Animation Breakdown

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Description

Generating your standard fly-through animation doesn't cut it anymore in the architecture industry. Creating an interesting piece that will excite your client and captivate the audience requires some forethought. In this class we will go through an animation process, highlighting techniques used on a recent project that Tiltpixel was tasked with to sell an idea for a private school in South America. Using 3ds Max software we will go through setting up complex scenes, touching on lighting, rendering, and the post-production process.

Learning Objectives

- Learn how to set camera paths in 3ds Max
- Learn efficient and effective ways to create quick animatics
- Discover how render elements work
- Utilize render elements and other tricks in post-production

About the Speakers

Chris Lyner - *is a 3D artist at TILTPIXEL.*

He began his career selling and training in Autodesk and Adobe software. For the past 8 years Chris has been doing animation, 3d imagery, and corporate videos for architecture, transportation, water treatment facilities, mining, ports, and oil & gas. His work has been featured in multiple Revit Essentials books, Architecture MN magazines, and recognized in a documentary put together for Dredging Today. Chris is an instructor at the Art Institute of Houston. He ran the local MN 3ds Max User Group and assisted with the Minnesota Electronic Theatre. He was also on the Minnesota SIGGRAPH committee.

Ramy Hanna - *is a partner and 3D artist at TILTPIXEL.*

He has been in the arch-viz industry for the last decade creating architectural renderings and animations. He is familiar with various 3D software and a variety of rendering engines. He also dabbles in architectural photography and has had the privilege to win several design awards including AIA Design Awards. He has also spoken at several speaking engagements such as Autodesk University, RTC, and VisDay. Ramy is an online instructor for The Gnomon Workshop and Blackspectacles.com. Since 2009, he has been on the 3dsmax beta team providing input into the design of 3ds Max software. In 2003, he was involved in an animated short nominated at SIGGRAPH, and in 2006 his animated short played in AMC movie theatres nationwide.

Before we get started here is a comparison between the sketchup model provided and a finished frame from our animation.

BEFORE

AFTER

Building your Scene

Before any work begins, here are a few things to take into consideration…

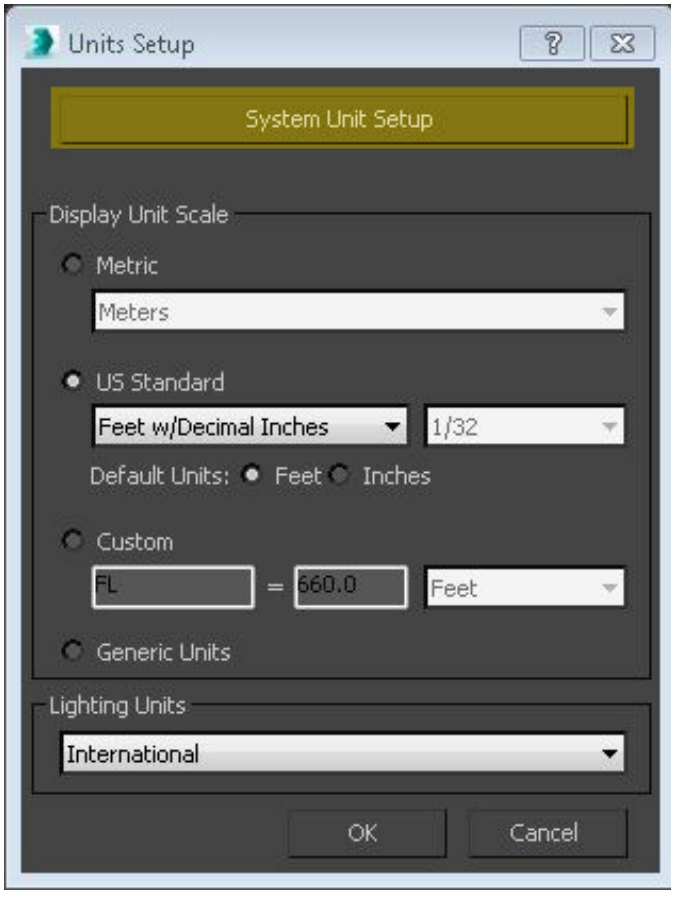
- **Deliverables from the client**

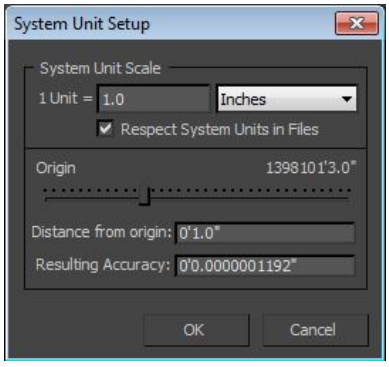
  The scope of the project greatly depends on the client deliverable. This ranges from 3d models out of 3d CAD, Revit, Sketchup, Rhino, etc to 2d CAD, or sometimes just a napkin sketch. In this case we were provided a Sketchup model.

- **Model Cleanup**

There are a number of steps that need to be taken into consideration before importing a model into 3ds Max. Knowing the units of scale in which the model was created being the first. Set your max scene to the correct units.

Customize>Units Setup>System Unit Setup and change the units the same as file being imported.





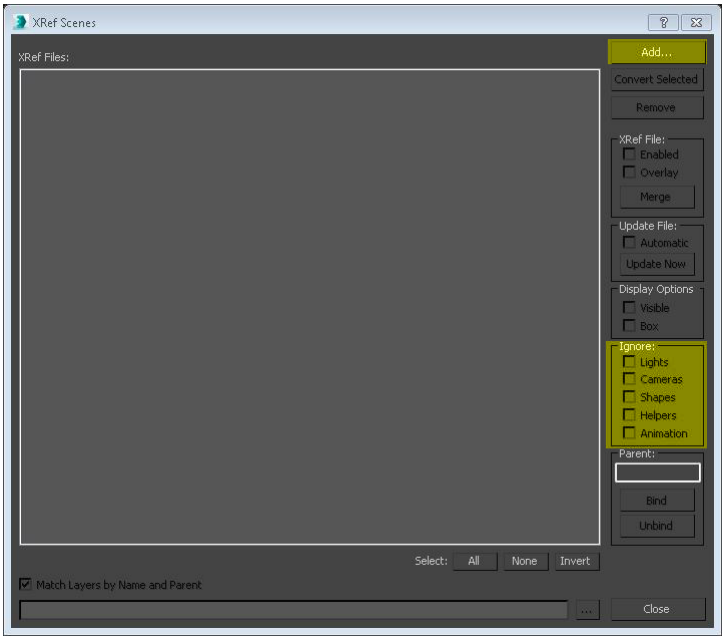
In this case, the model came from Sketchup which is notorious for having flipped faces. This requires some tedious and time consuming cleanup. In the modifier stack, add an edit poly over the edit mesh, in sub object mode and at the polygon level begin to flip faces if inverted.

- **Entourage, Trees, Cars, etc**

  In scenes that require a lot of high poly objects we use a mixture of techniques, from xref objects, to vray proxy objects, and the iTooSoft forest pack plugin. This gives us the detailed quality we are looking for while keeping our files light enough to render in one scene.

- **Large Scenes**

  For scenes with multiple buildings, we will typically clean up the buildings individually and save them out seperately. They are then brought in as xrefs to the master model. This will keep the file size down and be a huge timesaver at render time. To xref a scene go to **File>References>XRef Scene**. Click the **Add** tab. Note that you can ignore Lights, Cameras, Shapes, Helpers, Animation. This is helpful where you would otherwise have muliple of the same daylights or cameras for instance.



