SHORT SHARP TRAINING (monthly) issue 1301

Welcome to this issue of the Vectorworks Short Sharp Training (monthly). This manual is designed to work like a user group meeting. There is a main workshop topic, then extended movies showing tips or techniques and an area for beginners.

Workshop Topic
Desing Layers and Classes

Design layers and classes are the two most important organising concepts that you need to understand in order to create drawings in Vectorworks. I still find some users are confused about when to use a Design Layer and when to us a Class to organise their drawings. I use three simple rules to decide when I need a new Class, and three simple rules to decide when I need new Design Layers.

If you understand layers and classes fully, you will find it a lot easier to create your drawings because you know when whether should be applying a class to an object or whether you should be putting that object in a layer.

Use classes to assign attributes to objects, i.e. you define objects. Design Layers are like containers, they store all information related to that layer.

You can think of classes being what the object is because the class is an attribute assigned to objects. You can think of layers being where the information is because layers are a container that stores all the information related to that layer.

For more Vectorworks training information, or to purchase more copies of this book, please email jon@archoncad.co.nz

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Introduction

Many users struggle with the concepts of Design Layers and Classes. Some users think that these concepts are interchangeable, so it doesn't matter, but that is not correct.

I saw a discussion on the Vectorworks Community Board about setting up a renovation project. One of the suggestions was to have a layer for the demolition work and a layer for the proposed work. This suggests to me that layers for demolition are interchangeable with classes. Using classes for the demolition works is more effective because you can use the classes to control the graphic style. You can't use layers to control the graphics.

So, the aim of this manual is to make it very clear when to use classes, and when to use layers.

Design Layers

Design layouts are an organizing concept to help you to develop your designs. You can think of layers as being containers. The Design Layer contains parts of your design. Some people say “layers are **where** information is, classes are **what** information is.”

If you are creating an architectural project, the easiest way to think of Design Layers is to think of each story of the building as a Design Layer. This is a very simplistic way of looking at it, and there is much more to it than that.

You can use Design Layers to control visibility of objects in your file, but it is often better to use Classes for this.

I have three simple rules that decide when to use Design Layers:

structure your file;

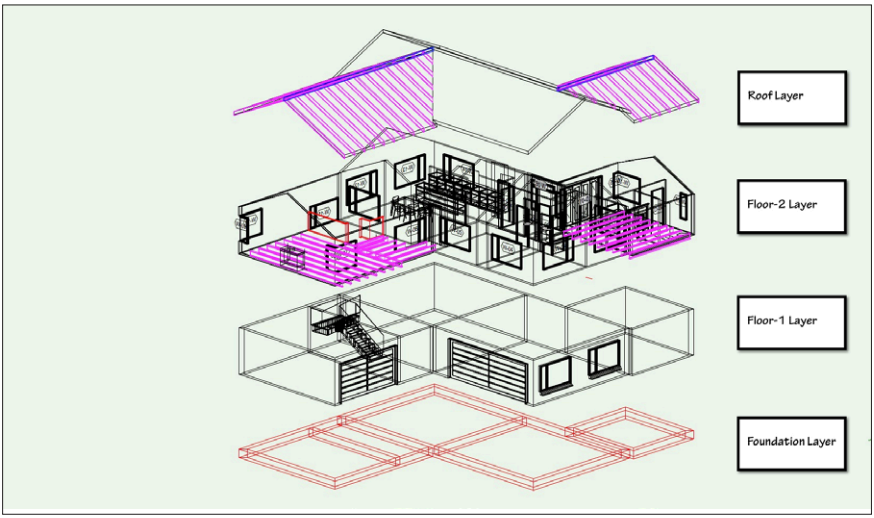
different scales;

scheduling and reporting.

Structuring your File

Design Layers are useful for structuring the file, for example, creating Design Layers that contain the various stories of a building, or separating landmark designs from the imported base information.

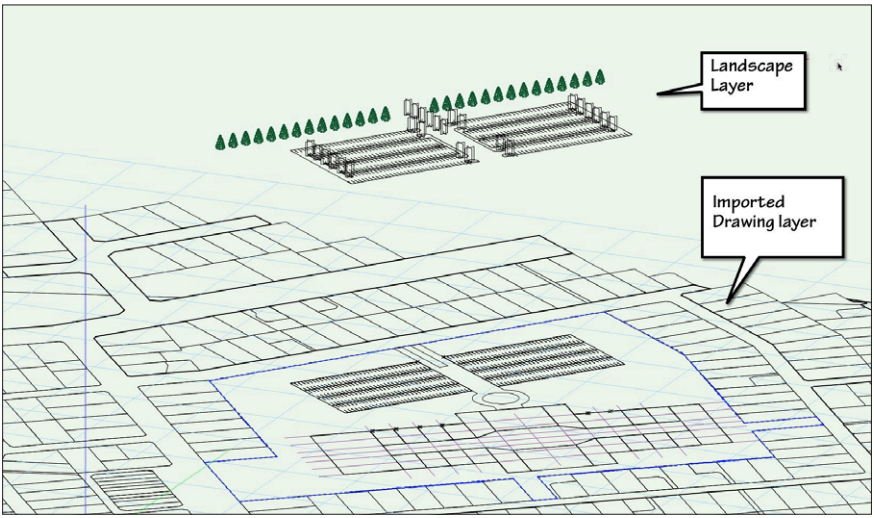
For a building project you would have a Design Layers for each story of the building and a separate Design Layers for the roof. Separating the roof from the other parts of the building will assist you when it comes to using commands like **Fit Walls to 3D Objects**. You might also choose to put your foundations on a separate Design Layer, which would be a good idea if it is a complex building, but if it is a small domestic project it might be easier to put the foundation walls in the same Design Layer as the main walls, but on a different Class.



