

# Aging your 3D models

Mastering 3D Graphics ~ issue #1

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We all know that in order to have a truly photorealistic scene it is absolutely necessary to apply aging to your objects. When I say “aging,” I am referring to a little rust on the metals, some creases in the paper, and even some air bubbles in the paint. There are several really good texture collections out right now that feature just this type of aging, but what do you do when you need to surface a high resolution 3D object that is a little out of the ordinary? I haven’t found any texture collections that included every single type of texture that you might need which is why it is important to know how to create your own. In this article I’ll show you how to use Photoshop to create some really dirty textures that will make your 3D objects look totally awful!



If you're still interested, take a look at the dumpster in [Figure 1](#).

In [Figure 1](#), we see a dumpster in its earliest stages of texturing with a base texture of mottled green applied to it. At this point, it isn't exactly one of the most realistic dumpsters that I've seen. Realistically, a dumpster would be covered in rust, scratches, dents, and dings. It's painfully obvious that [Figure 1](#) contains none of these elements. We'll take care of that. Let's take a look at where we need to age our dumpster.

## Deciding Where to Age

A dumpster has to be one of the filthiest objects that we'll come across in our lives. It not only has to deal with its own aging process, but with the aging that is caused by its contents. Before going crazy with adding rust and scratches, we need to have some sort of idea as to what ar-



Figure: 1 A pre-aged dumpster.

reas of the dumpster take the most abuse. The reference photo in [Figure 2](#) will make our job easier.

From this reference photo, we can see that something has dripped down the side of the dumpster. There is also some rust on the arm that raises the lid as well as various other parts of the dumpster. Actually, this is one of the cleaner dumpsters that I've seen. We'll make ours a little dirtier. OK, a lot dirtier.

There should definitely be rust around the bottom rim of the dumpster because all of the substances that drip down the sides will accumulate there. We'll add some rust around



Figure 2 A reference photo of the dumpster.

the opening of the dumpster since the substances inside will tend to keep that area nice and moist. Lastly, there should also be a good deal of rust around the hinges of the lid and surrounding the handle. OK, so now we've covered the rust, but that's not the only type of aging that is found on a dumpster. There is likely a fair amount of scratches on the sides as well as some dripping substances here and there. We will have to include those elements as well. Unfortunately, unlike its real life counterpart, our 3D dumpster isn't going to age itself, so let's get started!

## Texturing the Dumpster

In this tutorial we'll only create the textures for the front of the dumpster but the same techniques are applied to the entire object.

### Creating the Base Texture

1. The first thing that we need to do is to divide the object into its different surfaces. [Figure 3](#) shows the different surfaces into which I divided my dumpster. Obviously every color represents a different surface.
2. Once the object surfaces are assigned, you'll need to take a screen capture of an orthographic front view to

use as your painting template. The easiest method of doing this is by using the <Print Screen> key on your keyboard. With the screen capture saved to the clipboard, open Photoshop, create a new document, paste your image into it, and crop the template around the object. At this point you should also flatten your image from the layer's menu. There is no point in having extra layers floating around. You should have something similar to [Figure 4](#). Increase the image size to the needed resolution depending upon what your final output resolution will be. I chose 1500 pixels wide and 941 pixels tall.

Note that Photoshop automatically creates the image at the size of whatever is on your clipboard. In this case, an image that is the same resolution as your monitor setting.

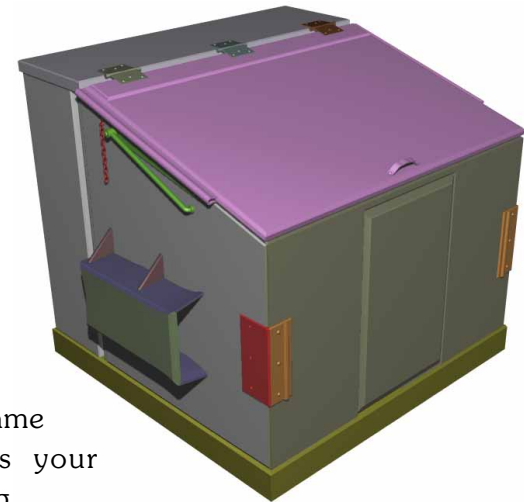


Figure 3: Assigning the surfaces.

