

Learn ArcGIS

Guided lessons for real world problems, with real GIS solutions



Importing and incorporating 3D models in a scene

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380 New York Street

Redlands, California 92373 – 8100 USA

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Importing and incorporating 3D models in a scene

Time: 1 hour, 30 minutes

Overview

3D modeling, especially in urban environments, can significantly be improved by importing additional non-GIS content, in different formats, derived using third-party tools. Using ArcGIS Pro, you can import several 3D formats such as .3ds, .wrl, .skp, .flt, and .dae. ArcGIS Pro 2.2 includes support for Revit.rvt files as a data source.

In some cases, 3D models may not be georeferenced, which can cause issues when integrating with GIS data that is projected and exists in coordinate space. However, ArcGIS Pro 2.2 has tools to update and fix unreferenced models using 3D georeferencing tools that make proper adjustments within the application.

This lesson will guide you through the process of importing 3D content such as COLLADA.dae models into feature classes and placing them into a scene and importing Revit.rvt files into Pro as a data source and 3D georeferencing them into 3D scenes.

In this lesson, you will learn to do the following:

- Import 3D models in various formats
- Interact with imported 3D models
- Add Revit.rvt project as a data source
- Georeference a Revit.rvt model

Open map package

First, download the data.

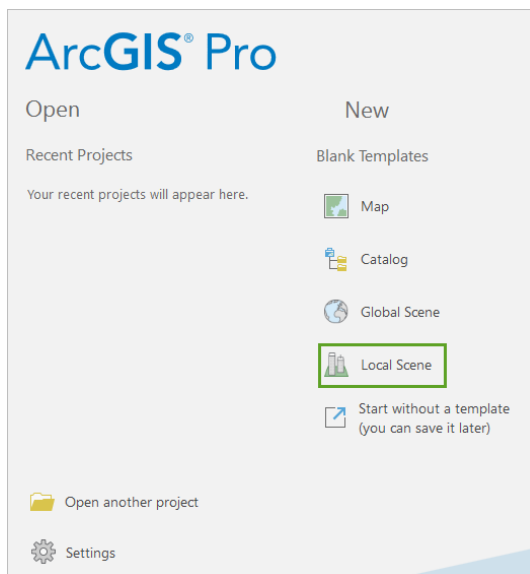
1. Download the [Importing-Content.zip](#) compressed folder.
2. Locate the downloaded file on your computer and extract it to a location you can easily find, such as your Documents folder.
3. Open the Importing-Content folder.

The data for this lesson covers the Redlands Packinghouse District, Redlands, California. The data has been created by Esri, Inc.

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Next, create a project using the Blank Project template.

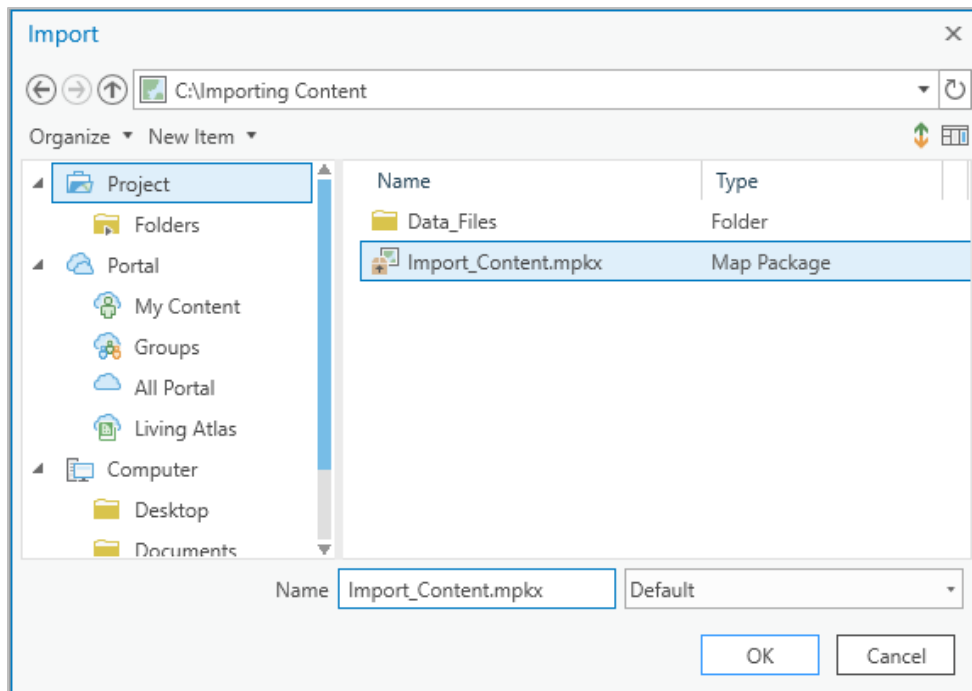
1. Start ArcGIS Pro and click the **Local Scene** template to create an ArcGIS project.



Note: If you don't have ArcGIS Pro or an ArcGIS account, you can sign up for an [ArcGIS free trial](#).

2. Name the project **ImportModels**, specify a suitable location, and click **OK**.
3. On the **Insert** tab, in the **Project** group, click **Import Map**.
4. Click, **Import_Content.mpkx** from the extract location. This will add a new local scene to your project.

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5. Click **OK**.

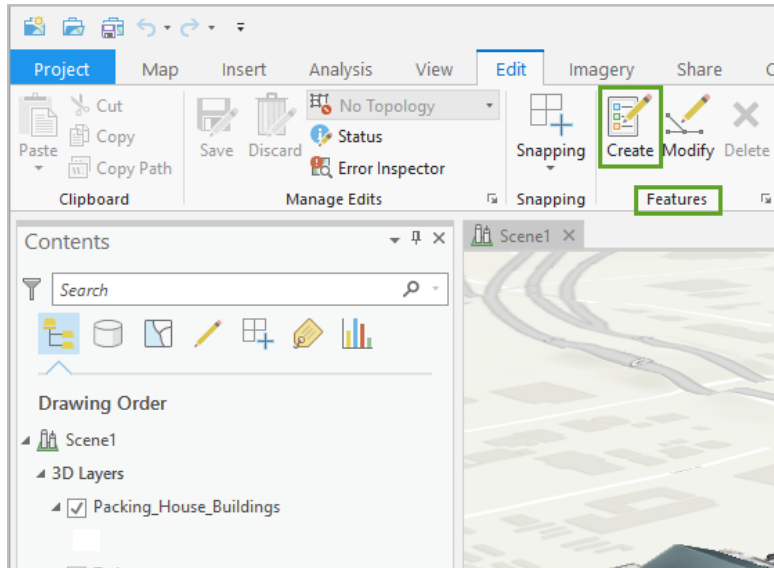
Adding, configuring, and placing a COLLADA.dae model

3D scenes can be significantly enhanced and made more realistic with the addition of 3D symbols and real-world models. Some of these models can be quite detailed or unique to a specific area or subject. As a result, many third-party model formats are supported in ArcGIS Pro.

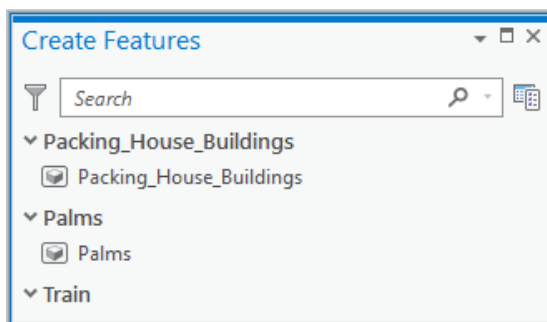
Next, you will explore the workflows and best practices for importing and using different formats and adding them to a 3D scene via a multipatch feature class.

1. On the **Edit** tab > **Features** group, click the **Create** button.

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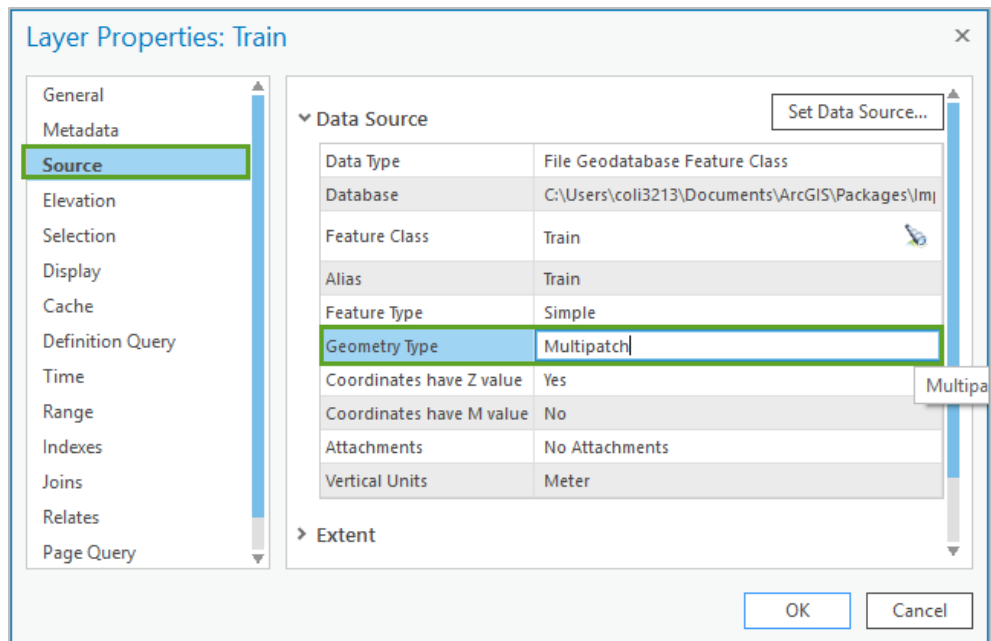
The **Create Features** pane appears, displaying available template layers.



