

**U.S. Census Bureau**  
**U.S. Department of Transportation**



**National Address Database**  
**Federal User Requirements Workshop**

**February 21, 2017 - Washington, DC**

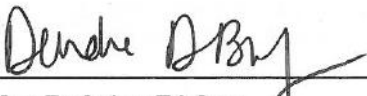
**Final Report**

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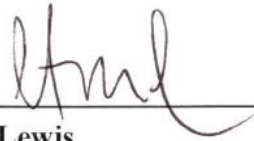
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<b>Sensitivity Assessment</b>	
This document does not contain any: <ul style="list-style-type: none"> <li>• Title 5, Title 13, Title 26, or Title 42 protected information</li> <li>• Procurement information</li> <li>• Budgetary information</li> <li>• Personally identifiable information</li> </ul>	

# Record of Changes

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**Table of Contents**

**Record of Changes .....4**

**1. Executive Summary .....6**

**2. Introduction .....11**

**3. Workshop Methodology .....13**

**4. Workshop Breakout Sessions .....18**

**5. Workshop Breakout Session Conclusions .....24**

**6. Recommendations .....26**

**7. Next Steps.....28**

**8. Contributors .....29**

**Attachment A: Data Dictionary .....30**

**Attachment B: Acronyms .....33**

**Attachment C: Workshop Meeting Agenda.....35**

**Attachment D: Workshop Attendees .....37**

**Attachment E: Pre-Workshop Questionnaire.....40**

**Attachment F: Pre-Workshop Questionnaire Summary and Weighted Summary Results.....48**

**Attachment G: Analysis of Questionnaire Results .....50**

# 1. Executive Summary

In August 2016, the Federal Geographic Data Committee (FGDC) Steering Committee, in concurrence with the Office of Management and Budget (OMB), approved the creation of a National Geospatial Data Asset (NGDA) Address Theme. The Address Theme was added to the existing National Spatial Data Infrastructure (NSDI) OMB Circular A-16 data portfolio. The Department of Transportation (DOT) and the U.S. Census Bureau were charged to co-manage the Address Theme and prioritize the development of a National Address Database (NAD): a consolidated public database of each address in the United States with its geospatial location.

All levels of government and particularly federal agencies need a NAD. Currently, multiple federal agencies maintain separate address lists, often through annual purchases of address data, and these data are not available to share with other agencies or the public. A NAD of authoritative spatially referenced address points from state and local governments would allow agencies to cease their duplicative address data activity and simply download up-to-date data from the consolidated database.

While work has been done to document federal agency use cases, as in the National Geospatial Advisory Committee (NGAC) Use Case Report,<sup>1</sup> the Census Bureau recognized a need to identify federal agency requirements for the NAD. In response, the Census Bureau and the DOT conducted a one day NAD Federal User Requirements workshop at the DOT in February 2017. The goal of the workshop was to capture federal agencies' requirements for NAD content, metadata, and database function.

The workshop team invited federal agency representatives from the FGDC Address Subcommittee to attend the workshop, along with tribal, state, local, and private industry members. Federal agency viewpoints were targeted, but as data providers, the tribal, state, local, and private company perspectives were of interest in part to serve as a reality check for the potential of data providers to meet the stated requirements.

Federal agencies were asked to respond to a pre-workshop questionnaire to help organizers better understand how the agencies use point address data. The questionnaire stated that agencies were to assume that the NAD would consist of the minimum content identified by state data providers as part of the DOT NAD Pilot. Agencies were asked to identify content and metadata requirements that were above and beyond the NAD Pilot minimum content. The responses to the questionnaires helped inform the workshop presentations, which in turn helped prepare the attendees for detailed requirements discussion and identification during the breakout sessions.

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<sup>1</sup> <https://www.fgdc.gov/ngac/meetings/december-2014/ngac-national-address-database-use-case-paper-december-2014.pdf>

A summary of the results of the pre-workshop questionnaire are included in Attachment G of this report.

The workshop consisted of overview presentations, a discussion on the goals of the workshop, breakout sessions to gather requirements, and presentations on the requirements captured and the next steps. The purpose of the morning presentations was to provide attendees with a basic understanding of the background and current activities pertaining to the Address Theme and NAD in addition to a summary of the results of the pre-workshop questionnaire. The workshop started with a presentation by the Census Bureau on the FGDC theme management process, relating it to managing a dataset such as the NAD, and noting that the DOT NAD Pilot minimum content was aligned with the Census Bureau's Geographic Support System minimum content guidelines. This was followed by a presentation by DOT on the NAD background. The Census Bureau then presented the results of the pre-workshop questionnaire. Prior to splitting out into the breakout session groups, attendees were reminded that the purpose of the workshop was to identify content and metadata requirements that were in addition to those already captured as minimum content from the DOT NAD Pilot and functional requirements for the NAD.

The three facilitated breakout sessions were the focus of the workshop and were designed to capture content requirements, metadata requirements, and functional requirements for the NAD. Attendees joined one of the three discussion groups and were asked to identify requirements for the NAD that were in addition to the DOT NAD Pilot minimum content and prioritize them in order of importance.

The workshop attendees then reconvened as one group to summarize their breakout discussions and present their list of requirements. Overall, agencies noted that the DOT NAD Pilot minimum content met their core needs for address data. In addition, there was wide agreement that the NAD needs some indicator of quality at the address record level. It was also noted that the first step toward reaching that goal was to, in the short term, identify a common data aggregation workflow and best practices. In the longer term, maintenance workflows need to be established for the NAD in order to shift from annual wholesale data uploads to flow-based transactional data record updates. Unique IDs for address records were also recognized as a common need, primarily to support address data workflows and NAD maintenance, but also to accommodate linkages to other data sets such as parcels, building footprints, and infrastructure points (e.g., fire hydrants, manholes, etc.)

The NAD federal users identified the following additional high-level requirements:

- Overall workflow
  - Maintenance
- Quality

- Unique IDs
- Linkages to other datasets
  - Infrastructure points (manholes, fire hydrants)
  - Building footprints, parcels, etc.

The following content requirements were identified:

- NAD Pilot minimum content met the needs of other Federal agencies
- Top five additional content needs
  - Alternate street names
  - Unit type
  - Postal City/State abbreviation
  - Multi-unit structure flag
  - Geocode confidence and accuracy

The following metadata requirements were identified:

- NAD Pilot minimum metadata content met some needs of other Federal agencies
- Top five additional metadata needs
  - Address coordinate reference system
  - Coordinate reference system authority
  - Indicator of quality
  - Unique IDs
  - Address lifecycle



The following additional functional requirements were identified:

- Bulk download serves 90 percent of agencies needs
- Functionality beyond tools on Geospatial Platform would be useful
- Top five functional needs:
  - Feedback mechanisms
    - Error correction
    - Functionality development
  - Download tools such as subset download and queuing
  - Anytime access via cloud
  - Batch geocoding service
  - Ability to feed updates to classified systems

In summary, the NAD Federal User Requirements workshop was a successful event. There was good representation from federal agencies and the initial feedback from workshop participants was very positive. Federal agencies identified high level requirements for the NAD that were in addition to the minimum content guidelines as specified by the DOT NAD Pilot.

As a result, the Census Bureau and DOT recommend the following to further develop the NAD to meet federal agency address needs:

- Establish working groups of the Address Subcommittee to study and provide recommendations on: 1) address data aggregation workflow and 2) address data content (including metadata)
- Use workshop information as the basis to conduct more agency-specific requirements gathering
- Identify milestones and goals for the development of the NAD, acknowledging that NAD development is currently constrained by the lack of funding which will negatively impact achieving milestones and goals

The Address Theme in general, and the NAD specifically, represents a significant opportunity for federal agencies to contribute toward building a nationwide address resource that will help support critical mission needs, with the potential for substantial cost savings through leveraging the existing investments of tribal, state, county and local government in address data.

A single, nationwide address database in a consistent, documented format has tremendous potential for simplifying federal agency address data operations, while supporting their address data use cases in a significantly more efficient manner than is the case currently. The workshop was the start of larger engagement in the Address Theme and development of the NAD.

## 2. Introduction

The Census Bureau and DOT co-lead the FGDC Address Theme and strongly advocate for the development of a NAD. This partnership recently organized a workshop to involve specific members of the address data user community to determine federal requirements for a national level address dataset.

This cooperative effort began shortly after the formation of the Address Theme by the FGDC's Steering Committee in August 2016. Prior to this date, the DOT completed their work on a NAD Pilot Project, the initial exploratory effort at building a consolidated public database of address data from six states (Arizona, Arkansas, New Jersey, Ohio, Utah and Virginia), Boone County Missouri, representing a consortium of 9 Missouri counties, and the District of Columbia. A detailed report describing this pilot effort was published by the DOT on September 20, 2016.<sup>2</sup> This report proposed minimum content guidance based on the relative availability of address data attributes described in the NAD Schema from the participants and other potential data providers (AppGeo, 2016, pp. 12-13).

In the early stages of the Address Theme and Subcommittee formation, the Census Bureau advocated for stakeholder engagement in the NAD requirements building process to identify as many address use cases as possible within federal agencies, as both the National States Geographic Information Council (NSGIC) and NGAC had been active in identifying state and local government use cases. NSGIC documented a significant number of state and local government address resource needs in their Address Business Needs document of October 2017<sup>3</sup>, and in a more limited way the NGAC Use Case Report documents some high level address resource use cases for the State of Arizona, Lexington County, South Carolina, and Boone County, Missouri. The Census Bureau placed primary emphasis on federal agency requirements to focus on potential duplicative efforts and spending. This primary focus of the newly organized Address Subcommittee expanded upon the previous efforts led by the address data provider community in conjunction with the NSGIC and DOT.

The Census Bureau proposed a full-day workshop with a broad section of stakeholders including tribal, federal, state, and local governments (primarily representing the address providers' interests), professional organizations, advocacy groups, and the commercial vendor community. Prior to the actual workshop held at DOT headquarters in Washington, DC, the Census Bureau designed and implemented a survey to poll federal agency address data requirements as a prerequisite to participation in the workshop. Participants responded to a pre-workshop

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<sup>2</sup> [https://www.transportation.gov/sites/dot.gov/files/docs/3\\_NAD\\_Pilot\\_Project\\_Final\\_Report.pdf](https://www.transportation.gov/sites/dot.gov/files/docs/3_NAD_Pilot_Project_Final_Report.pdf)

<sup>3</sup> [https://www.nsgic.org/assets/docs/ATdocs/Address\\_Business\\_Needs\\_101714\\_Final.pdf](https://www.nsgic.org/assets/docs/ATdocs/Address_Business_Needs_101714_Final.pdf)

questionnaire (Attachment E) to identify the high level user requirements, and a summary report of their responses was presented during the workshop.

### 3. Workshop Methodology

Workshop invitations were sent to eighty-nine individual stakeholders with forty-four actually attending. The departments and agencies of the federal attendees are listed in the table below. A complete list of the workshop attendees is included in Attachment D.

