NEMETSCHEK Vectorworks

Renderworks®

2012 Getting Started Guide

The contents of this guide and accompanying exercises were originally created for Nemetschek Vectorworks, Inc. by Daniel Jansenson.

© 2011 Nemetschek Vectorworks, Inc.

All rights reserved. No part of this book may be reproduced or transmitted in any form by any means, electronic or mechanical, including photocopying, recording, faxing, emailing, posting online or by any information storage and retrieval system, without prior written permission of the publisher. Published in the United States.

Vectorworks and Renderworks are registered trademarks of Nemetschek Vectorworks, Inc., in the United States and other countries. Windows is a registered trademark of Microsoft Corporation in the United States and other countries. Macintosh is a trademark of Apple Computer, Inc., registered in the United States and other countries. Adobe, Acrobat and Reader are registered trademarks of Adobe Systems in the United States and other countries.

The information in this book is distributed on an “as is” basis, without warranty. While every precaution has been taken in the preparation of this book, neither the author nor Nemetschek Vectorworks, Inc., shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the information contained in this book or by the computer software described in it.

For additional Vectorworks training information, or to purchase copies of this book, please call us, in the United States at (410) 290-5114 or visit Vectorworks.net/training online.

NVM.GSGRW-2012 v1.0

Table of Contents

Introduction 5

Section 1: Exterior Building View 7

Task 1: Place Renderworks Cameras 9

A. Select the Renderworks Camera Tool 9

B. Place the first camera 9

C. Adjust the camera's height 10

D. Save the view 11

E. Place the second camera. 11

F. Adjust the second camera's height 11

Task 2: Lighting & Light Quality Settings 12

A. Place a Heliodon (sunlight) 12

B. Adjust the light quality settings 13

1. Ambient lighting 14

2. Indirect lighting 15

C. Add light from the sky 17

1. Set a HDRI background as a light source 17

2. Select the desired HDRI background 18

Task 3: Apply Textures 19

1. Landscaping 19

2. Hardscaping 21

3. Building Walls 25

4. Glass 30

Task 4: Add Sky 33

Task 5: Add Entourage 33

1. Create and place image props....33
2. Place additional, premade image props....37
3. Place 3D symbols....38
Task 6: Render and Export an Image....39
1. Render the scene (including Renderworks styles)....39
2. Render a viewport....42
3. Export the image....44
Section 2: Day-Time Interior View....47
Task 1: Place a Heliodon Representing the Sun....48
Task 2: Lighting: Add Light from the Sky....49
Task 3: Lighting: Set Lighting Options....50
Task 4: Add a Graphic Sky Background....50
Task 5: Create and Apply Textures....51
1. Rear wall....51
2. Mesh partition....53
3. Wood paneling....55
Task 6: Render using Custom Renderworks....57
Section 3: Night-Time Interior View....59
Task 1, Lighting: Place and Adjust Lights....60
A. Rectangular fluorescents....60
B. Round, surface-mount fixtures....61
C. Pendant lights at reception counter....63
D. Fluorescent pendant light over conference table....64
E. Rear signage at the mesh partition (in front of the stairs)....65
1. Create the texture....66
2. Apply the new neon light texture to the 3-D model of the neon tubing....67
Task 2: Lighting: Set the Appropriate Light Quality Settings....67
Task 3: Render using Custom Renderworks....68
Task 4: Adjust Custom Renderworks Settings to Control Brightness....69

Introduction

Basic information about Renderworks can be found in a variety of places. These include third-party sources such as Jonathan Pickup's Archoncad, this author's own *Remarkable Renderworks* book, and a large repository of resources in Nemetschek Vectorworks' own materials–including much excellent information in other *Getting Started* guides.

Kevin Lee Allen's *Spotlight Getting Started Guide* has much valuable information about Renderworks. And Tamsin Slatter has prepared an excellent *Renderworks Migration Hints and Tips* guide that is a small manual in itself.

Familiarity with basic Renderworks techniques is one thing. Incorporating these basic skills into an overall rendering workflow is the next step, and is the basis of the material in this guide.

This book uses three case studies as the underpinning for detailed, step-by-step tutorials. There is no discussion of theory or high principles. Instead, the material uses an organized and logical method to develop each rendering exercise, from opening the file at the beginning, to exporting an image at the end. The intent is to convey the fundamental methods of texturing, lighting and rendering by describing the sequence of steps necessary to complete each rendering.

Each section is divided into tasks, which are the organizing stepping stones of the process. Each task contains a number of sub-steps covering the details of texturing, lighting and rendering. A careful and methodical approach to these steps and tasks simplifies the process of preparing Renderworks renderings, and makes it easier to make adjustments and changes.

Section 1:
Exterior Building View

A Vectorworks model is prepared for rendering using a three-step process. The sequential F/L/R workflow–File Prep/Lighting/Rendering–can consistently yield good-quality results when followed carefully and methodically. Note that the settings for *lighting* quality are completely

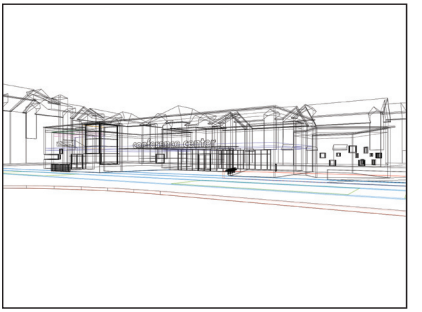
separate from those of *rendering* quality, even though they are closely linked. The workflow need not be completed in a specific order of tasks, necessarily (except for the last step), but it is important to view each step as a separate action–a stepping-stone, as it were, on the road to the final rendering.

This exercise will describe six basic sequential tasks, each adding a level of completion to the rendering:

1. Place Renderworks cameras.
2. Arrange lights and light quality settings.
3. Apply textures.
4. Add a sky background.
5. Add entourage.
6. Render and export.

Open the file: **building-new.vwx** from the Exterior Building View folder. Take a quick first look.

Make sure the entire model fits on the screen: -click on the **Fit To Objects** button in the View Bar. The view is in wireframe:



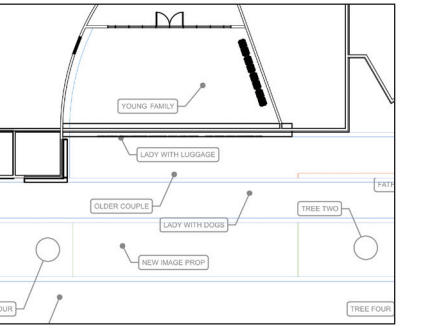
-Make a quick first rendering using OpenGL: **View>Rendering>OpenGL**. The white building in the middle of the screen is the subject of this rendering exercise. The large gray buildings around it are massing models intended for background purposes.

Note: OpenGL is a suitable rendering method when fast results are needed. Renderworks can provide higher-quality renderings, and will be discussed later in this chapter.

-Switch to **Top/Plan** view: **View>Standard Views>Top/Plan**.

-Change layer visibility to display the lower layer: **View>Layer Options>Show/Snap Others.**

The layer **Entourage Locations** is now visible. Zoom in and take note of the information shown on this layer.



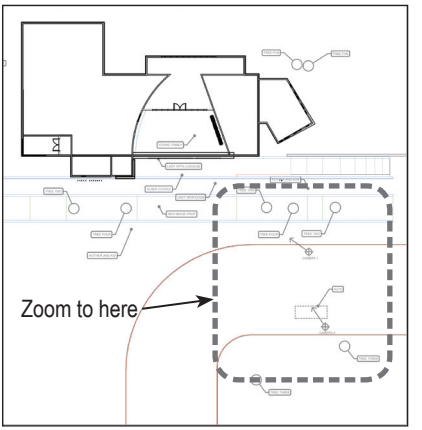
Note: This exercise will create and use a variety of scene accessories–image props and cameras that will need to be placed in certain places on the drawing. The **Entourage Locations** layer displays those spots as a kind of map, showing the exact locations of the image props and cameras. When the information is no longer needed, we will make this layer invisible.

Task 1: Place Renderworks Cameras.

This exercise will use two Renderworks cameras to generate views that will be used in the renderings. One camera will show an overall view of the building's front. The other camera will be oriented to display the building at an angle, and from a closer distance.

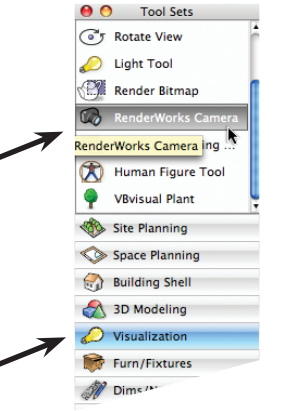
We will place the cameras in the layer **Site With Buildings**, which is currently active.

Before proceeding, zoom in to the area marked in the diagram. The two camera locations are in this area and can be seen more clearly from a closer distance.



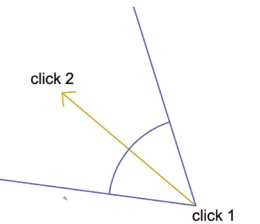
A. Select the Renderworks Camera Tool.

-In the **Visualization Toolset**, select the **Renderworks Camera** tool.



B. Place the first camera.

-With the tool selected, click once in the center of the marker called **Camera 1.** Then drag the cursor in the direction of the marker's arrow to set a direction, and click again to complete the action.



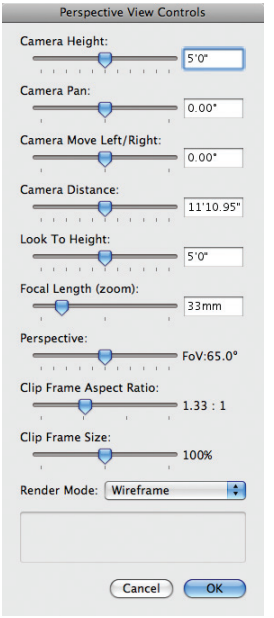
The **Object Properties** dialog box appears. Click **OK**.

To see what the camera sees, leave the camera object selected, go to the **Object Info** palette (under the Shape tab) and click on the **Display Camera View** button. The scene will swtich to a perspective view as seen by the camera. Can't see the perspective view? Click on the Fit to Objects button in the View Bar.

Note: the Entourage Locations layer is still visible. Make it invisible by changing the ***Layer Options*** *to* ***Active Only****: View>Layer Options>Active Only.*

C. Adjust the camera's height.

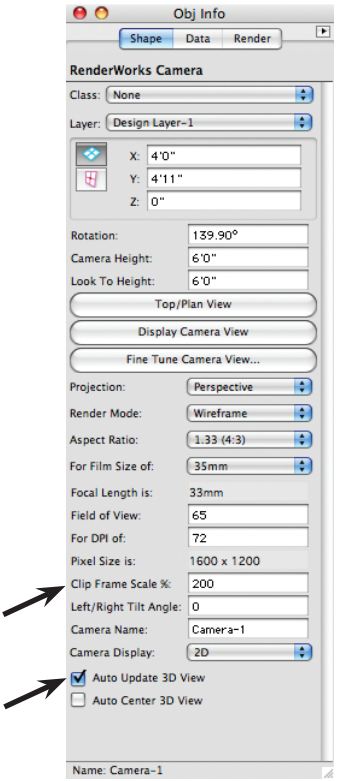
-In the **Object Info** palette, click on the **Fine Tune Camera View** button. The **Perspective View Controls** dialog box opens. The first slider at the top is the **Camera Height** control. In the white data field, enter the height: **6'-0" [1830mm].**



The camera is now tilting down slightly. To correct this, go to the **Look To Height** slider, and in the white data box enter the height: **6'-0" [1830mm].** Click **OK**.The camera's actual height, and the direction in which it looks are now both the same, so the camera's view is perfectly horizontal.

Is the image too small on the sheet? Is it off-center on the screen?

To make the image bigger on the sheet, go to the **Object Info** palette. With the camera object selected, go to the **Clip Frame Scale %** data box and enter **200**. Then update the view: select the **Auto Update 3D View** checkbox near the bottom of the palette.



To center the image on the screen, select the **Auto Center 3D View** checkbox.

Before saving this view, make sure the **Entourage Locations** layer is invisible: **View>Layer Options>Active Layer Only.**

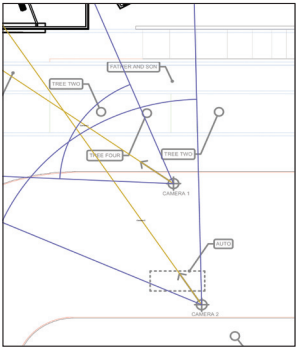
D. Save the view.

-**View>Save View.** The **Save View** dialog box opens. Give this view a name: **View 1**. Click **OK**.

E. Place the second camera.

First make the **Entourage Locations** layer visible: **View>Layer Options>Show/Snap Others.**

-Switch to **Top/Plan** view and zoom in again to the area shown earlier. Note the location of the marker called **Camera 2**. In the **Visualization** palette, select the **Renderworks Camera** tool, and place a new camera in the center of the **Camera 2** marker. Point, drag and click to finish as described earlier.

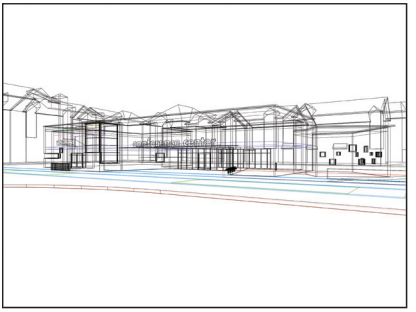


*Note: The **Object Properties** dialog box didn't open this time; it only opens the first time the **Renderworks Camera** tool is used in a file.*

F. Adjust the second camera's height.

-With the camera selected, go to the **Object Info** palette and click on the **Fine Tune Camera View** button. The **Perspective View Controls** dialog box opens. Change the **Camera Height** and **Look To** settings to **6'-0" [1830mm].** Click **OK**.

Make the **Entourage Locations** layer invisible (**View>Layer Options>Active Only** or change visibilities in the Organization dialog box), and then save this view as well, with the name **View 2**.



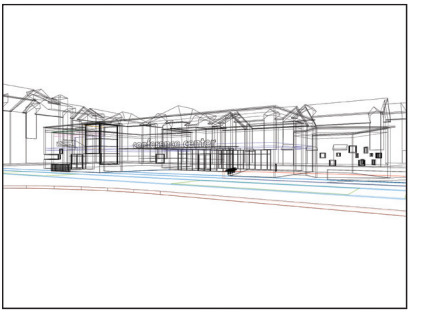
***Note**: We can access this camera's view at any time by selecting it in the **Saved Views** drop-down box or double-clicking on the view in the **Visualization** palette. We can also access this camera's view by going to T**op/Plan** view and double-clicking on the camera object itself, or by going to the **Visualization** palette and double-clicking on the camera there (click on the **Cameras** tab of the palette to display the cameras in the file).*

Congratulations! We've completed the first task: placing cameras and saving views.

Task 2: Lighting & Light Quality Settings

This task will demonstrate a variety of lighting settings and propose a suitable combination for this exercise file.

In the **Saved Views** drop-down box, select **View 2**. The image on the screen will be in wireframe (not rendered).



First a quick first rendering in Renderworks: **-View>Rendering>Fast Renderworks**.

Wait a few seconds until the scene finishes rendering. Notice that the scene is lit, even though there are no actual light objects in the file. This is due to the default lighting provided by the program, mainly for working purposes. Once lights are placed in the scene (including a Heliodon light representing the sun), the original default lighting is *disabled* and lights can be adjusted as desired, resulting in a better quality rendering.

***Note:** Does the scene look a little rough and unfinished? The **Fast Renderworks** setting is useful for on-going work, rather than final quality renderings, which can take a long time to complete. With this Renderworks setting, low-level accuracy, quality and resolution settings make for a speedy rendering, albeit at the expense of image quality. More on adjusting these settings later.*

What light sources will we use?

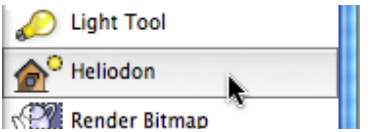
The final lighting in this exterior scene will come from two sources:

- a Heliodon representing the sun;
- a **High Dynamic Range Image (HDRI)** background representing overall light coming from the sky.

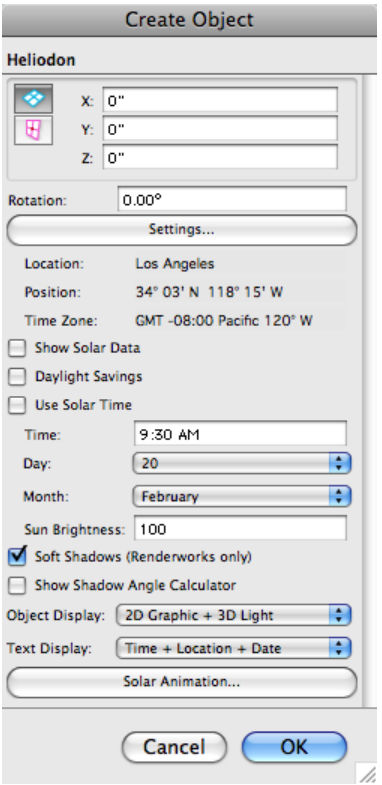
A. Place a Heliodon (sunlight).