You are able to edit and add new multipatch features to these layers.

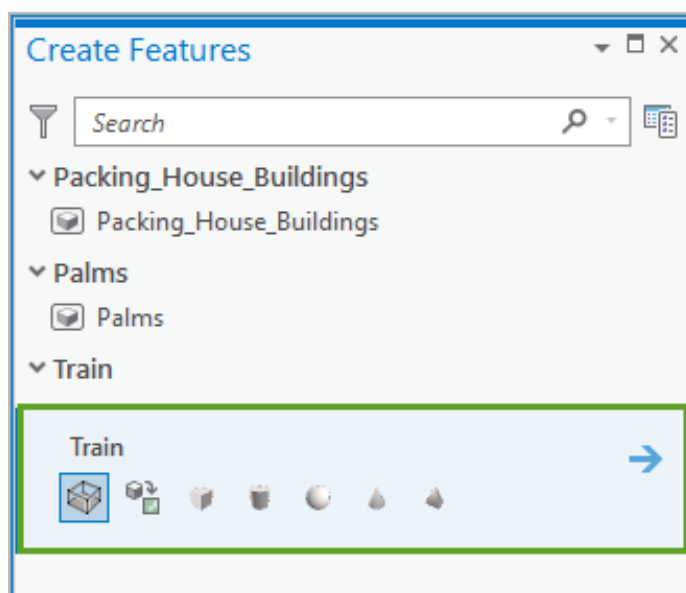
2. In the **Contents** pane, right-click **Train** and select **Properties**.
3. In the **Layer Properties** window, click **Source**.

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Note that the **Train** layer, **Geometry Type** is a **Multipatch**. This means that any new train feature created will be a 3D multipatch feature. Multipatch features consist of one or more faces that can be extruded to specify depth. In addition, faces can be split to create openings and edges dragged to complete features.

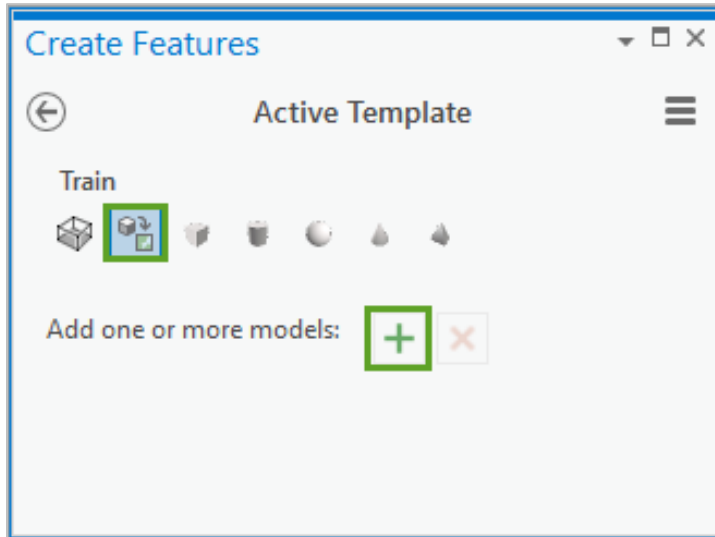
4. Click **Cancel** to close the **Layer Properties** window.
5. In the **Create Features** pane, click **Train**.



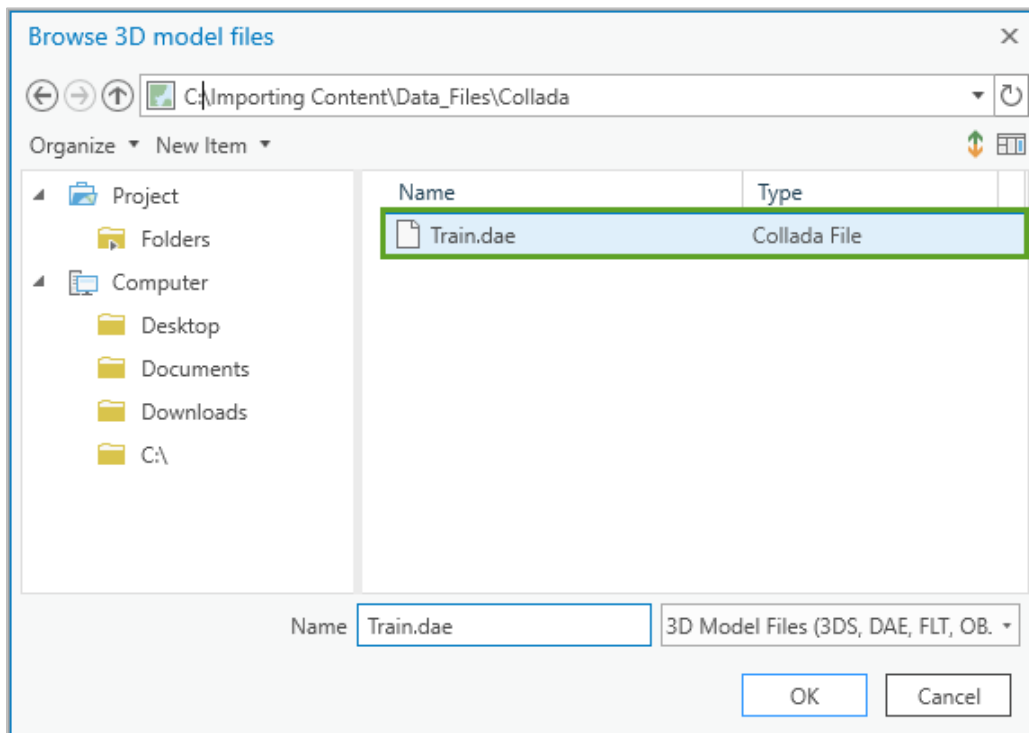
The **Create Features** pane now displays the available **Multipatch Construction** tools.

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6. Locate and click the **Model File** construction tool .
7. Click the green plus to add one or more models.



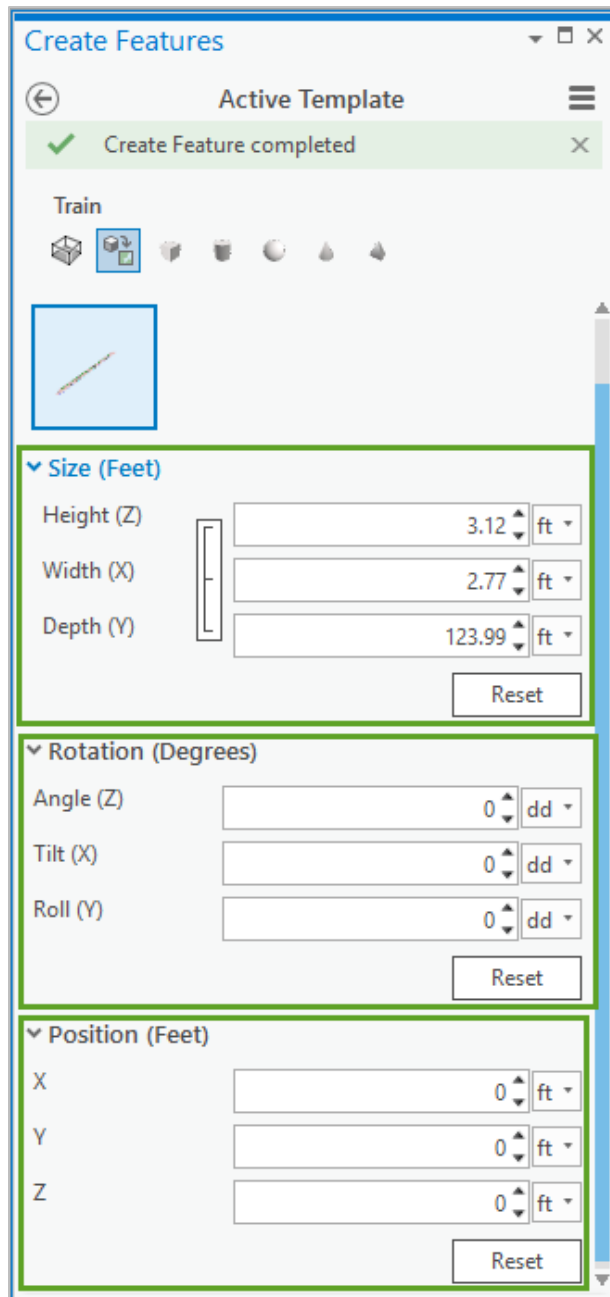
8. Browse to the **Importing Content > Data Files > Collada** folder and click **Train.dae**, then click **OK**.



