Construction Sequence Animations

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Revit
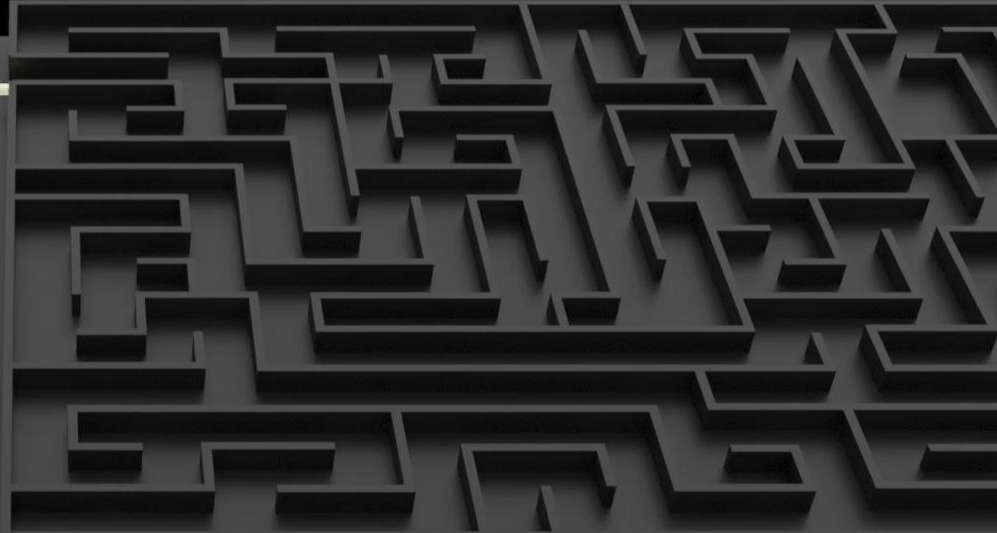
Time

Animations are all about timing

How long is the animation?

When is the deadline?
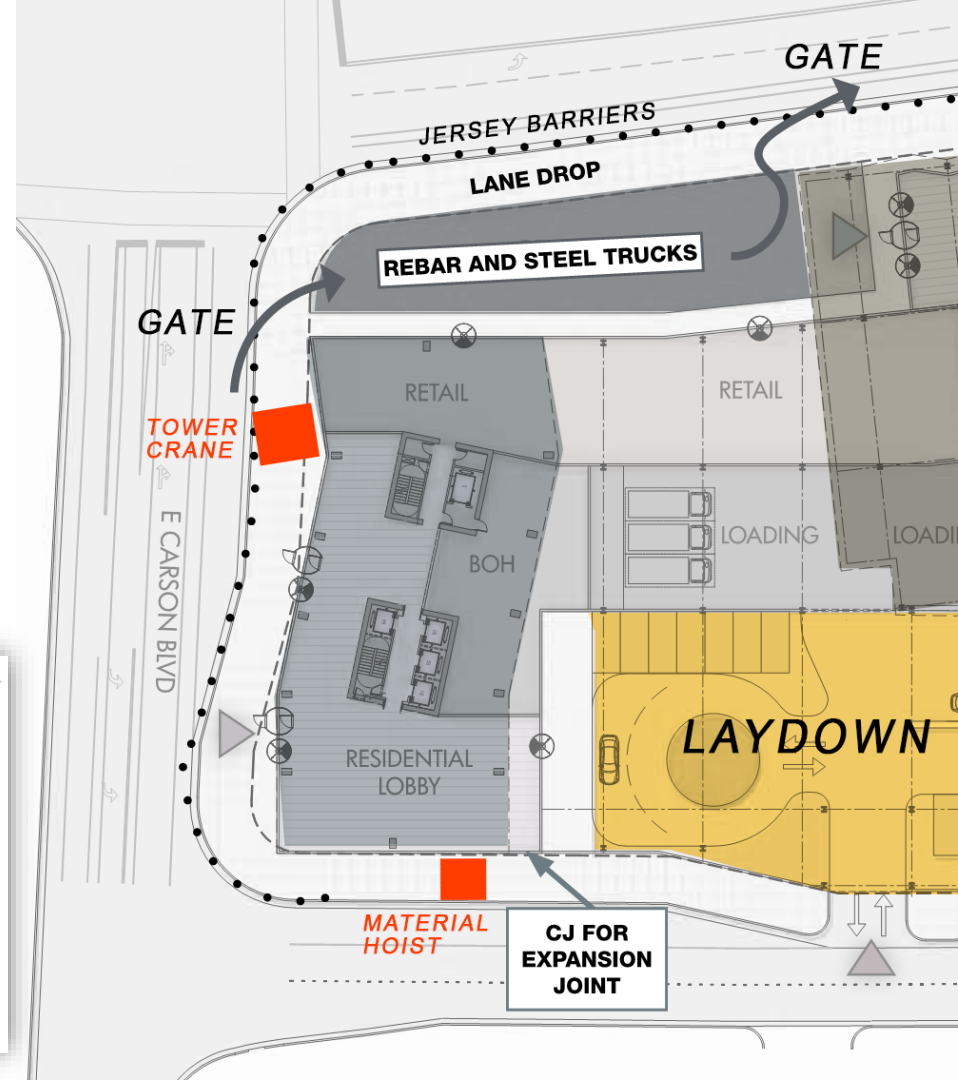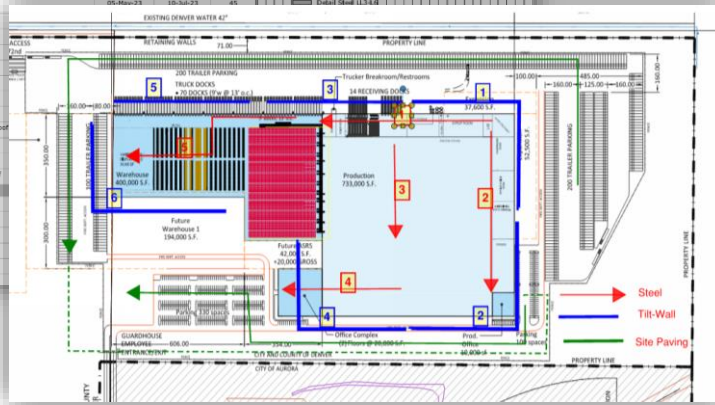
How fast is your computer?

Will there be changes?

Managing Expectations and Division of Labor

Gather the Inputs

What do you have to work with?

- Gantt Charts
- Pour Diagrams
- Steel Erection Diagrams
- Revit/Rhino/SketchUp Models
- Site Logistics

