Beginner's Guide to Importing and Analysing Kowloon East 3D Visualisation Map in ArcGIS Pro: A Step-by-Step Workshop

The tutorial provides a step-by-step guide on how to import and analyse the Kowloon East 3D Visualisation Map in ArcGIS Pro, covering topics such as downloading the map, setting up the project, importing the map, and exploring the 3D mesh layer. The tutorial aims to provide a comprehensive and easy-to-follow guide to help beginners gain a basic understanding of how to work with 3D visualisation maps in ArcGIS Pro

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Part 1: Download the data from CSDI Portal

1. Open your web browser and go to the **CSDI Portal website** by entering the following URL in the address bar: **https://portal.csdi.gov.hk/**

2. Type "3d visualisation map" in the search box at the top of the page.

Filter Panel
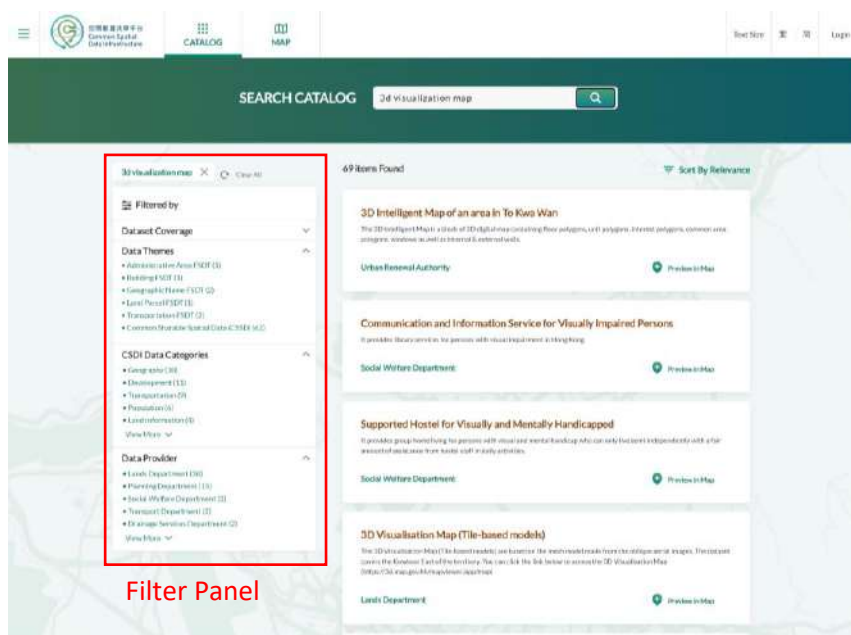
You will be presented with a list of datasets. On the left side of the screen, you can filter the results by coverage, themes, categories, and providers. For example, if you want to focus on a specific location such as Kwun Tong, you can zoom into the district on the map and select "Within" in the coverage filter.

3. Click on the title **3D Visualisation Map (Tile-based models)** that appears as the first result of the search.
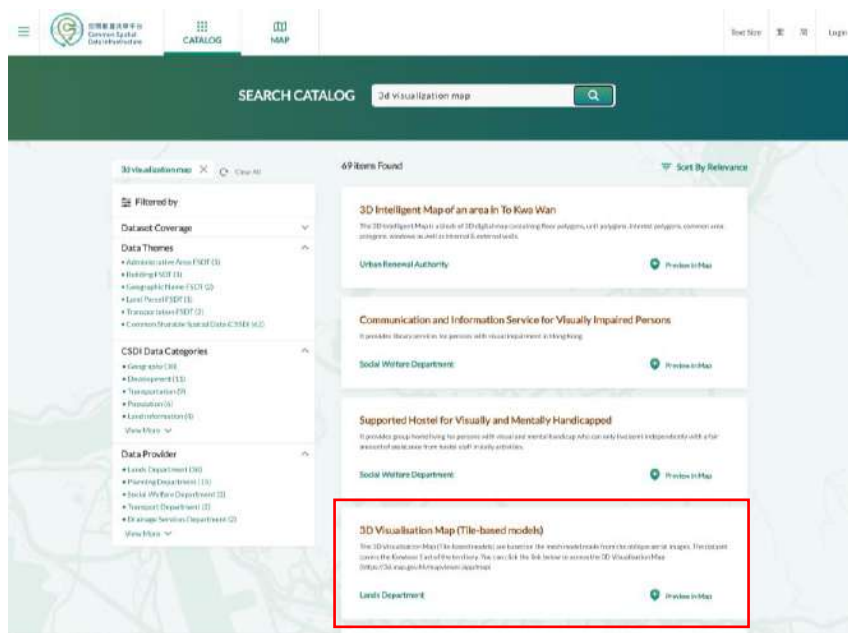
On this page, you'll find general information about the data provider, including technical specifications, update frequency, and contact details. The dataset is available for download in various formats that comply with the Open Geospatial Consortium standard.

Please note that some datasets cannot be downloaded directly via the CSDI portal. For example, to access most spatial data and topographic maps from the Lands Department, you'll need to download a layer of reference polygons that provides the name, extent, and download path for each tile. This is especially useful when downloading tiles in bulk with automation. However, if you only need to download a few tiles, it's best to use the individual download links available on the CSDI interactive map view.

