Finding Your Way in a Building

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Discovering a route within a building constitutes the initial phase of exploration or visitation. I would like to present a guide on creating an indoor floor plan for a structure and locating a desired destination. This story map utilized data from the Seneca and Iribe Buildings.

Loading Floor Plan Data

prepare the CAD data

	A	B	C
1	SOURCE_PATH	LEVEL_ID	
2	M:\INTERNS\2023\mkim1226\PROJECTS\Seneca\CAD\812_0.dwg	UMD.812.0	
3	M:\INTERNS\2023\mkim1226\PROJECTS\Seneca\CAD\812_1.dwg	UMD.812.1	
4	M:\INTERNS\2023\mkim1226\PROJECTS\Seneca\CAD\812_2.dwg	UMD.812.2	
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Layer to Feature Class | Annotation to Field | Facility Properties | Level Properties | Source Files

Seneca CAD Data

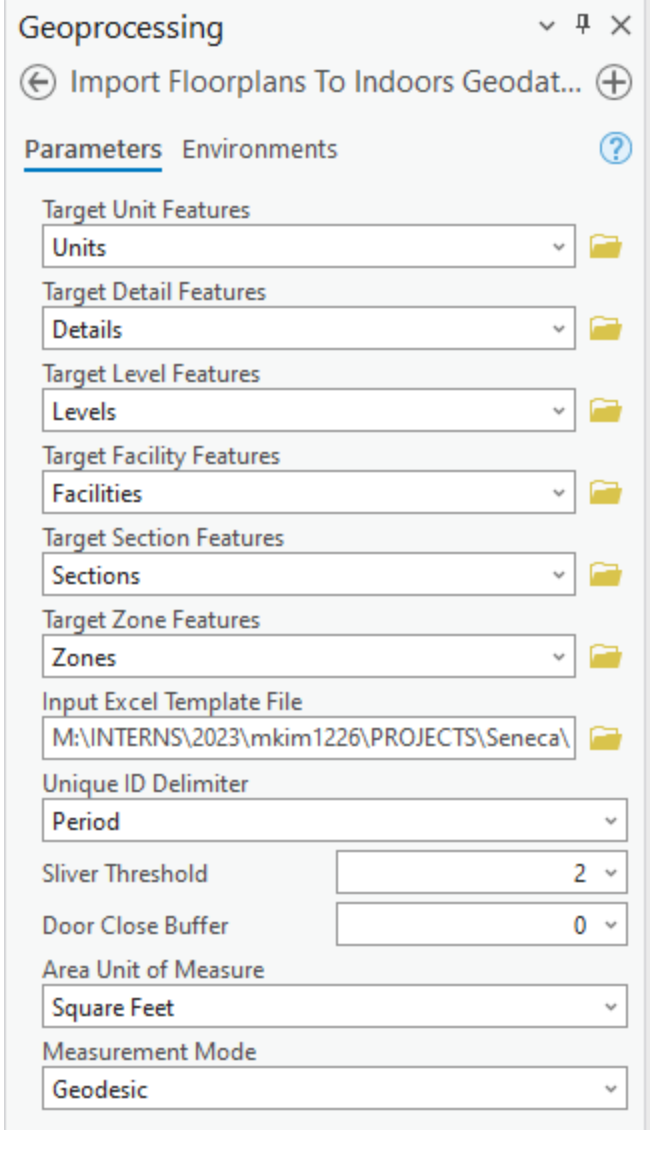
Preparing CAD data is crucial, as inconsistencies can lead to errors and cause geoprocessing tools to malfunction. For instance, if the source path of the .dwg files does not align with the actual path, the floor plan import process will encounter an error.

Create a GeoDatabase

Establish coordinates on the map and generate a new geodatabase to store the floor plan data. It is essential to accurately set both the XY and Z coordinates.

