

Mapping Municipal Boundaries Washington County

July 31, 1999

Staff contributing to this project:

Jane Harper, Office of Administration
Martina Johntz, Office of Administration
Jay Krafthefer, Surveyor's Office
Mark Nieman, Surveyor's Office
Peggy Ryan, Surveyor's Office
Nelson P. Vaughn, Surveyor's Office

For comments or questions, please contact: Washington County Surveyor's Office:
651-430-6875 or surveyor@co.washington.mn.us

ACKNOWLEDGMENTS

The preparation of this document was made possible, in part, through the financial assistance of the Metropolitan Council. Research and development of municipal boundaries, and development of the guidelines which follow, are the work of the Washington County Surveyors and Administration offices.

Washington County would like to thank the following individuals for their input regarding the pilot portion of this project:

Steve Feesl, Minnesota Department of Natural Resources
Rick Gelbmann, Metropolitan Council
Randy Johnson, Metropolitan Council
Mark Kotz, Metropolitan Council
Ed Krum, Northern States Power
Jim Maxwell, The Lawrence Group
Curt Peterson, Ramsey County
James Piegat, Hennepin Conservation District
Jeff Saholt, Minnesota Department of Transportation
Heidi Welsh, Metropolitan Council
Ron Wencil, United States Geological Survey
David Windle, City of Roseville

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INTRODUCTION

Increasing use of geographic information systems (GIS) by local and regional governments has shed light on the importance of developing complete and accurate spatial data sets. Of particular significance to communities in the Minneapolis-St. Paul Metropolitan Area is the availability and accuracy of boundary coverages for municipalities. Representatives of Metro-Area communities ranked jurisdictional boundary information (county, city and school district boundaries) first among 87 identified information needs.

The project described herein was an attempt to develop complete, accurate and current municipal boundary datasets for their addition to the Washington County parcel map database. A county boundary coverage was also developed. These replaced an existing boundary layer, which was based on a generalized collection of available municipal boundary information. The earlier boundary layer was appropriate for display and presentation use, but not for applications requiring a higher degree of accuracy. Research and boundary mapping development took place between August 1997 and November 1998.

This document is intended for use by others developing municipal and county boundary coverages for use with GIS. It documents the tasks and issues involved in developing accurate boundary data sets. Construction of boundary layers will vary from location to location; thus the information contained in this report should be considered a guideline, rather than a standard, to support these efforts.

Benefits of improved boundary layers

The benefits of improved boundary layers are increased quality and accuracy of map products and decision results in GIS analysis. A primary justification for development of accurate boundary layers is to ensure the accuracy of tax assessments based on parcel location. In addition, an accurate municipal boundary coverage will increase the accuracy of other spatial data layers that are supported by it, such as schools, historical features and road networks.

Costs of improved boundary layers

The major costs of developing accurate municipal boundaries are the time and money required for research and construction. Washington County's municipal boundary project was completed on a part-time basis, in conjunction with other work being performed for parcel mapping. Washington County has 34 communities covering 423 square miles. Counties with a greater number of municipalities or annexations, or which have difficulty obtaining boundary location documentation, could expect higher costs to complete similar projects.

Another additional area where cost may be incurred is in resolving boundary conflicts, errors, and omissions. Cost depends entirely upon the extent of issues uncovered and the desire of those involved to address them. In some cases, the cost to resolve a conflict may be far less than the cost that could be incurred if the problem continues (i.e., legal disputes, administrative conflicts, citizen frustration, etc.).

Project components

Development of Washington County boundary coverages included the following components:

- Determining the processes required for incorporation of municipalities and annexation of land;
- Identifying current and historical state statutes relating to incorporations and annexations;
- Designing the database;
- Completing a pilot area;
- Constructing municipal and county boundary layers by applying pilot area processes to the remaining boundary coverages;
- Creating metadata; and
- Developing maintenance procedures.

This report documents these components, research findings, options considered, and processes used.

Report format

The sections which follow document project activities according to the following categories:

- *Need* -- why is this activity needed?
- *Options* -- what options are available to meet the need?
- *Observations* -- what specific circumstances apply to Washington County municipal and county boundary coverages development?
- *Findings* -- what conclusions can be drawn from results of research and analysis efforts?
- *Decision* -- the manner in which Washington County met the need or resolved the issue.

Additional information regarding Washington County boundary coverages can be found in the metadata.

Software

Washington County does not endorse any specific software for municipal boundary development. Any reference to specific software products is only to show the outcome or relevant issues to the project described.

HISTORICAL PERSPECTIVE

The following is a brief history of the events which led to the organization, incorporation and annexation of territories into towns, villages and cities within Washington County and the State of Minnesota.

The area now known as Washington County was at one time encompassed by St. Croix County in the Territory of Wisconsin. St. Croix County was established on January 9, 1840. Its boundaries were the Chippewa, Montreal and Mississippi Rivers to the east and south, the Lake Superior shoreline and United States/Canada border to the north, and 95 degrees west latitude to the west.

The town of Stillwater was founded in 1843 and three years later became the county seat of St. Croix County. On May 29, 1848 however, Wisconsin statehood was ratified and established the St. Croix River and the portion of the Mississippi River south of its juncture with the St. Croix River, as part of its western boundary. As a result, the area between the new Wisconsin State line and the western boundary of St. Croix County as established in 1840, was in effect, left without a governing body.

The county commissioners continued to meet in Stillwater, acting upon the business of St. Croix County, until the establishment of the Territory of Minnesota on March 3, 1849.

With the establishment of the Territory of Minnesota came the formation of several counties, including Washington County, on October 27, 1849. The boundaries of present day Washington County were established on March 5, 1853. The county seat of Stillwater was incorporated as a charter city on March 4, 1854.

Many of the familiar geographical names associated with present day communities have existed since the settlement of the area, but were not officially attached to any particular governmental body until after Minnesota statehood was obtained on May 11, 1858. Although further research is necessary to locate the documentation associated with many of the original town organizations, it appears that all of the municipal boundaries within Washington County, except Stillwater, were established after statehood.

RESEARCH SUMMARY

State statutes and sources of legal boundary information were researched to frame the critical issues in developing the municipal and county boundary coverages. Minnesota Statutes were investigated for the period from 1849 through 1996 to identify legislation affecting municipal incorporations and annexations. Sources of legal boundary information which were investigated include the offices of Secretary of State, Minnesota Municipal Board, Minnesota Department of Transportation, Minnesota State Historical Society, and Washington County Auditor.

Legal boundaries for charter cities are established in a city charter and filed with the Secretary of State and County Recorder. Stillwater is the only charter city in Washington County.

Statutes pertaining to incorporation and annexation of land

Need

To identify the legal framework for municipal incorporations and annexations, particularly requirements for filing records and the effective date of incorporation or annexation. Additional information of interest for incorporations included the manner in which the process was initiated, to which body a petition or resolution was submitted, action required by that body, whether a map of the boundaries was required, and who supplied the map and legal description of the affected property. Due to the complexity and numerous types of annexations within state statutes, limited information was collected regarding these.

Sources

Minnesota Statutes were researched for the period from 1849 to 1996 to identify current and historical statutes pertaining to the organization of towns and the incorporation of cities and municipalities. Statutes regarding annexations were investigated for the period from 1941 to 1996. The complete volume of statutes is available at the State Law Library, St. Paul; a limited selection is available at the Washington County Law Library, Stillwater.

Findings

Until 1959, all city and village incorporations were handled at the county level. An 1858 statute directed the governor to appoint three commissioners in each county to divide the county into towns, and to file the record with the County Register of Deeds (now the Recorder's Office). From 1865 to 1959, most statutes required the following:

- Initiation of the incorporation process by presentation of a petition to the County Board;
- Upon receipt of the petition, the County Board was to call an election;
- In most cases, records of the incorporation were to be filed with a county office (the Register of Deeds or County Auditor) and a state office (the Auditor of State or Secretary of State);
- Although metes and bounds descriptions were required, a map of the area of incorporation was not;
- Incorporations were effective on the date the records were filed with the County Auditor, the Secretary of State, or both.

Several exceptions existed during this time period. For example, the 1865 statute for organization as a town directed the County Board, upon receipt of a petition signed by a majority of legal voters within the territory, to authorize the organization of a town. Likewise, according to an 1873 statute, city incorporations were executed without putting the issue to a vote. A petition signed by two-thirds of legal voters and presented to the Judge of Probate permitted the judge to issue an order declaring the territory incorporated as a city. Finally, the 1941 statute for incorporation of villages within villages required the

County Board to hold a hearing before calling for an election. (Further information on incorporation of villages, cities and municipalities and consolidation of municipalities can be found in Appendix A.)

Between 1959 and 1978, incorporations were handled by both county boards and the Minnesota Municipal Board (known as the Commission from 1959 - 1968, and as the Minnesota Municipal Commission from 1969 - 1978). The Commission was responsible for overseeing all municipal incorporations within the Metropolitan Area, or in any other area of Minnesota for cities of the first or second class or territories within four miles of an existing municipality. Outside these areas the incorporation was the responsibility of the county board. Most statutes between 1959 and 1978 required the following for incorporation through the Municipal Commission:

- Initiation of the incorporation process by presentation of a petition to the Minnesota Municipal Commission;
- Following a hearing, the commission was directed to approve the petition for incorporation and set an election date if it found the area was at that time, or was about to become, urban or suburban in character, or if the existing township form of government was inadequate to protect the public health, safety and welfare;
- Records were to be filed with the County Auditor, Secretary of State and Municipal Commission;
- A map of the incorporation area was required with the metes and bounds description; and
- The effective date of incorporation was the date on which records were filed in all required offices, or a later date as fixed in the incorporation order.

Several exceptions exist to these requirements. From 1965 to 1969 the Commission had the authority to enlarge the area of annexation by up to five percent if it found this in the best interest of the proposed village. After 1969, initiation of the incorporation process required resolution by the Town Board or petition of property owners.

After 1978, all municipal incorporations were handled by the Minnesota Municipal Board. The Board's responsibilities remained essentially the same as they had been during the preceding 19 years. Most statutes required the following for incorporation through the Municipal Board:

- Initiation of the incorporation process by presentation of a petition or Town Board resolution to the Municipal Board;
- Filing of incorporation records with the County Auditor, Municipal Board, Secretary of State, State Department of Revenue, and State Demographer; and
- The effective date of incorporation is when new officers are elected, or a later date as fixed in the incorporation order.

Sources of legal boundary information

Need

To determine sources for current and historical boundary information.

Options

Contact state and local-level government agencies as sources of boundary information.

Findings

Legislature. The General Statutes of Minnesota (1849) include the establishment and bounds of Washington County. Later statutes modified the boundary location.

Secretary of State. The Secretary of State keeps city annexation and incorporation records in two formats: digital boundary maps and microfiche records. The digital boundary map for Washington County was several years out of date.

Annexation and incorporation records on microfiche are more current than the digital boundary maps, but are difficult to obtain. Staff in the office of the Secretary of State can search for these records, although this is a low priority task and may take several months to complete. Individuals can also attempt to locate this information themselves on the microfiche. Poor organization of the information and gaps in the records however, can make the process of records retrieval time consuming and costly.

Minnesota Municipal Board. Incorporation and annexation records of the Minnesota Municipal Board are relatively easy to access. The city name and annexation number are needed to obtain the documents. It is helpful to have the Municipal Board docket number as well. The drawback to using these records is their limited scope. The Board does not have records prior to its formation in 1959. The Board does not maintain digital boundary maps.

Minnesota Department of Transportation. The Minnesota Department of Transportation (MnDOT) receives notice of boundary adjustments from the Secretary of State. MnDOT records boundary changes for each municipality on note cards and draws the new boundaries on hard copy maps. These maps are typically several years out of date. A limited number of maps are available in digital format.

Minnesota State Historical Society. The Minnesota State Historical Society has limited information regarding municipal boundary locations. The original incorporation order and boundary for the Village of Marine were found in the town clerk's record book. In addition, a book on the city's history referenced the State Laws for 1875 for the incorporation order. The Historical Society may also have information in cases where a boundary location was in dispute. This information can be accessed by searching the Historical Society's files for the county in which the city is located, or by using their on-line service.

County Auditor. All but four state statutes, dated 1873 and 1941, required that records of incorporation be filed with the county in which the action occurred. The 1858 statute required records to be filed with the Office of Register of Deeds (now the Recorder's Office); statutes which followed specified the County Auditor's Office. Annexation records are also on file with the Washington County Auditor.

Records of municipal incorporations and annexations are kept on file in the Washington County Auditor's Office stored in folders arranged alphabetically by city name. Relevant information such as ordinance number, municipal board number, and date received, has been noted on most incorporation and annexation documents.

City clerk. The use of city clerks as a source of municipal boundary information is dependent on the attentiveness with which city records have been maintained. In Washington County, some municipalities were unable to provide any information concerning their boundaries, while others maintained excellent records.

Decision

The County Auditor was chosen as Washington County's primary source for current and historical boundary information because these records were the most complete and accessible.

Mapping associated with incorporations and annexations

Need

To identify requirements for the mapping of municipal incorporations and annexations. To identify options for updating future municipal boundary changes in digital format, as they occur. This component is critical in determining maintenance procedures to keep boundary layers current.

Findings

Until establishment of the Minnesota Municipal Board in 1959, Minnesota statutes did not require the filing of municipal boundary maps when municipalities were incorporated or land was annexed. Most statutes required that only a description of the boundaries be included with records sent to the County Auditor and Secretary of State. Following establishment of the Municipal Board, the filing requirements changed.

Under the jurisdiction of the Municipal Board, proceedings for incorporation or annexation of land require a number of documents to be filed with the Municipal Board. Among the required documents are a petition of property owners or resolution of the municipal or town council, a legal description and a hard copy map of the area of incorporation or annexation.

All municipal incorporations and most annexations are handled by the Municipal Board, although some exceptions exist. For instance, a municipal council can annex land by ordinance if the land is owned by the municipality, completely surrounded by the municipality, or abuts the municipality and is 60 acres or less in area. Records of such annexations are submitted to the Municipal Board for approval; annexations are not valid until the records have been received by the Municipal Board.

Under the jurisdiction of the Municipal Board, the requirements are:

- All incorporations and annexations must be filed with the Municipal Board. The only exception is for “Consolidation of Municipalities”, which is handled by the Government Board of Innovation and Cooperation.
- All incorporations and annexations filed with the Municipal Board must have a legal description and hard copy map of the territory.
- Annexations completed without a Municipal Board order (such as “Annexation by Ordinance”) are not valid until received by the Municipal Board. A letter of approval, acknowledging the annexation, is forwarded to all appropriate offices.
- Copies of all Board orders and letters of approval are forwarded to the Secretary of State, Department of Revenue, State Demographer, County Auditor, city or township clerk, and, if the process was initiated by a resident petition, to individual property owners.
- Board orders include a legal description of the area of incorporation or annexation, but do not include copies of corporate boundary maps.

Options

As incorporations and annexations lead to changes in municipal boundaries, maps must be updated to reflect the new boundary locations. Maintenance and updating of digital municipal boundaries could be completed at the state level by the Land Management Information Center, the Municipal Board or the Department of Transportation; at the regional level by the Metropolitan Council; or at the local level by counties or cities. Although other options exist, Washington County only evaluated the options involving organizations that are currently involved in incorporation and annexation processes. For additional information regarding the manner in which Washington County will maintain its municipal boundary coverage, refer to Maintenance procedures in this document.

Observations

Minnesota Department of Transportation. The Land Management Department of MnDOT receives notification of municipal incorporations and annexations from the Secretary of State. Legal descriptions are used to draw boundary adjustments on paper maps. Of MnDOT's 800 municipal boundary maps, approximately 100 are in digital format. Only a handful of Metro-Area municipal boundary maps have been converted. Due to workload and limited staffing, the remaining maps are not expected to be converted in the near future.

MnDOT is currently preparing digital county boundaries, which will be accurate to within 40 feet. This level of accuracy may be appropriate for some GIS use, but is unsuitable for most county applications.