Now add the first of two light sources used in this exercise: sunlight. The light of the sun is represented by a specific kind of light object: a **Heliodon**.

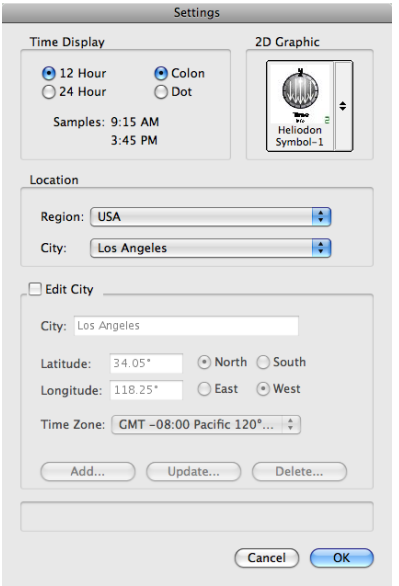
In the **Tool Sets** palette, click on the **Visualization** tool set, and double-click on the **Heliodon** tool.



A Heliodon will be placed in the scene, and the **Create Object** dialog box will open.



Click on the **Settings** button. The **Settings** dialog box opens. Under **Location**, click on the **Region** drop-down box and select **USA**. Now click on the **City** drop-down box and select **Los Angeles**. Click **OK**.



Back in the **Create Object** dialog box, enter the following information:

Time: 9:30 AM
Day: 20
Month: February

Leave everything else as-is, and click **OK**. The Heliodon's settings are complete for this scene.

With the sunlight in place, we will make adjustments to the light settings in order to improve the quality of the rendering.

B. Adjust the light quality settings.

The scene's light quality settings can dramatically affect the length of time required to complete a rendering. In this exercise we will first use light quality settings that yield quick renderings, using **Ambient** lighting.

Then we will improve the light quality settings by adding **Indirect** lighting, but at the expense of longer renderings.

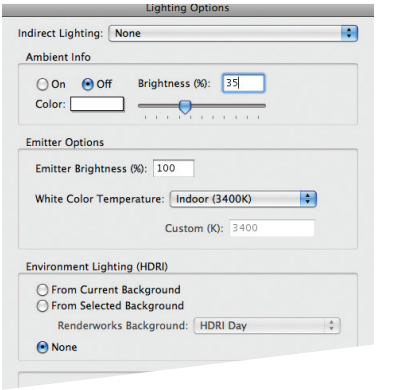
Before proceeding, open the **Lighting Options** dialog box (**View>Lighting>Set Lighting Options**) and take a look at the various components of the dialog box:

- The **Indirect Lighting** drop-down box controls lighting that bounces from one surface onto another. This is a feature that provides great realism. The greater the number of bounces, the more realistic the image–and the longer the rendering takes to complete.
- **Ambient Info** controls **Ambient** lighting, its brightness and color. **Ambient** lighting is general, sourceless lighting that affects all surfaces equally. This lighting can be used by itself, for general lighting purposes, or in combination with other light sources (such as light objects). It can also be used as a method of adding general light to a scene that has already been lit using other methods.
- **Emitter Options** sets the brightness and color temperature of light objects that have been set to **Use Emitter** (none of those are included in this exercise file).
- **Environment Lighting (HDRI)** provides access to Renderworks backgrounds that can be used for lighting purposes, as well as graphic representations of the sky. More on this later. Click **OK** to close the dialog box.

1. Ambient lighting

a. For the first example, use only the illumination produced by the **Heliodon** placed earlier–without **Ambient** lighting:
-**View>Lighting>Set Lighting Options**.

The **Lighting Options** dialog box opens. From top to bottom, arrange the settings as shown in the image below and click **OK**.



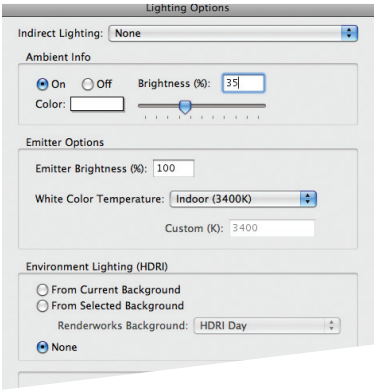
-Now render in **Fast Renderworks**:
View>Rendering>Fast Renderworks.

Note that the shadows are dark and lacking in detail. We can improve on this by adding **Ambient** lighting and changing the default settings.

b. Add and adjust **Ambient** lighting:
-**View>Lighting>Set Lighting Options**. The **Lighting Options** dialog box opens.

-Under **Ambient Info**, click **On**.

-Make sure the **Brightness (%)** box shows **35.**



-Click **OK** and render in **Fast Renderworks**: **View>Rendering>Fast Renderworks.**

c. For a smoother rendering, try rendering in **Final Quality Renderworks**.

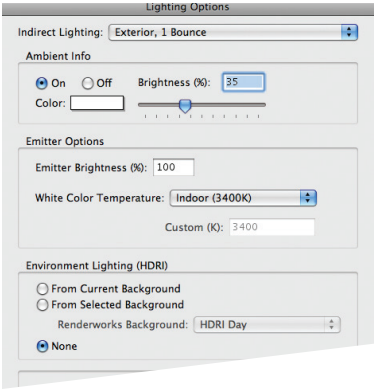
2. Indirect Lighting
In the second example, we will modify the light settings to include **Indirect** lighting.

This is a feature that provides much-improved realism by displaying lighting that bounces from one surface onto another. We will also turn off **Ambient** lighting in order to enhance the image's quality.

a. Add **Indirect** lighting:

-**View>Lighting>Set Lighting Options**. The **Lighting Options** dialog box opens.

-Click on the **Indirect Lighting** drop-down box and select **Exterior, 1 Bounce**. Click **OK**.



Now render in Fast Renderworks:
View>Rendering>Fast Renderworks.

Notice the increased rendering time compared to the previous light settings. More importantly, the effect of **Indirect** lighting can be seen clearly in places such as the left side of the entry area and the joint between the main building and the angled portion to the right.

The image can be much improved by switching **Ambient** lighting off.

b. Remove **Ambient** lighting.

-**View>Lighting>Set Lighting Options**. The **Lighting Options** dialog box opens.

-Under **Ambient Info**, click **Off**.

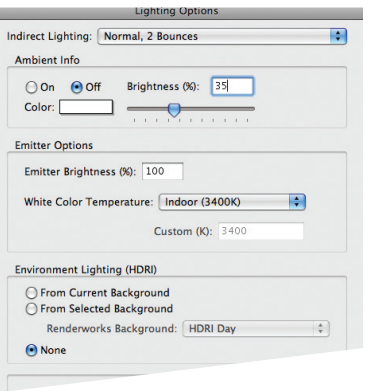
-Click **OK**.

To see the full impact of the change, render in **Final Quality Renderworks**.

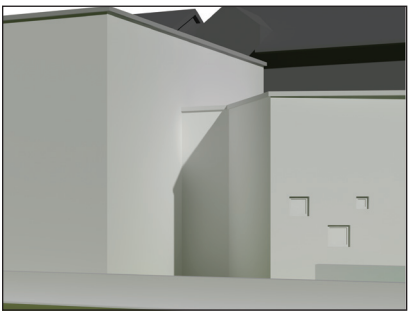
Note that with **Ambient** lighting turned off, the building's entry area is now a bit dark. We can improve the rendering by increasing the number of **Indirect Lighting** bounces. This will increase the quality and realism of rendered surfaces that bounce light from one to the next, including the area near the building's entrance. Increasing the number of light bounces there will represent the bounced lighting more accurately.

c. Increase the number of **Indirect Lighting** bounces:
-**View>Lighting>Set Lighting Options**. The **Lighting Options** dialog box opens.

-Click on the **Indirect Lighting** drop-down box and select **Normal, 2 Bounces.** Click **OK**.



The file will automatically rerender in Final Quality Renderworks. Note that this new quality setting will result in a longer render, requiring a wait before final results can be seen. If the wait is acceptable, we can obtain even better results by selecting **Interior, 4 Bounces** in the **Indirect Lighting** drop-down box, but this will result in a much lengthier render, and the results may not justify the increased rendering time:



To recap: We first rendered the file using a **Heliodon** representing the sun. Then, to fill in the shadows, we added **Ambient** lighting. Finally, in order to improve the quality of the final rendered image, we switched off **Ambient** lighting, turned on **Indirect** lighting and then increased the number of bounces. In each case the rendering was better; but at the expense of longer completion times.

We will now improve the quality of the rendering even further by adding one more source of light: the sky.

Before proceeding, render the file in Wireframe: **View>Rendering>Wireframe**.

C. Add light from the sky.

In the real world the sun is not the only source of daytime exterior lighting. The atmosphere– or sky– itself is another. Think of the sky as a kind of dome covering the model, with a bright light placed outside the dome. The glow of the skydome is diffused throughout the file, illuminating the model itself and casting shadows that are softer than those from the sun. To represent this sky-light, Renderworks uses a special layer background that emits light and helps illuminate the entire exterior scene.

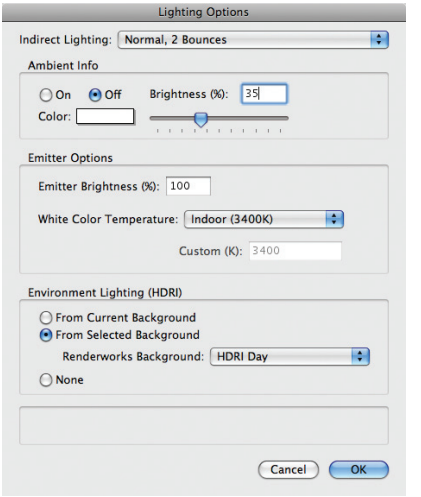
This **High Dynamic Range Image (HDRI)** background has a dual function: it can be used as a source of light and as a great background image, graphically representing the appearance of the sky itself. Each of these functions can be used separately, if desired. In this exercise file we will split those functions, using one **HDRI** background as a light source and a separate one for its graphic image of the sky.

1. Set a HDRI background as a light source.
-**View>Lighting>Set Lighting Options**.

The **Lighting Options** dialog box opens.

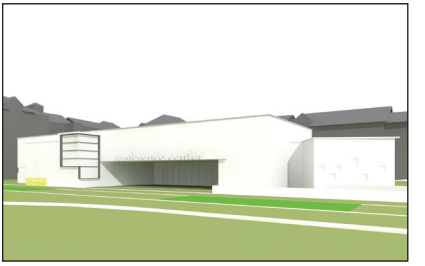
-Under **Environment Lighting (HDRI)**, click on **From Selected Background**.

2. Select the desired HDRI background.
-Click on the Renderworks Background drop-down box and select: **HDRI Day**.



-Click **OK**.

-With the **HDRI** background selected, render the scene: **View>Rendering>Fast Renderworks**.



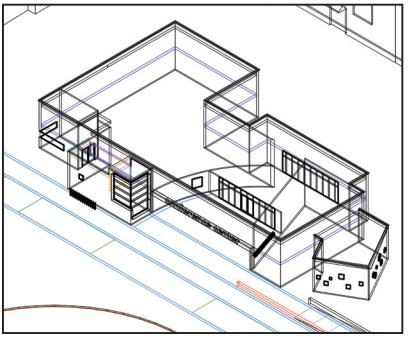
The scene may appear excessively bright. This effect will moderate once textures are applied, image props cast shadows, and a sky image is used.

Make sure to try other HDRI backgrounds supplied with Renderworks, as sources of light. Several backgrounds provide interesting and, indeed, beautiful lighting effects that might be especially suitable for particular projects. It is also possible to edit HDRI backgrounds, once they are accessible in the Resource Browser, by modifying their brightness and other features.

Until now we have been working with a simplified model of the building, with no textures or site accessories. In the next task we will add those things to the scene. This will result in a dramatic improvement in the appearance of the building and its surroundings.

Task 3: Apply Textures.

*For best visibility, switch to **Top/Plan** view (**View>Standard Views>Top/Plan**), then to **Right Isometric** view (**View>Standard Views>Right Isometric**). Zoom in for a clear view, as in the following wireframe image.*



*Render in **OpenGL** (**View>Rendering>OpenGL**). As textures are applied, the scene will automatically re-render.*

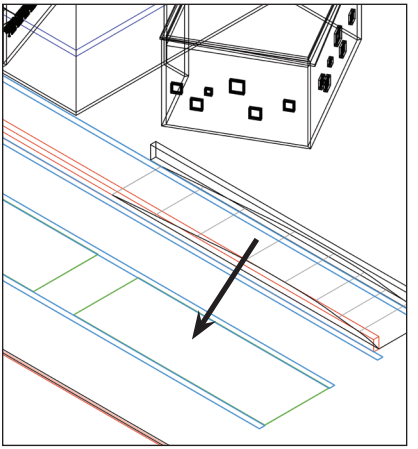
In this file textures will be applied to objects in four categories: landscaping, hardscape objects (including street paving), building walls and glass objects (windows, doors and window walls).

1. Landscaping.

In this model the five rectangular landscaped areas are represented by simple rectangular extrusions, each receiving a grass texture. The grass texture is made from an imported image, and has already been included in this exercise file. It is available through the Resource Browser.

a. Select the first landscape element and apply the grass texture:

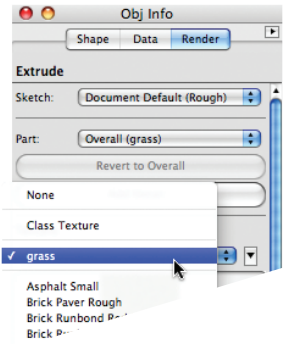
-Click once on the first landscape element.



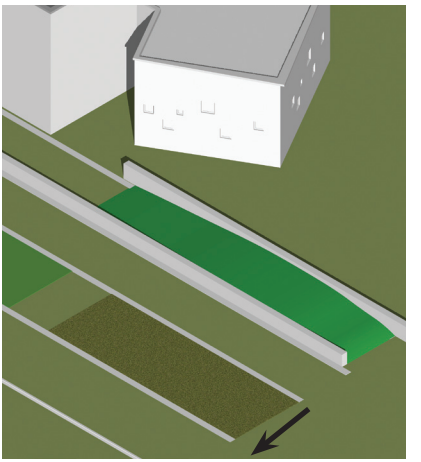
-In the **Object Info** palette, click on the **Render** tab.

-Make sure that the **Part** drop-down box is set to **Overall (None).**

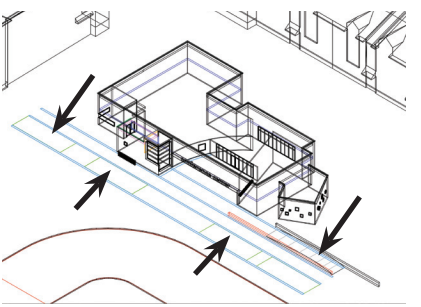
-Click on the **Texture** drop-down box and select **grass**.



-Render the scene in **OpenGL**, and the first landscape element will display the grass texture.



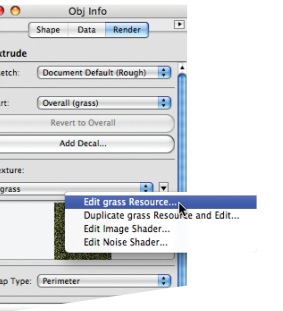
b. Select the remaining landscape elements and apply the grass texture:
-Hold the **Shift** key down, and select each of the remaining four landscape elements. All of the remaining four elements should now be selected.



-In the **Object Info** palette's **Render** tab, click on the **Texture** drop-down box and select **grass**. The scene will rerender, and all the remaining landscape elements will now display the grass texture.

c. Curious about the grass texture? Analyze the grass texture to understand its composition:
-With the landscape elements still selected, go to the **Render** tab of the **Object Info** palette.

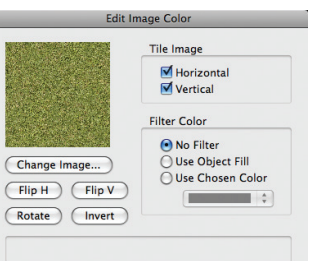
-Click on the **Texture** edit button, and then select **Edit grass Resource**.



The **Edit grass** dialog box opens.

-Click on the various shaders that make up this texture in order to observe the settings:

- The **Color** setting identifies the image that was used for this texture. Click on the **edit** button next to **Color** to display (or change) the image.



- The **Bump** shader shows the noise shader used. Click on the **Edit** button next to **Bump** to display the noise settings.

