

The Technical Panel of the NITC is seeking comments on this draft standard. Submit comments by January 12, 2006 to [rick.becker@nitc.ne.gov](mailto:rick.becker@nitc.ne.gov)



## Nebraska Information Technology Commission

### STANDARDS AND GUIDELINES

**DRAFT**

## Land Record Information and Mapping Standards

Category	<b>Data and Information Architecture</b>
Title	<b>Land Record Information and Mapping Standards</b>
Number	<b>XX-XXX</b>

Applicability

- ☒ **State Government Agencies**
  - ☒ All ..... **See each section**
  - ☒ Excluding ..... **See Section 4.1**
- ☒ **State Funded Entities** - All entities receiving state funding for matters covered by this document ..... **See each section**
- ☒ **Other: Public Entities**- Other public entities developing or acquiring geospatial data not supported by state funding ..... **See each section**

**Definitions:**

**Standard** - Adherence is required. Certain exceptions and conditions may appear in this document, all other deviations from the standard require prior approval of NITC Technical Panel.

**Guideline** - Adherence is voluntary.

Status	<input type="checkbox"/> Adopted <input checked="" type="checkbox"/> <b>Draft</b> <input type="checkbox"/> Other: _____
Dates	Date: 11-3-05 Draft Date Adopted by NITC: Other:

Prepared by: The Nebraska GIS Steering Committee and endorsed and referred to the Technical Panel of the Nebraska Information Technology Commission.  
Authority: Neb. Rev. Stat. § 86-572(2c), 86-516(6)  
<http://www.nitc.state.ne.us/standards/>

## 1.0 Standard

These standards/guidelines are primarily focused on those public entities responsible for maintaining property parcel maps for their particular jurisdiction. The last line following each standard or guideline refers to the type(s) of agency or entity to which that standard/guideline applies and whether it is a standard (adherence required) or guideline (adherence voluntary) for each type of entity.

- 1.1 Datum.** Local government multipurpose GIS/LIS (Geographic Information System/Land Information System) and their associated geospatial data layers should be based on the North American Datum (NAD) 83 and the North American Vertical Datum (NAVD) 88. Any existing systems developed based on other datums should consider conversion to these datum.

State Agencies: **Standard**

State Funded Entities: **Standard**

Other: **Standard**

- 1.2 Projection.** The Nebraska Plane Coordinate System, NAD 83, should be used as the primary map projection system for the recording of positions in local land-data systems in Nebraska. Selection of any other projection should be done reluctantly and only after most careful consideration. The plane coordinate values for a point on the earth's surface may be expressed in either meters or feet.

State Agencies: **Standard**

State Funded Entities: **Standard**

Other: **Standard**

- 1.3 Geodetic Control.** GIS/LIS systems developed with the goal of providing a multipurpose cadastre for local government use should be referenced to a local geodetic reference framework that is properly connected to the National Spatial Reference System (NSRS).

State Agencies: **Standard**

State Funded Entities: **Standard**

Other: **Standard**

### 1.4 Public Land Survey System Control.

- 1.4.1 PLSS Geodetic Framework.** For all land in Nebraska that is subdivided according to the Public Land Survey System (PLSS), the geodetic reference framework for the cadastre should be the section corners of the PLSS for each section.

State Agencies: **Standard**

State Funded Entities: **Standard**

Other: **Standard**

- 1.4.2 Locate, Monument, and GPS Primary Corners.** At a minimum, local government entities developing a geospatial land information system should initially invest in a precision Global Positioning System (GPS) survey to locate, re-monument as necessary, and obtain the geographic coordinates of the major boundary defining corners that legally define the boundaries of their county jurisdiction(s). These precision GPS survey coordinates for the boundary defining corners should be collected and integrated as framework data into the land information system. This effort should be coordinated with officials from the adjacent county(ies) to ensure agreement on the location of the shared corners.

