

NENA

Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF-US) Standard

Abstract: This CLDXF-US Standard defines the United States profile of the Internet Engineering Task Force (IETF) Presence Information Data Format-Location Object (PIDF-LO) to provide a format for exchange of civic location records.



NENA Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF-US) Standard

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1 Executive Overview

This document defines a standard format for the exchange of United States civic location data in Next Generation 9-1-1 (NG9-1-1) systems. Civic locations are specified using a combination of place names, thoroughfare address components and named location identifiers.

This document is one of a suite of NENA documents relating to the content, structure, and use of location data. The NG9-1-1 GIS Data Model, NENA-STA-006.2a-2022 [2], lists required and recommended Geographic Information System (GIS) data layers for location databases which support NG9-1-1. Any NG9-1-1 location database in the US, by design, must be compatible with the CLDXF-US exchange format. Still other NENA documents describe the use, maintenance, and validation of location data. The NENA Standards for the Provisioning and Maintenance of GIS data to ECRFs and LVFs, NENA-STA-005.1-2017 [3], describes operational processes for maintaining location data. The NENA i3 Standard for Next Generation 9-1-1, NENA-STA-010.3-2021 [4], specifies the structure and design of software services, databases, Functional Elements, and interfaces which use location and other data to process NG9-1-1 emergency calls. A complete listing of all NENA standards and reference documents is to be found on the NENA website at <https://www.nena.org/page/Standards>.

In the context of NG9-1-1, location data are crucial – they are the means by which the NG9-1-1 system routes calls to the proper Public Safety Answer Point (PSAP), and how PSAPs determine where to send the response. In contrast to geodetic coordinates, which uniformly specify location using latitude and longitude, civic location descriptions are inherently diverse; as noted above, they can include different kinds of place names, thoroughfare addresses, and/or interior or exterior locations identified by name. The goal, however, is the same: to identify any given location clearly, consistently, and precisely. Standardization is achieved by breaking civic location descriptions into their component parts or "elements." This document defines and describes the data elements permitted in a CLDXF-US record. Emergency response stakeholders should adopt this and related NENA standards to ensure the consistency and interoperability of their data in NG9-1-1 systems.

The specific goals of this document are:

- Provide a definitive set of civic location data elements for data exchange in support of emergency response (Section 3).
- Provide a United States-specific implementation, or profile, of the Presence Information Data Format-Location Object (PIDF-LO) [5], which is an international standard for location data exchange as defined in Internet Engineering Task Force (IETF) RFCs 4119 [6], 5139 [7], 4776 [8], and 5491 [9].

A companion reference document, Moving Data between Datasets Compliant with Federal Geographic Data Committee (FGDC) Address and NENA CLDXF-US Standards, DRAFT NENA-REF-007.1-202Y [10], provides a detailed discussion of the correspondence between CLDXF-US and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard, FGDC-STD-016-2011 [10]. The FGDC standard covers address data content, address reference systems, address classes, address data quality tests, and address data exchange.

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2 Document Conventions

NENA: The 9-1-1 Association improves 9-1-1 through research, standards development, training, education, outreach, and advocacy. Our vision is a public made safer and more secure through universally-available state-of-the-art 9-1-1 systems and better-trained 9-1-1 professionals. Learn more at <https://www.nena.org>.

2.1 Document Terminology

This section defines keywords, as they should be interpreted in NENA documents. The form of emphasis (UPPER CASE) shall be consistent and exclusive throughout the document. Any of these words used in lower case and not emphasized do not have special significance beyond normal usage.

1. **MUST, SHALL, REQUIRED:** These terms mean that the definition is a normative (absolute) requirement of the specification.
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 [12].

2.2 Describing Interfaces for XML and JSON Objects

This document defines one or more interfaces, often called "Application Programming Interfaces" (APIs) that provide a standardized way to communicate with a Functional Element. The interface consists of data objects and the operations that apply to those data

objects. In this document, the operations and data objects are documented as a formal definition of an interface or schema and a set of "business rules" which are also required in the software or database environment to comply with the standard and achieve interoperability. The business rules are specified with normative statements using keywords that are defined in the Document Terminology section above.

Describing Interfaces using XML Objects

This document uses "XML Schemas" [13] as the formal description of the objects. This description is manifested in a file ("XSD") that is not contained directly in this document. The file is maintained in a NENA GitHub repository. In the interface description, a hyperlink to the XSD file is provided. The XSD file is the normative description of the objects and was reviewed with the text of this document.

The document contains descriptions in text or tabular form of the XML data objects exchanged by the interface. This information is informative: the XSD file is the normative documentation of the objects. If there is a discrepancy between the information and the XSD file, the XSD controls. In the tables or description, a data element may be labeled "Required". Three values may be assigned. A "y" means the parameter or member is required to be present. The "minOccurs" property will be present and have a value ">0". An "n" means that the parameter or member is optional. The "minOccurs" property will be present and have a value of "0". The "c" means that the parameter or member is conditional. This value alerts the reader that a business rule is specified that controls the presence of the parameter or member. The "minOccurs" property will be present and have a value of "0".

2.3 NENA Intellectual Property Rights (IPR) and Antitrust Policy

NOTE – The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, NENA takes no position with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from NENA by contacting the Committee Resource Manager identified on NENA's website at <https://www.nena.org/ipr>.

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2.4 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-004.1.1-2014	March 23, 2014	Initial Document
NENA-STA-004.2-2024	February 25, 2024	<p>NENA-STA-004.1.1-2014 (CLDXF v1) was revised to group both landmark and subaddress elements into a single "Named Location" collection of elements (Section 3.4, with listing and summary definitions in Section 3.4.1) The CLDXF v1 Landmark Name Part and Complete Landmark Name elements were subsumed into the Site, SubSite, and Structure elements. This reorganization eliminates the complexity of managing the relationship between Complete Landmark Names and Landmark Name Parts. Building identifiers which would have been placed in the CLDXF v1 Building element are also stored in the Structure element, so there is no longer any designated "landmark" or "subaddress" status for building features in the standard. This avoids any potential inconsistencies in classification. The new Structure element includes non-building structures like cell towers, tanks and so on, thus eliminating another potential inconsistency; it still implements the PIDF-LO BLD element.</p> <p>This revision also adds new sub-structure elements: Wing, Section, and Row. These</p>

Document Number	Approval Date	Reason For Issue/Reissue
		<p>allow for greater precision in the identification of interior locations, including locations within large, open spaces like stadiums, warehouses, and factories. These elements can be particularly helpful in disambiguating locations with non-unique identifiers, within sites or structures.</p> <p>In revisions to other v1 content, Direction of Travel was added to the street name elements to standardize values relating to travel on divided roadways. A new optional element, Address Number Complete, was added to the address number elements to deal with issues parsing unusual formatting. Also, the name of the Milepost element was changed to Distance Marker to accommodate metric systems and align with other workgroups.</p> <p>Additionally, the CLDXF v1 Unit element is now parsed into Unit PreType and Unit Value to better support standardization and validation of unit identifiers. The Postal Code Extension element is added to handle ZIP+4® values consistent with other NENA standards. Finally, the Location Marker element is added for small infrastructure components such as call boxes and alarms.</p> <p>Below is a list of elements (and PIDF-LO equivalents) added, updated, or dropped as discussed above:</p> <ul style="list-style-type: none"> • <i>Complete Landmark Name/LMK</i> (Section 3.5.2 in CLDXF v1) is removed • <i>Landmark Name Part/LMKP</i> (Section 3.5.3 in CLDXF v1) is removed



Document Number	Approval Date	Reason For Issue/Reissue
		<ul style="list-style-type: none"> • <i>Site/SITE</i> is added (Section 3.4.2) • <i>SubSite/SUBSITE</i> is added (Section 3.4.3) • <i>Building/BLD</i> (Section 3.6.2 in CLDXF v1) is updated to <i>Structure/BLD</i> (Section 3.4.4) • <i>Wing/WING</i> is added (Section 3.4.5) • <i>Unit/UNIT</i> (Section 3.6.5 in CLDXF v1) is removed • <i>Unit PreType/UNIT_PRETYPE</i> (Section 3.4.8) and <i>Unit Value/UNIT_VALUE</i> (Section 3.4.9) are added • <i>Section/SECTION</i> is added (Section 3.4.11) • <i>Row/ROW</i> is added (Section 3.4.12) • <i>Postal Code Extension/PCE</i> is added (Section 3.1.10) • <i>Location Marker/PN</i> is added (Section 3.4.14) • <i>Milepost/MP</i> is changed to <i>Distance Marker/MP</i> (Section 3.3.6) • <i>Address Number Complete/HNC</i> is added (Section 3.3.5) • <i>Direction of Travel/DT</i> is added (Section 3.2.10) <p>Additional revisions to Sections 5-7 reflect the changes described above along with additional examples of parsing location records added to Appendix A – Examples of Address Parsing.</p> <p>Appendix A in CLDXF v1, detailing the correspondences between the FGDC address standard and CLDXF v1, was replaced by a separate REF document, National Emergency Number Association. <i>Moving Data between Datasets Compliant with FGDC Address and NENA CLDXF-US Standards</i>. NENA-REF-007.1-202Y.</p>



Document Number	Approval Date	Reason For Issue/Reissue
		Arlington, VA: NENA (forthcoming), to provide more detailed guidance on data exchange and to avoid dependencies within CLDXF-US on an external standard.

3 Civic Location Data Elements

As explained above, this document is the US profile of the PIDF-LO XML data structure defined in RFC 4119, updated by RFC 5139. The PIDF-LO data structure is defined in an XML schema that, among other items, includes an XML <sequence> of elements. The following sections describe the elements as used in the United States. This document also provides business rules for each element in a subsection entitled "Business Rules" that defines when the element may or may not appear in a PIDF-LO record that conforms to this document.

The default value for <minOccurs> and <maxOccurs> attributes for an XML <sequence> is "1"; if an attribute is not present, its default value is assumed. In the XML schema, each element in the XML <sequence> is specified with a <minOccurs=0> attribute, which makes them all optional, and does not provide a <maxOccurs> attribute, which means that the default value of "1" is assumed. The default value of "1" for <maxOccurs> prohibits any of them from being repeated, which means that each element can occur only once under one <civicAddress> complex element. The business rules listed for each element specify additional requirements or conditions for when the element may appear in a PIDF-LO record that conforms to CLDXF-US. This document does not modify the PIDF-LO schema, and all PIDF-LO records MUST conform to the schemas provided in the RFCs. However, PIDF-LO records conforming to this document MUST also conform to the business rule that no element may be repeated, and to all the requirements and conditions that are specified below in the element descriptions.

At the XML schema level, all element values in CLDXF-US are limited to "tokens" - strings that do not contain carriage returns, line feeds, or tab characters, with no leading or trailing spaces, and no internal sequences of two or more spaces. Within this document, two datatypes are additionally defined to further limit element values. The specification of the datatype in the description for each element constitutes an implicit Business Rule that the element MUST conform to that datatype. The datatypes are defined as follows:

- Printable Text – The set of UTF-8 characters that display 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.
- Non-negative integer – A whole number with the value of 0 or greater.

It should be noted that, like other Business Rules, the datatype constraints are applied at a different layer than XML processing. Once embedded in its XML element, a value becomes what the XML schema requires, which in practice means that if an element datatype is non-negative integer, the actual value will be a "token" resulting from the conversion of an integer to a string. All civic address element values in PIDF-LO are "tokens."

This document specifies a format for exchanging civic location information between systems – as such, it specifies data types for data in transit. Other data types may be used when the data is stored (i.e., at rest) however, any stored data that is promoted to a CLDXF-US PIDF-LO for exchange purposes MUST adhere to the format and data types specified in this document.

For convenience, Table 3-1 lists salient XML schemas available at their permanent, stable locations. Note that this list is not exhaustive and other XML schemas may need to be imported to an XML validator to validate fully a CLDXF-US PIDF-LO.

Table 3-1 Available XML Schemas for CLDXF-US Validation

Name	URL
pidf	No permanent location available at this time. Implementers have to create a local schema file off of the schema definition found in RFC 3863
pidf:common-schema	https://www.iana.org/assignments/xml-registry/schema/pidf/common-schema.xsd
pidf:data-model	https://www.iana.org/assignments/xml-registry/schema/pidf/data-model.xsd
pidf:geopriv10	https://www.iana.org/assignments/xml-registry/schema/pidf/geopriv10.xsd
pidf:geopriv10:basicPolicy	https://www.iana.org/assignments/xml-registry/schema/pidf/geopriv10/basicPolicy.xsd
pidf:geopriv10:civicAddr	https://www.iana.org/assignments/xml-registry/schema/pidf/geopriv10/civicAddr.xsd
pidf:geopriv10:civicAddr:ext	https://www.iana.org/assignments/xml-registry/schema/pidf/geopriv10/civicAddr/ext.xsd
EmergencyCallData:ProviderInfo	https://www.iana.org/assignments/xml-registry/schema/EmergencyCallData/ProviderInfo.xsd
vcard-4.0	https://www.iana.org/assignments/xml-registry/schema/vcard-4.0.xsd
nenacivicAddr	http://technet.nena.org/nrs/registry/urn-nena-xml-schema.xml
nenacivicAddr2	http://technet.nena.org/nrs/registry/urn-nena-xml-schema.xml

Section 3 defines and describes each CLDXF-US element. The elements are presented in five groups, each preceded by a brief explanatory note:

1. Country, State, and Other Place Name elements
2. Street Name elements
3. Address Number elements
4. Named Location elements

5. Address Descriptor

Each element description includes eight sections:

1. CLDXF-US name and PIDF-LO name – The name of the CLDXF-US element, followed, in parentheses, by a namespace-qualified XML element name. Prefixes defined below are used to represent the namespaces in these instances.
2. Definition – The definition or meaning of the element.
3. Definition source – The source of the definition ("New" indicates that the definition is original).
4. Examples – Illustrative examples of the element.
5. Data type – Whether the element is printable text or non-negative integer.
6. Domain of values – The range or set of values (if any) to which the element is restricted.
7. Business Rules – As explained above, all elements are optional in the interface definition; this section provides normative text that specifies any *additional* requirements or conditions for inclusion of the element beyond what is specified in the interface definition. As noted above, one default business rule applies throughout – that no element may be repeated.
8. Notes – Notes and comments giving additional explanation about the element.

CLDXF-US element names are formatted in italics and title case throughout this document (e.g., *Country*; *State*; *County*; *Incorporated Municipality*). PIDF-LO element names are upper or lower case according to their schema definition. When CLDXF-US element name words are used in their generic sense, normal font and capitalization are used.

CLDXF-US element values consist of UTF-8 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. All systems compliant with this standard that receive and store data MUST preserve case. Element values SHOULD be represented with mixed casing (i.e., 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 with the exception of *Country* and *State* elements which are represented by all capital letters as per ISO-3166-1 and USPS Pub 28. When performing comparisons of the content of fields containing alpha characters, case is not important (comparisons of values MUST be case-insensitive).

The following prefixes are defined for use in this document to represent the indicated namespace names. Note that actual PIDF-LO instances and other XML documents may declare whatever prefixes they wish in order to represent these namespace names.

- ca – urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr (RFC 5139)

- cae – urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr:ext (RFC 6848)
- cdx1 – urn:nena:xml:ns:pidf:nenaCivicAddr (NENA-STA-004.1)
- cdx2 – urn:nena:xml:ns:pidf:nenaCivicAddr2 (NENA-STA-004.2)

Throughout this document, the phrase "*Street Name*" alone refers to the CLDXF-US or FGDC element. The phrase "complete street name" indicates the full name of a street as it would appear on a sign, map, or listing (that is, the several elements of the name concatenated together, usually with a space between each element). As an example, "North Main Street" would be a complete street name, and "Main" would be the *Street Name* element within that complete street name.

3.1 Country, State, and Other Place Name Elements

3.1.1 Introductory Note on Country, State, and Other Place Name Elements

Place names denote areas within which individual street addresses and landmarks are found. Although place names may seem as simple as "city-state-zip," within the United States using place names sometimes creates confusion. Place names give the general location of a feature or event and are often needed to distinguish between otherwise identical complete street name and address number combinations in a given area. Confusion arises because, within the United States, there are three processes for creating place names: legislative, postal, and unofficial. Each system is independent of the others, and all three are useful and sometimes necessary to identify a civic location. To provide for all three processes, the CLDXF-US includes nine place name elements:

- Legislative: *Country, State, County, Incorporated Municipality*
- Postal: *Postal Community Name, Postal Code, Postal Code Extension*
- Unofficial: *Unincorporated Community, Neighborhood Community*

Incorporated municipalities, unincorporated areas, and postal delivery areas can be quite extensive, and often contain duplicate complete street names and address ranges. In these cases, unofficial place names may be useful or necessary in specifying more precisely where an address is located, and in differentiating between similar addresses in the same general area.

Legislative places are created by law. Because they create taxing and police jurisdictions, they are well-documented and precisely mapped. Every address in the United States lies within a state or state-equivalent, county or county-equivalent, and, within a county or county-equivalent, either within an incorporated municipality, or within the unincorporated portion of the county or county-equivalent. The four elements for legislative place names are:

- *Country* (e.g., "US") – The two-letter abbreviation for the country, as given in ISO 3166-1 standard [14].

- *State* (e.g., "WA") – The two-letter abbreviation for the state (or territory, or federal district) given in USPS Publication 28 [15], Appendix B.
- *County* (e.g., "King") – The name of the county (or equivalent thereof—terms and forms of government vary greatly among the states and territories), as given in the official list maintained by the U.S. Census Bureau.
- *Incorporated Municipality* (e.g., "Seattle") – The name of a city, town, or other incorporated local government (if any).

Postal place names are placed into the *Postal Community Name* element and locations may be identified more specifically by the *Postal Code* and *Postal Code Extension* elements. The *Postal Code* is the five-digit ZIP Code, and the *Postal Code Extension* is the four-digit ZIP+4 Code assigned by the USPS. The USPS City State File is the authoritative register of US postal place names and their associated ZIP Codes.

Within the US, the USPS has sole authority to recognize postal place names, assign their corresponding ZIP Codes and ZIP+4 Codes, and to allocate delivery points among them. The USPS allocates and reallocates delivery points as needed for efficient mail delivery, without regard to county or incorporated city boundaries. Postal place names and municipality names are often the same, but where they are the same, they should not be presumed to contain the same sets of addresses. A given post office might serve delivery points that are outside the namesake municipality, and it might not serve all the delivery points within the municipality. Conversely, municipalities may contain addresses that are not postal delivery points (e.g., vacant lots, playgrounds, transit terminals, cell towers).

A postal place name can be used for multiple ZIP Codes (e.g., in a large city), and the USPS City State File often recognizes multiple place names for a given ZIP Code. In all cases, one name is recommended and the other(s) are recognized. Either the recommended or any recognized name may be used within CLDXF-US.

Unofficial place names include hamlets, neighborhoods, subdivisions, shopping districts, crossroads, and other locales within large municipalities and unincorporated areas. These place names come into existence through informal usage and recognition. The unofficial places have no precise definition in US place name geography, they have no general powers of government, and they are not controlled or registered by any authority. Their definition and boundary are often imprecise. Nevertheless, unofficial place names can be useful and even necessary in locating an address, because incorporated municipalities, unincorporated areas, and postal delivery areas can be quite extensive and often contain duplicate complete street names and address numbers. Unofficial place names should be included whenever they might be helpful in getting first responders to the right place faster. The CLDXF-US therefore includes two elements for unofficial place names:

- *Unincorporated Community* – For areas on the scale of a community, ward, borough, village, hamlet, etc. or larger.

- *Neighborhood Community* – For areas smaller than an *Unincorporated Community*, on the scale of a neighborhood or small shopping district.

3.1.2 Country

3.1.2.1 CLDXF-US name (PIDF-LO name): *Country* (ca:country).

3.1.2.2 Definition: The name of a country represented by its two-letter ISO 3166-1 [14] English country alpha-2 code elements in UPPER CASE letters.

3.1.2.3 Definition source: IETF RFC 5139 [7] Section 3.3.

3.1.2.4 Examples: US, CA, MX.

3.1.2.5 Data type: Text.

3.1.2.6 Domain of values: Restricted to ISO 3166-1 alpha-2 code elements [14].

3.1.2.7 Business Rules: Every civic location record MUST include a *Country*.

3.1.2.8 Notes:

1. Although the scope of CLDXF-US is restricted to US addresses, the *Country* element is included for two reasons: to facilitate reconciliation with address standards of other nations, and to accommodate files which mix addresses from the US and other countries.
There are several standards for country names. The IETF PIDF-LO (the international standard for which CLDXF-US is the United States profile) accepts ISO 3166-1 [14] as the standard for representing country names. Note that PIDF-LO and CLDXF-US recognize only the 2-letter abbreviations (ISO 3166-1-alpha-2).
2. ISO 3166-1 [14] is protected by ISO copyright. The ISO states, "The ... alpha-2 codes are made available by ISO at no charge for internal use and non-commercial purposes."
3. Users of the CLDXF-US must be aware that some two-letter country name abbreviations are identical to some two-letter state abbreviations (e.g., CA = Canada and California; CO = Colombia and Colorado).

3.1.3 State

3.1.3.1 CLDXF-US name (PIDF-LO name): *State* (ca:A1).

3.1.3.2 Definition: The name of a state or state equivalent, represented by the two-letter UPPER CASE abbreviation given in USPS Publication 28 [15], Appendix B. A state is a primary governmental division of the United States.

3.1.3.3 Definition source: Adapted from IETF RFC 4119 [6] and the FGDC Geographic Information Framework Data Content Standard, Part 5: Governmental Unit and Other Geographic Area Boundaries [16], Table 13.

3.1.3.4 Examples: VA, WA, GU, PR.

3.1.3.5 Data type: Text.

3.1.3.6 Domain of values: Restricted to the two-letter state and possession abbreviations given in USPS Publication 28 [15], Appendix B.

3.1.3.7 Business Rules: Every civic location record MUST include the *State*.

3.1.3.8 Notes:

1. USPS Publication 28 [15], Appendix B, provides standard abbreviations for the fifty US states, DC, and the five US territories (PR, VI, GU, MP, and AS).
2. ISO 3166-2 includes the same abbreviations as USPS Publication 28 [15], Appendix B, and in addition one more- UM (nine minor uninhabited islands owned by the US). The difference is of no significance for the purposes of this standard.
3. The revision note in IETF RFC 5139 [7] (Feb. 2008), Section 3.4, states, "In the absence of a country-specific guide on how to use the A-series of elements, the second part of the ISO 3166-2 code [14] for a country subdivision SHOULD be used." USPS Publication 28 [15], Appendix B, is a US-specific guide on how to use the A1 elements.
4. Special note on Washington, DC addresses. For Washington, DC addresses, enter the *State*, *County*, and *Incorporated Municipality* names as follows: *State* = "DC"; *County* = "District of Columbia"; *Incorporated Municipality* = "Washington" (Source: U.S. Census Bureau. Federal Information Processing Standards (FIPS) Codes Reference Files [17], and United States Geological Survey (USGS) Geographic Names Information System (GNIS) [18]).

