NENA Standard for NG9-1-1 GIS Data Model

Abstract: This document defines the Geographic Information System (GIS) data information, structure, requirements, and related information used in NENA Next Generation 9-1-1 (NG9-1-1) Core Services (NGCS).

NENA Standard for NG9-1-1 GIS Data Model

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1 Executive Overview

Purpose and Scope

This document defines the Geographic Information System (GIS) Data Model, which supports the NENA Next Generation 9-1-1 (NG9-1-1) Core Services (NGCS) of location validation and geospatial call routing to the appropriate agency for dispatch. This model also defines several GIS data layers (hereinafter "layers") used in local Public Safety Answering Point (PSAP) and response agency mapping applications for handling and responding to 9-1-1 calls.

The data structures defined in the main body of this document are related to, but different from the relational data structures defined in Appendix E—Relational Data Model. Appendix E—Relational Data Model describes the Spatial Interface (SI). The SI is a standardized interface between the GIS data and the functional elements that consume GIS data, such as the Emergency Call Routing Function (ECRF), Location Validation Function (LVF), and Mapping Data Service (MDS). In contrast, the flat file model in the main body of this document focuses on the structure (e.g., field names, field data types, domains) of GIS data. Care has been taken to ensure compatibility between the two models and to simplify the transformation between the flat file structure and relational structure to support diverse implementation needs.

Spatial (GIS) data drives NG9-1-1. Spatial data is often grouped into layers or feature classes. Layers are homogenous collections of common features, each having the same spatial representation and a common set of fields. Spatial data in this document consists of the following vector (discrete) layer types:

- Points—Discrete locations such as address points, premises locations, and distance markers
- Lines—Linear features such as roads, rivers, and railways
- Polygons—Geographic coverage areas such as service boundaries, lakes, and cities

While local governments, public safety entities, and PSAPs currently use GIS address points, road centerlines, boundaries, and many other data layers in many different ways, the move to NG9-1-1 introduces and sometimes requires new uses of existing data and creation of new data layers. The layers identified in this document are grouped into the categories of Required, Strongly Recommended, and Recommended. The ***Required*** layers MUST be available for NGCS to process a 9-1-1 call via an ESInet, in particular, with an ECRF and LVF and for the functionality of the SI. The ***Strongly Recommended*** layers may aid in NGCS functionality and may be used for call taking and dispatch operations. The ***Recommended*** layers will not be provisioned into the LVF or the ECRF, but are beneficial for PSAP map display and 9-1-1 call taking.

This NENA Standard for NG9-1-1 GIS Data Model (NG9-1-1 GIS Data Model) and the NG9-1-1 system rely on standardized, accurate, and up-to-date GIS data. This document

updates previous GIS Data Models for use in the NG9-1-1 system while remaining backward compatible with existing Enhanced 9-1-1 (E9-1-1) GIS data.

The NG9-1-1 system makes use of a new location conveyance format, called the "Presence Information Data Format-Location Object" or PIDF-LO. The PIDF-LO is an international data format that serves as the representation of the location of the device calling 9-1-1 and allows for the conveyance of detailed civic and geospatial information. The United States profile of PIDF-LO for civic locations is the *NENA Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF-US) Standard*, NENA-STA-004 [4]. The Canadian profile of PIDF-LO for civic locations is the *Next Generation 9-1-1 (NG9-1-1) Canadian Civic Location Data Exchange Format (CLDXF-CA) Standard*, NENA-STA-029 [23].

This document conforms to *CLDXF-US* [4] for the representation of civic location information in United States NG9-1-1 environments and conforms to *CLDXF-CA* [23] for the representation of civic location information in Canadian NG9-1-1 environments. However, there are additional fields described in this document that provide information beyond what CLDXF-US and CLDXF-CA describe.

This GIS Data Model for NG9-1-1 is designed to support the location conveyed in the PIDF-LO in support of both validation of the location information compared to the local 9-1-1 Authorities' GIS data in addition to the routing of the 9-1-1 call to the appropriate PSAP. The process of validating the location information that is contained in the PIDF-LO first occurs in the LVF of the NG9-1-1 system before the call is made. The location information within the PIDF-LO is then used to route the 9-1-1 call to the appropriate PSAP via the ECRF.

The LVF and ECRF require standardized GIS data to perform their respective roles. GIS data provided in accordance with this standard are used as input to the SI. The SI's role is to then provision the LVF and ECRF (and other functional elements). The Master Street Address Guide (MSAG) Conversion Service (MCS) will also make use of the information contained in the GIS data, in particular, legacy data attributes. In addition, public safety mapping applications use these GIS layers, allowing the PSAP to properly display the location of a 9-1-1 call on a map and to dispatch the correct emergency service(s) to the appropriate location.

The primary reasons to implement this standard are to:

- Promote the creation of complete, consistent, and high quality GIS data for use within NENA NG9-1-1 systems,
- Establish standardized GIS data provisioning requirements and structure for all users,
- Establish provisioning guidelines for GIS data needed to support existing E9-1-1 systems, while transitioning into NG9-1-1 systems,
- Enable validation of the incoming 9-1-1 civic location information against the local 9-1-1 Authorities' GIS data via the LVF,

- Enable routing of the 9-1-1 call to the appropriate destination, using the local 9-1-1 Authorities' GIS data provisioned to the ECRF,
- Provide the data to determine the appropriate emergency responding agencies, and
- Enable compatibility and interoperability between GIS datasets while standardizing attributes for consistent use in software.

Benefits

Adherence to this document provides a standardized, interoperable GIS data model that benefits users and providers of GIS data in the following manner:

- Enables the validation of civic locations before a 9-1-1 call is made
- Provides the data structure that allows the NG9-1-1 functionality that routes calls to the correct destination
- Maintains or improves support for accurate plotting of 9-1-1 calls in public safety mapping applications for call handling purposes
- Provides a framework to help migrate existing GIS datasets to NG9-1-1 systems
- Streamlines data maintenance
- Enhances interoperability and data sharing
- Reduces confusion and ambiguity that can result from non-standardized data

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2 Document Conventions

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2. MUST NOT: This phrase, or the phrase "SHALL NOT", means that the definition is an absolute prohibition of the specification.
3. SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
4. SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED" means that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
5. MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option "must" be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option "must" be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.)

These definitions are based on IETF RFC 2119 [2].

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2.3 Reason for Issue/Reissue

NENA reserves the right to modify this document. Upon revision, the reason(s) will be provided in the table below.

Document Number	Approval Date	Reason For Issue/Reissue
NENA-STA-006.1-2018	June 16, 2018	Initial Document
NENA-STA-006.1.1-2020	February 18, 2020	Scrivener errors corrected and URLs updated
NENA-STA-006.2-2022	September 23, 2022	• Added new content and revised existing content to: • Begin to address Canadian considerations related to the NG9-1-1 GIS Data Model. Additional changes will be made in a future version following publication of the CLDXF-CA standard. • Resolve some issues related to Road Centerlines identified as future work in version 1 of the standard.

Document Number	Approval Date	Reason For Issue/Reissue
		• Resolve inconsistencies and other issues related to Layer Names, Domains, and Street Type field names identified by the GIS Data Model Template WG as needing further clarification in the Standard. • Update NENA Globally Unique ID structure to align with NENA-STA-010.3, and update language to clarify that the structure is mandatory. • Update terminology and guidance around service boundary layers and eliminate the requirement to provide them as separate layers. Specific structural changes to the Data Model can be found in Appendix F—Structural Changes by Version.
NENA-STA-006.2a-2022	May 2, 2023	Publishing error corrections. • Increased field width of Street Name Pre Directional and Street Name Post Directional fields from 9 to 10 in the RoadCenterLine layer and SiteStructureAddressPoint layer to accommodate French directional domain values added in v2. • Increased field width of Alias Street Name Pre Directional and Alias Street Name Post Directional fields from 9 to 10 in the StreetNameAliasTable to accommodate French directional domain values added in v2. • Increase field width of Road Class field from 15 to 24 in the RoadCenterLine layer to accommodate renamed domain values in v2 (*Walkway* changed to *Walkway/Pedestrian Trail*; *Trail* changed to *Bike Path or Trail*). • In Section 4.3.2, replaced a comma following "smaller polygons" with "and" in the sentence "Because a polygon set is

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		allowed, if this layer had the smaller polygons and if all of them have the same Service URI and Service URN (but not necessarily the same Display Name, for example), it would work correctly" to clarify that both conditions must be met. • In Section 4.3.4, removed "(Primary Key)" from the NGUID Descriptive Name and increased field width from 50 to 55 for Service URN to accommodate all IANA Registry values as defined in NENA-STA-010.3. • Fixed cross-reference numbers in Sections 5, 5.74, Appendix B, and Appendix D to go to referenced sections.
NENA-STA-006.3-2026	March 11, 2026	Added new content and revised existing content to: • Align with NENA-STA-010.3 Appendix B and add a relational data model option as Appendix E in this document to supersede Appendix B in the next version of NENA-STA-010. • Align with CLDXF-US, NENA-STA-004.2, and CLDXF-CA, NENA-STA-029.1, and resolve discrepancies. • Add business rules and references to CLDXF-supported fields. • Add conditional business rules to legacy fields. • Incorporate some requirements identified by NENA-REQ-003.1, NENA Requirements for 3D GIS for E9-1-1 and NG9-1-1. • Resolve issues and discrepancies identified while updating existing templates. • Split distance markers and location markers into separate layers. • Redefined "Type" column that indicates the data type of the attribute columns in all layers and updated the Required values.

Document Number	Approval Date	Reason For Issue/Reissue
		• Populated the "GIS Data Layers" Registry to replace the values populated in "GIS Data Layers" registry created in v2, since NENA-STA-006.2 will not be submitted to IANA. • Update field definitions throughout Section 5, including clarifying definitions and updating examples. Specific structural changes to the Data Model can be found in Appendix F—Structural Changes by Version.

3 Technical/Operational Description

3.1 Background

The NENA Next Generation (NG9-1-1) GIS Data Model meets the demands and needs of a NENA i3 NG9-1-1 system, as described in the *NENA i3 Standard for Next Generation 9-1-1*, NENA-STA-010 [3], while permitting backward compatibility with existing E9-1-1 systems. This GIS Data Model can be used with today's E9-1-1 location conveyance format, Automatic Location Identification (ALI), and the Next Generation 9-1-1 location conveyance format, PIDF-LO. PIDF-LO is the Internet Engineering Task Force (IETF) Presence Information Data Format-Location Object as defined in the IETF Request for Comments (RFC) 4119 [5] and extended by RFC 5139 [6] and RFC 6848 [7]. NENA has adopted the PIDF-LO as the means of conveying location information within an NG9-1-1 system.

In an NG9-1-1 system, the location of the IP endpoint supporting the fixed or nomadic calling device is validated against the local 9-1-1 Authorities' provisioned GIS data by the LVF.

This same local provisioned GIS data is used with the ECRF. The ECRF uses the location of the call (civic or geodetic) to determine, primarily, to which PSAP the call should be routed, based on the local 9-1-1 Authorities' GIS data. The ability to perform validation of locations and routing of an emergency call will depend on the currency, standardization, quality, and accuracy of the GIS data being used. The local 9-1-1 Authorities' GIS data is used within NG9-1-1 to accomplish the same functions as the MSAG, ALI, and Selective Router perform in E9-1-1.

NG9-1-1 is designed to interoperate with other 9-1-1 systems, across a county, across a state, across North America, and throughout the world. In order to obtain this level of interoperability, strict adherence to standards is REQUIRED. Being able to transfer a 9-1-1

call to another PSAP, or to assist other PSAPs in times of emergencies depends on the core routing and validation database, the provisioned GIS data within the LVF and ECRF, and meeting and adhering to the standards in this document.

3.2 Metadata

Metadata is a file of information that captures the basic characteristics of the data and information resource. It represents the *who, what, when, where, why,* and *how* of the resource. Metadata is strongly recommended to be included and available for each GIS data layer described in this document.

Agencies are encouraged to use or transition to ISO 19115 [8] and other associated International Standards Organization (ISO) metadata standards as they are able. More information about ISO metadata standards is available on the Federal Geographic Data Committee website [9] and the National Oceanic and Atmospheric Administration website [10].

3.3 Spatial Reference

Local GIS data may be developed and managed in any datum (typically NAD83) and coordinate system (ex. State Plane projection) desired. A datum is a reference surface that is used to provide a consistent reference for geospatial information, assuring that any comparisons or analyses are consistent (such as location determination).

Prior to loading GIS data into the ECRF it MUST be transformed into the World Geodetic System of 1984 (WGS 1984) [11]. All GIS data in i3 must be in this WGS84 format to support interoperability between all systems and all sites, as referenced in NENA-STA-010 [3].

Geodetic parameters for WGS84 are specified by the European Petroleum Survey Group (EPSG) for both 2-dimensional and 3-dimensional geometries [12].

- For 2-dimensional geometries the geodetic parameters are required to follow EPSG::4326.
- For 3-dimensional geometries the geodetic parameters are required to follow EPSG::4979.

3.4 Standardized Data Fields

Data domains must be utilized to ensure that information is not lost when merged with other GIS data and to ensure interoperability across all systems. In some fields, only certain values are accepted; therefore, any data outside of this format MAY be ignored or replaced with a null value. Regardless of how the data is being maintained locally, data SHALL be provided in accordance with this standard when exported. Attribute values other than those within the "domain" of allowed values will not be recognized. Non-standardized attributes will lead to problems with validation, routing, and interoperability.

In the current E9-1-1 system, GIS and MSAG data are usually contained within a jurisdiction or region, and as long as the data is consistent within that region, it does not matter how closely it conforms to a data standard. For example, some jurisdictions store non-numeric prefix and suffix information in an address number data field.

In NG9-1-1, data may not be confined within a jurisdiction or an area. In disaster or overload conditions, calls may be answered out of area. Data may be consolidated into region-wide, statewide, and province-wide databases. For these reasons, it is essential that ALL jurisdictions define their GIS data layers and attributes as they are specified in this NENA NG9-1-1 GIS Data Model Standard. While this change may mean additional effort for many jurisdictions, it is important that every GIS conforms to the GIS Data Model Standard contained in this document, in order to realize the many benefits of interoperable data and systems.

3.5 Case Sensitivity

All systems compliant with this standard that receive and store data MUST preserve case. Fields using a domain of values MUST adhere to the casing rules of that domain. Legacy fields specified in this standard, namely "Legacy Street Name," "Legacy Street Name Post Directional," "Legacy Street Name Pre Directional," "Legacy Street Name Type," and "MSAG Community Name" (including left and right siblings), MUST match the casing in the MSAG. For all fields that are not governed by domains, values SHOULD be provided using mixed casing (i.e., a combination of uppercase and lowercase letters such as in "MacDonald," "LaCrosse," "O'Reilly," "DeHavilland," "Avenue of the Americas," "Bras d'Or") as deemed correct by the authoritative source.

3.6 NENA Globally Unique ID (NGUID)

An NGUID is REQUIRED for all GIS features. NGUIDs SHALL be generated and maintained within a GIS database by concatenating "urn:emergency:uid:gis:[Layer Indicator]:[Local Unique ID]:[Agency Identifier]" where the elements are defined as:

- **urn:emergency:uid:gis—**standardized unique prefix that defines this class of IDs associated with GIS data.
- **Layer Indicator—**the shorter name for the GIS data layer the feature is associated with as defined by the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and the responder registries in NENA-STA-010.3.1 [28].
- **Local Unique ID—**a GIS Data Provider generated "locally assigned ID," which can be numeric and/or text. This local ID MUST be unique within the GIS Data Provider's dataset for all features associated with a specific Agency Identifier.
- **Agency Identifier—**a fully qualified domain name (FQDN) representing the GIS Data Provider, which is an "Agency." Agency and Agency Identifier are as defined in NENA-STA-010 [3]. The domain name is obtained from any Domain Name System (DNS) registrar.

Each NGUID MUST be unique as an aggregated NGUID following the structure described in this section. It is not intended for use as a primary key in database operations.

The combination of the Local Unique ID with the rest of the values that construct the NGUID, provides a unique NGUID when multiple GIS Data Provider submissions are aggregated. The NGUID SHOULD be stable for as long as possible, so that it supports the reporting and resolution of errors from a quality control process, including the discrepancy reporting. The consistency of the ID between submissions also assists with managing downstream data sets.

Example NGUID:
urn:emergency:uid:gis:RCL:{AD873541-F41C-409E-A0BE-1B0C583902A4}:nortexrpc.org

URN	urn:emergency:uid:gis
Layer Indicator	RCL
Local Unique ID	{AD873541-F41C-409E-A0BE-1B0C583902A4}
Agency Identifier	nortexrpc.org

Note: In Version 2 of the NG9-1-1 GIS Data Model, the format of the NGUID was changed to a standardized format to align with conventions set in i3. This version stays consistent, and no further changes were made.

3.7 GIS Data Format

GIS data can be represented in a growing number of different GIS data file formats. In some cases, a GIS data file format can also be "versioned" which can create problems even when an entity believes it is fully-equipped to read a particular format from another entity. Due in part to the dynamic nature of GIS data file formats and in part to the variety of formats that an entity may or may not be in a position to support with their chosen GIS, this standard currently places no requirement on the GIS data file format to use for information exchange. However, this standard does place requirements on the field names used, the properties of each field, and specific guidance on the attribution to be placed within the fields of an entity's chosen GIS data file format.

In many cases, when an entity is exchanging GIS data with a vendor, the vendor's requirements will drive the use of a particular GIS data file format. When exchanging GIS data between entities, it is expected that the entities will coordinate to ensure the receiving entity can read the GIS data file format provided. What should be consistent with GIS data exchange in an NG9-1-1 environment, regardless of the GIS data file format used for the exchange, are the naming conventions of each field in each layer as well as the accompanying properties of each field described within this standard. This should be true whether the exchange is between a public safety entity and its vendor(s) or between one or more public safety entities and/or authoritative GIS sources. It is anticipated that by ensuring consistency at the field level, entities will be able to share information with any

other public safety entity using a mutually-agreed-upon GIS data file format and that the information received will not be misinterpreted, or perceived as malformed by the recipient, in that exchange.

Within Section 4 GIS Data Model Layers, a table is provided for each layer with a "Descriptive Name" column for the field along with a REQUIRED "Field Name" column. The "Descriptive Name" column provides a fully-spelled-out name that is intended to be used when referencing other NENA documentation that uses the same fully-spelled-out names. The "Field Name" column contains the specific field names to assign within each layer and is intended to be used when exchanging GIS data between one or more entities for the purposes of NG9-1-1. Other columns within these tables provide guidance on the use of attributes within the field such as "Required" and data type specifications. Entities are also encouraged to refer to Section 5 Detailed Description of Field Names and Associated Attribute Data for more guidance on the fields. In some cases, it may also be necessary to reference *CLDXF-US* [4] and *CLDXF-CA* [23] Standards for certain address fields

The NENA Standard for NG9-1-1 GIS Data Model version 2 introduced a change in the naming convention for geopolitical/administrative boundaries that were previously defined as States, Counties, Incorporated Municipalities, Unincorporated Communities, and Neighborhood Communities in Section 4 GIS Data Model Layers. The recommended polygon names of A1-A5 are intended for alignment with the GEOPRIV Location Object Format described in RFC 4119 [5].

Version 3 of this document has new administrative polygon layer name changes to accommodate the widespread differences between administrative naming hierarchies and the uniqueness that exists for these levels across North America.

It is important to note that any entity MUST be capable of exporting their GIS data in a GIS data format that meets the specified field naming conventions, "Required" usage, and data type attributes. Entities SHOULD use the recommended layer names. Using the recommended layer names also simplifies the recognition and usage of layers through the SI or when sharing data between PSAPs and a GIS Data Provider.

It is not required that every entity will use the GIS Data Model or the recommended layer names described within this standard for its day-to-day internal use and maintenance. However, entities are encouraged to use the standard for the development of their internal GIS data model to ensure they can meet the export requirements and improve interoperability. Utilization of the GIS Data Model naming conventions benefits the user by eliminating the need for scripting or other data transformation processes to meet the export requirements. NENA recognizes that these name changes are an initial introduction of change and will take time to be recognized and adopted in internal GIS models.

4 GIS Data Model Layers

GIS data layer names shown below are meant to provide consistent naming conventions for GIS data layers across all NENA documents. This document populates the GIS Data Layers registry with the initial values for GIS Layer Name and Layer Indicator (see Section 7.1 "GIS Data Layers" Registry). NENA-STA-010.3.1 [28] populates the responder registries with the initial values for GIS Layer Name and Layer Indicator. It should be noted that the GIS Data Layers registry and the responder registries are Internet Assigned Numbers Authority (IANA) registries. IANA registries are always the most up-to-date source of layer names, and the IANA registries should be referenced directly for the recommended layer names. Please see Section 3.7 GIS Data Format for more information on local layer naming conventions.

Note that any of the layers defined in this document can be provisioned into any of the NGCS functional elements using GIS data to function. Their use outside of the above is not defined in this document.

Table 4-1 illustrates the functional elements for NGCS and services that are dependent on the specific GIS data layers in column "GIS Layer Name." Each GIS data layer in this document has been denoted as Required, Strongly Recommended, or Recommended as defined above. The table identifies the functional elements and services each layer is "Required for," "Strongly Recommended for," or "Recommended for" to operate successfully. The functional elements and services included are Emergency Call Routing Function (ECRF), Location Validation Function (LVF), GeoCode Service (GCS), MSAG Conversion Service (MCS), and Mapping Data Service (MDS). The ProvisioningPolygon layer is useful for GIS Data Management, but it is not currently associated with a specific functional element or service.

Table 4-1 NG9-1-1 GIS Data Layers

GIS Layer Name	Required for	Strongly Recommended for	Recommended for	Some Additional Uses for All Layers
RoadCenterLine	ECRF LVF GCS MCS MDS			Organizing data for NGCS Emergency call taking Emergency dispatch PSAP map display Computer Aided Dispatch (CAD) systems GIS Basemaps Transportation Planning
SiteStructureAddressPoint	ECRF LVF GCS MCS MDS			
PsapPolygon	ECRF LVF MDS			
FirePolygon	ECRF		LVF	

GIS Layer Name	Required for	Strongly Recommended for	Recommended for	Some Additional Uses for All Layers
	MDS			Utilities
PolicePolygon	ECRF MDS		LVF	Environmental studies
EmsPolygon	ECRF MDS		LVF	Computer Aided Drafting & Design (CADD) systems
ProvisioningPolygon	MDS			
Other service boundary layers (e.g., CoastGuardPolygon, PoisonControlPolygon)		ECRF MDS	LVF	Parks & Recreation
A1Polygon		MDS		
A2Polygon		MDS		
A3Polygon		MDS		
A4Polygon		MDS		
A5Polygon		MDS		
RailroadCenterLine			MDS	
HydrologyLine			MDS	
HydrologyPolygon			MDS	
LocationMarkerPoint			MDS	
DistanceMarkerPoint			MDS	
SiteStructureAddressPolygon			MDS	

The data structures defined in the main body of this document are related to, but different from the relational data structures defined in Appendix E—Relational Data Model. Appendix E—Relational Data Model describes the SI, which is a standardized interface between the GIS data and the functional elements that consume GIS data, such as the ECRF, LVF, MDS, etc. In contrast, the main body of this document describes the flat file model, focusing on the structure (e.g., field names, field data types, domains) of GIS data. If fields are not included within locally maintained GIS data, the 9-1-1 Authority or its designee should consult with their NGCS Provider to ensure that the data conforms to either the flat file model or the relational model described in Appendix E—Relational Data Model, before the data is provided to the SI (by manual or automated means).

