

LEVELS, LAYERS & STORIES

A TUTORIAL

IN VECTORWORKS ARCHITECT



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INTRODUCTION

The purpose of this document is to outline the interrelationship between levels, layers, and stories leading to expected results from your model.

Consult the Vectorworks Help system for detailed information on tools and commands.

We'll start by explaining, in broad terms, the purpose of each of the organizational elements. Then we'll work through, at a step-by-step level, how and why to set up levels and their associated layers and define the elevations of stories. We'll then move on to creating a Wall Style that uses the automation provided by the level types we created.

But first, we'll use a residential scenario as an example, starting by filling out the worksheet that's provided at the end of this tutorial. We'll end up with all the dimensional criteria required to enter into the various fields for Default Level information, Story height, etc. We strongly recommend that you adopt this process when setting up a project even to the point of creating Model Set-Up Worksheets for various building types.

Two copies of the worksheet have been provided. One has been completed using a story-and-a-half cottage as an example, and another copy is blank for your use.

TOOLS AND FEATURES

STORIES – Let me tell you a Story. In Vectorworks Architect, a story is an organizational element that works in conjunction with layers, levels, and classes, providing superior change management, as well as aiding in export options of certain file types. Think of stories as containers for certain layers and *all* levels. Stories are set up to coincide with the floor-to-floor relationship within a building. In Vectorworks, the “break” where one story ends and another begins is often set at the top of slab (commercial) or the sub-floor (residential). This break coincides with the “real world” break in the construction process.

LAYERS

Vectorworks has two types of layers: design layers and sheet layers. Sheet layers are for presentation and printing and are not relevant to this discussion. Design layers are a working space, where modeling and drawing is done. As a rule, to better understand layers and classes. It is often said that objects are placed **in** a class and **on** a layer. An “analog” equivalent might be stacking sheets of Mylar on top of one another, where each sheet of Mylar is a layer. In Vectorworks 2012 and beyond, design layers can be either story layers (equipping them with all the automated features described in the Stories and Levels sections) or just plain design layers. An example of a non-story design layer might be the column reference grid in a commercial project that will appear in more than one plan view of a multi-story building. Vectorworks creates the layer “Design Layer-1” by default.

LEVELS (Story Levels)

Story Levels, or simply levels, are new in 2015; their purpose is to define a horizontal plane in space independent of a layer, letting you constrain or “bind” the top or bottom of certain elements at a given elevation. For example, the bottom of a wall can be bound to the sub floor level, and the top of the wall can be bound to the level at the underside of the floor structure above, closely approximating how you actually build a wall in the field. Additionally, a change in the floor-to-floor height of a story will cause these “level aware” objects to “stretch” and respond accordingly.

In fact, individual wall components can be bound to levels. Therefore, in some situations, it’s possible to have *one* wall style accommodate several variations in building construction. Additionally, levels can be set to exceed the elevational limits of the story they are contained within and, in fact, overlap one another. Vectorworks ships with several “Default Story Levels,” which can be renamed and/or edited to more closely match your workflow and/or office standard.

CLASSES

In Vectorworks Architect, objects are placed in a class. Using the “analog” example above, any object drawn on a Mylar “layer” is placed **in** a class. A class can control attributes such as the line weight, line type, hatch, color, texture, and visibility of an object. Classes can also exist within classes. These are often referred to as “container classes.” For example, the container class “Wall-Exterior” will include component

classes like “Wall-Component-Exterior Cladding” or “Wall-Component-Interior Finish.” The program can also auto-class objects. However, in this exercise, we’ll be using several elements such as wall styles, incorporating more “granularity” than auto-classing allows. Consequently, we will NOT be using auto-classing. Vectorworks creates two classes by default: None and Dimension.

Tip: To turn off Auto-Classing, go to **File > Document Settings > Standard Naming**. Be sure “Enable Auto-Classing” is UNCHECKED.

LEVEL, LAYER & STORY SETUP (or Levels and Layers and Stories, oh my!)

LEVELS

Conceptually, think of levels as horizontal planes in space, letting you choose where the tops and bottoms of wall components and certain other elements can be constrained. We call this binding. Levels reside within a container. The container is a story.

CREATING

For most projects, first a list of levels is created (some will have layers associated with them and some won't), which are the "Default Story Levels." Then stories are created. Finally, the appropriate levels are chosen from the default list and are included in each story. Layers become more about visibility than how the model actually goes together.

Here are some rules for level and story creation and editing:

- You can create multiple levels with the same name (but with different elevations).
- You CANNOT use a level with the same name in a given story.
- A level can and should be used to control the elevation of recurring elements. For example, the Finish Floor might occur at the same elevation on each story.
- Levels can be created "on the fly" when creating stories. For example, if you're creating a particular story and see the need for a level that will help control the heights of all the bulkheads, you can create that level from within

the story set-up pane. (Double click the story or choose Edit, choose the "New Level" button, then create the new Level.) This new level will ONLY appear in the list of level types for that story. However, what you CANNOT do is associate this level with a layer that's already been created. If this becomes necessary, you'll need to perform some gymnastics – create a temporary layer, associate the level with that, then, in the Design Layers tab, rename the layer.

EDITING

The method and steps for editing levels may appear a bit confusing at first. For example, when you first go to create the "Default Story Levels" list of levels and the layers they'll be associated with, you CAN have multiple levels with the same layer associated with them in that list (because you haven't actually *created* a layer yet, you've really just made a list of *possibilities*).

HOWEVER, once you've created your default level types and ONE story (that has a layer in it), that particular layer you associated with the level is now "tied up." You can create a number of levels as defaults, and you can actually insert them in a story, but you CANNOT go back and add another one. You'll get an error that a layer already exists.

There is a strong argument for including a LAYER with any "significant" level. For example, a "significant" level might be a bulkhead or a lowered ceiling. Chances are,

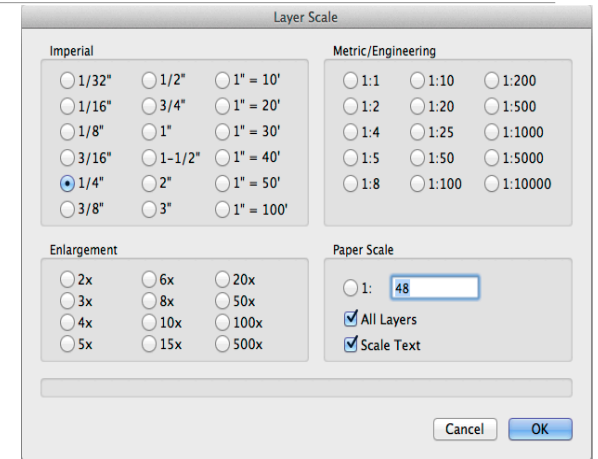


Fig. 1 Drawing Scale Dialog Box

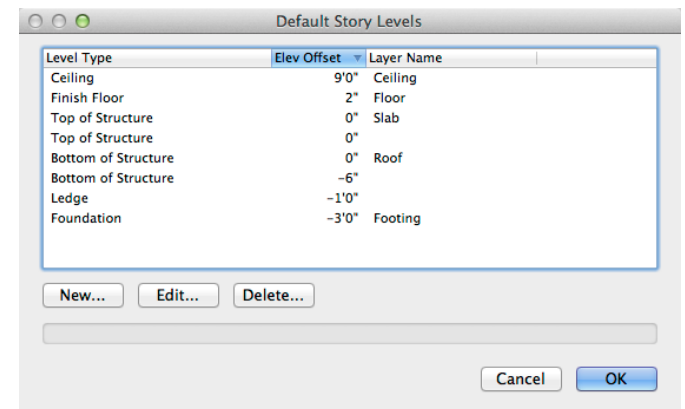


Fig. 2 Default Levels Out-of-the-Box

you'll need to place elements like lighting, diffusers, smoke detectors, etc. at that elevation. Consequently, by virtue of having created the layer, these items can be directly placed in your model at the prescribed elevation.

Conversely, a scenario may occur where you may choose to create just a level, with no layer, such a case might be a brick ledge. You will never actually place anything there; you'll only use the level to constrain a wall component at that elevation.

Now that you know the "rules," let's see how to accomplish this within the software. We'll start by opening a blank file and setting up level types and their associated layers and then move on to creating the stories required for this exercise. We'll accept some of the default values, as well as create some of our own. This is typical and will vary from project to project. You can review ***Progress File 1*** with the levels, layers, and stories already set up; however, it will be to your advantage to work through how and where this information is created, modified, and stored.

Referring to the completed Model Setup Worksheet, the values were determined based on a hypothetical client meeting, where it was decided that nine-foot ceilings on the first floor and an eight-foot ceiling on the lower level were desired. The upper level will have a short knee wall and a vaulted ceiling with a pair of dormers giving the space a bit more volume and natural light. From those agreed-

upon dimensions and the known thicknesses of the floor joists, sub-floor, and finish floor, values were entered into the worksheet to determine the heights for the required levels, layers, and stories. (My "Pocket Handyman IV" feet/inch calculator still serves me well.)

Step 1

Open a new file (**File > New**). Select "Create blank document" from the dialog box. Set the drawing scale to 1/4" and choose "All Layers" (see Fig. 1).

Step 2

In this step, we'll investigate the DEFAULT levels. Open the Organization palette (**Tools > Organization**) and choose the **Stories** tab. Choose the **Default Story Levels** button. As you can see, some default information has been created (see Fig. 2).