3. To begin the texturing process we need to establish a base color that will be the color of the paint on the dumpster. The easiest way of matching the color to that of the real object is to scan in a good photo of the object and sample the color directly from there. I usually use the eyedropper tool with a Sample Size of '3 by 3 average' in the eyedropper options panel. Create a new layer on top of your painting template named 'base color' and fill it with the color. I used a dark green with the RGB values: 19,39,13.
4. In real life, objects are rarely ever exactly the same color across their whole surface. There are usually darker areas and lighter areas, especially when it comes to objects that have been exposed to sunlight. To simulate this effect and add some irregularity to our surface, we'll add some noise. Use the Filter/Noise/Add Noise tool with an amount of 10, Gaussian, and Monochromatic.
5. Apply the Filter/Blur/Gaussian blur tool with a radius of 3.0 pixels to blur the colors for our mottled base texture seen in [Figure 5](#).

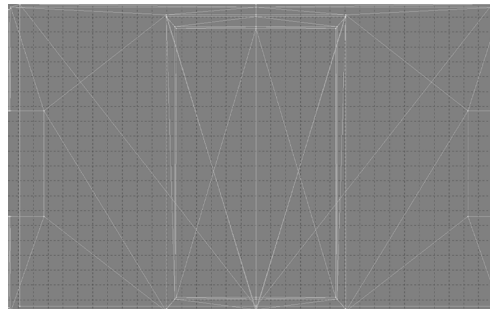


Figure 4: The cropped painting template.

Now that we have the basic color of the dumpster, we can finally begin the aging process.

## Creating the Color Map

For the purpose of this tutorial I will be using a mouse. However, I would highly recommend the use of a graphics tablet as I find that the ability to change size, color, and opacity based on pen pressure is an invaluable tool.

1. The first step in painting this color map is to acquire some sort of rust texture. The rust texture that I used is a scanned piece of metal from my garage. I scanned it in at 2139 x 1147. That might be more than you need, but again, it depends on the resolution at which you'll be rendering the image. A scaled down version of the rust texture as seen in [Figure 6](#) can be found on

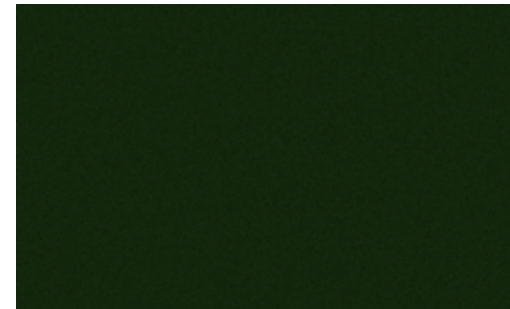


Figure 5: The mottled base texture.

the Mastering 3d Graphics website. Whichever rust texture you use, place it in a layer between your painting template and your color map. We will be using layer masks on the color map layer to reveal the rust texture beneath it. You might want to experiment with various types of rust, dirt, or even stone to achieve different effects.

Here's a tip: Rust makes an excellent stone texture. By adjusting the Hue/Saturation, you can achieve some convincing looking stone. And believe me, rusty objects are a lot gentler on your scanner than slabs of stone!

2. The next step is a bit different than you might expect. Instead of lowering the transparency of the color map layer so that we can see our painting template, we will make a new template from the old one that can be placed on top of the color map. What we'll do first is to hide all of the layers except for the painting template. Now, create a new layer named 'outline' and place it at the top of all the layers. Now, using the line tool, trace over the main sections of the dumpster as

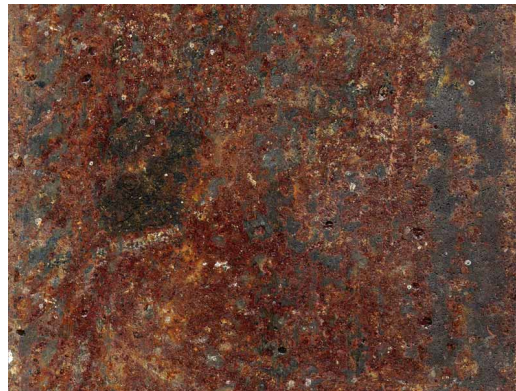


Figure 6: The underlying rust texture.

seen in Figure 7. By creating this new template, we have a pattern that we can place on the top layer over the color texture to use as a reference. I use this method because I find it distracting to have some layers semi-transparent. It becomes difficult to tell whether your colors are bright enough, etc. Of course, this really can't be done with objects that are organically shaped because it would take too much work to trace over the old template to create the new one. However, in this case, it wasn't really that much extra work.

There are two ways that we could go about making the color map nice and rusty. We could either erase the color map itself to show the rust underneath, or we could create a layer mask to hide portions of the color map leaving it unscathed. I like the second option.