4. To view the dataset, click the **Preview in Map** button.

The **Map View Page** displays a visual representation of the data, allowing you to interact with the map as you would in a GIS program. You can add multiple layers and toggle them on and off, change the base map, and click on each polygon to view its attributes.
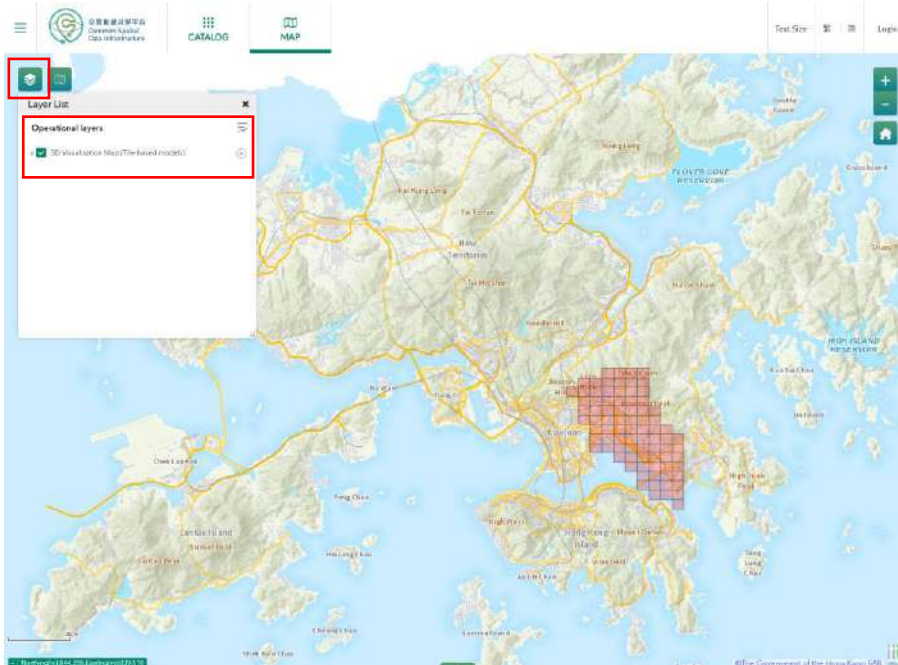
5. Select the tile you want to download by clicking on it.

In the feature pop-up box, you'll see key information like the tile name, revision date, and download links for different formats. If you want to preview the 3D model, click "3D_Visualation_Map" to access the map viewer.

6. Go back to the **CSDI Portal website** and select the **OSGB** format to download.
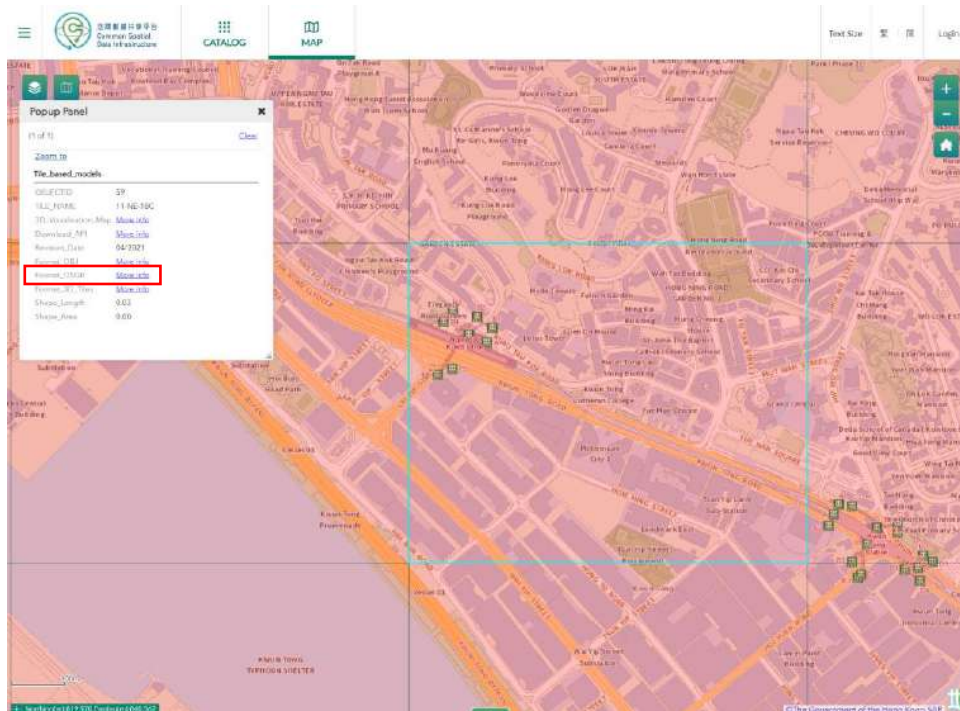
7. Once the download is complete, unzip the file.

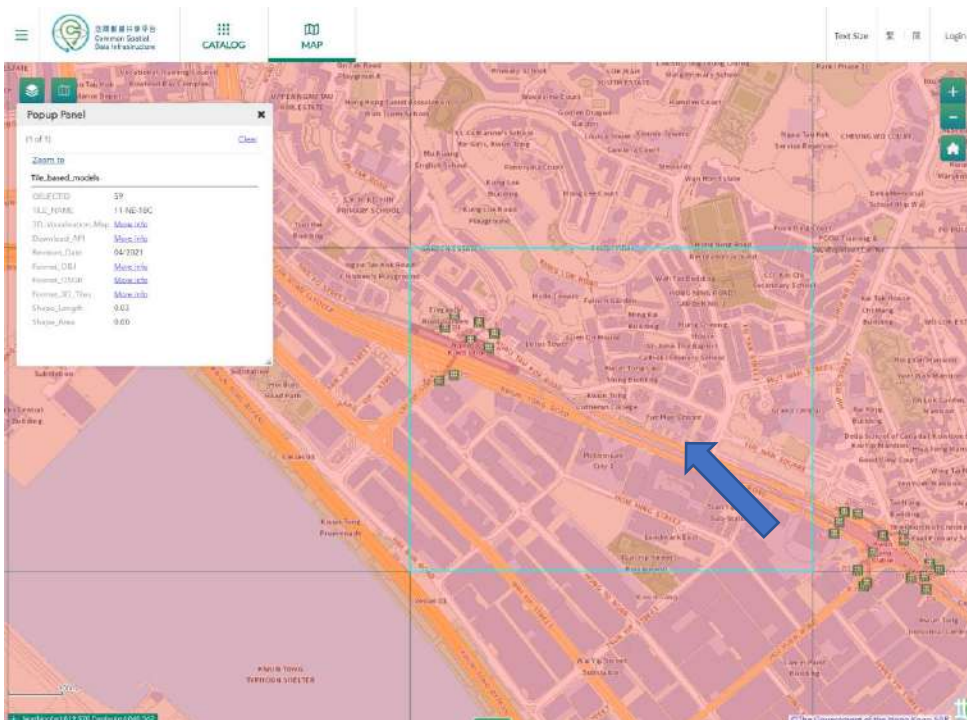When you unzip the OSGB folder, you will find 20 sub-folders. This is because the 1:1000 tile has been divided into 20 equally sized sub-tiles to manage the large amount of data, resulting in a tile-based dataset. On the other hand, the **3D Visualisation Map (Individualized models)** further breaks down the 1:1000 tile into individual types of ground objects such as buildings, infrastructure, vegetation, sites, water bodies, terrain, and generic objects. This allows for a more detailed and specific view of the data.

