

GIS Tips & Tricks

In this session, we'll cover some tips and tricks to get the most out of your Lucity GIS integration.

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Creating Feature Services

Feature Services are created from an ArcMap document. There are many factors and requirements that apply when creating feature services based upon the underlying data and your specific GIS environment. The following steps will walk through creating a feature service for a typical Lucity client; however, detailed instructions for authoring feature services based upon your specific configuration can be found on Esri's online documentation at:

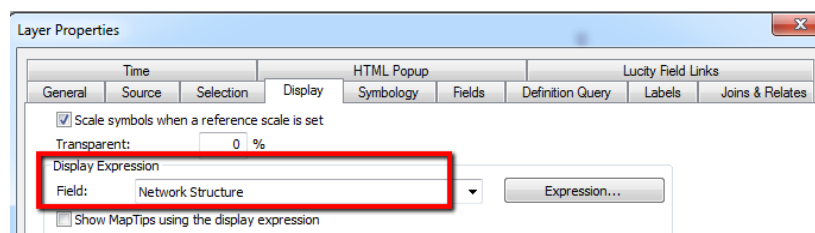
<http://server.arcgis.com/en/server/latest/publish-services/windows/author-feature-services.htm>

Requirements

- A valid spatial reference must be defined.
 - Most likely your feature classes have already been associated to a valid spatial reference, if not, you must specify a spatial reference for the map document.
- Only include data in the map document that you want to edit.
 - Publish data such as basemap layers in a different service
- The database connection used to add the data in the map must have editing permission on the data.
 - If you loaded the data in the map using a database connection that was read-only then the data will not be editable in the feature service
 - If you loaded the data in the map using Operating System Authentication, then you must make sure the ArcGIS Server account was granted editing permission to the data. Lucity recommends using Database Authentication connection NOT Operating System Authentication to avoid this factor when troubleshooting issues.
 - If working with versioned data, the version in the map document is the one that will be exposed through the feature service when published.
- Layers based on views are not supported
 - Publish this data in a different service
- Do not duplicate layers in the map
 - A feature class should only be added once in the map. Don't have multiple instances of the same feature class in the map.
- You must define a default z-value for layers that are z-aware.
- Additional limitations apply to layers that are m-aware
- All layers must be from the same geodatabase
- Additional limitations apply to layers that participate in a geometric network
 - The data must be in the same projection and coordinate reference system used by the editing client application.
- The following data types are NOT supported in feature services:
 - Annotations, Dimensions, Group layers, Layers and tables based on views, Query layers that contain virtual columns or where clauses and joins, Rasters, Terrains

Configure Map Document

1. Define symbology for each layer
 - a. Feature services support simple, unique value, class break, and cartographic representation renderers. However, proportional symbols or unique value renderers based on multiple fields are not supported.
 - b. Symbol types may be downgraded if not supported. The following symbols are supported:
 - i. Line layers- simple line symbols
 - ii. Polygon layers- simple fill and picture fill symbols
 - iii. Point layers- simple marker and picture marker symbols
2. Define feature templates
 - a. Each layer must have a feature template defined
 - b. The easiest way to define a feature template is to simply start an edit session. ArcMap will automatically create a default template for each layer that doesn't already have one defined.
3. Set a scale range (optional)
 - a. By default, feature services only display 1,000 features.
 - b. To improve performance and prevent the layer from displaying at a scale in which more than the maximum number of features would appear you should set a scale range
 - c. Typically, you would only want features to become visible if zoomed in within a certain extent
4. Set field properties (optional)
 - a. Field aliases, field visibility, field read-only properties
5. Set the desired field to display by default. This is important if using this service with Lucity mobile, as it is the default field value shown when identifying a feature. Most likely, you would want this to be the asset FacilityID/CommonID field.



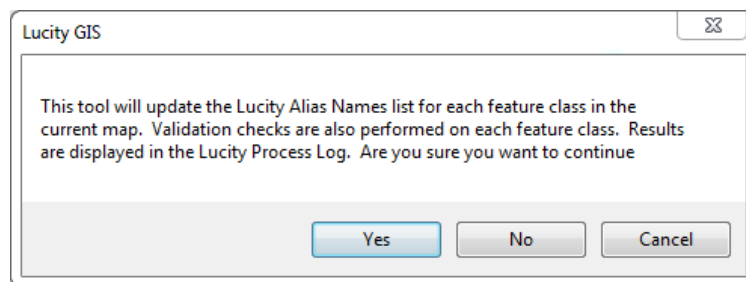
- a.
6. Joined Data
 - a. If a feature class has an attribute join to another table, the other table's fields will not be available in the feature service. Keep this in mind when publishing feature services for layers with joins.