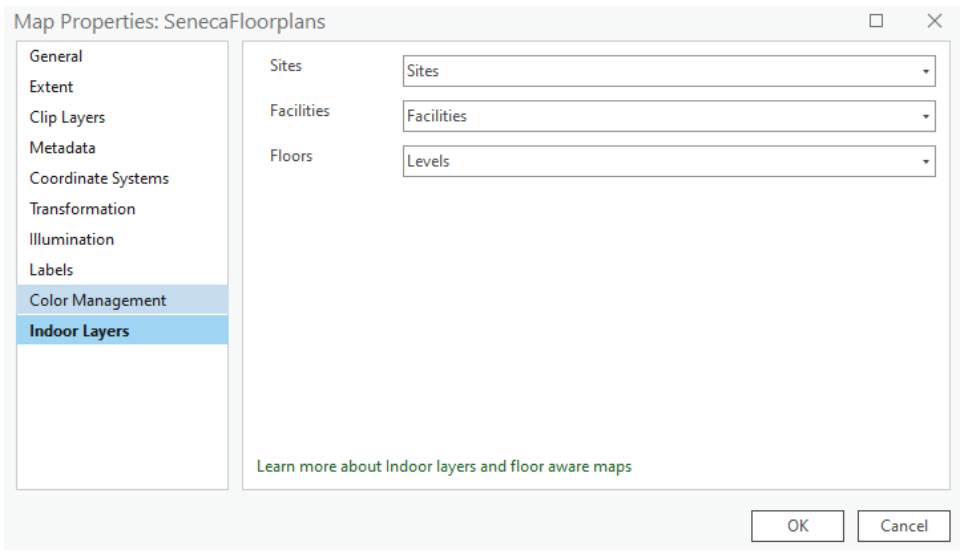
Import Floor plan

To import floor plans into an indoor geodatabase, utilize the CAD file as an input Excel template file. Employ the "Import Floorplans to Indoors Geodatabase" geoprocessing tool for this purpose. Ensure that each feature corresponds to the appropriate target feature.