When I am creating a renovation project, I always create Design Layers for the existing walls and roof to model the existing building correctly. After the building has been correctly drawn, I then copy the walls and roof layers, assign these to the correct stories and then use these new layers for my proposed and demolition work.

For some projects it is more effective to use Vectorworks to create the model, then use that model to create 2-D sections of the building. This allows you to put a high level of detail into these sections, which you can then use for detail viewports.

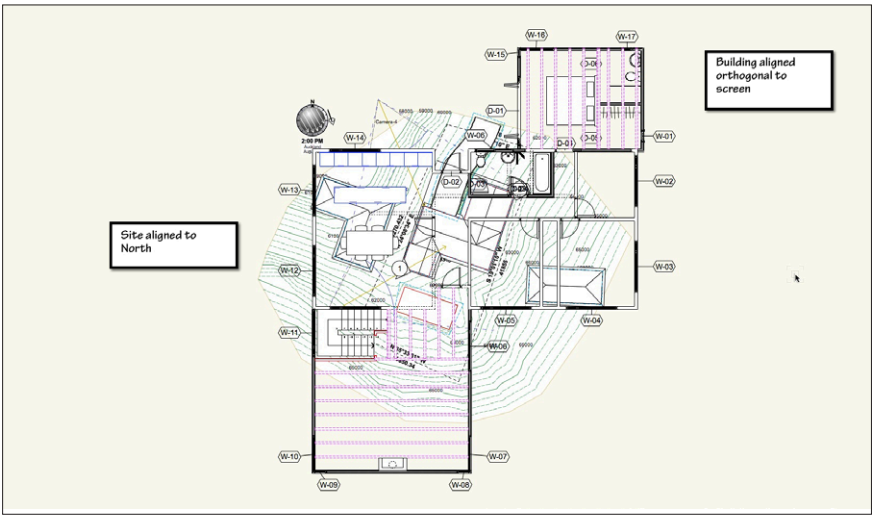
For landscape work, you very often have to import a base drawing. The base drawing should be on its own Design Layer, and then you can put your landscape design on a separate layer. Separating your landscape into soft and hard landscaping is an advantage for large projects, but may not be necessary for a small project.



It is important to remember that your Design Layer is a container, containing information that you need to keep together.

Different Scales

When you create text as part of your drawings Vectorworks uses the scale of the design layer to create the text at the correct size. This means that if you want to use parts of the file at different scales, you either have to change the size of the text to suit, or use diffeent scales. Some hatch settings are connected to the scale of the layer, so they also need to be treated carefully.



Another example is the difference between the plan drawings and the site plan. Depending on the size of your site there might be a huge difference between the scale of the plans and the scale of the site. As well as the scale issue between site plans and floor plans, there is also the difference in orientation. Often designers want to have the floorplan square on the page, but this conflicts with wanting to have the site plan with true North up the page. The solution of course is to have the floor plans on one layer and the site plan on a different layer.

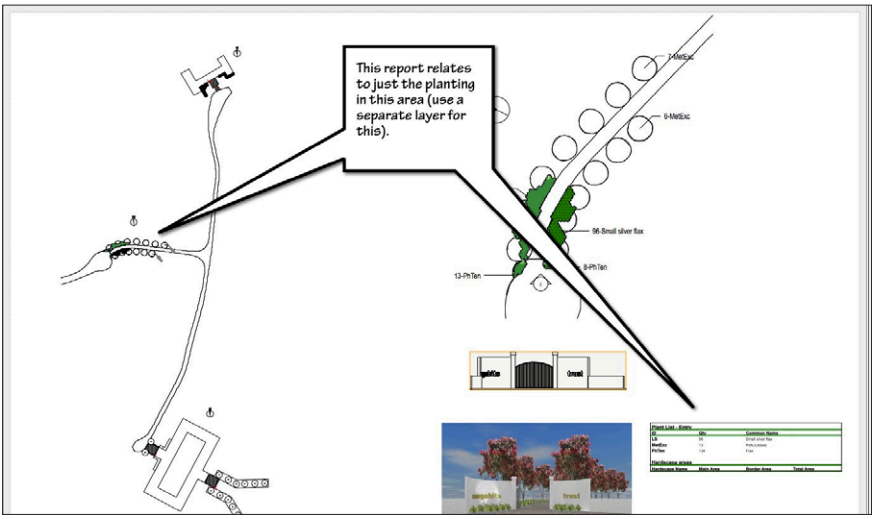
Details are also ideal for having their own layers. This allows you to have the details at the correct scale, without affecting any of the other work on the other layers.