3.1.4 County

3.1.4.1 CLDXF-US name (PIDF-LO name): *County* (ca:A2).

- 3.1.4.2 Definition:** The name of the county or county-equivalent where the address is located. A county (or its equivalent) is the primary legal division of a state or territory.
- 3.1.4.3 Definition source:** Adapted from IETF RFC 4119 [6] and the FGDC Geographic Information Framework Data Content Standard, Part 5: Governmental Unit and Other Geographic Area Boundaries [16], Table 13.
- 3.1.4.4 Examples:** Winston County, Cook County, Orleans Parish, Fairbanks North Star Borough, Falls Church City (an independent Virginia city treated as the equivalent of a county).
- 3.1.4.5 Data type:** Text.
- 3.1.4.6 Domain of values:** Restricted to the names of counties and county equivalents.
- 3.1.4.7 Business Rules:** Every civic location record MUST include the county or county-equivalent.
- 3.1.4.8 Notes:**
1. The county or county-equivalent name indicates location, not jurisdiction. Many counties include federal, state, tribal, and other lands within which county government powers, including powers to name roads and assign address numbers, may be limited or superseded by other government bodies. Indicating who has what jurisdiction at a given address is well beyond the scope or intent of this standard.
 2. County-equivalents include parishes (LA), boroughs and census areas (AK), federal district (DC), independent cities (VA, MD, MO, NV), municipios (PR), and districts (AS, GU, MP, VI).
 3. The most recently compiled, authoritative listing of county and county-equivalent names is the U.S. Census Bureau. "2021 State, County, Minor Civil Division, and Incorporated Place FIPS Codes" listing. Current versions will be posted at: <https://www.census.gov/programs-surveys/popest/geographies/reference-files.html> [17].
 4. Many governments have a popular name and a legal name (e.g., "Allegheny County" v. "County of Allegheny"). For CLDXF-US records, enter the county name as given in the Census reference cited above.
 5. Special note on Washington, DC addresses: Enter the *State*, *County*, and *Incorporated Municipality* names as follows: *State* = "DC"; *County* = "District of Columbia"; *Incorporated Municipality* = "Washington".
 6. Special note on New York City and its counties and boroughs. New York City is one city comprised of five counties and five boroughs. The counties and boroughs have

identical boundaries and, in two cases, the same name, but they are distinct units of government with different purposes and powers. Here is the listing:

<u>Borough</u>	<u>County</u>
Manhattan	New York
(The) Bronx	Bronx
Brooklyn	Kings
Queens	Queens
Staten Island	Richmond

For CLDXF-US records, place "New York" in the *Incorporated Municipality* element. Enter the county name (New York, Kings, Queens, Bronx, or Richmond) in the *County* element and the borough name in the *Unincorporated Community* element.

3.1.5 Incorporated Municipality

3.1.5.1 CLDXF-US name (PIDF-LO name): *Incorporated Municipality* (ca:A3).

3.1.5.2 Definition: The name of the incorporated municipality or other general-purpose local governmental unit (if any) where the address is located.

3.1.5.3 Definition source: Adapted from IETF RFC 4119 [6] and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10] (sections 2.2.6.1 and 2.3.8.4).

3.1.5.4 Examples: Haleyville, Chicago, Tampa, Dallas.

3.1.5.5 Data type: Text.

3.1.5.6 Domain of values: There is no single controlling registry or authority of incorporated municipality names. A domain may be established by regional or state authorities that covers their area of jurisdiction.

3.1.5.7 Business Rules: The municipality name **MUST** be provided if the address is located within an incorporated local government unit.

3.1.5.8 Notes:

1. An *Incorporated Municipality* is defined by its boundaries. Within the United States, incorporated local governments are known by a variety of terms: municipality, city, borough, town, village, township, corporation, consolidated government, metropolitan government, and unified government, among others. Local government types and terminologies vary substantially from state to state, but the

distinctions are not particularly significant in constructing civic location records. Incorporated municipalities are general purpose governments having legislative, taxation, and police powers.

2. Addresses in unincorporated portions of counties have no municipal place name by definition and in those cases this element would not be provided.
3. The boundaries of an *Incorporated Municipality* are set by legislative authorities. These municipality boundaries often differ from postal delivery (ZIP Code) areas. Therefore, the *Incorporated Municipality* name may differ from the *Postal Community Name* (PCN) for historical or practical reasons.
4. Many governments are known by a popular/common name and a legal name (e.g., "Saint Paul" vs. "City of Saint Paul"). For ease of use, it is recommended to use the common name as illustrated in the examples given in 3.1.5.4. However, state or county level authorities may create a domain to standardize municipal names. The exception to the use of common names is that in some cases, the official name including the place type may be required to disambiguate between identically named jurisdictions of different types. For example, there are both a city and a town of "Madison" in Wisconsin, so they would be entered as "City of Madison" or "Town of Madison" respectively.
5. Special note on Washington, DC addresses: For Washington, DC addresses, enter the *State*, *County*, and *Incorporated Municipality* names as follows: *State* = "DC"; *County* = "District of Columbia"; *Incorporated Municipality* = "Washington" (Source: US Census Bureau, FIPS Codes Reference Files [17], and USGS GNIS [18]).
6. Special note on New York City and its counties and boroughs. New York City is one city comprised of five counties and five boroughs. The counties and boroughs have identical boundaries and, in two cases, the same name, but they are distinct units of government with different purposes and powers. For CLDXF-US records, place "New York" in the *Incorporated Municipality* element. Enter the county name (New York, Kings, Queens, Bronx, or Richmond) in the *County* element. The borough name, if given, must be placed in the *Unincorporated Community* element.
7. In some cases, there are overlapping jurisdictions within counties which have their own separate, legally defined boundaries and governmental powers. For example, in New York State, there are villages which may be contained within towns, or which may overlap several towns. A given location may be in both the village and the town. There are two ways to deal with this situation. One or the other jurisdiction may be considered primary for addressing purposes and be placed into the *Incorporated Municipality* element, and the other ignored for addressing purposes. Or, as with the City and the boroughs of New York, one name may be placed into the *Incorporated Municipality* element, and the other into the *Unincorporated Community* element (despite its status as an "incorporated" or legally defined entity.)

8. As noted above, there is no single authoritative, nationwide listing for incorporated municipalities. State authorities are the best source for a domain of incorporated municipalities or equivalent incorporated general purpose local governments. Listings of incorporated municipalities and maps of their boundaries may be obtained by querying US Census files, but the specific file and the query to use vary by state. For some states, the relevant file is the "Places" file, but the query needs to exclude Census Designated Places that are NOT incorporated. For other states, the relevant file is "County Subdivisions," but the query is based on how localities are classified and varies by state. Further guidance on using these resources may be found at https://www2.census.gov/geo/pdfs/reference/GTC_10.pdf.

3.1.6 Unincorporated Community

3.1.6.1 CLDXF-US name (PIDF-LO name): *Unincorporated Community* (ca:A4).

3.1.6.2 Definition: The name of an unincorporated community, either within an incorporated municipality or in an unincorporated portion of a county, or both, where the address is located.

3.1.6.3 Definition source: Adapted from IETF RFC 4119 [6].

3.1.6.4 Examples:

- 14th Ward (a ward in the incorporated municipality of Pittsburgh, PA)
- Urbanizacion Los Pinos (Puerto Rican urbanization)
- Manhattan (borough of New York City)
- Harlem (unincorporated community in Manhattan borough of New York City)
- Poquito Valley (residential area and road improvement district in unincorporated Yavapai County, AZ)
- Climax (an unincorporated community and a school district in Guilford County, NC)

3.1.6.5 Data type: Text.

3.1.6.6 Domain of values: None.

3.1.6.7 Business Rules: Either an *Unincorporated Community* or a *Neighborhood Community* MUST be included if needed to distinguish between otherwise identical addresses within an incorporated municipality or within the unincorporated area of a county.

3.1.6.8 Notes:

1. Incorporated municipalities and unincorporated portions of counties often cover such large areas that addresses cannot be readily located within them. Unincorporated place names (*Unincorporated Community* or *Neighborhood Community*) may be used informally to indicate more precisely where an address is located.
2. Unincorporated communities comprise a wide variety of settlements within the United States. Because they may be unofficial, their definition and boundary are often imprecise. If an *Unincorporated Community* does not have a precise, mapped boundary, this data element must not be used for address validation unless some description or rule is given for determining whether an address is in the community or not.
3. The *Unincorporated Community* and *Neighborhood Community* differ in the relative scale of the place they name. An *Unincorporated Community* has the scale of a community, ward, borough, village, hamlet, etc. or larger. A *Neighborhood Community* has the scale of a subdivision or small commercial area. Where both elements apply to an address, the *Unincorporated Community* often encloses the *Neighborhood Community*.
4. This distinction provides general guidance, but cases of similar size and partial overlap are easily found. Because the elements themselves have no precise definition in U.S. place name geography, no hard and fast distinction can be made between them. Address authorities and PSAPs should use these elements to indicate as clearly as possible where addresses are located, especially when duplicate complete street names and address ranges occur within the area.
5. The difference between an *Unincorporated Community* and a *Site* is not always clear and distinct. As a general principle, a *Site* is under a single use, ownership, or control, while an *Unincorporated Community* is not. Thus, an *Unincorporated Community* generally includes numerous separate addresses, while a *Site*, even if it covers an extensive area, might be considered to be a single "master address" (often containing multiple subordinate addresses). These general principles apply to most cases and are useful as general distinctions, but exceptions and marginal cases are easily found.
6. Special note on New York City and its counties and boroughs. New York City is one city comprised of five counties and five boroughs. The counties and boroughs have identical boundaries and, in two cases, the same name, but they are distinct units of government with different purposes and powers. For CLDXF-US records, place "New York" in the *Incorporated Municipality* element. Enter the county name (New York, Kings, Queens, Bronx, or Richmond) in the *County* element. The borough name, if given, must be placed in the *Unincorporated Community* element.

7. Local authorities may wish to compile a list of locally-recognized unincorporated communities for their convenience. Whether to do so, and if so what names to include, are implementation matters to be decided locally.

3.1.7 Neighborhood Community

3.1.7.1 CLDXF-US name (PIDF-LO name): *Neighborhood Community* (ca:A5).

3.1.7.2 Definition: The name of an unincorporated neighborhood, subdivision or area, either within an incorporated municipality, or in an unincorporated portion of a county or both, where the address is located.

3.1.7.3 Definition source: Adapted from IETF RFC 4119 [6].

3.1.7.4 Examples: Cypress Meadows Subdivision; Northdale (an area in Tampa that is not incorporated); East Harlem (an area in New York City).

3.1.7.5 Data type: Text.

3.1.7.6 Domain of values: None.

3.1.7.7 Business Rules: Either an *Unincorporated Community* or a *Neighborhood Community* MUST be included if needed to distinguish between otherwise identical addresses within an incorporated municipality or within the unincorporated area of a county.

3.1.7.8 Notes:

1. Incorporated municipalities and unincorporated portions of counties often cover such large areas that addresses cannot be readily located within them. Unincorporated place names are used informally to indicate more precisely where an address is located. The CLDXF-US includes two elements for unincorporated place names: *Neighborhood Community* and *Unincorporated Community*. Either or both may be used.
2. Neighborhood communities comprise a wide variety of settlements within the United States. Because they are unofficial, their definition and boundary are often imprecise. If a *Neighborhood Community* does not have a precise, mapped boundary, this data element must not be used for address validation unless some description or rule is given for determining whether an address is, or is not, in the community.
3. The *Neighborhood Community* and *Unincorporated Community* differ in the relative scale of the place they name. A *Neighborhood Community* usually has the scale of a

subdivision or small commercial area. An *Unincorporated Community* has the scale of a community, ward, borough, village, hamlet, etc. or larger. Where both elements apply to an address, the *Neighborhood Community* is often enclosed within the *Unincorporated Community*.

4. This distinction provides general guidance, but cases of similar size and partial overlap are easily found. Because the elements themselves have no precise definition in U.S. place name geography, no hard and fast distinction can be made between them. Address authorities and PSAPs should use these elements to indicate as clearly as possible where addresses are located, especially when duplicate complete street names and address ranges occur within the area.
5. The difference between a *Neighborhood Community* and a *Site* is not always clear and distinct. As a general principle, a site has a single use, ownership, or control, while neighborhood communities do not. Thus, a *Neighborhood Community* generally includes numerous separate addresses, while a *Site*, even if it covers an extensive area, might be considered to be a single "master address" (often containing multiple subordinate addresses). These general principles apply to most cases and are useful as general distinctions, but exceptions and marginal cases are easily found.
6. Local authorities may wish to compile a list of locally recognized *Neighborhood Communities* for their convenience. Whether to do so, and if so what names to include, are implementation matters to be decided locally.

3.1.8 Postal Community Name

3.1.8.1 CLDXF-US name (PIDF-LO name): *Postal Community Name* (ca:PCN).

3.1.8.2 Definition: A city name for the ZIP Code of an address, as given in the USPS City State file.

3.1.8.3 Definition source: Adapted from IETF RFC 4776 [8] and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (sections 2.2.6.1 and 2.3.8.4).

3.1.8.4 Examples: Stanton (a post office name in KY); Bowen (a town name shown in the USPS database for KY served by the Stanton PO).

3.1.8.5 Data type: Text.

3.1.8.6 Domain of values: Restricted to city names given in the USPS City State File for a given ZIP Code.

3.1.8.7 Business Rules: If included, the *Postal Community Name* MUST be fully spelled out.

3.1.8.8 Notes:

1. The *Postal Community Name* is the name of the post office from which mail is delivered to the address or another city name for that ZIP Code that is recognized in the USPS City State file.
2. The USPS City State File assigns a city name to each ZIP Code and also lists additional city names that are acceptable for postal delivery. The preferred/actual city or acceptable/other acceptable city names for a ZIP can be found via the USPS ZIP Code Lookup service's "Find All Cities in a ZIP Code" tab at <http://zip4.usps.com/zip4/citytown.jsp>.
3. User may view samples and order a USPS City State File using the resources found at <https://postalpro.usps.com/address-quality/city-state-product>.
4. USPS permits abbreviation of city names as needed to fit labelling constraints. These constraints do not apply in CLDXF-US records, so Postal Community names must be spelled out completely.

3.1.9 Postal Code

3.1.9.1 CLDXF-US name (PIDF-LO name): *Postal Code* (ca:PC).

3.1.9.2 Definition: A system of 5-digit codes that identifies the individual USPS Post Office or metropolitan area delivery station associated with an address.

3.1.9.3 Definition source: Adapted from IETF RFC 4119 [6] and RFC 4776 [8]; and the USPS "Quick Service Guide 800: Glossary of Postal Terms and Abbreviations in the Domestic Mail Manual (DMM)" [19].

3.1.9.4 Examples: 02109 (one of many ZIP Codes for Boston, MA).

3.1.9.5 Data type: Text.

3.1.9.6 Domain of values: Defined by the USPS.

3.1.9.7 Business Rules: A *Postal Code* SHOULD be included if the address is in a USPS service area with an assigned five-digit ZIP code.

3.1.9.8 Notes:

1. If a 9-digit ZIP+4 is given, then the 5-digit ZIP Code is placed in the *Postal Code* element and the 4-digits after the hyphen are placed in the *Postal Code Extension* element.
2. Strictly speaking a ZIP Code is not an area but a set of USPS delivery points served from the same post office or metropolitan delivery station. Delivery points with the same ZIP Code can encompass a single building that has a very high mail volume; a portion of a city; all or parts of several municipalities; or even portions of more than one county (and, in a few cases, more than one state).
3. ZIP Codes are assigned to an address by the USPS and the USPS can change the ZIP Code assignment at any time.

3.1.10 Postal Code Extension

3.1.10.1 CLDXF-US name (PIDF-LO name): *Postal Code Extension (cdx2:PCE)*.

3.1.10.2 Definition: A system of 4-digit codes that are used after the 5-digit ZIP Code to specify a range of USPS delivery addresses.

3.1.10.3 Definition source: Adapted from IETF RFC 4119 [6] and RFC 4776 [8]; and the USPS "Quick Service Guide 800: Glossary of Postal Terms and Abbreviations in the Domestic Mail Manual (DMM)" [19].

3.1.10.4 Examples: "0001" in "02109-0001" (portion of a 02109 ZIP Code).

3.1.10.5 Data type: Text.

3.1.10.6 Domain of values: Defined by the USPS.

3.1.10.7 Business Rules: A *Postal Code* MUST be present if a *Postal Code Extension* is included.

3.1.10.8 Notes:

1. If a 9-digit ZIP+4 is given, then the 5-digit ZIP Code is placed in the *Postal Code* element and the 4 digits after the hyphen are placed in the *Postal Code Extension* element.
2. Strictly speaking a ZIP Code is not an area but a set of USPS delivery points served from the same post office or metropolitan delivery station. Delivery points with the same ZIP Code can encompass a single building that has a very high mail volume; a portion of a city; all or parts of several municipalities; or even portions of more than one county (and, in a few cases, more than one state).

3. ZIP Codes are assigned to an address by the USPS, and the USPS can change the ZIP Code assignment at any time.

3.2 Street Name Elements

3.2.1 Introductory Note on Street Name Elements and Street Name Parsing

The CLDXF-US standard requires that complete street names be parsed into their component simple elements. This section of the CLDXF-US defines and describes the eight simple elements needed for parsing any complete street name in the U.S. Each word or phrase of a complete street name fits into one of the elements. When the elements are reassembled in order, the complete street name is reconstructed. If each element is correct, then the complete street name will also be correct.

This approach greatly simplifies data validation and organization, and the use of consistent, common elements fosters address data exchange between PSAPs and other entities. Parsing is essential for complete street name data maintenance and quality control, and for defining and applying local street naming rules consistently. Usually, local street naming authorities will provide PSAPs with the official list of complete street names and how they are parsed, but if no local authority maintains a parsed list of complete street names the PSAP may have to do the parsing.

Each of the eight element descriptions includes a definition, examples, and notes with more detailed explanations. The eight elements are:

- *Street Name Pre Modifier* (e.g., "Alternate" in Alternate Route 8)
- *Street Name Pre Directional* (e.g., "North" in North Fairfax Drive)
- *Street Name Pre Type* (e.g., "Avenue" in Avenue A; "County Route" in County Route 88)
- *Street Name Pre Type Separator* (e.g., "of the" in Avenue of the Americas)
- *Street Name* (e.g., "Fairfax" in North Fairfax Avenue)
- *Street Name Post Type* (e.g., "Avenue" in North Fairfax Avenue)
- *Street Name Post Directional* (e.g., "East" in Seventh Street East)
- *Street Name Post Modifier* (e.g., "Extended" in East End Avenue Extended)

Every complete street name must have a *Street Name* element; all the other elements are optional. (No complete street name is likely to include all eight elements.)

Most complete street names are simple and straightforward to parse — they include a *Street Name* and the vast majority include a type word and perhaps a directional word before or after. However, a few complete street names are more complex or ambiguous, and no set parsing rules can parse all complete street names unambiguously. Directional words and *Street Name Pre Type/Post Type* words are frequently used as or in the *Street Name* element ("West Virginia Avenue"; "Court Place"). Some complete street names are

inherently ambiguous (e.g., "East North Broadway") or unusually complex ("Flaming Gorge Alternate Loop Road 2"; "US 2/County Road 424 Cutoff"; "North White River Parkway East Drive"). Deciding which words and phrases of the complete street name go in which data elements may require human judgment and local knowledge.

Each of the eight elements is described in more detail in the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.2). Section 2.2.2.9 of that standard provides a more detailed discussion of complete street name parsing principles and rules.

Prior NENA address data standards have followed the USPS Publication 28 [15] postal addressing standard, which includes only four street name elements: pre directional, street name, suffix, and post directional. These four elements suffice for parsing most but not all U.S. complete street names. For the exceptions — names that include a *Street Name Pre Modifier*, *Street Name Pre Type*, *Street Name Pre Type Separator*, or *Street Name Post Modifier* — the USPS parsing procedure is simply to combine those words and phrases into the *Street Name* element, along with any directional or suffix words in between. The USPS procedure therefore does not provide for logically consistent parsing of similar words. For example:

- "Street" is a suffix in "Birch Street", but it is part of the street name element in "Birch Street Extended".
- "Avenue" is a suffix in "D Avenue", but it is part of the street name element in "Avenue D".
- "North" is a pre directional in "North First Street", but it is part of the street name element in "Old North First Street".

The simplified USPS street name elements suffice for USPS purposes, but USPS purposes differ, in two fundamental respects, from NG9-1-1 purposes:

1. The USPS standard specifies how to standardize addresses for matching against the USPS master list of postal addresses to determine if they are valid for mail delivery. NG9-1-1 call records include non-mailable addresses as well as mailable addresses.
2. To format addresses for mailing labels, the USPS standard specifies how to abbreviate and compress address components so that the addresses do not exceed 40 characters per line. NG9-1-1 call records are stored in databases, so line length and typographical formatting are irrelevant. Abbreviations and word compression lose information and conflict with NG9-1-1 needs for complete, correct, unambiguous address data.

The larger set of street name elements supports a systematic, logically consistent method for parsing complete street names. Parsing helps to isolate and correct errors within complete street names. Local street naming authorities (usually not the PSAPs) can create

local lists of values for each element to trap errors and standardize values on entry. This in turn prevents duplication of names and misassignments, misspellings, case differences, syntax differences, and other variations that hinder maintenance of an authoritative street name list. This in turn benefits all of the parties that create, validate, organize, and exchange address data. However, as noted above, a few complete street names are more complex or ambiguous, and local knowledge and human judgement may be required. Local authorities will have the final say on how the rules and definitions provided in this document will be implemented.

The goals of parsing include:

1. Enhancing data quality and validation for local address authorities (usually not PSAPs) and helping to ensure consistent application of street naming rules over time;
2. giving PSAPs (and other downstream users) cleaner data from the local addressing authorities;
3. providing software vendors with one single list of street name elements that works consistently, in almost all cases, nationwide;
4. similarly, providing data aggregators such as regional, state, and federal agencies, utilities, telcos, and private firms with a single set of elements for use in combining data from multiple sources; and
5. simplifying NG9-1-1 record exchange through the use of common elements that are consistently defined and used.

3.2.2 Street Name Pre Modifier

3.2.2.1 CLDXF-US name (PIDF-LO name): *Street Name Pre Modifier* (ca:PRM).

3.2.2.2 Definition: 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.

3.2.2.3 Definition source: Adapted from IETF RFC 5139 [7] and 4776 [8]; and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.2.1).

