

The Whole 9 Yards—Visualization Workflow from AutoCAD to 3ds Max

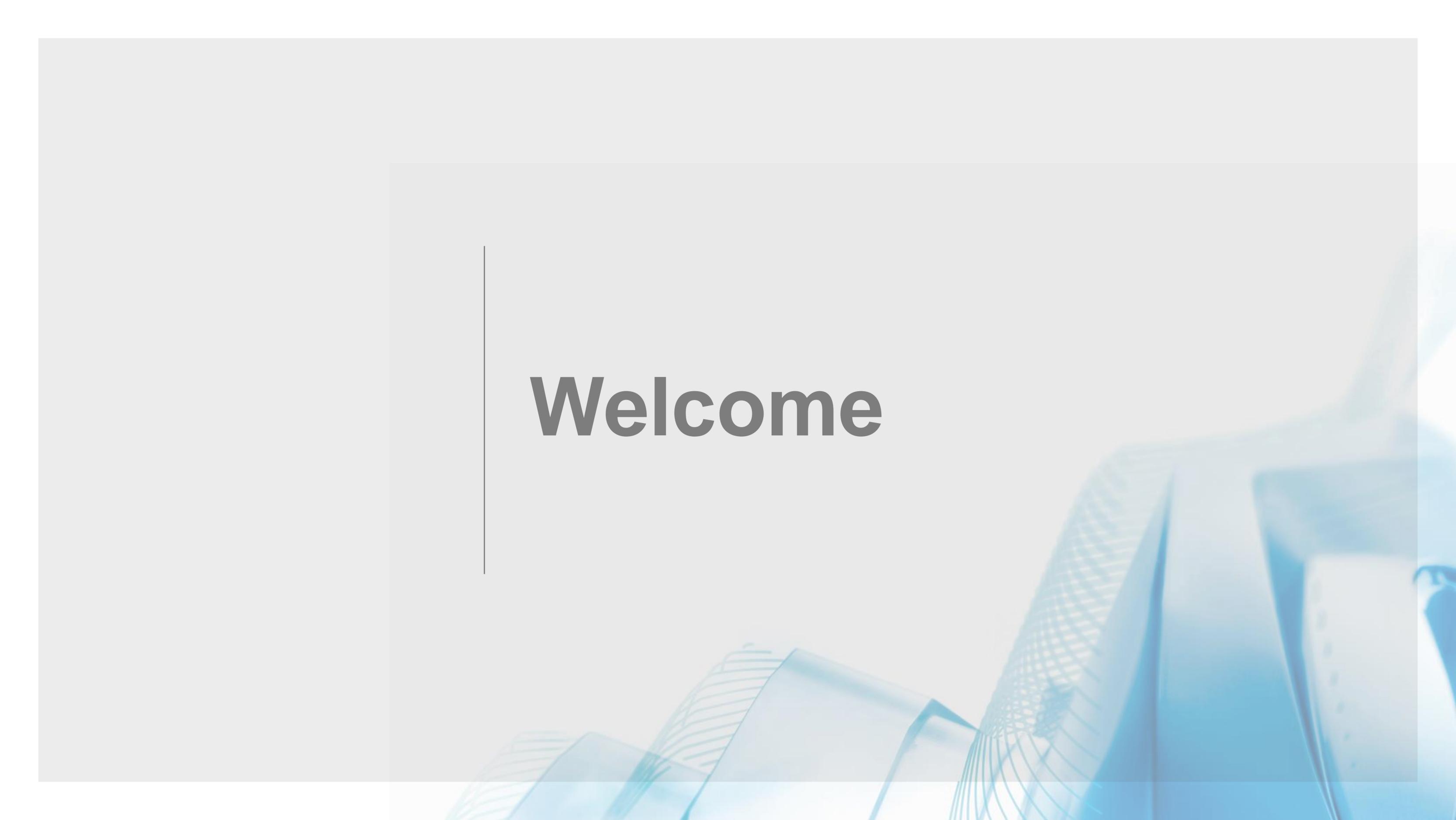
Steven Schain

4D Technologies/CADLearning

Post-Production Supervisor | M&E Content Development Manager

Co-presenters: David Cohn, Senior Content Manager



The background features a blurred image of a modern building with a blue wireframe overlay. The wireframe consists of a grid of lines that form the structure of the building, including its facade and roof. The overall color palette is light blue and white, creating a clean and professional aesthetic.

Welcome

Learning Objectives

- Understand the connection between AutoCAD, FormIt, and Revit for an optimal design workflow.
- Properly link a Revit model into 3ds Max 2019 for use with the Arnold renderer.
- Create and configure the Sun Positioner and camera exposure.
- Place cameras and create simple fly-through animations of the Revit design.

Question

Is anyone using a multi-software workflow? FormIt > BIM 360 > Revit > 3ds Max



The Project



The Project

The background features a blurred image of a modern building with a blue wireframe overlay, suggesting architectural design. The wireframe is composed of thin, light blue lines that form a grid-like structure over the building's facade. The overall color palette is light and airy, with soft blues and greys.

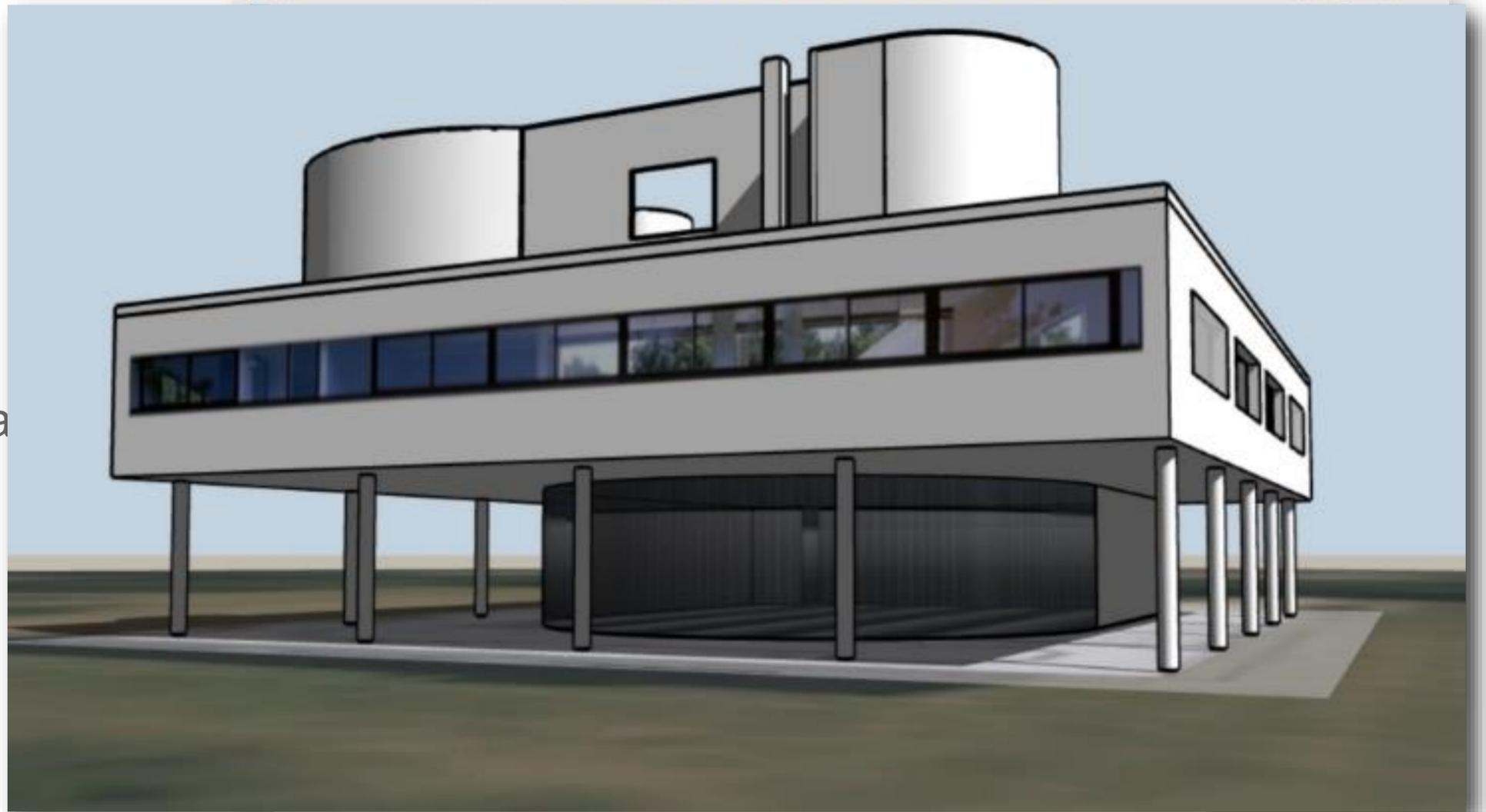
FormIt for Concept Design

FormIt for Concept Design



What is Autodesk FormIt?

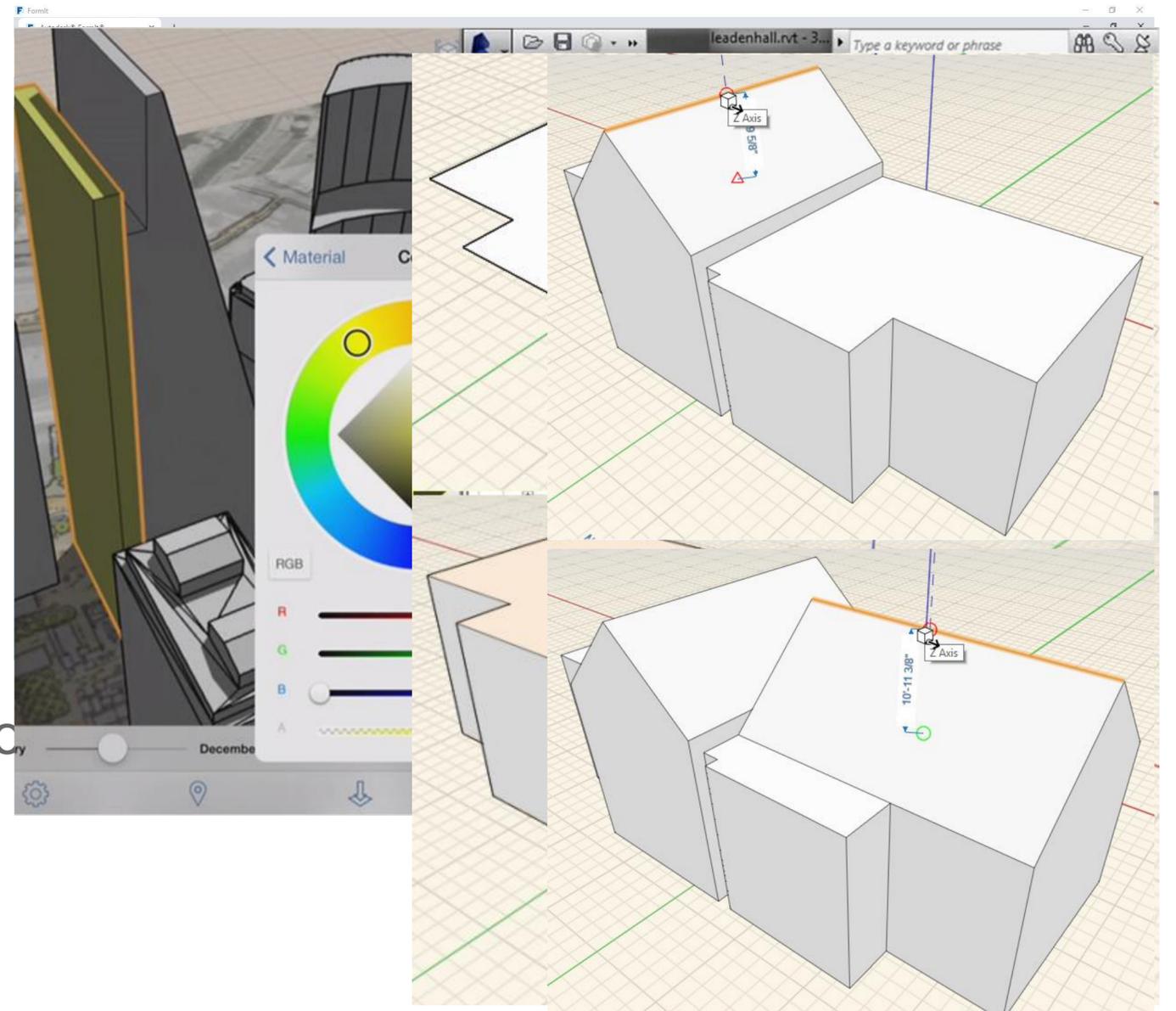
- A conceptual design tool that enables users to design anytime, anywhere.
- Available for:
- Windows
- Web browser
- Apple iPad
(Android version no longer available)



Advantages of Starting Designs in FormIt

There are several advantages to starting a design using Autodesk FormIt:

- Create designs in a portable, digital format
- Incorporate real-world site information
- Use real building and environmental data
- Move designs into centralized storage
- Refine using Revit or other apps
- Use both 2D and 3D geometry creation tools
- Modify faces using push/pull, transform, Boolean c



Use Actual Location Data

Set the location of your project

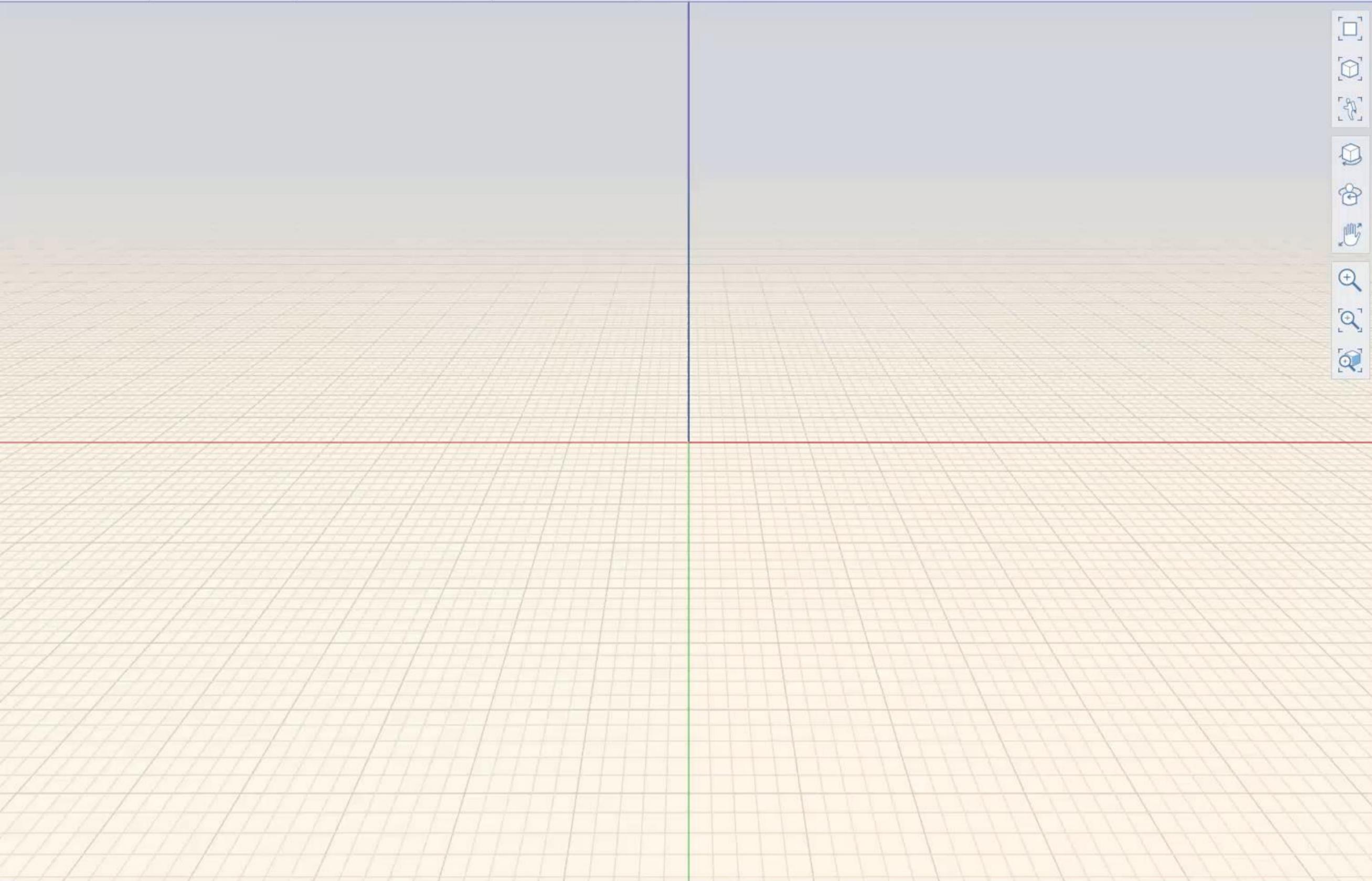
- Important for downstream accuracy
- Use scaled satellite image as background reference
- Display options
 - Map view/detailed aerial view
 - Detailed aerial view (labels on/off)
- FormIt now uses Bing rather than Google Maps
- No terrain view
- No 3D view
- No street view



**For demonstration purposes,
the following video was
created using an older
version of FormIt**



The project was built several years ago. The latest Bing satellite images include the finished building. This video was captured using the older Google Maps tools in Revit.



Properties

SKETCH PROPERTIES	
Location	<input type="text"/>
Gross Area	0 sq ft
Target Area	0 sq ft
Floor Area Ratio	<input type="text"/>
Site Area	0 sq ft



Working with Satellite Images

Include a satellite image for use as a background reference

- Import it when you establish the location
- Import it later





Specify the location

Map Satellite 500-598 Halleck St, Bellingham, WA 98225, USA

Import Satellite Image Set Location Only

A satellite map showing a residential area with a grid of streets. A red location pin is placed at the intersection of two streets. The map is displayed in a window titled 'Specify the location'.

Google

Map data ©2017 Google 5 m Terms of Use Report a map error

Properties

SKETCH PROPERTIES

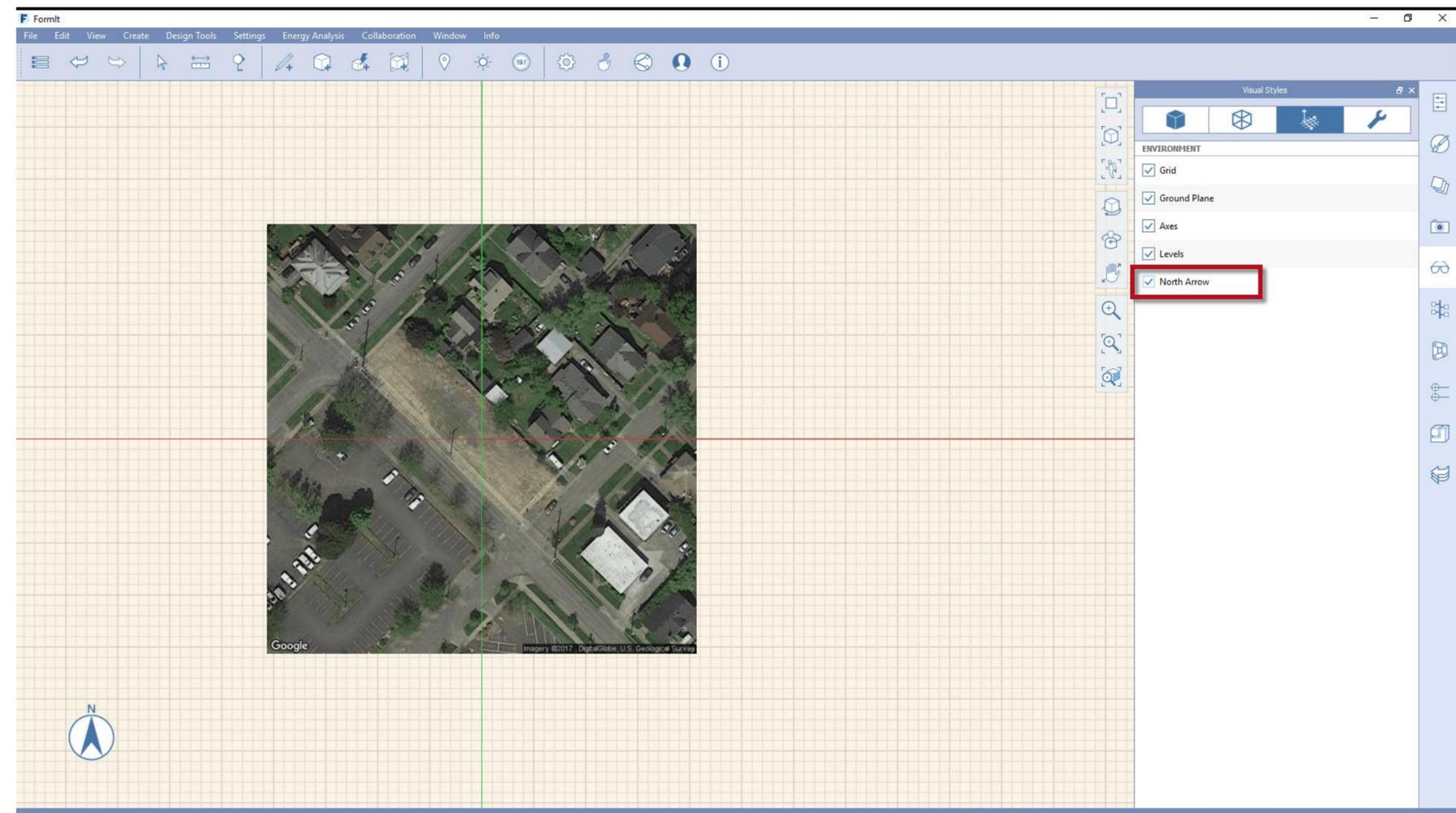
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Target Area	0 sq ft
Floor Area Ratio	
Site Area	0 sq ft