<b>Department</b>	<b>Agency</b>
Department of Agriculture	
Department of Commerce	Census Bureau
Department of Education	
Department of Health and Human Services	
Department of Homeland Security	Federal Emergency Management Agency
Department of Housing and Urban Development	
Department of Interior	U.S. Geological Survey
Department of Justice	Federal Bureau of Investigation
Department of Transportation	Office of the Chief Information Officer
	Federal Highway Administration
	Bureau of Transportation Statistics
	National Highway Traffic Safety Administration
Department of Veterans Affairs	
	<b>Independent Agencies</b>
	Consumer Financial Protection Bureau
	General Services Administration
	Washington Metropolitan Area Transit Authority
	U.S. Postal Service

The workshop began with opening remarks from Deirdre Bishop, Chief of Geography Division, U.S. Census Bureau, followed by the welcome of the workshop attendees from Steve Lewis, Chief Geospatial Information Officer for the U.S. Department of Transportation and host of the workshop. This was followed by introductions of DOT and Census Bureau personnel who prepared and organized the workshop, the roll call of federal agency and other stakeholder workshop attendees, and lastly an overview of the day's agenda. The session then moved into the workshop agenda items. These consisted of overview presentations, a discussion of the goals of the workshop, breakout sessions to identify the most important high-level requirements, and presentations on the requirements captured and the next steps.

The workshop presentation is available on the FGDC Address Theme home page under NAD Federal User Requirements Workshop.

## **Goals and Objectives**

### **Goal 1: Provide background information on the FGDC Address Theme and NAD effort.**

Objectives:

- Describe the FGDC Theme Management Process; and
- Describe the NAD effort to date.

### **Goal 2: Identify high-level NAD requirements for federal agencies.**

Objectives:

- Present the results of the Pre-Workshop Questionnaire;
- Identify the most important high-level requirements in theme based breakout sessions; and
- Summarize the results of the breakout sessions, announcing the most important high-level requirements in each breakout session theme.

### **Goal 3: Identify some next steps to move the NAD effort forward.**

Objectives:

- Identify issues and areas for further discussion; and
- Publish a workshop summary report.

## **Pre-Workshop Questionnaire**

In order to facilitate a preliminary understanding of federal agency address data user requirements, a pre-workshop questionnaire was developed and distributed to perform an initial assessment of user needs.

The design of the NAD Federal Agency User Requirements Pre-Workshop Questionnaire (Attachment E) was intended to capture responses to develop an understating of current and future address data needs of federal agencies in several different areas, including:

- Address data uses
- Update frequency preference
- Address point location preference
- Address type preferences
- Relative importance of specific address data content
- Relative importance of specific address data metadata content
- Relative importance of specific address data interface functionality

In preparation for the NAD Federal User Requirements Workshop the Pre-Workshop Questionnaire responses were analyzed and presented to the workshop attendees. This provided initial insight into federal agency address data needs, and prepared workshop attendees to discuss requirements in more focused detail during the breakout sessions.

The updated Pre-Workshop Questionnaire results and analysis is included in Attachment G of this report.

## **NAD Background**

Participants were initially presented with the DOT NAD Pilot goals, including:

- Determining minimum content guidelines
- Exploring address workflows
- Understanding best practices for address aggregation
- Assessing technical feasibility
- Preserving accessibility, keeping the NAD in the public domain

Next, a description of how the NAD Pilot participant and volunteer data was integral to the development of the NAD Pilot Minimum Content Guidelines, as described in detail in the NAD Pilot Project Findings Report (AppGeo, 2016, p. 13). A detailed description of the recommended NAD Pilot Minimum Content Guidelines is included in the table below.

<b>Address Components</b>	<b>Geographic Location</b>	<b>Address Metadata</b>
Address Number	Latitude/Longitude Coordinate	Address Authority
Street Name	National Grid Coordinate	Address Source
Subaddress		Address Date
City/Town/Place		Unique ID
County		Address Type
State		Address Placement
ZIP Code		

Additional explanation was provided for address authority, the owner of the address, address source, the provider of the address, address type, a description of the primary human activity at the address (e.g., residential, commercial, government/public) and address placement (e.g., rooftop, driveway, parcel centroid, etc.)

### **Geographic Support System (GSS) Background**

The Geographic Support System (GSS) is an integrated program that supports the Census Bureau's mission by improving address coverage, continuous updating of spatial features, and enhancing the quality assessments and measurements of the Master Address File/Topologically Integrated Geocoding and Referencing System (MAF/TIGER) database.

As part of the ongoing development of the GSS, the Census Bureau held an Address Summit in 2011. A key part of the work at the Address Summit was the development of the GSS Address Submission Guidelines in two forms, optimal and minimum.<sup>4</sup> Census GSS Optimal Submission Guidelines were substantial input into the design of the NAD Federal Agency User

<sup>4</sup> [https://www2.census.gov/geo/pdfs/gssi/Address\\_Data\\_Submission\\_Guidelines\\_v1.1.pdf](https://www2.census.gov/geo/pdfs/gssi/Address_Data_Submission_Guidelines_v1.1.pdf)



Requirements Pre-Workshop Questionnaire, specifically the questions on additional address content.

The table below displays the comparison of Census GSS Minimum Address Data Submission and NAD Pilot Project Minimum Content Guidelines, displaying a high degree of alignment.

<b>NAD Minimum Content Guidelines</b>	<b>Alignment</b>	<b>Census Minimum Address Data Submission Guidelines</b>
		<b>All Required</b>
Address Number	Align	Address Number
Street Name	Align	Street Name
		<b>And One Required</b>
Subaddress	No Compliment	
City/Town/Place	No Compliment	
Postal Community Name	Align	Postal City and State
State		
County	No Compliment	
ZIP Code	Align	ZIP Code
Latitude/Longitude Coordinate	Align	Address Coordinate
National Grid Coordinate	No Compliment	
	No Compliment	2010 Census Tabulation State, County, Tract and Block

## 4. Workshop Breakout Sessions

### Breakout Session Background

Workshop participants were divided into groups focused on three distinct requirements areas, content, metadata and functional. Efforts were made to include a broad section of stakeholders in each focus group, including splitting up personnel attending from the same agency or organization among two (or more) of the focus groups. Stakeholders discussed the pros and cons of specific additional requirements in each area, and then ranked them in order of preference. The following are the results and recommendations from each of the workshop breakout sessions.

### Content Requirements Breakout Session

The Content Requirements breakout session group was tasked with assessing and prioritizing a list of address data attributes identified in the pre-workshop questionnaire as being potential additions to the NAD schema, and proposing any additional attributes that were desirable but were not captured in the survey results. The following are the highlights of the ensuing debate and discussion.

Requirements for the content to be included in the NAD should be minimal, focusing on the basic elements and attributes of an address. The NAD should not include everything that a local database or state requires for their particular circumstances or needs. There was general agreement that the existing NAD schema accommodates the majority of the basic elements and attributes, and that those are the attributes most likely to be maintained (available) at all levels of government. However, it was recognized that not all of the attributes included in the schema would be maintained currently (or consistently) by all potential contributors, therefore it is important to note that initial contributions to the NAD need not include every element in the schema, as these may be populated over time. Attributes that can be derived via joins to ancillary datasets should need not be included in the NAD. For instance, census geography and congressional districts change over time, and could easily be obtained via data linkage instead of direct inclusion. Lastly, while Alternate Street Names are a highly desirable element, their inclusion may require a more complex data model than is currently being proposed.

It will be important to know how the coordinates for the address point were derived. Subcommittee members suggested that contributors to the NAD select from a “pick list” of Geocoding Confidence Indicators to identify how the geocode was derived (i.e., Building centroid, Global Positioning System (GPS), structure rooftop, entrance, unit location, parcel, linear geocode, property access point, etc.) Additionally, it was suggested that metadata might include the ‘geocoding engine’ (software) used to derive the coordinates. How contributors to

and users of the NAD capture, assess, and use indicators of quality for the address data will need to be an ongoing topic for subcommittee discussions. The breakout session specifically, and workshop in general, was insufficient to address these topics in the detail they need to be addressed in order to support the NAD.

While the following topics were outside the scope of the group, they are worthy of note:

Data aggregation will be an ongoing challenge as there are myriad schemas in use across the governmental landscape. While the NAD will generate a Universally Unique Identifier (UUID), the propagation of this element back to the contributors (facilitating maintenance of the NAD) will be a challenge, and may not be feasible in all cases.

Additionally, ‘Address’ versus ‘Addressable (Dispatchable) Feature’ concepts will need to be addressed. In order to be useful for emergency response purposes, the database may need to include features such as channel markers, barns and chicken coops, any location where an individual may require emergency assistance.

Lastly, the concept of ‘place name’ will prove challenging as it could encompass postal community name, legal jurisdictional names, unincorporated communities, neighborhoods, etc., and there is the potential for widespread variance in usage. It may be desirable to join the contributions to United States Postal Service data (using ZIP Code) to derive the data for the postal names.

At the end of the session, participants were asked to identify the five most important attributes to their agencies, based upon the possibility that if these “essential” attributes listed here are not included in the NAD schema, their agency would not use this database. The results of the voting follow:

Top 5:

- Alternate street names
- Unit Type (residential, commercial, governmental/public)
- Postal City/State Abbreviation
- Multi-Unit Structure Flag
- Geocoding confidence indicator

## Metadata Requirements Breakout Session

The Metadata Requirements breakout group met to consider and prioritize the metadata needs for the NAD beyond those already established by NAD Pilot Minimum Content Guidelines.

In general, the group agreed that the Minimum Content Guidelines met their requirements and that additional metadata elements were “nice to have” as opposed to “must have.” With that foundation established, the group reviewed the pre-workshop questionnaire results and endorsed four additional metadata elements.

First, the Address Point Coordinate System, which could include the authorizing organization of the coordinate system (e.g., EPSG) or other authority that assigns an address or other identifier. This may include the spatial extent of the authority and contact info. Second, an Indicator of Quality, a general term for a potentially complex set of tests and procedures. It might include a standard set of quality tests with weights assigned to indicate their relative importance. More discussion is needed before the Quality Indicator can be fully defined in a way that is useful to most users. Third, the Date Address Last Validated, if an address is validated in the field or through other research; this information would be an indicator of accuracy. It is worth noting that many addresses are never validated, but does not necessarily indicate a problem with the address position. Finally, Update Frequency, the frequency that new or corrected addresses for a given geographic area are expected to be uploaded into the NAD. Questions to consider when defining this item include, what constitutes a “new” address, does a simple ZIP code change require a new address date, and what if the address is in area that is annexed and the Place Name changes, but nothing else?

The group noted that their primary interest is in record level metadata, with file level metadata (i.e., one metadata file for each state or local dataset) being less important but useful. The group also emphasized that it is difficult to determine metadata requirements without an understanding of the workflow for transferring data in and out of the NAD. For example, to define a field for an address source involves tracking a potentially long chain of handoffs from the original address authority to the NAD. Another example is establishing a unique ID. There might be an address ID assigned by the address authority, as well as a Dataset ID assigned by an intermediate aggregator that supplies the address to the NAD. There might also be a unique ID assigned by the NAD dataset managers. Determining what address source and IDs should be captured and when can only occur after the address workflow is well defined.

The group discussed several additional topics that require more discussion in the future. Determining the address type will be challenging because no domain of exhaustive, exclusive values can be defined that serves all the use cases for which the NAD will be constructed. Use cases such as permitting, police activities, postal delivery, or disaster recovery all require different ways of categorizing addresses, so no one domain will work for everyone. When defining the address placement field, one address can have multiple placements such as the front

door, public street access point, utility pole in the right of way, others, so a code may have to be developed to express multiple placements in a way that is useful to the majority of use cases.

### **Functional Requirements Breakout Session**

The Functional Requirements breakout group met to consider and prioritize the functional needs for the NAD. Unique to the task of the breakout groups, this group did not have a set of basic requirements or recommendations originating from the NAD Pilot Findings Final Report, only the basic requirement of a Web Mapping Service (WMS) as prescribed by the FGDC National Geospatial Data Asset (NGDA) Management Plan requirements.