3.2.2.4 Examples:

- "Old" in "Old North First Street" ("Old" is a *Street Name Pre Modifier* because the *Street Name Pre Directional* "North" separates "Old" from the *Street Name* "First" and the *Street Name Post Type* "Street".)
- "Alternate" in "Alternate Route 8" (because "Route" separates "Alternate" from the *Street Name* element)

- "Southwest" in "Southwest North Globe Avenue" (because only the last directional word is placed in the *Street Name Pre Directional*)

3.2.2.5 Data type: Text.

3.2.2.6 Domain of values: None.

3.2.2.7 Business Rules: A *Street Name* MUST be present if a *Street Name Pre Modifier* is included.

3.2.2.8 Notes:

1. A *Street Name Pre Modifier* precedes and modifies a *Street Name* element but is separated from the *Street Name* element by a *Street Name Pre Type* or a *Street Name Pre Directional* or both. Any word or phrase of a complete street name that precedes the *Street Name Pre Directional* (or that precedes the *Street Name Pre Type* if the complete street name has no *Street Name Pre Directional*) comprises the *Street Name Pre Modifier*.
2. Occasionally two directional words occur together in or before a *Street Name*. Only one of the words can be a *Street Name Pre Directional*. The other might either be parsed as a *Street Name Pre Modifier* or else placed in the *Street Name* element. In some cases, two parsing options are possible, and local knowledge may be required to know which is correct. Some examples illustrate these points:
 - Northwest East River Avenue
 - East North Parkway
 - Northwest East Avenue A
 - North South Road Southwest

In parsing a complete street name, the first task is to determine what goes in the *Street Name* element. Other decisions follow from that one. If more than one parsing is possible, confer with the local street naming authority for authoritative information. If that is not possible, sometimes the most likely parsing can be inferred by noting how directional words are used in other street names within the same addressing system.

Example 1: For "Northwest East River Avenue", the *Street Name* could be "River". In that case the complete name would be parsed as follows:

Northwest = *Street Name Pre Modifier*

East = *Street Name Pre Directional*

River = *Street Name*

Avenue = *Street Name Post Type*

(Plausible scenario: The avenue is in the northwest quadrant of the city, and it runs on both sides of a river. "Northwest East River Parkway" runs on one side of the river, and "Northwest West River Parkway" runs on the other side of the river.)

However, the street naming authority might also give "East River" as the *Street Name*. Then the complete name would be parsed as follows:

Northwest = *Street Name Pre Directional*

East River = *Street Name*

Avenue = *Street Name Post Type*

(Plausible scenario: The avenue is in the northwest quadrant of the city. It runs along the East River and is named for it.)

Example 2: For "East North Parkway", the *Street Name* most likely would be "North". In that case the complete name would be parsed as follows:

East = *Street Name Pre Directional*

North = *Street Name*

Parkway = *Street Name Post Type*

It is uncommon, but possible, that the *Street Name* is "Parkway". In that case the complete name would be parsed as follows:

East = *Street Name Pre Modifier*

North = *Street Name Pre Directional*

Parkway = *Street Name*

Example 3: For "Northwest East Avenue A", only one parsing is possible, because the directional words are separated from the *Street Name* by a *Street Name Pre Type*:

Northwest = *Street Name Pre Modifier*

East = *Street Name Pre Directional*

Avenue = *Street Name Pre Type*

A = *Street Name*

Example 4: In some cases, a *Street Name* can be comprised of two directional words. For example, "North South Road Southwest" (in Washington DC) is parsed as follows:

North South = *Street Name*

Road = *Street Name Post Type*

Southwest = *Street Name Post Directional*

(Note: By local street naming rules, this is the only permitted parsing. Washington DC's local street naming rules exclude the use of Street Name

Pre Directionals, and they require inclusion of the quadrant designator in the Street Name Post Directional field.)

3.2.3 Street Name Pre Directional

3.2.3.1 CLDXF-US name (PIDF-LO name): *Street Name Pre Directional* (ca:PRD).

3.2.3.2 Definition: A word preceding the *Street Name* element that indicates the direction taken by the street from an arbitrary starting point or line, or the sector where it is located.

3.2.3.3 Definition source: IETF RFC 4119 [6] and RFC 4776 [8]; and FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.2.2).

3.2.3.4 Examples:

- "North" in "North Fairfax Drive"
- "South" in "South Main Street"
- "North" in "Southwest North Globe Avenue" (because only the last directional word is placed in the *Street Name Pre Directional*)

3.2.3.5 Data type: Text.

3.2.3.6 Domain of values: North, Northeast, Northwest, South, Southeast, Southwest, East, West, or equivalent words in other languages.

3.2.3.7 Business Rules: A *Street Name* MUST be present if a *Street Name Pre Directional* is included.

3.2.3.8 Notes:

1. A *Street Name Pre Directional* is a word preceding the *Street Name* element that indicates the direction or position of the thoroughfare relative to an arbitrary starting point or line, or the sector where it is located.
2. A complete street name may include a *Street Name Pre Directional*, a *Street Name Post Directional*, neither, or both.
3. Full spelling (North, Northeast, Northwest, South, Southeast, Southwest, East, West) for data exchange is required to avoid ambiguity.
4. Directional words are often used as or in the *Street Name* element (e.g., North Avenue, West Virginia Avenue). Whether a directional value is placed in the *Street Name Pre Directional* or the *Street Name* element cannot always be discerned from the complete street name itself. Sometimes the proper parsing has to be inferred

from the context of the complete street name or checked with the street naming authority. For example, if West Virginia Avenue is named for the state of West Virginia, then "West" is part of the *Street Name* element. However, if at some point the street changes names and become East Virginia Avenue, then perhaps "Virginia" is the *Street Name*, and "East" and "West" are *Street Name Pre Directional*.

5. Occasionally two directional words occur together in or before a *Street Name*. Only one of the words can be a *Street Name Pre Directional*. The other might either be parsed as a *Street Name Pre Modifier* or else placed in the *Street Name* element. In some cases two parsing options are possible, and local knowledge may be required to know which is correct. Some examples illustrate these points:

- Northwest East River Avenue
- East North Parkway
- Northwest East Avenue A
- North South Road Southwest

In parsing a complete street name, the first task is to determine what goes in the *Street Name* element. Other decisions follow from that one. If more than one parsing is possible, confer with the local street naming authority for authoritative information. If that is not possible, sometimes the most likely parsing can be inferred by noting how directional words are used in other street names within the same addressing system.

Example 1: For "Northwest East River Avenue", the *Street Name* could be "River". In that case the complete name would be parsed as follows:

Northwest = *Street Name Pre Modifier*
East = *Street Name Pre Directional*
River = *Street Name*
Avenue = *Street Name Post Type*

(Plausible scenario: The avenue is in the northwest quadrant of the city, and it runs on both sides of a river. "Northwest East River Parkway" runs on one side of the river, and "Northwest West River Parkway" runs on the other side of the river.)

However, the street naming authority might also give "East River" as the Street Name. Then the complete name would be parsed as follows:

Northwest = *Street Name Pre Directional*
East River = *Street Name*
Avenue = *Street Name Post Type*

(Plausible scenario: The avenue is in the northwest quadrant of the city. It runs along the East River and is named for it.)

Example 2: For “East North Parkway”, the *Street Name* most likely would be “North”. In that case the complete name would be parsed as follows:

East = *Street Name Pre Directional*

North = *Street Name*

Parkway = *Street Name Post Type*

It is uncommon, but possible, that the Street Name is “Parkway”. In that case the complete name would be parsed as follows:

East = *Street Name Pre Modifier*

North = *Street Name Pre Directional*

Parkway = *Street Name*

Example 3: For “Northwest East Avenue A”, only one parsing is possible, because the directional words are separated from the *Street Name* by a *Street Name Pre Type*:

Northwest = *Street Name Pre Modifier*

East = *Street Name Pre Directional*

Avenue = *Street Name Pre Type*

A = *Street Name*

Example 4: In some cases, a *Street Name* can be comprised of two directional words. For example, “North South Road Southwest” (in Washington DC) is parsed as follows:

North South = *Street Name*

Road = *Street Name Post Type*

Southwest = *Street Name Post Directional*

(Note: By local street naming rules, this is the only permitted parsing. Washington DC’s local street naming rules exclude the use of Street Name Pre Directionals, and they require inclusion of the quadrant designator in the Street Name Post Directional field.)

3.2.4 Street Name Pre Type

3.2.4.1 CLDXF-US name (PIDF-LO name): *Street Name Pre Type* (cae:STP).

3.2.4.2 Definition: A word or phrase that precedes the *Street Name* element and identifies a type of thoroughfare in a complete street name.

3.2.4.3 Definition source: Adapted from IETF RFC 6848, Specifying Civic Address Extensions in the Presence Information Data Format Location Object (PIDF-LO) [20] and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.2.3).

3.2.4.4 Examples:

- "Avenue" in "Avenue A"
- "Calle" in "Calle 1"
- "Boulevard" in "Boulevard of the Allies"
- "Ranch-to-Market Road" in "Ranch-to-Market Road 2398"
- "County Road" in "County Road 18"
- "United States Highway" in "United States Highway 10"
- "Interstate" in "Interstate 95"

3.2.4.5 Data type: Text.

3.2.4.6 Domain of values: Restricted to values found in the NENA "Street Name Pre Types and Street Name Post Types Registry" [21] with possible addition of identifiers for specific states or localities, as in "Rhode Island Route 138", where "Route" is a pre-type found in the registry and "Rhode Island" specifies a state. See Note 6.

3.2.4.7 Business Rules: A *Street Name* MUST be present if a *Street Name Pre Type* is included.

3.2.4.8 Notes:

1. A *Street Name Pre Type* is a word or phrase that precedes the *Street Name* element and identifies a type of thoroughfare in a complete street name. A thoroughfare, in CLDXF-US, is defined as "a route, a part thereof, or other access way along which a location can be reached. A thoroughfare is typically a road, but may be a walkway, boardwalk, trail, waterway, rail line, etc."
2. In English-language complete street names, most *Street Name Pre Type* words are also found as *Street Name Post Types*.
3. A complete street name usually includes either a *Street Name Pre Type* or a *Street Name Post Type*. Occasionally, complete street names have neither ("Broadway") or both ("Avenue C Loop").
4. *Street Name Pre Types* must be spelled out in full for data exchange. No abbreviations are recognized within this standard.
5. In English-language complete street names, *Street Name Pre Types* are less common than *Street Name Post Types*. *Street Name Pre Types* are more common in Spanish, Italian, and French-language complete street names.
6. For numbered (or, occasionally, lettered) jurisdictional routes, the *Street Name Pre Type* includes the type word and the administrative type of road. The following examples show the parsing of jurisdictional route names:
 - Highway 101: *Street Name Pre Type* = "Highway"; *Street Name* = "101"

- County Road 88: *Street Name Pre Type* = "County Road"; *Street Name* = "88"
- Ranch-to-Market Road 2398: *Street Name Pre Type* = "Ranch-to-Market Road"; *Street Name* = "2398"
- United States Highway 99: *Street Name Pre Type* = "United States Highway"; *Street Name* = "99"

On occasion, the *Street Name Pre Type* may also include the jurisdiction name:

- Summit County Road 55: *Street Name Pre Type* = "Summit County Road"; *Street Name* = "55"

As referenced in 3.2.4.6 above, NENA maintains a registry of known *Street Name Pre Types* in the NENA "Street Name Pre Types and Street Name Post Types Registry" [21]. Anyone finding additional *Street Name Pre Types* may propose them for inclusion in the registry. This may be done by using the on-line form at https://www.nena.org/page/NRS_SubmitNewValue, selecting the "CLDXF-StreetNamePreTypesAndStreetNamePostTypes" registry, filling in the proposed new entry along with an example (required) and any desired comment (optional) in the appropriate boxes.

The parsing of complete street names is at local discretion; "however, a proposed new street type should fit within the definition of "street type." If it does not, then it should be placed in a different element, unless by reason of frequent usage there is reason to parse it as a street type.

Note that it is not required in CLDXF-US to have a type word, and it may be preferable to incorporate some components of the complete street name into the base *Street Name* element (or, less frequently, the *Street Name Pre Modifier* or *Street Name Post Modifier* elements) rather than parsing them as type words.

New submissions should NOT include state, county, or region-specific variations on generic street name types. Any value that includes a locality name will be represented in the registry by the generic form of the *Street Name Pre Type* without the locality name. Thus, for the *Street Name Pre Type* value of "Summit County Road" only the word "Road" needs to be validated in the registry. Where a state name is used in a *Street Name Pre Type* as shown above, it must be written out in full rather than abbreviated. Similarly, the words "United States" must be written out for all "US" routes and highways. The word "County" or "State" used in county or state routes must also be written out in full.

7. Occasionally two or more type words occur together before the *Street Name* element (e.g., Bypass Highway 22). All of the words are placed in the *Street Name Pre Type*, unless the local address authority has included any of them in *Street*

Name element. If the two type words are not part of the *Street Name* element and are not separated from each other by a directional word or other word, they are all placed in the *Street Name Pre Type*.

3.2.5 Street Name Pre Type Separator

3.2.5.1 CLDXF-US name (PIDF-LO name): *Street Name Pre Type Separator* (cdx1:STPS).

3.2.5.2 Definition: A preposition or prepositional phrase between the *Street Name Pre Type* and the *Street Name*.

3.2.5.3 Definition source: Adapted from the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.2.4).

3.2.5.4 Examples:

- "of the" in "Avenue of the Americas"
- "at" in "Avenue at Port Imperial"
- "de las" in "Alameda de las Pulgas"
- « des » in « Rue des Etoiles »
- "in the" in "Circle in the Woods"
- "to the" in "Road to the Ruins"

3.2.5.5 Data type: Text.

3.2.5.6 Domain of values: Restricted to values found in the NENA "Street Name Pre Type Separators Registry" [22].

3.2.5.7 Business Rules: A *Street Name* and a *Street Name Pre Type* MUST be present if a *Street Name Pre Type Separator* is included.

3.2.5.8 Notes:

1. If a prepositional phrase appears between the *Street Name Pre Type* and the *Street Name* elements, the prepositional phrase is a *Street Name Pre Type Separator*.
2. *Street Name Pre Type Separators* are rare in English-language street names, but they are common in Spanish, Italian, and French-language names.
3. NENA maintains a *Street Name Pre Type Separator* Registry. Anyone who finds additional *Street Name Pre Type Separators* in U.S. street names may propose them for inclusion in the registry. This may be done by using the on-line form at https://www.nena.org/page/NRS_SubmitNewValue, selecting the "CLDXF-

StreetNamePreTypeSeparators" registry, filling in the proposed new entry along with an example (required) and any desired notes (optional) in the appropriate boxes.

4. This data element is not part of the base PIDF-LO described in RFC 5139[7]. It is a NENA-defined extension of PIDF-LO. Procedures for defining and including local extensions to the PIDF-LO schema are given in RFC 6848 [20]. The following sample XML record shows how the *Street Name Pre Type Separator* is added to the PIDF-LO XSD and included in a CLDXF-US record.

```
<?xml version="1.0" encoding="UTF-8"?>
<civicAddress xml:lang="en-US"
  xmlns="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
  xmlns:cdx1="urn:ena:xml:ns:pidf:enaCivicAddr"
  xmlns:cae="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr:ext"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:ena:xml:ns:pidf:enaCivicAddr.xsd">
  <country>US</country>
  <A1>PA</A1>
  <A2>Allegheny</A2>
  <A3>Pittsburgh</A3>
  <RD>Allies</RD>
  <HNO>100</HNO>
  <cae:STP>Boulevard</cae:STP>
  <cdx1:STPS>of the</cdx1:STPS>
</civicAddress>
```

3.2.6 Street Name

3.2.6.1 CLDXF-US name (PIDF-LO name): *Street Name* (ca:RD).

3.2.6.2 Definition: The element of the complete street name that identifies the particular street (as opposed to any street types, directionals, and modifiers).

3.2.6.3 Definition source: Adapted from the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.2.5).

3.2.6.4 Examples:

- "Fairfax" in "North Fairfax Avenue"
- "Q" in "Avenue Q"
- "101" in "Highway 101"

3.2.6.5 Data type: Text.

3.2.6.6 Domain of values: None.

3.2.6.7 Business Rules: Either a *Street Name* and an *Address Number* or a *Street Name* and a *Distance Marker* MUST be included if none of the following are present:

- a *Site* whose identifier is unique within the given set of place names
- a *Structure* whose identifier is unique within the given set of place names
- a *Location Marker* whose identifier is unique within the given set of place names

3.2.6.8 Notes:

1. The *Street Name* may be the official name of a street as assigned by a street naming authority, or an alternate (alias) name that is used and recognized.
2. Street names are usually given to roads carrying vehicular traffic, but they may also be given to walkways, boardwalks, trails, rivers, rail lines, and other thoroughfares along which address numbers may be assigned or distance markers placed.
3. Either an *Address Number* or a *Distance Marker* (or both) should be provided with a *Street Name*, unless none have been assigned along a road. Examples:
 - 12005 County Road 88
 - Milepost 12, County Road 88 (Where *Distance Marker* = Milepost 12 and *Street Name Pre Type* = County Road and *Street Name* = 88)
 - Milepost 12, 12005 County Road 88 (Meaning: Address Number 12005 is found at Milepost 12 on County Road 88)
 - County Road 88 (No *Address Number* or *Distance Marker*—permitted only if no address numbers have been assigned along County Road 88, and mileposts are unmarked or unknown)
4. Inconsistent *Street Name* spellings are common, especially as to:
 - Internal capitalization: MacIntyre, McIntyre, Mc Intyre, McIntyre
 - Apostrophes: Smiths Lane, Smith’s Lane
 - Spaces and hyphens: Boston Providence Highway; Boston-Providence Highway
 - Numbered streets: Third Street, 3rd Street, 3 Street

Inconsistent spellings should be resolved by reference to official records of the street naming authority or written records of guidance from the street naming authority.

5. The *Street Name* element is the only one of the street name elements that may contain abbreviations. Common examples include honorifics or military ranks, such as “Msgr. O’Brien” in “Msgr. O’Brien Highway” or “Sgt. Joe Jones” in “Sgt. Joe Jones Road”. Personal names may also be abbreviated, such as “M. L. K. Jr.” in “M. L. K. Jr. Boulevard”.

One case which may cause confusion is ramps, defined as roads that provide controlled access from adjacent roads onto a limited access highway. Officially assigned ramp names often include references to the highway or other road from which or to which they provide access. In such cases, when the names of adjacent roadways are included in the name of the ramp, directionals, and type words may be abbreviated for the sake of brevity, even though such abbreviations are not allowed in the original naming of the referenced roadways. For example, the official name of a ramp from "East Main Street westbound" to "South First Avenue southbound" might be "E Main St WB to S First Ave SB", and that entire string would go into the *Street Name* element. In short, abbreviations for directionals and type words may be included in the *Street Name* element for a ramp if they are part of the officially assigned ramp name and do not refer to the ramp itself, but rather to the adjacent roadways.

3.2.7 Street Name Post Type

3.2.7.1 CLDXF-US name (PIDF-LO name): *Street Name Post Type* (ca:STS).

3.2.7.2 Definition: A word or phrase that follows the *Street Name* element and identifies a type of thoroughfare in a complete street name.

3.2.7.3 Definition source: Adapted from IETF RFC 4119 [6] and RFC 4776 [8] (Section 3.4); and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.2.6).

3.2.7.4 Examples:

- "Avenue" in "North Fairfax Avenue"
- "Street" in "E Street"

3.2.7.5 Data type: Text.

3.2.7.6 Domain of values: Restricted to values found in the NENA "Street Name Pre Types and Street Name Post Types Registry" [21].

3.2.7.7 Business Rules: A *Street Name* MUST be present if a *Street Name Post Type* is included.

3.2.7.8 Notes:

1. A *Street Name Post Type* is a word or phrase that follows the *Street Name* element and identifies a type of thoroughfare in a complete street name. A thoroughfare, in CLDXF-US, is defined as "a route, a part thereof, or other access way along which a

location can be reached. A thoroughfare is typically a road, but may be a walkway, boardwalk, trail, waterway, rail line, etc." In English-language complete street names, many *Street Name Post Type* words are also found as *Street Name Pre Types*.

2. A complete street name usually includes either a *Street Name Pre Type* or a *Street Name Post Type*. Occasionally, complete street names have neither ("Broadway") or both ("Avenue C Loop"). "Avenue C Loop" is parsed as follows: Avenue = *Street Name Pre Type*; C = *Street Name*; Loop = *Street Name Post Type*.
3. *Street Name Post Types* must be spelled out in full for data exchange. No abbreviations are recognized within this standard.
4. *Street Name Post Type* words are often used as or in the *Street Name* element (e.g., "Park Lane Circle"). Whether a *Street Name Post Type* value is better placed in the *Street Name Post Type* or the *Street Name* element cannot always be discerned from the complete street name itself. Sometimes the proper parsing has to be inferred from the context of the complete street name or checked with the street naming authority.
5. Occasionally, two or more type words occur together after the *Street Name* element (e.g., "Tenth Street Bypass"). All of the words are placed in the *Street Name Post Type*, unless the local address authority has included any of them in the *Street Name* element. If the type words are not part of the *Street Name* element and are not separated from each other by a directional word or other word, they are all placed in the *Street Name Post Type*.
6. NENA maintains a registry of known *Street Name Post Types* in the NENA "Street Name Pre Types and Street Name Post Types Registry" [21]. Anyone finding additional *Street Name Post Types* may propose them for inclusion in the registry. This may be done by using the on-line form at https://www.nena.org/page/NRS_SubmitNewValue, selecting the "CLDXF-StreetNamePreTypesAndStreetNamePostTypes" registry, filling in the proposed new entry along with an example (required) and any desired notes (optional) in the appropriate boxes.

The parsing of complete street names is at local discretion; however, a proposed new street type should fit within the definition of "street type." If it does not, then it should be placed in a different element, unless by reason of frequent usage there is reason to parse it as a street type.

Note that it is not required in CLDXF-US to have a type word, and it may be preferable to incorporate some components of the complete street name into the base *Street Name* element (or, less frequently, the *Street Name Pre Modifier* or *Street Name Post Modifier* elements) rather than parsing them as type words.

3.2.8 Street Name Post Directional

3.2.8.1 CLDXF-US name (PIDF-LO name): *Street Name Post Directional* (ca:POD).

3.2.8.2 Definition: A word following the *Street Name* element that indicates the direction taken by the street from an arbitrary starting point or line, or the sector where it is located.

3.2.8.3 Definition source: IETF RFC 4119 [6] and FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.2.7).

3.2.8.4 Examples:

- "East" in "Seventh Street East"
- "Northeast" in "Ingraham Street Northeast"
- "Southwest" in Boulevard South Southwest
- "South" in Pharr Court South Northeast

3.2.8.5 Data type: Text.

3.2.8.6 Domain of values: North, Northeast, Northwest, South, Southeast, Southwest, East, West, or equivalent words in other languages.