Setting a camera path in 3ds Max

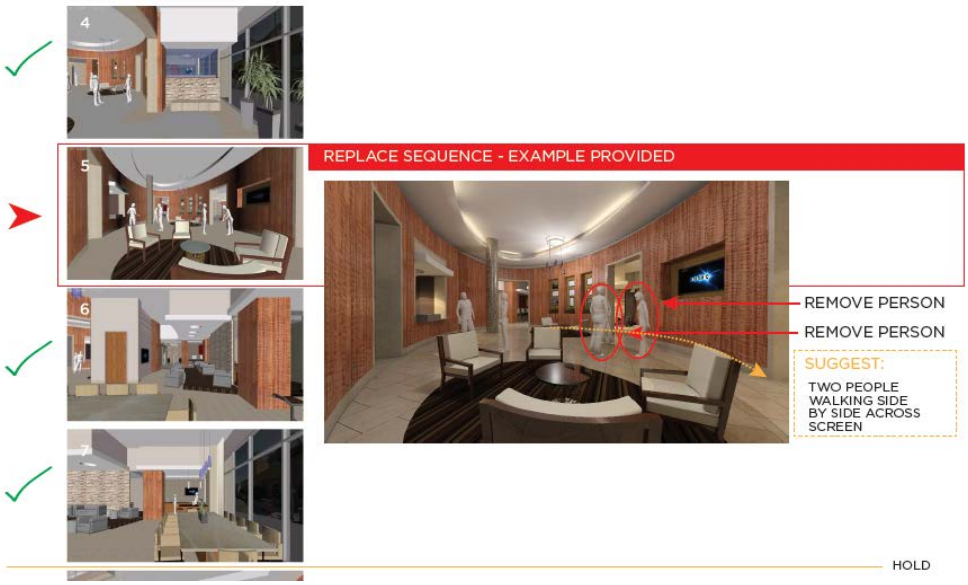
Setting up camera options

Prior to creating any shots, we send our client a **storyboard** that "loosely" outlines the overall flow of the animation. When we choose **camera paths** for our animation, we will typically create a few options highlighting interesting features within each space. We render out a single frame from each camera and send it to the client for approval. Once our client had chosen the views they like best for each shot, we then generate an **animatic**.

Storyboard

The storyboard is the most effective way for the client to see a breakdown of how the animation will come together before the production begins. It's an essential part of the process as it allows them to offer feedback on the production before any real work is done. This outlines everything from the camera shots and movements, transitions, sound effects, and audio track.

This is an example of our clients' feedback on shots for an animation.



Setting Camera paths

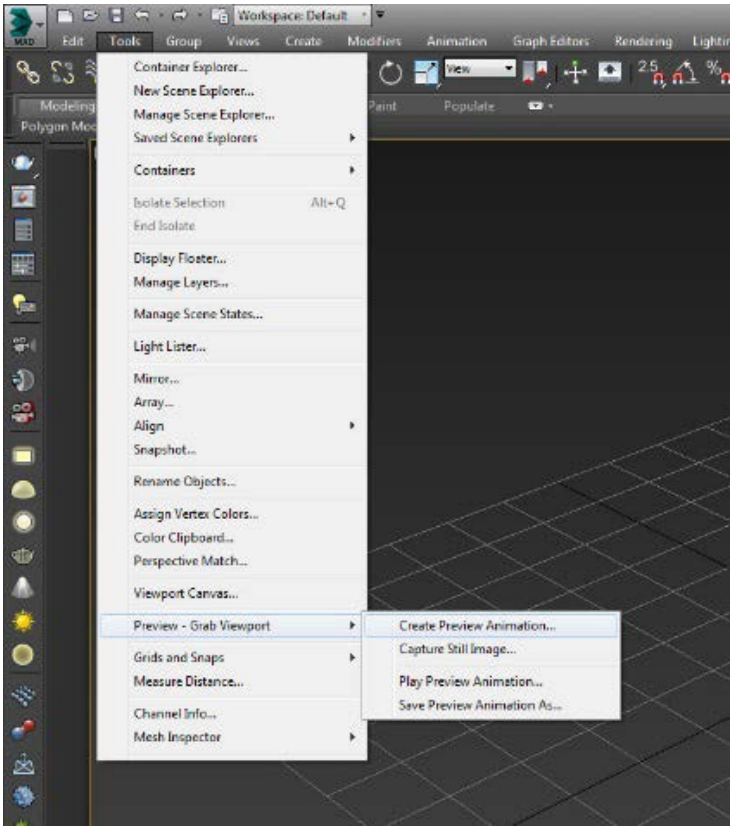
For each shot, we typically generate at least 3 views for each shot. These views are sent as stills to the client for them to choose the most suitable shot. Keeping the client engaged throughout the entire production process is important to keep in mind! It allows them to feel they are playing a significant role in the creation of the piece and will help build your relationship with that client.

Creating the Animatic

Creating the preview in 3ds Max

Once the client has chosen the views they like, we animate cameras from the selected views. Within 3ds Max we create a preview animation for each shot.

Tools>Preview Grab Viewport>Create Preview Animation



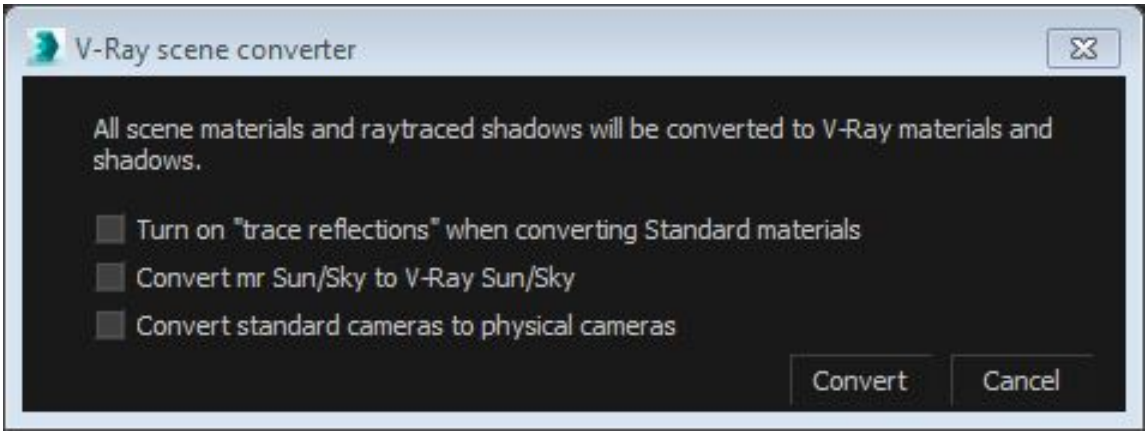
Generating an Animatic

After we've created previews for each shot, we tie them together in our editing software. The animatic does not need to be complex and is intended to give the client a more clear visual for what the end product will be, so we don't go overboard with effects or transitions. However, we do put the audio and sound effects in to give them the full effect.

Production

Texturing and Materials

The devil is in the details and this certainly applies to materials as well! We use a number of techniques in our material development to achieve a realistic look to our surfaces. For the purposes of this class we will only be touching on material conversions for Vray. This is important because materials coming from Revit, Autocad, and Sketchup are standard materials and will cause lighting and flickering issues at render time. The best way is to manually go through your materials and convert them, but if you are pressed for time, you can run the Vray scene converter by simply right clicking in your scene and going down to **Vray Scene Converter**. This will automatically convert all materials in your scene for you.



Animating

Limit cameras to 5 seconds or so each. This allows focus on the nice details of the spaces and keeps the viewer engaged. When a single “flythrough” camera is set through a space there is no emphasis placed on details or design and the viewer becomes easily disengaged.

Pans, dolly’s, etc. like a real camera. These movements create interest and diversity in your animation. It also gives a sense of realism to the animation.

No cameras on splines! This creates an unnatural camera movement that is known as the “flythrough” animation. This makes for an uneventful and dull animation.

Trees, cars, and other animated objects. Having subtle secondary animation in your scene, if done right, will bring in a new level of interest and realism to your video. Be careful not to overdo it as it can become a distraction and ultimately ruin the shot.