Part 2: Import the data in ArcGIS Pro

8. To begin, launch **ArcGIS Pro** on your desktop and create a new project by selecting "Start without a template".
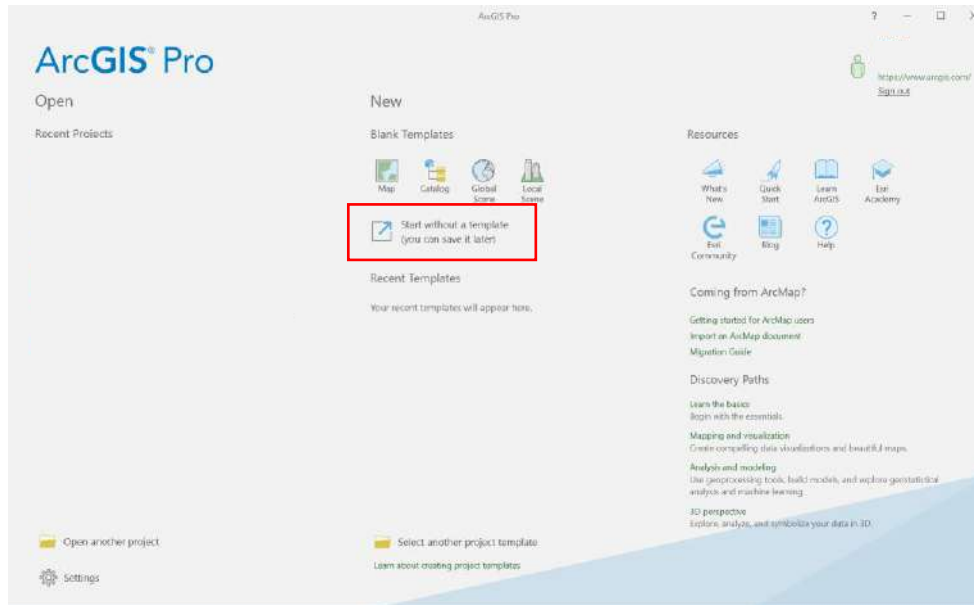
9. On the **Insert** ribbon, choose **New Map** and load a **New Local Scene**.
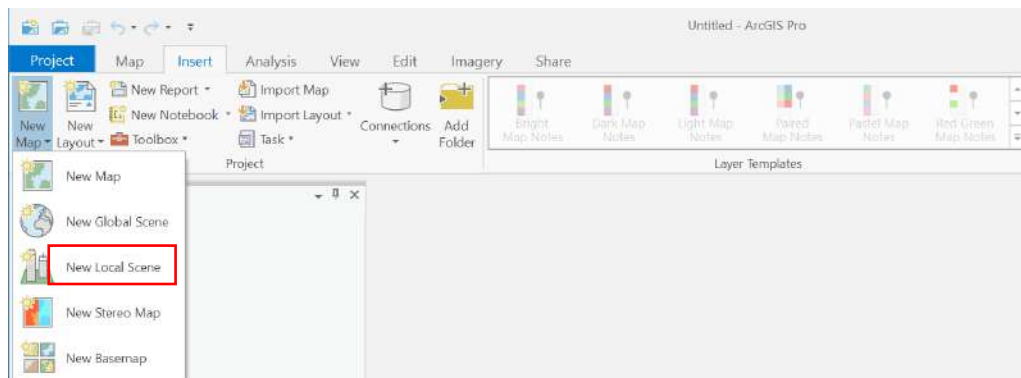
10. Add the OSGB folder to ArcGIS Pro's **Catalog Pane** by dragging it from your File Explorer into the program.
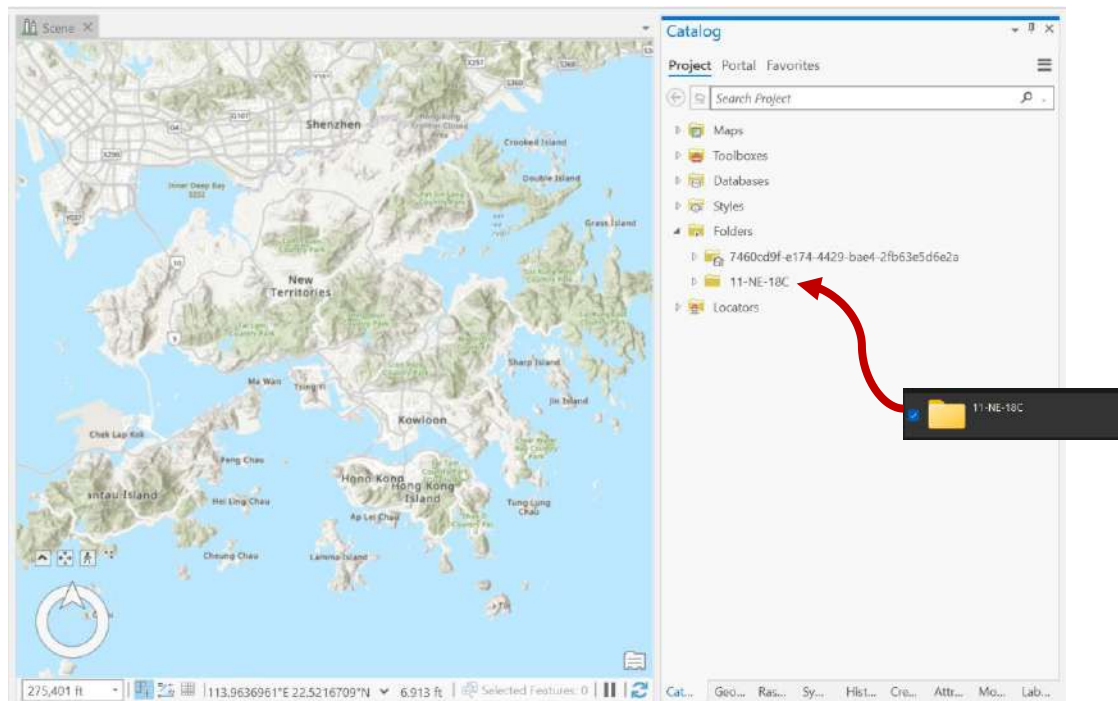
11. Locate and access the **Create Integrated Mesh Scene Layer Content** tool in the **Geoprocessing Pane**. If you're using ArcGIS Pro version below 2.9, look for the **Create Integrated Mesh Scene Layer Package** tool instead.
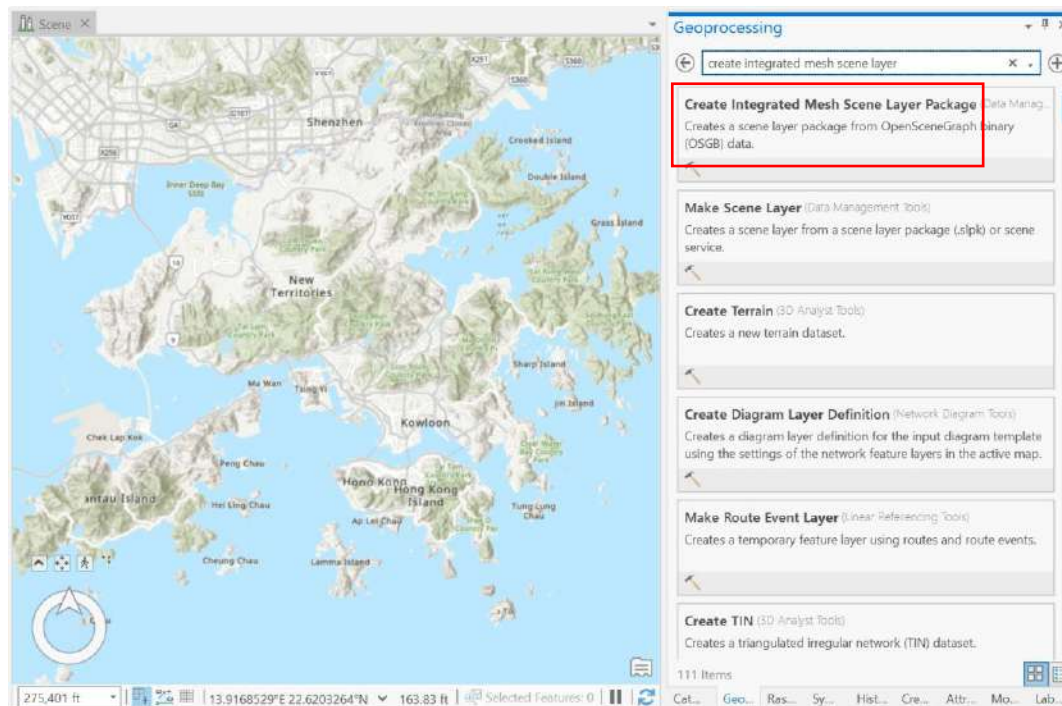
12. To specify the input data for this tool, click on the **Browse** button located next to the