Publish Feature Service

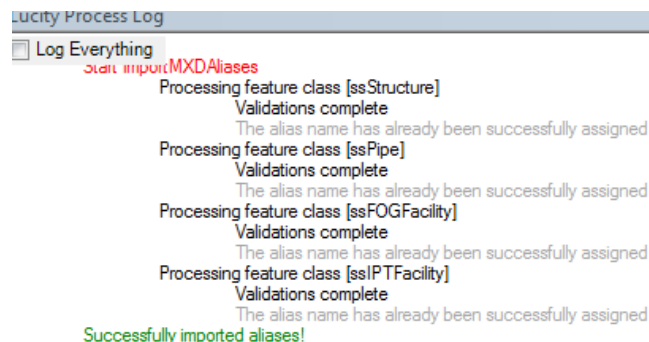
Once you have added and configured all the layers in the map, you are ready to publish the feature service.

1. Run the Lucy Alias Import tool. This is an important step as it will ensure that all your feature classes in the map are properly configured with Lucy. This step, although isn't required is strongly recommended. Not only does it make sure that Lucy is aware of the alias names, it also checks that each feature class has other required fields such as the OID, Shape, and FacilityID.

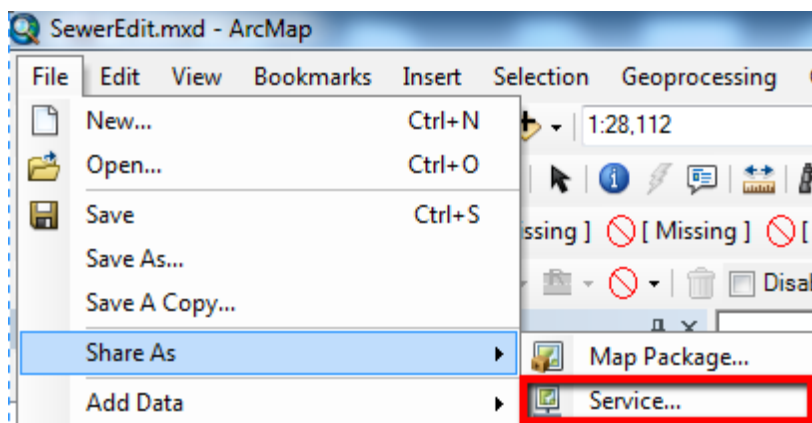
- a. To run the Lucy Alias Import tool, click the **Alias Import** button on the Lucy editor toolbar in ArcMap. If not already logged in, you may be prompted to select a client and log into Lucy using your user credentials.
- b. The following prompt will be displayed, click Yes.



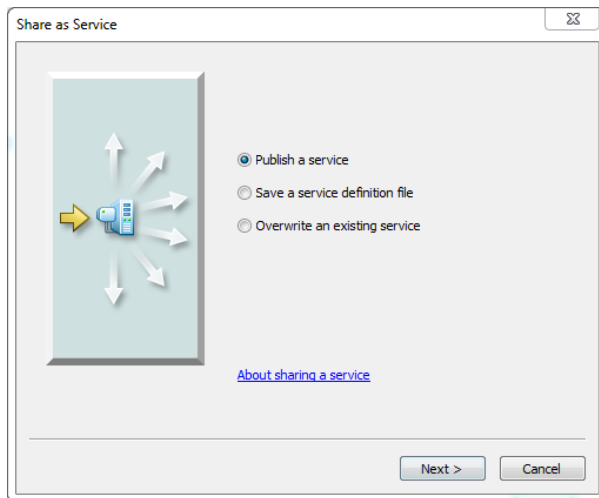
- c. The results of the process will be displayed in the Lucy Process Log. An example is shown below.