3.2.8.7 Business Rules: A *Street Name* MUST be present if a *Street Name Post Directional* is included.

3.2.8.8 Notes:

1. A *Street Name Post Directional* is a word following the *Street Name* element that indicates the direction or position of the thoroughfare relative to an arbitrary starting point or line, or the sector where it is located.
2. A complete street name may include a *Street Name Pre Directional*, a *Street Name Post Directional*, neither, or both.
3. Full spelling (North, Northeast, Northwest, South, Southeast, Southwest, East, West) for data exchange is required to avoid ambiguity.
4. Directional words are often used as or in the *Street Name* element (e.g., "Avenue North"). Whether a directional word value is placed in the *Street Name Post Directional* or the *Street Name* element cannot always be discerned from the complete street name itself. Sometimes the proper parsing has to be inferred from the context of the complete street name or checked with the street naming authority.
5. Occasionally two directional words occur together in or after Street Name. Only one of the words can be a *Street Name Post Directional*. The other might be parsed as

either a *Street Name Post Modifier* or else placed in the *Street Name* element. In some cases two parsing options are possible, and local knowledge is required to know which is correct. Three examples illustrate these points:

- Boulevard South Southwest
- Pharr Court South Northwest
- North South Road Southwest

In parsing a street name, the first task is to determine the street name element. Other decisions follow from that one. If more than one parsing is possible, confer with the local street naming authority for authoritative information. If that is not possible, sometimes the most likely parsing can be inferred by noting how directional words are used in other street names within the same addressing system.

Example 1: For "Boulevard South Southwest", the *Street Name* most likely would be "South". In that case the complete street name would be parsed as follows:

Boulevard = *Street Name Pre Type*
South = *Street Name* (directional word used as a *Street Name*)
Southwest = *Street Name Post Directional*

It is uncommon, but possible, that the *Street Name* is "Boulevard". In that case the complete street name would be parsed as follows:

Boulevard = *Street Name*
South = *Street Name Post Directional*
Southwest = *Street Name Post Modifier*

Example 2: For "Pharr Court South Northeast", only one parsing is possible, because the directional words are separated from the *Street Name* by a *Street Name Post Type*

Pharr = *Street Name*
Court = *Street Name Post Type*
South = *Street Name Post Directional*
Northeast = *Street Name Post Modifier*

Example 3: In some cases, a *Street Name* can be comprised of two directional words. For example, "North South Road Southwest" (in Washington DC) is parsed as follows:

North South = *Street Name*
Road = *Street Name Post Type*
Southwest = *Street Name Post Directional*

(Washington DC local addressing standards prohibit the use of Street Name Pre Directionals, and they mandate inclusion of the quadrant designator in the Street Name Post Directional field.)

3.2.9 Street Name Post Modifier

3.2.9.1 CLDXF-US name (PIDF-LO name): *Street Name Post Modifier* (ca:POM).

3.2.9.2 Definition: A word or phrase that follows and modifies the *Street Name* element and is either separated from it by a *Street Name Post Type* and/or a *Street Name Post Directional*.

3.2.9.3 Definition source: Adapted from IETF RFC 4776 [8] (Section 3.4) and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.2.8).

3.2.9.4 Examples:

- "Extended" in "East End Avenue Extended" ("Extended" is a *Street Name Post Modifier* because the *Street Name Post Type* "Avenue" separates "Extended" from the *Street Name* "East End". In this case, "East End" has been designated as the *Street Name* by the local naming authority; "East" is not a *Street Name Pre Directional*.)
- "Extension" in "Market Street North Extension" (because "North" separates "Extension" from the *Street Name Post Type*.)
- "Northwest" in "Pharr Court South Northwest" (because only the first directional word is placed in the *Street Name Post Directional*)
- "Number 2" in "Banner Fork Road Number 2" (because "Road" separates "Number 2" from the *Street Name*)

3.2.9.5 Data type: Text.

3.2.9.6 Domain of values: None.

3.2.9.7 Business Rules: A *Street Name* MUST be present if a *Street Name Post Modifier* is included.

3.2.9.8 Notes:

1. Occasionally two directional words occur together in or after *Street Name*. Only one of the words can be a *Street Name Post Directional*. The other might be parsed as either a *Street Name Post Modifier* or else placed in the *Street Name* element. In

some cases two parsing options are possible, and local knowledge is required to know which is correct. Three examples illustrate these points:

- Boulevard South Southwest
- Pharr Court South Northwest
- North South Road Southwest

In parsing a street name, the first task is to determine the street name element. Other decisions follow from that one. If more than one parsing is possible, confer with the local street naming authority for authoritative information. If that is not possible, sometimes the most likely parsing can be inferred by noting how directional words are used in other street names within the same addressing system.

Example 1: For "Boulevard South Southwest", the *Street Name* most likely would be "South". In that case the complete street name would be parsed as follows:

Boulevard = *Street Name Pre Type*
South = *Street Name* (directional word used as a Street Name)
Southwest = *Street Name Post Directional*

It is uncommon, but possible, that the *Street Name* is "Boulevard". In that case the complete street name would be parsed as follows:

Boulevard = *Street Name*
South = *Street Name Post Directional*
Southwest = *Street Name Post Modifier*

Example 2: For "Pharr Court South Northeast", only one parsing is possible, because the directional words are separated from the Street Name by a *Street Name Post Type*:

Pharr = *Street Name*
Court = *Street Name Post Type*
South = *Street Name Post Directional*
Northeast = *Street Name Post Modifier*

Example 3: In some cases, a *Street Name* can be comprised of two directional words. For example, "North South Road Southwest" (in Washington DC) is parsed as follows:

North South = *Street Name*
Road = *Street Name Post Type*
Southwest = *Street Name Post Directional*

(Washington DC local addressing standards prohibit the use of Street Name Pre Directionals, and they mandate inclusion of the quadrant designator in the Street Name Post Directional field.)

2. Although in most cases, the *Street Name Post Modifier* is a word like “Extended” or a second directional, any word or phrase that is part of the complete, official street name and that satisfies the definition (follows *Street Name*, separated by other elements) can be placed in the *Street Name Post Modifier*. This may include additional identifiers that are appended to an existing street name to further specify a location. An example of this usage is “Province Road Fire Road 12”, in Stafford, NH, which would be parsed as follows:

Province = *Street Name*

Road = *Street Name Post Type*

Fire Road 12 = *Street Name Post Modifier*

In this case, the address would be uniquely specified by a number along Province Road, and “Fire Road 12” is added to provide additional information that is useful to emergency service providers. Note that the additional information MUST be part of the official street name to be included in the *Street Name Post Modifier*.

3.2.10 Direction of Travel

3.2.10.1 CLDXF-US name (PIDF-LO name): *Direction of Travel* (cdx2:DT).

3.2.10.2 Definition: A word which 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.

3.2.10.3 Definition source: New.

3.2.10.4 Examples:

- “northbound” in “Interstate Highway 5 North northbound”
- “eastbound” in “State Route 22 eastbound”

3.2.10.5 Data type: Text.

3.2.10.6 Domain of values: “northbound”, “southbound”, “eastbound”, “westbound”.

3.2.10.7 Business Rules: A *Street Name* which references a divided roadway or associated frontage road MUST be present if *Direction of Travel* is included.

3.2.10.8 Notes:

1. For divided roadway location records only, the *Direction of Travel* may be used to indicate which side of the road the location refers to. In cases where the official street name does not include the direction of travel, travel direction shall be given as “northbound”, “eastbound”, “southbound”, or “westbound”. This is the only case in

which the CLDXF-US record may include in the street name elements a word that is not part of the official street name.

2. This element is used for situations where locations on divided roads cannot be uniquely identified (for example, milepost 50 located on both sides of a divided highway). In most cases, adding the direction of travel to the location record resolves the issue.
3. Given that roads rarely follow strictly one cardinal direction, selecting the cardinality should be based on the general cardinal direction of the divided road (for example, I-95 is generally north/south, with some segments in other directions).
4. Values used in this field are case insensitive.

3.3 Address Number Elements

3.3.1 Introductory Note on Address Number Elements

A complete address number precedes a street name in a thoroughfare-style address and usually indicates, by sequence and/or parity, where along a thoroughfare the numbered feature is found. In the CLDXF-US, components of the complete address number are parsed into three separate elements: *Address Number Prefix*, *Address Number*, and *Address Number Suffix*. A fourth element, *Address Number Complete*, may be used to record any formatting (spaces, hyphens, etc.) used by the local jurisdiction for the concatenation of these elements into the complete address number. A fifth element, *Distance Marker*, may be given in place of or in addition to the address number.

The *Address Number* element is defined as an integer to support address sorting, parity (even/odd) definition, and in/out of address range tests. An *Address Number* is required before an *Address Number Prefix* or *Address Number Suffix* can be given.

Many jurisdictions include alphanumeric extensions to the integer address number (e.g., the "A" in "123 A" and "123-A"; and the "½" in "123½"). The identifiers in these extensions are *Address Number Suffixes*. The *Address Number Suffix* includes any decimal and fractional portions of the complete address number but does not include separator characters such as spaces, hyphens, or any other special characters, if present. These formatting characters are preserved for reference in the *Address Number Complete*.

In a few parts of the United States, alphanumeric extensions precede the *Address Number* (e.g., "A" in "A100", "5" in "5-143"; "194" in "194-13"; "N89W" in "N89W16758''''"). The identifiers within these extensions are the *Address Number Prefix*. As with the *Address Number Suffix*, separator characters such as spaces, hyphens, and other special characters are not included in the *Address Number Prefix*.

The *Address Number Complete* element is used to record the desired formatting for the complete address number in cases where simple concatenation of the prefix, number, and suffix elements does not reproduce the official formatting of the complete address number.

Distance marker numbers are most useful for specifying locations along interstate highways, recreational trails, and other routes where addressed features are not found, as well as along sparsely populated stretches of county, state, federal, and other routes where distance marker signs are posted. Distance marker numbers may be given in place of or in addition to address numbers (if address numbers have been assigned along the route.) The *Distance Marker* element includes both the word and the numeric value ("Milepost 43"; "Mile Marker 231.5").

3.3.2 Address Number Prefix

3.3.2.1 CLDXF-US name (PIDF-LO name): *Address Number Prefix* (cae:HNP).

3.3.2.2 Definition: An identifier in the portion of the complete address number that precedes the integer *Address Number* in order to further specify a location along a thoroughfare or within a defined area.

3.3.2.3 Definition source: Adapted from IETF RFC 6848, Specifying Civic Address Extensions in the Presence Information Data Format Location Object (PIDF-LO) [20] and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.1.1).

3.3.2.4 Examples:

- "A" in "A19 Calle 117, Toa Alta, PR"
- "5" in "5-5415 Kuhio Highway, Hanalei, HI 96714"
- "194" in "194-13 50th Avenue, New York, NY 11365"
- "194" in "194-03½ 50th Avenue, New York, NY 11365"
- "N89W" in "N89W16758 Appleton Avenue, Menomonee Falls, WI 53051"
- "W63N" in "W63N 645 Washington Avenue, Cedarburg, WI 53012"

3.3.2.5 Data type: Text.

3.3.2.6 Domain of values: None.

3.3.2.7 Business Rules: An *Address Number* MUST be present if an *Address Number Prefix* is included.

3.3.2.8 Notes:

1. *Address Number Prefix* contains any additional identifier that precedes the *Address Number*, but does not include any separators such as spaces, hyphens, or other punctuation.
2. Most addresses do not include an address number prefix. When found, the *Address Number Prefix* is parsed from the complete address number so that the *Address Number* can be maintained as an integer for sorting and quality control tests.
3. Address number prefixes are known to be used in four unusual address numbering systems in the United States: Puerto Rico; certain parts of Hawaii; Queens and other areas of New York City; and certain counties and municipalities in Wisconsin and northern Illinois. (Other cases may also be found). The following notes explain each of the five in turn.
 - a. In Puerto Rico, address numbers are often preceded by a letter (e.g., "A" in "A 19 Calle 11"). The letter must be treated as an *Address Number Prefix*.
 - b. In certain parts of Hawaii, a number precedes the address number and is separated from it by a hyphen, (e.g., "5" in "5-5415"). The number indicates the taxing district responsible for maintaining the road. The number "5" (without the hyphen) must be treated as an *Address Number Prefix*.
 - c. In Queens Borough and nearby areas in New York City, most address numbers are hyphenated. The number to the left of the hyphen indicates the "block" (in theory—the number does not always change at street intersections and sometimes it changes within a single block). The number to the right of the hyphen indicates the site or house number within the "block." Thus 194-13 50th Street would occur on 50th Street just after it intersects 194th Avenue. If the site or house number is less than ten, it is written with a leading zero, as in 194-03½ in the examples in section 3.3.2.4. Within the CLDXF-US, these numbers can be constructed and parsed as follows:
 - The left-side number ("194" in "194-03½ 50th Street") is the *Address Number Prefix*.
 - The right-side number ("13" or "3", without the leading zero or the fractional part, in the examples above) is the *Address Number*.
 - The suffix, if any (such as the "½" in 194-03½), is an *Address Number Suffix*.
 - d. A number of communities and counties in Wisconsin and northern Illinois prefix their address numbers with map grid cell references. In the examples above:
 - "N89W16758" is read as "North 89 West Address Number 16758." The "N89W" is the *Address Number Prefix* and the "16758" is the *Address Number*.

- "W63N645" is read as "West 63 North Address Number 645." The "W63N" is the *Address Number Prefix* and the "645" is the *Address Number*.

The north and west values specify a locally defined map grid cell within which the address is located. The grid cell reference (everything up to and including the last letter) must be treated as an Address Number Prefix.

3.3.3 Address Number

3.3.3.1 CLDXF-US name (PIDF-LO name): *Address Number* (ca:HNO).

3.3.3.2 Definition: The integer identifier of a location along a thoroughfare or within a defined community.

3.3.3.3 Definition source: Adapted from IETF RFC 4119 [6] and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.1.2).

3.3.3.4 Examples:

- "123" in "123 Main Street"
- "19" in "A19 Calle 117, Toa Alta, PR"
- "119" in "119½ Elm Street"
- "16758" in "N89W16758 Appleton Avenue, Menomonee Falls, WI 53051"
- "645" in "W63N 645 Washington Avenue, Cedarburg, WI 53012"
- "19" in "A19 Calle 117, Toa Alta, PR"
- "3" in "194-03½ 50th Avenue, New York, NY 11365"

3.3.3.5 Data type: Non-negative Integer.

3.3.3.6 Domain of values: None.

3.3.3.7 Business Rules: A *Street Name* MUST be present if an *Address Number* is included.

3.3.3.8 Notes:

1. The *Address Number* is defined and must be stored as an integer to support address sorting, parity (even/odd/both) definition, and in/out of address range tests. Zero is an even number for parity purposes.

2. If an address includes a *Street Name*, it must also include an *Address Number* or *Distance Marker*, unless no address numbers/distance markers have been assigned along that street.
3. Some address numbers may be preceded by leading zeroes, which cannot be represented in an integer format. The leading zero is preserved for reference in the *Address Number Complete*.
4. Fractions or decimals following the address number (as distinct from any separators or other formatting) are placed in the *Address Number Suffix*. For example, the New York City hyphenated address 194-03½ 50th Avenue, New York, NY 11365 would be parsed as follows:
 - The *Address Number Prefix* would be "194";
 - the *Address Number* would be 3; and
 - the *Address Number Suffix* would be "½".
5. Zero should not be used to indicate there is no address number. Occasionally zero is issued as a valid address number (e.g., 0 Prince Street, Alexandria, VA 22314). If there is no integer portion of the complete address number, (e.g., ½ Fifth Avenue, New York, NY 10003) then "0" must be entered for the *Address Number*.
6. Wisconsin and Northern Illinois (examples: "N89W167"; "W63N"). A number of communities and counties in Wisconsin and northern Illinois prefix their address numbers with map grid cell references. In the examples above:
 - "N89W16758" is read as "North 89 West, Address Number 16758."
 - "W63N645" is read as "West 63 North, Address Number 645."

The north and west values specify a locally defined map grid cell within which the address is located. The grid cell reference (up to and including the last letter) must be treated as an *Address Number Prefix*.

3.3.4 Address Number Suffix

3.3.4.1 CLDXF-US name (PIDF-LO name): *Address Number Suffix* (ca:HNS).

3.3.4.2 Definition: An identifier in the portion of the complete address number that follows the integer Address Number in order to further specify a location along a thoroughfare or within a defined area.

3.3.4.3 Definition source: Adapted from IETF RFC 4119 [6] and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.1.3).

3.3.4.4 Examples:

- "½" in "194-03½ 50th Avenue, New York, NY 11365"
- "A" in "123 A Main Street"
- "A" in "123A Main Street"
- "A" in "123-A Main Street"

3.3.4.5 Data type: Text.

3.3.4.6 Domain of values: None.

3.3.4.7 Business Rules: An *Address Number* MUST be present if an *Address Number Suffix* is included.

3.3.4.8 Notes:

1. Most addresses do not include an address number suffix. Within the complete address number, the *Address Number* element must be an integer. The *Address Number Suffix* is that portion of the complete address number, excluding any separators such as spaces, hyphens, or other punctuation, that follows the *Address Number* element.
2. *Address Number Suffix* contains any decimal and fractional values as well as any other alphanumeric values that follow the integer address number, but does not include any separators such as spaces, hyphens, or other punctuation.
3. In the *Address Number Suffix*, fractions should always be represented as a single-character glyph (e.g., ½ and ¼). These single-character glyphs may be special characters in some database systems. Extra care needs to be taken when handling special characters, not only fractional glyphs but also forward slashes ("/"), backslashes ("\"), hyphens ("-"), and other characters that may require special treatment in other 9-1-1 functional elements. In some cases, this can be done locally by escaping the characters to treat them as string literals. It is up to the implementing agency to confirm what are special characters in their databases and functional elements and how to treat special characters as string literals if needed. In all cases, UTF-8 characters must be used for data exchange.

3.3.5 Address Number Complete

3.3.5.1 CLDXF-US name (PIDF-LO name): *Address Number Complete* (cdx2:HNC).

3.3.5.2 Definition: 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.

3.3.5.3 Definition source: Adapted from IETF RFC 6848, Specifying Civic Address Extensions in the Presence Information Data Format Location Object (PIDF-LO) [20] and the FGDC United States Thoroughfare, Landmark, and Postal Address Data Standard [10], (section 2.2.1.1).

3.3.5.4 Examples:

- "A19" in "A19 Calle 117, Toa Alta, PR"
- "123 A" in "123 A Main Street"
- "5-5415" in "5-5415 Kuhio Highway, Hanalei, HI 96714"
- "194-13" in "194-13 50th Avenue, New York, NY 11365"
- "194-03½" in "194-03½ 50th Avenue, New York, NY 11365"
- "N89W16758" in "N89W16758 Appleton Avenue, Menomonee Falls, WI 53051"
- "W63N 645" in "W63N 645 Washington Avenue, Cedarburg, WI 53012"

3.3.5.5 Data type: Text.

3.3.5.6 Domain of values: None.

3.3.5.7 Business Rules: A *Street Name* MUST be present if an *Address Number Complete* is included.

3.3.5.8 Notes:

1. The *Address Number Complete* contains all identifiers and numeric values, along with any internal separators and formatting, that precede the street name in a thoroughfare style address, with the exception of the space that would normally separate the complete address number from the street name.

3.3.6 Distance Marker

3.3.6.1 CLDXF-US name (PIDF-LO name): *Distance Marker* (cae:MP).

3.3.6.2 Definition: A distance travelled along a route such as a road or highway, indicated by a distance marker sign, typically a post or other marker indicating the distance in miles/kilometers from or to a given point.

3.3.6.3 Definition source: Adapted from IETF RFC 6848, Specifying Civic Address Extensions in the Presence Information Data Format Location Object (PIDF-LO) [20].

3.3.6.4 Examples:

- "Milepost 1303" in "Milepost 1303, Alaska Highway"
- "Km 2.7" in "Km 2.7, Carretera 175, Barrio San Antonio, Caguas, Puerto Rico 00725"
- "Mile Marker 12" in "Mile Marker 12, 12005 County Road 88"

3.3.6.5 Data type: Text.

3.3.6.6 Domain of values: None.

3.3.6.7 Business Rules: A *Street Name* MUST be present if a *Distance Marker* is included.

3.3.6.8 Notes:

1. An address may include a *Distance Marker* with or without an *Address Number*. If they are given together, it means that the address number occurs at the distance marker. Examples:
 - *Distance Marker* with no *Address Number*: "Milepost 12, County Road 88"
 - *Distance Marker* with *Address Number*: "Milepost 12, 12005 County Road 88" (Meaning: Address number 12005 is found at Milepost 12 on County Road 88.)

3.4 Named Location Elements

3.4.1 Introductory Note on Named Location Elements

This part of the standard defines and explains the use of named location elements in CLDXF-US. These specify a location, not by specifying a thoroughfare address, but rather by identifying features such as sites and buildings as well as locations within buildings such as units or rooms by name. The individual components of a complete location description that reference named features, other than places and thoroughfares (covered in Sections 3.1 and 3.2), are placed into the appropriate CLDXF-US elements based on the definitions provided here. The named location elements can be used to complement the thoroughfare address elements – either or both may be used as long as a valid identifier for a physical structure or site is provided. There is no limitation on how features are named – functional or descriptive phrases, proper names or alphanumeric identifiers can all be used. For example, "Building 1," "Ashcroft Library," and "Cafeteria" are all valid structure names.

Features referenced by named location elements may or may not be 'well known' or individually mapped in a GIS. In an emergency response context, location records may provide detail which can be used to precisely locate an incident only once responders are on the scene, by reference to signage or using local knowledge.

The named location elements along with somewhat simplified definitions are listed below:

- *Site* – An identified area of land, which may or may not have structures on it.
- *SubSite* – A named sub-area of a site, such as a parking lot.
- *Structure* – Any kind of “vertical” feature such as a building, cell tower, tank etc.
- *Wing* – A designated part of a structure that comprises a significant portion of the structure’s floor area.
- *Floor* – A defined vertical level within a structure.
- *Unit (type/value)* – Most commonly, a collection of rooms with distinct function or occupancy.
- *Room* – A single enclosed space within a structure.
- *Section* – An identified, unenclosed area within a structure.
- *Row* – A linear collection of seats, workstations, equipment, or storage.
- *Seat* – A single seat, workstation, or other “point” location within a structure.
- *Location Marker* – A uniquely identified infrastructure component such as a call box.

The elements from *Site* through *Room* (excepting *Floor*, see note below) in the listing above form a hierarchy from largest to smallest, where features higher in the hierarchy contain and aggregate features below. Note that for *Wing*, *Floor*, *Unit (type/value)*, and *Room* elements, a physical structure must be identified either by thoroughfare address or by name. In the most common case, named location elements are used to identify units within a structure that is identified by thoroughfare address. Also note that not every level of the hierarchy needs to be present in a location record. For example, there might be records for individual rooms in a named classroom building, without wing or unit being specified.