Notice there are some duplicates, and there are some levels that are NOT associated with a layer. This is by design. As mentioned earlier, a unique feature of Vectorworks 2015 and beyond is that you DO NOT have to have a level associated with a layer, and you CAN have levels with the SAME NAME but with DIFFERENT relative elevations associated with them. As long as you choose the correct level to be placed in a particular story, everything will work out fine. Recall from the Model Setup Worksheet that the elevation of a level is *relative to the story* it is associated with.

Understand that whatever you name the LEVEL, that name will appear as a choice in the drop-down menu when it comes time to actually

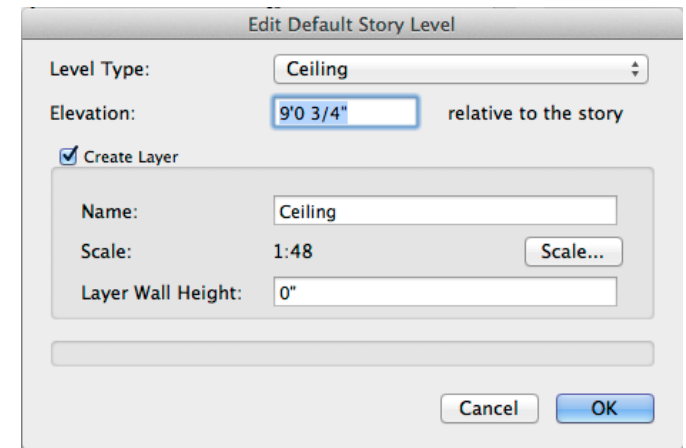


Fig. 3 Edit Level Dialog Box

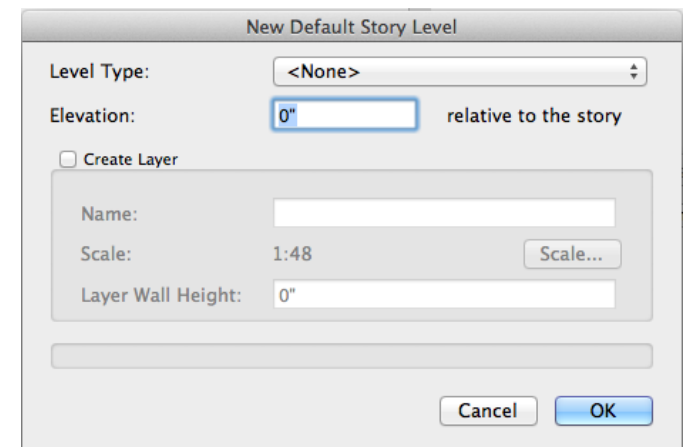


Fig. 4 Create New Level Dialog Box

creating binding conditions for a wall component.

Another tactic might be to name each LEVEL something discreet. For example, for the ceiling, you might have Ceiling-Basement and Ceiling-Main Floor. However, for this exercise, we'll stay with as close to out-of-the-box material as possible.

Step 3

In this step, we'll start to modify the levels, making them project specific. To EDIT a level, click on the level first, then click the EDIT button. To create a new level, click on the NEW button. Use the completed Model Setup Worksheet as a guide and as a source for the values that need to be entered into the various fields. Use the column in the worksheet to the far left to check off the levels you've created/modified (see Fig. 7).

Choose the **Ceiling** level and choose EDIT. In the **Edit Default Story Level** dialog box, "Level Type" can remain unchanged. Change the *Elevation* to 9' 3/4". Notice the *Create Layer* checkbox. Since this has been checked, a layer will be created within the appropriate story with the appropriate suffix attached. We'll see this "in action" when we create stories for the project. Bear in mind that the dimension 9'-3/4" represents the distance from the sub-floor, which is the "zero height" of the story to the underside of the ceiling. A quick look at the Model Setup Worksheet can help visualize this. When we get to actually placing a ceiling element in the model, we'll talk about how to

adjust the ceiling (made from a slab object) so that it arrives at the correct elevation. To avoid confusion, the field called *Layer Wall Height* can be zeroed out. This field is used for walls that are not bound by levels and therefore, is not applicable. Click **OK** (see Fig. 3 *Edit Level Dialog Box*).

Step 4

In this step, we'll create another ceiling level. The new level will be used in the basement to define the elevation of the ceiling. The ceiling is a bit lower down there, so the level type, although still a *ceiling* level type, will reflect this different elevation. By contrast, if all the ceilings in the project were at the same height, we'd only need one ceiling level type that could be used on every floor.

Using the same logic for the first ceiling we created (actually we didn't create the first ceiling, we just modified the level), we'll set the elevation for the level at 8'-0," which is the distance from the floor to the underside of the ceiling. Recall that when setting up the elevation for a slab, the elevation is set at the TOP of the slab measuring down. To correct for this, we place an offset in the slab style for the ceiling. We'll get to that in a bit.

In the **Default Story Levels** dialog box, choose NEW to open the **New Default Story Level** dialog box (see Fig. 4 *Create New Level Dialog Box*).

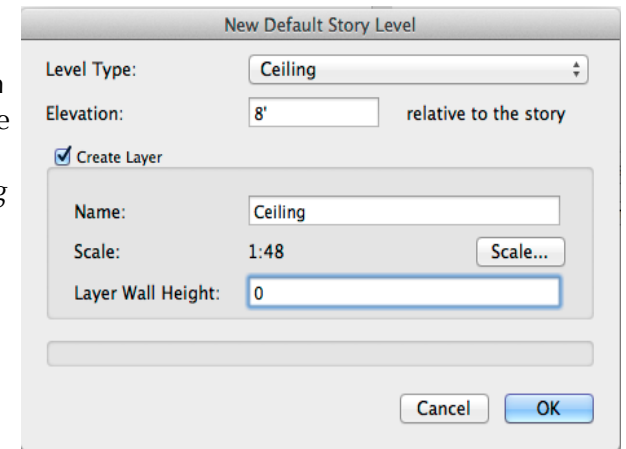


Fig. 5 Lower Level Ceiling Dialog Box

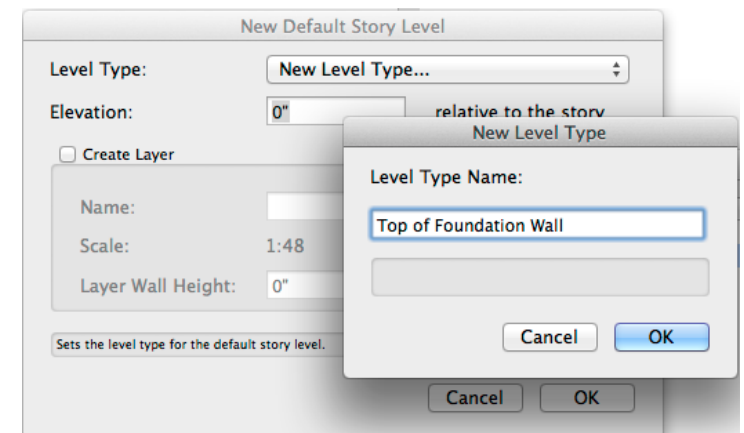


Fig. 6 Create New Level Type Dialog Box

In the *Level Type* drop-down, choose **Ceiling** as the type to be created. This “new” ceiling is required because its elevation is different from the ceiling on the main floor.

In the *Elevation* field, type in 8' to set the height of the future ceiling. We also need to create a layer, so check the box *Create Layer*. Enter **Ceiling** in the *Name* field. Click **OK** to complete this operation (see Fig. 5 Lower Level Ceiling Dialog Box).

Step 5
In this sequence, we'll create a new level type to define the top of the foundation walls. Once again, to help visualize this, refer to the Model Setup Worksheet. Since nothing will be drawn or placed on a layer at this elevation, all we'll need is a level defining the appropriate elevation in space onto which to bind the tops of walls (see Fig. 6 Create New Level Type Dialog Box).

From the *Level Type* drop-down, select **New Level Type**. Next, type in **Top of Foundation Wall** and hit **OK**. In the *Elevation* field, type in **7' 11."** DO NOT check *Create Layer*; just hit **OK**.

Step 6
Here we'll change the default elevation of the Finish Floor. For this project, recall that the finished floor material is 3/4" hardwood. Double click the *Level type* **Finish Floor**, and in the *Elevation* field, change it from the default 2" to the project-specific 3/4." That's all that is required for that entry. Hit **OK**.

Step 7
The next item on the list **Top of Structure** can be left as is. This will define the sub-floor on each story, that's why the elevation is set at "0." The layer name could be changed to "sub-floor" because that's what it's technically referring to. For this exercise, leave it as **Slab**.

Step 8
The next item down, at first glance, appears to be a duplicate of the one above. However, notice there is no layer associated with it. We won't be using it anyway, but just as FYI, be vigilant when setting up your levels. Select the **Top of Structure** level that does not have the layer associated with it and DELETE it.

Step 9
The next item, **Bottom of Structure** with the layer **Roof** associated with it, can stay as is. We'll need that one.

Step 10
The next item is also called **Bottom of Structure**. We need to modify its elevation to help define the overall thickness of the floor system and give the tops of walls an elevation to bind to. DOUBLE CLICK the level type **Bottom of Structure**, having the minus 6 Elev Offset associated with it. Change the minus 6 to **minus 1' 5/8."** Click **OK**.

