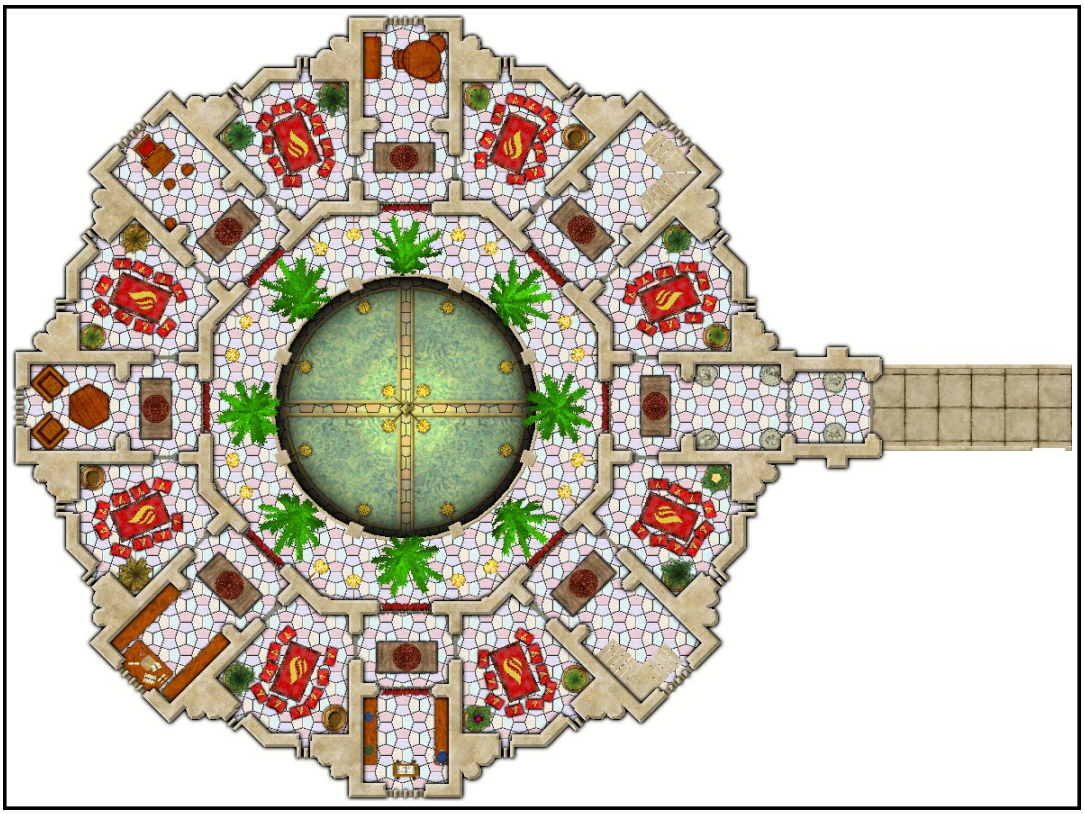
Map Bits as Fill Styles
A Campaign Cartographer 3 Tutorial
by Joachim de Ravenbel[1]



Conventions

Throughout this tutorial, I will use a color coding to clearly identify all the keywords:

Sheet names will always appear in **Green**,
Keyboard commands or keys will always appear in **Red**,
CC3 menu commands will always appear in ***Italic Orange***.
A bold **Black** name followed by an arrow pointing right → and, at least at the end, an ***Italic Orange*** name indicates a CC3 menu drop-down list leading to a command. **Black** names also represent buttons or sheet effects.

Introduction

CC3 is loaded with awesome sheet effects. If you want to use a lot of effects, you usually end up with a lot of sheets and a very high render time. By creating some parts in a sub CC3 file using the method described here, you will have the benefit of a lot of effects without the drawbacks.

On the above sample map, the circular hole has been exported from a sub-map and the export file used to create a new fill style.

1 Many thanks to Terraformer Author, for creating and sharing the nice font used for the title. You can find it here.

Planning

The method comes with a price too: you need to work on two different scales: CC3 units and pixel units. You also need to choose the size of the final version export.

The nature of CC3 units, whether feet, miles, meters or kilometers is not relevant. CC3 units correspond to the “real” dimensions of the map's entities. What is important is knowing how many pixels you want to represent the scope of the map. A pixel is a small colored square. A digital picture is made by placing millions of these square in the picture's area. A pixel is also the “dot” in “dot per inch” or “dpi” resolution. A value of 150 dpi means that for a length of 1 inch, your printer will align 150 colored squares. For example a 10'×10' at a resolution of 300 dpi will have 3000×3000 pixels on it.

