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TO: Jennifer Gimbel, Steering Committee Chair, Federal Geographic Data Committee (FGDC)
Ivan DeLoatch, Executive Director, Federal Geographic Data Committee (FGDC)
Julie Sweetkind-Singer, Chair, National Geospatial Advisory Committee (NGAC)

FROM: Rebecca Somers, President, Urban and Regional Information Systems Association (URISA)

CC: Tim Trainor, Chief Geospatial Scientist, US Census Bureau
Stephen Lewis, Chief Geospatial Information Officer, US Dept. of Transportation (USDOT)
David Maidment, Chair, Mapping Science Committee, National Academy of Sciences
Chris Diller, President, National States Geographic Information Council (NSGIC)
Christy Williams, President, National Emergency Number Association (NENA)

DATE: June 6, 2016

RE: Support and Recommendations for the Proposed National Address Database (NAD)

This memorandum transmits recommendations from URISA's Board of Directors concerning the proposed National Address Database. It is intended as a contribution to the ongoing dialog between FGDC, Census, USDOT, Mapping Science Committee, URISA, NSGIC, NENA, and others interested in the long-term success of a National Address Database.

URISA urges the FGDC to support the development of the National Address Database, most particularly by advocating the use of its own address data standard as the basis for the NAD data model.

In addition, URISA recommends that:

1. The NAD should be created under federal agency leadership.
2. The NAD should be completely public, comprehensive and national in scope, and local in origins.
3. The NAD should be designed for ongoing data maintenance and aggregation in the context of a large-scale spatial database. Maintenance at this scale requires a high degree of standardization and normalization in the data model.
4. The lead federal agency should have significant long-term experience and an on-going agency responsibility in the collection, organization, and ongoing maintenance of address and street network data nationwide; in the management of large-scale, complex, secured spatial databases needed for such operations; in the development of access tools and services needed to make it useful to the public; and in the creation of the many partnerships that will be necessary for local participation.
5. The NAD data model and exchange protocols should be based on the FGDC address data standard, which was created to support address relational and geographic databases. It provides the address data elements, attributes, classes, and quality tests needed to manage a large address spatial repository, and the flexibility to accommodate a wide range of local practices nationwide.
6. Specific technical design decisions should be deferred until the NAD business purposes and operations are better defined.

The recommendations above were adopted by the URISA Board on June 6, 2016

The remainder of this memorandum sets forth the reasoning for our recommendations. Attachment A provides background on the origins, content and respective purposes of the FGDC address data standard and the NENA CLDXF standard.

URISA members have a longstanding interest and deep knowledge of address data, address data systems and structures, and their incorporation into spatial databases. Address data structures have been discussed in URISA conferences and workshops since the Association was founded more than fifty years ago. URISA convened the first conference on addressing and GIS in 1999, and continued the conference through 2013, with NENA as a co-sponsor for 2005-2013. Five URISA leaders co-chaired the Address Standard Working Group, which authored the FGDC's *United States Thoroughfare, Landmark, and Postal Address Data Standard*, endorsed by the FGDC in 2011. This group worked closely with the NENA working group that created the NENA *Next Generation 9-1-1 United States Civic Location Data Exchange Format (CLDXF),* adopted by NENA in 2014.

A. Support for a National Address Database under Federal Agency Leadership

The URISA Board of Directors joins the National Geospatial Advisory Committee (NGAC), the National States Geographic Information Council (NSGIC) and other bodies in supporting the undertaking of a National Address Database. It should be led by federal government agencies, because they are the only ones whose scope of authority and interest extends nationwide. It must rely on local and county governments, because they create almost all of the addresses in the US. State governments and private firms should also have a role in aggregating address records from the local to the national level.

B. Criteria for a Successful National Address Database

A National Address Database would serve many public purposes, including: census, emergency management, taxation, postal services, housing, planning/zoning/development activities, voter and election data, public utilities and asset management, etc.