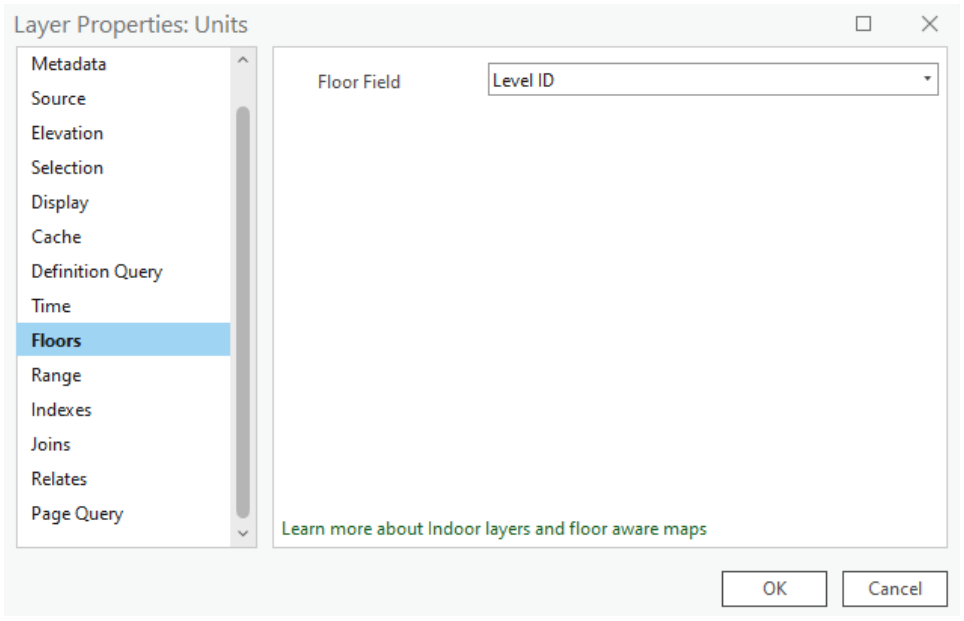


Import Floorplans To Indoors Geodatabase

Configure the map to show floors



Map Properties Dialog Box



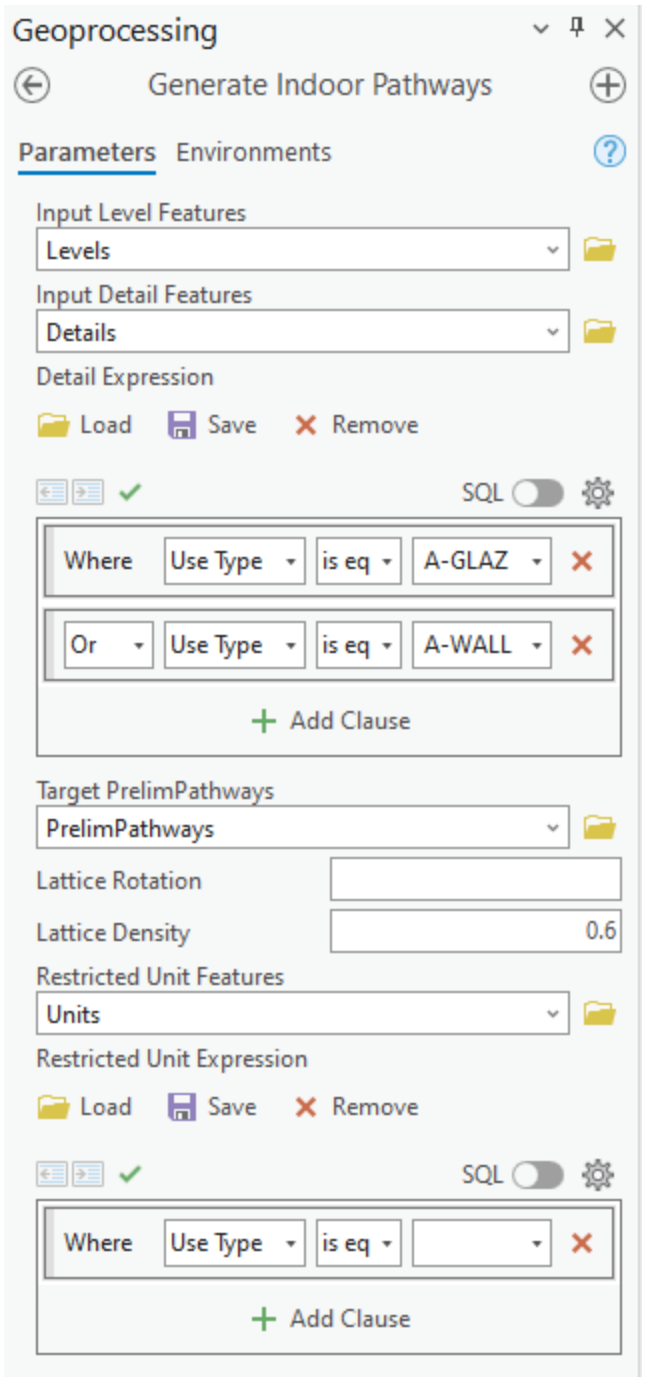
Feature Layer Properties Dialog Box

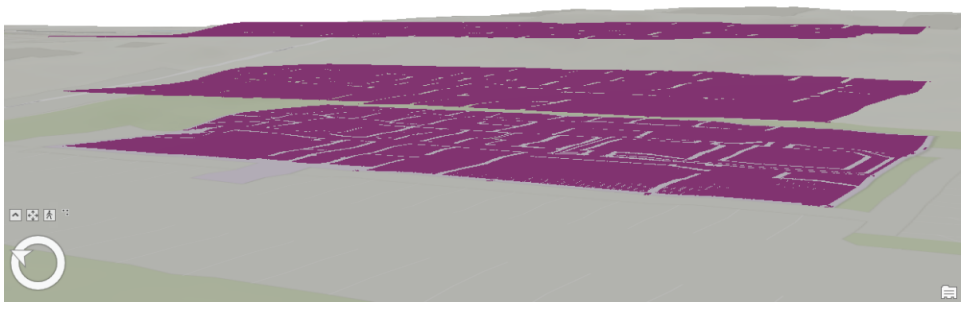
After loading your floor plan data, you can establish a map, scene, or feature layer-based web map as floor-aware by configuring the map's indoor layer properties. To utilize the interactive floor filter, you must set up layers for both the Facilities and Floors parameters. Optionally, you can also configure a layer for the Sites parameter.

Creating the Indoor Network

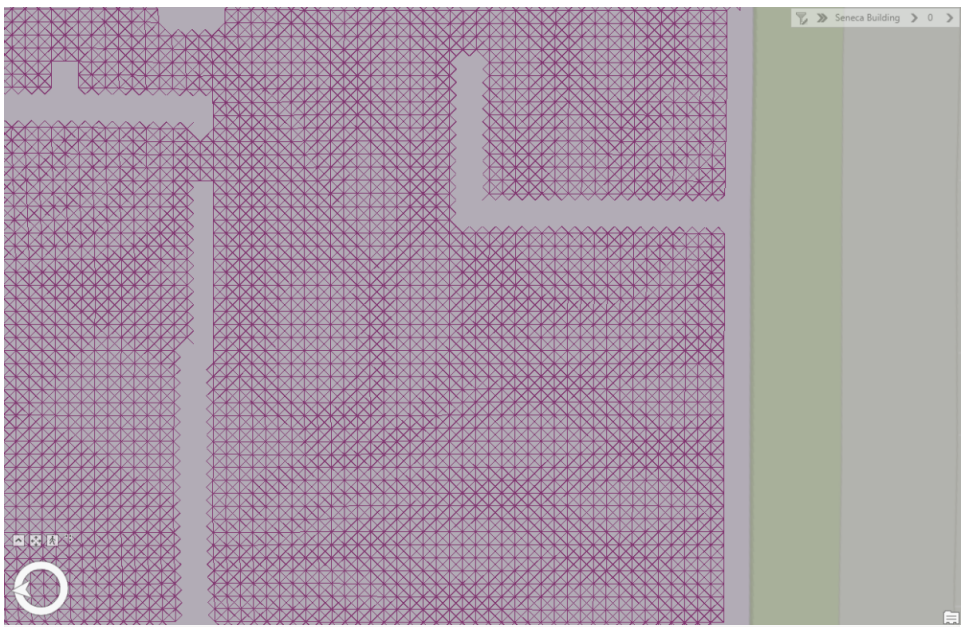
The completed indoor network dataset, derived from the refined and prioritized network, is suitable for indoor navigation purposes. To create the Indoor Network, follow these three steps: 1) Develop preliminary pathways, 2) Establish routable pathways, and 3) Thin the pathway.