The important difference between CC3 units and pixels is that when dealing with CC3 units, decimal numbers are allowed and very frequent indeed. Pixels are always numbered in whole numbers (integers).

There is thus three unit systems to consider:

1. CC3 units: “real” dimensions
2. Pixels numbers: whole numbers counting the number of colored “dots” of a digital picture.
3. Paper units if you want to print the map. If you just wish to create the map for a digital display, you usually know the pixels numbers and don't need to consider this third system.

These three systems work together because they all correspond to the same map. The conversion is not too hard: you have to multiply or divide a number from one system by a scale factor to get the equivalent in another system. The next steps are about finding the factor between CC3 units and pixels:

1. Determine the scope of your map in CC3 units. This is usually decided when you start the map using a template. However, you sometimes find that the initial size is not enough and enlarge the map. If you don't know the extents of your map, use the **Info**→***Distance*** tool (**F8**) and select opposite corners of the map border using the ***Endpoint modifier***  (**F5**). The sample map is 200'×200'.
2. Determine the size in pixels of the final product. If you want a paper print multiply the desired size in inches or centimeters by the chosen print resolution in dpi if the size is in inches, in ppcm (pixels per centimeter) if it's in centimeters. If you want a digital picture, just define the number of pixels compatible with the use of the map. The sample map was exported as a 3000×3000 pixels png file.
3. Determine the factor between CC3 units and pixels number by dividing the length of the map in pixels by the length of the map in CC3 units. For the sample map, the CC3 units size is 200'×200' whereas the final output will be at 3000×3000 pixels. The factors between CC3 units and pixels numbers is thus 3000÷200 = 15:

Size in CC3 units **×15** → size in pixels
Size in pixels **÷ 15** → size in CC3 units

In some cases, the result might not be a whole number. You can round the result but the more precise way is to keep it as a fraction. For example if you have a 300'×300' CC3 units map you want to export to a 2000×2000 pixels picture, the factor is $2000 \div 300 = \frac{20}{3} \simeq 6{,}66667$.

Size in CC3 units **×20** → **÷ 3** → size in pixels
Size in pixels **× 3** → **÷20** → size in CC3 units

It is important that the inserts resolution is not lower than the final export or the transition between them will be too obvious.

The main map

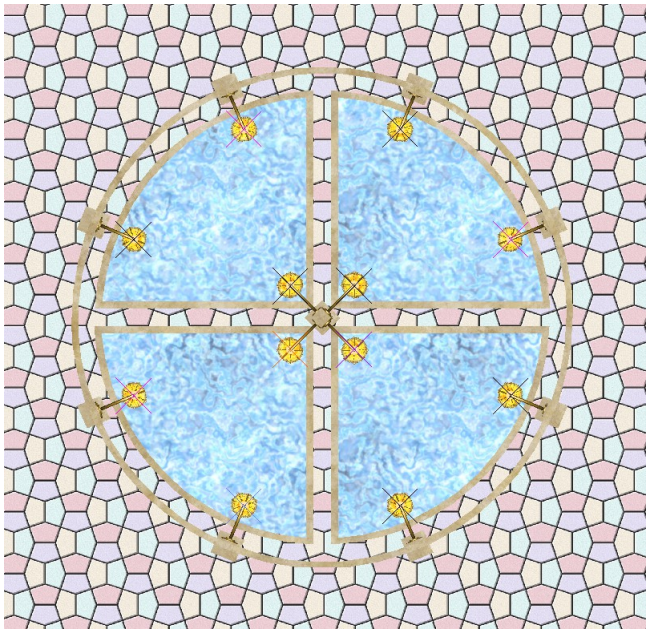
The work starts with the main map and the inserts are created when needed. The sample map shown here has been created using the steps detailed in the Chapel Tutorial (if you're interested, the floor fill style can be found here). An empty circular area sits in the center, open to a level below:

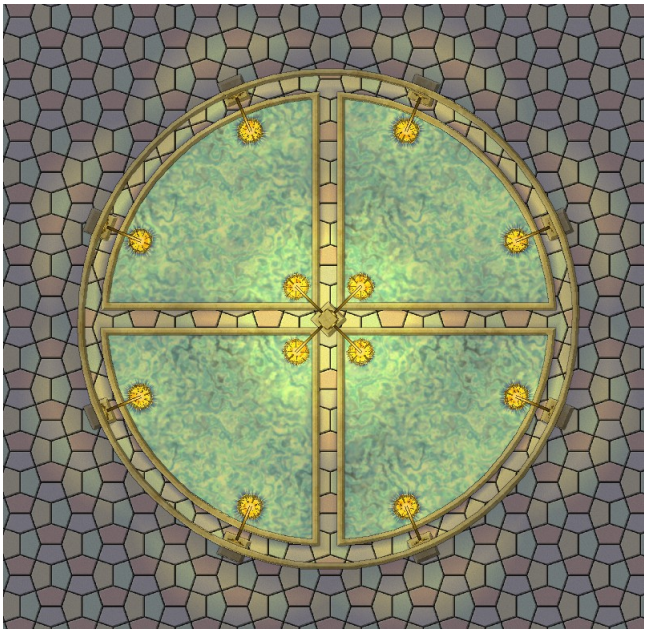
This low level features pools lighted by glowing crystals. The main floor will also be lighted but these lights should not affect the lower level. By carefully adding sheets and effects you might achieve a satisfying result. The solution presented here reduces the number of sheets and thus allows faster rendering and exports. The steps that will need to be taken are:

1. Create a sub-map in CC3
2. Measure the size of the circular “hole” on the main map
3. Export a rectangular section png picture of the required size at the required resolution
4. Create a fill style on the main map file using the sub-map export
5. Draw a circle on the main map file with the new fill style.

1. Create a sub-map in CC3

This sub-map is created similarly to the main map:





Left: effects off, right: effects on. The rings and pools sides are all very low walls that cast short shadows.

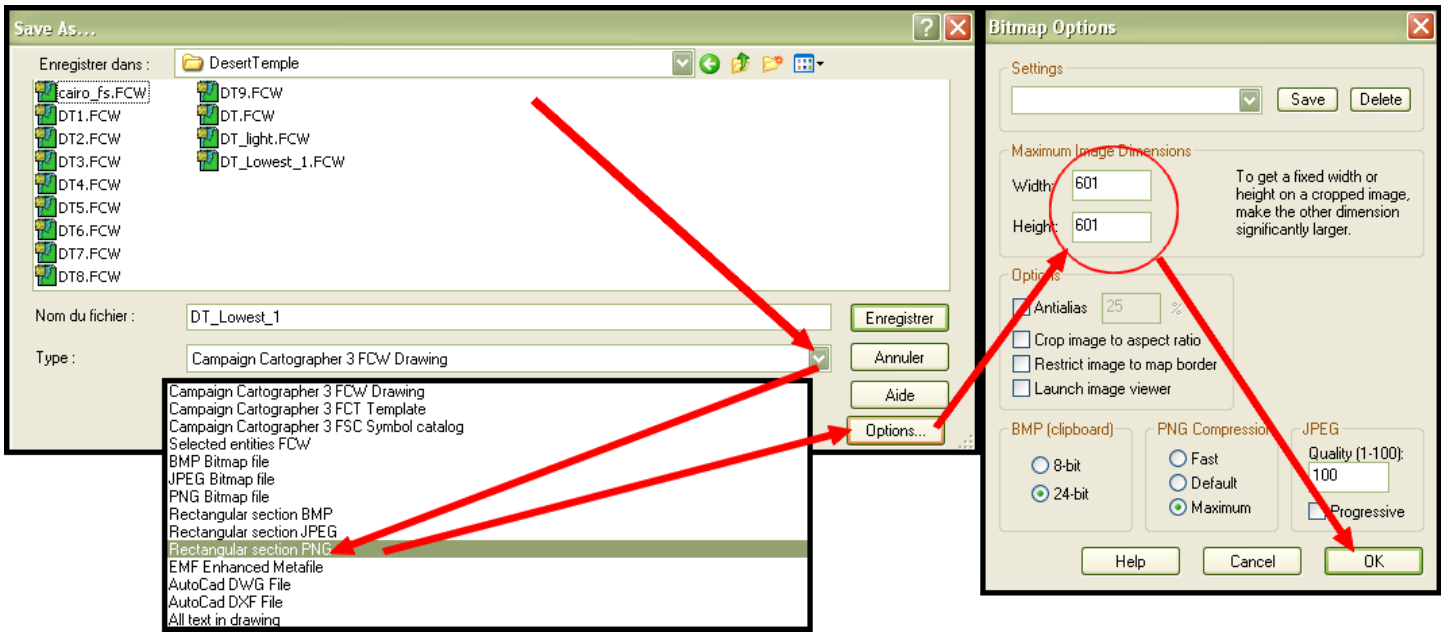
2. Measure the size of the circular “hole” on the main map

Use the **Info**→***Distance*** (or the function key **F8**) and click on the hole's center (hopefully it's a grid node easy to select with the **Snap** button down, alternatively click the ***center modifier*** **F4** then click on the circle to get its center precisely) then on a point on the circular rim.
The sample map gives a distance of 19.96247. Rounding is necessary because the export will need a size in pixels by whole numbers (also called integers). Usually you need to round to the nearest **upper** value to be sure to cover all the target area. Here it will be 20' for the radius, meaning a 40' diameter.
Because in the **planning** section (page 2) you defined the factor between CC3 units and pixels (15 for the sample map), you can now compute the export size needed: 40'×15=600 pixels wide.