The *Section*, *Row*, and *Seat* elements are used to identify unenclosed areas or more precise locations such as individual workstations within a structure, wing, unit, or room. For example, the *Section*, *Row*, and *Seat* elements may exactly specify a location within a named structure like a football stadium without reference to wing, unit, or room.

The *Floor* element is not in the hierarchy of larger to smaller “horizontal” elements – but of course it is often critical in a response context.

The primary challenge in using these elements is classification of the components of the complete location description. Careful reading of the definitions and reference to the examples are recommended. This set of elements is intended to be comprehensive, such that a description of any named location can be unambiguously recorded using the CLDXF-US. Examples are provided for concert and sports venues, trailer parks, campus buildings, airports, shopping malls, hospitals, and other cases that may be problematic. For those cases where the appropriate classification of a component of a location description cannot be determined, the *Additional Location Information* element is provided.

3.4.2 Site

3.4.2.1 CLDXF-US name (PIDF-LO name): *Site* (cdx2:SITE).

3.4.2.2 Definition: The name of an exterior area which is publicly known and unique within a given place. A site may contain one or more structures and/or sub-sites.

3.4.2.3 Definition source: New.

3.4.2.4 Examples:

- "Winslow Park and Campground" in "Winslow Park and Campground, Freeport, ME"
- "Jack Perry Plaza" in "Jack Perry Plaza, College Park, MD"
- "Duke University" in "Duke University, Durham, NC"
- "Tiburon Golf Club" in "Tiburon Golf Club, 2620 Tiburon Drive, Naples, FL"
- "San Marcos Premium Outlets" in "San Marcos Premium Outlets, 3939 South Interstate 35, San Marcos, TX"

3.4.2.5 Data type: Text.

3.4.2.6 Domain of values: None.

3.4.2.7 Business Rules: A *Site* whose identifier is unique within the given set of place names MUST be included if none of the following are present in a CLDXF-US record:

- a *Street Name* and an *Address Number*
- a *Street Name* and a *Distance Marker*
- a *Structure* whose identifier is unique within the given set of place names
- a *Location Marker* whose identifier is unique within the given set of place names

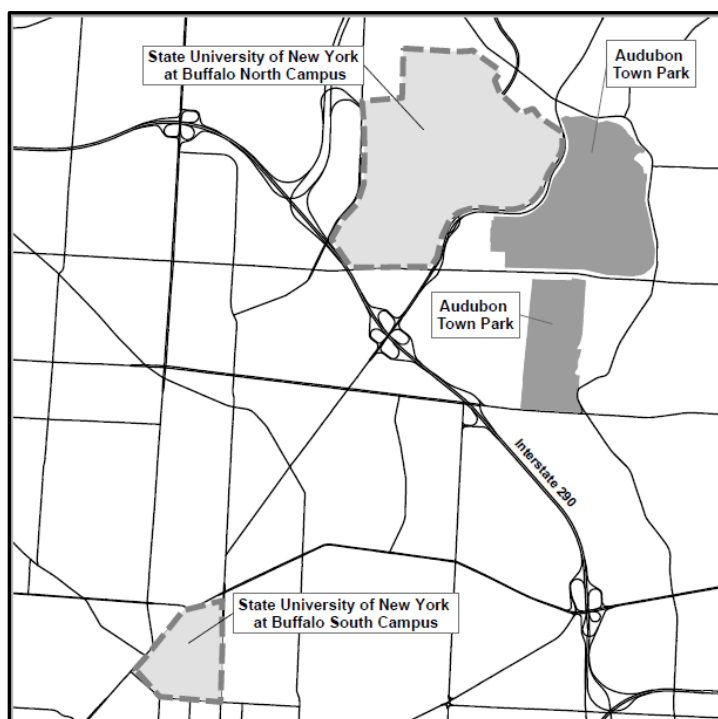
3.4.2.8 Notes:

1. A *Site* is often an area where there are numerous buildings such as a school campus, an industrial complex, a mall, or a residential development. However, *Site* may also refer to an area such as a historical or cultural site, a campground, a park, or a farm where there are few or no structures.
2. A *Site* typically has a single owner, use, or occupancy, as distinguished from the Place Name Elements represented by A1-A5.
3. Any exterior infrastructure at ground level such as tennis courts or parking lots would be classified as a *Site* or a *SubSite*. Any built feature with a vertical dimension is a *Structure*, including not only buildings but also underground parking garages, tanks, cell towers, sub-stations, and other similar infrastructure.

4. Areas which are distinctly identified and geographically separate are treated as different sites, even if they are associated with a single entity. For example, Figure 3-1 below shows two separate *Sites* for the State University of New York at Buffalo:

- *Site* (SITE) = "State University of New York at Buffalo North Campus"
- *Site* (SITE) = "State University of New York at Buffalo South Campus"

However, as also shown in Figure 3-1, a single site may be composed of several non-contiguous areas in close proximity, such as a park, campus, or similar feature divided by a roadway.



**Figure 3-1 SUNY Buffalo North & South;
Audubon Town Park**

5. Many named sites represent areas with multiple buildings which are collectively or individually assigned one or more thoroughfare addresses. Sites and buildings can be associated with a thoroughfare address simply by including the corresponding address number (or *Distance Marker*) and street name elements in the civic location record.

Site (SITE) = The Ohio State University
Structure (BLD) = Schottenstein Center
Address Number (HNO) = 555

Street Name (RD) = Borrer
Street Name Post Type (STS) = Drive

6. The following example shows a *Site* (SITE) and a *Structure* (BLD) in one CLDXF-US record, without any thoroughfare address information.

```
<?xml version="1.0" encoding="UTF-8"?>
<civicAddress xml:lang="en-US"
xmlns="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
xmlns:cdx2="urn:nena:xml:ns:pidf:nenaCivicAddr2">
  <country>US</country>
  <A1>FL</A1>
  <A2>Hillsborough</A2>
  <A3>Tampa</A3>
  <cdx2:SITE>University of South Florida</cdx2:SITE>
  <BLD>Sun Dome Stadium</BLD>
</civicAddress>
```

3.4.3 SubSite

3.4.3.1 CLDXF-US name (PIDF-LO name): *SubSite* (cdx2:SUBSITE).

3.4.3.2 Definition: The name of a sub-area within a larger area specified either by site name, by a thoroughfare address, or both.

3.4.3.3 Definition source: New.

3.4.3.4 Examples:

- "Buckeye Village" in "The Ohio State University, Buckeye Village"
- "South Cell Phone Lot" in "Orlando Airport, South Cell Phone Lot"
- "Zimmer Soccer Field" in "Central Park, Zimmer Soccer Field, Lawrence Township NJ"
- "Parking Lot" in "Parking Lot, 1000 Washington Street, Dorchester"
- "Tennis Courts" in "Sagamore Resort, Tennis Courts"
- "Lot 44" in "Cavalier Mobile Home Park, Lot 44, 5601 South Lake Drive, Texarkana, TX"

3.4.3.5 Data type: Text.

3.4.3.6 Domain of values: None.

3.4.3.7 Business Rules: One of the following that identifies a physical site MUST be present if a *SubSite* is included:

- A *Site*,
- A *Street Name* and *Address Number*
- A *Street Name* and *Distance Marker*

3.4.3.8 Notes:

1. Site names often identify extensive areas, which may contain smaller named areas. The *SubSite* element is used to identify such locations. There may be multiple civic location records referencing different sub-sites within the same site or at the same street address.

Site (SITE) = Franconia Notch State Park

SubSite (SUBSITE) = Cannon Mt Ski Area

Site (SITE) = Franconia Notch State Park

SubSite (SUBSITE) = LaFayette Campground

2. There may be some confusion as to whether a built feature such as a parking lot or a plaza is a sub-site or a structure. As noted above, sub-sites are exterior areas at ground level, as opposed to structures which have height.
3. For a given *Site* and *SubSite*, there may be multiple records referencing different structures. Examples:

Site (SITE) = Longwood Medical Area

SubSite (SUBSITE) = Harvard Medical School

Structure (BLD) = Building C2

Site (SITE) = Longwood Medical Area

SubSite (SUBSITE) = Harvard Medical School

Structure (BLD) = Gordon Hall

If it is necessary to specify several "levels" of detail for a non-structure location within a *Site* area, then all levels must be included in the *SubSite* element. These components of the *SubSite* element should be concatenated and ordered to reflect their geographic hierarchy from largest to smallest. Examples:

Site (SITE) = Wentworth Marina

SubSite (SUBSITE) = Dock C Slip 40A

Site (SITE) = State University of New York at Buffalo South Campus

SubSite (SUBSITE) = Main Street Lawn Basketball Courts

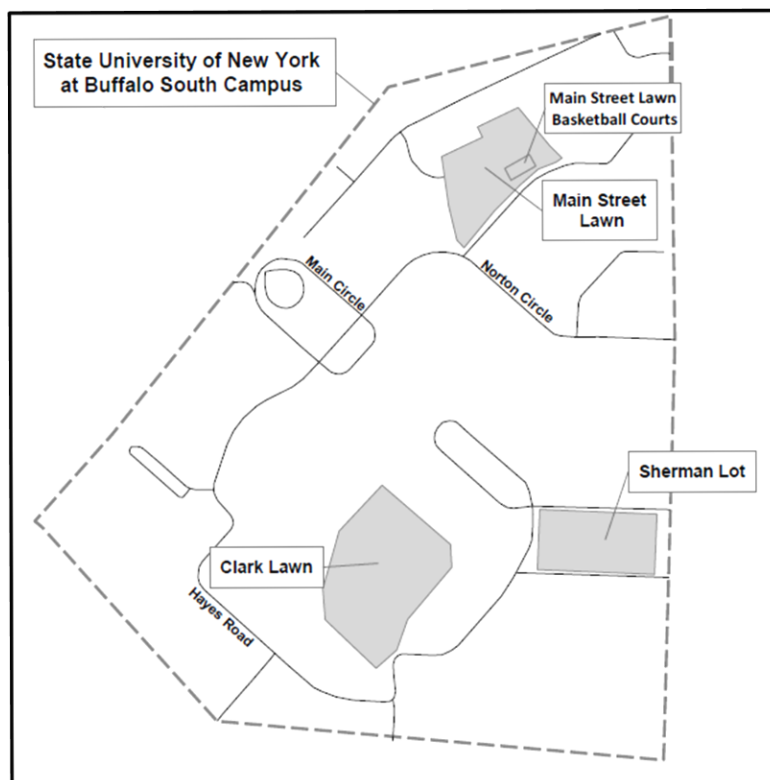


Figure 3-2 Example of SubSites within a Site

3.4.4 Structure

3.4.4.1 Note on Structure element

A common requirement in creating location records is to provide a distinct identifier for each of several structures that share a thoroughfare address. A similar need exists when structures on a campus, a housing complex, or similar sites are primarily known by name, whether or not a thoroughfare address has been assigned. The following sections cover both situations.

The *Structure* element stores the names or other identifiers for all structures with a vertical dimension as discussed in Note 3 for Section 3.4.4.9. This includes both conventional buildings which have walls, doors, and a roof, and other kinds of structures such as cell towers, transformer stations, fuel tanks, and so on.

Structures may be identified by proper or generic names ("Coppin Hall," "Cafeteria") or by alphanumeric IDs ("Building A26"). All these will be referred to as structure names or structure identifiers in the discussion below.

The official structure identifier should be used in CLDXF-US. If there are several distinct identifiers associated with a given structure, the one selected will be most useful if it matches what is displayed on the structure exterior or signage and is familiar to members of the community. Additional structure alias records may be created in a location database for a variety of purposes.

3.4.4.2 CLDXF-US name (PIDF-LO name): *Structure* (ca:BLD).

3.4.4.3 Definition: A built feature which has a vertical dimension, including both conventional buildings which have walls, doors, and a roof, and other kinds of infrastructure such as cell towers, transformer stations, fuel tanks, and so on.

3.4.4.4 Definition source: Adapted from IETF RFC 4776 [8] and RFC 5139 [7].

3.4.4.5 Examples:

- "Fuel Storage Shed" in "100 Cantwell Avenue, Fuel Storage Shed"
- "Welcome Center" in "Orlando Sanford International Airport, Welcome Center"
- "Kottman Hall" in "2021 Coffey Road, The Ohio State University, Kottman Hall"
- Roberto Clemente Bridge

3.4.4.6 Data type: Text.

3.4.4.7 Domain of values: None.

3.4.4.8 Business Rules: A *Structure* whose identifier is unique within the given set of place names MUST be included if none of the following are present in a CLDXF-US record:

- A *Street Name* and an *Address Number*
- A *Street Name* and a *Distance Marker*
- A *Site* whose identifier is unique within the given set of place names
- A *Location Marker* whose identifier is unique within the given set of place names

A structure identifier MUST be unique in the context of a site, or within a group of buildings identified by thoroughfare address, in order to define the location unambiguously. Otherwise, any *Structure* identifier MAY be provided.

3.4.4.9 Notes:

1. *Structure* identifiers should be complete and fully spelled out with no abbreviations. Building names typically include either the generic type word "Building" or a specific type word such as "Terminal" or "Library," and these should be included where they form part of the name. Clearly descriptive type words are especially important in

identifying non-building structures such as cell towers or fuel tanks. For example, if one amongst a group of fuel tanks at a tank farm is labelled "Number 5" in the source data, "Fuel Tank Number 5" would be a preferred identifier in the CLDXF-US location record.

2. In some cases, a location record may contain a structure identifier with no *Site* name or assigned thoroughfare address. Such structures will usually have visible signage and/or their identifiers will be publicly known. For location records with no *Site* name or assigned thoroughfare address, the structure identifier must be unique within the place specified.

There is no fixed relationship between the *Structure* element and the thoroughfare address elements – more than one thoroughfare address may be assigned to a single structure, or the same thoroughfare address may be assigned to several structures.

Here is an example of a civic location record which includes a named *Structure* and a thoroughfare address:

Street Name (RD) = Causeway
Street Name Post Type (STS) = Street
Address Number (HNO) = 135
Structure (BLD) = North Station

Here is an example of a named *Structure* with both a *Site* and a thoroughfare address:

Street Name (RD) = Newell
Street Name Post Type (STS) = Drive
Address Number (HNO) = 882
Site (SITE) = University of Florida
Structure (BLD) = Carr Hall

Here is an example of a named *Structure* on a site:

Site (SITE) = Massachusetts Institute of Technology
Structure (BLD) = Dreyfus Building

3. Structure identifiers should be relatively permanent. If a business or other organization name is used, which may change, there must be a mechanism in place to update location records in all associated databases.
4. Physically contiguous spaces such as attached townhouse-style residential units that have separate exterior access should be treated as separate structures rather than wings or units if most or all of the following conditions are met:
 - the two spaces contain unrelated entities,
 - management, utilities, and ownership are distinct,
 - there is no access between the spaces,

- there is no identifier for the whole footprint, and/or
- separate street numbers have been assigned.

Sometimes separate buildings in a campus setting (e.g., a large hospital or educational institution) are joined, and the type-word "Building" or equivalent is retained to identify that portion of the larger footprint. These should be classified as *Structures* to avoid confusion, even if they do not meet the criteria listed above. In Figure 3-3, the Shields Warren Building, the Mayer Building, and the Dana Farber Building are physically connected, and they are all part of the Dana Farber Cancer Institute – but for historic reasons they are called "Building" and should be classified as *Structures* in CLDXF-US.

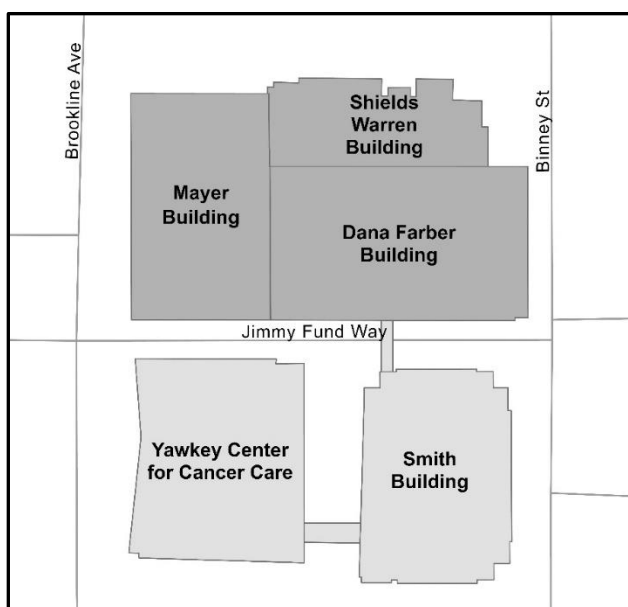


Figure 3-3 Example of physically connected structures

3.4.5 Wing

3.4.5.1 CLDXF-US name (PIDF-LO name): *Wing* (cdx2:WING).

3.4.5.2 Definition: A designated part of a structure which spans one or many floors, typically including more than one unit or room and representing a significant portion of the structure floor area.

3.4.5.3 Definition source: New.

3.4.5.4 Examples:

- "Concourse A" in "Pittsburgh International Airport, Airside Terminal, Concourse A"
- "North Quadrant" in "Spring Valley Mall, North Quadrant"

3.4.5.5 Data type: Text.

3.4.5.6 Domain of values: None.

3.4.5.7 Business Rules: At least one of the following MUST be present to identify a physical structure if a *Wing* is included:

- A *Structure* identifier
- A *Street Name* and an *Address Number*
- A *Street Name* and a *Distance Marker*

3.4.5.8 Notes:

1. A wing may be identified with the type word "Wing", but other type words describing similar physical configurations may be used such as "Zone" or "Quadrant." A wing may also be identified by distinct occupancy or function using type words such "Center" or "Concourse" as in the airport terminal in Figure 3-4 below.

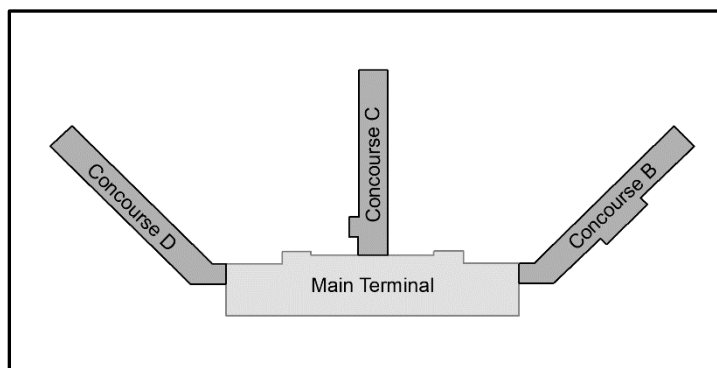


Figure 3-4 Example of a concourse represented as a *Wing* element

2. The *Wing* element may be needed to uniquely identify a given space. For example, in the assisted living complex in Figure 3-5 below, the distinct parts of the main structure ("Villages") would be classified as *Wings*. Unit numbers are duplicated between these "Villages" and for this reason, the *Wing* element must be included in the location record to unambiguously specify a unit.

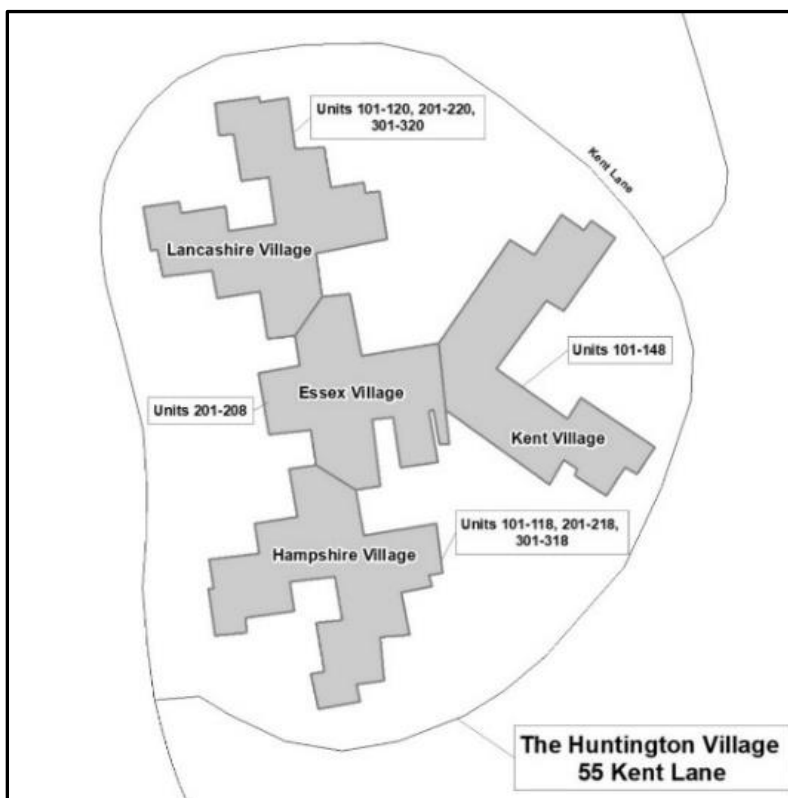


Figure 3-5 Example of an assisted living complex with multiple *Wing* elements

3. The *Wing* element may be used with reference to floor plans or on-site signage. For example, Figure 3-6 below shows a hospital building with patient rooms in distinct wings. A location record for an individual room might be formatted as follows:

Room (ROOM) = 1E63

Floor (FLR) = 1

Wing (WING) = E Wing

Structure (BLD) = Ward Tower

Site (SITE) = UAMS University Hospital

In this case, the room number includes reference to the wing, so the *Wing* element is not strictly necessary to uniquely specify rooms, but it should still be included to support responders who might not be familiar with the room numbering convention.

4. In some physical configurations, it may not be clear whether to treat a given space as a wing or a unit. In most cases, the key criterion is scale. Typically, a *Wing* is much larger than a collection of rooms, includes a large fraction of the structure, and has multiple floors or smaller sub-spaces. If this criterion is not clearly met, then rooms should be aggregated into units, and the *Wing* element should only be used if necessary, as outlined in Notes 2 and 3 above.