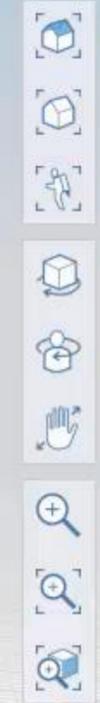
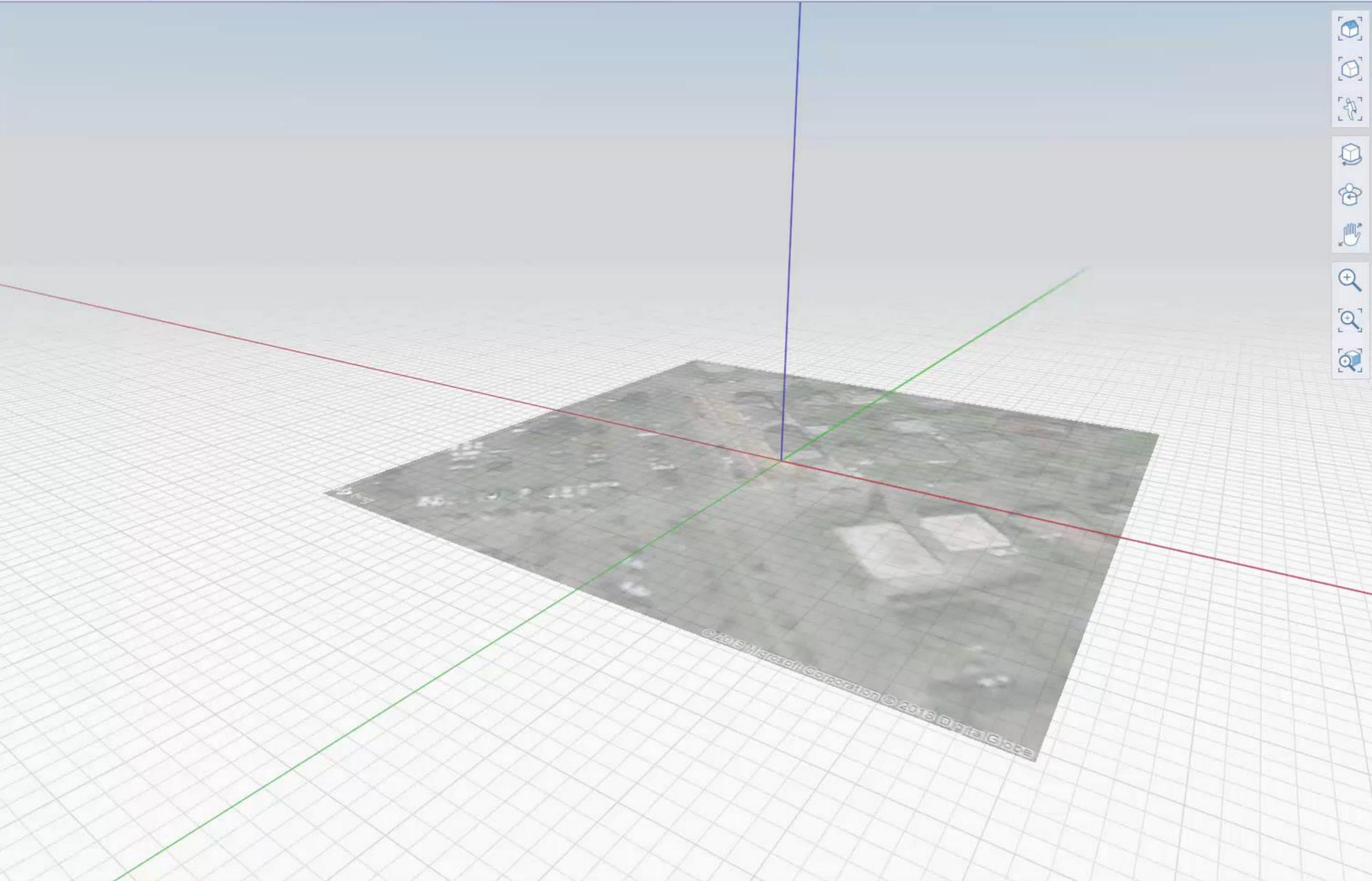


Toggling the North Arrow

Provides an interactive indicator of true north

- To toggle the North Arrow:
 1. In the **Palette**, switch to the **Visual Styles** tab.
 2. Select the **Environment** panel.
 3. Select the **North Arrow** checkbox.
-  **Tip:** Use the keyboard shortcut **D N**.





Properties

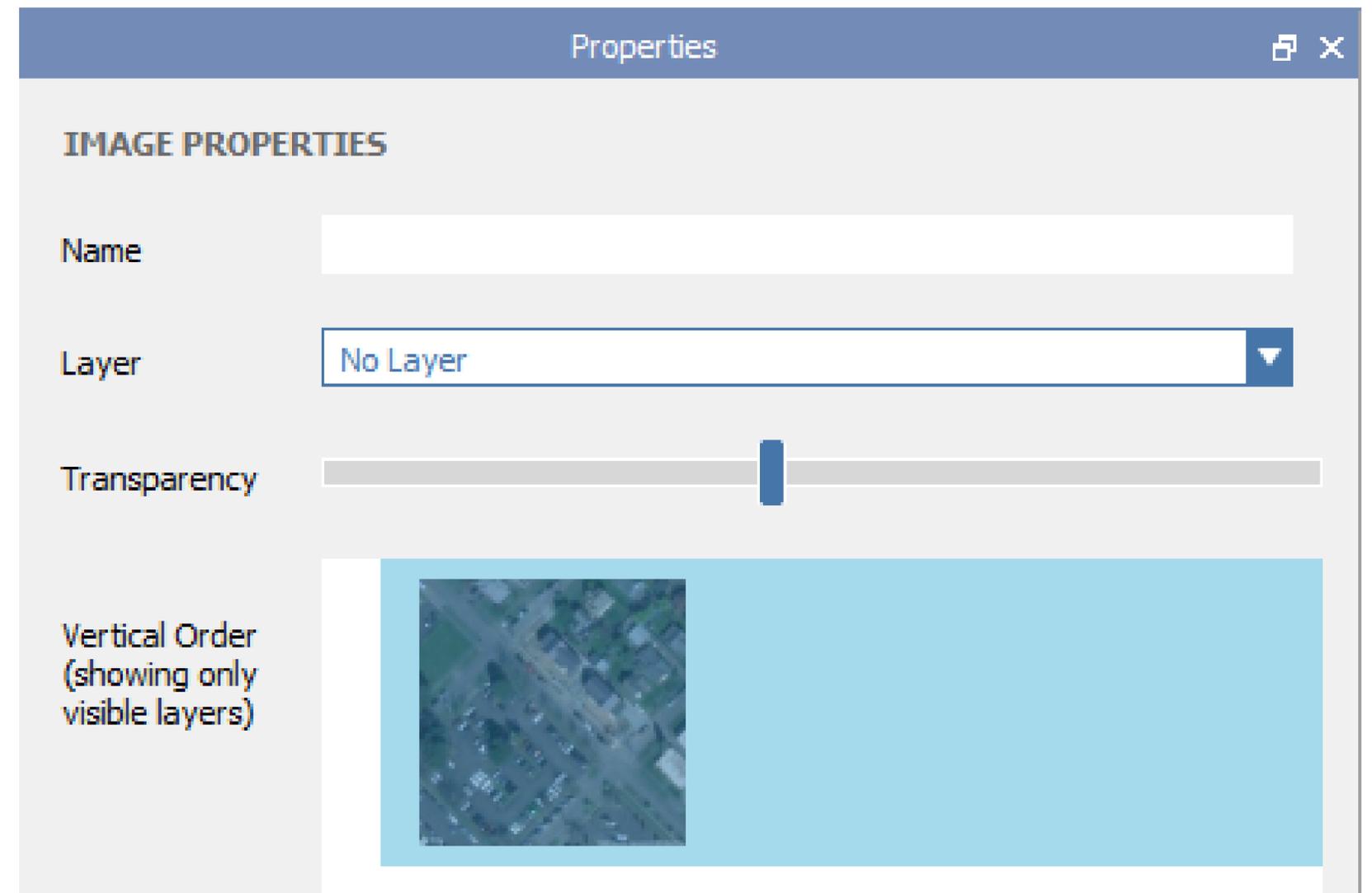
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Gross Area	0 sq ft
Target Area	0 sq ft
Floor Area Ratio	
Site Area	0 sq ft

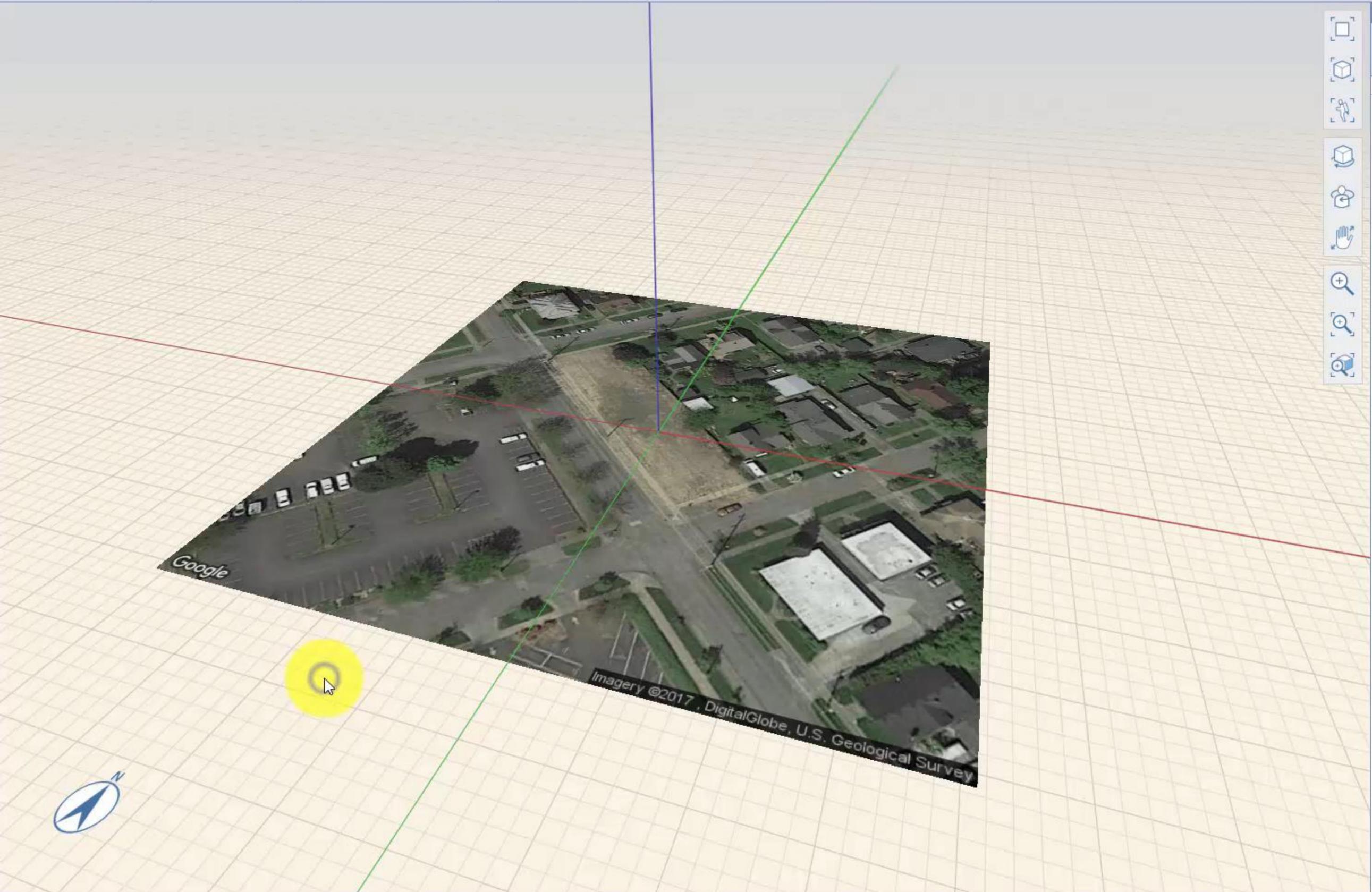


Adjusting the Transparency of the Satellite Image

So that the objects you model are prominently displayed

- To adjust the transparency:
 1. Double-click the satellite image.
 2. In the Palette, switch to the **Properties** tab.
 3. Adjust the **Transparency** slider.
-  **Tip:** You can also assign a name.





Visual Styles



ENVIRONMENT

- Grid
- Ground Plane
- Axes
- Levels
- North Arrow

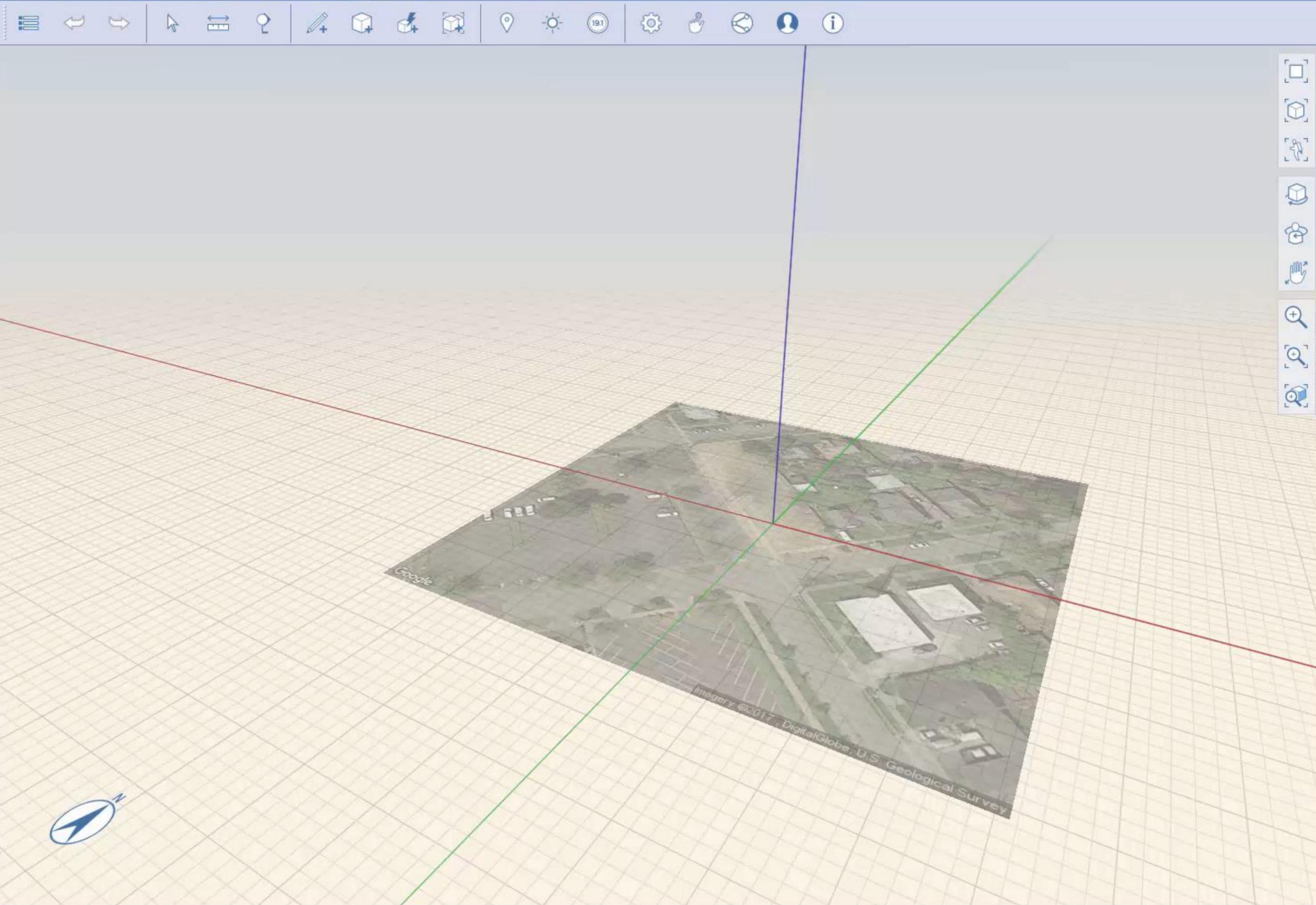


Adjusting the World Axes

So that the axes align with what you are modeling

- Initially, the default grid aligns with true north
- To adjust the world axes:
 1. Right-click on the ground plane to display a context menu.
 2. Click **Set axes**.
 3. Locate the origin of the axes.
 4. Drag the dot to align the X- or Y-axis with the property line.
 5. Click away from the axes to complete.





Properties

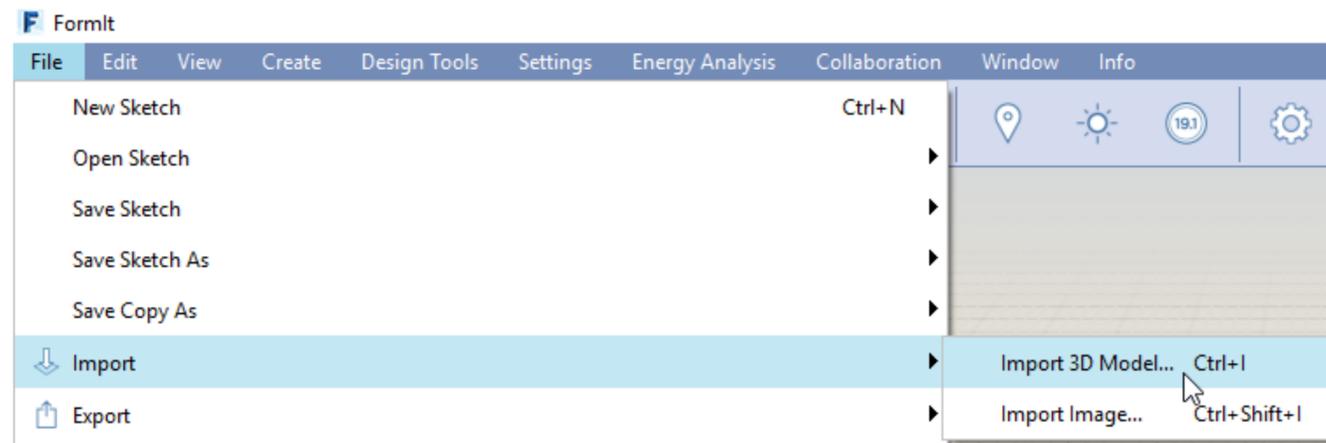
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Gross Area	0 sq ft
Target Area	0 sq ft
Floor Area Ratio	
Site Area	0 sq ft



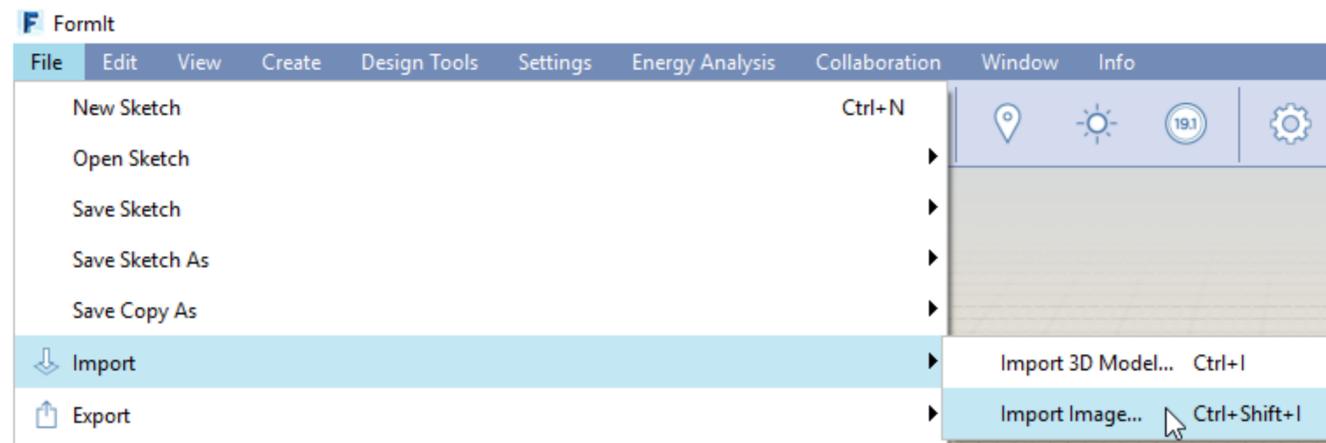
Incorporating Sketches from Other Sources