In the **Create Features** pane, notice that the Collada model has been added to the **Active Template** as a **Multipatch** feature.

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9. If necessary, resize the pane to display the current model properties.



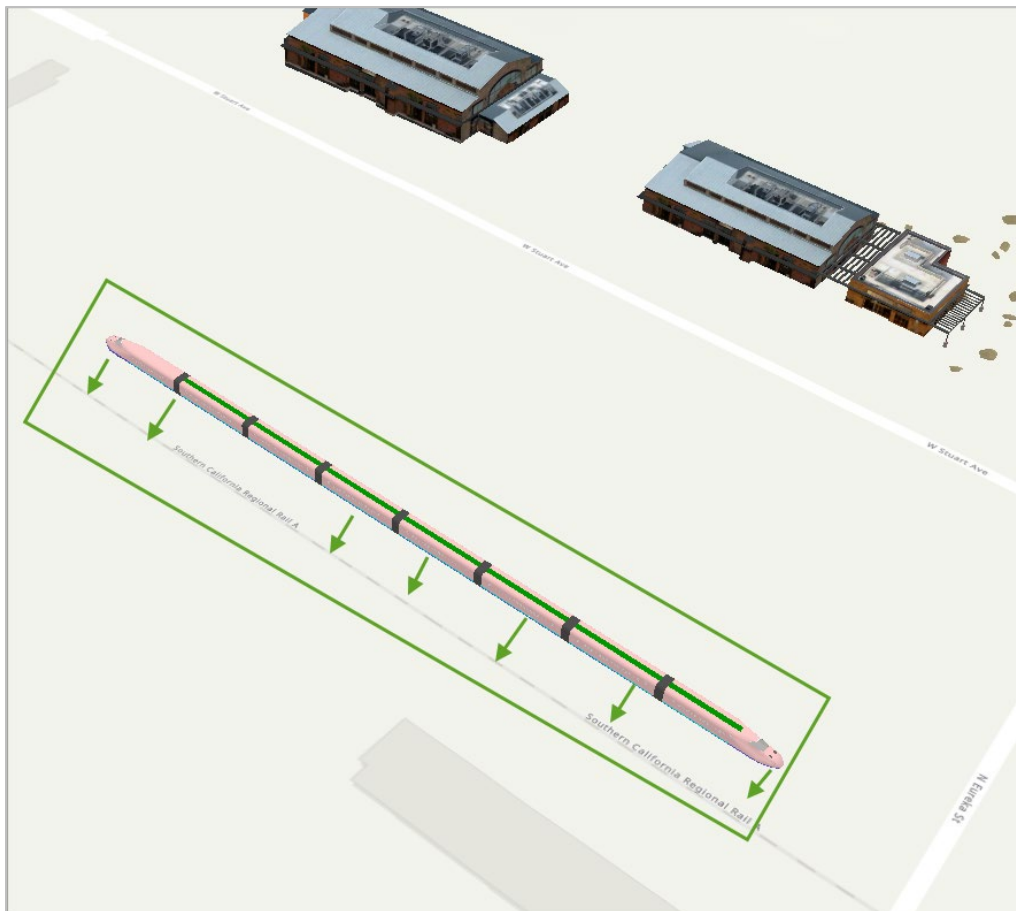
At this point, you could change the **Size**, **Rotation** or **Position** of the **Multipatch** feature on the **Active Template**, if desired.

10. Update the **Angle (Z)** to **90 dd**.

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▼ Rotation (Degrees)		
Angle (Z)	<input type="text" value="90"/>	dd ▾
Tilt (X)	<input type="text" value="0"/>	dd ▾
Roll (Y)	<input type="text" value="0"/>	dd ▾
<input type="button" value="Reset"/>		

In Scene 1, move the cursor and notice how you can add a new multipatch train feature derived from the **COLLADA** file.



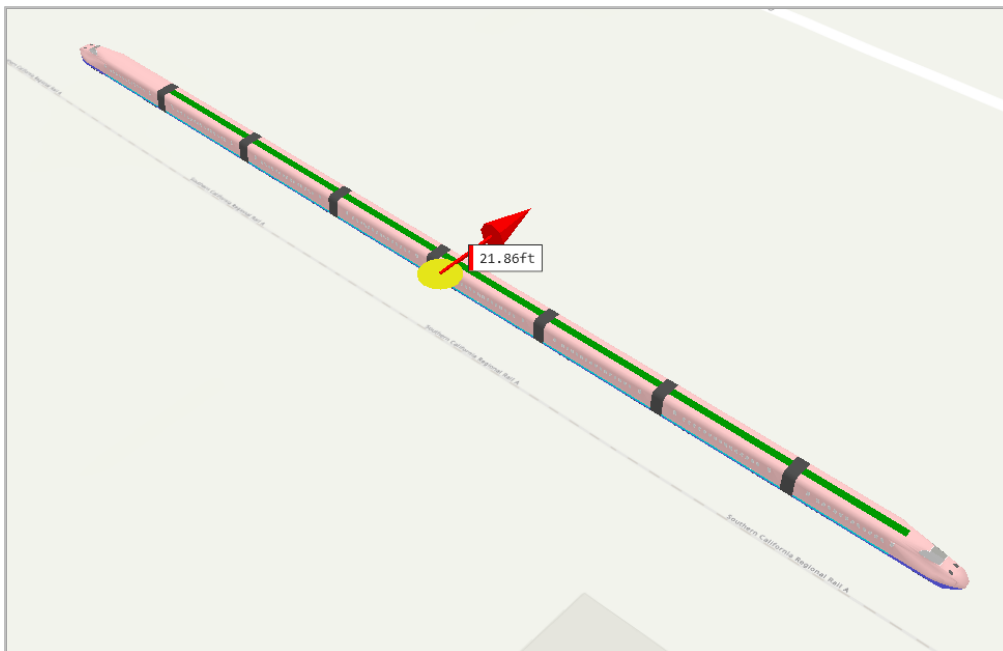
11. Using a simple click on the scene, add and place the 3D model of a train along the Southern California Regional rail line located to the south of the West Stuart Avenue.

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12. On the **Edit** tab > **Tools** group, click the **Move** tool to update and move the newly placed train model.



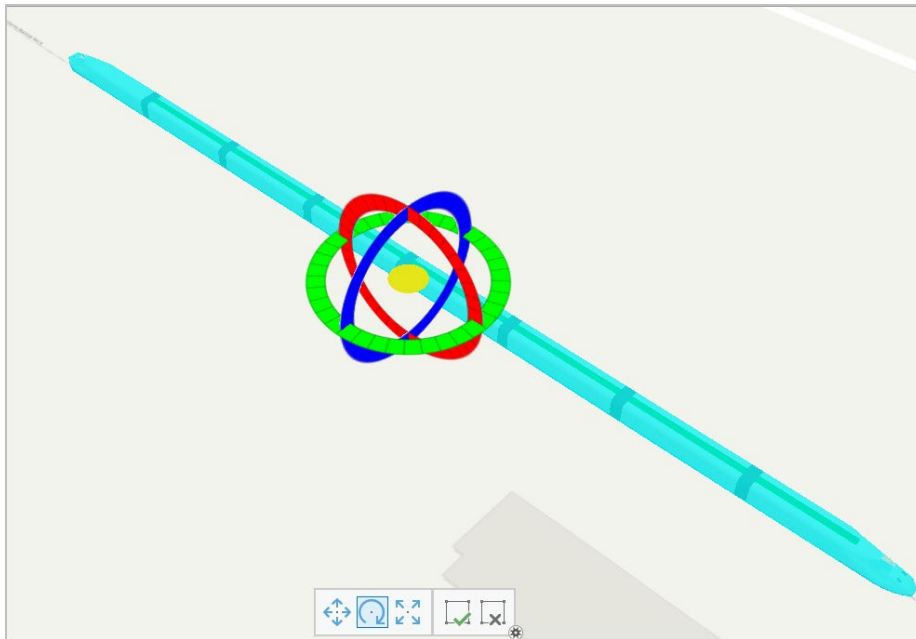
13. Explore the tool by moving and positioning the train model in x,y,z space.