First, a clear and distinct line between access to NAD data in the form of a download service being paramount over any other functionality considerations was expressed by several of the group. Next, group members were asked to consider the functionality offered by the Geospatial Platform. Along these lines of discussion, there was unanimous concurrence that developing functionality beyond the basic interface tools available on the Geospatial Platform would be useful and would support some mission needs without having to develop the functionality locally at the agency level. However, this did not supplant the primary “requirement” to gain access to the data, especially among the federal agencies expressing this desire strongly.

Before delving into additional desirable functional requirements for the NAD, the topic of feedback mechanisms was raised to this group. The need to provide feedback on address data being ingested into the NAD to the providing entities, concerning any potential or actual errors discovered in the provided address data. This includes but is not limited to:

- An unreadable or incorrectly formatted dataset
- Address records that do not meet the NAD Schema Minimum Content Standard
- Address records without spatial coordinates (subset of minimum content)
- Address data that does not meet a recognized domain of values, for appropriate data variables
- Address records whose location exceeds the providing entity’s boundary by a significant distance (geographic location sanity check)

The group was informed that feedback had been a significant topic at the 2015 National Address Database Summit, and was widely supported by the attendees at that event. The Functional Requirements Breakout Session group discussed the need for feedback and some of the details per the above, but unanimously agreed that feedback is necessary to the NAD enterprise, especially in terms of supporting long term maintenance of the NAD. However, there were additional aspects of feedback that the breakout group considered and added to the requirements; this is described later in this section.

Other functional requirements that emerged as the most desirable from the breakout session include the following:

- Download tools
  - Geographic subset
    - The ability to select a geographic area smaller than the whole NAD or a whole state such as standard geographic subdivisions (for The United States of America, territories and possessions).
    - User defined geographic area, such as a custom polygon.
  - Queuing functionality. The ability to serve large datasets through scheduling and/or resuming downloads taking into account first come, first serve principles.
- Anytime access via the cloud. Providing high resource availability to users, either through basic download access and/or through an application serving the NAD.
- Batch geocoding service. The ability to input addresses and have the geographic locations returned.
- Updates to classified systems. Ability to feed updates to classified systems, with appropriate security measures for potentially restricted NAD content.

## **Parking Lot Topics**

For those discussions that were not directly related to the individual breakout session topics or not fully discussed, stakeholders agreed to put these in a parking lot for future discussion. These represent important topics and considerations relevant to the NAD enterprise, but in most cases are not directly related to the breakout session topics of content, metadata, and functionality.

Development of workflows between all the levels of stakeholders, from address authority to various levels of aggregators to final aggregation at the federal level, was raised as an important need and topic of future discussion in all three breakout sessions. How data flows up from authoritative sources at the local level to the national level is a major consideration for data aggregators. There are a variety of schemas in place from the local level to the national level (e.g., existing address datasets such as the MAF, the proposed NAD schema, others), but locals use their own schemas which work best for their needs. Local requirements are slow to change. Best practices for the NAD involve coordination at the state and national level, in which states will continue to take on the role of the aggregator for local and county-level data for the NAD. Not all data collected at the local level will be necessary for the NAD.

Stakeholders expressed the desire to develop some guidelines and documentation to support implementation of workflows, with particular emphasis on how this would be used to support NAD maintenance. In addition to this larger topic, stakeholders in all three breakout sessions emphasized the need to implement the concept of unique ID for address records primarily for the

purpose of supporting address workflows and maintenance. An important aspect of unique ID that was left to future discussions was whether a single unique ID could be implemented at all stakeholder levels, or if unique ID needs to be implemented distinctly at each level of address data aggregation.

Stakeholders in the Content and Metadata breakout sessions identified the need for additional discussions on the topic of representing quality in the NAD. In the Content breakout group, quality discussion moved towards the concept of quality indicators. How contributors and users of the NAD capture, assess, and use indicators of quality for the address record will be an ongoing topic for subcommittee discussions. For example, users can assign different confidence levels of quality for individual address points, attributes, or geocodes based on their own needs and how the addresses were derived. In the Metadata breakout group, the concept of metadata being intrinsic to an understanding of quality was emphasized. Additionally, how quality could be linked to specifically included NAD minimum content for metadata and/or recommended metadata content items emerging from the breakout session. Lastly, potentially develop a series of specific tests each with a weighted value, to either determine a quality score for an address record individually or address data from a provider collectively, or both. This last suggestion is an advanced approach to determining quality, in need of substantial discussion and development prior to implementation.

Linkages to other datasets, especially those that are address related or have addressable objects, was suggested as an important future topic of discussion. This was raised in both the Content and Metadata breakout session groups. A desire to include spatially related record IDs from other related enterprise datasets, such as Parcel Identification Numbers (PINs) from tax parcel datasets and unique IDs from building footprint datasets are the obvious and most closely related spatial datasets to consider. However, the potential inclusion of infrastructure objects that are addressable, such as manholes, fire hydrants, telephone poles and others was also raised for future consideration.

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## 5. Workshop Breakout Session Conclusions

The workshop attendees then reconvened as one group to summarize their breakout discussions and present their list of requirements. Overall, agencies noted that the DOT NAD Pilot minimum content met their core needs for address data. In addition, there was wide agreement that the NAD needs some indicator of quality at the address record level. It was also noted that the first step toward reaching that goal was to, in the short term, identify a common data aggregation workflow and best practices. In the longer term, maintenance workflows need to be established for the NAD in order to shift from annual wholesale data uploads to flow-based transactional data record updates. Unique IDs for address records were also recognized as a common need, primarily to support address data workflows and NAD maintenance, but also to accommodate linkages to other data sets such as parcels, building footprints, and infrastructure points (fire hydrants, manholes, etc.)

The breakout session summaries ended with a brief discussion of some preliminary conclusions, followed by a more lengthy consideration of the workshop details and results by the FGDC Address Theme Team (FGDC ATT).

- Federal agencies identified additional requirements for a NAD, beyond the NAD Pilot Minimum Content Guidelines.
- The NAD Pilot Minimum Content Guidelines currently meet many of the address needs of many of the responding federal agencies.
- Stakeholders recognized the interconnectedness of the three breakout session requirements topics, which limited their ability to come to full conclusions or consensus on a number of specific requirements and requirement topics.
- There is substantial room and significant need to discuss and develop additional metadata content for the NAD.
- Stakeholders expressed a significant desire to quantify quality about the NAD, and the link to metadata being the primary way to enable this was recognized.
- Feedback from address aggregators to address providers was recognized as a critical need, supporting NAD quality and maintenance.
- Address data providers may not currently collect all of the data attribution desired by federal agency stakeholders.
- The need to utilize universally unique IDs for address records in the NAD and precursor input datasets emerged with strong consensus, and the link to unique ID being necessary to enable workflows and maintenance activities is recognized.
- Inclusion of alternate street names in the NAD has strong support among federal agencies and stakeholders in general.



- Understanding what the address represents in terms of its architectural classification and function (e.g., single family home, apartment, trailer, duplex, etc.) has strong support among federal agencies and stakeholders in general.
- There may be some misunderstanding among some federal agency stakeholders as to the close relationship between ZIP Code and Postal City and State, based on the inconsistent response data from related questions on the NAD Federal Agency Requirements Pre-Workshop Questionnaire.
- There is significant desire among stakeholders to gain access to the NAD as soon as possible, and particularly among certain federal agencies.
- Stakeholders desire on demand access to the NAD, with limited or no access downtime.

## 6. Recommendations

**Recommendation 1: The FGDC ATT should author and publish a report of the NAD Federal User Requirements Workshop presentations, pre-workshop questionnaire analysis, breakout session discussions, findings and recommendations.**

Rationale: A report describing the details of the NAD Federal Agency User Requirements Workshop activities, including the analysis of the pre-workshop questionnaire and breakout session findings will serve as foundation for additional discussions and requirement development for the NAD. The report and its findings can be used to guide discussions that are more detailed on these topics in other forums, for both federal agency and other stakeholders.

**Recommendation 2: The FGDC ATT should continue discussions on NAD content and functionality at monthly Address Subcommittee meetings.**

Rationale: The FGDC Address Theme, Address Subcommittee meeting is the appropriate forum to continue discussions on the NAD and related address topics. The Address Subcommittee has substantial federal agency participation as well as state, county and professional organization participation, representing a broad set of interests and expertise beneficial to development of the NAD, including the interests of the address providers.

**Recommendation 3: The FGDC ATT should establish specific NAD topic based subgroups, comprised of a smaller number of individuals representing diverse interests and experience, to address NAD topics in detail and make recommendations to the full Address Subcommittee.**

Rationale: It is clear from the developments at the NAD Federal Agency Requirements Workshop that there are many lingering issues regarding NAD content and functionality that require additional discussion and resolution. Additionally, new NAD related topics such as quality, workflow and maintenance were only raised in a limited way at the workshop and require more detailed investigation and discussion. Since it is impractical to gather a large group of stakeholders on a frequent basis for workshops, or even the somewhat smaller regularly attending membership of the Address Subcommittee to address these multiple topics, a smaller group of individuals with diverse interests and expertise can focus on topics narrowly and make more rapid progress than larger groups of stakeholders. The entire Address Committee can provide periodic guidance to established subgroups, and can adopt, modify or reject recommendations from subgroups through established subcommittee bylaws.

**Recommendation 4: Evaluate the DOT NAD Pilot data to determine if the minimum content guidelines were met.**

Rationale: It is important to evaluate the DOT NAD Pilot data to determine if the initial submissions from data providers meet the minimum content guidelines, both to determine if providers are capable of meeting this minimum standard as well as the potential usability of the address data in the NAD Pilot to users.

**Recommendation 5: Identify milestones and goals for the development of the NAD.**

Rationale: Identifying goals and milestones, through the Address Theme Strategic Plan and Theme Implementation Plan, will both help move the NAD effort forward and measure progress at specified points to determine how well the effort is doing to reach its goals. One notable constraint in reaching milestones and meeting goals is the current lack of funding for the initiative, which will negatively affect achieving the goals

**Recommendation 6: Broaden requirements gathering beyond federal agencies to tribal, state, county and municipal governments.**

Rationale: Federal agencies responded to a survey to rank core attributes for the NAD. While several state representatives participated in the workshop and are on the Address Subcommittee, dialog between states and their county, municipal, and township partners on these core attributes will add to the value of the NAD. The same applies to tribal interests. The FGDC Address Subcommittee should promote this dialog, and feature state programs that access and leverage this database.

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## 7. Next Steps

The following are some important next steps for the FGDC ATT to address the recommendations.

- Call for federal agency and other stakeholder member participation on subgroups at a future Address Theme Subcommittee meeting. These should initially include but are not limited to Address Workflow, NAD Content, NAD Metadata and Quality. The Address Workflow subgroup has since been formed and is addressing its topic.
  - Conceive of and implement Quality Assurance procedures and individual Quality Control tests to assess the quality of the NAD. This has been initially implemented by DOT and its contractor to assess the following:
    - Address records have a spatial location, and are in or near the providing entity
    - Address records meet NAD Minimum Content Guidelines
    - Address records are consistent with a recognized domain of values for specified data variables, with some expansion of valid domain values based on experience
- If minimum standards are not being met then DOT should develop a method of communicating feedback to the providers to help them address the errors (since implemented), or determine if some providers are not capable of meeting the minimum standards and further evaluate them in the Address Subcommittee. If minimum standards are being met, then DOT can start taking steps to release the data publicly, so users can benefit from it.
- Develop a list of NAD goals, and tie them to specific milestones in a high level schedule in the Address Theme Strategic Plan and Theme Implementation Plan.
  - Ask state participants on the Address Subcommittee to share their experiences working with tribal, county, municipal, and township partners in building their statewide address databases. Specifically, what address data elements local government maintains and any differences with what states are requesting to meet their address use cases.
  - Call for federal agency, commercial vendor and other interested stakeholders to conduct their own independent evaluations of the NAD to determine if it meets minimum standards and other user needs. Several entities have already done this and provided their feedback to DOT and Census, including the Consumer Financial Protection Bureau, and commercial vendors TomTom and Digital Map Products.