Preliminary pathways





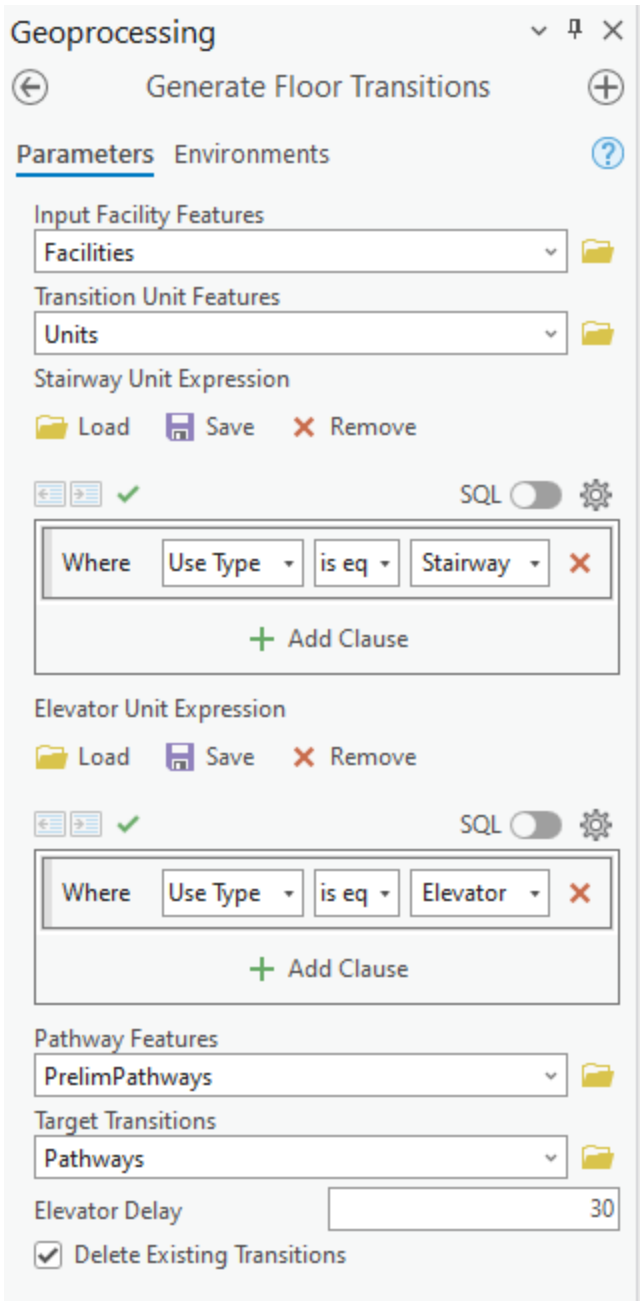
Preliminary Pathway (Floor Aware 3D Map)

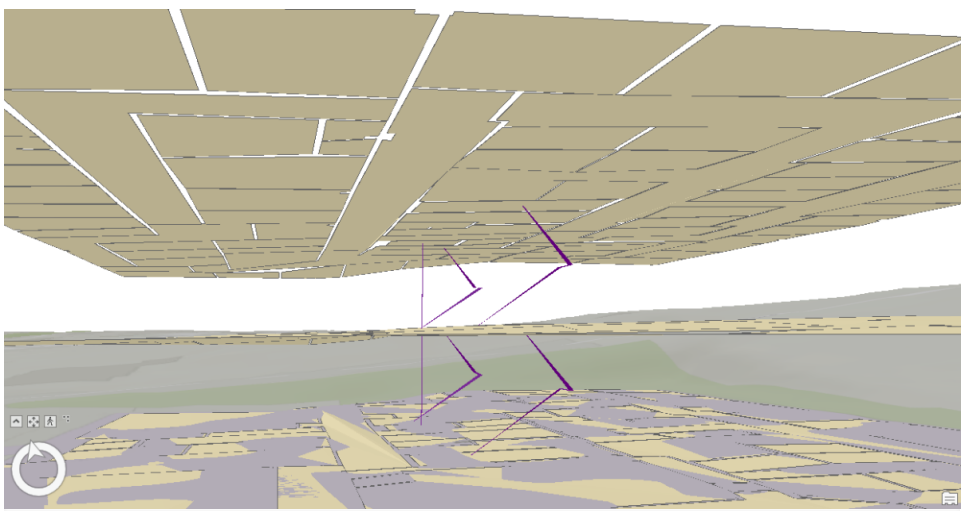


Preliminary Pathway

Employ the "Generate Indoor Pathways" geoprocessing tool to develop preliminary pathways. Identify obstructed features like walls and glass as non-navigable pathways. Upon completion, you can view the preliminary pathways and, in the 3D map, observe the floor-aware preliminary pathways.