Input Dataset parameter. Then, navigate to the unzipped OSGB folder and select the
sub-folders that you want to import. If you choose to import the entire 1:1000 tile, you
should select all 20 sub-tiles, which will appear as a list under the **Input Dataset**
parameter.
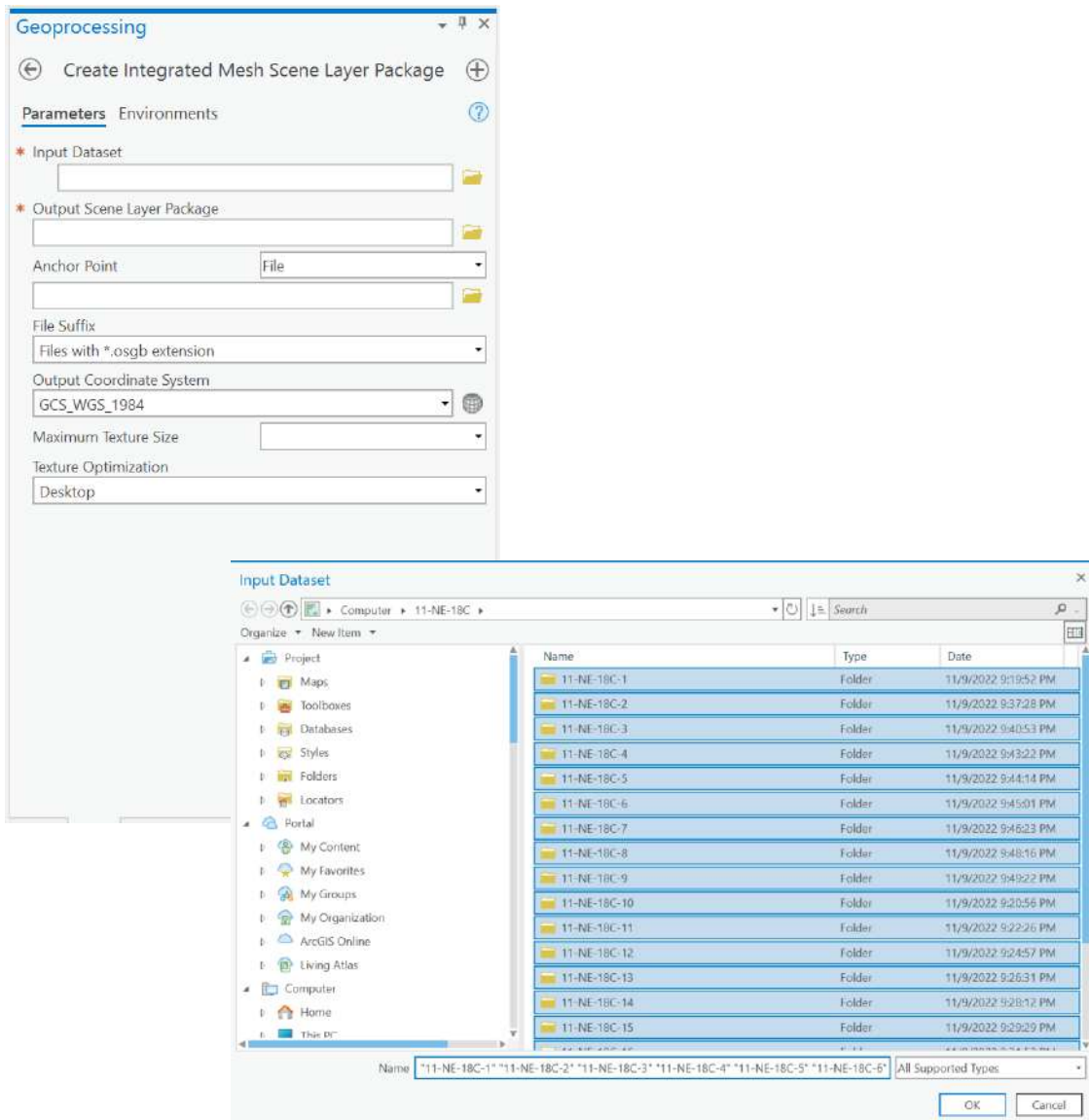
13. Set the **Output Scene Layer Package** location to the same directory as your OSGB folder and give it the same name as the OSGB file you downloaded (e.g. 11-SE-3A).
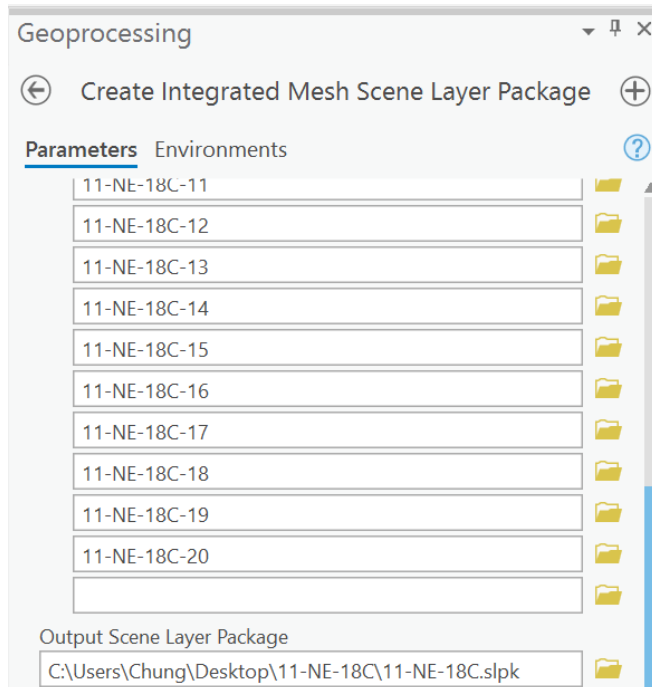
To ensure the model is accurately georeferenced, you will need to provide additional metadata (click to download) in the form of a .xml, .3mx, or .wld3 file. This file should be placed in the same folder as the OSGB files, or you can specify the file location through the **Anchor Point** parameter.