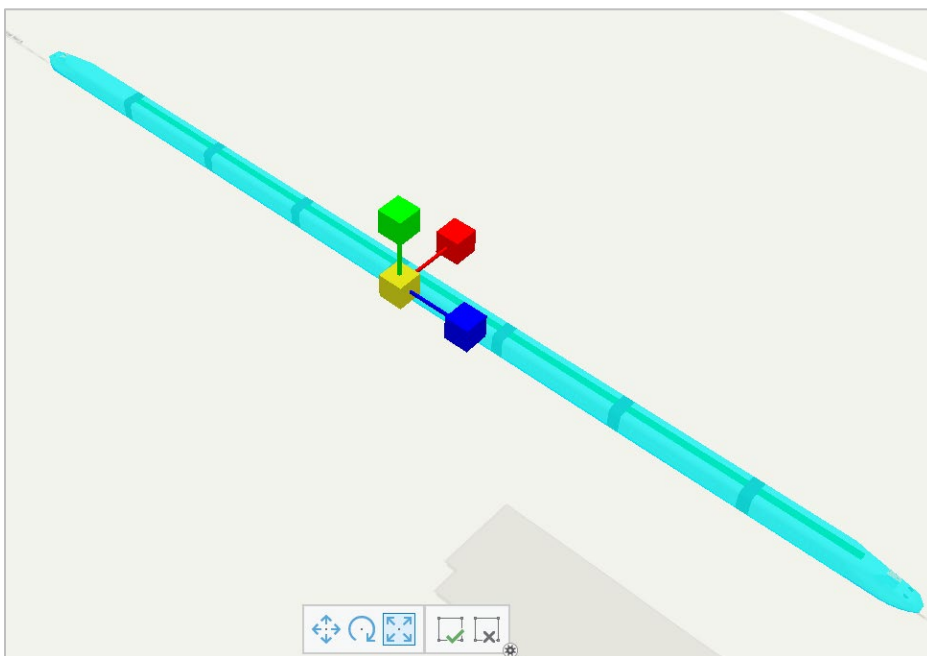
14. Explore with the **Rotate** tool.

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15. Notice how you can flip the train upside down.

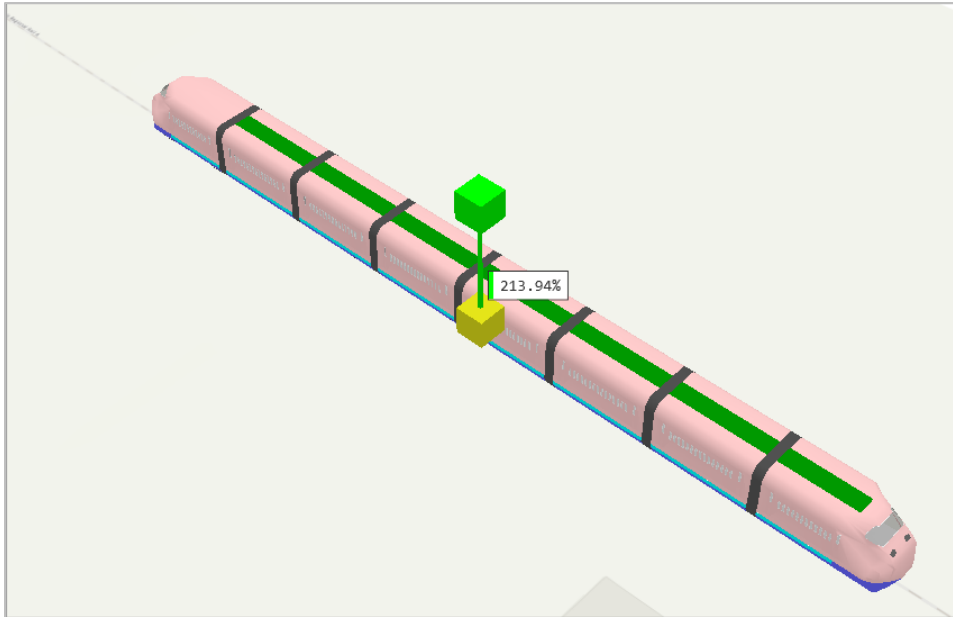


16. Use the **Scale** tool.

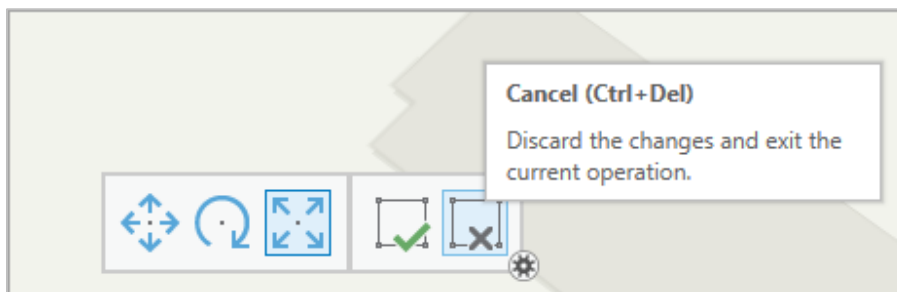


Notice how you can increase the width and height of the model as needed.

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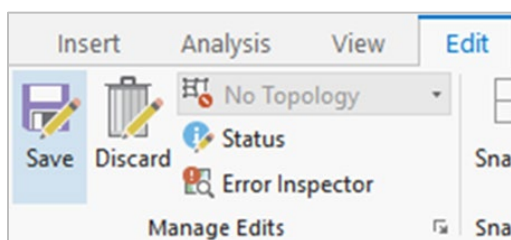
17. When you are done exploring, click **Cancel** to discard changes and exit the current operation.



If you made any edits, click the **Finish** button on the mini-toolbar or press **F2** to accept changes.

18. On the **Edit** tab, in the **Manage Edits** group, and click **Save**.

This will commit the newly created **Train** feature to the geodatabase feature class storing train features.

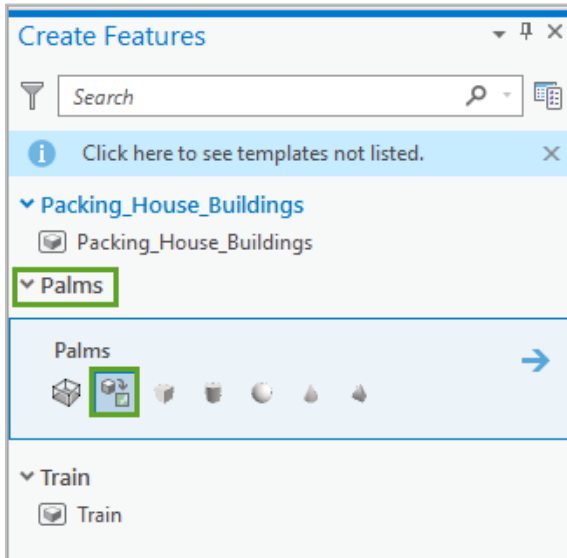


19. Click **Yes** to save the project.

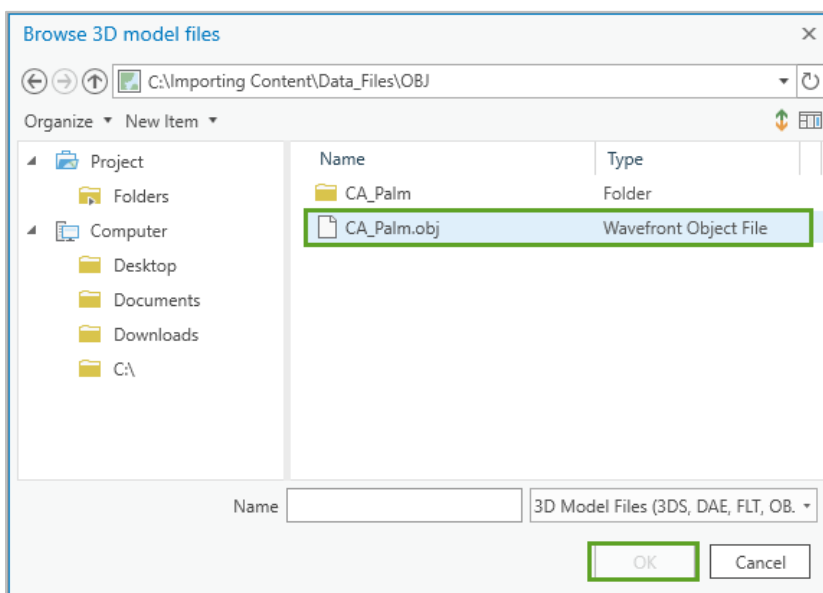
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Adding, configuring, and placing an OBJ.obj model

1. In the **Create Features** pane, click the **Palms** multipatch template.



2. Locate and click the **Model File** construction tool.
3. Click the green plus to add one or more models.
4. Browse to the **Importing Content > Data_Files > OBJ** folder and select **CA_Palm.obj**, then click **OK**.