Click **OK** and then **OK** again, to exit the dialog boxes.

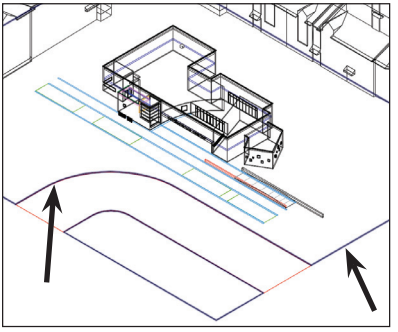
2. Hardscaping.

The overall hardscaping around the building consists of low walls, concrete sidewalk paving, asphalt street paving and pebble stone trim arranged in long horizontal lines near the building. The textures have already been imported into the exercise file and are available via the Resource Browser.

a. Concrete sidewalk paving.

The concrete sidewalk paving is a simple 3D extrusion/subtraction object with a texture applied.

-Still in **Right Isometric** view, select the 3D object representing the concrete sidewalk paving.

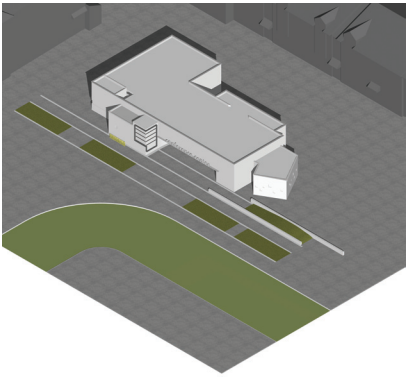


*Note: the **Object Info** palette reports this object as a **Solid Subtraction.***

-Click on the **Render** tab of the **Object Info** palette.

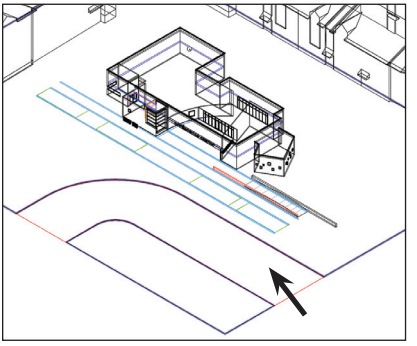
-Click on the **Texture** drop-down box and select the texture **Conc Lighter Small.**

Render in **OpenGL** to confirm that the texture has been applied.



b. Street Paving.

The street is represented by a NURBS surface assigned to the class **street paving**.

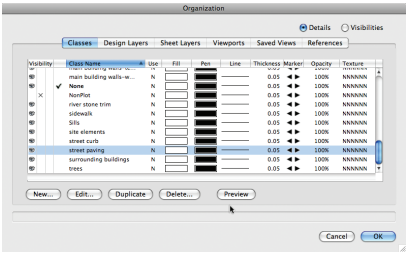


The street object will receive an asphalt paving texture applied by class.

First we'll apply the asphalt texture to the appropriate class. Then we will set the NURBS surface to accept a texture by class.

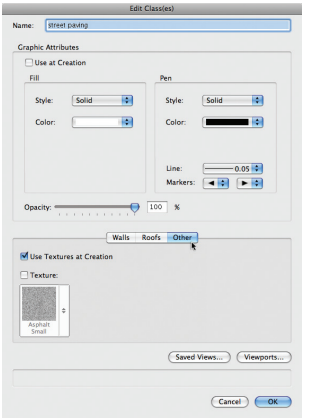
First apply the asphalt texture to the appropriate class:
-Open the **Organization** dialog box: **Tools>Organization**.

-Select the **Details** option at the top right, and then click on the **Classes** tab to view the file's classes.



-Select the class **street paving**, and then click on the **Edit** button.

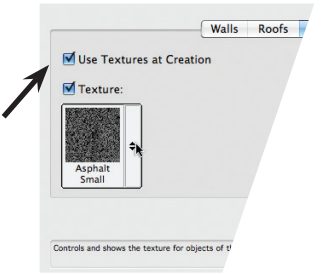
The **Edit Class(es)** dialog box opens.



-Click on the **Other** tab (about halfway down the dialog box).

-Check the **Use Textures at Creation** checkbox in order to apply the wall textures automatically.

-Check the **Texture** check box in order to activate the texture for 3D objects in this class.



-Click on the texture selection menu (just beneath the **Texture** check box). The texture selection window opens.

-Select the texture **Asphalt Small**.

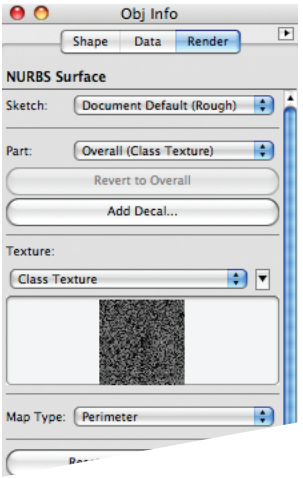
-Click **OK** to exit the **Edit Class(es)** dialog box.

-Click **OK** again to exit the **Organization** dialog box.

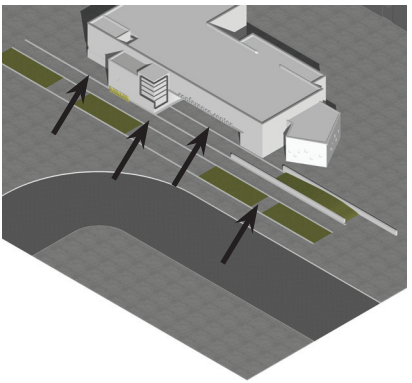
Now set the NURBS surface to accept a texture by class:
-Select the NURBS surface representing the street.

-In the **Object Info** palette, click on the **Render** tab.

-Click on the **Texture** drop-down box and select **Class Texture**.



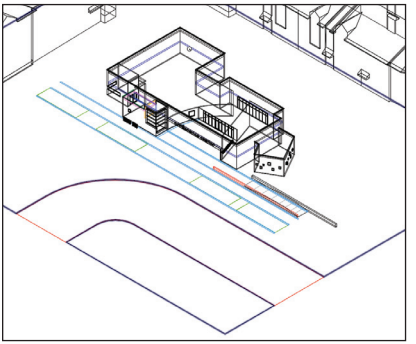
Render in **OpenGL** to confirm that the texture has been applied.



c. River Stone Trim.

The hardscaping is punctuated by a series of linear trim objects, running parallel to the building's front (and along one curved wall). In the model these objects are actually simple extrusions. In wireframe view they can be identified by their light blue color. These linear trim objects will receive the texture **river stone**, applied directly to each object via the **Object Info** palette.

Switch to Right Isometric view for easy visibility.



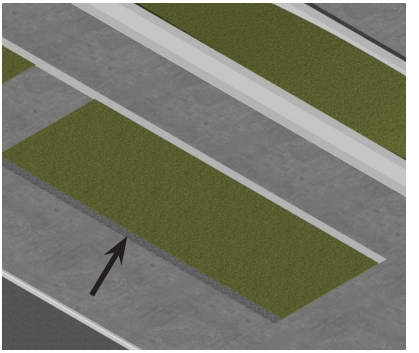
Select the first object and apply the appropriate texture:
-Select the linear trim object located furthest from the building.

-In the **Object Info** palette, click on the **Render** tab.

-Make sure the **Part** drop-down box is set to **Overall (none)**.

-Click on the **Texture** drop-down box and select **river stone**.

Render in OpenGL to confirm that the texture has been applied properly.



Now select the remaining objects and apply the texture:
-Click on the next trim object, and then, pressing and holding the **Shift** key, click on the remaining objects. There should now be three objects selected.

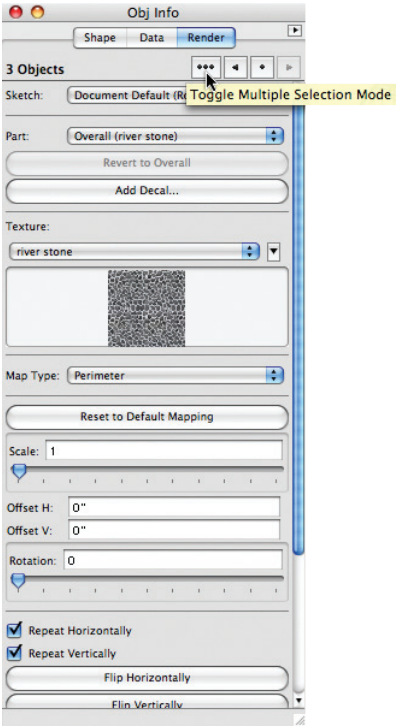
-In the **Object Info** palette, click on the **Render** tab if necessary.

-Make sure the **Part** drop-down box is set to **Overall (none)**.

-Click on the **Texture** drop-down box and select **river stone**.

Render in OpenGL to confirm that the texture has been applied properly to all the remaining objects.

With the three objects selected, the **Render** tab of the **Object Info** palette should match the following:



d. Low Walls.
The two low walls, running parallel to the building's front, receive the same texture as the concrete sidewalk paving: **Conc Lighter Small.**

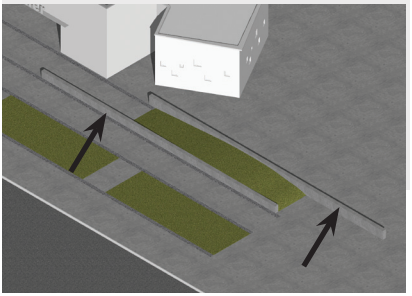
-Click on the first low wall, and then, pressing and holding the **Shift** key, select the second wall also. Both walls should now be selected.

-In the **Object Info** palette, click on the **Render** tab if necessary.

-Make sure the **Part** drop-down box is set to **Overall (none)**.

-Click on the **Texture** drop-down box and select **Conc Lighter Small**.

Now render in OpenGL to confirm that the texture has been applied properly to both walls. This completes the hardscaping adjustments.



3. Building Walls

Some of the building's walls receive a texture representing travertine stone panels. First we will create the texture from an imported image, and then we will apply the texture by class. These are the steps:

a. Create the travertine stone texture.

b. Select and then adjust the walls to receive textures by class.

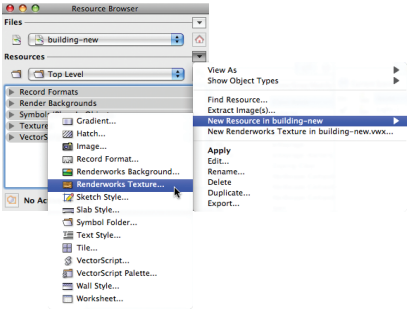
c. Apply the texture to the desired class.

d. Fine-tune the texture's appearance.

The exterior building walls have all been placed in the class **main building walls-textured** and will receive the texture simultaneously.

a. Create the travertine stone texture:
-In the Resource Browser, click on the **Resource** menu button and select **New Resource in building-new.**

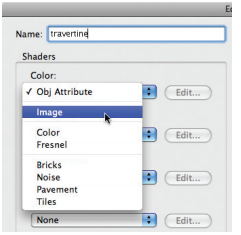
-Drag the cursor to **Renderworks Texture** and select it.



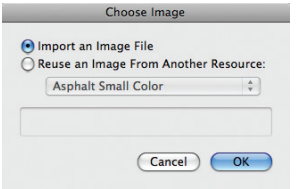
The **Edit Texture** dialog opens.

-In the **Name** box, type a name for this texture: **travertine**.

Next, import an image to be used as a source for this texture:
-In the **Shaders** area, click on the **Color** drop-down box and select **Image**.



The **Choose Image** dialog box opens. Select **Import an Image File**, and click **OK**.



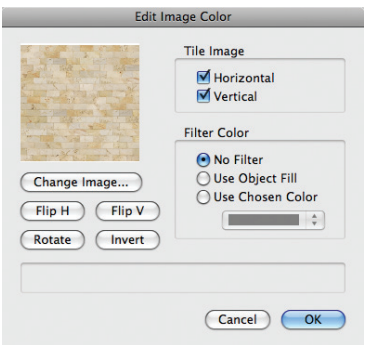
The **Import QuickTime Image Document** dialog box opens.

-Click on the drop-down box at the top of the dialog box, and navigate to the folder containing this exercise's resources: **graphics support files**.

-Select that folder and click **Open**.

-Select the image: **travertine.png** and click **Open**.

The **Edit Image Color** dialog box opens, displaying a thumbnail picture of the image we're selecting. Make sure that all the settings are as shown in the screenshot below.



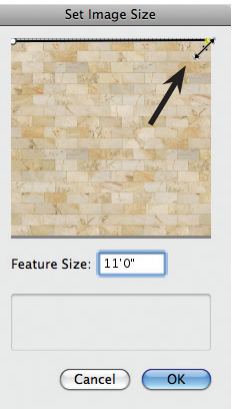
-Click **OK**.

We're back in the **Edit Texture** dialog box.

Now adjust the size of the texture:
-In the **Size** area at the bottom of the dialog box, click on the **Set By Image** button. The **Set Image Size** window opens.

-Grab the little round handle at the upper left side of the window and drag it over to the right edge. The dimension we will enter in the next step will match the size of this handled widget.

-In the **Feature Size** box enter the desired dimension: **11'0" [3350mm]**.



-Click **OK** to exit the **Set Image Size** window, and then click **OK** again to exit the **Edit Texture** dialog box.

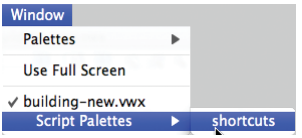
The new texture is now complete. Look in the Textures pane of the **Object Info** palette and see the new texture.

Next, we will apply the texture to all the walls in the **main building walls-textured** class. Once these walls have been set to receive their textures by class, all that remains is to assign an actual texture to that class, and the walls will then automatically display that texture.

b. Adjust the walls to receive textures by class:
Find the correct walls to receive this texture. The exercise file includes a pre-made script that will instantly pick out those walls. The script is located in the script palette **shortcuts**.

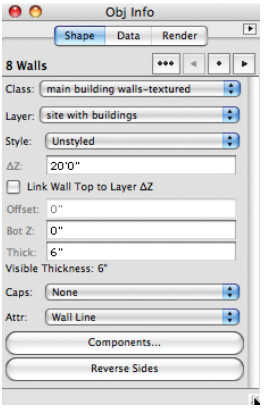
Note: Before proceeding, make sure nothing is selected.

-Open the script palette **shortcuts**: **Window>building-new.vwx/Script Palettes>shortcuts.**



-double-click on the script **select main building walls-textured**.

The walls are now selected and highlighted. The **Object Info** palette should report that 8 walls are selected.

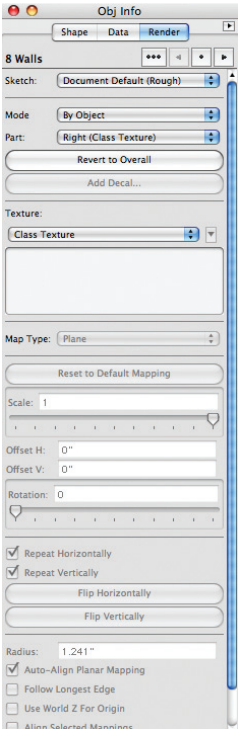


The walls must now be set to *receive* textures by class in order to display that class texture:
-Click on the **Render** tab of the **Object Info** palette.

-Make sure the **Toggle Multiple Selection Mode** button is set to multiple selections (it will display three dots).

-Set the **Part** drop-down box to **Right** (from Overall).

-Click on the **Texture** drop-down box and select: **Class Texture**. The Object Info palette will look like the following image.



c. Apply the texture to the desired class:
-Open the **Organization** dialog box.

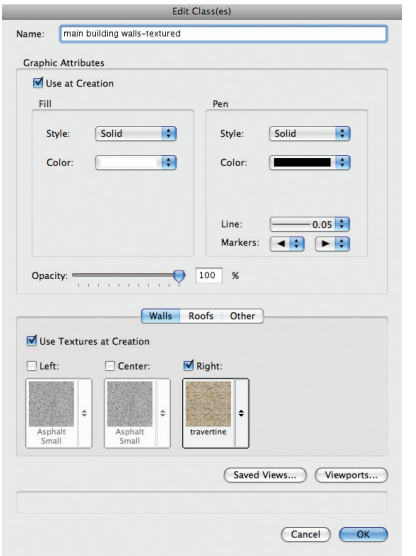
-Select the **Details** button (top-right side), and then click on the **Classes** tab to view the file's classes.

-Select the class **main building walls-textured**, and then click on the **Edit** button. The **Edit Class(es)** dialog box opens.

-Click on the **Walls** tab (about halfway down the dialog box).

-Check the **Use Textures at Creation** checkbox in order to apply the wall textures automatically.

-Click on the **Right** check box in order to activate the texture for those wall parts.



-Click on the **Right** texture selection tool.

The texture selection window opens.

-Select the texture: **travertine**.

-Click **OK** to exit the **Edit Class(es)** dialog box.

-Click **OK** again to exit the **Organization** dialog box.