Rendering

Lighting solutions (light cache / ir map / brute force). When generating an animation, understanding the render settings is crucial to the quality of the final image sequences. When sending a sequence to a render farm using Backburner, Deadline, etc., it is important to understand and set up your Global Illumination or GI settings correctly. If done incorrectly, each machine rendering a sequence will generate different lighting results in the frame and flickering will occur in the animation.

IR/LC GI

For a sequence with camera movement only, we typically set our GI to Primary to Irradiance Map (IR) and our Secondary to Light Cache (LC). Render this locally! Once both IR and LC has finished and the render has started, cancel and save both maps.

Make sure to check the use camera path box.

Change the mode for both from Single Frame to From File. Then point to where you've saved the file.

Brute Force GI

For a sequence with secondary animation i.e. moving cars, trees, people, leaves, etc., we use Brute Force for GI. It is slower, but results in no flickering. This does not require any saved GI maps so just send your sequence to the farm!

Rendering .png with Alpha

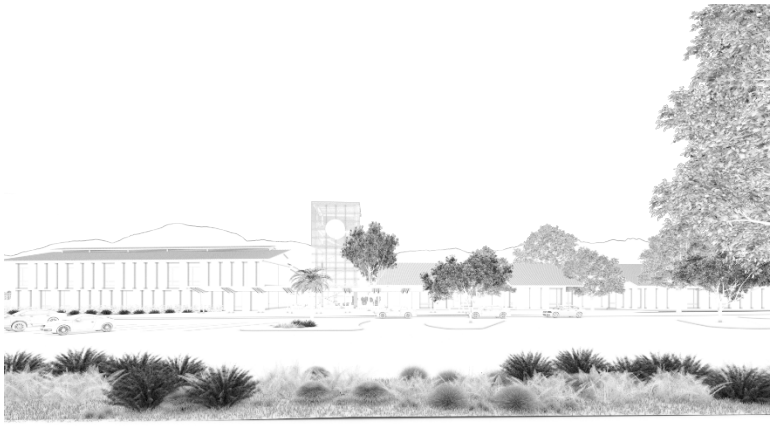
I typically render my sequences as .png with **alpha checked**. Unless it is an interior shot (alpha is not needed for interiors.) There are two reasons for this, .png is a light file that retains lots of pixel information and when you have alpha checked, your post software allows you to turn on your sky giving you more control in post. This will be covered later in the coarse.

Postproduction

Discover how Render Elements work

Beauty Pass
This is the base render in which all other passes will be applied.

Ambient Occlusion Pass
The AO pass defines edges and helps create depth. We change the blend mode to **Multiply** and set it to **30% or 40% in Opacity**.

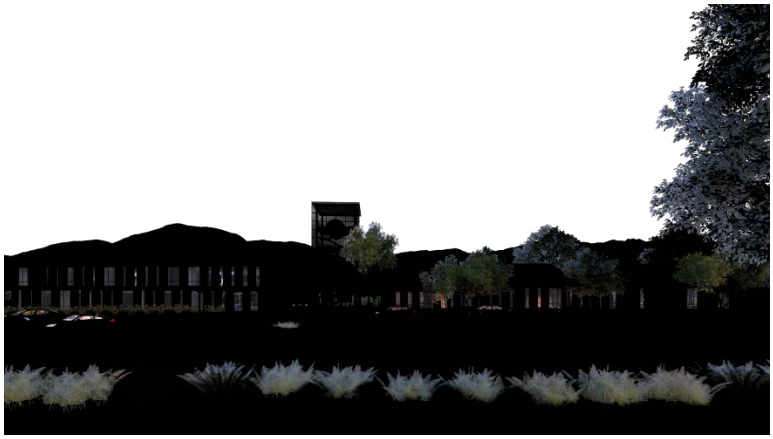


Reflection Pass

Reflection is used to enhance the gloss and reflections in the render. This pass should be set to **Screen** in the blend mode and set to around **30% Opacity** in most cases.

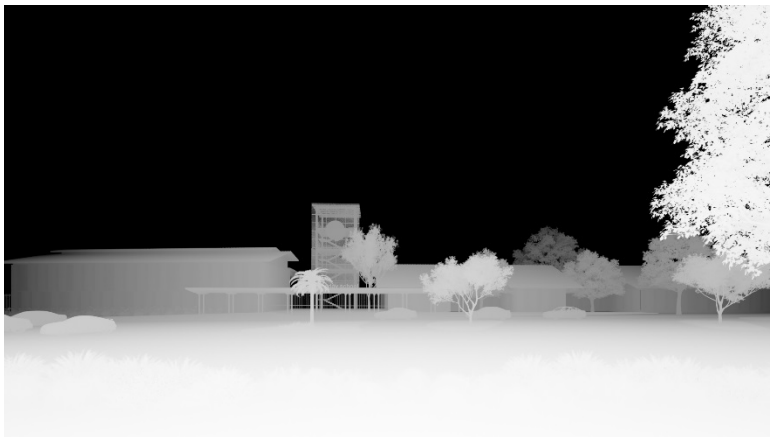
Refraction Pass

Refraction will enhance detail beyond transparent objects and help interior spaces "pop". Set this to **Screen** in the blend mode and usually no more than **30% Opacity**.



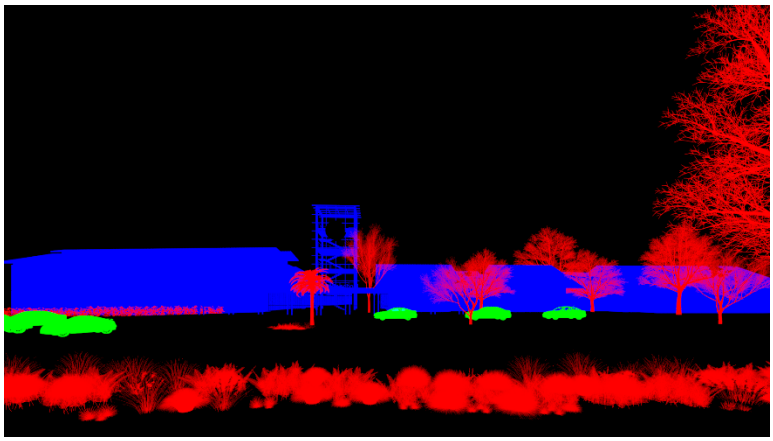
Zdepth Pass

Zdepth is an important pass primarily in exterior shots. It controls fog, atmosphere, and many other effects. Here we us it to control the lighting on the trees, depth of field, fog, and atmosphere.

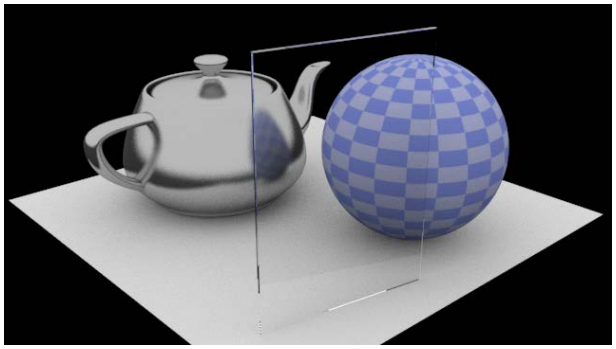


Multi Matte Passes

Multi-matte passes are the most effective way to isolate and take control over certain objects in post-production.