Organize the Process

Create a Master file that gathers all of the scheduling data

Utilize formulas to control the entire layout

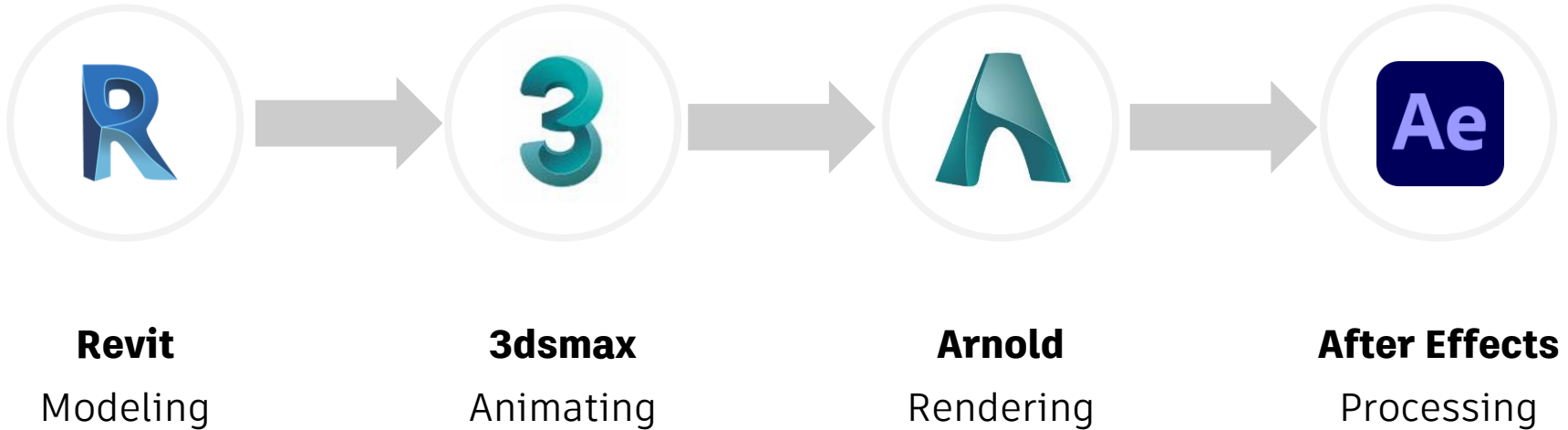Output activities to another list to create views in Revit using Dynamo

Plan out the Construction Sequence

Animation Process

Simple Right?

Revit

Modeling

3dsmax

Animating

Arnold

Rendering

After Effects

Processing

Animation Process

Reality is messier

Is the background a drone video? An
Infraworks model? Or modeled in 3dsmax?

Do we need an Infraworks model?

Are there multiple videos?

How will it be shown? Online? mp4 ? Ppt?

Will there be changes once started? YES!
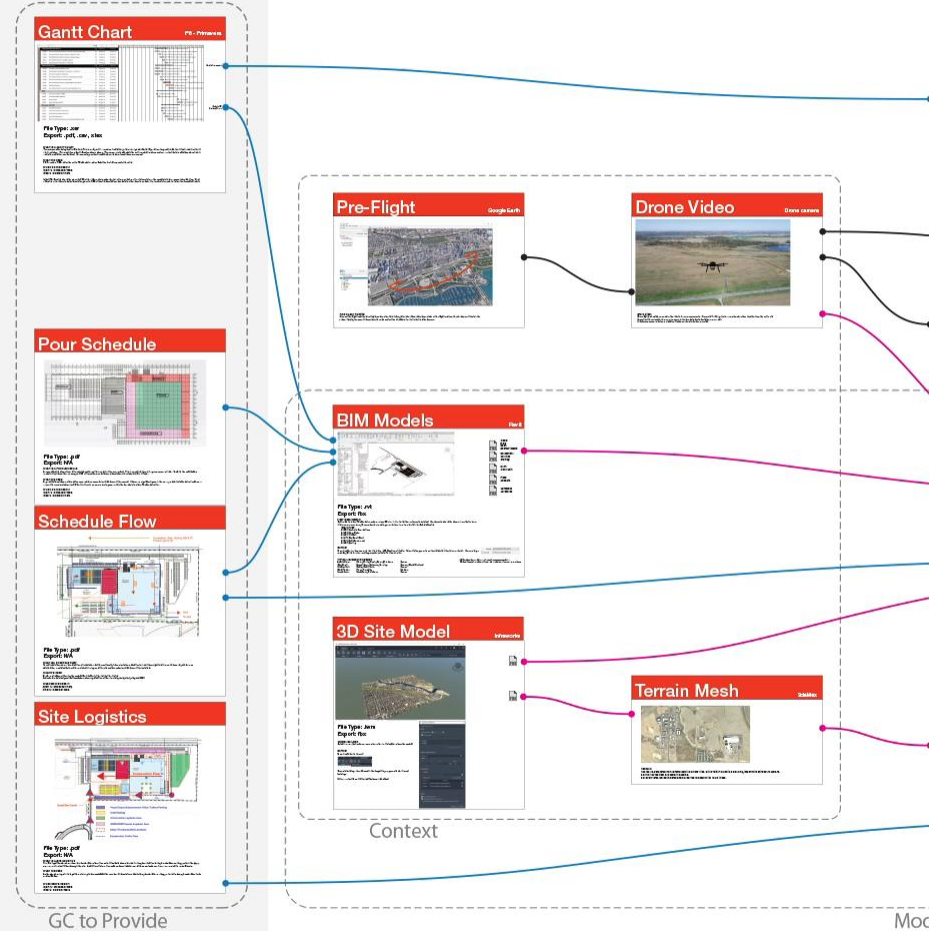
Generate Views in Revit

Slices of the model
- Use scope boxes

Align with Activities from the schedule
- L05 Structure
- L12 Exterior Skin
- L17 Building Core

Export each view to FBX

Import FBX to 3dsmax

Use Maxscript to bring in multiple FBX files
Assigns a layer and a group to each event
- This quickens the animation process
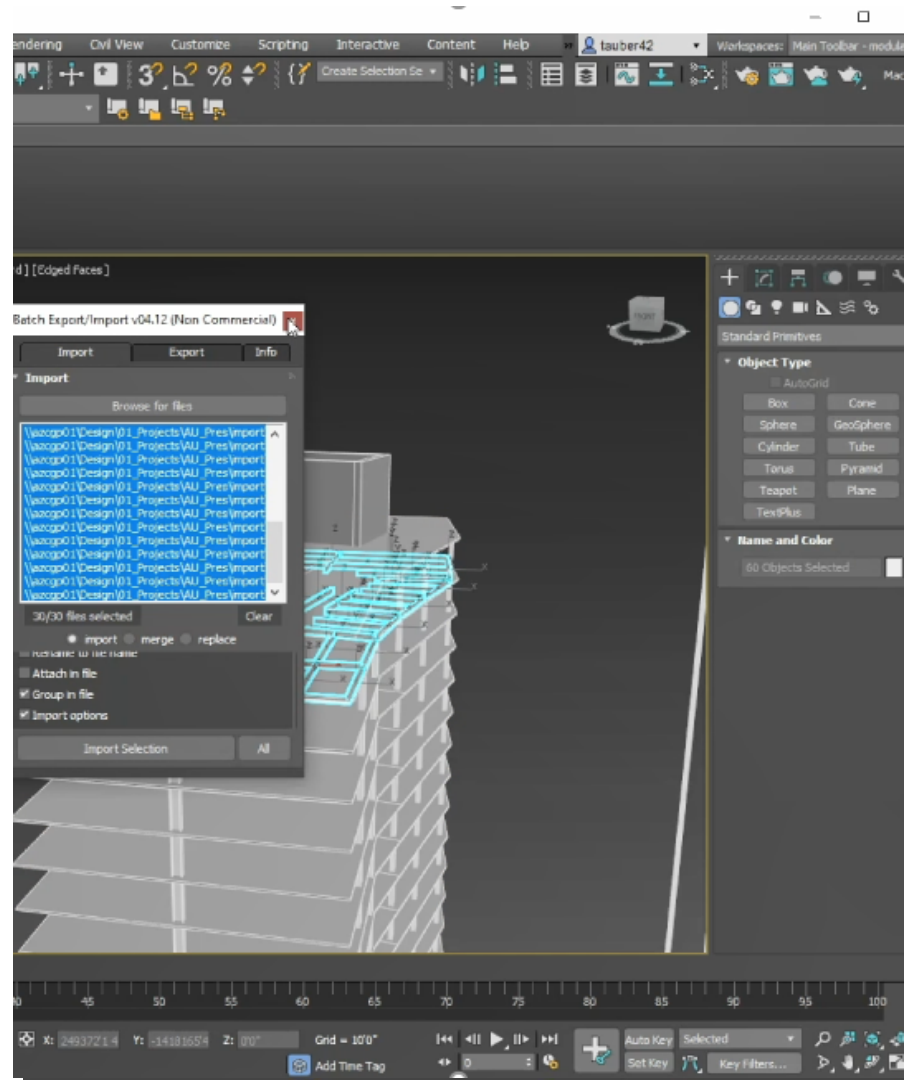
Animation Tips & Tricks

Slice Plane

The Slice plane splits a model or group and removes a portion of it from view.