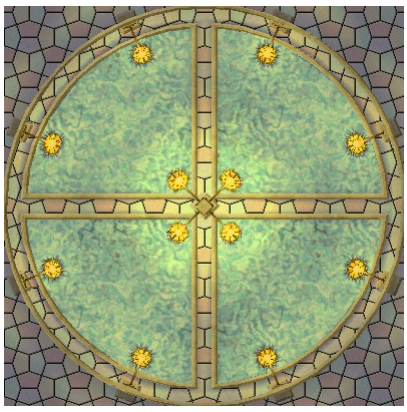
3. Export a rectangular section png picture of the required size at the required resolution

When exporting a rectangular (or here square) part of a map with precision, you need a way to pick the opposed corner of the rectangle. One possibility is to use the coordinates of these corners.
Even if you didn't use the grid snapping, you can still change the coordinates system on the sub-map using the **View**→ ***Move Origin*** command (or the keyboard command **ORIGIN** followed by a carriage return). The cross-hair cursor appears to select the new origin so pick it with the ***center modifier*** **F4**.
Now you know that the lower left corner's coordinates are -20,-20 and the upper right corner's coordinates are 20,20 (if necessary adapt these numbers to the size found in step **2.** above).

- Make sure the effects are on. Otherwise click on the Sheet Indicator, check **Activate Sheet** Effects and click OK.
- Use the **File→*Save as*** command (keyboard **EXPORT**). A pop-up appears.
- Click on the "v" button at the right end of the **Type** line (commonly showing "Campaign Cartographer 3 FCW drawing") and select **Rectangular section PNG** in the drop-down list.
- Click on the **Options** button to launch a new pop-up.
- Set the **Width** and **Height** to the target values in pixels **plus one** (for the sample map 601×601): you have perhaps already noticed that CC3 adds a pixel on the top and right sides of the export, probably due to the conversion of a continuous length unit to a discrete (whole) number of pixels. To circumvent this habit, you need to add one to all the pixel sizes (and to remove the extra pixels afterward).