Capture design sketches

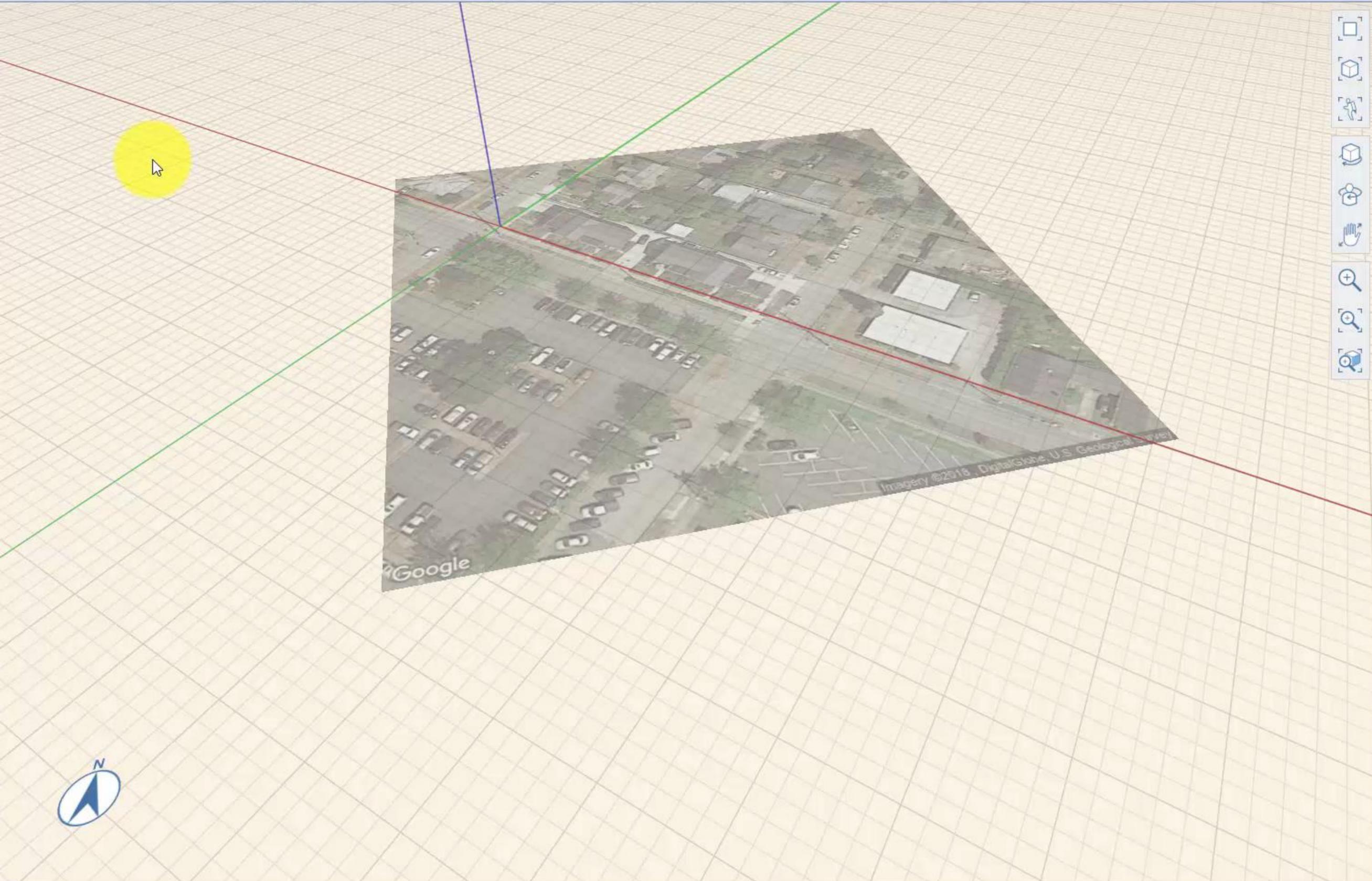
- Import DWG
 - Orient
 - Scale
 - Snap to geometry



- Import image file (.jpg or .png)
 - Orient
 - Scale
 - Trace over geometry



- Can also import OBJ, SAT, STL, and SketchUp SKP



Properties

SKETCH PROPERTIES

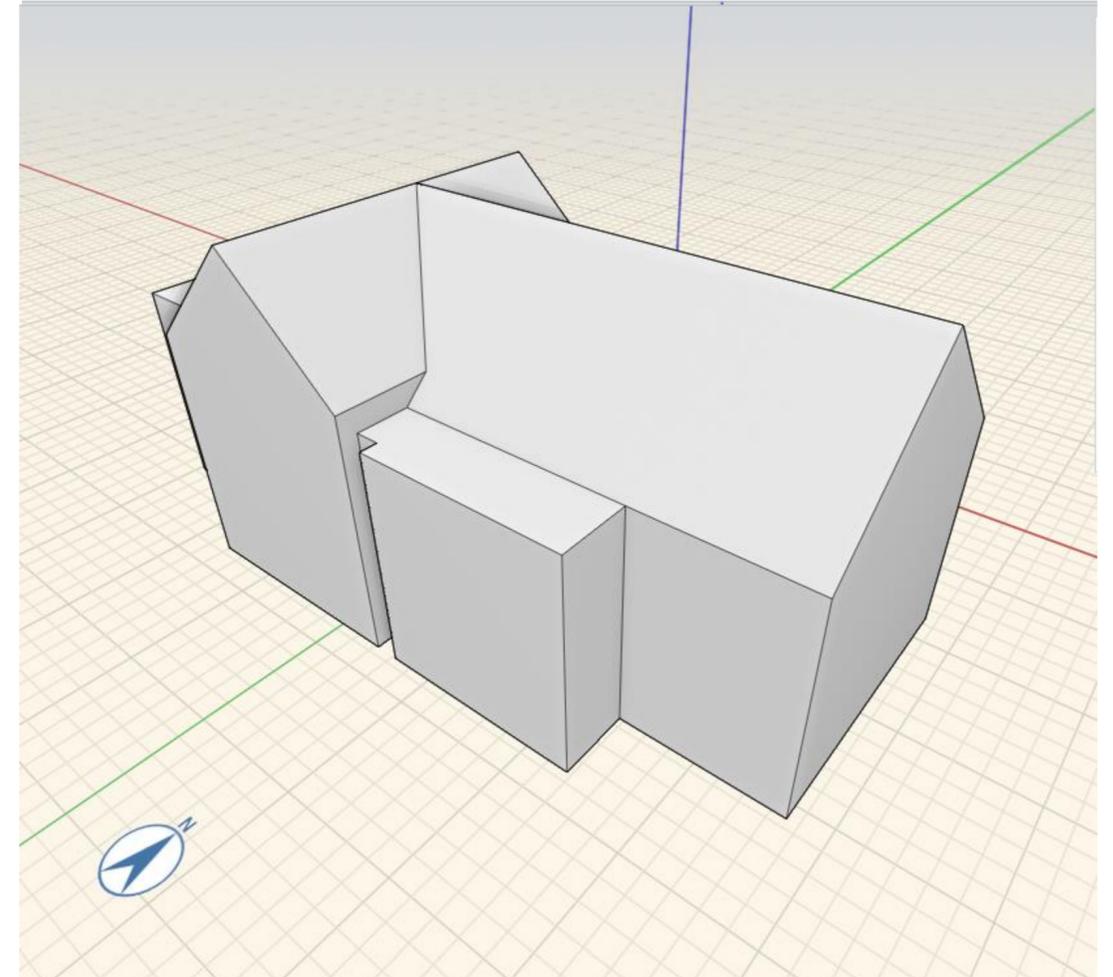
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Target Area	0 sq ft
Floor Area Ratio	
Site Area	0 sq ft

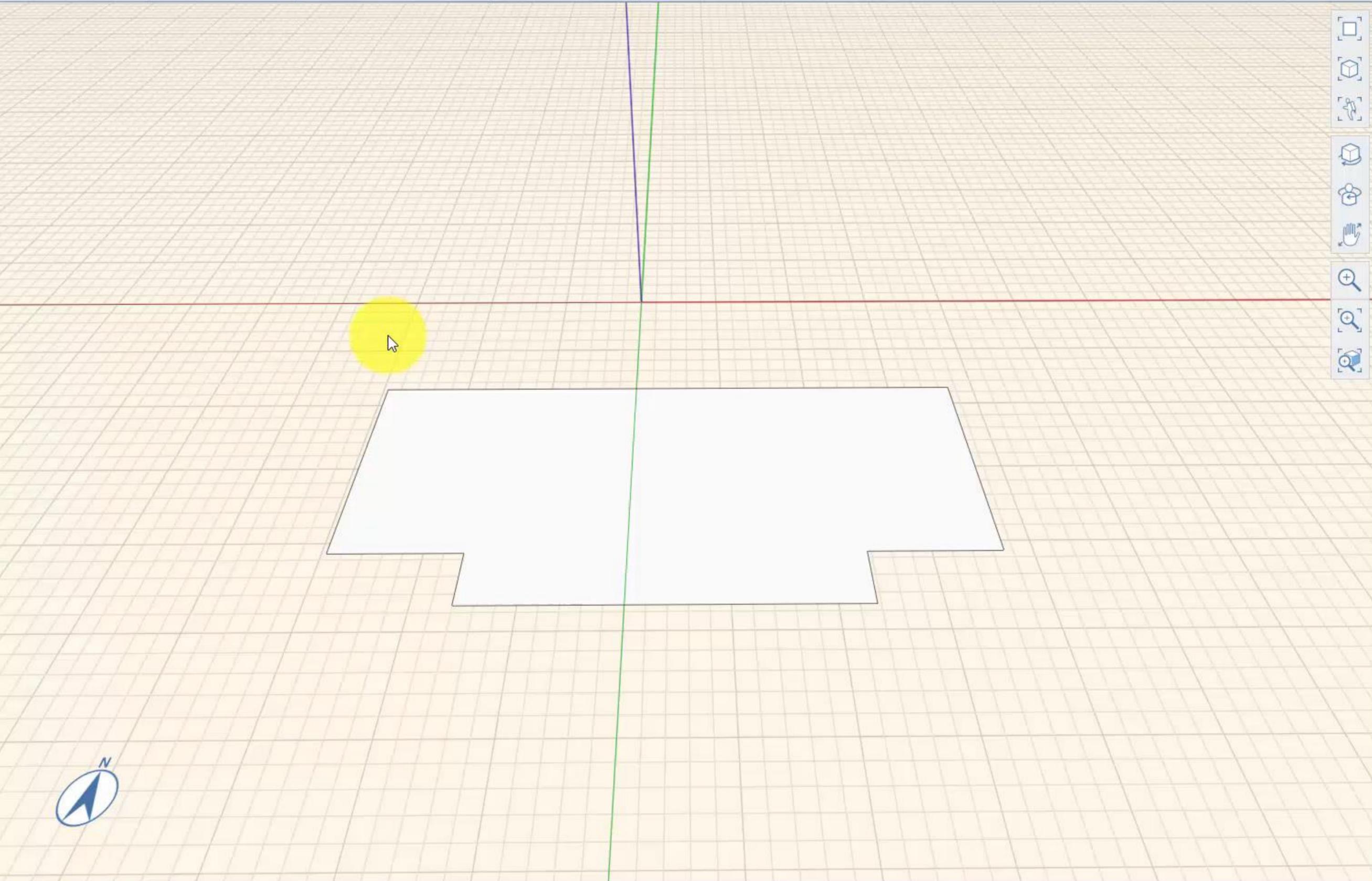


Creating the 3D Design Model

Use tools in FormIt to develop the 3D model

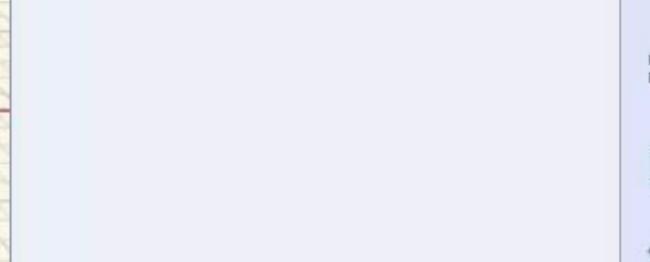
1. Sketch closed 2D boundary
2. Select face/edge/vertex and push/pull to create solid
3. Combine actions with snaps and references
 - Sketch lines to divide faces
 - Pull lines to create ridges
 - Adjust slope





Properties

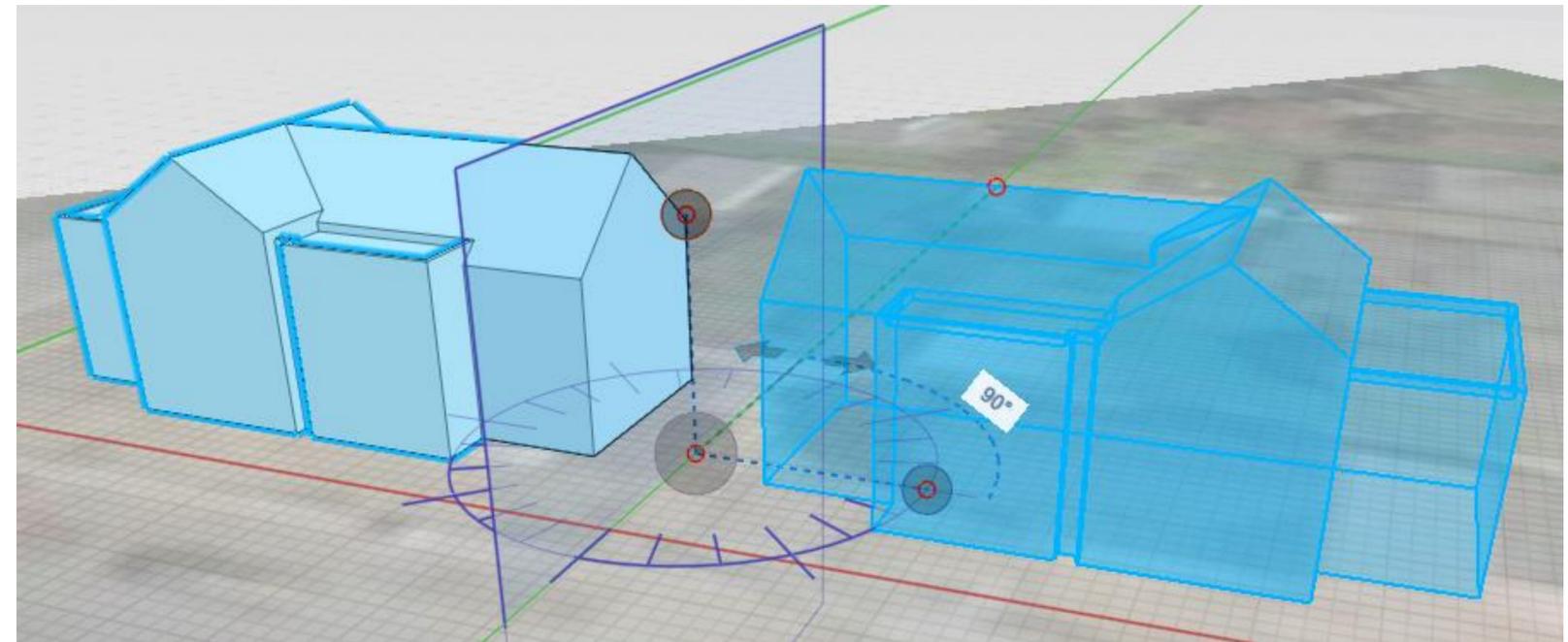
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Target Area	0 sq ft
Floor Area Ratio	<input type="text"/>
Site Area	0 sq ft

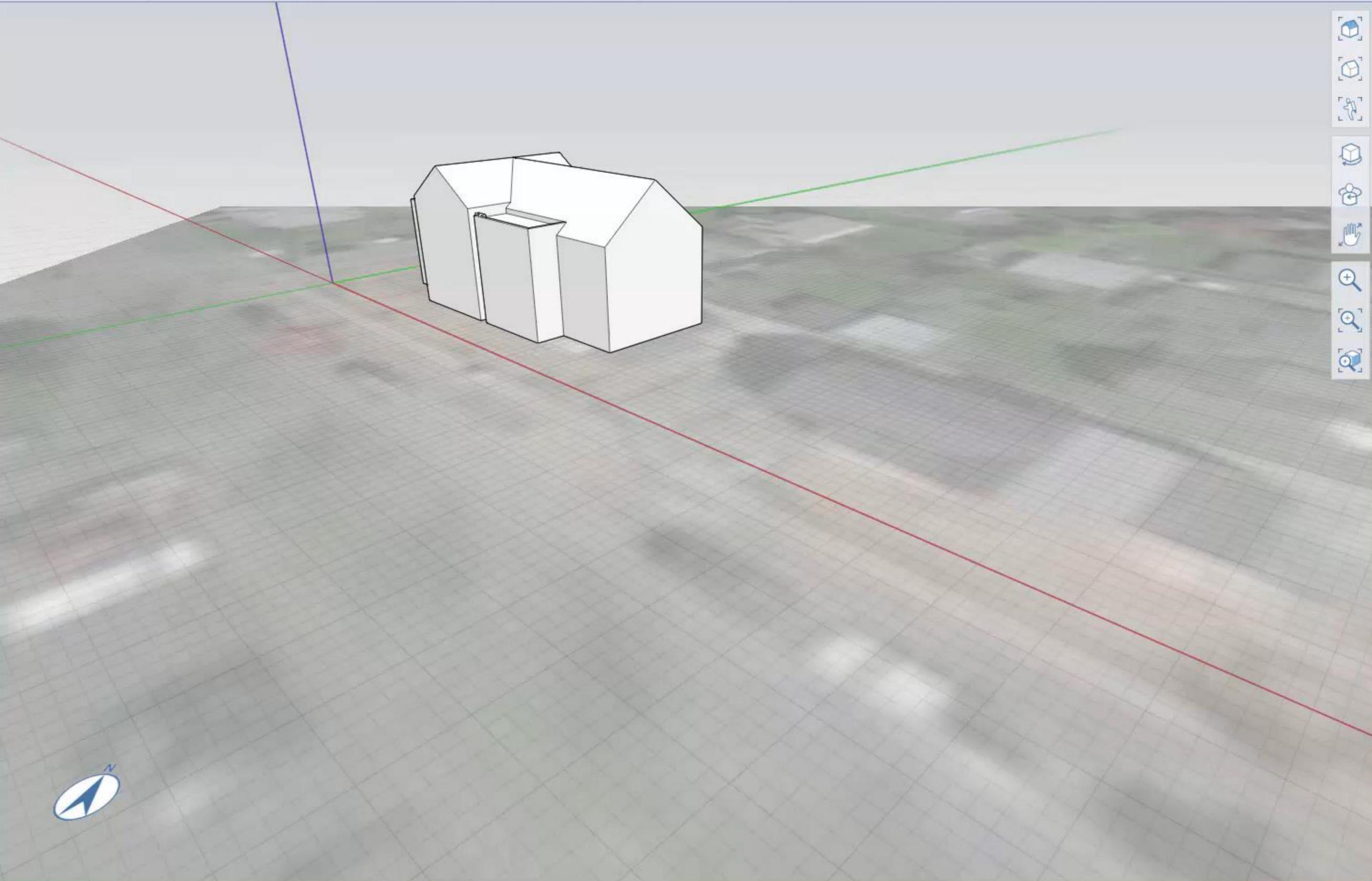


Make a Mirrored Copy of the Townhouse Model

You can work in either a 3D or town-down view

- To mirror the model:
 1. Double-click to select the entire model
 2. Right-click to display context menu
 3. Select **Mirror** tool
 4. Relocate the mirror widget
 5. Reorient the mirror plane
 6. Click in an empty spot (or **ESC**) to end





Properties

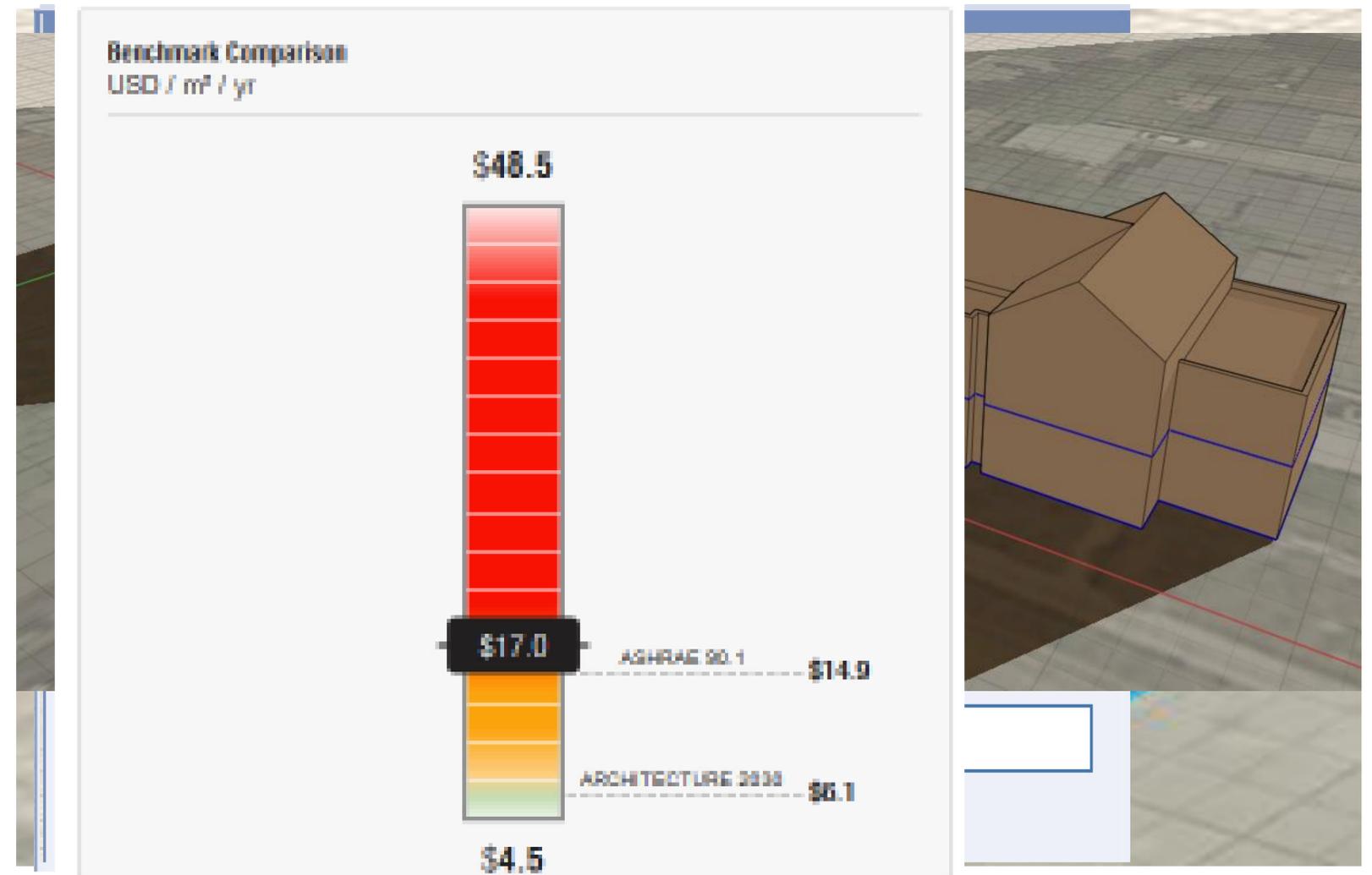
SKETCH PROPERTIES	
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Gross Area	0 sq ft
Target Area	0 sq ft
Floor Area Ratio	
Site Area	0 sq ft