- Animating this slice plane introduces objects gradually
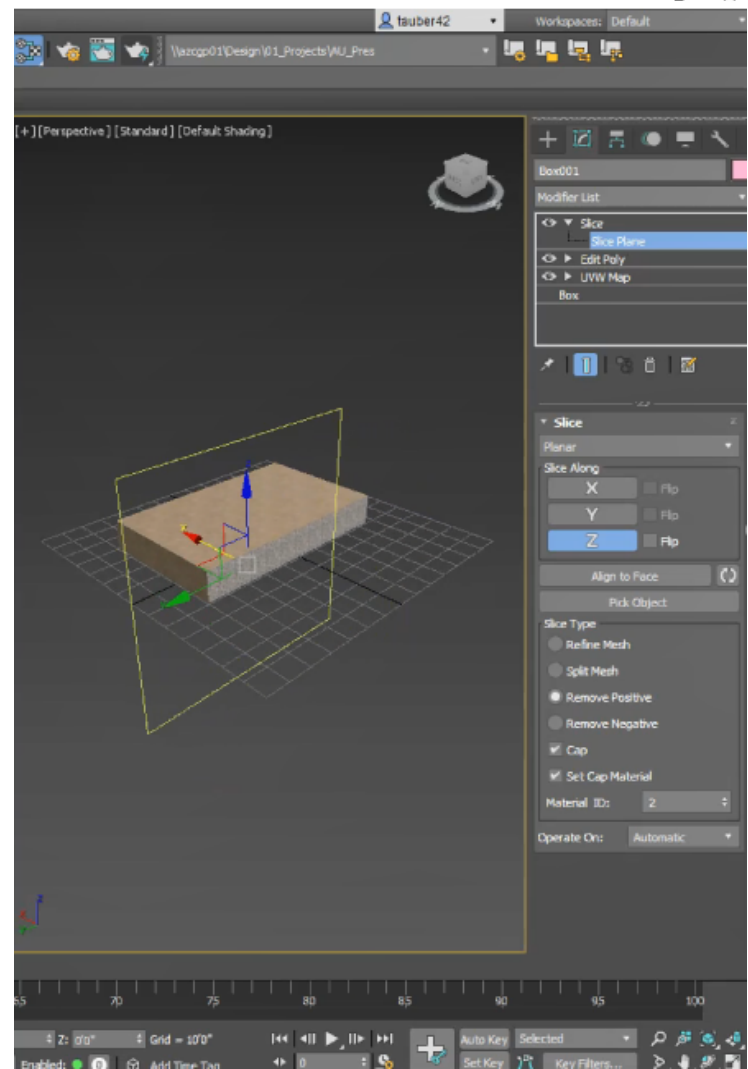
Animation Tips & Tricks

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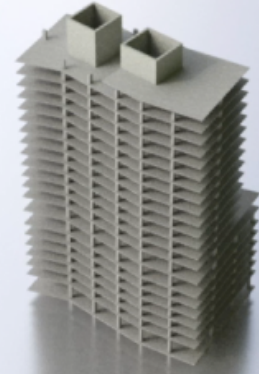
Animation Tips & Tricks

Keyframe Offset

Animate everything at once and then use a Maxscript to offset these keyframes

Note that Arnold does not have the ability to animate opacity at a Layer level, so we generally hide objects out of sight until they are brought in

Align Keyframes & Schedule

Align Keyframes & Schedule
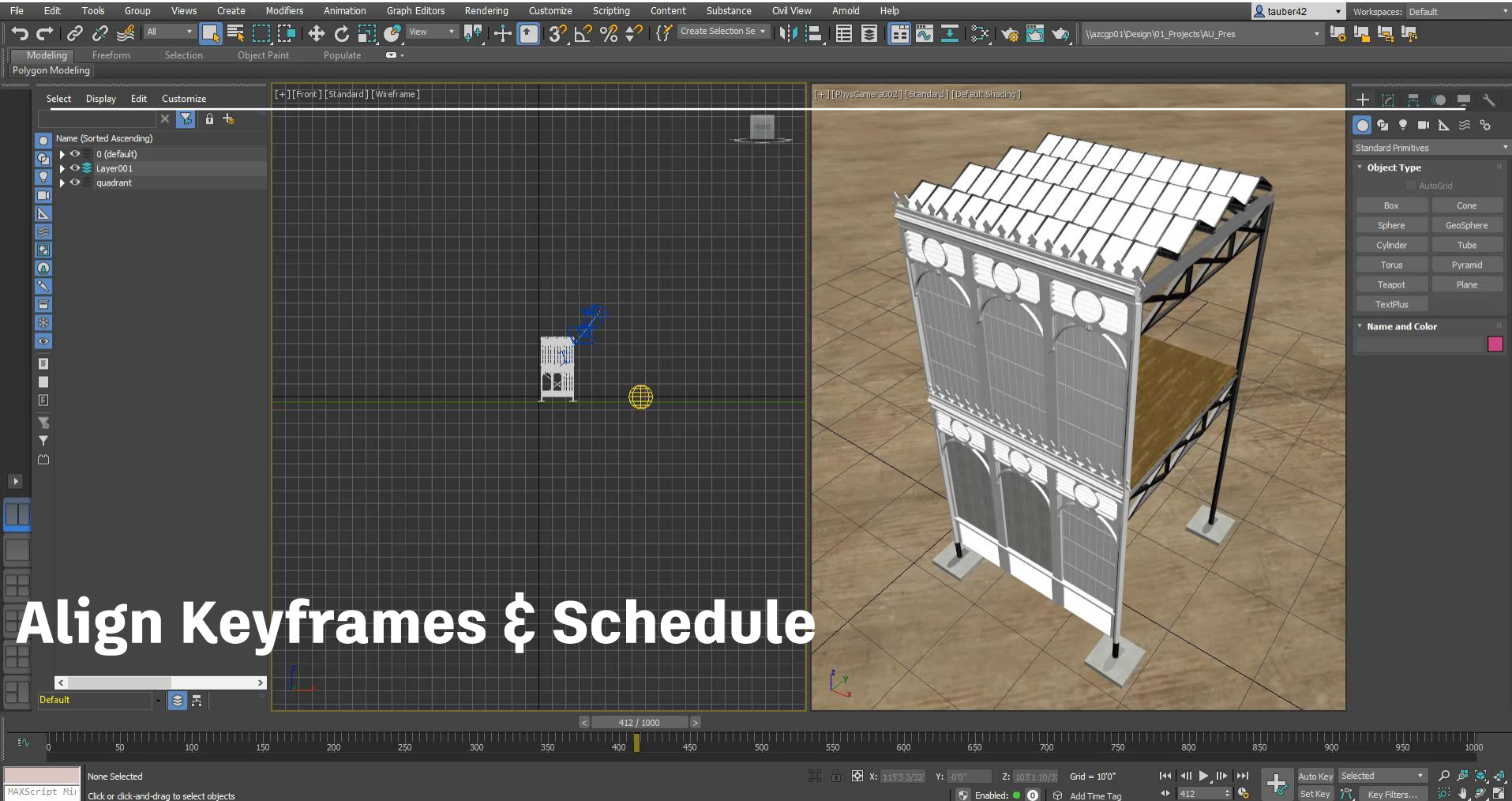
Build a Quality Library

Create a Material Library

Textures

Makes renderings "real"

Use seamless textures only

If the camera is far from the object, only use a
base color to save rendering time

Create a Material Library

ADSKLIB

By saving your materials in an ADSKLIB file you allow others to work with exactly the same palette.