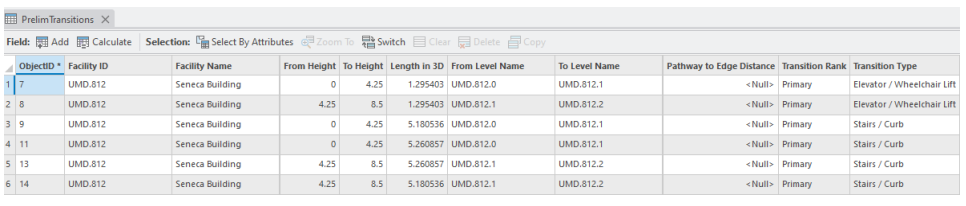
Routable pathways (Thin pathways)





Revised Stairway

Modify the floor transitions by adding stairways and elevators to the map. It is essential that the Unit feature layer's UseType field includes stairway and elevator entries; otherwise, generating the transitions will fail. Upon creation, stairway vertices are initially represented as points and must be manually edited. Utilize the edit functionality in ArcGIS Pro to adjust transitions accurately. Be cautious to ensure that transition vertices are located on the pathways.

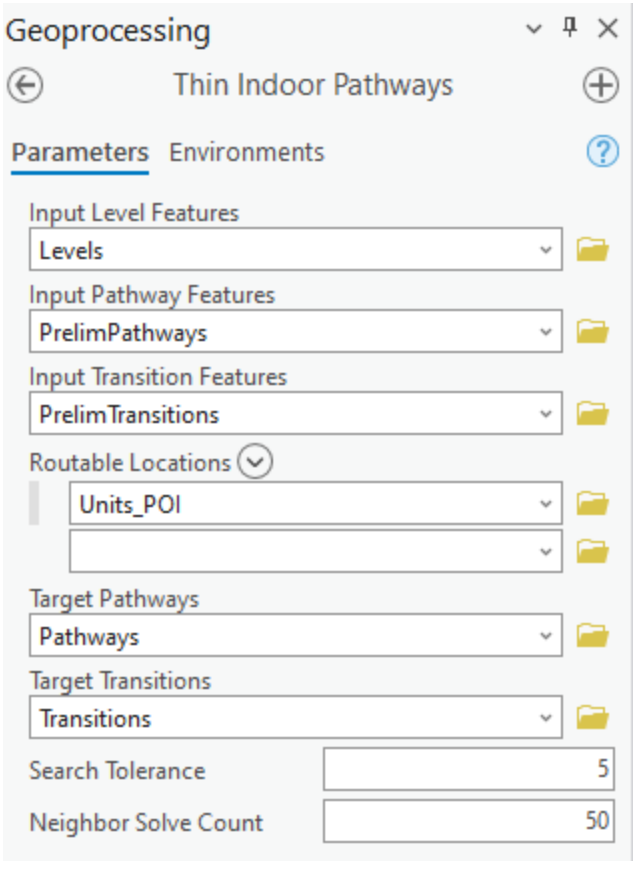


PrelimTransitions

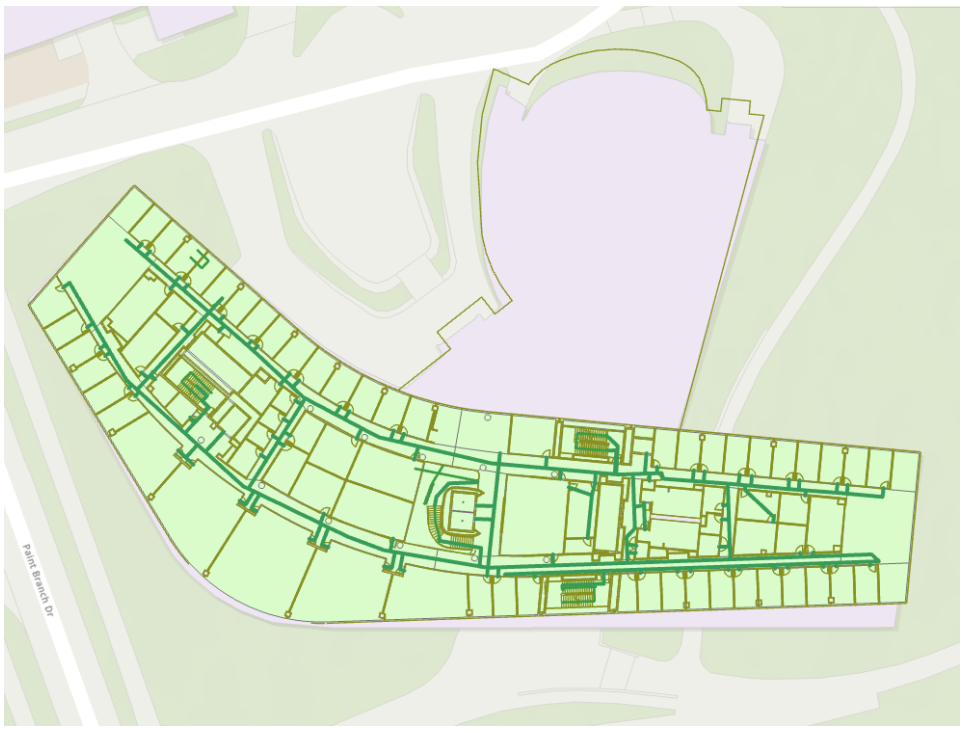
Field: Add Calculate | Selection: Select By Attributes Zoom To Switch Clear Delete Copy

