GIS Data the 9-1-1 Way:

Understanding NENA's NG9-1-1 GIS Data Model Standard

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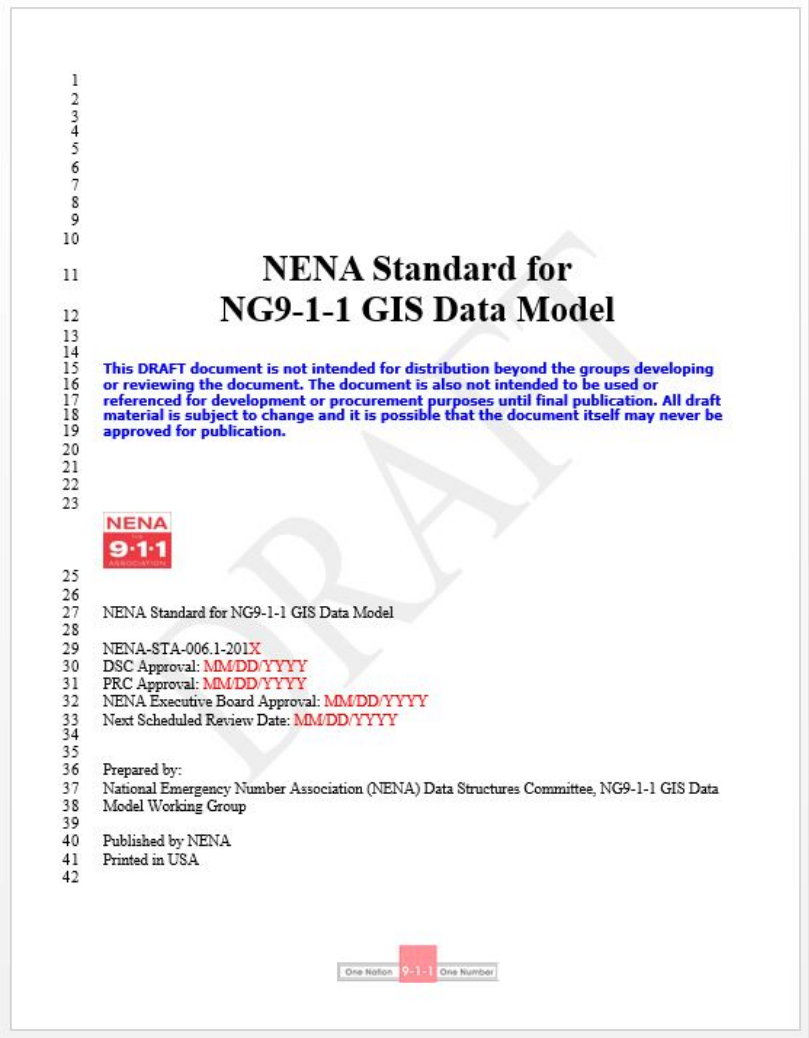
To Be Discussed…

- What is the NG9-1-1 GIS Data Model Standard?
- Structure of the document
- GIS data layers needed in a NG9-1-1 system
- Structure of the GIS data layers
- Items deferred for future work
- Use in required NG9-1-1 functional elements
- Current status of the standard
- How to participate in the public review
- Other NENA GIS-related standards



NENA Standard for
NG9-1-1 GIS Data Model

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NENA Standard for NG9-1-1 GIS Data Model

NENA-STA-006.1-201X
DSC Approval: MM/DD/YYYY
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NENA Executive Board Approval: MM/DD/YYYY
Next Scheduled Review Date: MM/DD/YYYY

Prepared by:
National Emergency Number Association (NENA) Data Structures Committee, NG9-1-1 GIS Data Model Working Group

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What is the NG9-1-1 GIS Data Model?

- **NENA-STA-006**, *NENA Standard for NG9-1-1 GIS Data Model*
- Defines the GIS data layers in a NG9-1-1 System that support:
  - Location Validation
  - Geospatial Call Routing
  - Dispatch Routing
  - Public Safety Mapping Applications
- Required data structure for GIS data exchange in a NG9-1-1 environment
- May use any internal GIS data model for daily maintenance
  - Must export data from local GIS data model into the NG9-1-1 GIS Data Model
- Allows backwards compatibility with existing E9-1-1 systems
- Related to, but different than NENA-STA-010, *NENA Detailed Functional and Interface Standards for the NENA i3 Solution, Appendix B*
  - Appendix B describes the Spatial Interface (SI) between a GIS and a functional element that is provisioned with spatial data