Create unique ADSKLIB files for large projects with unique materials

Use the same textures in Revit and Enscape
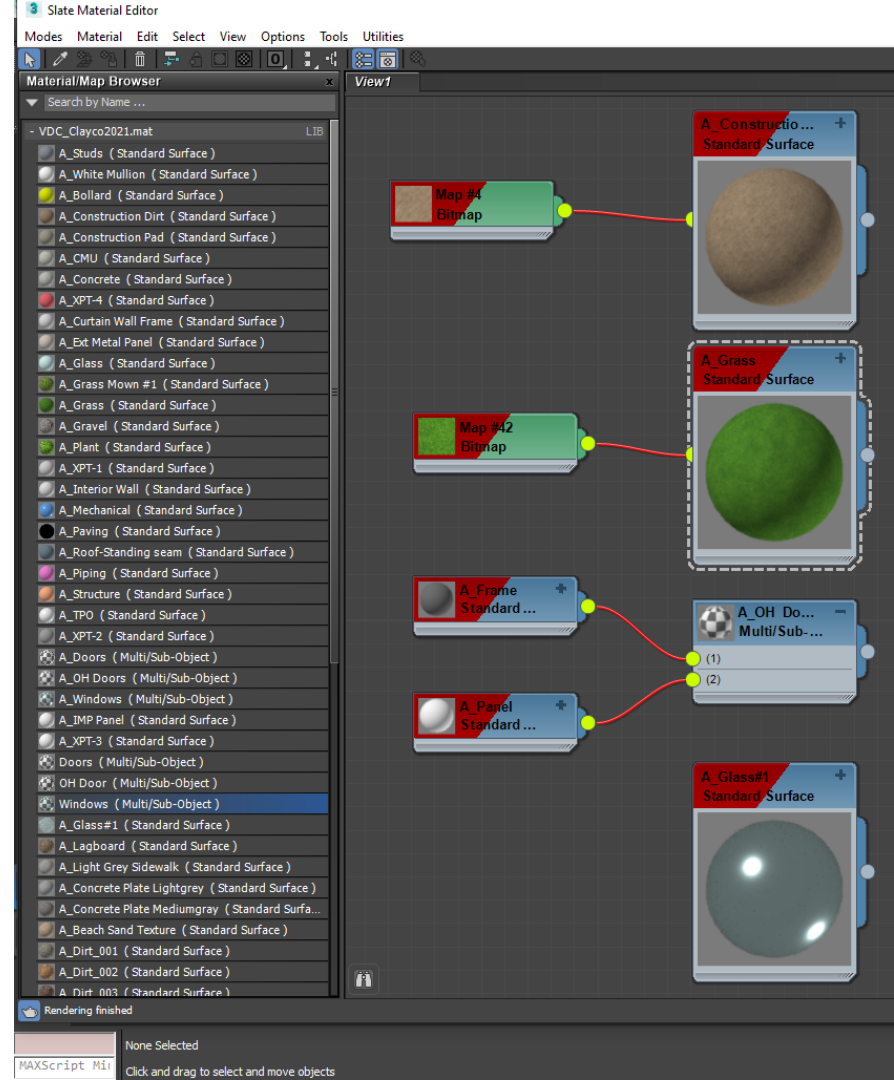
Model Library

Build
- Any reused objects should be stored in a model library on your server

Buy
- It sometimes faster/cheaper to purchase collections of models like construction equipment

Simplify
- The fewer faces the faster the render

Rig
- A well-organized model with dummies and Kinematics can make animating a breeze
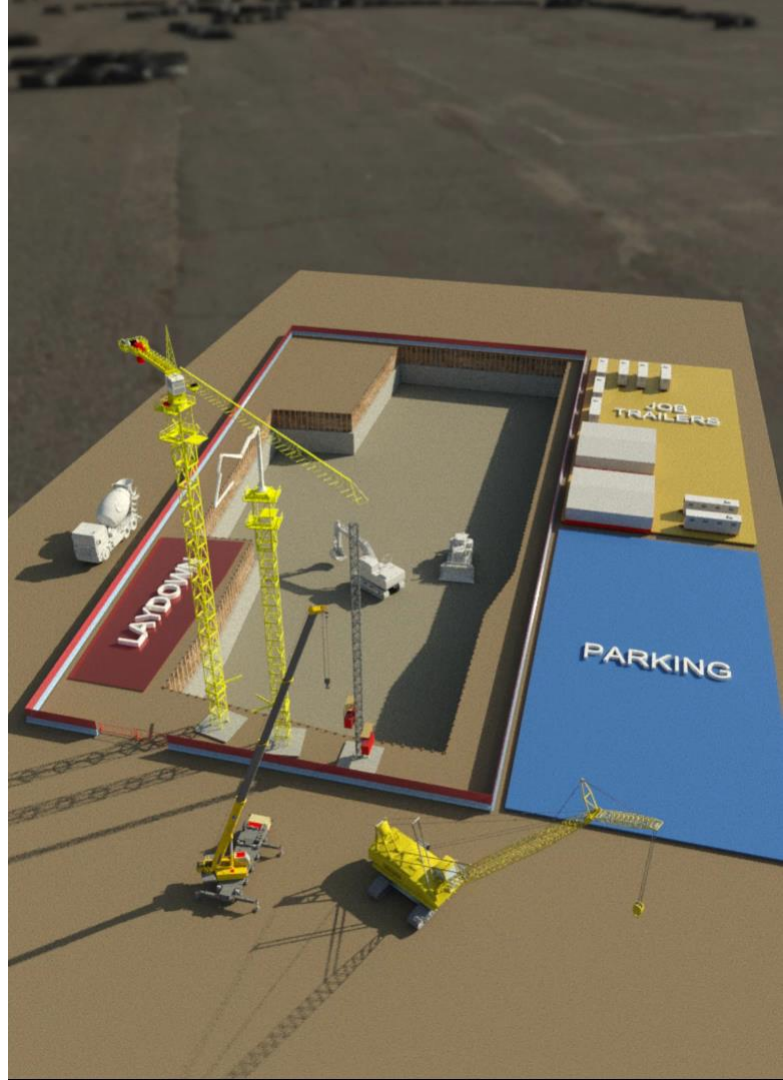
Arnold Renderer Basics

Trifecta of good rendering

Keep it simple

Lights

One HDRI Light

Materials
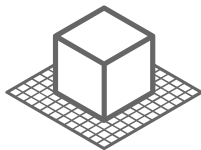
Basic Arnold materials

Camera

Physical Camera

Lights

Skydome Type

- Casts lighting from all directions
- Great for Ambient Occlusion

HDRI Texture

- Casts direct sunlight with shadows
- Fills in ambient lighting with sky and ground lighting
- Fastest way to achieve realistic lighting