## 8. Contributors

Deirdre Bishop (U.S. Census Bureau, Division Chief, Geography Division)

Monique Eleby (U.S. Census Bureau, Assistant Division Chief for Program Management and External Engagement, Geography Division)

Tim Trainor (U.S. Census Bureau, Chief Geospatial Scientist)

Lynda Liptrap (US Census Bureau, Geography Division)

Matt Zimolzak (U.S. Census Bureau, Geography Division)

Mark Lange (U.S. Census Bureau, Geography Division)

Deirdre Bevington-Attardi (U.S. Census Bureau, Geography Division)

Karen Poole (U.S. Census Bureau, Customer Liaison and Marketing Service Office)

Stuart Irby (U.S. Census Bureau, Geography Division)

Steve Lewis (Chief Geographic Information Officer, US Department of Transportation)

## Attachment A: Data Dictionary

Term	Definition
Address Theme	The Address Theme consists of the data elements, attributes, and metadata that specify a fixed geographic location by reference to a thoroughfare or landmark, or specifies a point of postal delivery, or both. The address theme does not include occupants or addressees nor does it include the features (e.g., parcels, building footprints, etc.) that may be specified by an address. The theme may include linkages between these features and other location reference methods.
Address Subcommittee	The primary objective of the Address Subcommittee is to support the National Spatial Data Infrastructure through coordination among tribal, federal, state, and local programs and interested commercial vendors to make spatially referenced national address data freely available.
Basic Street Address	The Census Bureau defines a basic street address as the address (i.e., structure number and street name) for a multi-unit structure, such as an apartment building, without the unit designations (e.g., apartment number, unit number, etc.) of the associated units at that multi-unit structure. For example, apartments at an apartment building share the same basic street address (typically) and are distinguished uniquely by their unit designations.
Public Land Survey System	The Public Land Survey System (PLSS) is used to divide public domain lands, which are lands owned by the Federal government for the benefit of the citizens of the United States. It encompasses major portions of the land area of 30 southern and western States. Since the original PLSS surveys were completed, much of the land

	<p>that was originally part of the public domain has been transferred to private ownership and in some areas the PLSS has been extended, following similar rules of division, into non-public domain areas. The PLSS typically divides land into 6-mile-square townships, which is the level of information included in the National Atlas. Townships are subdivided into 36 one-mile square sections. Sections can be further subdivided into quarter sections, quarter-quarter sections, or irregular government lots (ex., N 1/2 SE 1/4 SW 1/4, S24, T32N, R18E).</p>
Web Feature Service (WFS)	<p>A Web Feature Service Interface Standard (WFS) provides an interface allowing requests for geographical features across the web using platform-independent calls.</p>
Web Map Service (WMS)	<p>A Web Map Service Interface Standard (WMS) is a standard protocol for serving (over the Internet) georeferenced map images which a map server generates using data from a GIS database.</p>
Alternate Street Name	<p>Other names that differ from the primary street name for the same linear extent of a street or road feature. These can be honorary or ceremonial in nature, or officially recognized as another valid name for the street or road.</p>
City style address	<p>Housing unit and group quarter addresses that have an address number and street name address, for example, 212 Elm Street or 137 Clark Ct., Apt. 316. These addresses are used for mailing and/or to provide locations for emergency services, such as police, fire, and rescue (E911 addresses).</p>
Non-city style address	<p>Addresses that do not include a house number and/or a street name are noncity style addresses. Frequently used noncity style mailing addresses include Rural Route and Box Number, Highway contract route and Box Number, and Post Office Box addresses. These types of addresses are not typically geocodable.</p>

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Facility	<p>The Census Bureau defines facility as a commercial, residential, or institutional building or complex encompassing one or more structures, such as a college or university, nursing home, hospital, prison, hotel, migrant or seasonal farm worker camp, or military installation or ship. Facility examples include The University of Massachusetts, Scott Air Force Base and Folsom State Prison.</p>
Group Quarters	<p>The Census Bureau classifies all people not living in housing units (house, apartment, mobile home, rented rooms) as living in group quarters. There are two types of group quarters: Institutional, such as correctional facilities, nursing homes or mental hospitals, and Non-Institutional, such as college dormitories, military barracks, group homes, missions or shelters.</p>



## Attachment B: Acronyms

Acronym	Meaning
BSA	Basic Street Address
CFPB	Consumer Financial Protection Board
DOE	Department of Energy
DOT	Department of Transportation
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FGDC	Federal Geographic Data Committee
FGDC ATT	Federal Geographic Data Committee Address Theme Team
FHWA	Federal Highway Administration
GEO	Geography Division
GIS	Geographic Information System
GPS	Global Positioning System
GSA	General Services Administration
GSS	Geographic Support System
HHS	Health and Human Services
HUD	Housing and Urban Development
IHS	Indian Health Service
LRS	Location Referencing System
MAF	Census Bureau Master Address File
MTdb	MAF/TIGER Database

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NAD	National Address Database
NCES	National Center for Education Statistics
NGDA	National Geospatial Data Asset
NSGIC	National States Geographic Information Council
PIN	Parcel Identification Number
PLSS	Public Land Survey System
SSA	Social Security Administration
TIGER	Topologically Integrated Geographic Encoding System
USPS	United States Postal Service
UUID	Universally Unique ID
VA	Veterans Administration
WFS	Web Feature Service
WMS	Web Mapping Service
ZIP	Zone Improvement Program

## Attachment C: Workshop Meeting Agenda

### National Address Database (NAD) Federal User Requirements Gathering Session Agenda

February 21, 2017 - 9am to 3pm

- I. Introduction (25 min.)
  - a. Welcome/Purpose of the day
  - b. Introduction of participants/Agency role call
  
- II. Theme Management Process (10 min.)
  - a. Roles & Responsibilities
  - b. Management components and deliverables
  
- III. NAD background (20 min.)
  - a. Current Status
    - i. DOT
      - 1. NAD Pilot – Establish minimum content guidelines
    - ii. Census
      - 1. Geographic Support System (GSS Partner Program – minimum data content guidelines for addresses)
  - b. Challenges
    - i. Funding
    - ii. Data coverage gaps
  
- IV. Federal Agency User Requirements Pre-Workshop Questionnaire (25 min.)
  - a. Analysis of Results

**10 min. break**

- V. User requirements gathering – Breakout sessions (90 min.)
  - a. Content requirements
  - b. Metadata requirements
  - c. Functional requirements

**LUNCH 12 noon to 1pm**

- VI. User requirements gathering – Breakout sessions continued (70 min.)
  
- VII. Summary of Breakout sessions (35 min.)
  - a. Content summary
  - b. Metadata summary
  - c. Functional summary

- VIII. Conclusion (15 min.)
  - a. Next steps
    - i. Parking Lot
    - ii. Workshop summary report
  - b. Closing remarks

## Attachment D: Workshop Attendees

Florinda Balfour  
Department of Veterans Affairs  
Functional Breakout Session Group

Deirdre Bishop  
U.S. Census Bureau

Mickey Brierley  
Federal Emergency Management Agency  
Functional Breakout Session Group

Michael Byrne  
Consumer Financial Protection Bureau  
Functional Breakout Session Group

Stephanie Crews-Jones  
Federal Bureau of Investigation  
Content Breakout Session Group

Aluanda Drain  
General Services Administration  
Functional Breakout Session Group

Laurie Flaherty  
National Highway Traffic Safety  
Administration  
Metadata Breakout Session Group

Adrian Gardner  
Federal Emergency Management Agency  
Functional Breakout Session Group

Brian Gardner  
Federal Highway Administration  
Metadata Breakout Session Group

Doug Gevert  
Department of Education  
Content Breakout Session Group

Ben Gurga  
Department of Health and Human Services  
Functional Breakout Session Group

Shirley Hall  
Department of Agriculture  
Metadata Breakout Session Group

Joseph Hausman  
Federal Highway Administration  
Functional Breakout Session Group

Parrish Henderson  
Federal Bureau of Investigation  
Functional Breakout Session Group

Stuart Irby  
U.S. Census Bureau  
Content Breakout Session Group

David Jackson  
City of Washington, District of Columbia

Christian Jacqz  
National States Geographic Information  
Council/Commonwealth of Massachusetts  
Content Breakout Session Group

Earl Johnson  
U.S. Postal Service

Mark Lange  
U.S. Census Bureau  
Functional Breakout Session Group

Steve Lewis  
Department of Transportation  
Functional Breakout Session Group

Lynda A Liptrap  
U.S. Census Bureau  
Metadata Breakout Session Group

Eric Litt  
Department of Veterans Affairs  
Metadata Breakout Session Group

Gita Urban-Mathieux  
U.S. Geological Survey  
Functional Breakout Session Group

Dominic Menegus  
Bureau of Transportation Statistics  
Metadata Breakout Session Group

Kenny Miller  
National States Geographic Information  
Council  
Content Breakout Session Group

Anne Nussear  
General Services Administration  
Content Breakout Session Group

Ted Payne  
Department of Housing and Urban  
Development  
Functional Breakout Session Group

Greg Pewett  
U.S. Census Bureau  
Metadata Breakout Session Group  
(Facilitator)

Karen Poole  
U.S. Census Bureau  
Content Breakout Session Group  
(Facilitator)

Deborah Rivera-Nieves  
U.S. Census Bureau  
Functional Breakout Session Group  
(Facilitator)

Tom Roff  
Federal Highway Administration  
Functional Breakout Session Group

Rob Seay  
Social Security Administration  
Metadata Breakout Session Group

Rob Shankman  
Department of Health and Human Services  
Content Breakout Session Group

John Sperling  
Department of Housing and Urban  
Development  
Content Breakout Session Group

Tianjia Tang  
Federal Highway Administration  
Metadata Breakout Session Group

Michael Turner  
Applied Geographies  
Metadata Breakout Session Group

Lucie Vogel  
Indian Health Services  
Content Breakout Session Group

Ed Wells  
Washington Metropolitan Area Transit  
Authority  
Metadata Breakout Session Group

Martha Wells  
Urban and Regional Information Systems  
Association  
Content Breakout Session Group

Daniel Widner  
Consultant

David Winter  
Federal Highway Administration  
Content Breakout Session Group

Patrick Zhang  
Federal Highway Administration  
Content Breakout Session Group

Nate Workman  
Federal Emergency Management Agency  
Content Breakout Session Group

Matthew Zimolzak  
U.S. Census Bureau  
Functional Breakout Session Group

Amy Youmans  
Federal Emergency Management Agency  
Metadata Breakout Session Group

# Attachment E: Pre-Workshop Questionnaire

## National Address Database (NAD) Federal Agency User Requirements

### Pre-Workshop Questionnaire

Your Name: \_\_\_\_\_

Your Department/Agency: \_\_\_\_\_

Contact Email: \_\_\_\_\_

Contact Phone: \_\_\_\_\_

**Please consolidate your response by agency, one response per agency, to aid our compilation efforts. Please email the completed questionnaire back to [mark.lange@census.gov](mailto:mark.lange@census.gov)**

#### I. **NAD Uses**

Please identify the most important (mission critical) ways your agency would use the NAD to support your mission from the list below. Please include any specific examples of your agency's broad uses not listed under "Other."