State Agencies: **Standard**

State Funded Entities: **Standard**

Other: **Guideline**

- 1.4.3 Progressive Monumentation.** In addition, each county (or municipality) that is planning to develop a GIS/LIS-based cadastre program should also consider initiating a progressive program to locate and/or re-monument, as

necessary, and collect geographic coordinates on other PLSS corners according to the legally established procedures and properly connect them to the National Spatial Reference System to obtain geodetic coordinates.

State Agencies: **Guideline**      State Funded Entities: **Guideline**      Other: **Guideline**

- 1.5 PLSS Base Map.** Local governments considering the development of a multipurpose GIS, should consult with the Nebraska State Surveyor's Office to locate and access the best available data on the Public Land Survey System (PLSS) for their geographic area. To assist the State Surveyors Office in maintaining a repository of the best available PLSS data, local governments participating in the Nebraska Land Information System Program should share any enhanced PLSS data, for their geographic area, with the State Surveyors Office so that it might be integrated into the PLSS repository database.

State Agencies: **Standard**      State Funded Entities: **Standard**      Other: **Standard**

- 1.6 Ortho-base (Aerial Layer) or Base Maps.** Both a Public Land Survey System base map and an orthophoto (surface features) base map should be used to provide the geospatial reference framework upon which a local government multipurpose land information system is developed. Both base maps should be tied to the National Spatial Reference System and have a level of spatial accuracy appropriate to the range of applications planned for a given area.

State Agencies: **Standard**      State Funded Entities: **Standard**      Other: **Standard**

## **1.7 Map Scale and Spatial Accuracy.**

- 1.7.1 Minimum Horizontal Accuracy Standard.** Public entities developing a GIS/LIS program should conduct data collection and development in a manner to achieve at least the minimum level of horizontal spatial accuracy consistent with the National Horizontal Map Accuracy Standards corresponding to a 1:12,000 (1" = 1,000') scale map (90% of the "well defined" horizontal locations must be within  $\pm 33.3$  ft. of their real world location).

State Agencies: **Standard**      State Funded Entities: **Standard**      Other: **Standard**

- 1.7.2 Additional Accuracy Considerations.** Beyond this minimum horizontal map accuracy, public entities are encouraged to consider the following recommended map scales and their corresponding National Horizontal Map Accuracy Standards in determining the positional accuracy needed for base maps in the development of a local government GIS/LIS:

<u>Relative Size of Property Parcels</u>	<u>Map Scale</u>		<u>Nat'l Horizontal Map Accuracy Std.</u>	<u>Equivalent Metric Scale</u>
Urban areas	1:600	(1" = 50')	$\pm 1.7$ ft.	1:500
	1:1,200	(1" = 100')	$\pm 3.3$ ft.	1:1,000
Large urban & suburban	1:2,400	(1" = 200')	$\pm 6.7$ ft.	1:2,500
Rural areas	1:4,800	(1" = 400')	$\pm 13.3$ ft.	1:5,000
	1:9,600	(1" = 800')	$\pm 26.7$ ft.	1:10,000
	1:12,000	(1" = 1,000')	$\pm 33.3$ ft.	1:10,000

State Agencies: **Guideline**      State Funded Entities: **Guideline**      Other: **Guideline**

**1.8 Legal Lot and Parcel Layers.** Two graphic data layers are necessary to provide the foundation for a wide variety of local government GIS/LIS applications that involve land subdivision and/or ownership.

a). The legal lot layer consisting of legal land subdivisions. These are aliquot portions of the PLSS, filed subdivision plats and irregular tracts defined by filed deeds.

b). The parcel layer that defines ownership tracts of land. These tracts may group multiple legal lots into one taxable account and that typically represents the boundaries of a landowner's property. These data layers include locational coordinates for points representing property corners, lines between property corners representing property boundaries and closed polygons representing the property area.