Exposure = 0.0EV
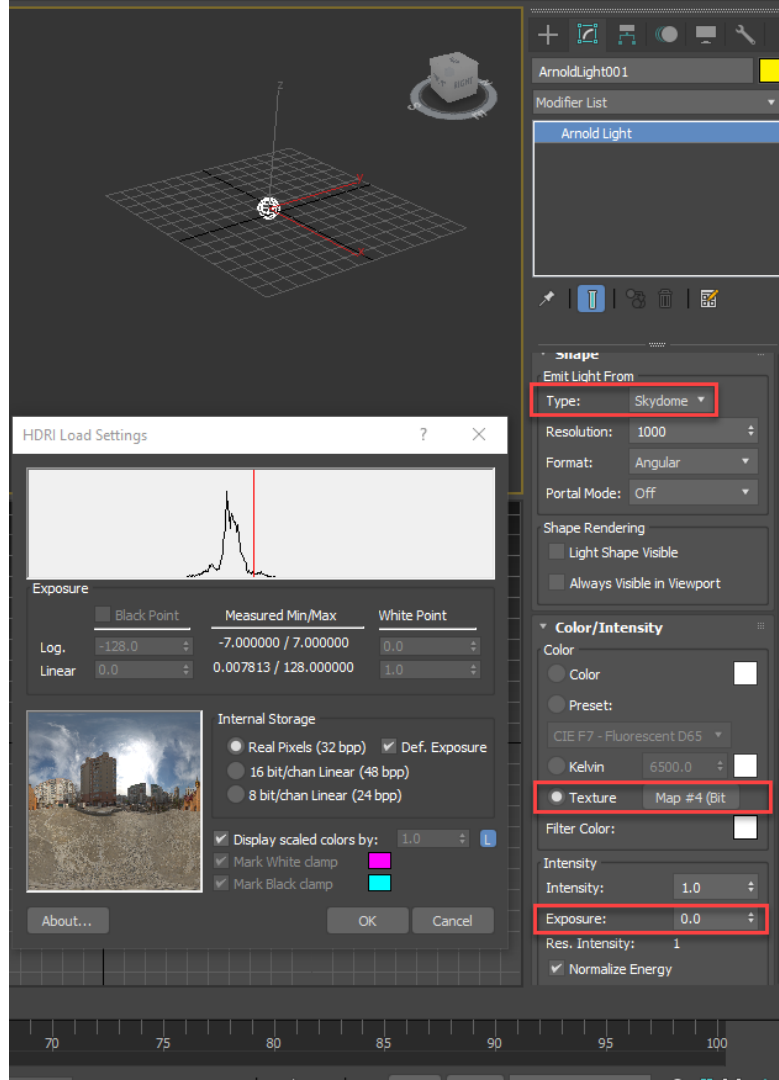
Cameras

Physical Camera

Full Photography control

- Presets cameras available
- Aperture, Focal length, Shutter speed and Exposure able to be adjusted

Exposure
- Set Camera Exposure to 0.0 EV
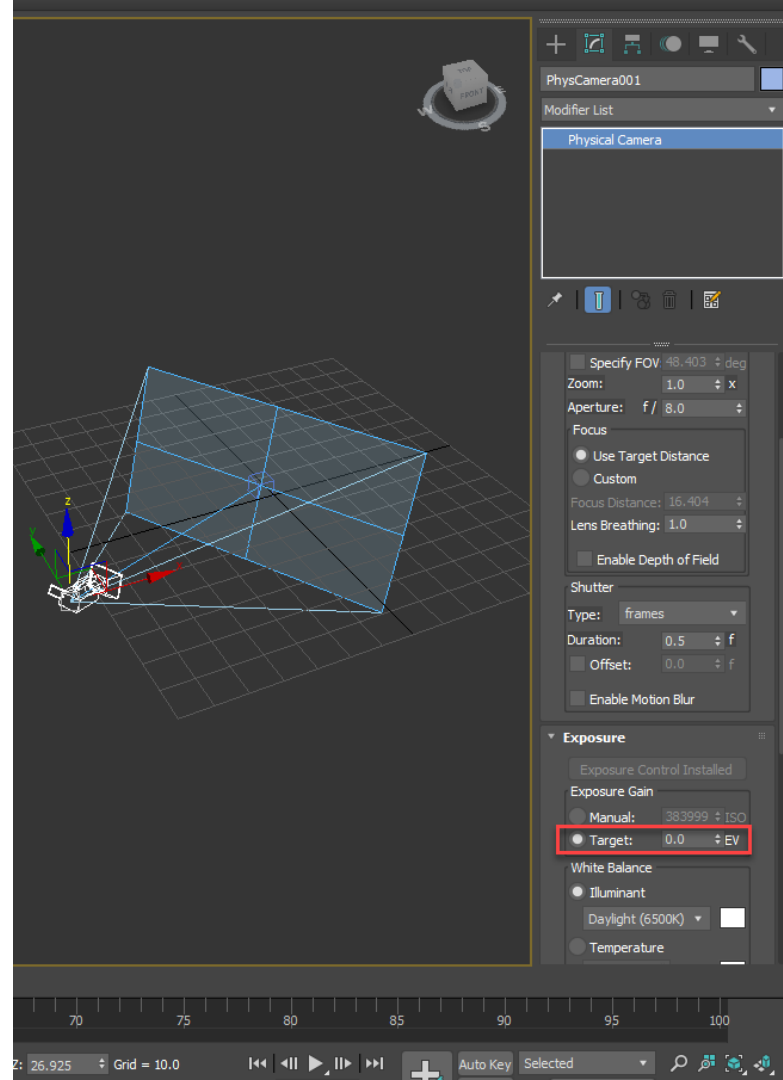
Cameras

Drones

Using External solutions such as Syntheyes, we can generate 3D cameras using drone footage.
- Tracker points follow color queues in the image sequence and are able to calculate image depth
- Tracker points can be used to align 3D models with existing structures

Image sequence can also be brough in as a background (as shown) in the Rendering: Environment section of 3dsmax.
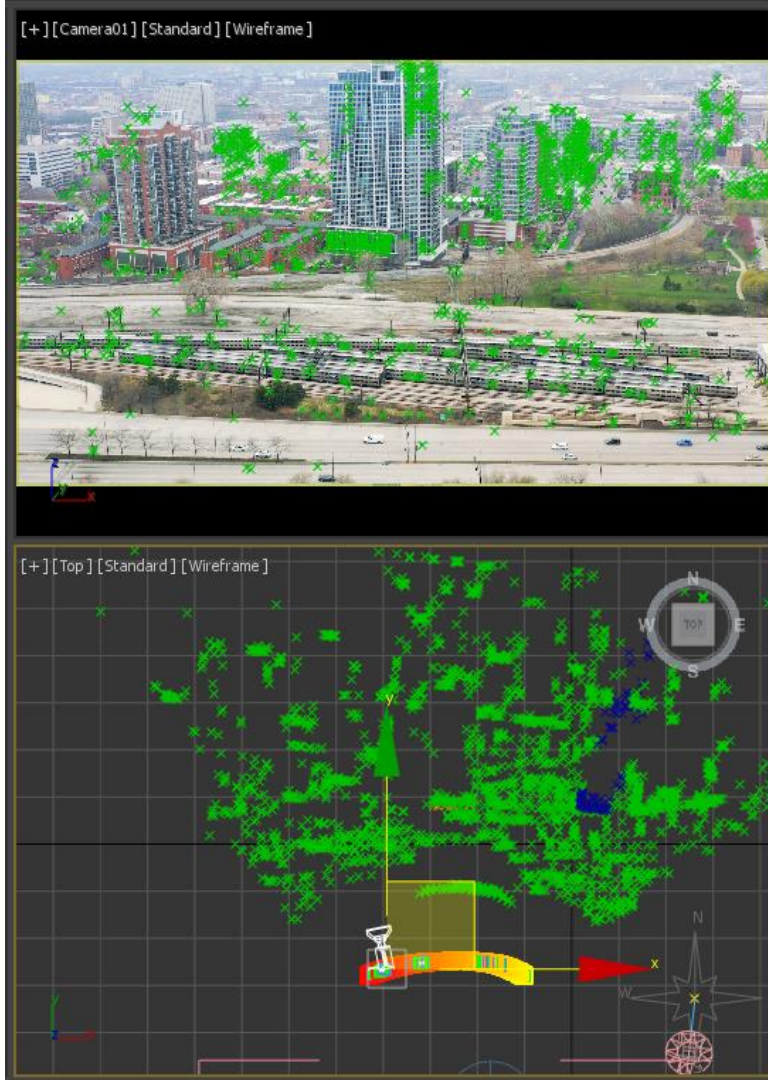
Arnold Materials

Arnold Standard Surface works the best

- Base Color – What color is it?
- Specular/Roughness – How shiny is it?
- Metalness - How reflective is it?
- Transmission – How Opaque is it?