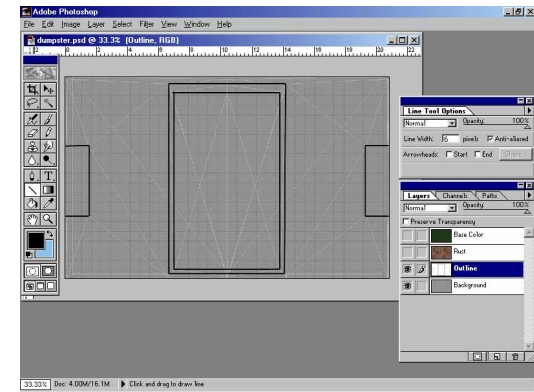


Figure 7: Creating the new template.



3. Create a layer mask on the color layer by clicking on the “Add Layer Mask” button on the floating layer’s window. In case you haven’t worked with layer masks before, you’ll notice that your foreground and background colors have been changed to black and white and a white square is next to the green image icon in your layer’s window. You’re now essentially working in grayscale mode with the layer mask selected. You can switch back and forth between editing the color mask and the layer mask by clicking on either the green image or your layer mask to the right in the layer’s window.

4. With your layer mask selected, we will add our first layer of paint. Actually, we’ll remove our first layer of paint. Select the paintbrush tool with the following settings:

Pressure: 25%

Diameter: 25 pixels

Hardness: 50%

Spacing: 25

Default angle and roundness

5. Select black as your foreground color. Depending upon what your presets are in Photoshop, either black or white will be the color that creates transparency in your layer mask. If one fails, try the other. Using the

paintbrush that you have selected, shade in the areas that you wish to be rusty. Be careful not to overuse the tool. As we saw from our reference photo, rust is sporadic. Once you finish applying the first layer of rust you should save your work. You can refer to [Figure 8](#) to give you an idea of what you should have so far.

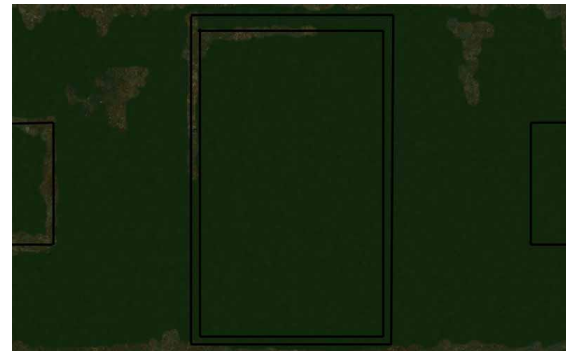


Figure 8: The first layer of rust.

6. For the second layer of rust we will be using a different brush. Again, select the paintbrush tool with these settings:

Pressure: 25%

Diameter: 10 pixels

Hardness: 0%

Spacing: 25

Default angle and roundness

7. With the new brush, go back over the areas that you have already painted. Be sure to rough up the smooth edges and create some contrast between the rust and the paint. Go over the edges of the rust multiple times to make the transition between the paint and the rust sharper. Use this smaller brush to create lots of small rusty areas. Experiment with it, but just don't overdo it.
8. Now we'll increase the sharpness of the rust in certain areas and even add some new rust. Using the lasso tool, pick an area of rust that you wish to make sharper and draw an irregular selection around it. This will be like using a stencil, allowing us to achieve nice crisp edges. Now select the paintbrush that you previously made with these settings:

Pressure: 25%  
 Diameter: 25 pixels  
 Hardness: 50%  
 Spacing: 25  
 Default angle and roundness

9. Now simply paint in the selection that you made. Concentrate on painting around the edge of the selection to define the hard edge. Be careful not to remove too much rust or you will defeat the purpose of having layered it. Create other hard-edged rust patches here

and there on your dumpster. **Figure 9** illustrates this process. You can even use the same technique to remove areas of rust. Select the area that you wish to "clean up" and instead of painting with black (the transparent color), paint with white. That will make the layer mask opaque in that area.

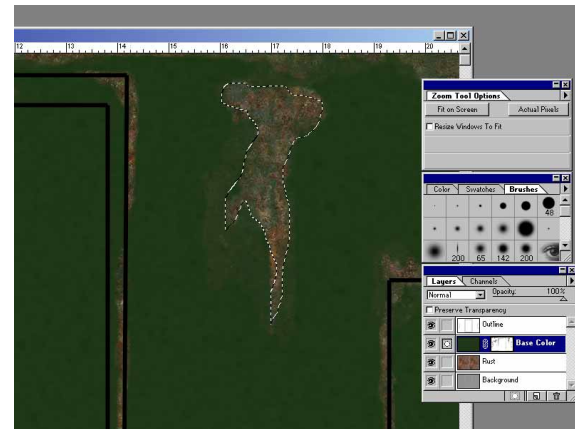


Figure 9: Using the lasso tool as a stencil.