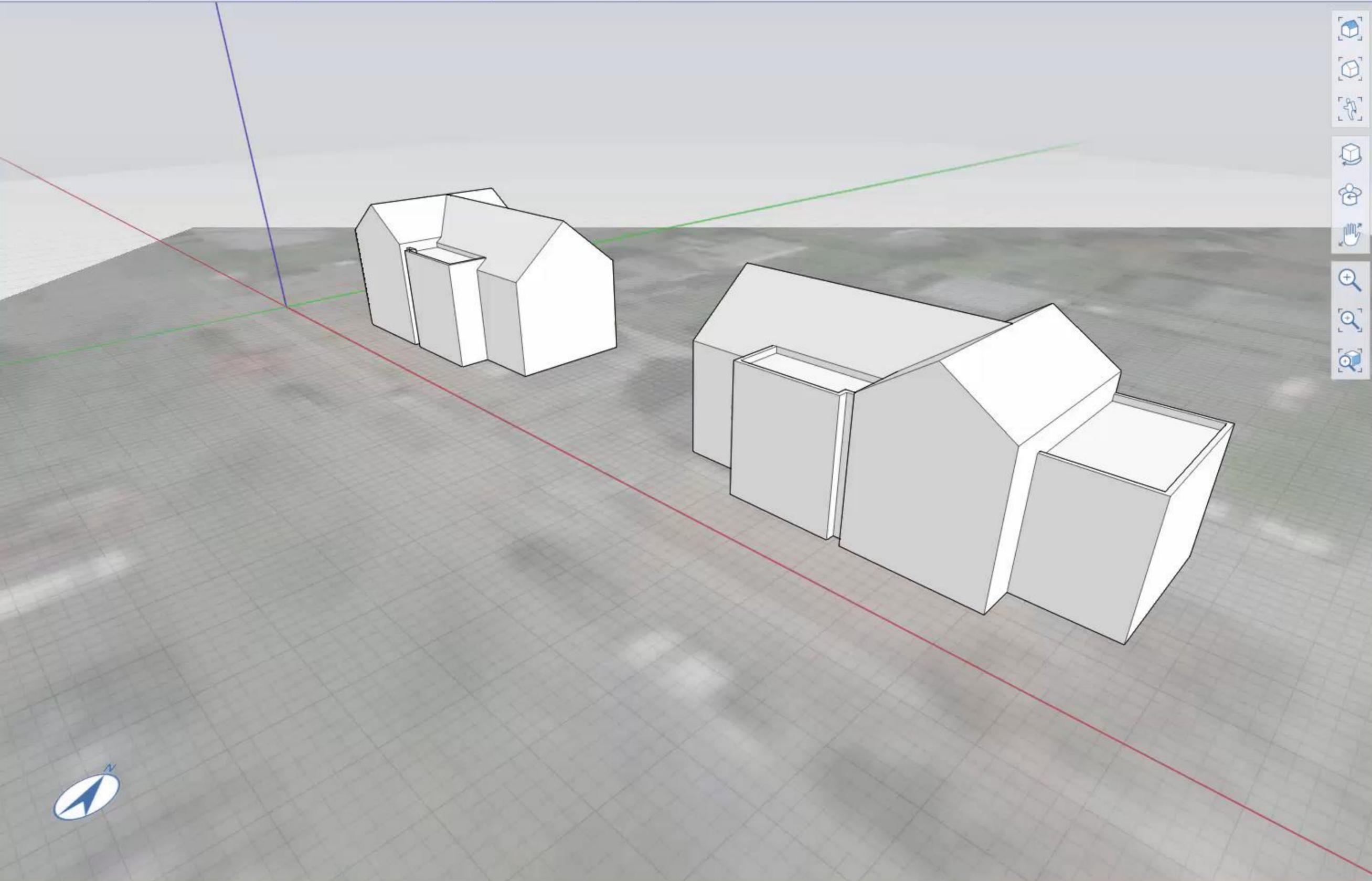


Properties and Levels

When you select an object, you immediately see information

- Each object in FormIt has properties
- Add levels
- Enable levels in the model
- Use levels to report area per level
- Name objects in the FormIt sketch
- Enter the site area to calculate the Floor Area Ratio
- Use FormIt to perform sun and shadow studies
- Run a preliminary energy analysis





Properties

SKETCH PROPERTIES	
Location	598 Halleck St, Bellingham, WA 98225, USA
Gross Area	0 sq ft
Target Area	0 sq ft
Floor Area Ratio	
Site Area	0 sq ft



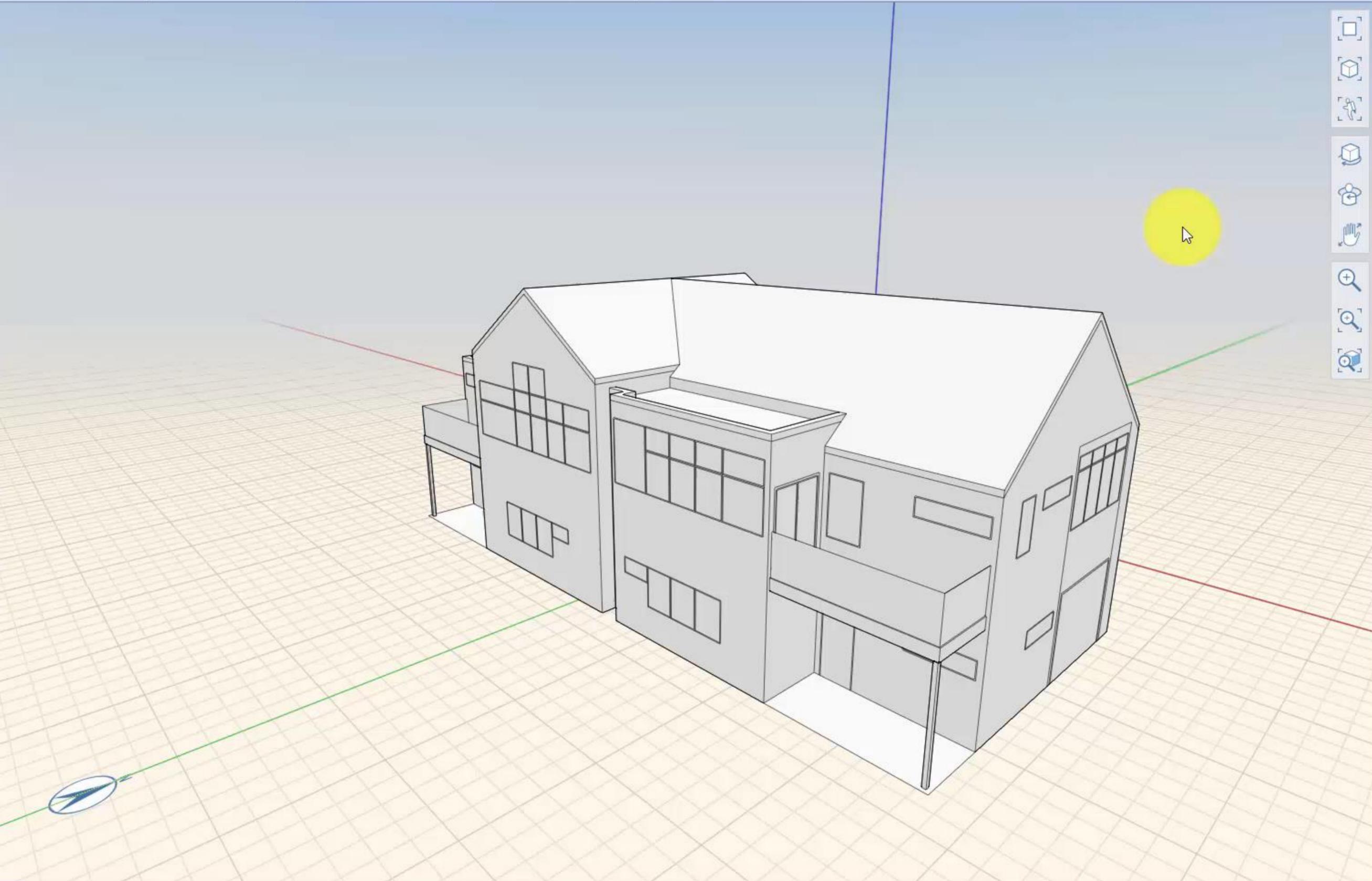
Creating a Presentation Model

You can embellish the FormIt model to create design presentations

- Sketch windows and doors
- Use drag-and-drop to add materials
- Add entourage objects



- You can even create realistic images and short animations
-  **Tip:** Save a version of the FormIt massing model for import into Revit, and then save a separate copy for use in developing the presentation model.



Properties

SKETCH PROPERTIES	
Location	<input type="text"/>
Gross Area	0 sq ft
Target Area	0 sq ft
Floor Area Ratio	<input type="text"/>
Site Area	0 sq ft



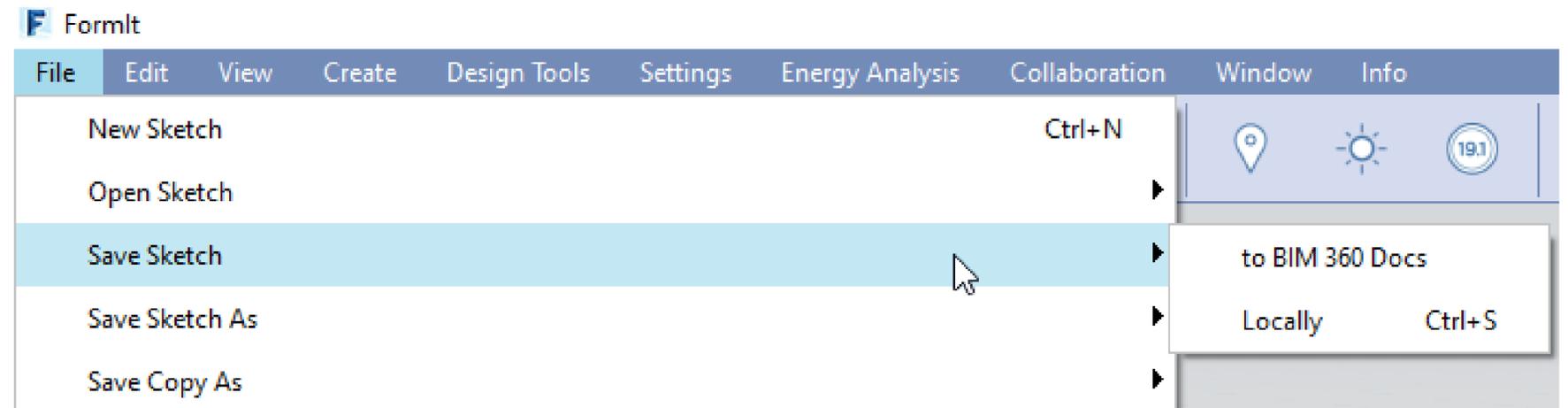


Hand the Project Off to Revit

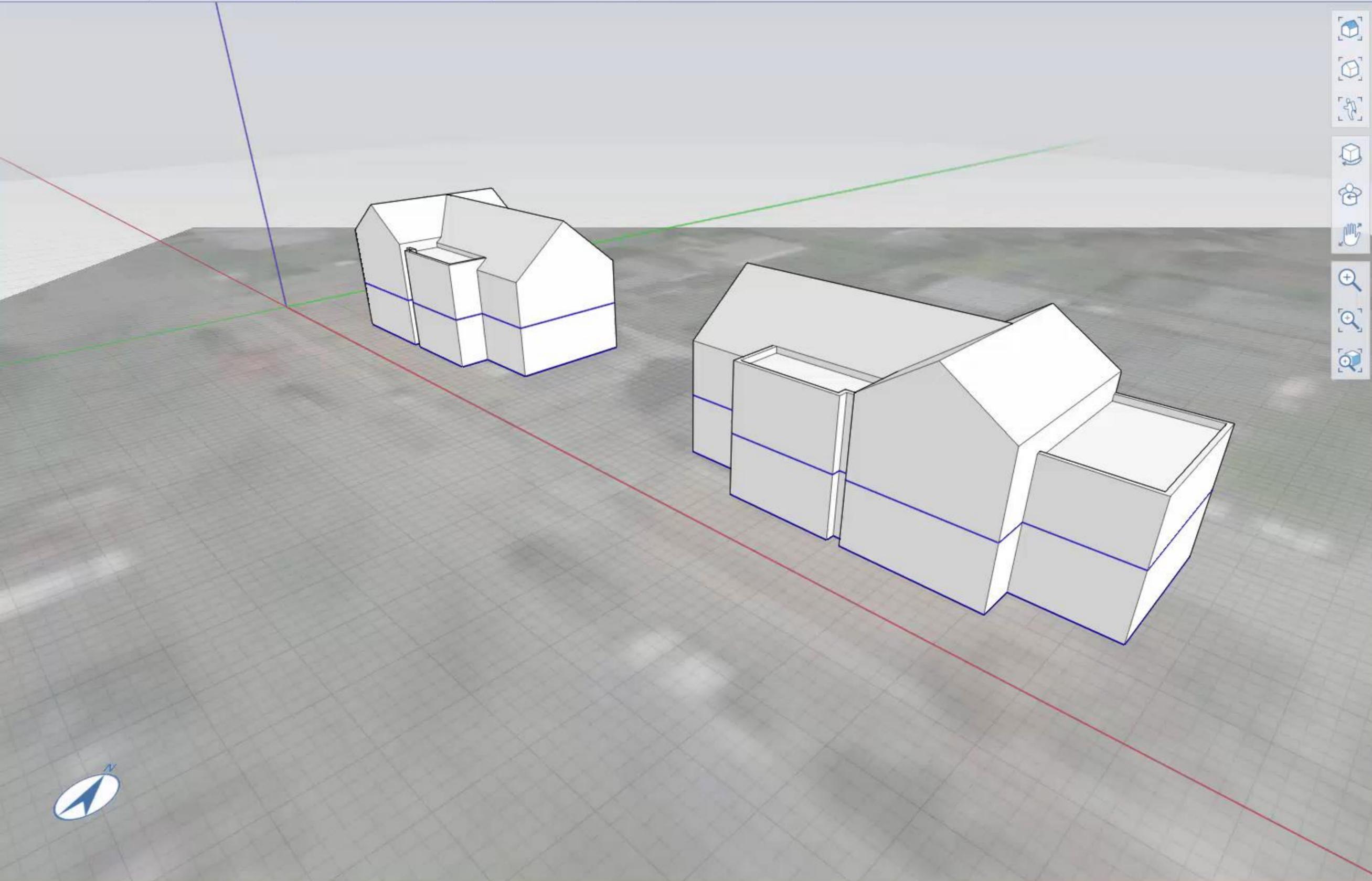
Saving the FormIt Model

Two different ways to hand the project off to Revit:

- Save the FormIt model locally
- Save the FormIt model to BIM 360 Docs



- **NOTE:** Starting with v17.0, FormIt uses BIM 360 Docs for cloud storage, replacing A360 Drive. BIM 360 Docs is Autodesk's premier cloud storage solution and brings new benefits to FormIt customers.
- Regardless of the method you use to save the FormIt sketch, it is saved as a FormIt AXM file.



Properties

SKETCH PROPERTIES

Location	598 Halleck St, Bellingham, WA 98225, USA
Gross Area	7340 sq ft
Target Area	7350 sq ft
Floor Area Ratio	0.7
Site Area	10500 sq ft





Staying Connected with BIM 360

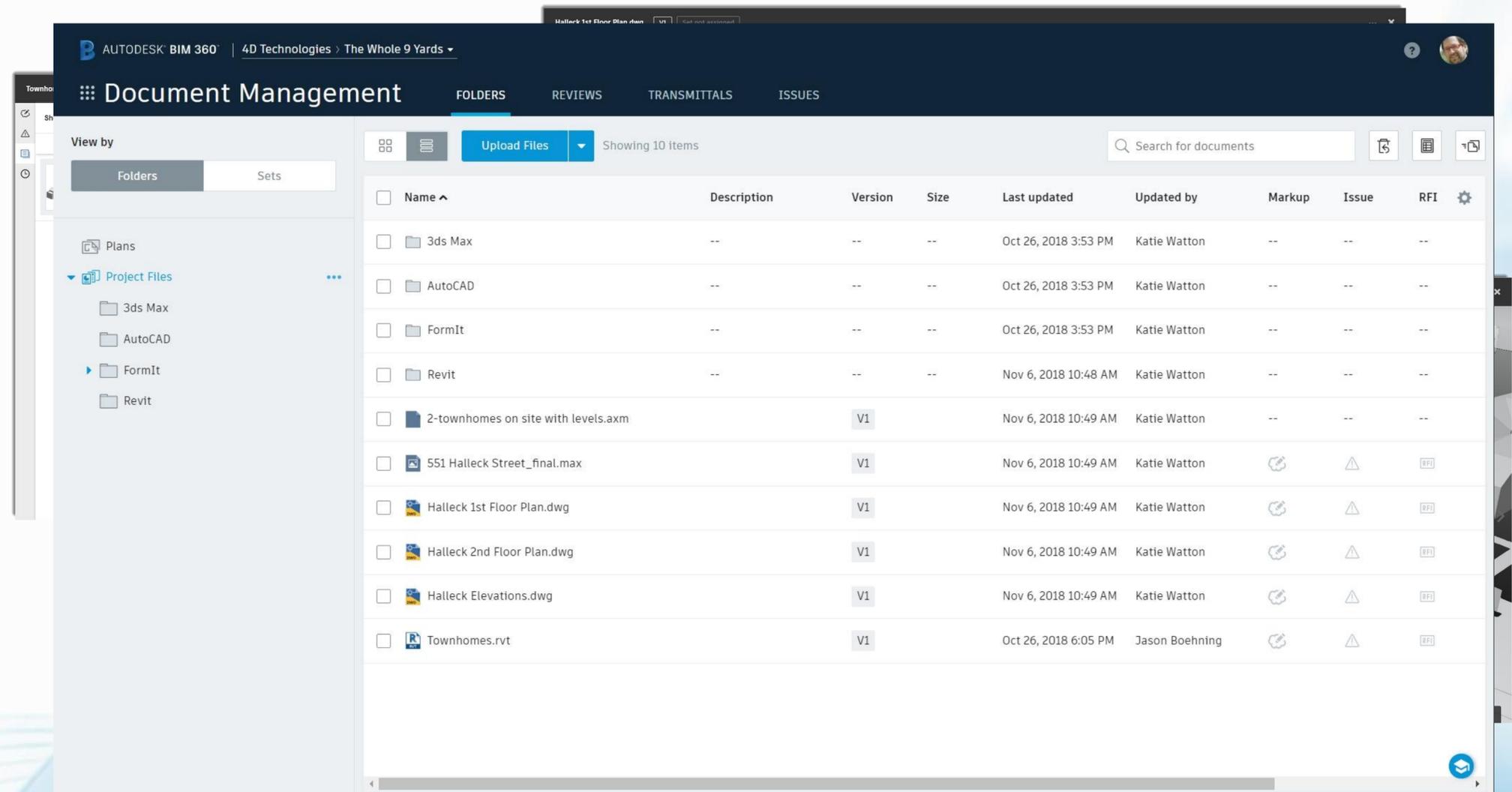
What is BIM 360?



CONCEPTUAL DESIGN	DETAIL DESIGN	CONSTRUCTION DOCUMENTATION	PRE-CONSTRUCTION	CONSTRUCTION	COMMISSION & HANDOVER
DOCUMENT MANAGEMENT					
DESIGN / DESIGN COLLABORATION					
	MODEL COORDINATION				
				FIELD MANAGEMENT	
				PROJECT MANAGEMENT	

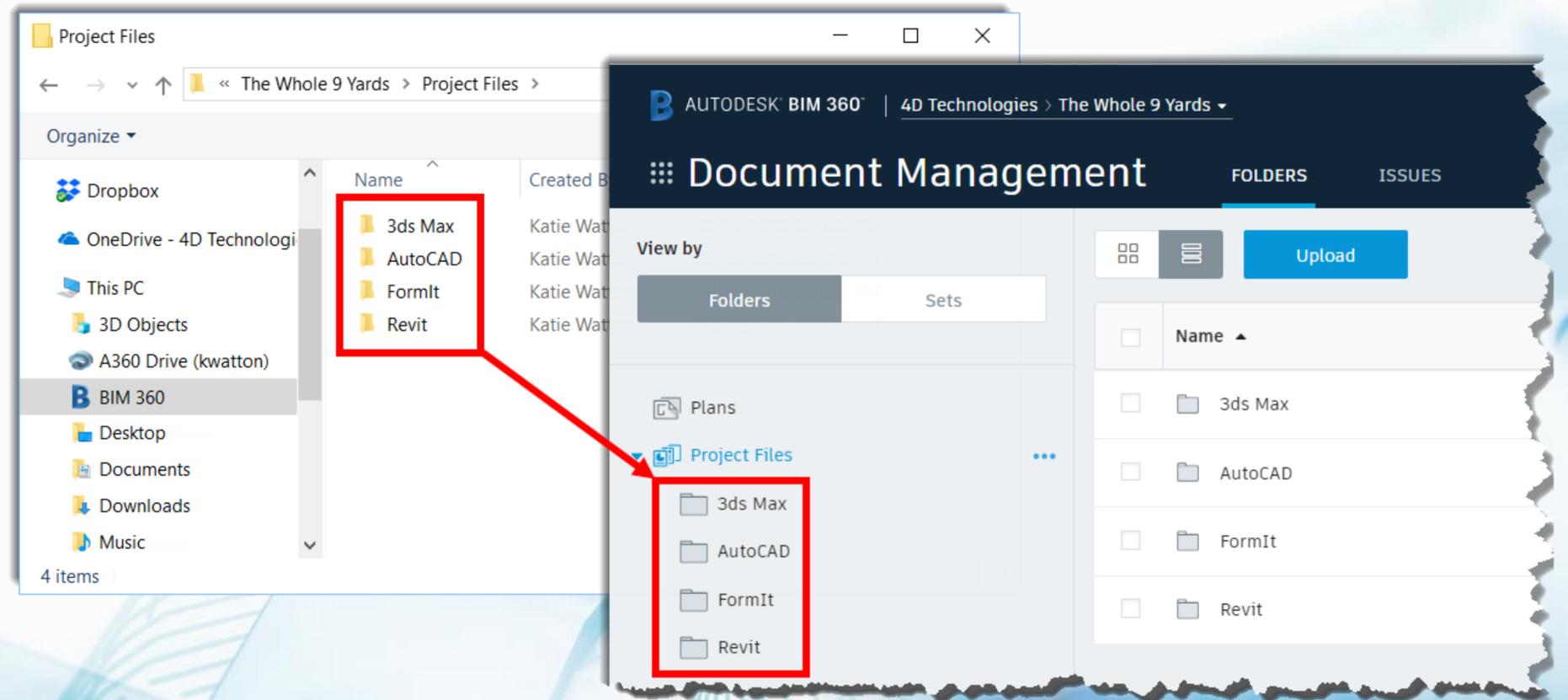
What is Document Management?