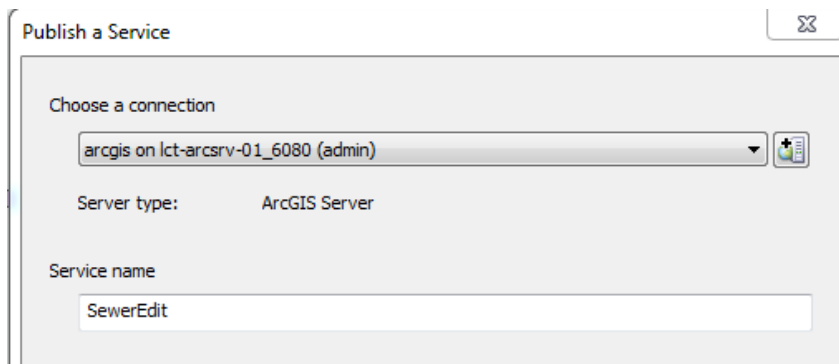
2. Start the publish service process. Go to File>>Share As>>Service...



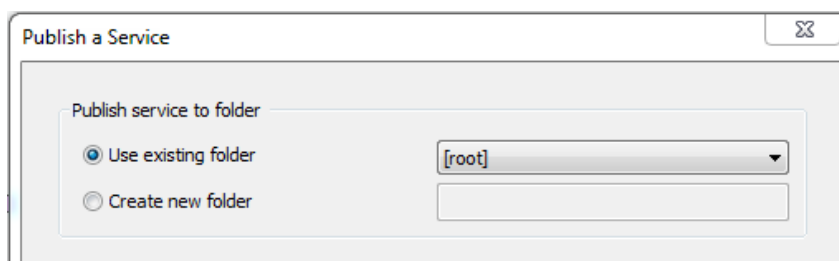
3. The following prompt will display. Select the corresponding option based on if you are creating a new service or re-publishing an existing service.



4. Next, you'll need to choose a connection to your ArcGIS Server and a name for the service.
- If you haven't already created a connection, you'll need to click the button to the right of the dropdown to create a new connection.
 - The service name can be whatever you would like as long as it is unique for the service directory. Note: The map document name is used as the default service name.



5. Determine where you want the service to reside.
- The default location would be your ArcGIS Server root directory, but you can choose an existing subfolder or create a new folder.



6. The Service Editor dialog will appear. There are many options and settings on this form. Please refer to Esri's help documentation for full details on each item. The following are just a few settings that should be reviewed as they relate to Lucy:

- a. Maximum number of records returned by the server. The default is 1000 records, depending on your data, environment, and server you may want to adjust that amount.

Service Editor

Connection: arcgis on lct-arcsrv-01_6080 (admin) Service Name: SewerEdit

General Parameters Capabilities Mapping KML Pooling Processes Caching Item Description Sharing

Parameters

Document Location
Original Document: C:\Users\edaniel\Desktop\SewerEdit.mxd

Anti-Aliasing
Anti-Aliasing: None
Text Anti-Aliasing: Force

Properties
Maximum number of records returned by the server: 1000
Advanced...

Cluster
Choose the cluster hosting the service: default

Output Directory
Directory: C:\arcgissrv\directories\arcgsooutput

- b. **Enable Feature Access.** That is the critical component that creates the associated feature service with your map service. When you enable Feature Access you will notice a new submenu will appear under Capabilities for Feature Access.

Service Editor

Connection: arcgis on lct-arcsrv-01_6080 (admin) Service Name: SewerEdit

General Parameters Capabilities Mapping KML Pooling Processes Caching Item Description Sharing

Capabilities

Choose the capabilities you would like enabled for this service:

- ☒ Mapping (always enabled)
- ☐ Schematics
- ☐ WCS
- ☐ WFS
- ☐ Network Analysis
- ☒ KML
- ☐ WMS
- ☒ Feature Access
- ☐ Mobile Data Access
- ☐ Lucity Data Update SOE

- c. Modify the Feature Access capabilities. In the left pane of the Service Editor, click Feature Access.

Feature Access

REST URL: https://arcgis.mylucity.net:6443/arcgis/rest/services/LucityGISTraceWater/FeatureServer

SOAP URL: https://arcgis.mylucity.net:6443/arcgis/services/LucityGISTraceWater/MapServer/FeatureSe

Operations allowed:
☒ Create ☒ Delete ☐ Extract ☒ Query ☐ Sync ☒ Update

Properties

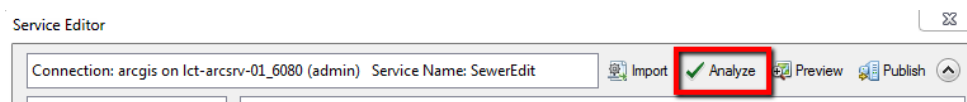
☒ Allow geometry updates
☐ Allow update of true curves
☐ Only allow true curve updates by true curve clients

☐ Apply default z-value
 When inserting or updating features with no z-values, set z-value to: 0

☐ Allow geometry updates without m-value
☐ Enable ownership-based access control on features
 Operations allowed on features created by other users:
☒ Query ☐ Update ☐ Delete

Advanced Options...