Advantages exist to having municipal boundaries and future boundary adjustments converted to digital format at MnDOT. Foremost, consistency in currentness and GIS format would be ensured. The Department has a process in place for mapping municipal boundary changes and could provide mapping state-wide. This would provide a single source for users to acquire municipal boundary maps.

Disadvantages to handling digital municipal mapping in the Land Management Department of MnDOT include duplication of effort, staff shortages and map accuracy. Development and maintenance of municipal boundary maps by MnDOT is a duplication of mapping efforts taking place at the county level. In addition, this task would probably take more time to complete at MnDOT due to its larger area of responsibility.

The greatest obstacle to development of digital boundary maps in the Land Management Department is their limited staff size and current workload. Although the Department is attempting to develop new municipal coverages in digital format, other responsibilities have restricted the time available to devote to these efforts. Finally, the accuracy levels of MnDOT's municipal boundary maps vary widely. Metro-Area maps tend to be significantly less accurate than boundary maps for outstate municipalities.

Counties. County Auditors are notified of all municipal boundary changes within their jurisdictional area. Copies of Municipal Board orders and letters of approval are forwarded to the County Auditor where legal descriptions are kept on file.

In Washington County, the Auditor's Office uses the Municipal Board orders and letters of approval to update taxing district (city) codes, then files the correspondence alphabetically by city name. In some instances the Auditor's Office notifies the Surveyor's Office when boundary changes have occurred; in others, the Surveyor learns of these changes when a municipality requests an updated boundary map or a mapping technician detects changes in the city code for parcels located in an annexation area. In order for Washington County to keep its new municipal boundary coverage current, an internal procedure must be developed to ensure Municipal Board orders are forwarded for mapping in the Surveyor's Office.

An advantage to having municipal boundary changes digitally mapped at the county-level is the time required to make the updates. The smaller number of boundary changes within a county jurisdiction gives counties an advantage over MnDOT in this respect. In addition, counties' links to parcels and tax records will improve the accuracy of both the digital municipal boundary coverage and the tax database. However, to ensure that digital maps from different counties can be used together, standards for accuracy, currentness and GIS format are needed. It is recognized that many counties would first need to develop the digital boundary coverages.

Recommendations

Implement a review process. To be most effective, the process should emphasize review of legal descriptions and map documents by a knowledgeable professional prior to their filing.

Require that all petitions submitted include a surveyable legal boundary description, together with a map prepared according to specific defined standards, both preferably certified by a professional land surveyor.

Require that the legal description of the final boundary as ordered by State authority, along with a map of the subject area, accompany notification to county and local government agencies.

Require that the appropriate county government agent/office file all orders of incorporation and annexation in a uniform format; indexed for record keeping and inquiry. This procedure would improve record keeping and ease of access, and also assist the ongoing mapping maintenance of the boundaries.

Adopt statewide uniform record keeping standards for county and local government agencies.

Digital boundary map compilation

Need

To identify where responsibility for the compilation and dissemination of Metro-Area digital municipal boundary maps could be best supported.

Options

A single location for the compilation and dissemination of Metro-Area digital boundary maps would provide users with a single source to acquire current boundary maps. Furthermore, the responsible agency could work to encourage consistency in accuracy, format, and currentness of digital maps produced by Metro-Area counties.

Map compilation could be managed at the state level by the Land Management Information Center, the Municipal Board or the Department of Transportation, or at the regional level by the Metropolitan Council. Placing these responsibilities in a state level agency would provide for expansion of map compilation and dissemination services outside the Metro Area.

Recommendation

Digital municipal boundary maps should be maintained at the county level then forwarded to an agency at the state or regional level for compilation and dissemination of regional digital municipal boundary maps. In time, this function could be expanded to include municipal boundary maps state-wide, or other types of boundaries, such as school districts, watershed districts, etc.

Decision

On May 27, 1998, the MetroGIS Policy Board voted to designate the Metropolitan council as the official custodian and compiler of the Regional MCD/County Jurisdictional Boundary Dataset. The Board also designated each of the seven metro area counties as the primary source data custodians for the Regional MCD/County Jurisdictional Boundary Dataset.

PLANNING ELEMENTS AND MUNICIPAL BOUNDARY PILOT AREA

Development of the Washington County municipal boundary coverage began with a planning phase and completion of a pilot area. Much of the project planning involved design of the GIS database. Other project elements, such as issue tracking and resolution, maintenance procedures, and the relationship of the municipal layer to the County's existing parcel database, were considered also in the planning phase. However, the manner for dealing with some issues was not apparent until the project was near completion.

A pilot area was completed to assist the planning of the municipal boundaries layer. The goals of the pilot were to develop an initial methodology to guide city and township boundary development, to determine the types of problems likely to be encountered, to establish standards where none had previously existed, and to develop procedures for handling reoccurring issues. Consideration was given to including two cities in the pilot. This was rejected due to the increased time which would be involved in completing two pilot areas and the decreased return expected on the second city. It was expected that boundary development for each municipality would introduce new problems and issues, and that some changes in methodology would be required for each.

Five criteria were used for selection of the pilot city:

- an older municipality that experienced boundary changes under various statute requirements (incorporation prior to 1930);
- annexation of at least one area of land;
- overall medium-level complexity;
- at least one city boundary located on the county boundary; and
- at least a portion of the city boundary defined by a body of water.

The tasks below were completed in developing municipal boundaries for Washington County, however they are not necessarily presented in the order completed. Many were completed concurrently and with tasks described elsewhere in this report. Organizations conducting similar projects may find it necessary to re-order, add or remove steps to optimize specific conditions.

Relationship between municipal coverage and other databases

Need

To be compatible with other commonly used databases.

Background

Compatibility of the municipal boundary layer with other parcel database layers involves issues such as text use, established processes (i.e., database management), levels of accuracy, and naming conventions to coincide with existing themes of information (layer naming). For example, if the municipal layer information will be used in standard half section map hard copy plots, various factors need to be considered such as scale of text, text placement methods, type of symbology used, etc. Hard copy output in other formats, such as those produced at a smaller scale, add complexity to these decisions. Use of digital data provides the potential for unlimited map output scales.

Sustained compatibility is necessary in areas which impact computer programs used in database management. Programs which process data, such as those for data input, library indexing, quality control verification and output, will need modification.

When evaluating the design options, one important consideration in the relationship between the municipal coverage and other databases is the factor of compatible positional accuracy. Applications conducted at the parcel level may utilize a municipal boundary in the performance of spatial analysis, i.e., comparing locations of points, lines and polygons. If the positional accuracy between the municipal and parcel boundaries does not coincide, less than desirable results can be expected in some applications.

Decision

Municipal and county boundary coverages were prepared separately from the parcel data base coverage. Annotation (notational text) was not applied to the coverages at this time. Several factors led to these decisions:

- Discrepancies surrounding the location of municipal boundaries would have required extensive work to place appropriate notations and labeling for the parcel maps;
 - Many parcel maps are crowded with features and symbols, leaving little room for additional notation;
 - Boundary coverages will be used at a wide range of map scales, further limiting the use of annotation.
- In the interim, text associated with municipal areas can be generated from the attributes.

Although the municipal boundary coverages are separate from the parcel data base coverage, the accuracy of municipal boundaries must be fully compatible with the parcel data. In addition, while the maintenance of two databases was somewhat inefficient, the added simplicity of a separate boundary coverage seemed to justify this approach.

Software for data creation

Need

To select a software package that will create boundary lines and attribute information for use in a computer aided drafting (CAD) environment or with GIS software.

Options

AutoCAD, Arc/Info, and ArcCAD were considered for their compatibility with existing systems. Compatibility with Washington County's current system required spanning a combination of these options.

Findings

For systems using a combination of AutoCAD and Arc/Info, special concerns must be addressed. Where initial map development takes place in AutoCAD and is transferred to Arc/Info for holding, a problem develops when the information is sent back to AutoCAD. Upon transfer, Arc/Info converts curved lines into many small arcs. In large area/small scale maps, over 10,000 arcs can be created. This is problematic when map updates and maintenance work are performed in AutoCAD, as the program is unable to create polygons using files of 10,000 or more arcs.

Decision

Washington County chose to use a combination of three programs to complete its municipal boundary coverage: Arc/Info, AutoCAD, and ArcCAD. AutoCAD, the software used to construct the Washington County parcel database, was used to draw municipal boundary lines and create the attribute information. AutoCAD was chosen for this task because of its efficiency in handling graphic changes. ArcCAD was used to create GIS coverages. The transfer problem described above was resolved by maintaining a single direction in the transfer of map files - from AutoCAD to Arc/Info.

AutoCAD layers and associated information

Need

To define and document AutoCAD entities such as layer names, layer colors, layer linetypes and text for the municipal layer.

Options

Layer elements used for the municipal boundaries layer need to be compatible with layer naming elements currently in use in the Washington County parcel database, anticipating that they may be used together. Naming conventions used by others were not explored.

Decision

The following AutoCAD mapping layers were established for use with this project:

- CNTYLIN = exterior county boundary line
- MNCALIN = interior municipal annexation line
- MNCELIN = exterior municipal boundary line
- CNTYLBL = test label point with block attributes for entire county
- MNCALBL = text label point with block attributes for each municipal annexation
- MUNCELBL = text label point with block attributes for entire municipality.

Additional layer information is documented in the metadata.

Accuracy rating definitions

Need

To convey data quality and accuracy.

Background

Legal descriptions of property or jurisdictional boundaries often use a mixture of terms. Some “calls” referenced in legal descriptions, such as Public Land Survey lines, can be accurately located using surveying methods. Other descriptors, such as “west of the road” can be accurately located if additional information is available. For example, if a legal description referencing a road was written in 1919 and the location of the road is known for that year, the boundary can be accurately established. However, questions can arise when referenced features change position over time and documentation of the initial location is not available.

Another issue is the quality of the legal description. It is not uncommon to find poorly written legal descriptions with vague or ambiguous calls. Confidence in the interpretation of a legal description, and the resulting positional accuracy of a boundary location, is reduced when a call has multiple meanings.

A final issue can be illustrated in a boundary defined by the main channel of a river. The location of the river at the time the legal description was written may be nearly impossible to determine. In this case, the boundary is well defined, but its precise location is unknown.

Options

There appears to be value in applying a test, which would convey a level of confidence in the accuracy of created boundaries. The test would examine how well the description “call” could be interpreted with any known locations of called for features. The method needed to be simple and flexible.

One method would use three levels to indicate confidence in, and/or accuracy of, the feature. As boundary lines were read from the legal description, mapping technicians could categorize them appropriately.

A more complex method would involve rating various quality components for each feature. Seven components of GIS data quality have been identified, including positional accuracy, attribute accuracy, logistical consistency, resolution accuracy, completeness, data accuracy and lineage. By applying a rating to each component and averaging the scores, an overall score could be applied. This score could be used as an indicator of quality or confidence.

The situation is further complicated if the actual segments (points and lines) of the municipal boundary (polygon) are individually rated for their quality. The map user may not realize that the accuracy of each of these components contributes to, and has a direct relationship with, the accuracy of the polygon. The overall accuracy of a polygon is only as good as its least accurate spatial component. Often boundary lines are based on different sources of reference, each with its own level of accuracy. If a rating scheme is applied to each boundary segment, additional issues must be considered. For instance, a municipal coverage using a common line to represent two municipalities (one on each side of the line), may encounter conflicting boundary descriptions or differing quality of the source materials. This can be problematic in assigning an accuracy level to the segment and establishing the true boundary location.

As the mapping of municipal boundaries was nearing completion, the National Standard for Spatial Data Accuracy (NSSDA) was finalized and available for use.

Decision

As the Washington County municipal boundaries were developed, each boundary segment was rated according to a combination of how well it was described and the ability to determine its positional location. Ratings were applied and listed as boundary segment attributes. These ratings were also applied to layer naming in the development process to expedite the boundary creation process.

Three categories were used to describe the accuracy of each boundary segment. The category names are simple indicators of the level of quality:

- Located and measured. Based on the existence of some form of measuring activity. The boundary is surveyable and field measurement information exists.
- Derived. Having been compiled from records through analysis or conversion.
- Presentation and display. Intended for general presentation and display purposes such as small scale general reference maps.

(Complete accuracy rating definitions can be found in Appendix B: Positional Accuracy Definitions.)

Only upon completion of the municipal boundaries coverage was the full complexity of the rating issue apparent. The assigned ratings have been removed from the final municipal boundary product until further research can be conducted and more thorough consideration given to the implementation of this concept. For some portions of the municipal boundary dataset, the NSSDA was applied.

(Refer to Appendix E: Metadata, Section 2: Data quality information.)

Recommendation

A method should be developed to rate the quality and confidence level of data sets based on the positional accuracy, completeness, consistency and currency of the data.

Polygon definition

Need

To define and identify the physical make-up of polygons created.

Options

A single polygon for each municipality would address a majority of GIS applications, with multiple attributes linked to each polygon. However, it is common to have multiple annexations with numerous and separate legal descriptions making up one municipality. Another option would be to create a polygon for each of the legal descriptions that make up a community. In any case, this work is needed in communities with multiple annexations.

Observations

The manner in which legal descriptions were constructed for annexed land varied between municipalities. In several instances, the description included not only the land to be annexed, but the entire municipal boundary as well. This practice reduced the effectiveness of Washington County's municipal boundary mapping process which entailed posting the document number for each annexation. Consequently a detailed historical analysis of land annexations cannot be accurately performed in some parts of the county. However, if the legal description of the most recent action was accurately drafted, this method was effective in rectifying any gaps which may have existed in the interior of the municipality.

Decision

As a result of the differences in annexation descriptions, two separate data sets were created. In one data set, the sub-unit polygons coincide with each area of annexation. In the other, the sub-units were combined to create a single polygon for each municipality.

Methods to handle unique polygon issues

Need

To determine how to handle unique polygon issues, including:

- Areas in which two or more municipalities overlap;
- Boundary segments of adjoining municipalities which do not meet (gaps);
- Polygons which exist without an official FIPS code;
- Islands of municipalities which are detached from the body of the municipality; and
- Municipalities which are located in two counties.

Observations

No overlaps or gaps were found along adjoining municipal boundaries in Washington County. Two polygons were identified which had not been assigned a FIPS place code. These were the result of several municipal incorporations which acquired the majority of a former township.

Decision

Polygons without assigned FIPS place codes were given a label identification of "unknown". Polygon islands detached from the body of the municipality are identified within the polygon with attributes which correspond to the major polygon. Polygons for municipalities located within two counties are labeled, within each county, with the county number and FIPS code unique to that location.

Manner for dealing with water bodies

Need

To determine if water bodies (lakes and rivers) will be included in city and township polygon areas.

Findings

Often legal descriptions do not indicate whether water bodies are included within municipal boundaries. Where water bodies adjoin municipalities, this can be problematic. Whether included in a municipality or not, water bodies must be addressed in the overall county wide design.

Some communities in Washington County have water bodies within the municipal boundary; others adjoin or border on bodies of water. Further research may be required to clarify jurisdiction in these areas.

Decision

All water bodies have been included within the described municipal boundaries.

Polygon link / label code

Need

To establish a unique identifier for municipalities in order to link attribute information required for GIS applications.

Options

Assign to each municipality a random, identification number or a number based on existing codes. Codes that were considered, whole or in part, included:

- Minnesota Department of Revenue city-town code, 4 digits, unique within counties;
- FIPS place code (Federal Information Process Standard Publication 55), 5 digits, unique within the state;
- IRM Standard 15, Numeric Codes for the Identification of Counties in Minnesota, 3 digit county identification code equivalent to FIPS PUB 6-4, FIPS County Code, 3 digits;
- County code, 2 digits, used by state government.

Decision

Initially, the Minnesota Department of Revenue city-town code was planned as the polygon link/label code, as this number is used in the Washington County tax collection system. However, a peer review of the municipal boundaries project identified several problems with use of this code. The most significant problem is that the number is not unique outside county boundaries, and therefore, cannot be used on a statewide basis.

Following consideration of other identification codes assigned to Washington County's cities, a combined code was chosen. An eight-digit identification number combining the FIPS three-digit county code for Washington County, with the five-digit FIPS place code was selected as the linking code. For example, the linking code for Forest Lake is 163-21770. Any other identification methods can be added by use of a look up table.