Scheduling and Reporting

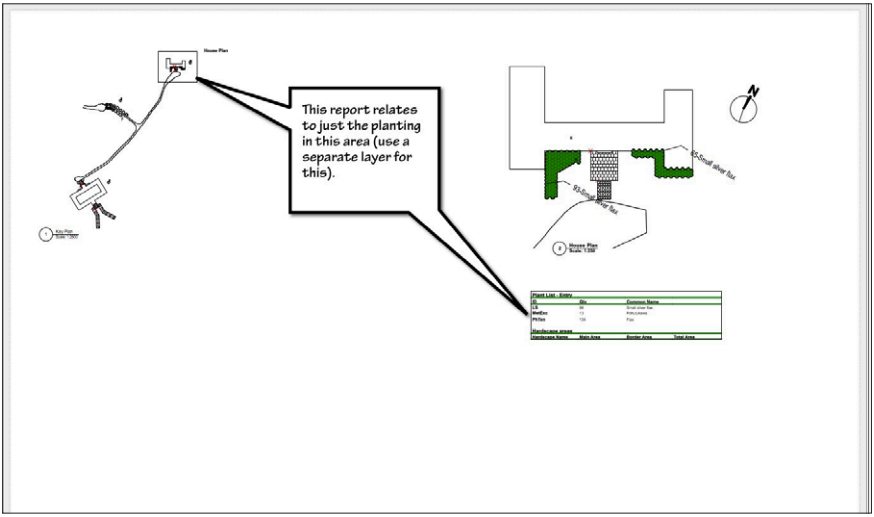
Design Layers can be used to separate information for scheduling and reporting. For example, in an architectural project, you might use layers to separate the reporting of doors and windows so that you only get a window report for the windows in a particular layer of the building.

In a landscape project, layers are extremely useful for separating information so that you can report specific areas of the landscape. In this

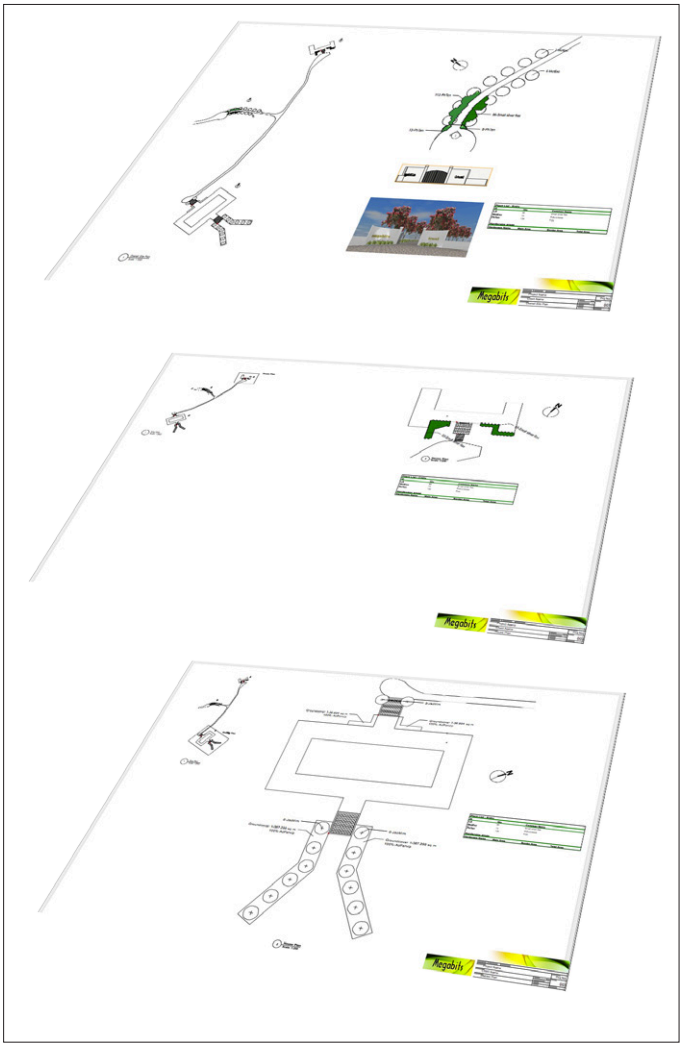
example I have three main areas of the landscape that I want to report independently. I have the entrance area, the main house area, and the stables area.



Separating each area with its own layer makes it easy to create a report that will only show hardscape and planting information for that specific area.



This allows you to create drawings that are concise and more easily understandable, with reports showing you the information that relates to that specific area.



Classes

Classes are an organizing concept that you can assign objects to. This allows you to control the visibility of these objects as well as controlling the graphic style of the objects.

The easiest way to think of Classes is to think of them as an attribute that you apply to objects. Classes are **what** the objects are, Design Layers are **where** the objects are.