In the GIS data layer tables below, data fields include a specification of when they may appear in a record. The database systems that are used to store a GIS typically can only support a specification of whether a field is required to be present. If not, it is optional. The "Required" column provides this specification. Three values may occur in this column:

- "Yes" means the data field is required to be present in all records. It will appear as required in the database schema.
- "No" means that the data field is optional in a record. It will not appear as required in the database schema.

- "Conditional" means that the data field is conditional. This value alerts the reader that a business rule is specified that controls the presence of a value in the data field. It will not appear as required in the database schema. All attributes that are defined by a CLDXF PIDF-LO structure MUST follow the business rules identified in the *CLDXF Standard* [4] [23] applicable to the reader's country. For all non-CLDXF conditional attributes that do not have a stated business rule in this document, if an attribute value exists, it MUST be provided. If no value exists for the attribute, the data field is left unpopulated.

There are differences in addressing methodologies between Canada and the United States. These differences are noted in the field name descriptions in Section 5 Detailed Description of Field Names and Associated Attribute Data.

Locally maintained GIS data layers are REQUIRED to include all data fields specified as "Yes" within this GIS Data Model but are NOT REQUIRED to include data fields that are not specified as "Yes" if no data exists to be populated within the data fields. If there are no records in the entire database for a specific non-required data field, then the data field itself is NOT REQUIRED. Local policy may dictate that all data fields be included in the structure regardless of whether data exists.

The complete attribute definitions shown in the GIS data layer tables are described and defined in Section 5 Detailed Description of Field Names and Associated Attribute Data.

In the GIS data layer tables below, each layer has a heading of Descriptive Name, Field Name, Required, Type, and SubType.

The "Descriptive Name" is provided to clarify the intent of the information contained in the "Field Name."

The "Field Name" column gives the standardized GIS data field name that MUST be used. While local entities MAY use their own field names for internal processes, utilization of GIS data within and between the NG9-1-1 system functional elements MUST conform to this standard structure.

The "Type" column indicates the data type of the fields. To maintain vendor neutrality, data types are genericized but include data types common to most systems.

- **TEXT (Length)—**A variable-length character or string data type, using a database encoding of UTF-8. Common database and GIS data types include but are not limited to VARCHAR, TEXT, NVARCHAR, and STRING.

  TEXT fields utilize the following TEXT subtypes and may have domain restrictions that are defined in Section 5 Detailed Description of Field Names and Associated Attribute Data. The "SubType" column indicates which of the following subtypes applies.

  - **P—**Printable UTF-8 [13] characters that display recognizable glyphs when printed, plus the space character, (U+0020). This explicitly supports accented

characters and does not permit other blank characters such as a non-breaking space or control characters such as carriage return, line feed, and escape. Indigenous characters are expressly allowed. It is up to the agency to verify with their 9-1-1 system vendor(s) that their systems support characters or pictographic glyphs for all Indigenous languages within their service area, or for a service area from which they receive diverted or transferred emergency calls.

  - **U—**A Uniform Resource Identifier (URI) as described in Section 9 Abbreviations, Terms, and Definitions and as defined in RFC 3986 [14], and also conforming to any rules specific to the scheme (sip:, https:, etc.) of the chosen URI.

- **DATETIME—**A datetime or timestamp data type that is time-zone aware. Common database and GIS data types include but are not limited to DATETIME2, TIMESTAMPTZ, DATE, TEXT. It is important for GIS Data Providers to understand that GIS software, by default, stores datetime data types in the local time zone, which are not time-zone aware.

  A datetime or timestamp MUST be transferred in a data type that can be represented as year, month, day, hour, minute, seconds, and a time zone offset value (e.g., '2023-05-25T20:51:13Z', '2023-05-25T14:52:15-06:00', '2023-05-25T20:52:30+00:00'). Datetime objects MAY record decimal seconds with one digit past the decimal point. When NENA-STA-006 datetime objects are used in interfaces defined in NENA-STA-010 [3], all i3 systems will treat time specified without decimal seconds as if it had the value ".0". If vendor-specific software does not support time zone offset values, datetime or timestamp values MUST be transferred in UTC time zone.

  The storage of timestamps and datetime objects can be difficult as time-zone aware datetime fields are commonly only supported in relational databases, not vendor-specific GIS software. Most databases store datetime and timestamp objects as 8-byte integer values as the number of microseconds since the Unix epoch ('1970-01-01 00:00:00' UTC). However, some databases, such as GeoPackages, store DATE data types as a string representation in TEXT data type utilizing ISO-8601 rather than RFC 3339. The GIS Data Provider should be cognizant of how datetime and timestamp objects are stored in their local database and ensure that they are converted accurately during ETL processes, which is beyond the scope of this document.

- **INTEGER—**The value of a signed integer, stored as a 4-byte integer number. Common database and GIS data types include, but are not limited to, INTEGER, INT4, LONG.

- **REAL (Precision,Scale)—**The value of a floating point number (numbers that have decimal places), stored as an 8-byte IEEE floating point number with a defined

precision and scale. Precision is the total number of digits and sign (+/-) of the value, whereas the scale is the number of digits after the decimal point. Common database and GIS data types include but are not limited to, FLOAT, DOUBLE, and REAL.

Additional GIS data layers and data fields may be used as needed to best meet local purposes and needs. However, only those layers listed below and the associated attribute data shown in the layers provided in this document will be utilized for the loading and provisioning of GIS data for the LVF, ECRF, and MCS functions within NG9-1-1 as described in NENA-STA-010 [3].

The following sections are organized by data themes, with subsections for their feature types.

4.1 Roads

4.1.1 Road Centerlines—REQUIRED

Roads data is maintained as a line layer for representing the centerline of a roadway. This dataset is referred to as the RoadCenterLine layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward. GIS road centerline arc-node topology is associated with attribute data containing information on street names, address ranges, jurisdictional boundaries, and other attributes. The RoadCenterLine layer is an integral part of any public safety GIS due to its versatility and use for:

- Querying and geocoding of civic addresses based on dual (left/right) address ranges
- Tactical map display
- Map and attribute viewing
- Map production
- Location and driving directions
- Integration of network topology to allow vehicle routing, drive time analysis
- Integration of spatially related attributes for advanced applications including those focused on public safety, asset management, planning, utilities, and public works

All Road Centerlines MUST have the Street Name field populated, even if unnamed.

Table 4-2 RoadCenterLine Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
Effective Date	Effective	No	DATETIME	-
Expiration Date	Expire	No	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P

Descriptive Name	Field Name	Required	Type	SubType
Left Address Number Prefix	AdNumPre_L	Conditional	TEXT (15)	P
Right Address Number Prefix	AdNumPre_R	Conditional	TEXT (15)	P
Left FROM Address Number	FromAddr_L	Yes	INTEGER	-
Left TO Address Number	ToAddr_L	Yes	INTEGER	-
Right FROM Address Number	FromAddr_R	Yes	INTEGER	-
Right TO Address Number	ToAddr_R	Yes	INTEGER	-
Parity Left	Parity_L	Yes	TEXT (1)	P
Parity Right	Parity_R	Yes	TEXT (1)	P
Street Name Pre Modifier	St_PreMod	Conditional	TEXT (25)	P
Street Name Pre Directional	St_PreDir	Conditional	TEXT (10)	P
Street Name Pre Type	St_PreTyp	Conditional	TEXT (50)	P
Street Name Pre Type Separator	St_PreSep	Conditional	TEXT (20)	P
Street Name	St_Name	Yes	TEXT (254)	P
Street Name Post Type	St_PosTyp	Conditional	TEXT (50)	P
Street Name Post Directional	St_PosDir	Conditional	TEXT (10)	P
Street Name Post Modifier	St_PosMod	Conditional	TEXT (25)	P
Direction of Travel	Dir_Travel	Conditional	TEXT (10)	P
Legacy Street Name Pre Directional*	LSt_PreDir	Conditional	TEXT (2)	P
Legacy Street Name*	LSt_Name	Conditional	TEXT (75)	P
Legacy Street Name Type*	LSt_Typ	Conditional	TEXT (4)	P
Legacy Street Name Post Directional*	LSt_PosDir	Conditional	TEXT (2)	P
ESN Left*	ESN_L	Conditional	TEXT (5)	P
ESN Right*	ESN_R	Conditional	TEXT (5)	P
MSAG Community Name Left*	MSAGComm_L	Conditional	TEXT (30)	P
MSAG Community Name Right*	MSAGComm_R	Conditional	TEXT (30)	P
Legacy County ID Left*	LCntyID_L	Conditional	TEXT (5)	P
Legacy County ID Right*	LCntyID_R	Conditional	TEXT (5)	P
Country Left	Country_L	Yes	TEXT (2)	P
Country Right	Country_R	Yes	TEXT (2)	P
Administrative Level 1 Left	A1_L	Yes	TEXT (2)	P
Administrative Level 1 Right	A1_R	Yes	TEXT (2)	P
Administrative Level 2 Left	A2_L	Conditional	TEXT (254)	P
Administrative Level 2 Right	A2_R	Conditional	TEXT (254)	P
Additional Code Left	AddCode_L	Conditional	TEXT (6)	P
Additional Code Right	AddCode_R	Conditional	TEXT (6)	P

Descriptive Name	Field Name	Required	Type	SubType
Administrative Level 3 Left	A3_L	Conditional	TEXT (254)	P
Administrative Level 3 Right	A3_R	Conditional	TEXT (254)	P
Administrative Level 4 Left	A4_L	Conditional	TEXT (254)	P
Administrative Level 4 Right	A4_R	Conditional	TEXT (254)	P
Administrative Level 5 Left	A5_L	Conditional	TEXT (254)	P
Administrative Level 5 Right	A5_R	Conditional	TEXT (254)	P
Postal Code Left	PostCode_L	No	TEXT (7)	P
Postal Code Right	PostCode_R	No	TEXT (7)	P
Postal Community Name Left	PostComm_L	No	TEXT (40)	P
Postal Community Name Right	PostComm_R	No	TEXT (40)	P
Road Class	RoadClass	No	TEXT (24)	P
One-Way	OneWay	No	TEXT (2)	P
Speed Limit	SpeedLimit	No	INTEGER	-
Validation Left	Valid_L	No	TEXT (1)	P
Validation Right	Valid_R	No	TEXT (1)	P

* Used in legacy systems and is not used in a full NG9-1-1 implementation

4.1.2 Street Name Aliases

The street name as assigned by the local addressing authority MUST be the name in the RoadCenterLine layer. The street name assigned by the local addressing authority is the street name used for location validation and call routing. However, many roads are known by more than one street name, and these are known as alias street names. Examples include when a state route or state highway crosses into a city jurisdiction, when several streets "merge" to traverse the same road segment, or when honorary names are given to previously named and addressed roads. There are many ways to represent an alias. Regardless of the alias naming methodology used, one MUST ensure it is compatible with the latest version of Appendix E—Relational Data Model.

4.2 Site/Structure Addresses

4.2.1 Site/Structure Address Points—REQUIRED

Site/Structure Addresses data is maintained as a point layer that supports 3D for representing the location of a site, a structure, an interior space, or access to a site, structure, or an interior space. This dataset is referred to as the SiteStructureAddressPoint layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward. While the SiteStructureAddressPoint layer is required, there is

no requirement for the completeness of these data. It is understood that it will take time and resources to develop complete and accurate Site/Structure Addresses data.

Site/Structure Addresses data can be used to locate sites that otherwise may not geocode correctly using the road centerline data. It can also be used to locate areas of unusual addressing (i.e., odd addresses on the even side of the road centerlines and vice versa), and other areas where the data is available. Some addressable locations may be problematic near boundaries.

The Address Number, Street Name, and Administrative Levels 1-5 attributes in the SiteStructureAddressPoint layer SHOULD be consistent with the address number range, street name, and left/right Administrative Level attribute combinations found in the RoadCenterLine layer.

While there may be address data available, it may not be in the standardized format of this structure. GIS Data Providers should be working toward developing and maintaining the Site/Structure Addresses data described in this Standard.

Table 4-3 SiteStructureAddressPoint Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
Effective Date	Effective	No	DATETIME	-
Expiration Date	Expire	No	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Country	Country	Yes	TEXT (2)	P
Administrative Level 1	A1	Yes	TEXT (2)	P
Administrative Level 2	A2	Conditional	TEXT (254)	P
Additional Code	AddCode	Conditional	TEXT (6)	P
Administrative Level 3	A3	Conditional	TEXT (254)	P
Administrative Level 4	A4	Conditional	TEXT (254)	P
Administrative Level 5	A5	Conditional	TEXT (254)	P
Address Number Prefix	AddNum_Pre	Conditional	TEXT (15)	P
Address Number	Add_Number	Conditional	INTEGER	-
Address Number Suffix	AddNum_Suf	Conditional	TEXT (15)	P
Address Number Complete	AddNum_Cmp	Conditional	TEXT(42)	P
Distance Marker	DistMarker	Conditional	TEXT (150)	P
Street Name Pre Modifier	St_PreMod	Conditional	TEXT (25)	P
Street Name Pre Directional	St_PreDir	Conditional	TEXT (10)	P
Street Name Pre Type	St_PreTyp	Conditional	TEXT (50)	P

Descriptive Name	Field Name	Required	Type	SubType
Street Name Pre Type Separator	St_PreSep	Conditional	TEXT (20)	P
Street Name	St_Name	Conditional	TEXT (254)	P
Street Name Post Type	St_PosTyp	Conditional	TEXT (50)	P
Street Name Post Directional	St_PosDir	Conditional	TEXT (10)	P
Street Name Post Modifier	St_PosMod	Conditional	TEXT (25)	P
Direction of Travel	Dir_Travel	Conditional	TEXT (10)	P
Legacy Street Name Pre Directional*	LSt_PreDir	Conditional	TEXT (2)	P
Legacy Street Name*	LSt_Name	Conditional	TEXT (75)	P
Legacy Street Name Type*	LSt_Typ	Conditional	TEXT (4)	P
Legacy Street Name Post Directional*	LSt_PosDir	Conditional	TEXT (2)	P
ESN*	ESN	Conditional	TEXT (5)	P
MSAG Community Name*	MSAGComm	Conditional	TEXT (30)	P
Legacy County ID*	LCountyID	Conditional	TEXT (5)	P
Postal Community Name	Post_Comm	No	TEXT (40)	P
Postal Code	Post_Code	No	TEXT (7)	P
Postal Code Extension	PostCodeEx	Conditional	TEXT (4)	P
Site	Site	No	TEXT (254)	P
SubSite	SubSite	No	TEXT (254)	P
Structure	Structure	No	TEXT (75)	P
Floor Label	Floor	No	TEXT (75)	P
Floor Index	FloorIndex	No	INTEGER	-
Wing	Wing	No	TEXT (75)	P
Unit	Unit	Conditional	TEXT (75)	P
Unit Pre Type	UnitPreTyp	Conditional	TEXT (75)	P
Unit Value	UnitValue	Conditional	TEXT (75)	P
Section	Section	No	TEXT(75)	P
Row	Row	No	TEXT(75)	P
Room	Room	No	TEXT (75)	P
Seat	Seat	No	TEXT (75)	P
Location Marker	LocMarker	No	TEXT(100)	P
Additional Location Information	Addtl_Loc	No	TEXT (225)	P
Additional Data URI	AddDataURI	No	TEXT (254)	U
Place Type	Place_Type	Conditional	TEXT (50)	P
Placement Method	Placement	No	TEXT (25)	P
Longitude	Longitude	No	REAL (11,7)	-

Descriptive Name	Field Name	Required	Type	SubType
Latitude	Latitude	No	REAL (10,7)	-
Elevation	Elevation	No	REAL (9,3)	-
Altitude	Altitude	No	REAL (9,3)	-
Height	Height	No	REAL (9,3)	-

* Used in Legacy Systems and is not used in a full NG9-1-1 implementation

4.2.2 Site/Structure Address Polygons—Recommended

Site/Structure Addresses data is maintained as a polygon layer to represent the extent of addressable areas such as outdoor sites, structures, or interior spaces. This dataset is referred to as the SiteStructureAddressPolygon layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward. It is understood that it will take time and resources to fully develop complete and accurate Site/Structure Addresses data.

Site/Structure Address Polygon data can be used to more effectively convert geodetic locations into civic locations than Site/Structure Address Point data. This is because the polygon represents the extent of the space whereas the point provides no information as to its extent. Gaps and overlaps between SiteStructureAddressPolygon features MAY exist and are permissible (e.g., a room on a floor within a building may be represented as three overlapping SiteStructureAddressPolygon features).

SiteStructureAddressPolygon feature attribution SHOULD be consistent with the attribution of related SiteStructureAddressPoint or RoadCenterLine features where they exist.

While there may be address data available, it may not be in the standardized format of this structure. GIS Data Providers should be working toward developing and maintaining the Site/Structure Address Polygon data described in this Standard.

Table 4-4 SiteStructureAddressPolygon Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
Effective Date	Effective	No	DATETIME	-
Expiration Date	Expire	No	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Country	Country	Yes	TEXT (2)	P
Administrative Level 1	A1	Yes	TEXT (2)	P
Administrative Level 2	A2	Conditional	TEXT (254)	P
Additional Code	AddCode	Conditional	TEXT (6)	P

Descriptive Name	Field Name	Required	Type	SubType
Administrative Level 3	A3	Conditional	TEXT (254)	P
Administrative Level 4	A4	Conditional	TEXT (254)	P
Administrative Level 5	A5	Conditional	TEXT (254)	P
Address Number Prefix	AddNum_Pre	Conditional	TEXT (15)	P
Address Number	Add_Number	Conditional	INTEGER	-
Address Number Suffix	AddNum_Suf	Conditional	TEXT (15)	P
Address Number Complete	AddNum_Cmp	Conditional	TEXT(42)	P
Street Name Pre Modifier	St_PreMod	Conditional	TEXT (25)	P
Street Name Pre Directional	St_PreDir	Conditional	TEXT (10)	P
Street Name Pre Type	St_PreTyp	Conditional	TEXT (50)	P
Street Name Pre Type Separator	St_PreSep	Conditional	TEXT (20)	P
Street Name	St_Name	Conditional	TEXT (254)	P
Street Name Post Type	St_PosTyp	Conditional	TEXT (50)	P
Street Name Post Directional	St_PosDir	Conditional	TEXT (10)	P
Street Name Post Modifier	St_PosMod	Conditional	TEXT (25)	P
Direction of Travel	Dir_Travel	Conditional	TEXT (10)	P
Legacy Street Name Pre Directional*	LSt_PreDir	Conditional	TEXT (2)	P
Legacy Street Name*	LSt_Name	Conditional	TEXT (75)	P
Legacy Street Name Type*	LSt_Typ	Conditional	TEXT (4)	P
Legacy Street Name Post Directional*	LSt_PosDir	Conditional	TEXT (2)	P
ESN*	ESN	Conditional	TEXT (5)	P
MSAG Community Name*	MSAGComm	Conditional	TEXT (30)	P
Legacy County ID*	LCountyID	Conditional	TEXT (5)	P
Postal Community Name	Post_Comm	No	TEXT (40)	P
Postal Code	Post_Code	No	TEXT (7)	P
Postal Code Extension	PostCodeEx	Conditional	TEXT (4)	P
Site	Site	No	TEXT (254)	P
SubSite	SubSite	No	TEXT (254)	P
Structure	Structure	No	TEXT (75)	P
Floor Label	Floor	No	TEXT (75)	P
Floor Index	FloorIndex	No	INTEGER	-
Wing	Wing	No	TEXT (75)	P
Unit	Unit	Conditional	TEXT (75)	P
Unit Pre Type	UnitPreTyp	Conditional	TEXT (75)	P
Unit Value	UnitValue	Conditional	TEXT (75)	P

Descriptive Name	Field Name	Required	Type	SubType
Section	Section	No	TEXT(75)	P
Row	Row	No	TEXT(75)	P
Room	Room	No	TEXT (75)	P
Seat	Seat	No	TEXT (75)	P
Additional Location Information	Addtl_Loc	No	TEXT (225)	P
Additional Data URI	AddDataURI	No	TEXT (254)	U
Place Type	Place_Type	No	TEXT (50)	P
Placement Method	Placement	No	TEXT (25)	P

4.2.3 Site/Structure Address Aliases

The address assigned by the local addressing authority is the address used for location validation and call routing. However, many civic locations are known by multiple named location elements, and/or more than one address number, and/or more than one street name. These are known as alias addresses. Examples include when a sports stadium is assigned a civic address by a jurisdiction, but then the structure receives additional local names, commemorative names, the name of a business sponsor, or a series of structure names that change over time but are continued to be used and accepted. There are many ways to represent an alias.

4.3 Service Boundaries

Service Boundaries data is maintained as polygon layers for representing the geographic area for the providers of response services. These layers are collectively referred to as the service boundary layers in NENA documents or individually as the PsapPolygon layer, PolicePolygon layer, FirePolygon layer, and EmsPolygon layer in the urn:emergency:service:responder registry in NENA-STA-010.3.1 [28] and in NENA documents going forward. All other service boundary layers (e.g., CoastGuardPolygon, PoisonControlPolygon, FireForestPolygon) would follow the naming conventions found in the responder registries in NENA-STA-010.3.1 [28].

Within the i3 architecture, all service boundary layers follow the same data structure. GIS Data Providers MAY locally maintain these layers as separate or combined. It is important to consult with your NGCS Provider to determine if they have a requirement that each Service Boundary be provisioned as an individual layer or as a consolidated Service Boundary layer (one combined layer for all Service Boundaries). Additionally, confirm if there is a specific requirement for Service Boundary geometry and if they mandate a single versus multipart geometry. Within the ECRF, LVF, MCS, GCS, and MDS, the PsapPolygon layer is a service boundary. It is listed as a separate layer here, although in every respect it is equivalent to a service boundary with urn:emergency:service:sos.psap as its Service URN. It should be noted that the Policy Routing Function of an ESRP (Emergency Service

Routing Proxy) may override the predefined PSAP route provided by an ECRF based on certain policies established by the PSAP. The boundary that corresponds to the Service URN urn:emergency:service:sos.psap depends on the architecture of the ESInet and deals with how unintentional gaps and overlaps of this layer are handled by the ECRF. How the ECRF determines what boundary it uses for urn:emergency:service:sos.psap is beyond the scope of this document.

4.3.1 Primary PSAP Services—REQUIRED

In an NG9-1-1 deployment, the initial routing of a 9-1-1 call cannot happen without Primary PSAP boundaries. It is the most critical layer and MUST be provided. Its data structure is the same as all service boundary layers defined in this section. All polygons in this layer MUST have a Service URN of urn:service:sos.

The PsapPolygon layer may have one or many PSAP Boundaries contained in the layer. Each PSAP Boundary defines the geographic area of a PSAP that has primary responsibilities for an emergency request. This layer is used by the ECRF to perform a geographic query to determine the PSAP to which an emergency request is routed. An emergency request is routed using the NG9-1-1 Core Services based upon the geographic location of the request, provided by either a civic address, geographic coordinate, or geodetic shapes as defined in NENA-STA-010 [3].

4.3.2 Primary Emergency Services—REQUIRED

In an NG9-1-1 deployment, the selective transfer of 9-1-1 calls and Emergency Incident Data Objects (EIDOs) to another PSAP or downstream agency uses service boundary layers, all with the same data structure.

The following layers (formerly known as Emergency Service Boundaries), which may be maintained as separate or combined, are the next highest priority for NG9-1-1 deployment. Primary Emergency Services MUST include the following:

- Police
- Fire
- Emergency Medical Services

Each of these layers is used by the ECRF to perform a geographic query to determine which agencies are responsible for providing service to a location in the event a selective transfer is desired or to direct an EIDO to an agency for dispatch or to display the responsible agencies at the PSAP. In addition, service boundary layers are used by PSAPs to identify the appropriate entities/first responders to be dispatched. Each layer representing a primary emergency service may contain one or more polygon boundaries that define the primary emergency services for that geographic area.