	ObjectID *	Facility ID	Facility Name	From Height	To Height	Length in 3D	From Level Name	To Level Name	Pathway to Edge Distance	Transition Rank	Transition Type
1	7	UMD.812	Seneca Building	0	4.25	1.295403	UMD.812.0	UMD.812.1	<Null>	Primary	Elevator / Wheelchair Lift
2	8	UMD.812	Seneca Building	4.25	8.5	1.295403	UMD.812.1	UMD.812.2	<Null>	Primary	Elevator / Wheelchair Lift
3	9	UMD.812	Seneca Building	0	4.25	5.180536	UMD.812.0	UMD.812.1	<Null>	Primary	Stairs / Curb
4	11	UMD.812	Seneca Building	0	4.25	5.260857	UMD.812.0	UMD.812.1	<Null>	Primary	Stairs / Curb
5	13	UMD.812	Seneca Building	4.25	8.5	5.260857	UMD.812.1	UMD.812.2	<Null>	Primary	Stairs / Curb
6	14	UMD.812	Seneca Building	4.25	8.5	5.180536	UMD.812.1	UMD.812.2	<Null>	Primary	Stairs / Curb

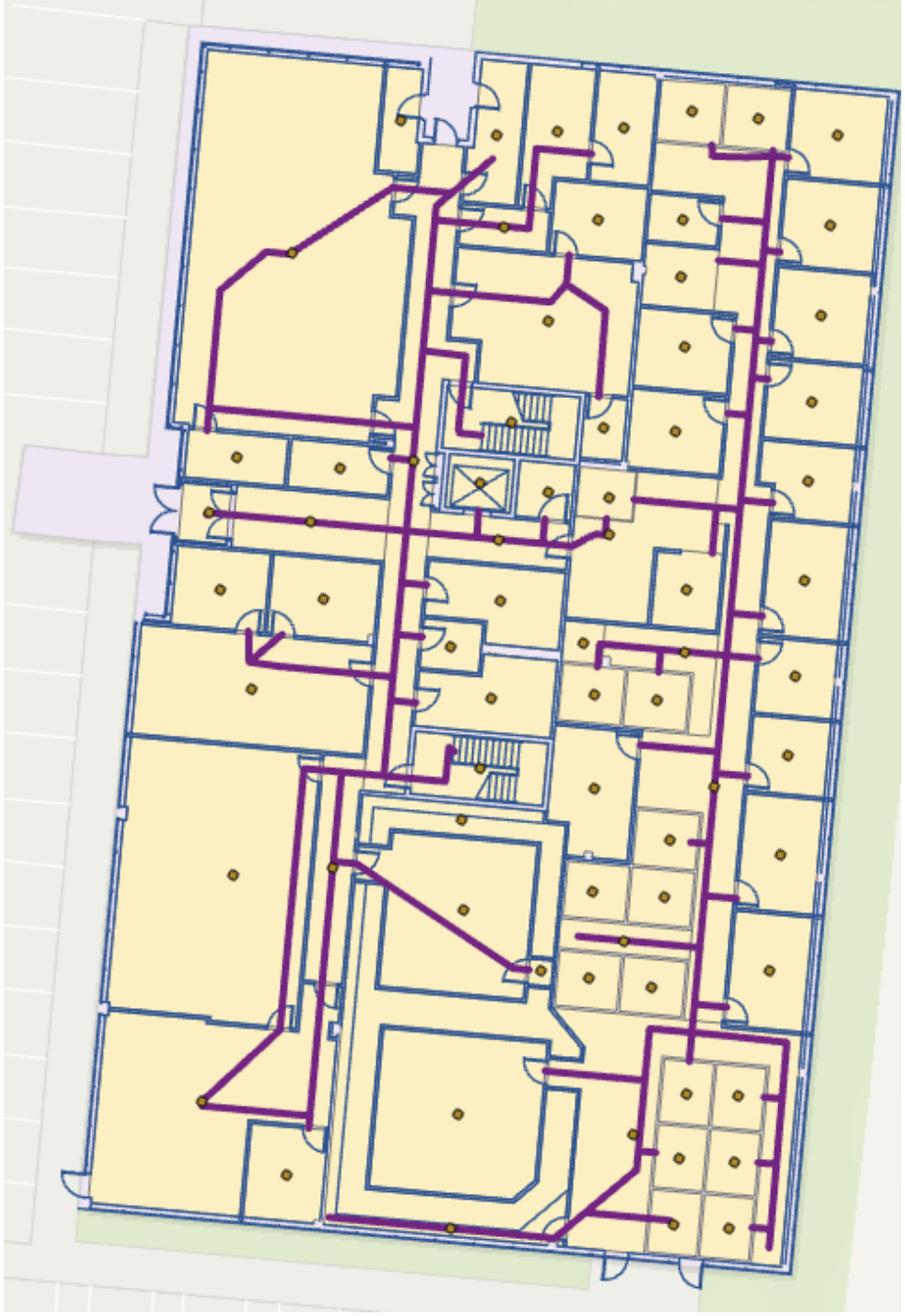
Verify the height, as well as the "from level" and "to level" parameters, as discrepancies in these values may lead to connectivity issues when refining the pathways.