I have three simple rules for deciding when to use a class:

control visibility;

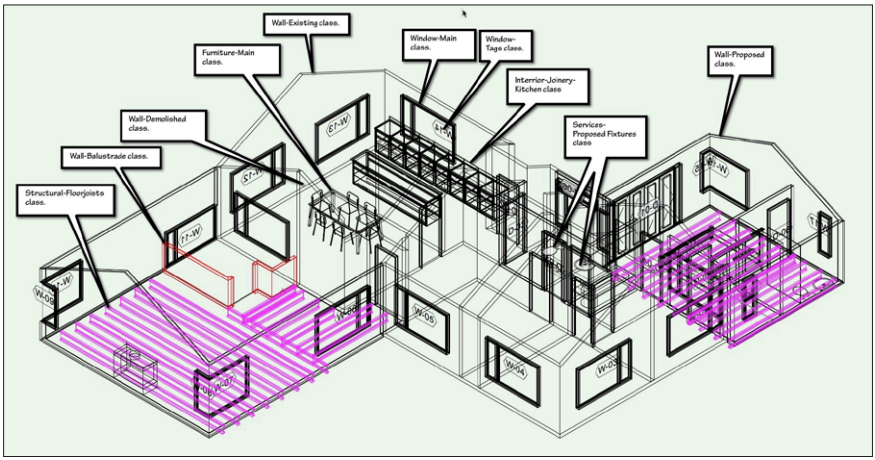
controlling graphic styles;

scheduling and reporting.

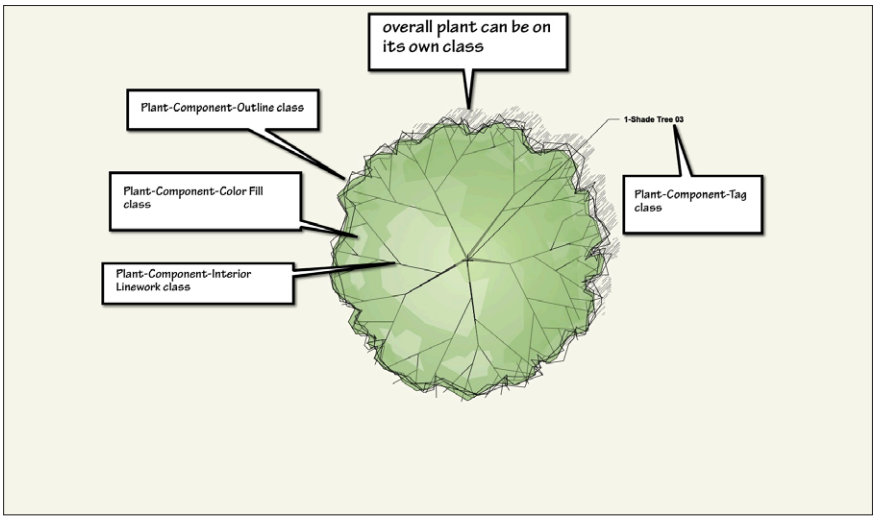
Controlling Visibility

Classes should be used control the visibility of objects, e.g. show / hide only that object.

In an architectural project classes relate very well to the types of objects that you put in your plans, e.g. furniture, doors and windows, joinery, and so on. So you could have doors in one class and windows in a different class. But the rule is that you only need a different class if you want to control the visibility independently, so generally you could put windows and doors on the same class.



When you use objects from Vectorworks they often come with their pre-defined classes, which are then automatically added to the class list, e.g. windows, dimensions, plants. When you place a Vectorworks plant, it already has classes associated to it. These classes control the color fill, the interior line work, and the plant tag. This allows you to show or hide parts of the plant to suit your design.



If you have objects that will be shown or hidden together they can be on the same class, even if they are not the same type of object. You can create

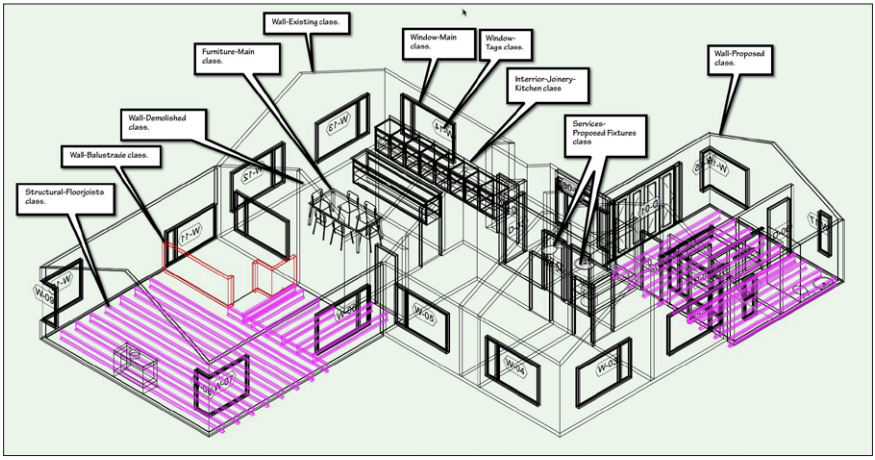
an almost infinite number of classes, but it is better to keep your number of classes to a minimum.

You can use layers to control the visibility, but not to the same fine detail that you can with classes. For example, in the tree image above, it is impossible to use layers to control visibility of parts of the plants. But classes are ideal for this kind of visibility control.

Controlling Graphic Style

As seen above, Classes are ideal for controlling the graphic style of objects, such as the line type, line color, line weight, and so on. This also includes the fill style, fill settings, and textures. So things that you want to look the same should be on the same class. Often you will find that the class you used to control visibility can also be used to control the graphic style.

In this image you can see several objects that have different colors. These colors are being controlled by the classes, and they show me not just the color, but they also help me understand the line weight.