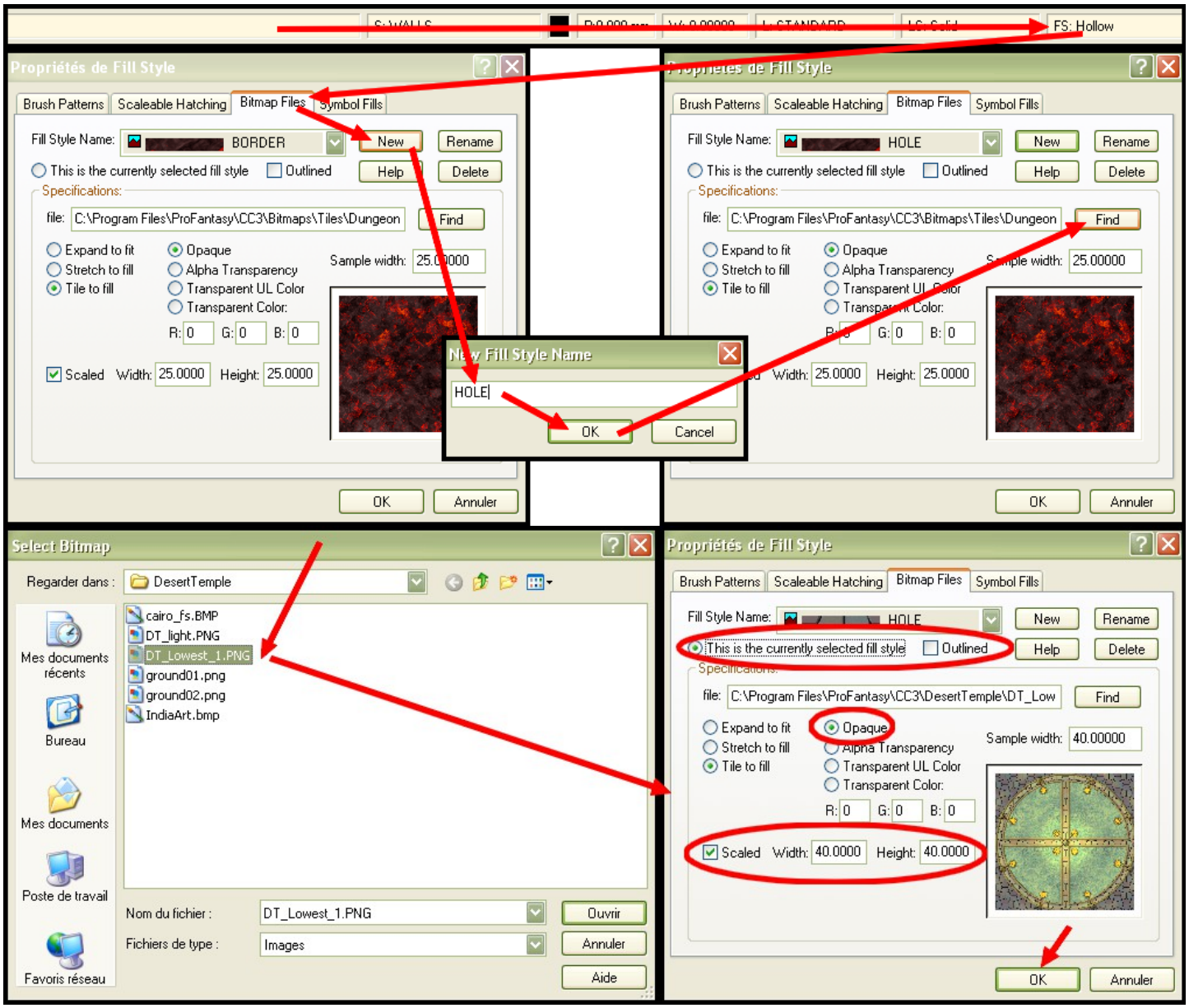
- Click **OK** to close the second pop-up.
- Change the file name if you wish, note the location of the export (usually the same folder as the map but you may change it) and click **Save** to launch the export.
- The prompt reads "Pick first corner" in the command line. Just type **-20,-20** (adapt values if necessary) and hit return. The prompt now reads "Opposite corner" so type **20,20**. CC3 starts to export the map and you can follow the progress on the status bar turned red on the top left of your CC3 window.
- Once CC3 finishes exporting, open an image editor (such as PhotoFiltre, the Gimp or Photoshop) and crop the picture file to 600x600. You need to remove a single pixel line at the top and a single pixel column at the left so make sure you keep the lower right part of the picture. Save the modified file.
  → With PhotoFiltre, the way to do this is to **Image→Canvas Size**, reduce the Width and Height by 1 and click in the lower right square in the 3×3 grid.
  → With The Gimp, also use **Image→Canvas Size** click on the chain picture to enable disproportional resizing, reduce the Width and the Height by one and set both offsets at -1.



4. Create a fill style on the main map file using the sub-map export

- Open the main map and click on the Fill Style Indicator (A rectangle top right beginning with FS). Select the Bitmap Files Tab.
- Click on **New** and type a name such as “HOLE” for example.
- Click on **Find** and browse the png file saved at step 3.
- Check the **Scaled** check box and set the **width** and **height** to the size found at step 2, in CC3 units (for the sample map, 40 and 40). You can also set the **Sample Width** to the greatest value of the **width** or **size**.
- Verify that the **Tile to fill**, Opaque and **This is the current fill style** radio buttons are on, and that **Outlined** is unchecked.

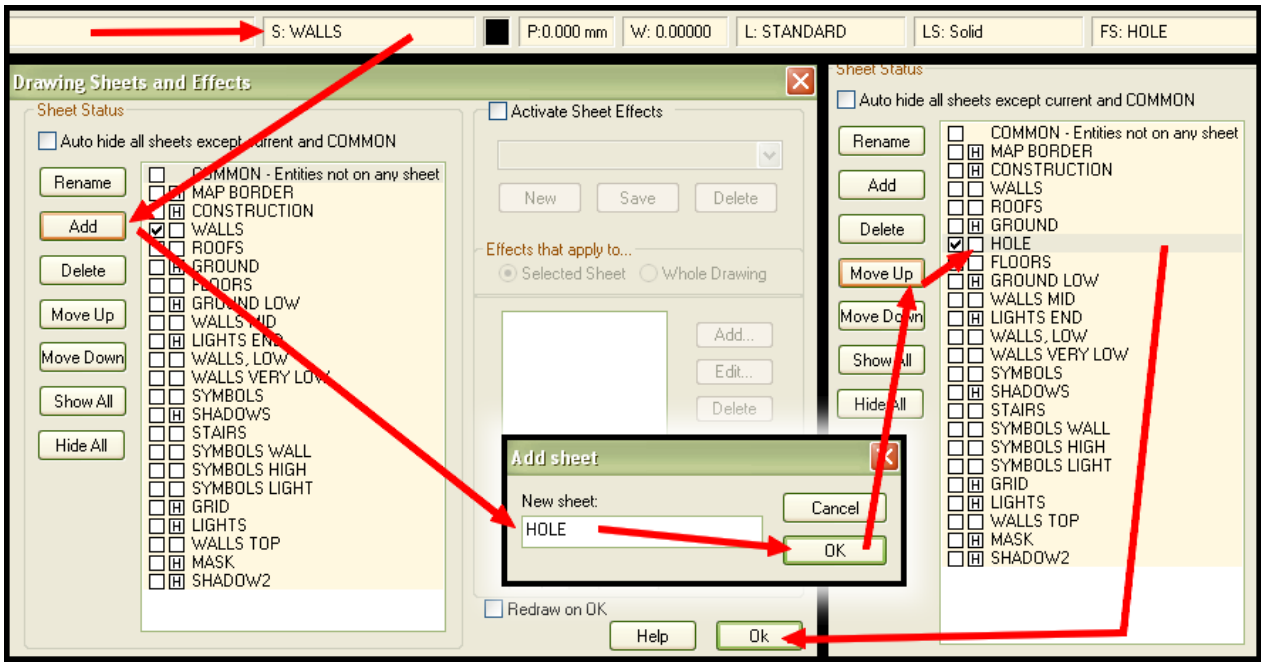
Note: if you uncheck **Scaled** and choose **Expand to fit** or **Stretch to fill** you'll get the same result as the png size is indeed made to fit the circle.