State Agencies: **Standard**

State Funded Entities: **Standard**

Other: **Standard**

### **1.9 Parcel Identifiers.**

a). Each county/region should adopt a system of unique, permanent feature identifiers (PID) that provide the link between each graphic land ownership parcel polygon and the attribute information (ownership, size, situs address, value, etc.) related to that specific land ownership property parcel.

b). A county/region PID system must be designed in a manner such that a unique, statewide PID can be defined and maintained for each property parcel by using the county FIPS code (Federal Information Processing Standards Publications) as a prefix to the county/region's PID system.

c). To maintain this unique one-to-one association between a specific property parcel and its related attribution information, new PIDs should be assigned whenever a property parcel is altered by either splitting it into two or more parcels or by combining two or more parcels to form a new parcel. The previous PIDs should not be used for these new modified parcels, but the historical PID associations should be maintained through a parent/child PID reference table.

State Agencies: **Standard**

State Funded Entities: **Standard**

Other: **Standard**

**1.10 Spatial Data Format.** A broad range of state and regional applications require property parcel information. Many of these applications require the combining of data across jurisdictional boundaries. To facilitate these applications, the property parcel spatial (graphic) data should be either maintained in a manner that allows it to be readily integrated in a common geographic data format (i.e., shapefile) or be capable of being exported into a common geographic data format (i.e., shapefile), while including the parcel identifiers.

State Agencies: **Standard**

State Funded Entities: **Standard**

Other: **Guideline**

**1.11 Metadata.** All geospatial land record databases, and their associated attribute databases should be documented with Federal Geographic Data Committee (FGDC) compliant metadata outlining how the data was derived, attribute field definitions and

values, map projections, appropriate map scale, contact information, access and use restrictions, etc.

State Agencies: **Standard**

State Funded Entities: **Standard**

Other: **Standard**

**1.12 Attribute Data.** To provide the foundation necessary for a wide variety of local government applications, non-graphic, attribute data should be organized within the GIS/LIS, which describes individual property parcels relative to their basic parcel characteristics, tenure, value, history, buildings and units within the parcel, and tax status. In most cases, much of this attribute data will already exist in separate databases within a variety of local agencies and should be tied to the graphic property parcel via the unique PID. To meet a range of state and regional applications that require property parcel information, the following types of property parcel data should be maintained (for every property parcel?) and (be) available in a manner that allows it to be harvested, translated, and integrated into a statewide property parcel attribute dataset.

PID# .....	Parcel identifier (county FIPS code plus local government PID)
Situs Address.....	Address of parcel (may be multiple fields)
Owner Address.....	Address of property owner (may be multiple fields)
Township .....	Township #
Section.....	Section #
Range .....	Range #
Range Direction .....	East or West
Legal Description .....	Narrative legal description of parcel
Assessed Value .....	Total assessed value of property (land and improvements)
Land Value.....	Assessed value of land
Area (Deeded) .....	Area of parcel according to the deed
Property Class .....	(Res, Ag, Com, Rec., Ind.)
Property Sub-class .....	i.e., Ag (Dryland, Irrigated, Grassland/Pasture, Waste)
Ownership type.....	Federal, State, County, Private, Tribal, Exempt, Other and Unknown
Tax District.....	County ID plus Tax Dist. #
School District .....	State number definition
Landuse .....	Actual landuse with NPAT defined general categories
Property Parcel Type...	NPAT defined categories
Status .....	(Vacant, Improved or Improved only) (NPAT defined)
Location .....	(Urban, Sub-urban, Rural)(NPAT defined)
City Size.....	1 <sup>st</sup> class, 2 <sup>nd</sup> class, primary, metro, or village
Source Document.....	Sales/transfer reference or document (book & page)
Recording Date.....	Most recent sales/transfer date
Sales Value.....	Most recent sales value

State Agencies: **Standard**

State Funded Entities: **Standard**

Other: **Standard**

## **2.0 Purpose and Objectives**

The purpose of these standards and guidelines is to help realize the maximum long-term return on and overall utility of the public's investment in the modernization of how Nebraska's land records are maintained and distributed.

### **2.1 Background**

Land records and land ownership records are public records that are used by wide cross-section of our society and its institutions. Ready access to current and accurate land

records is critical to our state's overall economy and the efficient functioning of many of its public and private institutions.