Step 11
The next item on the list is called **Ledge**. This is an arbitrary term used to define the elevation of the bottom of exterior cladding. Conceptually, it could be thought of as a brick ledge. In this

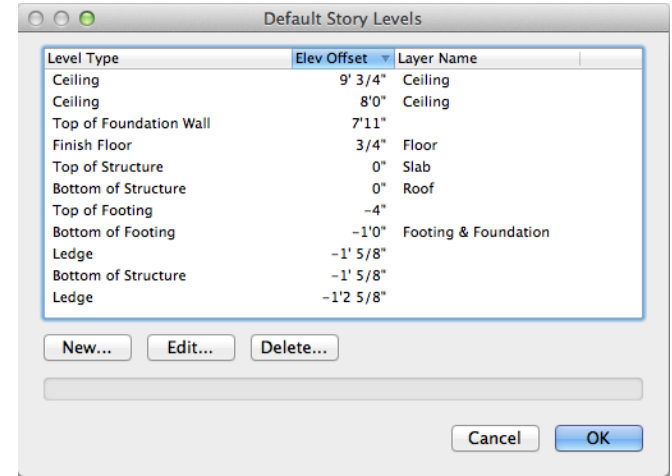


Fig. 7 Completed Levels Dialog Box

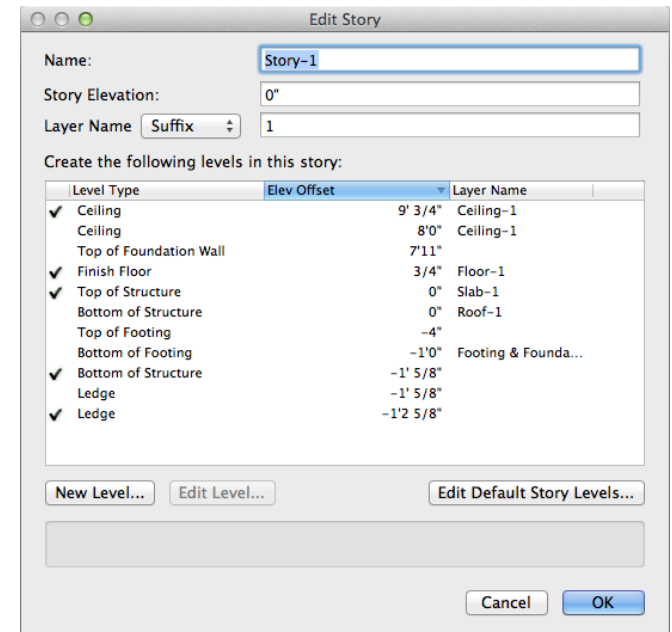


Fig. 8 Example Story Setup

project, although we're not using brick; we'll use this level type to define the bottom of the exterior wood cladding. This first **Ledge** represents the break in exterior cladding between the first and second floors of the building.

Similar to the ceiling level type where we have two levels called **Ceiling** that have different elevation constraints associated with them, we'll do the same with the ledge. DOUBLE CLICK on the **Ledge** to edit and change the *Elevation* to **minus 1' 5/8."** Hit **OK**.

Step 12

Now we'll create another *Level* called **Ledge**. This one needs to accommodate not only the thickness of the floor system but also the sill plate. (See the *Model Setup Worksheet*)

From the **Default Story Levels** dialog box, choose **NEW** and then from the *Level Type* drop-down, choose **Ledge**. To complete this step, enter **minus 1' 2 5/8"** in the *Elevation* field.

Step 13

In this step, we'll modify the level type called **Foundation**. DOUBLE CLICK the **Foundation** level type, then, from the *Level Type* drop-down, select **New Level Type**. Type in **Bottom of Footing** and hit **OK**. Change the *Elevation* to minus 1'-0". The check box for *Create Layer* can **stay checked** and in the **Name** field, to make it a little more descriptive, call it **Footing & Foundation**. Hit **OK**.

Step 14

In this step, we'll create a level to define the top of the footings. From the **Default Story Levels** dialog box, choose **New** and then in the *Level Type...* drop-down, choose **New Level Type**. Name it **Top of Footing** and hit **OK**. Enter **minus 4** in the *Elevation* field and hit **OK**.

This completes the level set-up process. The completed level setup should look like *Fig. 7 Completed Levels Dialog Box*. Hit **OK**.

Notice that the Level Types re-order themselves, starting with the largest dimension at the top of the list. You may have noticed this occurring automatically as you created and edited your level types.

You can now return to the **STORIES** tab of the **Organization Palette**.