*Note: The service boundary layers described here are intended to represent the entirety of the service boundary of the agencies. In many agencies, the service boundary is broken into smaller areas served by a station/beat/platoon, with the service area of the agency

being the union of the smaller areas. The layer can contain a polygon set (more than one polygon), which is intended to cover holes, and disconnected areas of service, which does occur. Because a polygon set is allowed, if this layer had the smaller polygons and if all of them have the same Service URI and Service URN (but not necessarily the same Display Name, for example), it would work correctly. It has the downside of increasing work on the ECRF since it has more polygons to consider. The SI Operator can advise whether small polygons can be accommodated in any given implementation.

4.3.3 Other Services—Strongly Recommended

In an NG9-1-1 deployment, the transfer of 9-1-1 calls uses service boundary layers, all with the same data structure. These agencies may be served by a call center, dispatch center, or other terms.

Other service boundary layers, which may be maintained as separate or combined, MAY include, but are not limited to:

- Poison Control
- Forest Service
- Coast Guard
- Animal Control

4.3.4 Data Structure for each Service Boundary Layer

Table 4-5 Service Boundary Layers

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
Effective Date	Effective	No	DATETIME	-
Expiration Date	Expire	No	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Agency Identifier	Agency_ID	Yes	TEXT (100)	P
Service URI	ServiceURI	Yes	TEXT (254)	U
Service URN	ServiceURN	Yes	TEXT (100)	U
Service Number	ServiceNum	No	TEXT (15)	P
Agency vCard URI	AVcard_URI	Yes	TEXT (254)	U
Display Name	DsplayName	Yes	TEXT (60)	P

4.4 Provisioning Boundaries—REQUIRED

Provisioning Boundaries data is maintained as a polygon layer for representing the area of GIS data provisioning responsibility, with no unintentional gaps or overlaps. This dataset is

commonly referred to as the ProvisioningPolygon layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward. The Provisioning Boundary MUST align with data from all adjoining GIS Data Providers.

A Provisioning Boundary can take on a variety of shapes; for example, it may represent the extent of a city, the extent of a county, a region with multiple cities and counties, or possibly the extent of all areas served by a particular PSAP.

When provisioning data for an ECRF and LVF through the SI, a GIS Data Provider MUST only include GIS data within their Provisioning Boundary and MUST ensure the data includes coverage for the entire extent of their Provisioning Boundary. The Spatial Interface Operator will utilize the ProvisioningPolygon layer to ensure that these requirements are met.

Note: The 9-1-1 Authority is ultimately responsible for the GIS data within the area they provide service for.

Table 4-6 ProvisioningPolygon Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
Effective Date	Effective	No	DATETIME	-
Expiration Date	Expire	No	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P

4.5 Administrative Levels (A1–A5)

Administrative levels A1–A5 denote geographic areas within which individual thoroughfare addresses and sites are found. The A1–A5 polygons give the general location of a feature or event and are useful to disambiguate or otherwise distinguish between identical combinations of the complete street name and address number in an area.

In previous versions of this document, administrative layers were named "State/Province," "County or Equivalent," "Incorporated Municipality," "Unincorporated Community," and "Neighborhood Community." Version 2 of this document expanded this nomenclature and added the IETF's PIDF-LO element names of A1, A2, A3, A4, and A5, respectively, in its attempt to make these terms more country-agnostic. Territories, Indigenous lands, military installations, and widespread differences within Canadian administrative naming have shown that using the previous layer names does not cover the wide variety of uniqueness that exists for these levels across North America. The new descriptive name changes reflected below are also applicable to associated field names.

With the creation of the *CLDXF-CA Standard* [23], the more inclusive and country-agnostic PIDF-LO nomenclature has been adopted which respects the implied hierarchy of the administrative boundaries but still provides flexibility to GIS Data Providers whose areas may have different settlement histories and administrative structures.

These changes affect the GIS Data Model in Section 4.1 Roads, Section 4.2 Site/Structure Addresses, and Section 4.5 Administrative Levels (A1–A5).

For further guidance, GIS Data Providers should consult the *CLDXF Standard* [4] [23] applicable to their country.

4.5.1 Administrative Level 1 (A1) Polygons—Strongly Recommended

Administrative Level 1 data, formerly States or Equivalents (A1) data, is maintained as a polygon layer for representing the geographic area of a state, province, territory, or other top-level subdivision of the larger country corresponding to the PIDF-LO A1 element. This dataset is referred to as the A1Polygon layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward.

Table 4-7 A1Polygon Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
Effective Date	Effective	No	DATETIME	-
Expiration Date	Expire	No	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Country	Country	Yes	TEXT (2)	P
Administrative Level 1	A1	Yes	TEXT (2)	P

4.5.2 Administrative Level 2 (A2) Polygons—Strongly Recommended

Administrative Level 2 data, formerly Counties or Equivalents (A2) data, is maintained as a polygon layer. It typically represents the geographic area of a county, parish, regional district, or other similar level division corresponding to the PIDF-LO A2 element. The presence of A2 polygon records is conditional based on the CLDXF Standard applicable to the country of the GIS Data Provider. This dataset is referred to as the A2Polygon layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward.

Table 4-8 A2Polygon Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
Effective Date	Effective	No	DATETIME	-
Expiration Date	Expire	No	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Country	Country	Yes	TEXT (2)	P
Administrative Level 1	A1	Yes	TEXT (2)	P
Administrative Level 2	A2	Yes	TEXT (254)	P
Additional Code	AddCode	Conditional	TEXT (6)	P

4.5.3 Administrative Level 3 (A3) Polygons—Strongly Recommended

Administrative Level 3 data, formerly Incorporated Municipalities (A3) data, is maintained as a polygon layer. It typically represents the geographic area of a city, town, village, or other similar level division corresponding to the PIDF-LO A3 element. The presence of A3 polygon records is conditional based on the CLDXF Standard applicable to the country of the GIS Data Provider. This dataset is referred to as the A3Polygon layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward.

Table 4-9 A3Polygon Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
Effective Date	Effective	No	DATETIME	-
Expiration Date	Expire	No	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Country	Country	Yes	TEXT (2)	P
Administrative Level 1	A1	Yes	TEXT (2)	P
Administrative Level 2	A2	Conditional	TEXT (254)	P
Additional Code	AddCode	Conditional	TEXT (6)	P
Administrative Level 3	A3	Yes	TEXT (254)	P

4.5.4 Administrative Level 4 (A4) Polygons—Strongly Recommended

Administrative Level 4 data, formerly Unincorporated Communities (A4) data, is maintained as a polygon layer. It typically represents the geographic area of an unincorporated community, borough, ward, or other similar level division corresponding to the PIDF-LO A4 element. The presence of A4 polygon records is conditional based on the CLDXF Standard applicable to the country of the GIS Data Provider. This dataset is referred to as the A4Polygon layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward.

Table 4-10 A4Polygon Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
Effective Date	Effective	No	DATETIME	-
Expiration Date	Expire	No	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Country	Country	Yes	TEXT (2)	P
Administrative Level 1	A1	Yes	TEXT (2)	P
Administrative Level 2	A2	Conditional	TEXT (254)	P
Additional Code	AddCode	Conditional	TEXT (6)	P
Administrative Level 3	A3	Conditional	TEXT (254)	P
Administrative Level 4	A4	Yes	TEXT (254)	P

4.5.5 Administrative Level 5 (A5) Polygons—Strongly Recommended

Administrative Level 5 data, formerly Neighborhood Communities (A5) data, is maintained as a polygon layer. It typically represents the geographic area of a neighborhood, commercial area, or other similar level division corresponding to the PIDF-LO A5 element. The presence of A5 polygon records is conditional based on the CLDXF Standard applicable to the country of the GIS Data Provider. This dataset is referred to as the A5Polygon layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward.

Table 4-11 A5Polygon Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
Effective Date	Effective	No	DATETIME	-
Expiration Date	Expire	No	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Country	Country	Yes	TEXT (2)	P
Administrative Level 1	A1	Yes	TEXT (2)	P
Administrative Level 2	A2	Conditional	TEXT (254)	P
Administrative Level 3	A3	Conditional	TEXT (254)	P
Administrative Level 4	A4	Conditional	TEXT (254)	P
Administrative Level 5	A5	Yes	TEXT (254)	P

4.6 Railroads—Recommended

Railroads data is maintained as a line layer for representing the centerline of a rail line. This dataset is referred to as the RailroadCenterLine layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward. A database structure crosswalk between this model and the United States Federal Railroad Administration's Rail Lines database is in Appendix A—United States' Federal Railroad Association (FRA) Rail Lines Database Structure Crosswalk to NENA's RailroadCenterLine Layer of this document. A database structure crosswalk between this model and Canada's National Railway Network database is in Appendix B—Canada's National Railway Network Database Structure Crosswalk to NENA's RailroadCenterLine Layer of this document.

Table 4-12 RailroadCenterLine Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Rail Line Owner	RLOwn	Conditional	TEXT (100)	P
Rail Line Operator	RLOp	Conditional	TEXT (100)	P
Rail Line Name	RLName	No	TEXT (100)	P
Rail Mile Post Low	RMPL	No	REAL (7,3)	-
Rail Mile Post High	RMPH	No	REAL (7,3)	-

4.7 Hydrology

4.7.1 Hydrology Lines—Recommended

Hydrology data is maintained as a line layer for representing creeks, streams, rivers, and other linear water features. This dataset is referred to as the HydrologyLine layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward. A database structure crosswalk between this model and the United States Geological Survey's National Hydrography Dataset (NHD) database is in Appendix C—United States' National Hydrography Dataset (NHD) Database Structure Crosswalk to NENA's HydrologyLine Layer and HydrologyPolygon Layer of this document. A database structure crosswalk between this model and Canada's National Hydrographic Network database is in Appendix D—Canada's National Hydrographic Network Database Structure Crosswalk to NENA's HydrologyLine Layer and HydrologyPolygon Layer of this document.

Table 4-13 HydrologyLine Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Hydrology Segment Type	HS_Type	No	TEXT (100)	P
Hydrology Segment Name	HS_Name	No	TEXT (100)	P

4.7.2 Hydrology Polygons—Recommended

Hydrology data is maintained as a polygon layer for representing the area of water features. This dataset is referred to as the HydrologyPolygon layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward. A database structure crosswalk between this model and the United States Geological Survey's National Hydrography Dataset (NHD) database is in Appendix C—United States' National Hydrography Dataset (NHD) Database Structure Crosswalk to NENA's HydrologyLine Layer and HydrologyPolygon Layer of this document. A database structure crosswalk between this model and Canada's National Hydrographic Network database is in Appendix D—Canada's National Hydrographic Network Database Structure Crosswalk to NENA's HydrologyLine Layer and HydrologyPolygon Layer of this document.

Table 4-14 HydrologyPolygon Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Hydrology Polygon Type	HP_Type	No	TEXT (100)	P
Hydrology Polygon Name	HP_Name	No	TEXT (100)	P

4.8 Distance Markers—Recommended

Distance Markers data is maintained as a point layer and is used primarily for map display purposes. If required for ECRF and LVF purposes, Distance Markers data MUST be included in the SiteStructureAddressPoint layer. Distance Markers may represent a numeric measurement of a point along a route, such as a mile marker. This dataset is referred to as the DistanceMarkerPoint layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward.

Table 4-15 DistanceMarkerPoint Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Distance Marker Unit of Measurement	DM_Unit	Yes	TEXT (15)	P
Distance Marker Measurement Value	DM_Value	Yes	REAL (9,3)	-
Distance Marker Route Name	DM_Rte	Yes	TEXT (100)	P
Distance Marker Route Type	DM_Type	No	TEXT (50)	P
Distance Marker Indicator	DM_Ind	Yes	TEXT (1)	P
Distance Marker Label	DM_Label	Conditional	TEXT (100)	P

4.9 Location Markers—Recommended

Location Markers data is maintained as a point layer and is used primarily for map display purposes. If required for ECRF and LVF purposes, Location Markers data MUST be included in the SiteStructureAddressPoint layer. Location Markers may represent locations such as an alarm box, a utility pole, a callbox, a trail intersection, a buoy, a channel marker, or other similar features. This dataset is referred to as the LocationMarkerPoint layer in the GIS Data Layers registry in Section 7.1 "GIS Data Layers" Registry and in NENA documents going forward.

Table 4-16 LocationMarkerPoint Layer

Descriptive Name	Field Name	Required	Type	SubType
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P
Date Updated	DateUpdate	Yes	DATETIME	-
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P
Location Marker Label	LM_Label	Yes	TEXT (100)	P
Location Marker Type	LM_Type	No	TEXT (50)	P
Location Marker Indicator	LM_Ind	Yes	TEXT (1)	P

5 Detailed Description of Field Names and Associated Attribute Data

Each of the Field Names given in the tables in Section 4 GIS Data Model Layers are listed in alphabetical order below. Each Field Name has a description, attribute data domain, and an example. Some Field Names include a conditional business rule that controls the presence of a value in the data field. For details on case sensitivity, please refer to Section 3.5 Case Sensitivity.

A domain defines the set of all valid values that are allowed in the field. If the domain is shown as "None," then any value that matches the data type and description MAY be used. Those with a given data domain MUST use only those values with the domain given. Web links in the examples are for illustrative purposes.

Due to differences in addressing methodologies between Canada and the United States, the business rules for each Field Name are set in the CLDXF Standard appropriate for the country of the implementor (i.e., *CLDXF-US* for the United States [4], *CLDXF-CA* for Canada [23]). If the Field Name does not exist or is not used in a CLDXF Standard for a particular country, but not the other countries, the business rule will have a value of "Not Applicable" and the Field Name will be listed as "Conditional" in the GIS data layer tables in Section 4 GIS Data Model Layers.

5.1 Additional Code

Description: A case-sensitive alphanumeric code of up to six characters, used to disambiguate addresses in Canada when the combination of Administrative Level 2, Administrative Level 3, Administrative Level 4 (if used), and Street Name may not be unique within a province or territory.
Domain: None
Example: 3h12jk; 100232; AREQUF
Business Rules: *CLDXF-US* [4]: Not Applicable; *CLDXF-CA* [23]: Yes

5.2 Additional Code Left

Description: The Additional Code on the left side of the road segment relative to the FROM Node.
Domain: None
Example: 3h12jk; 100232; AREQUF
Business Rules: *CLDXF-US* [4]: Not Applicable; *CLDXF-CA* [23]: Yes

5.3 Additional Code Right

Description: The Additional Code on the right side of the road segment relative to the FROM Node.
Domain: None
Example: 3h12jk; 100232; AREQUF
Business Rules: *CLDXF-US* [4]: Not Applicable; *CLDXF-CA* [23]: Yes

5.4 Additional Data URI

Description: URI(s) for additional data associated with the address. This attribute is contained in the SiteStructureAddressPoint and SiteStructureAddressPolygon layers and will define the URI of additional information about a location, including building information (blueprints, contact info, floor plans, etc.).
Domain: None
Example: https://addl68603.example.com

5.5 Additional Location Information

Description: Information that relates to location but does not meet the definition of any other named location elements.
Domain: None
Example: Main Loading Dock; Stairwell C; Elevator Bank 14-21
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.6 Address Number

Description: The integer identifier of a location along a thoroughfare or within a defined community.
Domain: None
Example: "1600" in "1600 Pennsylvania Avenue"; "24" in "24 Sussex Drive"
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.7 Address Number Complete

Description: The Address Number Complete includes the Address Number Prefix (if any), the Address Number, Address Number Suffix (if any), and any formatting or separator characters needed to display the official version of the complete address

number. The Address Number Complete precedes the complete street name to identify a location along a thoroughfare or within a defined area.
Domain: None
Example: A19; 194-03½; N89W16758
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Not Applicable

5.8 Address Number Prefix

Description: An identifier that precedes the Address Number and further identifies a location along a thoroughfare or within a defined area.
Domain: None
Example: "A" in "A19 route 117"; "75" in "75-6214 Kailua Place" (CLDXF-US only); "75-" in "75-6214 Kailua Place" (CLDXF-CA only)
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.9 Address Number Suffix

Description: An extension of the Address Number that follows it and further identifies a location along a thoroughfare or within a defined area.
Domain: None
Example: "B" in "223B Jay Avenue"; "½" in 119½ Elm Street" (CLDXF-US only); "1/2" in "119 1/2 Elm Street" (CLDXF-CA only)
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.10 Administrative Level 1

Description: The name of a state, province, or territory represented by the two-letter UPPERCASE abbreviation given in ISO 3166-2 [26].
Domain: ISO 3166-2 [26] or USPS Publication 28 [17] (for the United States)
Example: TN; NS; YT; PR
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.11 Administrative Level 1 Left

Description: The Administrative Level 1 value on the left side of the road segment relative to the FROM Node.
Domain: ISO 3166-2 [26] or USPS Publication 28 [17] (for the United States)
Example: LA; NB
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.12 Administrative Level 1 Right

Description: The Administrative Level 1 value on the right side of the road segment relative to the FROM Node.
Domain: ISO 3166-2 [26] or USPS Publication 28 [17] (for the United States)
Example: PA; NU
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.13 Administrative Level 2

Description: The name of the primary subdivision of a state, province, or territory.
Domain: *CLDXF-US* [4]: A complete list is maintained by the US Census Bureau as ANSI INCITS 31:2009 [15] (Formerly FIPS 6-4) and the Domain is restricted to the exact listed values as published in ANSI INCITS 31:2009 [15], including casing and use of abbreviations.
CLDXF-CA [23]: None
Example: Washington County; District of Columbia; Capitale-Nationale; Region of Peel
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.14 Administrative Level 2 Left

Description: The Administrative Level 2 value on the left side of the road segment relative to the FROM Node.
Domain: *CLDXF-US* [4]: A complete list is maintained by the US Census Bureau as ANSI INCITS 31:2009 [15] (Formerly FIPS 6-4) and the Domain is restricted to the exact listed values as published in ANSI INCITS 31:2009 [15], including casing and use of abbreviations.
CLDXF-CA [23]: None
Example: St. Louis County; Adams County; Northumberland; Central Kootenay
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.15 Administrative Level 2 Right

Description: The Administrative Level 2 value on the right side of the road segment relative to the FROM Node.
Domain: *CLDXF-US* [4]: A complete list is maintained by the US Census Bureau as ANSI INCITS 31:2009 [15] (Formerly FIPS 6-4) and the Domain is restricted to the exact listed values as published in ANSI INCITS 31:2009 [15], including casing and use of abbreviations.
CLDXF-CA [23]: None
Example: St. Johns County; DeSoto County; Doña Ana County; Guysborough
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.16 Administrative Level 3

Description: The name of the secondary division of a state, province, or territory. In Canada, where no Administrative Level 2 exists, it can be the name of the primary division of the province or territory.
Domain: None
Example: Southlake; Alpine; Yellowknife
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.17 Administrative Level 3 Left

Description: The Administrative Level 3 value on the left side of the road segment relative to the FROM Node.
Domain: None
Example: Lexington; Columbus; Mont-Saint-Grégoire
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.18 Administrative Level 3 Right

Description: The Administrative Level 3 value on the right side of the road segment relative to the FROM Node.
Domain: None
Example: Tampa; Yonkers; Toronto
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.19 Administrative Level 4

Description: The name of the subdivision of the most granular preceding administrative level.
Domain: None
Example: Cypress; Bowen; Mont-Élie
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.20 Administrative Level 4 Left

Description: The Administrative Level 4 value on the left side of the road segment relative to the FROM Node.
Domain: None
Example: Latham; Moose; Sherwood Park
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.21 Administrative Level 4 Right

Description: The Administrative Level 4 value on the right side of the road segment relative to the FROM Node.
Domain: None
Example: Mountain View; Palmer; Picard
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.22 Administrative Level 5

Description: The name of the most granular administrative level supported by this standard. It is typically an unincorporated portion of a preceding administrative level.
Domain: None
Example: Copperfield; University Heights; Shady Oaks Mobile Home Park; Sutton

Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.23 Administrative Level 5 Left

Description: The Administrative Level 5 value on the left side of the road segment relative to the FROM Node.
Domain: None
Example: East Harlem; Cypress Meadows Subdivision
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.24 Administrative Level 5 Right

Description: The Administrative Level 5 value on the right side of the road segment relative to the FROM Node.
Domain: None
Example: Edgewater Park; The Meadows
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.25 Agency Identifier

Description: A Domain Name System (DNS) domain name which is used to uniquely identify an agency. An agency is represented by a fully qualified domain name as defined in NENA-STA-010 [3]. In order to correlate actions across a wide range of calls and incidents, each agency MUST use one domain name consistently. Any domain name in the public DNS is acceptable so long as each distinct agency uses a different domain name. This ensures that each agency identifier is globally unique.
Domain: Fully qualified domain name
Example: psap.harriscounty.tx.us; police.allegheny.pa.us; newbrunswick.ca; flctnecd.gov
Note: The Agency Identifier is a field in service boundary layers that identifies the agency the boundary defines. It is also used in the Emergency Incident Data Object, the Service/Agency Locator, and MUST be used in constructing NGUIDs.

5.26 Agency vCard URI

Description: A vCard is a file format standard for electronic business cards. The Agency vCard URI is the internet address of a JavaScript Object Notation (JSON) data structure which contains contact information (Name of Agency, Contact phone numbers, etc.) in the form of a jCard (RFC 7095). The vCard URI is used in the service boundary layers to provide contact information for that agency. The Agency Locator (see NENA-STA-010 [3]) provides the URIs for Agencies listed in it.
Domain: None
Example: https://vcard.psap.allegheny.pa.us; https://jcard.houstontx.gov/fire
Note: This field will be considered for deletion in a future version of this document to align with future changes in NENA-STA-010 [3].

5.27 Altitude

Description: The measure of the orthogonal distance from the WGS84 ellipsoid, given in meters. For Site/Structure Address Points, Altitude measures the orthogonal distance from the WGS84 ellipsoid to the surface (such as a floor or ground).
Domain: Restricted to a double-precision floating point number with a precision of nine and a scale of three (e.g., REAL (9,3)).
Example: "75.000" representing the altitude (in meters) associated with the address "123 Main Street, Suite 401"
Note: WGS84 (GPS) altitude, also known as the Z Coordinate, is measured as distance above or below the ellipsoid, which varies significantly from the geoid (approximately mean sea level). For more information, see *NENA Requirements for 3D Location Data for E9-1-1 and NG9-1-1*, NENA-REQ-003 [24].

