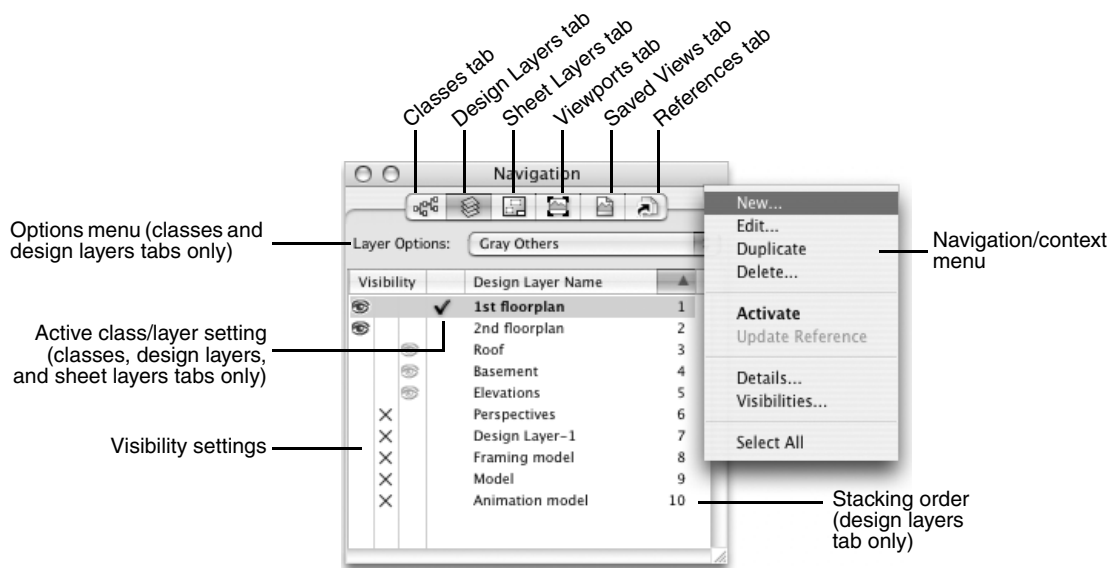
Product: Architect, Landmark, Spotlight, and Machine Design

The Navigation palette provides access to classes, design layers, sheet layers, viewports, and saved views, similar to the Organization dialog box. However, the drawing area is accessible while the Navigation palette is open.

To use the Navigation palette:

1. Select **Window > Palettes > Navigation**.

The Navigation palette opens.



2. Select the appropriate tab: Classes, Design Layers, Sheet Layers, Viewports, Saved Views, or References.

A list of items of that type in the current drawing displays.

3. Change the settings for classes, design layers, sheet layers, viewports, saved views, or references as needed.
 - Click a class or design layer's **Visibility** column to set the visibility for objects when the class or layer is inactive. To set the same visibility for all classes or design layers in the list, Option-click (Macintosh) or Alt-click (Windows) one of the Visibility columns.
 - Double-click a class, design layer, or sheet layer to activate it. Or, click the column to the left of the item's name to activate it.
 - Double-click a saved view to switch to that view.

- Double-click a viewport to switch the active layer to the sheet layer or design layer that contains the viewport, and to select the viewport (if a viewport is in a class with settings that prevent the viewport from being selected, a message displays to indicate that the active class changed to the viewport class).
- Select a class or design layer and then select one of the **Class Options** or **Layer Options**.
- Change the stacking order of a design layer by clicking the number in its # column and dragging it up or down the list.

See the following sections in the VectorWorks Fundamentals User’s Guide for details: “Setting Visibilities” on page 108, “Setting the Active Class” on page 101, “Setting the Active Design Layer” on page 93, “Managing Saved Views” on page 104, “Creating Classes” on page 96, and “Changing the Design Layer Stacking Order” on page 89.

4. The Navigation menu provides creation and management functions. Select a list item and then select the desired function from the Navigation menu to the right of the References tab.

Alternatively, Ctrl-click (Macintosh) or right-click (Windows) a list item and then select the desired function from the navigation context menu.

Menu Command	Function
Classes tab	
New	Select New to open the Class Options (Macintosh) or New Class (Windows) dialog box. See “Creating Classes” on page 96 in the VectorWorks Fundamentals User’s Guide.
Edit	Select a class and then select Edit to edit it in the Edit Class(es) dialog box. See “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide.
Duplicate	Select a class and then select Duplicate to create a copy of it. The name of the duplicate is the same as the original class, with a number added (as in cabinets-2); if the original name ends in a number, the number is incremented by one.
Delete	Select a class and then select Delete to open the Delete Class(es) dialog box. Specify what to do with the objects currently assigned to the class(es) being deleted (delete them, or reassign them to another selected class). Click OK to return to the Navigation palette. VectorWorks moves all objects in the deleted class(es) to the appropriate class, or deletes them, as specified. Shortcut keys for this command are Delete (Windows) and Forward Delete (Macintosh). The Dimension and None classes cannot be deleted. These are default classes in every drawing.
Activate	Select a class and then select Activate to make that class active for every design layer, viewport, and saved view without class visibility saved. Shortcut keys for this command are Enter (Windows) and Return (Macintosh).
Details	Select Details to open the Organization dialog box to the Classes tab in Details view; double-clicking the Classes tab in the Navigation palette is a shortcut for this command
Visibilities	Select a class and then select Visibilities to open the Organization dialog box to the Classes tab in Visibilities view (showing Viewport and Saved View visibilities for the class)
Select All	Choose Select All to select all classes
Design Layers tab	
New	Select New to open the New Design Layer dialog box. See “Creating Layers” on page 85 in the VectorWorks Fundamentals User’s Guide.

Menu Command	Function
Edit	Select a layer and then select Edit to edit it in the Edit Design Layers dialog box. See “Setting Design Layer Properties” on page 87 in the VectorWorks Fundamentals User’s Guide.
Duplicate	Select a design layer and then select Duplicate to create a copy of it. The name of the duplicate is the same as the original layer, with a number added (as in floorplan-2); if the original name ends in a number, the number is incremented by one.
Delete	Select a design layer and then select Delete ; when prompted, click Yes to confirm the deletion. Shortcut keys for this command are Delete (Windows) and Forward Delete (Macintosh). When a design layer is removed from the drawing, all objects in that layer are also removed.
Activate	Select a layer and then select Activate to switch to that design layer. Shortcut keys for this command are Enter (Windows) and Return (Macintosh).
Update Reference	(Layer import referencing method only) This option is available if a design layer has been imported into this file with workgroup referencing (the name of the referenced layer displays in italics). Select a referenced layer and then select Update Reference to update this file with layer information from the master file. See “Workgroup Referencing” on page 111 in the VectorWorks Fundamentals User’s Guide.
Details	Select Details to open the Organization dialog box to the Design Layers tab in Details view; double-clicking the Design Layers tab in the Navigation palette is a shortcut for this command
Visibilities	Select a layer and then select Visibilities to open the Organization dialog box to the Design Layers tab in Visibilities view (showing Viewport and Saved View visibilities for the layer)
Select All	Choose Select All to select all design layers
Sheet Layers tab	
New	Select New to open the New Sheet Layer dialog box. See “Creating Layers” on page 85 in the VectorWorks Fundamentals User’s Guide.
Edit	Select a sheet layer and then select Edit to edit it in the Edit Sheet Layers dialog box. See “Setting Sheet Layer Properties” on page 95 in the VectorWorks Fundamentals User’s Guide.
Duplicate	Select a sheet layer and then select Duplicate to create a copy of it. The name of the duplicate is the same as the original layer, with a number added (as in details-2); if the original name ends in a number, the number is incremented by one.
Delete	Select a sheet layer and then select Delete ; when prompted, click Yes to confirm the deletion. Shortcut keys for this command are Delete (Windows) and Forward Delete (Macintosh).
Activate	Select a layer and then select Activate to switch to that sheet layer. Shortcut keys for this command are Enter (Windows) and Return (Macintosh).
Details	Select Details to open the Organization dialog box to the Sheet Layers tab in Details view; double-clicking the Sheet Layers tab in the Navigation palette is a shortcut for this command
Select All	Choose Select All to select all sheet layers

Menu Command	Function
Viewports tab	
New	Select New to open the Create Viewport dialog box. For sheet layer viewports, see “Creating a Sheet Layer Viewport from a Design Layer” on page 610 in the VectorWorks Fundamentals User’s Guide. For design layer viewports, see “Presenting Drawings with Design Layer Viewports” on page 456 in this guide.
Edit	Select a viewport and then select Edit to edit it in the Properties dialog box. For sheet layer viewports, see “Properties of Sheet Layer Viewports” on page 614 in the VectorWorks Fundamentals User’s Guide. For design layer viewports, see “Properties of Design Layer Viewports” on page 463 in this guide.
Duplicate	Select a viewport and then select Duplicate to create a copy of it. The name of the duplicate is the same as the original viewport, with a number added (as in details-2); if the original name ends in a number, the number is incremented by one. VectorWorks places the duplicate viewport directly on top of the original, in the original sheet layer.
Delete	Select a viewport and then select Delete ; when prompted, click Yes to confirm the deletion. Shortcut keys for this command are Delete (Windows) and Forward Delete (Macintosh).
Activate	Select a viewport and then select Activate to switch to that viewport’s sheet layer and select that viewport (if a viewport is in a class with settings that prevent the viewport from being selected, a message displays to indicate that the active class changed to the viewport class). Shortcut keys for this command are Enter (Windows) and Return (Macintosh).
Details	Click Details to open the Organization dialog box to the Viewports tab in Details view; double-clicking the Viewports tab in the Navigation palette is a shortcut for this command
Visibilities	Select a viewport and then select Visibilities to open the Organization dialog box to the Viewports tab in Visibilities view (showing Class and Design Layer visibilities for the viewport)
Select All	Choose Select All to select all viewports
Saved Views tab	
New	Select New to open the Save View dialog box. See “Creating Saved Views” on page 104 in the VectorWorks Fundamentals User’s Guide.
Edit	Select a saved view and then select Edit to edit it in the Edit Saved View dialog box. See “Editing Saved Views” on page 106 in the VectorWorks Fundamentals User’s Guide.
Duplicate	Select a saved view and then select Duplicate to create a copy of it. The name of the duplicate is the same as the original view, with a number added (as in deckview-2); if the original name ends in a number, the number is incremented by one.
Delete	Select a saved view and then select Delete ; when prompted, click Yes to confirm the deletion. Shortcut keys for this command are Delete (Windows) and Forward Delete (Macintosh).
Activate	Select a saved view and then select Activate to switch to that view. Shortcut keys for this command are Enter (Windows) and Return (Macintosh).
Redefine	Select a saved view and then select Redefine to open the Redefine Saved Views dialog box. See “Redefining Saved Views” on page 453.



Menu Command	Function
Details	Select Details to open the Organization dialog box to the Saved Views tab in Details view; double-clicking the Saved Views tab in the Navigation palette is a shortcut for this command
Visibilities	Select a saved view and then select Visibilities to open the Organization dialog box to the Saved Views tab in Visibilities view (showing Class and Design Layer visibilities for the saved view). The active class/layer and class/layer options can also be changed here.
Select All	Choose Select All to select all saved views
References tab	
New	Click New to open the Open File dialog box. For layer import references, see “Adding and Editing Layer Import References” on page 113 in the VectorWorks Fundamentals User’s Guide. For design layer viewport references, see “Creating a Referenced Design Layer Viewport” on page 458 in this guide.
Edit	Select a referenced file and click Edit to open the Edit Reference dialog box. For layer import references, see “Adding and Editing Layer Import References” on page 113 in the VectorWorks Fundamentals User’s Guide. For design layer viewport references, see “Creating a Referenced Design Layer Viewport” on page 458 in this guide.
Delete	Select a reference and click Delete . In the Delete Reference dialog box, specify what to do with the items in the file that are currently referenced. See “Deleting References” on page 117 in the VectorWorks Fundamentals User’s Guide.
Update	Select a referenced file and click Update to update this document with references from the file. See “Updating References” on page 115 in the VectorWorks Fundamentals User’s Guide.
Update All	Click Update All to update all of the references in this document. See “Updating References” on page 115 in the VectorWorks Fundamentals User’s Guide.
Details	Select Details to open the Organization dialog box to the References tab in Details view; double-clicking the References tab in the Navigation palette is a shortcut for this command
Select All	Choose Select All to select all references

Redefining Saved Views

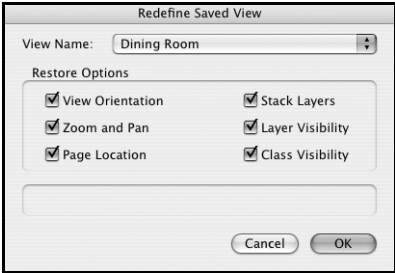
Product: Architect, Landmark, Spotlight, and Machine Design

To change the content of a saved view, use the **Redefine** command. This changes the saved view settings to match those of the current drawing area view, including the current layer options and class options, the plan rotation, the visibility of layers and classes that are inactive, and the active layer and class.

To redefine a saved view:

1. From the Navigation palette, select the Saved Views tab.
2. Select the view to be changed from the list.
3. From the Navigation palette menu or the view context menu, select **Redefine**.

The Redefine Saved View dialog box opens. Specify the view options and the visibility parameters.



Parameter	Description
View Name	Specify the view name
Restore Options	
View Orientation	Saves the general view parameters (current projection, 3D orientation, plan rotation, and page origin settings) of the active layer
Zoom and Pan	Saves the zoom and pan settings of the active layer
Page Location	Saves the design layer page location with the view; if deselected, the current page location setting is used when the view is displayed. The page location of sheet layers cannot be saved.
Stack Layers (VectorWorks Architect required)	Saves the current stacked layer status, whether on or off; if deselected, the current stack layers status is ignored and the status in effect when the view was created is used
Layer Visibility	Saves the current layer visibilities; if deselected, uses the visibilities that were set when the view was created
Class Visibility	Saves the current class visibilities; if deselected, uses the visibilities that were set when the view was created

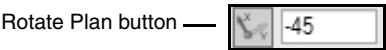
4. Click **OK** to save the current drawing area view with the specified settings.

Rotating the Plan

Product: Architect, Landmark, Spotlight, and Machine Design

In a design layer, the view may need to be rotated to match a drawing angle. When the plan is rotated, the view switches to Rotated Top/Plan, and all existing layers are rotated together.

The View bar has a button for quick access to the **Rotate Plan** command. Double-click the button to disable the rotation animation if desired. The animation can also be disabled by pressing the Ctrl key (Windows) or Command key (Macintosh).



To rotate the plan:

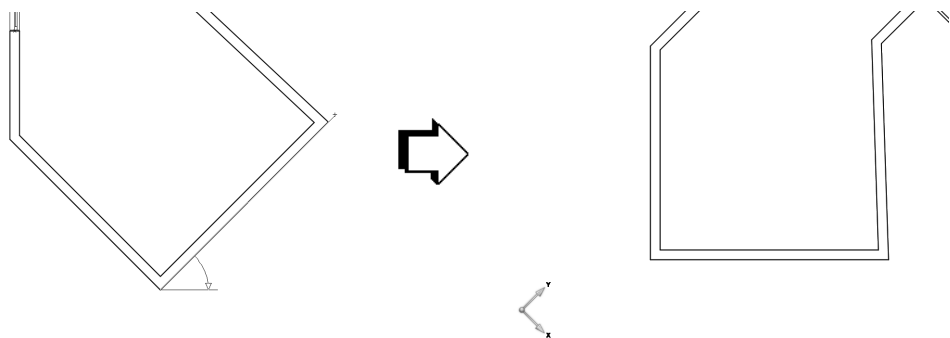
1. Select **View > Rotate Plan**, or click **Rotate Plan** from the View bar.
2. Click to indicate the center of plan rotation, and then click again to indicate the angle of plan rotation. The angle snaps to existing objects.

The angle of plan rotation can also be specified from the floating data bar, or entered directly in the View bar. The drawing rotates around plan center (0, 0) when the angle is specified in the View bar.

- 3. All layers in the drawing rotate to match the specified angle. (If some layers were in a 3D view, they will lose this view since all layers in the drawing are set to Rotated Top/Plan; confirm that this is the desired action.) Symbols placed and objects drawn while in this view match the current rotation angle.

At the bottom left of the drawing window, the position of the X - Y axis indicator shows the drawing rotation angle and direction.

The View bar indicates that the drawing has been rotated; the icon next to the layers in the Layers list changes, and the Current View list displays “Rotated Top/Plan.” Once the drawing has been rotated, a different rotation angle can be specified with **Rotate Plan** in the View bar.

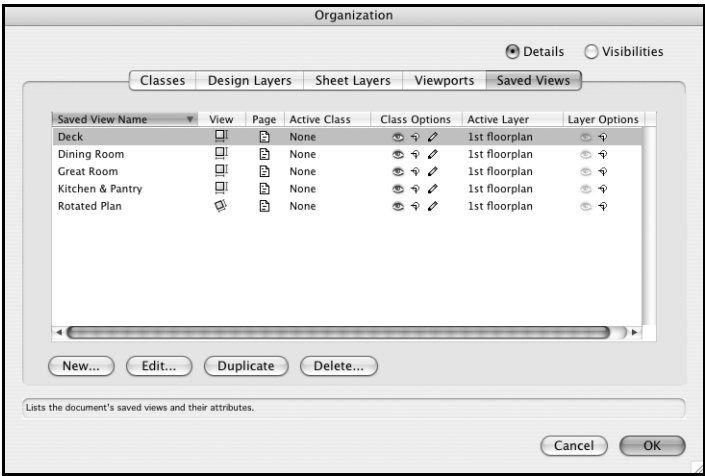


A red line indicates the previous rotation angle, if the **Rotate Plan** command is selected again.

To “un-rotate” the view, returning to the world coordinate system, select **View > Standard Views > Top/Plan**, select **Top/Plan** from the View bar, or enter an angle of 0 for **Rotate Plan** in the View bar.

The plan rotation can be saved as a view and restored later by selecting the view for display. Select **Save View Orientation** in the Save View dialog box to save the plan rotation (see “Creating Saved Views” on page 104 in the VectorWorks Fundamentals User’s Guide).

Saved views with rotation information display with a rotated icon in the View column of the Organization dialog box. Sorting by the View column separates non-rotated views from the rotated views.





Presenting Drawings with Design Layer Viewports

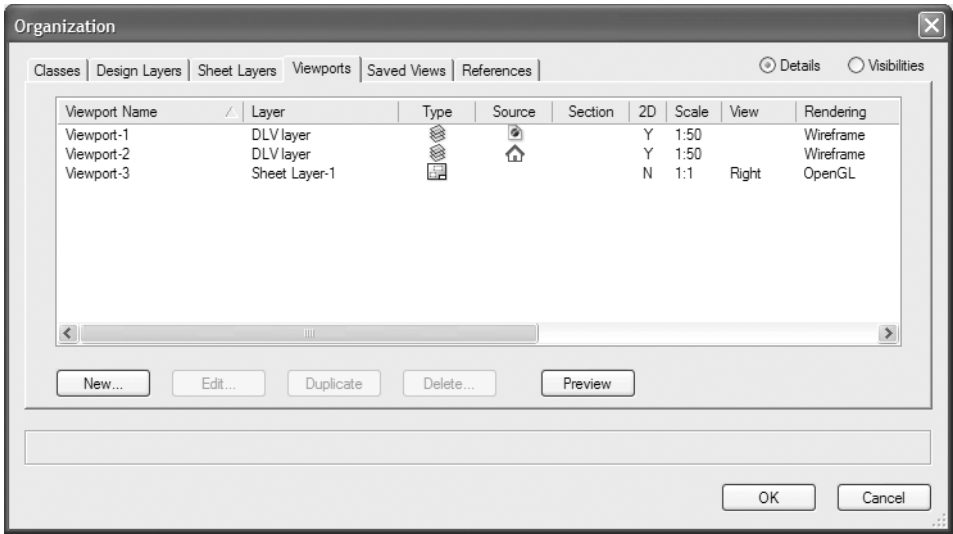
Product: Architect, Landmark, Spotlight, and Machine Design

A sheet layer viewport displays a full or cropped view of one or more design layers, which you can change as needed and not affect the original drawing. For example, change the viewport’s layer and class visibilities, use a different render mode, or add annotations and dimensions. (See “Presenting Drawings with Sheet Layer Viewports” on page 609 in the VectorWorks Fundamentals User’s Guide.)

Design layer viewports provide different functionality, for more flexibility. Like a sheet layer viewport, a design layer viewport can display design layers from the current file in a full or cropped view; unlike a sheet layer viewport, it can include one or more design layers that are workgroup referenced from another file.

Like a sheet layer viewport, in a design layer viewport you can control layer and class visibility, and create layer and class overrides. However, because it is an object on a design layer, a design layer viewport has the same view, scale, and render mode as everything else on the layer. You can use 2D and 3D drawing tools to add objects to the design layer, but you cannot add annotations to a design layer viewport.

The Organization dialog box differentiates among the various types of viewports in the Viewports tab. In the following example, the Type column indicates that Viewport-1 and Viewport-2 are design layer viewports, while Viewport-3 is a sheet layer viewport. The Source column indicates that Viewport-1 contains design layers from an external file, while Viewport-2 contains internal design layers.

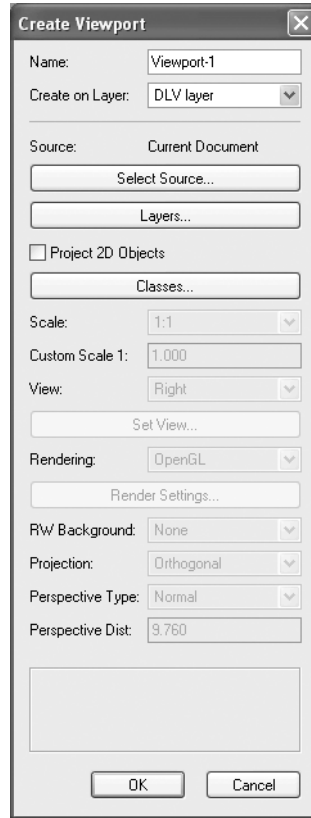


Creating a Design Layer Viewport that Displays an Internal Design Layer

Product: Architect, Landmark, Spotlight, and Machine Design

To create a design layer viewport that displays a design layer in the same file:

1. Select **View > Create Viewport**. Alternatively, from either the Organization dialog box or the Navigation palette, select the Viewports tab, and click **New**.
2. The Create Viewport dialog box opens. The scale, view, and render mode of the viewport are determined by the design layer on which it is placed; they cannot be changed here. Other viewport parameters can be set either at creation, or after the viewport has been created.



Parameter	Description
Name	Specifies the viewport name
Create on Layer	Select the design layer in the current file where the viewport will be created, or select New Design Layer to create a layer
Source	<p>Displays the name of the file that contains the design layers to display in the viewport. If Current Document is not displayed here, click Select Source to open the Select Viewport Source dialog box; select Current Document as the source, and click OK to return to this dialog box.</p> <p>See “Creating a Referenced Design Layer Viewport” on page 458 for information about referencing an external file.</p>
Layers	Specifies which design layers will be visible in the viewport; see “Changing the Layer Properties of Design Layer Viewports” on page 466
Project 2D Objects	Select to display 2D objects in a viewport with a view other than Top/Plan
Classes	Specifies which classes from the source file will be visible in the viewport; see “Changing the Class Properties of Design Layer Viewports” on page 469
Remaining fields	The remaining fields are not available for design layer viewports



3. Click **OK**.

The viewport is created on the designated design layer, and the design layer becomes active. The viewport can be cropped, as described in “Cropping Design Layer Viewports” on page 465.

Creating a Design Layer Viewport by Cropping

Product: Architect, Landmark, Spotlight, and Machine Design

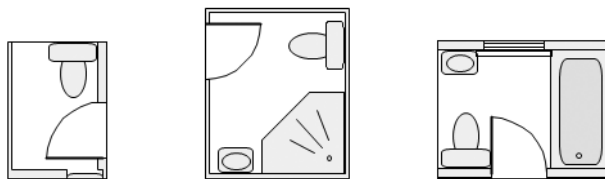
These steps require that the viewport and the design layer that displays in it are in the same file.

To create a design layer viewport by cropping:

1. Access the design layer that will display in the viewport.
2. Create a 2D object (such as a rectangle, oval, circle, polyline, or polygon). The 2D object must define an area; for example, a 2D line cannot be used. Position the 2D object on the design layer to delimit the area to be included in the new viewport. The fill of a viewport crop object is always None; however, the pen style can be set from the Attributes palette.
3. Select the 2D crop object, and then select **View > Create Viewport**.
4. An alert dialog box asks whether the object should be used as the viewport’s crop. Select **Yes** (also select **Always do the selected action** to always use a selected 2D object as a crop object when creating viewports).
5. The Create Viewport dialog box opens. Select the design layer on which to create the viewport. The **Source** must be the current document. Specify the design layers and classes to display in the viewport. (See “Changing the Layer Properties of Design Layer Viewports” on page 466 and “Changing the Class Properties of Design Layer Viewports” on page 469.)
6. Click **OK**.

The viewport, cropped by the selected 2D object, is created on the specified design layer.

To hide the crop object, edit the viewport’s crop (see “Cropping Design Layer Viewports” on page 465) and set the object’s Pen Style to **None**. Alternatively, change the class of the crop object to invisible.



1st Floor Powder Room

2nd Floor Master Bath

2nd Floor Hall Bath

Creating a Referenced Design Layer Viewport

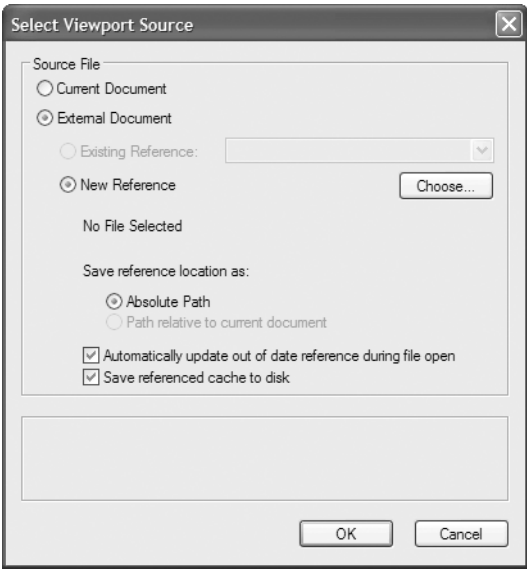
Product: Architect, Landmark, Spotlight, and Machine Design

There are two ways to reference design layers that are in other VectorWorks files:

- The default method in the VectorWorks Design Series is to create a design layer viewport and then reference the desired design layers from the master file into the viewport, as described here.
- In VectorWorks Fundamentals, design layers are imported into the target file when they are referenced. For backward compatibility, the Design Series supports this method. See “Adding and Editing Layer Import References” on page 113 in the VectorWorks Fundamentals User’s Guide.

To create a design layer viewport that references a design layer in another file:

1. If the current file uses layer import referencing, switch to design layer viewport referencing. (From the References tab of the Organization dialog box, click **Settings**, and click the Design layer viewports option on the Reference Settings dialog box. Any existing referenced layers are automatically converted into referenced design layer viewports.)
2. Select **View > Create Viewport**. Alternatively, from either the Organization dialog box or the Navigation palette, select the Viewports tab, and click **New**.
3. The Create Viewport dialog box opens. Select the design layer on which to create the viewport.
4. Click **Select Source** to open the Select Viewport Source dialog box.



Parameter	Description
Current Document / External Document	Select External Document to indicate that the design layers that will display in this viewport are in a different file
Existing Reference	If the master file is already a reference in this file, select this option, and then select the reference from the list
New Reference	Select this option if this is a new reference, and click Choose to open the Open Current-Version Drawing dialog box; locate the master file and click Open to return to this dialog box. The path to the selected file displays below the New Reference field. Referenced VectorWorks files must be the same version as the target file.



Parameter	Description
Save reference location as	Maintains either an absolute or relative file path reference from the current file to the referenced file. Use the absolute path when the location of the referenced file with respect to the current file is not going to change. Use the relative path when the files might be moved to another computer or platform; as long as the relative path between the files remains the same, the reference can be found. Both files must be saved on the save volume to select this option. The Source File path displays either an absolute or relative path, depending on the selection.
Automatically update out of date reference during file open	Updates the reference each time the target file is opened; when deselected, the reference is updated only when Update is clicked from the References tab of the Organization dialog box
Save referenced cache to disk	Saves a copy of the referenced data with the target file. When this option is deselected, a copy of the referenced data is not saved, which means that the target file size is smaller; the referenced data is refreshed when the target file is opened.

- Click **OK** in the Select Viewport Source dialog box to return to the Create Viewport dialog box.
- Specify the design layers and classes to display in the viewport (see “Changing the Layer Properties of Design Layer Viewports” on page 466 and “Changing the Class Properties of Design Layer Viewports” on page 469).
- Click **OK**.

The viewport is created on the designated design layer, and the design layer becomes active. The viewport can be cropped, as described in “Cropping Design Layer Viewports” on page 465.

Adding or Editing References for Design Layer Viewports

Product: Architect, Landmark, Spotlight, and Machine Design

Workgroup referencing allows you to use information from other VectorWorks files in your file, including design layers, classes, and resources (such as hatches, worksheets, or symbols). Referencing in the Design Series is different from VectorWorks Fundamentals referencing because it uses design layer viewports to reference design layers in other VectorWorks files. One advantage to this method is that all of the layers, classes, and resources from the master file are not automatically imported into the target file. In addition, image and PDF files can be referenced. The Design Series uses this type of referencing by default, but you can choose to use Fundamentals (layer import) referencing for a particular file if necessary.

Use the References tab of the Organization dialog box to create references to VectorWorks, image, and PDF files, and to edit or update existing references. A reference for a design layer viewport can be created when the viewport is created, or it can be created ahead of time from the References tab.

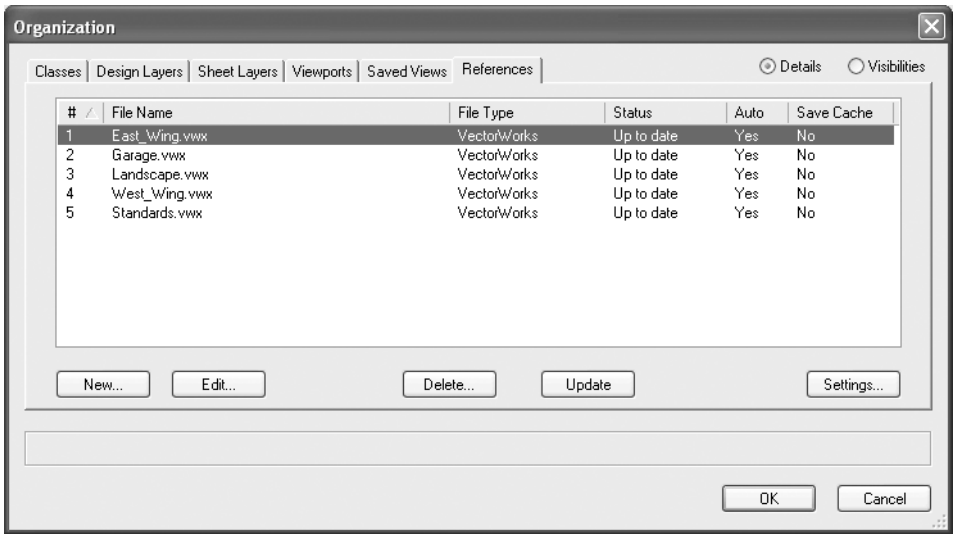
For detailed information about other aspects of workgroup referencing in both Fundamentals and Design Series, see “Workgroup Referencing” on page 111 in the VectorWorks Fundamentals User’s Guide.

To add or edit references when design layer viewport referencing is enabled:

- Access the target file, and select **Tools > Organization**.

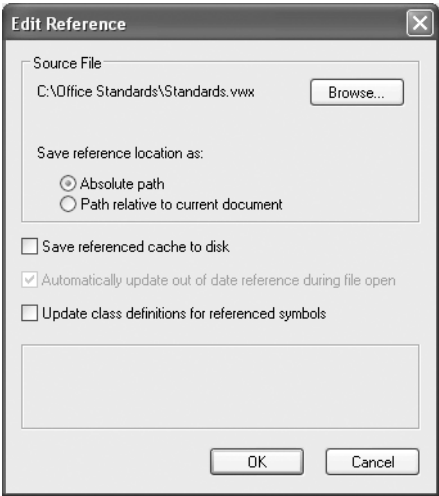
The Organization dialog box opens.
- Click the References tab.

Referenced files are listed in priority order, along with their current status, whether they are set to update automatically when the target file is opened, and whether they are set to save copies of the referenced items with the file.



Parameter	Description
New	Opens the Open File dialog box to select a new reference file
Edit	Opens the Edit Reference dialog box to change the parameters of a selected reference file
Delete	Opens the Delete Reference dialog box to delete a file from the list of referenced files, and to choose whether to keep the referenced layers and resources in the target file; see “Deleting References” on page 117 in the VectorWorks Fundamentals User’s Guide
Update	Manually updates the referenced items from the selected file(s)
Settings	Opens the Reference Settings dialog box to set options for updates of referenced items; see “Setting the Referencing Options” on page 112 in the VectorWorks Fundamentals User’s Guide

3. To edit a current reference file, select the file and click **Edit**.
The Edit Reference dialog box opens. Proceed to step 5.
4. To add a new reference file, click **New**.
The Open File dialog box opens. Select the desired file, and then click **Open** to open the appropriate dialog box:
- **VectorWorks file:** New Reference dialog box
 - **Image file:** Image Import Options dialog box
 - **PDF file:** Import PDF dialog box
- [Referenced VectorWorks files must be the same version as the target file.](#)
5. From the New Reference or Edit Reference dialog box, specify the parameters for the workgroup reference.



Parameter	Description
Source File	Displays the path and file name of the referenced master file; if the Edit option was selected, click Browse to edit the file location
Save reference location as	<p>Maintains either an absolute or relative file path reference from the current file to the referenced file. Use the absolute path when the location of the referenced file with respect to the current file is not going to change. Use the relative path when the files might be moved to another computer or platform; as long as the relative path between the files remains the same, the reference can be found. Both files must be saved on the save volume to select this option.</p> <p>The Source File path displays either an absolute or relative path, depending on the selection.</p>
Save referenced cache to disk	Saves a copy of the referenced data with the target file. When this option is deselected, a copy of the referenced data is not saved, which means that the target file size is smaller; the referenced data is refreshed when the target file is opened.
Automatically update out of date reference during file open	Updates the reference each time the target file is opened; when deselected, the reference is updated only when Update is clicked from the References tab of the Organization dialog box
Update class definitions for referenced symbols	Updates class definitions along with the referenced symbols that use those classes; this field does not appear if the reference is for an image or PDF file

6. Click **OK** to return to the Organization dialog box.



Properties of Design Layer Viewports

Product: Architect, Landmark, Spotlight, and Machine Design

Viewport Parameters

Product: Architect, Landmark, Spotlight, and Machine Design

Once it has been created, the properties of the design layer viewport can be edited in the Object Info palette.

Viewports have a fill and pen style of None.

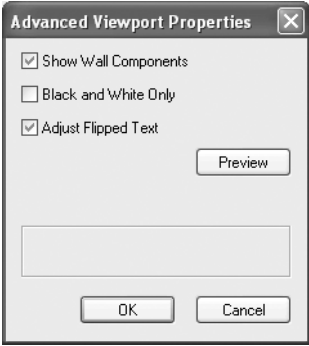
Parameter	Description
X / Y / Z	Specifies the absolute position of the viewport's bounding box along the X, Y, and Z axes
Rotation	Sets the viewport rotation; if the viewport was created from a rotated plan view, this parameter can be used to reset the viewport to the world coordinate system
Lock Position	Select to prevent the viewport from being moved accidentally
Crop	Indicates whether the viewport has been cropped (see "Cropping Design Layer Viewports" on page 465)
Layers	Specifies which design layers are visible in the viewport and allows changes to some of the layer properties in the viewport; see "Changing the Layer Properties of Design Layer Viewports" on page 466
Project 2-D Objects	Select to display 2D objects in a viewport with a view other than Top/Plan
Classes	Specifies which classes are visible in the viewport and allows changes to some of the class properties in the viewport, including changes to the properties for crop objects. Class visibilities can be overridden for a selected viewport; see "Changing the Class Properties of Design Layer Viewports" on page 469.
Advanced Properties	Opens the Advanced Viewport Properties dialog box; see "Advanced Design Layer Viewport Properties" on page 463
Source	Indicates the source file that contains the original design layer(s) that display in the viewport

Advanced Design Layer Viewport Properties

Product: Architect, Landmark, Spotlight, and Machine Design

To access additional viewport parameters, click **Advanced Properties** from the Object Info palette of a selected viewport.

The Advanced Viewport Properties dialog box opens. These settings affect the viewport display only; they do not affect the original design layer(s).



Parameter	Description
Show Wall Components	Displays or hides wall components in Top/Plan view, regardless of the document preferences wall component display setting (see “Display Preferences” on page 48 in the VectorWorks Fundamentals User’s Guide)
Black and white only	Changes all colors in the viewport to black or white; this is useful for displaying two viewport copies on the same design layer, with one in color and the other in black and white. However, if the document preferences display setting is black and white, viewports will also display as black and white.
Adjust Flipped Text	Re-oriens rotated and flipped text in the viewport so that it is always readable (regardless of the VectorWorks flipped text preference; see “Display Preferences” on page 41 in the VectorWorks Fundamentals User’s Guide)
Preview	Displays the viewport with a preview of the advanced settings

Modifying Design Layer Viewports

Product: Architect, Landmark, Spotlight, and Machine Design

There are several ways to modify design layer viewports; their appearance can be completely different from the original design layers, for presentation purposes.

- Modify the settings for the viewport in the Object Info palette.
- Modify the viewport with various 2D and 3D tools and commands.
- Crop the viewport.
- Edit the design layer(s) that display in the viewport.
- Change the properties of the viewport’s layers and classes.

Moving and Editing Design Layer Viewports

Product: Architect, Landmark, Spotlight, and Machine Design

A design layer viewport can be edited like most 2D objects. For information on 2D tools and commands, see “Editing 2D Objects” on page 255.

- Use the **Cut**, **Copy**, and **Paste** commands to copy or paste a viewport on its original design layer or another design layer. Use the **2D Selection** tool to drag a viewport to a new position (or edit the X, Y, and Z axis positions in the Object Info palette). Press the Delete key to delete a selected viewport.



- Use the **Move**, **Rotate**, and **Mirror** commands and the **Rotate** and **Mirror** tools to move, rotate, or mirror a viewport.
- Use the **Modify > Lock** and **Modify > Unlock** commands to lock and unlock viewports.

Cropping Design Layer Viewports

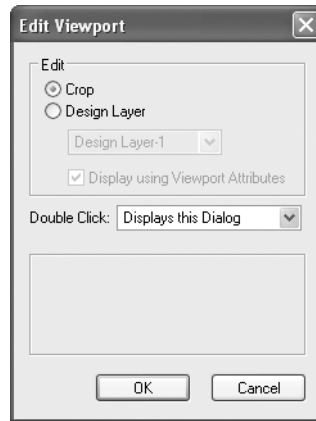
Product: Architect, Landmark, Spotlight, and Machine Design

A viewport can be cropped on its design layer, to display only a portion of the viewport.

To crop a viewport:

1. Right-click (Windows) or Ctrl-click (Macintosh) on the viewport and select **Edit** from the context menu.

The Edit Viewport dialog box opens.