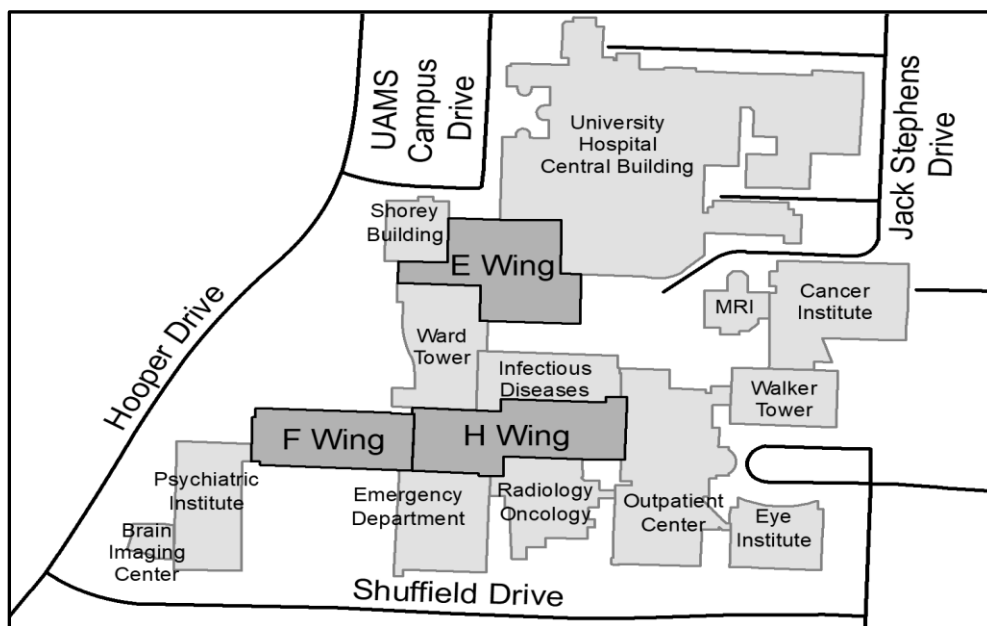


Figure 3-6 Example of Multiple *Wing* elements on the UAMS Campus

3.4.6 Floor

3.4.6.1 CLDXF-US name (PIDF-LO name): *Floor* (ca:FLR).

3.4.6.2 Definition: The standardized identifier for a story or level within a structure, wing, or unit.

3.4.6.3 Definition Source: Adapted from IETF RFC 4119 [6] and RFC 4776 [8].

3.4.6.4 Examples:

- "5" in "800 Jefferson Street, 5th Floor"
- "Mezzanine" in "800 Jefferson Street, Mezzanine"

3.4.6.5 Data Type: Text

3.4.6.6 Domain of values: None

3.4.6.7 Business Rules: At least one of the following **MUST** be present to identify a physical structure if a *Floor* is included:

- A *Structure* identifier
- A *Street Name* and an *Address Number*
- A *Street Name* and a *Distance Marker*

3.4.6.8 Notes:

1. A few simple rules should be followed to standardize content of the *Floor* element.
 - Many floors are identified solely by specific type words such as "Basement," "Mezzanine," or "Balcony." These words should be fully spelled-out and placed in the *Floor* element.
 - Floors are often identified using the type word "Floor" in combination with numeric values, which may be expressed as ordinal words, ordinal numbers, numbers, or number words. For example, "Second Floor," "Floor 2," or "2nd Floor" could all be used to refer to the second floor. All these different number forms should be represented as a plain integer in the *Floor* element, thus "Second," "2nd," and "Two" should all be represented by the number "2" in the *Floor* element with no additional type word.
 - In all other cases, both type and value words should be fully spelled out and included in the *Floor* element. This rule also applies where a specific type word other than "Floor" precedes a numeric value. For example, if the complete identifier is "Sub-basement 2," both type and value words should go into the *Floor* element.

3.4.7 Introductory Note on Unit Elements

A unit is typically a group or suite of rooms within a structure that are under common ownership or tenancy and do not have a separately assigned street address. The most common kinds of unit are residential apartments or condominiums, or spaces occupied by a single business within a larger commercial building, but a unit can also be a collection of rooms comprising a department or functional area within a single enterprise. Usually, a unit is on a single floor, but a unit can span multiple floors.

Distinct occupancy, control, or use is the key characteristic of a unit. For example, a single-room studio apartment in a residential apartment building or a storage unit in a self-storage facility would be classified as units because they are distinctly occupied and controlled even though they are single rooms.

This also applies to stores in a small strip mall or side-by-side residential units in a “rowhouse” or “townhouse” configuration. However, if separate street numbers instead of unit identifiers are assigned to side-by-side businesses or residential units, then they should be treated as separate structures rather than units.

Physical configuration is also important. If a space is physically configured as a collection of rooms which also individually need to be identified, then the space should be classified as a unit even if it is not labelled as such.

Exterior features such as lots in a mobile home park or slips at a marina are not contained within structures and do not meet the CLDXF-US definition of a unit. Their complete identifiers should be stored in the *SubSite* element instead.

In what follows, the word “unit” is used to refer to the physical entity as defined above. The phrase “complete unit identifier” refers to the entire string that identifies a given unit.

Units are often specified using a type word, such as “Apartment,” followed by a unique identifier such as “1A.” CLDXF-US parses these into separate elements, *Unit Pre Type* and *Unit Value*, as defined below. The *Unit Value* must always be populated, whereas *Unit Pre Type* may or may not be present. If both are provided then they can be concatenated to reconstruct the complete unit identifier.

3.4.8 Unit Pre Type

3.4.8.1 CLDXF-US name (PIDF-LO name): *Unit Pre Type* (cdx2:UNIT_PRETYPE).

3.4.8.2 Definition: Part of the complete unit identifier that precedes the Unit Value and indicates the kind of unit.

3.4.8.3 Definition source: New.

3.4.8.4 Examples:

- “Apartment” in “422 Via Casitas, Apartment 12”
- “Suite” in “4300 Flamingo Avenue, Suite 3103”

3.4.8.5 Data type: Text.

3.4.8.6 Domain of values: None.

3.4.8.7 Business Rules: A *Unit Value* MUST be present if a *Unit Pre Type* is included.

3.4.8.8 Notes:

1. *Unit Pre Type* and *Unit Value*: As noted in Section 3.4.7, complete unit identifiers often consist of a type word followed by a value word, such as "Apartment 1A", "Suite B", or "Unit 201". In these cases, the initial type word goes into the *Unit Pre Type* element and the remainder of the complete identifier that uniquely identifies a unit of that type goes into the *Unit Value* element.

The parsing of complete unit identifiers into type and value, which involves initial additional effort on the part of data managers, will save effort in the long term. Different type words, such as "Apartment" or "Unit" or symbols such as "#" may be used interchangeably by different addressing stakeholders to reference the same unit. In most cases there is only one kind of unit at a given address, and only the unit value is needed to distinguish a particular unit, so variations in the type word cause unnecessary discrepancies in validation of these records.

In some cases, however, the type word is also needed to uniquely identify the unit, for example if both "Unit A" and "Suite A" exist at a given address. Also, even if not needed to uniquely identify a unit, the type word as assigned by the facility manager, 9-1-1 authority, or addressing authority may be considered a useful part of the complete identifier for display or other purposes. The CLDXF-US separates *Unit Pre Type* and *Unit Value* so that 9-1-1 system managers can decide whether they want to use one or both in a given functional context.

2. *Unit Pre Type* not required: The *Unit Value* element must always be populated if there is a unit being identified in the location record whereas *Unit Pre Type* may or may not be populated.
3. *Unit Pre Type* must precede *Unit Value*: Any type word following the value word is included in the *Unit Value* element. Thus, for "Lilac Suite" in a hotel, the entire phrase would go into the *Unit Value* element.
4. Standardizing *Unit Pre Type*: There is no domain for *Unit Pre Type*, unless one is created by a 9-1-1 or addressing authority, but fully-spelled out words must be used.

3.4.9 Unit Value

3.4.9.1 CLDXF-US name (PIDF-LO name): *Unit Value* (cdx2:UNIT_VALUE).

3.4.9.2 Definition: Part of the complete unit identifier that uniquely identifies a particular unit.

3.4.9.3 Definition source: New.

3.4.9.4 Examples:

- "12" in "422 Via Casitas, Apartment 12"
- "3103" in "4300 Flamingo Avenue, Suite 3103"

3.4.9.5 Data type: Text.

3.4.9.6 Domain of values: None.

3.4.9.7 Business Rules: At least one of the following **MUST** be present to identify a physical structure if a *Unit Value* is included:

- A *Structure* identifier
- A *Street Name* and an *Address Number*
- A *Street Name* and a *Distance Marker*

3.4.9.8 Notes:

1. *Unit Value* required: The *Unit Value* element must be populated if there is a unit being identified in the location record. So, if an accessory apartment in a residence is identified simply as "Apartment," then "Apartment" would go into the *Unit Value* element even though it might normally be considered a type word.
2. Type word following value goes into *Unit Value*: As stated in, Note 3 for *Unit Pre Type*, if the complete unit identifier consists of a unique value followed by a type word, the entire string goes into the *Unit Value* element. Thus, "In-law Apartment" in a residence, "Mandarin Suite" in a hotel, or "Intensive Care Unit" in a hospital would go into the *Unit Value* element. Only type words preceding the value word go into the *Unit Pre Type* element.
3. Informal positional identifiers: Often in situations where formal unit identifiers have not been assigned, a positional word such as "Left," "Upper," or "Rear" is used to identify a unit. Such identifiers should be placed in the *Unit Value* element. However, if positional words are used to identify a separate structure on a lot, then they should be placed into the *Structure* element.
4. *Floor*: Where known, the *Floor* element should be populated, even if the *Unit Value* includes the floor value. "Unit 3101" might indicate that the unit is on the 31st floor, but that cannot be presumed. Giving the floor value explicitly helps to locate the unit.

Similarly, if the complete unit identifier consists of a floor name, as in "Basement," or a floor name followed by a type word, as in "Basement Apartment," or by a combination of floor name and informal identifier, as in "Basement Rear," the complete unit identifier would go into the *Unit Value* element.

5. Simplifying/standardizing *Unit Values*: Different sources may use various formats for unit values which identify the same unit. CLDXF-US cannot dictate how to format unit values — such decisions are in the purview of property managers working with

local 9-1-1 and addressing authorities. However, the elimination of unnecessary punctuation and spaces will tend to reduce the number of exact-string-match discrepancies which have to be dealt with. For example, different sources might enter "1-A" or "1A" or "1 A" to refer to the same unit. If all parties use the most compact form of the unit identifier, in this case "1A" with no space or punctuation, this will avoid discrepancies. Of course, punctuation must not be eliminated where it would introduce ambiguity. Thus, an identifier like "1-21" in a low-rise housing complex, where the first number indicates the building and the second the unit with a dash separating the two numbers, must be left as is.

3.4.10 Room

3.4.10.1 CLDXF-US name (PIDF-LO name): *Room* (ca:ROOM).

3.4.10.2 Definition: A single, distinctly identified, enclosed space within a structure.

3.4.10.3 Definition source: Adapted from IETF RFC 5139 [7] and RFC 4776 [8].

3.4.10.4 Examples:

- "E427" in "Gilman Memorial Hospital, Room E247"
- "Lobby" in "1200 Main Street, Lobby"

3.4.10.5 Data type: Text.

3.4.10.6 Domain of values: None.

3.4.10.7 Business Rules: At least one of the following MUST be present to identify a physical structure if a *Room* is included:

- A *Structure* identifier
- A *Street Name* and an *Address Number*
- A *Street Name* and a *Distance Marker*

3.4.10.8 Notes:

1. Fully spelled-out and type words included, except for the pre-type word "Room": Rooms within institutional or commercial buildings are often identified using sequential numbering schemes, as in a space labelled "Room 201." Rooms are also frequently identified by use or function, as in "Dining Room" or "Operating Room." If the type word "Room" precedes the identifier, then only the identifier (value word) should be placed in the *Room* element. In all other cases, the type word should be included in the *Room* element, and type words and functional identifiers should be fully spelled-out.

2. Functional labels versus alphanumeric IDs: Sometimes both a sequential or alphanumeric ID and a descriptive word or phrase may be associated with a given room, for example "Room 201, Science Lab." One must be chosen as the primary identifier for CLDXF-US. Considerations in making such a choice include:
 - Prefer the authoritative name assigned by property manager/occupant.
 - Be consistent with signage at the entrance of the space or pointing to it.
 - Choose persistent, unique identifiers.
 - Consider how space is known to the community.

One important point relating to (c) above is that using functional or descriptive identifiers that might change as opposed to more permanent alphanumeric or sequential IDs requires a commitment to maintaining them. A generic space that is identified as a conference room might become an office, or an office labelled with a person's name might get a new occupant. On the other hand, a cafeteria with built-in kitchen equipment and food display cases is likely to remain a cafeteria. It may be necessary to consider several of the criteria listed above in deciding which identifier to use. For example, a room might be known as Room 201 in a facility management system (authoritative identification), but also have built in lab benches, a big sign on the door saying only "Science Lab" and be universally known as such. In these cases where there are inconsistencies it may be helpful to work with facility managers and other stakeholders to make the best decision.

3. Naming schemes: Complete identifiers for locations in complex settings may encode multiple named location elements. For example, a hospital room might be identified as "A-E307" where "A" is a building tower, "E" refers to the east wing of that tower, and "A-E307" is the room number posted on the door. The components of the identifier should go into the matching elements in a way that matches signage and how these features are known to hospital staff, as in the following example:

Site (SITE) = Mariana Memorial Medical Center

Structure (BLD) = Tower A

Wing (WING) = East Wing

Floor (FLR) = 3

Room (ROOM) = A-E307

4. Rooms within rooms: A space labelled as a "Room" should be presumptively classified as such. However, the physical configuration may be at odds with the label, when a space identified as a "Room" provides access to and contains smaller enclosed spaces within it which are also identified as rooms. This creates a conflict, since there can be only one *Room* element in a given location record. If, in such cases, there are sub-spaces whose size and function qualify them as "rooms" and which need to be included in a location record, then the larger space

should be classified as a *Unit* with the *Unit Pre Type* of "Room", and the sub-spaces should be classified as *Room* values.

Example:

Structure (BLD) = McCormick Office Building

Unit Pre Type (UNIT_PRETYPE) = Room

Unit Value (UNIT_VALUE) = 219

Room (ROOM) = Berkshires Conference Room

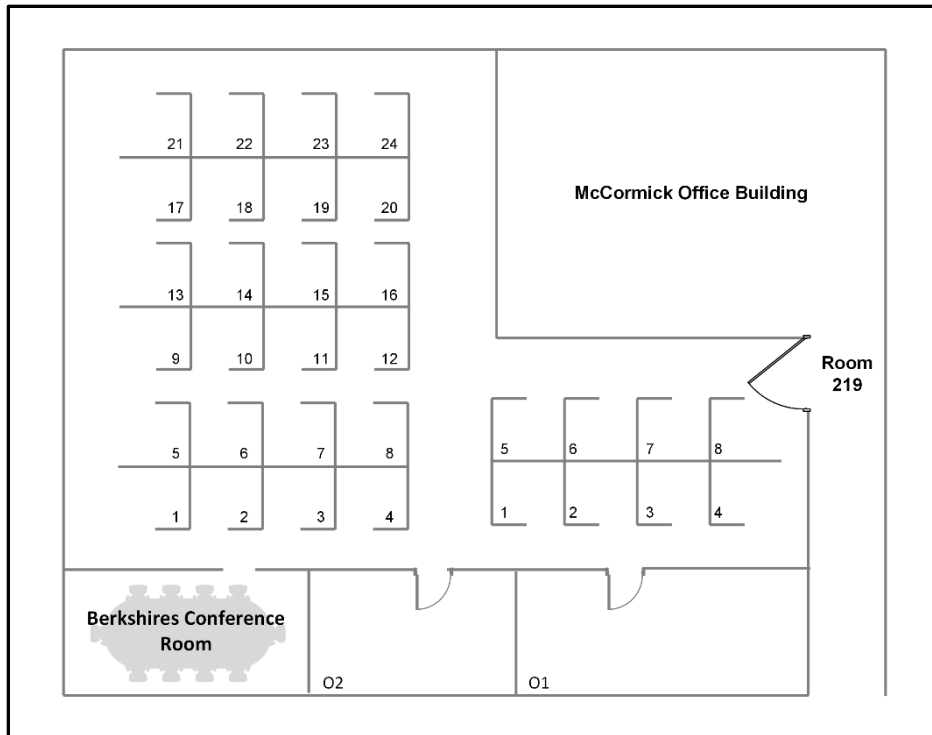


Figure 3-7 Example of room within a room

3.4.11 Section

3.4.11.1 CLDXF-US name (PIDF-LO name): *Section* (cdx2:SECTION).

3.4.11.2 Definition: An identified, unenclosed area within a structure, wing, unit, or room.

3.4.11.3 Definition source: New.

3.4.11.4 Examples:

- "Customer Seating" in "Coastland Mall, Food Court, Customer Seating"
- "Waiting Area" in "Logan International Airport, Terminal B, Gate B21, Waiting Area"

3.4.11.5 Data type: Text.

3.4.11.6 Domain of values: None.

3.4.11.7 Business Rules: At least one of the following **MUST** be present to identify a physical structure if a *Section* is included:

- A *Structure* identifier
- A *Street Name* and an *Address Number*
- A *Street Name* and a *Distance Marker*

3.4.11.8 Notes:

1. Type words included except for the pre-type word "Section": Element values should be fully spelled-out and type words included, except for the pre-type word "Section."
2. Sections may be identified using the type word "Section" in combination with numeric values, which may be expressed as ordinal words, ordinal numbers, numbers, or number words. For example, "Second Section," "Section 2," or "2nd Section" could all be used to refer to the second section. All these different number forms should be represented as a plain integer in the *Section* element, thus "Second," "2nd," and "Two" should all be represented by the number "2" in the *Section* element with no additional type word.
3. Temporary sub-spaces: Often in event venues, temporary partitions are used to split a large room into sub-spaces. If location records are needed for these, *Section* should be used.

Example:

Structure (BLD): Four Seasons Hotel

Room (ROOM): Grand Ballroom

Section (SECTION): West

4. *Section* may aggregate *Rows* and/or *Seats*: *Section* will often be used to identify a sub-area which contains a collection of seats or cubicles (*Seats*) within a larger space. Sections containing seats or cubicles may be internally organized into rows as well. Note that a *Section* need not be part of a room or unit, but it must be within a structure identified either by a value in the *Structure* element or a thoroughfare address.

Example:

Site (SITE) = University of Texas Austin

Structure (BLD) = Texas Memorial Stadium

Floor (FLR) = Upper Deck

Section (SECTION) = 129
Row (ROW) = B
Seat (SEAT) = 3

Example:

Structure (BLD) = Warehouse 3
Section (SECTION) = Paper Products
Row (ROW) = Aisle 4

5. Sub-spaces within large open areas: The *Section* element should be used to identify an unenclosed area within a large open interior space, such as a functional area on a factory floor or an identified sub-division of a large warehouse.

Example:

Site (SITE) = Walker Plant
Structure (BLD) = Main Assembly Building
Section (SECTION) = Powder Coat

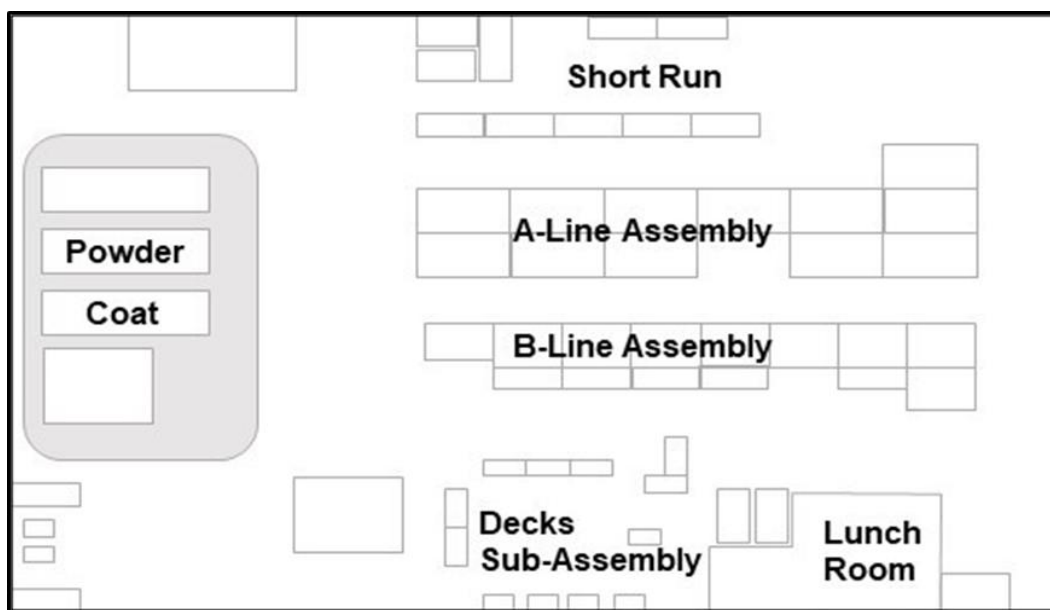


Figure 3-8 Example of *Section* and *Row* elements in a factory setting

3.4.12 Row

3.4.12.1 CLDXF-US name (PIDF-LO name): *Row* (cdx2:ROW).

3.4.12.2 Definition: An identified linear feature, such as a linear arrangement of seats, workstations, equipment, or storage, within a structure, wing, unit, or room.

3.4.12.3 Definition source: New.

3.4.12.4 Examples:

- "Aisle 4" in "Warehouse 3, Aisle 4"
- "AA" in "Theater 4, Row AA, Seat 5"
- "B-Line Assembly" in "Walker Plant, Main Assembly Building, B-Line Assembly"

3.4.12.5 Data type: Text.

3.4.12.6 Domain of values: None.

3.4.12.7 Business Rules: At least one of the following **MUST** be present to identify a physical structure if a *Row* is included:

- A *Structure* identifier
- A *Street Name* and an *Address Number*
- A *Street Name* and a *Distance Marker*

3.4.12.8 Notes:

1. Fully spelled-out and type words included, except the word "Row": Rows may be formally or informally identified, but in all cases the complete identifier should be fully spelled-out and type words should be included, except for the type word "Row."
2. Rows may be identified using the type word "Row" in combination with numeric values, which may be expressed as ordinal words, ordinal numbers, numbers, or number words. For example, "Second Row," "Row 2," or "2nd Row" could all be used to refer to the second row. All these different number forms should be represented as a plain integer in the *Row* element, thus "Second," "2nd," and "Two" should all be represented by the number "2" in the *Row* element with no additional type word.
3. *Row* may aggregate *Seat*: *Row* will often be used to identify a linear grouping of seats or cubicles (*Seats*) within a larger space. Note that a row need not be part of a room or unit, but it must be within a physical structure identified either by a value in the *Structure* element or by thoroughfare address.

Example:

Site (SITE) = University of Texas Austin
Structure (BLD) = Texas Memorial Stadium
Floor (FLR) = Upper Deck
Section (SECTION) = 129
Row (ROW) = B
Seat (SEAT) = 3

4. A *Row* may contain no *Seats*.

Example:

Structure (BLD) = Publix Supermarket

Row (ROW) = Aisle 12

3.4.13 Seat

3.4.13.1 CLDXF-US name (PIDF-LO name): *Seat* (ca:SEAT).

3.4.13.2 Definition: An identified seat, desk, workstation, or similar precise location within a structure, wing, unit, room, section, or row.