PBR (Physically Based Rendering) Shaders can also be useful and are available for download online.

Press (M) to open the Material Browser

0.0 Metalness
0.0 Roughness

1.0 Metalness
0.0 Roughness

0.0 Metalness
0.5 Roughness

1.0 Metalness
0.5 Roughness

Arnold Materials

Avoid the default Autodesk materials that Revit assigns.

Keep it Simple

- Materials are a huge rabbit hole and there is much to learn.

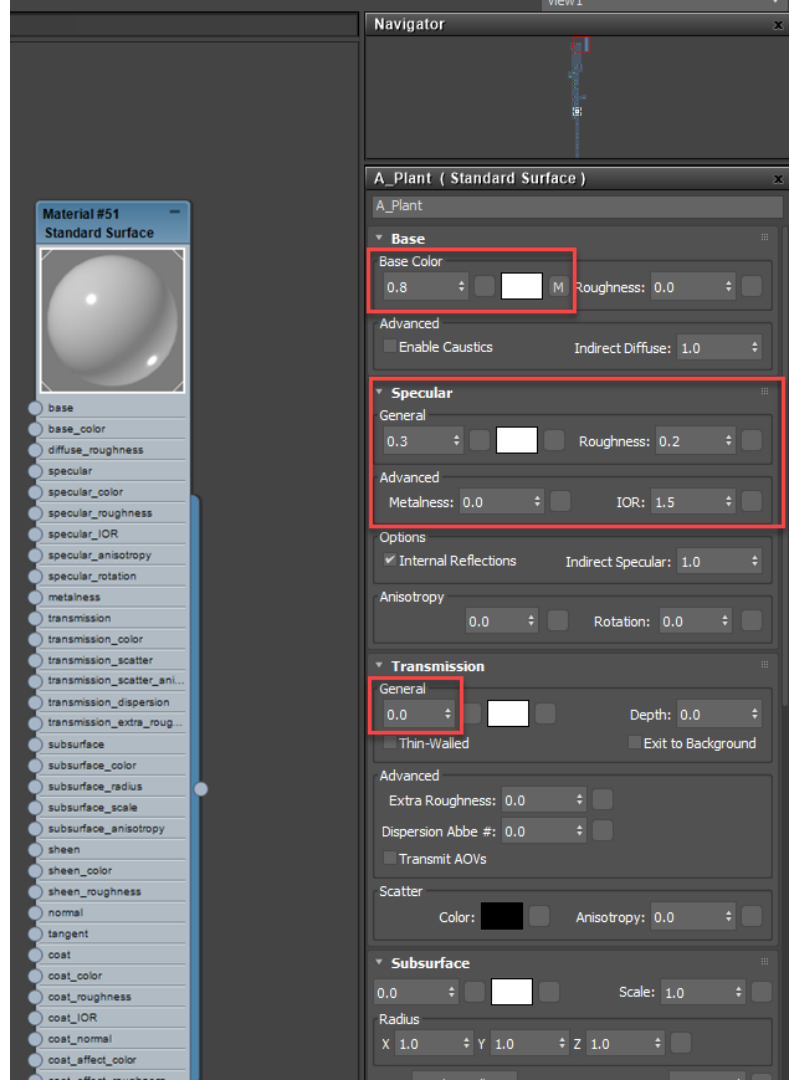Good Quality materials are worth the time to build to render quickly

Arnold Materials

Multi/SubObject

Multi/SubObject Materials are a great way to work with Revit family Exports.
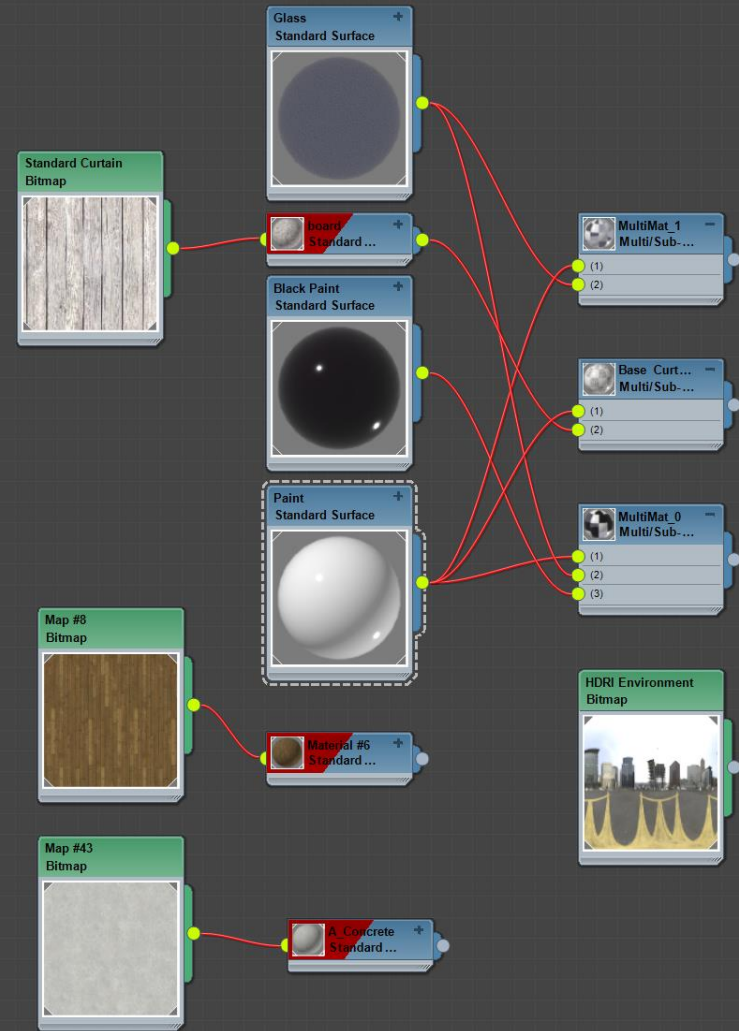
Render Output Settings

Exposure

Set Exposure Control to **Physical Camera Exposure Control**

Control all Camera exposure globally in the Environment dialog box

By default 3dsmax adds exposure values to Camera and Lights which need to be wiped clean.

Exposure Value between 9.0 – 11.0 EV will give a balanced look to the seen.

Press (8) to open the Environment Panel
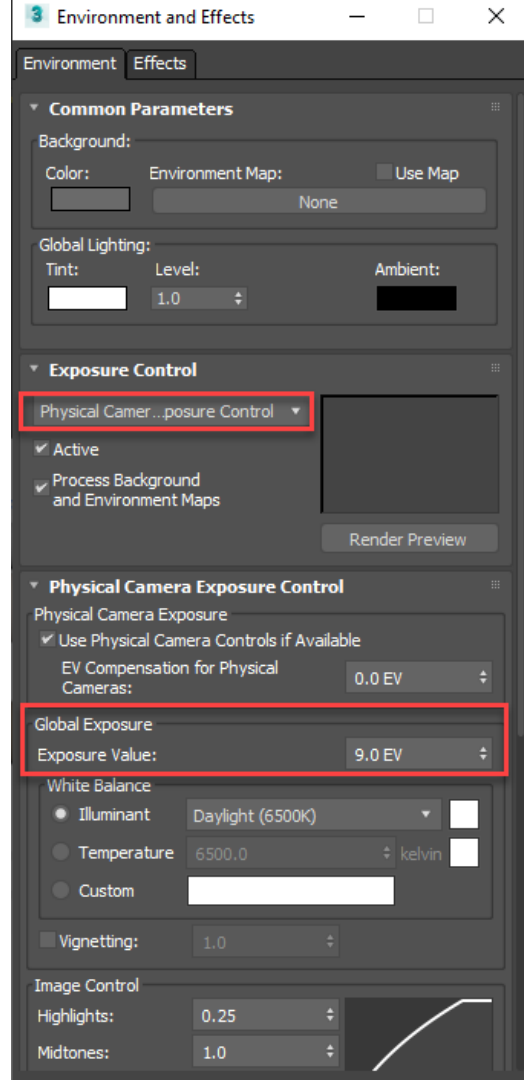
Render Output Settings

Render Setup

Range

Set which frames will be rendered

Output size

1920x1080 (HDTV) is sufficiently detailed but small enough to render quickly.