Parameter	Description
Crop	Creates or edits a cropped viewport
Design Layer	Navigates to the selected design layer to edit the objects contained in the viewport (see “Editing a Design Layer Displayed in a Design Layer Viewport” on page 466)
Display using Viewport Attributes	Retains the viewport view parameters and layer and class visibilities when you navigate to the design layer
Double Click	Sets the future behavior when a viewport is double-clicked, eliminating the display of this dialog box if desired (it can still be accessed from a viewport’s context menu). If the Edits the Design Layer option is selected, a double-click activates the design layer of the double-clicked object.

2. Click **Crop**, and then click **OK** to enter Edit Crop mode.

Alternatively, right-click (Windows) or Ctrl-click (Macintosh) on a viewport and select **Edit Crop** from the context menu.

A colored border around the drawing window indicates that you are in an edit mode. The **Exit Group** command becomes available from the **Modify** menu, and the **Exit Viewport Crop** button is visible in the top right corner of the drawing window.



3. Create a 2D object (such as a rectangle, oval, polyline, or polygon). The 2D object must define an area; for example, a 2D line cannot be used. Position the 2D object to delimit the new viewport display area. The fill of a viewport cropping object is always None; however, the pen style can be set from the Attributes palette while in Edit Crop mode. Set the pen style to None to make the crop object invisible.

To view other objects while in Edit Crop mode, select the **Show other objects while in groups** VectorWorks preference (see “Display Preferences” on page 41 in the VectorWorks Fundamentals User’s Guide).

Adjust the view as necessary using the **Flyover** tool (see “Flyover” on page 406 in the VectorWorks Fundamentals User’s Guide).

The bounding box of the crop object is also the perspective clip rectangle, if the viewport is in Perspective projection. Reshaping the crop object changes the perspective clip rectangle as well.

4. Click **Exit Viewport Crop** to return to the design layer.
5. The cropped viewport displays. In the Object Info palette, the crop status changes to **Yes**.
6. To change, replace, or delete the crop object, right-click (Windows) or Ctrl-click (Macintosh) on the viewport and select **Edit** from the context menu to re-enter Edit Crop mode.

Visibility changes made from the Classes tab of the Organization dialog box (**Tools > Organization**) do not affect the visibility of the crop object. To change the class visibility of a crop object, click **Classes** from the viewport Object Info palette, and make the changes in the Viewport Class Properties dialog box (see “Changing the Class Properties of Design Layer Viewports” on page 469).

Editing a Design Layer Displayed in a Design Layer Viewport

Product: Architect, Landmark, Spotlight, and Machine Design

To edit a design layer that is displayed in a design layer viewport:

1. Right-click (Windows) or Ctrl-click (Macintosh) on the viewport and select **Edit** from the context menu. The Edit Viewport dialog box opens (see “Cropping Design Layer Viewports” on page 465 for a description of the dialog box parameters).

Click **Design Layer** and select the design layer to edit from the list. Select **Display using Viewport Attributes** to view the design layer with the viewport attributes for the visibility of layers and classes. If the original design layer has different “Z” heights and **Display using Viewport Attributes** is selected, the layer options are set to **Active Only**.

Alternatively, right-click on a viewport and select **Edit Design Layer** from the context menu to activate the design layer of the right-clicked object.

2. Click **OK** to make the selected design layer the active layer.

Changing the Layer Properties of Design Layer Viewports

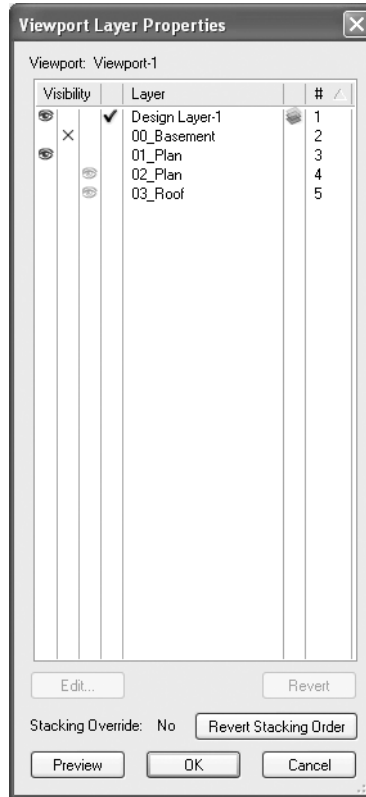
Product: Architect, Landmark, Spotlight, and Machine Design

The viewport’s layer visibility, opacity, stacking order, and colors can be changed to be different from the design layer that contains the viewport. Other viewports, as well as the design layer properties, are not affected. The viewport attributes can be tailored as desired for presentation; several copies of the same viewport can appear completely different.

To change the layer properties of a viewport:

1. Select the viewport.
2. From the Object Info palette, click **Layers**.

The Viewport Layer Properties dialog box opens.

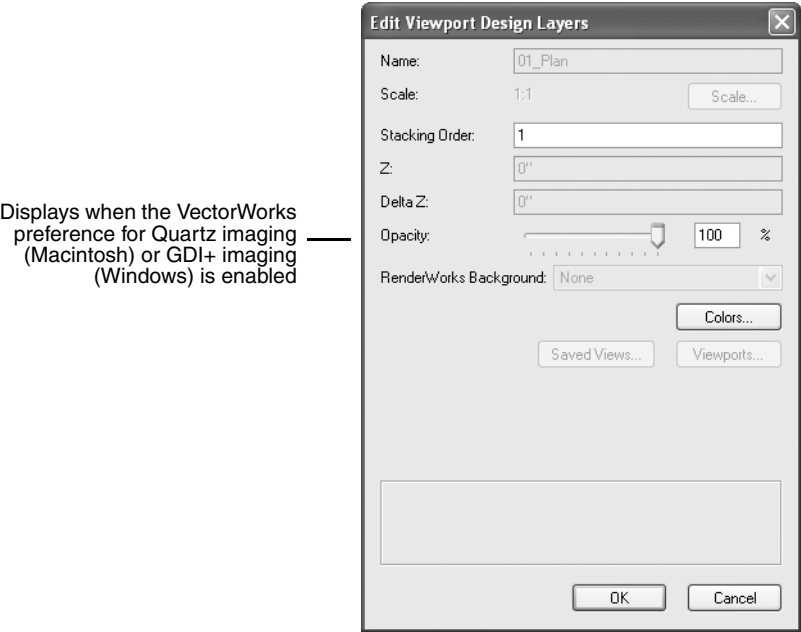


Parameter	Description
Layer list	Lists the viewport layers and their visibility, edited status, layer color use status, and stacking order. Click the triangle in the heading of an active column to toggle between ascending and descending sort order based on that column parameter.
Visibility	Click in a layer visibility column to change the layer visibility for this viewport. <ul style="list-style-type: none"> • Visible (displays objects in this layer) • Invisible (hides objects in this layer) • Gray (displays objects in this layer as dimmed) • Check mark (indicates layers with overrides)
Use Layer Colors	Click to apply the viewport layer colors set in the Edit Viewport Design Layers dialog box (click Edit to set the colors, as described in the next step), overriding the design layer colors. This setting is independent of the Use layer colors document preference.
#	Displays the layer stacking order; drag a layer within the # column to change its stacking order
Edit	Opens the Edit Viewport Design Layers dialog box, to override the selected layer's properties
Revert	Returns the viewport layer properties to their status upon opening the dialog box, undoing any layer overrides

Parameter	Description
Stacking Override	Indicates whether the layer stacking order in the viewport is different from the design layer stacking order. Click Revert Stacking Order to return to the original design layer stacking order.
Preview	Click to preview the layer property settings in the selected viewport

3. To override the layer properties (for viewport display), select one or more viewport layers and click **Edit**.
Alternatively, double-click on a viewport layer to edit it.

The Edit Viewport Design Layers dialog box opens.



4. The same parameters apply when you create a design layer (see “Setting Design Layer Properties” on page 87 in the VectorWorks Fundamentals User’s Guide); for viewport layers, only the stacking order, transfer mode or opacity, and colors can be edited. These edits apply to the current viewport only, though they can be transferred to other viewports with the **Eyedropper** tool.

The viewport layer colors can be controlled separately from the design layer colors, for flexible presentation output. Click **Colors** to override the fill and pen colors for the selected viewport layer. To see the effects of the color override, **Use Layer Colors** must be selected in the Viewport Layer Properties dialog box for the selected viewport. This is similar to the way that **Use Layer Colors** must be selected in Document Properties to see the layer color settings for a design layer, as described in “Setting the Design Layer Color” on page 92 in the VectorWorks Fundamentals User’s Guide.

5. Click **OK** to return to the Viewport Layer Properties dialog box.
Click **Preview** to evaluate the results of the property changes.
6. Click **OK** to return to the design layer.



Changing the Class Properties of Design Layer Viewports

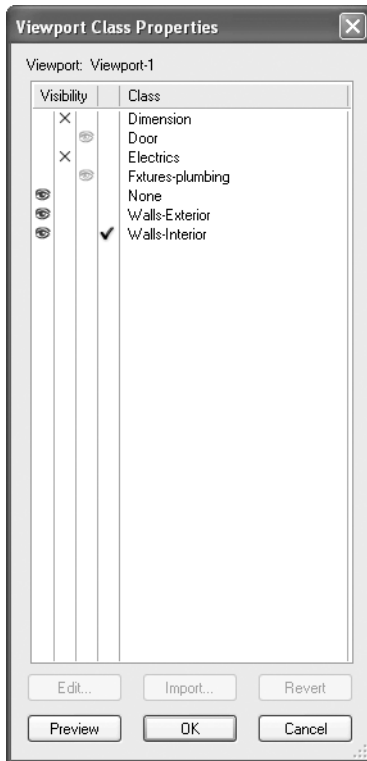
Product: Architect, Landmark, Spotlight, and Machine Design

The class visibilities and attributes of a selected viewport can be changed to be different from the design layer that contains the viewport. This does not change the class properties or the class visibility for the original design layers or for other viewports. The viewport attributes can be tailored as desired for presentation; several copies of the same viewport can appear completely different.

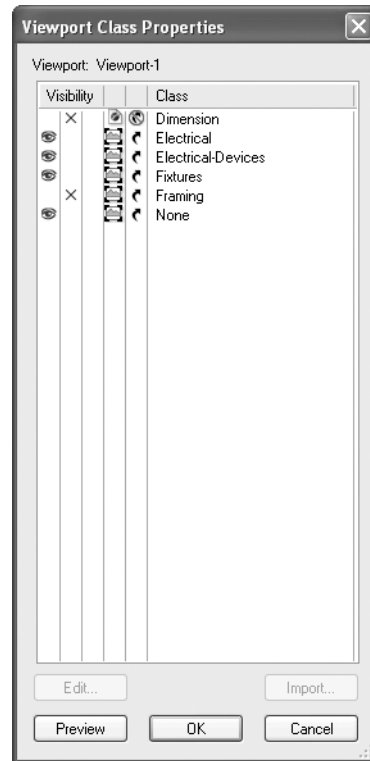
To override viewport class properties:

1. Select the viewport.
2. From the Object Info palette, click **Classes**.

The Viewport Class Properties dialog box opens. The dialog box functionality is slightly different for referenced and non-referenced (internal) viewports. Change class visibilities and/or make class attribute overrides for the selected viewport.

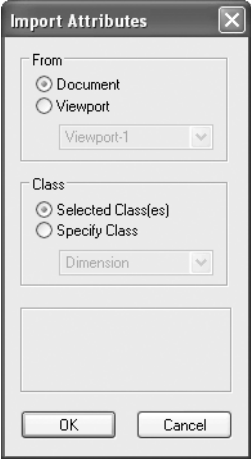


Non-Referenced Viewport



Referenced Viewport

Parameter	Description
Class List	Lists the viewport classes and their visibility and edited status; click in a class visibility column to change the class visibility for this viewport. Click the triangle in an active column to toggle between ascending and descending sort order based on that column parameter.

Parameter	Description
Visibility	<ul style="list-style-type: none">Column 1: Visible (displays objects in this class)Column 2: Invisible (hides objects in this class)Column 3: Gray (displays objects in this class as dimmed)Column 4: Check mark (indicates that the class definition has overrides; non-referenced viewports only)
Definition overrides (Referenced viewports only)	<ul style="list-style-type: none">Column 4 indicates whether the class definition is the same as the source file, or the class definition has overrides in this file. When a class is edited with the Edit button, the override icon displays automatically. Click the icon to revert to the original setting.<div><div>The class definition is from the viewport's source file</div><div><div></div><div></div></div><div>Class overrides exist in this file</div></div>Column 5 indicates whether the class definition will be updated from the source file when the reference is updated. Click the icon to toggle the setting.<div><div>Update</div><div><div></div><div></div></div><div>Do not update</div></div>
Edit	Opens the Edit Class(es) dialog box, to make overrides to the selected class that only apply to the current viewport (see “Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide)
Import	<p>Opens the Import Attributes dialog box, to import the class attribute settings from the file or from another viewport. The attributes can be imported for the classes selected in the Viewport Class Properties dialog box, from corresponding classes, or from a specified class in the file or a specified viewport.</p> <div></div> <p>Click OK to import the class attributes into the selected viewport. (The Eyedropper tool can also transfer class override attributes between viewports.)</p>
Revert (Non-referenced viewports only)	Sets the selected class back to its original attributes, undoing any class overrides
Preview	Click to preview the class visibility and attribute settings in the selected viewport



3. Click **OK** to apply the changes to the selected viewport.

Creating Section Views

Product: Architect, Landmark, Spotlight, and Machine Design

A section view slices through a model, creating a cross section of the model while leaving the model intact. The section view can display a 2D cross-section view of only the objects that intersect the section line, or, additionally, the 3D geometry that remains on the indicated side of an infinite plane passing through the section line.

Using the capabilities of viewports, VectorWorks can create live section views from design layers or viewports on sheet layers. By placing several section viewports on a sheet layer, models can be analyzed and presented effectively. The section views can be updated as the model changes, and their attributes and appearance can be easily changed.

Creating a Section Viewport

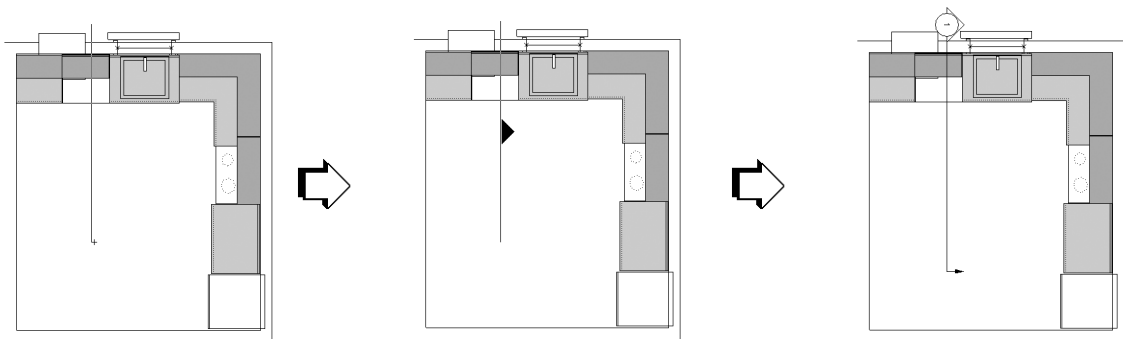
Product: Architect, Landmark, Spotlight, and Machine Design

Section views are placed in special viewports, called section viewports, on sheet layers. A section viewport can be created from either a design layer or a viewport on a sheet layer.

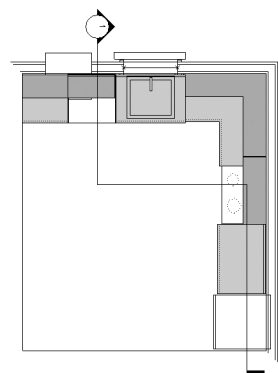
To create a section viewport:

1. If creating a section view from an active design layer, set the layer to Top/Plan view by selecting **View > Standard Views > Top/Plan**. If creating a section view from an existing viewport, select a non-sectioned viewport object. The viewport object must be in Top, Bottom, Left, Right, Front, or Back view orientation.
2. Select **View > Create Section Viewport**.
3. Draw the section line to create the cutting plane on the design layer or viewport.

Click in the drawing and drag the mouse to begin drawing the section line. Click to mark the end of the section line, and then click to indicate the side of the section line to keep, which is indicated by a black arrow. Double-click to end the section line.



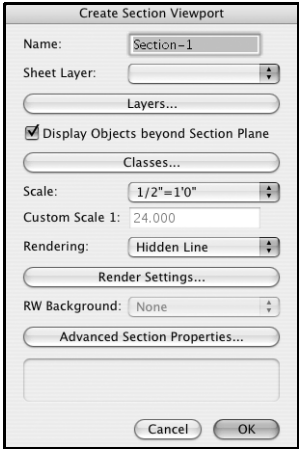
To create a broken section line, click in the drawing and draw the first segment. Indicate the section side to keep. Click and drag to draw additional segments; broken section line segments are always parallel or perpendicular to each other. Double-click to end the broken section line.



4. The Create Section Viewport dialog box opens, set to the parameters of the active design layer or non-sectioned viewport.

Because a section viewport is a type of viewport created on a sheet layer, many of the parameters are identical to those required when creating a regular viewport as described in “Creating a Sheet Layer Viewport from a Design Layer” on page 610 in the VectorWorks Fundamentals User’s Guide. Only the parameters necessary for creating section viewports are described here.

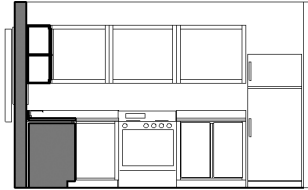
The view of a section viewport cannot be changed. In addition, wireframe and sketch rendering modes are not available for section viewports. (Hidden line rendering results can be sketched.)



Parameter	Description
Display Objects Beyond Section Plane	When selected, shows objects beyond the section plane, on the indicated side of the section; deselect to show only the objects that intersect the section line
Advanced Section Properties	Specifies advanced section viewport parameters defining the extent and attributes of the section view; see “Advanced Section Viewport Properties” on page 473



5. Click **OK**. A section line object is created in the design layer, or is added to the annotation of the existing non-sectioned viewport. A section viewport is created on the selected sheet layer, and the drawing switches to that sheet layer, displaying the new section viewport.



By default, the cross-section areas (along the plane where the section was cut) are displayed in red.

A section viewport created from a design layer can be updated when changes are made to the design layer. However, a section viewport created from a viewport does not maintain a connection to the viewport that created it. It updates when the design layers that are visible in the source viewport change.

Advanced Section Viewport Properties

Product: Architect, Landmark, Spotlight, and Machine Design

While creating a section viewport, the advanced properties which define its extent and attributes can be specified from the Create Section Viewport dialog box. After creation, the advanced properties can also be edited.

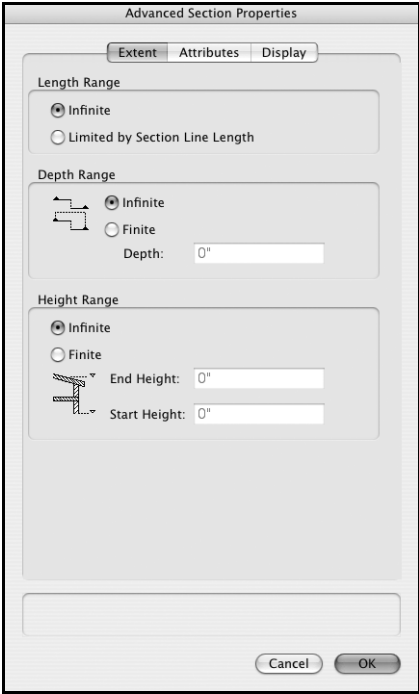
To specify the advanced properties of a section viewport:

1. From the Create Section Viewport dialog box, or the Object Info palette of a selected section viewport, click **Advanced Section Properties**.

The Advanced Section Properties dialog box opens.

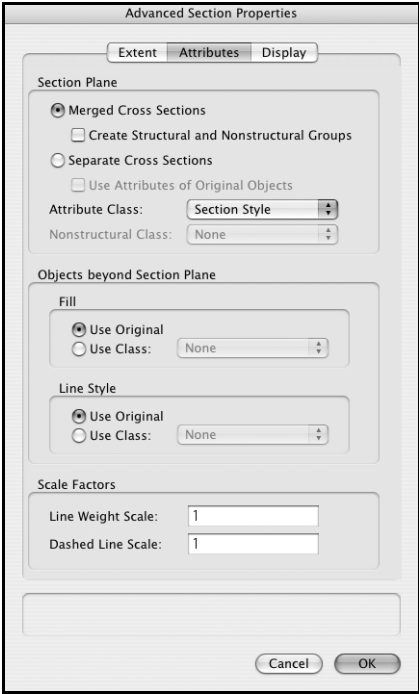
2. Click the Extent tab to specify either an infinite section view, or the length, depth, and height of a finite section viewport.

Finite sections are useful when creating interior elevations; for example, by drawing a section line across a particular room of a building and setting the layer visibility only for the room's floor, an interior elevation of only that room can be created.



Parameter	Description
Length Range	Specifies the length range of the section viewport
Infinite	Cuts the section by an infinite plane
Limited by Section Line Length	Limits the section only to the length defined by the section line
Depth Range	Specifies the depth range of the section viewport
Infinite	All objects on the indicated side of the section line are displayed
Finite	Displays objects on the indicated side up to a specified depth (the depth can be indicated graphically by dragging a dotted line on the design layer; see “Modifying Section Lines Graphically” on page 484)
Height Range	Specifies the height range of the section viewport
Infinite	Does not limit the section to a Z range
Finite	Limits the display of the section viewport to a range defined by the Start and End Height Z values

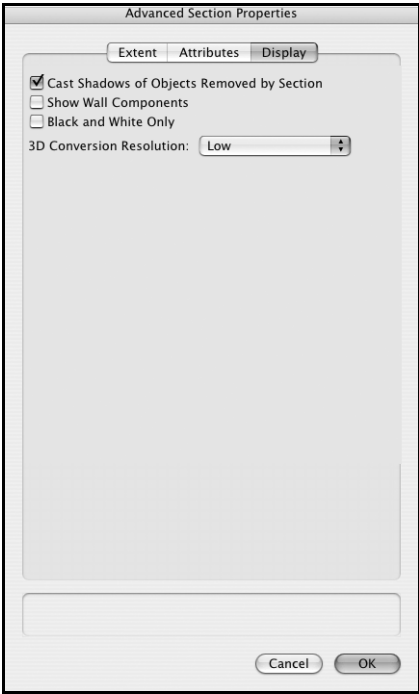
- Click the Attributes tab to specify the appearance of objects on and beyond the section plane. Objects on the section plane can maintain an individual profile, or can be divided into structural and non-structural groups to display them differently according to class settings.



Parameter	Description
Section Plane	Objects on the section plane can be merged into a single profile, maintain individual profiles, or be divided into groups of structural and non-structural elements (useful for displaying cabinets and walls differently, for example)
Merged Cross Sections	Merges the sectioned objects' cross-section profiles into one profile
Create Structural and Nonstructural Groups	Merges the structural objects' cross-section profiles into one group, and the non-structural objects' cross section profile into another, allowing them to have a different class setting
Separate Cross Sections	Generates a separate cross-section for each sectioned object
Use Attributes of Original Objects	Each sectioned object is displayed with the attributes of its original object
Attribute Class / Structural Class	Specifies the line and fill class for the section profiles; by default, the Section Style class is applied to the cross sections. If Create Structural and Nonstructural Groups is selected, the class selected here applies only to structural elements
Nonstructural Class	When Create Structural and Nonstructural Groups is selected, specifies the line and fill class for non-structural elements
Objects Beyond Section Plane	Specifies the fill and line style for objects beyond the section plane (for section viewports that display objects beyond the section plane)
Fill	
Use Original	Uses the fill style of the original objects

Parameter	Description
Use Class	Sets the fill style of the objects by class
Line Style	
Use Original	Uses the line style of the original objects
Use Class	Sets the line style of the objects by class
Scale Factors	Changes section viewport display scale settings for lines and dashed lines
Line Weight Scale	Enter a number larger than 1.0 to make the line weight of hidden line and dashed hidden line sections thicker. Enter a number below 1.0 to make them thinner. The scale value must be above zero.
Dashed Line Scale	Enter a number larger than 1.0 to make the line weight of dashed hidden line sections thicker. Enter a number below 1.0 to make them thinner. The scale value must be above zero.

4. Click the Display tab to specify the section viewport display properties.



Parameter	Description
Cast Shadows of Objects Removed by Section	When rendering, includes shadows cast by objects that are not included in the section viewport, for a more realistic effect (especially for interior elevations)



Parameter	Description
Show Wall Components	Displays a projection of the wall components in 3D, regardless of the document preferences wall component display setting (see “Display Preferences” on page 48 in the VectorWorks Fundamentals User’s Guide), or component class visibility settings. The top and bottom wall lines of components do not display in Section Viewports, so that stacked walls display without a line break.
Black and White Only	Changes all colors in the section viewport to black or white; this is useful for displaying two section viewport copies on the same sheet layer, with one in color and the other in black and white. However, if the document preferences display setting is black and white, viewports will also display as black and white.
3D Conversion Resolution	Sets the segmentation resolution for curved surfaces in a live section, regardless of the VectorWorks preferences resolution setting (see “3D Preferences” on page 44 in the VectorWorks Fundamentals User’s Guide). Changing the resolution of an existing section viewport causes the viewport to become out-of-date; the higher resolution settings require longer update times.

5. Click OK.


Section Viewport and Section Line Properties

Product: Architect, Landmark, Spotlight, and Machine Design

Section Viewport Parameters

Product: Architect, Landmark, Spotlight, and Machine Design

The properties of a section viewport can be edited in the Object Info palette.

Parameter	Description
Object Position Locator 	Specifies the point on the section viewport’s bounding box that is to be positioned by the X and Y values; click on a different location to change the point
X / Y	Specifies the absolute position of the section viewport’s bounding box along the X axis and Y axis, based on the point specified in the object position locator
Crop	Indicates whether the selected section viewport has been cropped (see “Cropping Sheet Layer Viewports” on page 618 in the VectorWorks Fundamentals User’s Guide)
Update	Click to update the section viewport to reflect any changes which have occurred since the section view was created or last updated (see “Section Viewport and Section Line Status” on page 478)
Layers	Specifies which design layers are visible in the section viewport, and allows layer visibility changes
Display Objects Beyond Section Plane	Shows or hides objects beyond the section plane
Classes	Specifies which classes are visible in the section viewport and allows class visibility and attribute changes, including changes to viewport crop and annotation objects



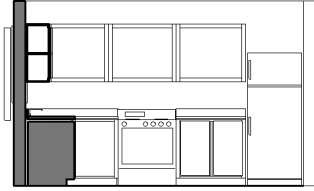
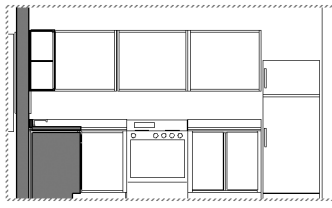
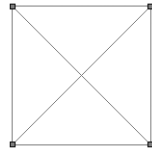

Parameter	Description
Scale	Specifies the section viewport scale relative to the page; select a scale or choose Custom and enter the scale value in Custom Scale
Custom Scale 1:	When a custom scale is selected, enter the scale value
Rendering	Specifies the rendering mode for the section viewport; RenderWorks is required for certain rendering modes. Open GL, Hidden Line, Dashed Hidden Line, Final Shaded Polygon, Artistic RenderWorks, Custom Radiosity, and Custom RenderWorks enable the Render Settings button for specifying rendering parameters
Render Settings	Certain rendering modes require parameters to be set; click to specify (see “Line Render Options” on page 435 in the VectorWorks Fundamentals User’s Guide for Hidden Line Render settings, “Rendering with VectorWorks” on page 431 in the VectorWorks Fundamentals User’s Guide for OpenGL and shaded polygon settings, “Artistic RenderWorks Options” on page 700 in the VectorWorks Fundamentals User’s Guide for Artistic RenderWorks settings, “Custom RenderWorks Options” on page 689 in the VectorWorks Fundamentals User’s Guide for Custom RenderWorks settings, and “Radiosity” on page 692 in the VectorWorks Fundamentals User’s Guide for information on rendering with radiosity)
RW Background	Select a RenderWorks background from either the default resources or the current file’s resources to use as a background for the section viewport (RenderWorks required); see “VectorWorks Fundamentals Default Resources” on page 141 in the VectorWorks Fundamentals User’s Guide
Projection	Select the projection type for the section viewport (see “Projection” on page 405 in the VectorWorks Fundamentals User’s Guide)
Perspective Type	For Perspective projection, select the type of perspective, or choose Custom and specify the perspective distance
Perspective Dist	For custom perspectives, enter the perspective distance
Lighting Options	Click to change the ambient light parameters described in “Setting Lighting Options” on page 420 in the VectorWorks Fundamentals User’s Guide. By default, a section viewport’s ambient light is set according to the ambient light settings of the first visible design layer in the section viewport. If there are no visible layers, then the ambient light is set to on, with a color of white and a brightness of 35% (similar to the default ambient lighting for a design layer).
Advanced Properties	Specifies advanced section viewport parameters defining the extent and attributes of the section view; see “Advanced Section Viewport Properties” on page 473
Reverse Section Side	Switches to view the other side of the section line
Section Line Instances	Lists the section lines present in design layers (see “Section Line Instances” on page 483)

Section Viewport and Section Line Status

Product: Architect, Landmark, Spotlight, and Machine Design

The status of a section viewport based on a design layer is indicated visually.



Status	Description
Normal	<p>A normal, up-to-date section viewport displays with rectangular handles when selected</p> 
Out of date	<p>When the objects in a section viewport have changed since the viewport was created or last updated, the viewport becomes out of date. An out-of-date viewport is displayed with a red and white outline.</p> 
Empty	<p>A section viewport is displayed as a red "X" when the referenced design layer contains no objects or the objects are hidden, or when the referenced design layer is set to "invisible"</p> 
Unlinked	<p>An unlinked section line (disconnected from its associated section viewport, possibly because the section line was pasted from a copy, duplicated, or mirrored) displays as a black and yellow line, and "Not Linked" is displayed in the Object Info palette</p> 

Section Lines and Section-elevation Markers

Product: Architect, Landmark, Spotlight, and Machine Design

A section line displays the cutting plane of the associated section viewport and shows the orientation of the section view. The properties of a section line can be edited in the Object Info palette, and its attributes, including marker fill color, applied from the Attributes palette. A section line is easily accessed by clicking **Section Line Instances** from the Object Info palette of a selected section viewport (see "Section Line Instances" on page 483).

A section line that has been pasted from a copy, duplicated, or mirrored from a section line that was associated with a section viewport becomes an “unlinked” section line. It displays with black and yellow stripes and the **Section Viewport** is “Not Linked.”

A section-elevation marker can also be inserted from the Dims/Notes tool set, as a reference line graphic for sections and elevations, or as a cutting plane graphic. When inserted as an object, the section line is not associated with a section viewport and is named a section-elevation marker in the Object Info palette.



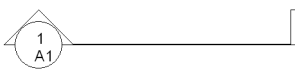
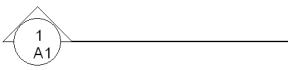
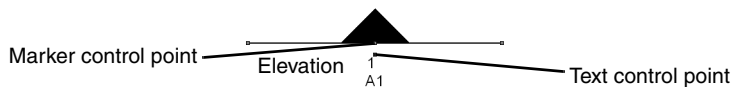
To insert a section-elevation marker:

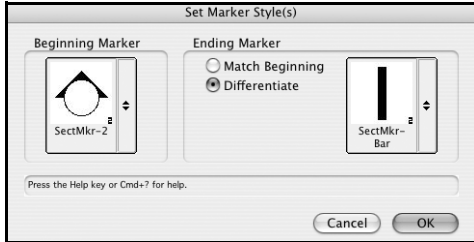
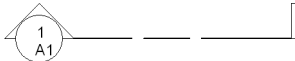
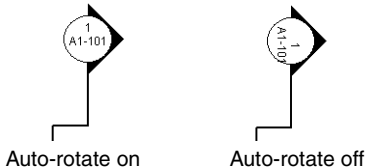
- 1. Select the **Section-Elevation Marker** tool from the Dims/Notes tool set.
- 2. Click to place one end of the section-elevation marker.
- 3. If inserting a single-segment marker, drag to determine the marker length.

If inserting a multi-segment marker, click to define each segment. Because a multi-segment marker is a polyline, the methods of drawing and editing polylines apply (see “Creating Polylines” on page 212 in the VectorWorks Fundamentals User’s Guide).

- 4. Double-click to finish placing the section-elevation marker.

The parameters of a section line or section-elevation marker can be edited in the Object Info palette. The objects can also be edited graphically (see “Modifying Section Lines Graphically” on page 484).

Parameter	Description
Section Viewport (Section Line Only)	Displays the name of the section viewport associated with the section line; a section line that is not associated with a section viewport is labeled “Not Linked”
Reverse Section Side (Section Line Only)	Reverses the side to display when objects beyond the section plane are visible
Activate Section Viewport (Section Line Only)	Navigates to the section viewport associated with the section line
Configuration	<div>Select the section line configuration<ul style="list-style-type: none">• Section: draws a section marker at both ends of a straight or broken section line• Partial Section: draws a section marker at the beginning of a straight or broken section line• Elevation: draws a section marker along a straight section line at a control point, which can be dragged to a new location<div><div><p>Section</p></div><div><p>Partial Section</p></div><div><p>Marker control point Elevation Text control point</p></div></div></div>

Parameter	Description
Section Marker Style(s)	<p>Opens the Set Marker Style dialog box, for selecting the section marker type at each end of the section line; markers can be the same (Match Beginning) or different (Differentiate) at each end of the section line. Select from either the default resources or the current file's resources; see "VectorWorks Fundamentals Default Resources" on page 141 in the VectorWorks Fundamentals User's Guide.</p> 
Marker Size	Specifies the size of the section marker(s), measured from the marker's insertion point to the top of its longest point. Changing the marker size does not affect the text size.
Use Gapped Line	<p>Displays the section line with a gapped line</p> 
Gap Line Length	Specifies the length of the solid section line at each end of the section line
Text Auto-Rotate	<p>Specifies whether the text rotates with the section marker or always displays right-reading</p> 
Text Both Ends (Section and Partial Section Only)	Adds text to both ends of the section line
Text Style	Specifies the display style for the item and sheet name; if Item Sheet or Sheet Item is selected, specify a Text Separator to place between the names
Text Rotation	Specifies the rotation of the item and/or sheet text
Text Separator	For the Item Sheet and Sheet Item text styles, specifies the text separator to place between the names
Text Sheet	Specifies the scale value for the marker text. Enter a number larger than 100 to make the text larger. Enter a number below 100 to make it smaller. The scale value must be above 1.
Text Auto-Fill	For section line objects associated with a section viewport, automatically displays the name of the referenced section viewport for the Item name, and the name of the viewport's sheet layer for the Sheet Name



Parameter	Description
Item Name	When Text Auto-Fill is not selected, enter the item name
Sheet Name	When Text Auto-Fill is not selected, enter the sheet name

Modifying Section Views and Section Lines

Product: Architect, Landmark, Spotlight, and Machine Design

Section viewports can be modified, cropped, annotated, and updated, like regular viewports. See “Modifying Sheet Layer Viewports” on page 617 and “Updating Sheet Layer Viewports” on page 627 in the VectorWorks Fundamentals User’s Guide.

The appearance of a section viewport can be completely customized, from the items it displays to the attributes of those items. Copies of a section viewport on a sheet layer can look completely different. Changes to a section viewport’s appearance can be made by several methods; after changes are made, update the section viewport by clicking **Update** in the Object Info palette.

Modification	Method	Description
Change the section view	Click Advanced Properties from the Object Info palette of a selected section viewport, and modify the section view from the Extent tab	“Advanced Section Viewport Properties” on page 473
Change the view attributes	Click Advanced Properties from the Object Info palette of a selected section viewport, and modify the attributes of the view from the Attributes tab	“Advanced Section Viewport Properties” on page 473
Change the section side	Click Reverse Section Side from the Object Info palette of a selected section viewport	“Section Viewport Parameters” on page 477
Change the cross section appearance for sectioned items	The cross section appearance is set by the Section Style class. Edit the class to change the appearance of sectioned items. If the Section Style class is made invisible, the cross sections are not displayed.	“Setting Class Properties” on page 98 in the VectorWorks Fundamentals User’s Guide
Override the class settings from the design layer	Click Classes from the Object Info palette of a selected section viewport, and override the desired class properties	“Changing the Class Properties of Sheet Layer Viewports” on page 625 in the VectorWorks Fundamentals User’s Guide
Change the location of the section line	Change the location of the section line with the 2D Selection tool, and update the section viewport	“Modifying Section Lines Graphically” on page 484
Create section viewports from unlinked section lines	Select the unlinked section lines and then select the Create Section Viewport command to create section viewports from the section lines	“Creating Section Viewports from Unlinked Section Lines” on page 485
Add additional section line instances to design layers or viewports	Click Section Line Instances from the Object Info palette of a selected section viewport, and specify the design layers or viewports where section line instances should display	“Section Line Instances” on page 483



Modification	Method	Description
Change the section line length, position, or type	Change the section line with the 2D Selection tool or the 2D Reshape tool, and update the section viewport	“Modifying Section Lines Graphically” on page 484
Change the depth of a finite section	The depth can be changed graphically or by modifying the Depth Range in the Advanced Properties of the section viewport	“Modifying Section Lines Graphically” on page 484, or “Advanced Section Viewport Properties” on page 473

Section Line Instances

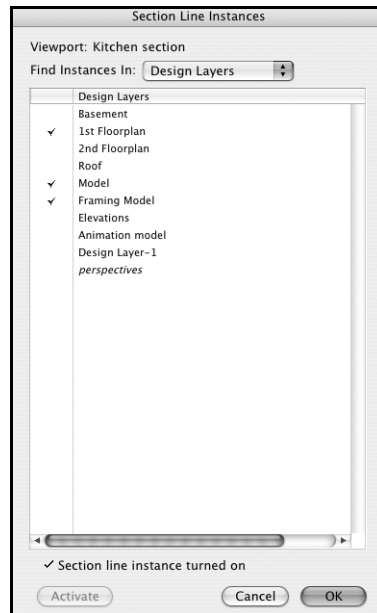
Product: Architect, Landmark, Spotlight, and Machine Design

Section line instances of a section view can be added to or deleted from design layers or viewport annotation. In addition, the Section Line Instances dialog box provides an easy way to navigate from a section viewport to its associated section lines.

To edit section line instances or navigate to a section line:

1. Click **Section Line Instances** from the Object Info palette of a selected section viewport.

The Section Line Instances dialog box opens.



Parameter	Description
Viewport	Displays the section viewport name associated with the section line instances
Find Instances In	Select whether to list section line instances in design layers or viewports



Parameter	Description
Instances list	Displays the list of design layers or viewports in the file, with a check mark next to layers or viewports with a section line instance
Activate	Navigates to the selected section line instance

2. To add a section line instance to a selected design layer or viewport annotation, click in the left column. A check mark indicates that a section line instance exists on that layer or viewport. Click again to remove the instance from the selected layer or viewport.

Deleting all section line instances does not delete the section viewport, and new instances can be created at any time. However, deleting a section viewport deletes all section line instances.

3. The section line instances can also be used as a navigation tool to access a particular section line. Select the section line and click **Activate** to switch to the design layer or viewport; the section line is selected for any modifications.

Return from a section line instance to the associated section viewport by clicking **Activate Section Viewport** from the Object Info palette of a selected section line.

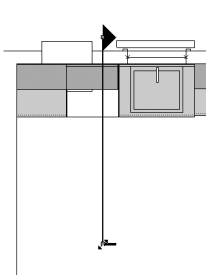
Modifying Section Lines Graphically

Product: Architect, Landmark, Spotlight, and Machine Design

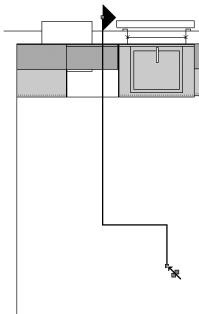
In addition to modifying section line parameters as described in “Section Lines and Section-elevation Markers” on page 479, the section line can be modified by changing its location, length, or shape.