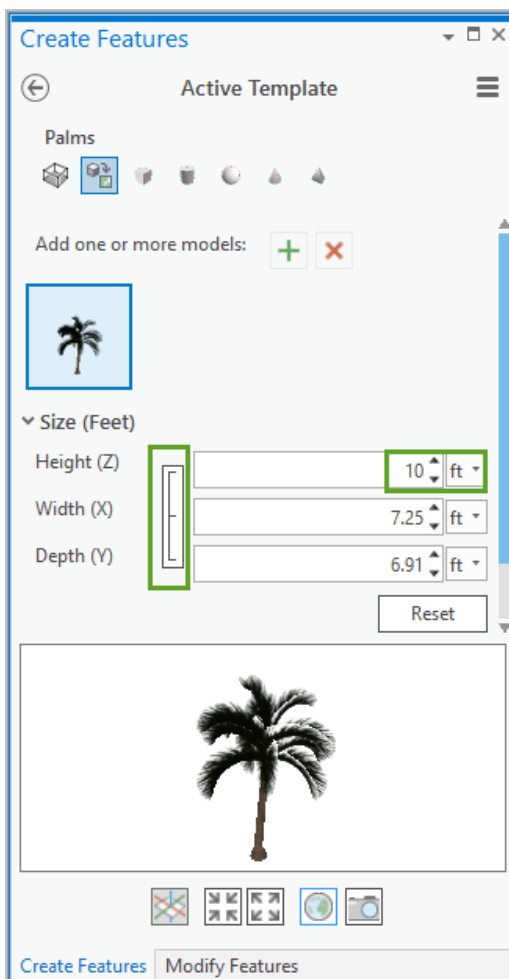


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5. Move the pointer to the scene and notice the Palm multipatch feature generated from the Obj format. Do not click anywhere on the scene.



6. In the **Active Template** properties pane, update the **Height (Z)** value from **119** to **10** ft.



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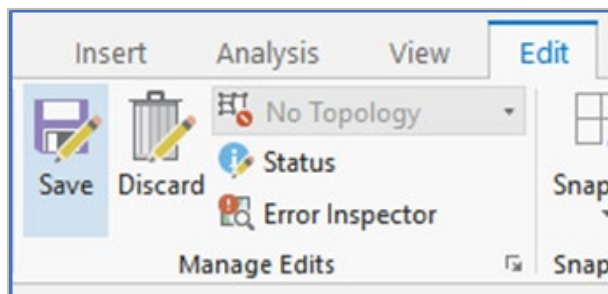
Notice how it locks the aspect ratio by default; you can click on the three connecting bars to disable it. You can change the **Size**, **Rotation**, or **Position** of the Palm model.

7. Place several palm trees with different sizes or configurations by modifying model properties in the **Active Template**.
8. When finished, click the scene to place the 3D model.



9. On the **Edit** tab > **Manage Edits** group, click **Save**.
10. Click **Yes** to save edits.

This will commit the newly created Palm feature to the geodatabase feature class storing train features.



11. On the **Edit** tab > **Selection** group, click **Clear** to clear the selection.
12. Close the **Create Features** pane.

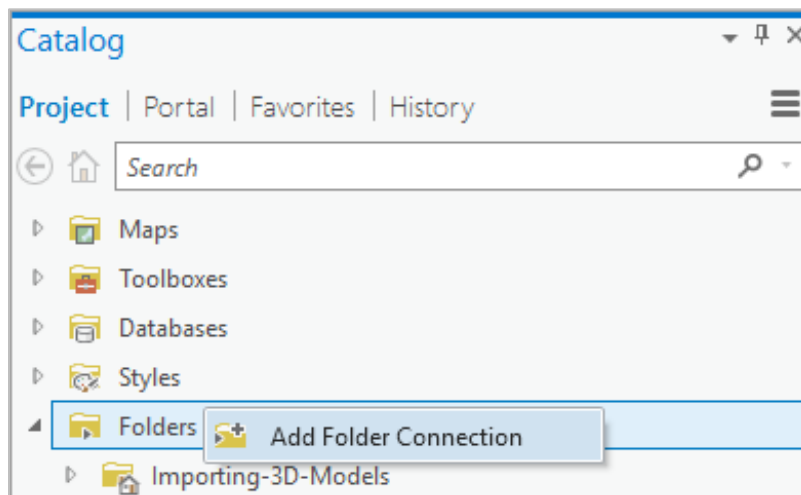
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13. Save the project.

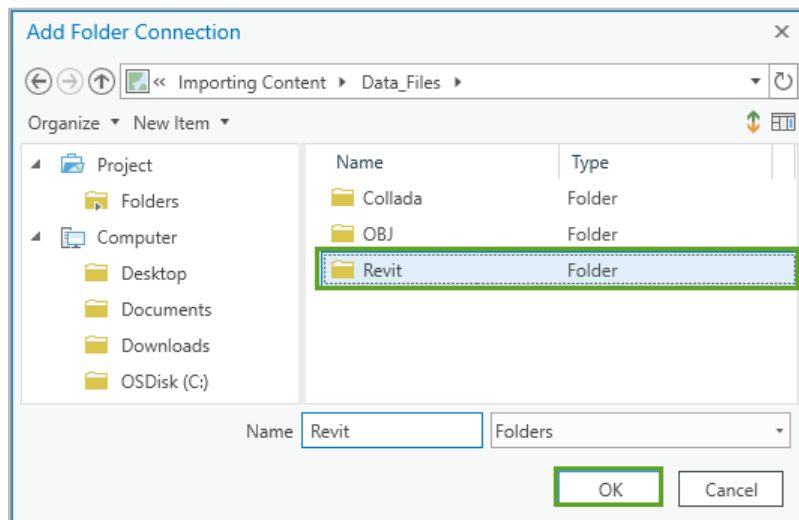
Reading and adding Revit.rvt (BIM) projects into ArcGIS Pro

Revit is a design and documentation platform that supports the design, drawings, and schedules required for building information modeling (BIM).

1. If necessary, on the **View** tab > **Windows** group, click the **Catalog** pane.
2. In the **Catalog** pane, right-click the **Folders** section and click **Add Folder Connection**.

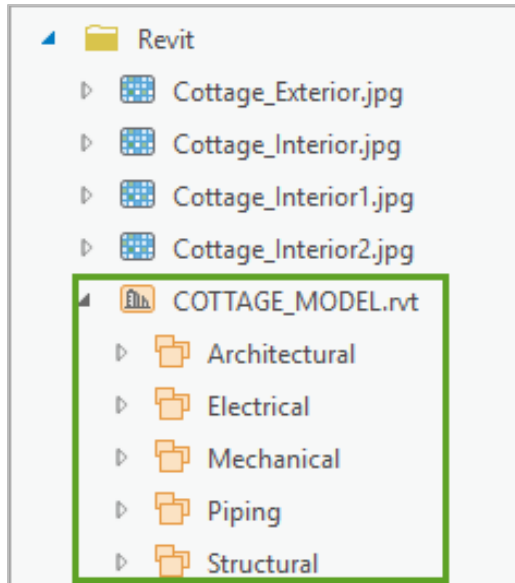


3. Browse to or search for the **Importing Content** > **Data_Files** > **Revit** folder and click **OK**.



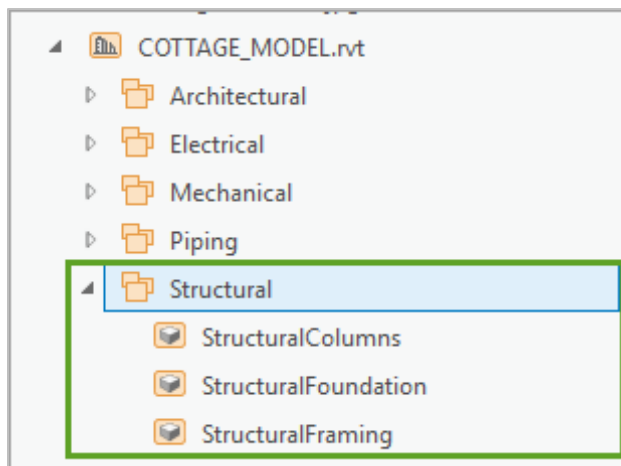
4. Expand the **Folders** > **Revit** folder tree > **COTTAGE_MODEL.rvt** in the **Catalog** pane.

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Notice how the entire **COTTAGE_MODEL.rvt**, Revit project is available directly as a data source without the need for conversion.

5. Expand **Structural** under **COTTAGE MODEL.rvt**.



Notice how the model consists of building elements organized into categories of element types. **Structural** contains structural elements of the building and includes the foundation, framing, and columns of the building.

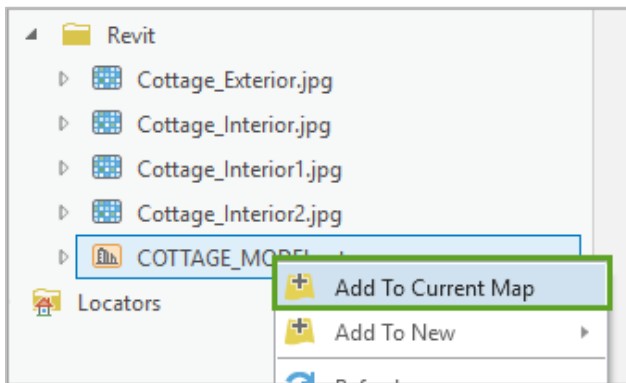
6. Expand **Architectural**.

Note how this category includes doors, furniture, and other architectural elements of the building.

7. When you are done exploring the model, collapse the open categories of elements.

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8. In the **Catalog** pane, **Folders > Revit**, right-click **COTTAGE_MODEL.rvt**, then choose **Add To Current Map**.



Note: You can also drag **COTTAGE_MODEL.rvt** onto the scene.