- Emergency Response
- Mailing List
- Address Location Verification/Inventory
- Enumeration
- Survey Execution
- Service Delivery
- Delivery Route Optimization
- Facility Management
- Planning
- Decision-Making/Policy Development
- Impact Analysis
- Funding Allocation
- Risk Assessment
- Compliance Notification
- Permit Management and Verification
- Regulatory/Code Enforcement
- Fraud Detection



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Other: \_\_\_\_\_

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## II. Content Requirements

Background: In preparation for the user requirements workshop, the FGDC Address Theme co-leads recommend accepting the NAD Pilot Minimum Content Guidelines as a starting point, with a workshop focus on additional content requirements or refining requirements from the minimum content guidelines. The guidelines are intended for residential, commercial, and governmental structures, but could include other addressable objects meeting these minimum content guidelines. For more details on the NAD Pilot Minimum Content guidelines and proposed NAD Schema, see the NAD Pilot Project Findings Report, pp. 12-13, <https://www.fgdc.gov/topics/national-address-database/nad-pilot-project-final-report.pdf>

Additionally, please note that terminology marked with an asterisk is found on the definitions pages at the end of this questionnaire.

NAD Content Preferences:

- 1) Update Frequency: How frequently does your agency require address data be updated to meet its mission needs? (select one)

Continuously       Quarterly       Biannually (2 times per year)

Annually (once a year)       Every 2 years       Every 5 years

No preference

- 2) Address Point Location: Please identify the address point location that is most useful to your agency (select one):

Front door only       All doors       Building footprint centroid

Access point (driveway entrance)       Post office mail receptacle

Parcel centroid       No preference

3) Address Type: What address types does your agency require to meet its mission needs? (select all that apply)

Residential                   Commercial                   Governmental/Public

Other (please specify): \_\_\_\_\_

Requirement

NAD Pilot minimum content guidelines requirements:

■ Address Number                  ■ Street Name                  ■ Subaddress (e.g. Apt. number, etc.)

■ Local Jurisdiction (e.g., city, town, borough, village, township, place)                  ■ County

■ State                  ■ ZIP Code (5-digit)                  ■ Latitude/Longitude                  ■ National Grid Coordinates

Please rate the following content requirements that are **in addition** to the DOT NAD Pilot Minimum Content Guidelines on their importance to supporting your agency’s mission: Essential (must have) - 1, Desirable (highly valuable, but not mandatory) – 2, Useful (nice to have) – 3, Not Useful (unneeded) - 4.

<u>Requirement</u>	<u>Score:</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Multi-unit structure flag		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unit count at basic street address*		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Postal city name and state abbreviation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unit type (e.g., SFH*, apartment, duplex, trailer, etc.)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Census geography (e.g., tract, block)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facility*/Group Quarters* name (e.g., UCLA, Hunt Dorm)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facility*/Group Quarters* type		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alternate street name(s)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Non-city style*/mailing only address flag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parcel identification number (PIN)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Building Identifier/Building ID Number	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transportation Network Identifier/LRS* Key	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Congressional/state legislative districts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>Requirement</u>	<u>Score:</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Public Land Survey System (PLSS)*		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Address use (location, mailing, both)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Building permit date		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Structure built/occupancy certificate date		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other address content:					
Other content 1 _____		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other content 2 _____		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other content 3 _____		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### III. Metadata Requirements

Background: The FGDC Address Theme Co-Leads recommend accepting the NAD Pilot Minimum Content Guidelines for metadata as a starting point, with a workshop focus on additional metadata content requirements and/or refining requirements from the minimum content guidelines. More details on the NAD Pilot Minimum Content guidelines for metadata can be found in the previously referenced report.

NAD Pilot minimum metadata guidelines requirements:

- Unique ID
- Address Type (e.g., residential, commercial, governmental, etc.)

- Address Placement (e.g., rooftop, structure entrance, driveway entrance, etc.)
- Address Authority (i.e., data creator)      ■ Address Source (i.e., data aggregator)
- Address date (i.e., date last updated, last validated date, etc.)

Please rate the following additional metadata requirements on their importance to supporting your agency’s mission: Essential (must have) - 1, Desirable (highly valuable, but not mandatory) – 2, Useful (nice to have) – 3, Not Useful (unneeded) - 4.

<u>Requirement</u>	<u>Score:</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Date address last validated		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Address point coordinate system		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Update frequency		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indicator of quality		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other metadata content:					
Other metadata 1 _____		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other metadata 2 _____		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other metadata 3 _____		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**IV. Functional Requirements**

At a minimum, Web Mapping Services (WMS)\* will be provided per the Federal Geographic Data Committee (FGDC) National Geospatial Data Asset (NGDA) Management Plan requirements. What other functionality does your agency require when interacting with the National Address Database?

1) What database management model would suit your agency’s needs best? (select one)

- Centralized        Distributed        No preference

Please rate the following functional requirements on their importance to supporting your agency's mission: Essential (must have) - 1, Desirable (highly valuable, but not mandatory) – 2, Useful (nice to have) – 3, Not Useful (unneeded) - 4.

<u>Requirement</u>	<u>Score:</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Anytime access via internet		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Always available/mirror		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<u>Requirement</u>	<u>Score:</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
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Dataset interoperability (interact with other datasets)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Web Feature Services (WFS)*		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Spatial files (shapefiles, geodatabase, etc.)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Application/Interface Tools:

Display tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Navigation tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Search tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Spatial and nonspatial query tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Selection tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Imagery tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
---------------	--	--------------------------	--------------------------	--------------------------	--------------------------

Map format tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
------------------	--	--------------------------	--------------------------	--------------------------	--------------------------

Data tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Report tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------	--	--------------------------	--------------------------	--------------------------	--------------------------

Statistics tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
------------------	--	--------------------------	--------------------------	--------------------------	--------------------------

Download tools		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Other functional requirements:

Other functional 1 \_\_\_\_\_

Other functional 2 \_\_\_\_\_

Other functional 3 \_\_\_\_\_

### Definitions

**Basic street address** - The Census Bureau defines a basic street address as the address (i.e., structure number and street name) for a multi-unit structure, such as an apartment building, without the unit designations (e.g., apartment number, unit number, etc.) of the associated units at that multi-unit structure. For example, apartments at an apartment building share the same basic street address (typically) and are distinguished uniquely by their unit designations.

**City style address** - Housing unit and group quarter addresses that have an address number and street name address, for example, 212 Elm Street or 137 Clark Ct., Apt. 316. These addresses are used for mailing and/or to provide locations for emergency services, such as police, fire, and rescue (E911 addresses).

**Facility** - The Census Bureau defines facility as a commercial, residential, or institutional building or complex encompassing one or more structures, such as a college or university, nursing home, hospital, prison, hotel, migrant or seasonal farm worker camp, or military installation or ship. Facility examples include The University of Massachusetts, Scott Air Force Base and Folsom State Prison.

**Group Quarters** - The Census Bureau classifies all people not living in housing units (house, apartment, mobile home, rented rooms) as living in group quarters. There are two types of group quarters: Institutional, such as correctional facilities, nursing homes or mental hospitals, and Non-Institutional, such as college dormitories, military barracks, group homes, missions or shelters.

**LRS** - Location Referencing System

**Non-city style address** - Addresses that do not include a house number and/or a street name are noncity style addresses. Frequently used noncity style mailing addresses include Rural Route and Box Number, Highway contract route and Box Number, and Post Office Box addresses. These types of addresses are not typically geocodable.

**Public Land Survey System (PLSS)** - The PLSS is used to divide public domain lands, which are lands owned by the Federal government for the benefit of the citizens of the United States. It encompasses major portions of the land area of 30 southern and western States. Since the original PLSS surveys were

completed, much of the land that was originally part of the public domain has been transferred to private ownership and in some areas the PLSS has been extended, following similar rules of division, into non-public domain areas. The PLSS typically divides land into 6-mile-square townships, which is the level of information included in the National Atlas. Townships are subdivided into 36 one-mile-square sections. Sections can be further subdivided into quarter sections, quarter-quarter sections, or irregular government lots (ex., N 1/2 SE 1/4 SW 1/4, S24, T32N, R18E).

[https://nationalmap.gov/small\\_scale/a\\_plss.html#one](https://nationalmap.gov/small_scale/a_plss.html#one)

SFH - Single family home.

Web Feature Service (WFS) - A Web Feature Service Interface Standard (WFS) provides an interface allowing requests for geographical features across the web using platform-independent calls.

Web Map Service (WMS) - A Web Map Service Interface Standard (WMS) is a standard protocol for serving (over the Internet) georeferenced map images which a map server generates using data from a GIS database.

# Attachment F: Pre-Workshop Questionnaire Summary and Weighted Summary Results

NAD Workshop Questionnaire Results	
Questions	Summary and Weighted Summary Results
<b>Nad Uses (All that apply)</b>	
Emergency Response	8
Mailing List	2
Address Verification/Inventory	12
Enumeration	1
Survey Execution	3
Service Delivery	4
Delivery Route Optimization	1
Facility Management	6
Planning	8
Decision-Making/Policy Development	9
Impact Analysis	6
Funding Allocation	4
Risk Assessment	5
Compliance Notification	3
Permit Management and Verification	0
Regulatory/Code Enforcement	0
Fraud Detection	5
Other 1	4
Other 2	0
Other 3	0
<b>Update Frequency (Select one)</b>	
Continuously	3
Quarterly	4
Biannually	2
Annually	5
Every 2 years	0
Every 5 year	0
No Preference	0
<b>Address Point Location (Select one)</b>	
Front Door Only	3
All Doors	1
Building Footprint Centroid	4
Access Point/Driveway Entrance	1
Post Office Mail Receptacle	1
Parcel Centroid	2
No Preference	2
<b>Address Type (All that apply)</b>	
Residential	12
Commercial	12
Governmental/Public	13
Other	1
<b>Additional Content Requirements (Rate 1 to 4)</b>	
Postal City and State Abbreviation	31
Multi-Unit Structure Flag	30
Building ID Number	29
Unit Type (SFH, Apt., Trailer)	29
Alternate Street Names	27
Unit Count at BSA	27
Address Use (location, mailing, both)	26
Facility/Group Quarters Type	25
Facility/Group Quarters Name	23
Census Geography	22
Non-city style/Mailing Only Flag	22
Parcel Identification Number (PIN)	21
PLSS	20
Transportation Network ID / LRS Key	19
Congressional/State Legislative Districts	18
Structure Built/Occupancy Certificate Date	18
Building Permit Date	15
Other Content 1	5
Other Content 2	0
Other Content 3	0