To achieve its purposes, the NAD must be:

1. **Completely public.** Census and USDOT have stated their intent that the NAD will be built entirely within the public domain, so this appears to be a settled point.
2. **Truly national.** From the outset, the NAD should be designed and intended to handle all addresses found anywhere in the United States, including the fifty states, tribal lands, the federal District of Columbia, and the territories and outlying possessions.
3. **Comprehensive in scope.** The NAD must be designed, built, managed, and maintained to serve the full range of purposes for which addresses are used: general navigation and emergency dispatch, postal delivery and census enumeration, local government administration and intergovernmental cooperation, the creation and administration of master address repositories by local address authorities, and the aggregation of local records into larger regional, state, and national address databases.
4. **Local in Origins.** Within the US, addressing is almost entirely a municipal or county government function. Addressing systems and records are managed by thousands of local address authorities, who are responsible for assigning new addresses, retiring obsolete addresses, and recording address aliases and address changes. The NAD must be designed to aggregate the local records. Aggregation of locally created and managed addresses to state and national levels is a critical process in achieving a comprehensive standardized NAD that is trustworthy, current and shareable among all levels of government and the public, as well as the private sector.

5. **Designed for maintenance, not one-time data collection.** The NAD will take years to compile. First-time data accumulation is only the beginning. Addresses are not static. From the outset, the NAD must be designed, built, and managed to support year-to-year address data maintenance. The NAD must incorporate incremental update procedures and versioning into its periodic local/state upload process. Maintenance at this scale requires a high degree of standardization and normalization in the data model. Ongoing data maintenance is much more challenging; the design will not be complete until the data maintenance procedures are fully defined and tested.
6. **Designed as an implementation of the FGDC address data standard.** The NAD cannot possibly integrate address data from thousands of local jurisdictions unless it is built around a standard that accommodates all US addresses, for all purposes, within a spatial data repository. There is only one such standard: the FGDC address data standard. This is discussed at greater length in the next three sections.
7. **Led by a federal agency or agencies with significant experience in**:
    a. Collecting, organizing, and maintaining address data nationwide.
    b. Collecting, organizing, and maintaining street name and street network data nationwide.
    c. Maintaining and updating address, street name, and street network data over long time spans.
    d. Managing and operating secured, complex, large-scale geographic databases over long time spans.
    e. Creating tools and services for public access, search, and download of tabular and spatial data.
    f. Creating partnerships with state, local, non-profit, and private sector entities nationwide.

C. Comments on the USDOT's NAD Pilot Draft Minimum Content Standard

The USDOT has released a draft "NAD Minimum Content Standard" (now at v8, March 11, 2016, 3pp). The document:

1. Sets as the first critical task the determination of the "NAD Minimum Content Standard".
2. Proposes a list of minimum content data items, some new and some from the FGDC and CLDXF standards.
3. For data collection, recommends keeping "a low barrier to participation (e.g., don't require a specific parsing schema for data contributors)".
4. After a brief comparison of the FGDC and CLDXF data items, concludes that "the preference of the group is leaning towards the intuitive nature of the CLDXF model. However, further evaluation and input on this matter is needed".

In response URISA offers the following observations:

1. It is too early for technical specifications. In IT, business purpose shapes business process, and process drives the data model, and the data model drives technical design. The NAD use requirements and business cases should be further defined before deciding on a technical design and methodology.
2. Data maintenance is a far greater challenge than first-time data collection, so maintenance processes must be thought through along with data collection and standardization processes in creating the initial design. Pilot projects and a more comprehensive study would provide a "best practice" strategy for achieving success in this endeavor.
3. The FGDC standard was created to support address databases and spatial data repositories. It provides several capabilities not provided by the CLDXF (see the bulleted list in Attachment A.1) that are necessary for a successful long-term NAD.
4. The FGDC standard does not require a specific data model, and it allows logical groups of elements to be combined or parsed apart, so it accommodates a wider variety of local data formats than the CLDXF, thereby reducing the barrier to participation.

5. The proposed minimum content list includes two undefined elements (Address Type and Address Placement) not found in either the FGDC or CLDXF standards. The addition of new elements not currently found in either the FGDC or CLDXF standards implies the creation of a separate standard, which would not be in the best interests of the geospatial community.

