CHARLOTTE

Subject/Title: GIS-02

GEOSPATIAL METADATA

Date Effective	**Revision Date Effective** Draft Version 4.2, March 29, 2010

PURPOSE

This standard establishes *geospatial metadata requirements* for City of Charlotte (City) geospatial data investments and associated data entity stewardship. Metadata is "data about the data"—essential information about the source, currency, accuracy and lineage of the data. Metadata is essential for preserving the City's data investment, instilling accountability for the quality and content, and for facilitating data sharing.

The Geospatial Metadata Standard is intended to:
1. Define the geospatial metadata content standard for data residing on the City's shared server for geospatial data known as the Enterprise GIS Spatial Data Warehouse (SDW) and elsewhere in City Key Business Units.
2. Institutionalize metadata production and maintenance of geospatial data as a required component and best practice for managing the City's geospatial data investment.
3. Align the City's geospatial metadata requirements with the State of North Carolina, the federal U.S. government, and international metadata standards.
4. Prepare and fortify the City's geospatial data holding to support data sharing and facilitate data interoperability as promoted by the Federal Geographic Data Committee (FGDC) and the North Carolina Geographic Information Coordinating Council (NC GICC).
5. Expand the use of geospatial data to support City business processes by providing documentation including content, layout and timeliness of geospatial data.
6. Ensure compliance with the North Carolina Public Records Law requirement for database indexing as specified in General Statute 132-6-1(b).

SCOPE

The Geospatial Metadata Standard shall apply to:
1. Geospatial/GIS data and associated relational databases managed and/or published on the SDW as a component of the City of Charlotte's Enterprise GIS data environment.
2. Geospatial data and relational databases developed and maintained internally by KBUs to serve unique business needs.
3. Geospatial data acquired by contract or consultants to the City of Charlotte.

BACKGROUND

Geospatial metadata provides structured information on the source, currency, accuracy, data fields, maintenance and lineage of geospatial data (Appendix A – Geospatial Metadata Example). Metadata is essential for cross-functional data sharing because the content facilitates an understanding of the data that allows the user to determine appropriate usage.

Properly maintained metadata for the City's existing investment in geospatial data instills accountability for the quality, integrity and content accuracy.

Geospatial metadata creation and maintenance is an excepted requirement for GIS professionals at every level of government (federal, state, and local) and in the private sector. The creation and maintenance of geospatial metadata supports transparency of government efforts and is an essential component of the National Spatial Data Infrastructure (NSDI) for the United States.

The City of Charlotte GIS community has advocated and actively endorsed the use of metadata since the inception of the Enterprise GIS program in 2001.   The City of Charlotte and Mecklenburg County GIS staff developed templates, style sheets, and training solutions to encourage metadata creation and maintenance. The following geospatial metadata events provide relevancy for agency usage and adoption of the Geospatial Metadata Standard:

- 1994-1996: The FGDC approved a geospatial metadata standard, *Executive Order 12906*: *Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure*.
- 1998: The FGDC Content Standard for Digital Geospatial Metadata is updated (FGDC-STD-001-1998).
- 2000: The FGDC adopted the use of the Content Standard for Digital Geospatial Metadata (CSDGM) workbook.
- 2004: The GET and KBUs established data maintenance agreements to establish data stewardship and affirm their commitment to maintaining geospatial metadata.
- 2004: The GET and Mecklenburg County. established training curriculum for the City and County.
- 2003-2005: The FGDC and the International Organization for Standardization (ISO) Technical Committee 211 developed an International Metadata Standard. The American National Standards Institute formally adopted ISO 19115 Metadata Standard. The FGDC then followed with the U.S. National Profile based on Final Technical Specification 19139.
- 2008: State of North Carolina Geographic Information Coordinating Council (NC GICC) adopted the FGDC standard.
- 2008: The GET seeks official standard recognition for Geospatial Metadata for applicability to all spatial data in alignment with the City's technology standardization process.

DEFINITIONS

CSDGM – The Content Standard for Digital Geospatial Metadata (CSDGM) represents the authoritative resource for metadata from the FGDC. The CSDGM standard has also been adopted as a standard by State of North Carolina.

FGDC – The Federal Geographic Data Committee (FGDC) is an interagency committee that promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis. This nationwide data publishing effort is known as the National Spatial Data Infrastructure (NSDI). FGDC activities are administered through the FGDC Secretariat, hosted by the National Geospatial Programs Office (NGPO) of the U.S. Geological Survey. The NGPO

oversees other geospatial programs of national importance including The National Map and the Geospatial One-Stop activity.

Geospatial Data - Geospatial data, also referred to as *GIS data*, provides information in a structured format that identifies the geographic location and characteristics of natural or constructed features and boundaries on the earth.