Georeferencing a Revit.rvt (BIM) model

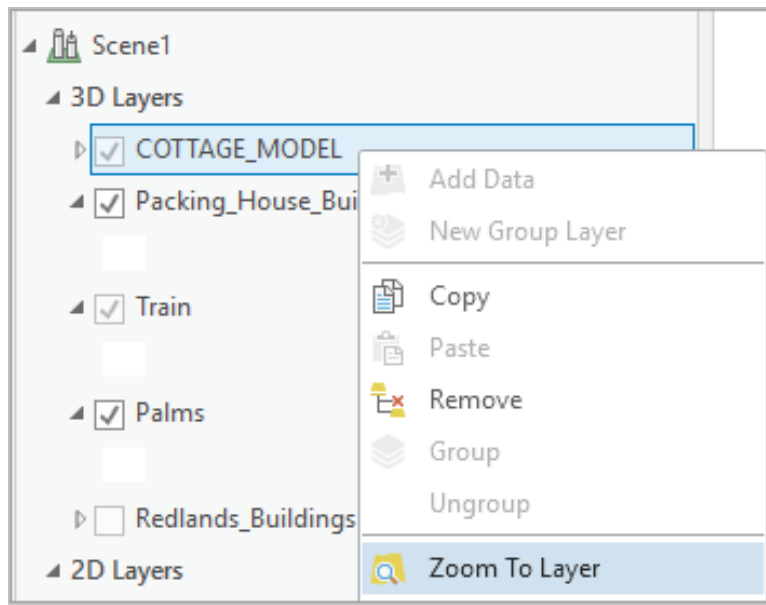
When bringing 3D models from third-party applications into ArcGIS Pro, they are often not georeferenced, which means that they have no coordinate system. This causes an issue when trying to place them in the correct coordinate space. You can use ArcGIS georeferencing tools to update and place the models in the correct coordinate space.

After adding COTTAGE_MODEL.rvt to your scene, you will notice that it appears that nothing is displayed. The model has in fact been added to the scene but may have been added to a location in the middle or elsewhere in the scene extent. This may be in the middle of the ocean, as the scene's current coordinate system is set to WGS 1984 Web Mercator Auxiliary Sphere_1, which encompasses the extent of the world.

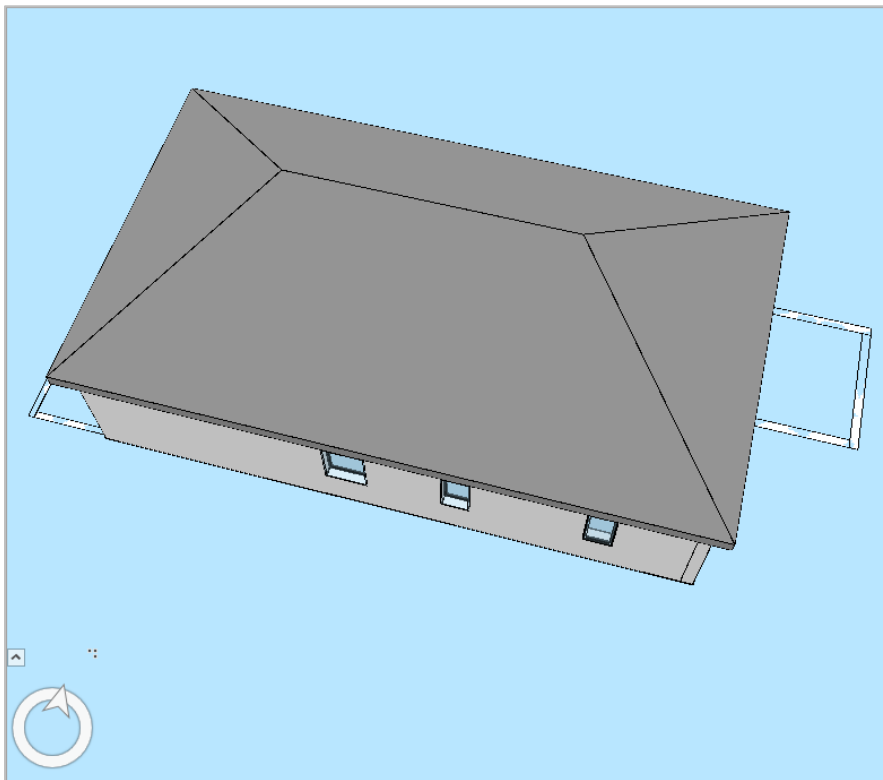
1. In the **Contents** pane, right-click **COTTAGE_MODEL** and choose **Zoom To Layer**.

Note: Depending on your settings, your model may be in a different location. Proceed to the next set of steps.

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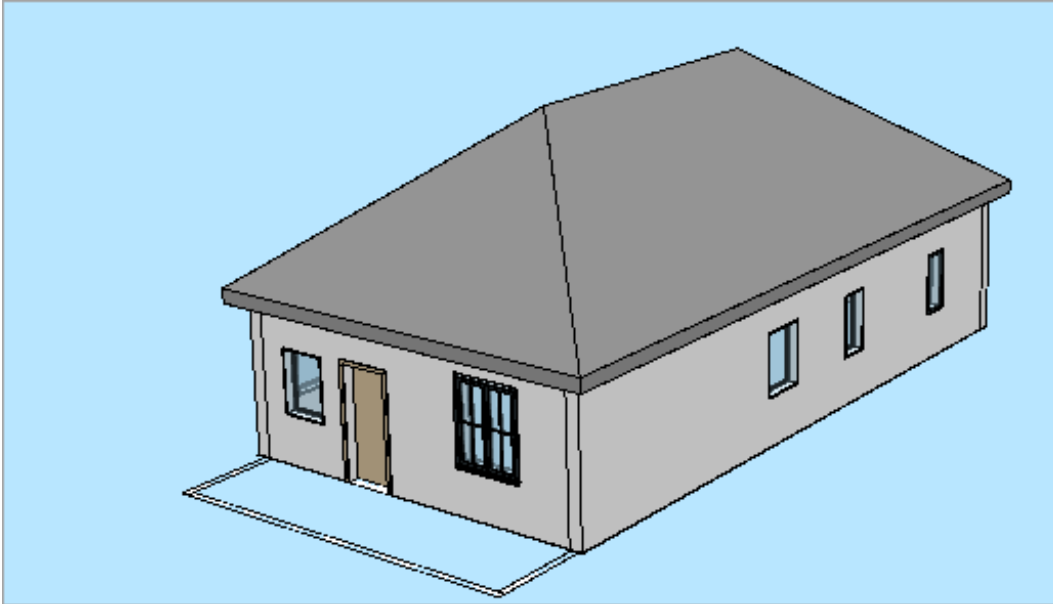


The scene updates and displays the COTTAGE_MODEL.

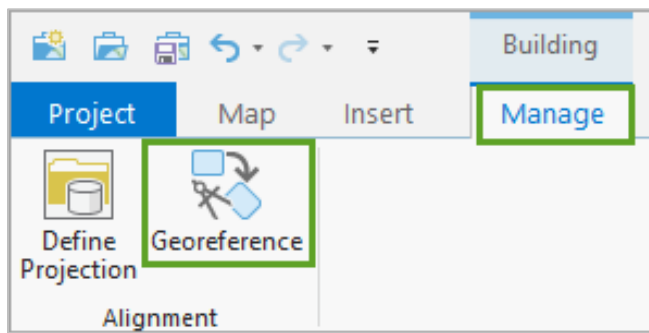


2. Tilt the view or zoom out and notice how it was placed in the middle of the ocean.

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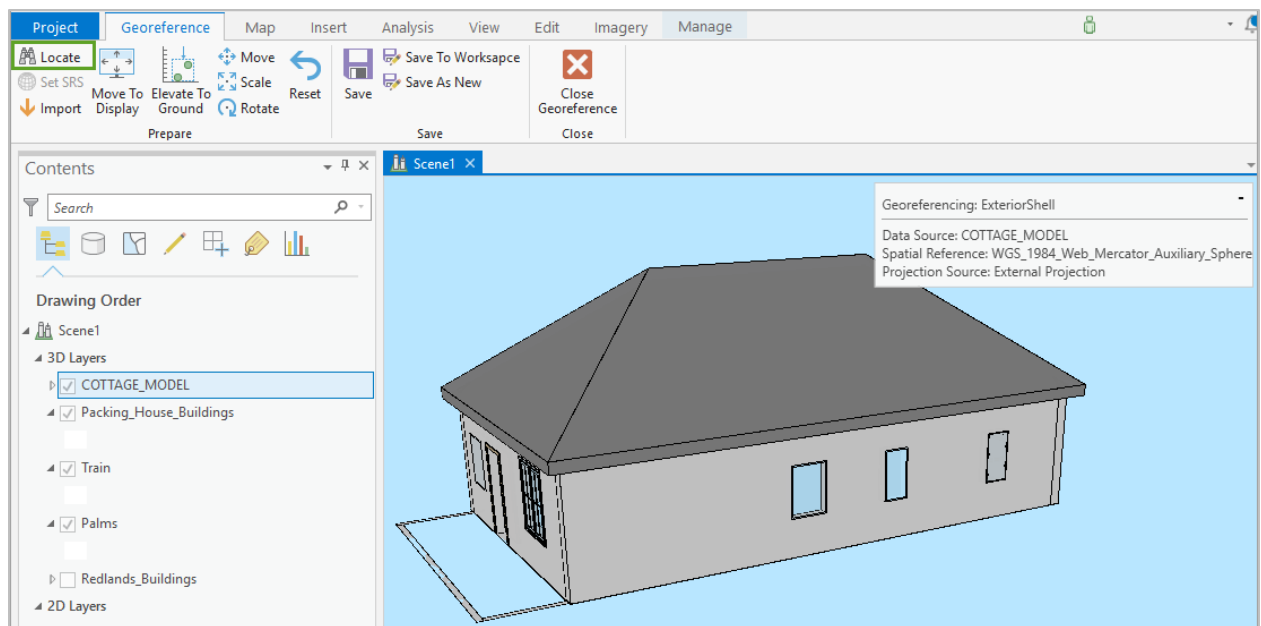


3. In the **Contents** pane, click **COTTAGE_MODEL** to select the layer.
4. On the **Manage** tab > **Alignment** group, click **Georeference**.