5.28 Country

Description: The name of a country represented by its two-letter ISO 3166-1 [25] English country alpha-2 code elements in UPPERCASE letters.
Domain: Restricted to the two-letter designations provided in ISO 3166-1 [25].
Example: "US" for the United States of America; "CA" for Canada
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.29 Country Left

Description: The name of the country on the left side of the road segment relative to the FROM Node, represented by its two-letter ISO 3166-1 [25] English country alpha-2 code elements in UPPERCASE letters.
Domain: Restricted to the two-letter designations provided in ISO 3166-1 [25].
Example: "US" for the United States of America; "CA" for Canada
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.30 Country Right

Description: The name of the country on the right side of the road segment relative to the FROM Node, represented by its two-letter ISO 3166-1 [25] English country alpha-2 code elements in UPPERCASE letters.
Domain: Restricted to the two-letter designations provided in ISO 3166-1 [25].
Example: "US" for the United States of America; "MX" for Mexico
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.31 Date Updated

Description: The date and time that the record was created or last modified. This value MUST be populated upon modifications to attributes, geometry, or both.
Domain: None
Example: (of a W3C dateTime with optional precision of .1 second)

2017-12-21T17:58.03.1-05:00 (representing a record updated on December 21, 2017 at 5:58 and 3.1 seconds PM US Eastern Standard Time);
2017-07-11T08:31:15.2-04:00 (representing a record updated on July 11, 2017 at 8:31 and 15.2 seconds AM US Eastern Daylight Time)

5.32 Direction of Travel

Description: A word that follows all other street name elements and is used only as needed to indicate direction of travel on a divided roadway and associated frontage roads.
Domain: None
Example: northbound; eastbound
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Not Applicable

5.33 Discrepancy Agency ID

Description: Agency that receives a Discrepancy Report (DR), should a discrepancy be discovered, and will take responsibility for ensuring discrepancy resolution. This may or may not be the same as the 9-1-1 Authority. This MUST be represented by a domain name that is an Agency Identifier as defined in the NENA Knowledge Base Glossary [1].
Domain: None
Example: Vermont911.vt.us.gov; nct911.dst.tx.us

5.34 Display Name

Description: A description or "name" of the service provider that offers services within the area of a Service Boundary. This value MUST be suitable for display.
Domain: None
Example: New York Police Department; Med-Life Ambulance Services

5.35 Distance Marker

Description: A physical marker labeled with the distance from or to a given point along a route such as a trail, a waterway, a road, or a highway.
Domain: None
Example: Milepost 13; Mile Marker 327.5; Station 101 North; Kilometre 10
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.36 Distance Marker Indicator

Description: Indicator of the type of distance marker.
Domain: P (for Posted); L (for Logical/calculated measurement)
Example: P; L

5.37 Distance Marker Label

Description: The label or text on a physical distance marker. Note that the posted label may be different from the actual measure.
Domain: None
Example: MM 3.5; HWY 102 SOUTH 19 KM; 14
Business Rules: If the Distance Marker Indicator value is "P" and the physical distance marker is labeled, the Distance Marker Label MUST be populated. If the Distance Marker Indicator value is "P" and the physical distance marker is not physically labeled, the Distance Marker Label MAY be populated with a description.

5.38 Distance Marker Measurement Value

Description: Linear distance from a reference point or the actual value of the distance measurement.
Domain: Restricted to a double-precision floating point number with a precision of nine and a scale of three (e.g., REAL (9,3)).
Example: 357.44; 10.0

5.39 Distance Marker Route Name

Description: The primary route name the distance marker is associated with.
Domain: None
Example: I 90; US 66; St. Lawrence River; South Beaver Creek Trail; CSX Railroad Blue Island to Utica

5.40 Distance Marker Route Type

Description: The type of route the distance marker refers to.
Domain: None
Example: Road; Waterway; Beach; Trail; Railroad

5.41 Distance Marker Unit of Measurement

Description: Unit of measurement used for the distance marker.
Domain: Standardized units of measure
Example: miles; nautical miles; feet; meters; kilometers

5.42 Effective Date

Description: The date and time that the record is scheduled to take effect.
Domain: None
Example: (of a W3C dateTime with optional precision of .1 second) 2017-02-18T02:30:00.1-05:00 (representing a record that will become active on February 18, 2017 at 2:30 and 0.1 seconds AM US Eastern Standard Time); 2017-10-09T13:01:35.2-04:00 (representing a record that will become active on October 9, 2017 at 1:01 and 35.2 seconds PM US Eastern Daylight Time)

Note: This field is used when the time and date of a change is known. For example, the time and date an annexation takes effect.

5.43 Elevation

Description: The orthogonal distance of the Earth's surface from the WGS84 ellipsoid given in meters at the Site/Structure Address Point's latitude and longitude; also, the Altitude of the ground level. Within a structure, this is "the zero floor level."
Domain: Restricted to a double-precision floating point number with a precision of nine and a scale of three (e.g., REAL (9,3)).
Example: "68.000" representing the elevation (in meters) associated with ground level.
Note: WGS84 (GPS) elevation is measured as the distance from the ellipsoid, which varies significantly from the geoid (approximately mean sea level). For more information, see *NENA Requirements for 3D Location Data for E9-1-1 and NG9-1-1*, NENA-REQ-003 [24].

5.44 ESN

Description: A 3-5 character numeric string that represents one or more Emergency Service Zones (ESZ).
Domain: Characters from 000 to 99999
Example: 54321; 120; 001
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.45 ESN Left

Description: The Emergency Service Number (ESN) on the left side of the road segment relative to the FROM Node.
Domain: Characters from 000 to 99999
Example: 5422; 124; 005
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.

Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.46 ESN Right

Description: The Emergency Service Number (ESN) on the right side of the road segment relative to the FROM Node.
Domain: Characters from 000 to 99999
Example: 5423; 125; 007
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.47 Expiration Date

Description: The date and time when the information in the record is no longer considered valid.
Domain: None
Example: (of a W3C dateTime with optional precision of .1 second)
2017-02-18T02:30:00.1-05:00 (representing a record that will expire and no longer be valid on February 18, 2017 at 2:30 and 0.1 seconds AM US Eastern Standard Time);
2017-10-09T13:01:35.2-04:00 (representing a record that will expire and no longer be valid on October 9, 2017 at 1:01 and 35.2 seconds PM US Eastern Daylight Time)
Note: This field is used when the time and date of a change is known. For example, the time and date an annexation takes effect and the previous boundary is retired.

5.48 Floor Index

Description: An internal counter or index of floor, story, or level within a building stored as an integer to convey the range and relationships between floors. Having a floor integer independent of the floor label provides an absolute measure that can be used to convey and operationalize vertical uncertainty and will assist first responders in arriving at the location of the emergency.
The level of an addressed main entrance is "0." Each floor or partial floor is sequentially incremented by 1 above or below 0. This is not intended for user display. It is intended to be used for internal processing or calculations.

Domain: Integers
Example: -2; -1; 0; 1; 2; 3; 4; 5; 6. See Figure 5-1 below.

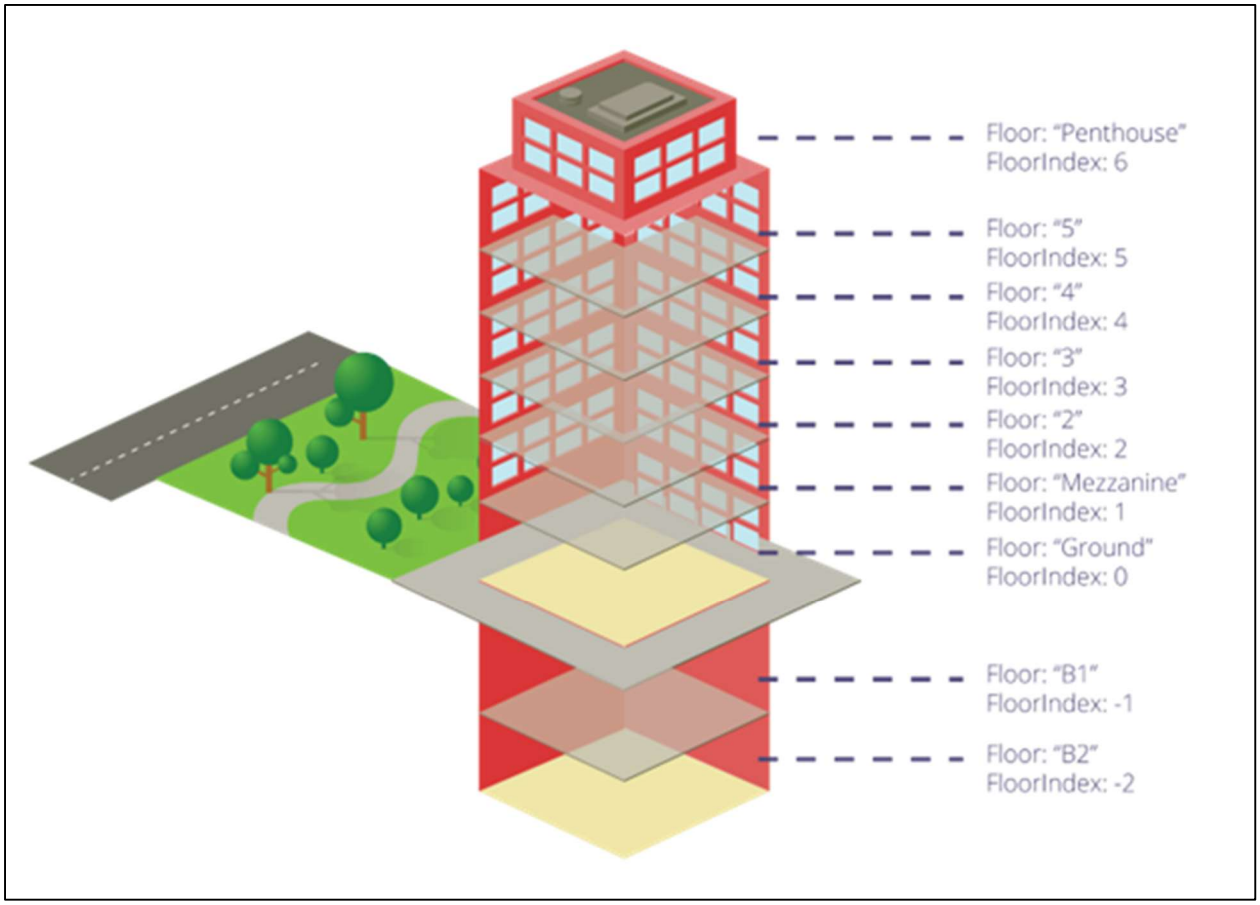


Figure 5-1 Example of the Relationship between Floor Label and Floor Index

5.49 Floor Label

Description: A description of floor, story, or level within a building stored as text. This may be considered part of a "dispatchable location."
Domain: None
Example: Floor 5; 5th Floor; Mezzanine. See Figure 5-1 above.

5.50 Height

Description: Height is the difference between Elevation and Altitude given in meters for a Site/Structure Address Point; often referred to as "Height Above Ground Level" (AGL).
Domain: Restricted to a double-precision floating point number with a precision of nine and a scale of three (e.g., REAL (9,3)).

Example: -3.3 meters; 15.5 meters; 21 meters
Note: For more information about Height, see *NENA Requirements for 3D Location Data for E9-1-1 and NG9-1-1*, NENA-REQ-003 [24].

5.51 Hydrology Polygon Name

Description: Name of a lake, pond, waterway, or similar body of water.
Domain: None
Example: Mirror Lake; intracoastal waterway

5.52 Hydrology Polygon Type

Description: Type of water body.
Domain: None
Example: lake; pond; stream; river

5.53 Hydrology Segment Name

Description: The name of a creek, stream, river, or similar linear water feature.
Domain: None
Example: Willow Creek; Red River

5.54 Hydrology Segment Type

Description: The type of surface water.
Domain: None
Example: stream; river

5.55 Latitude

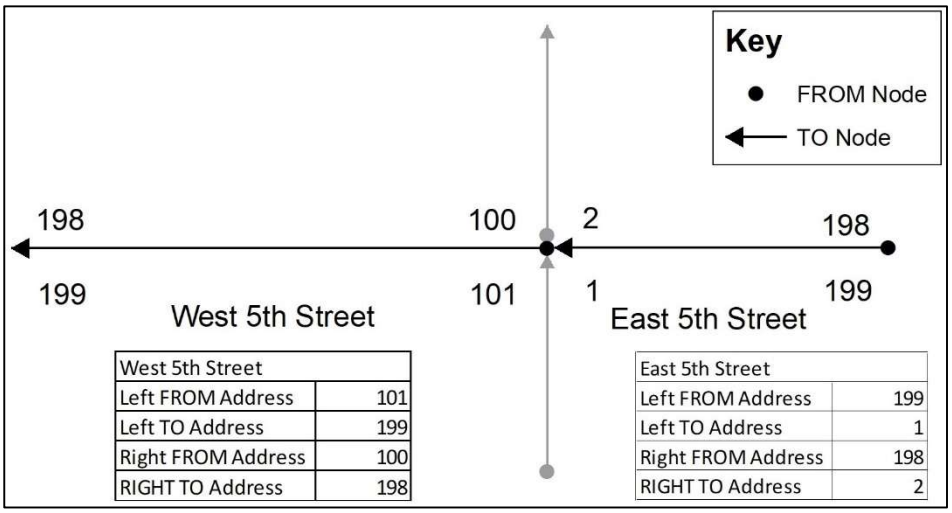
Description: The angular distance of a location north or south of the equator as defined by the coordinate system, expressed in decimal degrees.
Domain: Restricted to a double-precision floating point number, between +90 degrees to -90 degrees, with a precision of ten and a scale of seven (e.g., REAL (10,7)).
Example: 40.8686865

5.56 Left Address Number Prefix

Description: An identifier that precedes the Address Number, applying to all address numbers on the left side of the road segment relative to the FROM Node, and further identifies a location along a thoroughfare or within a defined area.
Domain: None
Example: "A" in "A19 route 117"; "75" in "75-6214 Kailua Place" (CLDXF-US only); "75-" in "75-6214 Kailua Place" (CLDXF-CA only)
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.57 Left FROM Address Number

Description: In the RoadCenterLine layer, each feature has a begin point and an endpoint. The FROM Node is the begin point while the TO Node is the endpoint. Each has a left side and a right side relative to a begin node and an end node. The Left FROM address is the address number on the left side of the road segment relative to the FROM Node.
Domain: None
Example: See Figure 5-2 below
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes



West 5th Street	
Left FROM Address	101
Left TO Address	199
Right FROM Address	100
RIGHT TO Address	198

East 5th Street	
Left FROM Address	199
Left TO Address	1
Right FROM Address	198
RIGHT TO Address	2

Figure 5-2 Example of Left FROM and Left TO Addresses

5.58 Left TO Address Number

Description: In the RoadCenterLine layer, each feature has a begin point and an endpoint. The FROM Node is the begin point while the TO Node is the endpoint. Each has a left side and a right side relative to a begin node and an end node. The Left TO address is the address number on the left side of the road segment relative to the TO Node.
Domain: None
Example: See Figure 5-2 above
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.59 Legacy County ID

Description: The existing County ID as found in the MSAG for the corresponding MSAG record with which the address point is associated. This is typically the same County ID value found on the corresponding Road Centerline segment.
Domain: None

Example: 021; FRKL
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters and casing) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.60 Legacy County ID Left

Description: The existing County ID as found in the MSAG on the left side of the road segment relative to the FROM Node.
Domain: None
Example: 021; FRKL
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters and casing) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.61 Legacy County ID Right

Description: The existing County ID as found in the MSAG on the right side of the road segment relative to the FROM Node.
Domain: None
Example: 021; FRKL
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters and casing) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address

records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.62 Legacy Street Name

Description: The street name as it currently exists in the MSAG. Ideally, this is the name as assigned by the local addressing authority. However, it is imperative that the content of the "Legacy Street Name" field in the GIS data and the content of the "Street Name" field in the MSAG MUST be identical. If there are discrepancies, one of these two databases (GIS and/or MSAG) MUST be updated to match the other.
Domain: None
Example: "STATE" in "STATE ST"; "ELMWOOD" in "N ELMWOOD AVE"
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters and casing) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.63 Legacy Street Name Post Directional

Description: The trailing street direction suffix as it currently exists in the MSAG. Ideally, this is the street name post directional as assigned by the local addressing authority. However, it is imperative that the content of the "Legacy Street Name Post Directional" field in the GIS data and the "Post Directional" field in the MSAG MUST be identical. If there are discrepancies, one of these two databases (GIS and/or MSAG) MUST be updated to match the other.
Domain: N; S; E; W; NE; NW; SE; SW; O; NO; SO; or equivalent abbreviations in other languages
Example: "E" in "CHURCH ST E"; "O" in "JEAN TALON BD O"
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters and casing) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Notes:

- The domain values "O," "NO," and "SO" are the French equivalent abbreviations for the English language West "W", Northwest "NW", and Southwest "SW."

- The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.64 Legacy Street Name Pre Directional

Description: The leading street direction prefix as it currently exists in the MSAG. Ideally, this is the street name pre directional as assigned by the local addressing authority. However, it is imperative that the "Legacy Street Name Pre Directional" field in the GIS data and the "Prefix Directional" field in the MSAG MUST be identical. If there are discrepancies, one of these two databases (GIS and/or MSAG) MUST be updated to match the other.
Domain: N; S; E; W; NE; NW; SE; SW; O; NO; SO; or equivalent abbreviations in other languages
Example: "S" in "S PINE AVE"
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters and casing) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Notes:

- The domain values "O," "NO," and "SO" are the French equivalent abbreviations for the English language West "W", Northwest "NW", and Southwest "SW."
- The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.65 Legacy Street Name Type

Description: The valid street abbreviation as it currently exists in the MSAG. Ideally, this is the street name type as assigned by the local addressing authority. However, it is imperative that the "Legacy Street Name Type" in the GIS data and the "Street Suffix" field in the MSAG MUST be identical. If there are discrepancies, one of these two databases (GIS and/or MSAG) MUST be updated to match the other.
Domain: None
Example: "ST" for "STREET"; "STR" for "STREET"; "BLVD" for "BOULEVARD"; "AVE" for "AVENUE"; "TRCE" for "TRACE"; "RU" in "48 RU O"; "BD" in "JEAN TALON BD O"

Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters and casing) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.66 Location Marker

Description: A uniquely identified and indivisible infrastructure component, smaller than a structure, which exists either within a structure or exterior to any structure, such as an alarm box, a utility pole, a callbox, or other similar features.
Domain: None
Example: Callbox AB-12-34; Pole 12; Low Water Crossing #12
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.67 Location Marker Indicator

Description: Indicates whether the location marker is identified by a physical sign.
Domain: P (for Posted); U (for Unposted)
Example: P; U

5.68 Location Marker Label

Description: The label or text on a physical marker, or if unposted, the description of an unposted marker.
Domain: None
Example: Call Box CC-680-21; Standpipe; Pole 12; Low Water Crossing #21; Trail Intersection 15; Blue Blaze

5.69 Location Marker Type

Description: The type of feature the location marker represents.
Domain: None
Example: Call Box; Utility Pole; Water Crossing; Trail Intersection; Standpipe

5.70 Longitude

Description: The angular distance of a location east or west of the prime meridian of the coordinate system, expressed in decimal degrees.
Domain: Restricted to a double-precision floating point number, between -180 degrees to +180 degrees, with a precision of eleven and a scale of seven (e.g., REAL (11,7)).

Example: -112.9458335

5.71 MSAG Community Name

Description: The Community name associated with an address as given in the MSAG and may or may not be the same as the Community Name used by the postal service.
Domain: None
Example: Cypress; Spring; Austin; ALBANY; VERSAILLES; WICHITA COUNTY
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters and casing) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.72 MSAG Community Name Left

Description: The existing MSAG Community Name on the left side of the road segment relative to the FROM Node.
Domain: None
Example: Harris County; SALEM; MATSU BOROUGH
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters and casing) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.73 MSAG Community Name Right

Description: The existing MSAG Community Name on the right side of the road segment relative to the FROM Node.
Domain: None
Example: Crystal City; BROWN TWP; FRONTIER SHORES
Conditional Business Rule: All Legacy fields MUST be populated with the exact matching value from the corresponding MSAG record (including space characters

and casing) if and only if a value exists. If no value exists, the field shall remain empty. Any new entries MUST be consistent between the GIS and MSAG systems of record. Service provider-specific legacy deployments should be taken into consideration.
Note: The legacy fields are used primarily for the MCS to ensure that PIDF-LO records are able to return an MSAG-valid address and/or MSAG-valid address records are able to return a PIDF-LO record. The legacy fields may also provide backward compatibility with legacy map display and CAD systems.

5.74 NENA Globally Unique ID

Description: The NENA Globally Unique ID (Primary Key) for each record in a GIS data layer. Each record in the GIS data layer MUST have a globally unique ID. When coalescing data from other local 9-1-1 Authorities into the ECRF and LVF, this unique ID MUST continue to have only one occurrence. Additional details on how to construct the NGUID can be found in Section 3.6 NENA Globally Unique ID (NGUID).
Domain: None
Example:

- urn:emergency:uid:gis:SSAP:3458:caloes.ca.gov
- urn:emergency:uid:gis:SSAPoly:3458:caloes.ca.gov
- urn:emergency:uid:gis:RCL:987364:lincoln911.gov
- urn:emergency:uid:gis:Psap:84274599:newbrunswick.ca
- urn:emergency:uid:gis:Pol:3184974-8:coronado.ca.us
- urn:emergency:uid:gis:Fire:{123e4567-e89b-12d3-a456-426652340000}:hanovercounty.gov
- urn:emergency:uid:gis:Ems:6ee38f8e-20e4-4e5e-aa37-a22b7a42d9b4:alleghany.pa.us

5.75 One-Way

Description: The direction of traffic movement along a road in relation to the FROM node and TO node of the line segment representing the road in the GIS data. The One-Way field has three possible designations: B (Both), FT (From–To), and TF (To–From).
B—Travel in both directions allowed
FT—One-way traveling from the FROM node to the TO node
TF—One-way traveling from the TO node to the FROM node
Domain: B; FT; TF
Example: See Figure 5-3 below

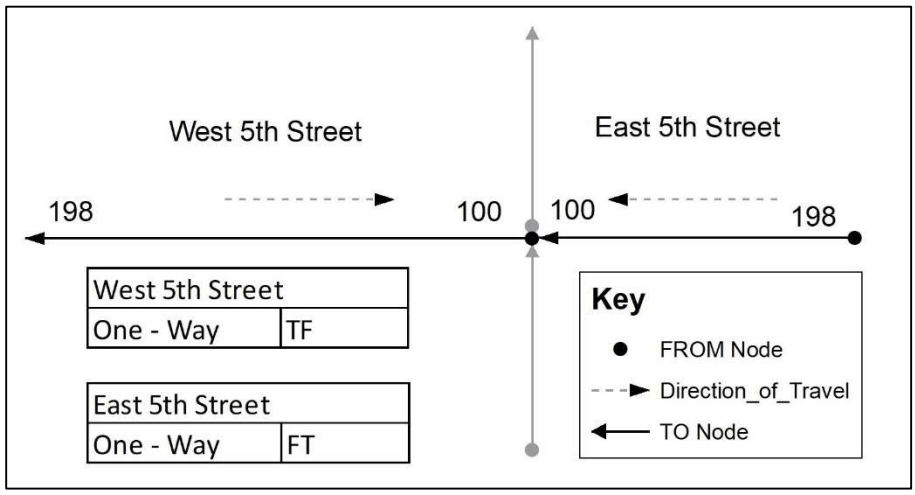


Figure 5-3 Example of One-Way

5.76 Parity Left

Description: The even or odd property of the address number range on the left side of the road segment relative to the FROM Node.
Domain: O=Odd; E=Even; B=Both; Z=Address Range 0-0
Example: O; E; B; Z

5.77 Parity Right

Description: The even or odd property of the address number range on the right side of the road segment relative to the FROM Node.
Domain: O=Odd; E=Even; B=Both; Z=Address Range 0-0
Example: O; E; B; Z

5.78 Place Type

Description: The type of feature identified by the address.
Domain: *CLDXF-US* [4]: https://www.iana.org/assignments/location-type-registry/location-type-registry.xml
CLDXF-CA [23]: None
Example: airport; bank; cafe; aéroport; usine; cinéma
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.79 Placement Method

Description: The methodology used for placement of the address point or defining the extent of an address polygon.