14. Locate the "metadata.xml" file and select it as the **Anchor Point** parameter.

15. Set the Output Coordinate System to "GCS_WGS_1984" and leave the other settings as default.

16. Click **Run** to begin the import process.

17. In the **Catalog Pane**, expand the OSGB folder to find the new slpk file. Simply drag and drop it into the scene.
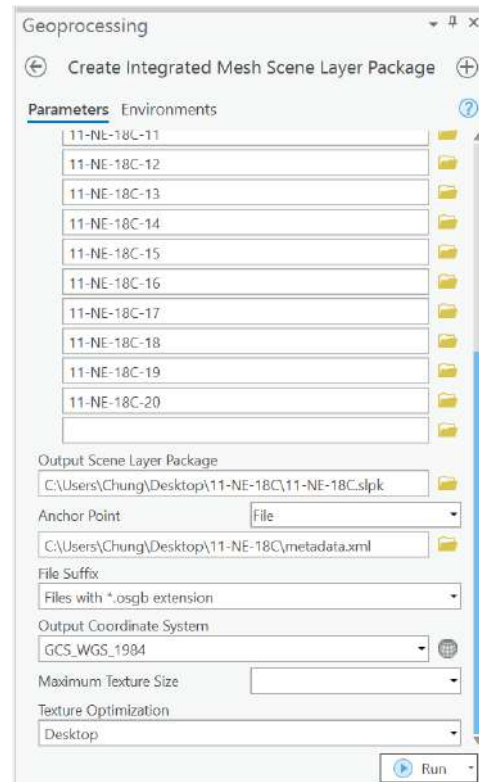
Once added to the scene in ArcGIS Pro, you can explore the 3D mesh layer by zooming in and out and using the navigation tool.
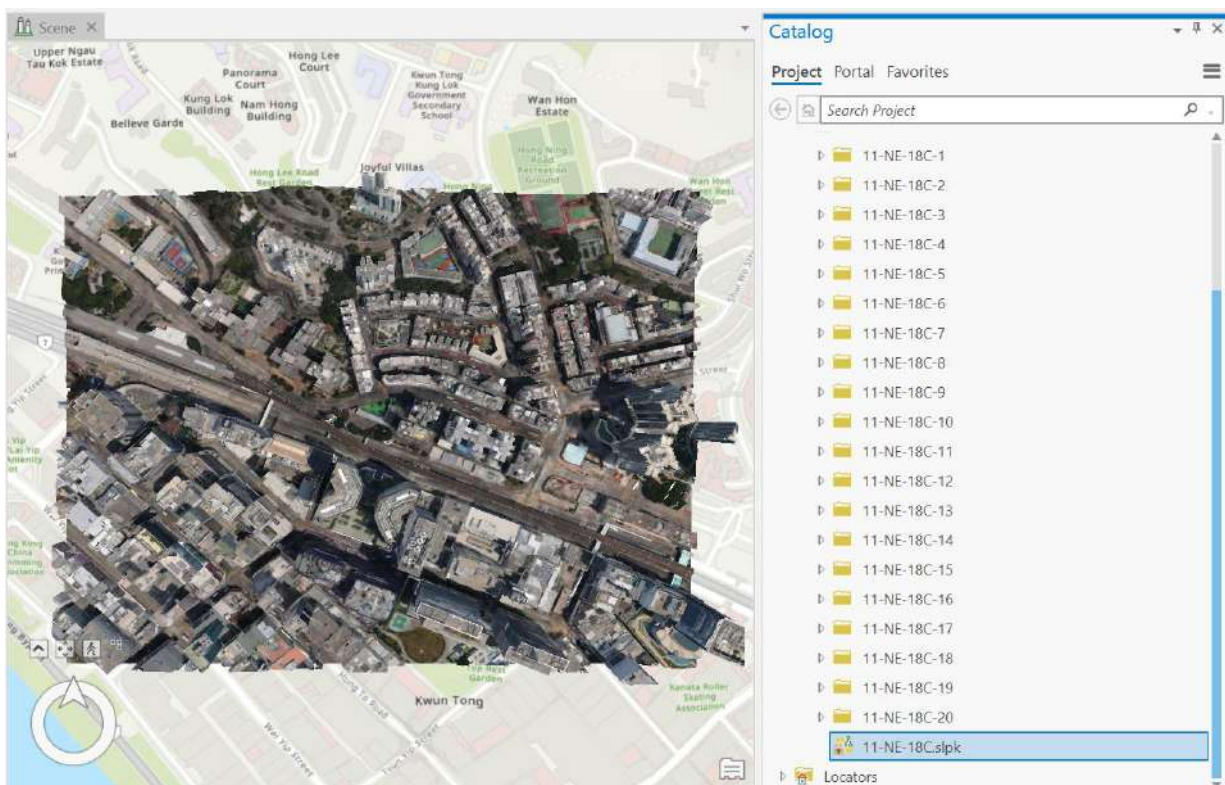
Part 3: Explore the 3D mesh in ArcGIS Pro