In Washington County the cities of Hastings and White Bear Lake have jurisdiction in two counties. Two eight-digit identification codes have been assigned to each city, enabling the user to combine or separate the cities as needed for regional GIS applications. The following identification codes have been assigned:

Hastings = 163-27530 (Washington County) & 037-27530 (Dakota County)

White Bear Lake = 163-69970 (Washington County) & 123-69970 (Ramsey County)

Polygon attribute fields

Need

To establish additional attribute fields for annexation and city boundary polygons. Default fields include area, perimeter and internal software codes.

Options

The following attribute fields were considered for annexation polygons:

- municipality name;
- FIPS place code (Federal Information Process Standard Publication 55), 5 digits;
- date of action (effective date of ordinance/order number);
- action number (city ordinance/order number);
- IRM standard 15, Numeric Codes for the Identification of Counties in Minnesota, 3 digits;
- Minnesota Department of Revenue city-town code, 4 digits;
- Minnesota Department of Transportation (MnDOT) state index number; and
- Secretary of State office document number.

The following attribute fields were considered for city-wide boundary polygons:

- municipality name;
- FIPS place code;
- IRM standard 15;
- Minnesota Department of Revenue city-town code;
- date of last change;
- duplicate city/township (noting if there are detached units or polygons); and
- city/township designation.

It is also possible to code municipalities no longer in existence due to consolidation with another municipality. This information could be used for historical analysis using the GIS.

Decision

All but two of the above were used for annexation and city boundary polygons, in addition to the three default fields (area, perimeter and internal codes). MnDOT index numbers, which do not exist prior to the 1950s, and Secretary of State office document numbers, which are not readily available, were not used for this project. These could be added at a later date. The FIPS place code and the IRM standard 15 code number were combined into one field.

Three additional codes were identified upon completion of the project which may be included at a future date: local government type (city, township, or unorganized); duplicate city or township (indicates if there are non-contiguous areas (islands) of a given MCD); and date of last revision to record.

Arc / line definition

Need

To define and identify arc/lines based on their legal definitions. To separate individual annexation line segments from overall exterior boundaries.

Options

Develop levels to rate accuracy and confidence, and create names to identify them.

Decision

Boundary line segments are typically defined by starting and ending at each boundary angle point. For the municipal boundary coverage, boundary line segments were defined separately between annexations and overall exterior boundaries. The individual quality/accuracy rating of each segment was not used in the final product of this coverage. (See Polygon definition, page 14.)

Arc link / label codes

Need

To establish a single attribute to function as a link for joining arc/line boundary segments with their corresponding attributes.

Decision

A unique link code for arcs was not established at this time as the attribute data can be accessed via the municipal polygons. Arc link/label codes can be added at a later date if desired.

Arc / line attribute fields

Need

To determine attribute fields for all associated information.

Options

Five attribute fields were reviewed:

- AutoCAD layer name field;
- document number field for the city ordinance/order number that created the line;
- municipality name field;
- positional locatability rating - the rating of a boundary segment based on the descriptive quality of its legal definition; and
- coordinate geometry attributes.

Decision

In addition to the default fields (from node, to node, left poly, right poly and internal codes), the AutoCAD layer name is included as an attribute field. The other fields of information can be obtained from the polygon attributes. By design, boundary segments cannot be extracted directly by a unique line label for an individual city. Instead, the arcs can be pulled from the database by use of the polygon information. Coordinate geometry attributes (COGO) were not included. The ArcCOGO command can be used to create all necessary fields of COGO information.

Check sources (map)

Need

To identify sources for comparison with the newly developed municipal boundaries to assure the accuracy of spellings and boundary locations.

Options

Obtain maps from state offices (Secretary of State or Department of Transportation), refer to historic plat maps, or check with cities.

Decision

Established check sources for comparison with Washington County maps:

- Minnesota Department of Transportation Corporate Data maps;
- Minnesota Secretary of State digital file (Arc export); and
- Washington County plat books.

A copy of MnDOT's Corporate Data map was compared with the pilot project map. A digital file (Arc export) of all cities within Washington County was obtained from the Secretary of State. The data file was plotted out and compared with the pilot project map. Plat books for 1901-1995 were used as a reference and compared with the pilot city's annexations. Historic plat books for Washington County are available from the County Surveyor or Recorder's offices, or from the Stillwater library.

Overall, sources to check and verify the final results were limited. In many instances even the municipalities had little supporting information to clarify their boundaries. As a result, accountability for the preparation of accurate digital boundary maps was with the mapping technicians. Their responsibilities included conducting thorough research, interpreting the results accurately, and producing the final map according to their findings.

Check procedures

Need

To determine standards that will ensure uniformity in the boundary maps. When general procedures are established, the map can be checked for conformity to these standards.

Options

Use the Washington County Surveyor's Office Manual of Map Standards and Procedures or develop additional standards based on the method employed in municipal boundary development.

Decision

The Washington County Surveyor's Office Manual of Map Standards and Procedures, which contains methods and standards for creating maps, was chosen to ensure map uniformity. A checklist is also available. (See page 26 and Appendix E: Metadata.)

Maintenance procedures

Need

To develop a procedure for maintaining boundary lines and related features. To document the procedure and maintain a system to communicate updates between responsible parties.

Options

Evaluate the current internal procedure used to transmit annexation and incorporation information. Develop internal procedures for notification of boundary changes, updating boundary coverages, and handling unresolved issues identified in the initial development of municipal boundary coverages.

Observations

The Minnesota Municipal Board sends copies of their orders regarding incorporation or annexation of land in Washington County to the County Auditor. These copies are kept on file in the Auditor's Office, stored in folders arranged alphabetically by city name. All orders received since 1992 have been listed and indexed in a computer file.

The County Auditor changes the municipal district code in the Property Tax System for properties described in the Municipal Board order. If annexed properties are not readily discernible, a copy of the order is forwarded to the Surveyor's Office where technicians review the legal description and identify property affected by the order. A report containing the identification number (geocode) of each property annexed is submitted to the Auditor. The report also notes whether part of all of each property area is included in the annexation description.

Property Tax System records can be monitored for changes to the municipal code assigned to parcels and used as a source for updating municipal boundaries. However, this method does not provide staff in the Surveyor's Office an opportunity to verify the new boundary location according to the order's legal description and compare whether or not it is coincident with parcel boundaries.

Decision

An agreement has been developed for transmittal of incorporation and annexation information. Whenever the County Auditor receives notices and orders from the State and individual municipalities regarding change to a jurisdictional boundary, a copy of each legal boundary change will be forwarded to the County Surveyor.

Changes to the drawings and reports regarding Minor Civil Division (MCD) jurisdictional boundaries are made by Surveyor's staff on a monthly basis in conjunction with the maintenance and updating of the county parcel database. Mapping standards and procedures developed by the Washington County Surveyor's Office will continue to be used.

Two master county MCD boundary drawings are maintained. One, muniannx.dwg, contains polygons with attribute information regarding each annexation for MCDs within the county. The other one, muniextr.dwg, contains only the current exterior boundary with attribute information for each municipality.

Computer software packages used in Washington County to draw boundary changes include AutoCAD, Arc/Info and ArcCAD. With a copy of a PLSS section from the Washington County parcel database for background reference, AutoCAD is used to draw lines to reflect the new boundary description and to add text to the parcel database map.

AutoLISP routines are used to check new label points and line work. The line work representing the new boundary is then exported out of the parcel database and inserted into the master county drawing of annexations. In the master drawing, the boundaries are revised to reflect the new change. For example, a line formerly coded exterior boundary line in the muniannx.dwg, will be coded interior annexation line because a new exterior boundary has replaced the former one. AutoCAD block command is used to add attribute information such as order number and date. Using either ArcCAD or Arc/Info, a new polygon coverage is created and checked for closure. After the master county drawing of annexations is satisfactorily updated, the new boundary lines are copied and inserted into the master county drawing of exterior boundaries. Municipality exterior boundaries are then revised as needed and a new polygon coverage is created. When all drawings have been revised and finalized, a copy of the new coverage for exterior municipal boundaries should be forwarded to the designated regional custodian.

Guidelines are in place to assure that all changes made to boundary drawings and reports are done consistently. There is a detailed checklist for technicians to follow. Refer to “Checklist: Procedures for Updating Municipal Polygon Boundaries” in the Appendix.

A Microsoft Access database file is kept to organize collected research information including municipal name and identifying number; type of action (order, ordinance or resolution); action number and date; source of the notice; and comments. The database file is updated as changes occur.

Unresolved issues are summarized in “Report for Corporate Limits”, a word document prepared for each municipality by the County Surveyor’s Office. It contains an account of discrepancies and problems encountered while working on the initial drawing for municipal boundaries. These reports are referred to whenever a boundary change is made so that boundary conflicts noted during prior work can be reviewed. If the new boundary description resolves or corrects a past discrepancy or problem, the item is checked by a supervisor or lead worker and removed from the report. If it creates a new conflict, an item is added to the report. Refer to Appendix: Metadata, Section 2, Issue index by MCD.

Format of deliverables

Need

To determine the data format of deliverables. Consider impact if any.

Options

DXF, Arc/Info export, DWG, Shapefile, or other.

Observation

Before the development of boundary coverages began, there was a concern that the size of the data files and the amount of map detail would be too large to be easily transferred. It was thought that generalization of detail would be required to reduce the files to a manageable size. These fears were unfounded. The file size of the municipal boundary coverage in Arc/Info Export format is 1.1 megabytes (Mb), the annexation coverage is 1.4 Mb, and the county boundary coverage is 0.1 Mb. Problems are not expected in the handling of these files. If generalization of data is required for map display, this can easily be handled by most software packages.

Decision

Washington County will provide all standard formats available with existing County software, as noted above.

Cartographic discrepancies between municipal and parcel boundary lines

Need

To establish common lines and close graphic slivers posing as gaps.

Observations

In development of the municipal boundary polygon for the pilot area, gaps were noted between municipal and parcel boundary lines. The majority of these errors occurred where polylines were used to create lake and river shorelines. In order to form closed polygons for city boundaries, gaps must be eliminated.

A polyline created in AutoCAD is converted into many separate arcs when exported by ArcInfo. This causes a problem for ArcCAD because the software can only create polygons if fewer than 10,000 arcs are contained.

Options

Use ADE software to close polygons and create new lines or, using AutoCAD snap features, draw a new polyline over the existing exploded polyline. Incorporate the corrected line or polyline into the parcel database during maintenance update.

Decision

Polygon gaps will be closed by drawing new polylines using AutoCAD snap features.

Discrepancies between annexations

Need

To resolve discrepancies among internal parts/polygons of a subject city.

Observation

Slivers and gaps created by poorly worded legal descriptions sometimes leave doubt as to the intent of earlier adjoining annexations. Overlaps may often be considered an area that was redefined to perhaps clarify some earlier ambiguity. Gaps however, especially those that are smaller in size, can raise significant question as to the intent of the earlier boundary limit.

Decision

When discrepancies were found between legal descriptions for adjoining annexation areas, the legal description of the most recent annexation was selected and used for the boundary.

Recommendations

The original intentions of local authorities would be greatly clarified if maps were required to have more detail and were to be presented in a more standardized format.

Give consideration to correcting errors made in the past. Changes to rules and regulations that would streamline corrections by making them easier and the correction process more efficient, would encourage resolution of existing conflicts.

Ongoing municipal boundary map maintenance systems are important to facilitate continued effectiveness in warding off boundary discrepancies.

Resolve a conflict/issue as soon as it is discovered.

Find ways to educate others about the problems connected with boundary discrepancies due to ambiguous municipal boundary descriptions. Through a heightened awareness of the potential problems, those

involved in the administration of municipal boundaries such as local officials, attorneys and surveyors can work together to improve this situation.

Certify one official boundary for each municipality. Something similar to the Torrens title process for individual land holdings. In most instances, a city is defined by a collection of descriptions, that is, the original incorporation and its following annexations. Like Torrens title, a legal action could result in a perfected boundary limit with a single legal description to forever close past discrepancies.

Discrepancies between municipalities

Need

To determine how to handle unincorporated areas/polygons (gaps).

Observation

Upon completion of the municipal boundaries, these coverages were joined to create the county coverage. Two areas were found which did not fall under an existing municipal jurisdiction. These areas were parts of townships whose original boundaries corresponded with the county boundaries in the centers of the main channels of the St. Croix and Mississippi rivers. As parts of the townships were incorporated, the city boundaries were defined as the shore of the river, leaving the areas between the shore and the center of the main river channel without municipal jurisdiction. Both areas are presently encompassed by water.

Options

Portray unincorporated areas within the county as gaps and create attribute text “unknown” for label code. Submit problem issues to the County Attorney for review.

Decision

Areas not included in the description of a municipal boundary fall within the County’s jurisdiction. Whether the jurisdiction of a township extends to the center of the main river channel depends on the enabling legislation granted by the Legislature to regulate surface water abutting townships. Absent such legislation, the legal description of the congressional township in which the political township was formed determines the boundary. In the case of a city, the same analysis would apply.

Polygon consistency (3 cities + 3 towns = total county area)

Need

To ensure that the sum of all municipal polygon areas equals the total area of the county polygon.

Options

Obtain and use the description which established the boundary of the county. Conduct research of historical documentation. Combine the boundaries for all municipalities within the county to create a county coverage. Review the descriptions of adjoining counties= boundaries and compare with the Washington County boundary.

Findings

The Public Statutes of Minnesota (1849) establish the boundaries of Washington County. The boundary between Washington County and the State of Wisconsin is defined as the center of the main channel of the St. Croix river, however the location of the river channel during this time period is unknown.

Decision

A layer was created in the municipal database for the county exterior boundary line coverage. Polygon groups were defined as:

- municipal = area under the jurisdiction of a single city or township government;
- gap = area lying within the county polygon but not under city or township jurisdiction;
- overlap = area lying within multiple municipal jurisdictions.

The sum of the polygon groups equals the total of the county polygon.

A review of adjoining county boundary definitions was not performed.

Recommendation

The point at which 100 percent accountability is achieved is ideal for creation or verification of a county boundary layer.

Issue tracking and resolution

Need

To develop a procedure for reporting inconsistencies and other issues needing resolution in the municipal boundaries layer. As research is performed, boundaries are mapped, and maintenance is completed, it is anticipated that issues will be encountered which cannot be easily resolved. Resolution may require an excessive amount of time, where completion would far exceed expected delivery dates of the project. Other issues may exceed the capacity and/or authority of the staff involved to resolve them.

Options

A wide spectrum of issues needing resolution were expected. Consideration was given to locating each issue based on the extent of its impact. An inconsistency can impact a geographic feature such as a single point, a line or an area. Associated information regarding each inconsistency can be attached to the mapped feature and accessed by outlining an area and pulling up the documentation of problem features. An easier method would be to maintain a single list and track with incident numbers.

Decision

A master list of the outstanding issues was developed. Problems and issues were grouped by city and numbered consecutively as they were discovered. The list was reviewed by the Washington County Attorney's Office. Plans also include forwarding the list to the most appropriate body for review, prioritization, and possible resolution. This may include the Washington County GIS Policy Team or Technical Committee, MetroGIS, affected cities or others.

The Washington County GIS Policy Team will provide direction regarding issues to be addressed further and considered for full resolution.

Refer to –

Appendix C: Unresolved Issues and

Appendix E: Metadata, Section 2: Data Quality Information, Lineage – Issue index by MCD.

Pilot project peer review

As the pilot area neared completion, a peer review was held to present information about the pilot area, the issues involved, and options considered. The purpose of the meeting was to gather feedback from GIS experts and representatives of the Metro Area. The peer review group consisted of 18 participants representing local, state and federal levels of government, and the private sector. Participants offered the following suggestions:

1. Accuracy rating definitions should be used to describe, not only positional accuracy, but also level of confidence. (See page 12 or Appendix C for additional details.)
2. The polygon link/label code selected for use should be reconsidered. While the municipal civil division (mcd) code is unique number at the county level, it is not unique state-wide. A combination of county and city FIPS was suggested as a better alternative. (See page 15 for additional details.)
3. Associated attribute fields for polygon development should be planned according to the expected data audience. Flexibility in design of the database was a major concern.
4. Attribute fields for arcs/lines should be handled using a coordinate geometry (COGO) data set.
5. Generalization of parcel map products was suggested as a way to reduce file size and map detail to a manageable level. This would benefit users who do not require map detail at the parcel level. Further discussion revealed that technology easily permits the generalization necessary to meet most users' needs if full detail is built into the original layer. (See Format of deliverables, page 19, for additional details.)
6. Regional boundary data should be compiled and distributed by a regional custodian. Users would have access to regional data through a single source and would be spared the effort of piecing the data sets together. Data would be maintained at the county level, and consistency between data sets could be encouraged by the custodian.