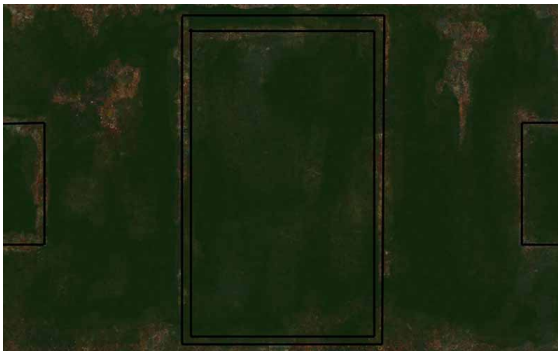
10. The final layer of rust that we will be adding is just a light coat of dirt. Select the paintbrush tool again with these settings:

Pressure: 8%  
 Diameter: 50 pixels  
 Hardness: 50%

Spacing: 25

Default angle and roundness

11. Using this brush, add some light rust all around the bigger patches of rust. Make sure that you take this opportunity to add some rust to the large patches of paint that have no other rust on them. We want our dumpster to be nice and dirty. Since this is the last layer of rust that we'll be adding, take your time and make sure that it's just the way you want it. Your texture should look similar to **Figure 10** by now. If you find that you have too much rust in certain areas you can easily fix it by choosing your desired brush and painting with white to subtract the excess rust.



*Figure 10: The final layer of rust.*

12. The final step in completing our rust is to adjust the brightness/contrast of the rust layer. Real rust is much richer in color than what we currently have. You might be wondering why we didn't just adjust the brightness/contrast of the rust in the beginning. It's a matter of personal preference, but I prefer to adjust it at the end so that I can see exactly how it will look with various settings. It eliminates a lot of the guesswork. I chose the following values of adjustment:

Brightness: -10%

Contrast: +20%

13. Well, we've completed the rust, but we're still not done applying aging. For the final touch we'll add some of those scratches that we talked about earlier. Select the dodge tool with these settings:

Exposure: 35% Midtones

Diameter: 3 pixels

Hardness: 100%

Spacing: 25

Default angle and roundness



14. Now select the actual color layer (not the layer mask) and add some vertical scratch marks on various parts of the dumpster. Using this same tool, you can even paint in some of that white goop spilling down the dumpster. **Figure 11** shows you what I came up with.



*Figure 11: Adding scratches to the dumpster.*

15. Using the same technique of layer masking, I created some labels and signs for my dumpster. I would recommend creating the labels in a separate document at a higher resolution; that way you'll have a high resolution copy in case you need it. Then, you can just paste it into a new layer on the dumpster texture and adjust the scaling and positioning with the Free Transform tools. I also found that by decreasing the opacity of the label layer to about 80% gives it a worn appearance.

16. Once you are finished with your color map, save the texture as a PhotoshopTM file first. That way you'll be able to use it to create the bump, specularity and diffusion maps. You'll also be able to go back and make adjustments and even use the same PSD as a starting point for other textures on the dumpster. Use the 'Save a Copy' command from the 'File' menu to save your color map as an TIF. Remember to hide the outline layer before you save your TIF. I've rendered out my objects on numerous occasions with nice black lines all over the place. The completed color map can be seen in **Figure 12**.



*Figure 12: The color map.*

Note that the Amiga TIF image loader/saver can be found in the Goodies\Plugins directory of the Photoshop 4.0 CD-ROM. Just copy the file 'aiff8b.8bi' into your Photoshop\Plugins\Formats directory on your hard drive.

Now that we have a really great color map for our dumpster, we'll create the bump, specular, and diffusion maps to match. It's actually a very simple process that can be done in about a minute. However, there are a few tricks that you should know.

## Creating the Bump, Specularity, and Diffusion Maps

The first of the three remaining image maps that we will create is the bump map. Essentially, the bump map is just a grayscale version of the color map with some slight variations.

Convert the PSD file containing the final version of your color map to grayscale via the Image/Mode/Grayscale menu. Be sure that you don't flatten it when given the option. By converting to grayscale, your file size can be decreased by as much as 75%. This is a huge space saver. In my case, my color map was a 2.3mb file. After converting to grayscale, it was only 982kb! This can save you many megabytes of RAM usage when it comes time to render your scene. At this point you need to select both the color layer and rust layer and merge them using the 'Merge Linked' command.