Domain (Address Point): Address point values are restricted to values found in the "NENA Site/Structure Address Point Placement Method Registry" at: http://technet.nena.org/nrs/registry/SiteStructureAddressPointPlacementMethod.xml
Example (Address Point): Structure; Site; Parcel; Geocoding; ExteriorAccess; InteriorAccess; InteriorCentroid; PropertyAccess; Unknown
Domain (Address Polygon): Address polygon values are restricted to values found in the "NENA Site/Structure Address Polygon Extent Method Registry" at: http://technet.nena.org/nrs/registry/SiteStructureAddressPolygonExtentMethod.xml
Example (Address Polygon): Structure; Site; Parcel; Interior; Other

5.80 Postal Code

Description: A system of codes that identifies an individual Post Office or metropolitan area delivery station associated with an address.
Domain: As defined by each country's postal authority (i.e., USPS, Canada Post)
Example: 02109 (Postal Code in Boston, MA); M4E 2V4 (Postal Code in Toronto, ON)
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.81 Postal Code Extension

Description: A system of 4-digit codes that are used after the US Postal Code to specify a range of USPS delivery addresses.
Domain: Defined by the USPS
Example: "0001" in "02109-0001" (Postal Code Extension in Boston, MA)
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Not Applicable

5.82 Postal Code Left

Description: The Postal Code on the left side of the road segment relative to the FROM Node.
Domain: As defined by each country's postal authority (i.e., USPS, Canada Post)
Example: 44114 (Postal Code in Cleveland, OH); H3B 3B0 (Postal Code in Montreal, QC)
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.83 Postal Code Right

Description: The Postal Code on the right side of the road segment relative to the FROM Node.
Domain: As defined by each country's postal authority (i.e., USPS, Canada Post)
Example: 84101 (Postal Code in Salt Lake City, UT); R3C 3Z0 (Postal Code in Winnipeg, MB)
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.84 Postal Community Name

Description: A mailing place name for the Postal Code of an address.
Domain: *CLDXF-US* [4]: Restricted to city names given in the USPS City State file for a given Postal Code.
CLDXF-CA [23]: None
Example: Bowen; Cypress; Sarnia
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.85 Postal Community Name Left

Description: A mailing place name for the Postal Code of an address on the left side of the road segment relative to the FROM Node.
Domain: *CLDXF-US* [4]: Restricted to city names given in the USPS City State file for a given Postal code.
CLDXF-CA [23]: None
Example: Dublin; Magnolia; Sainte-Agathe-des-Monts
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.86 Postal Community Name Right

Description: A mailing place name for the Postal Code of an address on the right side of the road segment relative to the FROM Node.
Domain: *CLDXF-US* [4]: Restricted to city names given in the USPS City State file for a given Postal code.
CLDXF-CA [23]: None
Example: Wicket; Zanesville; Yellowknife
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.87 Rail Line Name

Description: The word or phrase that constitutes the distinctive designation of the rail line.
Domain: None
Example: Chester to Rock Hill; Florence to Kingstree to Charleston; Portage la Prairie; Prince Rupert; Winnipeg Terminal

5.88 Rail Line Operator

Description: The name of the operator of the rail line or the primary rail company with rights to use the rail line.
Domain: None
Example: UP; CSX; Abilene & Smoky Valley Railroad; VIA Rail; Canadian National

5.89 Rail Line Owner

Description: The name of the owner of the rail right-of-way.

Domain: None
Example: CSX; South Carolina Central Railroad; Canadian Pacific; Canadian National

5.90 Rail Mile Post High

Description: The ending linear reference of the named rail line.
Domain: Restricted to a double-precision floating point number with a precision of seven and a scale of three (e.g., REAL (7,3)).
Example: 120.000; 257.330.

5.91 Rail Mile Post Low

Description: The beginning linear reference of the named rail line.
Domain: Restricted to a double-precision floating point number with a precision of seven and a scale of three (e.g., REAL (7,3)).
Example: 5.680; 14.000.

5.92 Right Address Number Prefix

Description: An identifier that precedes the Address Number, applying to all address numbers on the right side of the road segment relative to the FROM Node, and further identifies a location along a thoroughfare or within a defined area.
Domain: None
Example: "A" in "A19 route 117"; "75" in "75-6214 Kailua Place" (CLDXF-US only); "75-" in "75-6214 Kailua Place" (CLDXF-CA only)
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.93 Right FROM Address Number

Description: In the RoadCenterLine layer, each feature has a begin point and an endpoint. The FROM Node is the begin point while the TO node is the endpoint. Each has a left side and a right side relative to a begin node and an end node. The Right FROM address number is the address number on the right side of the road segment relative to the FROM Node.
Domain: None
Example: See Figure 5-4 below
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

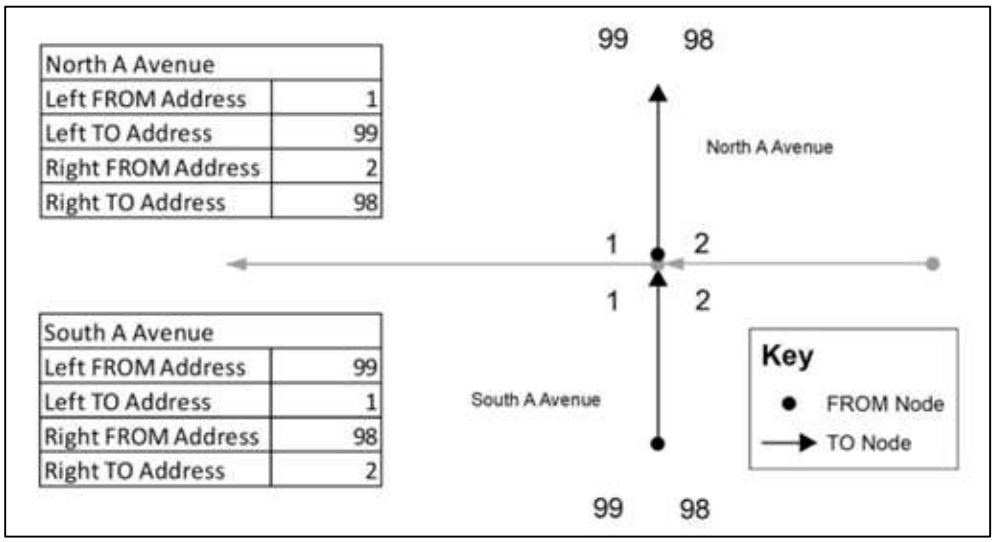


Figure 5-4 Example of Right FROM and Right TO Addresses

5.94 Right TO Address Number

Description: In the RoadCenterLine layer, each feature has a begin point and an endpoint. The FROM Node is the begin point while the TO node is the endpoint. Each has a left side and a right side relative to a begin node and an end node. The Right TO address number is the address number on the right side of the road segment relative to the TO Node.
Domain: None
Example: See Figure 5-4 above
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.95 Road Class

Description: The general description of the type of road. The Road Classifications used in this document are derived from the US Census MAF/TIGER Feature Classification Codes (MTFCC), which is an update to the now deprecated Census Feature Class Codes (CFCC).
Domain: Primary; Secondary; Local; Ramp; Service Drive; Vehicular Trail; Walkway/Pedestrian Trail; Stairway; Alley; Private; Parking Lot; Bike Path or Trail; Bridle Path; Other
Example: Ramp
Note: The Road Class is completely spelled out in the attribute fields. Road Classification is based on the Census road classification found in the MAF/TIGER Feature Class Code (MTFCC) Definitions [16]. The values are taken from the S series information in this document which provided the classification scheme for surface

roads and can be found at:
https://www2.census.gov/geo/pdfs/reference/mtfccs2019.pdf

- *Primary* roads are generally divided, limited-access highways within the interstate highway system or under state management and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways.
- *Secondary* roads are main arteries, usually in the US Highway, State Highway, or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways.
- *Local* roads are generally a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. Roads in this classification include neighborhood roads, rural roads, and city streets.
- *Ramp* designates a road that allows controlled access from adjacent roads onto a limited access highway, often in the form of a cloverleaf interchange. Ramps typically do not have address ranges.
- *Service Drive* provides access to structures along the highway, usually parallel to a limited access highway. If these roads are named and addressed, they may be considered local roads.
- *Vehicular Trail* (4WD, snowmobile) is an unpaved trail or path where a four-wheel-drive vehicle, snowmobile, or similar vehicle is required.
- *Walkway/Pedestrian Trail* is a path that is used for walking, being either too narrow for or legally restricted from vehicular traffic.
- *Stairway* is a pedestrian passageway from one level to another by a series of steps.
- *Alley* is generally a service road that does not generally have associated addressed structures and is usually unnamed. It is located at the rear of buildings and properties.
- *Private* (service vehicles, logging, oil fields, ranches, etc.) is a road within private property that is privately maintained for service, extractive, or other purposes. These roads are often unnamed.
- *Parking Lot* is the main travel route for vehicles through a paved parking area.
- *Bike Path or Trail* is a path that is used for manual or small, motorized bicycles, being either too narrow for or legally restricted from vehicular traffic.
- *Bridle Path* is a path that is used for horses, being either too narrow for or legally restricted from vehicular traffic.
- *Other* is any road or path type that does not fit into the above categories.

5.96 Room

Description: A single, distinctly identified, enclosed space within a structure.
Domain: None

Example: Room 137; Lobby
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.97 Row

Description: An identified linear feature, such as a linear arrangement of seats, workstations, equipment, or storage, within a structure, wing, unit, room, or section.
Domain: None
Example: Aisle 4; B-Line Assembly; ligne 5
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.98 Seat

Description: An identified seat, desk, workstation, cubicle, or similar precise location within a structure, wing, unit, room, section, or row.
Domain: None
Example: Cubicle 5A; 5A; Desk 11; 1
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.99 Section

Description: An identified, unenclosed area within a structure, wing, unit, or room.
Domain: None
Example: Section 241; Customer Seating; Waiting Area; pont supérieur
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.100 Service Number

Description: The numbers that would be dialed on a 12-digit keypad to reach the service appropriate for the location. This is not the same as an Emergency Service Number (ESN) in Legacy E9-1-1 systems. This field is used for all service boundary layers including PsapPolygon, PolicePolygon, FirePolygon, EmsPolygon, and others such as PoisonControlPolygon. Within North America, the Service Number for most services is 9-1-1; however, there may be service boundaries that have a different number that may be associated with them such as Poison Control. Additionally, in some countries, different numbers may be used for Police, Fire, and EMS—this field would be used to denote those numbers.
Domain: A dialable number or dial string
Example: 911; 18002221222

5.101 Service URI

Description: URI for call routing. This attribute is contained in the service boundary layers and will define the URI of the service. The URI is usually a Session Initiation Protocol (e.g., SIP or SIPs) URI that defines the initial route or path the call will take towards the PSAP or agency represented by the boundary.
Domain: Registered domain name

Example: sips:sos.psap@eoc.houston.tx.us
sip:cambriaallianceems.com
sip:dispatch@harriscountyso.org
sip:22444032@ohiocountywv.gov:5061
sip:wexford-fire@psap.allegheny.pa.us

5.102 Service URN

Description: The URN used to select the service for which a route is desired. The ECRF is queried with a location and a Service URN that returns the URI of the appropriate service.
Domain: RFC 5031 defines the Service URN; NENA-STA-010 [3] defines the domain of allowable values. PSAP boundaries SHOULD only contain features with Service URN values of "urn:emergency:service:sos.psap." Values to be used for service boundaries for other responding agencies are found in the IANA urn:emergency:service:responder registry.
Example: urn:emergency:service:sos.psap
urn:emergency:service:responder.police
urn:emergency:service:responder.fire
urn:emergency:service:responder.ems

5.103 Site

Description: The name of an exterior area that is publicly known and unique within a given place. A site may contain one or more structures and/or subsites.
Domain: None
Example: Jack Perry Plaza; Tiburon Golf Club; San Marcos Premium Outlets; State University of New York at Buffalo North Campus; Parliament Hill; Toronto Pearson International Airport; Prince Edward Island National Park
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.104 Speed Limit

Description: Posted Speed Limit in MPH or Km/h.
Domain: Whole numbers from 1 to 999
Example: 35; 55; 70

5.105 Street Name

Description: The element of the complete street name that identifies the particular thoroughfare (as opposed to any street types, directionals, and modifiers).
Domain: None
Example: "Hastings" in "East Hastings Street"; "101" in "Highway 101"; "Lionel-Groulx" in "Avenue Lionel-Groulx"
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.106 Street Name Post Directional

Description: A word following the Street Name element that indicates the direction taken by the thoroughfare from an arbitrary starting point or line, or the sector where it is located.
Domain: North; South; East; West; Northeast; Northwest; Southeast; Southwest; Nord; Sud; Est; Ouest; Nord-Est; Nord-Ouest; Sud-Est; Sud-Ouest; or equivalent words in other languages
Example: "North" in "Elm Avenue North"; "Ouest" in "Boulevard Jean-Talon Ouest"; "South" in "Pharr Court South Northwest"
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.107 Street Name Post Modifier

Description: A word or phrase that follows and modifies the Street Name element but is separated from it by a Street Name Post Type or a Street Name Post Directional or both.
Domain: None
Example: "Number 5" in "Fire Road Number 5"; "Extension" in "Main Street North Extension"; "Northwest" in "Pharr Court South Northwest"
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.108 Street Name Post Type

Description: A word or phrase that follows the Street Name element and identifies a type of thoroughfare in a complete street name.
Domain: Restricted to values found in the "NENA Registry of Street Name Pre Types and Street Name Post Types" or combinations thereof at: http://technet.nena.org/nrs/registry/StreetNamePreTypesAndStreetNamePostTypes.xml
Example: "Parkway" in "Ocean Parkway"; "Street" in "A Street"; "Rue" in "48e Rue Ouest"
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.109 Street Name Pre Directional

Description: A word preceding the Street Name element that indicates the direction taken by the thoroughfare from an arbitrary starting point or line, or the sector where it is located.
Domain: North; South; East; West; Northeast; Northwest; Southeast; Southwest; Nord; Sud; Est; Ouest; Nord-Est; Nord-Ouest; Sud-Est; Sud-Ouest; or equivalent words in other languages
Example: "South" in "South Congress Avenue"; "North" in "Southwest North Globe Avenue"
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.110 Street Name Pre Modifier

Description: A word or phrase that precedes and modifies the Street Name element but is separated from it by a Street Name Pre Type or a Street Name Pre Directional or both.
Domain: None
Example: "Alternate" in "Alternate Route 8"; "Old" in "Old North Church Street"; "Southwest" in "Southwest North Globe Avenue"
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.111 Street Name Pre Type

Description: A word or phrase that precedes the Street Name element and identifies a type of thoroughfare in a complete street name.
Domain: Restricted to values found in the "NENA Registry of Street Name Pre Types and Street Name Post Types" or combinations thereof at: http://technet.nena.org/nrs/registry/StreetNamePreTypesAndStreetNamePostTypes.xml
Example: "Avenue" in "Avenue A"; "Highway" in "Highway 443"; "Bypass Highway" in "Bypass Highway 22"; "Boulevard" in "Boulevard of the Allies"; "Chemin" in "Chemin de la Canardière"; "Rue" in "Rue Principale"
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.112 Street Name Pre Type Separator

Description: A preposition or prepositional phrase between the Street Name Pre Type and the Street Name.
Domain: Restricted to values found in the "NENA Registry of Street Name Pre Type Separators" at:
http://technet.nena.org/nrs/registry/StreetNamePreTypeSeparators.xml
Example: "of the" in "Avenue of the Stars"; "du" in "Rue du Petit-Champlain"; "in the" in "Circle in the Woods"; "at" in "Avenue at Port Imperial"
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.113 Structure

Description: A built feature with a vertical dimension, including both conventional buildings with walls, doors, and a roof, and other kinds of infrastructure such as cell towers, transformer stations, and fuel tanks.
Domain: None
Example: Fuel Storage Shed; Welcome Center; Confederation Bridge; Core Sciences Building; Tower C
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.114 SubSite

Description: The name of a sub-area within a larger area specified either by a site name, a thoroughfare address, or both.
Domain: None
Example: South Cell Phone Lot; Tennis Courts; les plaines d'Abraham
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

5.115 Unit

Description: A group or suite of rooms within a building, under common ownership or tenancy, typically having a common primary entrance.
Domain: None
Example: Apartment C2; Suite 3103; unité B
Business Rules: *CLDXF-US* [4]: Not Applicable; *CLDXF-CA* [23]: Yes

5.116 Unit Pre Type

Description: Part of the complete unit identifier that precedes the Unit Value and indicates the kind of unit.
Domain: None
Example: "Apartment" in "Apartment C2"; "Suite" in "Suite 3103"
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Not Applicable

5.117 Unit Value

Description: Part of the complete unit identifier that uniquely identifies a particular unit.
Domain: None
Example: "C2" in "Apartment C2"; "3103" in "Suite 3103"; Penthouse
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Not Applicable

5.118 Validation Left

Description: Indicates if the address range on the left side of the road segment, relative to the FROM node, should be used for civic location validation. A value of "Y" MAY be entered if any Address Number within the address range on the left side of the road segment should be considered by the LVF to be valid. A value of "N" MAY be entered if the Address Number should only be validated using the SiteStructureAddressPoint layer. If not present, a value of "Y" is assumed.
Domain: Y; N
Example: Y; N

5.119 Validation Right

Description: Indicates if the address range on the right side of the road segment, relative to the FROM node, should be used for civic location validation. A value of

"Y" MAY be entered if any Address Number within the address range on the right side of the road segment should be considered by the LVF to be valid. A value of "N" MAY be entered if the Address Number should only be validated using the SiteStructureAddressPoint layer. If not present, a value of "Y" is assumed.
Domain: Y; N
Example: Y; N

5.120 Wing

Description: A designated part of a structure that spans one or more floors, typically including more than one unit or room and representing a significant portion of the structure's floor area.
Domain: None
Example: Concourse A; North Quadrant; East Wing; Zone Publique – Niveau des Départs
Business Rules: *CLDXF-US* [4]: Yes; *CLDXF-CA* [23]: Yes

6 NENA Registry System (NRS) Considerations

6.1 "Site/Structure Address Point Placement Method" Registry

NRS is requested to update the Description for the existing Structure value in the Site/Structure Address Point Placement Method registry.

Value	Description	Reference
Structure	Placement of an address point to represent an address associated with a structure	This document

NRS is requested to add the following new values to the Site/Structure Address Point Placement Method registry.

Value	Description	Reference
InteriorAccess	Placement of an address point to represent an address based on the location of an access into a unit, room, or other space from within a building.	This document
ExteriorAccess	Placement of an address point to represent an address based on the location of an access into a structure, unit, room, or other space from outside the building.	This document
InteriorCentroid	Placement of an address point to represent the approximate center of an interior space within a structure usually bounded by walls, floors, windows, ceilings, and other surfaces that contain a logical	This document

Value	Description	Reference
	functional area such as a floor, wing, section, unit, or room.	

6.2 "Site/Structure Address Polygon Extent Method" Registry

NRS is requested to create a new registry that lists accepted values for the Placement Method of a Site/Structure Address Polygon. The Site/Structure Address Polygon Extent Method is defined in this NG9-1-1 GIS Data Model Section 4.2.2 Site/Structure Address Polygons—Recommended and Section 5.79 Placement Method.

6.2.1 Registry Title/Name

The name of this registry is *"Site/Structure Address Polygon Extent Method."*

6.2.2 Parent Registry

None.

6.2.3 Information required to create a new value

A new entry to the Site/Structure Address Polygon Extent Method Registry requires the identification of a feature used as a reference for delineating an address polygon, an explanation of the spatial reference between the feature and the address polygon, a graphic depicting the spatial relationship, a link to a document the Registry can connect to that contains this information and an explanation of how the proposed Site/Structure Address Polygon Extent Method improves upon the existing placement methodologies.

6.2.4 Management Policy

Addition of a new entry requires an "Expert Review" and "NENA Document Required" as defined in the NENA Registry System Standard, NENA-STA-008 (formerly 70-001). This expert should only allow values that are clearly distinct from values already in the registry and for which the provided documentation supports the inclusion of the proposed Site/Structure Address Polygon Extent Placement Method.

6.2.5 Content

Each entry in this registry contains:

- Value—A word or phrase that may be used as a Site/Structure Address Polygon Extent Method
- Description—An explanation of the placement method used to show the spatial relationship between the referenced feature and the address polygon.
- Reference—The link to a document the Registry can connect to that explains the extent method.

6.2.6 Initial Values

The registry should have the following entries:

Value	Description	Reference
Parcel	Address polygon represents the extent of a parcel associated with the address.	This document
Site	Address polygon represents the extent of an identified, described, or recognized outdoor area (e.g., campsite, ball field, picnic area). A site may be part of a parcel or contain multiple parcels. It may or may not contain structures.	This document
Structure	Address polygon represents the extent of a structure associated with the address.	This document
Interior	Address polygon represents the extent of an interior space within a structure usually bounded by walls, floors, windows, ceilings, and other surfaces that contain a logical functional area such as a floor, wing, section, unit, or room associated with an address.	This document
Other	Default value when the Site/Structure Address Polygon represents the extent of something other than a parcel, site, structure, or interior space.	This document

7 IANA Actions

Registries mentioned below are all within the "emergency" registry.

7.1 "GIS Data Layers" Registry

IANA is requested to add values to the GIS Data Layers registry in the Emergency area.

Name	Layer Indicator	Reference
RoadCenterLine	RCL	This document
SiteStructureAddressPoint	SSAP	This document
SiteStructureAddressPolygon	SSAPoly	This document
ProvisioningPolygon	Provisioning	This document
A1Polygon	A1	This document
A2Polygon	A2	This document
A3Polygon	A3	This document

Name	Layer Indicator	Reference
A4Polygon	A4	This document
A5Polygon	A5	This document
RailroadCenterLine	RrCL	This document
HydrologyLine	HydL	This document
HydrologyPolygon	HydPoly	This document
DistanceMarkerPoint	DistMark	This document
LocationMarkerPoint	LocMark	This document

7.2 "urn:emergency:uid" Registry

IANA is requested to add the following value to the urn:emergency:uid registry.

Name	Purpose	Reference
gis	GIS feature identifier	This document

8 Impacts and Considerations

NENA's NG9-1-1 uses GIS data provided by the local 9-1-1 Authority as the core database for civic location validation, all call routing, and PSAP map display functionality.

NENA's NG9-1-1 introduces the concept of an Emergency Services Internet Protocol network (ESInet) to facilitate communications among NG9-1-1 functional elements such as the ESRP, ECRF, LVF, and the PSAP. The ECRF is the primary location-based routing element. The LVF is the primary mechanism to determine that a civic address location is valid for routing and dispatch. Both ECRF and LVF use the same underlying GIS data.

The data format described in the main body of this document is expressly designed to facilitate conversion to the SI as described by the relational model in Appendix E—Relational Data Model. This allows a GIS system conforming to this data model, or capable of being automatically converted to this model, to be used to provision the ECRF and the LVF. The former is used to route emergency calls, and the latter is used to validate civic location prior to loading it into a Location Information Server (LIS). LVF validation is analogous to MSAG validation of an address prior to loading it into an ALI within an E9-1-1 system.

If both address points and road centerline ranges exist in the ECRF for the location of the caller, the address point route will be used. If there is no match of address points, but a road centerline or range segment matches, the route for that centerline segment will be used.

8.1 Operations Impacts Summary

The NENA NG9-1-1 GIS Data Model requires higher levels of standardization and attribute detail than existing E9-1-1 GIS data standards contained in *NENA Standard Data Formats for 9-1-1 Data Exchange & GIS Mapping*, NENA-STA-015 [19]. Existing GIS data may need to be manipulated and/or enhanced to conform to this standard structure.