CONSTRUCTION

Layer construction was guided by the planning and design work of the pilot area. Most of the needed templates were in place following completion of the pilot area. The pilot test brought forward a number of improvements that required adjustments in design before the actual construction began. In some cases, the construction phase included one time tasks such as creating and building the names of layers for points, lines, polygons and text, creation of checklists for various processes and other aspects not directly related to building the municipal lines. Many of these selections were made during the pilot test.

Design changes were expected during the construction phase. Like parcel mapping, each municipal area is unique and some areas demanded adjustments in the construction design. Each adjustment was evaluated for inclusion in the project elements. Design changes for adjustments with minor impacts were handled during maintenance; other changes may be handled as part of a separate project.

The construction steps are included in "Checklist for Creation of Municipal Polygons."

WASHINGTON COUNTY SURVEYOR'S OFFICE CHECKLIST FOR CREATION OF MUNICIPAL POLYGONS

Research and gather information from the following sources

- _____ County Auditor's Office – Make copies of records
- _____ County Recorder's Office – Research Articles of Incorporation Index for documentation relating to municipality.
- _____ Call appropriate city regarding any questions that may arise establishing the boundary.
- _____ Review MNDOT Corporate Data Maps
- _____ Review old county plat books

Review each incorporation and/or annexation for the municipality and document the following information.

Each municipality will have a separate report.

- _____ List each annexation in order by year
- _____ Indicate whether it is an order or ordinance and include its corresponding number
- _____ List the effective date of each ordinance or order
- _____ List the City/Town number (Minnesota Department of revenue)

All digital line work will be done using AutoCAD; Use the following steps to insure consistency between users.

- _____ Make copies of the appropriate section drawings from *j:\acad\dwgbank\final* to your drawing directory to be used for creation of municipal polygons.
- _____ Due to the potential large size of the drawing file created by combining several sections, it is recommended that the autosave feature in AutoCAD be set to the maximum of 600 minutes. Also set any Microsoft Windows screen saver settings to the maximum of 60 minutes to avoid any interruption during the process of opening, regeneration and closing of said drawing.
- _____ Create new layers for the municipal boundary project.

<u>LAYER NAME</u>	<u>COLOR</u>	<u>DESCRIPTION</u>
MNCELIN	120	Exterior boundary lines
MNCALIN	181	Annexation boundary
MNCELBL	0	Label point with attributes pertaining to exterior boundary
MNCALBL	0	Label point with attributes pertaining to annexation boundary

- _____ Draw incorporation and annexation boundaries using appropriate layer names, starting with the oldest description..

- _____ Insert a label point inside the appropriate polygon using the correct layer.
Using the INSERT BLOCK command, add the attribute information to the label point.
Two blocks are already set up and have the appropriate attribute fields associated to them, they are:
ANNX.DWG - Used for adding attribute information re: annexation boundaries
EXTR.DWG - Used for adding attribute information re: exterior boundaries

AutoCAD block commands used:

- DDATTDEF - assign block attributes (start with last field first)
- DATTE - edit attributes
- ATTREDEF - redefine attributes

<u>FIELD NAME</u>	<u>VALUE</u>
MUN_NAME	Municipality name (City or Township)
ORDER_ORD	Order or ordinance number (###)
DATE	Effective date of annexation (yyyymmdd)
CITY_TOWN_#	Internal revenue city or town number (#####)
COUNTY_FIPS_#	County number and FIPS number (#####)

- _____ Using the "Report for Corporate Limits" form, list all unresolved issues regarding the boundary.
Also note any possible sources or methods that may be used for continued research.

WASHINGTON COUNTY SURVEYOR'S OFFICE CHECKLIST: UPDATING MUNICIPAL POLYGON BOUNDARIES

Maintenance for MCD (Minor Civil Division) boundaries should coincide with the regular (monthly) parcel maintenance schedule (i.e. if an annexation is received in June, it will be added to the master county MCD boundary drawing in July.) Copies of documents regarding MCD boundary changes are forwarded to the County Surveyor from the County Auditor when they are received from the State.

Two master county MCD boundary drawings are maintained by our office. One contains boundaries of all annexations, orders, etc. for each municipality within the county (muniannx.dwg) and one contains the current exterior boundaries of municipalities within the county (muniextr.dwg). Each drawing needs to be updated every time a change occurs. Use the following guidelines for making boundary changes:

- ___ Review documents and determine which section the new boundary resides in.
- ___ Copy the specific section file from j:\acad\dwgbank\final to the “draw” directory on C:\drive.
- ___ Start AutoCAD and open the appropriate section file. Draw on the new boundary lines using layer ‘scratch’. Insert a copy of the existing master county MCD boundary drawing if necessary for reference. That drawing can be found in J:\jursbdry\munibdry\munidwgs\munannx.dwg.
- ___ In the individual section drawing, add or adjust the municipality names along the new boundary to reflect the change.
- ___ Wblock out the new boundary lines from the section drawing.
- ___ Save changes to the section drawing and carry out the necessary steps so it gets loaded for that month’s parcel database map maintenance.
- ___ Copy final annexation drawing from J:\jursbdry\munibdry\munidwgs\munannx.dwg to the “draw” directory on your C:\drive.
- ___ Insert the new boundary lines from the wblock created earlier into the annexation county boundary drawing (munannx.dwg). Change the layer name of the new boundary lines from ‘scratch’ to the appropriate line layer name. Add block attribute information per the new document. Refer to “Checklist for Creation of Municipal Polygons” for layer names and descriptions of attributes. File = J:\dept_adm\metrogis\jurisbry\munibdry\data_doc\brymunck.doc.
- ___ Save changes to the annexation drawing and copy it to J:\jursbdry\munibdry\munidwgs*.dwg.
- ___ Recompile the polygon coverage (name=munannx) using ArcCAD
Copy the new coverage to J:\jursbdry\munibdry\municovs\
- ___ Make a copy of the final annexation drawing from J:\jursbdry\munibdry\munidwgs\munextr.dwg to your “draw” directory on C:\drive.
- ___ Insert the new boundary lines from the wblock created earlier into the exterior county boundary drawing. Change the layer name of the new boundary lines to match the existing line layer name.
- ___ Save changes to the exterior drawing and copy it to J:\jursbdry\munibdry\munidwgs*.dwg.

CHECKLIST: UPDATING MUNICIPAL POLYGON BOUNDARIES (Continued)

- _____ Recompile the polygon coverage (name=munextr) using ArcCAD
Copy the new coverage to J:\jursbdry\munibdry \municovs\
- _____ A Microsoft Access database is kept to organize collected research information. (a record of each annexation, order, etc. to date). Edit the database file to reflect the new change.
File = J:\jursbdry\munibdry \munidwgs*cityname*.mdb
- _____ Review “Report for Corporate Limits” word document containing unresolved boundary issues to determine if the new boundary description resolves a past discrepancy. Edit report as needed and make appropriate changes to Metadata and HTML Internet file.

METADATA DEVELOPMENT

Metadata, often referred to as Adata about data \cong is the who, what, when, where, why and how of digital data. Metadata are necessary to help users find and use existing data, and to aid users in understanding the contents of data sets they receive from others. In order for the Washington County boundary coverages to be effective beyond the tenure of those responsible for their creation, complete documentation is essential. The lack of such documentation could result in misunderstanding or misuse of the data.

In 1994, the Federal Geographic Data Committee, a consortium of 14 federal agencies that create, use and share geographic data, published recommended standards containing more than 300 types of information that can be used to define and describe geographic data. A simplified version of the federal standards, the Minnesota Geographic Metadata Guidelines, contains approximately 100 items, organized in the same manner. The standards call for information on seven broad subjects, and answers to the most commonly asked questions about geographic data sets, including:

- identification
- data quality
- spatial data organization
- spatial reference
- entities and attributes
- distribution
- metadata reference.

(For more information, refer to *Documenting Geographic Information: The Minnesota Geographic Metadata Guidelines: A State Version of the FGDC Content Standards for Geospatial Metadata*, developed by the Minnesota Governor’s Council on Geographic Information, GIS Standards Committee.)

Development of metadata for the Washington County municipal boundaries coverage began July 10, 1997 with the entry of general information into a metadata spreadsheet. The majority of metadata items however, were entered upon completion of the municipal boundaries coverage. A single set of metadata was completed for the municipal coverage. Complete metadata is available in Appendix E.

SUMMARY

In accordance with a GIS Data and Cost Sharing Agreement with MetroGIS (Met Council) for mapping jurisdictional boundaries, Washington County developed polygon coverage of municipal boundaries for GIS use. Research, documentation of findings, and mapping took place between August 1997 and November 1998.

Results on the Municipal Boundary Project were presented at the Mn GIS/LIS Annual Conference in October, 1998, and to the Washington County Board of Commissioners, County Administrator, and representatives from municipalities in the county during November 1998. In February 1999 a draft version of the Municipal Boundary Report was made available on the Internet, posted on the Surveyor's Office Web page.

Recommendations and suggested guidelines for mapping municipal boundaries as generated from the project were presented to members of the Minnesota Government Unit Boundary Mapping Workgroup (subcommittee of Governor's Council on GIS) in March 1999.

Not all documentation pertaining to the organization or incorporation of certain towns, villages or cities has been located to date. Further research will be necessary to resolve instances of missing documentation.

Technicians on the project experienced frustration whenever interpretation of the legal description for a municipal boundary was not clear. It is doubtful that this problem unique to Washington County and most likely is common wherever there are jurisdictional boundaries to be defined. Many of the problems encountered could have been avoided through a systematic review of each legal description by a qualified professional prior to its use in a petition or order for boundary change.

Consideration needs be given to correcting errors found in the historical record. In doing so the overall cost must be taken into account. This is often difficult to discern when considering problems of the past, those lying ahead, who is involved, and to what extent. However, it is clear that the cost to convert legal documents into digitally mapped municipal boundaries could have been substantially reduced had the record been more complete, in standardized form, and preserved with surveyable boundary descriptions prepared with corresponding maps of a higher quality. Finding solutions through legislative and procedural changes, even if only to prevent the reoccurrence of difficulties brought forth by this project, may be well justified. Success will require attorneys, surveyors, local government officials and others involved in municipal boundary administration to all work together in raising awareness and in finding the solutions.

In planning for future GIS use, it is predicted that others mapping their municipalities will encounter many of these same issues. The overall progress toward complete and accurate digital municipal boundary datasets available on a regional basis will undoubtedly be slow in coming. This is unfortunate for a data set that was identified as the number one GIS business informational need.

It is hoped that as others embark upon a similar challenge, they will bring forth issues we did not encounter and that they will reinforce and promote the ideas and suggestions generated by our project.

RECOMMENDATIONS AND SUGGESTED GUIDELINES

Implement a review process. To be most effective, the process should emphasize review of legal descriptions and map documents by a knowledgeable professional prior to their filing.

Require that all petitions submitted include a surveyable legal boundary description, together with a map prepared according to specific defined standards, both preferably certified by a professional land surveyor.

Require that the legal description of the final boundary as ordered by State authority, along with a map of the subject area, accompany notification to county and local government agencies.

Require that the appropriate county government agent/office file all orders of incorporation and annexation in a uniform format; indexed for record keeping and inquiry. This procedure would improve record keeping and ease of access, and also assist the ongoing mapping maintenance of the boundaries. Adopt statewide uniform record keeping standards for county and local government agencies.

Digital municipal boundary maps should be maintained at the county level then forwarded to an agency at the state or regional level for compilation and dissemination of regional digital boundary maps. In time, this function could be expanded to include municipal boundary maps on a statewide basis; or other types of boundaries, such as school districts, watershed districts, etc.

The original intentions of local authorities would be greatly clarified if maps were required to have more detail and were to be presented in a more standardized format.

Give consideration to correcting errors made in the past. Changes to rules and regulations that would streamline corrections by making them easier and the correction process more efficient, would encourage resolution of existing conflicts.

Resolve a conflict/issue as soon as it is discovered.

Find ways to educate others on the problems with boundary discrepancies due to ambiguous municipal boundary descriptions. Through a heightened awareness of the potential problems, those involved in the administration of municipal boundaries such as local officials, attorneys and surveyors can work together to improve this situation.

Certify one official boundary for each municipality. Something similar to the Torrens title process for individual land holdings. In most instances, a city is defined by a collection of descriptions, that is, the original incorporation and its following annexations. Like Torrens title, a legal action could result in a perfected boundary limit with a single legal description to forever close past discrepancies.

Ongoing municipal boundary map maintenance systems are important to facilitate continued effectiveness in warding off boundary discrepancies.

Develop complete and accurate spatial data sets with quality equivalent to parcel level positional accuracy.

Develop a method to rate the quality and confidence level of data sets based on the positional accuracy, completeness, consistency and currency of the data.

Create a digital data set that can result in two separate data sets if desired. One group containing polygons which coincide with each area of annexation. The other group containing polygons which represent current exterior boundaries only, one for each municipality.

Provide data to others in all standard formats (e.g. DXF, Shapefile, Arc/Info export).

Achieve 100 percent accountability of a county boundary layer. (Polygon consistency: area of cities + area of townships = total county area.)

Apply unique municipal identity codes, standardized for regional boundary applications (e.g. FIPS 3 digit county code, FIPS 5 digit place code).

APPENDIX A: SUMMARY OF STATUTES

Tables A-1 and A-2 lay out the main components of Minnesota Statutes relating to the incorporation of towns, cities, villages and municipalities for the period from 1858 through 1996.

Table A-1 includes statutes for the period prior to the formation of the Minnesota Municipal Board; Table A-2 covers the period following its formation. Information in both tables is only that which is included in the statutes, and may not reflect the actual manner in which incorporations are executed.

Table A-1: Minnesota Statutes regarding incorporation of Towns, Cities and Villages, 1858 - 1959

Year and Statute	Type of action	Petition/ resolution submitted to	Petition/ resolution requirements	Action required	Votes needed	Records filed with	Metes and bounds required	Effective date of incorporation
1858 Chp. 8	County divided into Towns	-	-	The governor shall appoint three commissioners in each county to divide each into towns, unless the county commissioners have already done so, made a record and filed it with the Register of Deeds.	Election not required	Office of Register of Deeds and Auditor of State	Yes	Unspecified
1865 Chp. 10	Organization as a Town	County board	Petition signed by majority of legal voters	When a majority of voters of any township containing 25 legal voters, petition the county commissioners to be organized as a town, the board shall fix the boundaries of the new town.	Election not required	County Auditor and State Auditor	Yes	Unspecified
1873 Chp. 12	City incorporation	County judge of probate	Petition signed by 2/3 of legal voters	The judge of probate shall issue an order declaring the territory duly incorporated as a city.	Election not required	Unknown	With petition and judicial order	Upon presentation of petition to the judge
1879-1888 Chp. 10	Village incorporation	County board	Petition signed by 30+ resident electors	County board shall call an election.	Majority	County Register of Deeds	Yes	Date records filed with County Register
1913 Chp. 9	Village incorporation	County board	Petition signed by 25+ voters	County board shall call an election.	Majority	County Auditor and Secretary of State	Yes	Date records filed with Sec of State
1941	Incorporation	County	Petition of	Petition filed with County	60%	Secretary of	With	Upon filing

Chp. 411	ration of a City of the fourth class	board	1/4 of voters that voted in the last state election	Auditor asking that an election be called. County board shall set the time and place for a special election.		State	original petition only	of the petition with the Secretary of State
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1941 (Modified 1961) Chp. 412	Village incorporation	County board	Signed by 25+ voters residing in the territory for 2+ years	If the county board approves the petition, it shall set a time and place for an election.	Majority	Secretary of State	Yes	Upon filing of the petition with the Secretary of State
1941 (Repealed 49) Chp. 413	Reincorporation as a Village	-	-	Council may propose relinquishment of charter, and reincorporation by a ordering a special election.	Majority	Secretary of State	No	Date records filed with the Sec. of State
1941 (Repealed 59) Chp. 413	Incorporation of Villages within Villages	County board	Petition signed by 100 or more voters	Following a hearing, the board shall call an election.	Majority	County Auditor and Secretary of State	Yes	Date records filed with both offices

Table A-2: Minnesota Statutes regarding incorporation of Villages, Towns and Municipalities, 1961 - 1996

Year and Statute	Type of action	Petition/ resolution submitted to	Petition/ resolution requirements	Action required	Votes needed	Records filed with	Metes, bounds and map required	Effective date of incorporation
1961 (Modified 1965) Chp. 414	Incorporation of a Village	Commission or County board, depending on village location	Petition signed by 100 or more freeholders	Following a hearing, the commission shall approve the petition for incorporation if territory is, or is about to become, urban or suburban in character. The petition may be approved if the existing twp form of government is not adequate to protect the public health, safety and welfare regarding plat control or land development and construction which is expected to occur thereafter. The commission shall set an election date. Petition would be denied if the area would be better	Majority	County Auditor and Secretary of State	Yes	Date records filed in both offices or on a later date as is fixed in the incorporation order

Year and Statute	Type of action	Petition/ resolution submitted to	Petition/ resolution requirements	Action required	Votes needed	Records filed with	Metes, bounds and map required	Effective date of incorporation
				served by annexation.				