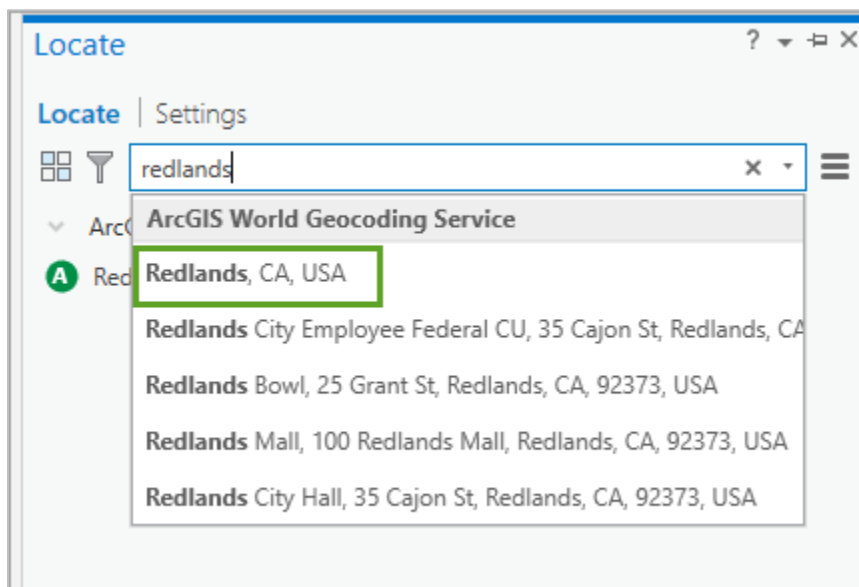


5. On the **Georeference** tab > **Prepare** group, click **Locate**.

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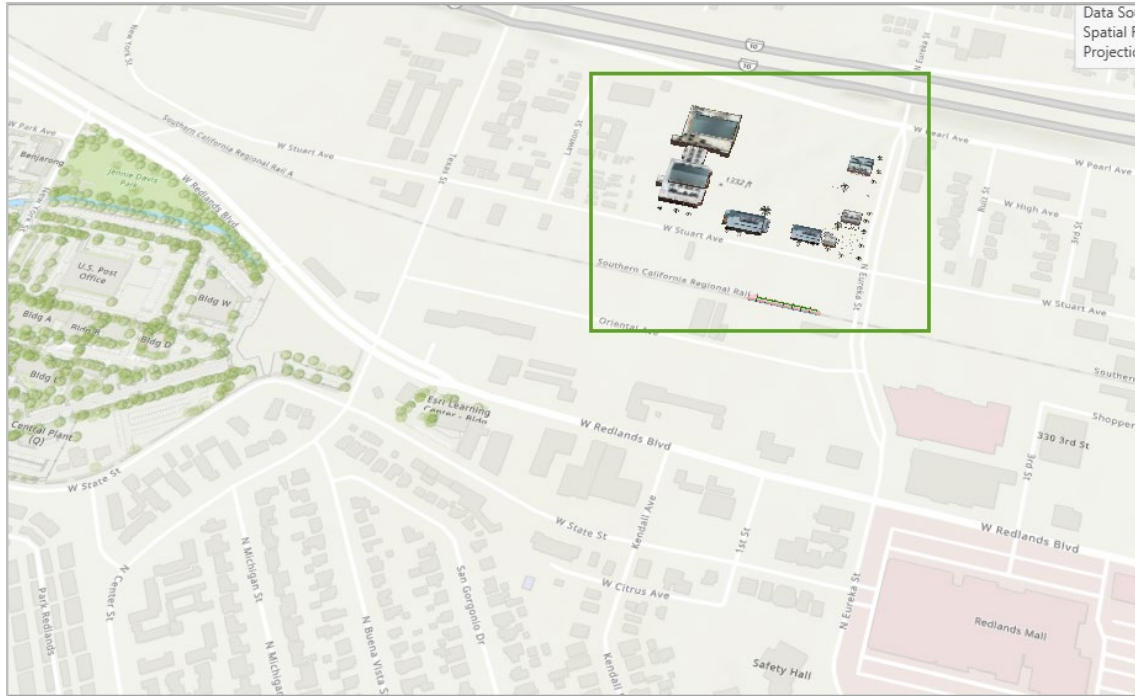


6. In the **Locate** pane, in the **Search** text box, type “Redlands” and press **Enter**.
7. In the search results, choose **Redlands, CA, USA**.

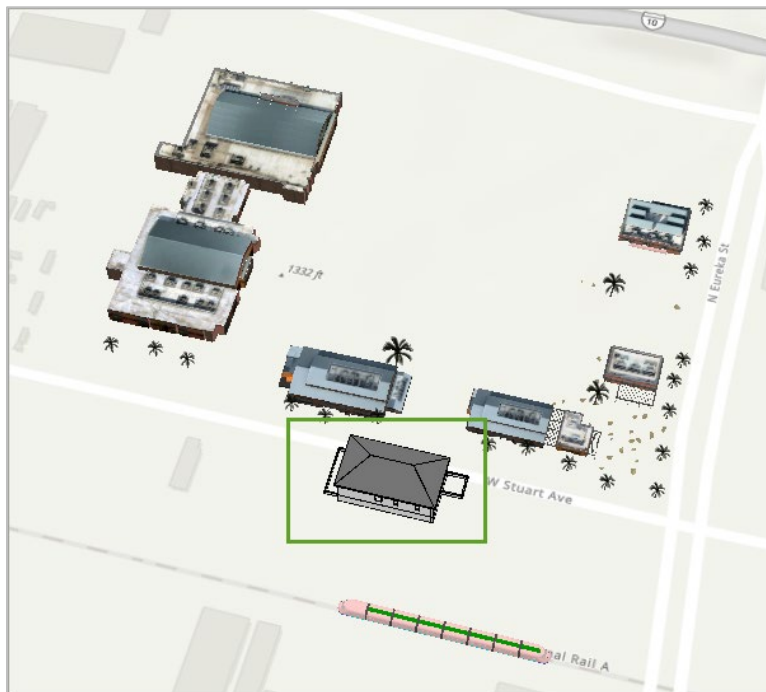


8. Zoom in close enough to view the Packing House buildings used in previous steps.

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9. On the **Georeference** tab > **Prepare** group, click **Move To Display**.

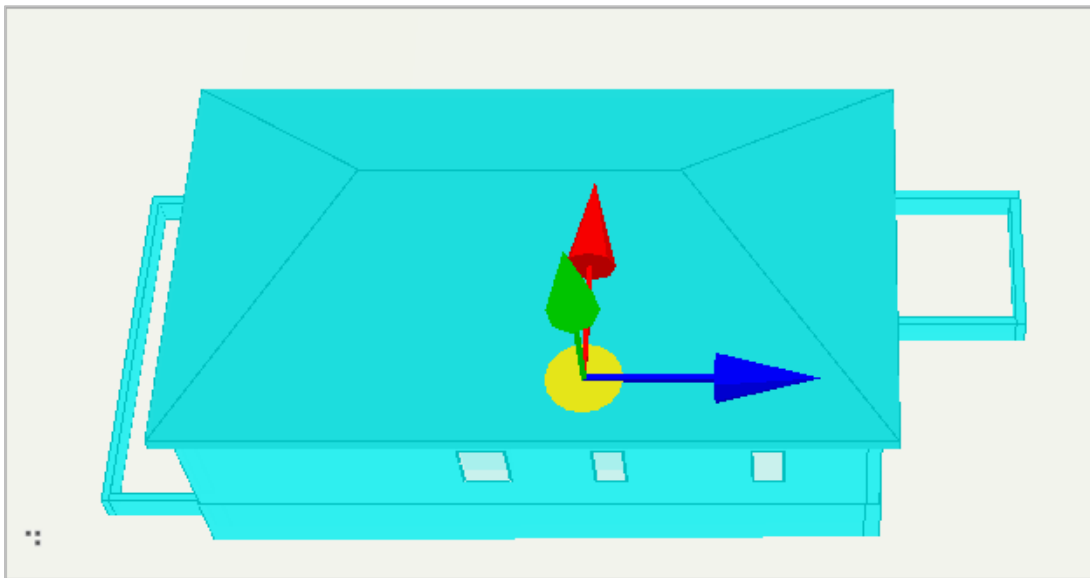


If needed, navigate around to notice how **COTTAGE_MODEL.rvt** displays on the relative location. Now you will move the cottage to a more suitable location. Next, you will tilt the view and zoom in on the cottage.