Structure of the Document

- Section 1 – Executive Overview
- Section 2 – Introduction
  - Operational, Technical, Security, and Additional Impacts
  - Recommendation for Additional Development Work
  - Timeline, Cost Factors, and Cost Recovery Considerations
  - Document Terminology, Abbreviations, Terms, and Definitions
- Section 3 – Technical/Operational Description
  - Metadata
  - Standardized Data Fields
  - NENA Globally Unique IDs
  - GIS Data File Format, Spatial Reference, and Horizontal Accuracy
- Section 4 – GIS Data Model Layers
- Section 5 – Detailed Description of Field Names and Associated Attribute Data
- Section 6 – NENA Registry System Considerations
- Section 7 – N/A
- Section 8 – Recommended Reading and References

GIS Data Layers in a NG9-1-1 System

- REQUIRED GIS data layers:
  - Road Centerlines
  - PSAP Boundary
  - Emergency Service Boundary (must include Law, Fire, and Emergency Medical Service)
- Absolutely necessary for:
  - Location Validation Function (LVF)
  - Emergency Call Routing Function (ECRF)
  - Call taking
  - Dispatch operations

GIS Data Layers in a NG9-1-1 System

- STRONGLY RECOMMENDED GIS data layers:
  - Street Name Alias Table
  - Site/Structure Address Points
  - Landmark Name Part Table
  - Complete Landmark Name Alias Table
  - States or Equivalents
  - Counties or Equivalents
  - Incorporated Municipality Boundary
  - Unincorporated Community Boundary
  - Neighborhood Community Boundary
  - Other Emergency Service Boundaries (e.g. Poison Control, Forest Service, Coast Guard, Animal Control, etc.)
- May assist or improve the functionality of the LVF and ECRF
- Extremely beneficial for call taking and dispatch operations

GIS Data Layers in a NG9-1-1 System

- Other RECOMMENDED GIS data layers:
  - Railroad Centerlines
  - Hydrology Line
  - Hydrology Polygon
  - Cell Site Location
  - Mile Marker Location
- Very useful for NG9-1-1 and E9-1-1 call taking and dispatch operations

Structure of the GIS Data Layers

Road Centerlines

Descriptive Name	Field Name	M/C/O	Type	Field Width
Source of Data	Source	M	T	75
Date Updated	DateUpdate	M	D	20
Effective Date	Effective	O	D	20
Expiration Date	Expire	O	D	20
Road Centerline NENA Globally Unique ID	RCL_NGUID	M	T	100
Left Address Number Prefix	AdNumPre_L	C	T	15
Right Address Number Prefix	AdNumPre_R	C	T	15
Left FROM Address	FromAddr_L	M	N	6
Left TO Address	ToAddr_L	M	N	6
Right FROM Address	FromAddr_R	M	N	6
Right TO Address	ToAddr_R	M	N	6
Street Name Pre Modifier	St_PreMod	C	T	15
Street Name Pre Directional	St_PreDir	C	T	9
Street Name Pre Type	St_PreTyp	C	T	25
Street Name Pre Type Separator	St_PreSep	C	T	20
Street Name	StreetName	M	T	60
Street Name Post Type	St_PosTyp	C	T	25
Street Name Post Directional	St_PosDir	C	T	9
Street Name Post Modifier	St_PosMod	C	T	25

Structure of the GIS Data Layers

- Descriptive Name
- Field Name
  - Standardized GIS attribute field name that must be used
  - 10 characters or less
- M / C / O
  - Mandatory – an attribute value must be populated in the data field
  - Conditional – if an attribute value exists, it must be populated in the data field, else blank
  - Optional – an attribute value may or may not be included in the data field
  - Mandatory and Conditional fields must be present in GIS Data used for NG9-1-1
- Type
  - T – Text
  - D – Date and time fields as per ISO 8601
  - F – Floating numbers (with a decimal place)
  - N – Number (whole numbers only)
- Field Width

Detailed Description of Field Names

- Section 5:
  - Detailed Description of Field Names & Associated Attribute Data
- Alphabetical listing of each Field Name with:
  - Description
  - Attribute Domain
  - Example

2000 **5.117 Source of Data**
2001 **Description**: Agency that last updated the record, usually the name of the 9-1-1 Authority.
2002 This MAY be represented by the domain name of the agency.
2003 **Domain**: None
2004 **Example**: Metropolitan Regional Addressing Authority; Vermont911.st.us.gov