1961 (Modified 1969) Chp. 414	Incorporation or annexation of Townships according to population	-	-	Following each federal or state census, the commission shall determine which twps have population greater than 2,000 exclusive of, or as part of, a municipality within the township. If the commission determines that a twp would be best served by incorporation (using standards for Incorporation of a Village, 1961), it shall issue an order calling for an election.	Majority	County Auditor and Secretary of State	Yes	Date records filed in both offices or on a later date as is fixed in the incorporation order
1965 (Modified 1969) Chp. 414	Incorporation of a Village	Commission or County board, depending on village location	Petition signed by 100 or more freeholders	(Basically the same as for Incorporation of a Village, 1961)	Majority	County Auditor, Secretary of State, and Commission	Yes	Date records filed in all three offices
1965 (Repealed 1969) Chp. 414	Incorporation of an entire Town	Commission or County board, depending on village location	Petition signed by 100 or more freeholders	(Basically the same as for Incorporation of a Village, 1961, although the area of incorporation can be enlarged by up to five percent if this is in the best interest of the proposed village)	Majority	County Auditor, Secretary of State, and Commission	Yes	Date records filed in all three offices
1965 (Modified 1969) Chp. 414	Consolidation of Municipality and Town	Commission or County board, depending on municipality or town location	Municipal resolution and petition signed by 100 or more freeholders of the Town	The commission shall order hearings and make findings (see Incorporation of a Village, 1961). If conditions for incorporation are met, the commission shall make an order for incorporation. Upon request (petition signed by the smaller of 20% or 500 freeholders of the municipality or abutting town) the commission	Majority	County Auditor, Secretary of State, and Commission	Yes	Date records filed in all three offices

				shall call for an election.				
1969 (Modified 1978) Chp. 414	Incorporation of a Village	Minnesota Municipal Commission or County board, depending on village location	Petition signed by 100 + property owners or Resolution of the Town board	(Basically the same as for Incorporation of a Village, 1961.)	Majority	County Auditor and Secretary of State (From 1978, also Department of Revenue and State Demo- grapher)	Yes	Upon the election and qualification of new village officers, or date fixed by order of the Commission

1969 (Repealed 1978) Chp. 414	Consolidation of Municipality and Town	Minnesota a Municipal Commission	Resolutions of municipal council and twp board or petition signed by 100+ twp property owners	Following a hearing, the commission may order the consolidation if it finds that it will be in the best interest of the area.	Election not required	County Auditor and Secretary of State (From 1978, also Department of Revenue and State Demographer)	Yes	Upon the election and qualification of new village officers, or date fixed by order of the Commission
1969 (Modified 1996) Chp. 414	Consolidation of two or more Municipalities	Minnesota a municipal commission (Minnesota a Municipal Board after 1978)	Resolution of a municipality, petition signed by 5% of resident voters (or 10% in 1969 -see statute), or board motion	Following a hearing, the commission/board may order the consolidation if it finds that it will be in the best interest of the area. No consolidation will be effective without approval of the governing bodies, and a majority of affirmative votes by qualified voters of the municipalities.	Majority	County Auditor and Secretary of State (From 1978, also Department of Revenue and State Demographer)	Yes	Upon the election and qualification of new village officers, or date fixed by order of the commission
1969 – 1996 Chp. 414	Review of Townships according to population	-	-	Following each federal census, the commission/board shall determine twps which have a population > 2,000 and make recommendations it deems necessary and reasonable to the board of any such township.	Election not required	-	-	-
1978 – 1996 Chp. 414	Municipal incorporation	Minnesota a Municipal Board	Town board resolution, or petition signed by 100+ prop. Owners	(Basically the same as process for Incorporation of a Village, 1961)	Majority	County Auditor, Secretary of State, Department of Revenue, and State Demographer	Yes	Upon election of new officers, or date fixed by order of board
1996 Chp. 414	Consolidation of Municipalities	Minnesota a Municipal Board	City council resolution of each municipality, petition signed by	The board shall appoint a consolidation commission which will hold hearings regarding the proposed consolidation. The commission shall issue a report with findings and	Majority (when election required)	County Auditor, Secretary of State, Department of Revenue, and State	Yes	Upon approval of consolidation by city councils and, when required,

			5% of the resident voters of a municipality, or motion by the board	recommendations to the board. The board shall hold hearings and order consolidation if it finds this is in the best interest of the municipalities. May require resolution or majority vote.		Demographer		approval by qualified voters
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Above information was compiled from Minnesota statutes. State and case law relating to incorporation of municipalities is not included.

APPENDIX B: POSITIONAL ACCURACY DEFINITIONS

Initial stages of this project set forth a generalized, three level rating method of the quality or confidence of the legal definition, based on the ability to define its actual position. Upon completion of the municipal boundaries coverage the full complexity of the rating issue became apparent. The assigned ratings have been removed from the final municipal boundary product until further research can be conducted and more thorough consideration given to the implement of this concept. The definitions below are included for informational purposes only. These categories may be revised after further consideration.

Located and measured. Having been created following some form of measuring activity. The feature was actually located according to a particular reference system using some form of measurement technology. Absolute and relative accuracy may vary considerably and must be defined in metadata. Features defined at this level should be verifiable by use of the same tools and reference system. Assumes full metadata available for use in verification and testing. It is understood that overlap may exist in accuracy with those features defined as ADerived.

Examples:

- Features using Public Land Survey System (PLSS) section lines. Most section corners have been located and supportive measurements are available.
- Features located, such as with global positioning system (GPS) methods, providing detail has been recorded to document methods used and appropriate reference information (metadata) is available.

Derived. Having been compiled from records through analysis or conversion. This level may represent the widest range of accuracy. The accuracy results may range from recalculated measurements through coordinate geometry (COGO) processes such as in computing old highway plans data (plans having an undocumented measurement process) to digitized contents from acceptable sources such as in digitizing from a hard copy source which complied with National Map Accuracy Standards.

Examples:

- Features computed from angles and distances shown on survey or road plans.
- Features digitized from Washington County aerial photographs.

Presentation and display. Having the least reliable or an unknown level of accuracy. This level is intended for general presentation and display purposes, such as hard copy general reference maps, and is not recommended for use in conducting digital GIS analysis. Although accuracy may be high, if source information is unknown or the metadata does not exist, the data would be categorized at the Presentation and display level of accuracy.

Examples:

- Features created for general information maps, such as municipal maps found in the telephone directory.
- Other presentation drawings where map scale is not required.

APPENDIX C: UNRESOLVED ISSUES

The following issues were encountered in the process of mapping municipal boundaries. Some are historical in nature and may be resolved with further research, while others raise questions concerning real property ownership, law enforcement jurisdiction, emergency services, municipal infrastructure taxing issues and business dealings within or between municipalities. The issues are categorized as follows:

- Legal documentation establishing township, village or city government not located;
- Ambiguity and inconsistency within legal descriptions (roads as boundary lines);
- Ambiguity and inconsistency within legal descriptions (water as boundary lines); and
- Miscellaneous ambiguity and inconsistency within legal descriptions.

These issues will be examined by the Washington County GIS Policy Team to determine which should be pursued through resolution.

For details regarding specific issues, refer to Appendix E: Metadata, Section 2: Data quality information; Lineage – Issue index by MCD.

Legal documentation establishing township, village or city government not located

The elements of this category, documentation and description, are quite literally the beginning of the process of organization, incorporation and annexation. The documentation organizing a township government would most likely include a legal description of the jurisdictional limits, as was discovered for (New) Scandia and May Townships (1893).

Although the word township is used in conjunction with these governmental bodies, it is not to be confused with congressional townships, established by the United States Public Land Survey, under the Congressional Act of May 20, 1785, which provided for townships six miles square, containing 36 sections of one mile square. The word town is often used with the name of the jurisdiction (Town of Denmark), and may be used interchangeably with township (Denmark Township) when referring to that particular form of governmental body.

Although limiting jurisdictional boundaries to congressional townships would have simplified the identification of township boundaries, this was apparently not the controlling factor in establishing governmental bodies within Washington County. Rather, the boundaries were established based on the needs and desires of the population. If available, legal documents containing descriptions of jurisdictional boundaries are the best source to accurately identify the location of these boundaries.

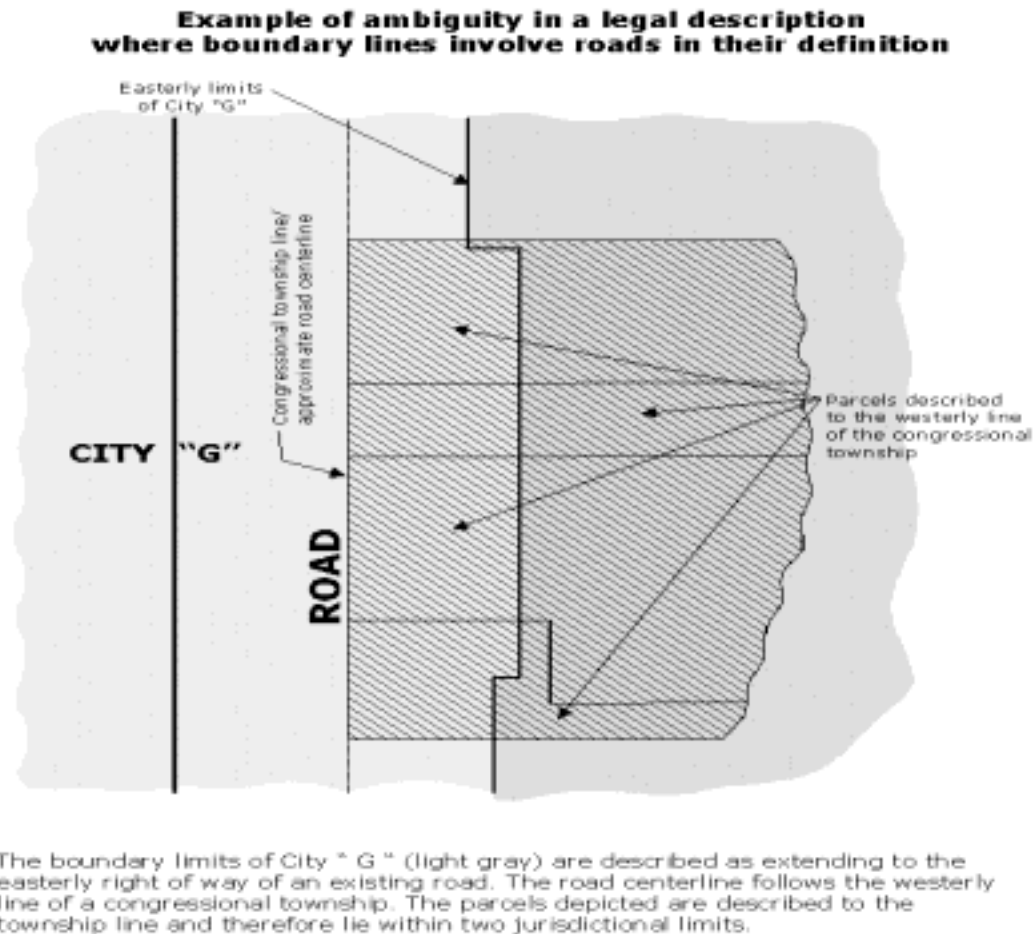
Throughout Washington County's history, numerous procedures, agencies and authorities have been involved in city and village incorporations and annexations. Petitions, resolutions, orders, ordinances and election certificates have been used to convey incorporation and annexation actions. However in several cases, staff have been unable to locate the documentation. In such instances it is inconclusive as to what officially creates, dissolves or extends a municipal boundary.

Further research will be necessary to resolve various instances of missing documentation. Information may be available from the Minnesota Historical Society catalog of governmental records (records available from the mid-1800s). State statute requires the filing of jurisdictional actions with the Secretary of State. Both of these agencies should be a good source of information. Some municipalities were unable to provide any information concerning their boundaries, while others maintained excellent records. Other commendable sources have been local historians and publications on local history found in the public library.

Ambiguity and inconsistency within legal descriptions (roads as boundary lines)

The use of roadway elements for municipal boundaries has been a common practice in many municipalities. While roads are easily located and provide a physical boundary between communities, some problems have been found with their use.

Figure 1



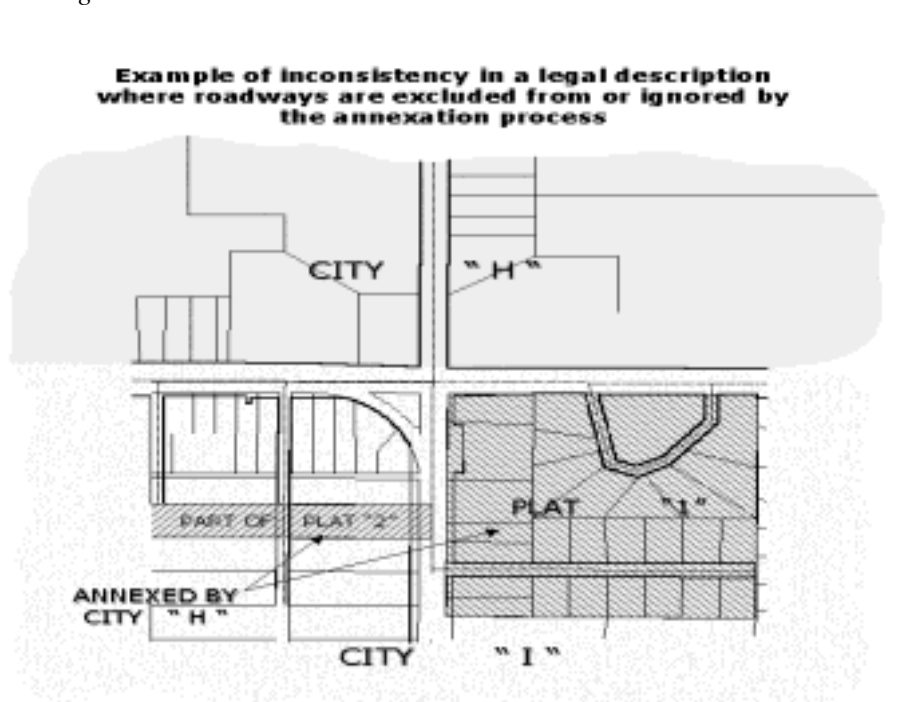
In Washington County, roads have been realigned, widened and vacated over time. While this is not a concern in itself, it can be problematic if these roads were used to describe a municipal boundary. Realignment of roadways can create gaps or overlaps between boundaries. Road widening can be a concern when a road right-of-way is used as the boundary. Questions such as whether the boundary moves as the right-of-way moves or whether it remains in the original position must be resolved. Vacating a roadway raises questions about the disbursement of land formerly used as the roadway. In addition, loss of the physical road may make it difficult to identify the boundary location.