- Single source of truth
- Supports a wide range of file types
 - Plans folder
 - Project Files folder
- Folder permissions
- Create, manage, and share
 - Markups
 - Issues



Desktop Connector

- Manage BIM 360 from your desktop
 - View and open files
 - Upload and download files
 - Edit and delete files
 - Create and delete project folders
- Integrates with Project Files folder





Revit for Construction Documents

Revit Goals

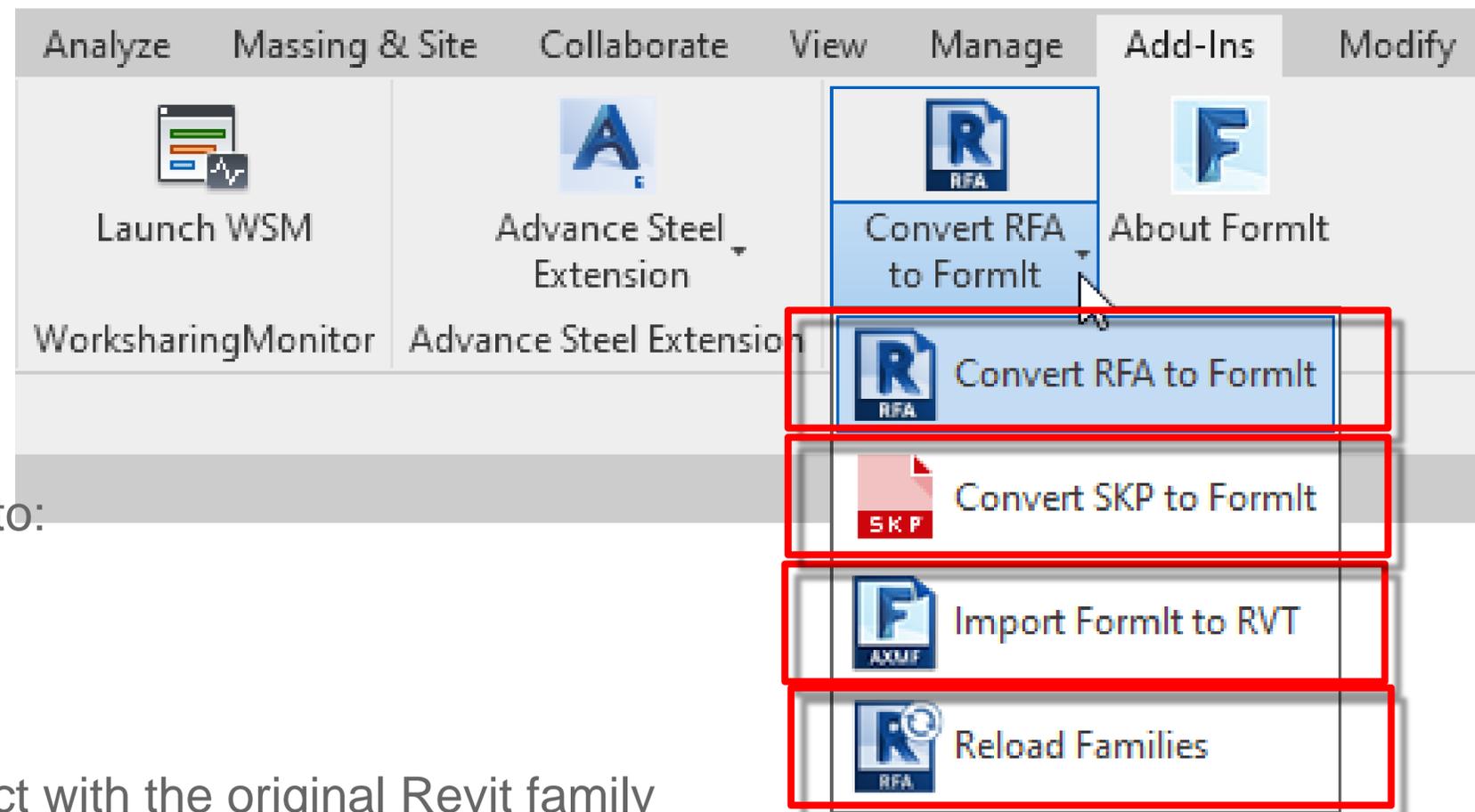
- Accurate model
 - Suitable for end goal
 - Comprehensive enough for 3ds Max
- Detailed construction documents



Importing FormIt Models into Revit

The FormIt Converter add-in for Revit

- Download and install the FormIt Converter add-in for Revit
- Use the FormIt Converter to Import FormIt to RVT



- You can also use the FormIt Converter to:
- Convert RFA to FormIt
- Convert SKP to FormIt
- Replace FormIt content in a Revit project with the original Revit family



MODELS

Open ...

New ...

FAMILIES

Open ...

New ...

Recent Files

4D Technologies

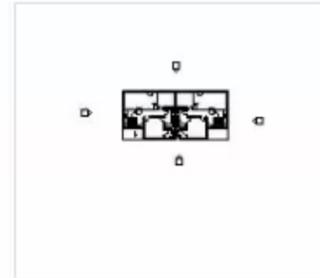
- AU Field Management ...
- Civil3D Project
- The Whole 9 Yards

Recent Files | Learn

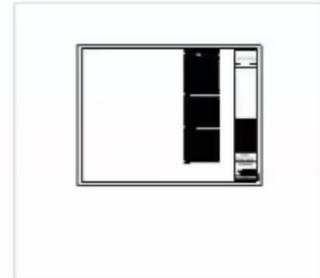
MODELS



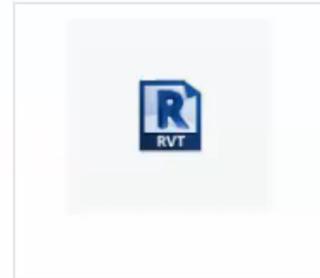
Townhomes



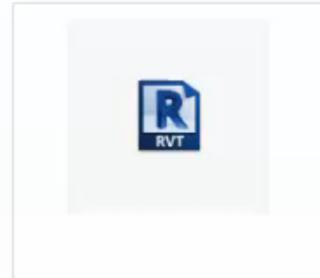
Imported from FormIt-01



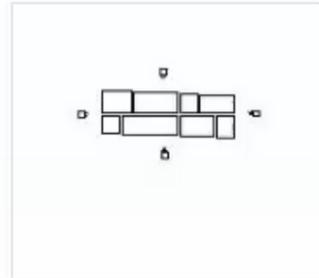
SchedulesAppearance_i



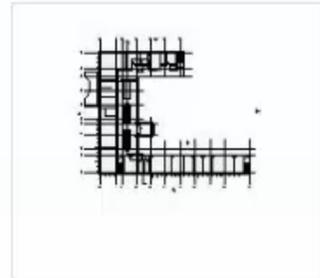
SchedulesFormatting_i



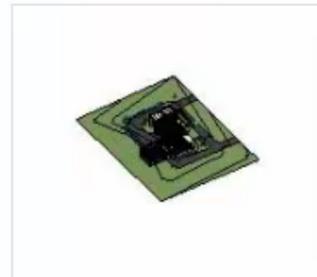
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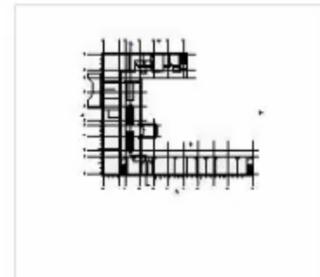
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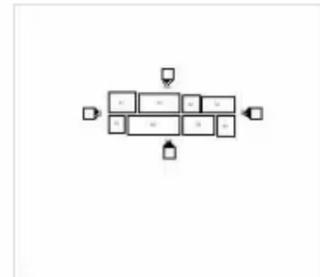
Schedules_i



2018 Small Medical Facility ...



Tags_i

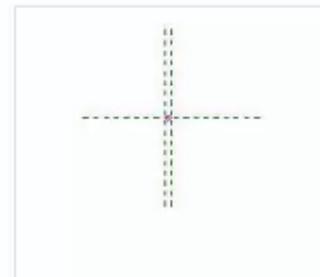


TagCalculatedValues_i

FAMILIES



View Title



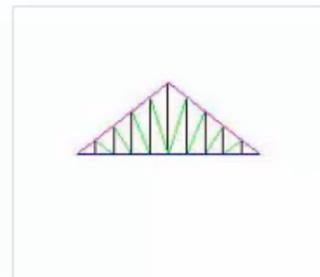
Temporary Section Head



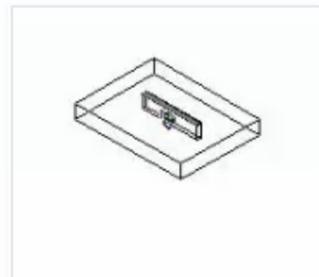
WindowTag



Sample Architecture Family



Sample Structure Family

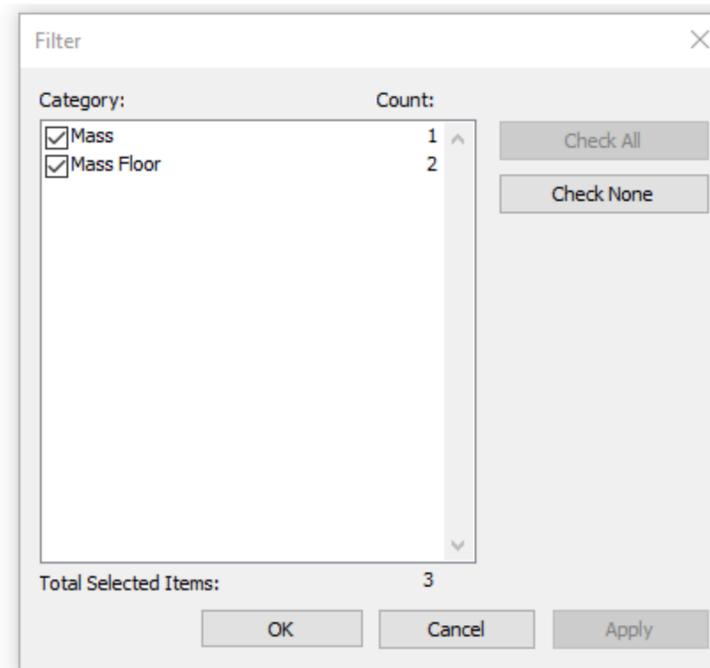
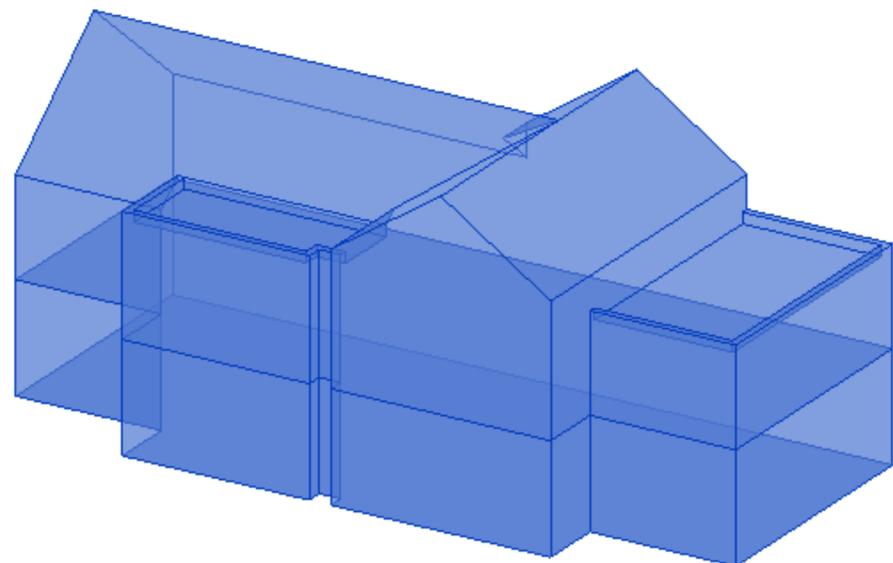


Sample Systems Family

Importing the FormIt Model (continued)

The FormIt model is imported into Revit as a *conceptual mass family*

- It does not contain any wall, roof, or floor elements
 - Use the Model by Face tools to place walls, roofs, and floors on faces in the mass
- Levels defined in the FormIt model are imported into Revit.
 - Can be used to create views
- You must show the mass form and floors before you can see them in Revit



File Architecture Structure Steel Systems Insert Annotate Analyze Massing & Site Collaborate View Manage Add-Ins Twinmotion Modify

Modify Batch Print Transmit a model Help About Check Manage View Launch WSM Advance Steel Extension Import Formit to RVT About Formit

Select Batch Print eTransmit Model Review WorksharingMonitor Advance Steel Extension Formit Converter

Properties Level 1

Floor Plan

Floor Plan: Level 1 Edit Type

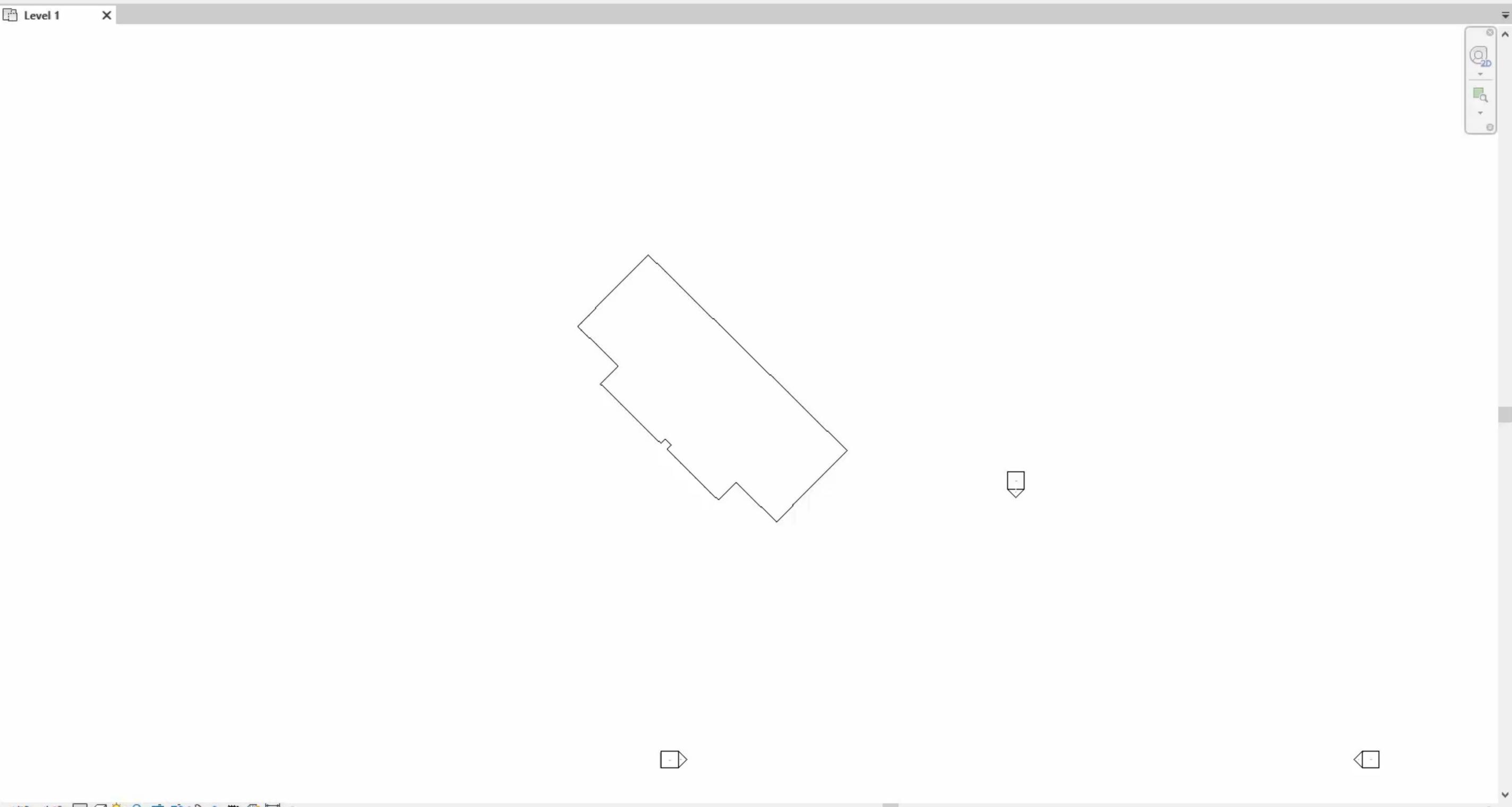
Graphics

View Scale	1/8" = 1'-0"
Scale Value 1:	96
Display Model	Normal
Detail Level	Coarse
Parts Visibility	Show Original
Visibility/Graphics ...	Edit...
Graphic Display Op...	Edit...
Orientation	Project North
Wall Join Display	Clean all wall joins
Discipline	Architectural
Show Hidden Lines	By Discipline
Color Scheme Loca...	Background
Color Scheme	<none>
System Color Sche...	Edit...
Default Analysis Dis...	None

Properties help Apply

Project Browser - Project4

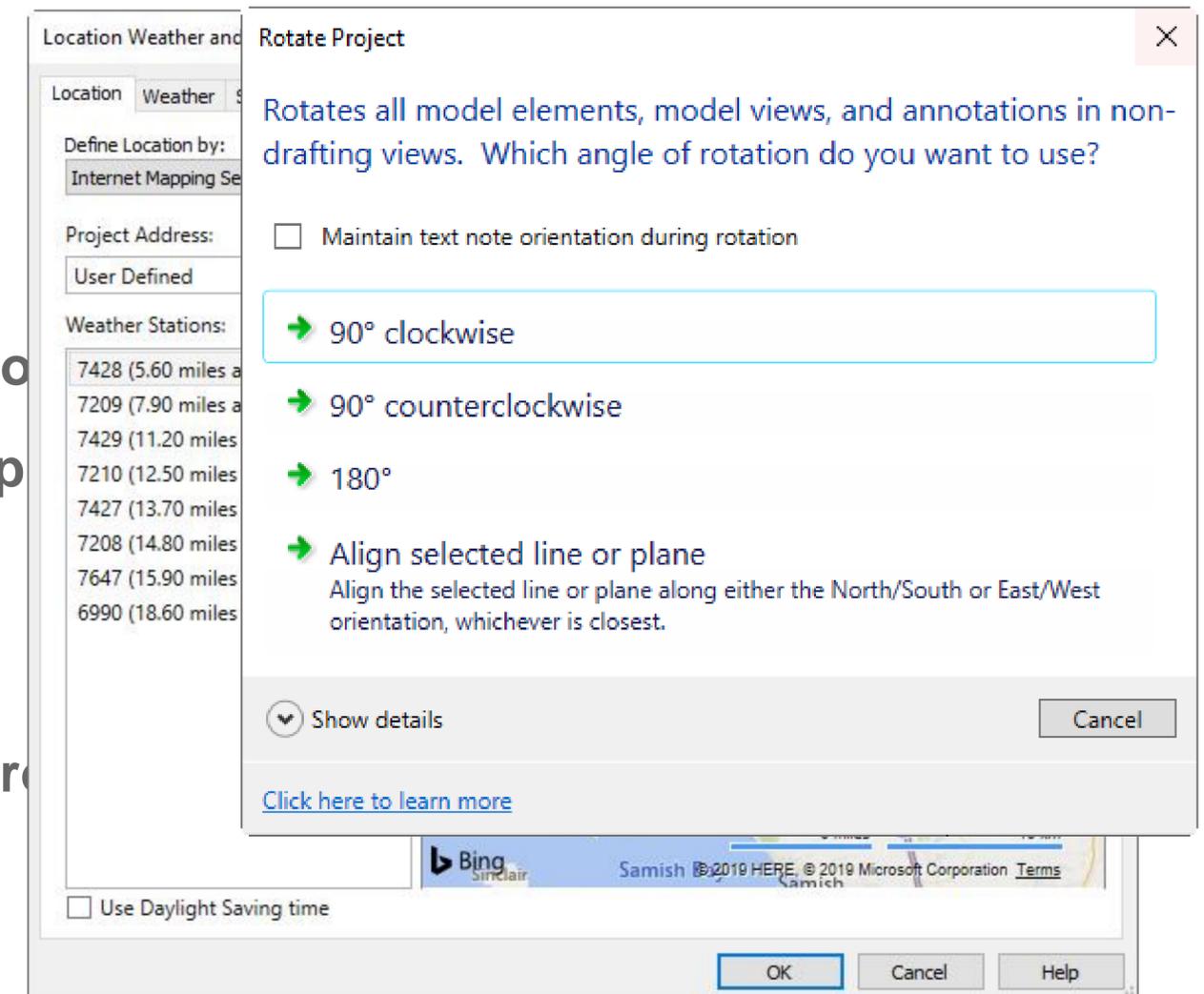
- Views (all)
 - Floor Plans
 - Level 1**
 - Level 2
 - Site
 - Ceiling Plans
 - Level 1
 - Level 2
 - 3D Views
 - Elevations (Building Elevation)
 - East
 - North
 - South
 - West
 - Legends
 - Schedules/Quantities (all)
 - Sheets (all)
 - Families
 - Groups
 - Revit Links



Setting Project North

If the location has already been defined in the FormIt model, the location in the Revit project will update when the FormIt model is imported.

- To see the location:
 1. Select **Manage > Project Location > Location**.
- To adjust project north:
 1. Select **Manage > Project Location > Position > Rotate Project**.
 2. In the **Rotate Project** dialog, select **Align selected line or plane**.
 3. Select an edge of the building footprint.
 4. Click **OK** to close the warning.
- In the **Properties** palette, toggle the **Orientation** between **Project North**.