3.4.13.3 Definition source: Adapted from IETF RFC 5139 [7] and RFC 4776 [8].

3.4.13.4 Examples:

- "Cubicle A-7" in "1 Ashburton Place, Room 819, Cubicle A-7"
- "Registration Desk" in "Grand Hotel, 1101 Madison Street, Registration Desk"
- "5" in "Theater 4, Row AA, Seat 5"

3.4.13.5 Data type: Text.

3.4.13.6 Domain of values: None.

3.4.13.7 Business Rules: At least one of the following MUST be present to identify a physical structure if a *Seat* is included:

- A *Structure* identifier
- A *Street Name* and an *Address Number*
- A *Street Name* and a *Distance Marker*

3.4.13.8 Notes:

1. Fully spelled-out and type words included, except the word "Seat": The complete identifier should be fully spelled-out and the pre-type word should be included, unless the pre-type word is "Seat."

3.4.14 Additional Location Information

3.4.14.1 CLDXF-US name (PIDF-LO name): *Additional Location Information* (ca:LOC).

3.4.14.2 Definition: Information that relates to location but does not meet the definition of any other named location elements.

3.4.14.3 Definition source: Adapted from IETF RFC 4119 [6] and 4776 [8] (Section 3.4).

3.4.14.4 Examples:

- Main Loading Dock
- Stairwell C
- Elevator Bank 14-21

3.4.14.5 Data type: Text.

3.4.14.6 Domain of values: None.

3.4.14.7 Business Rules: One of the following MUST be present if *Additional Location Information* is included:

- A *Street Name* and an *Address Number*
- A *Street Name* and a *Distance Marker*
- A *Site* whose identifier is unique within the given set of place names
- A *Structure* whose identifier is unique within the given set of place names

3.4.14.8 Notes:

1. Fully-spelled out words are always used for data exchange; type words should be included.
2. Named location data that does not fit in any other named location element may be placed in the *Additional Location Information* element.
3. This element "is an unstructured string specifying additional information about the location, such as the part of a building or other unstructured information" (IETF RFC 4776 [8] section 3.4).

3.4.15 Location Marker

3.4.15.1 CLDXF-US Name (PIDF-LO name): *Location Marker* (cae:PN)

3.4.15.2 Definition: 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 feature.

3.4.15.3 Definition source: Modified from RFC 6848 [20].

3.4.15.4 Examples:

- Call Box CC-680-118 (an emergency call box on Interstate 680 in Contra Costa County, CA)
- Standpipe 100 5th AVE (a standpipe at 100 5th Avenue, New York, NY)
- Pole 12 (a blue light pole in Mize Azalea Garden, Stephen F Austin State University, Nacogdoches, TX)
- Low Water Crossing #21, 6334 Joe Tanner Lane, Austin, TX
- Trail Intersection 15, Bradley Palmer State Park, Ipswich, MA
- Channel Marker 18, Gordon Pass, Collier County, FL

3.4.15.5 Data type: Text.

3.4.15.6 Domain of values: None.

3.4.15.7 Business Rules: A *Street Name*, *Structure*, or *Site* MUST be present or *Location Marker* MUST be unique within the given place.

3.4.15.8 Notes:

1. Some infrastructure features with a small footprint are not appropriately classified as structures. These locations may be relevant for emergency response, and their identifiers can be placed in the *Location Marker* element.
2. *Location Marker* may identify interior or exterior features.
3. *Location Marker* is distinct from *Distance Marker* in that *Location Marker* identifies a physical feature rather than a distance along a thoroughfare. In NENA-STA-006.2, the NENA Standard for NG9-1-1 GIS Data Model, the term "location marker" is used to include both markers of a distance along a thoroughfare AND markers associated with a physical feature unrelated to any distance measure. The conflict between CLDXF-US and NENA STA-006.2 NG9-1-1 GIS Data Model will be resolved in a future version of the NG9-1-1 GIS Data Model.
4. Since *Location Marker* can identify many different kinds of feature, both type and value words should be included in the element, e.g., "Call Box CC-680-118."
5. Nautical markers whose sole function is to indicate distance along a waterway should be treated as distance markers rather than location markers.
6. Some infrastructure features such as utility poles may not be located along a known thoroughfare or within a known site however, if they are uniquely identified within a given place then their identifiers may be placed in the *Location Marker* element.
7. Signposts or poles may carry signage that identifies other kinds of features, such as sub-areas in a parking lot; these identifiers should be placed in the appropriate *Site*, *Structure*, *SubSite*, or other corresponding element rather than into the *Location Marker* element. However, some poles with signage, for example at a jurisdiction

boundary, may be considered useful location markers and placed into the *Location Marker* element.

3.5 Address Descriptor

3.5.1 Introductory Note on Address Descriptor

Address descriptors do not contain data that is part of an address. They contain attributes for feature(s) at the given location.

3.5.2 Place Type

3.5.2.1 CLDXF-US name (PIDF-LO name): *Place Type* (ca:PLC).

3.5.2.2 Definition: The type of feature identified by the address.

3.5.2.3 Definition source: Adapted from "Location Types Registry" (IETF RFC 4589 [23]).

3.5.2.4 Examples: Airport, arena, bank, hospital, hotel, government, industrial, library, office, parking, warehouse, water, etc.

3.5.2.5 Data type: Text.

3.5.2.6 Domain of values: Allowable values are restricted to terms listed in the Internet Assigned Numbers Authority (IANA) Location Types Registry. The registry is posted at: <http://www.iana.org/assignments/location-type-registry/location-type-registry.xml>.

3.5.2.7 Business Rules: None.

3.5.2.8 Notes:

1. The *Place Type* element is not part of the address; it is an attribute of the location. The Place Type may optionally be used to indicate the type of feature at a given address which is often valuable to emergency responders. Acceptable terms are listed in a PIDF-LO registry. The Place Type element notes explain how to propose new terms for inclusion in the registry and some of its limitations.
2. The IANA Location Types Registry is intended to provide a standard set of categories and terms for "describing the types of places a human or end system might be found." The registry is intended for use with other types of locations in addition to addresses, such as mobile computing environments, so it includes *Place*

- Type* terms that do not pertain to address features, such as "airplane", "bicycle", "automobile", "truck", "bus", "watercraft", and "underway" (a vehicle in motion).
3. The IANA Location Types Registry provides (as of March 2022) 45 terms, with informal definitions and examples. However, the terms are neither exclusive nor exhaustive (that is, the terms overlap with each other to an undefined extent, and they do not cover all possible types). No data model or principles of classification are given, so users have little guidance on how to handle ambiguous cases or when a new term is needed.
 4. The original NENA CLDXF Working Group considered creating an exhaustive, exclusive, systematic, formally defined set of *Place Type* categories, but concluded that no such classification system could be created. The relevant categories depend on the purpose of the classifier. For example, firefighters may classify according to the structural characteristics of a building (low-rise/high-rise; wood-frame, steel-frame, brick, etc.), while police may classify according to the nature of the activities occurring at an address (residential vs. office; bar vs. restaurant; big-box retail vs. convenience store; etc.), and emergency medics, telephone service providers, other utilities, city planners, social service providers, and others all may have other concerns and points of view. Clearly no single system can meet all of these purposes when each purpose implies a different logical basis for defining categories. A set of categories that suits one purpose will be ambiguous or incomplete when used for a different purpose.
 5. CLDXF-US users who find existing terms in the IANA Location Types Registry to be inadequate for their purpose may propose additional terms for inclusion in the registry. This may be done by sending an email to the Internet Assigned Numbers Authority (IANA) at iana@iana.org. Indicate you want to add a new value to Location Types Registry as defined by RFC 4589 [23]. Give suggested token (an enumerated value; i.e., airplane, bar) and description. For additional examples see RFC 4589 [23] or the actual registry.
 6. Often, one address may contain multiple place types (e.g., "restaurant" and "bar") or is used to identify several types of features (e.g., parcel, building, building entrance, utility meter, utility pole, incident location) that occur at the same location. Per RFC 5139 [7], which defines *Place Type*, a CLDXF-US record may contain only one *Place Type* value. If multiple values apply, consider the purpose for which the record was created, and pick the one value that best indicates the type of feature for that purpose.

3.6 Unused Elements

The following caTypes are not used in CLDXF-US records:

- A6

- LMK
- LMKP
- POBOX
- ADDCODE
- RDSEC
- RDBR
- RDSUBBR
- UNIT
- NAM

4 NENA Registry System (NRS) Considerations

Whenever a standard has a list of items, especially where the list is used in an XML data structure, and the list is expected to change over time, the list should be maintained in a “Registry”. A registry is, at heart, just a table of data, with rows and columns. The Registry is established by a standard, which defines the columns and what they are used for. Each entry in the registry is a row and has values for the columns specified. The standard that creates the registry usually defines the initial values (row and column content). It also specifies how a new value is added: we call that a “Management Policy.”

Registries can be hierarchical (Registry contains sub-registries, nested as needed) if you have a group of registries that are related.

Registries are maintained by the NENA Registry System (NRS), which operates according to NENA-STA-008.2 (formerly 70-001). The existing registries, with all of the content of the registry, are available in stable locations in the NENA [website](#). Registries are stored as XML objects, although through custom style sheets, the registry content is human readable. The intent of storing the registries at stable URLs, in XML form, is that implementers of standards that use registries can automatically include current values in their implementations. NRS will only modify registries according to the management policy specified for that registry.

This section defines three registries to be modified in the NENA Registry System.

4.1 Street Name Pre Types and Street Name Post Types Registry

4.1.1 Registry Title/Name

The name of this registry is the “Street Name Pre Types and Street Name Post Types Registry”.

4.1.2 Parent Registry

None.

4.1.3 Information required to create a new value

A new entry to the "Street Name Pre Types and Street Name Post Types Registry" with an explanation of when the registry will be used MUST be accompanied by information that describes circumstances where a new value is created.

4.1.4 Management Policy

NENA is requested to amend the management policy to include the criteria for evaluation of values submitted to the Registry as outlined in Section 3.2.4.8 Note 6 and Section 3.2.7.8 Note 6, as follows:

- Expert reviewers should engage with submitters to suggest best practice for parsing complete street names in cases where the submitted value does not meet the definition of a pre-type or post-type or appears from the example provided to be a unique or very unusual case. Expert reviewers may suggest alternative parsing if that seems appropriate.
- Designated expert reviewers should review any submissions to make sure they include the mandatory value and example components. They should also ensure that any "AlternativeCasing" entry is valid and that any optional comments include both the source and date.

4.1.5 Content

NENA is requested to add three columns to the Registry schema as follows:

- **Example:** Example of the use of the value in a full street name.
Examples MUST be provided by the submitter of a new value. The explanation for a submitted value must describe why the value is considered to be viable and repeatable, and it must include multiple examples of its use, if possible across multiple jurisdictions. In the case of existing values, examples may be selected randomly from a national listing of street names by a sub-group of the CLDXF workgroup when the Registry is revised.
- **AlternativeCasing:** An alternative value which differs in the case of the initial letter from the entry due to language differences.
Entries in the Registry, by default, are in title-case. If an existing entry is used with an initial lower-case letter in some jurisdictions, then that lower-cased value is entered in this column. For example, in Quebec, the value "boulevard" would be entered, to record the preferred usage in that jurisdiction. This column is *only* for alternative casing as described above. Also note that some entries which are initially submitted with initial lower-case letter will be recorded that way in the Registry, and

the alternative column will be used if subsequent use of title-case is to be recorded. Note that case is not important for validation of any value in the Registry.

- **Comments:** One or more notes on the use of this value.

Comments MAY be provided by the original submitter, or they MAY be independently submitted by any Registry user related to an existing value. The source organization/department information and date of the comment must be included at the end of the comment, enclosed in square brackets. Multiple comments may be submitted and will be separated by a "|" symbol in the comment text.

4.1.6 Initial Values

Not applicable.

4.2 New Values for urn:nena:xml:ns Registry

NRS is requested to add a new value to the existing registry, urn:nena:xml:ns.

Category	Name	Reference
pidf	venaCivcAddr2	This document

4.3 New Values for urn:nena:xml:schema Registry

NRS is requested to add a new value to the existing registry, urn:nena:xml:schema.

Category	Name	Reference
pidf	venaCivcAddr2	This document

NRS is requested to add the following schema to urn:nena:xml:schema:

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:ca="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
  xmlns:xs="https://www.w3.org/2001/XMLSchema"
  targetNamespace="urn:nena:xml:ns:pidf:venaCivcAddr2"
  elementFormDefault="qualified">
  <xs:import namespace="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
    schemaLocation="https://www.iana.org/assignments/xml-
    registry/schema/pidf/geopriv10/civicAddr.xsd"/>
  <xs:import namespace="http://www.w3.org/XML/1998/namespace"
    schemaLocation="http://www.w3.org/2001/xml.xsd"/>
  <xs:annotation>
    <xs:appinfo source="urn:nena:xml:ns:pidf:venaCivcAddr2">
      NENA Civic Address extensions for PIDF-LO</xs:appinfo>
    </xs:annotation>
    <!--Site-->
    <xs:element name="SITE" type="ca:caType"/>
    <!--Subsite-->
```

