

# CA VoIP E911 GIS Shape File Recommendations

Background: County Coordinators have been asked by the State 9-1-1 Office to work with the Voice Positioning Centers (VPCs) to ensure accurate call routing of VoIP calls. VoIP calls are geocoded (translated from an address to a Lat/Long) and then routed using electronic maps known as shape files. These maps contain PSAP ESN jurisdiction information. Key to coordination has been for the County Coordinators to use any existing maps within the county to minimize work.

The following information is intended for the County Coordinators to use in discussions with the GIS entities. For County Coordinators that do not have access to GIS resources, they will need to manually verify maps from each VPC. The following recommendations are provided for the purposes of incorporating PSAP and/or ESN boundaries into the VPC's GIS, which will be ultimately used for E9-1-1, call routing. This information is comprised of input from the VPCs and the State 9-1-1 Office.

*The italicized, red text provides the rationale for each GIS data requirement.*

1. County Wide updates:
  - a. Updates are on a countywide basis with all updates to each PSAP/ESN within the county included in the file. *This will assist the GIS Analyst in incorporating all changes for that particular county as opposed to receiving separate updates per PSAP/ESN. Also, since the GIS data will be topologically sound, this will greatly assist the GIS Analyst in minimizing the amount of work it takes to resolve spatial discrepancies between polygons if they were supplied on a PSAP/ESN level.*
  - b. Changes to all PSAPs/ESNs included in the file must first be validated by the County Coordinator prior to incorporating into the VPC GIS. *This will minimize any discrepancies or conflicts between PSAPs.*
  - c. Unless specifically stated otherwise by the County Coordinator, for those PSAP/ESN boundaries that extend beyond the county boundary, that portion of the PSAP/ESN polygon will not be incorporated into the GIS in the interest of retaining spatial integrity of adjacent PSAP/ESN boundaries. *This will minimize any discrepancies or conflicts between PSAPs, ESNs, and/or counties.*
  - d. Any "gaps" or "holes" introduced by the GIS data will be corrected by the county, if possible, or by the VPC to expedite.
2. Naming convention:
  - a. The countywide GIS files should adhere to the following naming convention: County Name\_State Abbreviation\_MM\_DD\_YYYY: **Los\_Angeles\_CA\_06\_07\_2006**
3. Turnaround timeframe:
  - a. At a maximum, countywide updates will be provided on a quarterly basis.
  - b. VPC has one month to process and incorporate into GIS from the date file is received.
  - c. In the event that the volume and frequency of updates is beyond the capacity of a one-month turnaround time, this timeframe is subject to change.
4. Data formatting:
  - a. **GIS Format:**

An ESRI shapefile format is preferred. An ESRI shapefile is comprised of 5 files (.dbf, .sbn, .sbx, .shp, .shx). The projection file (.prj) should also be included with the ESRI .shp file (see next bullet point below). *ESRI shape files that do not contain, at a minimum, the .dbf, .shx, .shp files will not load correctly into the GIS application, thus, cannot be utilized for PSAP/ESN boundary creation and/or maintenance.*
  - b. **Zip File:**

In order to assist in the management and minimize the size of the GIS files, contents associated with the countywide data should be compressed into the .zip file format. *Spatial data file sizes are very large and compressing the file size will speed download/upload time and assist with data storage.*

**c. Projection File:**

Most counties have been providing NAD 83.

```
GEOGCS["GCS_North_American_1983",DATUM["D_North_American_1983",SPHEROID["GRS_1980",6378137,298.257222101]],PRIMEM["Greenwich",0],UNIT["Degree",0.017453292519943295]]
```

Spatial Data without projection information (i.e. Coordinate system used to project spatial data) will not be accepted. *When a .prj file is not included with the spatial data, the GIS Analyst does not know which coordinate system to use in order to process the data. There are very many different coordinate systems and projections to choose from, and choosing the incorrect one will transform the PSAP/ESN shape to incorrectly line up with the true location, thus, potentially misroute a 9-1-1 call.*

**d. Topologically Correct Data:**

Topologically sound data is preferred to have been created in a format that retains and enforces topology. Because this data is used for 9-1-1 call routing, spatial data that exhibits poor topology will not be accepted. *There should be no geographic area within the county that is not covered by a particular PSAP/ESN. All coverage area within the county should have an associated PSAP/ESN. Each polygon shall have only one ESN.*

**e. Currency:**

Spatial Data should be kept current. *Since the spatial data is used for E9-1-1 call routing, ensuring the data is current is critical.*

**f. Metadata Information:**

Information about the data's accuracy, or how a set of measurements was collected is preferred to be included with the spatial data. An item's metadata may include this type of documentation along with many properties that are derived from the data automatically. If standard Metadata files are not available, please provide information on the time period for which data is relevant, publication information, data storage and access information, and general details about the data. *The most important piece of information needed is the last time the GIS data was created/updated. Since the spatial data is used for E9-1-1 call routing, ensuring the data is current is critical.*

**g. Updates:**

Countywide comprehensive spatial data updates (wholesale replacements) containing a clear description indicating what has changed since the previous delivery. *Since the GIS data will be supplied on a countywide basis, this will assist the GIS Analyst in quickly identifying any spatial changes and speed up load time.*

**h. Description:**

Clear description of how the spatial data (i.e. ESN) correlates to PSAP jurisdictions. *In the event there is more than one ESN in a given PSAP, this description is very important. If all of the attribute information (see section below) is included in the attribute table (.dbf), then this is sufficient as a description.*

**i. Attribute Information:**

At a minimum, the following data columns should include PSAP Name, ESN Number, PSAP Type (Primary, Secondary, Basic, etc.), Technology, City, County, State. Attributes for these data columns must be populated and not left blank. Only Primary PSAPs/ESNs will be incorporated into the GIS.

**Example of attributes:**

PSAP Name	ESN	PSAP Type	Technology	City	County	State
Los Angeles Police Department Division 5	100	Primary	VoIP	Los Angeles	Los Angeles	CA
Lakewood Sheriffs Station	200	Primary	VoIP	Lakewood	Los Angeles	CA
South Gate Police Department	400	Primary	VoIP	South Gate	Los Angeles	CA
Downey Police Department	500	Primary	VoIP	Downey	Los Angeles	CA

Please note that a Primary PSAP is one to which an E9-1-1 call is first routed.

- **PSAP Name** – This attribute is required in order to associate polygon(s) to a PSAP.
- **ESN Number**- This attribute is required in order to associate polygon(s) to an ESN.
- **PSAP Type** – This attribute is required in order to identify if the PSAP/ESN is Primary. Only Primary PSAP/ESNs will be incorporated into the GIS.
- **Technology** – This attribute is required in order to identify if the technology for a given polygon(s) is VoIP or Wireless. This is important to know if the GIS files include both. Often times, a separate file for VoIP and Wireless is supplied.
- **City** – This attribute is not required, however, can assist in data management.
- **County** – This attribute is required in order to know what County to associate the polygon(s) to, along with assisting in data management.
- **State** - This attribute is required in order to know what State to associate the polygon(s) to, along with assisting in data management.

**Example of LA Shape File – by ESN:**