To modify a section line:

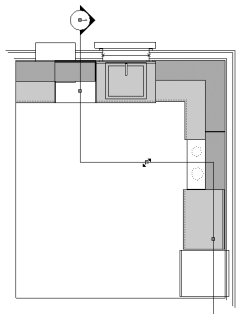
1. Navigate to the section line by clicking **Section Line Instances** from the Object Info palette of a selected section viewport.
2. The section line is automatically selected for modification.
 - Move the section line to a new location with the **2D Selection** tool
 - Shorten, lengthen, or rotate the line by dragging an end point with the **2D Selection** tool
 - Add vertices and change a straight section line to a broken section line with the **2D Reshape** tool
 - Reshape the section line with the **2D Reshape** tool



Changing the length

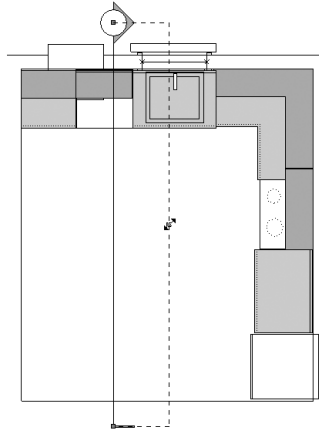


Adding vertices



Adjusting the position of vertices

3. A section view with a finite depth has a special control point on a dashed line. Adjust the depth by dragging the control point with the **2D Selection** tool.



4. Return to the section viewport by clicking **Activate Section Viewport** from the Object Info palette. Click **Update** from the Object Info palette to reflect the section line changes in the section view.

Creating Section Viewports from Unlinked Section Lines

Product: Architect, Landmark, Spotlight, and Machine Design

An unlinked (orphan) section line is disconnected from its associated section viewport, possibly because the section line was pasted from a copy, duplicated, or mirrored. It displays as a black and yellow line, and “Not Linked” is displayed in **Section Viewport** on the Shape tab of the Object Info palette.

Section viewports can be created from unlinked section lines located on a design layer, sheet layer, or while in edit annotation mode.

To create a section viewport from an unlinked section line:

1. Select the unlinked section lines. If on a sheet layer, include the viewport to be sectioned in the selection set.
Each selected section line creates a new section viewport.
2. Select **View > Create Section Viewport**.
The Create Section Viewport dialog box opens (see “Creating Section Views” on page 471). If multiple unlinked section lines were selected, the parameters specified apply to all section viewports created.
3. Click **OK** to create a section viewport for each selected section line.

Stacking Layers

Product: Architect

The **Stack Layers** command provides a one-step way to view multiple design layers with a unified 3D coordinate system. 3D objects in the active layer can be added and edited, and even snapped to objects in other layers as necessary. Use this command to get a quick look at the entire model, or to align objects across layers, without having to create a viewport or use layer links.

In a stacked view, VectorWorks aligns all visible design layers in the drawing file with the active layer, and displays them using the active layer’s scale and render mode. The active layer is on the ground plane; other layers are above or below depending on their Layer Z relationship to the active layer.



The active layer’s layer options setting determines whether other layers can be rendered and snapped to. For rendering, select **Show Others** or **Gray Others**. For both rendering and snapping, select **Show/Snap Others** or **Gray/Snap Others**. (Since only objects in the active layer can be selected, **Show/Snap/Modify Others** is not available.)

Setting Stack Layer Options

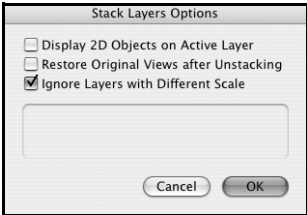
Product: Architect

Set the stacked layer options to obtain the desired stacking behavior.

To set stack layer options:

1. Select **View > Stack Layers Options**. Alternatively, double-click the **Stack Layers** button on the View bar.

The Stack Layers Options dialog box opens.



Parameter	Description
Display 2D Objects on Active Layer	Displays 2D objects from the active layer in the stacked layer mode, and allows access to 2D tools
Restore Original Views After Unstacking	Returns layers to their original view status when turning off Stack Layers mode. When deselected, the layer views remain aligned when turning off Stack Layers mode.
Ignore Layers with Different Scale	Does not include layers with a scale that is different from the active layer in the stack

2. Click **OK**.

Stacking Layers

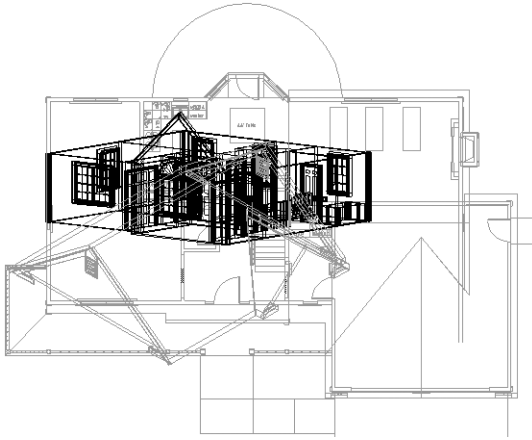


To stack layers:

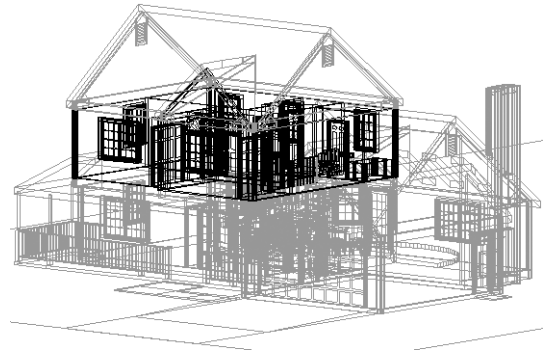
Product: Architect

1. Select **View > Stack Layers**. Alternatively, click the **Stack Layers** button on the View bar.
2. To return to an unstacked layer view, select **View > Stack Layers** again.

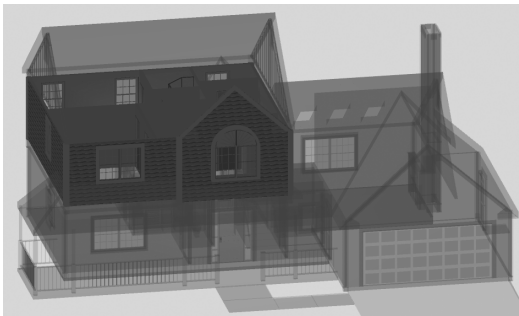
(A check mark next to the **Stack Layers** command indicates that the feature is activated.)



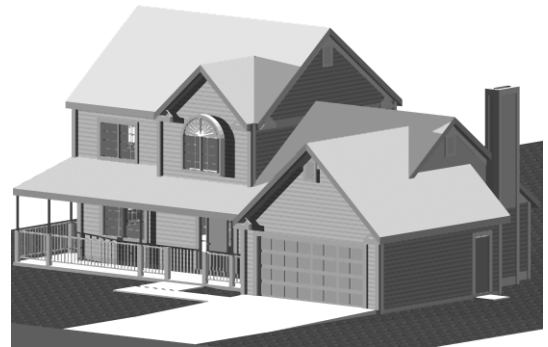
Unstacked, the active layer is in a rotated view; other inactive layers are in Top and Left Isometric views



The **Stack Layers** command aligns all visible layers to the active layer's rotated view



With the layer options set to Gray Others and OpenGL rendering, a transparent effect can be created for the grayed layers



With the layer options set to Show Others, all visible layers can be stacked and rendered

Creating a Model View

Product: Architect and Landmark

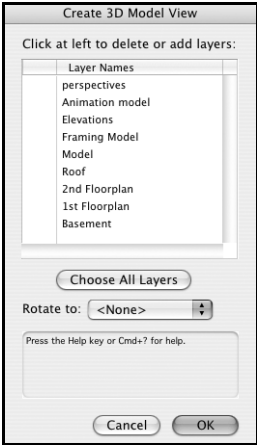
The **Model View** tool, similar to the **Layer Link** command in the Standard workspace, creates objects that are a 3D view of selected design layers and places them onto a single design layer. Unlike the **Layer Link** command, multiple representational model views can be easily created on one design layer, each in its own view.



To create a model view:

1. Create a new design layer or switch to the design layer that should contain the model view.
2. Click the **Model View** tool from the Visualization tool set.
3. Click on the design layer to indicate the approximate center of the model view.

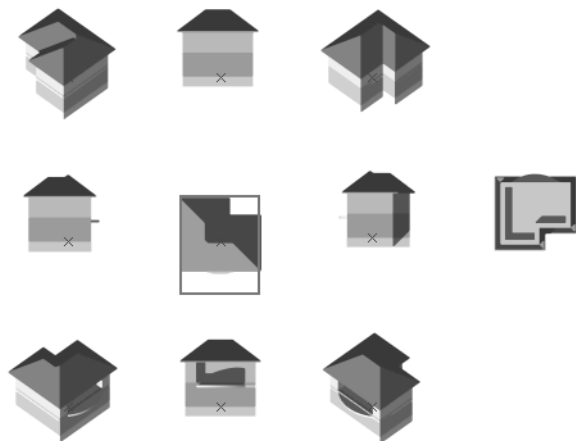
The Create 3D Model View dialog box opens. Specify the layers to include and set the view for the current layer.



Parameter	Description
Layer list	<p>Lists the design layers which can be added to or deleted from a model view; the active layer, sheet layers, and layers containing model views or linked objects cannot be selected, and are therefore not listed.</p> <p>Select the design layer(s) to add to the model view and deselect design layers which should not be included in the model view. A selected layer displays with a check mark.</p>
Choose All Layers	Selects all listed design layers for addition to the model view
Rotate to	Select the 3D view the model is automatically rotated to when placed on the drawing. Choosing a view sets the current design layer to Top/Plan view. Choose None for the model to use the current 3D view of the layer.

4. Click **OK** to create the model view.

If the **Model View** tool is used on a sheet layer, the Create Viewport command is run. See “Creating Viewports” on page 608 in the VectorWorks Fundamentals User’s Guide.





Editing an Existing Model View

Product: Architect and Landmark

To edit an existing model view:

1. Click on an existing model view with the **Model View** tool.
The Create 3D Model View dialog box opens.
2. Select design layers to add to or to remove from the current model view.
3. Change the view rotation, as desired.
4. Click **OK** to update the model view.

Importing and Exporting Files

Product: Architect, Landmark, Spotlight, and Machine Design

VectorWorks is interoperable with, and has the ability to import and export to, a variety of programs and file formats. The file formats supported in the VectorWorks Fundamentals package are described in “Importing and Exporting Files” on page 517 in the VectorWorks Fundamentals User’s Guide. In addition, depending on the installed product(s), VectorWorks can import and export files in the following formats.

PDF files and image files that are imported into VectorWorks files can be referenced, so that they can be kept up-to-date.

- **PDF** (Portable Document Format, from Adobe Systems Incorporated, creates files viewable with Acrobat Reader or other PDF viewers)
- **IFC** (Industry Foundation Classes, model data standards to facilitate information sharing in the building industry)
- **SketchUp** (3D model creation, viewing, modification, and presentation software from Google, Inc.). VectorWorks can import .skp files that are version 4.0 and higher.
- **3ds max** (3D animation, modeling, and rendering software from Autodesk Media and Entertainment). VectorWorks can import and export .3ds files that are version 3.0 and higher.
- **KML** (the markup language used by the Google Earth application)
- **Shapefile** (spatial data file type developed by Environmental Systems Research Institute, Inc.)
- **World files** (georeferenced raster files exported from ArcGIS from Environmental Systems Research Institute, Inc.)
- **DOE-2** (Department of Energy analysis engine, to estimate the energy cost implications of design strategies)
- **ASCII Patch** (USITT standard ASCII text patch file (Version 3.0, Ident 3.0))
- **Lightwright** (file exchange from VectorWorks Spotlight to Lightwright 4.0 software)
- **PartSpec** (import from Thomas Register PartSpec files saved in DXF/DWG, IGES, or ACIS format)

PDF Interoperability

Product: Architect, Landmark, Spotlight, and Machine Design

VectorWorks can import and export files that are interoperable with the Portable Document Format (PDF). An imported PDF is useful for displaying company logos, contractor drawings, and other graphics. PDF export creates high-quality files for printing, and takes advantage of PDF layers for creating an interactive representation of a model.

Importing PDF Files

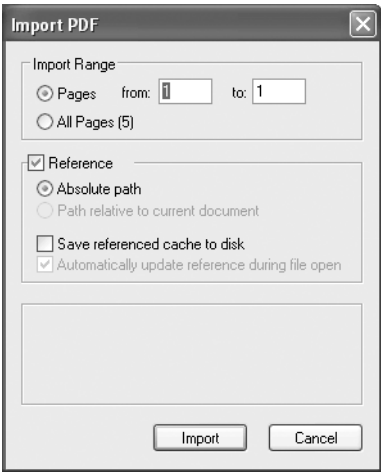
Product: Architect, Landmark, Spotlight, and Machine Design

The **Import PDF** command allows a PDF file to be imported into a VectorWorks file, where each PDF page becomes an independent PDF Page object. Create a reference to the original PDF file, if the original file may change, and you want to keep the imported pages up-to-date.

To import a PDF file:

1. Select **File > Import > Import PDF**.
2. Select the PDF file to be imported, and click **Open**.

The Import PDF dialog box opens.



Parameter	Description
Import Range	Specifies which portion of the PDF file to import
Pages	Imports the specified range of pages from the PDF file
All Pages	Imports all pages in the PDF file
Reference	References the original PDF file (master file), so that the imported PDF pages can be updated when the master file changes. See “Workgroup Referencing” on page 111 in the VectorWorks Fundamentals User’s Guide for more information.
Absolute path	Stores the absolute file path of the master file. Select this option when the location of the master file will not change in the future, or if the master file is on another volume.
Path relative to current document	Stores the file path of the master file relative to the target VectorWorks file; this option is available only if the master file is on the same volume as the VectorWorks file. Select this option if the target file and the master file may be moved to another volume in the future.
Save referenced cache to disk	Saves copies of the referenced PDF pages in the target VectorWorks file; if deselected, the target file is smaller, and the PDF pages are automatically updated when the target file is opened
Automatically update reference during file open	Updates the PDF pages from the master file each time this target file is opened, if the PDF pages are out-of-date

3. Click **Import**. Each PDF file page becomes a PDF Page object in VectorWorks.

The PDF page object can be resized, moved, rotated with the **Modify > Rotate > Rotate** command or the **Rotate** tool, scaled with the **Modify > Scale Objects** command, printed, and exported.



Exporting PDF Files

Product: Architect, Landmark, Spotlight, and Machine Design

VectorWorks drawing files can be exported to PDF for use as an interactive representation of a model, or for final quality printing purposes. Export settings are designed for maximum usability and the smallest possible file size. VectorWorks pages become PDF pages when exported. Fonts are always embedded in the PDF, for portability. Layer transfer modes other than Paint become transparency in the PDF. VectorWorks can export the currently visible design layer(s) or sheet layer, or create a batch export list of saved views and sheet layers.

VectorWorks layers and classes can be exported as PDF layers, to create an interactive model representation (PDF layers require PDF rev. 1.5 minimum).

As an alternative to the **Export PDF** command on the Macintosh, when Quartz Imaging is turned on in the Display tab of VectorWorks preferences, a single PDF file can also be sent to PDF with the **Export PDF (Quartz Only)** command. The parameters are then controlled by the system's PDF writer. See "Exporting Files" on page 519 in the VectorWorks Fundamentals User's Guide for more information.

Single PDF File Export

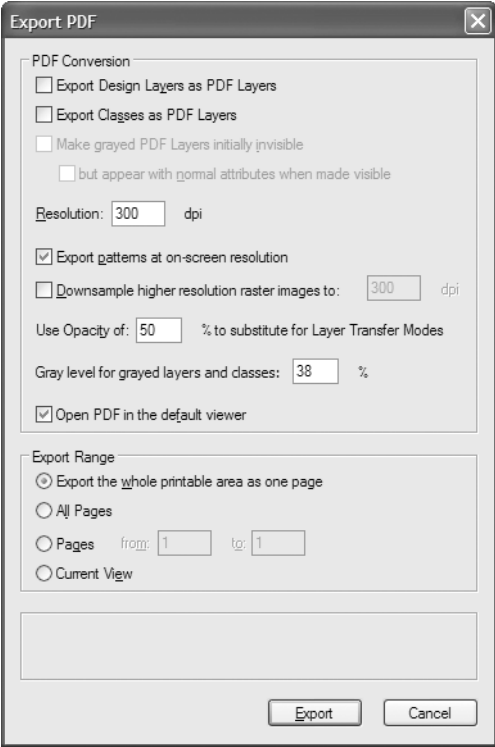
Product: Architect, Landmark, Spotlight, and Machine Design

The **Export PDF** command creates a PDF file from the current sheet layer or visible design layer(s).

To export the current sheet layer or design layer(s) to PDF:

1. Set the view for the export. The current sheet layer or currently viewed design layer(s) are exported.
Set the visibility of layers and classes as desired. All visible and grayed layers are exported; invisible layers and classes are not exported. For viewports on sheet layers, set the layer and class visibility of each viewport.
2. Select **File > Export > Export PDF**.

The Export PDF dialog box opens. Specify the settings for exporting to PDF.



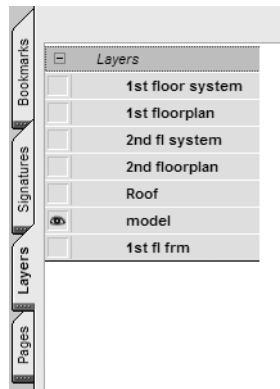
Parameter	Description
PDF Conversion	
Export Design Layers as PDF Layers	When exporting design layers, creates a PDF layer from each visible design layer
Export Classes as PDF Layers	When exporting design layers, creates a PDF layer from each visible class
Make grayed PDF Layers initially invisible	When creating PDF layers, grayed layers or classes appear invisible when first opening the resulting PDF
but appear with normal attributes when made visible	When creating PDF layers, grayed layers or classes do not display grayed, but with their assigned attributes once made visible in the PDF
Resolution	Sets the export resolution of pictures, rendered images, and patterns (unless Export patterns at on-screen resolution is selected). A larger value results in higher quality images, but also a larger PDF file. <i>Range:</i> 72—2500 dpi.
Export patterns at on-screen resolution	Exports the pattern size as viewed on-screen; when deselected, patterns are exported according to the specified Resolution
Downsample higher resolution raster images to	Reduces the resolution of raster images to the specified value, resulting in a smaller PDF file size



Parameter	Description
Use Opacity of	Sets the transparency of layers in the PDF file (replaces Layer Transfer modes in VectorWorks). Not necessary when the Quartz (Macintosh) or GDI+ (Windows) imaging VectorWorks preference is enabled.
Gray level for grayed Layers and Classes	Adjusts the level of gray when exporting with grayed layers and/or classes
Open PDF in the default viewer	After export, opens the PDF automatically in the system's specified PDF viewer
Export Range	
Export the whole printable area as one page	When the printable area consists of more than one page, exports the entire area as a single PDF page
All Pages	Exports all pages, creating a PDF page for each VectorWorks page
Pages	Exports the specified pages only
Current View	Exports the current view to a PDF page

3. Click **Export** to create the PDF file based on the settings. If **Open PDF in the default viewer** was selected, the PDF viewer opens automatically.

If layers or classes were exported as PDF layers and the viewer supports PDF layers, the layers are listed and their visibility can be controlled through the viewer.



Batch PDF File Export

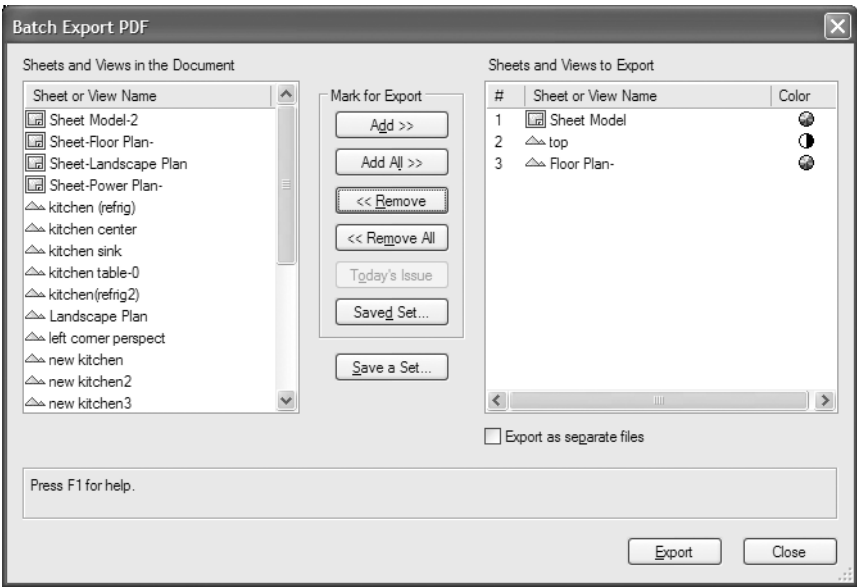
Product: Architect, Landmark, Spotlight, and Machine Design





The **Export PDF (Batch)** command exports a series of saved views and/or sheet layers to PDF. Similar to the **Batch Print** command, the export list and options can be saved as a set. The list order can be changed, and each item can be printed in either color or black and white. If the Issue Manager is in use, today's issue can be sent to PDF export.

To batch export the sheet layers and/or saved views in the current file to PDF:

1. Set up the sheet layers and/or saved views as desired for export.
Set the visibility of layers and classes in the viewports/views. All visible and grayed layers are exported; invisible layers and classes are not exported.
2. Select **File > Export > Export PDF (Batch)**.

The Batch Export PDF dialog box opens. Sheet layers and views in the current file are listed on the left, and sheets and views to export to PDF are listed on the right.



Parameter	Description
Sheets and Views in the Document	Lists the sheet layers  and saved views  present in the current file
Sheets and Views to Export	Lists the sheet layers/saved views to be exported to PDF; to change the list order, use the cursor to drag and drop the items to move in the # column. Click Color for each item to toggle between color  and black and white  export.
Add	Adds one or more selected item(s) from the file list to the end of the export list
Add All	Adds all sheet layers/saved views in the file list to the end of the export list
Remove	Removes one or more selected item(s) from the export list
Remove All	Removes all sheet layers and saved views from the export list
Today's Issue	Selects for export only sheet layers that have been marked as today's issue by the Issue Manager
Save Set	Restores a previously-saved list for export
Save a Set	Saves the current export set as a file that can be restored later
Export as separate files	Exports each sheet layer/saved view as a separate PDF file; when deselected, they are combined into a single PDF file

3. Click **Export**.

The Export PDF dialog box opens. Specify the PDF export options, as described in “Single PDF File Export” on page 493. The settings apply to all sheet layers/saved views being exported.



4. Click **Export**.

If viewports require updating before export, the Out of Date Viewports dialog box opens for each sheet layer with out-of-date viewports. Specify whether or not to update all the drawing viewports or all exported viewports.



5. Click **OK**. The PDF file or files are created based on the settings.

If **Open PDF in the default viewer** was selected, the PDF viewer opens automatically. Each sheet layer and saved view that was exported has a bookmark for easy navigation.

Saving a Batch Export Set

Product: Architect, Landmark, Spotlight, and Machine Design

A set of sheet layers and saved views, along with their color settings and list order, can be saved as a set and easily restored.

To save the export list as a set:

1. In the Batch Export PDF dialog box, click **Save a Set**.

The Name this Print Set dialog box opens.



2. Enter the name of the set, and then click **OK**. The settings are saved with the file and available for future batch exports.

The set name must be unique. The maximum number of saved sets is ten.

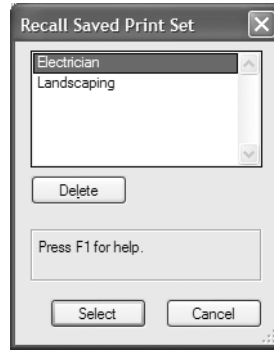
Restoring a Saved Batch Export Set

Product: Architect, Landmark, Spotlight, and Machine Design

To restore a saved export set:

1. In the Batch Export PDF dialog box, click **Saved Set**.

The Recall Saved Print Set dialog box opens.



2. Select a saved set. (To delete a saved set, select a set and click **Delete**.)
3. Click **Select**. The saved set displays in the Batch Export PDF dialog box.

IFC Format Interoperability

Product: Architect

VectorWorks supports Building Information Model (BIM) interoperability using the Industry Foundation Classes (IFC) file format.

IFC is an international standard that stores building data in a database, permitting information to be shared and maintained throughout the life cycle of the construction project: design, analysis, specification, fabrication, construction, and occupancy.

The capabilities and usage for IFC data standards are still evolving. However, objects and models containing IFC data have been proven to be a useful part of the design process. Some examples of the use of IFC data include:

- Round-trip engineering, where an architect exports a model to a structural engineer for analysis and design, and then re-imports the structural data for coordination purposes;
- Energy analysis of a building envelope;
- Automated analysis of code compliance;
- Space planning and space inventory analysis.

Central to the concept of IFC is the idea of “semantic objects.” Like VectorWorks’ plug-in objects, IFC objects are more than just collections of geometry; they have a meaning within the building fabric itself, be it as a door, a wall, a window, or a handrail. VectorWorks’ plug-in objects are automatically converted into their corresponding IFC objects upon export. With the **Create IFC Entity** command, users can assign object types and properties to arbitrary collections of geometry (such as groups or symbols), so that other applications that use these IFC files can identify these objects.

When an IFC file is imported into VectorWorks, many objects (such as slabs or walls) are brought in as their corresponding VectorWorks objects. However, the properties of many objects may not be matched to the corresponding VectorWorks object properties to parametrically create the closest-matching VectorWorks plug-in object. There may also be a situation where an object (such as a column base plate) does not have a good match among VectorWorks plug-in objects. In these cases, the object is imported into VectorWorks as a particular and flexible kind of plug-in object: an “IFC Entity.” Like a group, an IFC Entity can contain an arbitrary collection of geometry, but like a plug-in object, it can be inserted into walls and has sets of data and properties attached. With this generalized import capability, VectorWorks can import any kind of object supported by the IFC data standard, regardless of whether it has a corresponding parametric plug-in object.



IFC Workflows

Product: Architect

Generally, VectorWorks expects users to export their files as entire projects (sites with buildings consisting of stories), to be exchanged or analyzed with other IFC applications. When using the **Export IFC** command, design layers are assigned to building stories for meaningful export. The **Import IFC Project** command assigns building stories to their own design layers.

VectorWorks also includes the ability to import and export IFC objects, anticipating that IFC may become a useful data platform for delivering product information from building products manufacturers to architects.

Creating IFC Entities

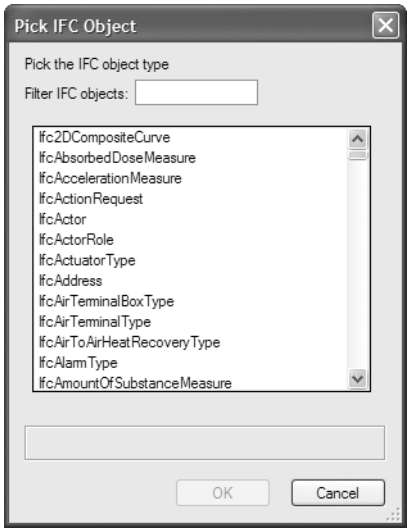
Product: Architect

When an entire building project is exported to IFC, VectorWorks symbols can be automatically assigned to IFC entities, while simple objects are assigned to default geometry. This association can also be made prior to export, which is especially useful for designers who wish to add specific IFC property set values to an entity.

To create an IFC entity:

1. Select the object, group, or symbol for assignment of IFC data. More than one item can be selected at one time.
2. Select **AEC > IFC > Create IFC Entity**.

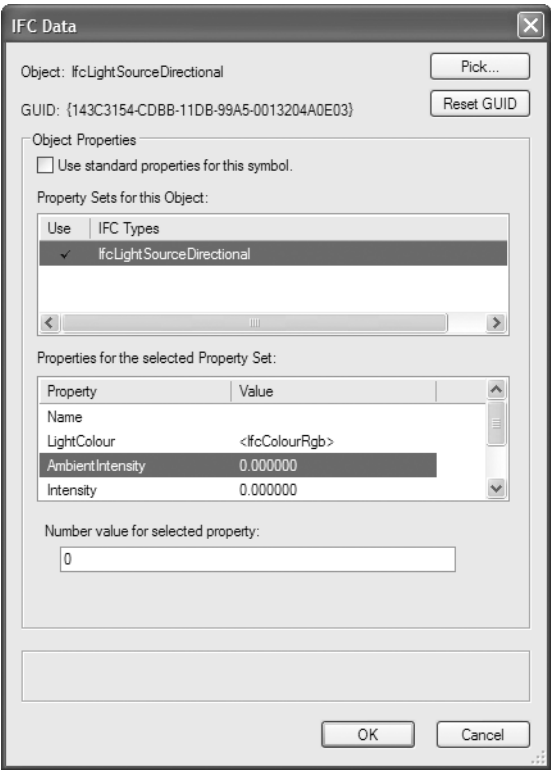
The Pick IFC Object dialog box opens, listing available IFC object types.



Parameter	Description
Filter IFC objects	Enter text or keywords to filter the objects list; only entries which contain the text are listed
IFC object types	Lists available IFC object types; click the object type to select it

3. Select the object type and click **OK**.

The IFC Data dialog box opens.



Parameter	Description
Object	Displays the IFC object type selected for this entity
Pick	Opens the Pick IFC Object dialog box, to select a different object type
GUID	Displays the Global Unique Identifier assigned to the entity; this ID follows the entity throughout the IFC workflow to distinguish it from other IFC entities
Reset GUID	Assigns a new Global Unique Identifier to the entity
Use standard properties for this symbol	Assigns standard required properties and values to the entity; when selected, custom data values cannot be entered for property sets
Property Sets for this Object	Displays the property sets associated with the IFC object; when specifying custom properties (Use standard properties is deselected), select whether to use each IFC pSet by clicking in the Use column
Properties for the selected Property Set	Displays the available properties and values for the selected pSet
Number value for selected property	Specifies a value for the selected pSet property



Parameter	Description
Select IFC Instance	For some pSet properties with complex values, an IFC Instance is specified. Select from the list of instances, or click New to open the IFC Instance Edit dialog box. Specify the values of the complex properties and click OK to return to the IFC Data dialog box. (To delete an IFC instance, select it from the list and click Delete .)

- Click **OK** to create the IFC entity.
The IFC data can be edited by clicking IFC Data from the Object Info palette of a selected IFC Entity, or by selecting the entity and selecting **AEC > IFC > IFC Data**.

Viewing IFC Data

Product: Architect

The data of IFC entities can be viewed and edited with the **IFC Data** command. In addition, the IFC object that corresponds to a VectorWorks plug-in object, such as a Space object, window, or wall, can be viewed.

This command can also be used to attach IFC data to an object, which remains a “standard” VectorWorks object in the Object info palette.

To access IFC data:

- Select the IFC entity or VectorWorks plug-in object.
- Select **AEC > IFC > IFC Data**.
The IFC Data dialog box opens.
- If an IFC entity was selected, the IFC Data dialog box displays the data attached to the entity as described in “Creating IFC Entities” on page 499; the data can be edited. If a VectorWorks plug-in object was selected, the IFC Data dialog box displays the corresponding IFC Object type. At export, the object will be converted to that type of entity.

Importing IFC Files

Product: Architect

An IFC project, including one which contains multiple buildings, can be imported into VectorWorks. An IFC object that is not part of a project file can also be imported.

To import an IFC file:

- Select **File > Import > Import IFC**.
- Select the .ifc or .ifcxml file to open, and click **Open**.
If the imported file contains more than one object, the Import IFC dialog box opens. (If the file contains only one object, it is automatically imported.)



Parameter	Description
IFC File Type	Indicates whether the IFC file consists of a project or an IFC object
Projects	For projects, specify which project to import
Units	For projects, select the units to use for import. Select Set by IFC to use the units specified by the IFC file, or select Set by VectorWorks to override the IFC file settings with those set in VectorWorks. Object file types always use Set by VectorWorks. If units were not specified correctly, or not specified at all, select the units to use from the list.

3. Click **OK**. If the file contains multiple buildings, the Multiple IFC Buildings dialog box opens. Specify the import options for each IFC building.

Parameter	Description
Status	<p>Specifies the import options for the selected building; click in one of the status columns to set the status for each building.</p> <ul style="list-style-type: none">• Black (imports the building in detail by floors)• White (excludes the building from import)• Gray (imports the building as a massing model or “adjacent building” that shows only exterior walls)
IFC Building	Lists the IFC buildings available for import

4. Click **OK** to import the IFC file.

Exporting IFC Projects

Product: Architect

VectorWorks project files can be exported to .ifc or .ifcxml format. Export to IFC Versions 2.0 – 2x3 is supported.

To export a VectorWorks file to IFC:

1. Select **File > Export > Export IFC Project**.

The Export IFC Project dialog box opens. Specify the overall project export options on the General tab.

Export IFC Project

General | Layer Mapping

Building Data

Primary Use Classification: LUC-01

Secondary Use Classification: LUC-02

Occupancy Type: Retail-Secondary

Gross Area (Planned): 0

Net Area (Planned): 0

Fire Protection: [Dropdown]

Export Options

IFC Version: IFC 2x3

☒ Export Site

☒ Export Building Stories

Number of Stories: 1

☒ Auto-convert Symbols

☒ Convert simple graphics

☒ Export Extended Data

☒ Convert Records to IFC Psets

Owner History Data

Owning User Name: [Text Box]

Owning User Organization: [Text Box]

Owning User Application: VectorWorks by Nemetschek North America

Creation Date: [Text Box]

Last Modification Date: [Text Box]

Last Modifying User: [Text Box]

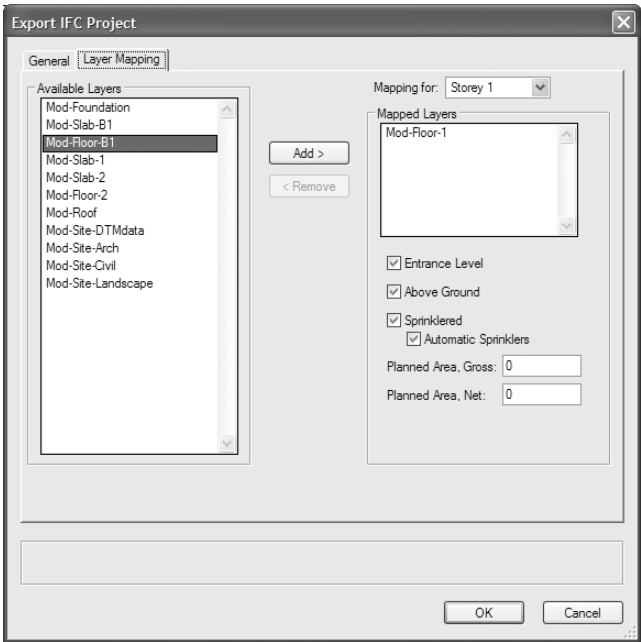
Last Modifying Application: [Text Box]

OK Cancel

Parameter	Description
Building Data	Specifies the IFC properties associated with the building (optional)
Primary Use Classification	Main fire use for the building, assigned from the fire use classification table as given by the relevant national building code
Secondary Use Classification	Ancillary fire use for the building, assigned from the fire use classification table as given by the relevant national building code
Occupancy Type	Occupancy classification, defined according to the presiding national building code
Gross Area (Planned)	Total planned area for the building, used for programming the building
Net Area (Planned)	Total planned net area for the building, used for programming the building
Fire Protection	Indicates whether the building has automatic sprinkler protection (when true, also select Sprinklered on the Layer Mapping tab)
Export Options	Sets export parameters for the file
IFC Version	Select the IFC version
Export Site	For drawings with a site model, this option enables site model layers to be mapped on the Layer Mapping tab
Export Building Stories	Exports building levels as stories, including floors below ground level; indicate the number of stories, including stories below ground level

Parameter	Description
Auto-convert Symbols	Converts VectorWorks symbols with IFC records to IFC objects (see “Creating IFC Entities” on page 499)
Convert simple graphics	Converts graphics and 3D primitives to default IFC objects
Export Extended Data	Attaches special IFC property sets (pSets) to objects for “round-trip” export/import; this allows exported plug-in objects to be re-created using all their standard VectorWorks parameters. Select this option when exporting a file that will be re-imported into VectorWorks in the future, and where file size is not an issue.
Convert Records to IFC Psets	Converts VectorWorks record information to IFC property sets
Owner History Data	Specifies file information according to IFC protocol
Owning User Name/ Organization/Application	Specifies the file owner’s name and company information; the application information is automatically assigned
Creation Date	Displays the file origination date
Last Modification Date/ User/Application	Displays file modification information

2. Click the Layer Mapping tab to specify the mapping options for each story and, if specified, the site model.
- When moving each layer from the Available Layers to the Mapped Layers list, select site mapping for site model layers, or the associated story for building floors. Then specify the associated building or site data for each of the mapped layers.



Parameter	Description
Mapping for	Select Site to assign mapped site model layers to an ifc Site object (on the General tab, Export Site must be selected); select the appropriate Storey number to assign mapped floor layers (according to the number of stories specified in Export Building Stories on the General tab)
Available Layers	Lists VectorWorks layers available for mapping
Mapped Layers	Lists layers that have been selected for export
Add	Adds available VectorWorks layers to the Mapped Layers list for export
Remove	Removes mapped layers from the export list, returning them to the Available Layers list
Layer Data	Specifies IFC properties for selected mapped layers according to their assignment as site or story layers
Entrance Level	Indicates whether the story is an entrance level for the building
Above Ground	Indicates whether the story is fully above ground or below ground
Sprinklered	Specifies whether the story includes sprinkler fire protection, and if so, whether the sprinklers are automatic
Planned Area (Gross)	Total planned area for the building story, used for programming the building
Planned Area (Net)	Total planned net area for the building story, used for programming the building
Reference Latitude/ Longitude/ Elevation	Specifies the site coordinates
Land Title ID	Identifying label according to local requirements
Street Address	Specifies the site street address
Buildable Area	Area of the site that can be covered by buildings, according to local building codes
Total Area	Total area of the site, measured according to local building codes
Buildable Height	Calculated maximum height of the buildings on this site, according to local building codes

3. Click **OK**.

When the exported layers contain VectorWorks symbols which have not yet been converted to IFC Entities, they must be mapped to the appropriate IFC object types. The Map Symbols from Chosen Layers dialog box opens.

Parameter	Description
VectorWorks Symbols	Lists VectorWorks symbols and shows the mapped IFC object type for each one
IFC Object Types	Shows the automatically assigned IFC object type for each VectorWorks Symbol



Parameter	Description
Pick IFC Object	Opens the Pick IFC Object dialog box, for selecting a different IFC object for the selected symbol as described in “Creating IFC Entities” on page 499

4. Click **OK** to export the project.
- Indicate the file name and location in the Save As dialog box.

Exporting IFC Objects

Product: Architect

The export procedure for objects is not as complex as it is for projects, since no mapping is required. VectorWorks objects can be exported to .ifc or .ifcxml format. Export to IFC Versions 2.0 – 2x3 is supported.

To export a VectorWorks object to IFC:

1. Select **File > Export > Export IFC Object**.

The Export IFC Project dialog box opens. Specify the object export options on the General tab. Since no mapping is required for object export, the Layer Mapping tab options are not needed.