File Architecture Structure Steel Systems Insert Annotate Analyze Massing & Site Collaborate View Manage Add-Ins Twinmotion Modify

Select
 Wall Door Window Component Column Roof Ceiling Floor Curtain System Mullion Railing Ramp Stair Model Text Model Line Model Group Room Room Separator Tag Room Area Area Boundary Tag Area By Face Shaft Wall Vertical Dormer Level Grid Set Show Ref Plane Viewer
 Build Circulation Model Room & Area Opening Datum Work Plane

Properties Level 1 (3D)

3D View Edit Type

3D View: (3D)

Graphics

View Scale	1/8" = 1'-0"
Scale Value 1:	96
Detail Level	Medium
Parts Visibility	Show Original
Visibility/Graphics ...	Edit...
Graphic Display Op...	Edit...
Discipline	Coordination
Show Hidden Lines	By Discipline
Default Analysis Dis...	None
Sun Path	<input type="checkbox"/>

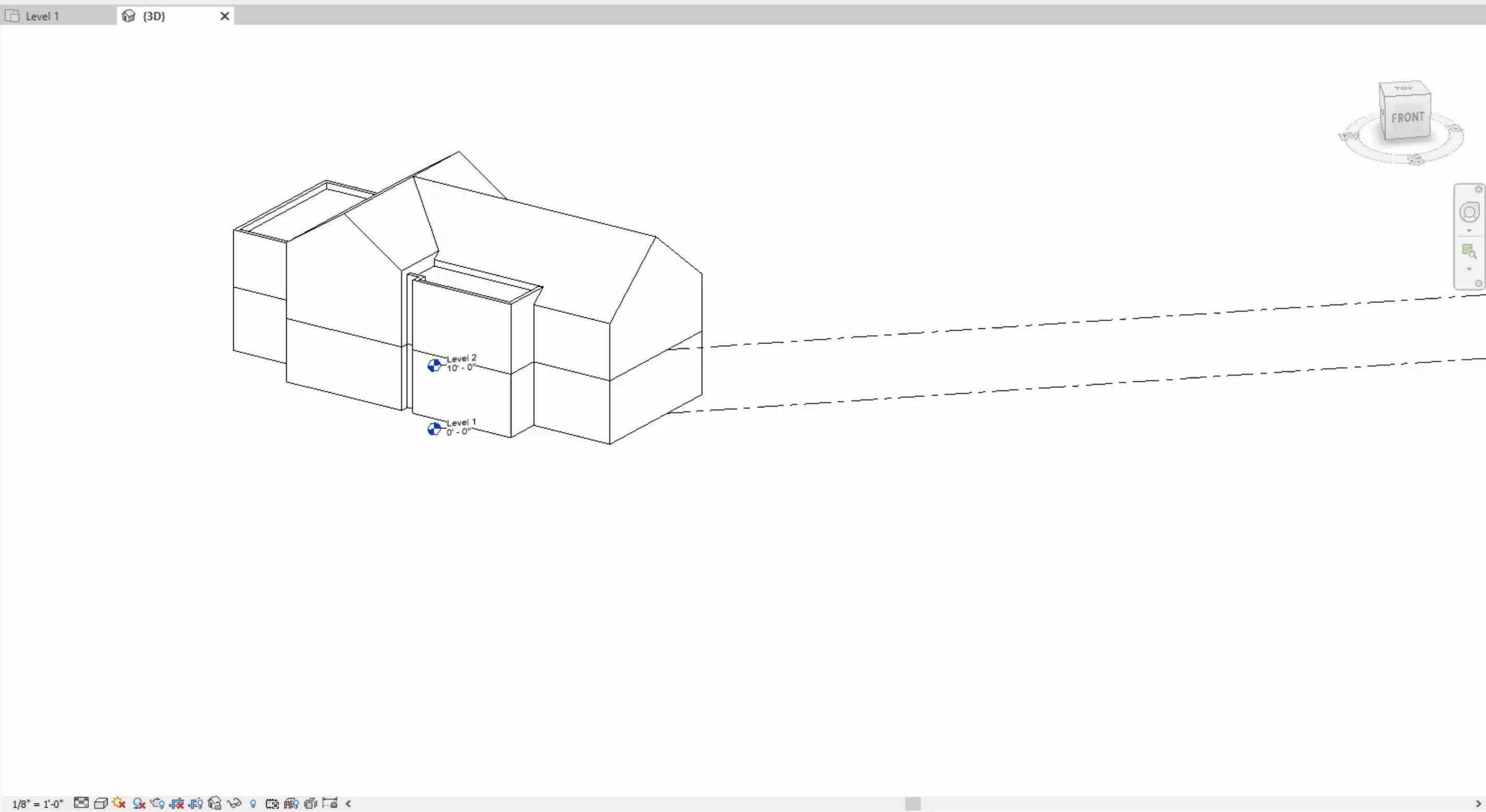
Extents

Crop View	<input type="checkbox"/>
Crop Region Visible	<input type="checkbox"/>
Annotation Crop	<input type="checkbox"/>
Far Clip Active	<input type="checkbox"/>
Far Clip Offset	1000' 0"

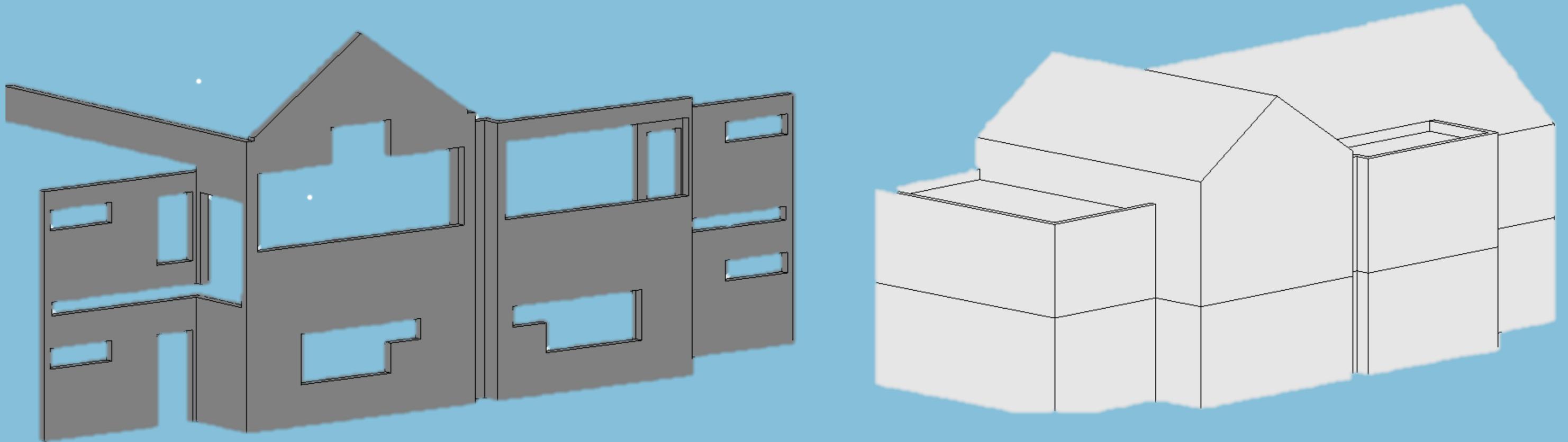
Apply

Project Browser - Project4

- Views (all)
 - Floor Plans
 - Level 1
 - Level 2
 - Site
 - Ceiling Plans
 - Level 1
 - Level 2
 - 3D Views
 - Elevations (Building Elevation)
 - East
 - North
 - South
 - West
 - Legends
 - Schedules/Quantities (all)
 - Sheets (all)
 - Families
 - Groups
 - Revit Links



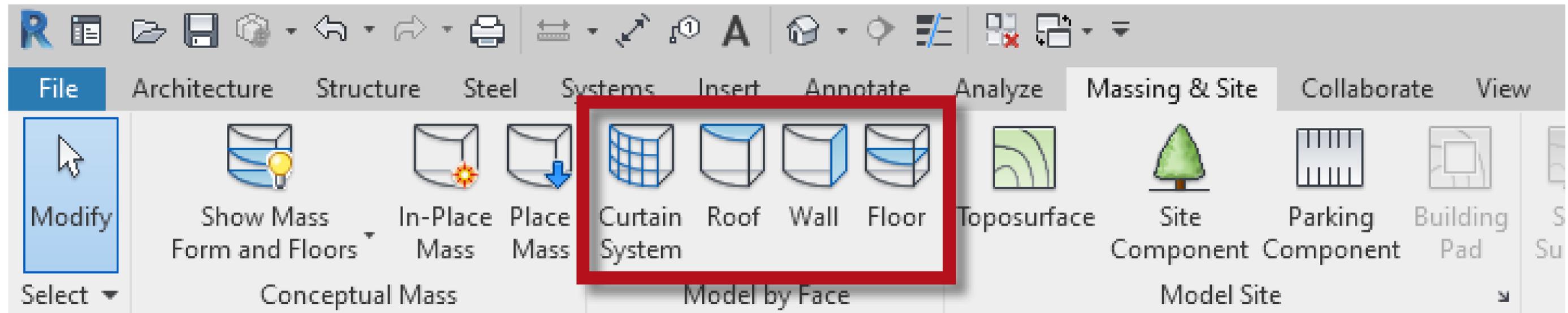
Why export the simple FormIt model rather than the one with openings?



Openings in the mass model would become openings in the Revit walls, preventing us from placing Revit windows and doors.

Developing the Revit Model

Using the Model by Face tools



- **Curtain System by Face** – creates a curtain system on the face of a mass or generic model
- **Roof by Face** – creates a roof using a non-vertical face on a mass
- **Wall by Face** – creates walls using faces of a mass or generic model
- **Floor by Face** – converts a mass floor into a floor of the building model

File Architecture Structure Steel Systems Insert Annotate Analyze Massing & Site Collaborate View Manage Add-Ins Twinmotion Modify

Modify Select Materials Object Snaps Styles Project Information Project Parameters Shared Parameters Global Parameters Transfer Project Standards Purge Unused Project Units Structural Settings MEP Settings Panel Schedule Templates Additional Settings Location Coordinates Position Project Location Design Options Add to Set Pick to Edit Main Model Manage Images Decal Types Starting View Phases Phasing Save Load Edit IDs of Selection Select by ID Warnings Inquiry Macro Manager Macro Security Macros Visual Programming Dynamo Dynamo Player

Properties Level 1 {3D} Site

Floor Plan

Floor Plan: Site Edit Type

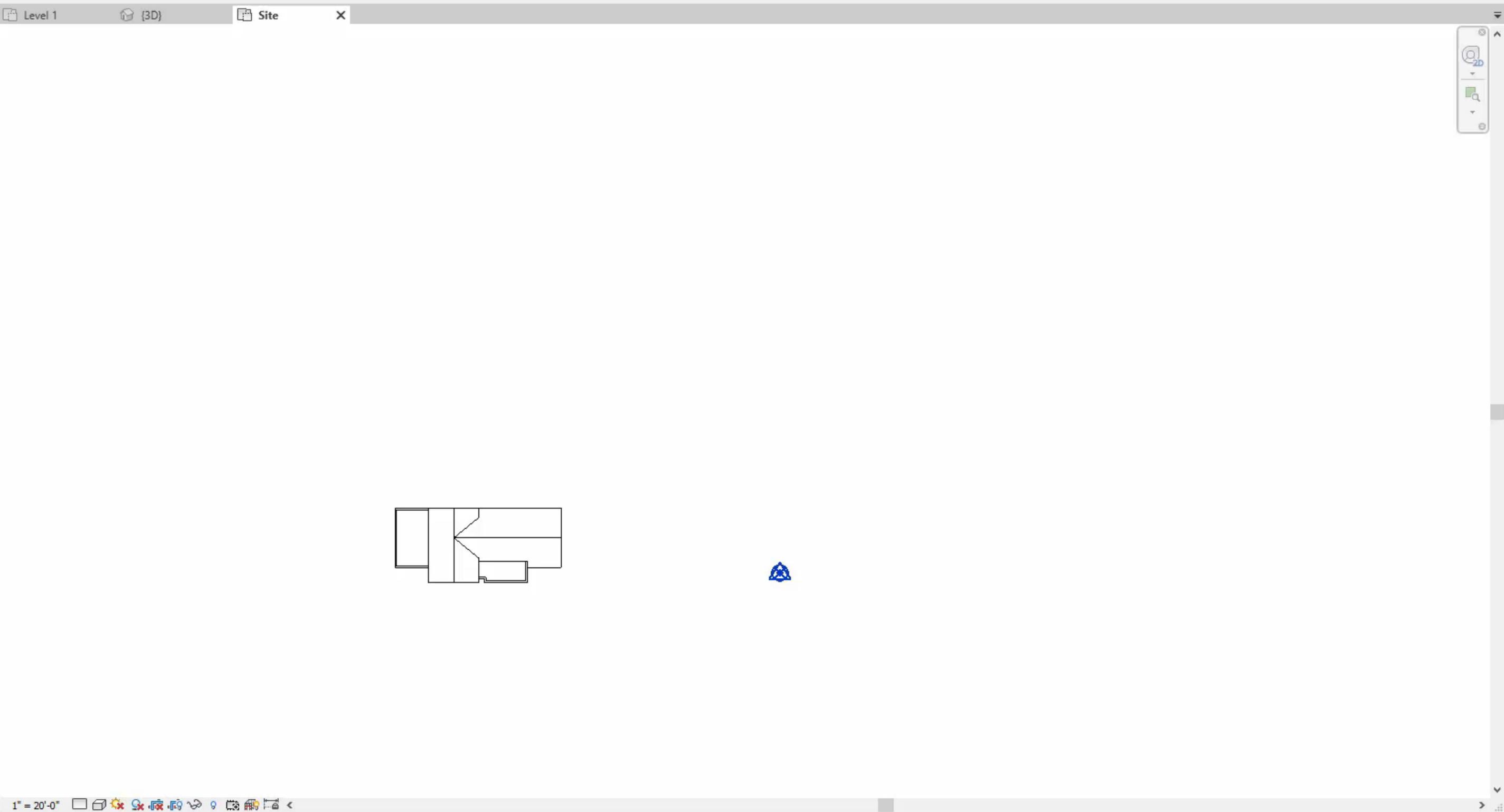
Graphics

View Scale	1" = 20'-0"
Scale Value 1:	240
Display Model	Normal
Detail Level	Coarse
Parts Visibility	Show Original
Visibility/Graphics ...	Edit...
Graphic Display Op...	Edit...
Orientation	Project North
Wall Join Display	Clean all wall joins
Discipline	Architectural
Show Hidden Lines	By Discipline
Color Scheme Loca...	Background
Color Scheme	<none>
System Color Sche...	Edit...
Default Analysis Dis...	None

Properties help Apply

Project Browser - Project4

- Families
 - Annotation Symbols
 - Cable Trays
 - Ceilings
 - Columns
 - Conduits
 - Curtain Panels
 - Curtain Systems
 - Curtain Wall Mullions
 - Detail Items
 - Division Profiles
 - Doors
 - Duct Systems
 - Ducts
 - Flex Ducts
 - Flex Pipes
 - Floors
 - Furniture
 - Generic Models
 - Mass
 - Parking
 - Pattern
 - Pipes



Problems with Joins and Connections

Can be tricky because wall profiles match face profiles.

Walls are not looking for parametric relations to other walls

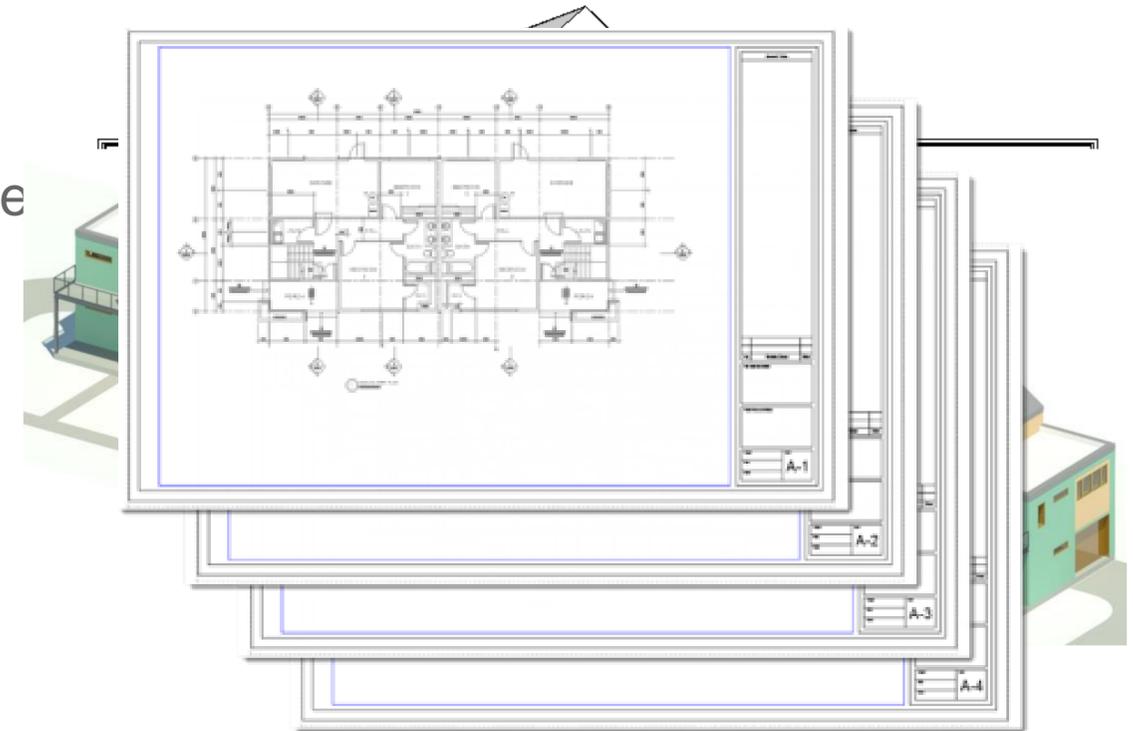
- Edit wall profiles
- Use Wall Joins tool
- Add additional elements/details
- Hide imperfections with facias, sweeps, reveals, etc.



Finishing the Revit Model

Use other tools in Revit to complete the model

- Create additional wall types
- Split exterior walls in appropriate locations and change the wall type
- Add windows, doors, and other building elements
- Link 2D sketches and use them to add interior walls
- Create construction documents
- Add paving and ground surfaces and render the model in Revit



A background image showing a 3D wireframe architectural rendering of a building structure, rendered in a light blue color. The structure consists of several interconnected volumes and surfaces, some of which are still in a wireframe state, suggesting a design or construction phase. The overall aesthetic is clean and technical.