Render Output

Set folder location to dump all of the images
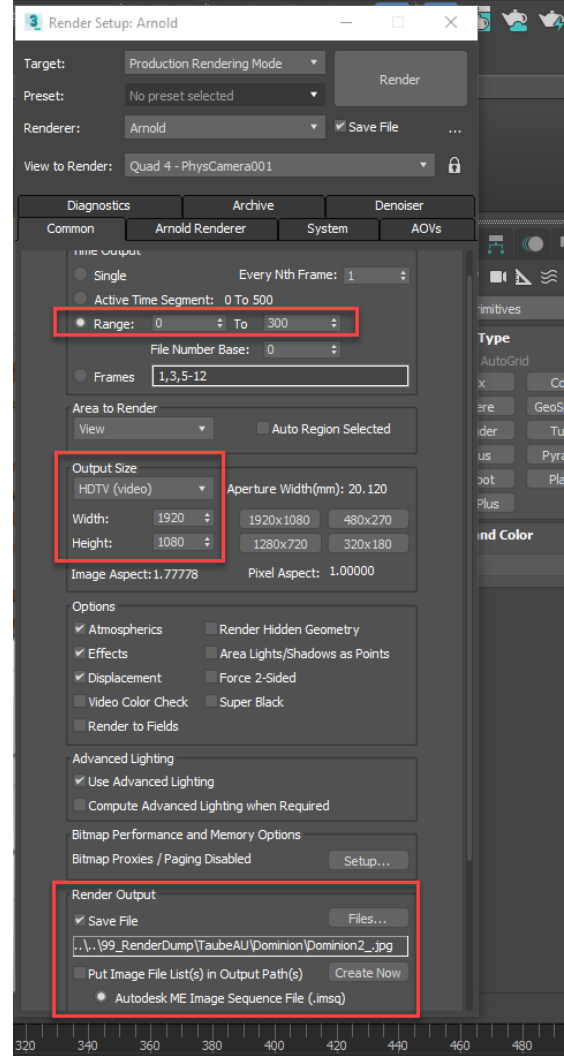
Render Output Settings

Render Setup

Arnold Render Tab

Camera (AA) has the greatest affect on your rendering

- Too Low – the render is grainy and pixelated
- Too High – the render takes too long

System Tab

Can toggle between a GPU or CPU render.
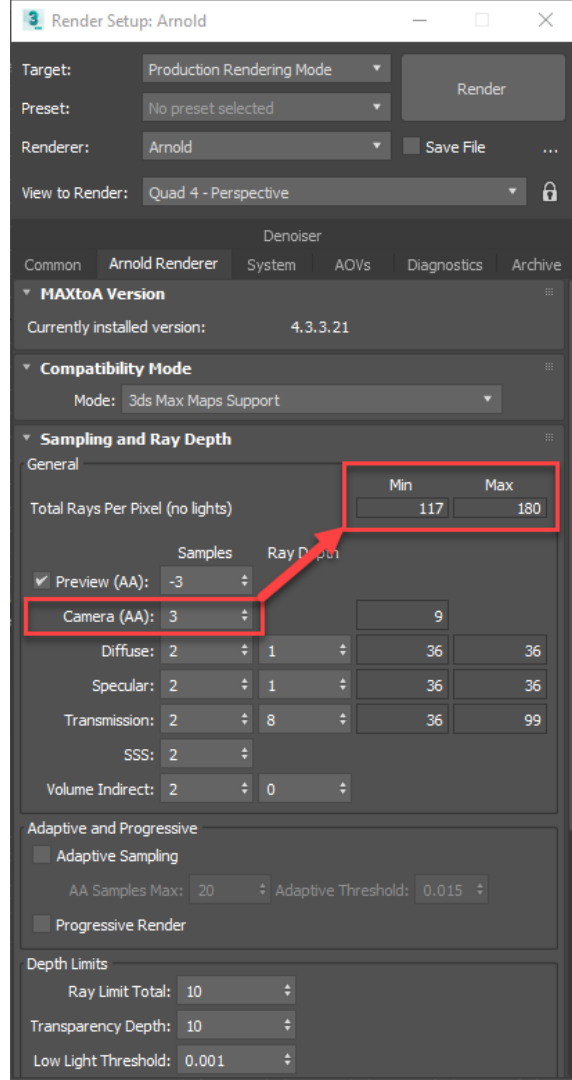
Post Processing

After Effects

Render Setup

The Master Schedule is used to highlight Activities in the animation

A timeline is shown at the bottom so that the video can be paused at any moment to see which activities are active at that time