Historically land records have been maintained on paper records and paper maps. This made it very difficult and costly to update and keep current records and maps in areas where there was significant turnover in property ownership. Paper records and maps also made it difficult to share land record information outside of the physical office where they were maintained. Paper records and maps also made it difficult to conduct analyses of broader land ownership and land valuation patterns. Computerization in general, and GIS/geospatial technologies in particular, have revolutionized how land and land ownership records can be maintained, analyzed, shared, and distributed.

Modern computerized land records and maps make it relatively easy to update and keep current land records and maps. Computerization and GIS/geospatial technologies now routinely enable easy, reliable access to land records and maps via the Internet to a wide variety of users. Land records in computerized relational databases and GIS parcel maps have provided a wide array of new information management tools that can be used to integrate land records with other data and analyze and display land ownership, land valuation and other broader land-related patterns. Among other uses, these tools help ensure that all property is on the tax rolls and that the property is tax equally.

Modern computerized land records and maps can provide a wide array of potential benefits to a wide array of users. However, to realize many of these benefits, it is important that when these databases and maps are originally developed they follow a minimal set of standards and guidelines that support this potential broad array of applications and benefits. In many instances, it is not this broader array of potential uses that is the immediate stimulus, which causes a local or state agency to undertake a modernization of its land records and maps. Therefore, these standards and guidelines serve the function of raising the awareness of these potential future applications and the related need to incorporate minimal standards beyond those needed for immediate applications.

These standards and guidelines are intended to help ensure that modernized land records are developed on a solid technical foundation. A foundation, which will enable both the original developing agency, and other interested entities, to build on this initial investment and maintain and enhance the data and enable it to be utilized for multi-purposes by multiple users. These standards and guidelines are also intended to facilitate partnerships between local, state, and federal entities to support the development and maintenance of modernized land records

## **2.2 Objectives**

These standards and guidelines to guide the modernization of land records in Nebraska have the following objectives:

- 2.2.1. Provide guidance to state and local officials as they work, either in-house or with private contractors, to develop and/or acquire computerized, geospatial data related to land records and maps and thereby increase the likelihood that the data acquired and/or developed will be suitable for the range of intended applications and likely future applications.

- 2.2.2. Improve public policy development and implementation by helping to make land records more current and readily accessible and by making available to land record management applications the wide range of analytical tools available through GIS/geospatial technology.
- 2.2.3. Enhance coordination and program management across jurisdictional boundaries by insuring that modernized land records and maps can be readily integrated across jurisdictional boundaries for regional applications (e.g., school districts, NRDs, emergency response, etc.) or statewide applications.
- 2.2.4. Save public resources by facilitating the sharing of computerized land records among public agencies or sub-divisions of agencies by incorporating data standards and following guidelines which will make it more likely that the computerized land records developed by one entity will also be suitable to serve the multiple needs of other entities and thereby avoid the costly duplication of developing and maintaining similar land records.
- 2.2.5. Make land records and land ownership maps more readily accessible to the wide range of potential users
- 2.2.6. Facilitate harmonious, trans-agency public policy decision-making and implementation by enabling multiple agencies and levels of government to access and appropriately use common geospatial datasets and thereby make it more likely that intersecting public policy decisions, across levels of government, will be based on the same information.
- 2.2.7. Lay the foundation for facilitating intergovernmental partnership to the modernization of land records by defining standards and guidelines that increase the likelihood that computerized land records will meet the needs of multiple users.

### **3.0 Definitions**

#### **3.1 Attribute Data**

Properties and characteristics of property parcel or other spatial data entities.

#### **3.2 Datum**

A Geodetic Reference System is the true technical name for a datum. A datum is a combination of an ellipsoid, which specifies the size and shape of the earth, and a base point from which the latitude and longitude of all other points are referenced.

#### **3.3 Entity**

Any object about which an organization chooses to collect data.