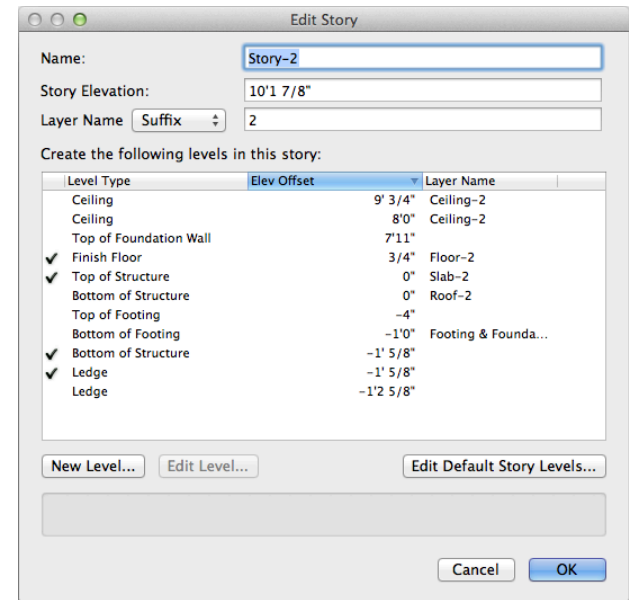


Fig. 9 Second Floor Story Setup

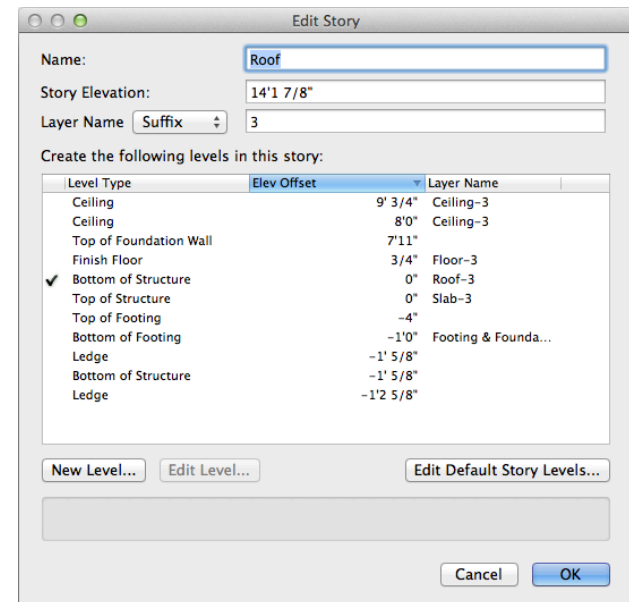


Fig. 10 Roof Story Setup

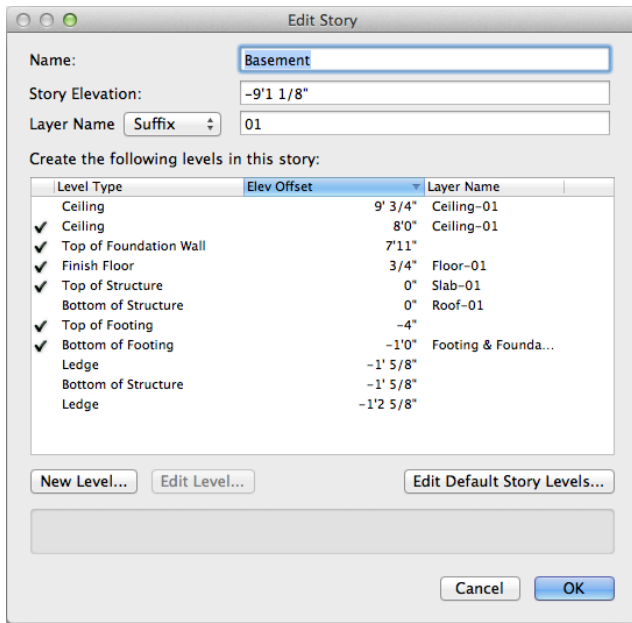


Fig. 11 Basement Story Setup

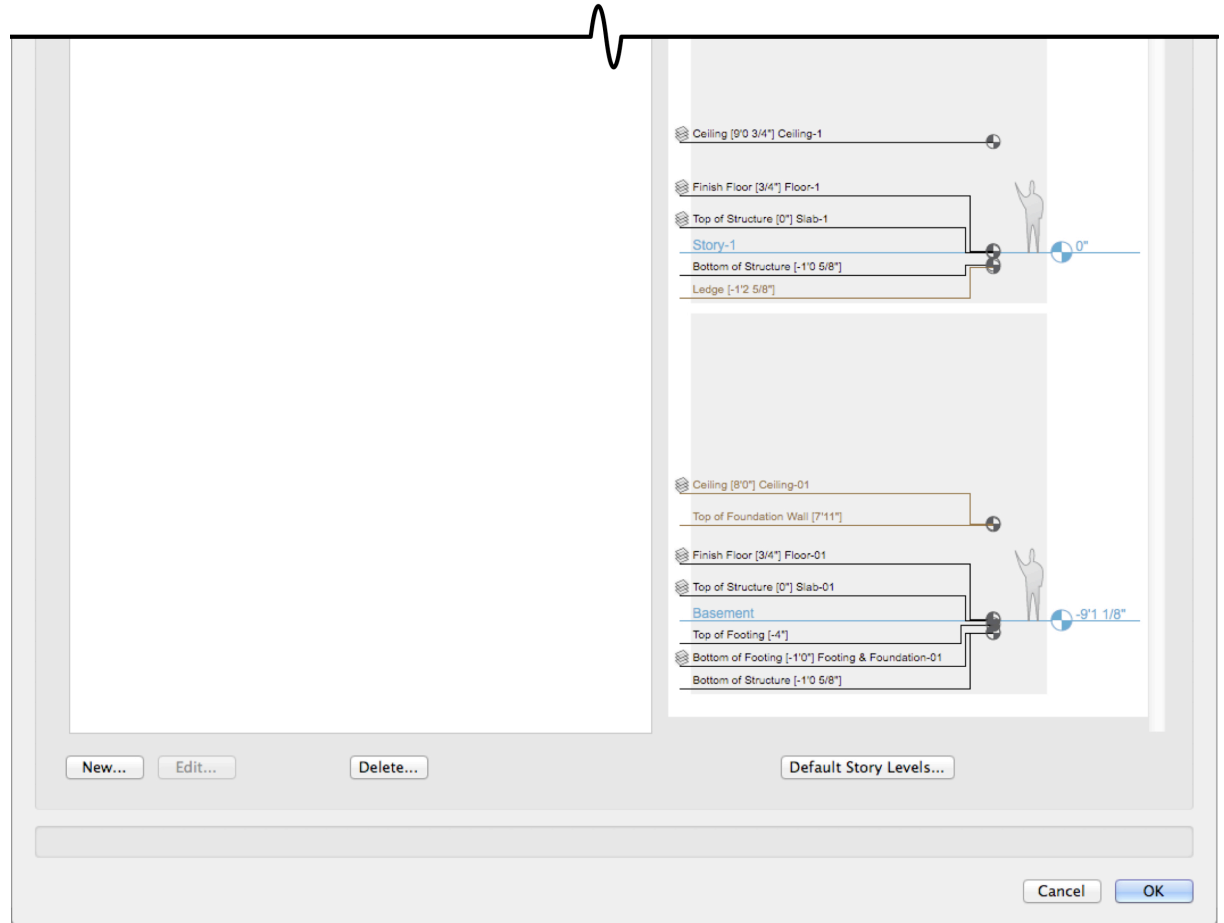


Fig. 12 Story Organization

STORIES

In this sequence, we'll create the required stories for the project. When creating a story, you have the opportunity to name the story, establish a story elevation, and select which levels and layers will be included or contained within the story. You can also append the layer name(s) with either a suffix or prefix (see *Fig. 8 Example of Story Setup*).

The most logical place to start, for residential work, is on the first floor, or more specifically on the sub-floor of the first floor. This is where we will establish what will be the "global zero" or ground plane. Additional stories will take their "Z" values from this "benchmark."

A *layer* receives its elevation when the level it's associated with is placed in a story. That elevation is derived from the story in which it is contained PLUS any height that has been imposed on it by the level with which it is associated. (This shows in the Design Layers tab in the column "Elevation.")

Step 1

From the STORIES tab of the **Organization Palette**, in the lower left, choose *New...* to be presented with the **New Story** dialog box. Make your settings look like the Example Story Set-Up figure by checking and unchecking the appropriate levels. The story name can be left as is, as well as the *Story Elevation*. Hit **OK**. If you make a mistake, you can either double

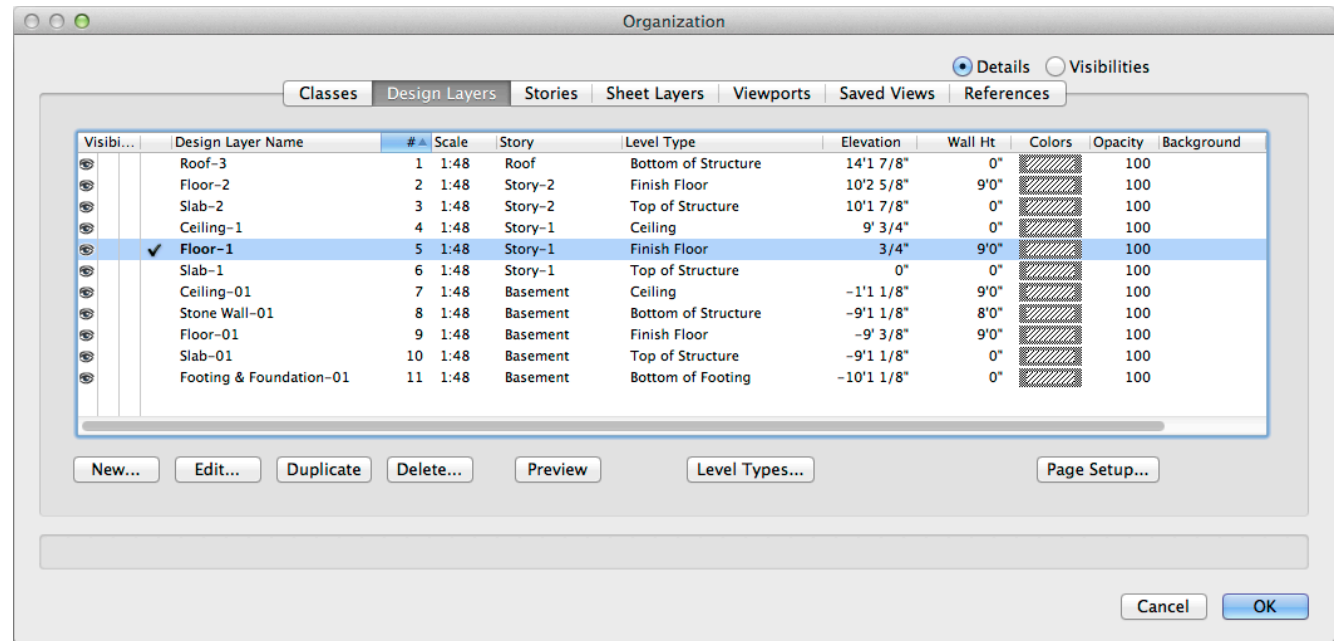


Fig. 13 Design Layer Setup

click on the story or use the EDIT button to go back and select or change field values. Use the Model Set-up Worksheet as a guide to ensure you have the correct levels checked.

Step 2

In this step, we'll create the story for the second floor. There are only four levels in this story. Choose *New...* and make sure to choose the correct **Ledge** level. It's different from the one on the first floor! Use the elevation that we calculated from the Model Set-Up Worksheet as the *Story Elevation 10' 1 7/8."* Select the correct **Ceiling** for the second floor. Hit **OK** (see *Fig. 9 Second Floor Story Setup*).

Step 3

In this step, we'll create the story for the roof. Rename the story **Roof** for clarity (see Fig. 11).

Use the elevation that we calculated from the Model Set-Up Worksheet as the *Story Elevation*: **14' 1 7/8."** There is only one level (and its associated layer) within this story. Click **OK** (see Fig. 10 *Roof Story Setup*).

Step 4

In this step we'll create the story for the basement. Rename the story **Basement** for clarity. Notice that the *Story Elevation* is entered as a negative number. The suffix for the layer(s) name(s) is entered as "01," letting it appear "correctly" in the stacking order. You'll see this when you return to the Organization Palette, as well as if you go to the Design Layers tab. There are six levels within this story. Be sure to check the correct levels (see Fig. 11 *Basement Story Setup*).

Quick Tip: To view all the stories in the Organization Palette at once, select the lower-most story. Then, holding the Shift key down, select the top-most story.

Under the **Stories** tab of the Organization Palette, the right-hand pane gives you a graphic representation of the levels, layers and stories in your project. Notice that several of the levels are light brown. This means that they: 1) exceed the bounds of the story they are included in, and 2) are in conflict with levels from the story above/below. This is OK and is there as a visual clue (see Fig. 12 *Story Organization*).

Also notice the small graphic to the left of some of the levels. This indicates that there is a layer associated with a particular level. The level name is shown first along with its elevation (taken from the "local" zero) in brackets and then the layer name (if any). The story name and its elevation (taken from the "global" zero) are shown in blue.

This completes the story set-up procedure. Return to the **Organization Palette** and choose the **Design Layers** tab. Several layers were created as part of the story set-up process. You can **DELETE Design Layer-1** as it won't be used in this project (see Fig. 13 *Design Layer Setup*).

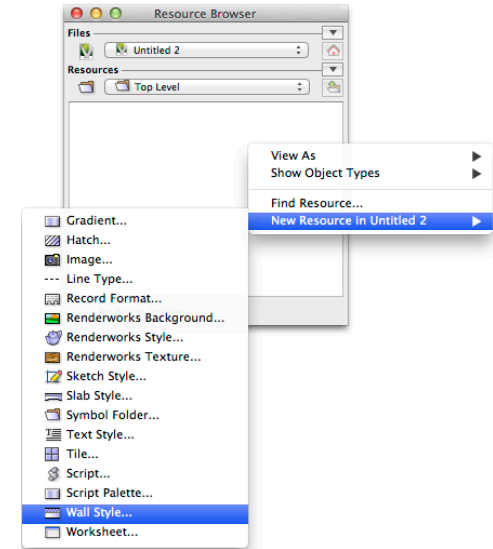


Fig. 14 Create a Wall Style

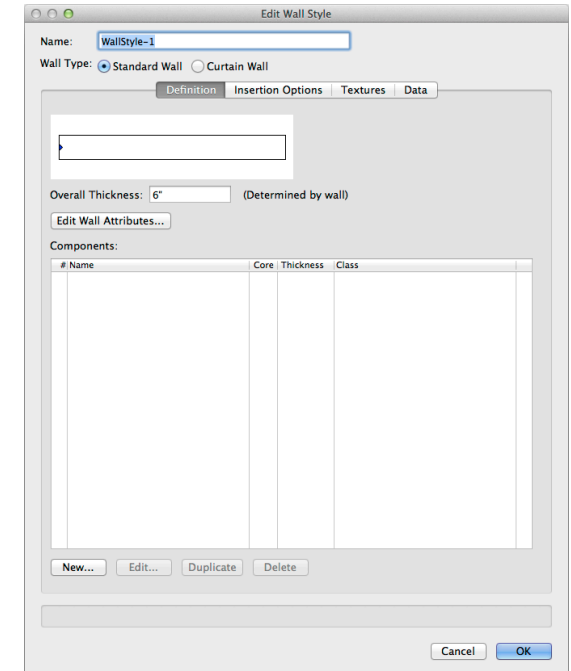


Fig. 15 Edit Wall Style Dialog Box

WALL STYLES

Create a Wall Style

To create a successful model, it is important to understand how wall styles, and the components contained within a wall style, relate to each other, to elevational constraints included in levels and offsets, as well as to how they interact with slabs. Once created, you'll be able to save and edit a custom wall style to help you further develop your own office-standard library.