Local 9-1-1 Authorities are responsible for provisioning their NG9-1-1 systems with local GIS data, which may require new procedures, processes, and training.

This GIS data model provides guidance on formatting GIS data prior to use in NG9-1-1. This document defines the minimum GIS Data Model required for E9-1-1 and NG9-1-1. 9-1-1 Authorities and other agencies must understand that a common baseline GIS data model must be established, recognized, and followed in order to participate in an interoperable NG9-1-1 environment. This document provides that baseline GIS data model.

This NG9-1-1 GIS Data Model represents not only the minimum set of GIS data that should be used for 9-1-1, but also the recommended and in some cases the locally required data for public safety. Non-standard field names and their associated attributes, as well as additional GIS data layers not discussed within this document, are allowed in order to meet individual entity needs. For example, additional data fields may be added to the road centerline data for the number of lanes, maintaining entity, planning district, and so forth. Additional layers, data fields, and associated attributes are allowed and encouraged to meet local, regional, and other organizational needs but are beyond the scope of this document.

8.2 Technical Impacts Summary

Hardware and software manufacturers may need to adapt their existing Customer Premises Equipment (CPE) or call handling software, CAD, map display, and related software to support this new format.

Service vendors may need to adapt their existing processes, procedures, and services to meet the new data needs.

Originating service providers may need to adapt existing software and systems to handle the new formats and use the PIDF-LO data structure.

8.3 Security Impacts Summary

GIS data may contain confidential, proprietary, and/or sensitive information which must not be introduced into the public domain. For example, certain information that telephone companies, other data providers, and Federal government entities (e.g., United States Postal Service, United States Department of Defense, United States Department of the Interior, Canadian Department of National Defence) furnish to local governmental entities, including those that provide 9-1-1 emergency services, are confidential or controlled under many laws and policies. Such information may be considered confidential and/or

proprietary when included in databases and on maps used by entities in the provision of emergency services. Confidential information must not be redistributed outside of 9-1-1. Sensitive information implies a loss of security when disclosed to others.

More information regarding guidelines for data and physical security is located in *NENA Security for Next-Generation 9-1-1*, NENA-STA-040-2024 [20], and *NENA Next Generation 9-1-1 Security (NG-SEC) Audit Checklist*, NENA 75-502 [21].

8.4 Recommendation for Additional Development Work

This document references existing NENA Standards. Additional work may be required as noted in the tables below.

Table 8-1 Future Work to be Considered by the GIS Data Model Working Group

Section	Future Work
3	Consider adding an IANA GIS Data Layers registry entry for the 988 Suicide Prevention and Mental Health Crisis Lifeline.
4.1 / 4.2, Appendix E	Align structure of Road Centerlines, Site/Structure Address Points, and Site/Structure Address Polygons with i3 v3.1 direction on how NGCS functional elements and services handle aliasing. Consider implementing aliases in these layers using an AliasFor attribute that stores the NGUID of another record.
4.2.1	In many cases, it is impossible to determine exactly which of multiple structures to associate with a given address. As detailed in the *NENA Information Document for Development of Site/Structure Address Point GIS Data for 9-1-1*, NENA-INF-014 [18], a single point may be used to represent a collection of buildings at a site. Future work on the data model will consider the use of a multipoint in such situations. Multipoints are first-class GIS features in the Simple Features standards implemented by OGC 06-103r4 and the parallel ISO 19125-1:2004. Advantages of multipoints include the ability to account for all structures and to convey more information about site configuration than a single, arbitrarily placed point. It will also be necessary to consider disadvantages such as lack of support in vendor systems and complications with GIS overlay operations.
4.2.1	Evaluate whether Latitude, Longitude, Elevation, Altitude, and Height fields are still needed in the data model. Altitude and Height were added in version 3 of the NENA GIS Data Model, NENA-STA-006.3, and with elevation support the transition to 3D address points where Altitude (Z) will join Latitude (X) and Longitude (Y) stored in the XYZ geometry of every feature. These are seen as transitional fields.

Section	Future Work
4.3.2	Clarification on service boundaries broken into smaller areas (sub services) such as station/beat/platoon, and whether a field needs to be added to the service boundary structure to accommodate the name of the sub service.
4.5	Clarification on how to handle tribal nations, military bases, and other general-purpose governmental units in the place name fields is deferred for future work.
4.6	Review of planned FRA (Federal Railroad Administration) rail data standardization efforts to consider alignment between those efforts and a future version of this document.
4.6	Inclusion of railroad crossing information deferred to future work.
4.7	Consider updates to national hydrography data sets for their alignment to the NENA GIS Data Model. For example, the National Hydrography Dataset (NHD) is expected to assess the relationship between the representations of hydrologic data relative to elevation data. Additional future work should assess the alignment between the HydrologyLine and HydrologyPolygon layers and future revisions to the NHD data model.
5.75	Determine the use and purpose of the OneWay attribute and discuss the potential inclusion of "N" in the domain to indicate "no traffic allowed." This will be part of a larger discussion with the Road Class attribute, or potentially a new attribute, and overall use and purpose as it relates to the Mapping Data Service, map display and functionality requirements, and whether a road centerline can be used or traveled on by an Emergency Responder.
5.95	Attributes in the Road Class field could be used to help responders better determine which vehicle type to use to reach an incident. This would be useful for data within the Mapping Data Service described in i3. An overall review of the use and purpose of the attribute values should be done to determine if any updates are needed to ensure its use in NG9-1-1 systems is clarified and determine if the appropriate classification strategy is applied.

Table 8-2 Future work to be considered by other NENA Working Groups

Section	Future Work
3.2	Development of a Metadata template based on the NG9-1-1 GIS Data Model Standard. Recommended Working Group: Establish a new Working Group

Section	Future Work
3.3	Develop guidance related to spatial reference, horizontal accuracy, and vertical accuracy. Recommended Working Group: GIS Data Stewardship
3.5	Expand language in GIS Data Stewardship around the NGUID structure. Include a discussion on the length of each element, in particular the local unique ID. Recommended Working Group: GIS Data Stewardship
4	There is a need for consistent treatment of GIS data layers and fields that are used exclusively for map display and visualization purposes (e.g., MDS), and are not directly used for location validation and/or geospatial call routing. Identify the display-only layers and fields in the current GIS Data Model and develop either a Standard or Informational Document that recommends content, structure, and visualization guidelines for map layers used for map display. Recommended Working Group: Establish a new Working Group
4	Development of a database structure crosswalk that establishes comparable matches between the *CLDXF-US Standard*, NENA-STA-004 [4], *CLDXF-CA Standard*, NENA-STA-029 [23], and *NG9-1-1 GIS Data Model*, NENA-STA-006, is deferred for future work. Recommended Working Group: Establish a new Working Group
4	Work this text that was removed from Section 4 GIS Data Model Layers into an INF document as the concepts it covers would be best placed there. *The "Field Width" column refers to the maximum number of characters a field may contain. Field width represents guidelines for interoperability. Local implementations MAY use smaller maximum widths, but their emergency call processing systems MUST be capable of managing the listed widths when handling out-of-area calls. A GIS system that allows longer widths must be used with great care as those attributes which exceed these widths may be truncated.* Recommended Working Group: GIS Data Stewardship
4.1.2	Consider adding example methodologies for storing and maintaining alias street names that are compatible with Appendix E—Relational Data Model to the *NENA Information Document for GIS Data Stewardship for Next Generation 9-1-1*, NENA-INF-028 [27].

Section	Future Work
	Recommended Working Group: GIS Data Stewardship
4.2	Consider what delimiter should be used to separate multiple URI values within the Additional Data URI. Recommended Working Group: i3 Architecture Working Group
4.2.1	With version 3 of the NENA GIS Data Model, the SiteStructureAddressPoint layer implements the *NENA Requirements for 3D Location Data for E9-1-1 and NG9-1-1*, NENA-REQ-003 [24], and now supports 3D. The Z value of the geometry corresponds to Altitude, which is the Height Above Ellipsoid. Consider adding guidance to the *NENA Information Document for GIS Data Stewardship for Next Generation 9-1-1*, NENA-INF-028 [27], about methods to determine Altitude and ways of using the transitional fields of Elevation, Altitude, and Height with the goal of populating Z values as part of the geometry. Recommended Working Group: GIS Data Stewardship
4.2.1	Document that stacked address points will result in topology errors and goes against existing GIS data standards. Deferred to future work. Recommended Working Group: GIS Data Stewardship
4.2.1	The Location Type Registry that references the Internet Engineering Task Force Request for Comments (RFC) 4589 (https://datatracker.ietf.org/doc/html/rfc4589) is: https://www.iana.org/assignments/location-type-registry/location-type-registry.xml. Additional location types for this registry need to be defined and be worked on through the formal Internet Assigned Numbering Authority as defined in Section 5.1 of RFC 4589. Coordination with the CLDXF-US and CLDXF-CA working groups is needed if the Location Type Registry is no longer to be used as a domain for Place Type. Recommended Working Group: Establish a new Working Group
4.2.2	Consider how Site Structure Address Polygons should, or must, be used by the functional elements that utilize GIS data (e.g., ECRF, LVF, GCS, MCS, and MDS). Also consider the topological relationships with Site Structure Address Points and the permissibility of multi-part features. Recommended Working Group: i3 Architecture Working Group
4.2.2	Consider the implications of Site Structure Address Polygons, how they offer benefits over Site Structure Address Points, the circumstances in which they

Section	Future Work
	don't, how they may relate to the road centerlines and their range attributes, and how the placement methods developed for Site Structure Address Polygons apply. Additionally, consider the topology practices that may be appropriate for the development and maintenance of Site Structure Address Polygons and their topological relationships with Site Structure Address Points. Recommended Working Group: GIS Data Stewardship
4.4	Provisioning of data from authoritative sources will be addressed in a future revision of NENA-STA-010 [3]. Additional work is needed to determine what standard mechanisms are needed, if any, for detecting inadvertent or malicious provisioning of data from a non-authoritative source to the ECRF and LVF. Recommended Working Group: i3 Architecture
4.4	Consideration of multiple ProvisioningPolygon layers or adding a provisioning control field(s) will be considered for future work. This would be used in circumstances where different GIS Data Providers are submitting data for different GIS data layers. For example, a County GIS Data Provider provides road centerlines for the entire extent of the County. In the same county, an Incorporated Municipality GIS Data Provider provides site/structure addresses data for everything within their boundary, while the County GIS Data Provider provides site/structure addresses data for everything outside of that Incorporated Municipality. Recommended Working Group: i3 Architecture

8.5 Anticipated Timeline

The time required to develop the necessary NG9-1-1 GIS data will depend on the level and quality of one's existing GIS data. Since NG9-1-1 requires adherence to the GIS database structure standards outlined in this document, the time required to migrate to the NG9-1-1 GIS data model will vary.

It is strongly advised that one go through the process of standardizing and synchronizing their existing GIS data with their MSAG and ALI as described in *NENA Information Document for Synchronizing Geographic Information System Databases with MSAG & ALI*, NENA 71-501 [22]. NENA recommends the MSAG and GIS data reach a 98% or greater match rate, with an option of matching with ALI, before using GIS data for NG9-1-1.

8.6 Cost Factors

In order to create and enhance the quality and accuracy of GIS data, the 9-1-1 Authority may need to dedicate additional resources for GIS data development and maintenance. The 9-1-1 Authority is ultimately responsible for the quality and accuracy of the GIS data used in the 9-1-1 system, even if the development and/or maintenance of this data is outsourced, shared, or obtained through others. It is anticipated that the rigorous requirements and highly standardized nature of the GIS data needed for an NG9-1-1 system to function may require:

- Additional training, personnel, and/or time to update or modify existing GIS data to meet this Standard
- New or revised procedures to meet the requirements of NG9-1-1 data
- Software upgrades or updates
- Improvements to the currency, accuracy, quality, and completeness of existing data
- Security-related standard operating procedures be developed or revised
- In all cases, strict adherence to the minimum standards outlined in this document is required to ensure compatibility with NG9-1-1 systems and interoperability

8.7 Cost Recovery Considerations

Collaborating, coordinating, and sharing the cost of data development and maintenance with neighboring 9-1-1 entities and other stakeholders outside of 9-1-1 may offset the cost of collecting and maintaining high quality, current GIS data. Other stakeholders include local and state planning departments, engineering, taxing authorities, and public/private partnerships with utilities, and other organizations that need highly accurate and current GIS data. Consistent addressing, data scrubbing, and data maintenance will benefit all stakeholders who can use this address information.

8.8 Additional Impacts (non-cost related)

Certain information or requirements contained in this NENA document are known to have 9-1-1 technical impacts that may include:

- Better performance of all 9-1-1 systems
- Better information available for Public Safety
- Reduced response time
- Minimization of miscommunication
- Efficient use of limited resources
- Improved communications with adjacent 9-1-1 entities to ensure layers match properly at the boundaries

9 Abbreviations, Terms, and Definitions

See the NENA Knowledge Base (NENAkb) [1] for a Glossary of terms and abbreviations used in NENA documents. Abbreviations and terms used in this document are listed below with their definitions.

Term or Abbreviation (Expansion)	Definition / Description
Agency Identifier	A domain name for an Agency used as a globally unique identifier.
ALI (Automatic Location Identification)	The automatic display at the PSAP of the caller's telephone number, the address/location of the telephone, and supplementary emergency services information of the location from which a call originates.
Altitude	The measurement of the device's orthogonal distance from the WGS84 ellipsoid, given in meters.
CAD (Computer-Aided Dispatch)	A computer-based system which aids PSAP Telecommunicators by automating selected dispatching and record keeping activities.
CLDXF-US (Civic Location Data Exchange Format – United States)	A United States profile of PIDF-LO that defines a set of standard data elements that describe detailed civic location information.
CLDXF-CA (Civic Location Data Exchange Format – Canada)	A Canadian profile of PIDF-LO that defines a set of standard data elements describing detailed thoroughfare address information.
Data Domain	An enumerated listing or range of valid values that may be used as an attribute. If no Data Domain is provided, then any value that meets the format criteria may be used.
Data Model	A data model defines the data layers, data features, data fields and attributes, and other defining requirements of a database for use in an application.
E9-1-1 (Enhanced 9-1-1)	A telephone system which includes network switching, database(s), and Public Safety Answering Point premises elements capable of providing automatic location identification data, selective routing, selective transfer, fixed transfer, and a call back number. The term also includes any enhanced 9-1-1 service so designated by the Federal Communications Commission in its Report and Order in WC Docket Nos. 04-36 and 05-196, or any successor proceeding.

Term or Abbreviation (Expansion)	Definition / Description
ECRF (Emergency Call Routing Function)	A functional element in NGCS (Next Generation Core Services) which is a LoST (Location-to-Service Translation) protocol server where location information (either civic address or geo-coordinates) and a Service URN serve as input to a mapping function that returns a URI used to route an emergency call toward the appropriate PSAP for the caller's location or towards a responder agency.
Elevation	The orthogonal distance of the Earth's surface from the WGS84 ellipsoid given in meters at a provided location (i.e., the Altitude of the ground level).
EMS (Emergency Medical Service)	A service providing out-of-hospital acute care and transport to definitive care, to patients with illnesses and injuries which the patient believes constitute a medical emergency.
ESInet (Emergency Services IP Network)	A managed IP network that is used for emergency services communications, and which can be shared by all public safety agencies. It provides the IP transport infrastructure upon which independent application platforms and core services can be deployed, including, but not restricted to, those necessary for providing NG9-1-1 services. ESInets may be constructed from a mix of dedicated and shared facilities. ESInets may be interconnected at local, regional, state, federal, national, and international levels to form an IP-based internetwork (network of networks). The term ESInet designates the network, not the services that ride on the network. See NGCS (Next Generation 9-1-1 Core Services).
ESN (Emergency Service Number)	A 3-5 digit number that represents one or more ESZs (Emergency Service Zone), stored as a 3-5 character numeric string in a GIS database. An ESN is defined as one of two types: Administrative ESN and Routing ESN.
ESRP (Emergency Service Routing Proxy)	An i3 functional element which is a SIP proxy server that selects the next-hop routing within the ESInet based on location and policy. There is an ESRP on the edge of the ESInet. There is usually an ESRP at the entrance to an NG9-1-1 PSAP. There may be one or more intermediate ESRPs between them.
Geocoding	Interpolation-based computational techniques to derive estimates of geographic locations.

Term or Abbreviation (Expansion)	Definition / Description
GIS (Geographic Information System)	A system for capturing, storing, displaying, analyzing, and managing data and associated attributes which are spatially referenced.
GIS Attribute	Tabular information about features contained in GIS data.
GIS Data Layer	A spatial dataset containing a common feature type.
GIS Data Provider	A person or group who is responsible for maintaining authoritative GIS data for a given service area.
GIS Feature	Representation of a real-world object in a GIS as a single geometric object.
Height	The difference between Elevation and Altitude given in meters for a given location, often referred to as "Height Above Ground Level" (AGL).
IANA (Internet Assigned Numbers Authority)	The departmental entity within ICANN (Internet Corporation for Assigned Names and Numbers) that oversees coordination of global IP address allocation, DNS root zone management, protocol name and number registries, and other Internet protocol assignments. Some NENA documents may use IANA Protocol Registries following the processes described in RFC 8126. **External References:** • IANA website • RFC 8126, Guidelines for Writing an IANA Considerations Section in RFCs
IANA Registry	A place where globally coordinated account records reflecting internet codes and numbers used in technical standards are centrally maintained by the Internet Assigned Numbers Authority, usually at the behest of the IETF.
IETF (Internet Engineering Task Force)	The lead standard-setting authority for Internet protocols. **External References:** IETF website

Term or Abbreviation (Expansion)	Definition / Description
ISO (International Standards Organization)	An independent, non-governmental international organization of national standards bodies. **External References:** www.iso.org
LVF (Location Validation Function)	A Functional Element in an NGCS (Next Generation 9-1-1 Core Services) that is a LoST protocol server where civic location information is validated against the authoritative GIS database information. A civic address is considered valid if it can be located within the database uniquely, is suitable to provide an accurate route for an emergency call, and adequate and specific enough to direct responders to the right location.
MCS (MSAG Conversion Service)	A web service providing conversion between PIDF-LO (Presence Information Data Format – Location Object) and MSAG (Master Street Address Guide) data.
Metadata	A record of information, usually presented as an eXtensible Markup Language (XML) document, which captures the basic characteristics of a data or information resource. Metadata records include core library catalog elements such as Title, Abstract, and Publication Data; geographic elements such as Geographic Extent and Projection Information; and database elements such as attribute label definitions and attribute domain values.
MSAG (Master Street Address Guide)	A database of street names and house number ranges within their associated communities defining Emergency Service Zones (ESZs) and their associated Emergency Service Numbers (ESNs) to enable proper routing of 9-1-1 calls.
NENA (National Emergency Number Association)	NENA is the National Emergency Number Association, also referred to as The 9-1-1 Association, which is fully dedicated to the continued improvement and modernization of the 9-1-1 emergency communication system. NENA's approach includes research, standards development, training, education, certification, outreach, and advocacy through communication with stakeholders. As an ANSI-accredited Standards Developer, NENA works with 9-1-1 professionals, public policy leaders, emergency services and telecommunications industry partners, like-minded public safety associations, and more. Current NENA activities center on

Term or Abbreviation (Expansion)	Definition / Description
	awareness, documentation, and implementation for Next Generation 9-1-1 (NG9-1-1) and international three-digit emergency communication systems. NENA's worldwide members join with the emergency response community in striving to protect human life, preserve property, and maintain the security of all communities. **External References:** https://www.nena.org/
NGCS (Next Generation 9-1-1 Core Services)	The set of services needed to process a 9-1-1 call on an ESInet. It includes, but is not limited to, the ESRP, ECRF, LVF, BCF, Bridge, Policy Store, Logging Services, and typical IP services such as DNS and DHCP. The term NG9-1-1 Core Services includes the services and not the network on which they operate. See ESInet (Emergency Services IP Network).
NGUID (NENA Globally Unique ID)	A globally unique ID generated and maintained within a GIS database as defined in NENA-STA-006. Each NGUID MUST be unique.
PIDF (Presence Information Data Format)	Specified in IETF RFC 3863, it provides a common presence data format for Presence protocols, and also defines a new media type. A presence protocol is a protocol for providing a presence service over the Internet or any IP network.
PIDF-LO (Presence Information Data Format – Location Object)	An extension to PIDF that contains location information.
PSAP (Public Safety Answering Point)	A physical or virtual entity where 9-1-1 calls are delivered by the 9-1-1 Service Provider.
Primary PSAP	A PSAP to which 9-1-1 calls are routed directly from the 9-1-1 Control Office.
RFC (Request for Comment)	A document published by the Internet Engineering Task Force (IETF). Note that the name is a historic artifact — An RFC is finalized. RFCs are never revised; updates are published as new RFCs. Errata are noted separately. (Documents for which input and

Term or Abbreviation (Expansion)	Definition / Description
	comments are requested are called Internet Drafts. Most RFCs are originally published as an Internet Draft).
SI (Spatial Interface)	A standardized interface between the GIS data and the functional elements that consume GIS data, such as the ECRF, LVF, and Mapping Data Service.
Spatial Data	Information stored as coordinates and topology that identifies the geographic location of features and boundaries on Earth. **Also known as:** ***Geospatial Data*** ***Geographic Information***
Topology	The spatial relationships between adjacent or neighboring GIS features.
URI (Uniform Resource Identifier)	An identifier consisting of a sequence of characters matching the syntax rule that is named <URI> in RFC 3986. It enables uniform identification of resources via a set of naming schemes. A URI can be further classified as a locator, a name, or both. The term "Uniform Resource Locator" (URL) refers to the subset of URIs that, in addition to identifying a resource, provides a means of locating the resource by describing its primary access mechanism (e.g., its network "location"). The term "Uniform Resource Name" (URN) has been used historically to refer to both URIs under the "urn" scheme [RFC 2141], which are required to remain globally unique and persistent even when the resource ceases to exist or becomes unavailable, and to any other URI with the properties of a name. An example of a URI that is neither a URL nor a URN is sip:psap@example.com. **External References:** RFC 3986, Uniform Resource Identifier (URI)
URL (Uniform Resource Locator)	A type of URI, specifically used for describing and navigating to a resource (e.g., https://www.nena.org).
URN (Uniform Resource Name)	A type of URI. Uniform Resource Names (URNs) are intended to serve as persistent, location-independent, resource identifiers and are designed to make it easy to map other namespaces (which share

Term or Abbreviation (Expansion)	Definition / Description
	the properties of URNs) into URN-space. An example of a URN is urn:service:sos. **External References:** RFC 8141, Uniform Resource Names (URNs)
USPS (United States Postal Service)	An independent agency of the United States government responsible for providing mail service in the United States.

10 References

[1] National Emergency Number Association. "NENA Knowledge Base Glossary." Updated March 14, 2025. https://kb.nena.org/wiki/Category:Glossary.

[2] Internet Engineering Task Force. *Key words for use in RFCs to Indicate Requirement Levels*. S. Bradner. RFC 2119, March 1997.

[3] National Emergency Number Association. *NENA i3 Standard for Next Generation 9-1-1*. NENA-STA-010.3-2021. Arlington, VA: NENA, approved July 12, 2021.

[4] National Emergency Number Association. *NENA Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF-US) Standard*. NENA-STA-004.2-2024. Arlington, VA: NENA, approved February 25, 2024.

[5] Internet Engineering Task Force. *A Presence-based GEOPRIV Location Object Format*. J. Peterson. RFC 4119, December 2005.