The next thing that we'll want to do is to adjust the brightness and contrast of the merged layer to more closely fit

the purpose of a bump map. These are the settings that I chose:

Brightness: +10%

Contrast: +40%

Lastly, you'll need to select the layer(s) containing your labels and fill each label with the same solid shade of gray. You'll want this shade of gray to be slightly brighter than the surround texture. The easiest way to do this is to turn on 'Preserve Transparency' for the label layers and simply use a brush at 100% to fill them in. This is so that the label will have a slight elevation above the texture as a real label would. Save the PSD as something like 'graydump.PSD'. Then save a copy of it for your bump map as seen in [Figure 13](#).

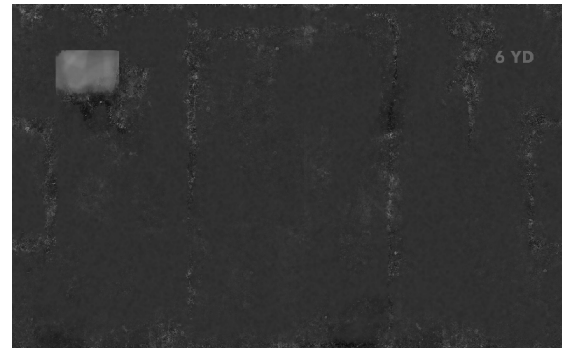


Figure 13: The bump map.

Now we'll create the specular map. Using the grayscale version of the PSD, we'll adjust the brightness/contrast. Remember that the brighter your specular map is, the shinier it will be. Since dumpsters are fairly shiny objects, I chose the following settings:

Brightness: +40%  
Contrast: -20%

Notice how the rusty areas are darker than the painted areas. This works out perfectly in our case since rust isn't nearly as shiny as paint.

The last thing that we need to change with the specular map are the labels. We don't want our labels to be quite as shiny as they currently are. Just decrease the brightness of the label layer a bit. It should actually be slightly darker than the paint. With that done, you can go ahead and save a copy of your PSD for the specular map as seen in [Figure 14](#).

One more map to go: the diffusion map. Diffusion maps are pretty basic in their usage. The brighter your diffusion map, the

brighter your object. With that in mind, we will adjust the brightness/contrast of the PSD file that we still have open from the last several maps. I chose the following values:

Brightness: +45%  
Contrast: -10%

Adjust your label layer to be slightly brighter than the paint and save a copy for your diffusion map as seen in [Figure 15](#).

Phew, that was a lot of work, but we're done! You can now apply your image maps to the front of the dumpster using the planar mapping method. In [Figure 16](#) we can see the fruits of our labor. Of course, we only surfaced the front of the dumpster in this tutorial, but I promise the rest will go much quicker.



Figure 14: The specular map.

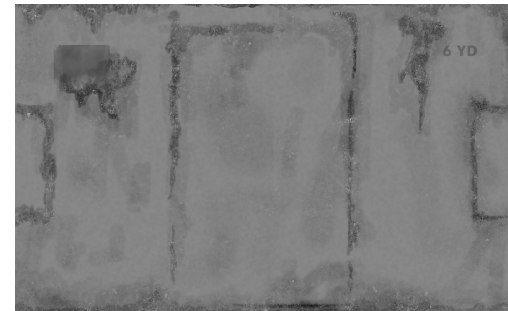


Figure 15: The diffusion map.

## Wrap Up

As you can see, aging your models does take a lot of extra work, especially when it comes to one that has been properly aged; however, the result is incredible.