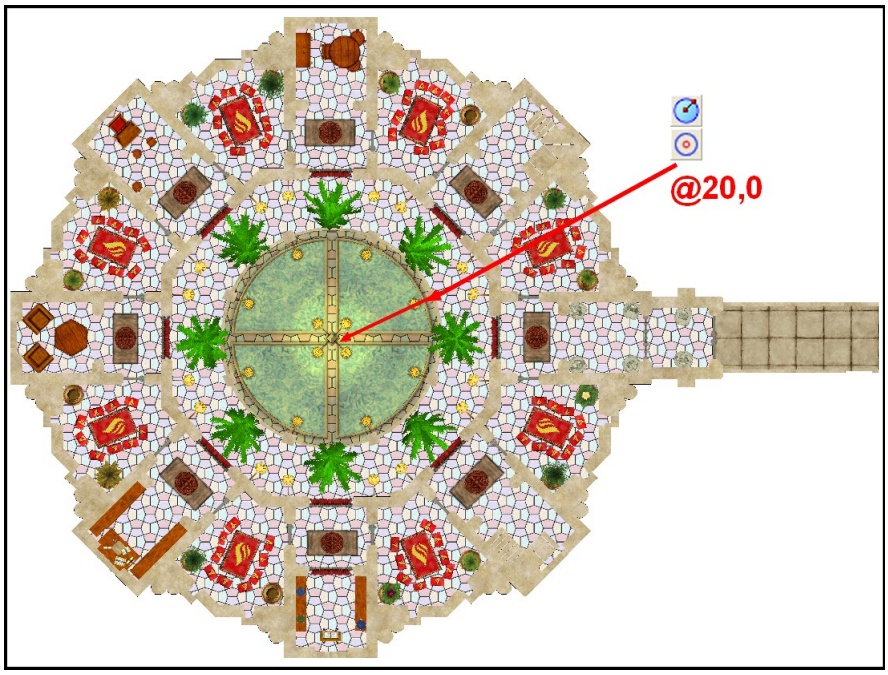
5 Draw a circle on the main map file with the new fill style.

Because the new fill style is now the current fill style you just need to draw a circle fill the hole, preferentially on a new sheet:

- Click on the Sheet Indicator than on the right **Add** button. Type the name of the new sheet (eg. **HOLE**) and click on the **Move Up** button to place the sheet under (in the list, above, the order is reversed compared to the graphic output) the **FLOOR** sheet. Click **OK** to close the sheets list.

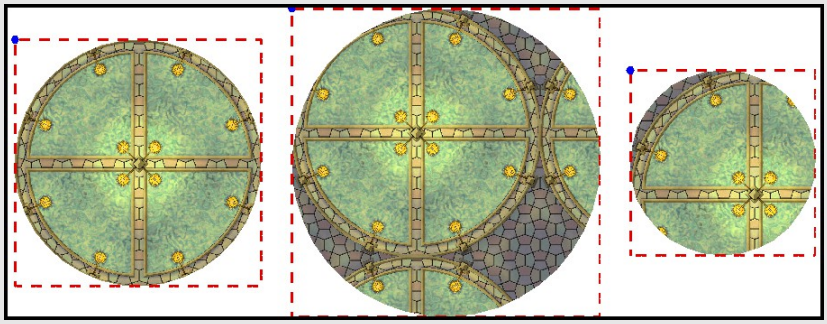


- Launch the ***Circle*** tool (**CIRP**), use the ***center modifier*** (**F4**) to select the center (or if this center is conveniently a grid node, just make sure the **Snap** button is down and click on the center) than type **@20,0** (adapt to your map, 20 is the radius of the circle) followed by a carriage return (the "@" character means "coordinates relative to the last selected point"):