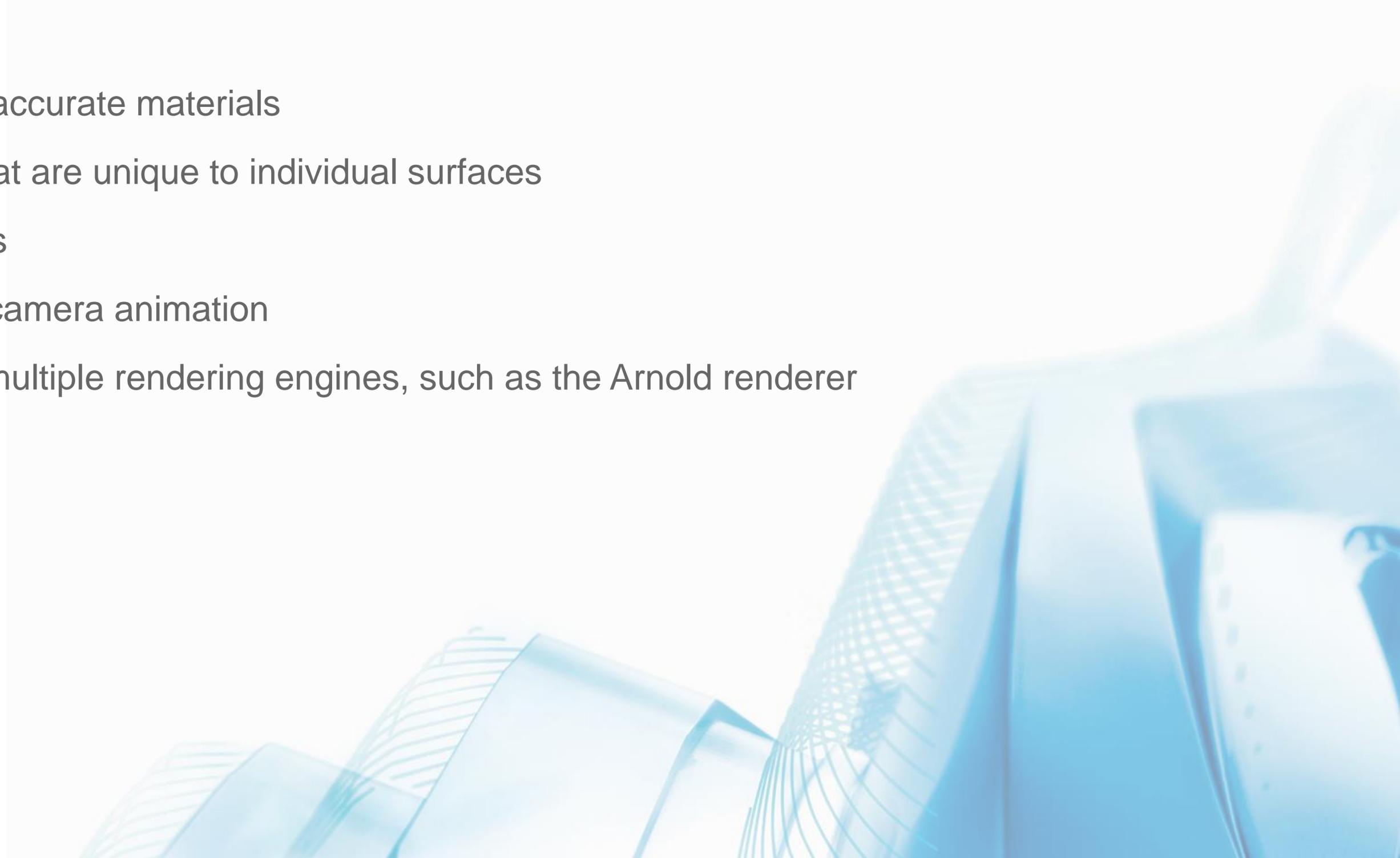
Hand the Project Off to 3ds Max

Revit to 3ds Max for the Final Touches

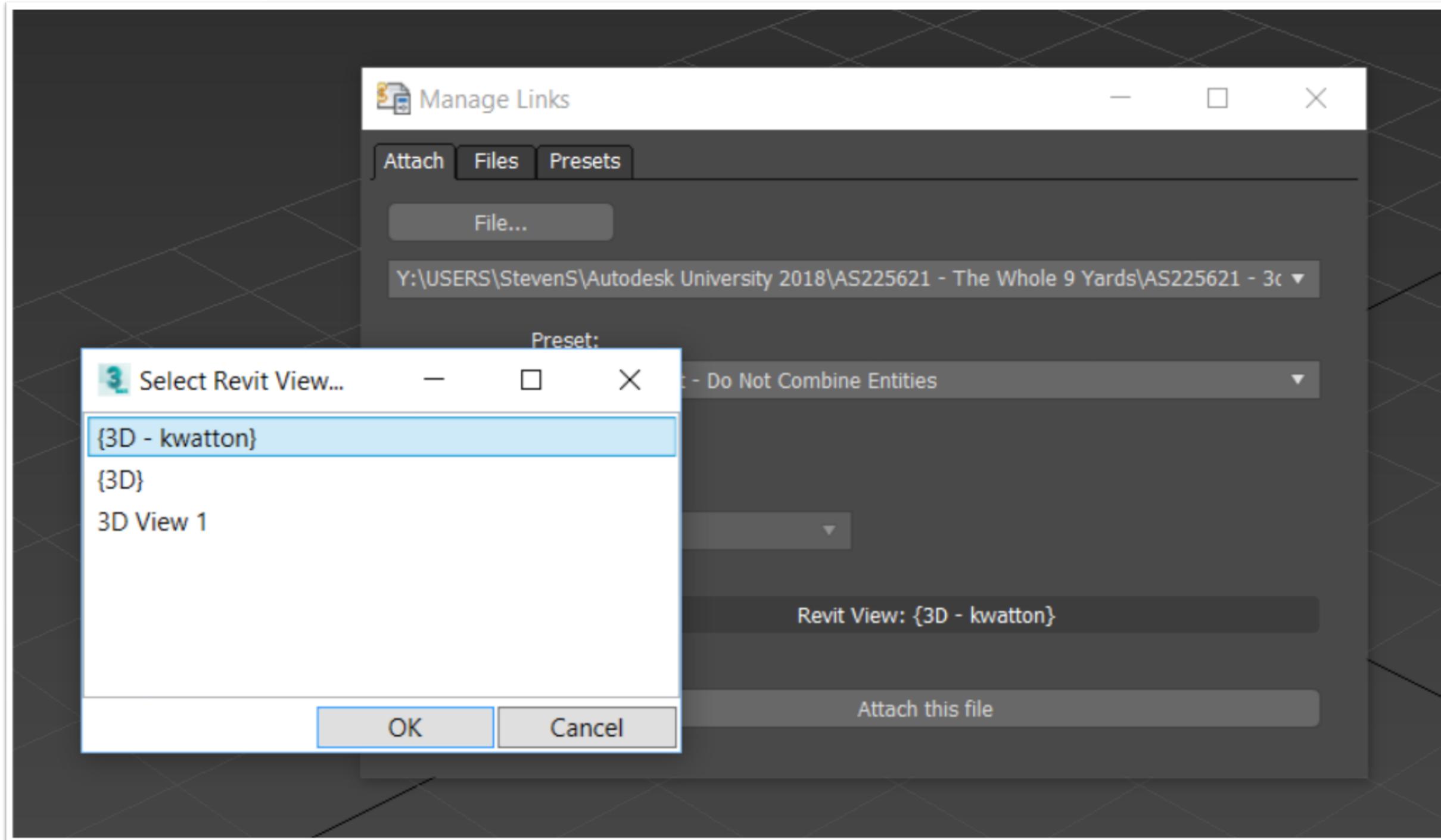


Advantages of Rendering in 3ds Max

- Apply physically accurate materials
- Apply textures that are unique to individual surfaces
- Add scene details
- Create dynamic camera animation
- Choice of using multiple rendering engines, such as the Arnold renderer

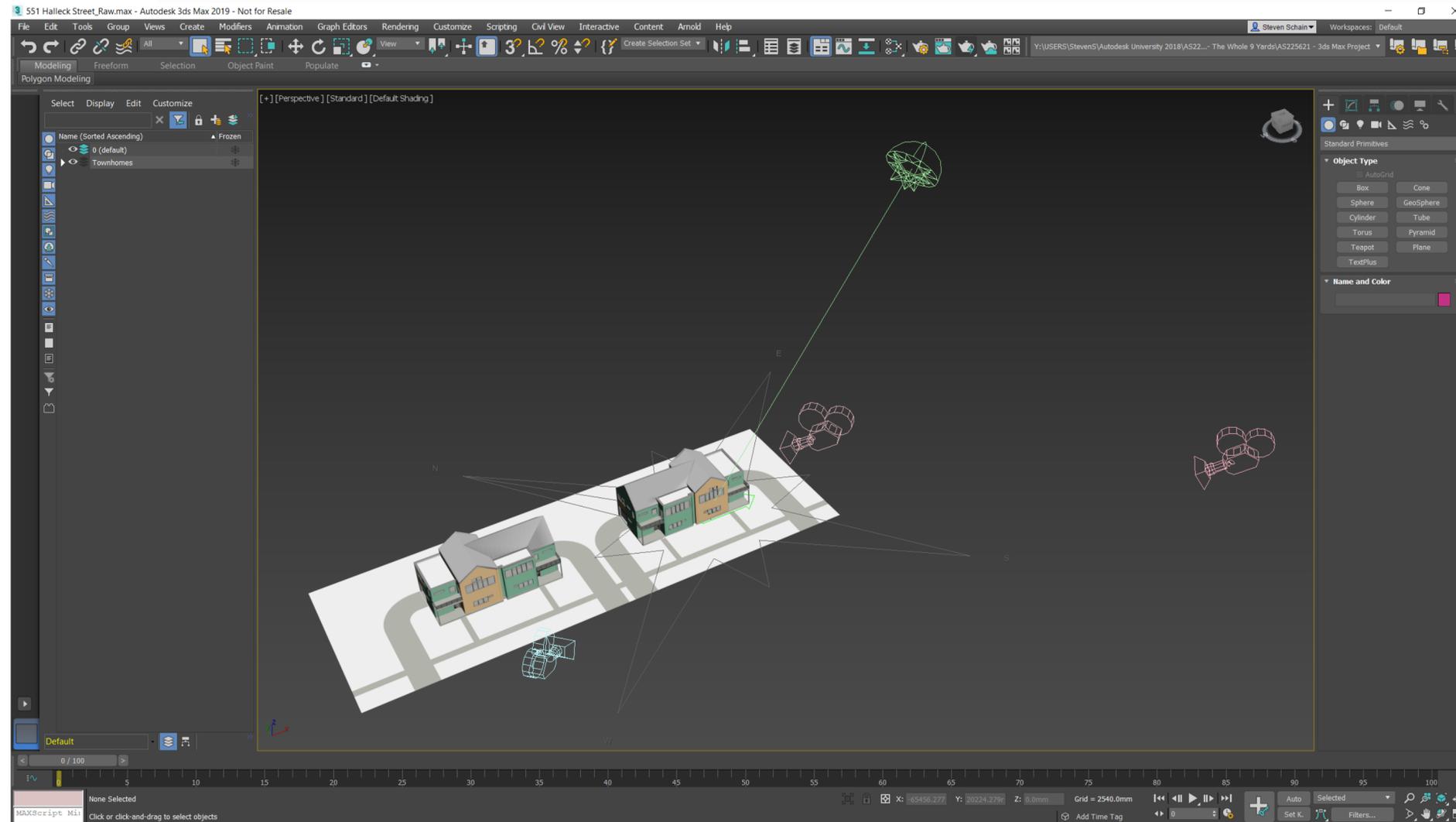


Linking the Revit Model



Advantages to Linking the Revit Model

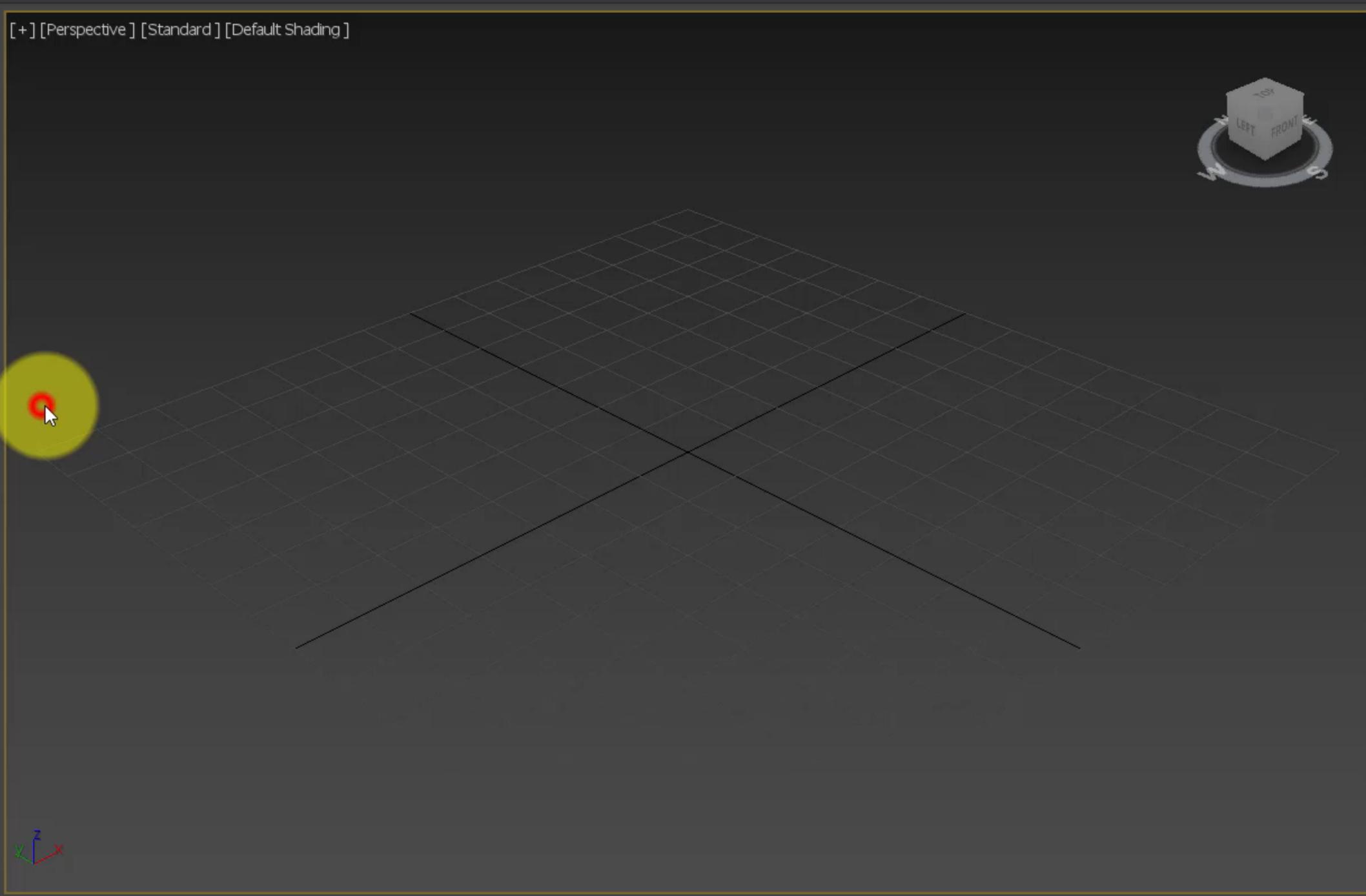
- The model can be updated in 3ds Max if the Revit file updates.
- Animators can ensure they're rendering the latest revision of the design.



Select Display Edit Customize

Name (Sorted Ascending) Frozen

Steve's Workspace



Standard Primitives

Object Type

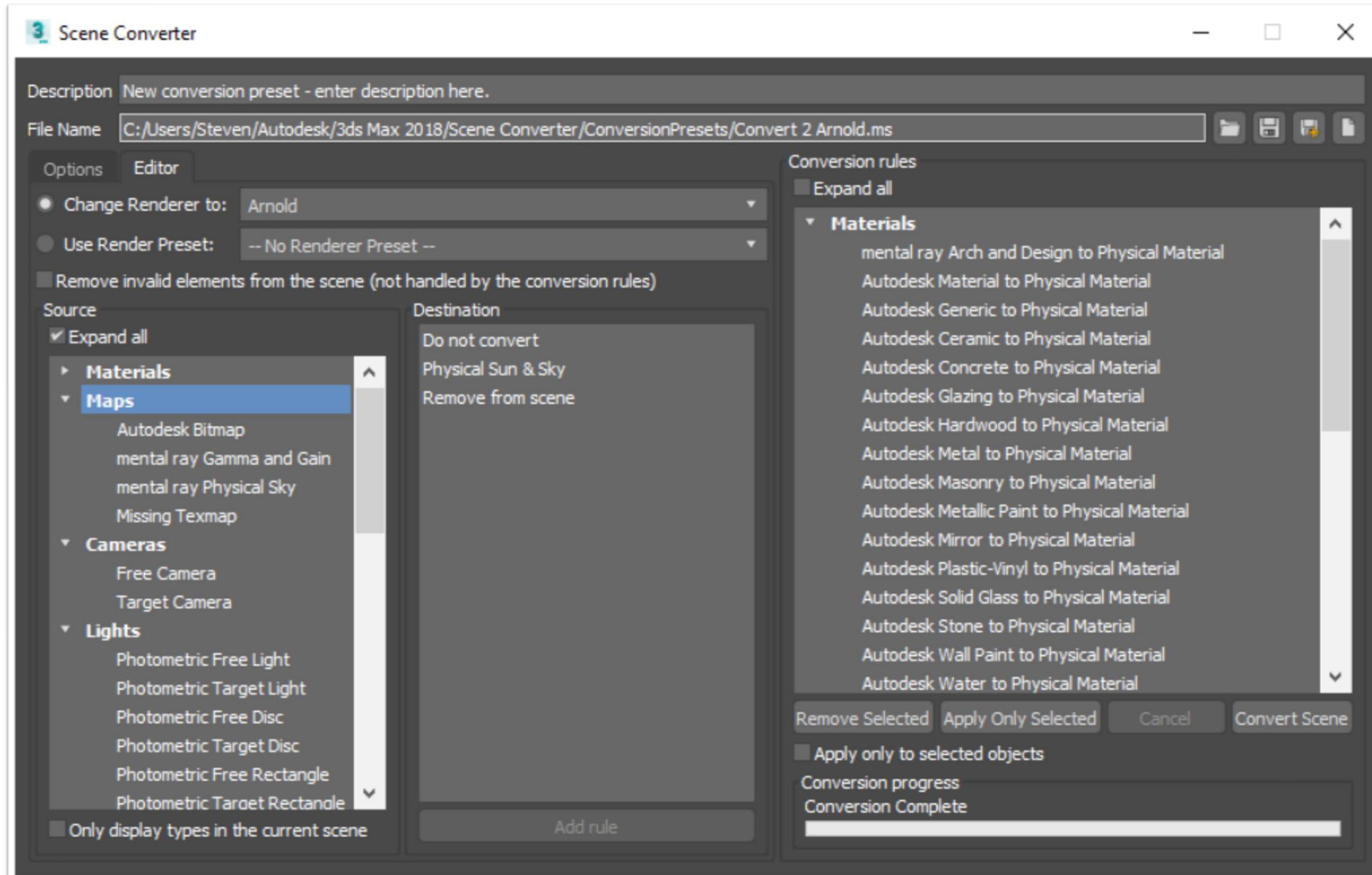
- AutoGrid
- Box
- Cone
- Sphere
- GeoSphere
- Cylinder
- Tube
- Torus
- Pyramid
- Teapot
- Plane
- TextPlus

Name and Color

The background features a light blue gradient with a faint, abstract wireframe pattern of geometric shapes, possibly representing a 3D model or architectural structure. A vertical line is positioned to the left of the main text.

Preparing the Scene

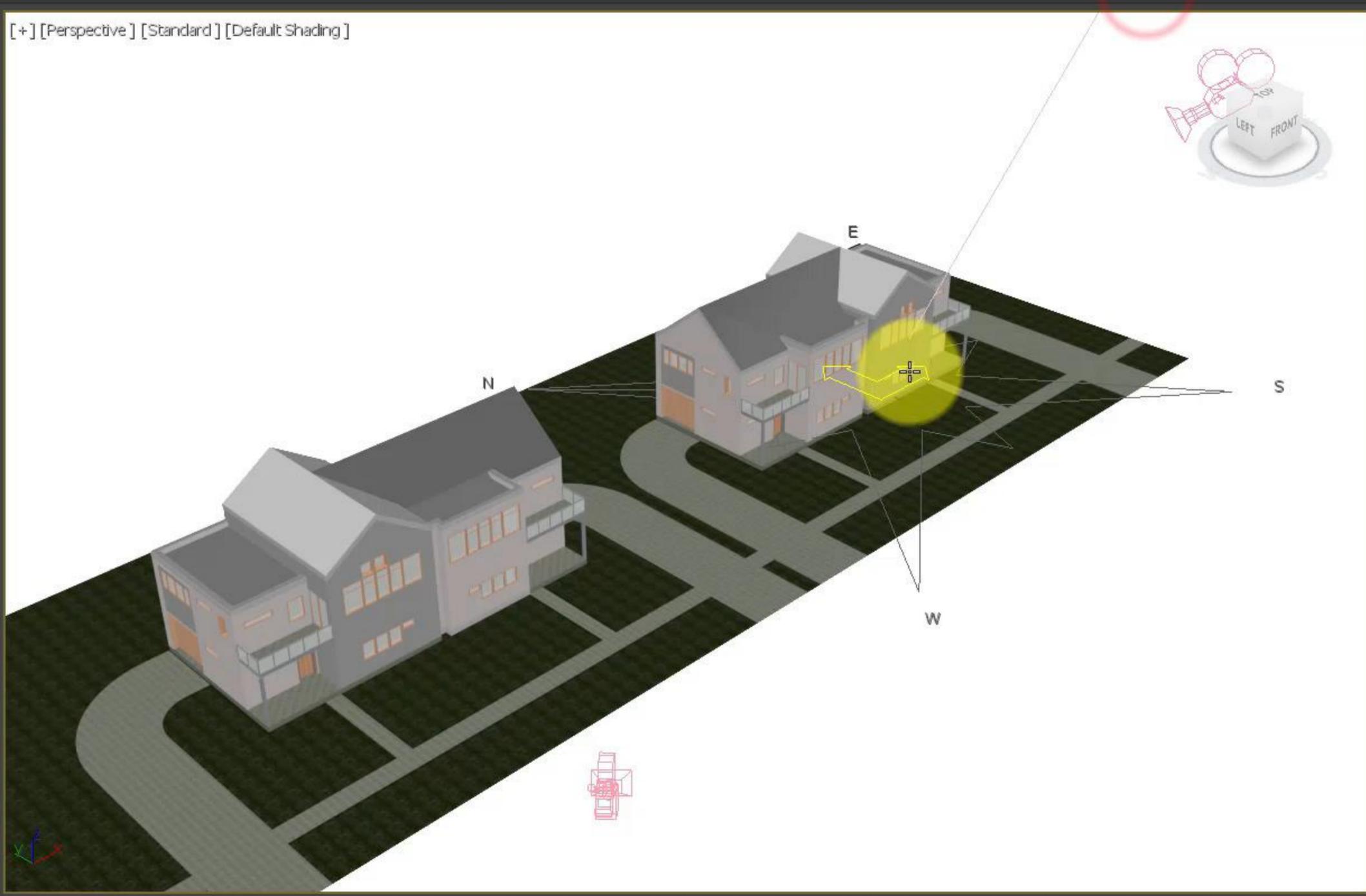
The Scene Converter



Name (Sorted Ascending) Frozen

- Townhomes.rvt

Steve's Workspace



Standard Primitives

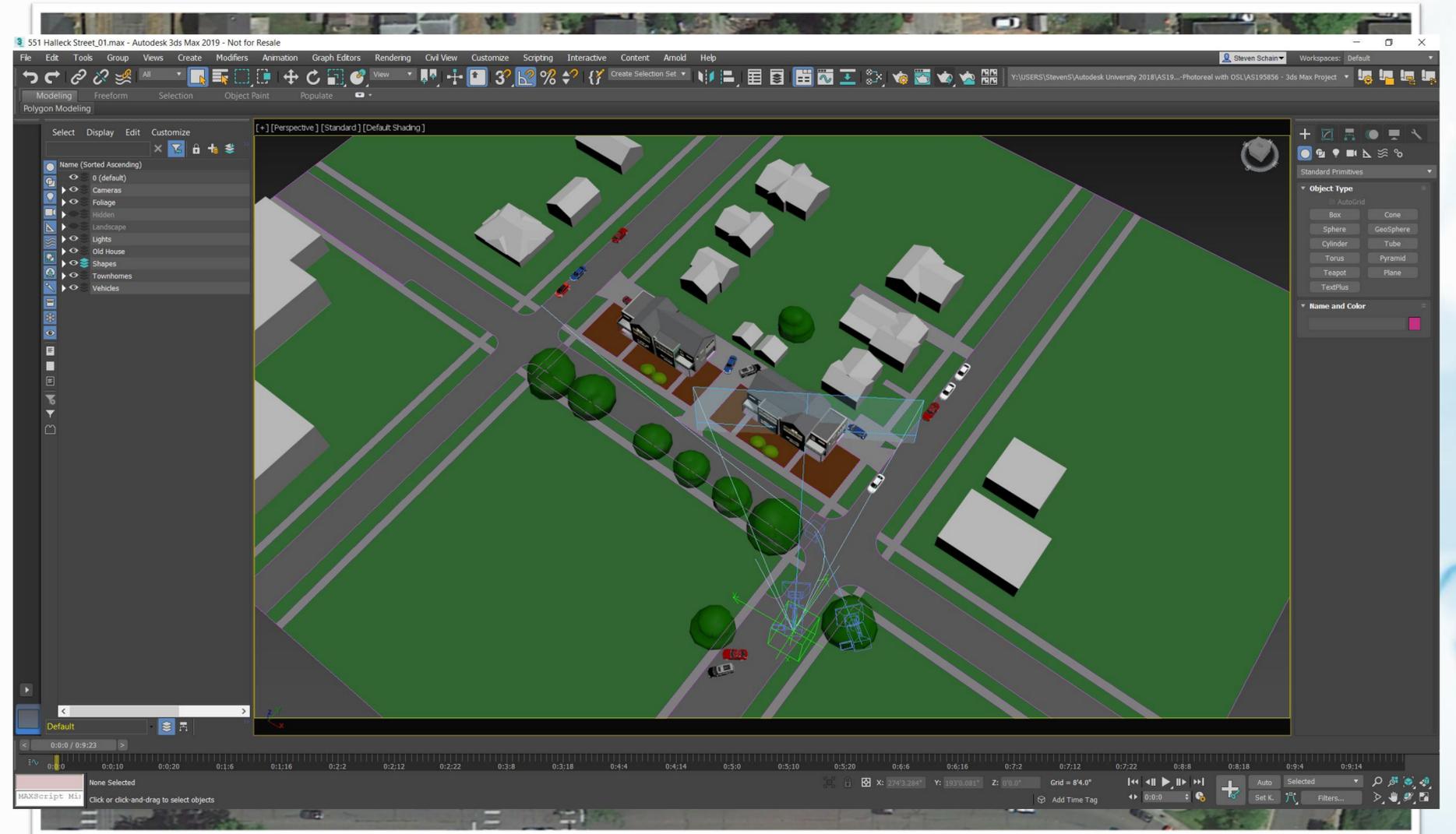
Object Type

- AutoGrid
- Box
- Cone
- Sphere
- GeoSphere
- Cylinder
- Tube
- Torus
- Pyramid
- Teapot
- Plane
- TextPlus