If you have come from an AutoCAD background, you might be used to using color to represent line weight. Vectorworks does not do this, but you can assign a color and a line weight so that you can tell the line weight of objects by their color. For example in the image above, all the magenta

lines are a .25 pen and all the red lines are .18.

Controlling the graphics is easy with classes, but just not possible with layers.

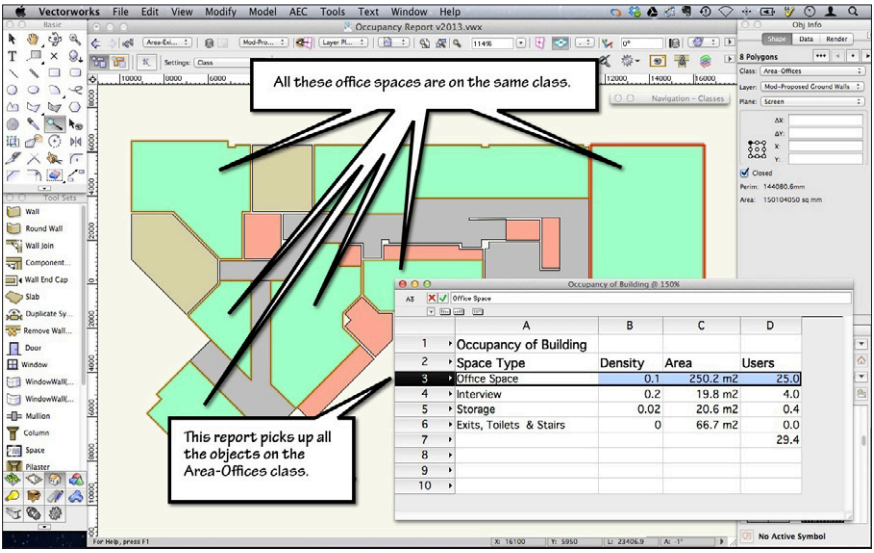
Scheduling and Reporting

You can use both layers and you can use classes for scheduling and reporting, so which one should you use?

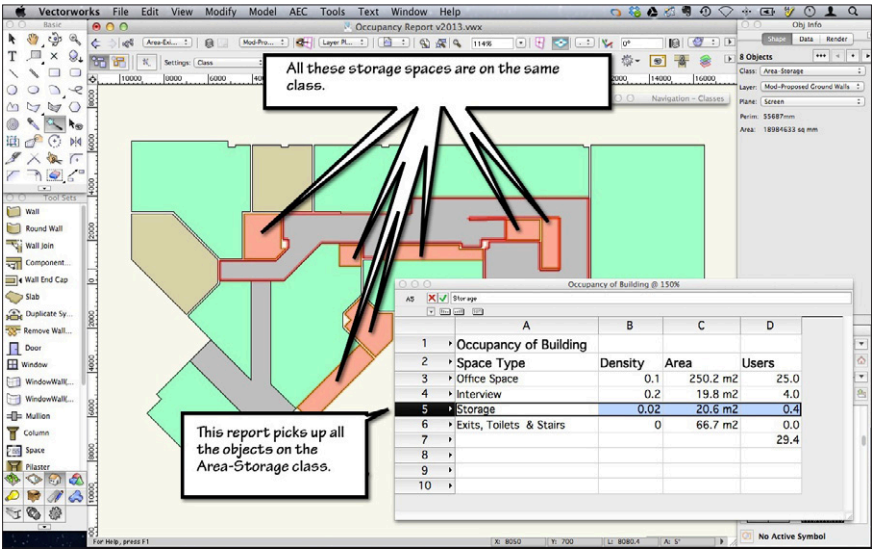
It comes back to layers being a container and classes being an attribute assigned to an object. So it depends on the report you are creating. If you are making a report to collect a lot of objects, use layers (as in the landmark example used earlier), if you are trying to report a range of objects but you want them to be reported together, then classes are better. For example, you can use Vectorworks to report areas for fire reports, energy reports, landscape areas, and so on.

In the case of the fire report, you need to calculate the occupancy of several areas. First, there are types of areas that have different density rates. For example, office space has a higher density than storage space. This means that we have to count all the office areas separate from all the storage areas.

A good way to do this is to use classes, rather than layers. If you use layers for this you would have to create a layer for each type of density. If you use classes for this, not only do you have a class for each type of density, but that class can also control the graphic style. Then, all the areas that are used for the fire report are all on the same layer, making it easier to find them.