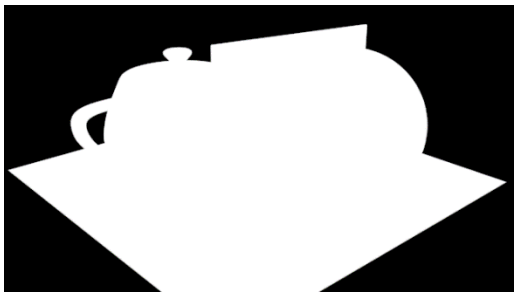


Working with Transparency and Render Elements

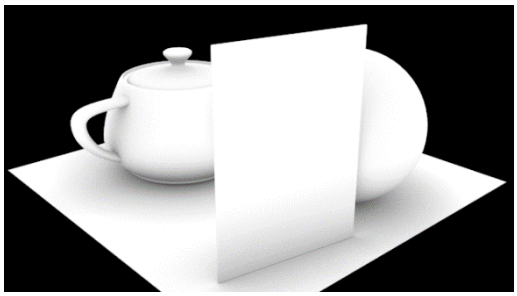


If you want to use render elements for objects that have transparent properties such as glass, notice that the elements below on the left side don't really work the way we need them to. They are treating the glass like an opaque object. Fortunately, there are a few extra steps that can be taken to get the elements below on the right side.