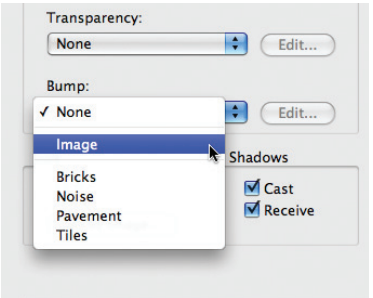
For easier viewing, click on the **Saved Views** drop-down box and select the **View 2**. Now click on the **Fit To Page Area** button. Re-render the scene in Fast Renderworks: **View>Rendering>Fast Renderworks**.

d. Fine-tune texture appearance.
The exterior walls selected earlier will show the stone texture applied. They look, however, a bit flat. We can improve their three-dimensional appearance by adding a three-dimensional quality to the image of the stone (a bit of shade and shadow). We do this by adding a **Bump** shader to the stone wall texture:
-In the Resource Browser, find and select the **travertine** texture (under **Textures**).

-Click on the Resource Browser's **edit** button (or just right-click) and select: **Edit...**

The **Edit Texture** dialog box opens.

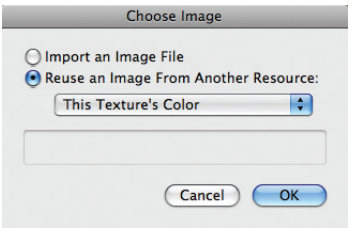
-In the **Shaders** area, click on the **Bump** drop-down box and select: **Image**. This means the bump shader is using an image as its source.



The **Choose Image** dialog box appears.

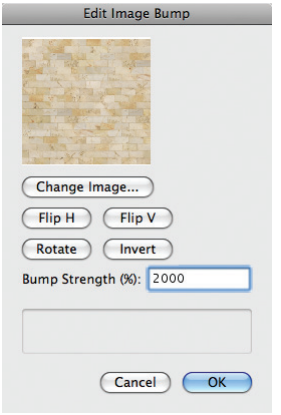
-Click on the **Reuse an Image From Another Resource** button.

-In the drop-down box, select: **This Texture's Color**. This means that we will use the image already selected for the texture as the source for its **Bump** shader (there are other choices available as well, but we'll stick to this image as the source here). Click **OK**.



The **Edit Image Bump** dialog box appears.

-In the **Bump Strength (%)** data field type: **2000**.

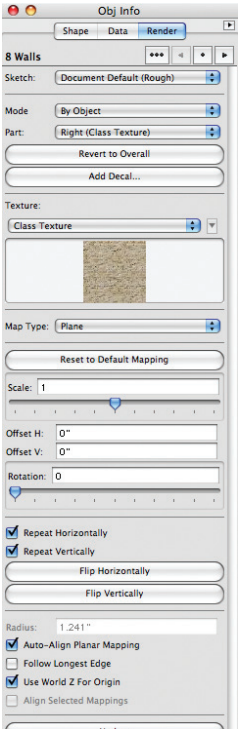


-Click **OK** to exit the **Edit Image Bump** dialog box.

-Click **OK** to exit the **Edit Texture** dialog box.

Re-render the scene in Fast Renderworks: **View>Rendering>Fast Renderwork**s. The stone texture should have a more three-dimensional appearance now.

How do the walls look? Are the textures on adjacent walls aligned? With the eight exterior walls still selected, make sure the settings in the Object Info palette match those in the following image.



4. Glass

The glass texture used in the building's windows, doors and storefronts is made entirely within Vectorworks and applied by class. In this exercise file the windows, doors and storefronts have already been set to receive the texture by class. All that remains is to make the glass texture itself, and then assign it to the appropriate class.

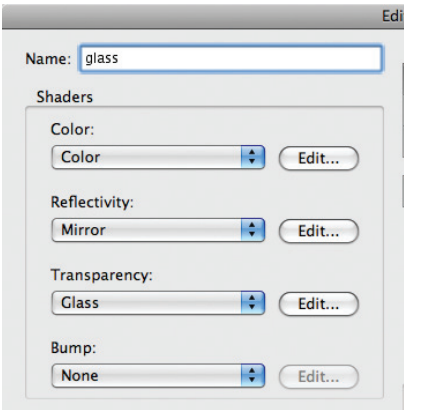
a. Create glass texture:

-In the Resource Browser, click on the **Resource** menu button, and then select **New Resources in building-new**, then **Renderworks Texture**.

The **Edit Texture** dialog box opens.

-In the **Name** box, type this texture's new name: **glass**.

This glass texture uses three of the four available shader types used to assemble textures: **Color**, **Reflectivity** and **Transparency**.



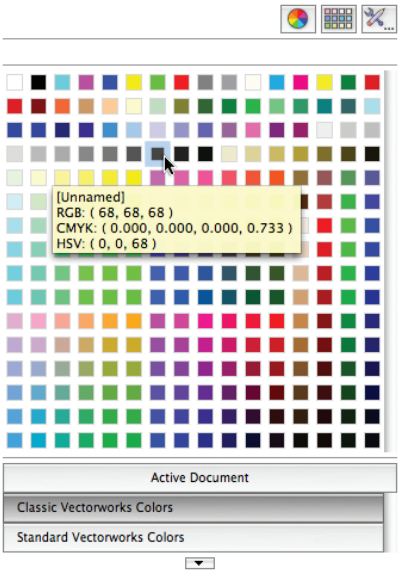
Color.

-In the **Shaders** area, click on the **Color** drop-down box and select **Color**.

- Click on the **Edit** button next to **Color**.

The **Edit Color Shader** dialog box opens.

-In the **Color** drop-down selection box, select the color shown below, and click **OK**.



***Note**: A very dark-gray color, nearly black, provides a very clear, clean appearance to the glass while adding just a touch of milky opacity.*

Reflectivity.

-Back in the **Shaders** area, click on the **Reflectivity** drop-down box and select **Mirror**.

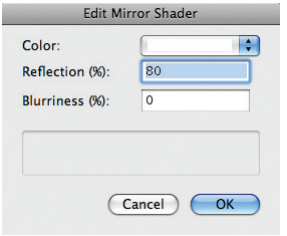
-Click on the **Edit** button next to **Reflectivity**.

The **Edit Mirror Shader** dialog box opens.

-Click on the **Color** drop-down box and select the color **white**.

-Click in the **Reflection** data field and enter **80**. Leave **Blurriness** at **0**.

-Click **OK**.



***Note**: Consider experimenting with the **Blurriness** setting. An increased setting may provide a significantly more realistic appearance by introducing a bit of blur–but at the cost of greatly-increased rendering times.*

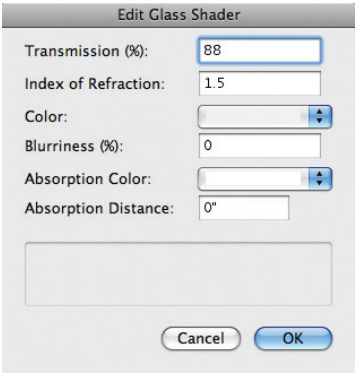
Transparency.

-Still in the **Shaders** area, click on the **Transparency** drop-down box and select **Glass**.

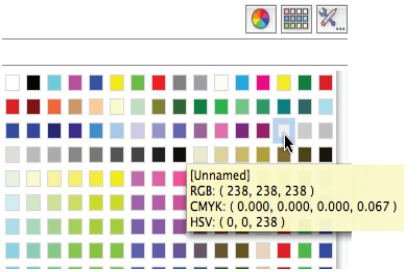
-Click on the **Transparency Edit** button.

The **Edit Glass Shader** dialog box opens.

-Modify the settings to match the following image:



-Make sure the **Color** setting (in the **Edit Glass Shader** dialog box) matches the following:



-Click **OK**.

Back in the **Edit Texture** dialog box, simply leave all the other settings untouched, and click **OK**.

b. Assign the Glass texture to the appropriate class:
Once the texture has been assigned to the correct class, all the objects in that class will display the texture. The process is similar to the steps taken earlier, when we assigned the **travertine** wall texture to the appropriate wall class.

-Open the **Organization** dialog box.

-Select the **Details** button, and then click on the **Classes** tab to view the file's classes.

-Select the class **Glazing-Clear**, and then click on the **Edit** button.

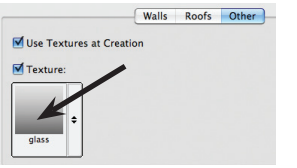
The **Edit Class(es)** dialog box opens.

-Click on the **Other** tab (about halfway down the dialog box).

-Check the **Use Textures at Creation** checkbox in order to apply the wall textures automatically.

-Check the **Texture** check box in order to activate the texture for 3D objects in this class.

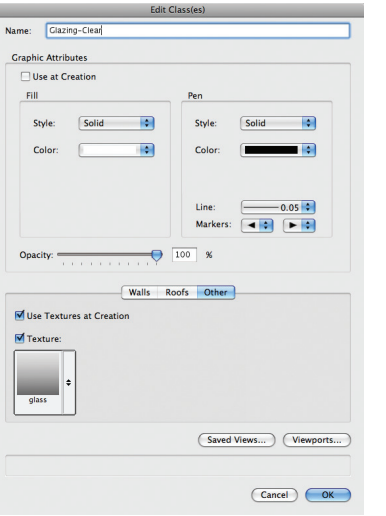
-Click on the texture selection menu.



The texture selection window opens.

-Select the texture **Glass**.

-Click **OK** to exit the **Edit Class(es)** dialog box.



-Click **OK** again to exit the **Organization** dialog box.

Task 4: Add Sky.

In this file the graphic image of the sky is a **HDRI** background supplied with Renderworks and applied as a layer background: **HDRI Sky Day Mostly Sunny.**

***Note**: **HDRI** backgrounds can also be used as lighting sources–they are actually dual-purpose backgrounds. But for this exercise file, the **HDRI Sky Day Mostly Sunny** layer background will be used only for its image of the sky (a different layer background is used here as a light source, as described in **Task 1: Lighting**).*

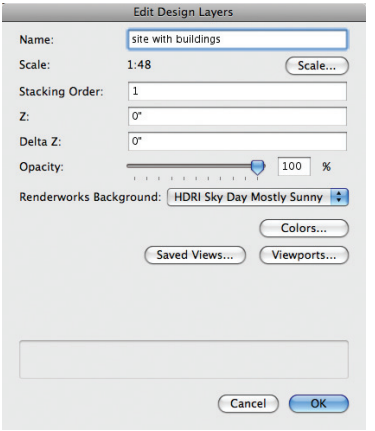
-Open the **Organization** dialog box.

-Select the layer **site with buildings** and click **Edit**.

The **Edit Design Layers** dialog box opens.

-Click on the **Renderworks Background** drop-down box and select **HDRI Sky Day Mostly Sunny.**

-Click **OK**, and then back in the **Organization** dialog box, click **OK** again.



To see the new sky, click on the **Saved Views** drop-down box and select the **View 1**. Now click on the **Fit To Page Area** button. Re-render the scene in Fast Renderworks: **View>Rendering>Fast Renderworks**.

Task 5: Add Entourage.

This scene uses three types of entourage: one car symbol, several image props of people, and several of trees.

1. Create and place image props.

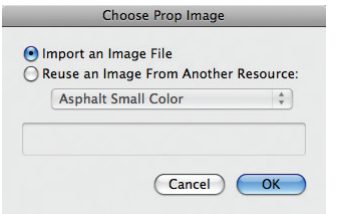
An image prop is, in essence, a three-dimensional flat object onto which an image has been mapped, similar to a billboard. The image prop can be optionally set to automatically rotate toward the camera in order to enhance its appearance and three-dimensionality. With this setting, it is not necessary to orient each image prop in a particular direction (unless desired). One need only place specific image props in the desired locations, and they will automatically point toward the camera in any 3-D view. Additional automated features are optionally available as well, such as the selection of certain colors for transparency, suitable for transparent backgrounds.

This exercise file requires several image props to be installed at various locations, representing trees and people.

a. Make an image prop from a tree image and place it in the scene.
Later we will add a number of pre-made image props in various locations.

-Go to the command **Model>Create Image Prop...**

The **Choose Prop Image** dialog box will open, prompting us to select an image to be used in the image prop.



-Click on: **Import an Image File**, and then click **OK**.

The **Import QuickTime Image Document** dialog opens.

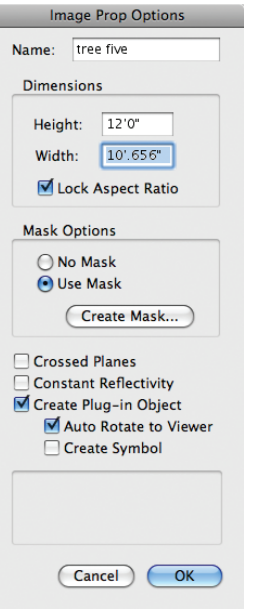
-Navigate to the folder containing this exercise and, once inside, to the folder **graphics support files**. The image file to be used for this image prop is located in this folder.

-Select the image **tree five image.png** and click on the **Open** button.

The **Image Prop Options** dialog box opens.

-In the **Name** data field, type a new name for this image prop: **tree five**.

-Under **Dimensions**, change Height to **12'-0" [3660mm]**, and make sure that the **Lock Aspect Ratio** checkbox is selected.



Now we'll make the background color of the tree image transparent, so that only the image of the tree itself will be seen.

-Under **Mask Options**, select **Use Mask**, and then click on the **Create Mask** button.

The **Choose Prop Mask Image** dialog box opens. To create the transparency mask (required in order to make a portion of the image transparent) we will reuse the image we have already selected:
-Click on **Reuse an Image from Another Resource.**

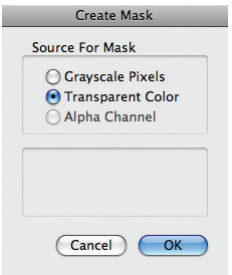
-Leave the drop-down box at **This Prop's**

Color (if that is not the default selection, click on the drop-down box and select **This Prop's Color**).

-Click **OK**.

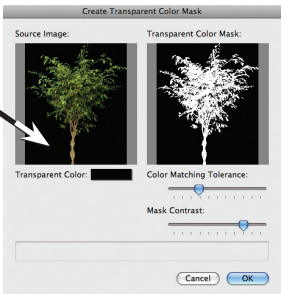
The **Create Mask** dialog box opens.

-Select **Transparent Color**, and click **OK**.



The **Create Transparent Color Mask** dialog box opens. We will now select the color to be used as a transparent color mask (anything in that color will be transparent in the image prop). Note that the original image has been prepared with a uniform background of a single color. When making an image prop, it is simpler to pick out a single color and make it transparent.

-In the left window, click on the **black** background color.



-Move the **Color Matching Tolerance** slider one notch to the right.

-Move the **Mask Contrast** slider one notch to the right.

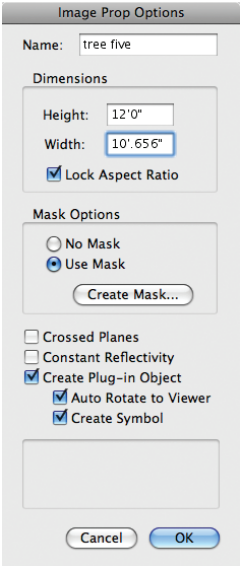
-Click **OK**.

We're back in the **Image Prop Options** dialog box.

-Deselect **Constant Reflectivity**. This setting increases (or maintains) the brightness of the image prop, even when it is in the shade. Not required for our example.

-Make sure the **Create Symbol** checkbox is selected. This will make the image prop into a symbol that can be placed repeatedly throughout the scene.

-Make sure the remaining options are as shown below.



-Click **OK**.

The completed image prop has now been made into a symbol (which can be seen in the Resource Browser). A copy of it has been placed in the scene–at the origin point, where it remains selected and highlighted.

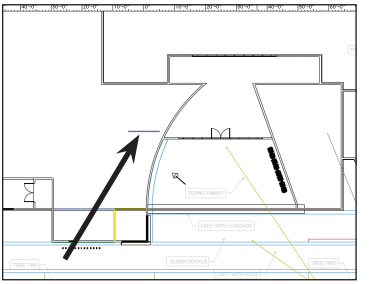
b. Place copies of the new image prop at the desired locations:
-First switch to a **Top/Plan** view and turn on the **Entourage Locations** layer (**View>Layer Options>Show/Snap Others**). This layer is a pre-made map showing the desired spots for image props and symbols, including the just-completed image prop.

-In the **Organization** dialog box, make the **Entourage Locations** layer visible and click **OK**.