Metadata - A file of information which captures the basic characteristics of a data or information resource.   Metadata represents the who, what, when, where, why and how of the resource. Geospatial metadata are used to document geographic digital resources such as Geographic Information System (GIS) files, geospatial databases, and earth imagery.   A geospatial metadata record includes core library catalog elements such as Title, Abstract, and Publication Data; geographic elements such as Geographic Extent and Projection Information; and database elements such as Attribute Label Definitions and Attribute Domain Values (Source: www.fgdc.gov/metadata). According to the FGDC, the major uses of metadata are to:

- Organize and maintain an organization's internal investment in spatial data
- Provide information about an organization's data holdings to data catalogues, clearinghouses, and brokerages, and
- Provide information to process and interpret data received through a transfer from an external source.

NC GICC – The North Carolina Geographic Information Coordinating Council (GICC) was formed to develop policies regarding the use of geographic information, GIS, and other related technologies. The GICC conducts strategic planning, resolves policy and technology issues, and provides coordination of State, local and private sector GIS efforts. The Center for Geographic Information and Analysis (CGIA) provides staff support to the NC GICC.

NSDI - The National Spatial Data Infrastructure (NSDI) is a physical, organizational, and virtual network designed to enable the development and sharing of this nation's digital geographic information resources.

SDW – The City of Charlotte stores and manages Enterprise GIS data within the shared, centralized data server environment referred to as the Spatial Data Warehouse (SDW).

STANDARD

CONTENT AND LAYOUT

The City of Charlotte shall comply with the following sections of the FGDC Content Standard for Digital Geospatial Metadata (CSDGM):

Section 1 – Identification
Section 2 – Data Quality
Section 3 – Spatial Data Organization Information
Section 4 – Spatial Reference Information
Section 5 – Entity and Attribute Information
Section 6 – Distribution Information
Section 7 – Metadata Reference
Section 8 – Citation
Section 9 – Time Period
Section 10 – Contact

The following list details the metadata sections and elements of each section in alignment with the *CSDGM Essential Metadata for Templates* (2008). For each element, the level of applicability is designated according to the following legend. Content for sections 8, 9, and 10 are embedded in sections 1 through 7. (Further information may be obtained from the FGDC main website on Metadata.)

Legend:

bold text = CSDGM mandatory element
bold or plain green text = CSDGM mandatory if applicable element
italicized blue text = CSDGM optional element
stylized plain text = use of element is conditional

Section One: Identification
 Originator
 Publication_Date
 Title
 Abstract
 Purpose
 Time_Period_of_Content
 Currentness_Reference
 Progress
 Maintenance_and_Update_Frequency
 West_Bounding_Coordinates
 East_Bounding_Coordinates
 North_Bounding_Coordinates
 South_Bounding_Coordinates
 Theme_Thesaurus
 Theme_Keywords (note: important to include at least one ISO Topic Category Code for data exchange, see http://www.fgdc.gov/metadata/documents/MetadataQuickGuide.pdf (pages 8-9))

Access_Constraints
Use_Constraints
Point_of_Contact
    Contact_Organization *(preferred)* or **Contact_Person**
    Contact_Position
    Address_Type
    Address
    City
    State_or_Province
    Postal_Code
    Contact_Voice_Telephone
    ☐ *If data are available online:*
    Online_Linkage

Section Two: Data Quality

Logical_Consistency_Report
Completeness_Report
Process_ Description
Process_Date
    ☐ *If source data were used:*
    Source_Originator
    Source_Publication_Date
    Source_Title
    Source_Online_Linkage
    Source_Scale_Denominator
    Type_of_Source_Media
    Source_Time_Period_of_Content
    Source_Currentness_Reference
    Source_Citation_Abbreviation
    Source_Contribution
    ☐ *If data assessments performed:*
    Attribute_Accuracy_Report (*if applicable*)
    Horizontal_Positional_Accuracy_Report (*if applicable*)
    Vertical_Positional_Accuracy_Report (*if applicable*)
    ☐ *If aerial photography or imagery:*
    Cloud_Cover

Section Three: Spatial Data Organization Information

    Direct_Spatial_Reference_Method

Section Four: Spatial Reference Information

    Horizontal_Datum
    Ellipsoid_Name
    Semi-Major_Axis
    Denominator_of_Flattening_Ratio
    Horizontal Coordinate System (compound element)
    If Geographic (Lat/Lon):
        Latitude_Resolution
        Longitude_Resolution
        Geographic_Coordinate_Units
    or
    If Planar (projected) data:
        Planar_Coordinate_Encoding_Method
        Abscissa_Resolution
        Ordinate_Resolution