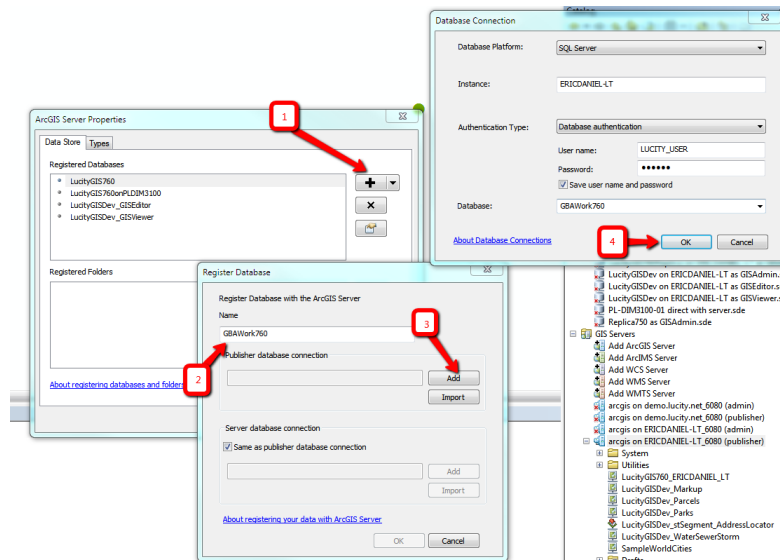
- i. **Create**- Allows users to add features to the feature service. This is enabled by default. This is **not required** by Lucy UNLESS you are using a GIS Scheduled Task (Lucy to GIS) for inspections.
 - ii. **Delete**- Allows users to delete features in the feature service. This is enabled by default. This is **not required** by Lucy UNLESS you are using a GIS Scheduled Task (Lucy to GIS) for inspections and have the option set to only maintain the latest inspection data.
 - iii. **Extract**- Allows users to extract copies of the data using custom applications. This is disabled by default. This is **not required** by Lucy.
 - iv. **Query**- Allows users to query and view the data. This is enabled by default. This **IS required** by Lucy.
 - v. **Sync**- Allows users to edit data while offline. This is disabled by default. This is **not required** by Lucy UNLESS you plan to access this service offline on Lucy mobile.
 - vi. **Update**- Allows users to update features. This is enabled by default. This **IS required** by Lucy if this feature service is the one configured to receive Lucy to GIS updates.
 1. Note: If the service is to be edited from ArcMap you must have the Create, Delete, and Update options enabled.
 - vii. **Allow geometry updates**: Allows users to edit the geometry of a feature. This is enabled by default. This is **not required** by Lucy UNLESS you are using a GIS Scheduled Task (Lucy to GIS) for inspections.
 - viii. **Allow update of true curves**: Allows users to replace the true curve geometry. This is disabled by default. This is **not required** by Lucy.
 - ix. **Only allow true curve updates by true curve clients**: Helps protect true curve data being replaced by a densified geometry. Currently ArcGIS Pro 1.3+ is the only client that supports true curve geometries. This is **not required** by Lucy.
 - x. **Apply default z-value**: Allows you to specify a default z-value that will be applied when no z-value is provided. This is recommended if you have z-aware feature classes in the service.
 - xi. **Allow geometry updates without m-value**: Allows updates to layers that store m-values without requiring an m-value to be provided. If no m-value is provided, NaN will be used. This is recommended if you have m-aware feature classes in the service.
 - xii. **Enable ownership-based access control on features**: Allows for advanced restrictions so users can only access/modify features they own.
- d. After you have finished setting all the options and settings, you should Analyze the configuration before publishing. On the upper right corner of the Service Editor window click the Analyze button.



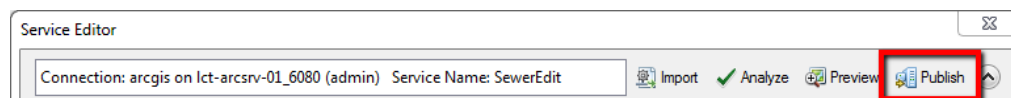
- e. Review the results from the Analyze operation. These will appear in Prepare window below. Any errors must be addressed before you publish the service, warnings and messages should be reviewed and optionally resolved on a case-by-case basis.