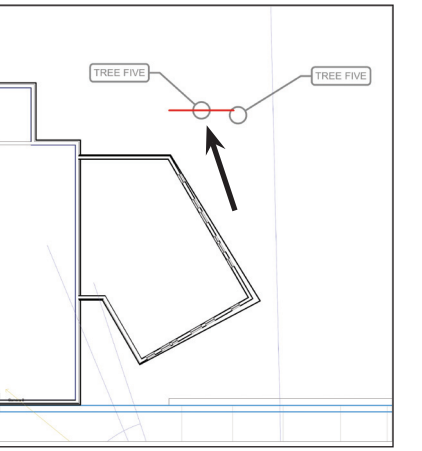
-Zoom as necessary to include the right half of the building.

-Make sure layer visibility is set to **Gray/Snap Others** (**View>Layer Options>Gray/Snap Others**).

-Now go to the **0-0** origin (turn on the rulers if necessary, to help identify the spot) and find the just-created image prop.

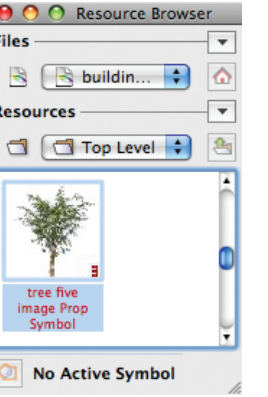


-Snap the cursor to the center of the image prop and drag it to the location marked **Tree Five**.



Now we'll place another copy of this image prop, alongside the first.

-In the Resource Browser, under **Symbols/ Plug-In Objects,** find the image prop named: **tree five Image Prop Symbol.**



-Click/hold on the thumbnail image, and drag/drop the image prop symbol from the Resource Browser onto the drawing, at the second location marked **Tree Five**, right alongside the first.

Now check to see that the image prop was placed properly.

-Switch to right isometric view: **View>Standard Views> Right Isometric**.

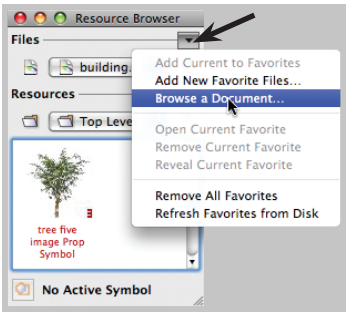
-Render in **Fast Renderworks**. Note that the trees do not appear flat, but have rotated to face the camera.

-Switch back to **Top/Plan** view. Make sure the **Entourage Locations** layer is visible. Set rendering to **Wireframe**.

2. Place premade image props.

A variety of premade image prop symbols are available in a library file supplied with this exercise. These symbols can be accessed and imported directly within the Resource Browser.

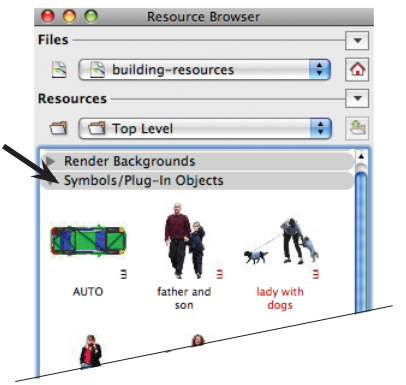
-In the Resource Browser, click on the **Files** menu button and select **Browse a Document**.



The **Select a Vectorworks Document** dialog box opens.

-Navigate to the folder containing this exercise, and select the library file **building-resources**. Click **Open**.

The Resource Browser will now display that file's resources, including the image prop symbols that have been previously created for this exercise. Find these image prop symbols under **Symbols/Plug-In Objects**. Drag/drop these symbols directly from the Resource Browser onto the drawing, at the spots marked in gray.



-Select the first image prop symbol, named **father and son**.

-Click/hold on the thumbnail image, and drag the image prop symbol from the Resource Browser onto the drawing, at the location marked **Father and Son**.

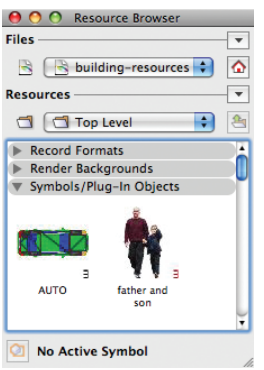
Note that we have imported a symbol from another drawing file, even though that other file is not currently open. The Resource Browser provides access to resources that are located both in the active file, and in other, non-active files as well.

-Now select each of the remaining image prop symbols, and move them one-by-one onto the drawing at the locations marked. The location names match those of the image prop symbols.

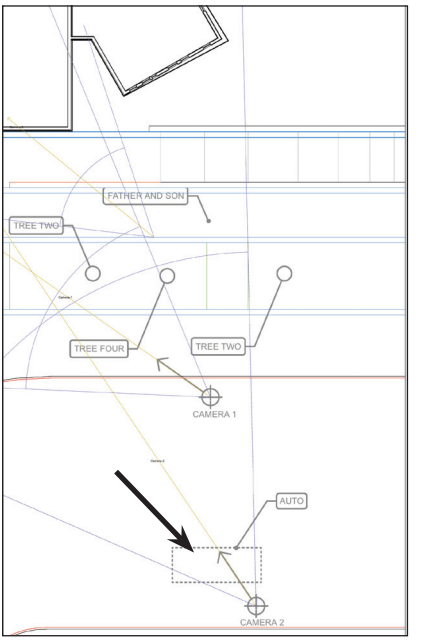
3. Place 3D symbols.

The Resource Browser should still be displaying the resources in the library file **building-resources**.

-In the Resource Browser, under **Symbols/ Plug-In Objects**, find the pre-made automobile symbol **Auto**.



-Click/hold on the symbol's thumbnail image, and drag the symbol from the Resource Browser onto the drawing, at the location marked **AUTO**, just in front of **Camera 2**.



To finish up, switch to **view 1** (click on the **Saved Views** drop-down box and select **view 1**). Make the underlying **Entourage Locations** layer invisible (by controlling layer visiibility: **View>Layer Options**) and render in **Fast Renderworks** (**View>Rendering>Fast Renderworks**).

This concludes the file-preparation portion of the exercise.

The final task involves rendering the file and exporting an image.

Task 6: Render and Export an Image.

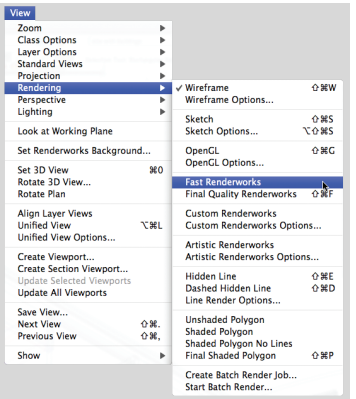
1. Render the scene.

a. Basic Renderworks Methods.
We have already used and reviewed a few basic methods for rendering in Renderworks. **Fast Renderworks** and **Final Quality Renderworks** represent two points on the rendering quality spectrum. The **Fast Renderworks** setting makes for a speedy rendering, albeit at the expense of image quality. **Final Quality Renderworks** is a high-quality rendering mode that provides smooth accuracy and precise representation of lighting–but at the expense of rendering time.

To put it simply:

- **Fast Renderworks** = Higher speed/ lower quality.
- **Final Quality Renderworks** = Higher quality/lower speed.

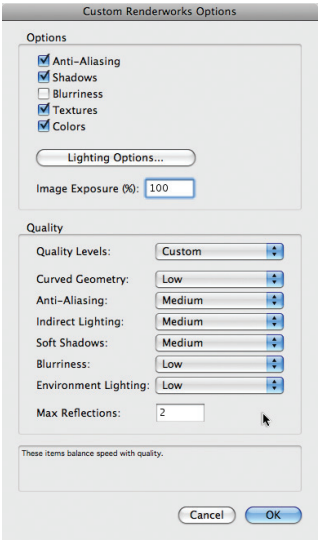
These two settings will be satisfactory in the majority of cases.



b. Finer Adjustments using Custom Renderworks.
To adjust the Renderworks settings more finely, access the individual components of these settings via the **Custom Renderworks Options** dialog box:
View>Rendering>Custom Renderworks Options.

The dialog box provides access to 13 different categories of quality and visibility settings. Once specific settings have been selected, use **Custom Renderworks** as the rendering option:
View>Rendering>Custom Renderworks.

c. Example of a Custom Renderworks setting:
For a quick mid-level **Custom Renderworks** setting–better than **Fast Renderworks** and faster than **Final Quality Renderworks**–arrange the **Custom Renderworks Options** as shown below:



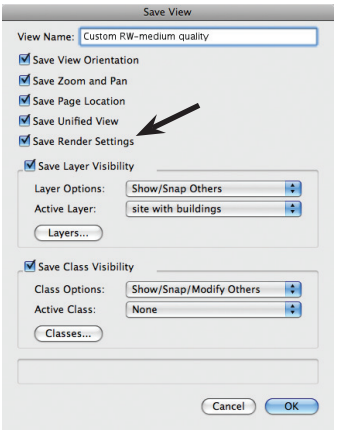
This example is just a starting point. Experiment with the different settings to find a suitable speed-vs.-quality compromise setting. Note the five options at the very top: deselecting several of them (such as Textures or Anti-Aliasing) may significantly increase rendering speed during interim development of renderings.

Once we have arranged the settings as desired, render in **Custom Renderworks**: **View>Rendering>Custom Renderworks**.

d. Save new Custom Renderworks settings by using the Saved Views command.
After rendering with **Custom Renderworks**, use the **Saved Views** command to save the new **Custom Renderworks** settings along with the view.
-View>Save View.

The **Save View** dialog box opens.

-In the **View Name** box, enter a desired name for the view. Consider a name that provides information about the settings, such as All Medium Settings, or No Textures.



-Select the **Save Render Settings** checkbox in order to preserve the **Custom Renderworks** settings just developed.

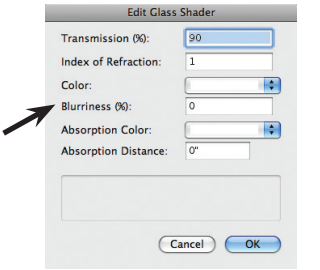
-Click **OK**.

Whenever we call up a saved view, the **Custom Renderworks Options** developed for that view will be implemented in the rendering. In this way it is possible to save a variety of **Custom Renderworks Options**. (**Custom Renderworks Options** can also be saved as **Renderworks** styles. See page 41).

Note: **Custom Renderworks Options** *settings are also saved with viewports when viewports are rendered. More on that below.*

A note about several **Custom Renderworks Options**:

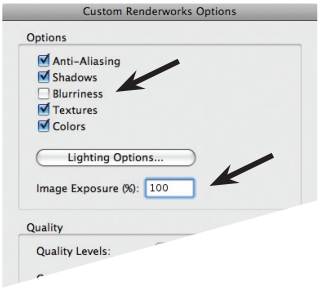
- **Blurriness** refers to a setting used when creating textures containing **Reflectivity** and **Transparency** shaders.



Blurriness will make those textures appear, as the name implies, *blurry* to a greater or lesser extent. Clicking the **Blurriness** checkbox in the **Custom Renderworks Options** can greatly increase rendering times, but can also increase the realism of a rendering.

For work-in-progress test renderings, deselect the **Blurriness** setting altogether, and just choose it at the very end, when the final rendering is desired.

- **Image Exposure (%)** controls the brightness of a rendering. Change the number in the **Image Exposure** box to fine tune a rendering's brightness. The default brightness is **100%.**



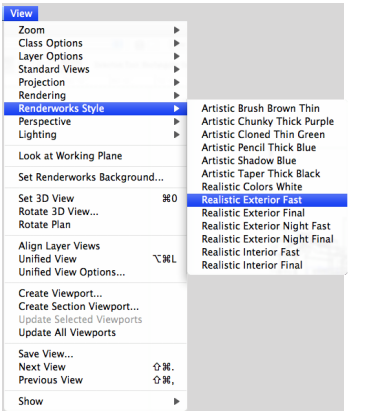
As a reminder, these settings only apply when rendering with **Custom Renderworks**, and do not affect the appearance of images prepared with **Fast Renderworks** or **Final Quality Renderworks**.

e. Use Renderworks Styles to Save Time

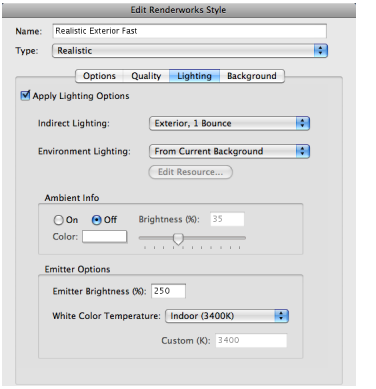
Fine-tuning **Custom Renderworks** settings can be time consuming. To speed up the effort, **Renderworks** provides a series of pre-made settings called **Renderworks Styles**, available via the **Renderworks Style** menu (**View>Renderworks Style**). Selecting a style automatically triggers a new rendering with the style's settings.

Render using a Renderworks style:
-First click on the **Saved Views** drop-down box, and select **View 1**. Remember that we already have the lights in place, and active.

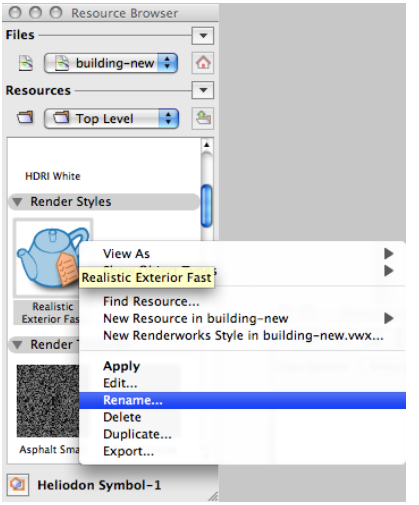
-Now render using a **Renderworks** style: **View>Renderworks Style>Realistic Exterior Fast.** The scene will render with the new settings.



To see the style's settings, go to **View>Lighting>Set Lighting Options**. The **Edit Renderworks Style** dialog box opens, displaying and providing access to the different parameters used by the style. You can modify any of these options, and subsequent use of the style in this file will reflect the changed parameters.



After altering a style's settings to a combination you find suitable, save that altered style as a new one by renaming it in the **Resource Browser** (right-click on the style and select **Rename**).

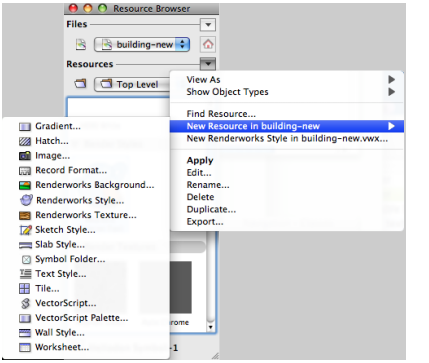


To re-create the style's original settings (before they were modified and the style renamed), simply re-render with the original chosen style. **Renderworks** will then create the style again, with the original settings.

If you have laboriously created a set of **Custom Renderworks** settings that you would like to save as a **Renderworks** style, do the following:

-Render the scene in **Custom Renderworks**.

-In the **Resource Browser**, click on the **Resources** menu button, choose **New Resource in...**, and then select **Renderworks Style.**



- The **Edit Renderworks Style** dialog box will open–with all the **Custom Renderworks** settings already in place. Give the new style a name, then click **OK**.

2. Render a viewport.

Make a viewport of a saved view, and then render the viewport. Among other advantages, a viewport will save **Custom Renderworks** settings and make it easy to compare different settings between viewports.

Keep this in mind: each rendered viewport will need its own lighting and rendering quality settings.These are set via the Object Info palette. To compare the results of settings, duplicate the viewports, set them side by side, and then alter the lighting and rendering quality settings for each viewport prior to updating.

a. Go to a saved view.
-Click on the **Saved Views** drop-down box, and select **View 1.**

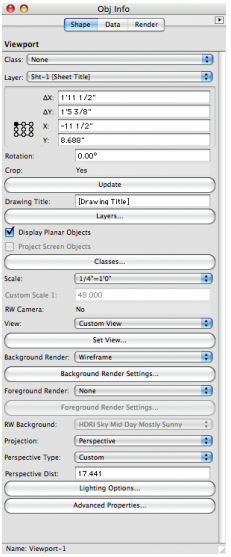
b. Make a viewport.
-**View>Create Viewport**. The **Create Viewport** dialog box opens.

-Leave all the settings in place, and click **OK**.

The **New Sheet Layer** dialog box opens (only the first time a viewport is created).

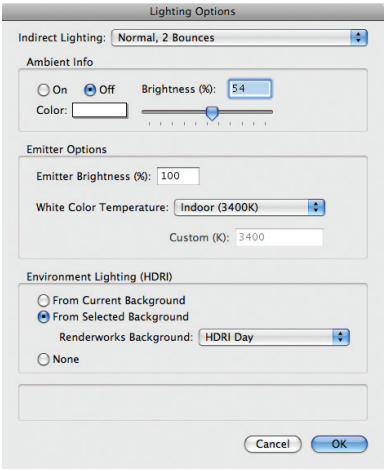
-Click **OK**.