#### **3.4 Geodetic Control**

A set of surveyed monuments used to define a spatial reference system and used to register map sheets and transform coordinates for a particular project.

#### **3.5 Geographic Information System (GIS)**

A system of computer hardware, software, and procedures designed to support the compiling, storing, retrieving, analyzing, and display of spatially referenced data for addressing planning and management problems. In addition to these technical components, a complete GIS must also include a focus on people, organizations, and standards.

#### **3.6 Geospatial Data**

A term used to describe a class of data that has a geographic or spatial nature. The data will usually include locational information (latitude/longitude or other mapping coordinates) for at least some of the features within the database/dataset.

### **3.7 Global Positioning System (GPS)**

GPS is a method for identifying locations on earth using triangulation calculations of satellite positions. Originally created by the United States Military, it has since found numerous commercial applications.

### **3.8 Land Information System (LIS)**

A special type of GIS that manages and analyzes data related to land ownership (e.g., tax parcels, urban infrastructure, property assessment). A GIS used for municipal or county level applications is typically structured as an LIS.

### **3.9 Map Scale**

The scale of a map is the ratio between a distance on the map and the corresponding distance on the earth, with the distance on the map typically expressed as 1. Thus, a scale of 1:100,000 means 1 inch on the map equals 100,000 inches (approximately 1.6 miles) on the earth. Large scale maps depict a small area and show more detail. Small scale maps depict a large area and show less detail.

### **3.10 Metadata**

Data describing a GIS database or data set including, but not limited to, a description of a data transfer mediums, format, and contents, source lineage data, and any other applicable data processing algorithms or procedures.

### **3.11 Monumentation of PLSS Corners**

Monumentation in surveying refers to the practice of marking known horizontal and vertical control points with permanent structures such as concrete pedestals and metal plaques. Once surveyed and marked, these monuments can be used for further surveying and for the alignment of land-parcel boundaries and infrastructure.

### **3.12 National Spatial Reference System (NSRS)**

A consistent national coordinate system that defines latitude, longitude, height, scale, gravity, and orientation throughout the Nation, and how these values change with time. Consequently, it ties spatial data to geo-referenced positions.

### **3.13 Nebraska Plane Coordinate System**

Nebraska Plane Coordinate System means the system of plane coordinates for designating the geographic position of points on the surface of the earth, within the State of Nebraska, which have been established by the National Ocean Service/National Geodetic Survey, or its successors, for defining and stating the geographic positions or locations of points on the surface of the earth, within the State of Nebraska. The Nebraska Plane Coordinate System is a Lambert conformal conic projection of the North American Datum of 1983, having standard parallels at north latitudes 40 degrees 00 minutes and 43 degrees 00 minutes along which parallels the scale shall be exact. The origin of coordinates is at the intersection of the meridian 100 degrees 00 minutes west of Greenwich and the parallel 39 degrees 50 minutes north latitude. This origin is given the coordinates. N = 0 meters and E = 500,000 meters. (State of Nebraska Statutes, Section 76-2502)

### **3.14 Orthophoto**

An aerial photo that has been corrected to eliminate the effects of camera tilt and relief displacement. The ground geometry is recreated as it would appear from directly above



each and every point. Digital orthophotos can be created by scanning the original photograph and applying a process called differential rectification to each pixel in the image. In creating digital orthophotos, it is also possible to remove the effects of tangential displacement.

### **3.15 Parcel Identifier (PID)**

A unique number identifying a specific property on the assessment and tax rolls and used as a cross reference between graphic/mapping data and tabular attribute data.

### **3.16 Projection**

A system to portray all or part of the earth, which is an irregular sphere, on a planar, or flat surface

### **3.17 Public Land Survey System (PLSS)**

The Public Land Survey System (PLSS) is a way of subdividing and describing land in the United States. All lands in the public domain are subject to subdivision by this rectangular system of surveys (townships, range, sections, quarter-sections, etc.), which is regulated by the U.S. Department of the Interior, Bureau of Land Management.