There are two main methods for managing the elevational constraints that can be placed on an individual wall component. The two methods can, and often will, coexist within the same model. In fact, we will develop a wall style that includes both. A third method is typically used in conjunction with one of the two main methods.

The first method, the **level-bound** method, assigns each component to a level. The second method, the **edge-offset** method, offers a little more automation involving the interaction between a wall component and a slab component. The wall component responds to a setting in the slab component set-up, allowing the edge of the slab component to align vertically with a face of the wall component, thus creating the proper slab-to-wall connection. The edge-offset method DOES require an Auto-bounded slab, meaning a slab that's completely enclosed by walls.

The third method, **offset bound**, lets you adjust the height of an individual wall component by entering a fixed dimensional value into an

offset field in the wall style. And what does all this mean to me? Automated building sections, wall sections, and details.

In this segment, we'll create a fully level-bound wall style, giving you a complete understanding of how to create a wall style "from scratch." We'll then modify it a bit to show some of the automation we referred to earlier.

We'll assign binding conditions so that it responds predictably when placed in the model, and we'll look at including hatches so that the wall "reads" correctly in plan, section, and elevation. Additionally, we'll include textures, enabling you to produce pleasing rendered views. Finally, we'll attach data for any subsequent sharing if exporting a file is required. We'll use a typical 2x6 wall that would be used in the construction of any residence as an example. The wall will be assigned to the container class **Wall-Exterior** and will have individual components such as exterior cladding, sheathing, air infiltration barrier, the stud space, and drywall. Each will have a discreet component class.

Step 1

Make **Floor-1** the *Active Layer*. (This doesn't really have anything to do with the creation of a wall style but will ensure that we are all doing the same thing). Click in "white space" anywhere in the **Resource Browser**, choose "New Resource in <Your file Name>." Near the bottom of the list, choose "Wall Style..." (see *Fig. 14 Create a Wall Style*).

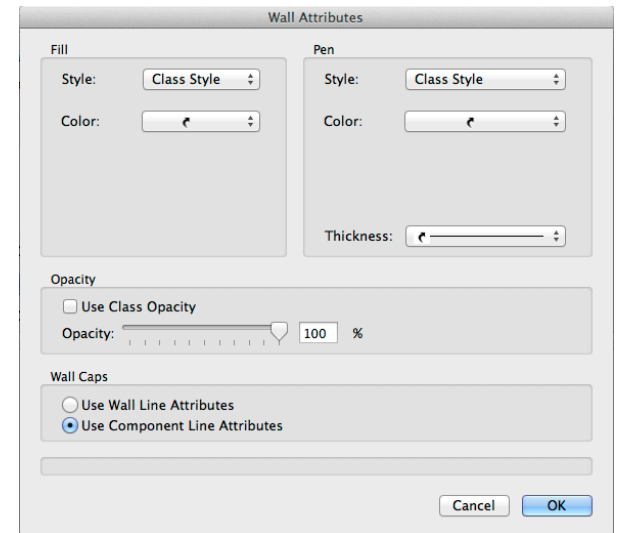


Fig. 16 Wall Attributes for Container Class

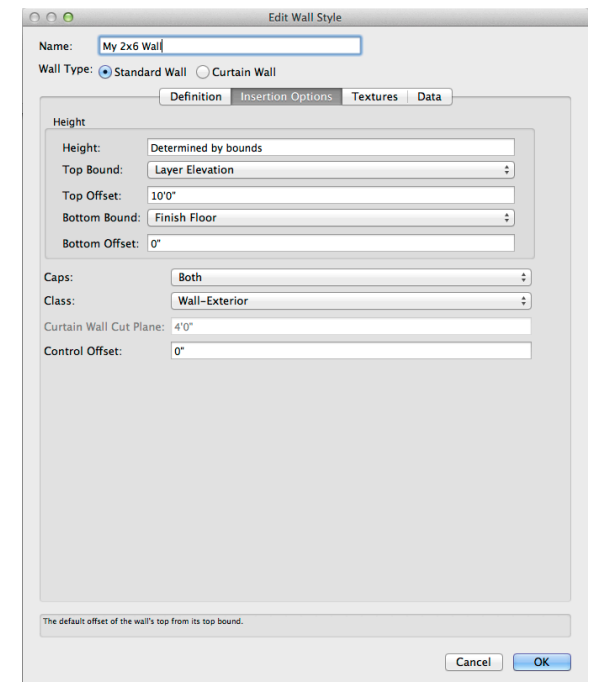


Fig. 17 Create Container Class for Walls

Step 2

Enter a name into the *Name* field - **My 2x6 Wall**. *Wall Type* lets you create a *Standard Wall* like we'll be doing or a *Curtain Wall* that can be used for a storefront, etc. Next, notice the four tabs – **Definitions**, **Insertion Options**, **Textures**, and **Data**. We'll get back to these in a bit (see Fig. 15 *Edit Wall Style Dialog Box*).

The default graphic shows a 6"-wide unstyled wall. The graphic will update as we add components. In addition, as components are added, they will be listed in the *Components* field. The field **Overall Thickness** will also automatically update once components are added.

Step 3

In this step, we'll set the attributes for the container class. The *Edit Wall Attributes...* button opens the **Wall Attributes** dialog box (see Fig. 16), letting you set all of the attributes. The actual class for the container class will be created under the *Insertion Options* tab. However, in this dialog box, we need to set up the attribute drop-downs as shown so that they take on the attributes of the class. The *Wall Caps* pane should be set to *Use Wall Line Attributes*. This lets the cap have the same line weight as the container class of the wall. Click **OK** to return to the *Edit Wall Style* dialog box.

Step 4

In this step, we'll create the *container class* (see Fig. 17). Choose the **Insertion Options** tab. Most of the default information being displayed is used for walls that are NOT bound to levels

and can be disregarded. We need to do two things: in the *Height* pane, change the **Bottom Bound** drop-down to **Finish Floor**. This will allow doors to be set at the correct elevation. Next, in the *Class* field, create a new class called **Wall-Exterior**. Click **OK**.

Step 5

In this step we'll set the options for the textures of the container class. Under the **Textures** tab, choose the **Use Component Textures** button. This lets the program use the textures of the components by default (see Fig. 18 *Set Container Class Texture Option*).

Step 6

The last tab, the **Data** tab, lets you describe the various materials that make up the wall style in a short description field. The field *Mark* is used primarily in commercial design for creating wall tags and partition schedules. We won't be using these fields in this exercise.

Step 7

Return to the **Definition** tab. In this step, we'll create a component. You can start anywhere, meaning you can define the stud space first, or the exterior cladding and then move the various components around to properly define the make-up of a wall. Let's take a look (see Fig. 19 *Wall Style Blank*).

In figure 19, in the lower pane labeled **Components**, there are five columns: # lets you adjust the "stacking" of the various components, **Name** lets you enter a name for the component such as "Sheathing," **Core** lets you define what

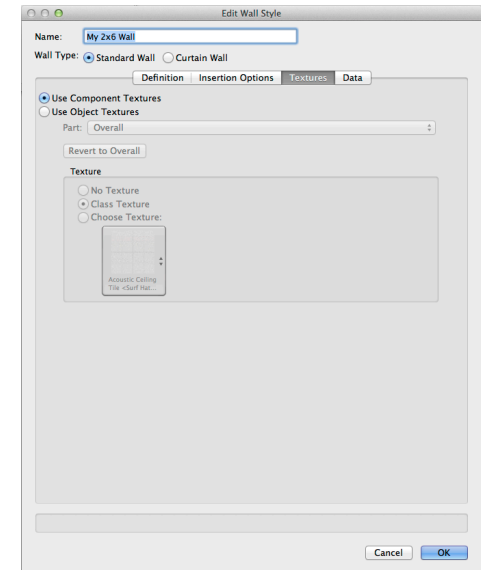


Fig. 18 Set Container Class Texture Options

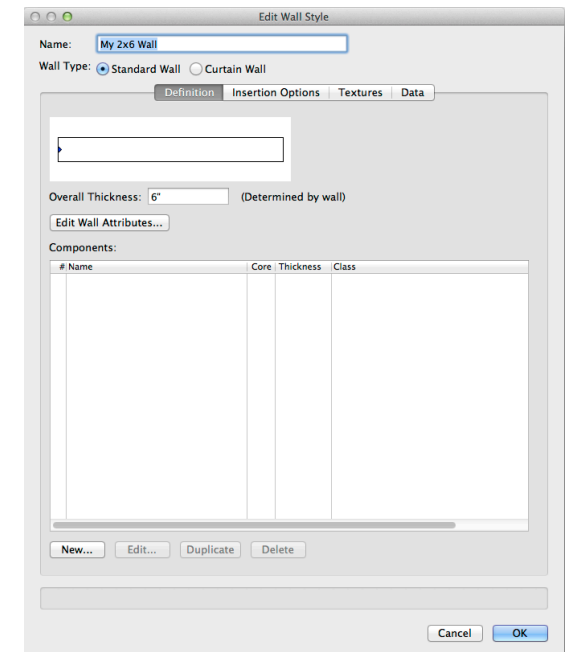


Fig. 19 Wall Style Blank

component within the wall style will be used as the core (this designation will be used when determining how slabs interface with the various components of a wall), **Thickness** defines the thickness of the individual component, and **Class** indicates the class to which the component is assigned.