[6] Internet Engineering Task Force. *Revised Civic Location Format for Presence Information Data Format Location Object (PIDF-LO).* M. Thomson and J. Winterbottom. RFC 5139, February 2008.

[7] Internet Engineering Task Force. *Specifying Civic Address Extensions in the Presence Information Data Format Location Object (PIDF-LO)*. J. Winterbottom, M. Thomson, R. Barnes, B. Rosen, and R. George. RFC 6848, January 2013.

[8] International Standards Organization. *Geographic Information - Metadata - Part 1: Fundamentals.* ISO 19115-1:2014. Geneva: ISO, published April 2014.

[9] Federal Geographic Data Committee. "ISO Geospatial Metadata Standards." https://www.fgdc.gov/metadata/iso-standards. Accessed October 30, 2025.

[10] National Oceanic and Atmospheric Administration. "Metadata." National Centers for Environmental Information (NCEI). April 8, 2021. https://www.ncei.noaa.gov/resources/metadata. Accessed October 30, 2025.

[11] National Geospatial Intelligence Agency (NGA). *Department of Defense World Geodetic System 1984 - Its Definition and Relationships with Local Geodetic Systems*. NGA Standard NGA.STND.0036_1.0.0_WGS84, Version 1.0.0, July 8, 2014.

[12] International Association of Oil and Gas Producers. "EPSG Geodetic Parameter Dataset." https://epsg.org. Accessed October 30, 2025.

[13] Internet Engineering Task Force. *UTF-8, a transformation format of ISO 10646*. F. Yergeau, RFC 3629, November 2003.

[14] Internet Engineering Task Force. *Uniform Resource Identifier (URI): Generic Syntax*. T. Berners-Lee, R. Fielding, and L. Masinter, RFC 3986, January 2005.

[15] InterNational Committee for Information Technology Standards (INCITS). *Information Technology - Codes For The Identification Of Counties And Equivalent Areas Of The United States, Puerto Rico, And The Insular Areas.* INCITS 31-2009 (R2019), approved November 2019.

[16] United States Census Bureau. *2019 MAF/TIGER Feature Class Codes (MTFCC)*. https://www2.census.gov/geo/pdfs/reference/mtfccs2019.pdf, July 25, 2019.

[17] United States Postal Service (USPS). *Publication 28-Postal Addressing Standards*. https://pe.usps.com/cpim/ftp/pubs/Pub28/pub28.pdf, October 2024.

[18] National Emergency Number Association. *NENA Information Document for Development of Site/Structure Address Point GIS Data for 9-1-1*. NENA-INF-014.1-2015. Arlington, VA: NENA, approved September 18, 2015.

[19] National Emergency Number Association. *NENA Standard Data Formats for E9-1-1 Data Exchange & GIS Mapping*. NENA-STA-015.10-2018. Arlington, VA: NENA, approved August 12, 2018 (originally 02-010).

[20] National Emergency Number Association. *NENA Security for Next Generation 9-1-1 Standard (NG-SEC)*. NENA-STA-040.2-2024, (originally 75-001). Arlington, VA: NENA, approved October 28, 2024.

[21] National Emergency Number Association. *NENA Next Generation 9-1-1 Security (NG-SEC) Audit Checklist*. NENA 75-502. Arlington, VA: NENA, approved December 14, 2011.

[22] National Emergency Number Association. *NENA Information Document for Synchronizing Geographic Information System Databases with MSAG & ALI*. NENA 71-501. Arlington, VA: NENA, approved May 26, 2009.

[23] National Emergency Number Association. *NENA Next Generation 9-1-1 (NG9-1-1) Canadian Civic Location Data Exchange Format (CLDXF-CA) Standard*. NENA-STA-029.1-2025. Arlington, VA: NENA, (April 28, 2025).

[24] National Emergency Number Association. *NENA Requirements for 3D Location Data for E-9-1-1 and NG9-1-1*. NENA-REQ-003.1-2022. Arlington, VA: NENA, approved June 10, 2022.

[25] International Standards Organization (ISO). *Codes for the representation of names of countries and their subdivisions — Part 1: Country code*. ISO 3166-1:2020, August 2020.

[26] International Standards Organization (ISO). *Codes for the representation of names of countries and their subdivisions — Part 2: Country subdivision code*. ISO 3166-2:2020, August 2020.

[27] National Emergency Number Association. *NENA Information Document for GIS Data Stewardship for Next Generation 9-1-1.* NENA-INF-028.2-2023. Arlington, VA: NENA, approved September 20, 2023.

[28] National Emergency Number Association. *NENA i3 Standard for Next Generation 9-1-1*. NENA-STA-010.3.1-202Y. Arlington, VA: NENA (forthcoming).

11 Appendix A—United States' Federal Railroad Association (FRA) Rail Lines Database Structure Crosswalk to NENA's RailroadCenterLine Layer

The Federal Railroad Association (FRA) maintains GIS data on the rail system in the United States, including the RailroadCenterLine layer which contains the railway network. The data is available from https://www.bts.gov/ntad.

This data may be used if no higher quality rail data is available. Before use, it SHOULD be checked for accuracy and completeness in the area of interest, and it MUST be adjusted to meet the database structure requirements in Section 4.6 Railroads—Recommended.

Table 11-1 FRA Rail Lines Database Structure Crosswalk Table

NENA-STA-006 Descriptive Name	NENA-STA-006 Field Name	US FRA Rail Lines Field Name
Discrepancy Agency ID	DiscrpAgID	None: Will be the 911 Authority adjusting the data
Date Updated	DateUpdate	None: Will be the date the 911 Authority performed the adjustment
NENA Globally Unique ID	NGUID	FRAARCID
Rail Line Owner	RLOwn	Rail company identified in RROWNER1
Rail Line Operator	RLOp	Rail company identified in TRKRGHTS1
Rail Line Name	RLName	-
Rail Mile Post Low	RMPL	-
Rail Mile Post High	RMPH	-

12 Appendix B—Canada's National Railway Network Database Structure Crosswalk to NENA's RailroadCenterLine Layer

The National Railway Network (NRWN) is produced by Natural Resources Canada, for the Canadian Council on Geomatics, with data contributions from the public sector (Transport Canada and mapping agencies of the three levels of government) and the private sector (CN, VIA Rail Canada, Railway Association of Canada, Esri). The NRWN provides the geographic locations of all tracks, crossings, structures (bridges, tunnels, rail ferries), and junctions (diamonds, switches), as well as partial coverage of stations and marker posts. In addition, the NRWN includes a set of attributes such as railway subdivision with start and end mileages, track classification, track name, track operator, track owner, track user, station name, and station type. The NRWN is available at:

https://open.canada.ca/data/en/dataset/ac26807e-a1e8-49fa-87bf-451175a859b8.

This data may be used if no higher quality railroads data is available. Before use, it SHOULD be checked for accuracy and completeness in the area of interest, and it MUST be adjusted to meet the database structure requirements in Section 4.6 Railroads—Recommended.

Table 12-1 National Railway Network Database Structure Crosswalk Table

NENA-STA-006 Descriptive Name	NENA-STA-006 Field Name	NRWN Track Segment Field Name
Discrepancy Agency ID	DiscrpAgID	None: Will be the 911 Authority adjusting the data
Date Updated	DateUpdate	None: Will be the date the 911 Authority performed the adjustment
NENA Globally Unique ID	NGUID	None: Will be the GUID generated by the 911 Authority
Rail Line Owner	RLOwn	Owner Name Name of the company that owns the track system
Rail Line Operator	RLOp	Operator Name Information relative to the rail company that operates the track
Rail Line Name	RLName	Subdivision Name Note: A field Track Name is also available but has no mileages associated. Only subdivision (and operator) is associated with start and end miles.
Rail Mile Post Low	RMPL	Subdivision Start of the linear reference
Rail Mile Post High	RMPH	Subdivision End of the linear reference

13 Appendix C—United States' National Hydrography Dataset (NHD) Database Structure Crosswalk to NENA's HydrologyLine Layer and HydrologyPolygon Layer

The United States Geological Survey (USGS) maintains the National Hydrography Dataset (NHD) for capturing hydrologic (surface water) features. The data is available from https://www.usgs.gov/national-hydrography.

This data may be used if no higher quality hydrologic data is available. Before use, it SHOULD be checked for accuracy and completeness in the area of interest, and it MUST be adjusted to meet the database structure requirements in Section 4.7.1 Hydrology Lines—Recommended and Section 4.7.2 Hydrology Polygons—Recommended.

Table 13-1 National Hydrography Dataset Database Structure Crosswalk Table: Lines

NENA-STA-006 Descriptive Name	NENA-STA-006 Field Name	US NHD Feature Class and Field Name
Discrepancy Agency ID	DiscrpAgID	None: Will be the 911 Authority adjusting the data
Date Updated	DateUpdate	None: Will be the date the 911 Authority performed the adjustment
NENA Globally Unique ID	NGUID	NHDFlowline:Permanent_Identifier
Hydrology Segment Type	HS_Type	NHDFlowline:FType
Hydrology Segment Name	HS_Name	NHDFlowline:GNIS_Name

Table 13-2 National Hydrography Dataset Database Structure Crosswalk Table: Polygons

NENA-STA-006 Descriptive Name	NENA-STA-006 Field Name	US NHD Feature Class and Field Name
Discrepancy Agency ID	DiscrpAgID	None: Will be the 911 Authority adjusting the data
Date Updated	DateUpdate	None: Will be the date the 911 Authority performed the adjustment
NENA Globally Unique ID	NGUID	NHDWaterbody: Permanent_Identifier and NHDArea: Permanent_Identifier
Hydrology Polygon Type	HP_Type	NHDWaterbody: FType and NHDArea: FType
Hydrology Polygon Name	HP_Name	NHDWaterbody: GNIS_Name and NHDArea: GNIS_Name

14 Appendix D—Canada's National Hydrographic Network Database Structure Crosswalk to NENA's HydrologyLine Layer and HydrologyPolygon Layer

The National Hydrographic Network (NHN) is produced by Natural Resources Canada, for the Canadian Council on Geomatics, from the best available data and is maintained jointly by the federal and interested provincial and territorial partners. The NHN provides the geographic locations of inland surface water bodies such as lakes, reservoirs, watercourses (rivers and streams), canals, islands, drainage networks, geographic names, infrastructure, and obstacles. In addition, the NHN includes a set of basic surface water attributes such as: permanency, validity date, and planimetric accuracy. The NHN (Canada) and the NHD (US) data has been aligned, converted, and integrated, and therefore provide seamless data for Canada/US transboundary watersheds. The NHN is available at: https://open.canada.ca/data/en/dataset/a4b190fe-e090-4e6d-881e-b87956c07977.

This data may be used if no higher quality hydrology data is available. Before use, it SHOULD be checked for accuracy and completeness in the area of interest, and it MUST be adjusted to meet the database structure requirements in Section 4.7.1 Hydrology Lines—Recommended and Section 4.7.2 Hydrology Polygons—Recommended.

Table 14-1 National Hydrographic Database Structure Crosswalk Table: Lines

NENA-STA-006 Descriptive Name	NENA-STA-006 Field Name	NHN Hydrographic Network Layer Name and Field Name
Discrepancy Agency ID	DiscrpAgID	None: Will be the 911 Authority adjusting the data
Date Updated	DateUpdate	None: Will be the date the 911 Authority performed the adjustment
NENA Globally Unique ID	NGUID	None: Will be the GUID generated by 911 Authority
Hydrology Segment Type	HS_Type	HD_SLWATER_1: TYPE_TEXT Single line hydrographic feature type of waterbody
Hydrology Segment Name	HS_Name	HD_SLWATER_1: NAME_1 Single line hydrographic feature name of the waterbody

Table 14-2 National Hydrographic Database Structure Crosswalk Table: Polygons

NENA-STA-006 Descriptive Name	NENA-STA-006 Field Name	NHN Hydrographic Network Layer Name and Field Name
Discrepancy Agency ID	DiscrpAgID	None: Will be the 911 Authority adjusting the data
Date Updated	DateUpdate	None: Will be the date the 911 Authority performed the adjustment
NENA Globally Unique ID	NGUID	None: Will be the GUID generated by 911 Authority
Hydrology Polygon Type	HP_Type	ND_WATERBODY_2: TYPE_TEXT Type of the waterbody
Hydrology Polygon Name	HP_Name	ND_WATERBODY_2: LAKENAME_1 Name of the waterbody

15 Appendix E—Relational Data Model

This appendix outlines the relational data model utilized in the SI. Apart from primary and foreign keys, the Descriptive Names used in the tables of this appendix align with those listed in Section 5 Detailed Description of Field Names and Associated Attribute Data.

15.1 Crosswalk to Flat File Fields

The Crosswalk column in each table indicates the source table for each record. For foreign key fields, the Crosswalk lists the related table where the referenced data can be found. For all other attributes, the Crosswalk value represents the field's location in the flat file model, providing a clear mapping between the normalized data and its original structure.

15.2 Street Segment

Table 15-1 Street Segment (StSeg) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Street Segment ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-2
Effective Date	Effective	No	DATETIME		Table 4-2
Expiration Date	Expire	No	DATETIME		Table 4-2
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-2
Complete Street Name ID	CompleteStNam_ID	Yes	INTEGER	FK	Table 15-9
Alias Set ID	AliasSet_ID	No	INTEGER	FK	Table 15-5
Left Address Number Prefix	AdNumPre_L	Conditional	TEXT (15)	P	Table 4-2
Right Address Number Prefix	AdNumPre_R	Conditional	TEXT (15)	P	Table 4-2
Left FROM Address Number	FromAddr_L	Yes	INTEGER	INT	Table 4-2
Left TO Address Number	ToAddr_L	Yes	INTEGER	INT	Table 4-2
Right FROM Address Number	FromAddr_R	Yes	INTEGER	INT	Table 4-2
Right TO Address Number	ToAddr_R	Yes	INTEGER	INT	Table 4-2

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Parity Left	Parity_L	Yes	TEXT (1)	P	Table 4-2
Parity Right	Parity_R	Yes	TEXT (1)	P	Table 4-2
Complete Legacy Street Name ID	CompleteLSt_Nam_ID	Conditional	INTEGER	FK	Table 15-12
ESN Left	ESN_L	Conditional	TEXT (5)	P	Table 4-2
ESN Right	ESN_R	Conditional	TEXT (5)	P	Table 4-2
MSAG Community Name ID Left	MSAGComm_L_ID	Conditional	INTEGER	FK	Table 15-23
MSAG Community Name ID Right	MSAGComm_R_ID	Conditional	INTEGER	FK	Table 15-23
Legacy County ID Left	LCounty_L_ID	Conditional	INTEGER	FK	Table 15-24
Legacy County ID Right	LCounty_R_ID	Conditional	INTEGER	FK	Table 15-24
Country Left	Country_L	Yes	TEXT (2)	P	Table 4-2
Country Right	Country_R	Yes	TEXT (2)	P	Table 4-2
A1 to A5 Code ID Left	A1toA5CodeL_ID	Yes	INTEGER	FK	Table 15-30
A1 to A5 Code ID Right	A1toA5CodeR_ID	Yes	INTEGER	FK	Table 15-30
Postal Code Left ID	PostalCode_L_ID	No	INTEGER	FK	Table 15-21
Postal Code Right ID	PostalCode_R_ID	No	INTEGER	FK	Table 15-21
Postal Community Left ID	PostalComm_L_ID	No	INTEGER	FK	Table 15-22
Postal Community Right ID	PostalComm_R_ID	No	INTEGER	FK	Table 15-22
Road Class ID	RdClass_ID	No	INTEGER	FK	Table 15-6
One-way	OneWay	No	TEXT (2)	P	Table 4-2
Speed Limit	SpeedLimit	No	INTEGER	INT	Table 4-2
Validation Left	Valid_L	No	TEXT (1)	P	Table 4-2
Validation Right	Valid_R	No	TEXT (1)	P	Table 4-2
Geometry	GEOMETRY	Yes	GEOMETRY	LINE	Table 4-2

15.3 Site/Structure Address Point

Table 15-2 Site/Structure Address Point (AdPt) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Site/Structure Address Point ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-3
Effective Date	Effective	No	DATETIME		Table 4-3
Expiration Date	Expire	No	DATETIME		Table 4-3
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-3
Complete Street Name ID	CompleteStNam_ID	Yes	INTEGER	FK	Table 15-9
Complete Address Number ID	CompleteAdNum_ID	Conditional	INTEGER	FK	Table 15-16
Street Segment ID	StSeg_ID	No	INTEGER	FK	Table 15-1
A1 to A5 Code ID	A1toA5Code_ID	Yes	INTEGER	FK	Table 15-30
Complete Legacy Street Name ID	CompleteLStNam_ID	Conditional	INTEGER	FK	Table 15-12
ESN	ESN	Conditional	TEXT (5)	P	Table 4-3
MSAG Community Name ID	MSAGComm_ID	Conditional	INTEGER	FK	Table 15-23
Legacy County ID	LCounty_ID	Conditional	INTEGER	FK	Table 15-24
Postal Community Name ID	Post_Comm_ID	No	INTEGER	FK	Table 15-22
Postal Code ID	Post_Code_ID	No	INTEGER	FK	Table 15-21
Postal Code Extension	PostCodeEx	Conditional	TEXT (4)	P	Table 4-3
Site ID	Site_ID	No	INTEGER	FK	Table 15-17
Subsite ID	SubSite_ID	No	INTEGER	FK	Table 15-18
Structure	Structure	No	TEXT (75)	P	Table 4-3
Floor ID	Floor_ID	No	INTEGER	FK	Table 15-19
Wing ID	Wing_ID	No	INTEGER	FK	Table 15-20
Unit	Unit	Conditional	TEXT (75)	P	Table 4-3
Unit Pre-Type	UnitPreTyp	Conditional	TEXT (75)	P	Table 4-3

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Unit Value	UnitValue	Conditional	TEXT (75)	P	Table 4-3
Section	Section	No	TEXT (75)	P	Table 4-3
Row	Row	No	TEXT (75)	P	Table 4-3
Room	Room	No	TEXT (75)	P	Table 4-3
Seat	Seat	No	TEXT (75)	P	Table 4-3
Additional Location Information	Addtl_Loc	No	TEXT (225)	P	Table 4-3
Location Marker	LocMarker	No	TEXT (100)	P	Table 4-3
Distance Marker	DisMarker	Conditional	TEXT (150)	P	Table 4-3
Place Type ID	Place_Type_ID	No	INTEGER	FK	Table 15-7
Placement Method ID	Placement_ID	No	INTEGER	FK	Table 15-8
Longitude	Longitude	No	REAL (11,7)		Table 4-3
Latitude	Latitude	No	REAL (10,7)		Table 4-3
Elevation	Elevation	No	REAL (9,3)		Table 4-3
Altitude	Altitude	No	REAL (9,3)		Table 4-3
Height	Height	No	REAL (9,3)		Table 4-3
Geometry	GEOMETRY	Yes	GEOMETRY	POINT	Table 4-3

15.4 Site Structure Address Polygon

Table 15-3 Site/Structure Address Polygon (AdPoly) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Site/Structure Address Point ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-4
Effective Date	Effective	No	DATETIME		Table 4-4
Expiration Date	Expire	No	DATETIME		Table 4-4

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-4
Complete Street Name ID	CompleteStNam_ID	Yes	INTEGER	FK	Table 15-9
Complete Address Number ID	CompleteAdNum_ID	Conditional	INTEGER	FK	Table 15-16
Street Segment ID	StSeg_ID	No	INTEGER	FK	Table 15-1
A1 to A5 Code ID	A1toA5Code_ID	Yes	INTEGER	FK	Table 15-30
Complete Legacy Street Name ID	CompleteLStNam_ID	Conditional	INTEGER	FK	Table 15-12
ESN	ESN	Conditional	TEXT (5)	P	Table 4-4
MSAG Community Name ID	MSAGComm_ID	Conditional	INTEGER	FK	Table 15-23
Legacy County ID	LCounty_ID	Conditional	INTEGER	FK	Table 15-24
Postal Community Name ID	Post_Comm_ID	No	INTEGER	FK	Table 15-22
Postal Code ID	Post_Code_ID	No	INTEGER	FK	Table 15-21
Postal Code Extension	PostCodeEx	Conditional	TEXT (4)	P	Table 4-4
Site ID	Site_ID	No	INTEGER	FK	Table 15-17
Subsite ID	SubSite_ID	No	INTEGER	FK	Table 15-18
Structure	Structure	No	TEXT (75)	P	Table 4-4
Floor ID	Floor_ID	No	INTEGER	FK	Table 15-19
Wing ID	Wing_ID	No	INTEGER	FK	Table 15-20
Unit	Unit	Conditional	TEXT (75)	P	Table 4-4
Unit Pre-Type	UnitPreTyp	Conditional	TEXT (75)	P	Table 4-4
Unit Value	UnitValue	Conditional	TEXT (75)	P	Table 4-4
Section	Section	No	TEXT (75)	P	Table 4-4
Row	Row	No	TEXT (75)	P	Table 4-4
Room	Room	No	TEXT (75)	P	Table 4-4
Seat	Seat	No	TEXT (75)	P	Table 4-4
Additional Location Information	Addtl_Loc	No	TEXT (225)	P	Table 4-4
Location Marker	LocMarker	No	TEXT (100)	P	Table 4-4

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Distance Marker	DisMarker	Conditional	TEXT (150)	P	Table 4-4
Place Type ID	Place_Type_ID	No	INTEGER	FK	Table 15-7
Placement Method ID	Placement_ID	No	INTEGER	FK	Table 15-8
Longitude	Longitude	No	REAL (11,7)		Table 4-4
Latitude	Latitude	No	REAL (10,7)		Table 4-4
Elevation	Elevation	No	REAL (9,3)		Table 4-4
Altitude	Altitude	No	REAL (9,3)		Table 4-4
Height	Height	No	REAL (9,3)		Table 4-4
Geometry	GEOMETRY	Yes	GEOMETRY	POINT	Table 4-4

15.5 Alias

Table 15-4 Alias (Alias) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Alias ID	ID	Yes	INTEGER	PK	
Alias Set ID	AliasSet_ID	Yes	INTEGER	FK	Table 15-5
Complete Street Name ID	CompleteStNam_ID	Yes	INTEGER	FK	Table 15-9

15.6 Alias Set

Table 15-5 Alias Set (AliasSet) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Alias Set ID	ID	Yes	INTEGER	PK	

15.7 Road Class

Table 15-6 Road Class (RdClass) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Road Class ID	ID	Yes	INTEGER	PK	
Road Class	RoadClass	Yes	TEXT (24)	P	Table 4-2

15.8 Place Type

Table 15-7 Place Type (PlaceTyp) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Place Type ID	ID	Yes	INTEGER	PK	
Place Type	Place_Type	Yes	TEXT (50)	P	Table 4-3 and Table 4-4

15.9 Placement Method

Table 15-8 Placement Method (PlacementMethod) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Placement Method ID	ID	Yes	INTEGER	PK	
Placement Method	Placement	Yes	TEXT (50)	P	Table 4-3 and Table 4-4

15.10 Complete Street Name

Table 15-9 Complete Street Name (CompleteStNam) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Complete Street Name ID	ID	Yes	INTEGER	PK	
Street Name Pre Modifier	St_PreMod	Conditional	TEXT (25)	P	
Street Name Pre Directional	St_PreDir	Conditional	TEXT (10)	P	Table 4-2, Table 4-4, Table 4-5