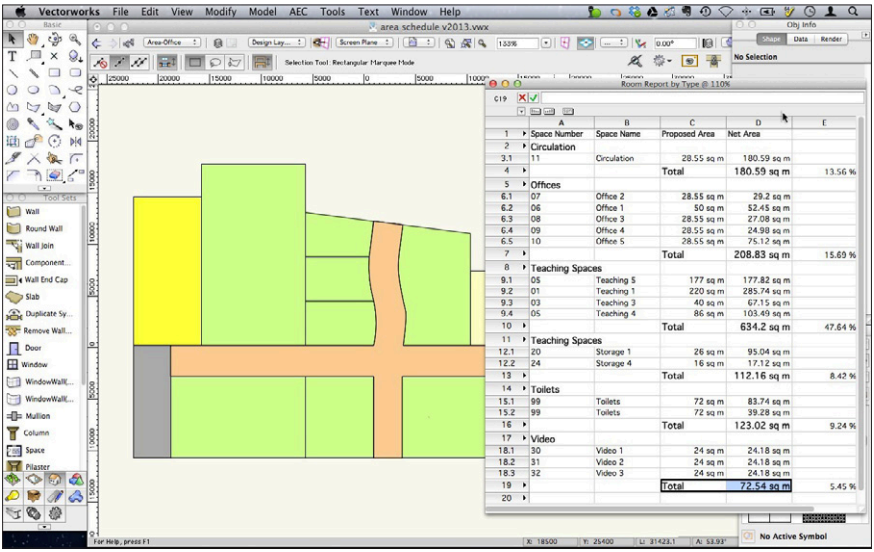
When you create your report you can then look for all the objects that are in a specific class. As soon as you add another object in the same class, this object will be added to the report as soon as you recalculate the report. You could have named each space and set up the report to find all the named areas, but this is slow and prone to error. It also prevents you from reusing the report on other projects. Using classes for this report allows you to reuse this report on any project.



Here is a similar example using spaces to find the areas. Again, I have used classes to group together the same occupancy types. Then I have set up my report to look for spaces that are on specific classes.

As soon as new spaces are added and assigned to the correct class, they can be shown in the report. As with the fire report above, using classes to create your report allows you to save this worksheet in your library and use it on any project that requires it.

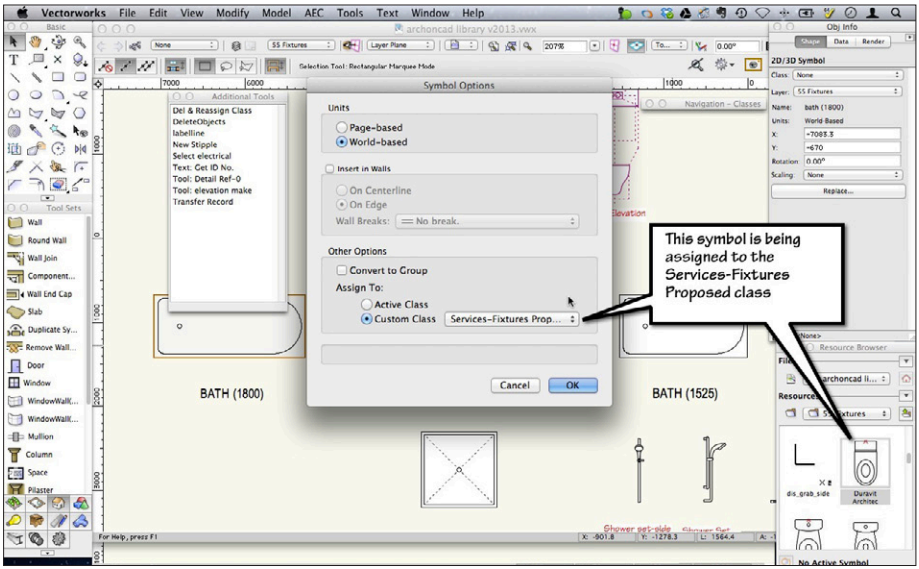
You could have separated all the spaces by layer, but that would make it awkward when you wanted to create a three-dimensional view of the spaces. You can get around this by using unified view and using the navigation palette control layers, but I have also used the classes to control the graphic style of the spaces. So if you wanted to repeat the report I have created, and the graphic style that I have used, by using layers you would still have to use classes for the graphic style. This is doubling your workload, so using classes only is quicker.


Vectorworks File Edit View Modify Model AEC Tools Text Window Help
area schedule v2013.vwx
Room Report by Type @ 110%
Space Number | Space Name | Proposed Area | Net Area
Circulation
3.1 | 11 | Circulation | 28.55 sq m | 180.59 sq m
Total | 180.59 sq m | 13.56 %
Offices
6.1 | 07 | Office 2 | 28.55 sq m | 29.2 sq m
6.2 | 06 | Office 1 | 50 sq m | 52.45 sq m
6.3 | 08 | Office 3 | 28.55 sq m | 27.08 sq m
6.4 | 09 | Office 4 | 28.55 sq m | 24.98 sq m
6.5 | 10 | Office 5 | 28.55 sq m | 75.12 sq m
Total | 208.83 sq m | 15.69 %
Teaching Spaces
9.1 | 05 | Teaching 5 | 177 sq m | 177.82 sq m
9.2 | 01 | Teaching 1 | 220 sq m | 285.74 sq m
9.3 | 03 | Teaching 3 | 40 sq m | 67.15 sq m
9.4 | 05 | Teaching 4 | 86 sq m | 103.49 sq m
Total | 634.2 sq m | 47.64 %
Teaching Spaces
12.1 | 20 | Storage 1 | 26 sq m | 95.04 sq m
12.2 | 24 | Storage 4 | 16 sq m | 17.12 sq m
Total | 112.16 sq m | 8.42 %
Toilets
15.1 | 99 | Toilets | 72 sq m | 83.74 sq m
15.2 | 99 | Toilets | 72 sq m | 39.28 sq m
Total | 123.02 sq m | 9.24 %
Video
18.1 | 30 | Video 1 | 24 sq m | 24.18 sq m
18.2 | 31 | Video 2 | 24 sq m | 24.18 sq m
18.3 | 32 | Video 3 | 24 sq m | 24.18 sq m
Total | 72.54 sq m | 5.45 %

Controlling Symbols

When you create a symbol you have the option to assign a specific Class to the symbol. Every time you place an instance of that symbol, it will be assigned to the correct Class, regardless of the active Class.