About fill styles

If you read the Chapel tutorial, you are already aware that fill styles fill from the upper left corner of the smallest horizontal rectangle bounding the shape to fill. Consider the following circles:

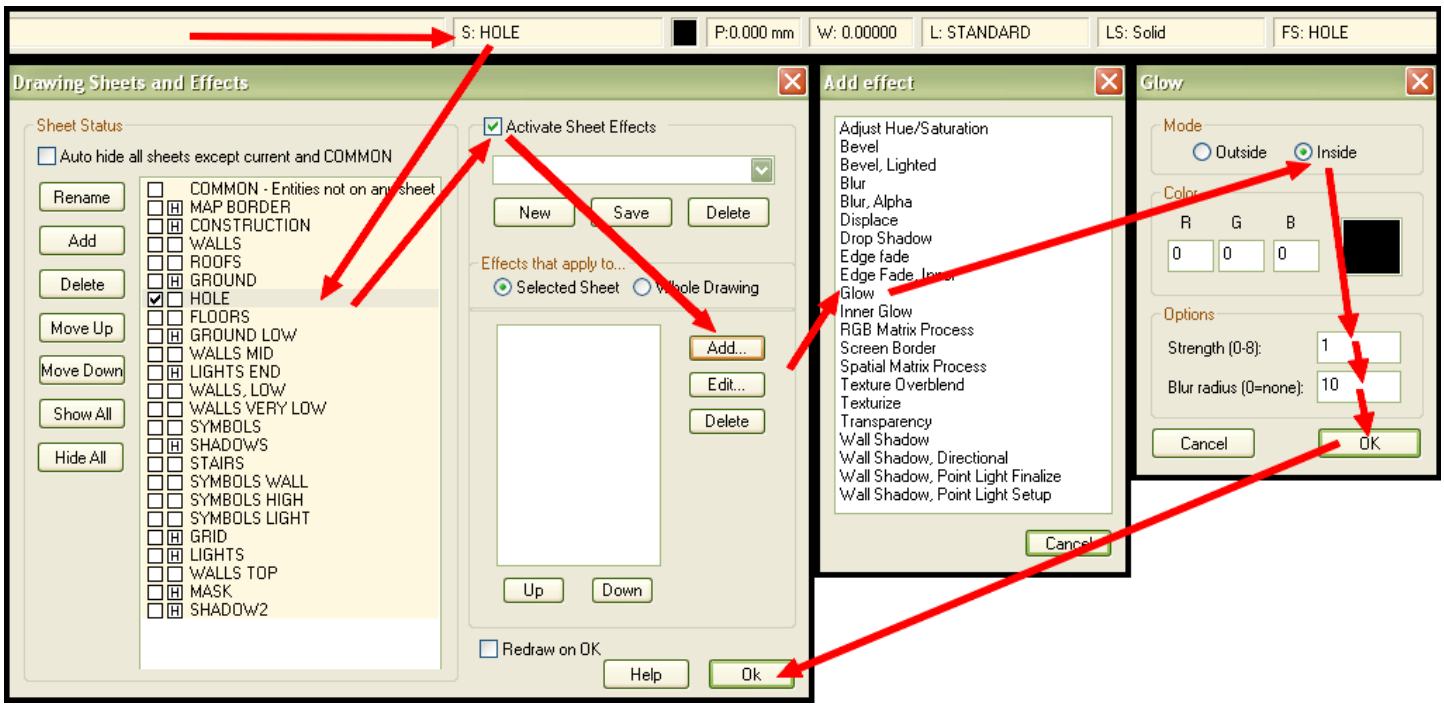


The first circle has a radius of 20', the second of 25' and the third of 15'. The fill style is not applied from the center but from the blue dot: the upper left corner of the dotted red bounding rectangle.