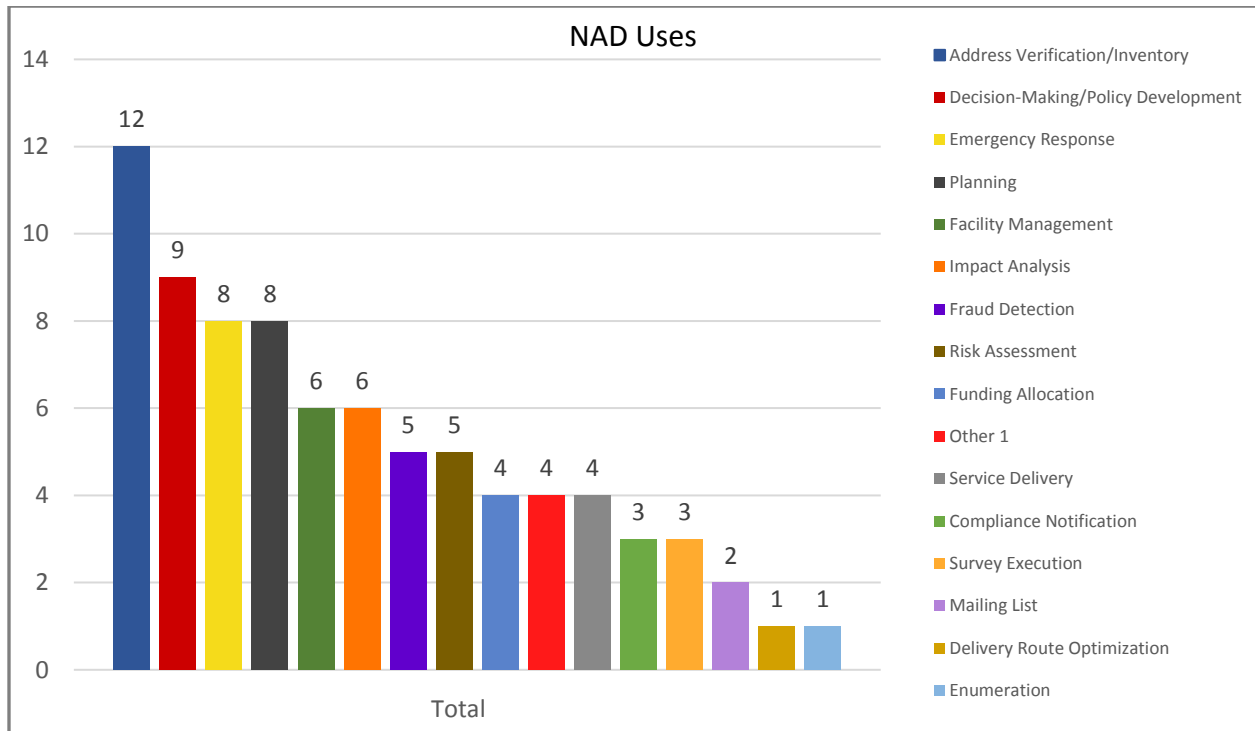


NAD Workshop Questionnaire Results	
Questions	Summary and Weighted Summary Results
<b>Additional Metadata Requirements (Rate 1 to 4)</b>	
Address Point Coordinate System	37
Indicator of Quality	34
Date Address Last Validated	31
Update Frequency	31
Other Metadata 1	4
Other Metadata 2	4
Other Metadata 3	0
<b>Data Management Model (select one)</b>	
Centralized	2
Distributed	5
No Preference	7
<b>Additional Functional Requirements (Rate 1 to 4)</b>	
Dataset Interoperability	35
Anytime Access via Internet	34
Always Available/Mirror	33
Download Tools	33
Web Feature Services (WFS)	32
Data Tools	31
Spatial Files (shapefiles, geodatabase)	29
Display Tools	28
Search Tools	28
Selection Tools	28
Spatial and Nonspatial Query Tools	28
Navigation Tools	27
Report Tools	25
Imagery Tools	23
Statistics Tools	23
Map Format Tools	19
Other Functional 1	2
Other Functional 2	0
Other Functional 3	0

## Attachment G: Analysis of Questionnaire Results

The following are graphic representations of the questionnaire results in the form of bar and pie charts.

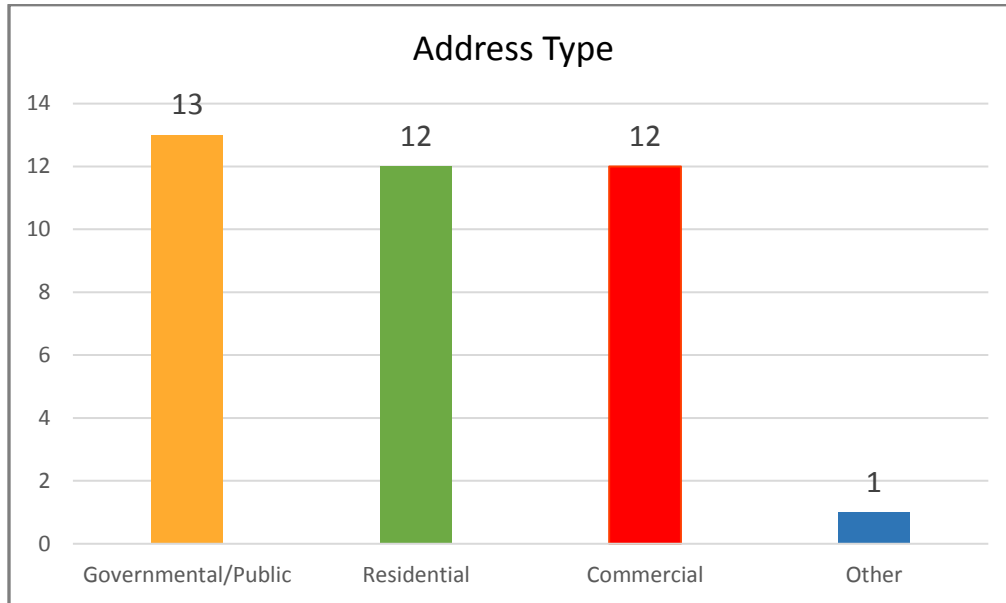
Figure 1



The bar chart in Figure 1 displays the distribution of the ranked NAD Uses from most important to least important, according to the responding federal agencies.

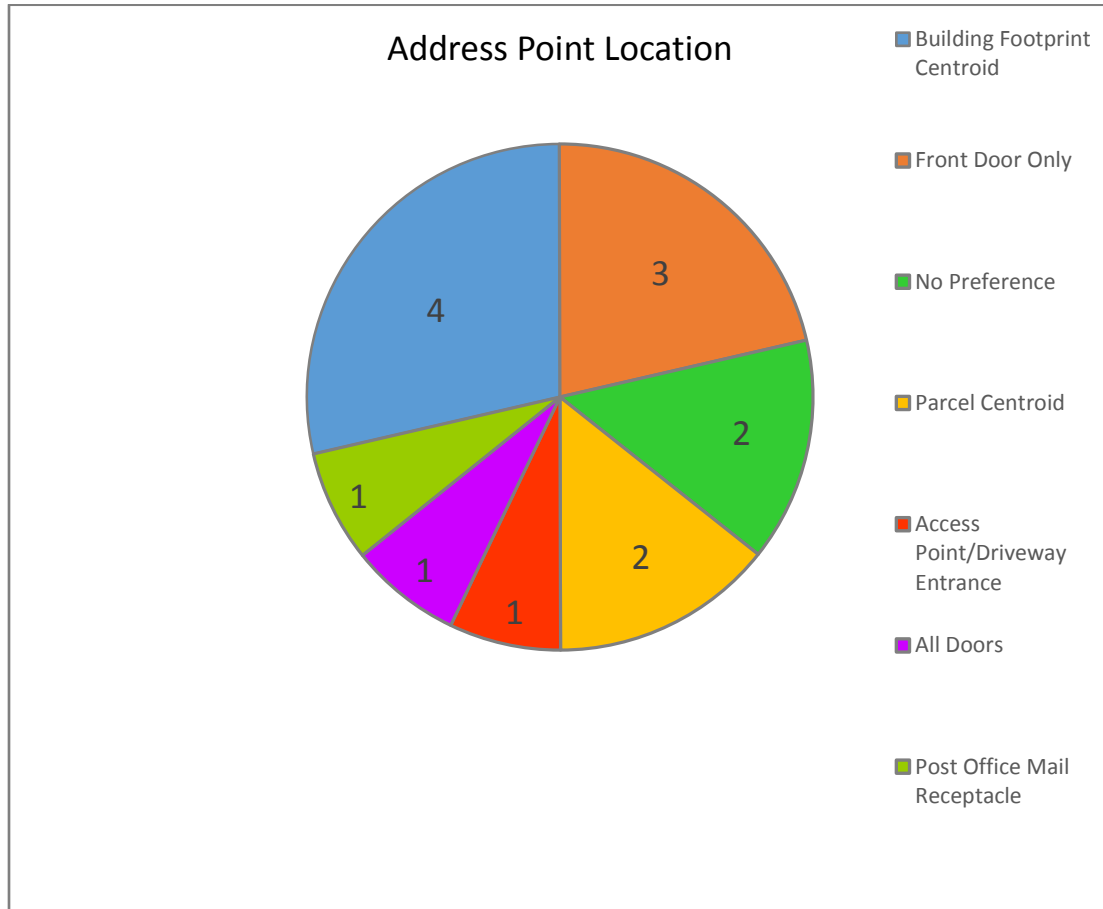
The top three include:

- Address Verification/Inventory with twelve responses;
- Decision Making/Policy Development with nine responses;
- Emergency Response and Planning tied with eight responses each.

**Figure 2**

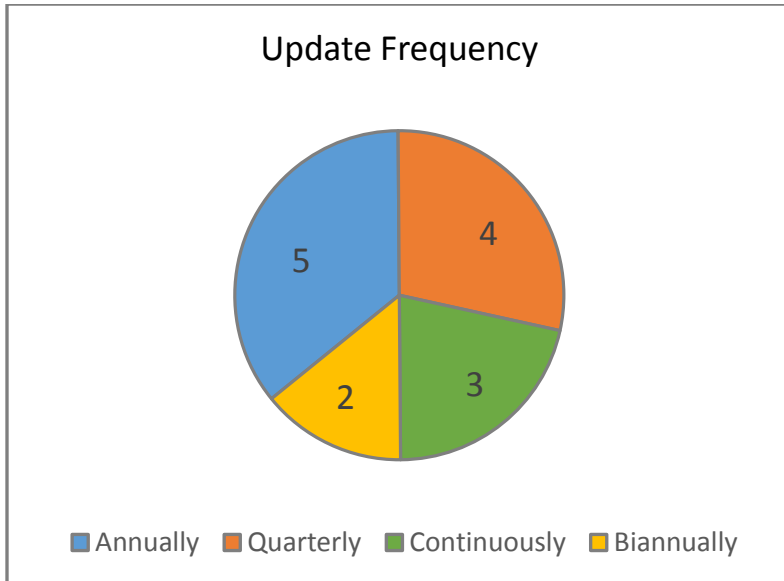
The bar graph in Figure 2 analyzes the responses to the address types needed in the NAD. There is strong consensus that federal agencies want all three types of addresses in the NAD, governmental/public, residential and commercial.

Figure 3



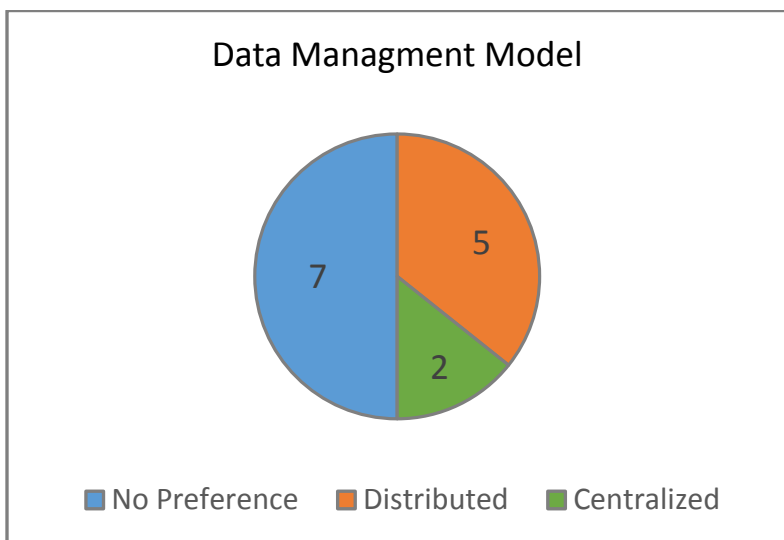
For preferred Address Point Location (Figure 3), Building Footprint Centroid was the most popular with four responses, followed by Front Door Only with three responses. The top two responses had as much support as the remaining five responses had, among responding federal agencies.