The new sheet layer containing the viewport is immediately made active, and the new viewport is left selected on the screen.
The **Object Info** palette reports and controls the viewport's settings:



c. Add HDRI lighting and adjust Indirect Lighting settings.
-Click on the **Lighting Options** button. The **Lighting Options** dialog box opens.

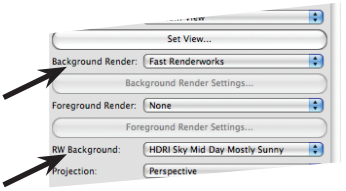
-Make sure the settings are as shown and click **OK**:



Remember that heliodon representing the sun? In this file that light object continues to reside on the original *design* layer (not the sheet layer), and the viewport will incorporate its lighting into the rendering without further adjustment.

d. Select rendering method.
-Click on the **Background Render** drop-down box and select **Fast Renderworks**.

e. Add sky.
-Click on the **RW Background** drop-down box and select the visible, graphic layer background **HDRI Sky Day Mostly Sunny.** (Remember that we are using one **HDRI** background for lighting purposes, and a different one for a graphic representation of the sky.)



Why choose a Background Render prior to selecting a sky? Not all rendering methods utilize Renderworks backgrounds, and the **RW Background** drop-down box will remain grayed-out until a compatible rendering method is chosen.

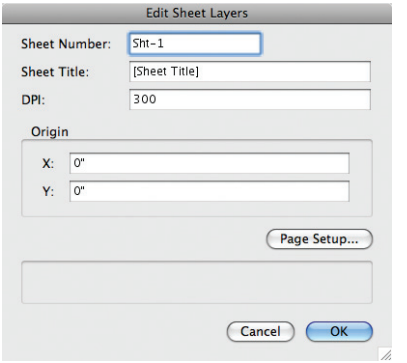
f. Render by updating the viewport.
-In the **Object Info** palette, click on the **Update** button. The viewport will render.

The viewport resides on a sheet layer which has a default resolution of 72 dpi (Dots Per Inch). This resolution corresponds to that of many computer monitors, but it is often too coarse for printing, and may yield blurry results on paper. For better printed results increase the sheet layer's resolution. For print purposes, 300 dpi is often a good setting:

-In the **Organization** palette, select the **Sheet Layers** tab, select the desired sheet layer, and click the **Edit** button. The **Edit Sheet Layers** dialog box opens.

-In the **DPI** data field enter **300**, and click **OK**.

-Back in the **Organization** palette, click **OK**.

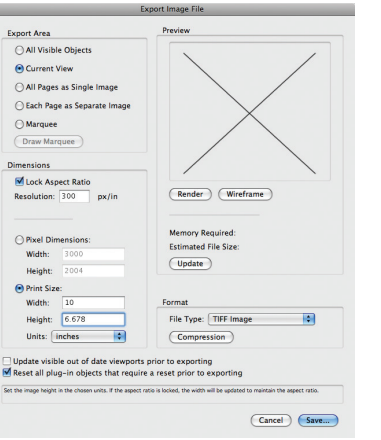


Important: increasing the sheet layer's resolution from 72 dpi to 300 will significantly increase rendering times, because many more pixels need to be calculated, developed and rendered.

3. Export the Image.

-File>Export>Export Image File.

The **Export Image File** dialog box opens. Arrange the settings as shown below.

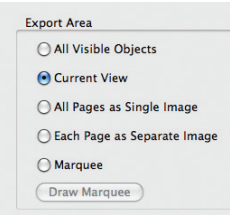


Before clicking **Save**, please see the specific notes below and then modify the settings as desired.

a. Selecting options within Export Area:

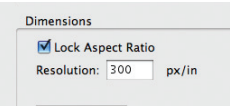
- **Current View** will export the sheet with the rendering exactly as shown on the screen. If the rendering is smaller than the sheet and surrounded by white areas, that is exactly what the rendering will include.

- **Marquee** will allow us to draw a fence–or marquee–around the specific portions of the rendering we wish to include.



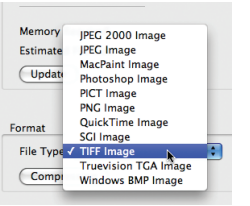
b. Selecting options within Dimensions.

- **Lock Aspect Ratio**. This locks the relationship between height and width of the exported image. If we change the image *width* under **Pixel Dimensions** or **Print** size, for example, the image *height* will automatically adjust in order to maintain the original proportions.
- **Resolution**. This is the resolution of the exported image, which normally defaults to 72 pixels per inch. For print purposes, try 300 px/in. 72 px/in can look fine on most computer monitors but not always in print.



c. Selecting options within Format.
-Click on the **File Type** drop-down box, and select a file format for the image being exported:

- **JPEG** is good for viewing on monitors.
- **TIFF** is suitable for printing.
- **Photoshop** will export a file in native Photoshop format that will automatically open in that program.



d. Selecting other options.

- **Update visible out of date viewports prior to exporting**. This will allow a viewport that has not been updated to automatically do so just prior to the render export.

e. Complete the image export.
-Click **Save**.The **Export as Quicktime Document** opens.

-Navigate to the spot in which the image file will be saved, and in the **Save As** field, enter a desired file name.

-Click **Save**.

The **Export Image File** dialog box is still visible on the screen. Do *not* click **Save** again. Simply wait for the image export to complete (it will take some time, as the file needs to render again). When the export operation is complete, the **Export Image File** dialog box will automatically disappear.

conference cen

Section 2:
Day-Time Interior View

Section 2 of this guide will focus on rendering an office interior, daylit through a window wall. The exercise file has already been partially set up with textures and cameras.

What will this exercise cover? We will install and adjust lighting and then add a layer background, essentially a sky graphic, to be seen through the window wall on the left. We will apply textures to the rear-most wall behind the stairs, the partial-height mesh partition just in front of the rear steps and the wood paneling on the right, beneath the upper mezzanine. Finally, we will render in Custom Renderworks.

The exercise will focus on the following tasks:

1. Placing a sun-light and a HDRI background, adding light from the sky.
2. Setting the appropriate light quality settings.
3. Adding a layer background representing the sky (seen through the window wall).
4. Creating and applying three textures to interior surfaces.
5. Rendering using Custom Renderworks.

Open the file: **Interior-day.vwx**. Take a quick first look:
-Go to the **Saved Views** drop-down box and select **view 1**. The view will be in wireframe.

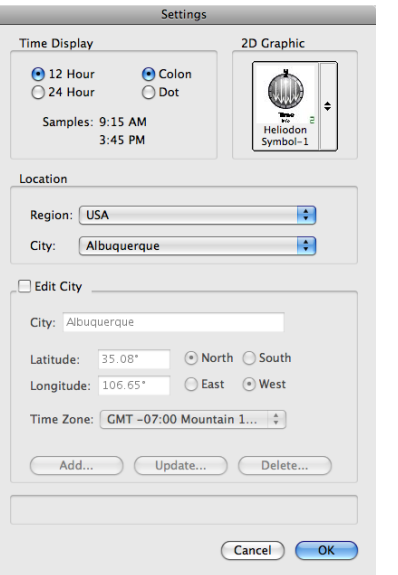
-Make a quick first rendering using Fast Renderworks: **View>Rendering>Fast Renderworks** (seen above).

Task 1: Place a Heliodon Representing the Sun.

In the **Tool Sets** palette, click on the **Visualization** tool set, and then double-click on the **Heliodon** tool.

A Heliodon will be placed in the scene, and the **Create Object** dialog box will open.

-Click on the **Settings** button. The **Settings** dialog box opens.

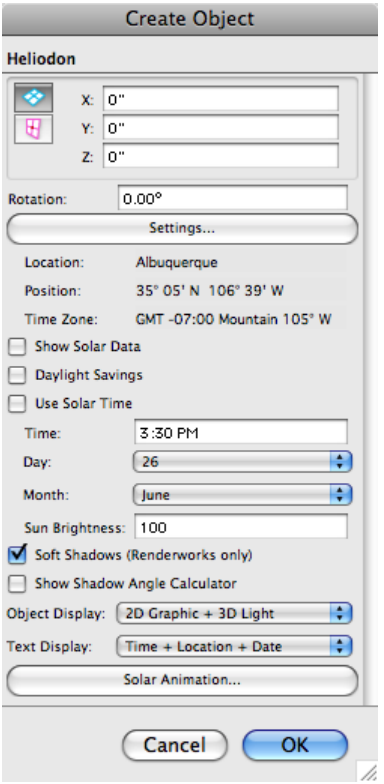


-Under **Location**, click on the **Region** drop-down box and select **USA**. Now click on the **City** drop-down box and select **Albuquerque**. Click **OK**.

-Back in the **Create Object** dialog box, enter the following information:

Time: 3:30 PM
Day: 26
Month: June

Leave everything else as-is, and click OK.



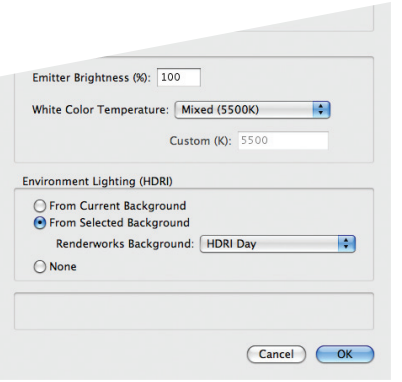
Task 2: Lighting: Add Light from the Sky.

a. Use a HDRI background as a light source (light from the sky) for the scene:
-View>Lighting>Set Lighting Options.
The **Lighting Options** dialog box opens.

-Under **Environment Lighting (HDRI)**, click on **From Selected Background**.

b. Now select the desired HDRI background:
-Click on the **Renderworks Background** drop-down box and select: **HDRI Day**.

-Click **OK**.



-Render in **Fast Renderworks** to see the results.

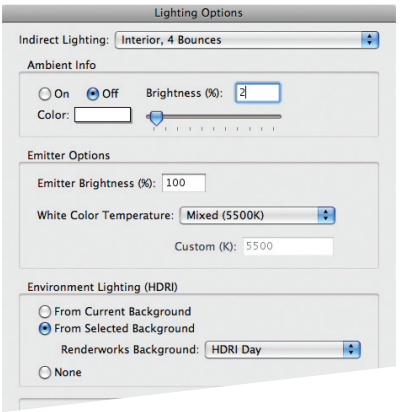
Task 3: Lighting: set Lighting Options.

Access the **Lighting Options** dialog box:
-**View>Lighting>Set Lighting Options**.

The **Lighting Options** dialog box opens.
-Click on the **Indirect Lighting** drop-down box and select **Interior, 4 Bounces**.

A good quality indirect lighting setting for interiors uses 2 bounces. Using fewer bounces can often yield unsatisfactory results. 4 bounces is the best setting for interiors but at the occasional cost of lengthy rendering times (depending on the file).

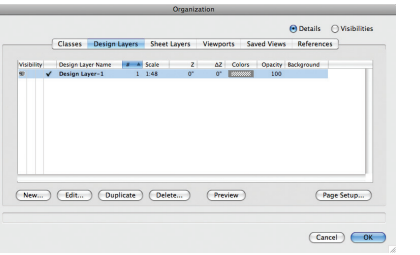
-Make sure the remaining settings are as shown below.



-Click **OK** to finish.

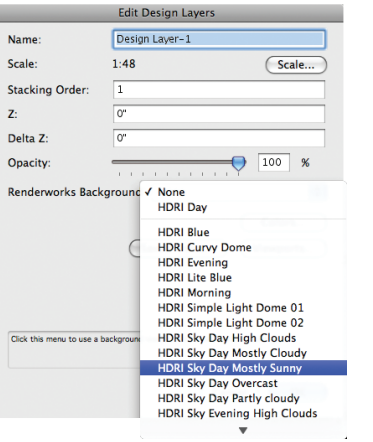
Task 4: Add a Graphic Sky Background.

Use a High Dynamic Range Image background for its graphic sky image, to be seen through the window wall to the left of the image:
-Open the **Organization** dialog box.



-Select the layer **Design layer-1** and click **Edit**.

-The **Edit Design Layers** dialog box opens. Click on the **Renderworks Background** drop-down box and select **HDRI Sky Day Mostly Sunny**.



-Click **OK**, and then back in the **Organization** dialog box, click **OK** again.

Task 5: Create and Apply Textures.

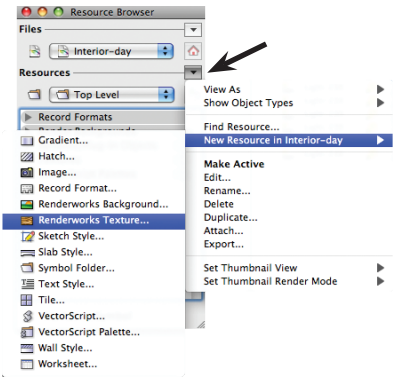
Create three textures and apply them to interior surfaces:

1. Rear wall

The first texture is applied to the rear wall and represents textured plaster. This texture will take on the color of the wall, and recreates the plaster texture through use of the **Noise** bump shader.

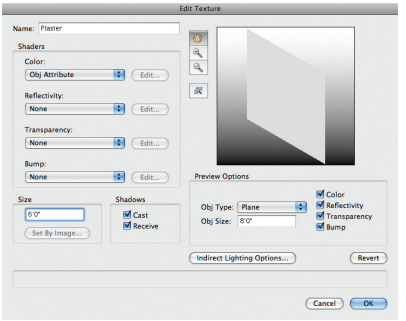
a. Create texture.

First, create a new texture:
-In the **Resource Browser,** click on the **Resource** menu button, and then select **New Resources in Interior-day.vwx**, then **Renderworks Texture**.

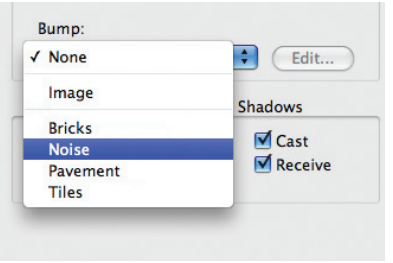


The **Edit Texture** dialog box opens.

-In the **Name** box, type this texture's new name: **Plaster**.



This plaster texture uses one of the four available shader types used to assemble textures: **Bump**, which adds a 3-D appearance to a texture:
-In the **Shaders** area, click on the **Bump** drop-down box and select **Noise**.

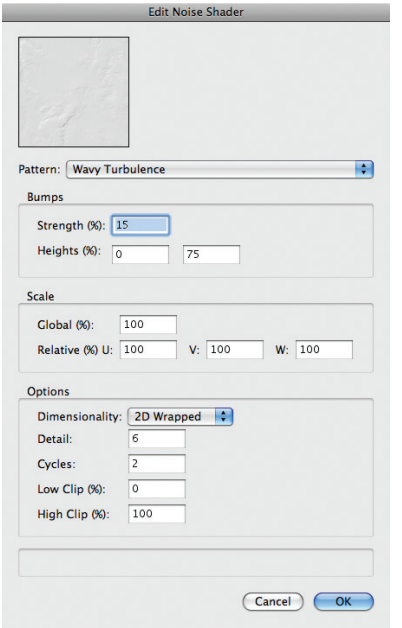


- Click on the **Edit** button.

The **Edit Noise Shade**r dialog box opens.

-Click on the **Pattern** drop down box and select **Wavy Turbulence**.

-Make sure the remaining settings are as shown below. Note some of the features that are particular to this specific **Noise**-based texture: **Strength** is only **15%, Detail** is **6**, and **Cycles**: **2**.



These last two settings are especially important in this shader. As an experiment, change each of these and observe the thumbnail image at the top of the dialog box to see the changes made.

-Click **OK**. We're back in the **Edit Texture** dialog box.

Now change the size of the texture:
-In the **Edit Texture** dialog box, click in the **Size** data field and enter **6'0".** (Why 6'0"? Trial and error–it just looks good. Change it and see if you prefer a different size.)

-Click **OK**.

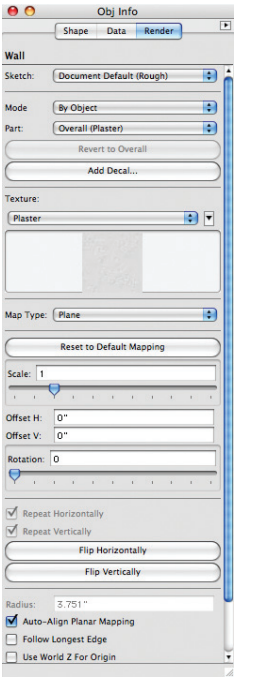
*Note: to change the size of a completed texture, right-click (or Control-click) on the texture in the **Resource Browser** and choose **Edit...** . This will launch the **Edit Texture** dialog box, and the texture's size can be changed in the **Size** data field.*

b. Apply the new texture to the rear wall.

-Switch to **Top/Plan** view.

Select the wall:
-Click once on the rear, orange wall.

Now go to the **Object Info** palette to apply the texture.