Export IFC Project

General | Layer Mapping

Building Data

Primary Use Classification: LUC-01

Secondary Use Classification: LUC-02

Occupancy Type: Retail-Secondary

Gross Area (Planned): 0

Net Area (Planned): 0

Fire Protection:

Export Options

IFC Version: IFC 2x3

☒ Export Site

☒ Export Building Stories

Number of Stories: 1

☒ Auto-convert Symbols

☒ Convert simple graphics

☒ Export Extended Data

☒ Convert Records to IFC Psets

Owner History Data

Owning User Name:

Owning User Organization:

Owning User Application: VectorWorks by Nemetschek North America

Creation Date:

Last Modification Date:

Last Modifying User:

Last Modifying Application:

OK

Cancel

Parameter	Description
Building Data	Specifies the IFC properties associated with the object, if any
Export Options	Sets export parameters for the file



Parameter	Description
IFC Version	Select the IFC version
Export Site	Does not apply to the export of objects
Export Building Stories	Does not apply to the export of objects
Auto-convert Symbols	Converts VectorWorks symbols with IFC records to IFC objects (see “Creating IFC Entities” on page 499)
Convert simple graphics	Converts graphics and 3D primitives to default IFC objects
Export Extended Data	Attaches special IFC property sets (pSets) to objects for “round-trip” export/import; this allows exported plug-in objects to be re-created using all their standard VectorWorks parameters. Select this option when exporting a file that will be re-imported into VectorWorks in the future, and where file size is not an issue.
Convert Records to IFC Psets	Converts VectorWorks record information to IFC property sets
Owner History Data	Specifies file information according to IFC protocol
Owning User Name/ Organization/ Application	Specifies the file owner’s name and company information; the application information is automatically assigned
Creation Date	Displays the file origination date
Last Modification Date/ User/Application	Displays file modification information

2. Click **OK** to export the object.

Indicate the file name and location in the Save As dialog box.

Importing a SketchUp File

Product: Architect, Landmark, Spotlight, and Machine Design

The **Import SketchUp** command allows architectural drawings created in SketchUp® (versions 4 and above) to be imported into VectorWorks. SketchUp component instances are imported as 3D symbols, and geometry can be designated as walls, roof faces, and floors. After importing, refine the design using VectorWorks editing tools, or replace imported 3D symbols with VectorWorks 3D symbols.

Flexible import options allow either automatic conversion of architectural elements based on their orientation, or allow geometry conversion to be mapped to specific SketchUp materials or layers.

[SketchUp import is intended for architectural geometry. Use the **Import DXF/DWG** command rather than the **Import SketchUp** command to import polygonal geometry.](#)

Consider the following points when importing from SketchUp to VectorWorks.

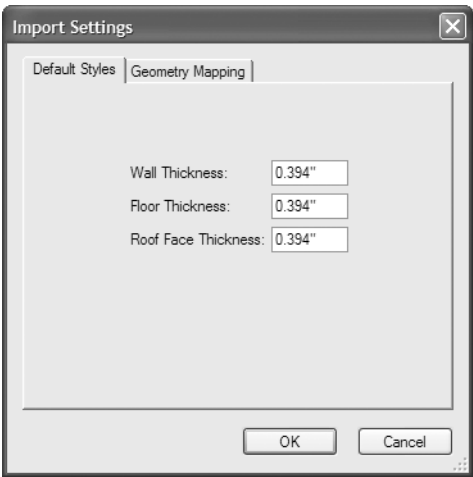
- Hidden SketchUp geometry is placed on the SketchUpHidden layer in VectorWorks and the layer is set to invisible by default.
- A component which creates an opening is imported as a VectorWorks window or door, if attached to an object imported as a VectorWorks wall. If the component touches the baseline of the wall it is considered to be a door; if it does not touch the baseline of the wall, it is considered to be a window.

- Groups and components are always imported as plain polygons in a symbol and do not generate any architectural elements such as walls or floors.
- Walls are unjoined upon import, and may need to be rejoined in VectorWorks.

To import a SketchUp file:

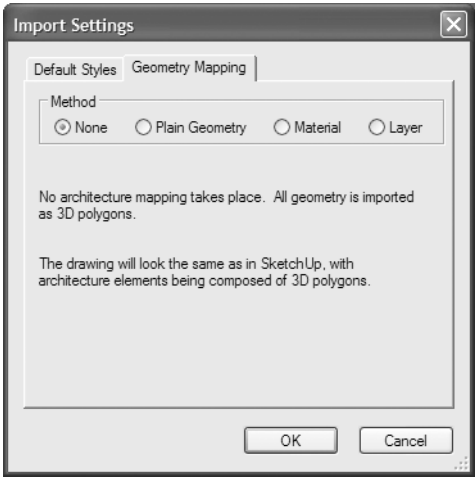
1. Select **File > Import > Import SketchUp**.

The Import Settings dialog box opens, for specifying mapping parameters to use during import. Set the default thickness of imported geometry using the parameters on the Default Styles tab.



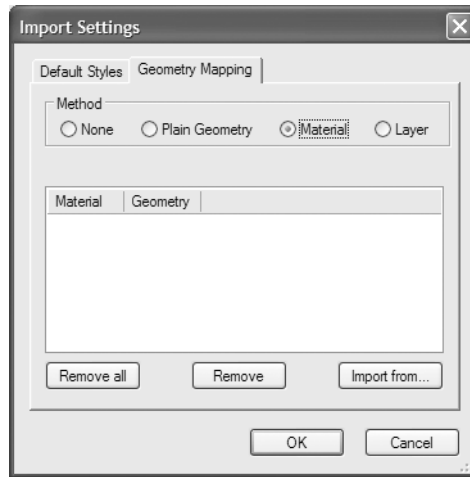
Parameter	Description
Wall Thickness	Enter the thickness to assign to wall geometry during import; this value must be greater than zero
Floor Thickness	Enter the thickness to assign to floors during import
Roof Face Thickness	Enter the thickness to assign to roof faces during import

2. Click the Geometry Mapping tab to specify the type of VectorWorks geometry to create for each imported SketchUp element. Specify **None** when mapping is unnecessary, as for non-architectural SketchUp drawings.

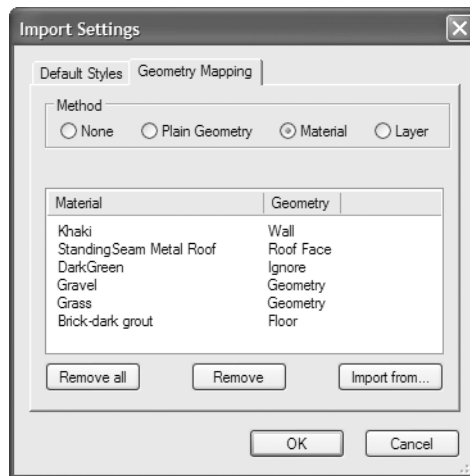


Parameter	Description
None	Does not map SketchUp geometry to VectorWorks geometry; all geometry becomes 3D polygons in VectorWorks
Plain Geometry	Maps SketchUp geometry to VectorWorks geometry based on the geometric orientation; VectorWorks converts vertical faces to walls, horizontal faces to floors, and non-horizontal or non-vertical geometry to roof faces
Material	Maps SketchUp geometry to VectorWorks geometry based on the material assigned to the geometry
Layer	Maps SketchUp geometry to VectorWorks geometry based on the geometry layer; geometry from imported layers is retained on the correct layers after import

3. If no mapping or the plain geometry method is selected, click **OK** to select the file and begin the import (skip to Step 9).
4. If material or layer geometry mapping is selected, the Geometry Mapping tab displays mapping import criteria. The mapping options are identical for both material and layers, except for the column heading indicating the type of element being mapped.



- Click **Import from** to open the Import SketchUp Model dialog box. Select the SketchUp file from which to derive the mapping criteria for the material or layer list, and click **Open**. The list of available materials or layers displays in the Import Settings dialog box.



- For each material or layer, specify how to convert to the VectorWorks equivalent. (For example, convert all geometry with a shingle material to a roof face, or all geometry on a roof layer to roof faces.)

Double-click a material or layer from the list to open the Select Geometry dialog box.

- In the Select Geometry dialog box, select whether to import the material or layer as geometry based on its orientation (this is the same as if the plain geometry method was selected in the top portion of the dialog box), a floor, roof face, or wall. Alternatively, select **Ignore** to leave the item in the list, but not import elements of that particular material or residing on that layer. Click **OK** to close the Select Geometry dialog box and update the mapping list.



The mapping list is saved after import, so that several files with the same mapping criteria can be imported sequentially. To remove a material or layer from the list prior to importing, select it and click **Remove**. To clear all items from the list, click **Remove All**. Selecting **Remove All** is a quick way to clear the list prior to specifying new mapping criteria.

- Repeat steps 6 and 7 until all desired materials or layers are mapped to a geometry type.
- Click **OK**; the Import SketchUp Model dialog box opens. Select the file to import, and click **Open**.
- SketchUp geometry and components are imported as specified, and are automatically selected. The Resource Browser is populated with the converted 3D symbols.

Items are imported at a 1:1 scale. It may be helpful to click **Fit to Objects** on the View bar to zoom to fit the objects in the drawing. It may also be helpful to adjust the layer scale at this time.

Importing and Exporting 3ds Format

Product: Architect, Landmark, Spotlight, and Machine Design

VectorWorks Designer can both import from and export to the .3ds file format used by Autodesk Media and Entertainment's 3ds max software.

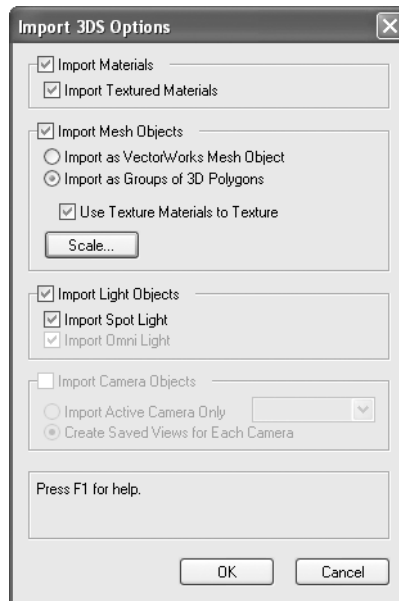
Importing a 3ds File

Product: Architect, Landmark, Spotlight, and Machine Design

When importing a 3ds file, specify how the drawing components will be represented in VectorWorks.

To import a 3ds file and select conversion options:

- Select **File > Import > Import 3DS (3D only)**, and then select the 3ds file to import.
- The Import 3DS Options dialog box opens; the options available depend on the contents of the file being imported. Specify the file import options.





Parameter	Description
Import Materials	Converts each material definition in the 3ds file to a RenderWorks texture in the Resource Browser (disabled if RenderWorks is not installed)
Import Textured Materials	If Import Materials is selected, select this option to import each texture from the 3ds file as a RenderWorks texture in the Resource Browser. The RenderWorks texture can then be edited (using the Edit Texture dialog box).
Import Mesh Objects	Imports each mesh object defined in the 3ds file as either a mesh object or a group of 3D polygons
Import as VectorWorks Mesh Object	Converts 3ds mesh objects to VectorWorks mesh objects
Import as Groups of 3D Polygons	Converts each 3ds mesh object to a group of triangles in VectorWorks
Use Texture Materials to Texture	If Import Textured Materials and Import as Groups of 3D Polygons are both selected, select this option to apply the imported textures to the appropriate portions of the 3D polygons during conversion
Scale	Opens the Import 3DS Scale dialog box, for specifying a scale to apply to all imported objects; see “Scaling 3ds Objects” on page 514
Import Light Objects	Imports light objects from the 3ds file
Import Spot Light	Select this option to import spot lights from the 3ds file as VectorWorks spot lights
Import Omni Light	Select this option to import omni lights from the 3ds file as VectorWorks point lights
Import Camera Objects	Imports camera objects from the 3ds file
Import Active Camera Only	Imports only the active camera from the 3ds file, and sets the current view to the camera view
Create Saved Views for Each Camera	Imports all camera objects from the 3ds file, and creates a saved view in VectorWorks for each

- Click **OK** to import the file with the selected options. The Object Info palette displays the image information. The original file remains unchanged.

Exporting in 3ds Format

Product: Architect, Landmark, Spotlight, and Machine Design

Different portions of the drawing can be selected for export to a 3ds file.

To export a 3ds file:

- To export a few specific objects, select them first.
- Select **File > Export > Export 3DS (3D only)**.
- The Export 3DS Options dialog box opens; the options available on the lower part of the dialog box depend on which group of items were selected for export.



Parameter	Description
Export Selected Objects Only	Creates a 3ds file that contains only the 3D objects that are currently selected in VectorWorks
Export All Objects in Current Layer	Creates a 3ds file that can include all 3D objects in the current layer in VectorWorks. Exclude or include specific types of objects using the dialog checkboxes; for example, export walls but not 3D symbols.
Export Quality (Number of Polygons)	Controls the conversion quality of 3D objects that have rounded sides. Move the slider bar left to convert rounded objects using fewer large polygons (thus lower quality). Move the bar right to create rounded objects of higher quality. Exporting more polygons slows down the export and increases the size of the output file.
Export Objects	Exports all kinds of VectorWorks 3D objects except walls, 3D loci, symbols, lights, and plug-in objects
Export 3D Locuses	Exports each 3D locus as a one-vertex 3ds mesh
Export Walls	Exports walls
Export 3D Symbols	Exports each 3D symbol as a group of 3D meshes
Export Plug-in Objects	Exports each plug-in object as a group of 3D meshes
Export Lights	Exports VectorWorks light objects as 3ds light objects. VectorWorks point lights are exported as 3ds omni lights, and VectorWorks directional and spot lights are exported as 3ds spot lights.
Export Current View as Camera	If the current view was set with one of VectorWorks' Perspective commands (Narrow, Normal, Wide, or a custom perspective), this option exports the view as a 3ds camera object



Parameter	Description
Scale	Opens the Export 3DS Scale dialog box, for specifying a scale to apply to all exported objects; see “Scaling 3ds Objects” on page 514
Export Materials	Exports colors that are attached to the exported objects as 3ds materials; this includes colors both from the Attributes palette and from RenderWorks textures
Export Textures as	<p>If Export Materials is selected, this option exports each RenderWorks texture to a texture image file (disabled if RenderWorks is not installed). Select the export file format from the list. VectorWorks automatically names exported image files with sequential numbers starting at zero. For example, a VectorWorks drawing with two textures would export two image files named Textr0.jpg and Textr1.jpg.</p> <p>When exporting multiple drawings with textures, be sure to save them to different folders—otherwise, VectorWorks will overwrite existing exported textures with new textures.</p>

4. Select the types of objects to export, and then click **OK**.
5. Specify the file name and destination, and then click **Save**.
VectorWorks exports to a new file, leaving the original file intact.

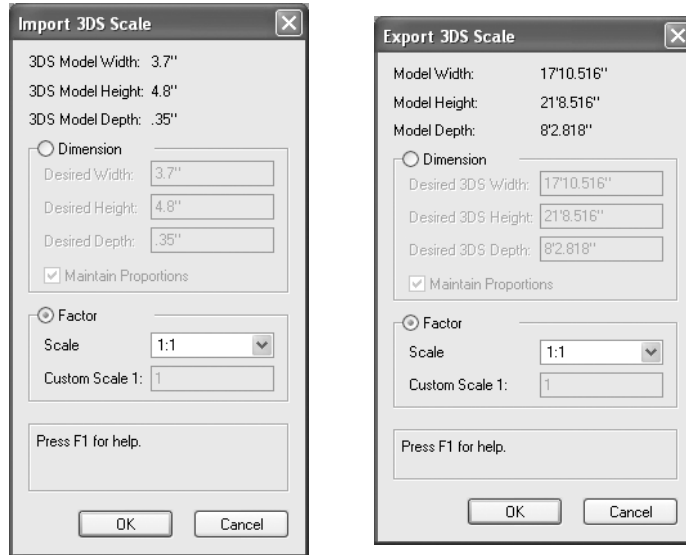
Scaling 3ds Objects

Product: Architect, Landmark, Spotlight, and Machine Design

The scale of 3ds objects can be changed during both import and export. The scaling is applied to all imported/exported objects.

To scale 3ds objects during import or export:

1. From the import or export dialog box, click **Scale**.
2. The Import/Export 3DS Scale dialog box opens. Choose whether to scale the object(s) by dimension or by scale factor.



Parameter	Description
(3DS) Model Width/Height/Depth	Displays the original dimensions of the object(s) selected for import or export; if there are multiple objects, the scaling center is the center of the selection bounding box
Dimension	Allows entry of custom dimensions for imported or exported objects in the Desired (3DS) Width , Desired (3DS) Height , and Desired (3DS) Depth fields. Select Maintain Proportions to have VectorWorks automatically adjust the proportions when a custom width, height, or depth is entered.
Factor	Allows entry of a scaling factor to be applied to imported or exported objects. Either select a Scale from the list, or select Custom from the top of the list and enter a Custom Scale value. When the scaling factor is changed, the Dimension values also change to show the exact size of the selection bounding box for the given scale.

3. Click **OK** to save the scaling information.

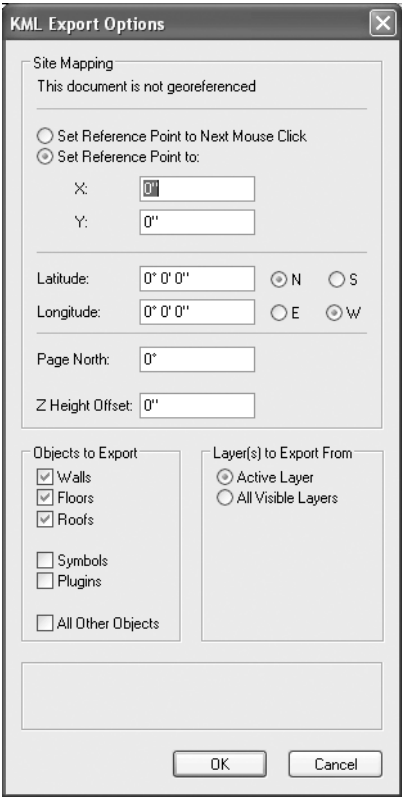
Exporting in KML Format

Product: Architect, Landmark, Spotlight, and Machine Design

The **Export KML** command exports VectorWorks 3D drawing components to KML, the markup language used by the Google Earth application. The resulting file can then be opened in Google Earth, in order to provide a visualization of how a building fits into its intended environment, for example. KML models can also be uploaded and shared via Google's 3D Warehouse.

To export a KML file:

1. Select **File > Export > Export KML (3D only)**.
2. The KML Export Options dialog box opens.



Parameter	Description
Mapping	VectorWorks maps a 2D reference point on the object to specific Google Earth coordinates during export. If the file is georeferenced, the following mapping fields are filled in automatically and disabled.
Set Reference Point to Next Mouse Click/Set Reference Point to	To specify the reference point manually, select Set Reference Point to Next Mouse Click . Or, to specify X and Y coordinates for the reference point, select Set Reference Point to and enter the appropriate values.
Latitude	Enter the latitude where the model will be positioned in Google Earth, using DMS notation (for example, 39d 12m 34s N)
Longitude	Enter the longitude where the model will be positioned in Google Earth, using DMS notation (for example, 76d 51m 44s W)
Page North	Enter the angle between the drawing's Y axis and true north in DMS notation; positive angles proceed clockwise
Z Height Offset	Enter the difference between the VectorWorks ground plane and the Google Earth ground plane
Objects To Export	Select the specific object types to be exported; leaving out unnecessary objects can reduce the KML file's size



Parameter	Description
Layer(s) to export from	Select the layers to export 3D objects from. In Google Earth, VectorWorks layers are listed in the Places panel on the left side of the application window, and their visibilities can be controlled individually.

3. Select the export parameters, and then click **OK**.
4. Specify the file name and destination, and then click **Save**.

VectorWorks creates an export file, leaving the original file intact.

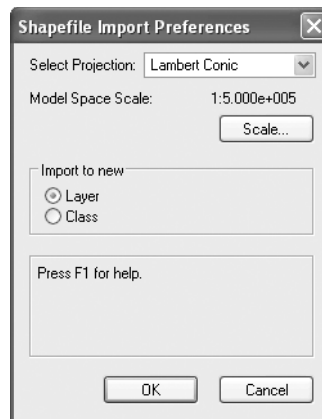
Importing a Shapefile

Product: Landmark

VectorWorks Landmark can import files in shapefile (.shp) format. Each geometric feature stored in the shapefile is converted to a VectorWorks object. In turn, each of these objects has a corresponding data record, which is converted from the shapefile's database file.

To import a shapefile and select conversion options:

1. Select **File > Import > Import Shapefile**, and then select the shapefile to import.
2. VectorWorks determines the appropriate units for the imported objects from the projection (.prj) file, if one is available. If no projection file is found, VectorWorks uses feet (if the current document's units setting is Imperial) or meters (if the units setting is metric). A message displays indicating what units will be used.
3. The Shapefile Import Preferences dialog box opens; the options available depend on the contents of the file being imported. Specify the file import options.



Parameter	Description
Select Projection	If the shapefile being imported is georeferenced (in degree coordinates) and the current VectorWorks units setting is not degrees, select a projection method: UTM can be used for any shapefile; select Lambert Conic only for shapefiles being used in the continental United States; select Current Projection to use XY coordinates. Otherwise, this parameter is disabled and XY coordinates are used automatically.



Parameter	Description
Model Space Scale	The scale in the file being imported displays automatically; to change it, click Scale to open the Layer Scale dialog box and select a scale
Import to new	
Layer	Select this option to import themes from the shapefile to a new design layer named after the shapefile; if additional shapefiles are imported, they will be placed on their own layers
Class	Select this option to import themes from the shapefile to a new class named after the shapefile, on a new design layer called "Shapefile Import Layer"; if additional shapefiles are imported, they will be placed on the same layer, with their own class names

4. Click **OK** to import the file with the selected options. The Object Info palette displays the imported shapefile information.
- The original file remains unchanged.

Exporting in Shapefile Format

Product: Landmark

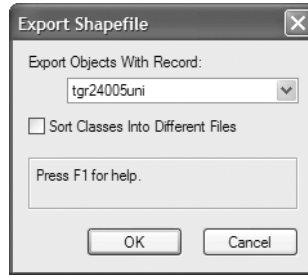
The **Export Shapefile** command exports VectorWorks Landmark drawing components to the shapefile format. Each shapefile (.shp) exported is accompanied by an index file (.shx) and a database file (.dbf) with the same name.

The following objects cannot be exported: text, dimensions, worksheets, bitmaps, lights, layer links, walls, round walls, and 3D objects (including 3D loci, extrudes, 3D polygons, sweeps, meshes, roofs, floors, columns, and NURBS curves). Other objects are exported as follows:

- Lines, rectangles, circles, ovals, arcs, polygons, rounded rectangles, polylines, and path plug-in objects are exported as shapefile polylines.
- Symbols, loci, and point plug-in objects are exported as shapefile points.
- Shapefiles can contain only one shape type. If multiple shape types are being exported, they will go into separate files.
- Groups that contain exportable object types are ungrouped when exported.
- If the VectorWorks file contains projection data from a shapefile, the export process removes the projection and exports the file with the original georeference data.

To export a shapefile:

1. Select **File > Export > Export Shapefile**.
2. The Export Shapefile dialog box opens.



Parameter	Description
Export Objects With Record	Select a data record to be exported; all objects that have a data record of this type attached are exported
Sort Classes Into Different Files	Select this option to create a different shapefile for each class exported

3. Select the export parameters, and then click **OK**.
4. Specify the file name and destination, and then click **Save**.
VectorWorks creates a set of export files, leaving the original file intact.
5. The Shapefile Export Summary dialog box displays a summary of the export procedure.



6. Click **Details** to view a log file in a separate window. The log's summary section lists the number of exported and non-exported objects, and the number of files created. The log's details section lists each file created and the number of objects in each file. It also lists the non-exportable objects and their types (such as Wall, Light, Text).
7. Click **OK** to close the dialog box.

World File Support

Product: Landmark

Georeferenced raster images with associated world files, both normal and referenced, are supported in VectorWorks Landmark. World files associated with the raster file must have the same name as the raster file and an extension of .bpw, .jgw, .pgw, .tfw, .gfw, or .wld.

To import a georeferenced raster image:

1. Select **File > Import > Import Image File**.



The Open dialog box opens. Select the raster file for import.

2. If a world file is associated with the raster file, the image is automatically imported, translated, and scaled. The current view changes to Fit to Objects, so the imported image is visible.

To import an image without its associated world file scaling and translation, either rename the associated world file, or move it to a different folder.

GeoTiff file import is not supported.

Exporting for DOE-2 Requirements

Product: Architect

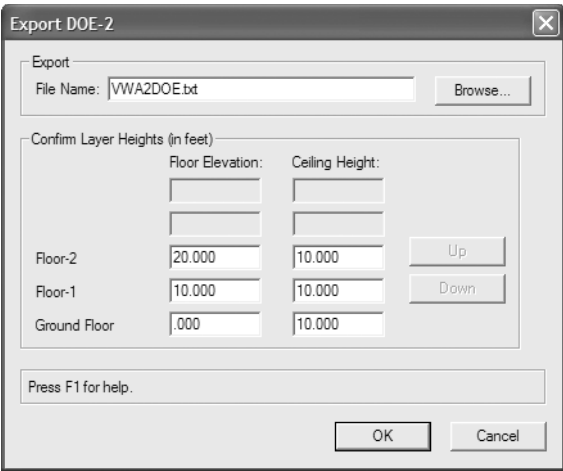
With rising energy costs and stricter regulations on energy usage in commercial buildings, it is becoming increasingly important to be able to estimate the energy cost implications of design strategies, especially during the schematic design phase. Energy usage programs develop these estimates. VectorWorks Architect can export the building geometry to a file in the format read by the DOE energy analysis engine.

To create a DOE-2 export file:

1. The initial building space planning should be complete, with layers for all the building levels and spaces on those layers. Exterior walls are also required; create these automatically with the **Create Walls from Spaces** command, or manually.

Windows and doors should also be inserted into the walls where appropriate.

2. Select **AEC > Space Planning > Export DOE-2**. The Export DOE-2 dialog box opens.



Parameter	Description
File Name	Enter the path and file name for the DOE-2 file, or click Browse to specify the location and file name
Confirm Layer Heights	Displays the floor elevation and ceiling heights as specified in the Layers Setup dialog box; these values can be edited
Up/Down	Scroll up and down through the list of layers (available when there are more than five layers)



3. Click **OK** to create the DOE-2 text file. Send the file to your DOE consultant for analysis.

The relationship between VectorWorks entities and their corresponding BDL language entities is shown in the following table.

VectorWorks	DOE
Distance from layer Z to next highest layer Z	Floor height
Layer delta-Z	Space height
Description field in wall record	Construction type
Wall record R-value	Construction type U-Factor
Window vs. door record	Window vs. door

Generating an INP File from a DXF File

Product: Architect

If .INP files need to be generated from DXF files for analysis with the DOE-2 engine, several steps are required to properly import and format the file in VectorWorks Architect prior to exporting it.

X-REFs and Layers

Product: Architect

AutoCAD building plans are often broken up into several files, which are then cross-referenced (x-ref) to a master file. Prior to importing into VectorWorks Architect, all of these files must be pulled into the master file. Essentially, all of the information about a building must be present in one file for the export to recognize the relationships among adjacent building levels and spaces on each of those floors. See “DXF/DWG File Import” on page 537 in the VectorWorks Fundamentals User’s Guide.

VectorWorks classes are roughly equivalent to AutoCAD layers. When importing the DXF file, the layers should be imported as VectorWorks classes. VectorWorks allows the specification of the base elevation (Z value) of layers; therefore, VectorWorks layers are typically used to separate the different building levels in the drawing. Once these layers have been established with the appropriate Z values, it is much easier to draw on the layers without having to specify base heights of each object.

The **Export DOE-2** command uses the layer Z values to determine the Z value of each floor in the INP file. After importing a DXF file, first create a layer for every building level, and then assign a Z value to that layer. In addition, assign a delta Z value. In a normal VectorWorks Architect drawing, the delta Z controls the default height (at object creation time) of all walls on that layer. The **Export DOE-2** command uses the delta Z as the space-height.

To create a layer for a building level, select **Tools > Organization**. On the Design Layers tab, create and set properties for the building level layer. See “Creating Layers” on page 85 and “Setting Design Layer Properties” on page 87 in the VectorWorks Fundamentals User’s Guide.

Defining Spaces

Product: Architect

Once the layers have been defined, define the spaces. Polygons may already exist for all the spaces; if so, convert the polygons to spaces with the **Create Spaces from Polys** command (see “Space Properties” on page 30).



Walls

Product: Architect

VectorWorks has a dedicated object type for walls. A VectorWorks wall is a complex object type which is a combination of lines, arcs (in the case of rounded walls), polygons/polylines, and fill patterns. VectorWorks Architect adds more functionality to wall objects by attaching a record with a description field.

The **Export DOE-2** command checks for wall objects along the perimeter of the spaces in the drawing. If walls are found, it checks for a wall record. If this is found, the description field is exported as the construction type for that segment. If no wall record is present, the command exports the wall's class name as the construction type. If it does not find a wall object on any particular space vertex, a default construction type for the wall on that vertex is assigned. The default construction types are "Default Exterior Wall" construction and "Default Interior Wall" construction.

If the walls in the original DWG file were drawn with multi-lines, importing the multi-lines as VectorWorks walls is recommended. If the original draftsman did not use multi-lines, then the walls must be manually drawn. The walls must be on the same layer as their respective space objects. In other words, first floor walls must be on the same layer as the space objects for the first floor.

Windows and Doors

Product: Architect

The **Export DOE-2** command determines the difference between windows and doors on the basis of the attached record. If the symbol has a door record attached, the symbol is exported as a door. If it has a window record attached to it, or no record at all, it is exported as a window.

To export windows and doors, walls are required. Inserting windows and doors into VectorWorks walls is much easier than creating them mathematically within the DOE-2 interface. VectorWorks walls normally "contain" the windows and doors, essentially as nested objects. The associativity of windows and doors with their parent walls allows the **Export DOE-2** command to recognize which windows/doors are associated with which walls, and export them to the appropriate place in the INP file. Ensure that when inserting the windows and doors into the walls, they create a wall break. Otherwise, they are not considered associated with the wall.

AutoCAD blocks can be used, which convert to VectorWorks symbols during the DXF import. The length of the window/door, parallel to the wall, is exported as the width. For windows, the elevation of the lowest part of the window is exported as the Y value.

Spotlight Export and Import

Product: Spotlight

VectorWorks Spotlight provides the ability to import and export lighting design data. Spotlight is compatible with Lightwright 4, and includes extra functionality to facilitate data transfer to and from Lightwright.

Exporting Instrument Data

Product: Spotlight

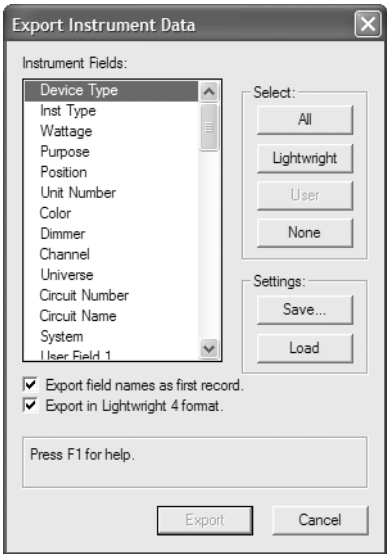
VectorWorks Spotlight instrument data (including accessory, power, and position information) can be exported to an external file. The resulting file can then be opened by a spreadsheet or database program, and is compatible with Lightwright 4.

All instrument and accessory data from the current light plot are exported. Individual instruments cannot be selected for export.

To export instrument data:

1. Select **File > Export > Export Instrument Data**.

The Export Instrument Data dialog box opens.



Parameter	Description
Instrument Fields	Selects the instrument data to be exported. Double-click (Macintosh) or click (Windows) an item to select it; a plus sign (+) next to the field indicates that it will be exported. To deselect a field, double-click it.
All	Selects all instrument data fields for export
Lightwright	Selects only the instrument data fields supported by Lightwright. All Lightwright-compatible fields will be exported; these fields are displayed with a plus sign. Verify the selections to ensure that these are the fields desired for export.
User	Restores the last saved or loaded set of instrument data fields
None	Deselects all instrument data fields
Save	Saves the current set of selections; enter a name for the selection set file
Load	Loads a selection set file
Export field names as first record	Retains headers for the field information during export; this option is recommended, as it helps to organize the data in the database or spreadsheet program
Export in Lightwright 4 format	Exports all static accessories attached to an instrument as a list separated by a "+" sign, to the Accessories field associated with the instrument

The Unique ID field (UID) is not in the list, but is automatically exported. This field is required to re-import data.

See “Importing Lightwright Data into Spotlight” on page 530 for more information on the UID field and Lightwright.

- Click **Export** and enter a file name and export location for the file.



3. Click **Save** and the selected instrument data is exported to the file in tab-delimited format. Import the file as tab-delimited into the other program.

Exporting Patch Information

Product: Spotlight

The **Export ASCII Patch** command exports the dimmer and channel information from the drawing to a USITT standard ASCII text patch file (Version 3.0, Ident 3.0).

To export dimmer and channel information to a patch file:

1. Select **File > Export > Export ASCII Patch**.
2. Select whether to clear existing console patch information when importing the patch data into the lighting console. Click **Yes** to delete all existing patch data in the console before importing the new patch. Click **No** to preserve the current console patch data; the new patch information may overwrite existing data.
3. The Export ASCII Patch File dialog box opens. Specify the location and file name of the patch text file.

Fixtures with multiple channels are patched sequentially. For example, setting the **Channel** to 6, the **Dimmer** to 20, and the **Num Channel** to 4 generates the following patch information:

Channel	Dimmer
6	20
7	21
8	22
9	23

Importing Instrument Data

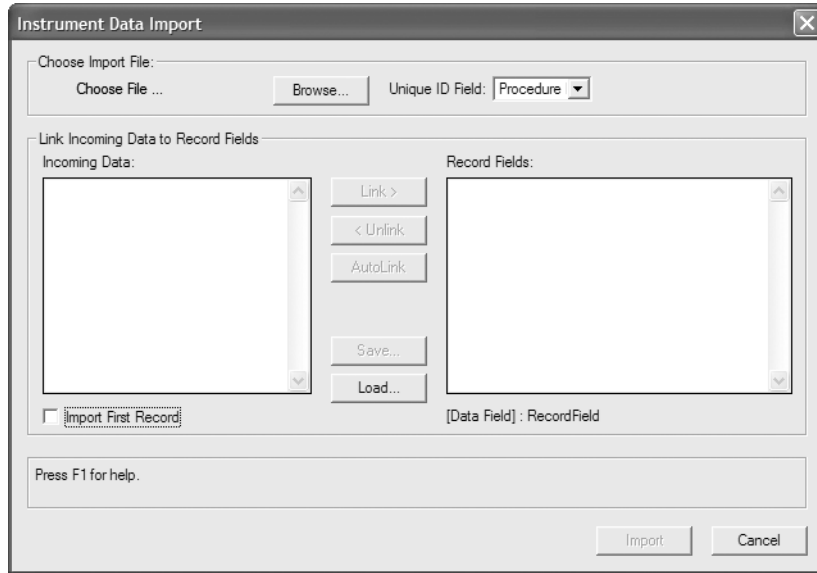
Product: Spotlight

Instrument data from an external file can be imported into VectorWorks Spotlight. Import settings can be saved.

To import instrument data:

1. Select **File > Import > Import Instrument Data**.

The Instrument Data Import dialog box opens.



2. Click **Browse** to search for the file to be imported.

The imported file must consist of tab-delimited text, with the instrument information in the rows and the field information in the columns.

3. Once the file has been selected, choose the **Unique ID Field** from the list of available fields.

This field will be used as the key field to match imported data to the data in the plot. Normally, select UID (Unique ID) or EID (External ID).

[When re-importing a Lightwright file back into Spotlight, import by External ID. See “Importing Lightwright Data into Spotlight” on page 530 for more information.](#)

4. After the **Unique ID Field** has been selected, the list of incoming data fields is displayed in the **Incoming Data** list on the left, and all available instrument fields are shown in the **Record Fields** list on the right.
5. To map the incoming data to an instrument field, select a data item from the **Incoming Data** list, and then select the destination record field on the right. Click **Link** to link the fields. The linked field moves to the **Record Fields** list. (To unlink two linked fields, select the field from the **Record Fields** list and then click **Unlink**.)
6. Continue mapping fields individually until the desired links have been made. To save time, click **AutoLink**; this automatically matches fields based on the similarity of their names. Verify that the links were made as intended.
7. To import the data without saving the links, click **Import**.

Saving the mapping information allows you to skip the process of mapping individual fields when importing similar external files. Once the fields have been mapped appropriately, save the mapping links by clicking **Save**. Specify the name of the links file, which can then be restored with the **Load** button.

8. During import, Spotlight attempts to match all incoming data to an appropriate instrument. However, if items exist which cannot be matched, these display as orphan instruments at the bottom left of the drawing, outside the page boundary.

[The first row of the imported file should contain the field labels. However, if the file to import contains instrument data in the first row, select **Import First Record**.](#)



To load saved mapping files:

1. Click **Browse** and select the file to be imported.
2. Click on the **Load** button, and select either a pre-defined mapping file or a saved mapping file. Click **Import** to open the mapping file and automatically map the fields based on the saved links.

Data Transfer Between Spotlight and Lightwright

Product: Spotlight

Instrument data can be transferred between Spotlight and Lightwright 4. Once lighting instruments and parameters have been specified in Spotlight, their information can be sent to Lightwright to perform paperwork processing. When the paperwork in Lightwright is complete, the data can be imported back into Spotlight to update the Spotlight light plot.

Spotlight includes Lightwright automated action files, which, when selected at installation, are located in the Extras folder. These files have the correct settings required for exchanging data with Spotlight, and need to be placed into Lightwright's Automated Actions folder. Consult the Lightwright documentation for information on using these files.

Exporting Spotlight Data to Lightwright

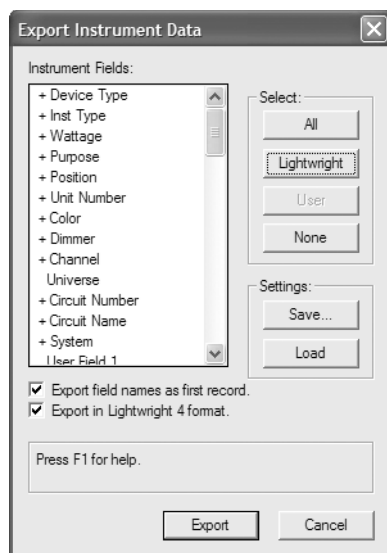
Product: Spotlight

To export Spotlight instrument data to Lightwright:

1. When the Spotlight file contains instrument data that is ready to export, select **File > Export > Export Instrument Data**.

The Export Instrument Data dialog box opens.

2. Select the appropriate Lightwright items for export by clicking the **Lightwright** button. (See "Exporting Instrument Data" on page 522 for more information.) Select **Export field names as first record**. If exporting to version 4 of Lightwright, select **Export in Lightwright 4 format**.



3. Click **Export** to export the lighting instrument information as a tab-delimited file. Specify the location for the exported file, and click **Save**.



Importing Spotlight Data into Lightwright

Product: Spotlight

The data exported from Spotlight now needs to be imported into Lightwright.

1. Prior to import, select **Setup > Vocabulary** in Lightwright.

The Show Setup dialog box opens.

