Final Report

Version 4 Statewide Parcel Map Database Project

November 15, 2018 | *Appendix B Updated: July 22, 2018

CONTENTS

NAVIGATE

Wisconsin State Cartographer's Office
384 Science Hall
550 North Park Street
Madison, WI 53706-1491
608-262-3065
sco@wisc.edu
www.sco.wisc.edu

Wisconsin Department of Administration
Wisconsin Land Information Program
101 East Wilson Street
Madison, WI 53703
608-267-3369
wlip@wisconsin.gov
doa.wi.gov/WLIP

OVERVIEW

The **Version 4 Statewide Parcel Map Database Project** (V4 Project) was a joint effort between the Wisconsin Department of Administration (DOA) Division of Intergovernmental Relations and the Wisconsin State Cartographer's Office (SCO). This document describes the V4 Project, which ran from January 2018 to December 2018 as part of the Statewide Parcel Map Initiative established by Act 20 of 2013.

Project Objectives Achieved

- Create an updated statewide parcel database and map layer by integrating county-level datasets.
- Provide for download of parcel database and display map layer online.
- Continue implementation of standard for parcel data known as the "Searchable Format," which is tied to Wisconsin Land Information Program grant funding for local governments.
- Assess and communicate county progress in achieving the Searchable Format.

The V4 Project successfully aggregated all known digital parcel datasets within the state, resulting in a statewide GIS parcel layer of **3.49 million parcels**. The statewide data was standardized to meet the Searchable Format and made publicly available online on July 31, 2018. The V4 Project represents another successful step in the Statewide Parcel Map Initiative, an effort important for improving the quality of Wisconsin's real estate information, economic development, emergency planning and response, and other necessary citizen services.

PROJECT BACKGROUND
The V4 Project was another phase in the incremental approach toward the Parcel Initiative—improving the statewide parcel map with each annual iteration. The V4 Project builds upon the experience of the LinkWISCONSIN and V1-V3 Projects. V4 was the third round of implementing standards for data submissions— the Searchable Format—which the legislature directed the Department of Administration to create in coordination with counties as part of Act 20 of 2013. In the Searchable Format, county data submittal is ready for immediate aggregation into the statewide parcel layer. Counties are to achieve the Searchable Format for parcel and tax roll data each year by March 31st.

TECHNICAL APPROACH
The technical approach taken by SCO staff involved several steps, including preparation and ingest, local-level processing, aggregation, state-level processing, and quality assurance/quality control. To support counties in achieving the Searchable Format, SCO developed a tool called the Validation and Submission Tool that counties are required to run in order to validate their data against the schema, as well as a suite of other geoprocessing tools. Data was distributed in several formats via a custom website and a web-based mapping application. The web app allows someone without GIS software to view the statewide parcel map.

V4 Statewide Parcel Layer - 2018
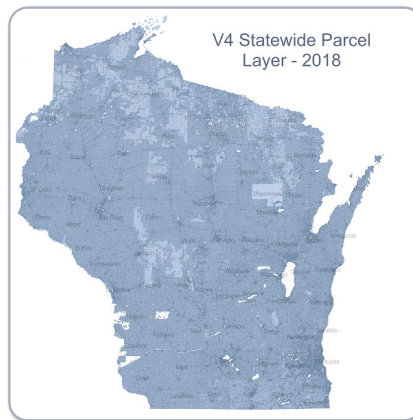
BENCHMARK PROGRESS ASSESSMENT
The final V4 layer of 3.49 million parcels represents a total parcel increase of roughly 4,837 records over the V3 statewide layer. Four counties have yet to complete their digital parcel mapping—Buffalo Burnett, Crawford, and Vernon. Notes from assessment and analysis of county data were communicated to counties through individualized documents called V4 Observation Reports, which describe what must still be done for a county to meet the Searchable Format. The majority of counties came close to meeting the Searchable Format in their V4 parcel data submissions. Very few met the Searchable Format exactly, and 53% of counties required follow-up to obtain missing data, clarify, or otherwise make their submission complete. In addition to parcels, several other GIS

data layers were collected as part of a collabor-ation with the UW-Madison Robinson Map Library. For V4, 446 new county datasets were cataloged, archived, and made available through the data portal GeoData@Wisconsin.

PLSS SUB-PROJECT
As part of V4, a pilot statewide Public Land Survey System (PLSS) layer, Edition 0, was created. The E0 feature class representing 29 counties totaled 83,688 points and will serve internal purposes of research and development. The V5 Project will produce comprehensive reporting on the planned update to the 1996 "24K Landnet" statewide PLSS database and a publicly available Edition 1 statewide PLSS database at the end of 2019, which has the potential to benefit many users of Wisconsin's local map data.