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Street Name Pre Type ID	St_PreTyp_ID	Conditional	INTEGER	FK	Table 15-10
Street Name Pre Type Separator ID	St_PreSep_ID	Conditional	INTEGER	FK	Table 15-11
Street Name	St_Nam	Yes	TEXT (254)	P	Table 4-2, Table 4-3, Table 4-4
Street Name Post Type ID	St_PosTyp_ID	Conditional	INTEGER	FK	Table 15-10
Street Name Post Directional	St_PosDir	Conditional	TEXT (10)	P	Table 4-2, Table 4-3, Table 4-4
Street Name Post Modifier	St_PosMod	Conditional	TEXT (25)	P	Table 4-2, Table 4-3, Table 4-4

15.11 Street Name Type

Table 15-10 Street Name Type (StNamTyp) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Street Name Type ID	ID	Yes	INTEGER	PK	
Street Name Type Value	StNameTyp	Yes	TEXT (50)	P	Table 4-2, Table 4-3, Table 4-4

15.12 Street Name Type Separator

Table 15-11 Street Name Type Separator (StNamTypSep) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Street Name Type Separator ID	ID	Yes	INTEGER	PK	
Street Name Type Separator Value	StNameTypSep	Yes	TEXT (20)	P	Table 4-2, Table 4-3, Table 4-4

15.13 Complete Legacy Street Name

Table 15-12 Complete Legacy Street Name (CompleteLStNam) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Complete Legacy Street Name ID	ID	Yes	INTEGER	PK	
Legacy Street Name Pre Directional ID	LSt_PreDir_ID	Conditional	INTEGER	FK	Table 15-13
Legacy Street Name	LSt_Nam	Conditional	TEXT (75)	P	Table 4-2, Table 4-3, Table 4-4
Legacy Street Name Type ID	LSt_Typ_ID	Conditional	INTEGER	FK	Table 15-15
Legacy Street Name Post Directional ID	LSt_PosDir_ID	Conditional	INTEGER	FK	Table 15-14

15.14 Legacy Street Name Pre Directional

Table 15-13 Legacy Street Name Pre Directional (LSt_PreDir) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Legacy Street Name Pre Directional ID	ID	Yes	INTEGER	PK	
Legacy Street Name Pre Directional	LSt_PreDir	Yes	TEXT (2)	P	Table 4-2, Table 4-3, Table 4-4

15.15 Legacy Street Name Post Directional

Table 15-14 Legacy Street Name Post Directional (LSt_PosDir) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Legacy Street Name Post Directional ID	ID	Yes	INTEGER	PK	
Legacy Street Name Post Directional	LSt_PostDir	Yes	TEXT (2)	P	Table 4-2, Table 4-3, Table 4-4

15.16 Legacy Street Name Type

Table 15-15 Legacy Street Name Type (LSt_Typ) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Legacy Street Name Type ID	ID	Yes	INTEGER	PK	
Legacy Street Name Type	LSt_Typ	Yes	TEXT (4)	P	Table 4-2, Table 4-3, Table 4-4

15.17 Complete Address Number

Table 15-16 Complete Address Number (CompleteAdNum) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Complete Address Number ID	ID	Yes	INTEGER	PK	
Address Number Prefix	AddNum_Pre	Conditional	TEXT (15)	P	Table 4-3 and Table 4-4
Address Number	Add_Number	Conditional	INTEGER	INT	Table 4-3 and Table 4-4
Adress Number Suffix	AddNum_Suf	Conditional	TEXT (15)	P	Table 4-3 and Table 4-4
Address Number Complete	AddNum_Cmp	Conditional	TEXT (42)	P	Table 4-3 and Table 4-4

15.18 Site

Table 15-17 Site (Site) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Site ID	ID	Yes	INTEGER	PK	
Site Name	Site	Yes	TEXT (254)	P	Table 4-3 and Table 4-4

15.19 Subsite

Table 15-18 Subsite (Subsite) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Subsite ID	ID	Yes	INTEGER	PK	
Site Name	Site	Yes	TEXT (254)	P	Table 4-3 and Table 4-4

15.20 Floor

Table 15-19 Floor (Floor) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Floor ID	ID	Yes	INTEGER	PK	
Floor Label	Floor	No	TEXT (75)	P	Table 4-3 and Table 4-4
Floor Index	FloorIndex	No	INTEGER	INT	Table 4-3 and Table 4-4

15.21 Wing

Table 15-20 Wing (Wing) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Wing ID	ID	Yes	INTEGER	PK	
Wing	Wing	No	TEXT (75)	P	Table 4-3 and Table 4-4

15.22 Postal Code

Table 15-21 Postal Code (PostalCode) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Postal Code ID	ID	Yes	INTEGER	PK	
Postal Code	PC	Yes	TEXT (7)	P	Table 4-2, Table 4-3, Table 4-4

15.23 Postal Community

Table 15-22 Postal Community Name (PostalCommunity) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Postal Community ID	ID	Yes	INTEGER	PK	
Postal Community Name	PostalComm	Yes	TEXT (25)	P	Table 4-2, Table 4-3, Table 4-4

15.24 MSAG Community Name

Table 15-23 MSAG Community Name (MSAGCommunity) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
MSAG Community ID	ID	Yes	INTEGER	PK	
MSAG Community Name	MSAGComm	Yes	TEXT (25)	P	Table 4-2, Table 4-3, Table 4-4

15.25 Legacy County

Table 15-24 Legacy County (LCounty) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Legacy County ID (Primary Key)	ID	Yes	INTEGER	PK	
Legacy County ID	LCountyID	Yes	TEXT (5)	P	Table 4-2, Table 4-3, Table 4-4

15.26 A1 Boundary

Table 15-25 A1 Boundary (A1Boundary) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
A1 Boundary ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-7
Effective Date	Effective	No	DATETIME		Table 4-7
Expiration Date	Expire	No	DATETIME		Table 4-7
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-7
Country	Country	Yes	TEXT (2)	P	Table 4-7
Administrative Level 1	A1	Yes	TEXT (2)	P	Table 4-7
Geometry	GEOMETRY	No	GEOMETRY	POLYGON	Table 4-7

15.27 A2 Boundary

Table 15-26 A2 Boundary (A2Boundary) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
A2 Boundary ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-8
Effective Date	Effective	No	DATETIME		Table 4-8
Expiration Date	Expire	No	DATETIME		Table 4-8
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-8
A1 Boundary ID	A1Boundary_ID	Yes	INTEGER	FK	Table 15-25
Administrative Level 2	A2	Yes	TEXT (254)	P	Table 4-8
Additional Code	AddCode	Conditional	TEXT (6)	P	Table 4-8
Geometry	GEOMETRY	No	GEOMETRY	POLYGON	Table 4-8

15.28 A3 Boundary

Table 15-27 A3 Boundary (A3Boundary) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
A3 Boundary ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-9
Effective Date	Effective	No	DATETIME		Table 4-9
Expiration Date	Expire	No	DATETIME		Table 4-9
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-9
A1 Boundary ID	A1Boundary_ID	Yes	INTEGER	FK	Table 15-25
A2 Boundary ID	A2Boundary_ID	Conditional	INTEGER	FK	Table 15-26
Additional Code	AddCode	Conditional	TEXT (6)	P	Table 4-9
Administrative Level 3	A3	Yes	TEXT (254)	P	Table 4-9
Geometry	GEOMETRY	No	GEOMETRY	POLYGON	Table 4-9

15.29 A4 Boundary

Table 15-28 A4 Boundary (A4Boundary) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
A4 Boundary ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-10
Effective Date	Effective	No	DATETIME		Table 4-10
Expiration Date	Expire	No	DATETIME		Table 4-10
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-10
A1 Boundary ID	A1Boundary_ID	Yes	INTEGER	FK	Table 15-25
A2 Boundary ID	A2Boundary_ID	Conditional	INTEGER	FK	Table 15-26
A3 Boundary ID	A3Boundary_ID	Conditional	INTEGER	FK	Table 15-27

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Additional Code	AddCode	Conditional	TEXT (6)	P	Table 4-10
Administrative Level 4	A4	Yes	TEXT (254)	P	Table 4-10
Geometry	GEOMETRY	No	GEOMETRY	POLYGON	Table 4-10

15.30 A5 Boundary

Table 15-29 A5 Boundary (A5Boundary) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
A5 Boundary ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-11
Effective Date	Effective	No	DATETIME		Table 4-11
Expiration Date	Expire	No	DATETIME		Table 4-11
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-11
A1 Boundary ID	A1Boundary_ID	Yes	INTEGER	FK	Table 15-25
A2 Boundary ID	A2Boundary_ID	Conditional	INTEGER	FK	Table 15-26
A3 Boundary ID	A3Boundary_ID	Conditional	INTEGER	FK	Table 15-27
A4 Boundary ID	A4Boundary_ID	Conditional	INTEGER	FK	Table 15-28
Administrative Level 5	A5	Yes	TEXT (254)	P	Table 4-11
Geometry	GEOMETRY	No	GEOMETRY	POLYGON	Table 4-11

15.31 A1 through A5 Code

Table 15-30 A1 Through A5 Code (A1toA5Code) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
A1 to A5 Code ID	ID	Yes	INTEGER	PK	
A1 Boundary ID	A1Boundary_ID	Yes	INTEGER	FK	Table 15-25

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
A2 Boundary ID	A2Boundary_ID	Conditional	INTEGER	FK	Table 15-26
A3 Boundary ID	A3Boundary_ID	Conditional	INTEGER	FK	Table 15-27
A4 Boundary ID	A4Boundary_ID	Conditional	INTEGER	FK	Table 15-28
A5 Boundary ID	A5Boundary_ID	Conditional	INTEGER	FK	Table 15-29

15.32 Service Boundary

Table 15-31 Service Boundary (ServiceBoundary) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Service Boundary ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-5
Effective Date	Effective	No	DATETIME		Table 4-5
Expiration Date	Expire	No	DATETIME		Table 4-5
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-5
Agency Identifier	Agency_ID	Yes	TEXT (100)	P	Table 4-5
Service URI	ServiceURI	Yes	TEXT (254)	U	Table 4-5
Service URN ID	ServiceURN_ID	Yes	INTEGER	FK	Table 15-32
Service Number	ServiceNum	No	TEXT (15)	P	Table 4-5
Agency vCard URI	AVcard_URI	Yes	TEXT (254)	U	Table 4-5
Display Name	DsplayNam	Yes	TEXT (60)	P	Table 4-5
Geometry	GEOMETRY	Yes	GEOMETRY	POLYGON	Table 4-5

15.33 Service URN

Table 15-32 Service URN (ServiceURN) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Service URN ID	ID	Yes	INTEGER	PK	
Service URN	ServiceURN	Yes	TEXT (100)	P	Table 4-5

15.34 Provisioning Boundary

Table 15-33 Provisioning Boundary (ProvBoundary) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Provisioning Boundary ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-6
Effective Date	Effective	No	DATETIME		Table 4-6
Expiration Date	Expire	No	DATETIME		Table 4-6
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-6
Geometry	GEOMETRY	Yes	GEOMETRY	POLYGON	Table 4-6

15.35 Railroad Centerline

Table 15-34 Railroad Centerline (RailroadCenterLine) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Railroad Centerline ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-12
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-12
Rail Line Owner ID	RLOwn_ID	Conditional	INTEGER	FK	Table 15-35
Rail Line Operator ID	RLOp_ID	Conditional	INTEGER	FK	Table 15-36

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Rail Line Name ID	RLName_ID	No	INTEGER	FK	Table 15-37
Rail Mile Post Low	RMPL	No	REAL (7,3)		Table 4-12
Rail Mile Post High	RMPH	No	REAL (7,3)		Table 4-12
Geometry	GEOMETRY	Yes	GEOMETRY	LINE	Table 4-12

15.36 Rail Line Owner

Table 15-35 Rail Line Owner (RLOwn) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Rail Line Owner ID	ID	Yes	INTEGER	PK	
Rail Line Owner	RLOwn	Yes	TEXT (100)	P	Table 4-12

15.37 Rail Line Operator

Table 15-36 Rail Line Operator (RLOp) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Rail Line Operator ID	ID	Yes	INTEGER	PK	
Rail Line Operator	RLOp	Yes	TEXT (100)	P	Table 4-12

15.38 Rail Line Name

Table 15-37 Rail Line Name (RLNam) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Rail Line Name ID	ID	Yes	INTEGER	PK	
Rail Line Name	RLName	Yes	TEXT (100)	P	Table 4-12

15.39 Hydrology Lines

Table 15-38 Hydrology Line (HydrologyLine) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Hydrology Line ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-13
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-13
Hydrology Segment Type ID	HS_Type_ID	No	INTEGER	FK	Table 15-40
Hydrology Segment Name ID	HS_Name_ID	No	INTEGER	FK	Table 15-41
Geometry	GEOMETRY	Yes	GEOMETRY	LINE	Table 4-13

15.40 Hydrology Polygons

Table 15-39 Hydrology Polygons (HydrologyPolygon) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Hydrology Polygon ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-14
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-14
Hydrology Polygon Type ID	HP_Type_ID	No	INTEGER	FK	Table 15-42
Hydrology Polygon Name ID	HP_Name_ID	No	INTEGER	FK	Table 15-43
Geometry	GEOMETRY	Yes	GEOMETRY	POLY	Table 4-14

15.41 Hydrology Segment Type

Table 15-40 Hydrology Segment Type (HydrologySegTyp) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Hydrology Segment Type ID	ID	Yes	INTEGER	PK	
Hydrology Segment Type Name	HS_Type	Yes	TEXT (100)	P	Table 4-13

15.42 Hydrology Segment Name

Table 15-41 Hydrology Segment Name (HydrologySegNam) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Hydrology Segment Name ID	ID	Yes	INTEGER	PK	
Hydrology Segment Name	HS_Name	Yes	TEXT (100)	P	Table 4-13

15.43 Hydrology Polygon Type

Table 15-42 Hydrology Polygon Type (HydrologyPolyTyp) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Hydrology Polygon Type ID	ID	Yes	INTEGER	PK	
Hydrology Polygon Type Name	HP_Type	Yes	TEXT (100)	P	Table 4-14

15.44 Hydrology Polygon Name

Table 15-43 Hydrology Polygon Name (HydrologyPolyNam) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Hydrology Polygon Name ID	ID	Yes	INTEGER	PK	
Hydrology Polygon Name	HS_Name	Yes	TEXT (100)	P	Table 4-14

15.45 Distance Marker

Table 15-44 Distance Marker (DistanceMarker) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Distance Marker ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-15
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-15
Distance Marker Unit of Measurement	DM_Unit	Yes	INTEGER	FK	Table 15-47
Distance Marker Measurement Value	Value	Yes	REAL (9,3)		Table 4-15
Distance Marker Route ID	DM_Route_ID	Yes	INTEGER	FK	Table 15-46
Distance Marker Route Type ID	DM_Type_ID	-No	INTEGER	FK	Table 15-49
Distance Marker Indicator	DM_Ind	Yes	TEXT (1)	P	Table 4-15
Distance Marker Label	DM_Label	Conditional	TEXT (100)	P	Table 4-15
Geometry	GEOMETRY	Yes	GEOMETRY	POINT	Table 4-15

15.46 Location Marker

Table 15-45 Location Marker (LocationMarker) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Location Marker ID	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAg_ID	Yes	INTEGER	FK	Table 15-50
Date Updated	DateUpdate	Yes	DATETIME		Table 4-16
NENA Globally Unique ID	NGUID	Yes	TEXT (254)	P	Table 4-16
Location Marker Label	LM_Label	Yes	TEXT (100)	P	Table 4-16
Location Marker Type ID	LM_Type_ID	No	INTEGER	FK	Table 15-48
Location Marker Indicator	LM_Ind	Yes	TEXT (1)	P	Table 4-16
Geometry	GEOMETRY	Yes	GEOMETRY	POINT	Table 4-16

15.47 Distance Marker Route

Table 15-46 Distance Marker Route (DM_Route) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Distance Marker Route ID	ID	Yes	INTEGER	PK	
Distance Marker Route Name	DM_Rte	Yes	TEXT (50)	P	Table 4-15

15.48 Distance Marker Unit of Measure

Table 15-47 Distance Marker Unit of Measure (DM_Unit) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Distance Marker Unit of Measure ID	ID	Yes	INTEGER	PK	
Distance Marker Unit of Measure	DM_Unit	Yes	TEXT (15)	P	Table 4-15

15.49 Location Marker Type

Table 15-48 Location Marker Type (MarkerTyp) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Location Marker Type ID	ID	Yes	INTEGER	PK	
Location Marker Type	LM_Type	Yes	TEXT (50)	P	Table 4-16

15.50 Distance Marker Route Type

Table 15-49 Distance Marker Route Type (RouteTyp) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Distance Marker Route Type ID	ID	Yes	INTEGER	PK	
Distance Marker Route Type	DM_Type	Yes	TEXT (50)	P	Table 4-15

15.51 Discrepancy Agency

Table 15-50 Discrepancy Agency (DiscrpAg) Table

Descriptive Name	Field Name	Required	Type	Subtype	Crosswalk
Discrepancy Agency ID (Primary Key)	ID	Yes	INTEGER	PK	
Discrepancy Agency ID	DiscrpAgID	Yes	TEXT (100)	P	All flat file layer tables

16 Appendix F—Structural Changes by Version

This appendix lists data structure changes made during each version of this document. See Section 4 GIS Data Model Layers for the complete structure of each GIS data layer.

Document	Structural Changes
STA-006.2	• Redefined "P" field type and changed all "E" field type values to "P" field type in all layers. • Changed Discrepancy Agency ID field width from 75 to 100 in all layers. • Changed Street Name field width from 60 to 254 in the RoadCenterLine layer and the SiteStructureAddressPoint layer. • Changed Alias Street Name field width from 60 to 254 in StreetNameAliasTable. • Changed field name for Longitude from "Long" to "Longitude" in the SiteStructureAddressPoint layer and CellSectorPoint layer. • Changed field name for Latitude from "Lat" to "Latitude" in the SiteStructureAddressPoint layer and CellSectorPoint layer. • Changed field name for Elevation from "Elev" to "Elevation" in SiteStructureAddressPoint layer. • Changed County Left and County Right field width from 40 to 100 in the RoadCenterLine layer. • Changed County field width from 40 to 100 in the SiteStructureAddressPoint layer, the A2-A5 Administrative Unit layers, and the CellSectorPoint layer. • Changed field name for primary key NGUIDs to just "NGUID" (i.e., removed "RCL" from RCL_NGUID) in all layers. • Changed field name for Site NENA Globally Unique ID (Foreign Key) from "Site_NGUID" to "SSAP_NGUID" in the LandmarkNamePartTable, the LandmarkNameCompleteAliasTable, and the CellSectorPoint layer. • Changed field name for Complete Landmark Name Alias NENA Globally Unique ID (Foreign Key) from "ACLMNNGUID" to "CLNA_NGUID" in the LandmarkNamePartTable. • Changed field name for Legacy Street Name Type from "LSt_Type" to "LSt_Typ" in the RoadCenterLine layer and the SiteStructureAddressPoint layer. • Changed descriptive name "ZIP Plus 4" to "Postal Code Extension" and changed associated field name "Post_Code4" to "PostCodeEx" in the SiteStructureAddressPoint layer. • Changed descriptive name "Mile Post" to "Milepost" and changed associated field name "Mile_Post" to "Milepost" in the SiteStructureAddressPoint layer.

Document	Structural Changes
	• Changed field name for Rail Line Name from "RLNameE" to "RLName" in the RailroadCenterLine layer. • Changed "State" field to Not Required in all service boundary layers. • Added "Country" field as a Not Required field to all service boundary layers. • Added "Incorporated Municipality" field as a Required field to the A4Polygon layer. • Removed Alias Legacy Street Name Pre Directional field, Alias Legacy Street Name field, Alias Legacy Street Name Type field, and Alias Legacy Street Name Post Directional field from the StreetNameAliasTable. • Made many changes to the descriptive names, the field names, and the M/C/O categorization in the LocationMarkerPoint layer (previously named Mile Marker Location). Also added the Location Marker Label field as a Conditional field.

STA-006.3	• Created the SiteStructureAddressPolygon layer.
	• Created the Site/Structure Address Polygon Extent Method registry.
	• Created the DistanceMarkerPoint layer.
	• Removed the StreetNameAliasTable.
	• Removed the CellSectorPoint layer.
	• Removed the LandmarkNamePartTable.
	• Removed the LandmarkNameCompleteAliasTable.
	• Redefined "Type" column that indicates the data type of the attribute columns in all layers.
	  ○ TEXT(Length) field type replaces field types P and U.
	  ○ DATETIME field type replaces field type D.
	  ○ INTEGER field type replaces field type N.
	  ○ REAL (Precision, Scale) field type replaces field type F.
	• Administrative Levels (A1-A5) changes
	  ○ Changed descriptive names and field names for State, County, Incorporated Municipality, Unincorporated Municipality, and Neighborhood Community in all layers.
	  ○ Increased field length for all A2-A5 fields in all layers.
	  ○ Added Additional Code field in A2Polygon layer.
	  ○ Removed Additional Code field in A5Polygon layer.
	• RoadCenterLine layer changes
	  ○ Changed descriptive name of "Left FROM Address" to "Left FROM Address Number".
	  ○ Changed descriptive name of "Right FROM Address" to "Right FROM Address Number".

Document	Structural Changes
	○ Changed descriptive name of "Left TO Address" to "Left TO Address Number". ○ Changed descriptive name of "Right TO Address " to "Right TO Address Number". ○ Added Direction of Travel field. ○ Added Legacy County ID Left field. ○ Added Legacy County ID Right field. ○ Increased field length of Street Name Pre Modifier field. • SiteStructureAddressPoint layer changes ○ Added Address Number Complete field. ○ Added Altitude field. ○ Added Distance Marker field. ○ Added Direction of Travel field. ○ Added Floor Index field. ○ Added Height field. ○ Added Legacy County ID field. ○ Added Location Marker field. ○ Added Row field. ○ Added Section field. ○ Added Site field. ○ Added SubSite field. ○ Added Unit Pre Type field. ○ Added Unit Value field. ○ Added Wing field. ○ Removed the Complete Landmark Name field. ○ Changed descriptive name and field name of Building to Structure. ○ Changed descriptive name of Floor to Floor Label. ○ Increased field length of Street Name Pre Modifier field. ○ Changed type for Latitude field. ○ Changed type for Longitude field. • Service Boundary layers changes ○ Increased the field length of Service URN field. ○ Removed the Country field. ○ Removed the State or Equivalent field. • RailroadCenterLine layer ○ Changed type for Rail Mile Post Low field. ○ Changed type for Rail Mile Post High field. • LocationMarkerPoint layer changes ○ Increased the field length of Location Marker Type field.

Document	Structural Changes
	○ Removed the Location Marker Unit of Measurement field. ○ Removed the Location Marker Measurement Value field. ○ Removed the Location Marker Route Name field. • Domain values have been removed for the following fields: ○ Additional Code ○ Additional Code Left ○ Additional Code Right ○ Additional Data URI ○ Address Number ○ Administrative Level 3 ○ Administrative Level 3 Left ○ Administrative Level 3 Right ○ Date Updated ○ Effective Date ○ Expiration Date ○ Left FROM Address Number ○ Left TO Address Number ○ Right FROM Address Number ○ Right TO Address Number • Domain values have been changed for the following fields: ○ Administrative Level 1 ○ Administrative Level 1 Left ○ Administrative Level 1 Right ○ Administrative Level 2 ○ Administrative Level 2 Left ○ Administrative Level 2 Right ○ Elevation ○ Latitude ○ Location Marker Indicator ○ Longitude ○ Place Type ○ Placement Method ○ Postal Code ○ Postal Code Left ○ Posta Code Right ○ Postal Community Name ○ Postal Community Name Left ○ Postal Community Name Right ○ Rail Mile Post High ○ Rail Mile Post Low

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