These problems can cause concern regarding taxing, emergency services, and the construction and maintenance of municipal infrastructure, particularly when a municipal boundary is in doubt or dispute. In some cases, accurate identification of a boundary defined by a road right-of-way or centerline can be determined through examination of records showing the road location at the time of the incorporation or annexation.

Another significant problem occurs when roadways are ignored in the annexation process. The result is that islands or corridors of questionable jurisdiction are created. This raises concerns regarding responsibility for municipal services and law enforcement in these areas. *Clark on Surveying and Boundaries*, Sixth Edition, Section 16.10 notes:

The courts are inconsistent as to the rule to be followed in the situation where a boundary of a parcel is described as a road or traveled way. The majority of the decisions hold that unless the words are specific as to the contrary, the true and correct dividing boundary extends along the center of the road or traveled way. The minority opinion limits the boundary to the near edge of the roadbed or right-of-way. (Robillard and Bouman, 1992, p. 455)

Figure 2

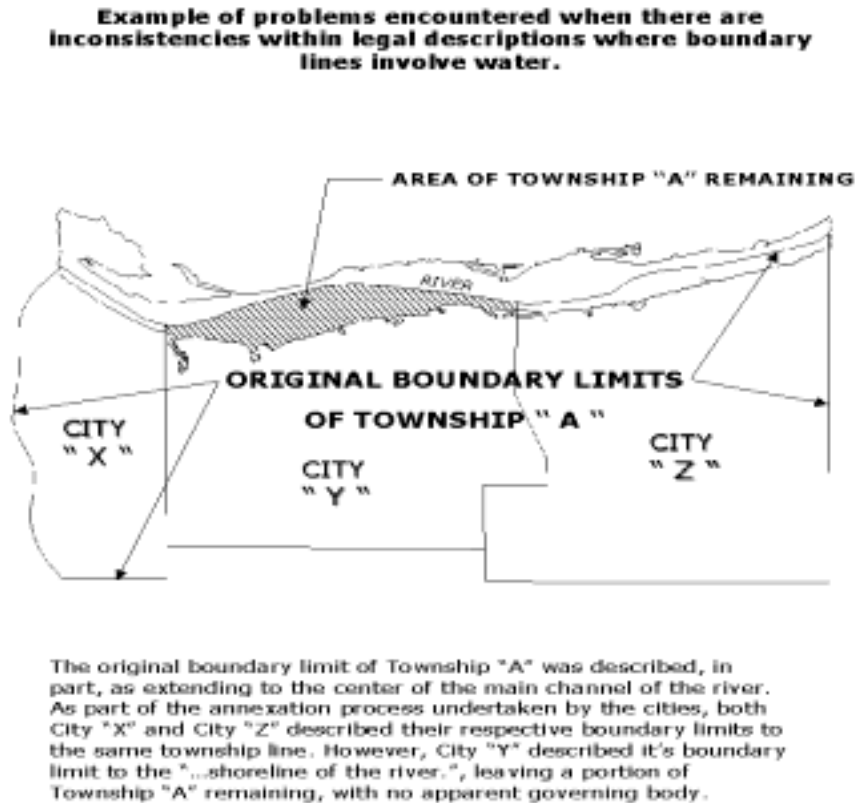


As roadways have historically been used, and will continue to be used in municipal boundary descriptions, the question of jurisdiction becomes increasingly important. However, it is unclear as to whether the boundary and case law associated with parcels and rights-of-way can or should be applied to municipal and other jurisdictional boundaries.

Ambiguity and inconsistency within legal descriptions (water as boundary lines)

Two-thirds of Washington County's boundaries are defined by the Mississippi and St. Croix Rivers. Municipal legal descriptions have varied in their reference to rivers. Some phrases used to describe these limits include "to the river," "to the shoreline of," "to the edge of" and "to the middle of." County and state boundaries have also been referenced.

Figure 3



Clark on Surveying and Boundaries, Sixth Edition, Section 25.02, states:

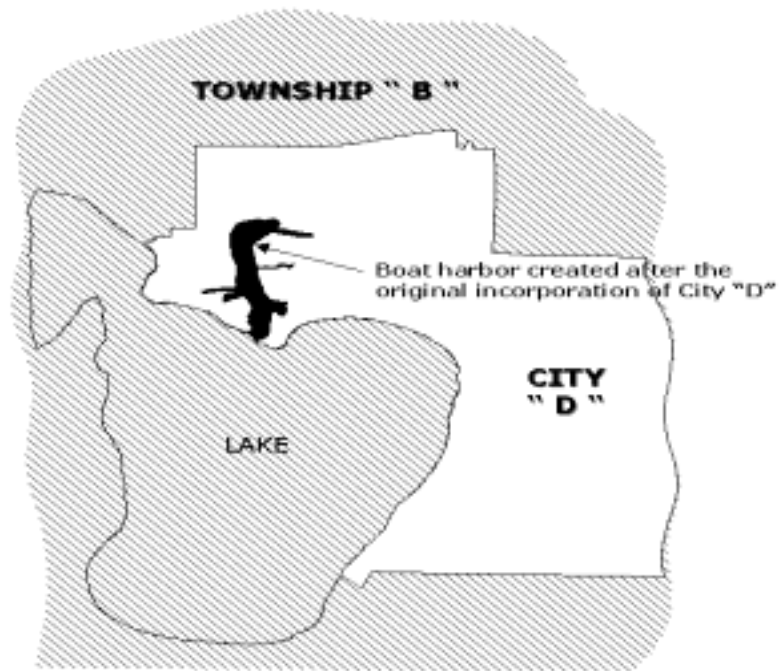
Depending upon the applicable state or federal law, where a description touches water, the boundary may be the meander line, the high-water mark, the low-water mark, the center line of the water at the time the boundary was first established, or the thread or center of the main current of a flowing stream. Where it depends partly on the intent of those creating such boundary, the law interprets such intent according to the applicable law of the particular jurisdiction. (Ibid.)

Where water bodies are described as boundary lines, several general rules have been applied to ownership. These vary from state to state and address several conditions unique to water. These conditions must be defined and understood before decisions affecting uncertain or disputed parcel boundary locations are made.

As water bodies are increasingly used for recreational purposes, the question of jurisdiction becomes more important. However, it is unclear as to whether the boundary and case law associated with riparian and littoral rights of ownership can or should be applied to jurisdictional boundaries.

Figure 4

Example of problems encountered when there are inconsistencies within legal descriptions where boundary lines involve water.

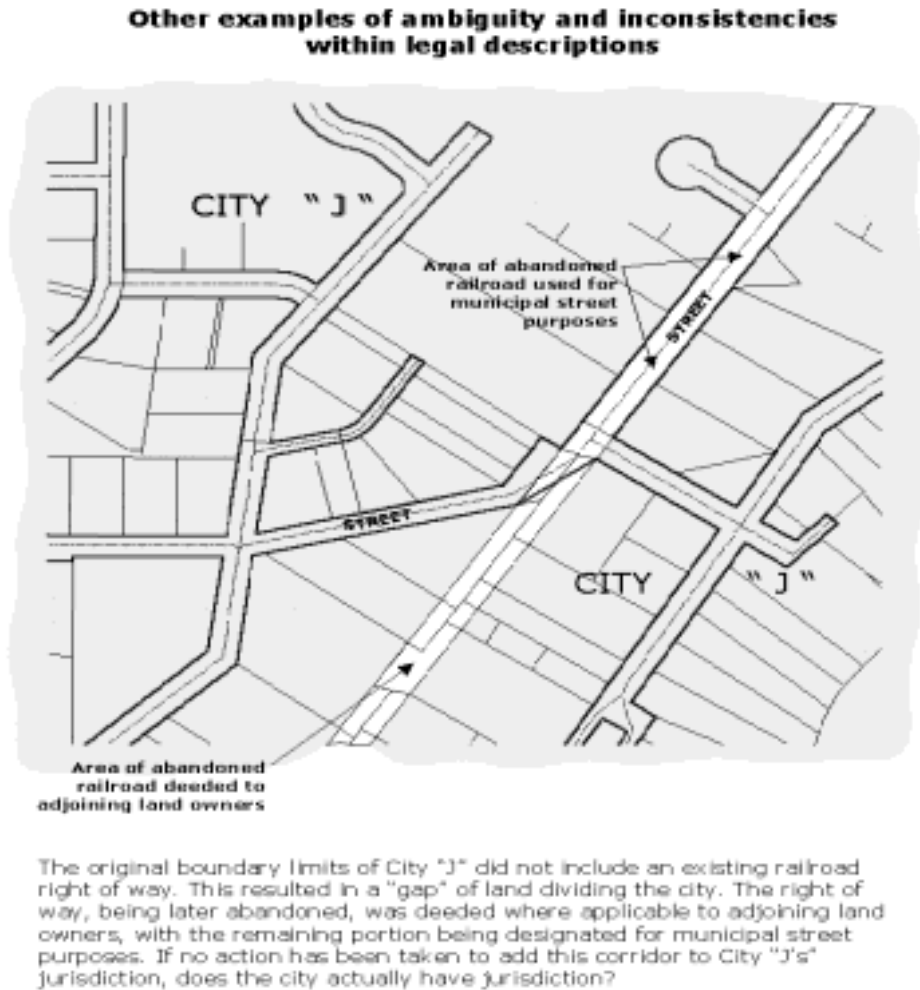


The original boundary limits of City "D" follow the "shoreline" of an existing lake lying within Township "B". Through later man-made improvements, a boat harbor now exists. The question of jurisdiction over surface water arises and also whether littoral rights and case law can be applied to municipal boundaries.

Miscellaneous ambiguity and inconsistency within legal descriptions

Jurisdictional boundaries must be mapped using the official legal description submitted at the time of incorporation or annexation. However, some common problems exist in these legal descriptions including ambiguous statements and outright errors. Frequently these can result in gaps in the municipal boundary.

Figure 5

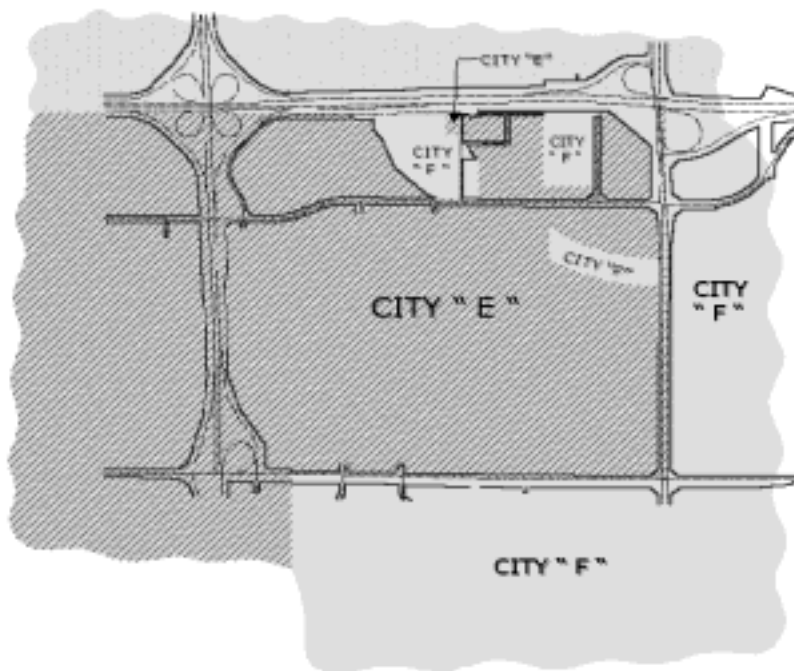


Where ambiguity exists within a legal description, the presumption of intent is used to guide placement of the boundary line. This entails giving consideration to the entire legal description and the exact wording used, while paying particular attention to the intent of the parties involved.

As noted above, use of roads and water as boundary lines can create ambiguity in the legal description and cause discrepancies between described properties. In most cases, errors occur in legal descriptions due to a lack of sufficient review before submission to the appropriate authority.

Figure 6

Example of tracts of land being isolated from their parent municipality



Annexation actions initiated by City "E" and City "F" resulted in the isolation of particular parcels from their respective parent municipalities. While ambiguous language within legal descriptions can lead to the creation of "islands", it is unclear whether or not this example was intentional.

APPENDIX D: SAMPLE ATTRIBUTE TABLES

Table 1: Example of exterior municipal boundary attribute table

Area	Perimeter	Acad laver	City town #	Countv FIPS #	Mun name
734940100	126897.5	MNCELBL	0100	163316	Afton, City of
362308.6	3341.353	MNCELBL	0200	1634114	Bayport, City of
47485650	55755.34	MNCELBL	0200	1634114	Bayport, City of
6241.212	462.4799	MNCELBL	0002	1634132	Baytown Township
265085200	136690.4	MNCELBL	0002	1634132	Baytown Township
9446081	14955.55	MNCELBL	0300	1636050	Birchwood Village, City of
1054388000	159071	MNCELBL	2200	16313456	Cottage Grove, City of
78665530	71457.66	MNCELBL	0500	16315616	Dellwood, City of
841132200	135487.4	MNCELBL	0004	16315688	Denmark Township
872792300	162871.2	MNCELBL	0005	16321788	Forest lake Township
117381000	66263.02	MNCELBL	0600	16321770	Forest lake, City of
739710500	142112.9	MNCELBL	0006	16325334	Grant, City of
106383300	59294.25	MNCELBL	0011	16325982	Grey Cloud Island Township
11057270	14320.74	MNCELBL	7500	16327560	Hastings, City of
1004345000	126664.4	MNCELBL	0700	16330392	Hugo, Village of
668282700	110613.9	MNCELBL	0800	16334244	Lake Elmo, City of
27479500	23619.69	MNCELBL	2000	16334865	Lake St Croix Beach, City of
19325580	18524.29	MNCELBL	0900	16334658	Lakeland Shores, City of
16082060	15585.33	MNCELBL	9999	1639999	Lakeland Town
57451070	44295.16	MNCELBL	1900	16334622	Lakeland, City of
2302124	7557.682	MNCELBL	1400	16335414	Landfall, City of
158559500	102458	MNCELBL	1000	16339428	Mahtomedi, City of
116128900	50389.8	MNCELBL	1100	16340562	Marine on St Croix, City of
1061882000	140057.4	MNCELBL	0009	16341120	May Township
1107692000	143689.3	MNCELBL	0010	16345952	New Scandia Township
108311900	54651.85	MNCELBL	1200	16345790	Newport, City of
94139000	70996.7	MNCELBL	1700	16347914	Oak Park Heights, City of
440179.8	4114.767	MNCELBL	1700	16347914	Oak Park Heights, City of
315118400	94833.27	MNCELBL	2600	16347680	Oakdale, City of
25202390	23160.87	MNCELBL	2100	16351316	Pine Springs, City of
10483030	15906.48	MNCELBL	1800	16357292	St Marys Point, City of
65690600	40520.39	MNCELBL	1300	16358018	St Paul Park, City of
487095300	121395	MNCELBL	0014	16362842	Stillwater Township
114292.8	1430.285	MNCELBL	0014	16362842	Stillwater Township
40327.86	2705.401	MNCELBL	0014	16362842	Stillwater Township
36888.74	996.3171	MNCELBL	0014	16362842	Stillwater Township
337695	2404.471	MNCELBL	0014	16362842	Stillwater Township
2791719	7319.755	MNCELBL	0014	16362842	Stillwater Township
3210585	7490.061	MNCELBL	0014	16362842	Stillwater Township
42183.58	1703.005	MNCELBL	0014	16362842	Stillwater Township
201227500	104987.7	MNCELBL	1500	16362824	Stillwater, City of
22185.56	598.6795	MNCELBL	1500	16362824	Stillwater, City of
8411732	16094.62	MNCELBL			Unknown
4260296	18224.47	MNCELBL			Unknown
354604900	82743.84	MNCELBL	0017	16369520	West Lakeland Township
1505232	4920.555	MNCELBL	9400	16369970	White Bear Lake, City of
548113.9	4155.694	MNCELBL	9400	16369970	White Bear Lake, City of