- Orange is active

- Green is finishing

- Black is completed

Examples

Examples

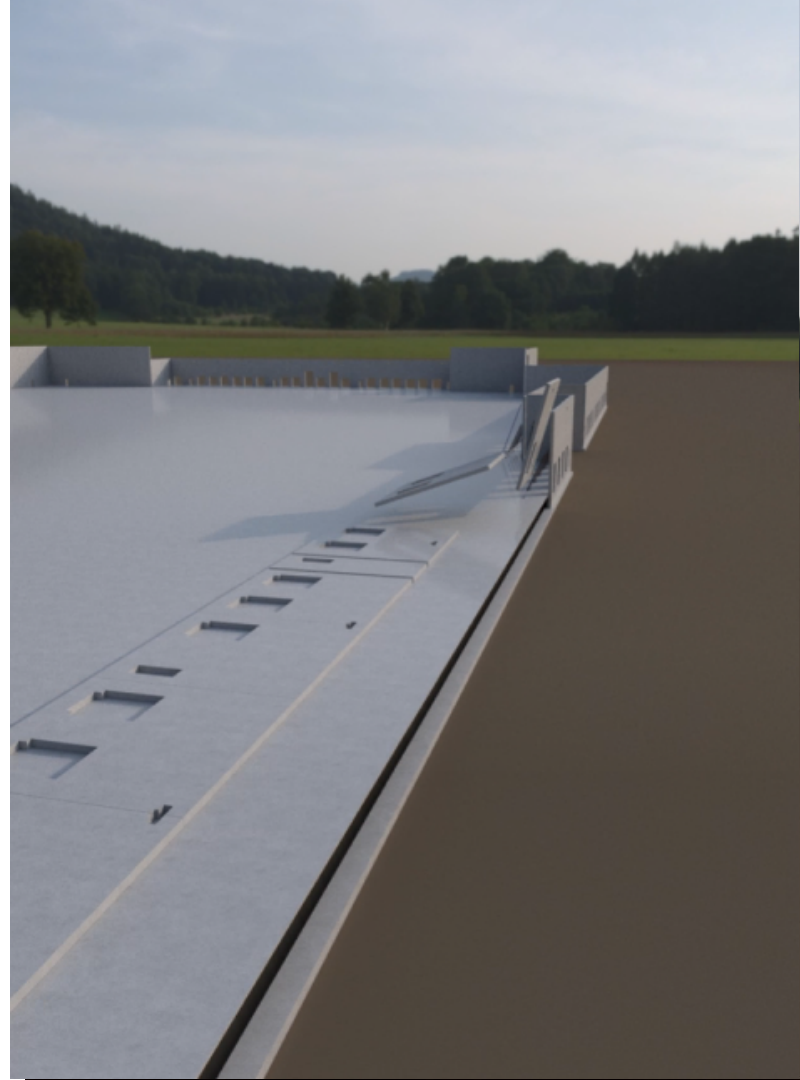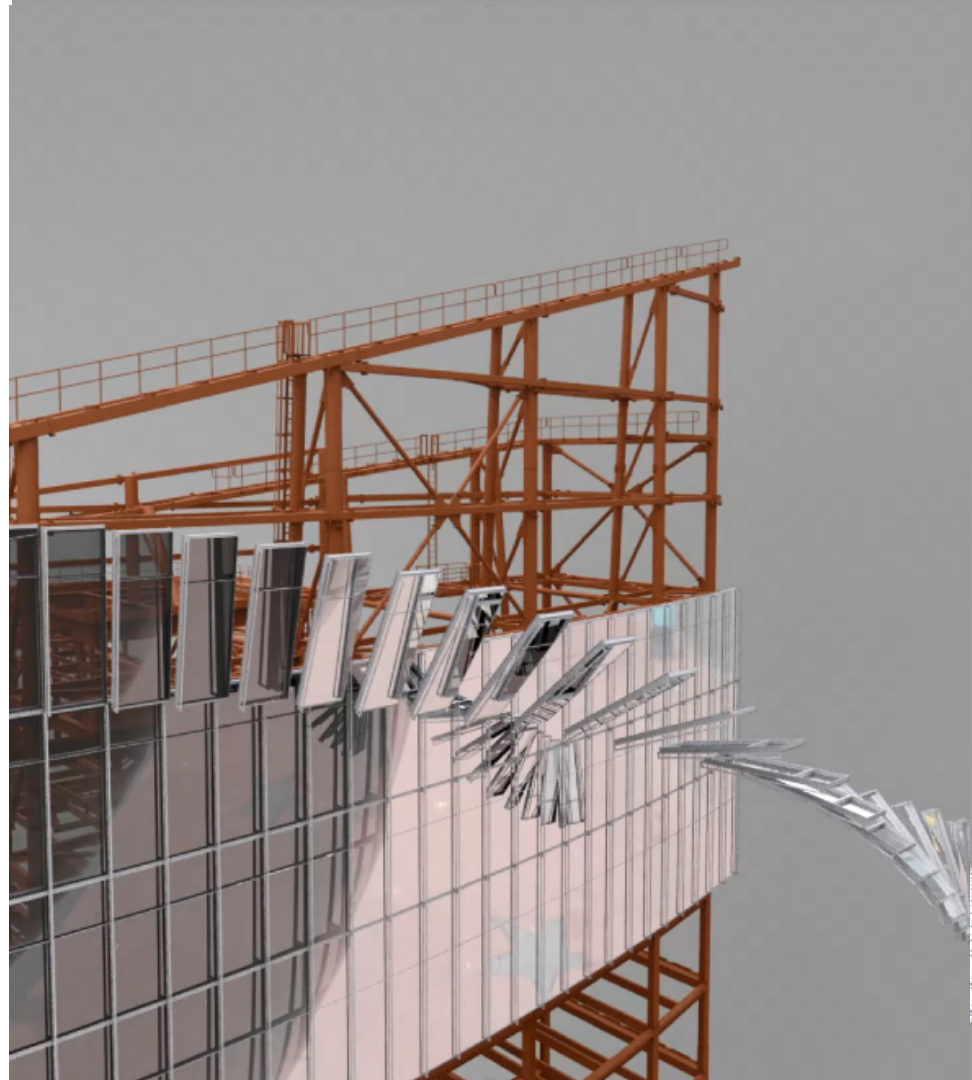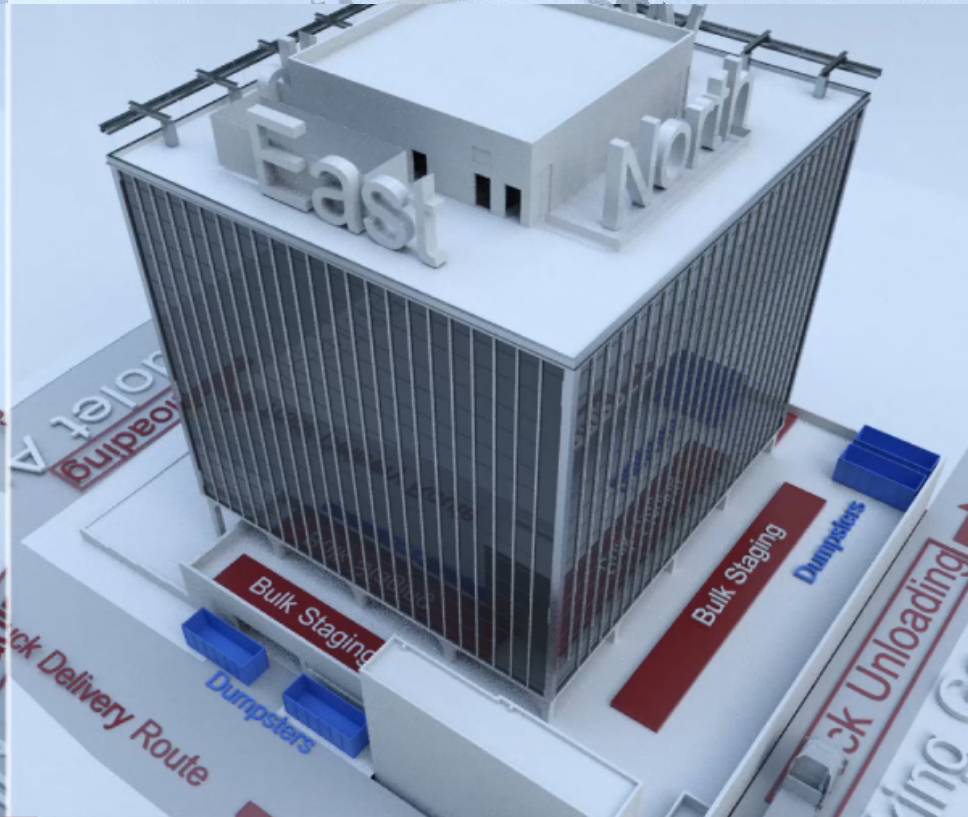# Examples

| FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL |

2021

WEST ELEVATION	SOUTH ELEVATION	EAST ELEVATION	NORTH ELEVATION
Occupant Relocation	Occupant Relocation	Occupant Relocation	Occupant Relocation
Interior Demo	Interior Demo	Interior Demo	
Rebuild Interiors		Rebuild Interiors	
Re-Occupy		Re-Occupy	
SECTION 1	*SECTION 1*	*SECTION 1*	*SECTION 1*
Curtainwall Demo	Curtainwall Demo	Curtainwall Demo	Interior Demo
Curtain wall Install		Curtain wall install	Rebuilding Wall Demo
SECTION 2	*SECTION 2*	*SECTION 2*	Curtain Wall install
Curtainwall Demo	Curtainwall Demo	Curtainwall Demo	*SECTION 2*
Curtain wall Install		Curtain wall install	Temporary Wall Removal
SECTION 3	*SECTION 3*	*SECTION 3*	Bridge Re-Location
Curtainwall Demo	Curtainwall Demo	Curtainwall Demo	
Curtain wall Install		Curtain wall install	

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