Before (Iribe Building)



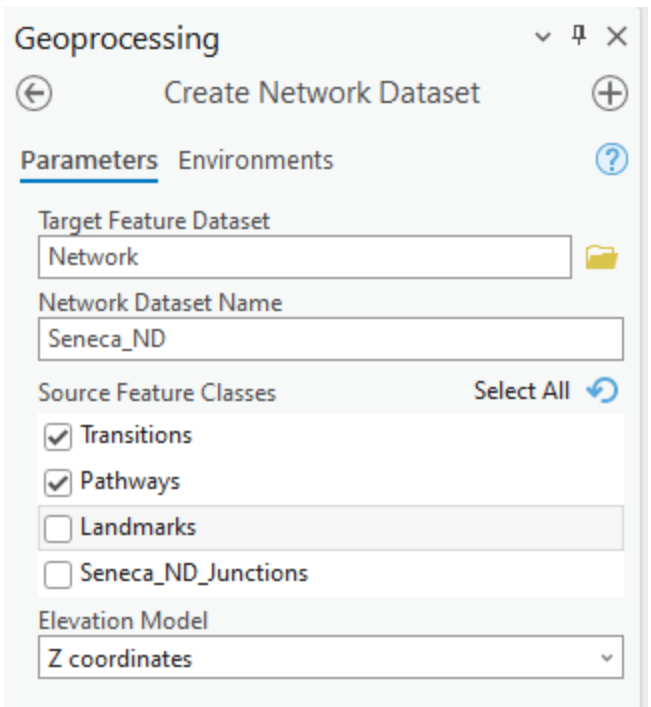
After (Iribe Building)

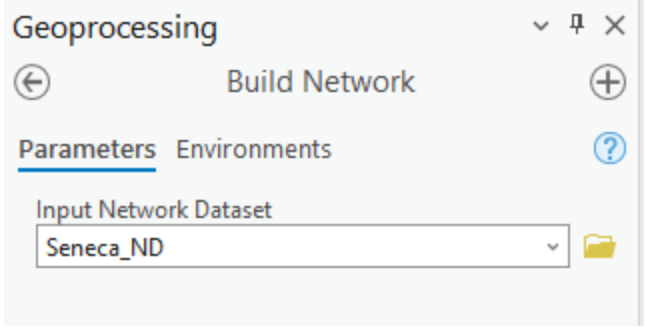


After (Seneca Building)

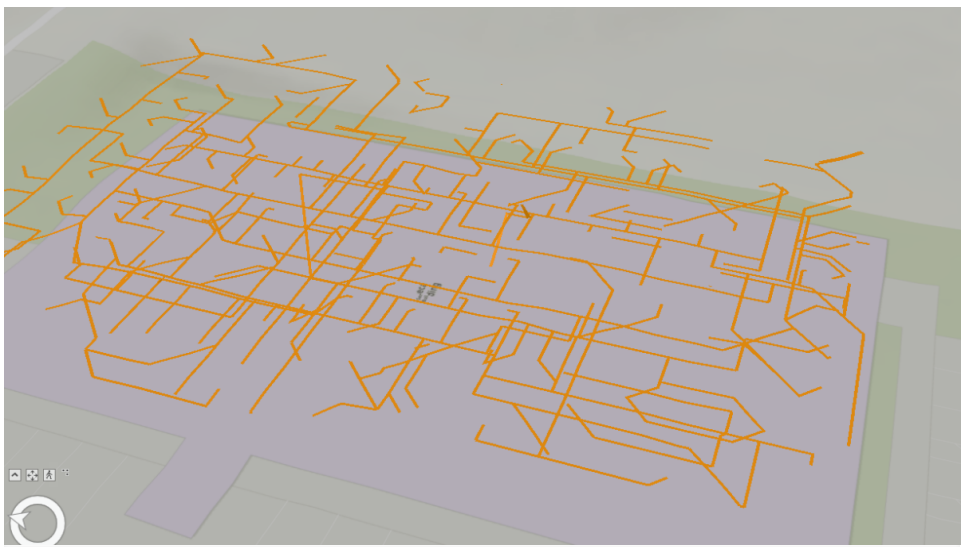
The Thin Indoor Pathways tool computes routes between selected Routable Location points or polygons to streamline the preliminary pathway network. The output generated by this tool is employed when constructing the final network dataset. After thinning the pathway, organize the pathways to make it a one or two line and make sure check the connectivity. Following the pathway thinning process, consolidate the pathways into one or two lines, and ensure proper connectivity is maintained.