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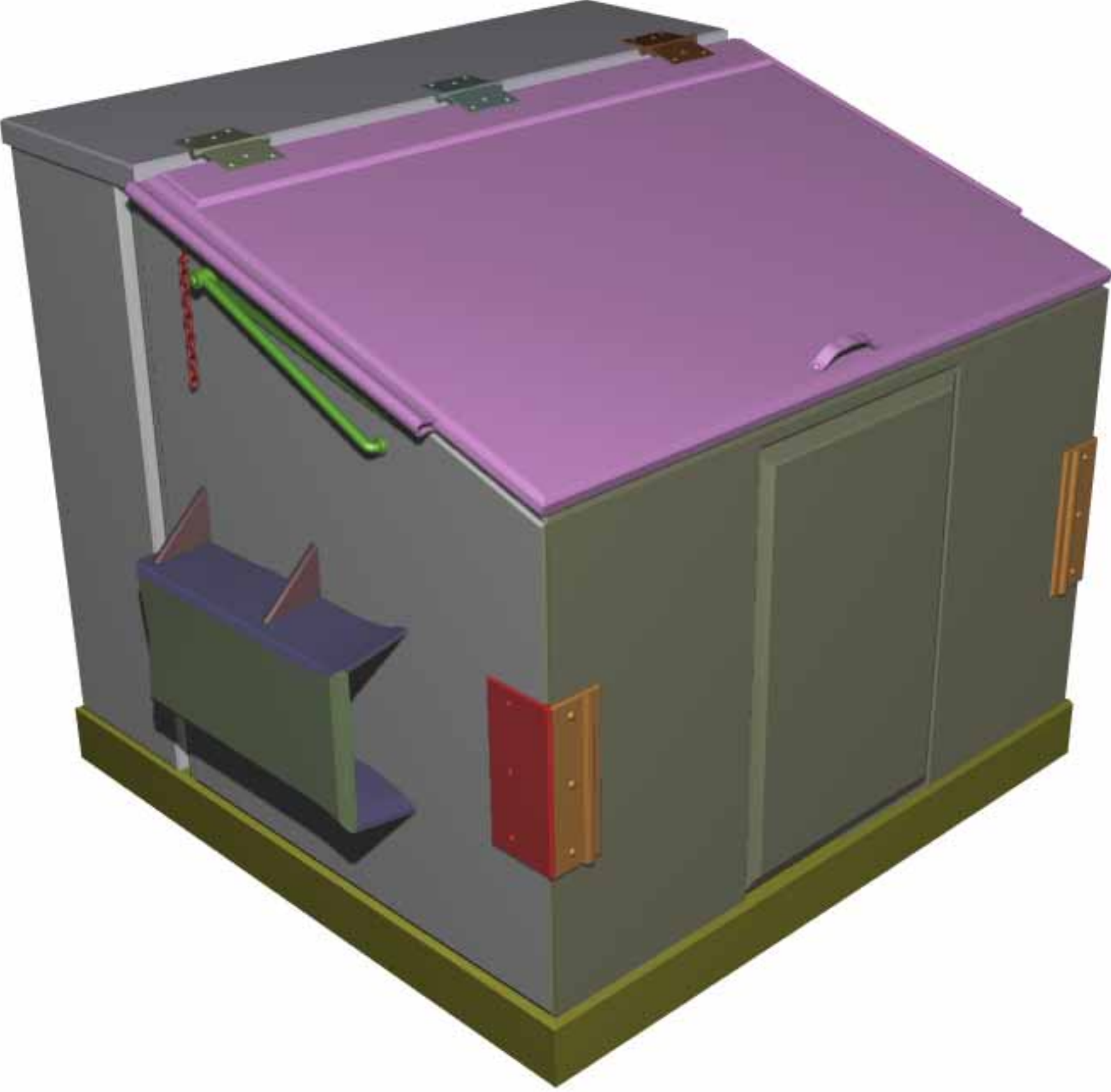
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NO HAZARDOUS  
WASTES ACCEPTED  
**CAUTION CAUTION**

  
**USA WASTE  
OF VIRGINIA**  
WASTE MANAGEMENT  
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**ATTENTION**  
DO NOT PARK  
IN FRONT OF  
OR REAR OF  
BUILDING  
OR DRIVEWAY





