What GIS layers are required for NG9-1-1?

GIS layers are classified as Required, Strongly Recommended, or Recommended. Required layers must be available to Next Generation 9-1-1 Core Services (NGCS) and are helpful locally and in the Public Safety Answering Point (PSAP). Strongly Recommended layers may be made available to NGCS and are helpful locally and in the PSAP. Recommended layers cannot be provisioned to NGCS but are helpful locally and in the PSAP for map display, call taking, analysis, and attribution of layers to meet NG9-1-1 requirements.

There are seven **required** datasets:

1. **Road Centerlines**

   Road centerlines are polyline geometry features that represent actual roadways or transportation networks, with associated address ranges, jurisdictional information, and other attributes.

2. **Site/Structure Address Points (SSAPs)**

   Site/Structure Address Points represent the location of a site or structure and its corresponding physical address. This data is not required to be complete so just a single address point in the correct schema will be compliant, but accurate and complete addresses will be more important going forward. If you currently place address points at the point of access for a parcel, or at the parcel centroid, now is a good time to start moving those to the appropriate structure centroid or structure or unit access point(s). Now is also a good time to improve sub addressing with locations corresponding to units and building, floor, and/or unit attributes.
3. Service Boundary (SB) Polygons for PSAP, Police, Fire & Medical

The **PSAP** Boundary defines the geographic area of a PSAP that has primary responsibility for answering an emergency call. This dataset is used for call routing, so it should cover all areas for which your PSAP answers calls. You may have more than one PSAP Boundary in this dataset so the data model schema requires for you to identify each one as individual polygon features. Work with your neighbors to agree on what geometry to use for your shared boundaries. Tip: When creating the PSAP boundary layer, you can use the dissolve geoprocessing tool to combine boundaries from different datasets such as city and county.

Similar in function to your **ESN**'s in an E9-1-1 environment, the service boundaries for response agencies are different in that they need to be broken out into individual layers for each type of emergency (Police, Medical, and Fire at minimum). Others that may be helpful are Rescue, Animal Control, or Hazmat. Ask your **NGCS** provider if they support these additional layers before building them out. If it suits your business needs, you can choose to keep maintaining your ESN’s as a single dataset, but just know that you will need to be able to separate them upon request when your jurisdiction is moving toward NG9-1-1. The **DisplayName** field is what will populate in your PSAP’s call handling equipment (CHE) after your cut over to NG9-1-1, replacing what is populated from the ESN English Language Translation (**ELT**) today. Be sure to discuss these layers with PSAP leadership.

4. Provisioning Boundary

The provisioning boundary serves as the geographic extent or footprint of your data maintenance authority. If features from any other layers fall within your provisioning boundary, you are responsible for uploading it to the NG9-1-1 system. If an error is found within this polygon, you are responsible for fixing it. This boundary is sometimes different from the PSAP boundary as in cases where a PSAP answers calls from multiple jurisdictions. Work with your neighbors to agree on what geometry to use for your shared boundaries.
How are the required datasets used in NG9-1-1?

The required datasets meet system information needs and are used in tasks and functions in the i3 NG9-1-1 environment. These include:

- When a wireless 9-1-1 call is sent to the ESInet with an x and y coordinate, the NGCS Emergency Call Routing Function (ECRF) determines which PSAP should receive the call and sends it there with additional information from other GIS layers:
  - Information from the Law, Fire, and EMS ESB layers coinciding with the point
  - The closest address from a reverse geocode process (GCS) against the road centerlines and site / structure address points

- Originating wireline or Voice Over IP (VOIP) telephone service providers (OSPs) create a Location Information Service (LIS) database of valid addresses that the provider serves. The LIS is validated using the NGCS Location Validation Function (LVF), which references road centerlines and address points in the NGCS. LIS addresses are validated if they find a match in the provisioned GIS data. This ensures that when an OSP sends a wireline or VOIP 9-1-1 call to the ESInet, the address information it sends with it will geocode to the address points or road centerlines for delivery to the correct PSAP with the correct ESB layer information.

Please see the Moving Forward with NG9-1-1 GIS Fact Sheet for considerations of Spatial Interface (SI) and NCGS providers. Implementations and ecosystems that are not “full i3” may use these data layers and functions in other ways.

What data layers are not required by the NG9-1-1 Data Model?