Wrong Elements

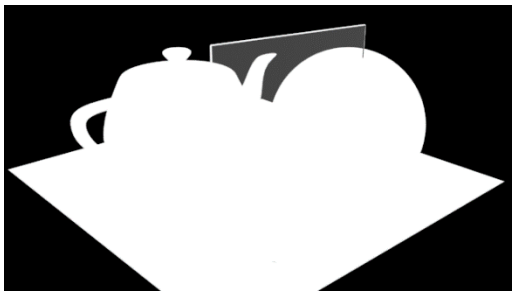


Alpha

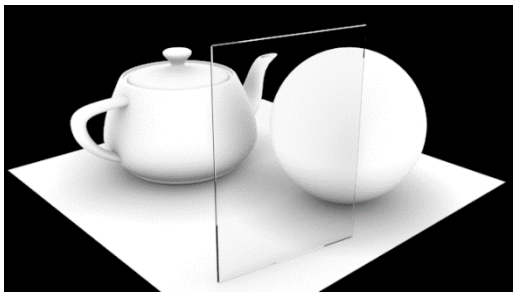


Occlusion

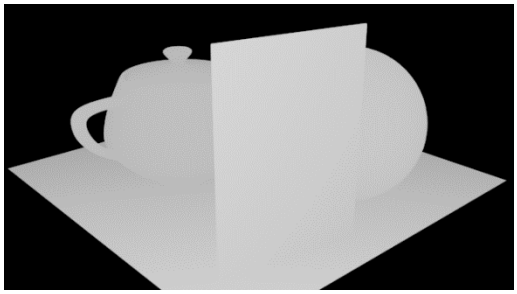
Correct Elements



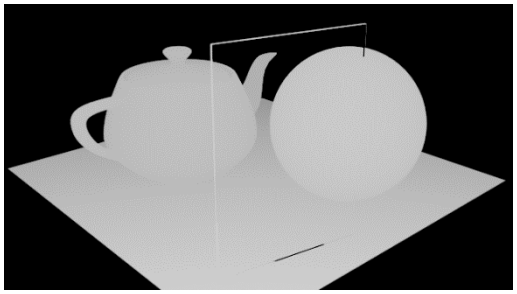
Alpha



Occlusion



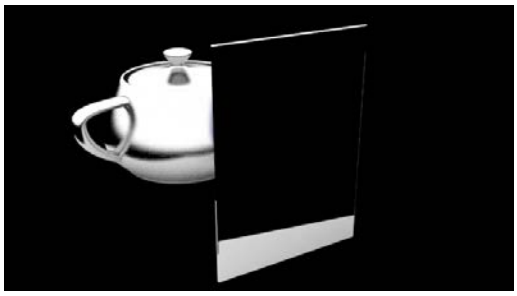
Z Depth



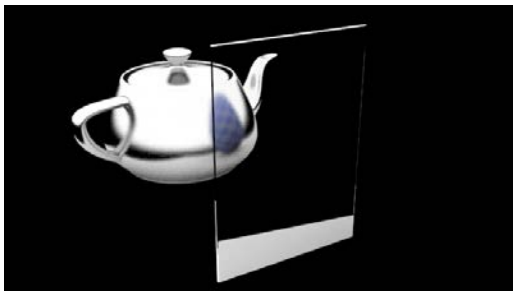
Z Depth

Wrong Elements

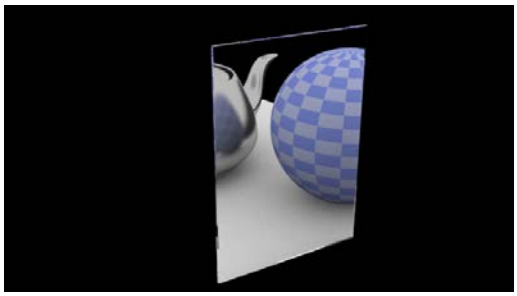
Correct Elements



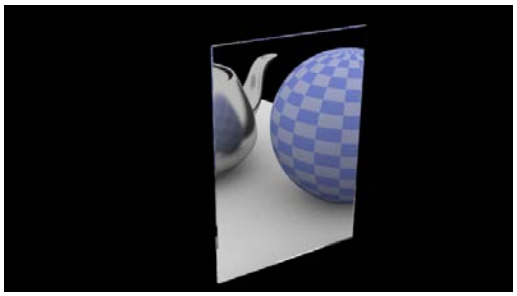
Reflection



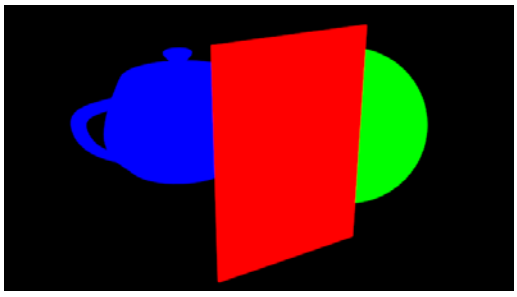
Reflection



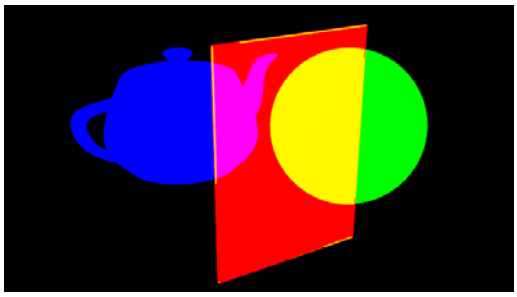
Refraction



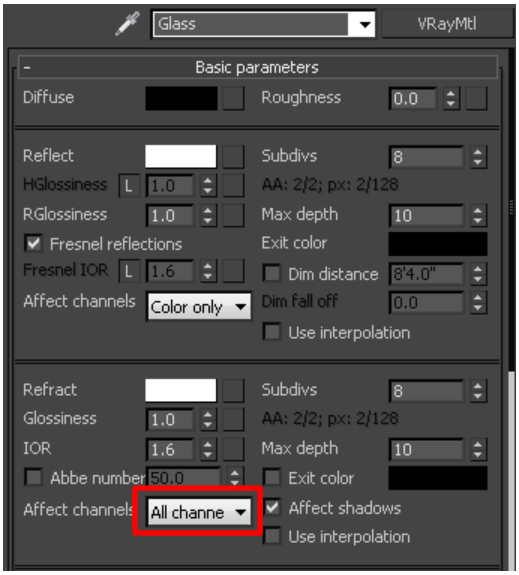
Refraction



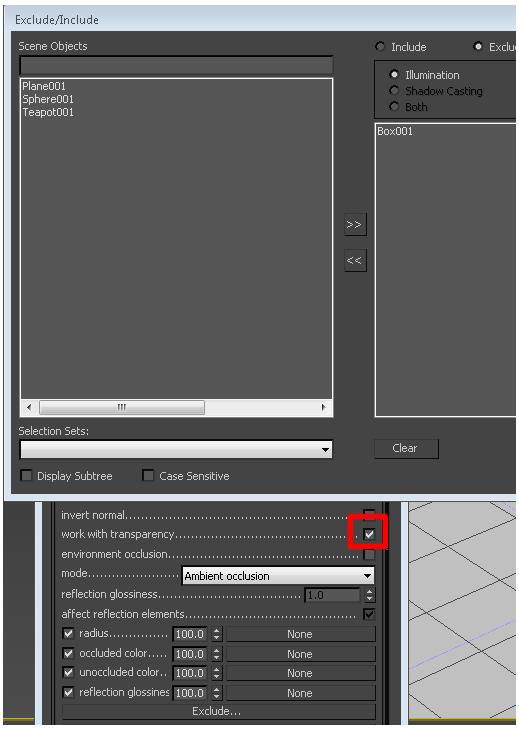
Multi-Matte



Multi-Matte



To get correct elements for transparent objects in v-ray, it really is all starts with the objects material settings under Refraction. By default it's set to Color only. Be sure to set it to **All channels**. That's all there is to it (with exception for the occlusion pass). This will ensure accurate elements based on the objects refraction. Note that you cannot have both reflection and refraction set to **All channels** for this to work. Render Elements will use one or the other but can't do both! So if you are needing reflection through refraction, think about rendering several elements for each refraction and reflection.



For Occlusion to work, the tweaks must be made in the Dirt map itself. Be sure to check "work with transparency". Then click on the "Exclude" button. In this dialogue select the refractive objects from the left and add them to the right side for the dirt map to exclude these from being occluded.

Using Render Elements and other tricks in post-production

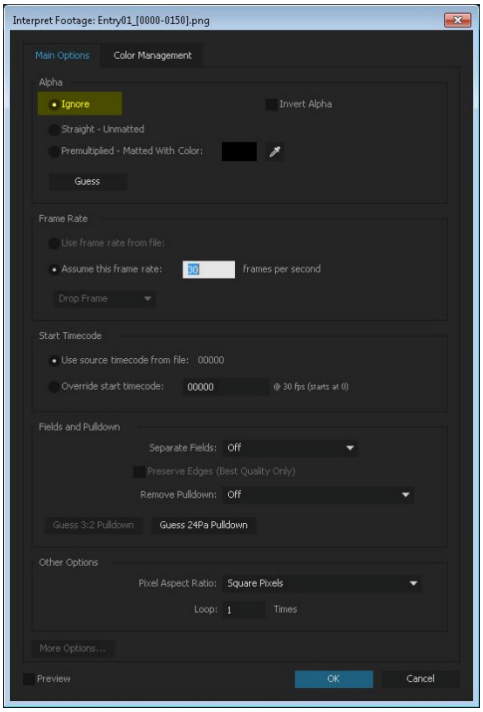
BEFORE

AFTER

Pre-comp using the render elements

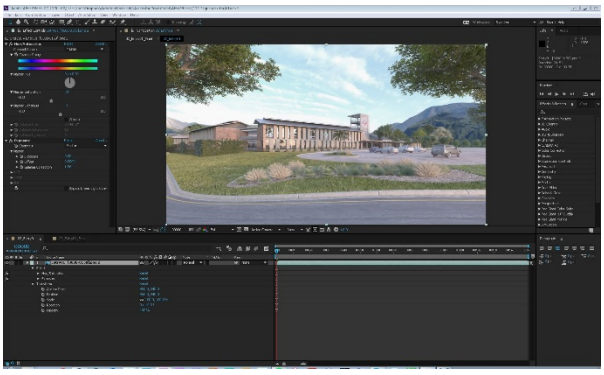
We set the elements in a preliminary composition. This comp is where the initial compositing of all our passes takes place. When importing the diffuse pass for exterior scenes, it is important to import it twice! One will use the alpha, the other we will not. This will give us control over the sky. In this tutorial we will be using Adobe After Effects.

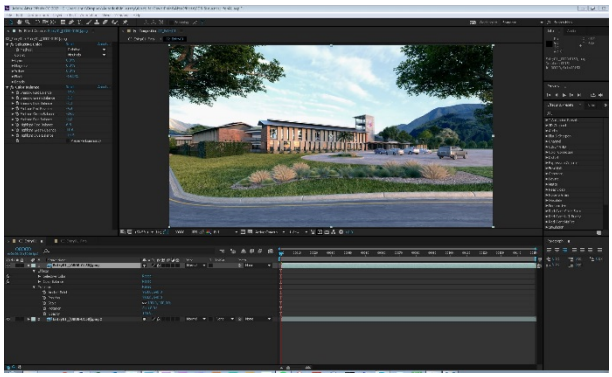
For the diffuse pass **WITH** the sky, you will need to change the alpha properties from Straight-Unmatted to ignore by going into the interpret footage dialogue, (Ctr+Alt+G, or File>Interpret Footage.) This only needs to be done for the diffuse where we want the sky to come through.



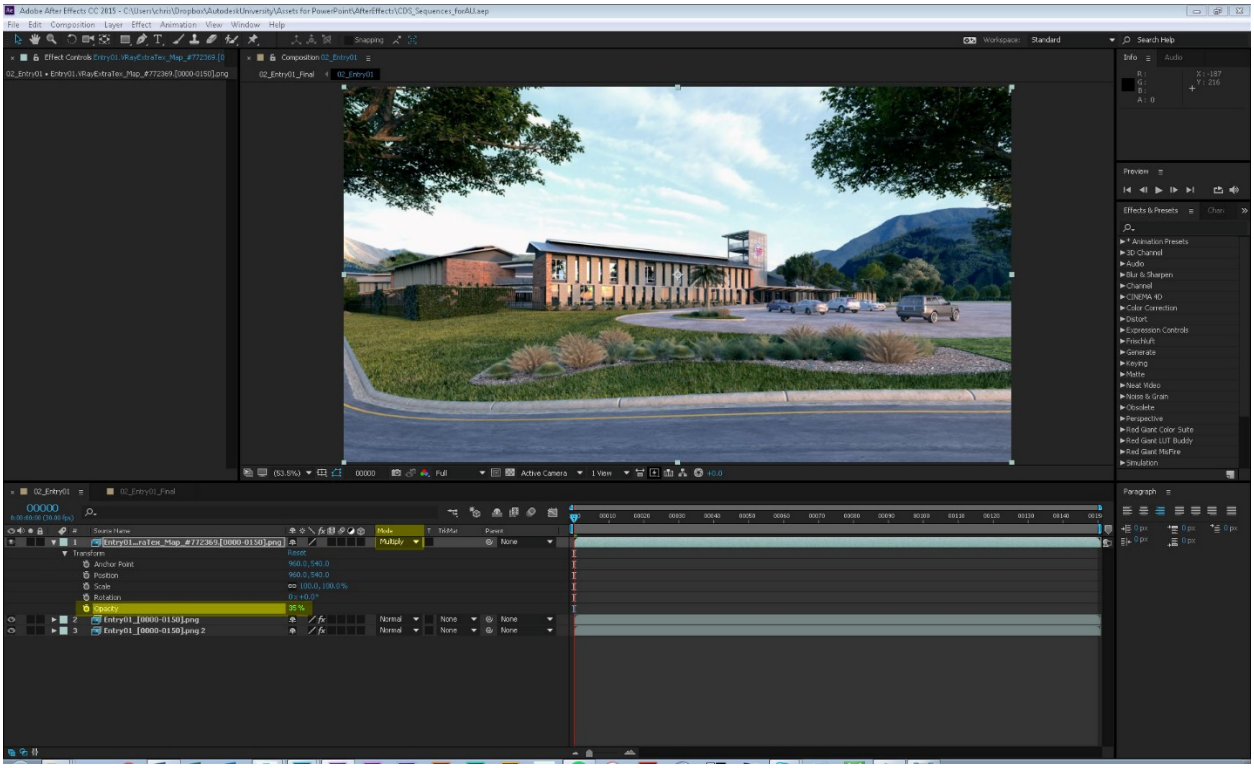
Animation Breakdown

Once the comp has been set up and all our passes are imported, I bring my diffuse with sky pass in first. Then I lay the diffuse without sky next. I color correct the sky and the building and foreground will not be affected.