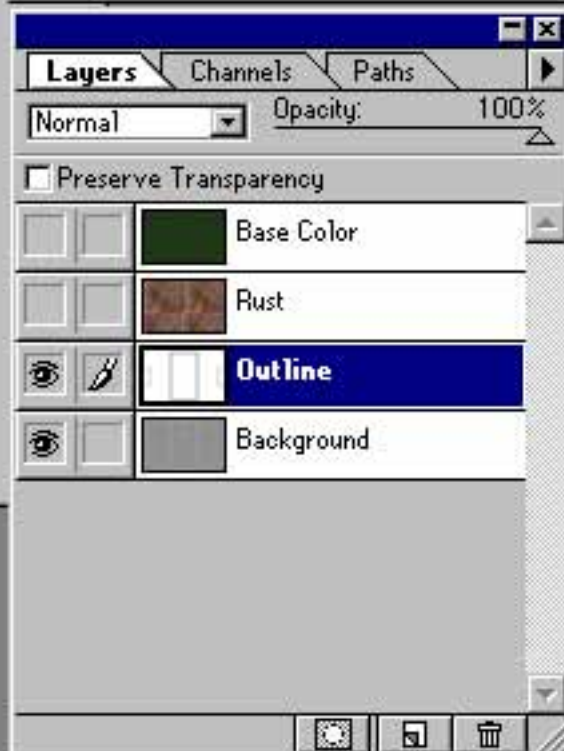
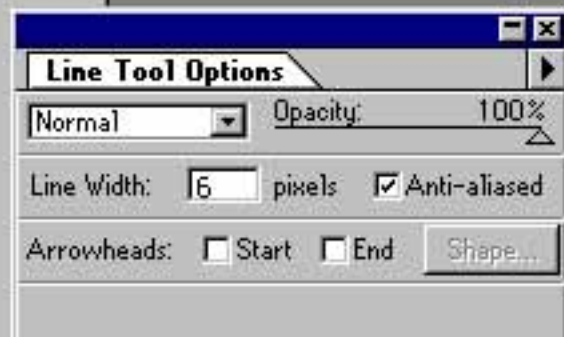
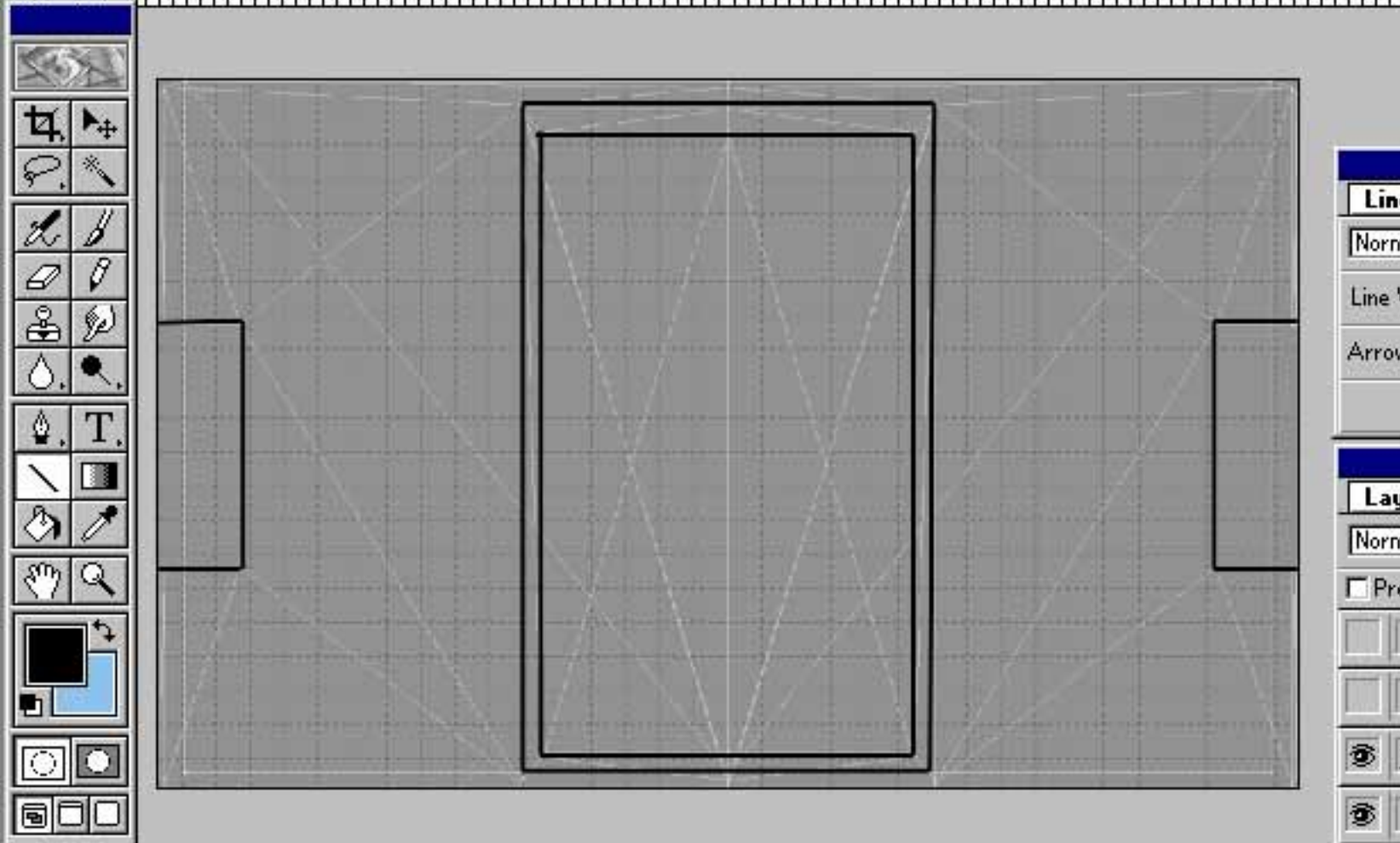