Show Setup

OK

Vocabulary | Names | Numbers | F-Keys | Focus Charts | Work Notes

The notation for "No Color" is: N/C

Footnote key phrase is: Note

Template (gobo/pattern) key phrase is: T: (used only when exporting)

Separate accessories from instrument types with: +

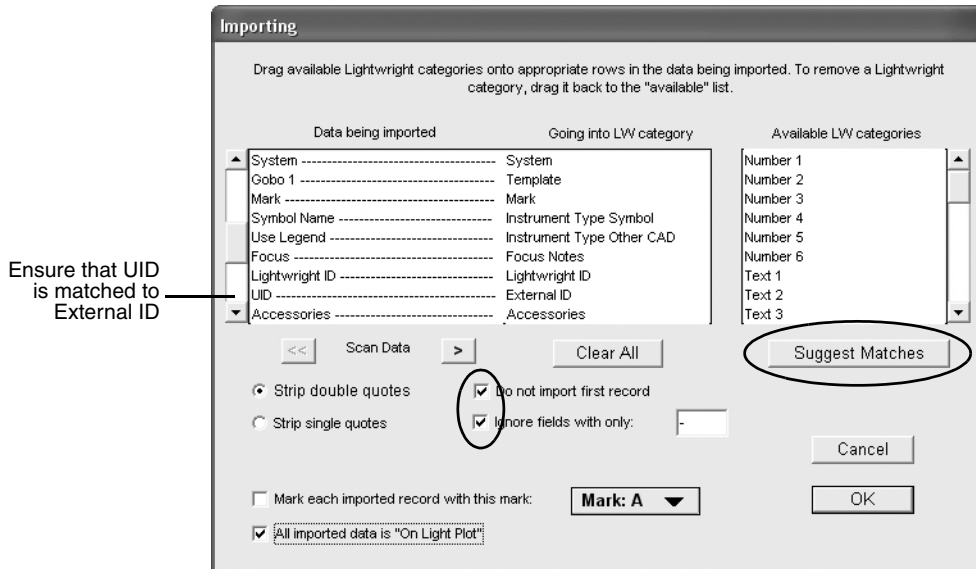
Separate lists to count items individually with: ,

When combining colors in a single frame, separate the colors with: +

2. Ensure that the **Separate accessories from instrument types with** field contains a "+" sign.

To import Spotlight data into Lightwright:

1. In Lightwright, select **File > Import Data**. Specify the location of the file that was just created, and click **Open**.
2. The Importing dialog box opens. Click **Suggest Matches**.

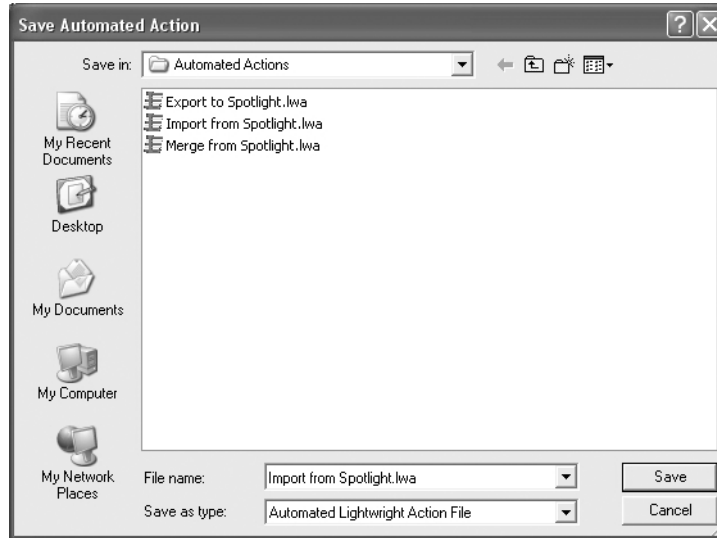


Lightwright attempts to match the imported data fields to Lightwright fields. Verify that the information has been matched correctly.

3. Select **Do not import first record** and **Ignore fields with only**. Enter a "-" (dash) so that Spotlight fields with a "-" are ignored.
4. Click **OK** to begin the import. Lightwright reports the number of instruments that were imported; this may differ from the number of instruments exported from Spotlight due to Static Accessories.
5. Select whether to save the import action in Lightwright.

Saving the action speeds up the import process from Spotlight, because the matching selections and other options will not need to be specified again.

Provide a name for the automated action, which can be selected later from **File > Automated Actions**.



6. The instrument information is now available for editing in Lightwright.

The screenshot shows the Lightwright 4.0 interface with a table of instrument data. The table has columns for Position, Circuits, ChN, Unit#, Instrument Type, Accessories, Wattage, Purpose, Color, Template, Dimmer, Channel, Sys, N, Ph, and External ID+Symbol. The data is organized into sections for different instrument types and their associated accessories and templates.

Position	Circuits	ChN	Unit#	Instrument Type	Accessories	Wattage	Purpose	Color	Template	Dimmer	Channel	Sys	N	Ph	External ID+Symbol
1st Electric			1	Source 4 50deg	SAB Template	575w	Hi Side Temp	G364	Leaf	13	(21)	A	B		1025 1.0.0+2Etc Source 4 50°
1st Electric			2	Source 4 50deg	575w	Hi Side	R37	14	(31)	A	B				1026 1.0.0+2Etc Source 4 50°
1st Electric			3	Source 4 50deg	575w	Hi Side	R57	15	(41)	A	B				1027 1.0.0+2Etc Source 4 50°
1st Electric			4	Source 4 50deg	575w	Hi Side	R78	16	(51)	A	B				1028 1.0.0+2Etc Source 4 50°
1st Electric			5	SA PAR WFL	575w	Tree	R88	17	(13)	A	C				1029 1.0.0+2Etc Source 4 PAR WFL
1st Electric			6	SA PAR WFL	575w	Center	R88	18	(11)	A	C				1030 1.0.0+2Etc Source 4 PAR WFL
1st Electric			7	Source 4 26deg	575w	Center	R88	19	(9)	A	C				1031 1.0.0+2Etc Source 4 26°
1st Electric			8	SA PAR WFL	575w	Center	R88	20	(11)	A	C				1032 1.0.0+2Etc Source 4 PAR WFL
1st Electric			9	SA PAR WFL	575w	Tree	R88	21	(13)	A	C				1033 1.0.0+2Etc Source 4 PAR WFL
1st Electric			10	Source 4 50deg	575w	Hi Side	R78	22	(53)	A	C				1034 1.0.0+2Etc Source 4 50°
1st Electric			11	Source 4 50deg	575w	Hi Side	R57	23	(43)	A	C				1035 1.0.0+2Etc Source 4 50°
1st Electric			12	Source 4 50deg	575w	Hi Side	R37	24	(33)	A	C				1036 1.0.0+2Etc Source 4 50°
1st Electric			13	Source 4 50deg	SAB Template	575w	Hi Side Temp	G364	Leaf	23	(23)	A	C		1037 1.0.0+2Etc Source 4 50°
3rd Electric			1	Source 4 50deg	SAB Template	575w	Hi Side Temp	G364	Leaf	25	(22)	A	A		1038 1.0.0+2Etc Source 4 50°
3rd Electric			2	Source 4 50deg	575w	Hi Side	R37	26	(32)	A	A				1039 1.0.0+2Etc Source 4 50°
3rd Electric			3	Source 4 50deg	575w	Hi Side	R57	27	(42)	A	A				1040 1.0.0+2Etc Source 4 50°
3rd Electric			4	Source 4 50deg	575w	Hi Side	R78	28	(52)	A	A				1041 1.0.0+2Etc Source 4 50°
3rd Electric			5	Sky Cyc 1 Cell	1kw	Pink Cyc	R37	29	(71)	A	A				1042 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			6	Sky Cyc 1 Cell	1kw	Amber Cyc	R04	30	(61)	A	A				1043 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			7	SA PAR WFL	575w	Back	R26	31	(28)	A	A				1044 1.0.0+2Etc Source 4 PAR WFL
3rd Electric			8	Sky Cyc 1 Cell	1kw	Pink Cyc	R37	32	(71)	A	A				1045 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			9	SA PAR WFL	575w	Back	R80	33	(30)	A	A				1046 1.0.0+2Etc Source 4 PAR WFL
3rd Electric			10	Sky Cyc 1 Cell	1kw	Amber Cyc	R04	34	(61)	A	A				1047 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			11	SA PAR WFL	575w	Back	R26	35	(28)	A	A				1048 1.0.0+2Etc Source 4 PAR WFL
3rd Electric			12	SA PAR WFL	575w	Back	R80	36	(27)	A	A				1049 1.0.0+2Etc Source 4 PAR WFL
3rd Electric			13	Sky Cyc 1 Cell	1kw	Pink Cyc	R37	37	(72)	A	B				1050 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			14	Sky Cyc 1 Cell	1kw	Amber Cyc	R04	38	(62)	A	B				1051 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			15	Sky Cyc 1 Cell	1kw	Pink Cyc	R37	39	(72)	A	B				1052 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			16	Sky Cyc 1 Cell	1kw	Amber Cyc	R04	40	(62)	A	B				1053 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			17	SA PAR WFL	575w	Back	R26	41	(29)	A	B				1054 1.0.0+2Etc Source 4 PAR WFL
3rd Electric			18	SA PAR WFL	575w	Back	R80	42	(27)	A	B				1055 1.0.0+2Etc Source 4 PAR WFL
3rd Electric			19	Sky Cyc 1 Cell	1kw	Pink Cyc	R37	43	(73)	A	C				1056 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			20	SA PAR WFL	575w	Back	R26	44	(29)	A	C				1057 1.0.0+2Etc Source 4 PAR WFL
3rd Electric			21	Sky Cyc 1 Cell	1kw	Amber Cyc	R04	45	(63)	A	C				1058 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			22	SA PAR WFL	575w	Back	R80	46	(27)	A	C				1059 1.0.0+2Etc Source 4 PAR WFL
3rd Electric			23	Sky Cyc 1 Cell	1kw	Pink Cyc	R37	47	(73)	A	C				1060 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			24	Sky Cyc 1 Cell	1kw	Amber Cyc	R04	48	(63)	A	C				1061 1.0.0+2Etc Source 4 SKY-CYC-01
3rd Electric			25	Source 4 50deg	575w	Hi Side	R78	49	(54)	A	B				1062 1.0.0+2Etc Source 4 50°
3rd Electric			26	Source 4 50deg	575w	Hi Side	R57	50	(44)	A	B				1063 1.0.0+2Etc Source 4 50°
3rd Electric			27	Source 4 50deg	575w	Hi Side	R37	51	(34)	A	B				1064 1.0.0+2Etc Source 4 50°
3rd Electric			28	Source 4 50deg	SAB Template	575w	Hi Side Temp	G364	Leaf	41	(24)	A	C		1065 1.0.0+2Etc Source 4 50°
FOH Truss			1	Source 4 36deg 750	750w	DS Front	L142	1	(0)	A	A				1066 1.0.0+2Etc Source 4 36° 750
FOH Truss			2	Source 4 36deg 750	750w	US Front	L142	2	(6)	A	A				1067 1.0.0+2Etc Source 4 36° 750
FOH Truss			3	Source 4 36deg 750	750w	DS Front	L142	3	(0)	A	A				1068 1.0.0+2Etc Source 4 36° 750
FOH Truss			4	Source 4 36deg 750	750w	US Front	L142	4	(6)	A	A				1069 1.0.0+2Etc Source 4 36° 750
FOH Truss			5	Source 4 36deg 750	SAB Template	750w	Lugo	5	(0)	A	A				1070 1.0.0+2Etc Source 4 36° 750
FOH Truss			6	Source 4 36deg 750	750w	Apex Front	L142	6	(1)	A	A				1071 1.0.0+2Etc Source 4 36° 750
FOH Truss			7	Source 4 36deg 750	750w	DS Front	L142	7	(4)	A	A				1072 1.0.0+2Etc Source 4 36° 750
FOH Truss			8	Source 4 36deg 750	750w	Apex Front	L142	8	(1)	A	A				1073 1.0.0+2Etc Source 4 36° 750
FOH Truss			9	Source 4 36deg 750	750w	US Front	L142	9	(7)	A	A				1074 1.0.0+2Etc Source 4 36° 750
FOH Truss			10	Source 4 36deg 750	750w	DS Front	L142	10	(4)	A	A				1075 1.0.0+2Etc Source 4 36° 750
FOH Truss			11	Source 4 36deg 750	750w	Apex Front	L142	11	(1)	A	A				1076 1.0.0+2Etc Source 4 36° 750
FOH Truss			12	Source 4 36deg 750	750w	US Front	L142	12	(7)	A	A				1077 1.0.0+2Etc Source 4 36° 750
FOH Truss			13	Source 4 36deg 750	750w	DS Front	L142	13	(4)	A	A				1078 1.0.0+2Etc Source 4 36° 750
FOH Truss			14	Source 4 36deg 750	750w	US Front	L142	14	(8)	A	A				1079 1.0.0+2Etc Source 4 36° 750

7. Save the Lightwright file.



Exporting Lightwright Data Back into Spotlight

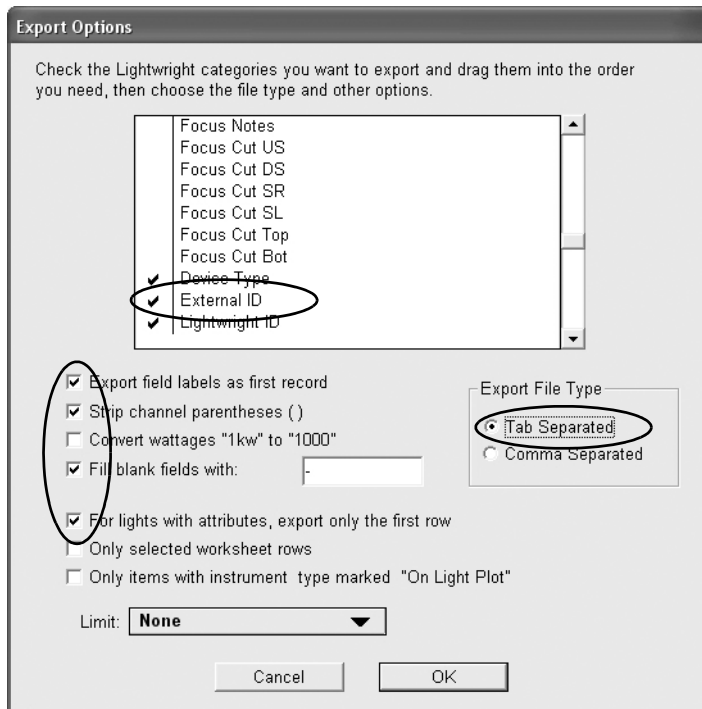
Product: Spotlight

Once the lighting instrument data has been edited in Lightwright, export the data back into Spotlight to update the light plot.

If lighting instruments have been deleted in Lightwright, they will not automatically be deleted in Spotlight. A warning message opens if this is the case, and the affected instruments are automatically selected for further action.

To export the Lightwright file back to Spotlight:

1. In Lightwright, select **File > Export > Data**. The Export Options dialog box opens.



2. Select the fields for export; selected fields display a check mark. Ensure that the **External ID** and **Accessory** fields are selected for export, and that **Tab Separated** is selected as the **Export File Type**. In addition, select **Export field labels as first record**, **Strip Channel Parentheses**, **For lights with attributes** and **Fill blank fields with**. For the blank fields, enter a “-” (dash), so that a “-” is inserted in any blank fields. Click **OK**.
3. Select a file name and location for the exported file.
4. The option to save the export action for future automation is presented.
5. Click **Yes** to save the action.

Importing Lightwright Data into Spotlight

Product: Spotlight

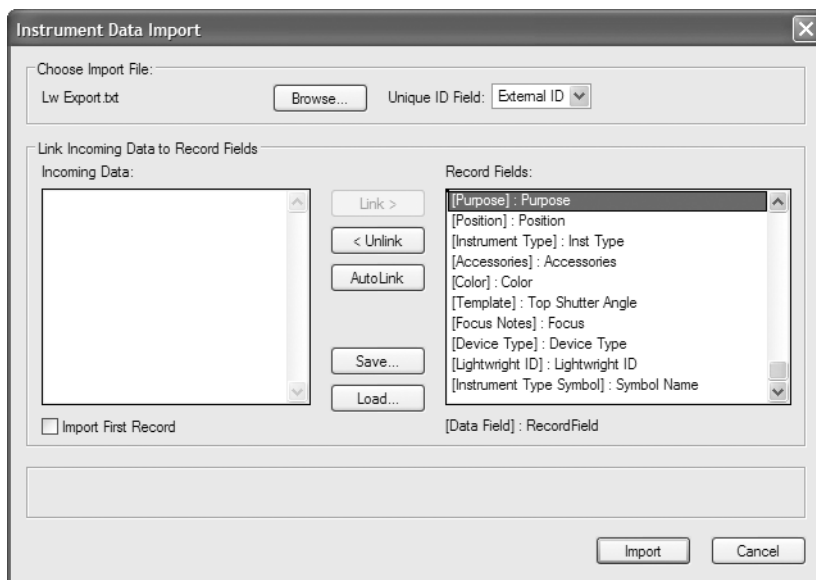
The edited Lightwright data is imported into Spotlight to update the lighting instrument information.



To import Lightwright data into Spotlight:

1. In Spotlight, select **File > Import > Import Instrument Data**.

The Instrument Data Import dialog box opens.



2. With the **Browse** button, specify the file exported from Lightwright. If the file to import has External ID or UID as a field name, it will automatically be selected as the UID. Do not select **Import First Record**.

Click **AutoLink** to correctly match important fields. If not all fields are automatically mapped, map the incoming data to an instrument field as described in “Importing Instrument Data” on page 524.

[Accessories should be mapped to Accessories, and Instrument Type Symbol to Symbol Name.](#)

3. Click **Import**. The Lightwright data is imported into Spotlight, automatically updating the instrument data in the light plot.

If the instruments are not updated, verify that the **External ID** field was exported, and the **Export Field Labels as First Record** option was selected in Lightwright.

If the data needs to be sent back to Lightwright after this initial export, select the **Merge** command in Lightwright rather than **Import**. Lightwright uses the Lightwright ID number to match the data to existing instruments rather than creating new instruments.

Importing PartSpec Files

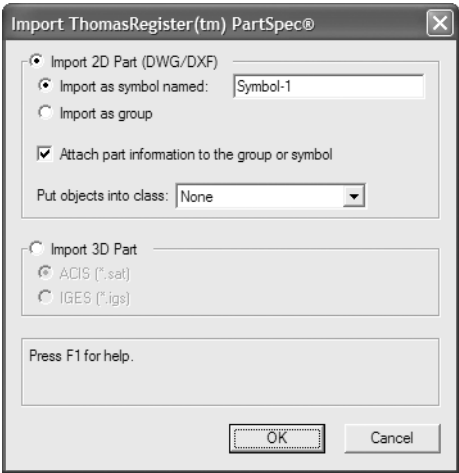
Product: Machine Design

The **Import PartSpec** command imports Thomas Register PartSpec files saved in either DWG/DXF (2D objects) or IGES or ACIS (3D objects) format. It places all parts in a single class on the active design layer and deletes any extraneous layers. The **Import PartSpec** command does not differentiate between a file created in the Thomas Register and other programs.

To import PartSpec files:

- 1. Select **File > Import > Import PartSpec**. A message indicates that the undo cache will be cleared, and that this action cannot be undone; click **OK** to proceed.

The Import Thomas Register PartSpec dialog box opens.



Parameter	Description
Import 2D Part (DWG/DXF)	Select to import a 2D part from a DWG or DXF file
Import as symbol named	Select to import the part as a symbol; enter the name of the symbol in the symbol name field
Import as group	Select to import the part as a group
Attach part information to the group or symbol	Select to attach the manufacturer’s part information to the symbol or group. The information is attached through the Part Information record format which is created if not already existing in the file.
Put objects into class	Select the class to apply to all objects being imported
Import 3D Part	Select to import a 3D part
ACIS	Select to import the part from an ACIS file
IGES	Select to import the part from an IGES file

- 2. Select the desired import options and click **OK**.



Import	Description
2D part from either a DWG or DXF file	<p>In the Import DXF/DWG Files dialog box, select the file to import, and then click Open. The DXF DWG Import Options dialog box opens. (See “DXF/DWG File Import” on page 537 in the VectorWorks Fundamentals User’s Guide.)</p> <p>The only setting that may need to be edited in the DXF DWG Import Options dialog is Units Setting In File under the Primary Settings tab. This setting refers to the units in the PartSpec DXF or DWG file, not the units of the current VectorWorks file. Do not edit the Import DXF Layers As Classes field under the Graphics Attributes tab or the Group Record Fields under the Objects tab. Changing these options will prevent objects from importing correctly. Depending on the imported part, the Map Colors to Line Weights dialog box and/or the Font Mapping dialog box may open. Make any necessary changes and then click OK. The part is imported into the file based on the specified settings.</p>
3D part from an ACIS or IGES file	<p>If this is an IGES file, the Import IGES File dialog box opens. Select the file to import, and then click Open. If this is an ACIS file, the Import SAT File dialog box opens. Select the file to import, and then click Open. The part is imported into the current class and design layer, and is available for editing and/or converting into a symbol.</p>

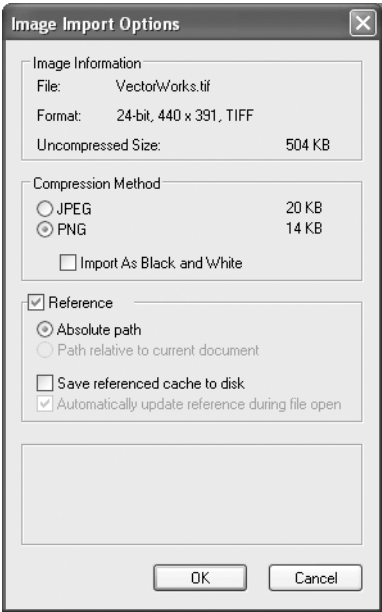
Referencing Imported Images

Product: Architect, Landmark, Spotlight, and Machine Design

Image files can be imported in VectorWorks Fundamentals, but they cannot be referenced. VectorWorks Design Series allows you to create a reference to the original image file, if the original image may change, and you want to keep the imported image up-to-date.

To reference an image file:

1. Select **File > Import > Import Image File**, and then select the image file to import.
2. The Image Import Options dialog box opens.
3. Specify the Compression Method options for the imported image as described in “Importing an Image File” on page 518 in the VectorWorks Fundamentals User’s Guide.
4. Specify the reference options for the imported image as described in the following table.



Parameter	Description
Reference	References the original image file (master file), so that the imported image can be updated when the master file changes. See “Workgroup Referencing” on page 111 in the VectorWorks Fundamentals User’s Guide for more information about referencing.
Absolute path	Stores the absolute file path of the master file. Select this option when the location of the master file will not change in the future, or if the master file is on another volume.
Path relative to current document	Stores the file path of the master file relative to the target VectorWorks file; this option is available only if the master file is on the same volume as the target file. Select this option if the target file and the master file may be moved to another volume in the future.
Save referenced cache to disk	Saves a copy of the referenced image in the target VectorWorks file; if deselected, the target file is smaller, and the image is automatically updated when the target file is opened
Automatically update reference during file open	Updates the image from the master file each time this file is opened, if the image is out-of-date

5. Click **OK** to import the image. The Object Info palette displays the image information.

This appendix contains advanced procedures for customizing items in a drawing file.

Creating Custom ID Label Symbols

Understanding ID Labels

Product: Architect and Landmark

VectorWorks Architect and Landmark ID labels are created as plug-in objects that draw an ID symbol and an optional leader line. The symbols can automatically be kept horizontal, or can be rotated to the leader line angle.

It is possible to create ID symbols based on custom markers. ID symbols have certain requirements that must be met.

ID Symbol Requirements

Product: Architect and Landmark

The **ID Label** tool (see “ID Label Tool” on page 381) detects the presence of any existing record information for the object being labeled in the drawing; if the tool cannot detect record information, you are prompted to select the appropriate record from a list. The ID symbols defined to work with that record type display for selection.

The **ID Label** tool determines whether the ID symbol requested in the dialog box is present in the drawing. If not, it copies it in from the ID_Symbols.vwx file, and scales it to the current drawing layer scale. Once an appropriate scaled symbol is created, it is used without further reference to external documents.

ID symbols must meet the following requirements:

- They are stored in the library file [VectorWorks]\Plug-ins\Common\Data\ID_Symbols.vwx;
- They are created at a 1:1 scale, using certain graphic primitives;
- They use linked text to display ID and attribute information; and,
- They have a TagSchema record attached.

The TagSchema Record

Product: Architect and Landmark

The TagSchema record determines the behavior of the ID symbol text. This record is present in the ID_Symbols.vwx file.



Data record format ID symbol is linked to; must match record name exactly

Current settings for these fields in the file, as set by the **ID Label** tool

Up to seven definitions of linked text fields (can be combinations of data record fields); see “Defining ID Symbol Custom Fields” for more details

Advanced feature option settings for this symbol type; fields hold current defaults for these ID settings and may be modified by the **ID Label** tool in the ID/Specification Tool dialog box

Graphics options for drawing ID symbol

Up to seven fields linked to text within ID symbol

Object Info - Data

ShapeDataRender

DEFAULTS*

TagSchema

TagType: Room Finish Record

Prefix:

Label:

Suffix:

TagSpec:

Fid1Spec:

Fid2Spec:

Fid3Spec:

Fid4Spec:

Fid5Spec:

Fid6Spec:

UID: 0

AutoIncrement: True

FixCurrRecord: False

WriteMatchIDs: False

MatchField:

DrawLeader: False

ShoulderLength: 0

KeepHoriz: False

MkrScaleFactor: 1

ArrowStyle: 0

TagText:

Fid1Text:

Fid2Text:

Fid3Text:

Fid4Text:

Fid5Text:

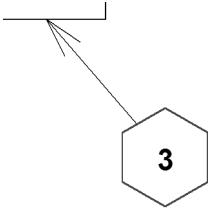
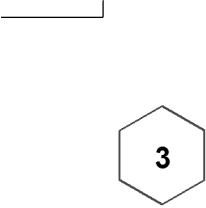
Fid6Text:

Room Finish Record

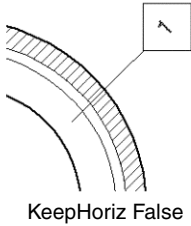
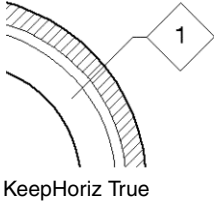

The **AutoIncrement**, **FixCurrRecord**, **WriteMatchIDs**, **DrawLeader**, and **KeepHoriz** fields are Boolean (true/false) values; **ShoulderLength** and **MkrScaleFactor** are numerical values. All other fields are text values.

ID Symbol Leader Options
Product: Architect and Landmark

Four TagSchema record fields determine whether the ID symbol is drawn with a leader, and, if so, determine the leader’s appearance.

Parameter	Description
DrawLeader	<p>If DrawLeader is false, no leader is drawn with the ID Leader object; otherwise, a leader is drawn between the ID symbol and the object to which the ID is referring. This field sets the default for the draw leader parameter in the ID Leader object, which can be changed later.</p> <div><div><p>DrawLeader True</p></div><div><p>DrawLeader False</p></div></div>



Parameter	Description
KeepHoriz	<p>If KeepHoriz is false, the ID symbol is drawn rotated to the leader angle; otherwise, the symbol is rotated horizontally, with a small “shoulder” line segment which is controlled using the value in the ShoulderLength field. These fields set the defaults for the KeepHoriz value and the ShoulderLength value of the ID Leader object, respectively. IDs with no leader should normally set KeepHoriz to true.</p> <div></div>
ArrowStyle	<p>This field, along with MkrScaleFactor, controls the appearance of the marker at the end of the leader (if any)</p> <div><ul style="list-style-type: none">0 - None1 - Thin Solid Arrow2 - Wide Solid Arrow3 - Thin Hollow Arrow4 - Wide Hollow Arrow5 - Dot6 - Circle7 - Cross8 - Slash9 - Lasso</div>
MkrScaleFactor	<p>This field, along with ArrowStyle, controls the appearance of the marker at the end of the leader (if any); this setting is a multiplier on a marker size of approximately 1/4". For example, a MkrScaleFactor setting of 0.5 results in a marker of 1/8" standard size.</p>

ID Symbol Record Writing Options

Product: Architect and Landmark

There are three ID record writing options controlled by four fields in the TagSchema record:

Parameter	Description
AutoIncrement	The value in this field controls the default setting for whether the ID number is automatically incremented between placements
FixCurrRecord	The value in this field controls whether the contents of the current record are rewritten to match earlier IDs with the same ID entry



Parameter	Description
WriteMatchIDs	The value in this field controls the writing of matching ID fields to records with identical contents in the MatchField text field
MatchField	Provides a record field for writing the ID for matching

Defining ID Symbol Custom Fields

Product: Architect and Landmark

The ID symbol can have up to seven fields containing virtually any text, combined with the contents of the data record the ID uses.

For example, the **ID Label** tool reads the contents of the **Fld1Spec** field and writes the results to the **Fld1Text** field. The “Spec” field follows the format **FieldName& “string constant”** where the field names are fields in the data record named in the **TagType** field; the & indicates a concatenation, and the string constants are surrounded by double quotes.

For example, a field in the data record is called “Count.” This is a number field representing the total number of something. You want the first field in the ID to read: **TOTAL: 12** when “Count” is 12. Enter the following formula in the **Tag1Spec** field: **“TOTAL: ”&Count**. There are no spaces between the ampersand and the field name, or between the string constant (in quotes) and the ampersand.

You can concatenate any number of fields and constants. For example, you could add the word “Item(s)” to the tag field definition by using the following formula: **“TOTAL: ”&Count& “ Item(s)”**.

There are a variety of pre-defined fields in the ID symbols that come with VectorWorks Architect and Landmark. Use these as a guideline in understanding this special formula language. This same formula convention is also used to define HVAC object tags.

Error Messages in ID Fields

Product: Architect and Landmark

If the **ID Label** tool cannot find the data record specified in the **TagType** field of the TagSchema record, the error message **#RECORDNAME?#** displays when the ID is placed. If any of the fields in the formula are misnamed, the message **#FIELDNAME?#** displays in the affected ID field. Verify the spelling of record and field names and ensure the data record is defined as described in “The Data Record” on page 538.

The Data Record

Product: Architect

The data record named in the **TagType** field of the ID symbol should be part of the standard records created using the **VA Records and Schedules** command and should be present in the current preference set. This enables the **ID Label** tool to create the record automatically if it is not defined at the time the **ID Label** tool is used.

The TagType “Styled Wall” is reserved for use when an ID is placed on a styled wall.

Creating Custom ID Symbols

Product: Architect and Landmark

Keeping in mind the information described in “Understanding ID Labels” on page 535, it is possible to create a custom ID symbol to be used by the **ID Label** tool.

An ID symbol can consist of any 2D object supported in VectorWorks except circles, arcs, grouped objects, or other symbols. These guidelines are necessary for the scaling algorithm currently used by the **ID Label** tool, to scale the

symbol to the correct scale for the file. To achieve the look of an arc in the symbol, use an arc-smoothed vertex of a polyline; use an oval instead of a circle.

To create a custom ID symbol:

1. Open the ID Symbols.vwx file, located in the [VectorWorks]\Plug-ins\Common\Data folder.
The TagSchema record, as well as the ID symbols currently used by the **ID Label** tool, are present in this file.
2. At a 1:1 scale, draw the object representing the ID symbol.
3. Select **Modify > Create Symbol** to create a symbol from the object (see “Creating New Symbols” on page 156 for more information on creating symbols).
4. Select the new symbol in the Resource Browser and select **Edit** from the Resources menu.

The Edit Symbol dialog box opens.

5. Select the 2D Component and click **Edit** to open the Edit Symbol window.
6. Deselect all items by clicking in an empty area.

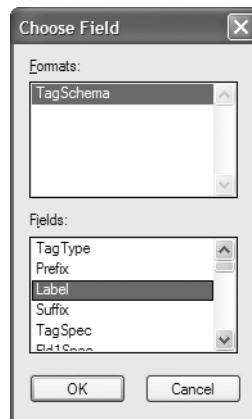
On the Data tab of the Object Info palette, *SYMBOL DEFAULTS* is displayed.

7. Attach the Tag Schema record by selecting it from the Data tab.
8. An “X” displays in the checkbox.
9. Select the TagType field and replace the field name with the exact name of your custom record.
10. Create and format text to be used to display the ID symbol text.

For more information, see “Linking Text to Record Formats” on page 176 in the VectorWorks Fundamentals User’s Guide.

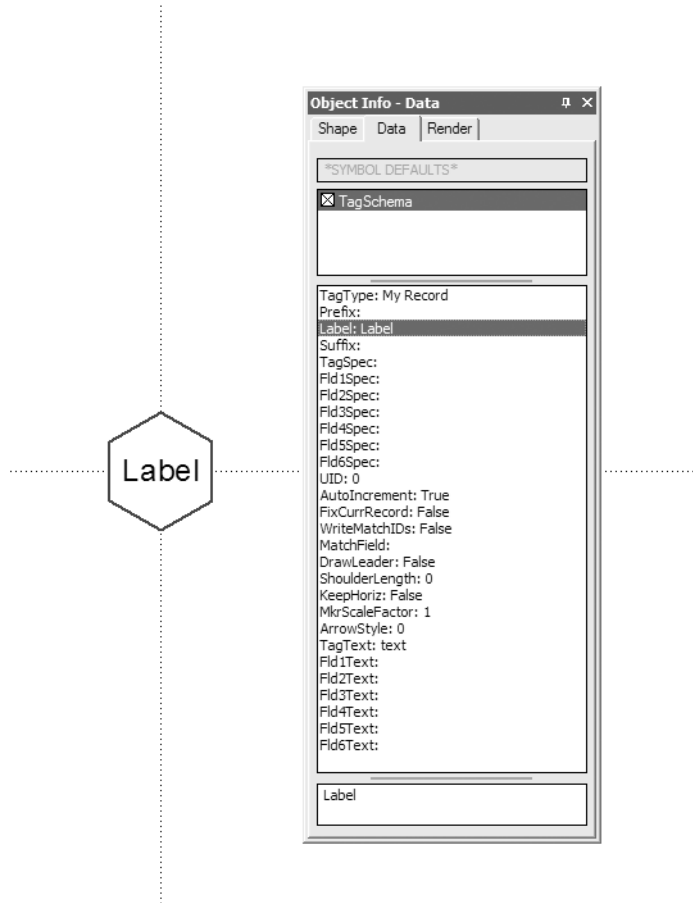
11. With the text selected, select **Tools > Records > Link Text to Record**.

The Choose Field dialog box opens.



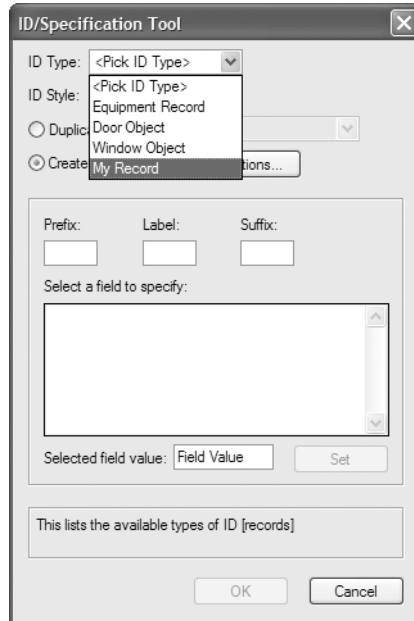
12. In the Tag Schema record format, select the Label field and click **OK**.
13. The symbol text is linked to display the contents of the Label record field.

To check the text link, enter text in the Label field on the Data tab of the Object Info palette. Data entered now would be overwritten later, in any case, by the **ID Label** tool.



14. Click **Exit Symbol** at the top right corner of the window to return to the drawing.
15. In the Pally script palette, double-click the **Output ID Prefs** script to run it.
16. Save the ID_Symbols.vwx file.
17. In the drawing file where the custom ID symbol is to be used by the **ID Label** tool, ensure that a record format exists which exactly matches the record name entered previously in the TagType field.
18. Select the **ID Label** tool from the Dims/Notes tool set.

The ID/Specification Tool dialog box opens.



19. The custom record is one of the selections for **ID Type**. Select it to use the associated custom ID symbol.

Notes Manager Database Format

Product: Architect, Landmark, Spotlight, and Machine Design

The Notes Manager, in version 11 and later, can use a database from an outside source, provided that it has been formatted appropriately. Data files must be in one of two formats: a version 11 or later format, or the format used by the Notes Manager in versions of VectorWorks previous to version 11. The format used by previous versions may be somewhat simpler to use, and is automatically converted to the current format by the Notes Manager.

Formatting by Previous Version

Product: Architect, Landmark, Spotlight, and Machine Design

The database format must adhere to the following requirements to be recognized as a database from versions of the Notes Manager prior to 11.

- The first line must contain only a numeric value
- The rest of the file must contain notes with the following data separated by tabs:
 - a numeric value
 - a dash
 - the section name
 - the description
 - the note text
- Additional tabs or carriage returns are not allowed within each field
- There can be no blank lines before the end of the file

This format is illustrated by the following example.



3				
00	-	Section 1	Description 1	This is keynote 1.
00	-	Section 1	Description 2	This is keynote 2.
00	-	Section 1	Description 3	This is keynote 3.

Formatting by Current Version

Product: Architect, Landmark, Spotlight, and Machine Design

The database format must adhere to the following requirements to be recognized as a database from version 11 and later Notes Manager.

- The first line must contain the word “NotesManager11DataFile”
- The second line must contain the database ID (unique for all databases used)
- The rest of the file must contain notes with the following data separated by tabs:
 - a note ID (unique for all notes in the file)
 - the section name
 - the description
 - the note text
- After the notes, an optional section can identify which description was last selected in each section
- Additional tabs or carriage returns are not allowed within each field
- There can be no blank lines before the end of the file

The database and note IDs are in the format of “ID_#”, where “#” represents any numeric value with not more than 14 digits and no decimal point. Notes Manager does not change these IDs after creation, but when new notes are added, it uses IDs similar to those shown in the following example.

Notes Manager11DataFile		
ID_04030110200020	General Project Notes Scope of Work	Project located at ‘ADDRESS’;‘CITY’;‘STATE’, county of ‘COUNTY’.
ID_04030110200021	General Project Notes Accessibility Compliance	Project complies with accessibility standards.
ID_04030110200022	General Project Notes Involved Parties	“Owner” refers to ‘OWNER ID’ or its authorized representatives.
0	End of Notes	
General Project Notes	Scope of Work	

Migrating from Previous Versions

Migrating Structural Shape Objects from Previous Versions

Product: Architect, Landmark, Spotlight, and Machine Design

The VectorWorks Design Series contains the bulb flat structural shape object, in addition to those shapes available in VectorWorks Fundamentals. The VectorWorks Design Series also provides the British Standard (BSI) and Japanese Standard (JIS) series for creating structural shape objects.

The **Update Plug-in Objects** command may need to be run on files containing structural shape objects that were created in an earlier version of VectorWorks. This command converts the structural shape objects to the latest format; see “Migrating from Previous Versions” on page 5 in the VectorWorks Fundamentals User’s Guide.



Migrating Site Models from Previous Versions

Product: Architect and Landmark

As of version 12, files containing DTM symbols from previous versions can be easily converted.

When you update a site model from a previous version, you are prompted to convert to the new DTM. If the file contains more than one site model symbol, an alert dialog box prompts for the selection of one of the symbols to be converted to the primary DTM object. The remaining symbols become snapshots of the primary DTM.

DTM classes that were necessary for previous versions remain in the file, although they are no longer used.

Migrating Machine Design Objects from Previous Versions

Product: Machine Design

When you migrate plug-in objects from older versions of VectorWorks Machine Design (previously called VectorWorks Mechanical), some Object Info palette parameters display when they should be hidden. Select the **Reset All Plug-ins** command to update the Object Info palette parameter display.

To reset plug-in objects:

1. Open an older VectorWorks Mechanical drawing containing plug-in objects.
2. Select **Tools > Utilities > Reset All Plug-Ins**.