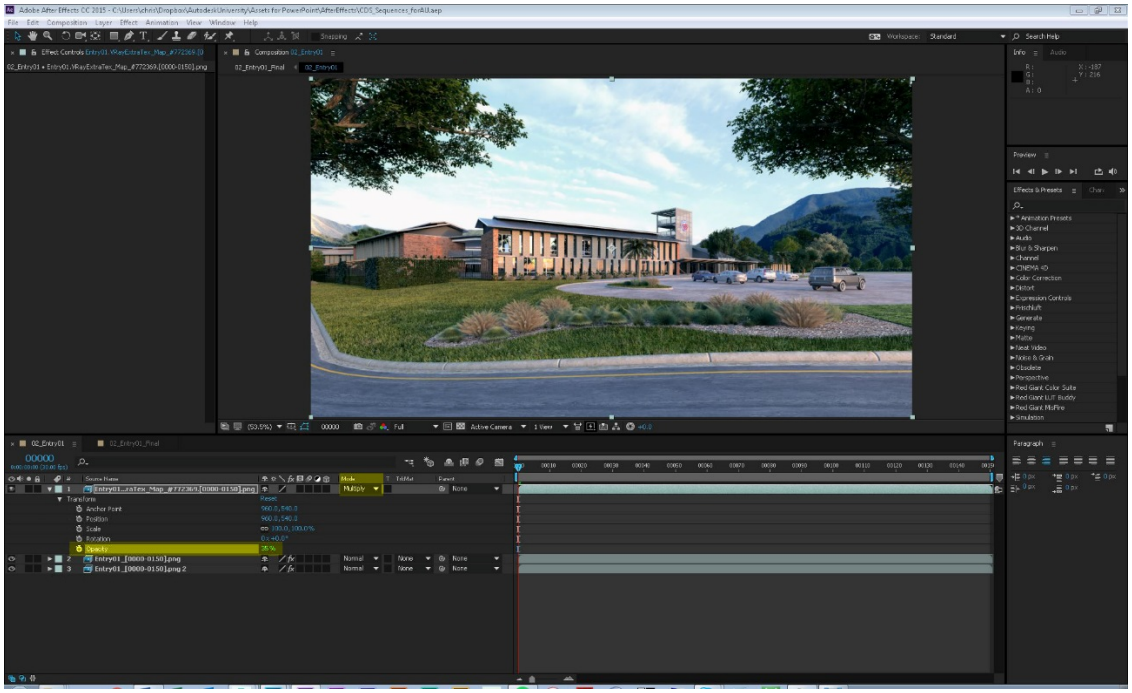




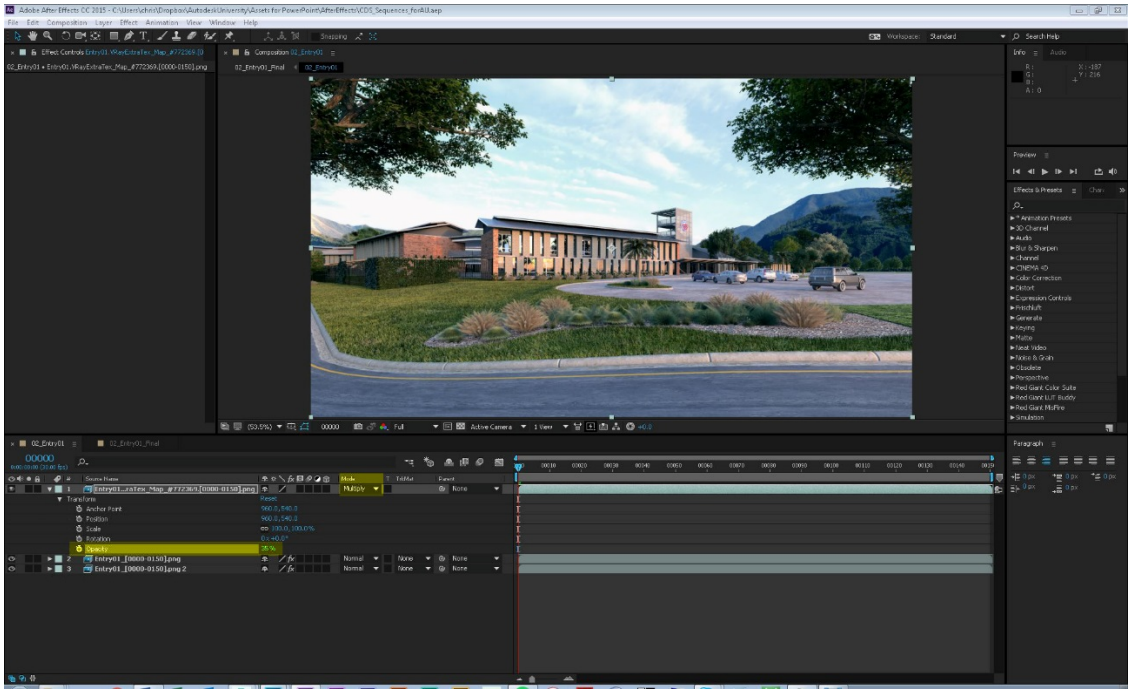
The next pass I bring into the comp is the **Ambient Occlusion** (AO pass). Change the Blend Mode to **Multiply** and set the opacity to around **30 or 40 percent**.



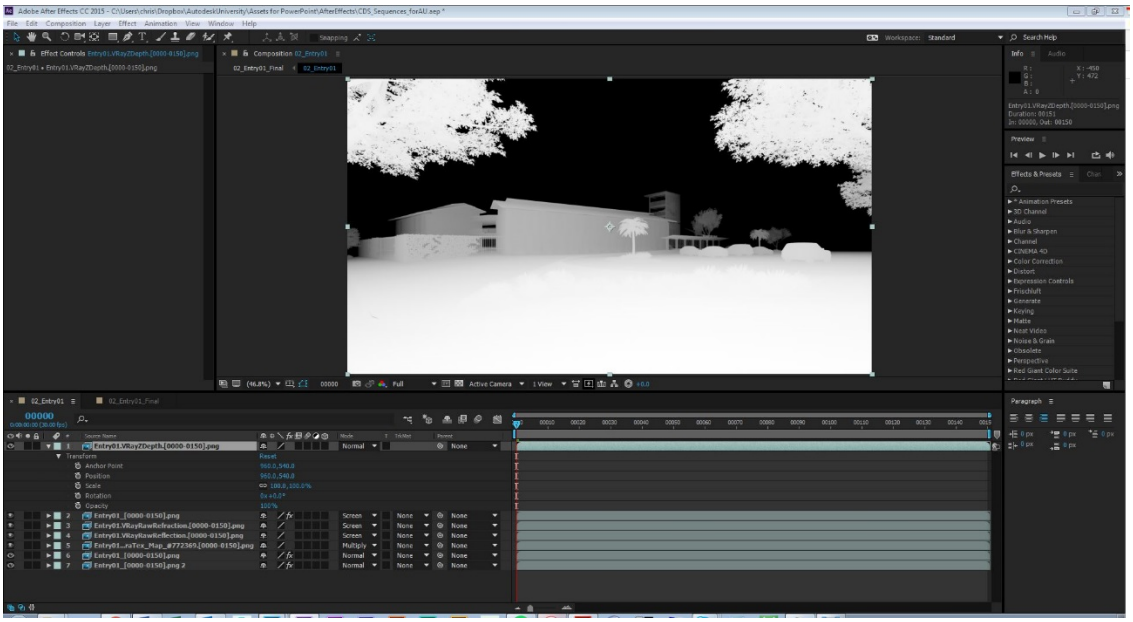
Then we bring in the **Reflection** pass. Change the Blend Mode to **Screen** and set the opacity to around around **10 or 20 percent**.