In this section, we will learn about some of the fundamental 3D exploratory analytical tools provided by ArcGIS Pro, such as the **Elevation Profile**, **View Dome**, and **Viewshed**.

The **Elevation Profile** tool is interactive and produces a graph of height values along a linear path in the current view. The profile is based on the elevation surface in the map or scene, and it retrieves values from the data sources for the elevation surface, rather than the level of detail of the view, which distinguishes it from other exploratory analysis tools.

1. Open the **Elevation Profile** tool from the **Exploratory 3D Analysis** gallery.
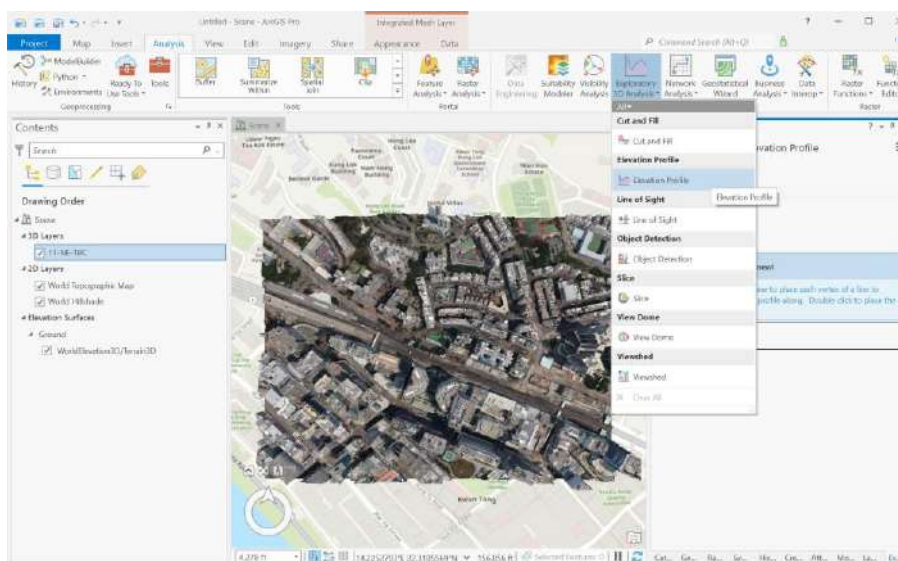
2. Select **Interactive Placemen"** in the **Elevation Profile** pane.
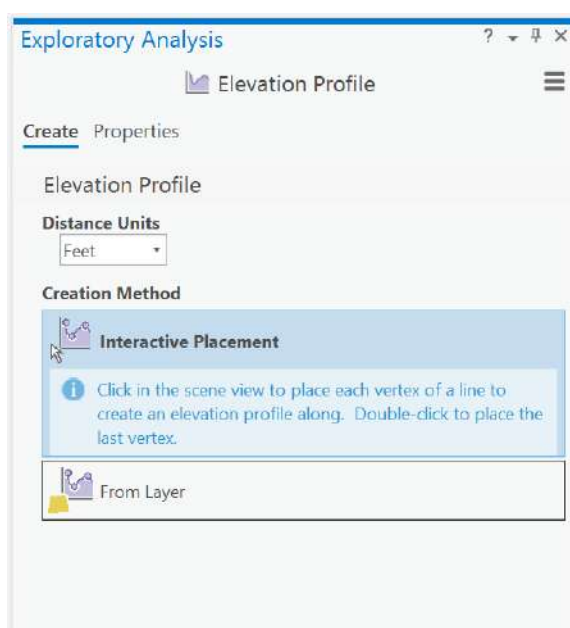
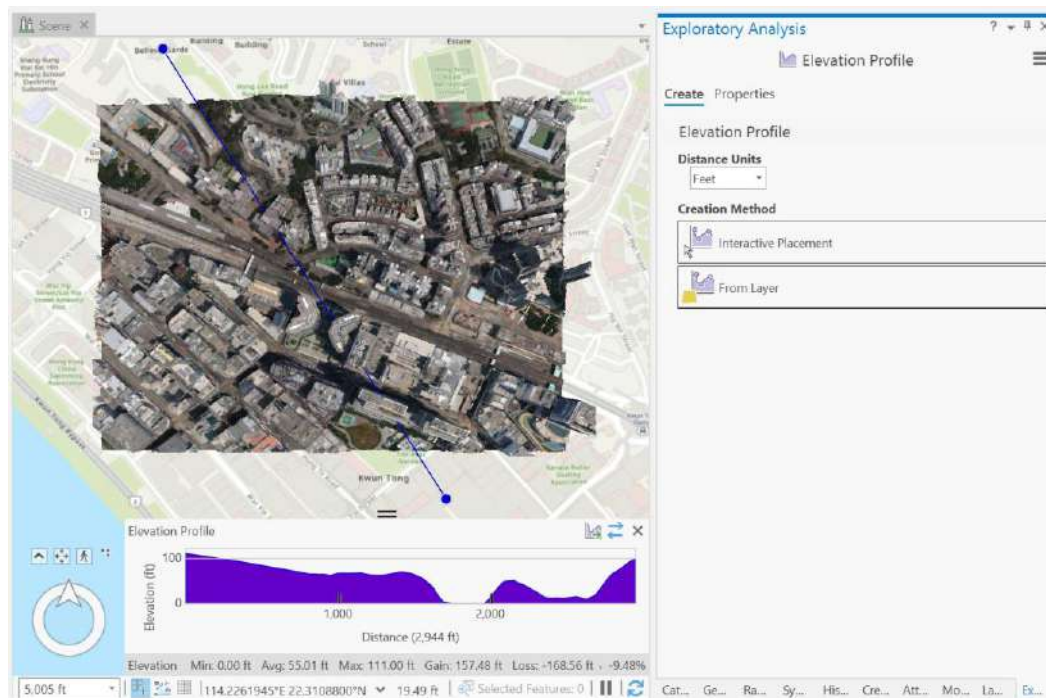3. Click the scene view and draw a line on the 3D mesh to indicate where you want the elevation profile.