Beyond the layers required to organize data in the SI and to allow the ECRF to function, other layers may be used by your organization for 9-1-1. This includes strongly recommended and recommended layers in the NENA GIS Data Model and other GIS layers that you may use in your PSAP or Emergency Communication Centers (ECC) in CAD systems or map displays. NGCS providers may offer differing levels of support for non-required GIS data layers. Examples include jurisdiction layers for cities and towns, counties, states, or countries; street or landmark name aliases; railroad geometry; water features; or mile markers. While only a few layers are required for use in the NG9-1-1 system, all of your other layers remain important for context and everything else that your GIS system supports.
The **NENA GIS Data Model Standard** has quite a few fields. Do I need all these fields? Do I need to populate all the fields?

NENA standards use the term “Required” to communicate what fields need to be filled out.

<table>
<thead>
<tr>
<th>NENA Required Field</th>
<th>Meaning</th>
<th>Common GIS Equivalent</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Mandatory</td>
<td>Required</td>
<td>Must be populated for every feature</td>
</tr>
<tr>
<td>No</td>
<td>Optional</td>
<td>Not Required</td>
<td>Use if desired</td>
</tr>
<tr>
<td>Conditional</td>
<td>Conditional</td>
<td>Not Required</td>
<td>Must be populated if the attribute exists for the feature. If no attribute exists for the feature, leave blank</td>
</tr>
</tbody>
</table>

“Conditional” fields are tricky. They must be present in your schema but do not need to be populated for every record. They can be left blank if the information is not applicable for that feature. This depends on your local data structure and what specific object the record pertains.

For example, if your jurisdiction has pre-directions for a street or address, then the pre-direction field `St_PreDir` needs to be populated since they are critical for geocoding the north street from the south street. Another jurisdiction may not use pre-directions thus they cannot be populated because they do not exist, and are not critical for geocoding.

Another example would be an address point for a single family residence where the `Unit` field can be left blank because it does not apply. If the address point was for an apartment, the `Unit` field must be populated. Even if you have no pre-directions or units currently, you should probably add the field to your schema in case you need it in the future.
I’ve looked at the NENA GIS Data Model Standard and the data types are confusing.

In the data standard schema tables, data types are specified to ensure your data can be shared and combined with others. Here is a table to help you translate data types from the NENA GIS Data Model and the appropriate geodatabase field type to meet this requirement.

<table>
<thead>
<tr>
<th>NENA Type</th>
<th>NENA Meaning</th>
<th>Common GIS Equivalent</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Printable ASCII*</td>
<td>Text, String</td>
<td>Just a text field</td>
</tr>
<tr>
<td>U</td>
<td>URI</td>
<td>Text, String</td>
<td>Field holds a web address or url as text</td>
</tr>
<tr>
<td>D</td>
<td>Date</td>
<td>Date</td>
<td>Must calculate to the second or tenth of a second (local time is fine)</td>
</tr>
<tr>
<td>F</td>
<td>Float</td>
<td>Single or double precision floating-point number</td>
<td>Numbers and negative numbers that include decimals</td>
</tr>
<tr>
<td>N</td>
<td>Non-negative Integer</td>
<td>Integer</td>
<td>Non-negative whole numbers (no decimals)</td>
</tr>
</tbody>
</table>

*ASCII stands for “American Standard Code for Information Interchange”

I already have several fields that store the same attributes that the NENA GIS Data Model requires, but I call them different things. Is there an alternative to overhauling my schema? I’m worried it will break other processes in my local environment.

You do not actually need to change your schema unless your local jurisdiction has been mandated to do so. Software solutions exist (as part of NGCS services, third-party solutions, and open source options) that translate or field map between what you currently have and the fields that are required for NG9-1-1. An alternative is to develop your own extract - transform - load (ETL) processes. ETL steps may also help you add and populate new fields that are required for NG911 to your existing GIS datasets and by using models, scripts, or procedures.
What’s Next?

NENA standards and documents setting forth and explaining how GIS contributes to NGCS continues to progress. Future updates to the NENA NG9-1-1 GIS Data Model may lead to additional versions of this fact sheet. Version 3 work includes site/structure address point attribution needed to support Z-axis values, building footprints, 3-D building shapes, and terrain and other elevation models.

Where can I go for more information about NG9-1-1 and GIS for NG9-1-1?

For more information about NG9-1-1 and GIS for NG9-1-1, see NENA’s NG9-1-1 Guide for 9-1-1 Authorities and NG9-1-1 GIS Data Model Standard and template. Feel free to connect with the URISA NG9-1-1 community, reach out to us on the URISA website and see our other NG9-1-1 Fact Sheets.