As we create components, this list will populate. Click **New...** to open the **Wall Component Settings** dialog box (see Fig. 20 *Wall Component Settings Before*).

Let's create the component that will represent the sheathing. Starting at the top left of the dialog box in the pane called **Definition**. This is where we'll enter the *Name* of the component, **Sheathing**. In the *Class* drop-down, choose **New** and then name the class **Wall-Component-Sheathing**. Use dashes as separators with no spaces and click **OK**. In the *Thickness* field, enter $\frac{1}{2}$ " to represent the thickness of the OSB/plywood.

Two panes below the *Thickness* field, **Component Top** and **Component Bottom**, let you choose the "binding condition" for the top and bottom of the individual component(s) within the wall style. There are two choices, *Relative to Wall* and *Relative to Story*. The first one, *Relative to Wall*, is used when you want to set the component relative to the height of the wall. The second choice, *Relative to Story*, which is the one we'll use primarily, is used to set the component relative to the Story. More precisely, it lets you set the component's top or bottom to one of the levels we created earlier.

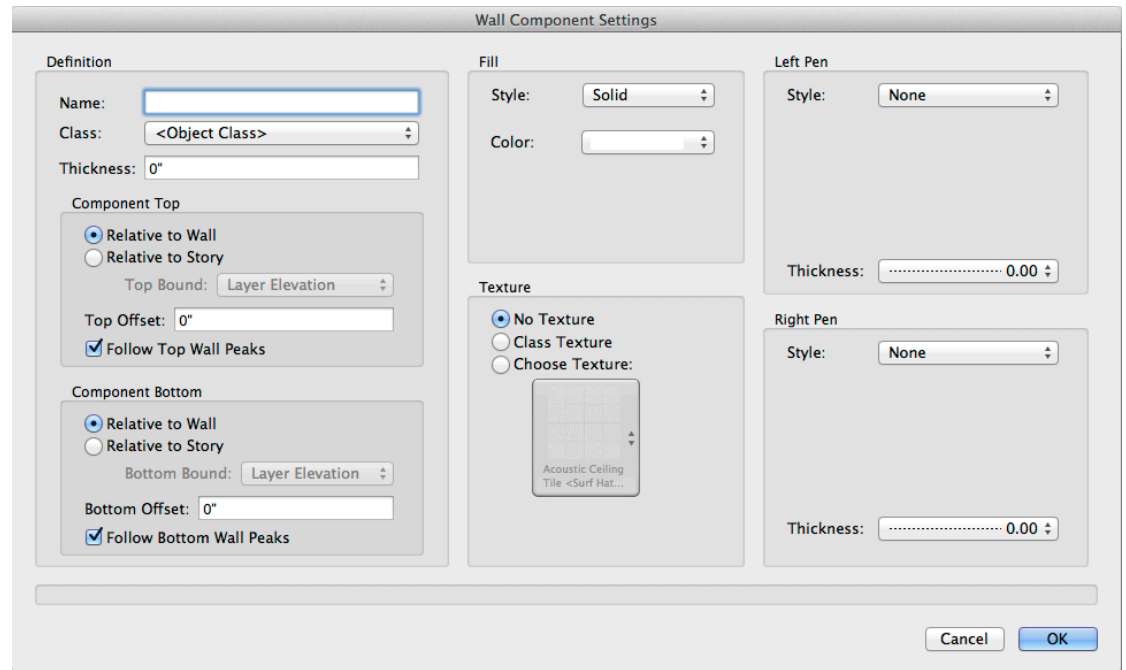


Fig. 20 Wall Component Settings Before

In the **Component Top** pane, choose *Relative to Story* and in the drop-down choose **Bottom of Structure [Story Above]** (see Fig. 21 Binding Condition Example).

Understanding the logic in this step is critical. Refer to the Model Set-up Worksheet for a graphic representation.

The next field down, *Top Offset*, and its mate, *Bottom Offset*, are mostly used when a convenient level is not available and are a means of “hard coding” a particular dimension into a wall component. A positive value drives the component up above the other components and a negative number drives a component down beyond the others. Offsets can be used *in conjunction* with binding a component to a given level.

The next checkbox, *Follow Top Wall Peaks*, and its mate, *Follow Bottom Wall Peaks*, are used to add and subtract wall peak nodes, letting you shape a wall’s top or bottom profile. For example, a wall that is fit to the underside of a gable end will have a wall peak added. You can do this manually with the Reshape Tool or automatically with the command “Fit Walls to Objects,” making sure **Follow Wall Peaks** for the *Component Top* is checked. These checkboxes can be toggled on or off for each individual component. In this exercise, we want the top of ALL the components to be capable of following the wall peaks like in the example sited for the gable end wall. However, the bottom of the wall components can be set to NOT allow this. , In summary, **check the box** *Follow Top Wall Peaks*

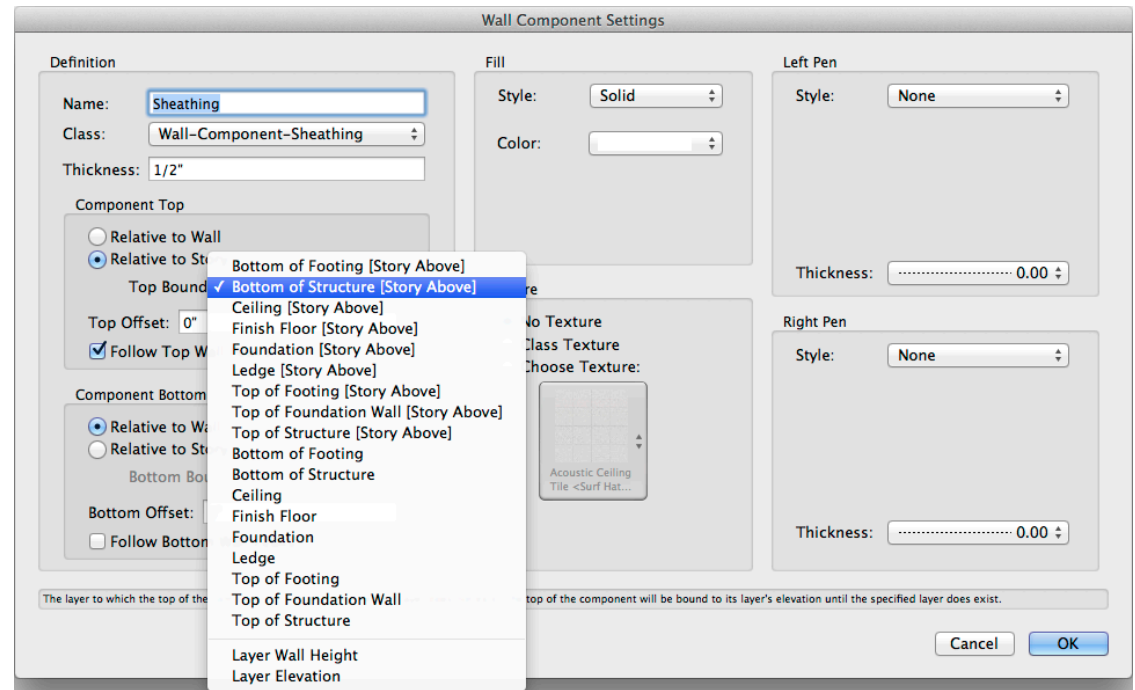


Fig. 21 Binding Condition Example

but NOT the box *Follow Bottom Wall Peaks*. Continuing on, in the sub-pane **Component Bottom**, choose the *Relative to Story* button. In the drop-down, choose **Bottom of Structure**. This sets the bottom of the component at the underside of the floor system. Recall that the sheathing needs to “run long” to cover the side of the floor system. Refer to the Model Set-up Worksheet to see this graphically.

The remaining panes, **Fill**, **Texture**, **Left Pen**, and **Right Pen**, are all be handled similarly. The end result is to be able to control the look of ALL of the components within the wall style by their class assignments, so when it comes time to make drawings and over ride classes, it'll be possible. But let's not get ahead of ourselves. Make all of the panes look like the ones in Fig. 22 *Wall Component Settings After* and click **OK**.

Step 8

In this step, we'll create the second component. As mentioned earlier, you do not have to create components in any particular order as they can be “stacked” by mousing over the “#” column and dragging the component up or down (see Fig. 23 *Wall Style Complete*.)