4. Double-click to set the endpoint of your elevation profile line.

5. Once the analysis is complete, the **Elevation Profile** pane will display a graph which can be navigated by clicking and dragging to view different sections of the profile.

6. You can also export the elevation profile as a CSV by clicking on the **Export Data** button.
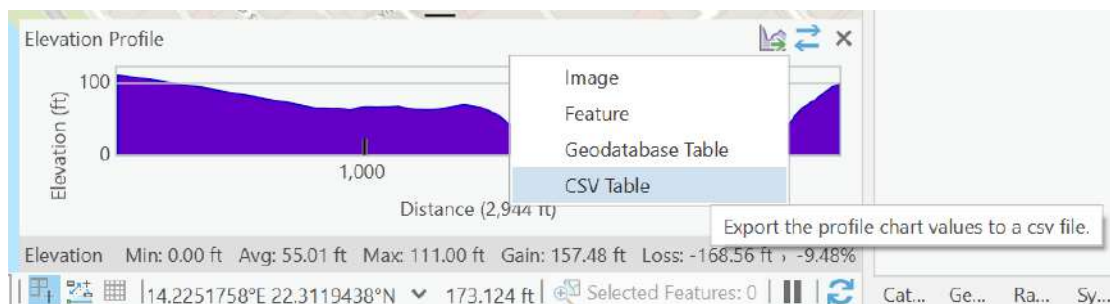
View Domes are an effective way to visualize the visible 3D spaces from a specific location. They are calculated based on the 3D content currently displayed in a scene, including the ground surface, buildings, and trees. By following a few simple steps, we can easily create and modify a view dome to visualize how city buildings may affect residents' ability to view the sky. This can be a valuable tool in urban planning and design.

1. Click the **View Dome** tool in the **Exploratory 3D Analysi"** gallery.
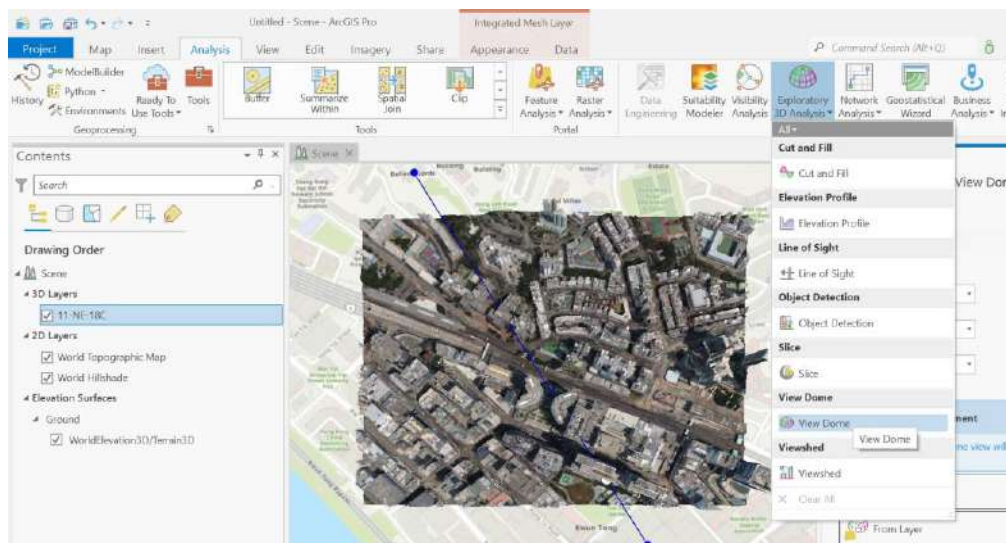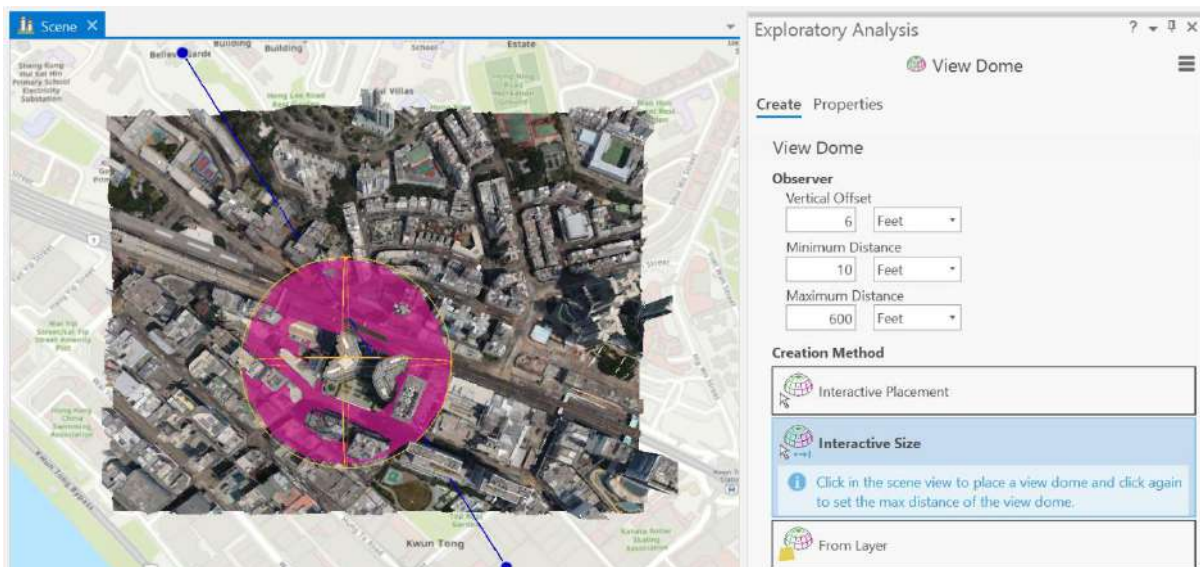

2. In the **View Dome** pane, click on the **Interactive Size** option.

3. Click on the desired location in the mesh model within the scene view to set it as the centre of the view dome.

4. Adjust the view dome size by dragging the ring around the point.

5. Left-click anywhere in the scene view to create the view dome after adjusting its extent to your satisfaction.


You will be able to see that the view dome tints the dome for areas of the sky that are not visible to the observer.