-In the **Object Info** palette, click on the **Render** tab.

-Click on the **Mode** drop-down box. Select: **By Object**.

Select the wall part to which the texture is applied:
-Click on the **Part** drop-down box and select **Overall**.

Now choose the texture:
-Click in the **Texture** drop-down box and select the new texture, **Plaster**.

Now switch to the saved view and render to see the results:
-Click on the **Saved Views** drop-down box and select **view 1**.

-Render in Fast Renderworks.

2. Mesh partition.

The second texture is applied to the partial-height wall in front of the stairs. This wall is actually a metal-mesh partition.

a. Create Texture.

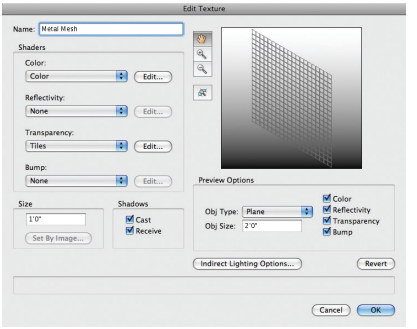
-In the **Resource Browser**, click on the **Resource** menu button, and then select **New Resources in Interior-day.vwx.** Then select **Renderworks Texture**.

The **Edit Texture** dialog box opens.

-In the **Name** box type this texture's new name: **Metal Mesh**.

This mesh texture uses two of the four available shader types used to assemble textures: **Color** and **Transparency**.

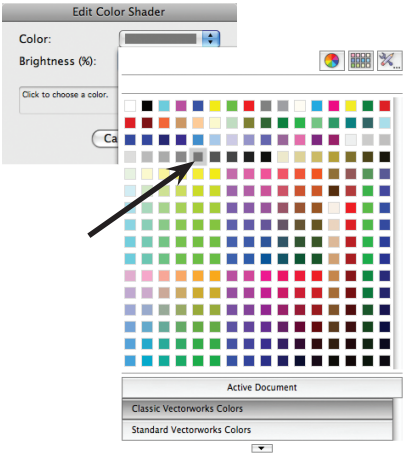
First we'll decide on a mesh color to use in this texture:



-In the **Shaders** area, click on the **Color** drop-down box and select **Color**.

- Click on the **Edit** button.The **Edit Color Shader** dialog box opens.

-Click on the **Color** drop-down box and select the color shown below. Then click **OK**.



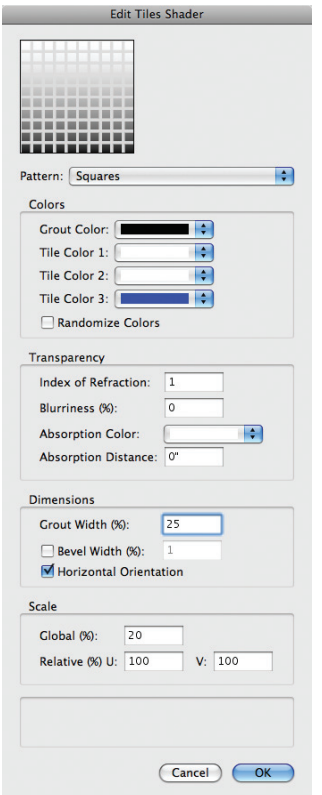
Now we'll apply a patterned transparency to the texture (the pattern representing the mesh material itself):

-Back in the **Edit Texture** dialog box, click on the **Transparency** drop-down box and select **Tiles**.

-Click on the **Edit** button.The **Edit Tiles Shader** dialog box opens.

-Click on the **Pattern** drop-down box and select **Squares**.

-Make sure the remaining settings match those shown below, and click **OK**.



-Back in the **Edit Texture** dialog box, click in the **Size** data field and enter the desired size for a single tile of this texture: **1'-0".**

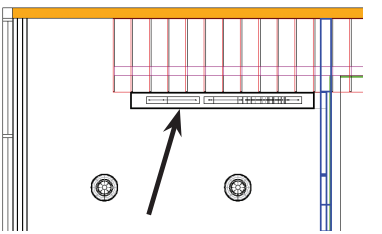
-Click **OK**.

b. Apply the new texture to the wall in front of the stairs.

-Switch to **Top/Plan** view (**View>Standard Views>Top/Plan**).

-Select the partial-height wall just in front of the stairs.

Note: In the file the wall is actually made with a simple extrusion.



-In the **Object Info** palette, click on the **Render** tab.

Now select the part to which the texture is applied:

-Click on the **Part** drop-down box and select **Overall**.

Select the texture:
-Click in the **Texture** drop-down box and select the new texture, **Metal Mesh**.

Switch to the saved view and render to see the results:

-Click on the **Saved Views** drop-down box and select **view 1**.

-Render in Fast Renderworks (**View>Rendering>Fast Renderworks**).

3. Wood paneling.

The third texture is applied to a 3-D object (a Solid Subtraction) on the right side, representing wood paneling.

a. Create the texture.

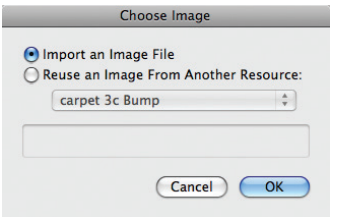
-In the **Resource Browser**, click on the **Resource** menu button, and then select **New Resources in Interior-day.vwx**, then **Renderworks Texture**.

The **Edit Texture** dialog box opens.

-In the **Name** box type this texture's new name: **Wood Paneling**.

***Note**: This texture uses two of the four available shader types used to assemble textures: Color and Reflectivity. This texture also uses a graphic image file as the texture source. The next step will select the image file to be used in this texture.*

-In the **Shaders** area, click on the **Color** drop-down box and select **Image**. The **Choose Image** dialog box opens.

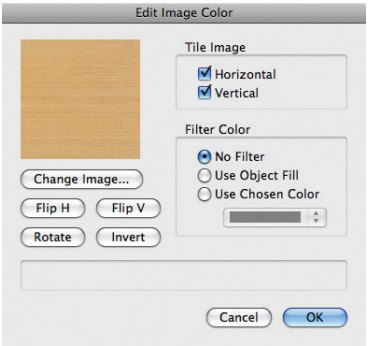


In this case we are importing an image file into our Vectorworks file:
-Select the first item, **Import an Image File**. Click **OK**.

The **Import QuickTime Image Document** opens. Select the image file to be imported:
-Navigate to the folder containing this file (**Day-Time Interior View>resources**) and select the image file **wood paneling.png**. Then click **Open**.

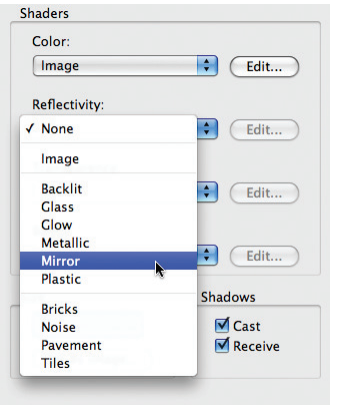
The **Edit Image Color** dialog box opens.

-Leave as is and click **OK**.



The wood paneling is intended to have a gloss finish, so we will add slight reflectivity to the texture:

-Back in the **Edit Texture** dialog box, click on the **Reflectivity** drop-down box and select **Mirror**.

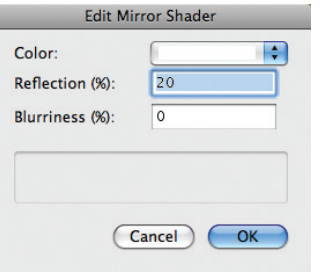


-Click on the **Edit** button.

The **Edit Mirror Shader** dialog box opens. Unlike a regular glass mirror, this texture is only slightly reflective, so we will enter a low **Reflection** percentage:

-Click in the **Reflection (%)** data field and enter the desired amount of reflection: **20**.

-Click **OK**.



Now adjust the texture size and complete the texture:

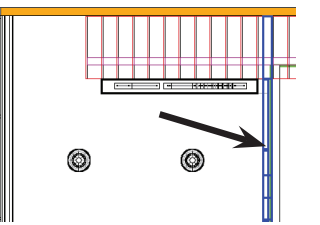
-Back in the **Edit Texture** dialog box, click in the **Size** data field and enter **2'0"[610mm]**.

-Click **OK**.

b. Apply the new texture to the 3-D object on the right.

-Switch to **Top/Plan** view.

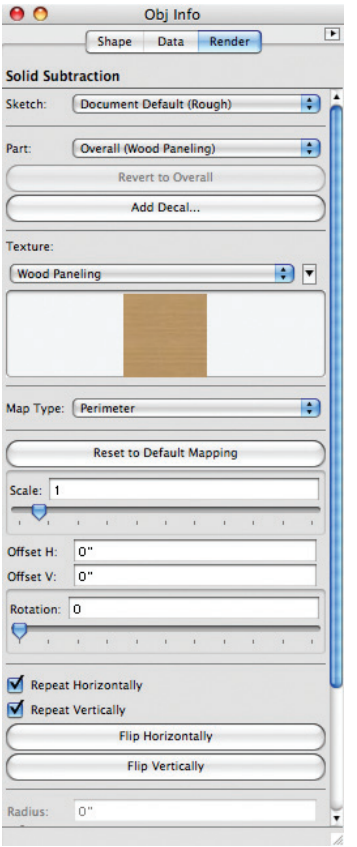
-Select the blue 3-D object on the right. The **Object Info** palette will report it as a **Solid Subtraction**.



-In the **Object Info** palette, click on the **Render** tab.

Now select the part to which the texture is applied:
-Click on the **Part** drop-down box and select **Overall**.

Select the texture:
-Click in the **Texture** drop-down box and select the new texture, **Wood Paneling**.



Switch to the saved view and render to see the results:

-Click on the **Saved Views** drop-down box and select **view 1**, and then render in **Fast Renderworks**.

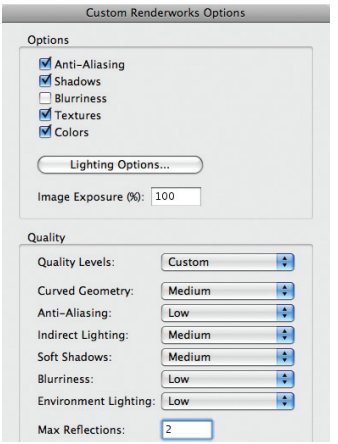
Task 6: Render using Custom Renderworks.

This exercise develops a **Custom Renderworks** setting as a compromise between **Fast Renderworks** and **Final Quality Renderworks**. By setting some controls to **Low** and others to **Medium**, deselecting **Blurriness** and reducing the **Max Reflections**, we accomplish a compromise: relatively quick rendering speed with acceptable image quality.

a. Access the Custom Renderworks settings:

-View>Rendering>Custom Renderworks Options.

b. Select the appropriate settings as shown below:



c. Render in Custom Renderworks:

View>Rendering>Custom Renderworks.

Enlarged detail:

As described in the previous chapter, try using **Renderworks** styles as an alternate to the various **Custom Renderworks** settings (**View>Renderworks Style**). Either **Realistic Interior Fast** or **Realistic Interior Final** may well provide acceptable settings for this file (note that the latter will require lengthier rendering times). Adjusting the selected style may yield even better results.

Don't forget–you can also save the **Custom Renderworks** settings developed for this scene as a **Renderworks** style by following the earlier description on page 42. Once saved, the style can be used in other files as well, since a **Renderworks** style is a resource that can be exported or imported via the **Resource Browser**.

Section 3:
Night-Time Interior View

The Vectorworks exercise file for this section has already been partially set up with textures, cameras, saved views and a layer background representing an urban night scene (viewed through the window wall).

The scene also has 3-D models of light fixtures in place, but lacks actual Vectorworks lights. This exercise will focus on the following tasks:

1. Placing and adjusting lights.
2. Setting the appropriate light quality settings.
3. Rendering using Custom Renderworks.
4. Adjusting Custom Renderworks settings to control the scene's brightness.

Note that darker scenes (or night views) often require longer rendering times than fully-lit ones.

-Open the file: **Night-Time Interior View>Interior-night.vwx**.

-Switch to **Top/Plan** view. This will make it easier to modify each light fixture.

The fixtures used in this scene are the following:

A. Ceiling-mounted lights: rectangular fluorescents above the mezzanine to the right.

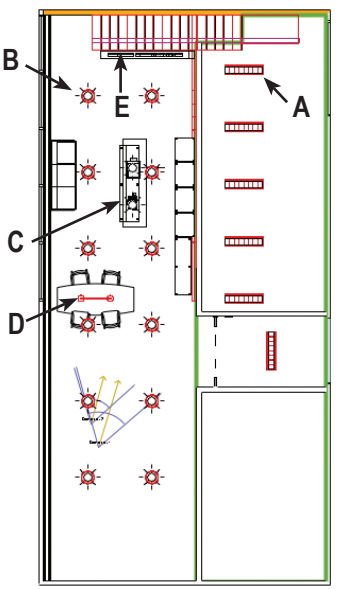
B. Round, surface-mount industrial fixtures over the two-story portion of the space.

C. Ceiling-suspended pendants: two pendant lights over the reception counter, at center rear.

D. One fluorescent fixture suspended over the conference table at the front.

E. Rear signage at the mesh partition (in front of the stairs): neon lights outlining the logo's letters.

This exercise will install light objects in each of the 3-D light models depicted in the scene and use them to illuminate the space.



Task 1, Lighting: Place and Adjust Lights.

A. Rectangular fluorescents.

The ceiling-mount rectangular fluorescent light fixtures are located above the mezannine to the right. The 3-D model of this luminaire has been saved as a symbol. We will edit the rectangular fluorescent symbol and place an Area light in it to represent the fluorescent light's lens. Once the symbol is modified, all instances of this light fixture will automatically reflect this change.

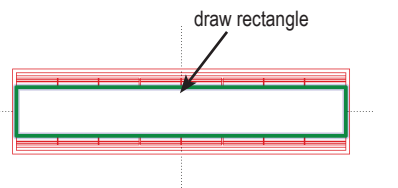
-Select one example of this fixture on the drawing, and double-click on it in order to edit the symbol.The **Edit Symbol** dialog box opens.

-Select **3D Component,** and then click **Edit**.

The file now goes into **Symbol Edit** mode, and displays the light fixture in Top/Plan view.

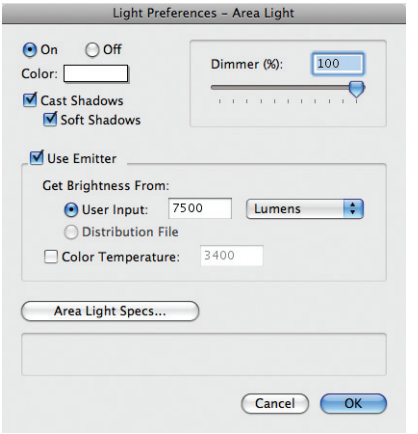
-Zoom in on the object for clarity.

Now prepare an Area light:
-Using the **Rectangle** tool, draw a 2-D rectangle on top of the light fixture. Give the rectangle a white fill, and make sure the rectangle fits within the boundaries of the fixture.



With the rectangle selected, convert it to an Area light:
-**Modify>Convert>Convert to Area Light**.

The **Light Preferences-Area Light** dialog box opens. Make sure the settings are as shown below:



Particularly important is the light's strength, ***7500 Lumens*** *(in the* ***Get Brightness From: User Input*** *data field).*

-Click on the **Area Light Specs...** button. The **Area Light Data** dialog box opens.

-Click on the **Distance Falloff** drop-down box and select **Realistic**.

-Click on the **Quality** drop-down box and select **From Render Mode**.

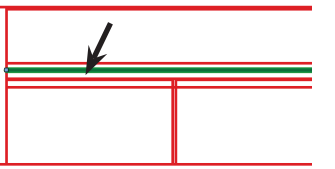
-Click on the **Render Geometry** checkbox and make sure it remains selected.

-Click **OK**.

-Back in the **Light Preferences-Area Light** dialog box, click **OK**.

Now adjust the height of the new area light:
-Switch to **Front** view and locate the area light (it will appear as a line).

-Move the Area light down to the location shown below:



-Exit the symbol. This fixture is complete. Before proceeding, switch back to Top/Plan view and zoom out to show the entire drawing.

B. Round, surface-mount fixtures.

The ceiling-mount round fixtures are located above the 2-story portion of the space. The 3-D model of this fixture has been saved as a symbol. We will edit the symbol to place a Point light inside it. Once the symbol is modified, all instances of this light fixture will automatically reflect the change.

-Select one example of this fixture on the drawing, and double-click to edit the symbol. The **Edit Symbol** dialog box opens.

-Select **3D Component,** and then click **Edit**.

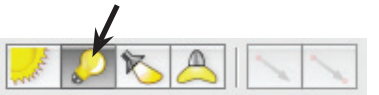
The file now goes into **Symbol Edit** mode and

displays the light fixture in Top/Plan view.