Because the FGDC standard is more comprehensive in scope and more flexible in implementation, we recommend it as best-suited to provide the basis for the NAD database model and exchange protocols.

The USDOT NAD Minimum Content Standard proposal is currently posted here:
https://sites.google.com/a/appgeo.com/usdot-national-address-database-pilot-project/

We thank you for your consideration of these comments and look forward to further participation as the NAD develops. If you have any questions, please contact me.

Sincerely,

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Attachment A: Background on the FGDC and CLDXF Address Data Standards

A.1. The FGDC Address Data Standard

The FGDC address data standard was created to meet, in one comprehensive standard, all of address data management requirements for all of the purposes listed at the beginning of this memorandum. The FGDC standard defines address classes, and the elements needed to construct address records and store them within relational databases and geographic information systems. It also defines the attributes needed for address documentation, mapping, and quality testing, including address ID's, coordinates, and linear reference locations. Finally, the standard provides a set of address data quality tests, and it supports address data exchange and data consistency by defining XML models for every address element, attribute, and class, integrated into a single XML Schema Document.

Because the FGDC standard is intended to support address relational and geographic databases, it includes elements and attributes that are required for the NAD but not needed in the CLDXF standard.

For example, the FGDC standard provides for:

- Unique Address IDs for every address
- Geographic coordinates for each address (including Z coordinates, if needed)
- Intersection, range, and USPS postal delivery (e.g., APO, PO Box, etc.) addresses.
- Relating addresses to road network segments such as MAF/TIGER segments (necessary for tests such as in/out of range and parity; and for geocoding)
- Relating one address to another (e.g., alias to primary; predecessor to successor, etc.)
- Managing address lineage from the originating address authority through several levels of aggregation.

The FGDC standard recognizes, as a practical matter, that different business purposes and different data sources will require different levels of complexity in address data records, files and repositories. For that reason the FGDC standard does not prescribe any specific database model. In addition, the FGDC standard allows for combining elements to simplify the address record structure. For example, in the address "123 ½ Main Street", "123 ½" can be separated into the address number (integer) and the address number suffix (text), or they can be combined a complete address number (text). Similar options are provided for street names; landmark names; subaddresses; place names; and USPS PO Box, APO, etc., elements. These in turn can be combined into the USPS Delivery Line and Place State ZIP lines of an address.

Because the FGDC standard supports many different address database models, address data managers can tailor their implementations of the standard according to their particular business purpose. Exchange between different address databases will be simplified because they refer to a common set of elements and definitions. In addition, exchange with CLDXF-compliant address databases will be simplified by the inclusion of FGDC-CLDXF data element equivalencies and conversion rules in the CLDXF profile.

The FGDC *United States Thoroughfare, Landmark, and Postal Address Data Standard* is published here: *http://www.fgdc.gov/standards/standards_publications/*

A.2. The NENA Civic Location Data Exchange Format (CLDXF)

NENA developed the CLDXF standard to provide a definitive set of core civic location data elements that support emergency call routing and dispatch. It is one of a number of NENA standards covering many aspects of 9-1-1 Public Safety Answering Point (PSAP) operations. The elements in the CLDXF standard are those needed to support the exchange of address information within 9-1-1 call records—not the creation of address records or databases. PSAPs rarely if ever function as address authorities. They obtain address data from external, trusted sources. For that reason, the CLDXF drafting committee consciously chose to omit a number of items that would be needed in an address repository.

Instead, the committee created the CLDXF as a formal profile of the FGDC standard, including (in an appendix) a complete data element mapping between the two standards, and the operations needed to convert from one to the other. CLDXF was designed to be used in conjunction with a full-function, FGDC-compliant address repository that includes the items and procedures needed for address data management, mapping, QC testing, etc.

It should be noted that NENA, along with URISA and the Census Bureau, was one of the three co-sponsors of the proposal submitted to FGDC in 2005 to create what became the FGDC standard.

The *NENA Next Generation 9-1-1 United States Civic Location Data Exchange Format* (CLDXF) is published at: *https://www.nena.org/?NG911CLDXF*