6. To adjust the viewing area, position your mouse over the observer located at the centre of the ring and click on it. Resize the observer by dragging the scale handles to encompass the area you want to visualize. This will adjust the extent of the view dome accordingly, allowing you to focus on the desired location.

Viewshed is a tool used to identify the visible areas of a 3D view from a specific point. These viewsheds are based on the current content displayed in the scene, including the ground surface and features such as buildings and trees that are represented using symbols.

1. Activate the Viewshed tool by clicking on **Viewshed** in the **Exploratory 3D Analysis** gallery.
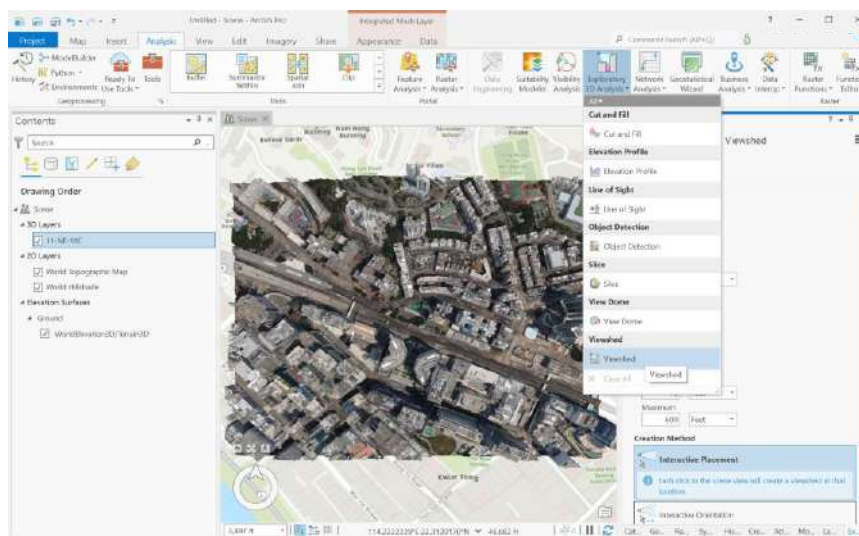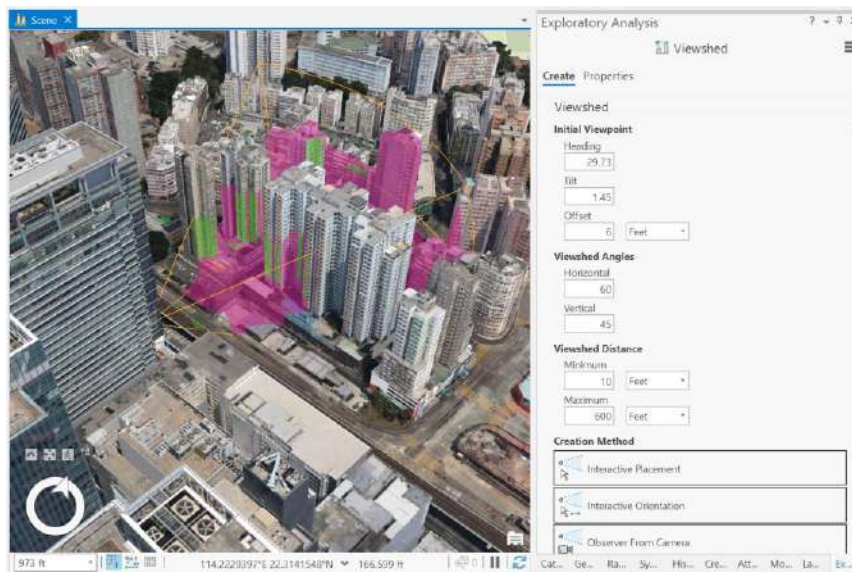

2. Click **Interactive Orientation** in the **Viewshed** pane.
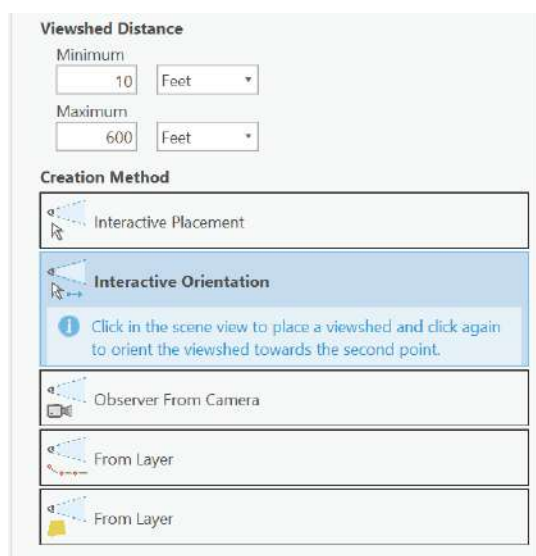
3. Click on the desired location in the scene to add an observer point and create a viewshed.

4. Rotate your viewshed to observe visible areas (green) and non-visible areas (red).

5. To modify a viewshed, begin by selecting the observer point. You can then use the in-scene handles to move the viewshed parallel to the ground or adjust its height by moving it up or down. In addition, you can make use of the XYZ handles, which are coloured green, blue, and red, to rotate the viewshed as desired.

6. Adjust the view range and angles as desired to customize your viewing experience. Use the available options to increase or decrease the range or change the angles to get a better perspective of the 3D model.