Name and Color

Detailing the Scene

- High resolution texture
- Hide unnecessary elements
- Detail the terrain
- Add additional scene elements





Preparing the Models

Surfaces

- Evaluating materials
- Mapping



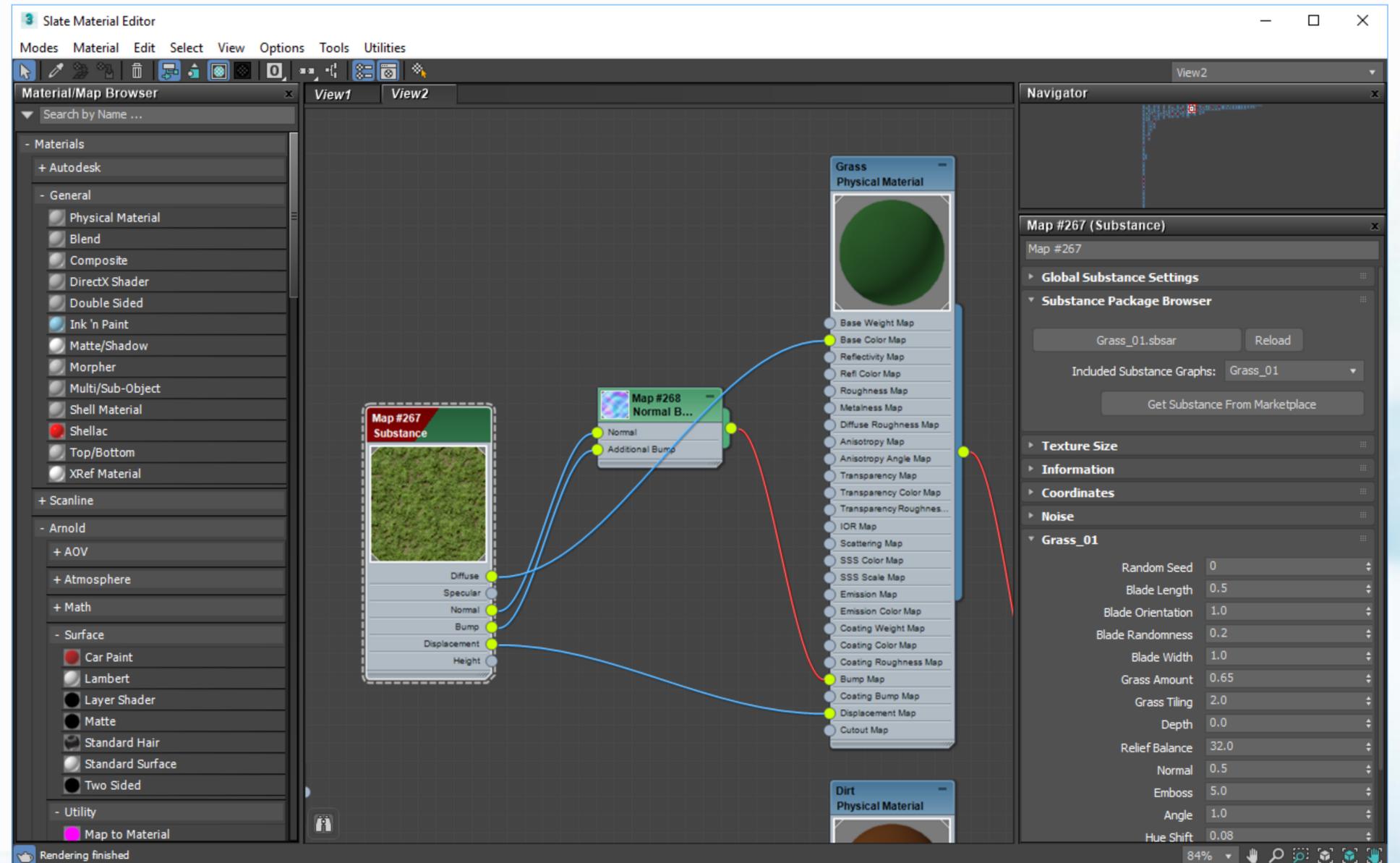
Terrain Level of Detail

- Basic terrain
- Fully modeled



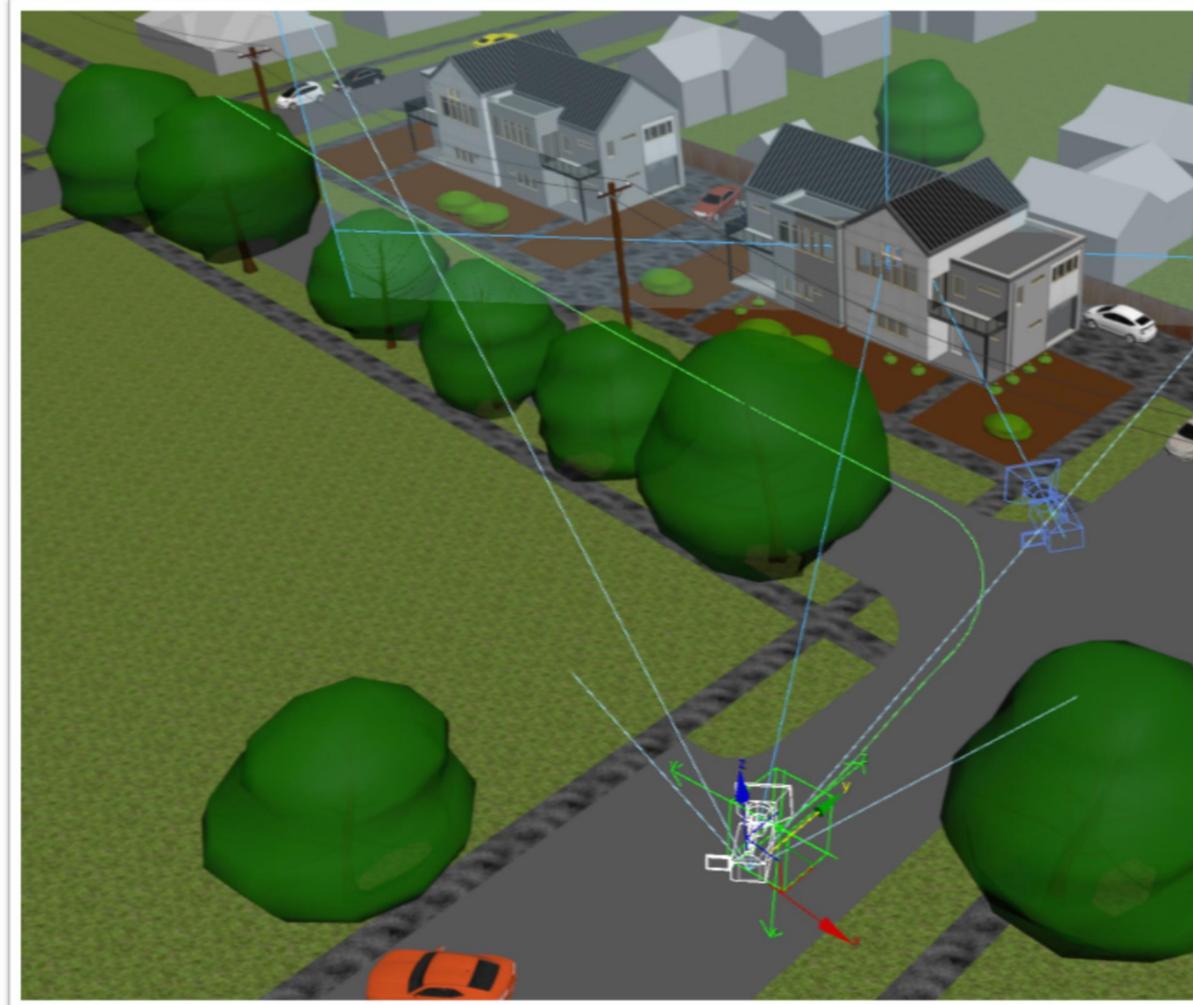
Editing Materials

- Slate Material Editor
- Physical Material
- Substance Textures



Cameras and Animation

- Physical Camera
- Camera Animation
 - Dummy animation



Physical Camera

Targeted
Target Distance: 160'0.89
Viewport Display
Show Cone: Whe...ted
Show Horizon Line

Physical Camera

Film / Sensor
Preset: Custom
Width: 55.0 mm

Lens
Focal Length: 40.0 mm
Specify FOV: 68.973 deg
Zoom: 1.0 x
Aperture: f / 8.0

Focus
 Use Target Distance
 Custom
Focus Distance: 16'4.85"
Lens Breathing: 1.0
 Enable Depth of Field

Shutter
Type: frames
Duration: 0.5 f
Offset: 0.0 f
 Enable Motion Blur

Exposure
Exposure Control Installed
Exposure Gain
 Manual: 18.75 ISO
 Target: 14.0 EV

Demo

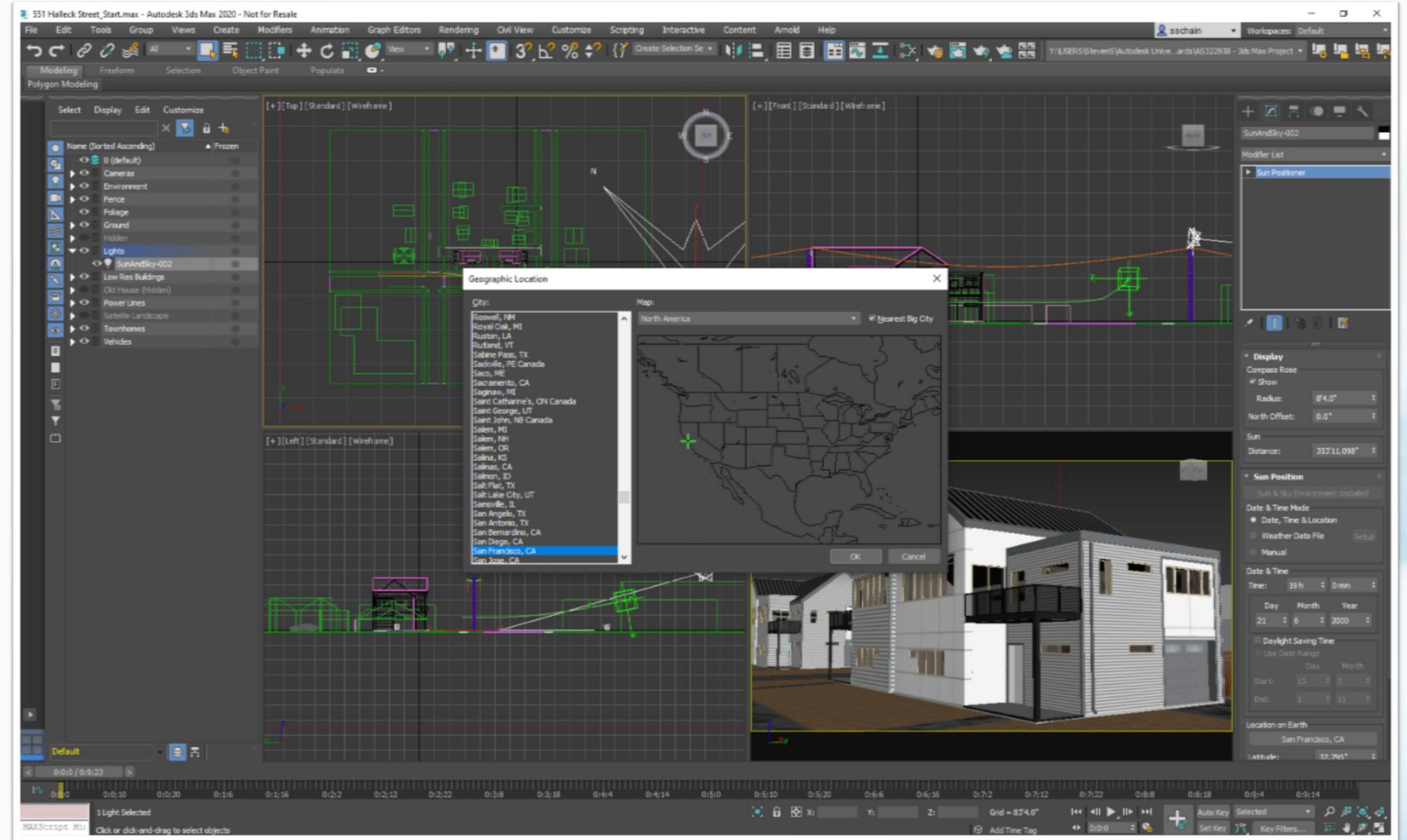
Detailing the Scene



Lighting and Rendering

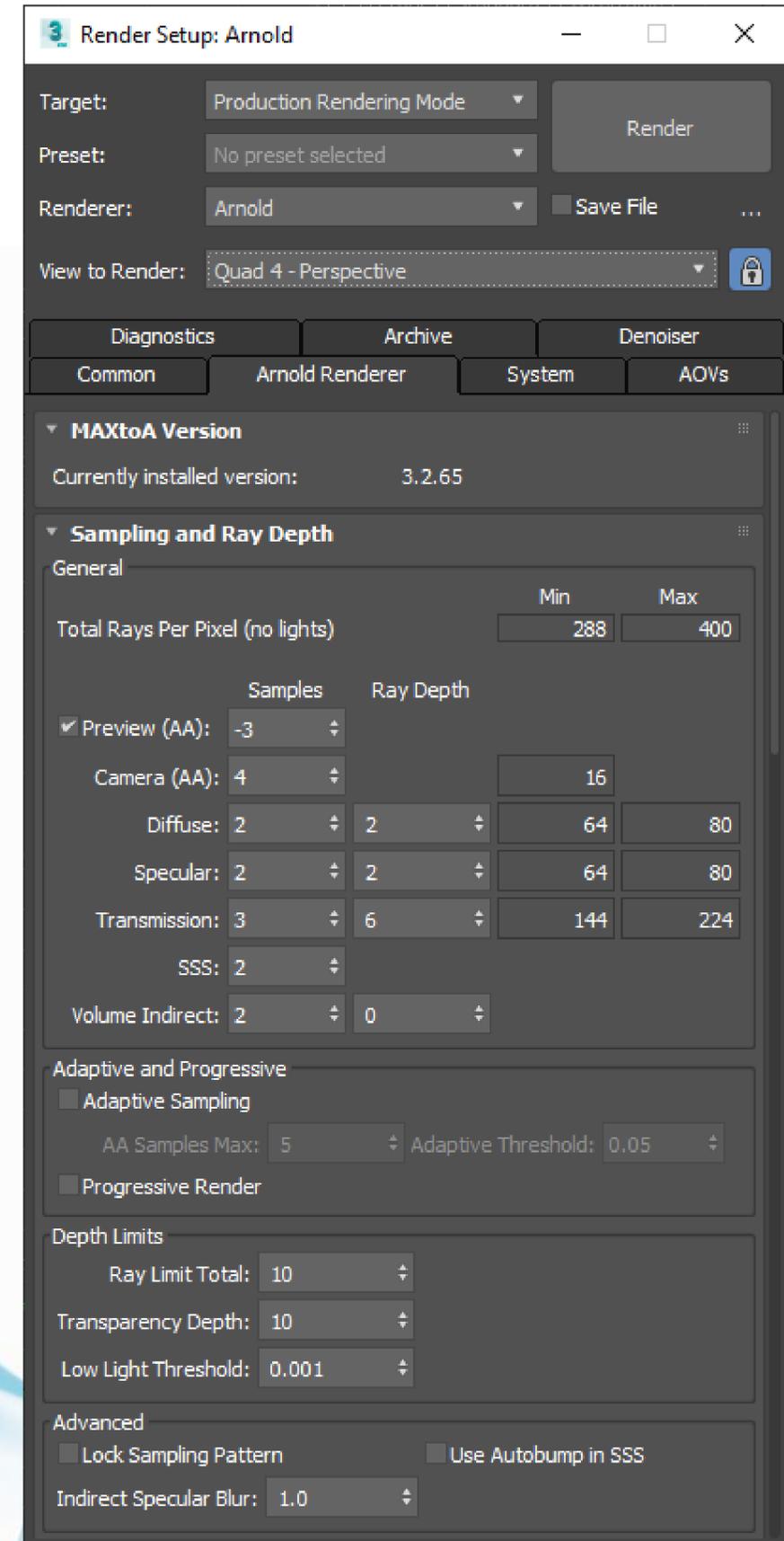
Lighting

- Sun Positioner
- Time and Location



Rendering

- Image resolution
- Arnold renderer



Demo

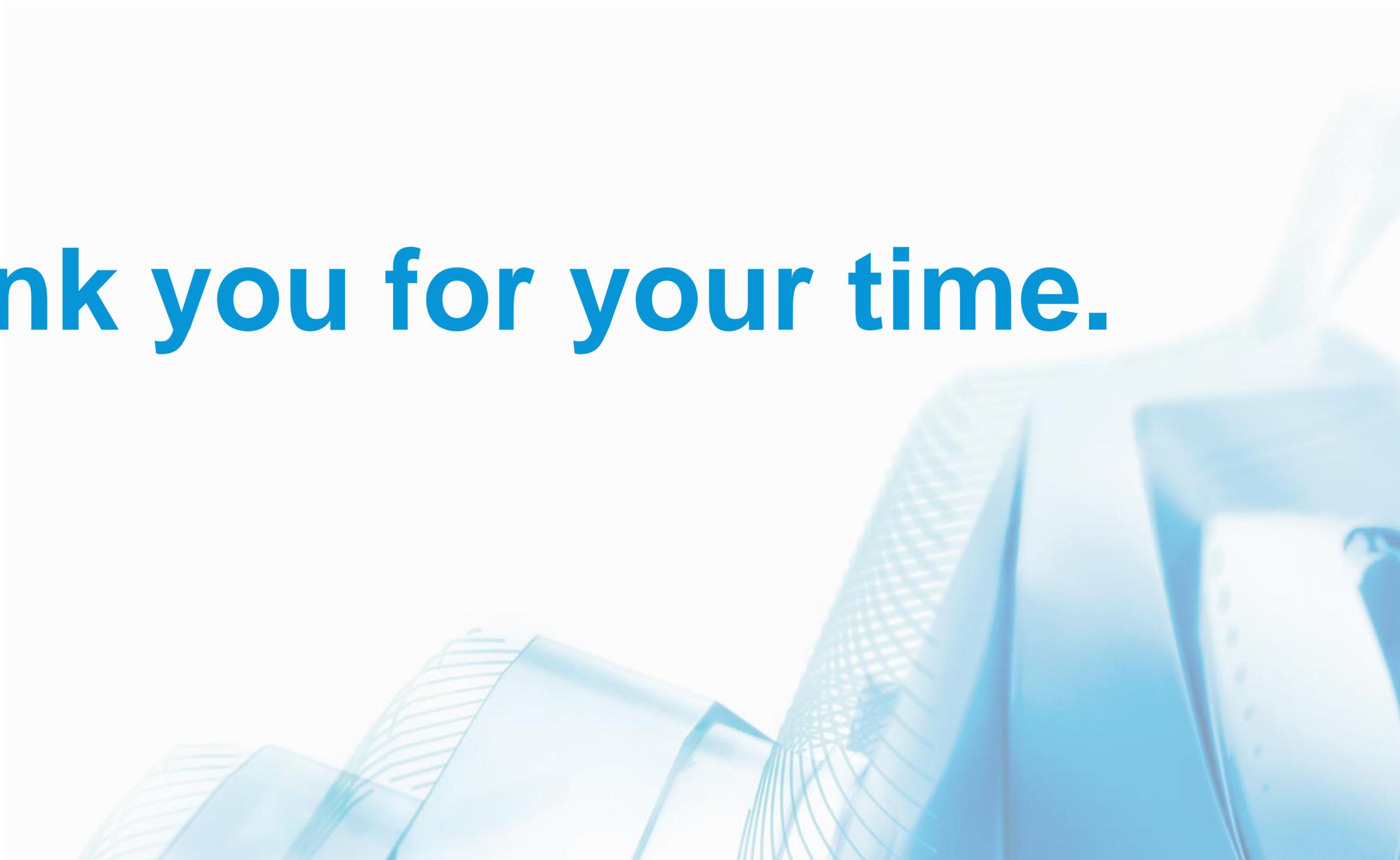
Lighting and Rendering





The Result

Thank you for your time.



Questions?





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