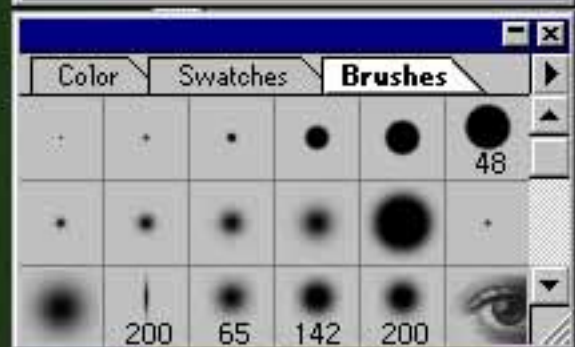
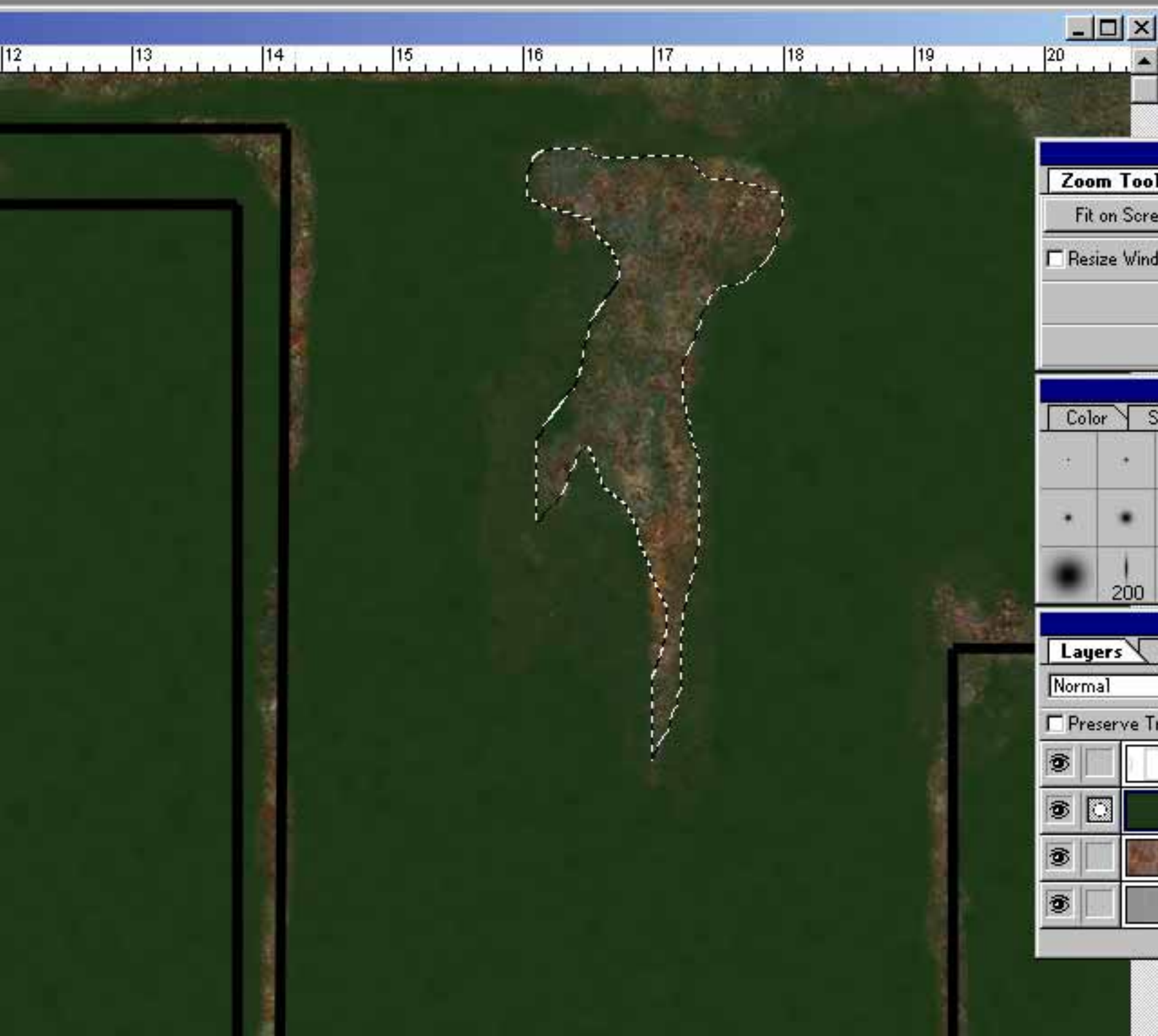




















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