Creating and Testing Routes





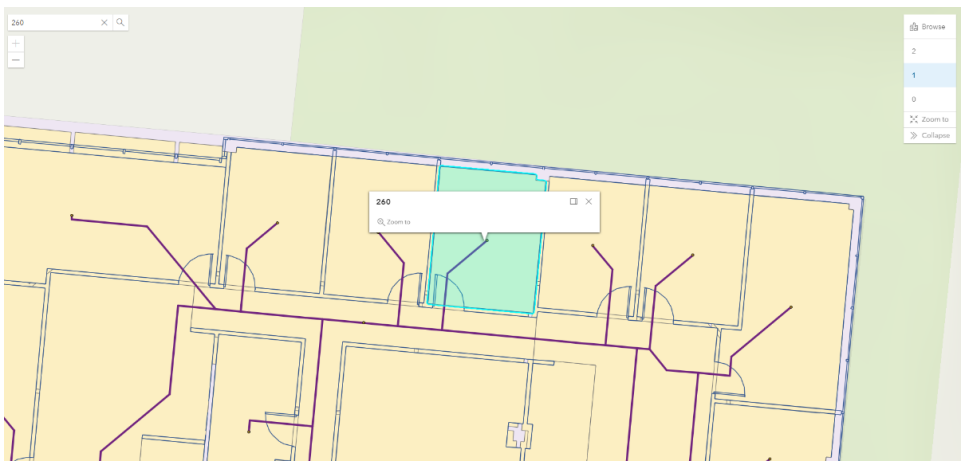
The process of reconstructing a network dataset involves reestablishing its connectivity and attribute information. After edits are made to the attributes or features of a participating source feature class, the network dataset must be rebuilt. The tool focuses on reestablishing connectivity in edited areas to expedite the build process. However, when network attributes are edited, the entire extent of the network dataset is reconstructed, which may be a time-consuming operation for larger network datasets.



service area

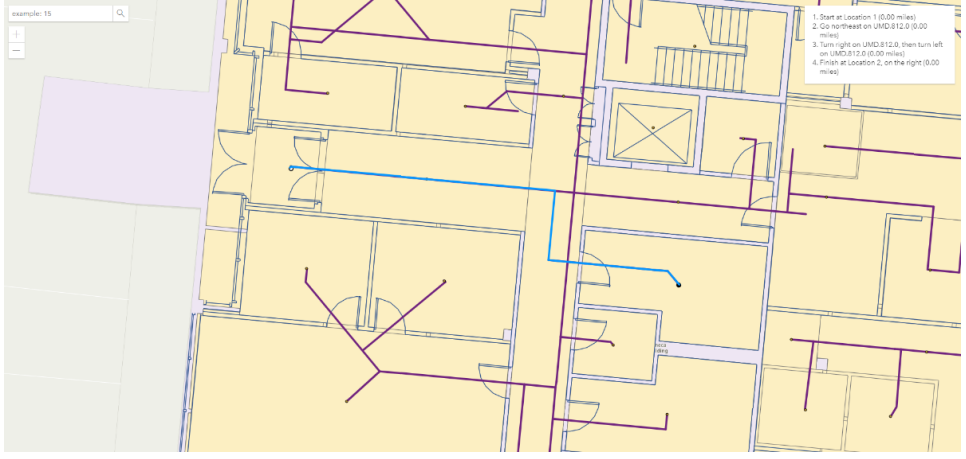
With the analysis tool, you can identify connected routes. For instance, the Service Area tool can help you detect any connectivity issues. If the 3D map indicates that certain areas are not connected, you can revise the pathway and reconstruct the network accordingly. Moreover, you can utilize the Route Analysis tool to verify the existence of routes with stops.

Creating Web App



Search Widget

Once you have shared the map you created on the portal, we can develop a web application that enables user interaction. The first step is to create a unit search widget that automatically changes the floor and highlights the unit when the user searches for the unit number.



Route Function

After creating the unit search widget, the next step is to display the route when the user selects a start and end point. The application should generate the route and provide directional recommendations for the user to follow.

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