The Reset All Plug-ins dialog box opens.

3. Click **Yes** to reset plug-in objects.

A VectorScript message displays the update status. When complete, the Object Info palette displays only the pertinent parameters.

Creating Custom Electrical and Communication Symbols

Product: Architect

VectorWorks Architect includes many pre-defined electrical and communication objects in its object library files. However, there is no need to be restricted to these objects; creating custom panel and circuiting symbols is also possible.

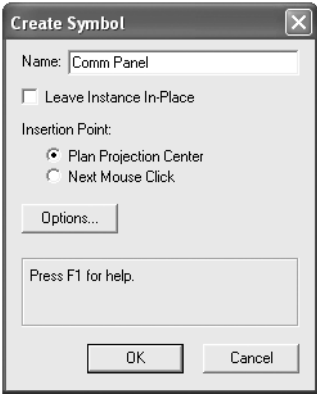
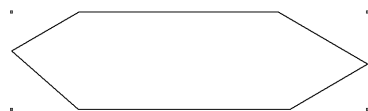
Creating Custom Panels

Product: Architect

Electrical, communication, and disconnect panel symbols can be created specifically to fulfill a custom requirement.

To create a panel symbol:

1. Draw the object to represent the panel.
2. Convert the object into a symbol by selecting **Modify > Create Symbol**. Provide a name for the panel. See “Creating New Resources” on page 146 in the VectorWorks Fundamentals User’s Guide.



3. The panel symbol requires both a panel and circuiting record. If the file does not contain panel and circuiting records, create the records according to the following formats.

Panel Record

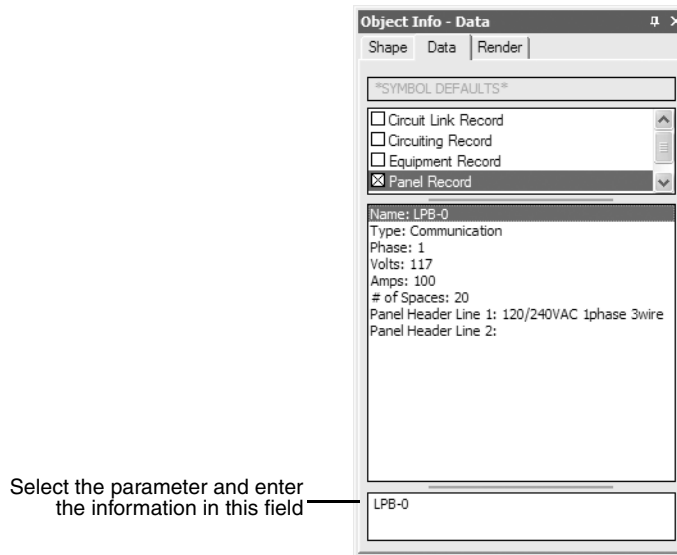
Field	Type	Contents
Name	Text	Must be unique
Type	Text	Must be Electrical, Communication, or Disconnect
Phase	Integer	1
Volts	Text	117
Amps	Integer	100
# of Spaces	Integer	20
Panel Header Line 1	Text	Text placed on Panel Schedule
Panel Header Line 2	Text	Text placed on Panel Schedule

Circuiting Record

Field	Type	Contents
Name	Text	None
Circuit #	Integer	0
Wire Size	Text	0
Trip	Integer	0
Conduit Size	Text	1/2
V.A./Watts	Integer	0
Remarks	Text	Panel
Phase/Pole	Integer	2
Voltage	Text	0

Field	Type	Contents
Circuit Type	Integer	1 for electrical device, 2 for communication device
UID	Text	0
ID	Text	0

- Select the symbol from the Resource Browser, and then click **Edit** from the **Resources** menu.
The Edit Symbol dialog box opens.
- Click **2D Component**, and then click **Edit**.
- In the Edit Symbol window, deselect all symbol components.
- Attach the panel record to the symbol by selecting it from the Data tab in the Object Info palette. Enter the panel information by selecting a parameter and entering its information in the lower field; the circuiting tools will use this information.



Parameter	Description
Name	The Name field changes for each symbol later, when it is placed on the drawing
Type	Specifies Electrical, Communication, or Disconnect
Other Panel Parameters	Enter specific information about the panel
Panel Header Line 1/2	Text specified here is placed on the panel schedule

- Attach the circuiting record to the symbol and enter the circuiting information by selecting a parameter and entering its information in the lower field; the circuiting tools will use this information.



Select the parameter and enter the information in this field

Parameters	Description
Name	Leave this field blank
Circuit #	Enter 0 (zero) for this parameter
Other Circuit Parameters	Enter specific information about the circuit
Circuit Type	Set to 1 for an electrical symbol, and to 2 for a communication symbol
UID	Enter 0 (zero) for this parameter

9. Click **Exit Symbol** at the top right of the drawing window.

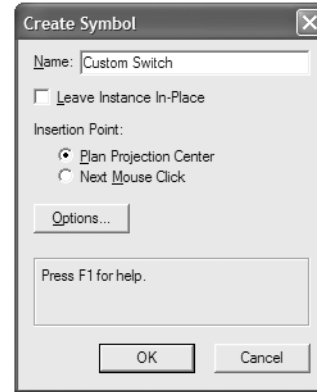
Creating Custom Circuit Symbols

Product: Architect

Electrical and communication circuit symbols can be created specifically to fulfill a custom requirement.

To create a circuit symbol:

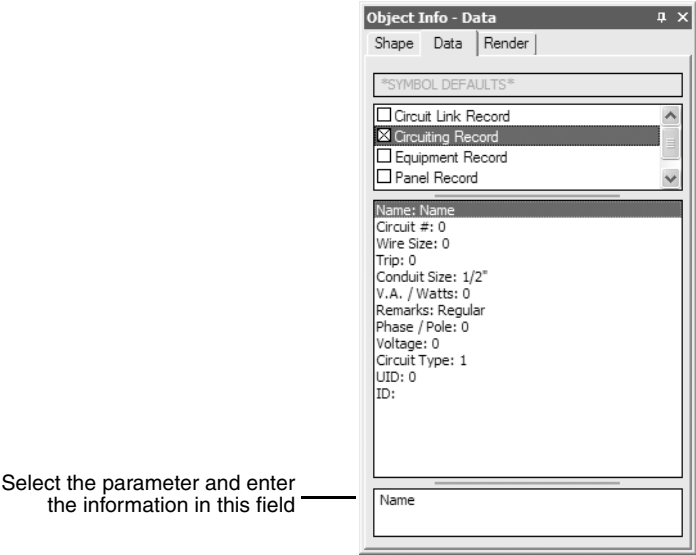
1. Draw the object to represent the circuitable symbol.
2. Convert the object into a symbol by selecting **Modify > Create Symbol**. Provide a name for the circuitable item. See “Creating New Resources” on page 146 in the VectorWorks Fundamentals User’s Guide.



- If the file does not contain a circuiting record, create the record according to the following format.

Field	Type	Contents
Name	Text	None
Circuit #	Integer	0
Wire Size	Text	0
Trip	Integer	0
Conduit Size	Text	1/2
V.A./Watts	Integer	0
Remarks	Text	Panel
Phase/Pole	Integer	2
Voltage	Text	0
Circuit Type	Integer	1 for electrical device, 2 for communication device
UID	Text	0
ID	Text	0

- Select the symbol from the Resource Browser, and then click **Edit** from the **Resources** menu.
The Edit Symbol dialog box opens.
- Click **2D Component**, and then click **Edit**.
- In the Edit Symbol window, deselect all symbol components.
- Attach the circuiting record to the symbol by selecting it from the Data tab in the Object Info palette. Fill out the circuiting information by selecting a parameter and entering its information in the lower field; this information is displayed and edited by the circuiting tools.



Parameters	Description
Name	Leave this field blank
Circuit #	Enter 0 (zero) for this parameter
Other Circuit Parameters	Enter specific information about the circuit
Circuit Type	Set to 1 for an electrical symbol, and to 2 for a communication symbol
UID	Enter 0 (zero) for this parameter

- 8. If the symbol requires more than one circuit, create and attach a second identical record named Circuiting Record-1.
- 9. Click the **Exit Symbol** button located at the top right of the drawing window.

Creating Custom Path Objects

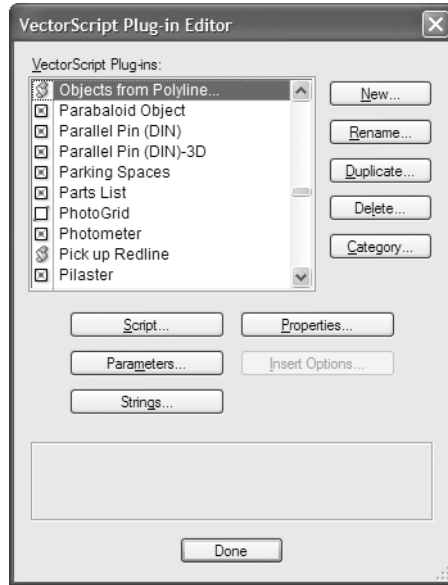
The **Objects from Polyline** command supports custom path objects (custom path plug-in objects with a .vso extension).

For information on creating custom path objects, see “New Plug-ins” on page 85 in the VectorScript Language Guide.

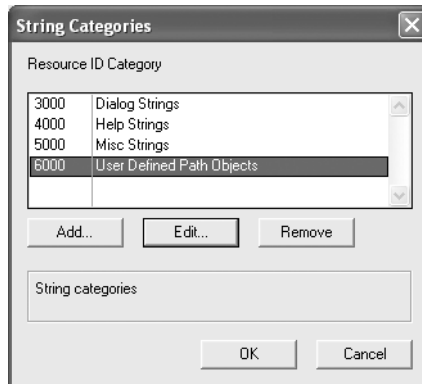
To add a custom path object to the **Objects from Polyline** command:

- 1. Place the custom path object file in the VectorWorks\Plug-Ins folder.
- 2. Select **Tools > Scripts > VectorScript Plug-in Editor**.

The VectorScript Plug-in Editor dialog box opens.



3. In the list of VectorScript plug-in objects, select Objects from Polyline.
Press the letter O key to quickly access Objects from Polyline in the list.
4. Click **Strings**.
The String Categories dialog box opens.



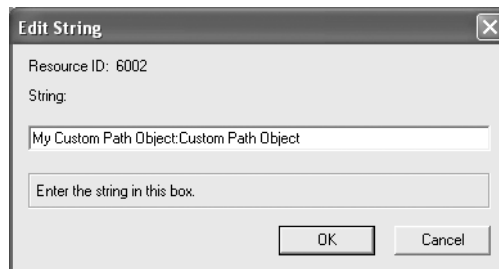
5. Select Resource ID 6000, User Defined Path Object, and click **Edit**.
The Edit Strings dialog box opens.



6. Select ID 6001, and click **Edit**.

The Edit String dialog box opens.

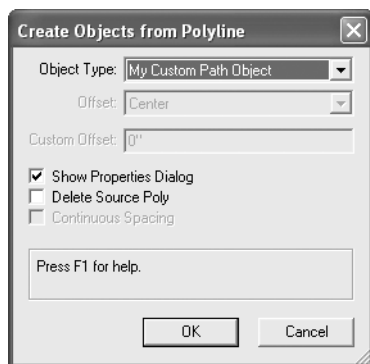
7. Enter the number of custom path objects that will be added, and click **OK**. (If adding one path object, enter 1.)
8. In the Edit Strings dialog box, click **Add**.



9. Enter the name of the path object that should be used in the command list, and then the actual name of the plug-in object file (without the .vso extension), separated by a colon.
 10. Click **OK** to return to the Edit Strings dialog box.
- The custom path object ID and string are listed.



11. Repeat steps 8-10 for each custom path plug-in object to add.
12. Click **OK** twice, and then **Done**, to exit the VectorScript Plug-in Editor.
13. The custom path object is included in the list of path objects created by the **Objects from Polyline** command.



Plant ID Codes

Product: Landmark

The meaning of commonly-used plant ID code categories is provided.

Plant ID Code	Meaning
A-#	Annual #
CTD	Conifer Tree Display
CTG	Conifer Tree Generic
ETD	Evergreen Tree Display
ETG	Evergreen Tree Generic



Plant ID Code	Meaning
G-#	Grasses #
OT-M	Ornamental Tree Massed
OTD	Ornamental Tree Display
OTF	Ornamental Tree Flowering
OTG	Ornamental Tree Generic
OTM	Ornamental Tree Multi-Stem
OTP	Ornamental Tree Patio
P-1 — P-9	Perennials
P1 — P4	Palms
SD-#	Shrub Display #
SD#	Shrub Deciduous #
SDM	Shrub Display Massed
SG#	Shrub Evergreen #
SG	Shrub Generic
SN#	Shrub Needle #
STG	Shade Tree Generic
STL	Shade Tree Large
STM	Shade Tree Massed
STP	Shade Tree Patio
STS	Shade Tree Street

Plant Database Field Mapping

Product: Landmark

When plant data is imported into the Plant Database with the **File > Import Records > File** database command, field mapping is required (see “Importing Plant Database Information” on page 214). Certain fields must be used during mapping for the plant list to function properly when exported to VectorWorks Landmark. All significant VectorWorks fields have a VW prefix.

Target Field Name	Notes or Example Values	Target Field Name	Notes or Example Values
VW Latin Name	Also known as the plant botanical name	VW Fruit Characteristics	Acorns, Berry, Catkins, Cones
VW Common Name		VW Fruit Color	
VW Category	Shrubs, Herbs, Trees...	VW Persistence	Deciduous, Semi-Evergreen, Evergreen...
VW Code		VW Tolerances	Cold Frost, Drought, Heat...



Target Field Name	Notes or Example Values	Target Field Name	Notes or Example Values
VW Landscape Use	Border, Hedge, Shade Tree...	VW Climate Zone	Arid, Semi Arid, Dry...
VW Growth Habit	Arching, Broad-domed, Columnar, Climber...	VW Soil Range	Bark, Sand, Sandy loam, Potting soil...
VW Height		VW pH Range	Acidic, Adaptable
VW Spread		VW Light Range	Deep Shade, Shade, Sun, Full Sun
VW Flower Characteristics	Double, Erect, Fragrant, Horizontal...	VW Hardy Zone	1 – 11 (from USDA zone mapping)
VW Flower Color		VW Used in Project	
VW Bloom Time	Also referred to as Season	VW Comments 1	
VW Foliage Characteristics	Aromatic, Broad-leaf, Evergreen, Fronds, Small leaves...	VW Comments 2	
VW Foliage Color		VW Comments 3	
VW Autumn Color			

Instrument and Accessory Specifications

Product: Spotlight

In VectorWorks Spotlight, custom symbols can be created and used in addition to the pre-defined standard symbol sets. Create an instrument, accessory, or lighting position out of a currently selected symbol by converting it with the commands in the **Modify > Convert** menu.

Certain restrictions apply when creating lighting and accessory symbols.

In addition, the colors used for indicating photometric threshold values can be customized.

Lighting Instrument Specifications

Product: Spotlight

Restrictions apply when creating a symbol to be converted to a lighting instrument.

Symbol Characteristics

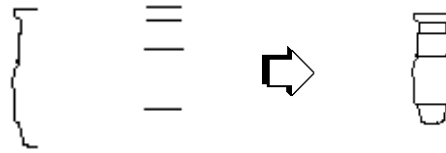
Product: Spotlight

Symbols should be hybrid (2D/3D) so that they display properly in both 2D and 3D views. At a minimum, the symbol must contain a 2D representation. All instruments should be drawn with the front of the instrument (the end which emits light) oriented towards the top of the drawing.

2D Characteristics

Product: Spotlight

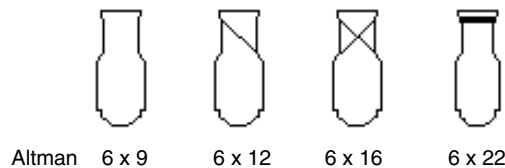
Create the 2D view of the symbol using as few polygons and lines as possible. If possible, use a single polyline rather than individual line segments. The symbol below was created from these few constituent parts:



The line weight of the symbol is also a consideration; the instruments need to stand out when printed. The outer perimeter of the symbol should have a line weight of at least 1/2 point (7 mils). Interior details should use a lighter line weight.

The 2D representation should have a solid fill so that it obscures information under the symbol. The size of the instrument should be accurate based on the real instrument it represents. While drawing the instrument, keep the level of detail as minimal as possible. The goal is to be able to distinguish instruments from one another, not to create a detailed plan view of each instrument.

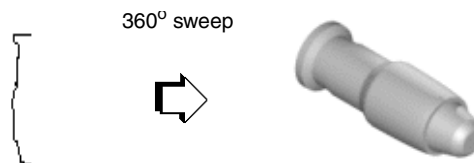
For instruments with multiple configurations, it is acceptable to use simple graphical differences to distinguish among the models. For example, use the following variations to separate the different versions of a symbol:



3D Characteristics

Product: Spotlight

An easy way to generate a reasonable 3D instrument model is to sweep the 2D portion of the symbol. The segment angle of the sweep should be between 20 and 40°. See “Sweeping Objects” on page 309 in the VectorWorks Fundamentals User’s Guide for more information.



Keep the 3D symbol simple. It should be solid. The model should be accurately sized, but without minute details like handles, grommets, fins, louvers, cords, and knobs. These items can add significantly to the rendering time required, and are not necessary to distinguish among instruments.

Insertion Point

Product: Spotlight

Align the 2D and 3D views so that the hanging points of both versions line up.

The insertion point of the 2D/3D hybrid symbol in Top/Plan view should represent the hanging location of the instrument. The 3D insertion point should be the hanging point (center of the clamp).



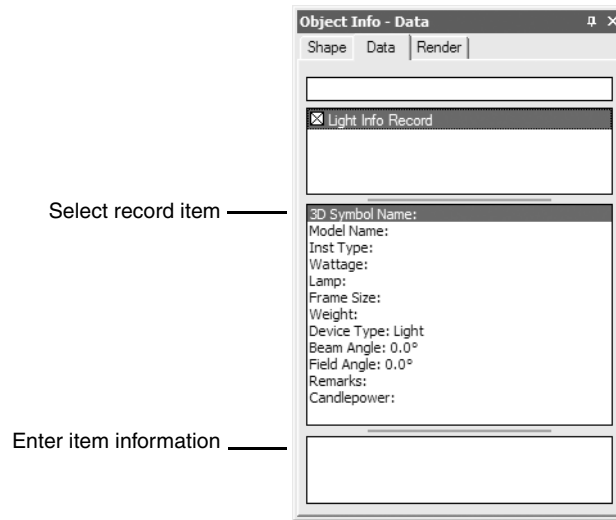
Attaching the Light Info Record

Product: Spotlight

Attach the Light Info Record to the symbol, with field names that match the names of the fields in the instrument object. Not all the fields are required, but the desired fields for the instrument object to read should be included. Filling the instrument type field with the manufacturer's name and model name for the particular instrument is recommended.

To attach the light info record:

1. In the Resource Browser, import the Light Info Record from one of the instrument library files.
Locate the Light Info Record and select **Import** from the Resources menu to bring the record into the current file.
2. Select the new symbol, and select **Modify > Edit Symbol**.
3. In the Edit Symbol window, click on an empty location so that nothing is selected.
4. Click on the Data tab in the Object Info palette. Attach the Light Info Record to the symbol defaults by selecting the checkbox. Then edit the record by selecting the record item and typing the information in the edit box.



The **Candlepower**, **Beam Angle**, and **Field Angle** parameters affect the photometric grid and photometer object calculations. The **Beam Angle** and **Field Angle** parameters affect the Draw Beam feature.

Normally, do not include text labels with the instrument, as these are handled by the instrument object. An exception can be made to distinguish different models or lamps of an instrument. For example, create three versions of a single PAR64 symbol by adding MFL, WFL, and NSP text blocks.

Symbols should be named with the model name of the lighting instrument.

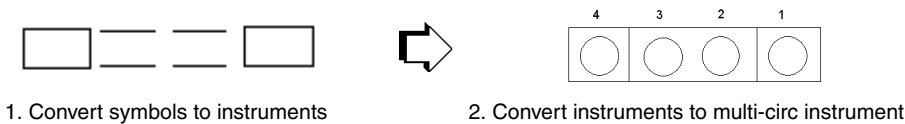
5. Selecting **Light On** in the Object Info palette of a lighting instrument includes a spot light as part of the lighting instrument. While editing the symbol, the spot light can be added, and accurate lighting information specified with the parameters in **Use Emitter**. See “Adding Light Sources” on page 423 in the VectorWorks Fundamentals User's Guide for information on adding a spot light and setting accurate lighting parameters.
6. Click **Exit Symbol** at the upper right corner of the window to return to the drawing.



Multi-circuit Instrument Specifications

Product: Spotlight

Multi-circuit instruments represent a special case of the instrument object. The symbol drawn should represent a single element of the multi-circuit instrument. An instrument that is at the end of the multi-circuit strip should look different from the instruments that are in the center. Place the number of symbols required to create the multi-circuit instrument. For example, place four symbols (two ends and two middle) to create a four-circuit cyc unit.



Accessory Specifications

Product: Spotlight

The accessory symbol should be a 2D/3D hybrid object. At a minimum, the symbol must contain a 2D representation. Keep the accessory representation as simple as possible to reduce rendering time.

The Object Info palette for accessories and lighting instruments looks identical, but the **Device Type** differs (Light, Accessory, or Static Accessory).

Accessories should have a record attached for storing the default accessory values. The record should not contain fields that vary from instance to instance of an accessory. For example, do not add a Color Scroller channel field value unless that channel is used by all the color scrollers in the file.

The attached record should consist of the following fields:

Field	Description
Instrument type	Accessory name; this can be a specific manufacturer’s model name or number, or a generic name for the accessory, such as 6” Top Hat
Accessory type	Generic accessory category; in some cases, this can be similar, or identical to the instrument type (example accessory types include Top Hat, Barn Door, Color Scroller, Gobo Rotator, and Color Frame)
Wattage	Amount of power consumed by the accessory
Weight	Accessory weight
Other	Add fields as desired; these fields are read into the Lighting Device object if the field name in the accessory record matches the field name of the Lighting Device object

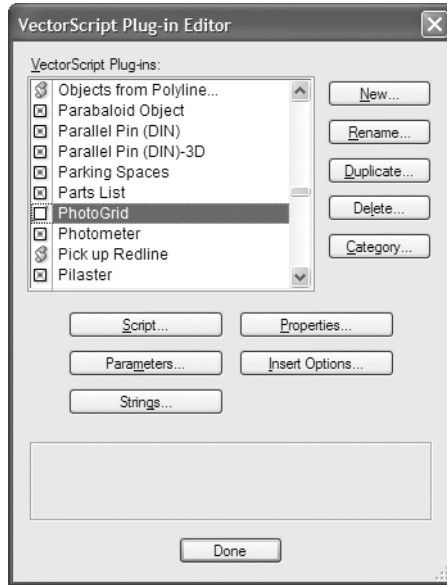
Customizing Photometric Threshold Colors

Product: Spotlight

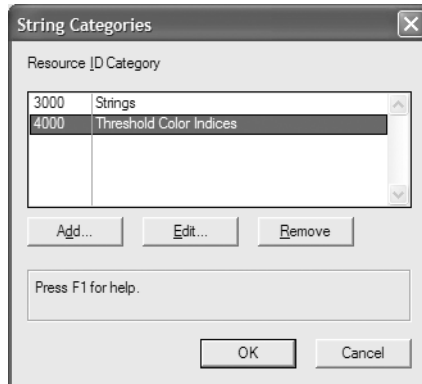
Both the photometer and photometric grid use colors that correspond to the specified threshold ranges (see “Obtaining Photometric Data” on page 263). These colors can be changed if desired.

To edit the photometric threshold color values:

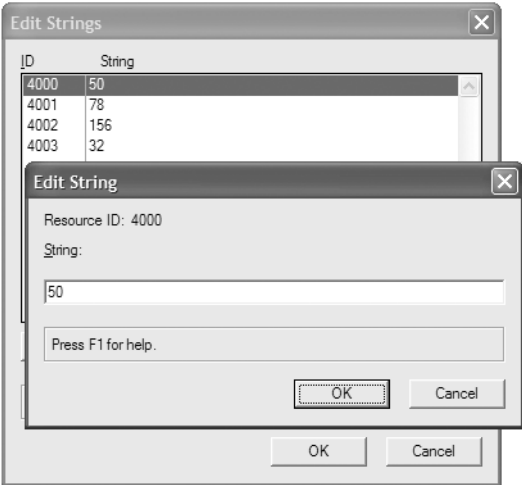
1. Select **Tools > Scripts > VectorScript Plug-in Editor**.
2. The VectorScript Plug-in Editor opens. Select either PhotoGrid or Photometer.



3. Click **Strings**. The String Categories dialog box opens.



4. Select Resource ID “4000: Threshold Color Indices.” Click **Edit**.
5. The Edit Strings dialog box opens. Select one of the indices and click **Edit** to specify a new color value for the threshold index.



ID	Corresponding Threshold Index
4000	Zero level
4001	Levels below the Lower Threshold value
4002	Levels between the Lower and Upper Threshold values
4003	Levels above the Upper Threshold value

For more information on the color selector values, see Appendix E - Miscellaneous Selectors, in the VectorScript Function Reference Guide. The VectorScript Function Reference is a comprehensive command reference available online. It is located in: [VWHelp/VectorScript Reference/VSFunctionReference.html](#)

- 6. When the desired threshold index color selector values have been edited, click **OK** to return to the VectorScript Plug-in Editor dialog box. Click **Done**.

Customizing Size Settings for Plug-in Objects

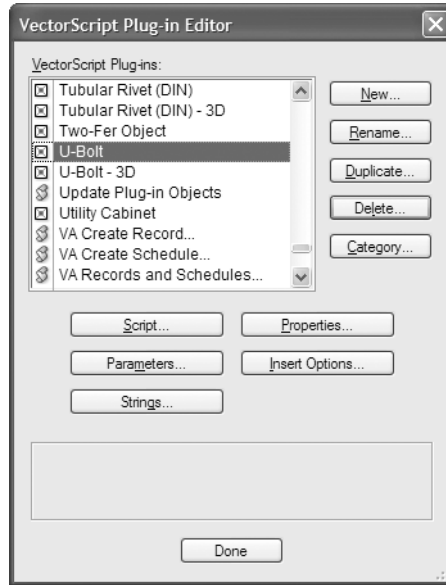
Product: Spotlight and Machine Design

User-defined sizes can be created for eye bolts, J-bolts, swing bolts, swing eye bolts, T-bolts, U-bolts, Hole - Tapped (Inch) and Hole - Tapped (Metric). Use the following procedures to add or remove sizes for use with these plug-in objects. Sizes are then assigned through the Object Info dialog box for the applicable object.

To add or remove plug-in object sizes:

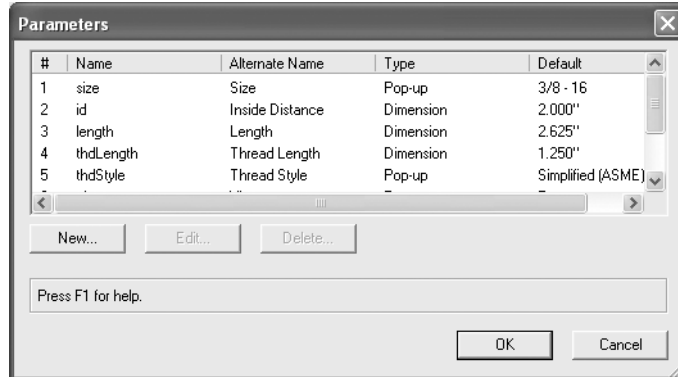
1. Select **Tools > Scripts > VectorScript Plug-in Editor**.

The VectorScript Plug-in Editor dialog box opens.



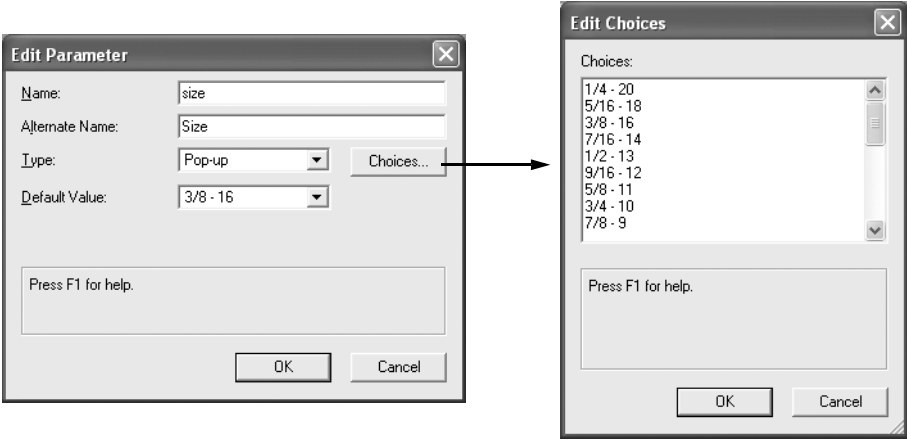
2. Select the plug-in object to be edited and click **Parameters**.

The Parameters dialog box opens.



3. Select the **Size** parameter and click **Edit**.

The Edit Parameter dialog box opens.



- 4. Click **Choices**.
The Edit Choices dialog box opens.
- 5. To remove a size, highlight it and press the Delete or Backspace key. To add a new size, insert the cursor in the desired location in the list of sizes. Enter the new parameters. To edit a size, simply type over the existing parameters. Use the following guidelines to add or edit a size:

Size	Description
Inch	Enter the size as a fraction or decimal. Enter a dash as a separator (with optional spaces before and after). Enter the threads per inch. Example: 1/2 - 20
Metric	Enter either an upper or lowercase “m.” Enter the nominal size in millimeters. Enter either an upper or lowercase “x” as a separator (with optional spaces before and after). Enter the thread pitch. Example: M8 x 1.25

Do not leave blank lines in the list of sizes. Also, if sizes are added to a 2D plug-in object that has a 3D counterpart, the same sizes must be added to the 3D plug-in object in order for the **Create 3D Object from 2D** command to work properly.

- 6. Click **OK** to accept the changes, and then click **Done** to exit the VectorScript Plug-in Editor dialog box.

Adding User-defined Information to Commands

Product: Machine Design

Certain commands permit adding to the list of available values for certain parameters (for example, the **Material** list for the Spring Calculator or the **Units** list for the **Simple Beam** command).



Parameters Allowing Addition of User-defined Values in the GetUserData.vss File			
Group	Plug-in Object	Parameter	Dialog Box
1	Spring Calculator	Units (inches, mm and cm only)	Spring Calculator
	Shaft Analysis	Outside Diameter	Shaft Analysis
	Simple Beam	Beam Length	Simple Beam: Set Beam Properties
	Simple Beam	Deflection Units	Simple Beam: Set Beam Properties
2	Simple Beam	These items are the singular form of the names in Group 1 and are used when writing the values to a worksheet and a text block on the drawing	Not applicable
3	Simple Beam	Load Units	Simple Beam: Add/Remove/Change Loads
4	Simple Beam	These items are the singular form of the names in Group 3 and are used when writing the values to a worksheet and a text block on the drawing	Not applicable
5	Simple Beam	Section Modulus Units	Simple Beam: Set Beam Properties
6	Simple Beam	Moment of Inertia Units	Simple Beam: Set Beam Properties
7	Shaft Analysis	Shear Modulus Units	Shaft Analysis
	Simple Beam	Modulus of Elasticity Units	Simple Beam: Set Beam Properties
8	Spring Calculator	Material	Spring Calculator
9	Shaft Analysis	Twisting Moment Units	Shaft Analysis

Adding User-defined Spring Calculator Materials

Product: Machine Design

The following example shows how to add to the list of materials available to the Spring Calculator.

To add to the list of Spring Calculator materials:

1. Make a backup copy of the GetUserData.vss file, located in Plug-ins\VW_Mech\Includes. Keep the backup copy in case there is a need to restore the GetUserData.vss file to its original state.
2. Open the GetUserData.vss file in any word processor and locate group 8 in the getUserString function.
3. Using the next available sequential number, add the new **Material** to the end of the list (in this example, Beryllium Copper). Enclose the name in single quotes and put a semi-colon at the end of the line. The new line should read:

```
16: getUserString := 'Beryllium Copper';
```

```
(* Spring Calculator - Material *)
8: BEGIN
    CASE item OF
        1: getUserString := '<Other>';
        2: getUserString := 'Music Wire - Up to 0.032" (0.81mm)';
        3: getUserString := 'Music Wire - 0.033" to 0.063" (0.82mm to 1.60mm)';
        4: getUserString := 'Music Wire - 0.064" to 0.125" (1.61mm to 3.18mm)';
        5: getUserString := 'Music Wire - 0.126" to 0.250" (3.19mm to 6.35mm)';
        6: getUserString := 'Hard Drawn MB - Up to 0.032" (0.81mm)';
        7: getUserString := 'Hard Drawn MB - 0.033" to 0.063" (0.82mm to 1.60mm)';
        8: getUserString := 'Hard Drawn MB - 0.064" to 0.125" (1.61mm to 3.18mm)';
        9: getUserString := 'Hard Drawn MB - 0.126" to 0.250" (3.19mm to 6.35mm)';
        10: getUserString := 'Oil Tempered MB';
        11: getUserString := 'Stainless Steel - Types 302, 304, 316';
        12: getUserString := 'Stainless Steel - Type 17-7 PH';
        13: getUserString := 'Stainless Steel - Type 420';
        14: getUserString := 'Stainless Steel - Type 431';
        15: getUserString := 'Spring Brass';
        16: getUserString := 'Beryllium Copper';
    END;
END;
(of CASE item)
END;
(of group = 8)
```

4. Locate group 8 in the getUserData function.
5. Using the next available sequential number, add the new **Mod. of Elasticity** value (in this example, pounds per square inch). The sequential number added here must correspond to the number added in the getUserString function. Put a semi-colon at the end of the line; do not use single quotes or commas in the value. The new line should read:
16: getUserData := 7000000;
6. Change the value of item 0 to the new group number, which indicates the number of available values (in this example, 16).

```
(* Spring Calculator - Material *)
(* Units = pounds per square inch *)
8: BEGIN
    CASE item OF
        0: getUserData := 16;
        1: getUserData := 0;
        2: getUserData := 12000000;
        3: getUserData := 11850000;
        4: getUserData := 11750000;
        5: getUserData := 11600000;
        6: getUserData := 11700000;
        7: getUserData := 11600000;
        8: getUserData := 11500000;
        9: getUserData := 11400000;
        10: getUserData := 11200000;
        11: getUserData := 10000000;
        12: getUserData := 10500000;
        13: getUserData := 11000000;
        14: getUserData := 11400000;
        15: getUserData := 5000000;
        16: getUserData := 7000000;
    END;
END;
(of CASE item)
END;
(of group = 8)
```

7. Save the file. The next time the Spring Calculator is run, the new item is available in the Material list, and when selected, the new value is available in the Mod. of Elasticity field. When executed, the Spring Calculator automatically recalculates the value to the user-specified units. (For beryllium copper, the value is 7,000,000 lb/in².)

If the Spring Calculator was used during the current session, VectorWorks needs to be restarted for the changes to take place.



Adding User-defined Simple Beam Units

Product: Machine Design

The following example shows how to add to the list of available units for the **Simple Beam** command.

To add to the list of units for the Simple Beam command:

1. Make a backup copy of the GetUserData.vss file located in Plug-ins\VW_Mech\Includes. Keep the backup copy in case there is a need to restore the GetUserData.vss file to its original state.
2. Open the GetUserData.vss file in any word processor and locate group 1 in the getUserString function.
3. Using the next available sequential number, add the new **Units** to the end of the list (in this example, Yards). Enclose the name in single quotes and put a semi-colon at the end of the line. The new line should read:

6: getUserString := 'Yards';

4. Locate group 2 in the getUserString function.
5. Using the next available sequential number, add the new **Units** to the end of the list. (In this example, type yard in the singular form; this value is used in certain output for the **Simple Beam** command and must have an entry corresponding to the same item in group 1).

Enclose the name in single quotes and put a semi-colon at the end of the line. The new line should read:

6: getUserString := 'Yard';

```
FUNCTION getUserString (group, item : INTEGER) : STRING;
BEGIN
    CASE group OF
        (* Spring Calculator - Units (items 1, 3 and 4 only *)
        (* Shaft Analysis - Outside Diameter *)
        (* Simple Beam: Beam Properties - Beam Length *)
        (* Simple Beam: Beam Properties - Deflection Units *)
        1: BEGIN
            CASE item OF
                1: getUserString := 'Inches';
                2: getUserString := 'Feet';
                3: getUserString := 'mm';
                4: getUserString := 'cm';
                5: getUserString := 'Meters';
                6: getUserString := 'Yards';
            END; (of CASE item)
        END; (of group = 1)

        (* Simple Beam *)
        (* Note: These values are the singular form of the values in group 1 and are only used
        for output. There are no data units associated with this group *)
        2: BEGIN
            CASE item OF
                1: getUserString := 'Inch';
                2: getUserString := 'Foot';
                3: getUserString := 'mm';
                4: getUserString := 'cm';
                5: getUserString := 'Meter';
                6: getUserString := 'Yard';
            END; (of CASE item)
        END; (of group = 2)
    END;
```

6. Locate group 1 in the getUserData function.
7. Using the next available sequential number, add the new **Units** to the end of the list (in this example, units per inch of a yard: 1/36). The sequential number added here must correspond to the number added in the getUserString function. Put a semi-colon at the end of the line; do not enclose the name in single quotes. The new line should read:

6: getUserData := 1/36;

8. Change the value of item 0 to the new group number, which indicates the number of available values (in this example, 6).

```

FUNCTION getUserData (group, item : INTEGER) : REAL;
BEGIN
    CASE group OF
        (* Spring Calculator - Units (items 1, 3 and 4 only *)
        (* Shaft Analysis - Outside Diameter *)
        (* Simple Beam: Beam Properties - Beam Length *)
        (* Simple Beam: Beam Properties - Deflection Units *)
        (* Units = units per inch *)
        1: BEGIN
            CASE item OF
                0: getUserData := 6;
                1: getUserData := 1;
                2: getUserData := 1/12;
                3: getUserData:= 25.4;
                4: getUserData:= 2.54;
                5: getUserData:= 0.0254;
                6: getUserData:= 1/36;
            END;
            (of CASE item)
        END;
        (of group = 1)
    END;
END;

```

9. Save the file. The next time the **Simple Beam** command is used, the new item is available in the Beam Properties dialog box.

This change also affects the Shaft properties of the **Shaft Analysis** command. These values are also used by the Spring Calculator Units, but only items 1, 3, and 4 are applicable, so the new units (Yards) will not show up in this field.

Resources



VectorWorks includes many resources designed to facilitate project setup and use.

Object Libraries

Product: Architect, Landmark, Spotlight, and Machine Design

Extensive object libraries are included with VectorWorks Architect, Landmark, Machine Design, and Spotlight. A subset of these resources are also available by default at the point of use (see “VectorWorks Design Series Default Resources” on page 570).

See “Accessing Existing Resources” on page 147 in the VectorWorks Fundamentals User’s Guide for information on inserting resources.

The following table lists all object libraries and the product(s) to which they belong, using these product abbreviations: A = Architect, L = Landmark, M = Machine Design, S = Spotlight, D = Designer.