-Zoom in on the object for clarity.

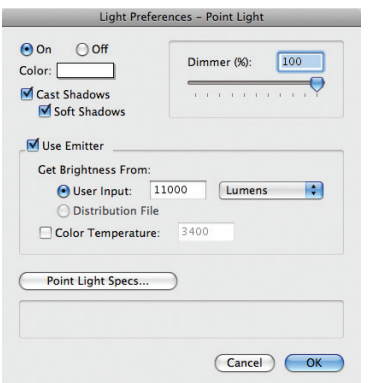
Now place a point light in the fixture:
-In the **Visualization** tool set, click once on the **Light** tool.

-Up in the mode bar, select the **Point Light Mode**.



-Click once in the center of the light fixture in order to place the light.

The **Light Preferences-Point Light** dialog box opens. Make sure all the settings are as shown below.

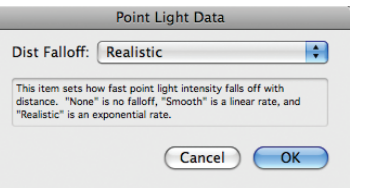


Note that the **Use Emitter** checkbox is selected, allowing more precise control over the light's characteristics. The light's strength is set to **11,000 Lumens** (it is intended to be a metal halide lamp).

-Click on the **Point Light Specs...** button. The **Point Light Data** dialog box opens.

-Click on the **Distance Falloff** drop-down box and select **Realistic**.

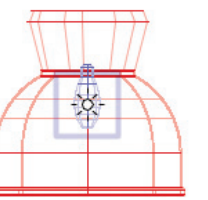
-Click **OK**.



-Back in the **Light Preferences-Point Light** dialog box, click **OK**.

Now adjust the height of the new point light so that it fits properly within the 3-D model of the light bulb, inside the fixture:
-Switch to Front view, and locate the Point light.

-Move the Point light into position as shown below:



-Exit the symbol by clicking the **Exit Symbol** button at the top-right side of the drawing area. This fixture is now complete. Before proceeding, switch back to Top/Plan view (**View>Standard Views>Top/Plan**) and zoom out to show the entire drawing.

C. Pendant lights at reception counter.

Two lights are suspended from the ceiling, hanging low over the reception counter. Each of these is a symbol of a 3-D model of a light. We will edit the symbol to place a point light within it.

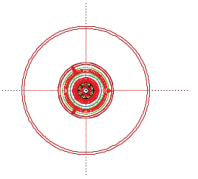
-Zoom in to the reception desk area for clarity.

-Select one example of this fixture on the drawing, and double-click on it in order to edit the symbol.The **Edit Symbol** dialog box opens.

-Select **3D Component,** and then click **Edit**.

The file now goes into **Symbol Edit** mode, and displays the light fixture in Top/Plan view.

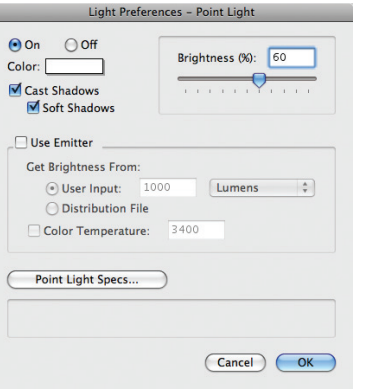
-Zoom in further on the object for additional clarity.



Now place a point light in the fixture:
-In the **Visualization** tool set, click once on the Light tool.

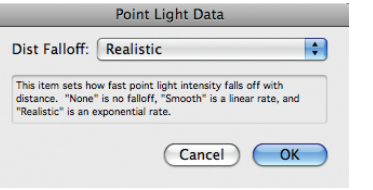
-In the mode bar, select the **Point Light Mode**.

-Click once in the very center of the light fixture in order to place the light. The **Light Preferences-Point Light** dialog box opens. Make sure all the settings are as shown below, and that the **Brightness** slider is at **60%**.



-Click on the **Point Light Specs...** button. **The Point Light Data** dialog box opens.

-Click on the **Distance Falloff** drop-down box and select **Realistic**.

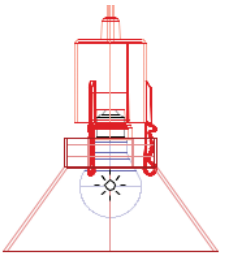


-Click **OK**.

-Back in the **Light Preferences-Point Light** dialog box, click **OK**.

-Switch to Front view and locate the Point light.

-Move the Point light into position in the fixture as shown below:



-Exit the symbol. This fixture is complete. Before proceeding, switch back to Top/Plan view and zoom out to show the entire drawing.

***Note**: Prior to exiting the symbol, consider clicking on individual portions of the overall light fixture and reviewing them in the Object Info palette. Several components–such as the light bulb and the shade–have textures applied (visible via the Render tab of the Object Info palette), displaying complete or partial transparency and reflection.*

D. Fluorescent pendant light over conference table.

A long fluorescent light fixture is suspended from the ceiling over the conference table. The 3-D model of the fixture is a symbol. We will edit the symbol in order to insert an Area light representing the light's lens.

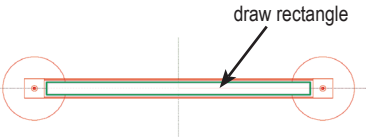
-Select this fixture on the drawing, and double-click on it to edit the symbol.The **Edit Symbol** dialog box opens.

-Select **3D Component,** and then click **Edit**.

The file now goes into **Symbol Edit** mode, and displays the light fixture in Top/Plan view.

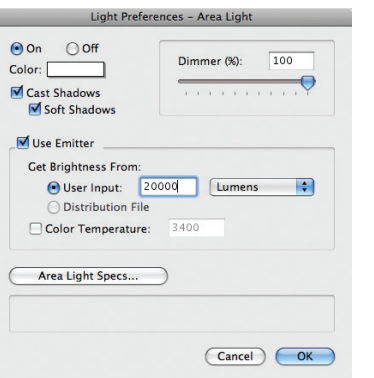
-Zoom in on the object for clarity.

Now prepare an Area light:
-Using the **Rectangle** tool, draw a 2-D rectangle on top of the light fixture. Give the rectangle a white fill, and make sure the rectangle fits within the boundaries of the fixture.



With the rectangle selected, convert it to an Area light:
-Modify>Convert>Convert to Area Light.

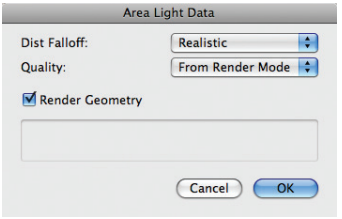
The **Light Preferences-Area Light** dialog box opens. Make sure the settings are as shown below:



Note: Particularly important is the light's strength, ***20000 Lumens*** *(in the* ***Get Brightness From: User Input*** *data field).*

-Click on the **Area Light Specs...** button. The **Area Light Data** dialog box opens.

-Click on the **Distance Falloff** drop-down box, and select **Realistic**.



-Click on the **Quality** drop-down box, and select **From Render Mode**.

-Click on the **Render Geometry** checkbox and make sure it remains selected.

-Click **OK**.

-Back in the **Light Preferences-Area Light** dialog box, click **OK**.

Now adjust the height of the new area light:
-Switch to Front view and locate the Area light (it will appear as a line).

-Move the Area light to the location shown below:

-Exit the symbol. This fixture is complete. Before proceeding, switch back to Top/Plan view and zoom out to show the entire drawing.

Note*: Since the Area light directs light in both directions, its illumination can be seen both on the conference table and through the small slit openings in the top of the light fixture.*

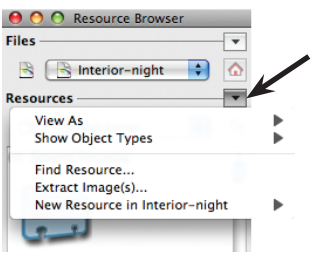
E. Rear signage at the mesh partition (in front of the stairs).

The mesh partition in front of the rear stairs contains a three-dimensional company logo, outlined in yellow neon. The neon lighting is actually a 3-D solid composed of three path extrudes, with a light-emitting **Glow** texture applied. Even though the model of this lighting emits light (because of the **Glow** texture), it is not technically a **Vectorworks** light object.

The 3-D model of the neon tubing has already been created and placed. This exercise will focus on creating the light-emitting **Glow** texture and applying it to the 3-D model of the neon tubing.

a. Create the texture.

-In the Resource Browser, click on the **Resource** menu button, then select **New Resources in Interior-night.vwx**, then **Renderworks Texture**.

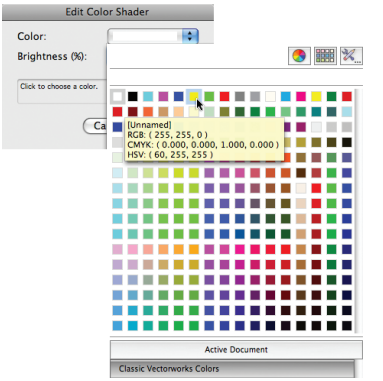


-The **Edit Texture** dialog box opens. In the **Name** box, type this texture's new name: **Neon Light**.

This texture uses two of the four available shader types used to assemble textures: **Color** and **Reflectivity**.

First we will set the texture's color:
-In the **Shaders** area, click on the **Color** drop-down box and select **Color,** then click on the **Edit** button at the side. The **Edit Color Shader** dialog box opens.

-Click on the **Color** drop-down box and select the color shown below, and then click **OK**.

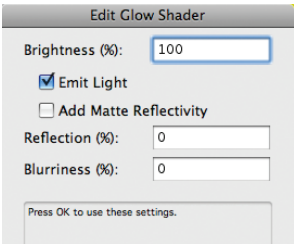


Click **OK** again to exit the **Edit Color Shader** dialog box. Now we will select the **Glow** setting, available in the **Reflectivity** shader. This setting causes the texture to emit light, not unlike a light object:
-Back in the **Edit Texture** dialog box, click on the **Reflectivity** drop-down box, and select **Glow**.

-Click on the **Edit** button to the right of **Reflectivity**. The **Edit Glow Shader** dialog box opens.

-Click in the **Brightness (%)** data field, and enter **100**.

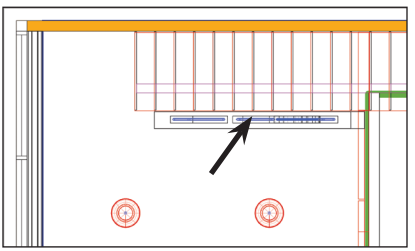
-Select **Emit Light** and then click **OK**.



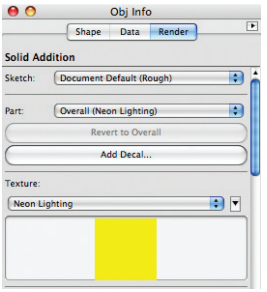
-Back in the **Edit Texture** dialog box, click **OK** to complete the texture.

b. Apply the new neon light texture to the 3-D model of the neon tubing.

-Switch to Top/Plan view and zoom in on the neon light model for clarity.



-Select the 3-D lettering model (outlined in blue), and in the Object Info palette, click on the **Render** tab.



-Click on the **Part** drop-down box, and select **Overall**.

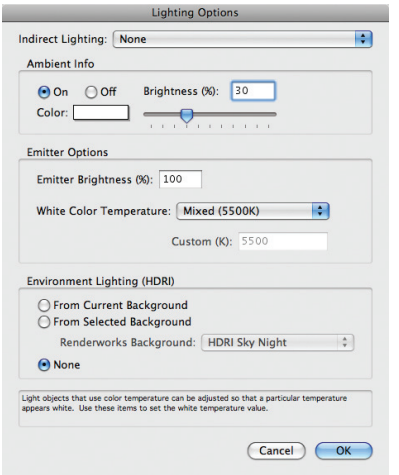
-Click on the **Texture** drop-down box, and select **Neon Light**.

The texture is now applied to the 3-D model of the neon tubing. Task 1 is complete.

Task 2: Lighting: Set the Appropriate Light Quality Settings.

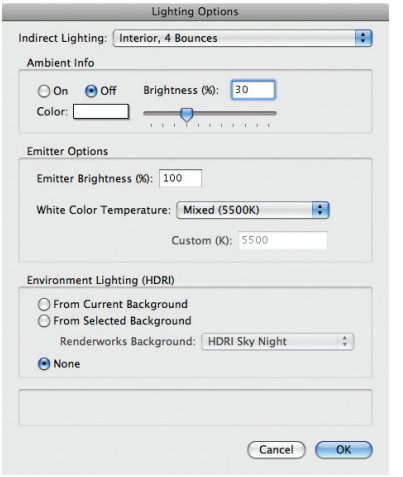
Access the **Lighting Options** dialog box: **-View>Lighting>Set Lighting Options**.

For the fastest, reasonable-quality results (with illumination from lights, not a Heliodon or HDRI), try turning off **Indirect Lighting** and using **Ambient** lighting instead, set to about **30%**.



For better results, turn off **Ambient** lighting, and use **Indirect Lighting** set to **2 bounces**. This will increase rendering time by about one-third compared to **Indirect** lighting.

For superior results, however, and a cleaner, lighter image (more light bounces send more light energy around the scene, increasing its brightness), set **Indirect Lighting** to **4 bounces**. This will increase rendering time by about 40% compared to **2 bounces** (your mileage may vary, depending on the file, number of lights, etc.).



-Once you have decided on your preferred lighting options, click **OK** to finish.

Task 3. Render using Custom Renderworks.

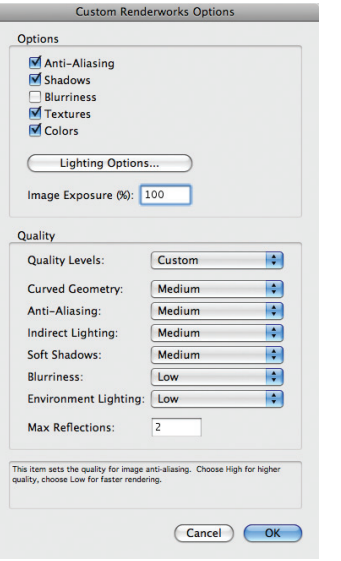
This exercise develops a Custom Renderworks setting as an optimal compromise between speed and quality of rendering. Try rendering in Fast Renderworks and Final Quality Renderworks to see the impact of those settings. Then modify Custom Renderworks settings as shown here, as an experiment.

After setting some Custom Renderworks controls to **Low** and others to **Medium**, deselecting **Blurriness** and reducing the **Max Reflections**, these settings yield relatively quick rendering speed with acceptable image quality. The settings shown here are merely a suggestion. Experiment with different settings to find the combination that best suits your purpose.

Before proceeding, switch to **View 1** (click on the **Saved Views** drop-down box and select **View 1**).

a. Access the Custom Renderworks settings:
-View>Rendering>Custom Renderworks Options.

b. Adjust the settings as shown below:

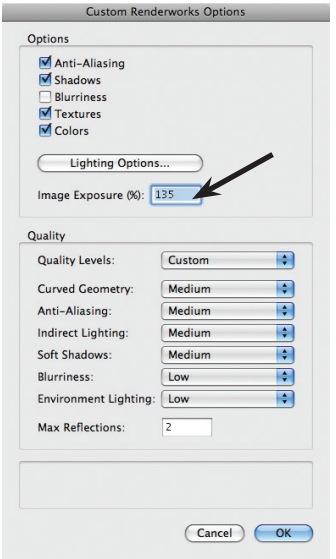


c. Render in Custom Renderworks: View>Rendering>Custom Renderworks.

Task 4. Adjust Custom Renderworks Settings to Control Brightness.

If the scene's brightness does not match your preference, it is possible to modify the overall brightness of the image by changing the **Image Exposure (%)** setting in Custom Renderworks.

a. Access the Custom Renderworks settings:
-View>Rendering>Custom Renderworks Options.



b. In the Image Exposure (%) data field enter a number greater or smaller than 100 (100 is the default setting, a smaller number makes the scene darker and vice versa).

As mentioned in the previous chapter–you can save the **Custom Renderworks** settings developed for this scene as a **Renderworks** style by following the earlier description on page 42. Once saved, the style can be used in other files as well, since a **Renderworks** style is a resource that can be exported or imported via the **Resource Browser**.

Notes

About the Author

Daniel Jansenson is an architect in private practice based in Santa Monica, California. A longtime Vectorworks user, he teaches seminars in the use of Vectorworks and Renderworks, presentation graphics and small-office project management. Author of the *Renderworks Recipe Book* and *Remarkable Renderworks*, Dan uses Vectorworks daily in his residential and small commercial practice. His focus is on the daily joys of designing homes, and having as much fun as humanly possible both in the design of buildings and in the creation of rendered presentations.

Dan can be reached via his firm's web site: www.danjansenson.com. His training activities are available through www.vectortasks.com.