RECOMMENDATIONS
Recommendations to improve and achieve better efficiency, accuracy, and final products include strengthening the logic of the Validation and Submission Tool, adding some minor clarifications to the schema documentation, revisiting the address element standardization requirements, and locating and realizing efficiencies in internal business processes. These recommendations are designed to be minimally-disruptive for counties, yet ultimately lead to a statewide parcel layer that continues to improve with each annual iteration. ■

1 PROJECT BACKGROUND

1.1 Background

The **Version 4 Statewide Parcel Map Database Project** (V4 Project) was a joint effort between the Wisconsin Department of Administration (DOA) Division of Intergovernmental Relations and the State Cartographer's Office (SCO) that ran between January 1, 2018 and December 31, 2018.

Wisconsin Act 20 of 2013 created statutory directives through s. 59.72 and s. 16.967 for the state and local governments to coordinate on the development of a statewide digital parcel map, which is referred to as the Statewide Parcel Map Initiative, or Parcel Initiative. One of the statutory requirements was for DOA to determine a "**Searchable Format**" for parcel data and for all county data to be posted online in this standard. V4 is the third round of requesting that counties submit local data in the Searchable Format.

The V4 Project followed successful collaboration between DOA and SCO on similar efforts. In the past, DOA and SCO have partnered on a project to create statewide parcel and address point layers for the LinkWISCONSIN Address Point and Parcel Mapping Project (2013-2014), the Version 1 (V1) Project (2015), the Version 2 (V2) Project (2016), and the Version 3 (V3) Project (2017).[1]

The V4 Project continued the approach of improving with each annual iteration through a process that allows for much involvement and collaboration with data contributors, who are primarily county land information offices, and data users—a wide array of persons from state agencies, private companies, and other entities and individuals.

1.1.1 V4 Project Goals

As part of the implementation planning for the statewide digital parcel map, the goals of the V4 Project were established in a memorandum of understanding (MOU) between DOA and SCO.

- **Tracking progress.** The statewide parcel layer is built in an iterative fashion. V4 will track progress made with investments to local governments, specifically on benchmarks for parcel dataset development instituted with the 2016 WLIP grant application.

- **Four A's – Authoritative Automated Asynchronous Aggregation.** A long-term goal is to achieve these "four A's" so county data stewards can submit datasets at any time or interval by automatically merging the local data with the most current statewide database.

- **Moving to a contributor model of aggregation.** A long-term goal is to move toward a more efficient, automated process for data aggregation (the end of a continuum where the locus of standardization labor is on the data contributors, known as a "contributor model"), rather than an aggregator model requires which requires more state resources be dedicated to the aggregation process. The contributor model should require fewer staff resources and thereby reduce state costs for sustaining the statewide digital parcel map.

- **Outreach and technical assistance to counties.** This may take the form of further development of existing technical tools or the creation of new tools for counties and municipalities to use. It could also involve site visits and direct assistance.

- **Incremental improvement.** Improvement of the statewide parcel layer itself, as well as workflow and methods for each step in the aggregation process, with each new version of the layer. As with the database, the hosting and display should keep pace with current technology and be continually improved to meet users' needs. Intake and aggregation process should become more efficient with time, facilitating other improvements and/or opportunities for value-added products.

- **Lean government principles.** The V4 Project should seek to create and realize efficiencies in general, and to integrate or collaborate with other state GIS services where possible, like the Legislative Technology Services Bureau.

- **Responsiveness to public needs and economic development goals.** Evaluate parcel layer user suggestions and implement improvements where feasible.

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[1] See the *V3 Final Report* (2017 November); *V2 Final Report* (2016 November); *V1 Interim Report* (2016 June); *V1 Final Report* (2015 November); and the *Final Report: LinkWISCONSIN Address Point and Parcel Mapping Project* (2014 September).