Object Library	A	L	M	S	D
Hatches					
Hatches_Paving Patterns.vwx		X			X
Hatches_Paver Patterns-Unilock.vwx		X			X
Hatches_Plant.vwx		X			X
Image Fills					
Image Fills_Forbo Flooring-Artoleum.vwx	X				X
Image Fills_Forbo Flooring-Marmoleum.vwx	X				X
Image Fills_Wood-Arcitex.vwx	X				X
Object Sampler					
3rd Party Promotional					
www.caddetails.com	X	X	X	X	X
Objects - Imperial					
00_Arch_Elements.vwx	X				X
00_Detail_LG_Metal Framing.vwx	X				X
00_Entourage_Figures.vwx	X	X		X	X
00_Entourage_Vehicles.vwx	X	X		X	X
02_Sitework_Game Fields.vwx	X	X			X
02_Sitework_Irrigation Drip Emitters.vwx		X			X
02_Sitework_Irrigation Heads.vwx		X			X
02_Sitework_Irrigation Pipe.vwx		X			X
02_Sitework_Lighting.vwx	X	X			X
02_Sitework_Parking and Road.vwx	X	X			X

Object Library	A	L	M	S	D
02_Sitework_Site Furnishings.vwx	X	X			X
02_Sitework_Trees.vwx	X	X			X
03_Concrete_Foundation.vwx	X				X
06_Millwork_Cabinets.vwx	X				X
08_Doors_Hinged.vwx	X				X
08_Doors_Overhead.vwx	X				X
08_Doors_Patio.vwx	X				X
08_Marvin Doors.vwx	X				X
08_Marvin Windows-Clad.vwx	X				X
08_Marvin Windows-Integrity.vwx	X				X
08_Marvin Windows-Wood.vwx	X				X
08_Storefronts & Win Walls.vwx	X				X
08_Window_Custom.vwx	X				X
10_Fireplaces.vwx	X				X
10_Fixtures.vwx	X				X
10_Handrails.vwx	X				X
10_Wall Accessories.vwx	X				X
11_Residential_Appliances.vwx	X				X
11_Residential_Appliances_SubZero.vwx	X				X
11_Residential_Appliances_Wolf.vwx	X				X
11_Restaurant_Equipment.vwx	X				X
12_Furnishings and Scenic Elements.vwx	X			X	X
12_Furniture_Desks.vwx	X				X
12_Furniture_HMI-Modern Classics.vwx	X				X
12_Furniture_Knoll.vwx	X				X
12_Furniture_Misc.vwx	X				X
12_Furniture_Systems.vwx	X				X
12_Furniture_Systems_HMI-Typicals.vwx	X				X
13_Fire_Suppression.vwx	X				X
14_Elevators & Escalators.vwx	X				X
14_Ramps.vwx	X	X			X
14_Stairs.vwx	X	X			X
15_HVAC_Diffusers.vwx	X				X

Object Library	A	L	M	S	D
15_HVAC_Ductwork.vwx	X				X
15_HVAC_Equipment.vwx	X				X
15_Plumbing_Fittings.vwx	X				X
15_Plumbing_Fixtures.vwx	X				X
15_Plumbing_Kohler-Baths.vwx	X				X
15_Plumbing_Kohler-Bidets.vwx	X				X
15_Plumbing_Kohler-Faucets.vwx	X				X
15_Plumbing_Kohler-Lavatory Sinks.vwx	X				X
15_Plumbing_Kohler-Showers.vwx	X				X
15_Plumbing_Kohler-Sinks.vwx	X				X
15_Plumbing_Kohler-Toilets.vwx	X				X
15_Plumbing_Kohler-Whirlpools.vwx	X				X
15_Plumbing_Piping.vwx	X				X
16_Electrical_Accurate_Lamps.vwx	X				X
16_Electrical_Lighting.vwx	X				X
16_Electrical_Panels.vwx	X				X
16_Power Devices.vwx	X				X
16_Telecomm Devices.vwx	X				X
Objects - Metric					
02_Detail_LG_Metal Framing.vwx	X				X
16_Concrete_Foundation.vwx	X				X
24_Stairs.vwx	X	X			X
31_Storefronts & Win Walls.vwx	X				X
31.4_Window_Custom.vwx	X				X
31.4_Window_Jeld-Wen.vwx	X				X
31.4_Window_Standard.vwx	X				X
31.5_Doors_Hinged.vwx	X				X
31.5_Doors_Overhead.vwx	X				X
31.5_Doors_Sliding.vwx	X				X
34_Handrails.vwx	X				X
62_Electrical Panels.vwx	X				X
62_Power Devices.vwx	X				X
66_Lifts & Escalators.vwx	X				X

Object Library	A	L	M	S	D
72_Furniture_Misc.vwx	X				X
72.3_Furniture_Knoll.vwx	X				X
72.3_Furniture_Systems.vwx	X				X
73_Kitchen Furniture.vwx	X				X
73.4_Residential_Appliances.vwx	X				X
74_Sanitary_Fittings.vwx	X				X
77_Wall Accessories.vwx	X				X
90.4_Sitework_Game Fields.vwx	X	X			X
90.4_Sitework_Parking and Road.vwx	X				X
90.4_Sitework_Trees.vwx	X	X			X
90.6_Sitework_Lighting.vwx	X				X
90.7_Sitework_Site Furnishings.vwx	X				X
98_Entourage_Figures.vwx	X	X		X	X
98_Entourage_Vehicles.vwx	X	X		X	X
U3_Ramps.vwx	X	X			X
Objects-Spotlight-Imperial					
Accessories Imp.vwx				X	X
Altman Imp.vwx				X	X
ARRI Imp.vwx				X	X
Audio Imp.vwx				X	X
Chroma Q Imp.vwx				X	X
City Theatrical Imp.vwx				X	X
Clay Paky Imp.vwx				X	X
Coemar Imp.vwx				X	X
ESP Symbols I(3D Only).vwx				X	X
ETC Imp.vwx				X	X
Hardware Imp.vwx				X	X
High End Imp.vwx				X	X
Lighting Positions Imp.vwx				X	X
LSD-Icon Imp.vwx				X	X
Lycian Imp.vwx				X	X
Martin Imp.vwx				X	X
Mole-Richardson Imp.vwx				X	X

Object Library	A	L	M	S	D
Morpheus Imp.vwx				X	X
NSI Colortran Imp.vwx				X	X
Powerline Imp.vwx				X	X
Robert Juliat Imp.vwx				X	X
Scenic Elements.vwx				X	X
Selecon Imp.vwx				X	X
Steel Shapes Imp.vwx				X	X
Strand Imp.vwx				X	X
Strong Imp.vwx				X	X
USITT Imp.vwx				X	X
Varilite Imp.vwx				X	X
Wybron Imp.vwx				X	X
Xenotech Imp.vwx				X	X
Objects-Spotlight-Metric					
Accessories Metric.vwx				X	X
Altman Metric.vwx				X	X
ARRI Metric.vwx				X	X
Audio Metric.vwx				X	X
Chroma Q Metric.vwx				X	X
City Theatrical Metric.vwx				X	X
Clay Paky Metric.vwx				X	X
Coemar Metric.vwx				X	X
ESP Symbols M(3D Only).vwx				X	X
ETC Metric.vwx				X	X
Hardware Metric.vwx				X	X
High End Metric.vwx				X	X
Lighting Positions Metr.vwx				X	X
LSD-Icon Metric.vwx				X	X
Lycian Metric.vwx				X	X
Martin Metric.vwx				X	X
Mole-Richardson Metric.vwx				X	X
Morpheus Metric.vwx				X	X
NSI Colortran Metric.vwx				X	X



Object Library	A	L	M	S	D
Powerline Metric.vwx				X	X
Robert Juliat Metric.vwx				X	X
Scenic Elements.vwx				X	X
Selecon Metric.vwx				X	X
Steel Shapes Metric.vwx				X	X
Strand Metric.vwx				X	X
Strong Metric.vwx				X	X
USITT Metric.vwx				X	X
Varilite Metric.vwx				X	X
Wybron Metric.vwx				X	X
Xenotech Metric.vwx				X	X
Plants					
Plant Objects		X			X
Xfrog Plant Images		X			X
Artistic (28 files)		X			X
Grayscale (12 files)		X			X
Photorealistic (31 files)		X			X
Silhouettes-black and white (12 files)		X			X
Textures					
Textures_Forbo Flooring-Artoleum.vwx	X				X
Textures_Forbo Flooring-Marmoleum.vwx	X				X
Textures-Gobo					
Various gobo texture files				X	X
Wall Styles					
Wall Styles Imperial.vwx	X				X
Wall Styles Metric.vwx	X				X

VectorWorks Design Series Default Resources

Product: Architect, Landmark, Spotlight, and Machine Design

A variety of default resources are available in VectorWorks Fundamentals and additional industry-specific resources are available in the VectorWorks Design Series. See “VectorWorks Fundamentals Default Resources” on page 141 in the VectorWorks Fundamentals User’s Guide.

Default resources are a subset of all available resources (see “Object Libraries” on page 565) and represent some of the more commonly-used resources. Default resources are available at the point of use throughout the drawing process,

and are listed beneath the current file's resources. This provides immediate access to resources needed while drawing, without having to first add them to the current file through the Resource Browser.

The following table lists VectorWorks Design Series default resources and the product(s) to which they belong, using these product abbreviations: A = Architect, L = Landmark, M = Machine Design, S = Spotlight, D = Designer.

Default Resource	Location	A	L	M	S	D
Architectural worksheets	Libraries\Defaults\Reports~Schedules	X				X
Color palettes	Libraries\Defaults\Color Palettes	X	X	X	X	X
Door custom leaves	Libraries\Defaults\Door - Custom Leaves	X	X			X
Door hardware	Libraries\Defaults\Door - Hardware	X	X			X
Gobo textures	Libraries\Defaults\Lighting Instrument - Gobos				X	X
Hardscape hatches	Libraries\Defaults\Hardscape - Hatches		X			X
Human figure textures	Libraries\Defaults\Human Figure - Textures	X	X		X	X
HVAC worksheets	Libraries\Defaults\Reports~Schedules	X				X
Irrigation worksheets	Libraries\Defaults\Reports~Schedules		X			X
Lighting instrument symbols	Libraries\Defaults\Lighting Instrument - Symbols				X	X
Plant hatches	Libraries\Defaults\Plants - Hatches		X			X
Plant lists	Libraries\Defaults\Reports~Schedules		X			X
Plant symbols	Libraries\Defaults\Plant Defaults		X			X
Repetitive unit symbols	Libraries\Defaults\Repetitive Unit	X	X			X
Seating layout seat symbols	Libraries\Defaults\Seating Layout - Symbols	X			X	X
Section markers	Libraries\Defaults\Section - Markers	X	X	X	X	X
Sketch Styles	Libraries\Defaults\Sketch Styles	X	X	X	X	X
Spotlight schedules	Libraries\Defaults\Reports~Schedules				X	X
Stairs	Libraries\Defaults\Stairs	X	X	X	X	X
Tile symbols	Libraries\Defaults\Tile - Symbols	X	X			X
Title blocks (ASME, custom, and standard)	Libraries\Defaults\Drawing Border - Title Blocks	X	X	X	X	X
Toilet stall fixture symbols	Libraries\Defaults\Toilet Stall - Fixtures	X				X
Wall styles	Libraries\Defaults\Walls	X				X
Window shutters	Libraries\Defaults\Window - Custom Shutters	X	X			X



Reserved Names

Product: Landmark

There are a number of words that are reserved for specific use within VectorWorks Landmark. These words should not be used to name objects or symbols.

- 2D Contours to 3D Polys
- DTM Mod Record
- Elev Analysis
- ID Label
- LineLength
- None
- Polyline ID
- Raise/Lower Record
- Saved Sheets
- Site-DTM-Modifier
- Stake #
- Station Worksheet
- Symbol List Sym
- VW_Land-Invisible
- BADSHEET678
- Data
- Fit To Objects
- Irrigation Head
- Mod-Guidelines
- Place Plant
- Project Plant List
- Roadway (Curved)
- Setup Record
- Site-Improvement-Spec
- Stake Object
- Survey Data
- Symbol to Group
- Vegetation line
- Cut N Fill DTM
- Drawing Border
- Guides
- Landscape-Plant
- Mod-Site-Civil
- Plant Record
- Project Symlst
- Roadway (Straight)
- Sheet-Common
- Slope Analysis
- Stake Record
- Symbol List
- VL Task Manager
- ZVI Analysis

Menus and Tool Sets

VectorWorks Architect Workspace

Product: Architect

When a VectorWorks Design Series product is launched by double-clicking the application in Explorer (Windows) or Finder (Macintosh), the Default.sta template file opens with predefined settings which vary slightly between products.

If only one Design Series product is installed, the default template file for that product is loaded. If multiple Design Series products are installed, the VectorWorks Architect Default.sta file is loaded. See “Creating a New File” on page 4 in the VectorWorks Fundamentals User’s Guide for information on opening a different template.

The Architect default template opens with the following predefined settings:

- **File > Document Settings > Units** are set to feet and inches on the General Display tab
- Grid lines are not visible
- Design layer scale is 1:48
- Printer setup is set to landscape orientation
- A default wall style is selected (Int-2x4-Framing only) to 96” H
- The default project preference set (Prefs_Def) is selected

Architect shares many of the same menus as VectorWorks while adding several menus and commands. The following table shows menu commands that are in the Architect workspace (**Tools > Architect > Workspace**) but not in the standard VectorWorks workspace:

Submenus and Commands Specific to the Architect Workspace		
File menu Document Settings Document Setup Model Setup Create Standard Viewports Standard Naming Import Import IFC Import PDF Import 3DS (3D only) Import SketchUp Export Export IFC Project Export IFC Object Export PDF Export PDF (Batch) Export 3DS (3D only) Export KML (3D only) Issue Manager Batch Print View menu Rendering Sketch Sketch Options Rotate Plan Align Layer Views Stack Layers Stack Layer Options Create Section Viewport Modify menu Tile Convert Objects from Polyline Convert to Viewport	Model menu Create Solar Animation AEC menu Fit Walls to Roof Space Planning Model to Floorplan Import Adjacency Matrix Create Spaces from Polys Create Spaces from Walls Create Walls from Spaces Update Space Boundaries Export DOE-2 Dimension Exterior Walls Terrain Create Site Model Filter 3D Polygons Validate 3D Data Site Model Section Send to Surface Survey Input Import Survey File 2D Polys to 3D Contours Grid Method Entry Create IFC Entity IFC Data Create Seating Layout Framing Simple Beam Calculator Create Joists from Poly Wall Framer Roof Framer Electrical Conduit Sizing Calc Conductor Sizing Calc Create Piping Runs	Tools menu Task Manager Class and Layer Mapping Reports Create Panel Schedule Create Panel Riser Diag VA Records and Schedules VA Create Record VA Create Schedule Create Drawing List Create Rm Finish Legend Scripts VS Compiler Mode Utilities Set Default Symbol Class Options VA Set Project Prefs Workspaces Architect Text menu Convert Old Notes to New Add Text to Database Reconcile Notes Redlines Show or Hide Redlines Pick up Redline Restore Redline Create Redline Status WS Window menu Palettes Navigation



Architect-specific Tool Sets

Product: Architect

The Architect workspace contains the standard VectorWorks tool palettes and tool sets, including 2D and 3D tools. In addition, there are tool sets and tools unique to Architect.

The **Hole Pattern** tool is documented only in the VectorWorks help system, in the Design Series volume. This tool is indicated with an asterisk (*) in the following table.

Tool Sets and Tools Specific to the Architect Workspace		
MEP tool set Ceiling Grid tool Circuiting tool Comm Device Edit Circuiting tool HVAC Damper HVAC Diffuser HVAC Elbow Duct HVAC Flex Duct HVAC Outlet HVAC Splitter HVAC Straight Duct HVAC Transition HVAC Vertical Duct HVAC Vertical Elbow Incandescent Fixture Piping Piping Connection Piping Run Receptacle Switch	Building Shell tool set Chain Extrude Column Component Join tool Door Drilled Footing Duplicate Symbol in Wall Escalator Mullion Pilaster Ramp Remove Wall Breaks tool Round Wall tool Simple Elevator Space Stair Wall tool Wall Join tool Window Window Wall (Curved, Straight)	Furn/Fixtures tool set Base Cabinet Bath-Shower Ceiling Grid tool Clothes Rod Compartment Sink Counter Top Desk Fireplace Grab Bars Handrail (Curved, Straight) Seating Layout Shelving Unit Table and Chairs Toilet Stall Utility Cabinet Wall Cabinet Workstation Counter Workstation Overhead Workstation Panel Workstation Pedestal



Tool Sets and Tools Specific to the Architect Workspace		
Detailing tool set Bolt and Nut (inch and mm) Detail Cut Wood Framing Member tool *Hole Pattern J-Bolt Joist Linear Material Pipe Fitting Repetitive Unit Space Planning tool set Adjacency Matrix Adjacency Score Space Space Link tool Stacking Diagram	Site Planning tool set Campanile Guardrail (Curved, Straight) Massing Model Parking Spaces Property Line tool Roadway (Curved, NURBS, Straight, Tee) Site Modifiers Stake Object Visualization tool set Human Figure tool Model View tool	Dims/Notes tool set Elevation Benchmark General Notes tool Grid Bubble ID Label tool North Arrow Redline tool Revision Marker Slope Dimension Stipple

VectorWorks Landmark Workspace

Product: Landmark

When a VectorWorks Design Series product is launched by double-clicking the application in Explorer (Windows) or Finder (Macintosh), the Default.sta template file opens with predefined settings which vary slightly between products.

If only one Design Series product is installed, the default template file for that product is loaded. If multiple Design Series products are installed, the VectorWorks Architect Default.sta file is loaded. See “Creating a New File” on page 4 in the VectorWorks Fundamentals User’s Guide for information on opening a different template.

The Landmark default template opens with the following predefined settings:

- **File > Document Settings > Units** are set to feet and inches on the General Display tab
- Grid lines are not visible
- Design layer scale is 1:48
- Printer setup is set to landscape orientation

Landmark shares many of the same menus as VectorWorks while adding several menus and commands. The following table shows menu commands that are in the Landmark workspace (**Tools > Workspace > Landmark**) but not the standard VectorWorks workspace:

Submenus and Commands Specific to the Landmark Workspace		
File menu Document Settings <ul style="list-style-type: none"> Document Setup Model Setup Create Standard Viewports Standard Naming Import <ul style="list-style-type: none"> Import PDF Import Shapefile Import 3DS (3D only) Import SketchUp Export <ul style="list-style-type: none"> Export PDF Export PDF (Batch) Export Shapefile Export 3DS (3D only) Export KML (3D only) Issue Manager Batch Print View menu Rendering <ul style="list-style-type: none"> Sketch Sketch Options Rotate Plan Create Section Viewport Show <ul style="list-style-type: none"> Show or Hide Plant Styles Show or Hide Site Modifiers Show or Hide Spray Pattern Modify menu Tile Convert <ul style="list-style-type: none"> Objects from Polyline Convert to Viewport 	Model menu Create Solar Animation Landmark menu Create New Plant VW Plants Database Choose VW Plants Change Plant Grouping Plant Line Vegetation Line Survey Input <ul style="list-style-type: none"> Import Survey File 2D Polys to 3D Contours 3D Polys to 3D Loci Grid Method Entry Create Site Model Filter 3D Polygons Validate 3D Data Create Fence from Pad Site Model Section Send to Surface Zone of Visual Influence Roads <ul style="list-style-type: none"> Station on Polyline Align Stakes Vertically Create Road from Stakes AEC <ul style="list-style-type: none"> Simple Beam Calculator 	Tools menu Task Manager Class and Layer Mapping Scripts <ul style="list-style-type: none"> VS Compiler Mode Utilities <ul style="list-style-type: none"> Set Default Symbol Class Workspaces <ul style="list-style-type: none"> Landmark Text menu Convert Old Notes to New Add Text to Database Reconcile Notes Redlines <ul style="list-style-type: none"> Show or Hide Redlines Pick up Redline Restore Redline Create Redline Status WS Window menu Palettes <ul style="list-style-type: none"> Navigation



Landmark-specific Tool Sets

Product: Landmark

The Landmark workspace contains the standard VectorWorks tool palettes and tool sets, including 2D and 3D tools. In addition, there are tools unique to Landmark.

Tool Sets and Tools Specific to the Landmark Workspace		
Site Planning tool set Campanile Drip Emitter Guardrail (Curved, Straight) Hardscape Irrigation Head Irrigation Line Landscape Wall (Straight, Arc, Bézier) Massing Model Parking Spaces Place Plant Property Line tool Roadway (Curved, NURBS, Straight, Tee) Site Modifiers Stake Object Visualization tool set Human Figure tool Model View tool	Building Shell tool set Chain Extrude Column Component Join tool Door Duplicate Symbol in Wall Ramp Remove Wall Breaks tool Round Wall tool Stair Wall tool Wall Join tool Window Detailing tool set Detail Cut Wood J-Bolt Linear Material Repetitive Unit	Furn/Fixtures tool set Base Cabinet Desk Handrail (Curved, Straight) Shelving Unit Table and Chairs Utility Cabinet Wall Cabinet Workstation Counter Workstation Overhead Workstation Panel Workstation Pedestal Dims/Notes tool set Elevation Benchmark General Notes tool Grid Bubble North Arrow ID Label tool Redline tool Revision Marker Slope Dimension Stipple

VectorWorks Spotlight Workspace

Product: Spotlight

When a VectorWorks Design Series product is launched by double-clicking the application in Explorer (Windows) or Finder (Macintosh), the Default.sta template file opens with predefined settings which vary slightly between products.

If only one Design Series product is installed, the default template file for that product is loaded. If multiple Design Series products are installed, the VectorWorks Architect Default.sta file is loaded. See “Creating a New File” on page 4 in the VectorWorks Fundamentals User’s Guide for information on opening a different template.



The Spotlight default template opens with the following predefined settings:

- **File > Document Settings > Units** are set to feet and inches on the General Display tab
- Grid lines are not visible
- Design layer scale is 1:48
- Printer setup is set to landscape orientation

Spotlight shares many of the same menus as VectorWorks while adding several menus and commands. The following table shows menu commands that are in the Spotlight workspace (**Tools > Workspace > Spotlight**) but not the standard VectorWorks workspace:

Submenus and Commands Specific to the Spotlight Workspace		
File menu Import Import Instrument Data Import PDF Import 3DS (3D only) Import SketchUp Export Export ASCII Patch Export Instrument Data Export PDF Export PDF (Batch) Export 3DS (3D only) Export KML (3D only) Batch Print View menu Rendering Sketch Sketch Options Rotate Plan Create Section Viewport	Modify menu Find and Modify Number Instruments Focus Instruments Assign Legend to Insts Replace Instrument Refresh Instruments Convert Convert to Instrument Convert to Accessory Convert to MultiCircuit Convert to Light Position Objects from Polyline Create Gobo Texture Convert to Viewport Model menu Manage Scenes Animate Scenes AEC menu Create Seating Layout Simple Beam Calculator	Tools menu Label Legend Manager Reports Generate Paperwork Key to Instrumentation Scripts VS Compiler Mode Options Toggle Auto Numbering Workspaces Spotlight Text menu Convert Old Notes to New Add Text to Database Reconcile Notes Redlines Show or Hide Redlines Pick up Redline Restore Redline Create Redline Status WS Window menu Palettes Navigation

Spotlight-specific Tool Sets

Product: Spotlight

The Spotlight workspace contains the standard VectorWorks tool palettes and tool sets, including 2D and 3D tools. In addition, there are tool sets and tools unique to Spotlight.



Tools in the Detailing and Hardware tool sets are documented only in the VectorWorks help system, in the Design Series volume. These tools are indicated with an asterisk (*) in the following table.

Tool Sets and Tools Specific to the Spotlight Workspace		
Spotlight tool set Accessory Insertion tool Align and Distribute Items Curtain Object Curved Truss Focus Point tool Ganging tool Inst Insertion tool Light Position Obj Photo Grid Photometer Straight Truss	Building Shell tool set Campanile Chain Extrude Column Door Duplicate Symbol in Wall Parking Spaces Ramp Remove Wall Breaks tool Round Wall tool Stair Wall tool Wall Join tool Window Detailing tool set *Hole - Drilled - 2D, 3D *Hole - Tapped (Inch, Metric) Dims/Notes tool set General Notes tool North Arrow Redline tool Stipple	Hardware tool set *Ball Bearing *Cap Screw (Inch, Metric) *Compression Spring 1 *Extension Spring - Front *Flanged Bearing - 2 Hole, 4 Hole *Hex Bolt (Inch, Metric) *J-Bolt *Lock Washer (Inch, Metric) *Machine Screw (Inch, Metric) *Nut (Inch, Metric) *Pillow Block *Plain Washer (Inch, Metric) *Roller Chain - Circular, Linear, Offset Link *Sprocket *Spur Gear *U-Bolt Visualization tool set Human Figure tool
Furn/Fixtures tool set Base Cabinet Desk Seating Layout Shelving Unit Table and Chairs Utility Cabinet Wall Cabinet Workstation Counter Workstation Overhead Workstation Panel Workstation Pedestal		

VectorWorks Machine Design Workspace

Product: Machine Design

When a VectorWorks Design Series product is launched by double-clicking the application in Explorer (Windows) or Finder (Macintosh), the Default.sta template file opens with predefined settings which vary slightly between products.

If only one Design Series product is installed, the default template file for that product is loaded. If multiple Design Series products are installed, the VectorWorks Architect Default.sta file is loaded. See “Creating a New File” on page 4 in the VectorWorks Fundamentals User’s Guide for information on opening a different template.



The Machine Design default template opens with the following predefined settings:

- **File > Document Settings > Units** are set to inches on the General Display tab
- Decimal rounding is set to three decimal places
- Design layer scale is 1:1

Machine Design shares many of the same menus as VectorWorks while adding several menus and commands. The following table shows menu commands that are in the Machine Design workspace (**Tools > Workspace > Machine Design**) but not the standard VectorWorks workspace:

Submenus and Commands Specific to the Machine Design Workspace		
File menu Document Settings Drawing Setup Import Import PartSpec Import PDF Import 3DS (3D only) Import SketchUp Export Export PDF Export PDF (Batch) Export 3DS (3D only) Export KML (3D only) Batch Print View menu Rendering Sketch Sketch Options Rotate Plan Create Section Viewport	Modify menu Convert Convert to Viewport Machine Design menu Create Multiple Views Spring Calculator Shaft Analysis Simple Beam Calculator Draw Cam Diagrams Simple Beam Simple Beam Analysis Conversion Factors Solution of Triangles Belt Length Calculator Chain Length Calculator Control Values for Keys Centroid 3D Properties Create 3D Object from 2D	Tools menu Reports Create Bill of Materials Create Parts List Scripts VS Compiler Mode Utilities Reset All Plug-Ins Workspaces Machine Design Text menu Convert Old Notes to New Add Text to Database Reconcile Notes Redlines Show or Hide Redlines Pick up Redline Restore Redline Create Redline Status WS Window menu Palettes Navigation

Machine Design-specific Tool Sets

Product: Machine Design

The Machine Design workspace contains the standard VectorWorks tool palettes and tool sets, including 2D and 3D tools. In addition, there are tool sets and tools unique to Machine Design.

Many Machine Design tools are documented only in the VectorWorks help system, in the Design Series volume. These tools are indicated with an asterisk (*) in the following table.

Tool Sets and Tools Specific to the Machine Design Workspace		
Hardware Inch/Metric tool set *Acorn Nut (Inch) - 2D, 3D *Clevis Pin (Inch, Metric) - 2D, 3D *Cotter Pin (Inch) - 2D, 3D *Dowel Pin (Inch) - 2D, 3D *Eye Bolt - 2D, 3D *Fastener tool (ASME Inch, ASME Metric) - places Lock Washer, Nut, Plain Washer, Screw and Nut, Set Screw, Shoulder Screw - 2D, 3D *J-Bolt - 2D, 3D *Knurled Thumb Nut (Inch) - 2D, 3D *Retaining Ring (ASME) - 2D, 3D *Rivet - Small, Large (Inch) - 2D, 3D *Swing Bolt - 2D, 3D *Swing Eye Bolt - 2D, 3D *T-Bolt - 2D, 3D *Taper Pin (Inch) - 2D, 3D *Thumb Screw (Inch) - 2D, 3D *U-Bolt - 2D, 3D *Wing Nut - Type A, B, C, D (Inch) - 2D, 3D Welding Symbols tool set *Leader Line *Surface Texture Symbol *Welding Sym-Fillet, Flange, Groove, Misc, Slot-Plug (AWS, ISO)	Hardware ISO/DIN tool set *Clevis Pin (DIN) - 2D, 3D *Fastener tool (DIN, ISO) - places Lock Washer, Nut, Plain Washer, Screw and Nut, Set Screw, Shoulder Screw - 2D, 3D *Hex Cap Nut (DIN) - 2D, 3D *Knurled Thumb Nut (DIN) - 2D, 3D *Parallel Pin (DIN) - 2D, 3D *Retaining Ring (DIN) - 2D, 3D *Retaining Washer (DIN) - 2D, 3D *Rivet (DIN) - 2D, 3D *Taper Pin (DIN) - 2D, 3D *Tubular Rivet (DIN) - 2D, 3D *Wing Nut (DIN) - 2D, 3D Bearings tool set *Ball Bearing - 2D, 3D *Bearing Lock Nut - 2D, 3D *Flanged Bearing - 2 Hole, 4 Hole - 2D, 3D *Needle Bearing - 2D, 3D *Pillow Block - 2D, 3D *Roller Bearing - 2D, 3D *Tapered Roller Bearing - 2D, 3D *Thrust Bearing - 2D, 3D	Springs tool set *Belleville Spring - 2D, 3D *Compression Spring 1, 2 - 2D, 3D *Conical Compression Spring - 2D, 3D *Die Spring - 2D, 3D *Extension Spring - Front, End - 2D *Extension Spring - 3D *Torsion Spring - Front, End - 2D *Torsion Spring - 3D Machine Components tool set *Bevel Gears - 2D, 3D *Hub - 3D *Key - 2D, 3D *Pulley - 2D, 3D *Roller Chain - Circular, Linear, Offset Link - 2D, 3D *Shaft - 2D, 3D *Sprocket - 2D, 3D *Spur Gear - 2D, 3D *Spur Gear Rack - 2D, 3D *Threaded Shaft - 2D, 3D *Woodruff Key - 2D, 3D *Worm - 2D, 3D *Worm Gear - 2D, 3D

Tool Sets and Tools Specific to the Machine Design Workspace		
Furn/Fixtures tool set Base Cabinet Desk Shelving Unit Table and Chairs Utility Cabinet Wall Cabinet Workstation Counter Workstation Overhead Workstation Panel Workstation Pedestal Detailing tool set *Hole - Drilled - 2D, 3D *Hole - Tapped (Inch, Metric) *Hole Pattern *Keyway *Screw Threads *Shaft Break 2	Building Shell tool set Campanile Column Door Duplicate Symbol in Wall Parking Spaces Ramp Remove Wall Breaks tool Round Wall tool Stair Wall tool Wall Join tool Window Visualization tool set Human Figure tool	Dims/Notes tool set *Center Line Marker Datum Feature Symbol Datum Target Symbol Detail Bubble Feature Control Frame General Notes tool Geom Dim and Tol Note *Material Note North Arrow Redline tool Revision Bubble *Section Note Stipple

VectorWorks Designer

The VectorWorks Designer product is comprised of the combined feature set of Architect, Landmark, Spotlight, and Machine Design. Therefore, it is not necessary to document each individual feature as belonging to Designer. The Designer workspace contains a major subset of the entire combined feature set; the remaining items can be added to the workspace using the Workspace Editor (see “Using the Workspace Editor” on page 719 in the VectorWorks Fundamentals User’s Guide).

VectorWorks Designer shares many of the same menus as VectorWorks while adding several menus and commands. The following table shows menu commands that are in the Designer workspace but not the standard VectorWorks workspace:

Submenus and Commands Specific to the Designer Workspace		
File menu Document Settings Document Setup Model Setup Create Standard Viewports Standard Naming Drawing Setup Import Import IFC Import PartSpec Import PDF Import Shapefile Import 3DS (3D only) Import SketchUp Export Export IFC Project Export IFC Object Export PDF Export PDF (Batch) Export Shapefile Export 3DS (3D only) Export KML (3D only) Issue Manager Batch Print View menu Rendering Sketch Sketch Options Rotate Plan Align Layer Views Stack Layers Stack Layer Options Create Section Viewport	View menu (continued) Show Show or Hide Plant Styles Show or Hide Site Modifiers Show or Hide Spray Pattern Modify menu Tile Convert Objects from Polyline Convert to Viewport Model menu Create Solar Animation AEC menu Space Planning Model to Floorplan Import Adjacency Matrix Create Spaces from Polys Create Spaces from Walls Create Walls from Spaces Update Space Boundaries Export DOE-2 Dimension Exterior Walls Terrain Create Site Model Filter 3D Polygons Validate 3D Data Create Fence from Pad Site Model Section Send to Surface Zone of Visual Influence	AEC menu (continued) Survey Input Import Survey File 2D Polys to 3D Contours 3d Polys to 3D Loci Grid Method Entry Roads Station on Polyline Align Stakes Vertically Create Road from Stakes Plants Create New Plant VW Plants Database Choose VW Plants Change Plant Grouping Plant Line Vegetation Line Create IFC Entity IFC Data Create Seating Layout Framing Simple Beam Calculator Create Joists from Poly Wall Frammer Roof Frammer Electrical Conduit Sizing Calc Conductor Sizing Calc Create Piping Runs Machine Design menu Create Multiple Views Spring Calculator Shaft Analysis Draw Cam Diagrams

Submenus and Commands Specific to the Designer Workspace		
Machine Design menu (continued) Simple Beam Simple Beam Analysis Conversion Factors Solution of Triangles Belt Length Calculator Chain Length Calculator Control Values for Keys Centroid 3D Properties Create 3D Object from 2D Tools menu Task Manager Class and Layer Mapping Reports Create Panel Schedule Create Panel Riser Diag VA Records and Schedules VA Create Record VA Create Schedule Create Drawing List Create Rm Finish Legend Create Bill of Materials Create Parts List	Tools menu (continued) Scripts VS Compiler Mode Utilities Set Default Symbol Class Options VA Set Project Prefs Workspaces Architect Designer Landmark Machine Design Spotlight	Text menu Convert Old Notes to New Add Text to Database Reconcile Notes Redlines Show or Hide Redlines Pick up Redline Restore Redline Create Redline Status WS Window menu Palettes Navigation

Designer-specific Tool Sets

The Designer workspace contains the standard VectorWorks tool palettes and tool sets, including 2D and 3D tools. In addition, there are tool sets and tools unique to Designer.

Many Designer tools are documented only in the VectorWorks help system, in the Design Series volume. These tools are indicated with an asterisk (*) in the following table.

Tool Sets and Tools Specific to the Designer Workspace
Site Planning tool set

Campanile
 Drip Emitter
 Guardrail (Curved, Straight)
 Hardscape
 Irrigation Head
 Irrigation Line
 Landscape Wall (Straight, Arc, Bézier)
 Massing Model
 Parking Spaces
 Place Plant
 Property Line tool
 Roadway (Curved, NURBS, Straight, Tee)
 Site Modifiers
 Stake Object

Hardware ISO/DIN tool set

*Clevis Pin (DIN) - 2D, 3D
 *Fastener tool (DIN, ISO) - places Lock Washer, Nut, Plain Washer, Screw and Nut, Set Screw, Shoulder Screw - 2D, 3D
 *Hex Cap Nut (DIN) - 2D, 3D
 *Knurled Thumb Nut (DIN) - 2D, 3D
 *Parallel Pin (DIN) - 2D, 3D
 *Retaining Ring (DIN) - 2D, 3D
 *Retaining Washer (DIN) - 2D, 3D
 *Rivet (DIN) - 2D, 3D
 *Taper Pin (DIN) - 2D, 3D
 *Tubular Rivet (DIN) - 2D, 3D
 *Wing Nut (DIN) - 2D, 3D

Space Planning tool set

Adjacency Matrix
 Adjacency Score
 Space
 Space Link tool
 Stacking Diagram

Building Shell tool set

Chain Extrude
 Column
 Component Join tool
 Door
 Drilled Footing
 Duplicate Symbol in Wall
 Escalator
 Mullion
 Pilaster
 Ramp
 Remove Wall Breaks tool
 Round Wall tool
 Simple Elevator
 Space
 Stair
 Wall tool
 Wall Join tool
 Window
 Window Wall (Curved, Straight)

Visualization tool set

Human Figure tool
 Model View tool

Furn/Fixtures tool set

Base Cabinet
 Bath-Shower
 Ceiling Grid tool
 Clothes Rod
 Compartment Sink
 Counter Top
 Desk
 Fireplace
 Grab Bars
 Handrail (Curved, Straight)
 Seating Layout
 Shelving Unit
 Table and Chairs
 Toilet Stall
 Utility Cabinet
 Wall Cabinet
 Workstation Counter
 Workstation Overhead
 Workstation Panel
 Workstation Pedestal

Dims/Notes tool set

*Center Line Marker
 Datum Feature Symbol
 Datum Target Symbol
 Detail Bubble
 Elevation Benchmark
 Feature Control Frame
 General Notes tool
 Geometric Dimensioning and Tolerancing Note
 Grid Bubble
 ID Label tool

Tool Sets and Tools Specific to the Designer Workspace		
Dims/Notes tool set (continued) *Material Note North Arrow Redline tool Revision Marker *Section Note Slope Dimension Stipple Detailing tool set Bolt and Nut (inch and mm) Curtain Curved Truss Detail Cut Wood Framing Member tool *Hole - Drilled - 2D, 3D *Hole Pattern *Hole - Tapped (Inch, Metric) J-Bolt Joist *Keyway Linear Material Pipe Fitting Repetitive Unit *Screw Threads *Shaft Break 2 Straight Truss Machine Components tool set *Bevel Gears - 2D, 3D *Hub - 3D *Key - 2D, 3D *Pulley - 2D, 3D	Machine Components tool set (continued) *Roller Chain - Circular, Linear, Offset Link - 2D, 3D *Shaft - 2D, 3D *Sprocket - 2D, 3D *Spur Gear - 2D, 3D *Spur Gear Rack - 2D, 3D *Threaded Shaft - 2D, 3D *Woodruff Key - 2D, 3D *Worm - 2D, 3D *Worm Gear - 2D, 3D MEP tool set Ceiling Grid tool Circuiting tool Comm Device Edit Circuiting tool HVAC Damper HVAC Diffuser HVAC Elbow Duct HVAC Flex Duct HVAC Outlet HVAC Splitter HVAC Straight Duct HVAC Transition HVAC Vertical Duct HVAC Vertical Elbow Incandescent Fixture Piping Piping Connection Piping Run Receptacle Switch	Bearings tool set *Ball Bearing - 2D, 3D *Bearing Lock Nut - 2D, 3D *Flanged Bearing - 2 Hole, 4 Hole - 2D, 3D *Needle Bearing - 2D, 3D *Pillow Block - 2D, 3D *Roller Bearing - 2D, 3D *Tapered Roller Bearing - 2D, 3D *Thrust Bearing - 2D, 3D Hardware Inch/Metric tool set *Acorn Nut (Inch) - 2D, 3D *Clevis Pin (Inch, Metric) - 2D, 3D *Cotter Pin (Inch) - 2D, 3D *Dowel Pin (Inch) - 2D, 3D *Eye Bolt - 2D, 3D *Fastener tool (ASME Inch, ASME Metric) - places Lock Washer, Nut, Plain Washer, Screw and Nut, Set Screw, Shoulder Screw - 2D, 3D *J-Bolt - 2D, 3D *Knurled Thumb Nut (Inch) - 2D, 3D *Retaining Ring (ASME) - 2D, 3D *Rivet - Small, Large (Inch) - 2D, 3D *Swing Bolt - 2D, 3D *Swing Eye Bolt - 2D, 3D *T-Bolt - 2D, 3D *Taper Pin (Inch) - 2D, 3D *Thumb Screw (Inch) - 2D, 3D *U-Bolt - 2D, 3D *Wing Nut - Type A, B, C, D (Inch) - 2D, 3D

Tool Sets and Tools Specific to the Designer Workspace		
Springs tool set *Belleville Spring - 2D, 3D *Compression Spring 1, 2 - 2D, 3D *Conical Compression Spring - 2D, 3D *Die Spring - 2D, 3D *Extension Spring - Front, End - 2D *Extension Spring - 3D *Torsion Spring - Front, End - 2D *Torsion Spring - 3D	Welding Symbols tool set *Leader Line *Surface Texture Symbol *Welding Sym-Fillet, Flange, Groove, Misc, Slot-Plug (AWS, ISO)	

VectorWorks includes many standards designed to facilitate project setup and use, including standards, preference sets, and auto-classing objects.