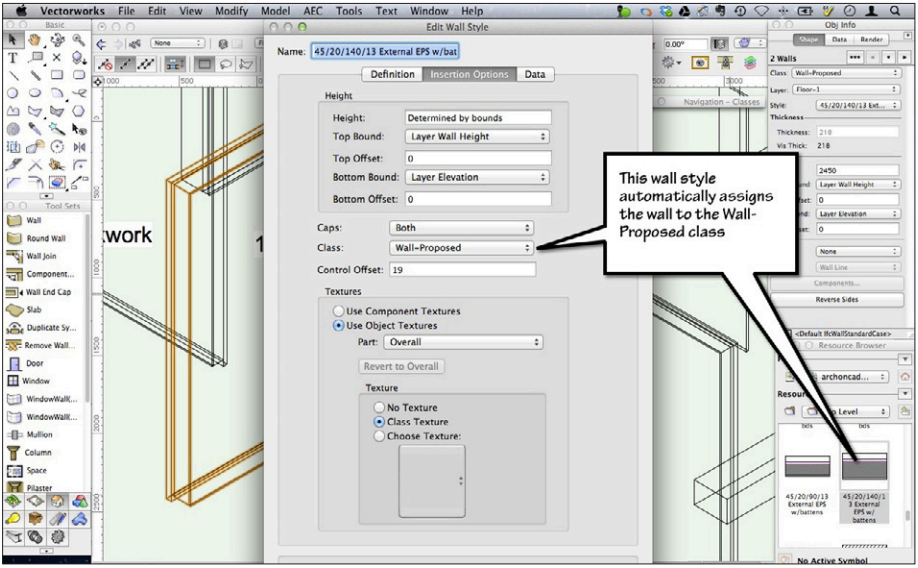
This is a fantastic way of building your office drawing system. It makes it foolproof to place symbols in the drawing because they are automatically assigned to the correct class. When you want those symbols to disappear turning off the class will make them all become invisible. This is impossible to do with layers.



Controlling Wall and Slab Styles

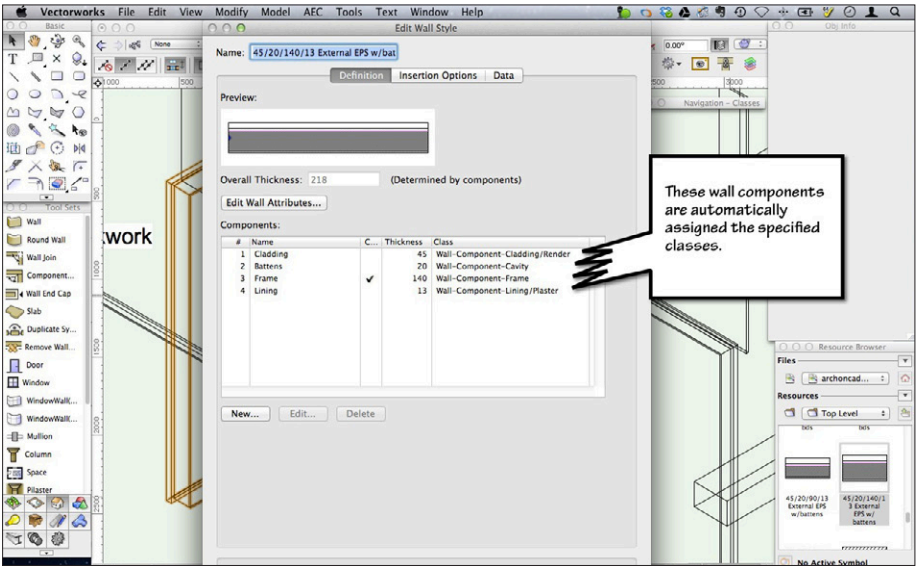
When you create a wall or slab style you can use the settings to control the class that the object is assigned to. This can only be done through classes and you cannot do this with layers.

It has a real advantage in that when you choose a wall from your library you do not have to check your active class. The setting instructs Vectorworks to assign the wall or slab to a specific class regardless of the active class settings. This is a great way to manage your Vectorworks drawing system because it becomes automatic. It does not rely upon the user to check.