Table 2: Example of annexation boundary attribute table

Area	Perimeter	Acad laver	City town #	County FIPS #	Date	Mun name	Order ord
-11803660000	576856.9						
88628.23	1500.03	MNCALBL	100	163316	19651214	Afton, City of	Ordinance 16
728407900	139741.7	MNCALBL	100	163316	19710105	Afton, City of	Order C4-mt
6443611	11644.19	MNCALBL	100	163316	19140404	Afton, City of	Incorporation
1199092	4464.668	MNCALBL	200	1634114	19910204	Bayport, City of	Ordinance 660
1207203	4774.351	MNCALBL	200	1634114	19820423	Bayport, City of	Ordinance 623
35538590	47144.11	MNCALBL	200	1634114	??????	Bayport, City of	Incorporation
8153163	13243.13	MNCALBL	200	1634114	19930728	Bayport, City of	Order OA-302-1
362308.6	3341.353	MNCALBL	200	1634114	19930728	Bayport, City of	Order OA-302-1
586540.3	3397.312	MNCALBL	200	1634114	19940106	Bayport, City of	Order A-5239
801038.9	3994.075	MNCALBL	200	1634114	19940106	Bayport, City of	Order A-5239
265085200	136690.8	MNCALBL	2	1634132	18??MMDD	Baytown Township	Town organized
6241.767	462.4799	MNCALBL	2	1634132	18??MMDD	Baytown Township	Town organized
9446081	14955.55	MNCALBL	300	1636050	19210921	Birchwood, Village of	Election Certificate
3491384	7942.861	MNCALBL	1700	16347914	19771129	City of Oak Park Heights	Order A-3212
1750826	5292.853	MNCALBL	1700	16347914	19720718	City of Oak Park Heights	Order A-1981
16878860	25296.24	MNCALBL	1700	16347914	19660321	City of Oak Park Heights	Order
8295477	17045.32	MNCALBL	1700	16347914	19880729	City of Oak Park Heights	Order A-4443
2313389	6144.306	MNCALBL	1700	16347914	19781214	City of Oak Park Heights	Order A-3292
14795340	19848.84	MNCALBL	1700	16347914	19910326	City of Oak Park Heights	Order A-4789
18471.74	913.8998	MNCALBL	1700	16347914	19860814	City of Oak Park Heights	Order A-4322
440176.4	4114.767	MNCALBL	1700	16347914	19660321	City of Oak Park Heights	Order
28179700	29134.62	MNCALBL	1700	16347914	19590331	City of Oak Park Heights	Incorporation
6681028	13314.25	MNCALBL	1700	16347914	19670605	City of Oak Park Heights	Ordinance 29
1070076	7688.351	MNCALBL	1700	16347914	19980710	City of Oak Park Heights	Order OA-552-1
600402.3	3939.077	MNCALBL	1700	16347914	19770513	City of Oak Park Heights	Ordinance 1503
910617.6	4762.591	MNCALBL	1700	16347914	19820415	City of Oak Park Heights	Order A-3824
4013043	10309.33	MNCALBL	1700	16347914	19660711	City of Oak Park Heights	Ordinance 25
194082.7	1810.292	MNCALBL	1700	16347914	19790209	City of Oak Park Heights	Ordinance 1503
4946237	9681.579	MNCALBL	1700	16347914	19980417	City of Oak Park Heights	Order A-5821
993840400	137380.1	MNCALBL	2200	16313456	19650716	Cottage Grove, City of	Order I-14
60548060	32874.21	MNCALBL	2200	16313456	19810730	Cottage Grove, City of	Order A-3527
499092.6	3053.249	MNCALBL	500	16315616	19710910	Dellwood, City of	Ordinance 42
4409732	9940.582	MNCALBL	500	16315616	19710910	Dellwood, City of	Ordinance 42
864669	3957.943	MNCALBL	500	16315616	19930416	Dellwood, City of	Ordinance 1.9
875383.1	3972.704	MNCALBL	500	16315616	19930416	Dellwood, City of	Ordinance 1.10
2478017	6787.603	MNCALBL	500	16315616	19970404	Dellwood, City of	Order A-5762
5387238	10409.81	MNCALBL	500	16315616	19610807	Dellwood, Village of	Ordinance 24
918269.5	4009.675	MNCALBL	500	16315616	19610807	Dellwood, Village of	Ordinance 25
14648.09	543.5266	MNCALBL	500	16315616	19320409	Dellwood, Village of	Ordinance 4
108933	1341.704	MNCALBL	500	16315616	19610807	Dellwood, Village of	Ordinance 25
1141635	4487.031	MNCALBL	500	16315616	19521013	Dellwood, Village of	Ordinance 16
27414960	39623.34	MNCALBL	500	16315616	19170712	Dellwood, Village of	Election Certificate

Table 3: County boundary attribute table

Area	Perimeter	Acad laver	Acad text
11803660000	576856.8	CNTYLBL	Washington County

APPENDIX E: METADATA

Section 1: Identification Information

<i>Originator</i>	Washington County Surveyor's Office
<i>Title</i>	County and Municipal boundary data set, Washington County, Minnesota
<i>Abstract</i>	This data set contains exterior boundary lines for each minor civil division (MCD) within Washington County. The exterior boundary for each MCD was derived from the compilation of all annexations. The exterior boundary lines for each MCD were individually joined to form a single MCD coverage. Each MCD polygon contains attribute information about the MCD. Annexation and County coverages are included as separate coverages.
<i>Purpose</i>	To provide accurate boundaries for each municipality within Washington County.
<i>Time Period of Content Date</i>	
<i>Currentness</i>	MCD exterior boundaries and similar recorded information is current to 30 days from recording or official entry in county record system.
<i>Reference</i>	
<i>Progress</i>	Complete
<i>Maintenance and Update Frequency</i>	Monthly
<i>Spatial Extent of Data</i>	MCD boundaries are shown for the entire area of Washington County. Mapping limits on bordering rivers extend to the thread or main channel of the river.
<i>Bounding Coordinates</i>	-93.017 -92.733 45.300 44.733
<i>Place Keywords</i>	Afton, Bayport, Baytown, Birchwood, Cottage Grove, Dellwood, Denmark, Forest Lake, Grant, Grey Cloud Island, Hastings, Hugo, Lake Elmo, Lake St Croix Beach, Lakeland, Lakeland Shores, Landfall, Mahtomedi, Marine, Newport, Oakdale, Oak Park Heights, Pine Springs, St. Mary's Point, St. Paul Park, Stillwater, White Bear Lake, Willernie, Woodbury, Washington County, Minnesota
<i>Theme Keywords</i>	city, township, town, MCD, municipal boundaries, jurisdictional boundaries, administrative boundaries, county, Twin Cities
<i>Theme Keyword Thesaurus</i>	None
<i>Access Constraints</i>	The data set is available to anyone.
<i>Use Constraints</i>	The digital map is furnished on an AS IS basis, without any support whatsoever, and without representation or warranty, including but not in any manner limited to fitness, merchantability and completeness. The information is neither a legally recorded map nor a survey, and is not intended to be used as one. The information is a compilation of records, information and data from various city, county and state offices and other sources and should be used for reference only. No representation is made that the features presented accurately reflect true locations. Washington County or any other entity from which data was obtained assumes no liability for any errors or omissions herein. If discrepancies are found, contact the Washington County Surveyor's Office.
<i>Contact Person Information</i>	Mark Nieman, Senior Survey Technician Washington County Surveyor's Office 14949 62nd Street North, PO Box 6 Stillwater, Minnesota 55082

Phone: 651-430-6875
FAX: 651-430-6888
E-mail: nieman@co.washington.mn.us

*Browse Graphic
File Name*

none available

*Browse Graphic
File Description*

none available

*Associated Data
Sets*

parcel data, property ownership, tax records, jurisdictional boundaries, administrative and political boundaries, road systems, annexations, county boundary

Section 2: Data Quality Information

Attribute Accuracy

Attribute information is tested by manual comparison with the source document.

Logical Consistency

Exterior boundary, annexation boundary and county boundary coverages are examined to remove all overshoots, unwanted intersections; insure polygons are closed; and to see that there are no missing or duplicate polygon labels. Each symbolic layer is individually examined for completeness. A separate independent check is made to examine and re-interpret each annexation order for accuracy and completeness from its hard copy output. Two of the polygons in the exterior boundary coverage do not have a FIPS place code value and have been provided a label identification of UNKNOWN. The total area of all exterior boundary polygons including the two polygons labeled as UNKNOWN is equal to the area (polygon) of the entire county. The total area of all annexation polygons within each MCD equals the area of the exterior polygon of the corresponding MCD. However, annexations occasionally overlap in description and include in their description areas already annexed. Typically, the most recent annexation was held as the controlling polygon. As a result, historical representation may not be consistent depending on whether or not this occurred within a given MCD. There is no line duplication in exterior or annexation coverages. MCD's with detached or non-contiguous units (polygons) have the same polygon link/label code in each of their units. For example the City of Stillwater has two separate polygons each with a polygon link/label code of 16362824. To uniquely identify one of the units, the Arc/Info ID or use of some other code would need to be used.

Completeness

Due to limitations in recovery of the entire historical record of each MCD, missing components may exist in boundary representation and within the attribute records. Completeness in the checking process is examined through the examination and comparison of all detail collected by County staff. Sources used included: City Clerks, County Auditor's Office, Washington County Historical Courthouse, MN State Historical Society, Secretary of State, Minnesota Municipal Board and MNDOT.

Horizontal

Positional Accuracy

Boundaries shown that coincide with hydrological features or those that have generalized definitions with little supporting detail of their location are digitized from partially rectified aerial photographs at 1 inch equals 200 feet. These features have been tested 23 feet horizontal accuracy at the 95% confidence level using NSSDA testing procedures except in areas of high vertical relief where such features tested 120 feet horizontal accuracy by use of other testing procedures. Boundaries defined as center of main channel on Mississippi and St. Croix rivers are approximations only (source U.S.G.S. quadrangle maps). All other boundary segments are generated by coordinate geometry based on a framework of accurately located PLSS corner positions. Legal boundary definitions were interpreted and analyzed according to records available and are not based on field survey. The nature of these definitions present situations where documents of record may not coincide with known ground

position or that their ambiguity makes it difficult to identify precise ground location. As a result, caution is necessary in use of the municipal boundary data when using it in site specific applications. For more information see the report noted in Lineage below or contact the Washington County Surveyor's Office.

*Vertical Positional
Accuracy
Lineage*

n/a

MCD boundary locations are derived from interpreting legal descriptions of incorporations, annexations and other various orders and ordinances. These documents range in date from 1840's through the present. The boundaries were derived using coordinate geometry software whenever possible and drawn with AutoCAD and ArcCAD software to create the line, polygons and attribute information. The boundary line location process used information available from the parcel database. Upon completing the drawing of all features, a thorough check was made using a prescribed checklist. The limits of each MCD were compared with adjoining MCD boundaries for discrepancies. Any discrepancies found were noted and indexed by MCD, see below. Following establishment of all incorporation and annexation boundaries, the exterior boundary was extracted and placed into a separate coverage. The creation of the county boundary coverage was handled in the same manner. This process is performed with each update to insure complete uniformity between these three coverages. For additional information on the development process see a separate report, Mapping Municipal Boundaries in Washington County, prepared by the Washington County Surveyor's Office.

Issue index by MCD:

Afton - Year of organization and boundary of Original Township of Afton has not been located; **Bayport** - Information regarding the original incorporation of South Stillwater (name changed to Bayport in 1922) has not been located; **Baytown** - No documentation for the establishment of Baytown Township has been found. Year of organization is unknown. Whether or not the middle of the St Croix River (Washington County bounds) is also the eastern boundary of Baytown is unknown; **Birchwood** – Resolution adopted by County Commissioners dated August 30, 1921, calls for an election to determine the *proposed* incorporation. No election results for said election have been located. However, a special election was held on September 21, 1921, to determine the question, “Shall the Village of Birchwood constitute a separate election and assessment district?”, the results being 51 in favor and 0 not in favor. An election certificate attesting to this exists in the Auditor’s Office. The legal description submitted with the petition for incorporation and subsequently approved by the County Commissioner’s describes all of the plats of Birchwood and Lakewood Park First, Second and Third Division as recorded and filed. The legal descriptions for all three Lakewood Park plats do not include the right of way of the Minneapolis-St Paul Suburban Railroad. Said railroad has since been abandoned and is now referred to as Hall Avenue, a traveled municipal road. No documentation has been located deeding said right of way to the municipality of Birchwood, nor incorporating it into the city; **Cottage Grove** - No documentation has been located for the establishment of Cottage Grove Township. The document for incorporation as a village lacks a legal description establishing the boundary of said city; **Dellwood** – A rather substantial gap has occurred between the boundaries of the original incorporation of Dellwood and lands later annexed by Ordinances 21 and 25. Due to the apparent relocation of Quail Street and/or abandonment of Vincent Street, as laid out in the plat of Wildwood, the gap measures 42 feet, where it intersects Highway 96 on the north, to as much as 90 feet along the westerly line of R.L.S. 117; **Denmark** – Documentation organizing township has not been located; **Forest Lake** – Documentation organizing Forest Lake Township has not

been located. A large portion of the City of Forest Lake's original boundary is defined by the lakeshore. Comparison of maps from 1893 to recent maps, revealed that the location of the lakeshore had changed in the intervening years. In particular, one bay had been significantly enlarged some time after incorporation of the city. The original legal description cites the lakeshore as a portion of the city boundary, however the way in which this affects the current boundary location is unclear. The laws of riparian lands must be examined. The boundary of the City of Forest Lake was placed along the original 1893 boundary, cutting across the mouth of the large bay and including the bay, in its entirety, within the municipal limits. This placement corresponds with the city staff interpretation of the city boundary. This portion of the boundary was included on a list of problem boundaries, for possible resolution at a later point in the project. Legal descriptions were interpreted and mapped differently by Washington County and the Minnesota Department of Transportation (MnDOT) along State Highway 61 and State Highway 97 in Forest Lake. Washington County places the city boundary along the centerline of the highway; **Grant** – Documentation organizing Greenfield Township (renamed Grant Township) has not been located. Documentation changing name from Greenfield to Grant has not been located; **Grey Cloud Island** - No documentation has been located that established Newport Township, being the township that was renamed Grey Cloud Island Township by a Washington County Commissioners resolution dated July 14, 1958. The boundaries shown for Newport Township were taken from the Washington County Plat Book for 1901; **Hugo** – No documentation for the establishment of Oneka Township has been found. No documentation concerning election results for consolidation of the Village of Hugo and Oneka Township has been found; **Lake Elmo** - No documentation for the establishment of Oakdale Township has been found. The Town of East Oakdale was incorporated in 1951 out of the Town of Oakdale and consolidated into the Village of Lake Elmo in 1969. Attaching a label point to the East Oakdale polygon is not possible due to its demise upon consolidation with the Village of Lake Elmo. Order D-248/A-4573, dated Nov. 11, 1990, detached several scattered portions of Lake Elmo to the City of Oakdale. It was superseded by Order D-319/A-5475, dated Feb. 17, 1995. However, not all the territory annexed in the order dated 1990 is covered by the order dated 1995. Therefore a small portion of the 1990 order remains within the city limits of Lake Elmo; **Lakeland** – Documentation organizing original Lakeland Township has not been located. Town of Lakeland formed by County Board resolution July 10, 1950, had the “easterly boundary of the State of Minnesota in the St Croix River” as its east line. When Lakeland was incorporated by petition and election Sep 27, 1951, the easterly municipal bounds were described as: “to the west shore of the St Croix River; thence Southerly along the west shore...”. Using the “west shore” instead of the state border “in the St Croix River”, resulted in a portion of the Town of Lakeland becoming a no man’s land without jurisdiction; **Marine on St Croix** - The description included in an act of the Legislature of the State of Minnesota, dated 1875, to incorporate the Village of Marine, reads in part, “...lying west of the St. Croix River...”, leaving to interpretation whether the descriptions intent was the main channel or the shoreline of the river. It remains unclear as to the location of the eastern boundary of said village. For mapping purposes, the boundary has been represented as extending to the main channel of the river; **May** – Documentation organizing Marine Township (split into May and New Scandia Townships in 1893) has not been located; **Oak Park Heights** -Washington County Board Resolution dated Jan 4, 1949 states Town of Oak Park is “bounded on the East by the St Croix River”. Does this mean the shoreline or the middle of the river? Placed the municipal boundary on the shoreline of the river as shown on 1996 aerial photo. This delineation coincides with the way the boundary has been shown on plat book