Prepare				
0 Errors 2 Warnings 2 Messages Search Analyze Results				
Severity	Status	Code	Description	
Low	Unresolved	24059	Missing Tags in Item Description	
Low	Unresolved	24058	Missing Summary in Item Description	
Low	Unresolved	30003	Layer draws at all scale ranges(2 items)	

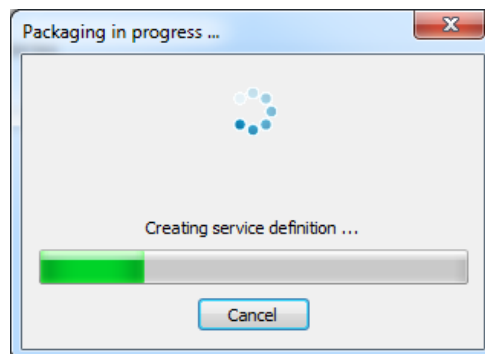
Note: One error you may encounter if this is the first time you have attempted to publish data using the connection properties with the map data is *Layer's data source is not registered with the server and data will be copied to the server*. There is more than one way in which you can resolve this error, but one way would be to right-click and select *Register Data Source with Server*

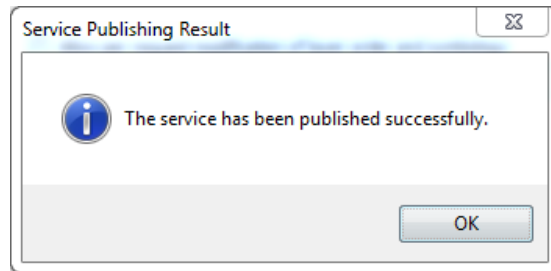


- f. After all issues have been resolved, you can publish the service. On the upper right corner of the Service Editor window click the Publish button.



- g. This will kick-off the packaging process and you will receive a prompt once the service has successfully been published.



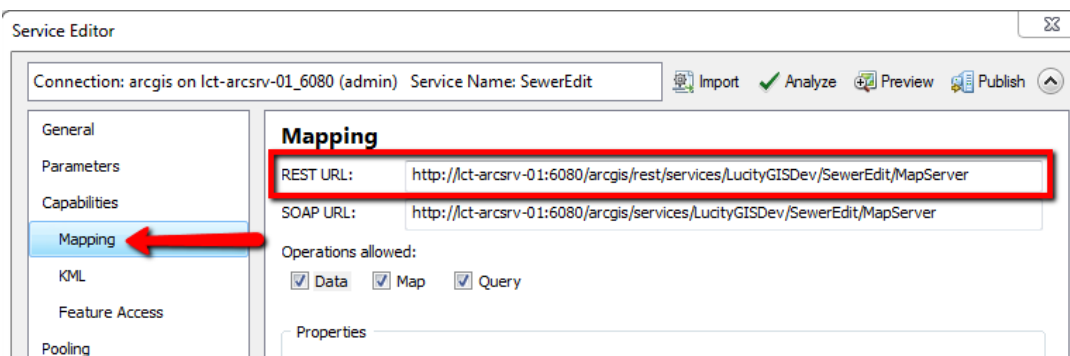


Defining Feature Services in Lucy

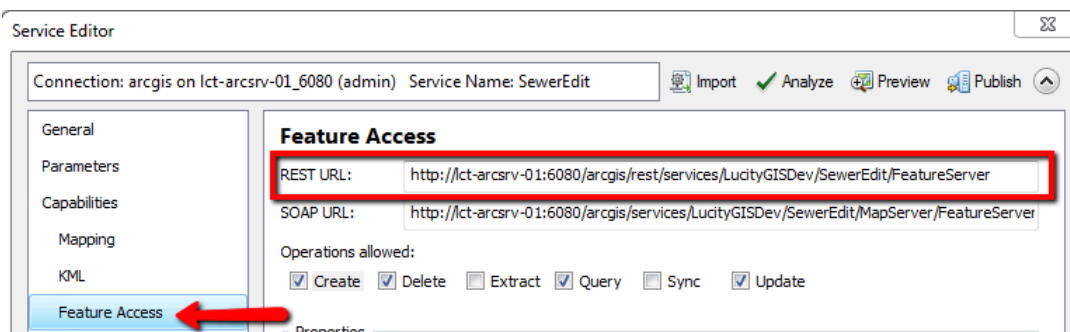
After your feature service(s) have been created, you'll need to provide Lucy with some information pertaining to those services so before the Lucy GIS tools can work with them.