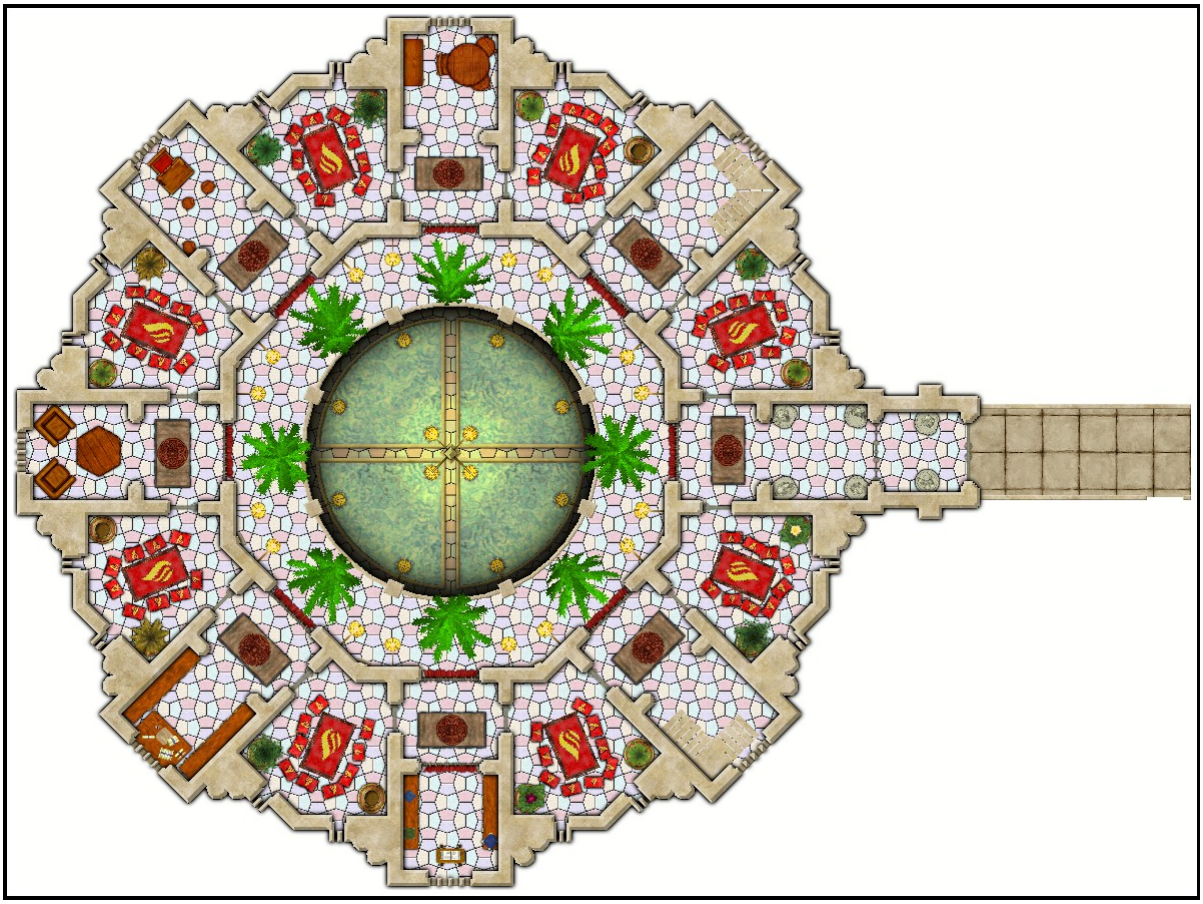
Adding an effect

The main technique detailed above is used to reduce effects in the main map but you can still add effects to the sheet receiving the fill style. For example, to simulate the depth of the low level on the sample map, a simple **GLOW** effect has been added:

- Click on the Sheet Indicator and select the **HOLE** sheet by clicking on its name: the line should turn gray (if it's already gray, proceed to next step).
- Check **Activate Sheet Effects** and click on the **Add** button on the right side of the pop-up (the left one adds a sheet as described page 5).
- Select **Glow** in the new pop up then set the parameters on the third pop-up: **Inside** radio button on, **Strength** 1 and **Blur radius** 10. Click **OK** to close the last pop-up than **OK** to close the sheets list.



Note: prior to adding the effect, the shape could very well have been a square as everything outside the circle is hidden by the floor multipoly. With a square shape, most of the **Glow** effect would have been hidden too...



Conclusion
In this tutorial we followed 5 steps to take a drawing with effects in a sub map, converted it into an accurate sized fill style, and incorporated the new fill style into a different, main map. This method provides a CC3 user even greater flexibility with the use of multiple effects and improves system performance.

Any picture file can be used as a fill style (provided it is in png or bmp file format) and not every fill style needs to be tiling (repeating copies of the original picture). However, due to the fact that fill styles are applied from the top left corner of the bounding rectangle, you need to carefully determine the resolution and size of the picture files you export from CC3.

The drawback is that if you ever want a larger resolution, you'll need to create again all the map bits in the higher resolution.

Happy mapping!
Joachim de Ravenbel
June 2013