**Figure 4**



For NAD Update Frequency (Figure 4), almost half of respondents would be satisfied with annual updates, with more than three quarters satisfied with updates that are less than continuous.

**Figure 5**



For preferred Data Management Model (Figure 5), half of respondents expressed no preference.

### Additional Content Requirements

The following pie charts describe the distribution of preferences from responding federal agencies, for the top six additional NAD content requirements responses.

Figure 6

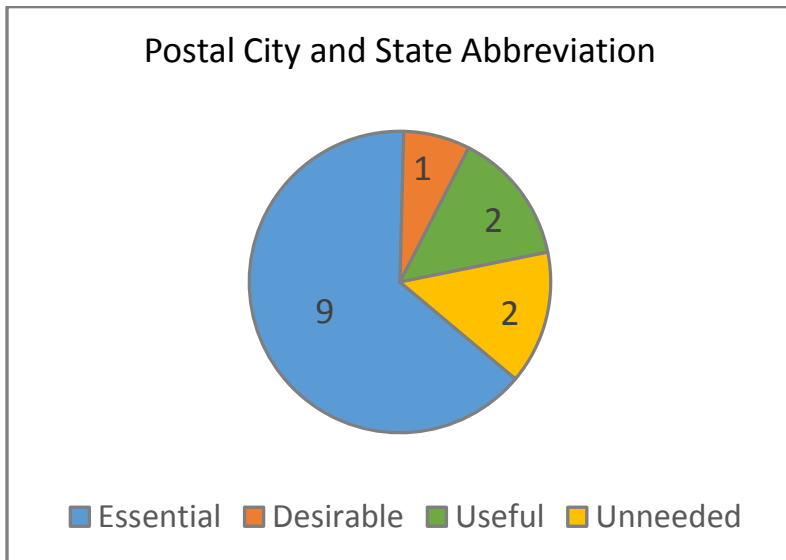


Figure 7

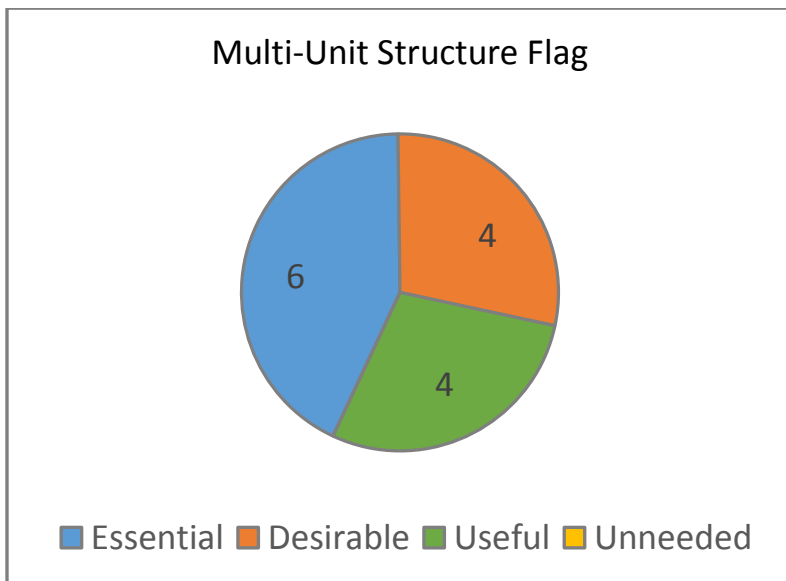


Figure 8

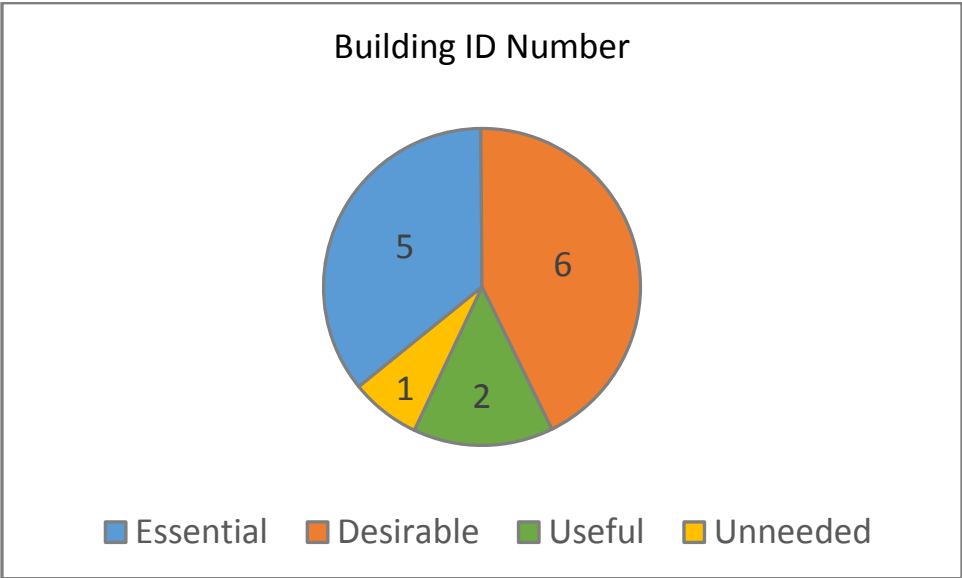


Figure 9

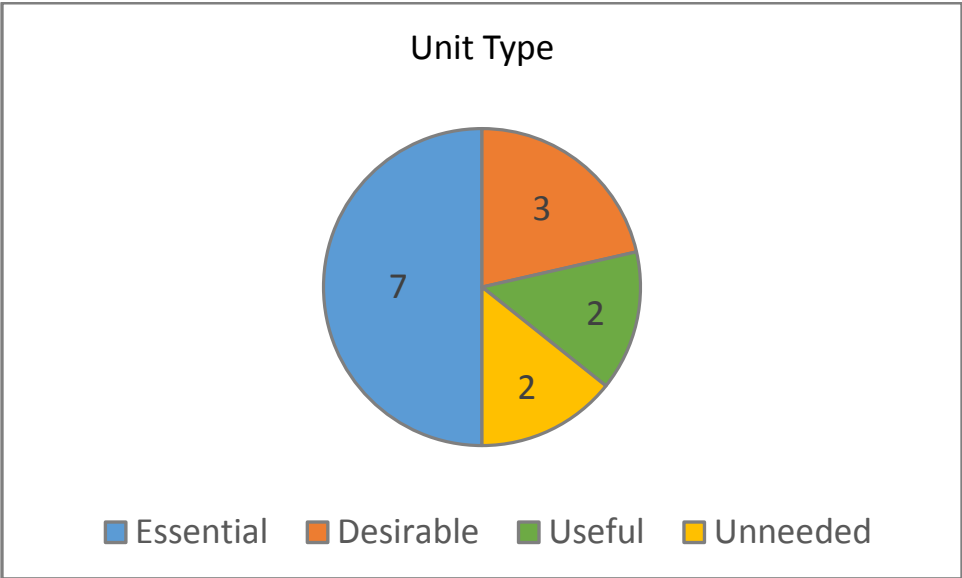


Figure 10

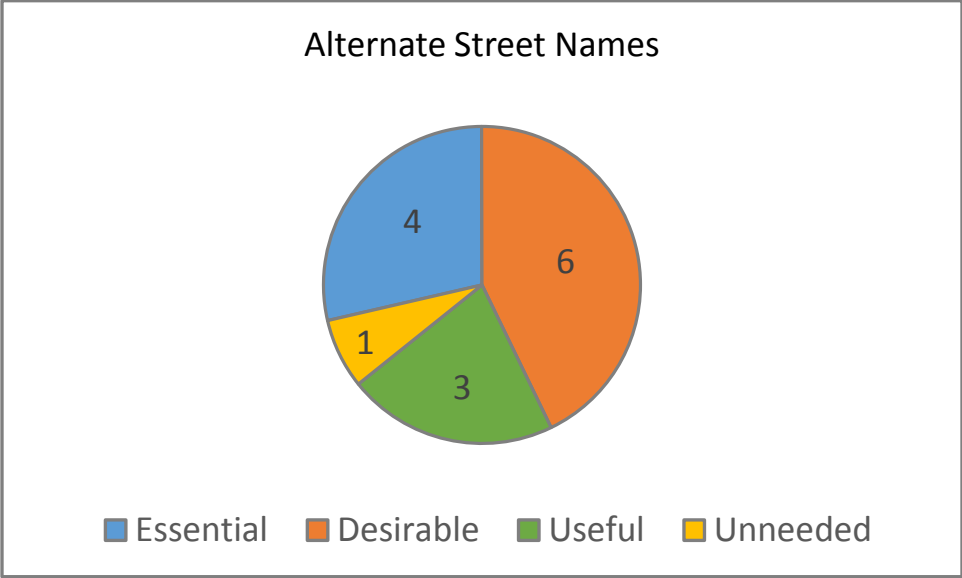
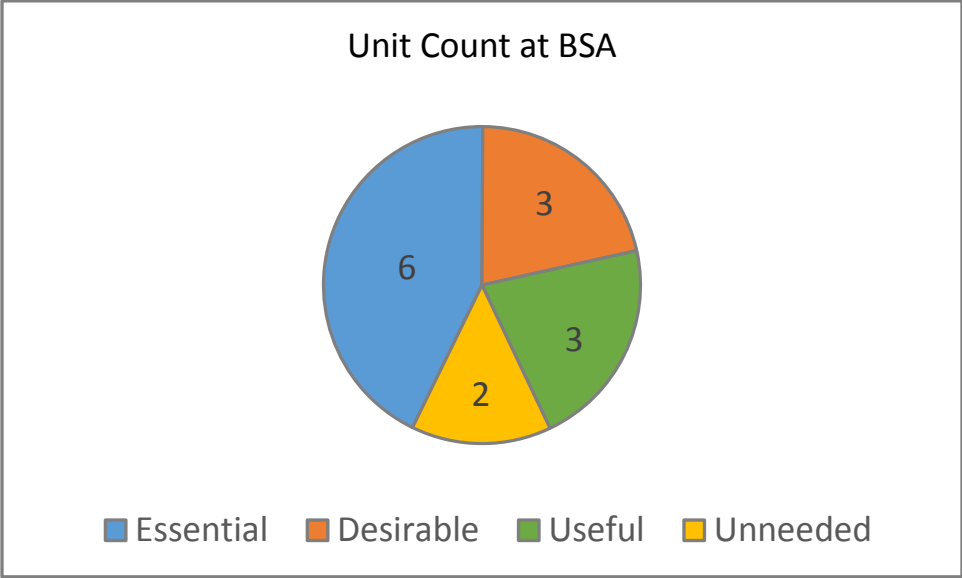


Figure 11



- Postal City and State Abbreviation is ranked first (Figure 6), with almost two thirds of respondents rating this as Essential and more than three quarters rating it as Desirable or higher. This is an interesting result, as only two Federal agencies selected “Mailing List” as a mission critical NAD use;



- Multi-Unit Structure Flag is ranked second (Figure 7), with nearly half rating it as Essential, more than two thirds rating it as Desirable or higher and none ranking it as Unneeded;
- Building ID Number is tied for third (Figure 8), with more than three quarters of respondents rating it as Desirable or higher;
- Unit Type is also tied for third with (Figure 9), half rating it as Essential and more than two thirds rating it as Desirable or higher;
- Alternate Street Names is tied for fifth (Figure 10), with more than two thirds rating it as Desirable or higher;
- Unit Count at BSA is also tied for fifth (Figure 11), with nearly half rating it as Essential and almost two thirds rating it as Desirable or higher.