maps and MnDOT maps. City Ordinance 1503 dated May 5, 1977 annexed 13.84 acres in the S ½ of the NW-NW Sec 4, T29-R20 (MnMunicBd A-3109). This same ordinance number (1503) dated Dec 14, 1979 was used to annex 4.45 acres in the NE corner of the NW-NW Sec 4 (MnMunicBd A-3442); **Oakdale** - No documentation for the establishment of Oakdale Township has been found. It appears that Order A-5475/D-319 dated Feb. 2, 1995 was meant to amend Order A-4573/D-248, dated Nov. 11, 1990. However, not all the territory annexed in the order dated 1990 is covered by the order dated 1995. In addition, the 1995 order annexed additional territories already acquired in the original incorporation of the Village of Oakdale by Order I-21, dated Jan. 29, 1968 and by Order A4453/D-239, dated Sep. 23, 1988; **Pine Springs** - The boundary legal description submitted with the petition for incorporation is ambiguous in nature. There are several erroneous line and corner calls within the description. The boundary has been mapped based on presumption of intent in those areas of question; **St Mary's Point** - The description for land incorporated as St Mary's Point refers only to Section 14, T28-R20. The metes and bounds boundary states "thence in a Southeasterly direction along the northeast shore of Bowles Creek to the West shore of Lake Saint Croix; then Northeasterly and Northerly along the West line of Lake Saint Croix". Following "the west shoreline" results in the boundary extending into Section 23. For mapping purposes, ignored the reference to "land being in Sec 14" and placed the municipal boundary on the west shoreline of Lake St Croix. The description for land incorporated does not include Lots 4340 thru 4350, 4363 thru 4372, 4665 thru 4684, 4691 thru 4694, or 4974 thru 4987 of the plat Lake St Croix Beach Section No 5. The metes and bounds boundary states "(from SW corner of Lot 4644) thence Sly a distance of 20 ft to the centerline of Iroquois Street; then Westerly to the Northwest corner of the SE ¼ of the NW ¼ of Section 14". Following this last direction would result in crossing through the above listed lots and parts of them would be included within St Mary's Point municipal boundary. For mapping purposes, placed municipal boundary along the centerline of Iroquois Street and its westerly extension until it intersected the west line of the SE-NW. Then went north along that west line to the NW corner of the SE-NW. Using this method resulted in lots not cited in the first part of the description being left outside of St Mary's Point boundary; **St Paul Park** - The description included in a Washington County Board of Commissioners Resolution, dated 1909, to form the Village of St. Paul Park, reads in part, "...thence in a northerly direction along the easterly bank of the Mississippi River...". This clearly excepts that portion of the river between the shoreline and the westerly boundary of Washington County, creating a gap of unknown jurisdiction. Moreover, with the construction of the Hastings Lock and Dam system in the 1930's, the "easterly bank" as it existed in 1909, would be extremely difficult to locate, due to flooding caused by said lock and dam; **Stillwater** - No documentation for the establishment of original Stillwater Township has been found. The east boundary of the township is questionable as to whether it is the shoreline or the middle of the St Croix River. Used middle of the river until documentation shows otherwise. Need to locate documentation regarding the judicial action which detached certain lands from the city of Stillwater. County Auditor and County Clerk of Court offices have references to the detachment but do not have actual papers. 19th Judicial District judgment dated April 16, 1932; Clerk Register Book 14, page 44; Judgment Book 8, page 546. County Clerk of Court records indicate original documents were sent to State Archives file #13055, Box 54, Locator 59K238. MnMunicBd Order OA-117-1 dated Apr 12, 1976 annexed part of SW-SW Sec 33 but did not include the part within Hwy 212 r/w. The area lying southerly of the northerly r/w of the hwy remains in Stillwater Township jurisdiction but is surrounded by the cities of Stillwater and Oak Park Heights. MnMunicBd Order OA-117-2 dated Dec 15,

1976 annexed part of Sec 31 lying northerly of the centerline of State Hwy 212. The area lying southerly of the old centerline remains in Stillwater Township jurisdiction but is surrounded by the cities of Stillwater and Oak Park Heights. MnMunicBd Order A-3868 dated Sep 13, 1982 annexed that part of the SE1/4-NW1/4 Sec 29 lying northerly of the northerly r/w line of CSAH 12. MnMunicComm Order A-1183 dated Sep 5, 1968 annexed that part lying southerly of the public highway. The problem is that the locations of the “public highway” in 1968 and of CSAH 12 in 1982 are not the same. An area of land in Sec 29 lying northerly of old public highway and southerly of CSAH 12 northerly right-of-way has not been annexed to the city. MnMunicBd Order OA-438-1 dated Oct 11, 1996 page 3: “...to the east line of Minnesota St extended to the North; thence north along east line of Owens St as extended to the north line of the S ½ of Section 21”. Problem is that the extended east line of Minnesota/Owens street lies approximately 30 feet west from the previously established city limit being the west line of E ½-NW1/4-SW1/4 cited in boundary line description per District Court Decree dated Apr 16, 1932. A strip of land approximately 30 ft wide by 1320 ft long in Sec 21 has not been annexed. MnMunicBd Order A-3496 dated Sep 19, 1980 states “Also part of *existing* r/w of public road known as Neal Avenue North abutting said lands.” No documentation for a public road along the west line of Section 20 prior to 1980 was found. Used 1979 aerial photo to locate road centerline in subject area and offset it 2 rods (33 ft) to establish a right-of-way on which to place the municipal boundary; **West Lakeland** - Washington County Board Resolution dated July 10, 1950, refers to NW corner of “the present Town of Lakeland”. No documentation for the establishment of underlying Lakeland Township has been found. Year of organization is unknown. Whether or not the middle of the St Croix River (Washington County bounds) is also the eastern boundary for Lakeland Township is unknown. **White Bear Lake** - The order for annexation A-591 described...”All of Alla-Bar City Addition...”. The legal description for said addition describes all of the SW ¼ of the SW ¼ of Section 30-T30N-R21W *except* the south 33 feet and the west 33 feet thereof. This creates an area entirely within the city limits of Mahtomedi; **Woodbury** – Documentation organizing Red Rock Township (renamed Woodbury Township in 1861) has not been located. The only documentation found in the Auditor’s Office is an order granting the petition for the proposed incorporation of the Village of Woodbury, said order being issued by the Minnesota Municipal Commission and dated January 10, 1967. Said petition establishes the eastern boundary of the village along the easterly rights of way of County Road 15 and State Highway 95. The easterly rights of way of said county road and state highway have expanded to the east since 1967. The easterly limit of the City of Woodbury has been mapped using an assumed roadway width of 4 rods (66 feet) as further research is necessary to determine the actual width of the above-mentioned roads at the time of the incorporation.
(Note: Absence of MCD name in this category indicates no issue)

Source Scale 1200
Denominator

Section 3: Spatial Data Organization Information

Native Data Set ARC/INFO ver. 8.2, AutoCAD Map 2004
Environment
Geographic A polygon link/label code is used to reference each minor civil division within the data
Reference for set. The label code consists of a combination of the Federal Information Processing

<i>Tabular Data</i>	Standard (FIPS) county code and the FIPS place code. Using this method each MCD within the county/state will have a unique ID. An example label code for the City of Forest Lake would be 16321770 where 163 equals FIPS County code and 21770 equals FIPS place code. Additional attributes are attached to the label code and are listed under Section 5.
<i>Spatial Object Type</i>	Vector
<i>Vendor Specific Object Types</i>	'arc' 'area' 'cell' 'column' 'network' 'node' 'label' 'line' 'point' 'polygon' 'row'
<i>Tiling Scheme</i>	County

Section 4: Spatial Reference Information

<i>Horizontal Coordinate Scheme</i>	County Coordinates
<i>Ellipsoid</i>	GRS80
<i>Horizontal Datum</i>	NAD83
<i>Horizontal Units</i>	Feet
<i>Distance Resolution</i>	
<i>Altitude Datum</i>	Not applicable
<i>Altitude Units</i>	Not applicable
<i>Depth Datum</i>	Not applicable
<i>Depth Units</i>	Not applicable
<i>County Coordinate Zone Identifier</i>	44
<i>Coordinate Offsets or Adjustments</i>	Washington County GPS Control Network, 1988 Adjustment
<i>Map Projection Name</i>	Traverse Mercator
<i>Map Projection Parameters</i>	False Northing in meters = 30481.2751 False Easting in meters = 152406.3759 Central Meridian = -92 50 00 Latitude of Grid Origin = 44 44 45 Grid Scale Factor at Central Meridian = 1.000039836799 State Plane Zone = 4326
<i>Other Coordinate System's Definition</i>	n/a

Section 5: Entity and Attribute Information

<i>Entity and Attribute Overview</i>	The data set contains attribute information attached to the polygon link/label code for each MCD. Associated attributes for exterior boundaries include: MUN_NAME = Municipality name CITY_TOWN_# = Minnesota Department of Revenue city or town number COUNTY_FIPS_# = FIPS County code and FIPS place code Associated attributes for annexation boundaries include: MUN_NAME = Municipality name
--------------------------------------	--

CITY_TOWN_# = Minnesota Department of Revenue city or town number
 COUNTY_FIPS_# = FIPS County code and FIPS place code
 DATE = Effective date of ordinance/order number
 ORDER_ORD = City ordinance/order number

Associated attributes for county boundary include:
 ACAD_TEXT = County name

AutoCAD mapping layers used for this project:
 CNTYLIN = exterior county boundary line
 MNCALIN = interior municipal annexation line
 MNCELIN = exterior municipal boundary line
 CNTYLBL = text label point with attributes for entire county
 MNCALBL = text label point with attributes for each municipal annexation
 MNCELBL = text label point with attributes for entire municipality

Entity and Attribute Detailed Citation For additional information see separate document, Mapping Municipal Boundaries in Washington County, prepared by the Washington County Surveyor's Office.

Section 6: Distribution Information

Publisher Washington County Surveyor
Publication Date Periodically revised
Online Linkage none available
Contact Person Information Mark Nieman, Senior Survey Technician
 Washington County Surveyor's Office
 14949 - 62nd Street North, PO Box 6
 Stillwater, Minnesota 55082-0006
 Phone: 651-430-6875
 FAX: 651-430-6888
 E-mail: nieman@co.washington.mn.us

Distributor's Data Set Identifier County and Municipal boundaries

Distribution Liability THE MCD DIGITAL MAP IS FURNISHED ON AN AS IS BASIS, WITHOUT ANY SUPPORT WHATSOEVER, AND WITHOUT REPRESENTATION OR WARRANTY, INCLUDING BUT NOT LIMITED TO FITNESS, MERCHANTABILITY AND COMPLETENESS.

The MCD data set is neither a legally recorded map or a survey and is not intended to be used as one. The MCD base is a compilation of records, information and data from various city, county and state offices and other sources and should be used for reference only. No representation is made that the features presented, accurately reflect true location. Washington County or and other entity from whom data was obtained assume no liability for any errors or omissions herein. If discrepancies are found, please contact the Washington County Surveyor's Department.

Transfer Format Name Arc/Info export, Arc shapefile, DXF, and AutoCAD formats

Transfer Format Version Number Arc/Info 8.2

Transfer Size Arc/Info export sizes: Annexations 1.4 Mb, Exterior MCD's 1.1 Mb, County 0.1 Mb

Ordering Instructions Send a written request to the distributor identifying the data set required, including the desired media type and file format. Fees are charged for media and handling according

to current Washington County policy. All fees must be submitted prior to release of the data.

Section 7: Metadata Reference Information

<i>Metadata Date</i>	11/12/03
<i>Contact Person Information</i>	Mark Nieman, Senior Survey Technician Washington County Surveyor's Office 14949 62nd Street North Stillwater, Minnesota 55082 Phone: 651-430-6875 FAX: 651-430-6888 E-mail: nieman@co.washington.mn.us
<i>Metadata Standard Name</i>	Minnesota Geographic Metadata Guidelines
<i>Metadata Standard Version</i>	1.1
<i>Metadata Standard Online Linkage</i>	http://www.lmic.state.mn.us/gc/stds/metadata.htm

APPENDIX F: LOG OF EVENTS

September 1996 – MetroGIS Information Needs Forum held, 750+ business needs identified.

May, 1997 – Findings from the MetroGIS Information Needs Project presented. Boundaries and characteristics of a specified jurisdiction ranked first.

June 2, 1997 - MetroGIS meeting at Earl Brown Center, University of Minnesota to plan GIS model as applied to jurisdictional boundaries.

July 3, 1997 – Members of Wash. Co. Administration and Surveyor's departments meet with Met Council to discuss plans and developments with the Jurisdictional Boundary Project

July 17, 1997 – GIS Data and Cost Sharing Agreement signed by County Administrator. Contract includes Jurisdictional Boundary Project to be completed, July 1, 1999.

August 19, 1997 – Select City of Forest Lake as pilot area.

October 8, 1997 – Peer review of Jurisdictional Boundaries pilot project with participants representing local, state and federal governments and the private sector.

October 23, 1997 – Results of survey to prioritize jurisdictional boundaries by Washington County GIS Users Group presented to Washington County GIS Policy Committee.

January 30, 1998 – Preliminary copy of full document printed.

February 3, 1998 - Draft report of municipal boundary documentation sent to Met Council for distribution to MetroGIS Data Content Team.

May 27, 1998 – The MetroGIS Policy Board votes to designate the Metropolitan Council as the official custodian and compiler of the Regional MCD/County Jurisdictional Boundary Dataset. The Board also designates each of the seven metro area counties as the primary source data custodians for the Regional MCD/County Jurisdictional Boundary Dataset.

June, 1998 – Abstracts submitted for GIS/LIS Conference for poster display and presentation on municipal boundaries.

July 7, 1998 – Preliminary document second version printed and distributed.

July 23, 1998 – Meet with MnDOT, Secretary of State, State Demographer, and LMIC to discuss needs and ideas for process changes relative to mapping municipal boundaries. Overview presented on Washington County's Municipal Boundary Project.

August 27, 1998 – Meet with County Auditor's staff on existing maintenance process for changes due to incorporations and annexations. Discussed suggested improvements to the process.

September 10, 1998 – Meet with County Attorney's Office staff to discuss handling the project report and issues.

October 8, 1998 – Jurisdictional Boundaries, The Municipal Boundary Chapter, presented at the MN

GIS/LIS Annual Conference. Poster session and paper presentations given.

October 21, 1998 - Jurisdictional Boundaries, The Municipal Boundary Chapter, presented to the Washington County GIS Policy Committee. The Committee determined that the County should pursue resolution of any issues that would affect County business. A six-month time frame was given to report and attempt to resolve critical outstanding issues if necessary.

November 10, 1998 – Presentation of results on Municipal Boundary Project given to Washington County Board.

November 18, 1998 – Presentation of results on Municipal Boundary Project given to County Administrator, City Administrators, Town Board Chairmen and Township Clerks meeting group.

February 12, 1999 – Draft version of Municipal Boundary Report posted to Surveyor’s Office Web page. The entire report provided except for the specific outstanding issues.

March 18, 1999 – Summary of recommendations and suggested guidelines for mapping municipal boundaries as generated from the project presented to the members of the Minnesota Government Unit Boundary Mapping Workgroup (subcommittee of Governor’s Council on GIS).

June 17, 1999 – The Metro GIS Coordinating Committee votes to accept the MCD Jurisdictional Boundary Guidelines developed by Washington County as guidelines for MetroGIS.

July 31, 1999 - Final report “Mapping Municipal Boundaries in Washington County”, an account of the municipal boundary project, is complete and available for distribution.