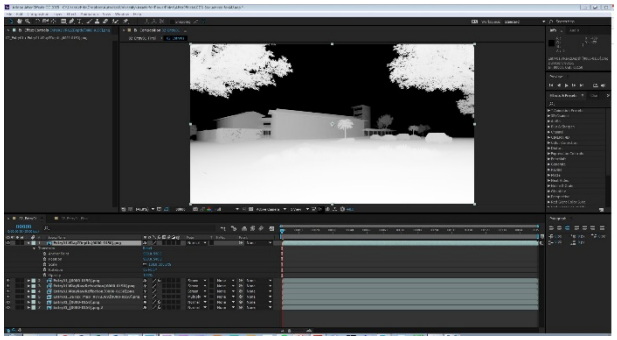


Next is the **Refraction** pass. Change the Blend Mode to **Screen** and set the opacity to a desired amount, in this case 20%. Extreme close-ups are usually around 5%.

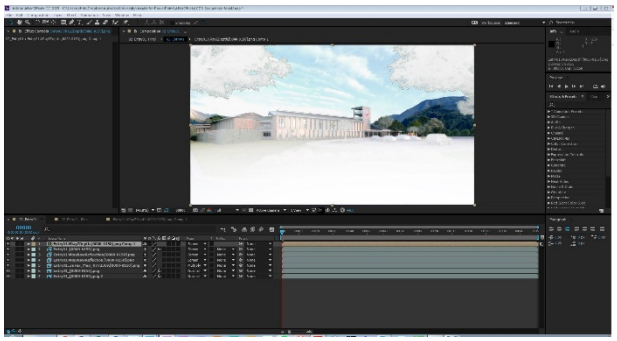


Next is the **Z-Depth** pass. This pass can be used for multiple effects in post. For this demonstration we will simply be using it for environment or fog. There is a bit of a process to this layer.



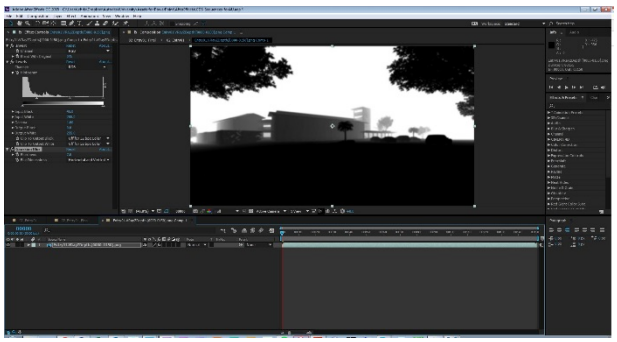


The first step is to do the same interpret footage trick we did to the diffuse for the sky. Again change the alpha properties from Straight-Unmatted to Ignore by going into the interpret footage dialogue, (Ctr+Alt+G, or File>Interpret Footage.)

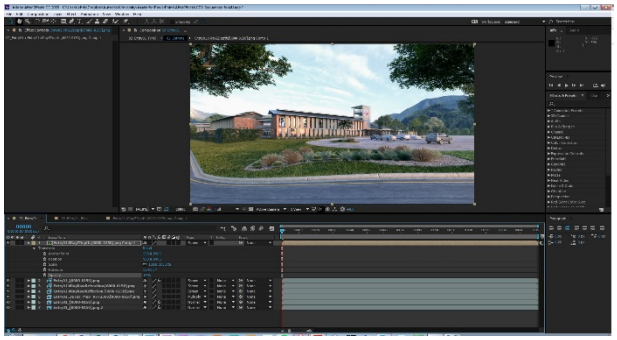


Now convert the Z-Depth layer to a precomp. With the layer selected hit Ctrl+Shift+C. Then change the Blending Mode to Screen.

Animation Breakdown

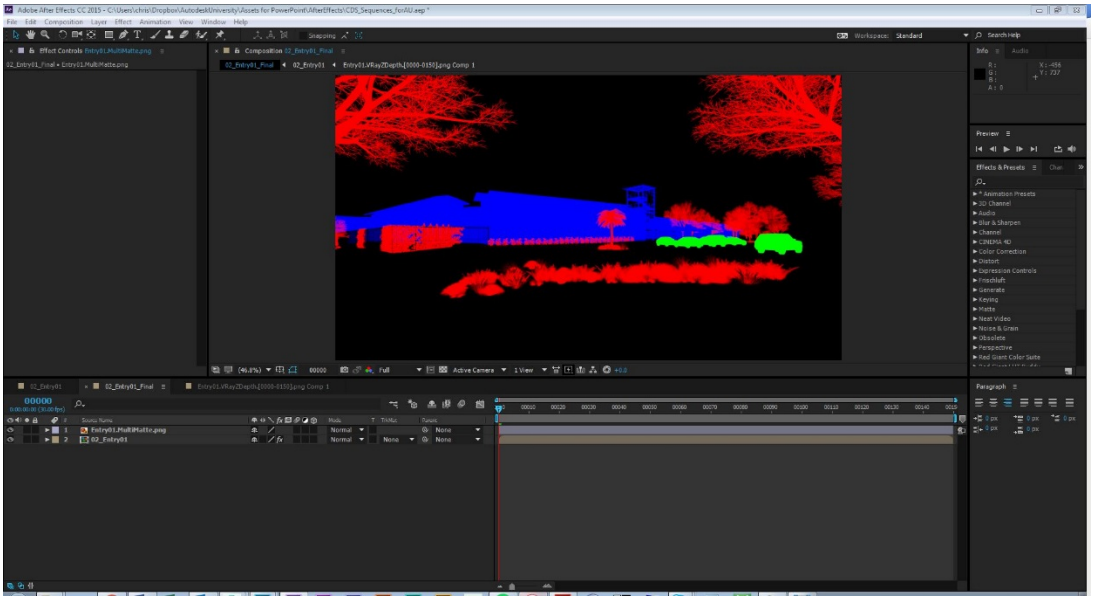


Now go into the Z-Depth precomp and apply an **Invert, Levels, and Gaussian Blur** effect to the layer. Adjust the Levels until you get a desired result for the fog falloff. Set the Gaussian Blur to somewhere between 4-9. Just enough to blur any sharp edges.

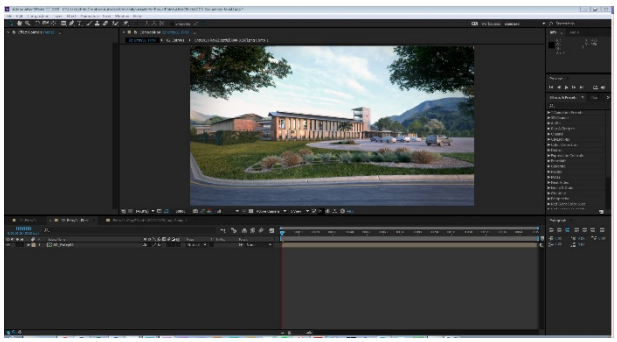


Lastly, go back to your base pre-comp and adjust the **Opacity** of the Z-Depth pre-comp. This value should not exceed 20%, the effect is only meant to be subtle.

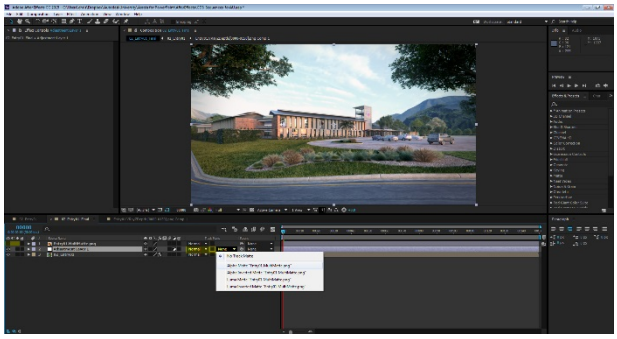
Next is the **Multi-Matte** pass. This pass can be used to control the objects that have been assigned material ID's in 3ds Max. For this demonstration we will simply be using it for controlling lighting, color correction, and blooms on the trees.