```
    <xs:element name="SUBSITE" type="ca:caType"/>
  <!--Wing-->
    <xs:element name="WING" type="ca:caType"/>
  <!--Unit Pre Type-->
    <xs:element name="UNIT_PRETYPE" type="ca:caType"/>
  <!--Unit Value-->
    <xs:element name="UNIT_VALUE" type="ca:caType"/>
  <!--Section-->
    <xs:element name="SECTION" type="ca:caType"/>
  <!--Row-->
    <xs:element name="ROW" type="ca:caType"/>
  <!--Postal Code Extension-->
    <xs:element name="PCE" type="ca:caType"/>
  <!--Direction of Travel-->
    <xs:element name="DT" type="ca:caType"/>
  <!--House Number Complete-->
    <xs:element name="HNC" type="ca:caType"/>
</xs:schema>
```

5 IANA Actions

5.1 caType Registry

IANA is requested to register the following in the Civic Address Types Registry, with reference to NENA-STA-004.2:

CAtype	Local Name	Description	Namespace URI/Schema	Contact	Type
40	DT	Indicates direction of travel on a divided roadway and associated frontage roads.	urn:nena:xml:ns:pidf:nenaCivicAddr2	The_NENA_Registry_System	B
40	HNC	The complete house number including any formatting, punctuation, or separator characters.	urn:nena:xml:ns:pidf:nenaCivicAddr2	The_NENA_Registry_System	B
40	SITE	The name of an exterior area which is publicly known and unique within a given place. A site may contain one or more structures and/or sub-sites.	urn:nena:xml:ns:pidf:nenaCivicAddr2	The_NENA_Registry_System	B
40	SUBSITE	The name of a sub-area within a larger area specified either by site name, by a thoroughfare address, or both.	urn:nena:xml:ns:pidf:nenaCivicAddr2	The_NENA_Registry_System	B
40	WING	A designated part of a structure (BLD) which spans one or many floors (FLR), typically including	urn:nena:xml:ns:pidf:nenaCivicAddr2	The_NENA_Registry_System	B

CAtype	Local Name	Description	Namespace URI/Schema	Contact	Type
		more than one unit (UNIT_VALUE) or room (ROOM) and representing a significant portion of the structure floor area.			
40	UNIT_PRETYPE	Part of the complete unit identifier that precedes the Unit Value (UNIT_VALUE) and indicates the kind of unit.	urn:nena:xml:ns:pidf:nenaCivicAddr2	The_NENA_Registry_System	B
40	UNIT_VALUE	Part of the complete unit identifier that uniquely identifies a particular unit.	urn:nena:xml:ns:pidf:nenaCivicAddr2	The_NENA_Registry_System	B
40	SECTION	An identified, unenclosed area within a structure (BLD), wing (WING), unit (UNIT_VALUE), or room (ROOM).	urn:nena:xml:ns:pidf:nenaCivicAddr2	The_NENA_Registry_System	B
40	ROW	An identified linear feature, such as a linear arrangement of seats, workstations, equipment, or storage, within a structure (BLD), wing (WING), unit (UNIT_VALUE), or room (ROOM).	urn:nena:xml:ns:pidf:nenaCivicAddr2	The_NENA_Registry_System	B

6 Impacts and Considerations

6.1 Operations Impacts Summary

This standard describes a format to be used within NG9-1-1 systems in the U.S. when exchanging location data. As such, this standard will have a profound impact on the operation of NG9-1-1 systems in the U.S. that require or use location data. Additionally, since this standard defines and describes a set of standard data elements for location records used within NG9-1-1 systems in the U.S., all NENA standards dealing with the creation, maintenance, or use of NG9-1-1 GIS data in the U.S. will need to be compatible with the required format.

6.2 Technical Impacts Summary

CLDXF-US is a profile of IETF PIDF-LO and uses the IETF PIDF-LO XML schema, extended to include NENA-defined elements. Due to extensions made in this, previous, and future versions of this document, current NG9-1-1 systems in the U.S., especially implementations of NGCS functional elements, such as the ECRF and the LVF, will need to adapt to the addition of new elements and removal of other elements in order to support uniformity in performance and overall consistency. Additionally, there are no impacts to Computer-Aided Dispatch (CAD) and Records Management Systems (RMS) systems that are not using the NG9-1-1 mechanism of Emergency Incident Data Object (EIDO) for delivery of location data. However, CAD and RMS systems that will use EIDO for the delivery of location data will need to adapt to the changes outlined in this version to remain compliant.

6.3 Security Impacts Summary

While this document is only concerned with the form of the data and how interchange between CLDXF-US, PIDF-LO, and FGDC data is accomplished, readers of this document should consider how privacy of location will be implemented in systems that reference this document.

Guidelines as outlined in Security for Next Generation 9-1-1 (NG-SEC), NENA 75-001 [24], shall be adhered to where applicable.

6.4 Recommendation for Additional Development Work

Recommendations for future work within this document:

Section	Reference to Future Work
3.2	Additional development on the use of fixed place types (i.e., <i>County, Incorporated Municipality, Unincorporated Community, and Neighborhood Community</i>) and refinement of wording in definition "where the address is located" is necessary to increase data integrity and data parsing.

Recommendations for future work in other documents:

Document	Reference to Future Work
STA-006	The NG9-1-1 Data Model will need to update to be compliant with the changes that have occurred within CLDXF-US including resolution of any conflicts.
STA-006	The NG9-1-1 Data Model will need to evaluate the usefulness and desire for the implementation and inclusion of validation flags for certain data elements.
STA-005	The GIS Data Maintenance and Provisioning for an ECRF and LVF Standard needs to be updated to include new elements outlined in CLDXF-US.
STA-010	i3 Appendix B will need to update to be compliant with the changes that have occurred within CLDXF-US.
INF-027	The Location Validation Functional Consistency Information document will need additional information to explicitly point out the validation issues associated with more feature-specific detail within the GIS data beyond what may be necessary for a 1-to-1 match during validation.
INF-027	The Location Validation Functional Consistency Information Document will have to update all schemas per CLDXF-US.
INF-028	The Data Stewardship for NG9-1-1 Information document will need to cover additional guidance and best practice on the additional elements in CLDXF-US.

6.5 Anticipated Timeline

As this is a major change to the 9-1-1 system, adoption of this standard will take several years. Experience with the immediately prior major change to 9-1-1 (i.e., Phase II wireless)

suggests that unless consensus among government agencies at the local, state, and federal levels, as well as carriers, vendors, and other service providers is reached, implementation for the majority of PSAPs could take a decade.

Data exchange formats may change as new or modified data elements are identified. Vendors and governmental agencies are expected to make updates as required by this document.

6.6 Cost Factors

If a 9-1-1 Authority chooses not to change its local data formats, funds will be needed to develop software capable of converting the local format to the standard data exchange format. As an alternative, the 9-1-1 Authority may contract with a service provider to complete this task.

To provide for consistency with PIDF-LO, the United States Thoroughfare, Landmark and Postal Address Data Standard, and other possible data formats, CLDXF-US defines the individual address data elements that comprise an address. This may cause inconsistencies with other formats.

6.7 Cost Recovery Considerations

Normal business practices are assumed to be the cost recovery mechanism.

6.8 Additional Impacts (non-cost related)

The information or requirements contained in this NENA document are known to have 9-1-1 technical impacts, based on the analysis of the authoring group. The primary impact is that implementation of the standard will require the modification or creation of programs to export address data to CLDXF-US format or to import address data from CLDXF-US format. Since this is an address data exchange standard, it does not impose any restrictions on how address data is handled internally within any agency.

7 Abbreviations, Terms, and Definitions

See the NENA Knowledge Base (NENAkB) [1] for a complete listing 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
9-1-1 SSP (9-1-1 System Service Provider)	An entity that provides systems and support necessary to enable 9-1-1 calling for one or more Public Safety

Term or Abbreviation (Expansion)	Definition / Description
	<p>Answering Points (PSAPs) in a specific geographic area. A 9-1-1 SSP may provide the systems and support for either E9-1-1 or NG9-1-1. In the context of E9-1-1, it is typically, but not always, an Incumbent Local Exchange Carrier (ILEC).</p> <p>This includes:</p> <ul style="list-style-type: none"> • A method of interconnection for all telecommunications providers including but not limited to the wireline, wireless, and VoIP carriers • A method and mechanism for routing a 9-1-1 call to the Public Safety Answering Point (PSAP) with no degradation in service regardless of the technology used to originate the call • A method to provide accurate location information for an emergency caller to a PSAP and if required, to other emergency response agencies • Installation of PSAP call handling equipment and training of PSAP personnel when contracted to do so • Coordinating with PSAP authorities and other telecommunications entities for troubleshooting and on issues involving contingency planning, disaster mitigation and recovery
Additional Location Information	Information that relates to location but does not meet the definition of any other named location elements.
Address Number	The integer identifier of a location along a thoroughfare or within a defined community.
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.
Address Number Prefix	An identifier in the portion of the complete address number that precedes the integer Address Number in order to



Term or Abbreviation (Expansion)	Definition / Description
	further specify a location along a thoroughfare or within a defined area.
Address Number Suffix	An identifier in the portion of the complete address number that follows the integer Address Number in order to further specify a location along a thoroughfare or within a defined area.
Building	One among a group of buildings that have the same address number and complete street name.
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.
Complete Landmark Name	The name by which a prominent feature is publicly known.
Country	The name of a country represented by its two-letter ISO 3166-1 English country alpha-2 code elements in UPPER CASE letters, listed at ISO 3166 Country Codes .
County	The name of a county or county-equivalent where the address is located. A county (or its equivalent) is the primary legal division of a state or territory.
Direction of Travel	A word which 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.
Distance Marker	A distance travelled along a route such as a road or highway, indicated by a distance marker sign, typically a post or other marker indicating the distance in miles/kilometers from or to a given point.
FGDC (Federal Geographic Data Committee)	The FGDC (Federal Geographic Data Committee) is an interagency coordinating body responsible for facilitating cooperation among federal agencies whose missions include producing and using geospatial data.

Term or Abbreviation (Expansion)	Definition / Description
Floor	The standardized identifier for a story or level within a structure, wing, or unit.
GIS (Geographic Information System)	A GIS (Geographic Information System) is a system for capturing, storing, displaying, analyzing, and managing data and associated attributes which are spatially referenced.
IANA (Internet Assigned Numbers Authority)	IANA (Internet Assigned Numbers Authority) is 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.
IETF (Internet Engineering Task Force)	Lead standard-setting authority for Internet protocols.
Incorporated Municipality	The name of the incorporated municipality or other general-purpose local governmental unit (if any) where the address is located.
IPR (Intellectual Property Rights)	IPR (Intellectual Property Rights) is a category of legal rights that includes patents, published and unpublished patent applications, copyrights, trademarks, and trade secret rights, as well as any intellectual property right resembling a member of the foregoing list as such right may exist in a particular jurisdiction.
Landmark Name Part	The name or collection of names by which a prominent feature is publicly known. This element is defined in CLDXF v1 as a US specific extension of PIDF-LO per RFC 6848.
Location Marker	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 feature.
Neighborhood Community	The name of an unincorporated neighborhood, subdivision or area, either within an incorporated municipality or in an

Term or Abbreviation (Expansion)	Definition / Description
	unincorporated portion of a county or both, where the address is located.
NENA (National Emergency Number Association)	NENA (National Emergency Number Association) is 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 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.
NG9-1-1 (Next Generation 9-1-1)	NG9-1-1 (Next Generation 9-1-1) is an IP-based system comprised of hardware, software, data, and operational policies and procedures that: (A) provides standardized interfaces from emergency call and message services to support emergency communications; (B) processes all types of emergency calls, including voice, data, and multimedia information; (C) acquires and integrates additional emergency call data useful to call routing and handling; (D) delivers the emergency calls, messages, and data to the appropriate public safety answering point and other appropriate emergency entities; (E) supports data or video communications needs for coordinated incident response and management.
NRS (NENA Registry System)	The entity provided by NENA to manage registries, NENA Registry System website .



Term or Abbreviation (Expansion)	Definition / Description
PIDF-LO (Presence Information Data Format – Location Object)	An extension to PIDF that contains location information.
Place Type	The type of feature identified by the address.
Postal Code	A system of 5-digit codes that identifies the individual USPS Post Office or metropolitan area delivery station associated with an address.
Postal Code Extension	A system of 4-digit codes that are used after the 5-digit ZIP Code to specify a range of USPS delivery addresses.
Postal Community Name	A city name for the ZIP Code of an address, as given in the USPS City State file.
PSAP (Public Safety Answering Point)	PSAP (Public Safety Answering Point) is a physical or virtual entity where 9-1-1 calls are delivered by the 9-1-1 Service Provider.
RMS (Records Management System)	In regard to Public Safety, Records Management Systems (RMS) are often interfaced to public safety communication centers. RMSs are sometimes accessed directly through computer systems deployed within communication centers for research and analysis purposes. Records Management Systems contain highly confidential information such as criminal activity, ongoing investigations, personal medical data, and the location of valuable items and other confidential information.
Room	A single, distinctly identified, enclosed space within a structure.
Row	An identified linear feature, such as a linear arrangement of seats, workstations, equipment, or storage, within a structure, wing, unit, or room.
Seat	An identified seat, desk, workstation, or similar precise location within a structure, wing, unit, room, section, or row.
Section	An identified, unenclosed area within a structure, wing, unit, or room.

Term or Abbreviation (Expansion)	Definition / Description
Site	The name of an exterior area which is publicly known and unique within a given place. A site may contain one or more structures and/or sub-sites.
State	The name of a state or state equivalent, represented by the two-letter UPPER CASE abbreviation given in USPS Publication 28, Appendix B. A state is a primary governmental division of the United States. Postal Addressing Standards Publication 28.
Street Name	The element of the complete street name that identifies the particular street (as opposed to any street types, directionals, and modifiers).
Street Name Post Directional	A word following the Street Name element that indicates the direction taken by the street from an arbitrary starting point or line, or the sector where it is located.
Street Name Post Modifier	A word or phrase that follows and modifies the Street Name element and is either separated from it by a Street Name Post Type and/or a Street Name Post Directional.
Street Name Post Type	A word or phrase that follows the Street Name element and identifies a type of thoroughfare in a complete street name.
Street Name Pre Directional	A word preceding the Street Name element that indicates the direction taken by the street from an arbitrary starting point or line, or the sector where it is located.
Street Name Pre Modifier	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.
Street Name Pre Type	A word or phrase that precedes the Street Name element and identifies a type of thoroughfare in a complete street name.
Street Name Pre Type Separator	A preposition or prepositional phrase between the Street Name Pre Type and the Street Name. This element is defined in CLDXF-US as a NENA-defined extension of PIDF-LO per RFC 6848.
Structure	A built feature which has a vertical dimension: including both conventional buildings which have walls, doors, and a

Term or Abbreviation (Expansion)	Definition / Description
	roof, and other kinds of infrastructure such as cell towers, transformer stations, fuel tanks, and so on.
SubSite	The name of a sub-area within a larger area specified either by site name, by a thoroughfare address, or both.
Thoroughfare	A route, a part thereof, or other access way along which a location can be reached. A thoroughfare is typically a road, but may be a walkway, boardwalk, trail, waterway, rail line, etc.
Unincorporated Community	The name of an unincorporated community, either within an incorporated municipality or in an unincorporated portion of a county, or both, where the address is located.
Unit	A group or suite of rooms within a building that are under common ownership or tenancy, typically having a common primary entrance.
Unit Pre Type	Part of the complete unit identifier that precedes the Unit Value and indicates the kind of unit.
Unit Value	Part of the complete unit identifier that uniquely identifies a particular unit.
URL (Uniform Resource Locator)	A type of URI, specifically used for describing and navigating to a resource (e.g., http://www.nena.org).
Wing	A designated part of a structure which spans one or many floors, typically including more than one unit or room and representing a significant portion of the structure floor area.
XSD Profile (XML Schema Definition Profile)	A profile of SPML-based provisioning describing the use of XML and an XSD as a data model.
XML (eXtensible Markup Language)	An internet specification for web documents that enables tags to be used that provide functionality beyond that in Hyper Text Markup Language (HTML). In contrast to HTML, XML has the ability to allow information of indeterminate length to be transmitted to a PSAP call taker or dispatcher versus the current restriction that requires information to fit the parameters of pre-defined fields.

Term or Abbreviation (Expansion)	Definition / Description
ZIP Code (Zone Improvement Plan Code)	A system of 5-digit codes that identifies the individual USPS Post Office or metropolitan area delivery station associated with an address, which may optionally be enhanced by four additional digits that identify a specific range of USPS delivery addresses.

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9 Appendix A – Examples of Address Parsing

Legal *Street Name* spellings, including upper/lower case, spaces, and special characters, are to be shown as created by the local street naming authority.

A1. Country, State, and Place Name Data Elements

Country	State	County (or County Equivalent)	Incorporated Municipality	Unincorporated Community	Neighborhood Community	Postal Community Name	Postal Code	Notes
ISO 3166-1 [14]	USPS Pub 28, [15] Appendix B	https://www.census.gov/programs-surveys/pepst/geographies/reference-files.html	No authoritative national registry	No authoritative national registry	No authoritative national registry	USPS City State File	USPS City State File	
A1.1 Examples of Incorporated Municipalities								
US	AL	Winston County	Haleyville			Haleyville		
US	LA	Orleans Parish	New Orleans			New Orleans		LA parish (County-Equivalent)
US	HI	Honolulu County	Honolulu			Honolulu		
US	IL	Cook County	Chicago			Chicago		
US	NY	Orleans County	Albion			Albion		
US	CA	San Francisco County	San Francisco			San Francisco		
US	VA	Falls Church city	Falls Church			Falls Church		Independent VA city (county equivalent)
US	MN	Carver County	Excelsior			Excelsior		
US	MN	Hennepin County	Excelsior			Excelsior		
US	DC	District of Columbia	Washington			Washington		Federal district (state and county-equivalent)

Country ISO 3166-1 [14]	State USPS Pub 28, [15] Appendix B	County (or County Equivalent) https://www.census.gov/programs-surveys/pepst/geographies/reference-files.html	Incorporated Municipality No authoritative national registry	Unincorporated Community No authoritative national registry	Neighborhood Community No authoritative national registry	Postal Community Name USPS City State File	Postal Code USPS City State File	Notes
US	PA	Luzerne County	Hanover Township			Hanover Township		
US	NY	New York County	New York					
US	NY	Kings County	New York					
US	PA	Allegheny County	Pittsburgh			Pittsburgh		
US	TX	Bowie County	Redwater			Redwater	75501	
US	TX	Bowie County	Redwater			Redwater	75567	
US	TX	Bowie County	Redwater			Redwater	75567	

A1.2 Examples of Unincorporated Places (Not in an *Unincorporated Community* or a *Neighborhood Community*)

US	AK	Fairbanks North Star Borough	Unincorporated			North Pole		AK borough (county equivalent). Outside incorporated North Pole, AK.
US	WA	Kitsap County	Unincorporated			Poulsbo		Outside incorporated Poulsbo, WA
US	CA	Marin County	Unincorporated			San Rafael		Outside incorporated San Rafael, CA

Country	State	County (or County Equivalent)	Incorporated Municipality	Unincorporated Community	Neighborhood Community	Postal Community Name	Postal Code	Notes
ISO 3166-1 [14]	USPS Pub 28, [15] Appendix B	https://www.census.gov/programs-surveys/popest/geographies/reference-files.html	No authoritative national registry	No authoritative national registry	No authoritative national registry	USPS City State File	USPS City State File	
A1.3 Examples of <i>Unincorporated Community</i> and <i>Neighborhood Community</i>								
US	FL	Hillsborough County	Unincorporated	Northdale	Cypress Meadows Subdivision	Tampa		
US	AL	Shelby County	Unincorporated	New Hope		Birmingham		
US	MS	Winston County	Unincorporated	Vernon		Louisville		
US	NY	New York County	New York	Harlem	West Harlem	New York		
US	NY	Bronx County	New York	Throggs Neck	Edgewater Park	Bronx	10465	
US	AK	Southeast Fairbanks Census Area	Unincorporated		Dot Lake	Dot Lake	99737	AK Census Area (county equivalent)
US	AZ	Yavapai County	Unincorporated		Poquito Valley	Prescott Valley	86315	
US	PA	Allegheny County	Pittsburgh	North Side		Pittsburgh		
US	NY	Erie County	Buffalo		Green Acres	Buffalo		



A2.Street Name Data Elements and Parsing Examples

Complete Street Name	Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier
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A2.1 Examples of Uncomplicated Complete Street Names

Main Street					Main	Street		
Broadway					Broadway			
North Fairfax Drive		North			Fairfax	Drive		
North Main Street		North			Main	Street		
Seventh Street East					Seventh	Street	East	
Cherry Street North					Cherry	Street	North	

A2.2 Examples of Complete Street Names that Include a *Street Name Pre Type* (Including Numbered Jurisdiction Routes)

Avenue A			Avenue		A			
Calle Aurora			Calle		Aurora			
Calle 1			Calle		1			
Avenue C Loop			Avenue		C	Loop		
County Road 18			County Road		18			
State Route 90			State Route		90			
Rhode Island Route 4			Rhode Island Route		4			
Polk County Road 14A			Polk County Road		14A			
United States Highway 101			United States Highway		101			
Ranch-to-Market Road 2398			Ranch-to-Market Road		2398			



Complete Street Name	Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier
Summit County Road 99			Summit County Road		99			
United States Highway 99			United States Highway		99			
Tiverton Township Road 20			Tiverton Township Road		357			
Utah State Route 12			Utah State Route		12			
Interstate Highway 95			Interstate Highway		95			
Interstate Highway 4			Interstate Highway		4			
Route 121			Route		121			
Kentucky State Highway 67			Kentucky State Highway		67			

A2.3 Examples of Road Names with *Street Name Pre Type Separators*

Boulevard of the Allies			Boulevard	of the	Allies			
Avenue of the Americas			Avenue	of the	Americas			
Avenue at Port Imperial			Avenue	at	Port Imperial			
Road to the Ruins			Road	to the	Ruins			
Circle in the Woods			Circle	in the	Woods			
Alameda de las Pulgas			Alameda	de las	Pulgas			
Rue des Etoiles			Rue	des	Etoiles			
Rue d'Armour			Rue	d'	Armour			



Complete Street Name	Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier
A2.4 Examples of Road Names with Multiple Street Type Words Before or After the <i>Street Name</i> Element								
Bypass Highway 22			Bypass Highway		22			
Tenth Street Bypass					Tenth	Street Bypass		
A2.5 Examples of Road Names with <i>Street Name Pre Modifiers</i> or <i>Street Name Post Modifiers</i>								
A2.5.1 Case 1: Road Names with Words that Modify the <i>Street Name</i> Element, but are Separated from it by Pre Type, Post Type, or Directional Words								
East End Avenue Extended					East End	Avenue		Extended
Market Street North Extension					Market	Street	North	Extension
Banner Fork Road Number 1					Banner Fork	Road		Number 1
East Lake Road Fire Road 12	East Lake Road		Fire Road		12			
East Lake Road Fire Road 12		East			Lake	Road		Fire Road 12
Bypass North Highway 22	Bypass	North	Highway		22			
Alternate North Avenue B	Alternate	North	Avenue		B			
Alternate Route 8	Alternate		Route		8			
A2.5.2 Case 2: Road Names Preceded by "The", "Old", etc.								
Old North First Street	Old	North			First	Street		



Complete Street Name	Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier
Old Main Street					Old Main	Street		
The Croft Lane					The Croft	Lane		
The Oaks Drive					The Oaks	Drive		
A2.5.3 Case 3: Road Names with Two Directional Words Before or After the <i>Street Name</i> Element								
Northwest East 14 th Street	Northwest	East			14 th	Street		
North East 14 th Street	North	East			14 th	Street		
Pharr Court North Northeast					Pharr	Court	North	Northeast
Horizon Lane West Southeast					Horizon	Lane	West	Southeast
A2.5.4 Use of Travel Directions (e.g., eastbound, northbound) to Show Direction of Travel on a Limited-access Highway								
Interstate Highway 5 northbound			Interstate Highway		5			northbound
Baltimore-Washington Parkway southbound					Baltimore-Washington	Parkway		southbound
A2.6 Examples of Road Names Requiring Local Knowledge to Parse Correctly								
East West Highway					East West	Highway		
East West Highway		East			West	Highway		
NOTE: Local knowledge is needed to know whether "East" is part of the Street Name, or a Street Name Pre Directional								
Charles Lane Drive					Charles Lane	Drive		



Complete Street Name	Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier
Charles Lane Drive					Charles	Lane Drive		
NOTE: Local knowledge is needed to know whether "Lane" is part of the Street Name, or part of the Street Name Post Type. In the first example, Charles Lane is the name of a person.								
East Main Street Road		East			Main	Street Road		
East Main Street Road		East			Main Street	Road		
NOTE: Local knowledge is needed to know whether "Street" is part of the Street Name, or part of the Street Name Post Type. In the second example, "East Main Street" is the name of a city street that has extended into the town where the town uses the same Street Name but uses "Road" for the Street Name Post Type.								
West Virginia Avenue					West Virginia	Avenue		
West Virginia Avenue		West			Virginia	Avenue		
NOTE: Local knowledge is needed to know whether "West" is part of the Street Name, or a Street Name Pre Directional								
West Boulevard Court					West Boulevard	Court		
West Boulevard Court		West			Boulevard	Court		
West Boulevard Court					West	Boulevard Court		
NOTE: Local knowledge is needed to know whether "West" is part of the Street Name element, or a Street Name Pre Directional. In the first example, West Boulevard Court" is a street off of "West Boulevard"								
North Avenue Southwest		North	Avenue		Southwest			
North Avenue Southwest					North	Avenue	Southwest	
NOTE: Local knowledge is needed to know whether the Street Name is "North" or "Southwest"								
East North Broadway		East			North Broadway			
East North Broadway	East	North			Broadway			
NOTE: Local knowledge is needed to know whether "North" is part of the Street Name element, or a Street Name Pre Directional								



A3. Address Number Data Elements

Complete Address Number	Address Number Prefix	Address Number	Address Number Suffix	Notes
123		123		Ordinary integer <i>Address Number</i>
210		210		Ordinary integer <i>Address Number</i>
12005		12005		Ordinary integer <i>Address Number</i>
119 ½		119	½	<i>Address Number</i> with <i>Address Number Suffix</i>
123B		123	B	<i>Address Number</i> with <i>Address Number Suffix</i>
121 E		121	E	<i>Address Number</i> with <i>Address Number Suffix</i> ; includes the space
A119	A	119		<i>Address Number</i> with alphanumeric prefix (Toa Alta, Puerto Rico)
194-23	194-	23		<i>Address Number Prefix</i> with hyphen (Queens Borough, New York)
194-03	194-0	3		<i>Address Number Prefix</i> with hyphen and leading zero (Queens Borough, New York)
194-03 ½	194-0	3	½	<i>Address Number Prefix</i> with hyphen and leading zero (Queens Borough, New York); complete address number includes <i>Address Number Suffix</i> and space.
5-5415	5-	5415		<i>Address Number Prefix</i> with hyphen (Hanalei, HI)
N6W23001	N6W2	3001		Map grid reference as <i>Address Number Prefix</i> (Waukesha WI)
W214N5818	W214N58	18		Map grid reference as <i>Address Number Prefix</i> (Menomonee Falls, WI)
N89W16758	N89W167	58		Map grid reference as <i>Address Number Prefix</i> (Menomonee Falls, WI)
W63N645	W63N	645		Map grid reference as <i>Address Number Prefix</i> (Cedarburg, WI)
30W221	30W	221		Map grid reference as <i>Address Number Prefix</i> (DuPage County IL)

A4. Distance Marker Data Element

Milepost 1303
Milepost 34.4
Km 2.7
Mile Marker 12

A5.Named Location Elements

<i>Site</i>	<i>SubSite</i>	<i>Structure</i>	<i>Wing</i>	<i>Floor1</i>	<i>Unit Pre Type</i>	<i>Unit Value</i>	<i>Room¹</i>	<i>Section¹</i>	<i>Row¹</i>	<i>Seat¹</i>	<i>Additional Location Information</i>
Statue of Liberty National Monument	Liberty Island	Statue of Liberty									
Statue of Liberty National Monument	Ellis Island	Ellis Island Immigration Museum									
United States Capitol		United States Capitol Building									
Yosemite National Park											
Yosemite National Park	Tuolumne Meadows Campground										
Chatham College		Smith Library									
Sagamore Resort	The Hermitage	Building 8				Knollwood Suite ²					
Washington Square Park		Washington Square Arch									
Winona Park Elementary School	Playground	Monkey Bars									
	Parking Lot ³										



<i>Site</i>	<i>SubSite</i>	<i>Structure</i>	<i>Wing</i>	<i>Floor1</i>	<i>Unit Pre Type</i>	<i>Unit Value</i>	<i>Room¹</i>	<i>Section¹</i>	<i>Row¹</i>	<i>Seat¹</i>	<i>Additional Location Information</i>
	Parking Lot Section M Row M2										
Arlington National Cemetery	Section 1										
Wentworth Marina	Dock C Slip 40A ⁴										
Cavalier Mobile Home Park	Lot 44										
		Empire State Building									
		Chemical Tank 11									
		Golden Gate Bridge									
		Building C			Apartment	206 ⁵					
		Building C				206 ⁵					
		Tower 2			Unit	1142 ⁵					
		Tower 2				1142 ⁵					
		Building 4		1	Suite	D ⁵	Empire Room				
		Building 4		2	Apartment	D ⁵					
						Penthouse ⁶					
						Rear ⁶					



<i>Site</i>	<i>SubSite</i>	<i>Structure</i>	<i>Wing</i>	<i>Floor1</i>	<i>Unit Pre Type</i>	<i>Unit Value</i>	<i>Room¹</i>	<i>Section¹</i>	<i>Row¹</i>	<i>Seat¹</i>	<i>Additional Location Information</i>
						Basement ⁶					
				Basement ⁷	Unit	B					
				Mezzanine ⁷			12				
Pittsburgh International Airport		Airside Terminal	Concourse A								
		Spring Valley Mall	North Quadrant								
UAMS University Hospital		Ward Tower	E Wing				1E63				
Southwest Florida International			Concourse B			Burger King					
		Coastland Mall	Food Court					Customer Seating			
Logan International Airport			Terminal B		Gate	B21		Waiting Area			
		Four Seasons Hotel					Grand Ballroom	West			
Walker Plant		Main Assembly Building						Powder Coat			
Walker Plant		Main Assembly Building							B-Line Assembly		



<i>Site</i>	<i>SubSite</i>	<i>Structure</i>	<i>Wing</i>	<i>Floor1</i>	<i>Unit Pre Type</i>	<i>Unit Value</i>	<i>Room¹</i>	<i>Section¹</i>	<i>Row¹</i>	<i>Seat¹</i>	<i>Additional Location Information</i>
University of Texas Austin		Texas Memorial Stadium		Upper Deck				Section 129	B	3	
		Warehouse 3						Paper Products	Aisle 4		
		Hollywood 20			Theater	4			AA	5	
		Publix Supermarket							Aisle 12		
		Alfred E Smith State Office Building					Lobby				Security Desk
							819				Cubicle 23
											Stairwell C
											Main Loading Dock
											Elevator Bank 14-21
Dupont Circle Metro Station											Escalator N3

Notes:

¹ The type word is not required in the *Floor*, *Room*, *Section*, *Row*, and *Seat* elements, and the identifier may be standardized.

² When the type word follows the identifier, both are placed in *Unit Value*.



- ³ When represented within a larger addressed property such as "Parking Lot, 1000 Washington Street, Dorchester."
- ⁴ When there are multiple levels of detail for a non-structure location, they are all placed in *SubSite*, separated by semi-colons.
- ⁵ Unit *Pre Type* is not required unless there are different types of units at the same locations that use the same *Unit Value*.
- ⁶ When formal unit identifiers have not been assigned, positional words identifying a unit are placed in *Unit Value*.
- ⁷ When floors are identified solely by a specific type word, the type word is placed in *Floor*.

A6.Address Descriptor Data Element

<http://www.iana.org/assignments/location-type-registry/location-type-registry.xml>

<i>Place Type</i>
airport
school
library
museum
place-of-worship
theater

Note: Registry does not allow for spaces within terms. Must fill spaces with hyphens.

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2 The National Emergency Number Association (NENA), Data Structures and Management
3 Committee, Civic Location Data eXchange Format (CLDXF) Working Group developed this
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