In the **Edit Wall Style** dialog box, choose New... to open the **Wall Component Settings** dialog box. Create a component called *Air Infiltration Barrier* and a new *Class* for it: **Wall-Component-Air Barrier**. The *Thickness* of the Air Infiltration Barrier can be entered as **.15 mm**. The top and bottom binding conditions can be the same as for the sheathing – *Top Bound* to **Bottom of Structure [Story Above]** and *Bottom Bound* to

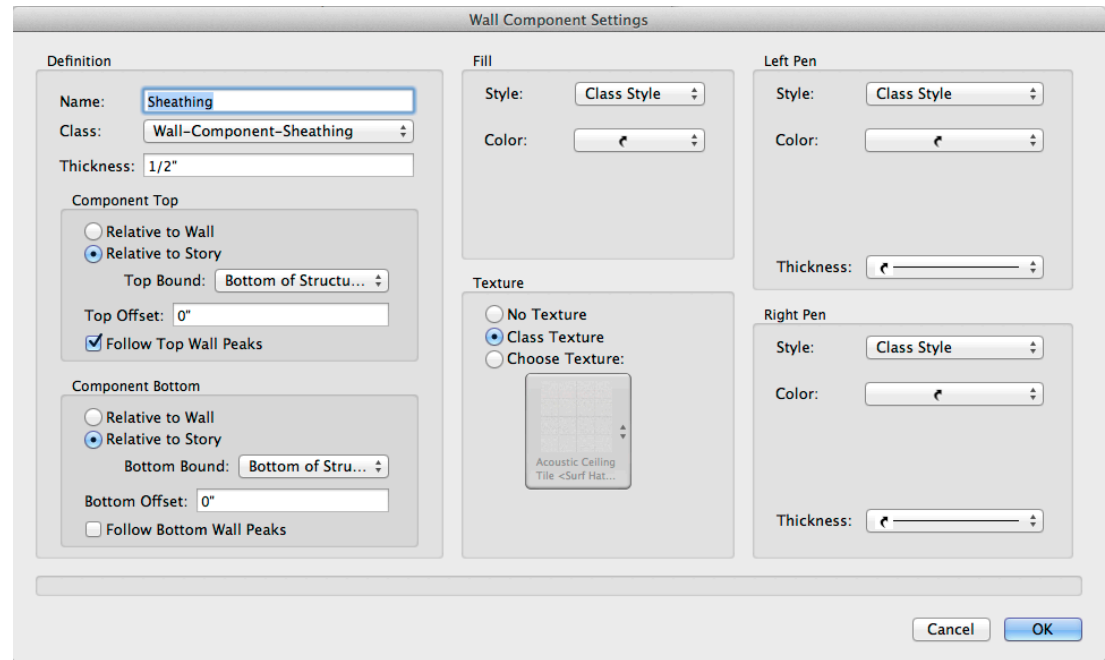


Fig. 22 Wall Component Settings After

Bottom of Structure. Choose to just have the top *Follow Top Wall Peaks*. Choose to have Fill, Texture, and Left and Right Pen “listen” to the class style. Then choose **OK** to accept your input.

Step 9

In this step, we’ll create another component, similar to the step above. This time, let’s create the space for the 2x6 studs. Choose New... to open the **Wall Component Settings** dialog box. The *Name* can be **Wood Stud Framing**, and the *Class* can be **Wall-Component-Structural-Wood**. The *Thickness* should be entered as an actual dimension (e.g., 5 1/2”). The *top* of this component will be *bound* to **Bottom of Structure [Story Above]**; however, the *bottom* needs to be *bound* to **Top of Structure** so that the wall rests on the sub-floor, just like you’d build it in the field. Choose to just have the top *Follow Top Wall Peaks*. Choose to have Fill, Texture, and Left and Right Pen “listen” to the class style. Then choose **OK** to accept your input. Once complete, in the **Edit Wall Style** dialog box, choose the Wood Stud Framing as **Core**. As mentioned earlier, this gives the slab a reference point once it’s been created, letting the wall/slab interface work out correctly.

Step 10

In this step, we’ll create another component, similar to the step above. This time, let’s create the component representing the drywall. Choose New... to open the dialog box. The *Name* can be **Drywall** and the *Class* can be **Wall-Component-Int Finish 1**. The *Thickness* can be entered as 1/2”. The *top* will be *bound* to

the **Bottom of Structure [Story Above]** level. The *bottom* of the drywall component is *bound* to the **Top of Structure**. Choose to just have the top *Follow Top Wall Peaks*. Choose to have Fill, Texture, and Left and Right Pen “listen” to the class style. Then choose **OK** to accept your input.

Step 11

The last component is the exterior cladding. Name it **Wood Siding** and *Class* it as **Wall-Component-Ext Finish-Siding**. The *Thickness* can be entered as 1”. The *top* of this component will be *bound* to **Bottom of Structure [Story Above]**, but the *bottom* is *bound* to **Ledge**. Recall we created two **Ledge** levels: one to deal with the upper floor and one to “run long” to accommodate not only the thickness of the floor system but also the thickness of the sill plate that only occurs on the first floor. This wall style will be capable of accommodating both conditions.

The Wood Siding component will need to have the checkbox for *Follow Top Wall Peaks* checked. Choose to have Fill, Texture, and Left and Right Pen “listen” to the class style. Then choose **OK** to accept your input.

Your newly created wall style should look something like *Fig. 23 Wall Style Complete*. If necessary, move components around top-to-bottom with top referencing the outer-most component.

The next step is to assign hatches, fills, colors, and textures to the various classes we created. These can be imported from the Office Standards

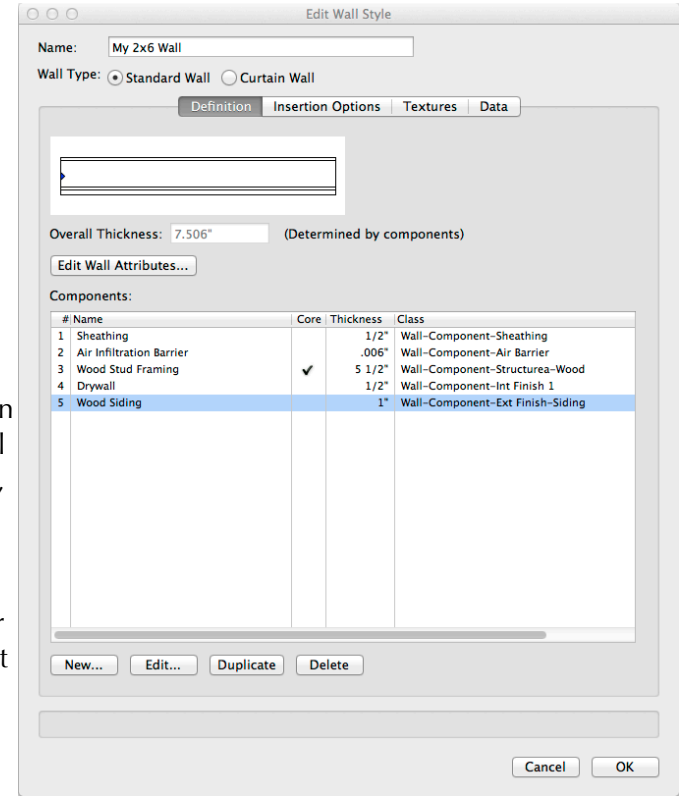


Fig. 23 Wall Style Complete

File. Once a hatch, color or tile fill is assigned in the Class Editor, it will not show in the thumbnail of the wall style in the Resource Browser until that particular wall style is edited and closed again. This forces Vectorworks to “reset,” letting you see the changes.

As we talked about in the beginning of this segment, what we just created is a **fully level-bound wall style**. It will function perfectly, but let’s look at taking advantage of some of the power and automation relative to wall styles.

From the Resource Browser, make a duplicate of the wall style we just created and call it **My 2x6 Wall-LB**, letting the “LB” stand for level-bound. Hit **OK**. You should now have two wall styles in the Resource Browser.

Now let’s modify the original wall style, **My 2x6 Wall**. We are going to change the binding condition of both the drywall and wood stud framing to help us out a little bit down the road when we insert a stair into the project.

- 1) Right click to **Edit** the wall style and choose **Wood Stud Framing**.
- 2) **Double click** or choose Edit (see Fig. 24 Change Binding Condition) and change the binding condition for the bottom of the wall to **Bottom of Structure** (it was Top of Structure).
- 3) Do the same for the component called Drywall.

That’s it! We now have a wall style that will respond to a slab as well as having its components respond vertically to the binding conditions we created.