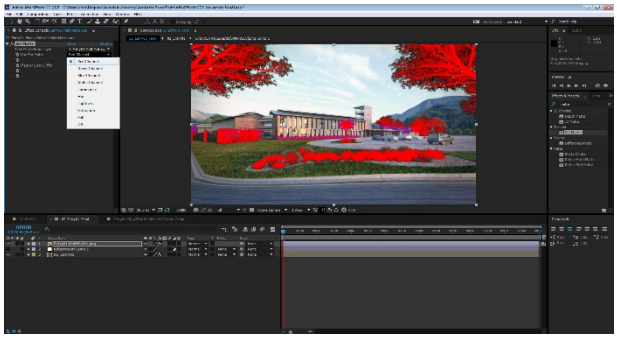
Animation Breakdown



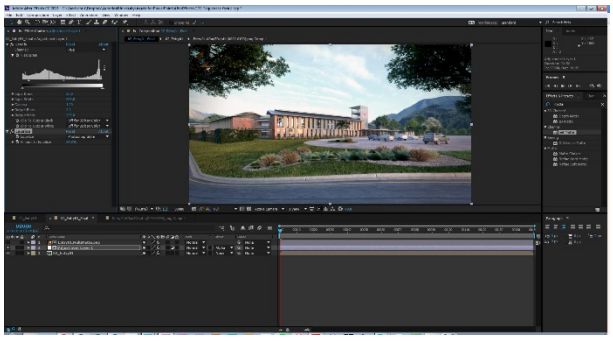
The first step is to create a final comp from your pre-comp for the shot. This must be done for the Multi-Matte pass to work as a mask!



Now bring the Multi-Matte pass into the final comp above the pre-comp layer. Turn the Multi-Matte pass to non-visible (we are only using it as a mask.) Create an Adjustment Layer above the precomp layer, but under the Multi-Matte layer (this is where we will be able to add effects to the matte selection. Now set the Adjustment Layer **Track Matte** to Alpha Matte "name of layer above".



With the hidden Multi Matte layer selected, unhide it so you can see the effect that will take place and add a **Set Matte** effect. Change the **Use for Matte** dropdown from **Alpha Channel** to either Red, **Green, or Blue Channel** depending on what objects you are wanting to adjust. In this case I've chosen the **Red Channel** which will affect my vegetation.



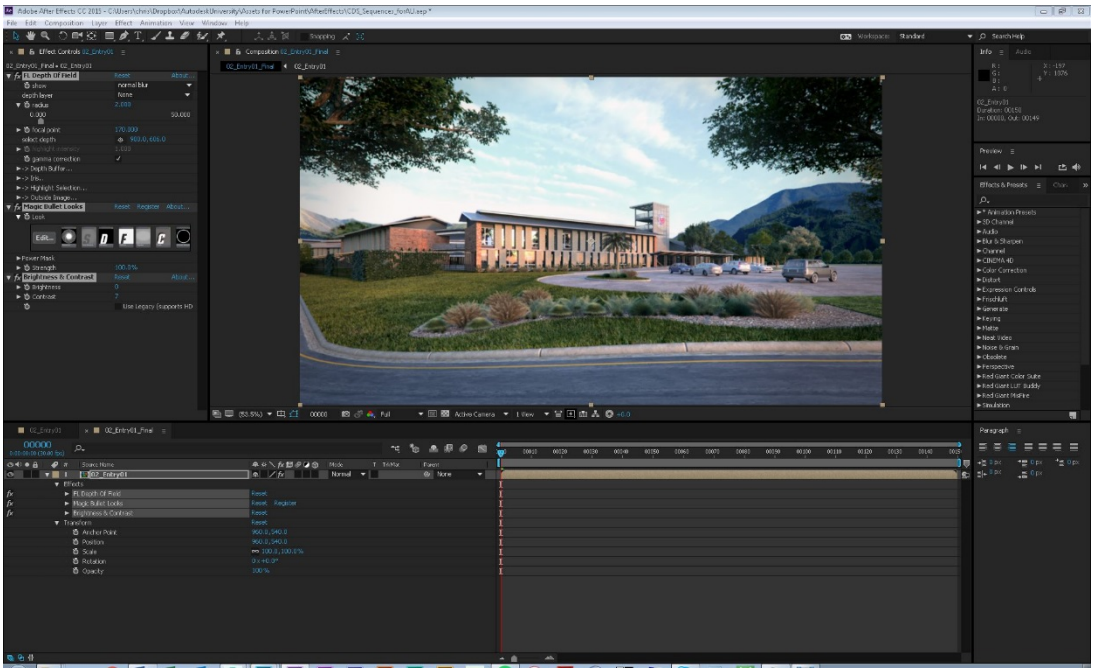
Now make the Multi Matte layer hidden again. Select the **Adjustment Layer** and apply whatever effects you want. In this case I will add **Levels** and **Equalize** effects to adjust my vegetation.

BEFORE Multi Matte

AFTER Multi Matte

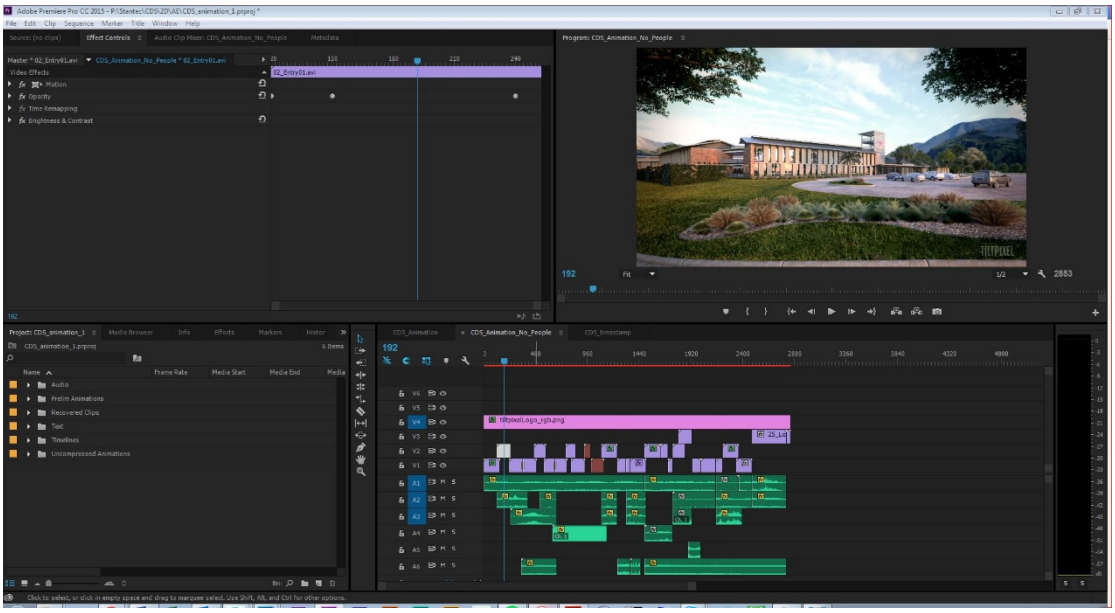
Final-comp using the Render Elements

Then in our **Final Comp** we do our final color grading, vignetting, glows, and any other effects we deem necessary to enhance the final quality of the shot. This process is repeated for every shot used in our animation.



Final Post Production

Once all of our scenes have been compiled, color graded, and exported, we create an Adobe Premiere sequence where we compile the final animation. This is the final edit where all the transitions for shots, timing of audio, titling, and folly effects are added.



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