### **3.18 Shapefile**

A Shapefile is an ESRI digital vector (non-topological) storage format for storing geometric location and associated attribute information that can be generated by a wide variety of GIS software packages.

### **3.19 Spatial Accuracy**

The accuracy of a map in representing the geographic location of an object relative to its true location on the surface of the Earth based on geographic coordinates.

## **4.0 Applicability**

### **4.1 State Government Agencies**

State agencies that have the primary responsibility for maintaining land ownership records and property parcel maps for a particular jurisdiction(s) or geographic area (e.g. Nebraska Dept. of Property Assessment and Taxation for counties for which it has assumed the primary assessment role) are required to comply with those sub-sections identified as a “Standard” for “State Agencies” in section 1. Those state agencies with oversight responsibilities in this area are required to ensure that their oversight guidelines, rules, and regulations are consistent with these standards.

### **4.2 State Funded Entities**

Entities that are not State agencies but receive State funding, directly or indirectly, for property parcel mapping and/or property tax assessment and have the primary responsibility for maintaining property parcel maps for a particular jurisdiction or geographic area are required to comply with those sub-sections identified as a “Standard” for “State Funded Entities” in section 1.

### **4.3 Other**

Other entities, such as local government agencies (e.g. County Assessor, County Register of Deeds, municipalities) that have the primary responsibility for developing and maintaining land ownership records and property parcel maps are required to comply with those sub-sections identified as a “Standard” for “Other” in Section 1.

### **4.4 Exemption**

Exemptions may be granted by NITC Technical Panel upon request by an agency.

#### **4.4.1 Exemption Process**

Any agency may request an exemption from these standards by submitting a "Request for Exemption" to the NITC Technical Panel. Requests should state the reason for the exemption. Reasons for an exemption include, but are not limited to: statutory exclusion; federal government requirements; or financial hardship. Requests may be submitted to the Office of the CIO via e-mail or letter (Office of the CIO, 521 S 14th Street, Suite 301, Lincoln, NE 68508). The NITC Technical Panel will consider the request and grant or deny the exemption. A denial of an exemption by the NITC Technical Panel may be appealed to the NITC.

### **5.0 Responsibility**

#### **5.1 NITC**

The NITC shall be responsible for adopting minimum technical standards, guidelines, and architectures upon recommendation by the technical panel. (N.R.S. 86-516 §6)

#### **5.2 State Agencies**

The Nebraska Department of Property Assessment and Taxation will be responsible for ensuring that its rules and regulations relative to land ownership records and property parcel (tax) mapping include those subsections in Section 1 that are identified as a "Standard" for "Other" and are consistent overall with those standards.

#### **5.3. Granting Agencies and Entities**

State granting or fund disbursement entities or agencies will be responsible for ensuring that these standards are included in requirements and regulations related to fund disbursements as they relate to land (property parcel) records or property parcel mapping.

#### **5.4 Other**

Local governments agencies that have the primary responsibility for land ownership records and property parcel mapping will be responsible for ensuring that those subsections defined for "Other" as a "Standard" in Section 1 will be incorporated in land record modernization and geospatial data development efforts and contracts.

### **6.0 Related Documents**

#### **6.1 Federal Geographic Data Committee (FGDC) Cadastral Data Content Standards**

[http://www.fgdc.gov/standards/status/sub3\\_5.html](http://www.fgdc.gov/standards/status/sub3_5.html)

#### **6.2 Nebraska Guidebook for Local Government Multipurpose Land Information Systems.** [http://www.calmit.unl.edu/gis/LIS\\_Stds\\_Intro.html](http://www.calmit.unl.edu/gis/LIS_Stds_Intro.html)

#### **6.3 Federal Geographic Data Committee Content Standard for Digital Geospatial Metadata Workbook (For use with FGDC-STD-001-1998) Version 2.0**

[http://www.fgdc.gov/publications/documents/metadata/workbook\\_0501\\_bmk.pdf](http://www.fgdc.gov/publications/documents/metadata/workbook_0501_bmk.pdf)