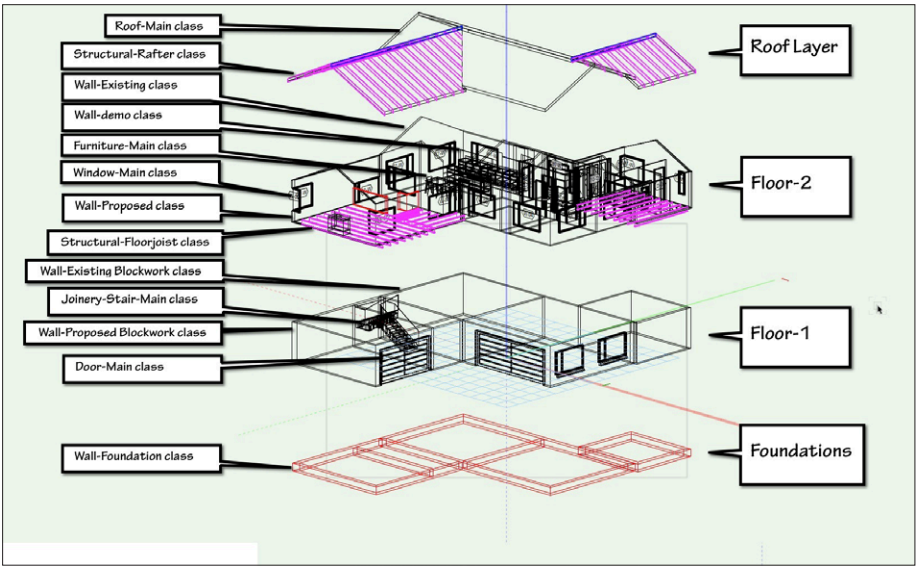
This setting controls the overall class the walls assigned to. But you can also assign the individual components of the wall to their own classes. This allows you to turn off some components by their class.

You cannot do this with layers.


Vectorworks File Edit View Modify Model AEC Tools Text Window Help
Edit Wall Style
Name: 45/20/140/13 External EPS w/bat
Definition Insertion Options Data
Preview:
Overall Thickness: 218 (Determined by components)
Edit Wall Attributes...
Components:
Name C... Thickness Class
1 Cladding 45 Wall-Component-Cladding/Render
2 Battens 20 Wall-Component-Cavity
3 Frame ✔ 140 Wall-Component-Frame
4 Lining 13 Wall-Component-Lining/Plaster
New... Edit... Delete
These wall components are automatically assigned the specified classes.
Resource Browser
Files
archoncad...
Resources
Top Level
45/20/90/13 External EPS w/battens
45/20/140/13 External EPS w/ battens

Layers and Classes Together

In this image we can see an architectural project. The layers are defining the stories of the building (and what objects are in them), and the classes are controlling the graphic style and the visibility of the objects.

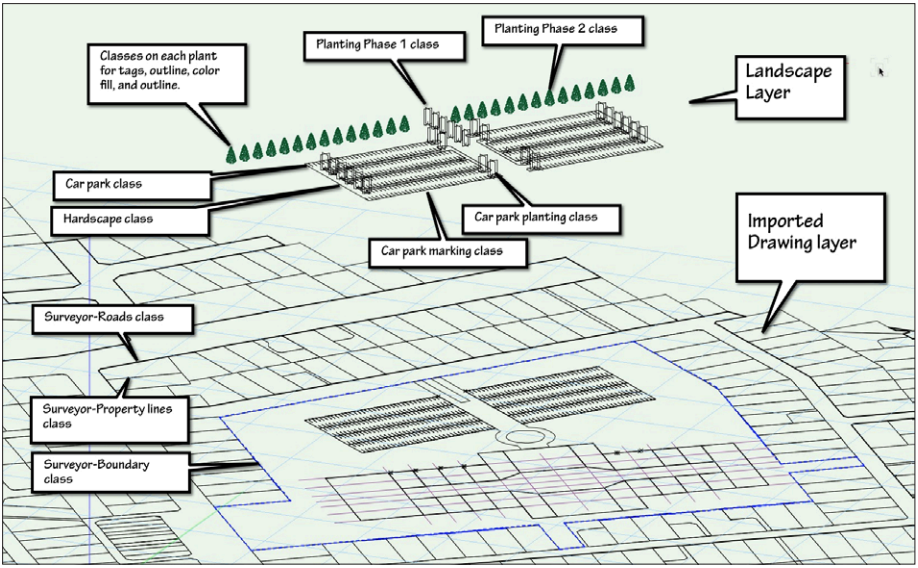


In a landscape project the layers are also defining where things are. When you import a survey drawing or an architect's drawing, you still want to keep that information separate from your landscape work. So you keep the imported drawing in its own layer and you put all your landscape work in a separate layer.

But each of these layers has objects that are assigned to classes. For example, the imported drawing has classes for the roads, the boundaries, the car parking, and many other objects. This allows you to filter the information by making some classes invisible.

When you create your landscape design, you will automatically have some objects on classes depending on the tools you use to create your landscape, and the settings of those tools. This allows you to create several complex drawings from the same few layers by being careful which classes you

make visible in each viewport.



Sheet Layers

Sheet layers are used for printing. So, Design Layers for designing, sheet layers for printing.

Generally, there is no need to use classes on your sheet layers.

Viewports should be assigned to the None class. They are not assigned automatically to the None class, they are always assigned to the active class. You need to be careful when changing the active class if you are creating viewports. I have wasted several hours looking for viewports because they were on a class that was turned invisible. If you are going to make viewports set your active class to None.

Title blocks and sheet borders might be assigned to specific classes if you want to create a drawing report showing phases of the construction. You cannot use layers for this.

Thank you

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

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

Thank you again,
Jonathan Pickup
January 2013