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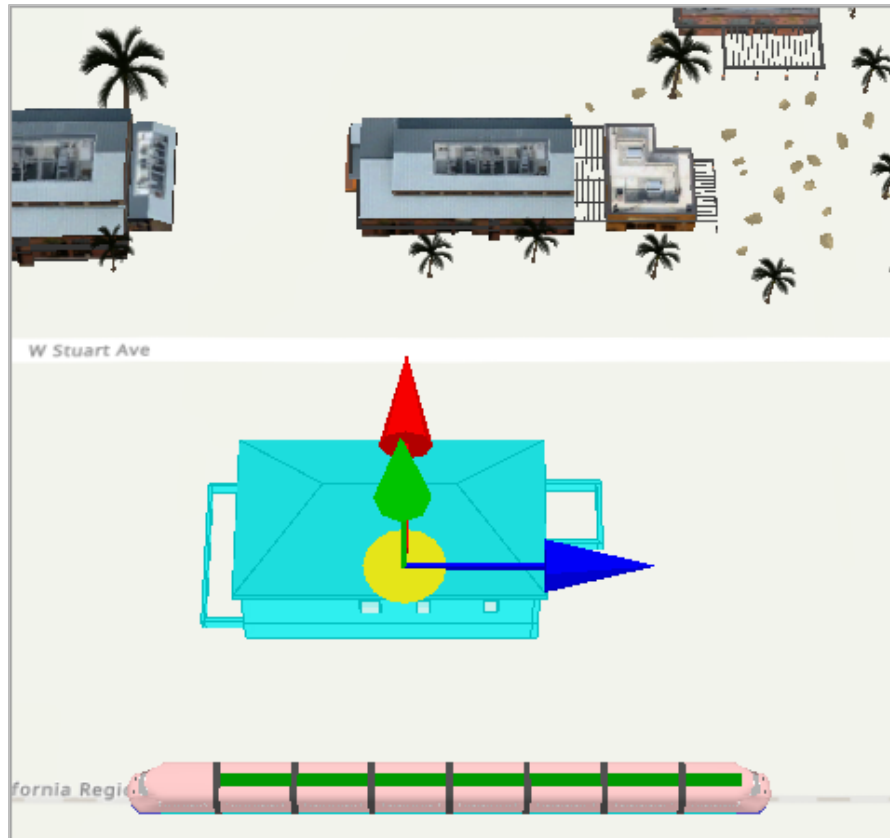


10. On the ribbon, **Georeference** tab > **Prepare** group, click **Move**.

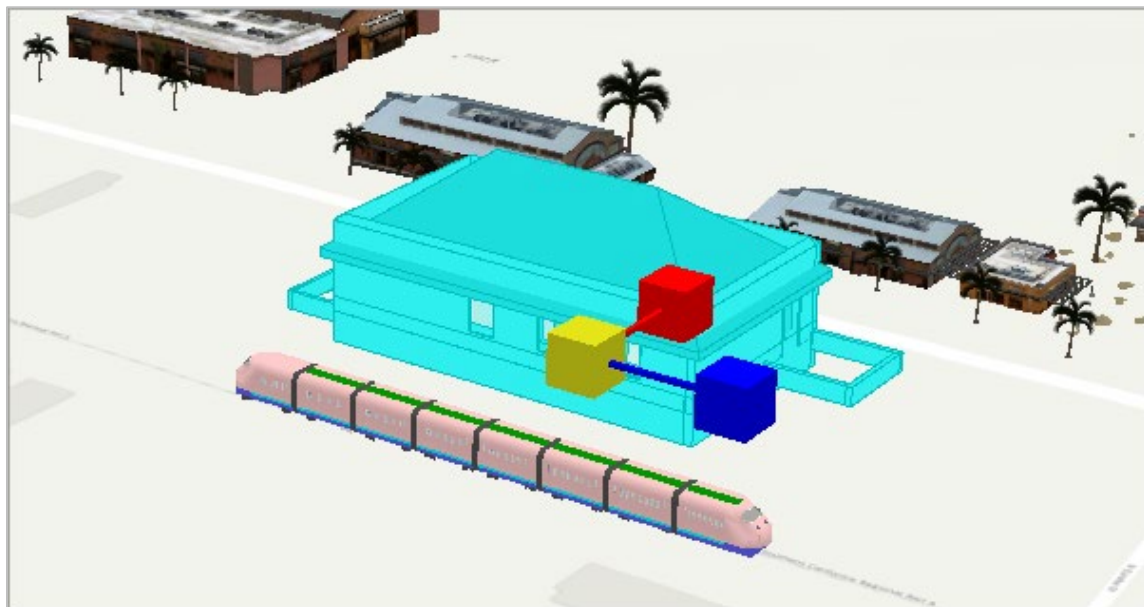


The cottage model is selected and displays navigation arrows to move the model in an x,y,z direction. Experiment and move the model to a suitable location opposite the train model added earlier.

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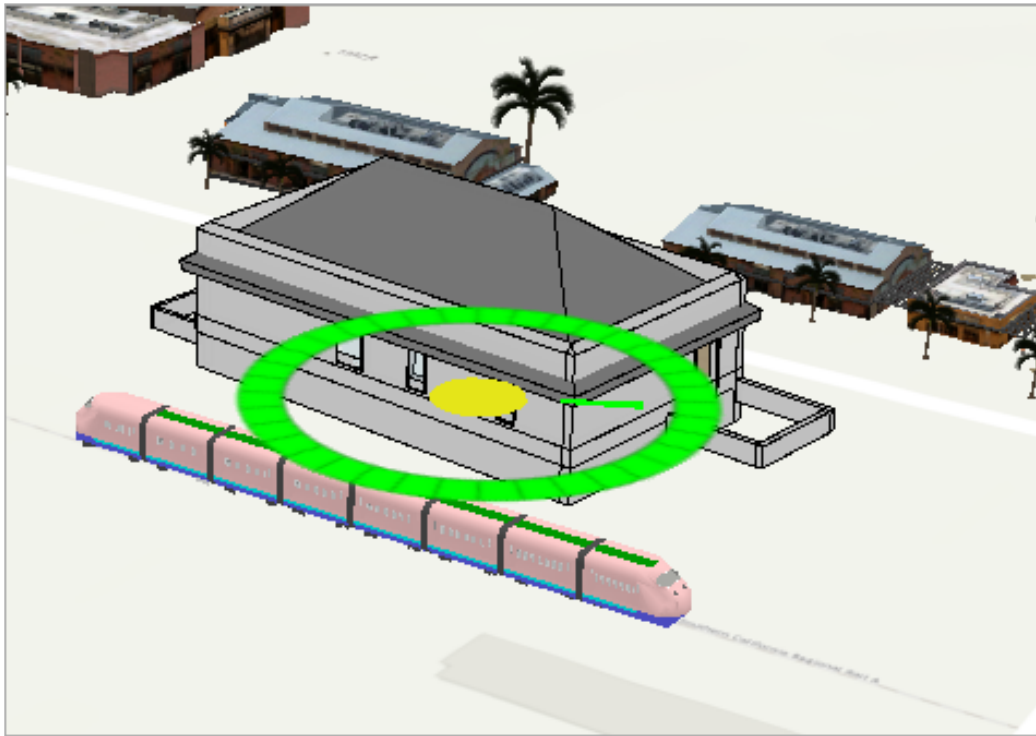
11. On the ribbon, **Georeference** tab > **Prepare** group, click **Scale**.



Experiment scaling the cottage model up by extending its length and width so that it may be used as a train depot.

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12. On the ribbon, **Georeference** tab > **Prepare** group, click **Rotate**.



Experiment rotating the cottage model to see if you can position it better within the space for use as a train depot.

13. When you finish georeferencing and positioning and scaling the model, from the **Georeference** tab > **Save** group, click **Save**.

This will create a 3D world file for the model.

14. Click **Yes**.

15. Click the **Close Georeference** button to exit of the georeferencing process.

16. Save the project and close ArcGIS Pro.

Summary

When working with external or imported content, it is important to know the format of and software used to create the file. This will help determine the correct workflow needed to display and use the file in ArcGIS Pro. Workflows may include either creating a multipatch feature classes or a BIM composite layer from

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the original content. Supporting, sharing and consuming external/imported content are particularly important for third parties and agencies working on site-specific projects and new proposed designs.