Planar_Distance_Units
If Map Projection:
    Map_Projection_Name
    < **projection parameters** – *vary with Projection* >
or
If Grid Coordinate System:
    Grid_Coordinate_System_Name
    < **coordinate system parameters** - *vary with Coordinate System*>
☐ *Additional elements are required for data maintained using:*
Distance_and_Bearing_Representation
Local_Planar_Horizontal_Coordinate_System
Local_Horizontal_Coordinate_System
Vertical_Coordinate_System

Section Five: Entity and Attribute Information

Entity_and_Attribute_Overview
and/or
Entity_and_Attribute_Detailed_Description
if the data includes a database that is not documented, you are strongly encouraged to develop the detailed description

Section Six: Distribution Information

Distributor_Contact
    Contact_Organization *(preferred)* or **Contact_Person**
    Contact_Position
    Address_Type
    Address
    City
    State_or_Province
    Postal_Code
    Contact_Voice_Telephone
Distribution_Liability
The following disclaimer will be included in all metadata:

By viewing this product you expressly agree that the use and interpretation of the data displayed in the application is at your sole risk. The City of Charlotte does not warrant that the data will be error free nor does the City of Charlotte make any warranty as to the results that may be obtained from the use of the data, or to the accuracy, reliability, or completeness of any content, information, material or postings.

Section Seven: Metadata Reference

Metadata_Date
Metadata_Contact
    Contact_Organization or **Contact_Person**
    Contact_Position
    Address_Type
    Address
    City
    State_or_Province
    Postal_Code
    Contact_Voice_Telephone
Metadata_Standard_Name
Metadata_Standard_Version

AVAILABILITY

Geospatial metadata shall be available concurrently with the source data at all times and will accompany the geospatial data when requests are made for copies or access.

ACCOUNTABILITY

- Each Key Business Unit that maintains geospatial data to support their business processes shall be accountable for maintaining the respective geospatial metadata. Accountability will include KBU sign-off on a *Geospatial Data Maintenance Agreement* (Appendix B). The *Geospatial Data Maintenance Agreement* will include a listing of geospatial data maintained by the KBU.

- The individual or organization listed as the Metadata_Contact (Section Seven of the Standard) shall be accountable and responsible for the maintenance and upkeep of the metadata information. It is important to note that this individual or agency may be different than that listed for Originator (Section One and Sub-Section Eight), which is used to indicate the party responsible for the data set itself (i.e. an external contractor may have created the data set).

- Before metadata is published or uploaded to the SDW for data users, an FGDC compliant parsing and validation tool shall be used by the Metadata_Contact to ensure accuracy, completeness, and to correctly set-up the metadata layout. The GET will provide assistance with implementation of the parsing tool.

STORAGE

Geospatial metadata shall be stored: 1) with the source geospatial/GIS data, and 2) using non-proprietary data formats (i.e., XML or GML) to expedite data exchange, to support participation with NC GICC and FGDC initiatives, and to ensure recoverability as a backup.

IMPLEMENTATION CONSIDERATIONS

The Geospatial Metadata Standard will be implemented on a KBU-by-KBU basis to coincide with the implementation of the new Enterprise GIS data model that supports data flow for the Enterprise GIS Spatial Data Warehouse (SDW) environment. Implementation of the Enterprise GIS Spatial Data Warehouse (SDW) environment is expected to be complete by December 31, 2010.

GET members representing their respective KBUs were involved in the design of the City of Charlotte's Enterprise GIS Data model for the SDW and were offered training in the fall of 2009 on the Multiuser Geodatabase Model to support the Geospatial Metadata Standard. Ongoing training will be provided to City GIS staff on an as-needed basis and will take the form of workshops, individualized coaching or formal training.

COMPLIANCE

Compliance will be monitored and measured by members of the GET with roles and responsibilities as follows:

- <u>BSS/Information Technology Division</u> – ensures that geospatial data published in the Enterprise SDW environment is complete with geospatial metadata. Geospatial/GIS data will not be published to the SDW without metadata.

- <u>KBU GET Members</u>:
    1. Ensure metadata is complete for geospatial data maintained by their respective KBU.
    2. Obtain sign-off of the *Geospatial Data Maintenance Agreement* from their KBU Senior Business Team (SBT) representative.
    3. Provide updates to the geospatial data listed as part of the Geospatial Data Maintenance Agreement on an annual and as-needed basis.

EXCEPTION

1. This standard does not specify how a geospatial dataset is to be organized in a computer system or the means by which the data is transmitted or communicated to data users.

2. The Aviation KBU is bound by Federal Aviation Authority requirements that may deviate from the FGDC Content Standard for Digital Geospatial Metadata (CSDGM) upon which the City's Geospatial Metadata Standard is in compliance.