Layer, Class, and Viewport Standards

Product: Architect and Landmark

VectorWorks Architect and Landmark standards are centered around the concept of viewports on sheet layers. A project file contains a number of viewports; each viewport consists of a particular combination of visible layers and classes.

This section provides information about the viewport, layer, and class standards in VectorWorks Architect and Landmark. Modifying these standards is not recommended, as it requires a large effort to manage and coordinate standards information.

Using the Layermap Worksheet

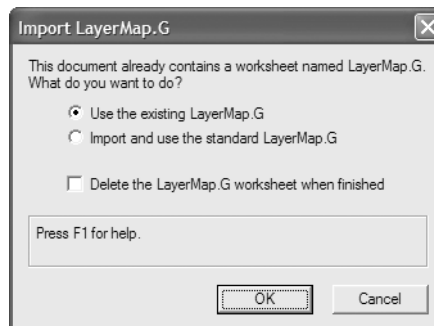
Product: Architect and Landmark

The creation of layers, classes, and viewports or views by the Setup commands (**Model Setup**, **Create Standard Viewports**, and **Standard Naming**) is controlled through the use of the worksheet LayerMap.G, in the **VA Setup Data-Imperial.vwx** or **VA Setup Data-Metric.vwx** file ([VectorWorks]\Plug-ins\Common\Data). This worksheet contains the predefined class, layer, attribute, and visibility information needed to generate a completely ready-to-use project file at any scale or level of complexity.

The LayerMap.G worksheet applies to viewports on sheet layers created with the **Create Standard Viewports** command, or views created with the **Create Corresponding View for Each Viewport** option in the Create Standard Viewports dialog box.

The settings in the LayerMap.G worksheet are automatically applied when a new file is opened and one of the Setup commands is selected. If the LayerMap.G worksheet contained in the **VA Setup Data-Imperial.vwx** or **VA Setup Data-Metric.vwx** file is edited, all sheets created on that machine will use the new standards. However, a copy of the LayerMap.G worksheet can be included in a file (by importing it) and edited there. These custom settings will supersede any automated settings for that file only. This is a convenient way of sharing standards between offices and users, without modifying the default standards on an individual machine.

If a VectorWorks file contains a LayerMap.G worksheet, when either the **Create Standard Viewports** or **Model Setup** commands are selected, the Import LayerMap.G dialog box opens. Specify which worksheet to use.





Parameter	Description
Use the existing LayerMap.G	Uses the LayerMap.G worksheet present in the file rather than the standard worksheet
Import and use the standard LayerMap.G	Uses the standard LayerMap.G worksheet (from the VA Setup Data.vwx file) rather than the imported (custom) worksheet
Delete the LayerMap.G worksheet when finished	Deletes the imported LayerMap.G worksheet from the file; this is recommended when using the standard worksheet

The Layermap Worksheet

Product: Architect and Landmark

The Layermap worksheet, located in the **VA Setup Data-Imperial.vwx** or **VA Setup Data-Metric.vwx** file, begins with a listing of project types in the first six rows (before the LayerMap.G row). These project types are used by the legacy command **Create Standard Views**, and are not used by the current setup commands. As such, they are no longer supported.

Following the legacy project types are the names of the viewports or views used by the current setup commands. Below the name is the viewport/view type, which controls under which drawing type the viewport/view appears in the Create Standard Viewports dialog box.

After the project types section is the layers section. This section of the Layermap worksheet controls the initialization and setup of layers in a specific viewport/view. Based on the information in this section, the **Create Standard Viewports** command generates a complete array of layers with the proper settings to correctly display a viewport or view.

Viewport/view names (the full name can be viewed in the formula bar)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	
1	▶ Residential Remodel	*		*	*														*	*	*	*	
2	▶ New Residence	*		*	*													*	*	*	*	*	
3	▶ Small Commercial	*	*	*	*							*		*				*	*	*	*	*	
4	▶ Large Commercial/Insti	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
5	▶ Tenant Finish Plan	*																					
6	▶ Interior Design																						
7	▶ LayerMap.G	Cover Sheet	DTM Data	Schem S	Site Plan (G	Top Sto	Sit	Ro	Env	Tre	Lan	Irrig	Sit	Zon	Par	Sit	Sit	Fo	Flr	Ro	Str		
8	▶ Layers:	N	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	L	1	M	1	L
9	▶ Mod-Guidelines																		V	V	V		
10	▶ Mod-Site-Arch			A	A	G	G	G	G	G	G	G	G	G	A	A	A						
11	▶ Mod-Slab-#																			V			
12	▶ Mod-Floor-#																			V			
13	▶ Mod-Ceiling-#																						
14	▶ Mod-Roof																				V		
15	▶ Mod-Enlarged Plan-#																						

Layers section

Layer visibility settings

The final section in the Layermap worksheet is the classes section. This section controls class setup and initialization for each viewport/view. As with the layer section, the Setup commands use the information to generate a full class setup configuration for each viewport/view in a project file.



40 ▶	Classes:	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	PF	LW	LS	FPat	Fill Fore	Fill B
41 ▶	Area-Main																		BL	10	2			
42 ▶	Area-Patterns																		BL	10	2			
43 ▶	Area-Spec																		BK	10	2			
44 ▶	Ceiling-Fixtures																		GY	10	2			
45 ▶	Ceiling-Main																		BK	10	2			
46 ▶	Ceiling-Overhead																		GY	10	-2			
47 ▶	Ceiling-Spec																		GY	10	2			
48 ▶	Controls																		OR	10	2			
49 ▶	DataComm-Devices																		OR	10	2			
50 ▶	DataComm-Spec																		BK	10	2			
51 ▶	Demolition																		RE	10	-2			
52 ▶	Dimension				V	V	V	V	V	V	V	V	V	V	V	V	V	V	MA	10	2			
53 ▶	Door-Main				V	V													BL	10	2			
54 ▶	Door-Spec																		BK	10	2			
55 ▶	Electrical-Devices					V													RE	10	2			
56 ▶	Electrical-Lighting					V													RE	10	2			

Class visibility settings

Class attribute settings

Viewport/View Types

Product: Architect and Landmark

Viewport/view types are found directly under the viewport/view names in the Layermap worksheet. The identifier directly beneath the viewport/view name indicates its drawing type. Viewport/view types control how the viewport/view is generated, and are used by the **Create Standard Viewports** command to properly configure the project document. The viewport/view type identifier may take on one of the following values:

Identifier	Drawing Type
1	Project plan view/viewport (one viewport/view only)
L	Auxiliary viewport/view (create a user-specified number of viewports/views)
M	Floor plan viewport/view (create one viewport/view for each floor in the project)
N	Notation viewport/view (create a user-specified number of viewports/views)
S	Site plan viewport/view (create one viewport/view)

Residential Remodel	*			*	*		
New Residence	*			*	*		
Small Commercial	*		*	*	*		
Large Commercial/Insti	*		*	*		*	*
Tenant Finish Plan	*						
Interior Design							
LayerMap.G	Cover Sheet	LT	TM Data	Schem S	Site Plan (G	Top	Sto
Layers:	N	S		S	S	S	S
Mod-Guidelines							
Mod-Site-Arch				A	A	G	G
Mod-Slab-#							
Mod-Floor-#							
Mod-Ceiling-#							

The cover sheet is a notation viewport/view



Standard Layer Visibility in Viewports/Views

Product: Architect and Landmark

In the layers section of Layermap worksheet, layer names are listed down the left side of the worksheet in the first column. This listing represents the available layers that can be included in a viewport/view. Layer names that are used when generating multiple layers (e.g., for the floor viewports/views of a multi-floor building) are indicated by a pound sign (#) suffix.

The visibility status of a specific layer is indicated by an alphabetic identifier located in the worksheet cell which cross-references the layer and the viewport/view in which it will be a component. The identifier can take on one of the following values:

Identifier	Meaning
A	Active layer
V	Visible
G	Grayed
I	Invisible
<no value>	Not created for viewport/view; set to invisible if existing

Residential Remodel	*		*	*		
New Residence	*		*	*		
Small Commercial	*	*	*	*		
Large Commercial/Insti	*	*	*		*	*
Tenant Finish Plan	*					
Interior Design						
LayerMap.G	Cover Sheet	DTM Data	Schem S	Site Plan (G	Top Sto	
Layers:	N	S	S	S	S	S
Mod-Guidelines						
Mod-Site-Arch			A	A	G	G
Mod-Slab-#						
Mod-Floor-#						
Mod-Ceiling-#						

The Mod-Site-Arch layer is the active layer in the Site Plan (General) viewport/view

Design Layer Types in the Standards

Product: Architect and Landmark

The Layermap worksheet contains a specialized set of identifiers which control how model design layers are configured for a project file. These identifiers, which are located on the extreme right of the Layermap worksheet opposite the model layers, are used by the Setup commands to correctly configure a set of model layers for the project file.

Model layer type identifiers can take on one of the following values:

Identifier	Meaning
C	Layer w/ ceiling referenced information (one per floor)
F	Foundation layer (one per project)
R	Roof layer (one per project)
S	Slab layer (one per floor)



Identifier	Meaning
W	Layer w/ floor referenced information (one per floor)
<no value>	Supplemental model layer

8	Layers:	N	S	S	S	S	S	S	M	M	M	N	M	M	N	TP
9	Mod-Guidelines															
10	Mod-Site-Arch			A	A	G	G	G								
11	Mod-Slab-#								V	V	V		V	V		S
12	Mod-Floor-#								V	V	V		V	V		W
13	Mod-Ceiling-#												V			C
14	Mod-Roof															R
15	Mod-Enlarged Plan-#															
16	Mod-Elevation-#															
17	Mod-Int Elevation-#															

The Mod-Floor-# layers will be referenced to finish floor level

Class Visibility in the Standards

Product: Architect and Landmark

In the class section of the Layermap worksheet, class names available for inclusion in the viewports/views are listed down the left side of the worksheet in the first column. The visibility of a specific class is indicated by an alphabetic identifier, which is located in the worksheet cell which cross-references the layer and the viewport/view.

The identifier can take on one of the following values:

Identifier	Meaning
V	Visible
G	Grayed
I	Invisible
<no value>	Not created for viewport/view; set to invisible if existing

An explanation of the specific uses of and applications for classes, including AIA layer name equivalents, is provided in PDF format (VA Sheet-Layer-Class stds.pdf) included with Architect and available in [VectorWorks]\Extras.

Default class attributes, such as line style and pen color, are no longer controlled from the Layermap worksheet.

Auto-classing Objects

Product: Architect and Landmark

Certain plug-in objects and symbols have specific default classes, which coordinate with the Layermap worksheet class name standards. The plug-in objects listed here are automatically classed when inserted into a file set up to use auto-classing (when **Enable Auto-classing** is selected in the Standard Naming dialog box); they are set to default class when inserted if the file has not been set up.

Object	Default Class	Product
Base Cabinet	Millwork-Main	Architect
Bath-Shower	Plumbing-Fixtures	Architect
Column	Structural-Columns	Architect, Landmark
Comm Device	DataComm-Devices	Architect
Compartment Sink	Plumbing-Fixtures	Architect
Control Fence	Site-DTM-Modifier	Architect, Landmark
Counter Top	Millwork-Main	Architect
Desk	Furniture-Main	Architect
Door (2D) - threshold, sidelight sashes and glazing, swing, and leaf	Sills	Architect, Landmark
Door (2D) - other components	Door-Main	Architect, Landmark
Door in Wall	Ceiling-Main	Architect, Landmark
Door ID	Door-Spec	Architect, Landmark
Drilled Footing	Structural-Footings	Architect
Drip Emitter	Irrigation-SprayPat	Landmark
Escalator	Vert Trans-Main	Architect
Fireplace	Fixtures-Main	Architect
Grab Bars	Fixtures-Main	Architect
Guardrail (Curved)	Site-Improvements	Architect, Landmark
Guardrail (Straight)	Site-Improvements	Architect, Landmark
Handrail (Curved)	Fixtures-Main	Architect, Landmark
Handrail (Straight)	Fixtures-Main	Architect, Landmark
Hardscape (tag)	Landscape-Spec	Landmark
HVAC Damper	HVAC-Duct/Equipment	Architect
HVAC Diffuser	HVAC-Diffusers	Architect
HVAC Elbow Duct	HVAC-Duct/Equipment	Architect
HVAC Flex Duct	HVAC-Duct/Equipment	Architect
HVAC Outlet	HVAC-Duct/Equipment	Architect
HVAC Splitter	HVAC-Duct/Equipment	Architect
HVAC Straight Duct	HVAC-Duct/Equipment	Architect
HVAC Transition	HVAC-Duct/Equipment	Architect
HVAC Vertical Duct	HVAC-Duct/Equipment	Architect
HVAC Vertical Elbow	HVAC-Duct/Equipment	Architect

Object	Default Class	Product
Irrigation Head	Irrigation-SprayPat	Landmark
Joist	Structural-Framing	Architect
Mullion	Wall-Ext-Glazed	Architect
North Arrow	Notes-Sheet	Architect, Landmark
Pad	Site-DTM-Modifier	Landmark
Parking Spaces	Site-Paving-Marking	Architect, Landmark
Pilaster	Structural-Columns	Architect
Plant (tag)	Landscape-Spec	Landmark
Rafter	Structural-Framing	Architect
Ramp	Vert Trans-Main	Architect, Landmark
Receptacle	Electrical-Devices	Architect
Reference Marker	Notes-Sheet	Architect, Landmark
Revision Marker	Notes-Sheet	Architect, Landmark
Roadway (Bezier)	Site-Paving	Architect, Landmark
Roadway (Curved)	Site-Paving	Architect, Landmark
Roadway (Straight)	Site-Paving	Architect, Landmark
Roadway (Tee)	Site-Paving	Architect, Landmark
Shelving Unit	Furniture-Main	Architect
Simple Elevator	Vert Trans-Main	Architect
Stair	Vert Trans-Main	Architect, Landmark
Switch	Electrical-Devices	Architect
Table and Chairs	Furniture-Main	Architect, Landmark
Texture Beds	Site-DTM-Modifier	Landmark
Toilet Stall	Fixtures-Main	Architect
Utility Cabinet	Millwork-Main	Architect
Wall Cabinet	Millwork-Main	Architect
Window (2D) - sills, sashes, and glazing	Sills	Architect, Landmark
Window (2D) - other components	Window-Main	Architect, Landmark
Window in Wall	Ceiling-Main	Architect, Landmark
Window ID	Window-Spec	Architect, Landmark
WindowWall (Curved)	Wall-Ext-Glazed	Architect
WindowWall (Straight)	Wall-Ext-Glazed	Architect
Workstation Counter	Furniture-Main	Architect



Object	Default Class	Product
Workstation Overhead	Furniture-Main	Architect
Workstation Panel	Furniture-Main	Architect
Workstation Pedestal	Furniture-Main	Architect

Class Standards

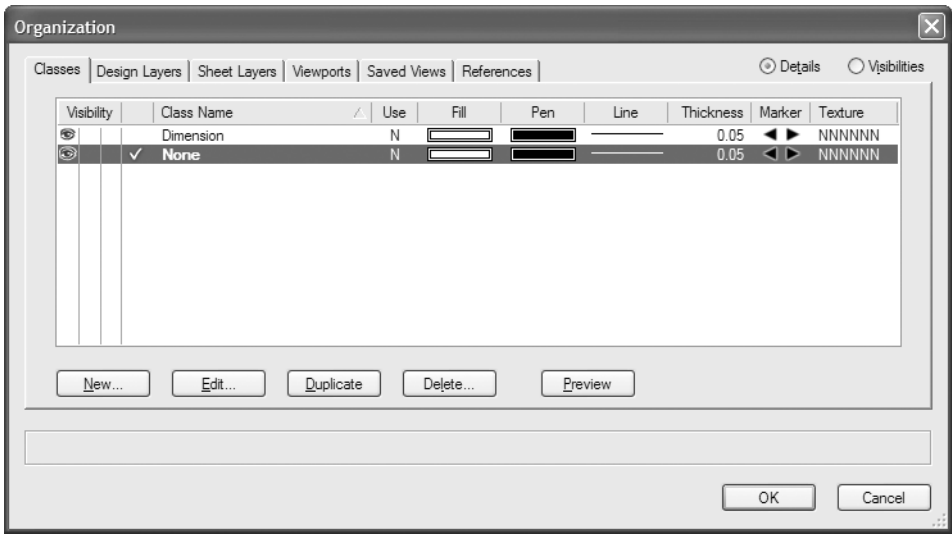
Product: Machine Design

The Machine Design_Classes.sta file, located in the Standards folder, contains a number of pre-defined class standards.

To use the pre-defined classes in a drawing:

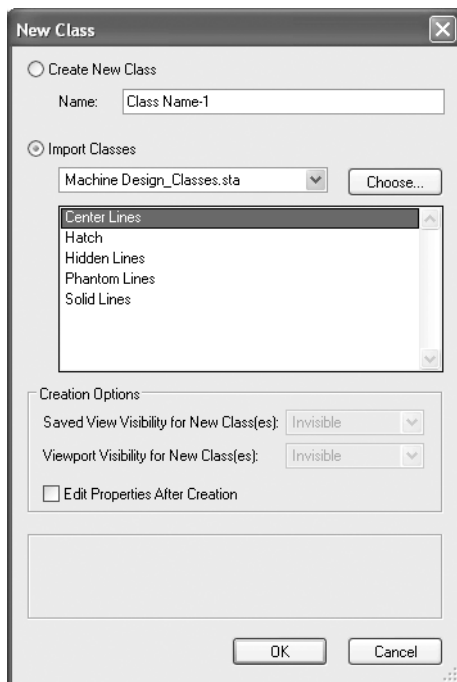
1. Select **Tools > Organization**.

The Organization dialog box opens. Click the Classes tab.



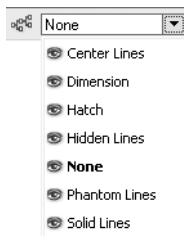
2. Click **New**.

The New Class dialog box displays.



3. Click **Import Classes** and choose Machine Design_Classes.sta from the list.
4. Select the desired classes and click **OK**.
5. Click **OK** in the Organization dialog box to return to the drawing.

Click the classes list on the Data bar to list the classes that are available for use in the drawing.



Project Preference Sets

Product: Architect

The following table lists the files contained in a preference set folder, and the menu commands/tools/objects which use those preference files. A description of the information stored in each preference file is also provided.

Preference File	Used By	Information Stored
Door Hardware Library.txt	Door tool, Door Hardware Library	Door hardware set name and record values
Equipment Record.txt	VA Create Record	Format and default values of record
Equipment Schedule.txt	VA Create Schedule, VA Records and Schedules	Format of schedule
Plumbing Fixt Record.txt	VA Create Schedule	Format and default values of record
Plumbing Schedule.txt	VA Create Schedule, VA Records and Schedules	Format of schedule
Room Finish Library.txt	Space tool, Room Finish Library	Room finish names and descriptions
VA2 Records and Schedules.txt	VA Records and Schedules	Format of records and schedules, and default values of records
VA_Project_Set.txt	Utility file for VA to ensure that the folder has not been moved	

Taken together, these files constitute a preference set; they must all be present in the folder of the “current preference set.”

VectorWorks Architect ships with six predefined preference sets.

Name	Location
VA Defaults	[VectorWorks]\Plug-Ins\VW_Arch\Data\Prefs_Def
Prefs_01	[VectorWorks]\Plug-Ins\VW_Arch\Data\Prefs_01
Prefs_02	[VectorWorks]\Plug-Ins\VW_Arch\Data\Prefs_02
Prefs_03	[VectorWorks]\Plug-Ins\VW_Arch\Data\Prefs_03
Prefs_04	[VectorWorks]\Plug-Ins\VW_Arch\Data\Prefs_04
Prefs_05	[VectorWorks]\Plug-Ins\VW_Arch\Data\Prefs_05

Making **no** changes to the preferences in the Defaults folder is strongly recommended. System administrators should make this folder “read-only” (Windows) or “locked” (Macintosh) to prevent users from making changes. The remaining preference set folders (01 – 05) can be customized.

Unused folders can be removed, leaving only the one that will be used; new folders can be created. To create a new folder, simply copy one of the existing folders to a new location. Select **Tools > Options > VA Set Project Prefs** to specify the location of the new folder. The folder location is not restricted. In a workgroup environment, locating the folder on the network makes the same project preference set available to everyone.

Drawing Techniques

This section provides examples of using VectorWorks Design Series products to accomplish specific tasks.

Importing Manual Sketches

Product: Architect, Landmark, Spotlight, and Machine Design

Scanning and importing sketches, and then tracing them, is a useful technique that can serve as a bridge between manual drawing and CAD. To be useful, sketches for tracing should be drawn to scale and scanned at a relatively high resolution (300 dpi or above).

To import sketches to be traced:

1. After scanning the sketch, save the file in one of VectorWorks' image import formats (GIF, JPG, TIF, BMP).
2. Determine the scale of the original sketch.
3. In the Design Series product, open the file where the sketch will be imported.

4. Select **Tools > Organization**.

The Organization dialog box opens. Click the Design Layers tab.

5. Select or create a layer for importing the sketch. Set the layer to the scale of the sketch. Make this layer the active layer.

See "Creating Layers" on page 85 in the VectorWorks Fundamentals User's Guide and "Setting Design Layer Properties" on page 87 in the VectorWorks Fundamentals User's Guide.

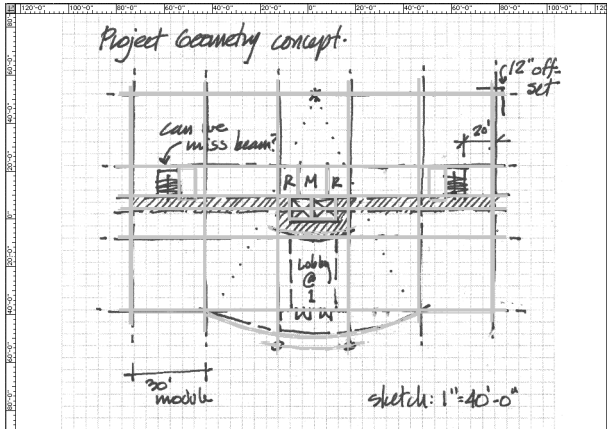
6. Select **File > Import > Import Image File** to import the sketch.

See "Importing Files" on page 517 in the VectorWorks Fundamentals User's Guide.

7. Set the layer back to the desired drawing scale.
8. Move the image to locate it properly. The image can be rotated; however, the best results are obtained when the image is scanned as straight as possible. Consider locking the image once it is in the desired orientation.

[Any manual reshaping or scaling of the image distorts its scale.](#)

The following image shows a scanned sketch used as the basis for a guidelines layout. Draw guidelines in the Guides class. Prior to printing, turn this class off with the **Modify > Guides > Hide Guides** command. See "Guides" on page 57 in the VectorWorks Fundamentals User's Guide.



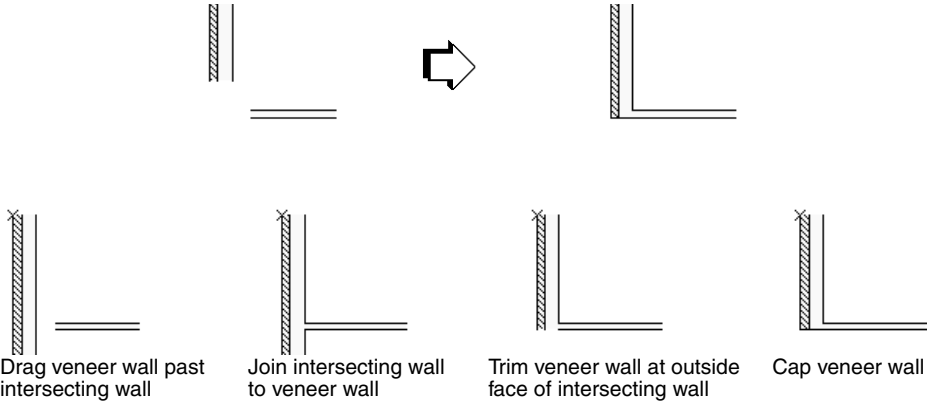
Special Wall Joins

Product: Architect

VectorWorks has standard tools for joining walls so that they display correctly in both plan and three-dimensional views; however, certain wall joining conditions require some extra manipulation. Two examples of these special wall joins are shown in the diagram sequences that follow. See “Joining Walls” on page 491 in the VectorWorks Fundamentals User’s Guide.

Veneer Join Outside Corner

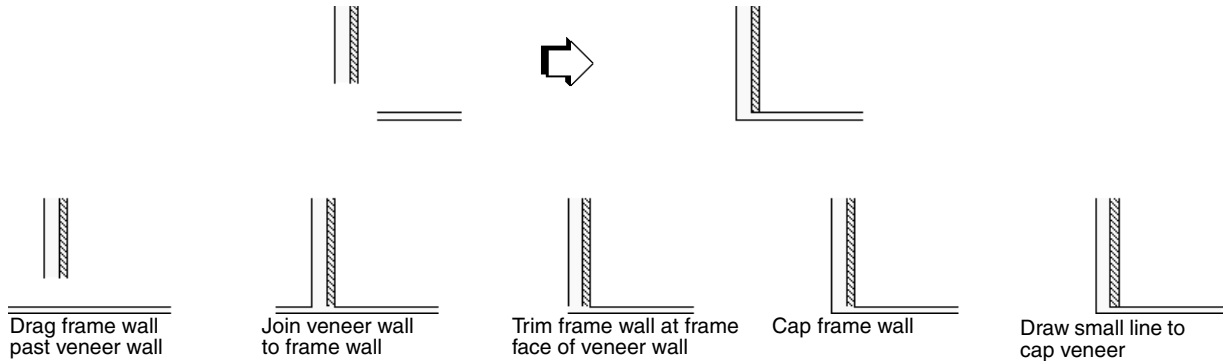
Product: Architect





Veneer Join Inside Corner

Product: Architect



VectorWorks Machine Design

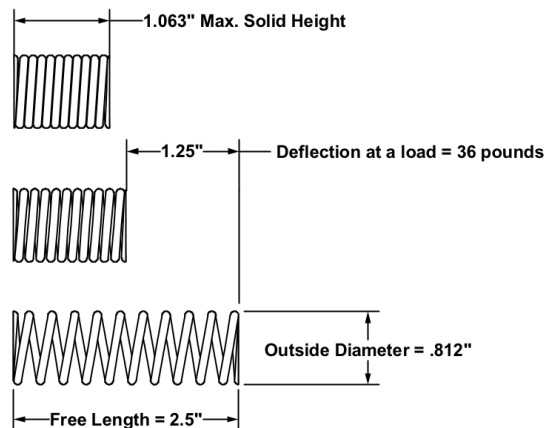
Product: Machine Design

This section provides examples of using the **Spring Calculator** and **Simple Beam** commands to accomplish specific tasks.

Spring Calculator

Product: Machine Design

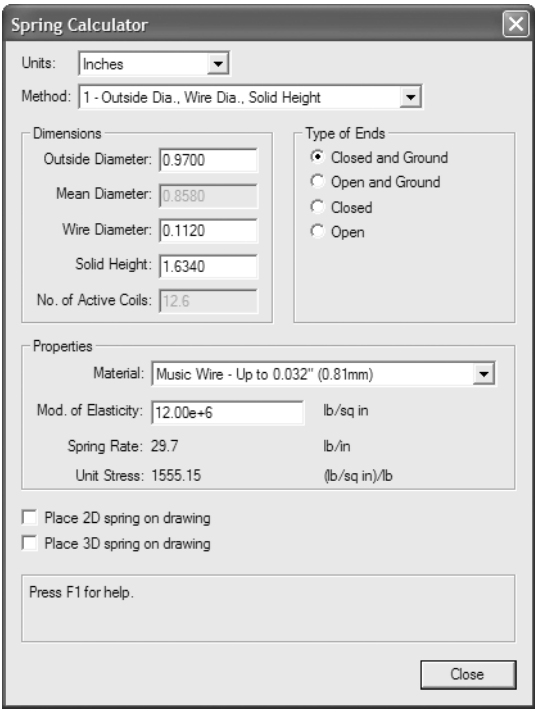
The spring calculator can determine spring rates and unit stresses of round wire helical coil compression springs with known parameters. It can also be used to design a spring knowing the working values. This example is based on the following compression spring with closed and ground ends of music wire.



To calculate spring rate and unit stress:

1. Determine the required spring rate based on the deflection at a load divided by the difference in the working length and the free length. For this example, the desired spring rate equals 28.8 lb/in ($36 \text{ lb} / 1.25 \text{ in} = 28.8 \text{ lb/in}$).
2. Select **Machine Design > Spring Calculator**.

The Spring Calculator dialog box opens.



- 3. As shown in the above dialog box, select **1 - Outside Dia., Wire Dia., Solid Height** from the **Method** list. After entering the known values, calculate a spring rate close to the desired value by trying several standard wire diameter values. Adjust the material in the **Material** list to fit the wire diameter used. Here, a wire diameter of .090" gives a spring rate of 26.1 lb/in.
- 4. In the **Method** list, select **2 - Mean Dia., Wire Dia., No. of Active Coils**.



The Spring Calculator dialog box is shown with the following settings:

- Units: Inches
- Method: 2 - Mean Dia., Wire Dia., No. of Active Coils
- Dimensions:
 - Outside Diameter: 0.9700
 - Mean Diameter: 0.8580
 - Wire Diameter: 0.1120
 - Solid Height: 1.6340
 - No. of Active Coils: 12.6
- Type of Ends:
 - ☒ Closed and Ground
 - ☐ Open and Ground
 - ☐ Closed
 - ☐ Open
- Properties:
 - Material: Music Wire - Up to 0.032" (0.81mm)
 - Mod. of Elasticity: 12.00e+6 lb/sq in
 - Spring Rate: 29.7 lb/in
 - Unit Stress: 1555.15 (lb/sq in)/lb
- ☐ Place 2D spring on drawing
- ☐ Place 3D spring on drawing
- Press F1 for help.
- Close button

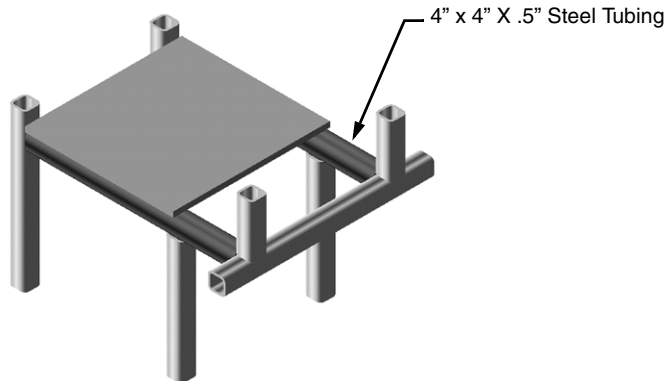
5. As shown in this dialog box, vary the wire diameter and number of active coils to get a spring rate close to the required spring rate. A wire diameter of .095" and 11 active coils gives a spring rate of 28.9 lb/in, but the solid height is 1.235", which is too high. A wire diameter of .090" and 9 active coils, however, gives a spring rate of 28.4 lb/in, and a solid height of .990", which is within acceptable limits.
6. Finally, check the stresses applied to the spring to verify that they are within acceptable limits. With a unit stress of 2522 (lb/sq in)/lb, multiply by 36 to obtain 90,792 lb/sq in. With a solid height of .990", the stress will be:
$$(2.500-0.900)\text{in} \times 28.4 \text{ lb/in} \times 2522 \text{ (lb/sq in)/lb} = 114,600 \text{ lb/sq in}$$
7. This value is below the safe working stress of 117,000 lb/sq in for this material and wire size.

Simple Beam

Product: Machine Design

This example shows how VectorWorks Machine Design Simple Beam commands can be used to find the stresses on the horizontal elements of a certain machine part.

Data:
 Length = 48"
 Distance between supports = 36"
 Distributed load = 600lb/in
 Concentrated load = 2000lb
 Tubing = 4" x 4" x 1/2" Steel
 Section Modulus = 6.12in³
 Moment of Inertia = 12.26in⁴
 Modulus of Elasticity = 29E+6lbsq in



To calculate the stresses:

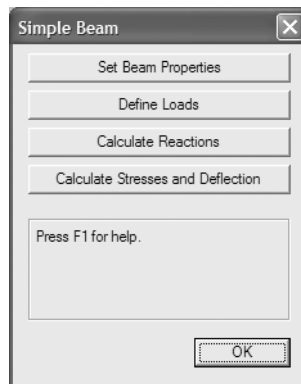
1. Select **File > New**.

The Create Document dialog box opens.

2. Select **Use document template**, and choose the Simple Beam (Imperial) or Simple Beam (Metric).sta template.
3. Click **OK**.

4. Select **Machine Design > Simple Beam**.

The Simple Beam dialog box opens.

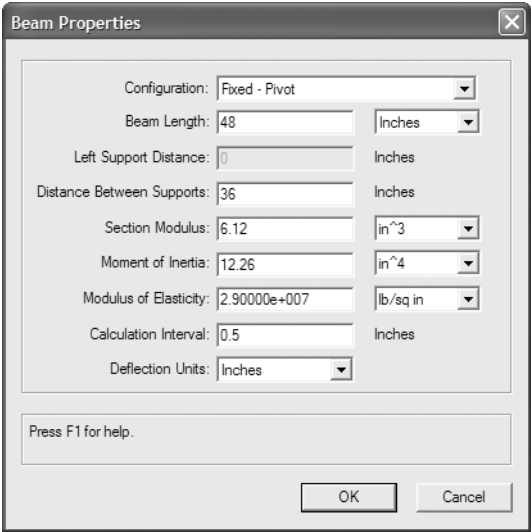


5. Click **Set Beam Properties**.

The Beam Properties dialog box opens.

6. Specify the beam properties. In this example, enter the following values:

Configuration: Fixed - Pivot
Length: 48
Units: Inches
Distance Between Supports: 36
Section Modulus: 6.12 in³
Moment of Inertia: 12.26 in⁴
Modulus of Elasticity: 29E+6 lb/sq in
Calculation Interval: 0.5
Deflection Units: Inches



The Beam Properties dialog box contains the following fields and values:

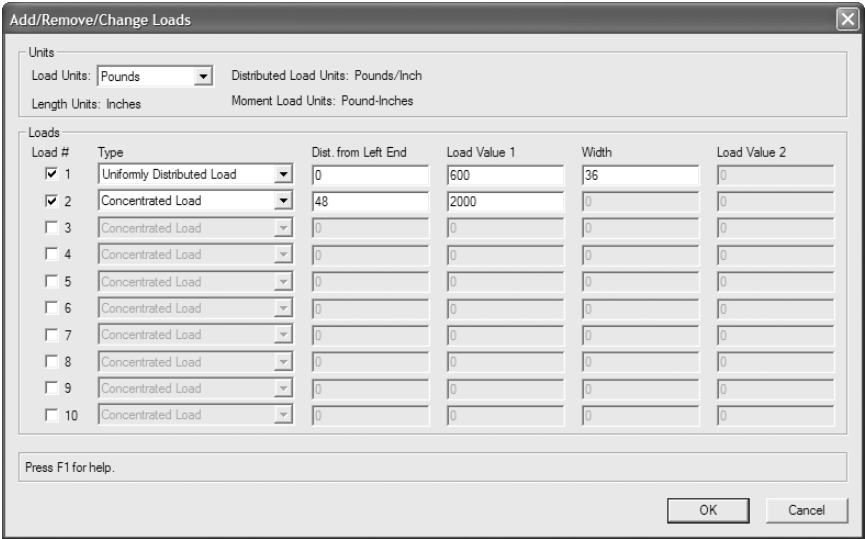
Field	Value	Units
Configuration	Fixed - Pivot	
Beam Length	48	Inches
Left Support Distance	0	Inches
Distance Between Supports	36	Inches
Section Modulus	6.12	in ³
Moment of Inertia	12.26	in ⁴
Modulus of Elasticity	2.90000e+007	lb/sq in
Calculation Interval	0.5	Inches
Deflection Units	Inches	

Buttons: OK, Cancel

To obtain the section modulus and moment of inertia of the tubing, select a tubing shape from the Resource Browser and place an instance of it on the drawing. Convert the tubing to a group and then use the **Engineering Properties** command to obtain the properties. For more information on the **Engineering Properties** command, see “Engineering Properties” on page 285 in the VectorWorks Fundamentals User’s Guide.

- 7. Click **OK** to close the Beam Properties dialog box.
- 8. Click **Define Loads** on the Simple Beam dialog box.
The Add/Remove/Change Loads dialog box opens.
- 9. Specify the load properties. In this example, use the following values:

Load Units: Pounds
Load #1
Type: Uniformly Distributed Load
Distance from Left End: 0
Load Value 1: 600
Width: 36
Load #2
Type: Concentrated Load
Distance from the Left End: 48
Load Value 1: 2000



The Add/Remove/Change Loads dialog box contains the following fields and values:

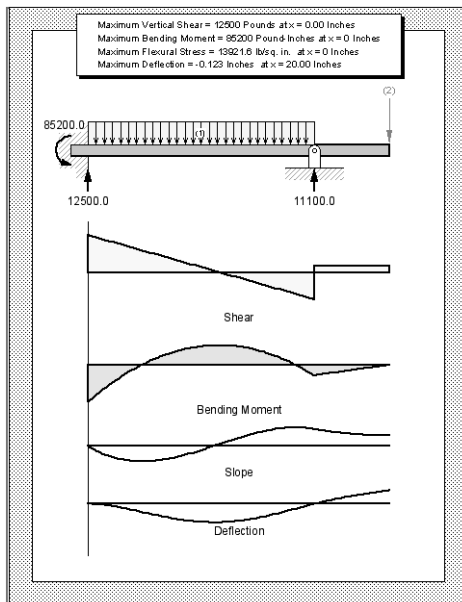
Units					
Load Units: Pounds	Distributed Load Units: Pounds/Inch				
Length Units: Inches	Moment Load Units: Pound-Inches				
Load #	Type	Dist. from Left End	Load Value 1	Width	Load Value 2
<input checked="" type="checkbox"/> 1	Uniformly Distributed Load	0	600	36	0
<input checked="" type="checkbox"/> 2	Concentrated Load	48	2000	0	0
<input type="checkbox"/> 3	Concentrated Load	0	0	0	0
<input type="checkbox"/> 4	Concentrated Load	0	0	0	0
<input type="checkbox"/> 5	Concentrated Load	0	0	0	0
<input type="checkbox"/> 6	Concentrated Load	0	0	0	0
<input type="checkbox"/> 7	Concentrated Load	0	0	0	0
<input type="checkbox"/> 8	Concentrated Load	0	0	0	0
<input type="checkbox"/> 9	Concentrated Load	0	0	0	0
<input type="checkbox"/> 10	Concentrated Load	0	0	0	0

Buttons: OK, Cancel

- 10. Click **OK** close the Add/Remove/Change Loads dialog box.

11. In the Simple Beam dialog box, click **Calculate Reactions**, and then click **Calculate Stresses and Deflection**, and then click **OK**.

A simple beam diagram is created based on the information provided. See “Simple Beam” on page 313 for more information on what is depicted in the diagram.



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