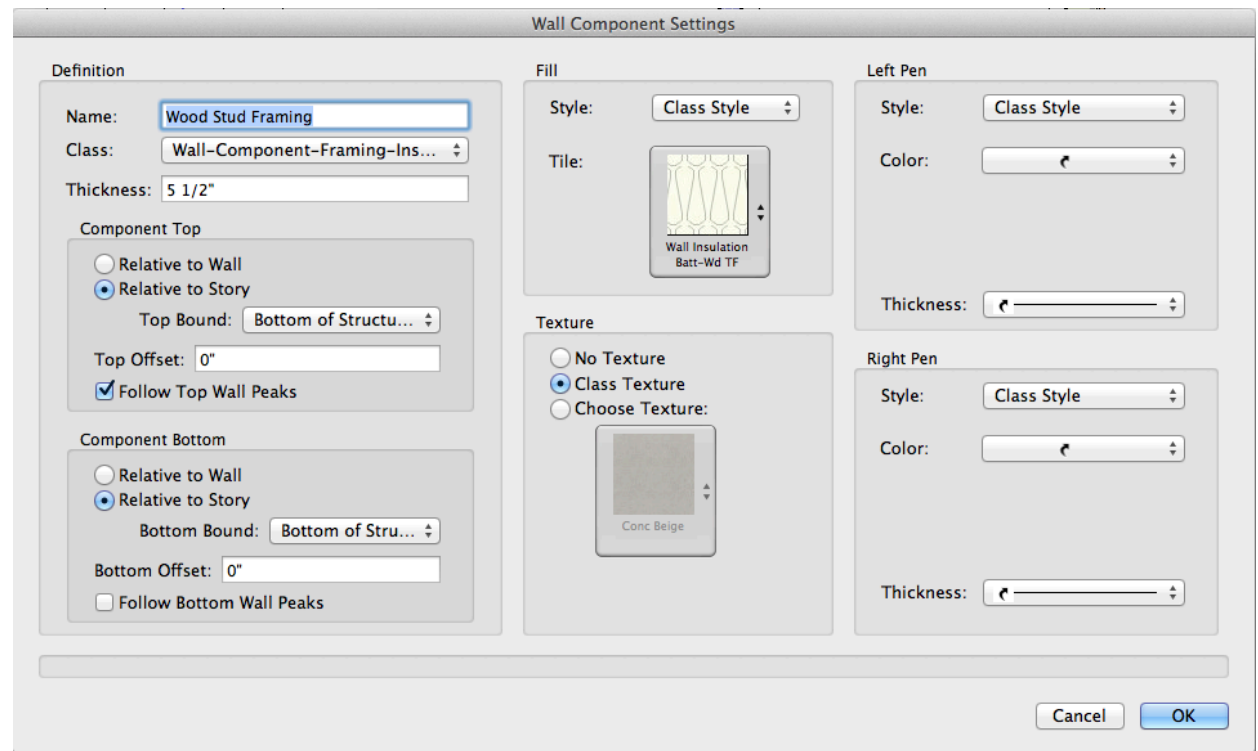
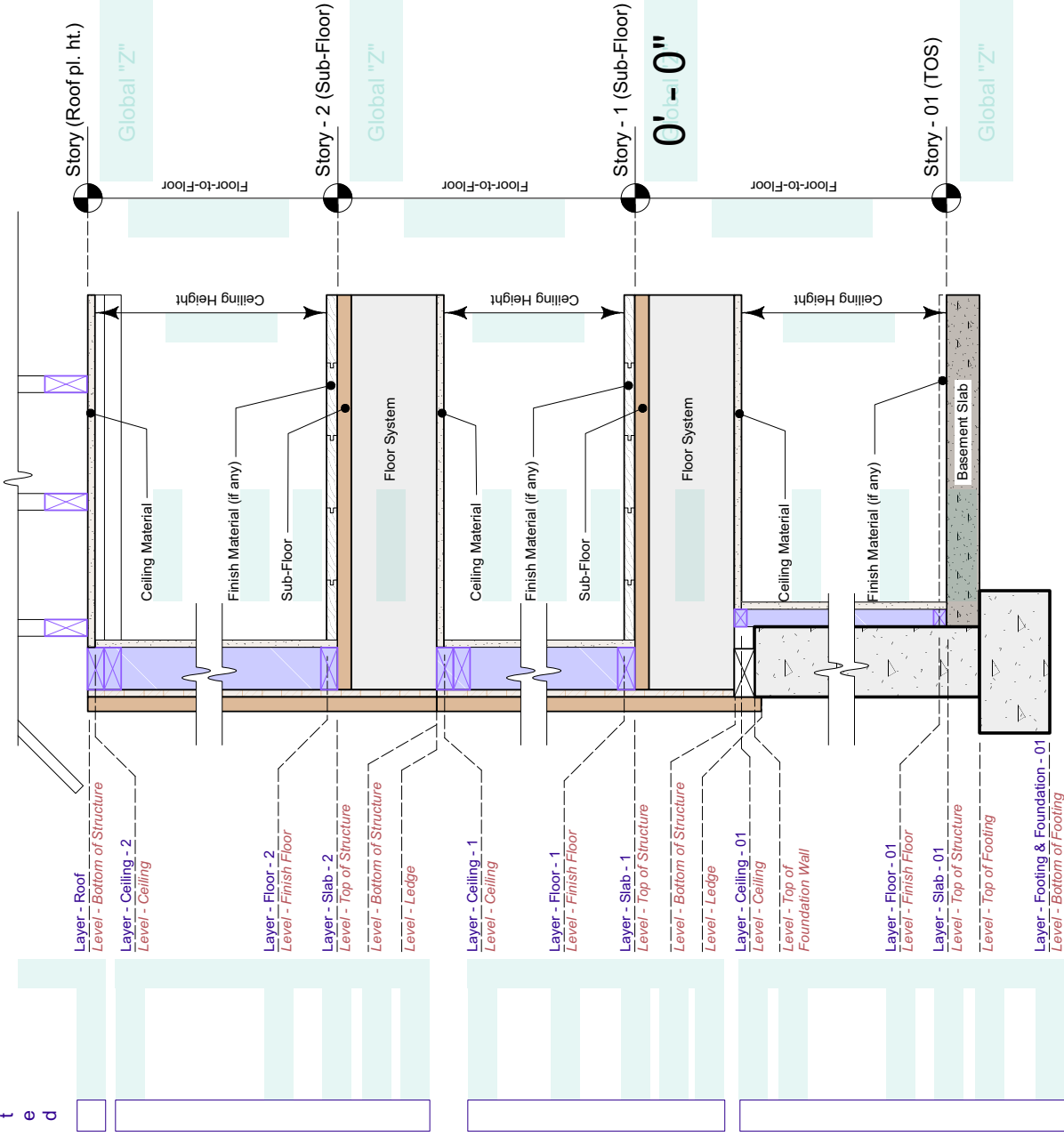


Fig. 24 Change Binding Condition

Model Set-up Worksheet

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1. Enter Ceiling Height
2. Determine thickness of materials, enter known values
3. Calculate & enter value for floor-to-floor

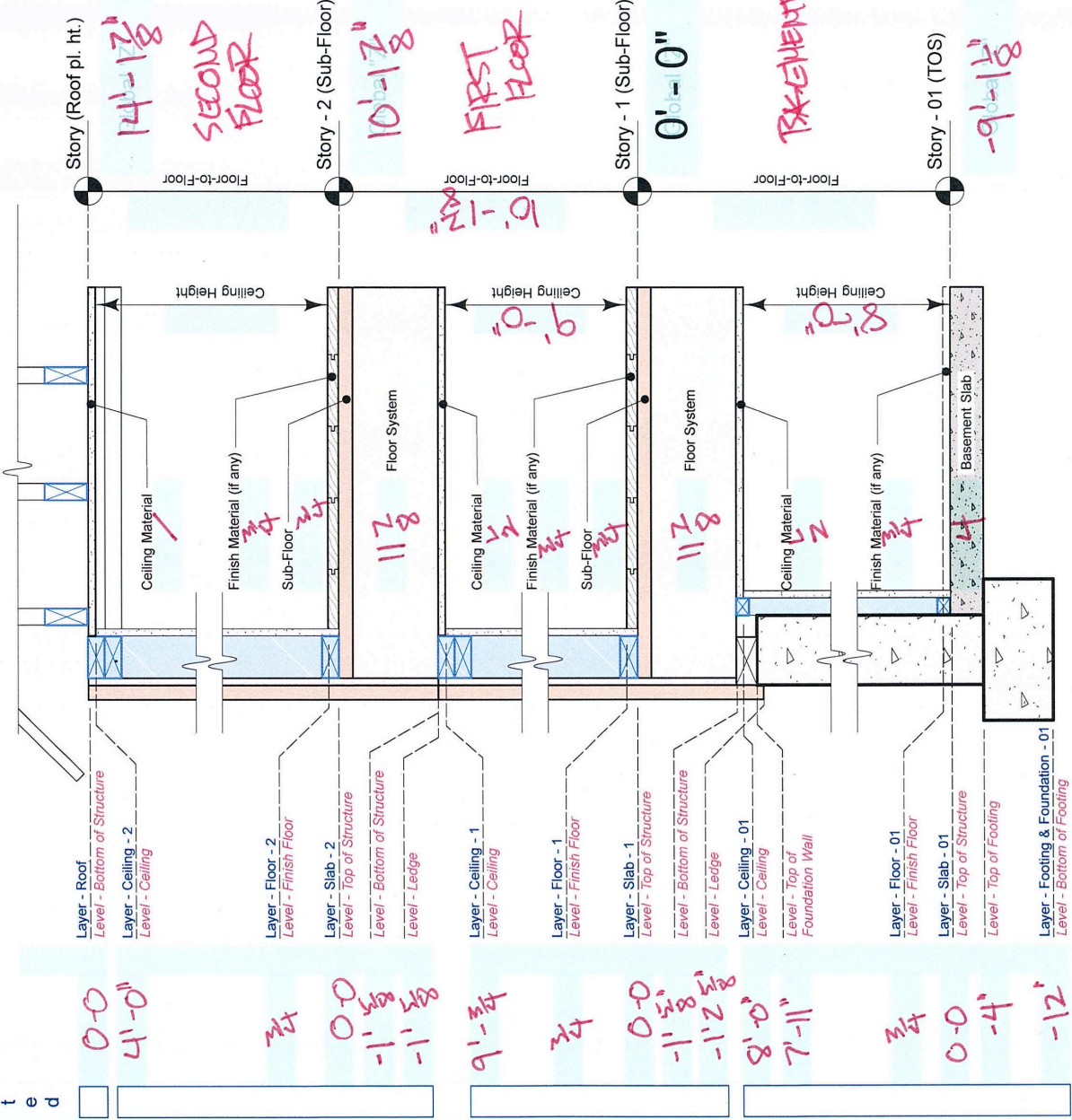
NOTE: Walls are drawn/placed on the Floor Layer

Elevational information for Levels is calculated/entered relative to the STORY they live in

Model Set-up Worksheet

Residential
Katrina 2015

Created



1. Enter Ceiling Height
2. Determine thickness of materials, enter known values
3. Calculate & enter value for floor-to-floor

NOTE: Walls are drawn/placed on the Floor Layer

Elevational information for Levels is calculated/entered relative to the STORY they live in