2005 **5.118 Speed Limit**
2006 **Description**: Posted Speed Limit in MPH in US or Km/h in Canada
2007 **Domain**: Whole numbers from 1 to 999
2008 **Example**: 35; 55; 70

2009 **5.119 State**
2010 **Description**: The name of a state or state equivalent, represented by the two-letter
2011 abbreviation given in USPS Publication 28 [12], Appendix B.
2012 **Domain**: ISO 3166-2 includes the same abbreviations as USPS Publication 28, Appendix
2013 B, with the exception of the additional one for the nine minor uninhabited islands owned
2014 by the US: These abbreviations are also freely available at
2015 https://www.census.gov/geo/reference/ansi_statetables.html
2016 **Example**: TN; NM; OR

Deferred for Future Work

- Vertical accuracy requirement
- Site/Structure polygon layer
- Movement to a true relational database structure
- Atypical street naming and addressing
  - e.g. A county line road with different street names and address ranges
- Alignment between Hydrology Line and Hydrology Polygon layers
- Review future FRA rail data standardization changes
- Railroad crossing information
- Define additional location types for the IETF Location Type Registry
  - e.g. bank, hospital, office, restaurant, school, store
- Revision of the cell tower sector table
- Metadata template
- Detecting inadvertent or malicious provisioning of data
- Work on version 2 will start when final Public Review ends

Use in NG9-1-1 Functional Elements

- Presence Information Data Format Location Object (PIDF-LO)
  - Subaddressing
  - Consistency with CLDXF and NENA NG9-1-1 GIS Data Model
- Location Validation Function (LVF)
  - NENA LVF Consistency workgroup
  - Valid, Invalid, Unchecked
  - Routable vs Dispatchable
- Emergency Call Routing Function (ECRF)
  - Consumes NG9-1-1 GIS Data Model compliant content
- Spatial Interface (SI)
  - Machine-to-Machine translation of GIS data
  - Provisions FEs (LVF, ECRF, MCS, etc.)
  - Uses OGC WFS, ATOM, GeoRSS
- MSAG Conversion Service
  - PIDF_LO and MSAG/ALI conversion
  - Civic to LNG (MCS) to PIDF_LO
  - PIDF_LO to LPG (MCS) to ALI Civic
  - Provisioned with ALI/MSAG and GIS data

Status in the NENA Review Process

- ✓ Standard completed & submitted to NENA leadership
- ✓ Internal NENA Authoring Committee Review (6/7/12 - 6/22/12)
- ✓ First internal NENA All Committee Review (12/17/14 - 1/30/15)
- ✓ Second internal NENA All Committee Review (6/14/16 - 7/8/16)
- Public review (minimum 45 business days)
  - ✓ Released 12/9/2016
  - Comments due 2/28/2017
  - NENA Workgroup reviews comments & updates document
  - Revised standard submitted to NENA leadership for additional public review(s) as necessary
- Revised standard submitted for publication

Participating in the Public Review

- Don’t wait…It’s 86 pages long!
- Use bulk load option (NENA Development Group members)
- Clearly articulate your concern
- Provide supporting references, examples, and justification
- Proposal should include suggested text
- Offer to be on workgroup calls for a complicated comment
- Consider noting new items as future development work
- Submissions from multiple states/local governments on same issue will have more weight than one comment submitted by NSGIC
- Review other submitted comments (for topics, format)
- Consider joining the workgroup to help resolve the public comments

https://dev.nena.org/kws/public/document?document_id=9828&wg_abbrev=csds-gis

Other NENA GIS-Related Standards

- **NENA-STA-004**, *United States Civic Location Data Exchange Format (CLDXF) Standard*, for the representation of addresses
- **NENA-STA-010**, *NENA Detailed Functional and Interface Standards for the NENA i3 Solution, Appendix B*
- **NENA-STA-005**, *NENA Standards for the Provisioning and Maintenance of GIS data to ECRF and LVFs***
- **NENA-REQ-002**, *NENA Next Generation 9-1-1 Data Management Requirements*
- **NENA-INF-14**, *NENA Information Document for Development of Site/Structure Address Point GIS Data for 9-1-1*
- **NENA-INF-XXX**, *NENA Information Document for GIS Data Stewardship for Next Generation 9-1-1 (NG9-1-1)* **
- **NENA 02-014**, *NENA GIS Data Collection and Maintenance Standards*
- **NENA 71-501**, *NENA Information Document for Synchronizing Geographic Information System Databases with MSAG & ALI*

***In development*

Questions?