You will need to provide Lucy with the url to the map service and in some cases the corresponding feature service. When you create an ArcGIS Server feature service, two services are actually created: a map service (url ending in \MapServer) and a feature service (url ending in \FeatureServer). Some capabilities are only available in a map service and some only in a feature service. If the service is to be used with the Lucy webmap or a Lucy mobile map (iOS or Android) then you should provide Lucy with the url to the MapServer.

Map Server Url

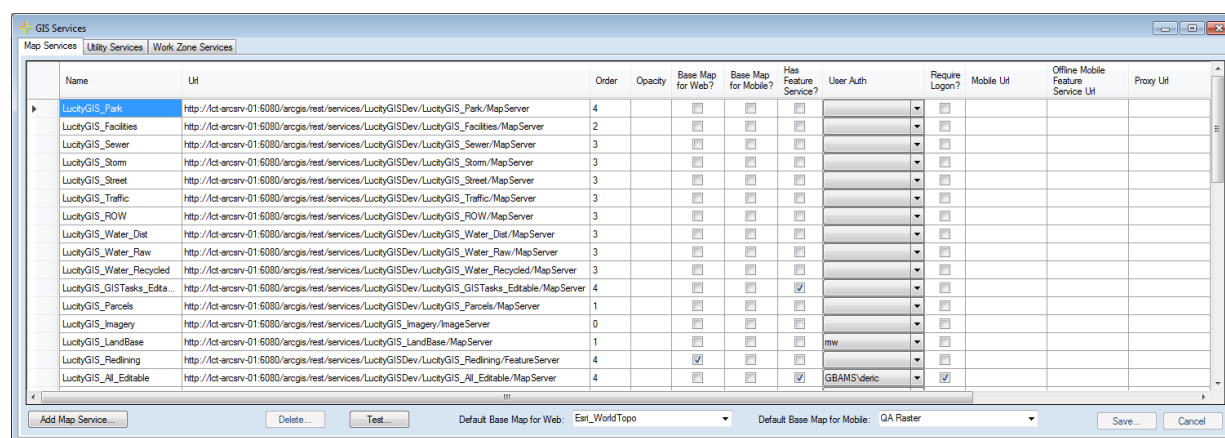
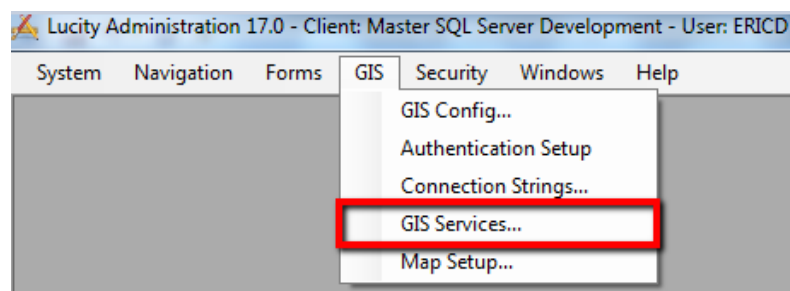


Feature Server Url



Lucy Administration Tool: GIS Services

Starting with version 2016r2, all service information is now stored in a centralized location with the GIS Services module in the Lucy Administration Tool.



1. Click the **Add Map Service** button to create a new record.
2. At a minimum fill out the following:
 - a. **Name:** Provide a unique name for the service. This is used to identify the service during setup.
 - b. **URL:** The REST URL for the feature service.
 - i. NOTE: If you want your feature service to be used in the Lucy webmap or mobile map then you will need to provide the URL to the map service component as described in the previous section and then check the Has Feature Service option described below.
 - c. **Has Feature Service?:** This setting indicates if the service has a corresponding feature service.
 - i. This option is only enabled if the URL specified in the previous step refers to a map service (ends in \MapServer). If the URL specified in the previous step ends in \FeatureServer then Lucy already knows
 - ii. Basically, for feature services you have two options:
 1. Provide the url to the feature service in the URL field, and DO NOT check the Has Feature Service option.
 2. Provide the url to the map service in the URL field, and DO check the Has Feature Service option.

- d. **User Auth:** If the service is secure, select a user authentication that has permission to access it.
3. Once you have completed filling out the information, click the Save button on the bottom right of the GIS Service form. The service is now in the system and can be associated to the geodatabase(s), feature class(es), and map setups configured with Lucity.