### **Additional Metadata Requirements**

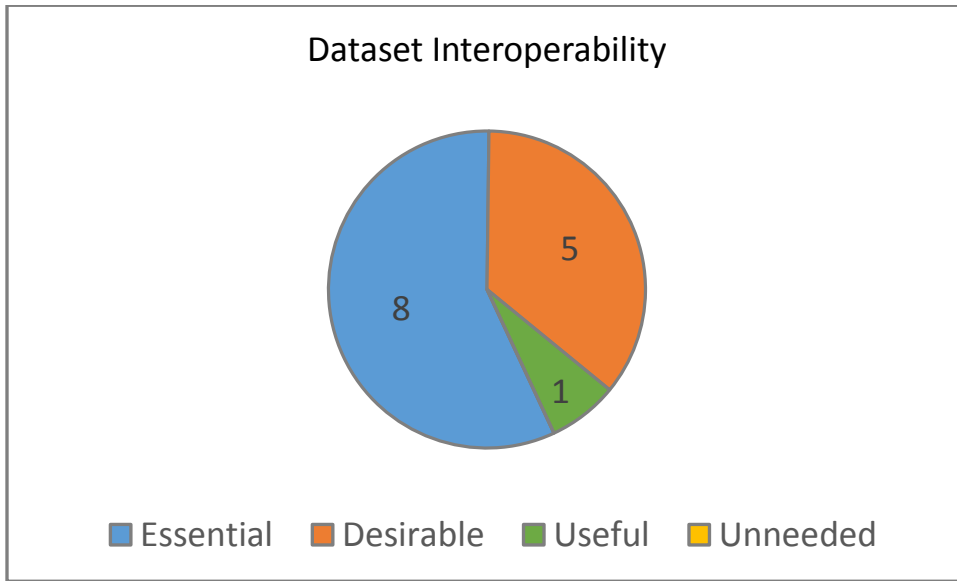
There are only four additional metadata requirements that were specified on the NAD Pre-Workshop Questionnaire: Address Point Coordinate System, Indicator of Quality, Date Address Last Validated and Update Frequency. All of these were overwhelmingly supported by responding federal agencies with mostly high ratings, Essential or Desirable. Analysis for the limited additional metadata requirements ratings is a ratio of the response weighted points to the total possible weighted points, expressed as a percentage. Below describes the percentage of the respondents ratings weighted points total divided buy the total possible points, ranked from highest to lowest.

- Address Point Coordinate System was the highest rated additional metadata requirement, scoring 88% of the total possible points;
- Indicator of Quality was the second highest rated additional metadata requirement, scoring 81% of the total possible points;
- Date Address Last Validated was tied for the third highest rated additional metadata requirement, scoring 74% of the total possible points;
- Update Frequency was tied for the third highest rated additional metadata requirement, scoring 74% of the total possible points.

### Additional Functional Requirements

The following pie charts describe the distribution of preferences from responding federal agencies, for the five highest weighted NAD functional requirements responses.

**Figure 12**



**Figure 13**

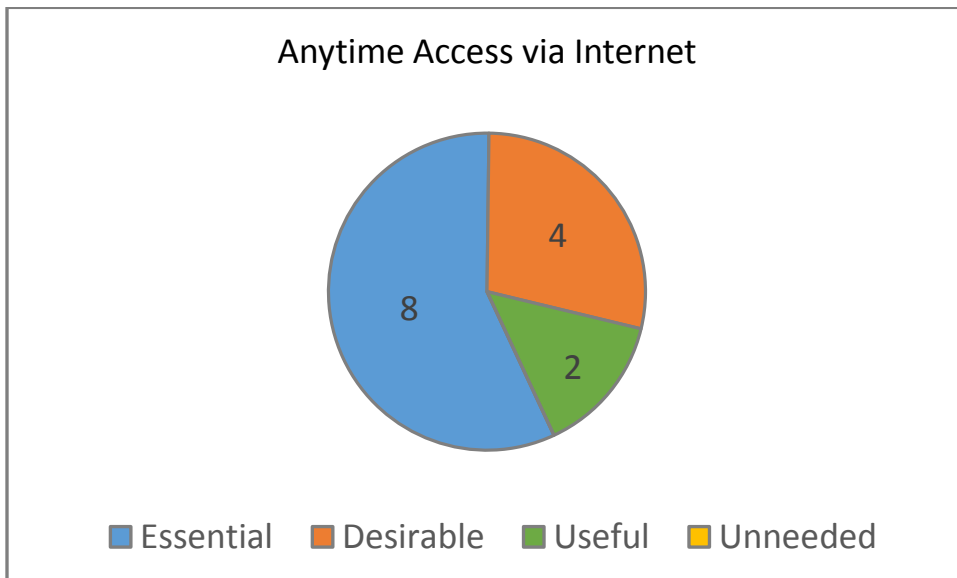


Figure 14

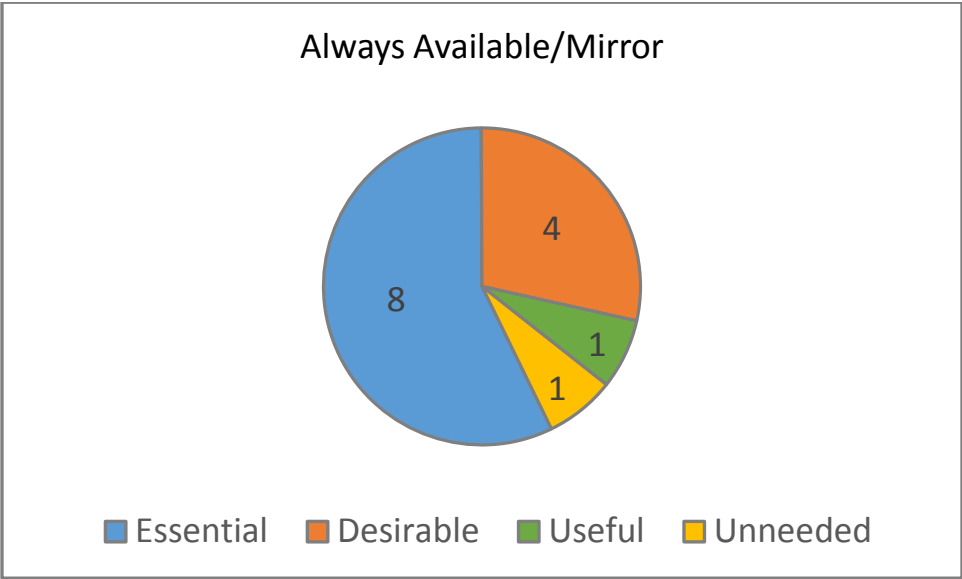


Figure 15

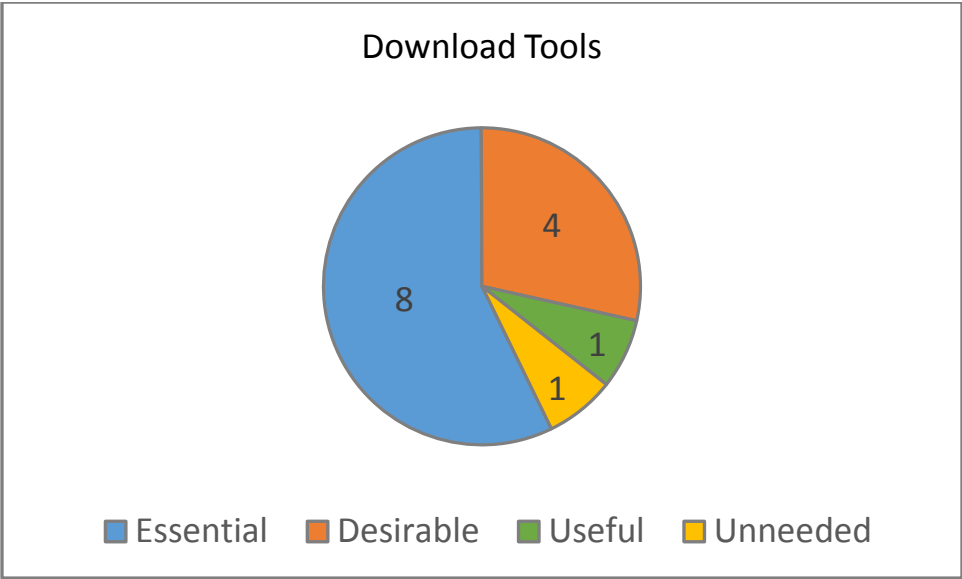
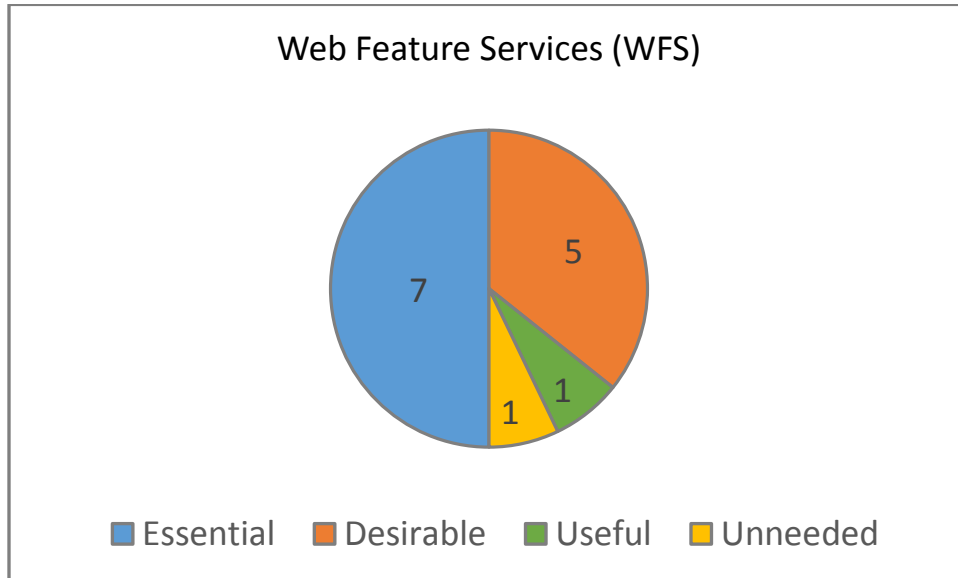


Figure 16



- Dataset Interoperability is ranked first (Figure 12), with more than half rating this as Essential and only one response lower than Desirable;
- Anytime Access vis the Internet is ranked second (Figure 13), with more than half rating this as Essential and 86% rating it as Desirable or higher;
- Always Available/Mirror is tied for third (Figure 14), with more than half rating this as Essential and 86% rating it as Desirable or higher;
- Download Tools, is tied for third (Figure 15), with more than half rating this as Essential and 86% rating it as Desirable or higher;
- Web Feature Services is ranked fifth (Figure 16), with half rating this as Essential and 86% rating it as Desirable or higher.