1.1.2 Project Timeline and Milestones

V4 Statewide Parcel Map Database Project Milestones	
Date	**Version 4 Project Milestone**
01/01/18	V4 Project start
03/31/18	V4 Data submissions due, including PLSS corner data
07/31/18	V4 Parcel map and data downloads available online
09/06/18	V4 Observation Reports available
10/15/18	V0 PLSS database
11/15/18	V4 Final report

1.1.3 Project Team

| V4 Statewide Parcel Map Database Project Team	
Howard Veregin, Project Co-Lead	Wisconsin State Cartographer's Office
Peter Herreid, Project Co-Lead	Wisconsin Department of Administration
Brenda Hemstead	Wisconsin State Cartographer's Office
Codie See	Wisconsin State Cartographer's Office
David Vogel	Wisconsin State Cartographer's Office
Ana Wells	Wisconsin State Cartographer's Office
Hayden Elza	Wisconsin State Cartographer's Office
Alexander Campbell	Wisconsin State Cartographer's Office (student)
Austin Coppernoll	Wisconsin State Cartographer's Office (student)
Andrea Eibergen	Wisconsin State Cartographer's Office (student)
Clayton Groth	Wisconsin State Cartographer's Office (student)
Michael Hruska	Wisconsin State Cartographer's Office (student)
Ben Segal	Wisconsin State Cartographer's Office (student)
Davita Veselenak	Wisconsin Department of Administration

1.1.4 Outreach

V4 Conference Presentations and Outreach To-Date	
69th Wisconsin Society of Land Surveyors Annual Institute January 2018	County PLSS Remonumentation and the Statewide Parcel Map
Wisconsin Land Information Association (WLIA) Annual Conference March 2018	V4 Parcel Data Submission Q&A Session
Wisconsin County Surveyor's Association Meeting March 2018	Developing a Statewide PLSS Dataset
Meet Me At The Corner: PLSS/Parcel Forum April 2018	4th Annual PLSS/Parcel Forum (Rothschild)
WLIA Spring Regional Conference June 2018	LION Meeting and DOA Update
State Agency Geospatial Information Committee Meeting August 2018	Presentation and Q&A on the Statewide PLSS Database Project
WLIA Fall Regional Conference October 2018	Statewide PLSS Layer Under the Statewide Parcel Map Initiative

1.2 Documentation and Communication of Standards

The Submission Documentation set forth the required data submission standards for the V4 Project. There are four benchmarks listed by the WLIP Strategic Initiative grant application:

- Benchmark 1 – Parcel and Zoning Data Submission
- Benchmark 2 – Extended Parcel Attribute Set Submission
- Benchmark 3 – Completion of County Parcel Fabric
- Benchmark 4 – Completion and Integration of PLSS
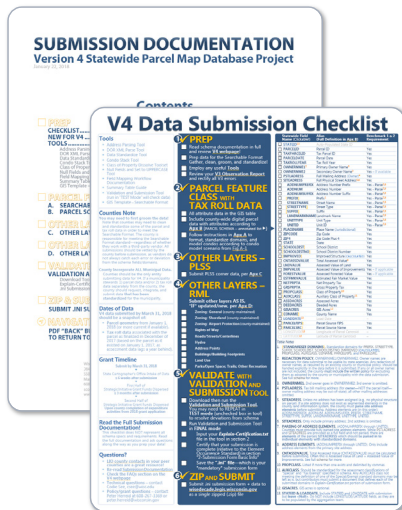
Together, Benchmark 1 and 2 make up the Searchable Format. The Searchable Format is detailed in the Submission Documentation.

Figure 1. V4 Submission Documentation and Data Submission Checklist

1.2.1 New for V4

The data counties were asked to submit for V4 was remarkably similar to the V3 data, as the V4 schema was not different in any substantive way. However, there were some clarifications and a few other changes for V4. The changes for V4 were highlighted at the beginning of the Submission Documentation.

- **Validation and Submission Tool.** The State Cartographer's Office updated the Validation and Submission Tool that counties were required to run in order to validate their data against the schema. Submitters must run the tool in FINAL mode before they can submit. The Submission Form (an ".ini" file) is produced by running the Validation and Submission Tool in FINAL mode. The .ini Submission Form is a mandatory component of the data submission.

- **Submit PLSS Corner Data.** To maximize return on investment of expenditures related to PLSS, DOA collected PLSS corner data, to be shared with SCO for the library associated with Survey Control Finder, and for a sub-project to create an initial version of a statewide PLSS database. PLSS corner data had to be submitted for V4.

- **Other Layers – Submit Updated/New Only.** DOA is continued to combine the V4 data request with a request that has been separate in the past—that of Jaime Martindale of the UW-Madison Robinson Map Library (RML). Therefore, a few other layers were requested, in addition to parcels with tax roll attributes. However, only UPDATED/NEW other layers had to be submitted.

- **Easier Zoning Data Submission.** For V4, counties only needed to submit three layers of county-maintained zoning data: 1) General, 2) Shoreland, and 3) Airport Protection. These layers were to be submitted AS IS, except for the requirement that the zoning layers shall be complete. "Complete" means the GIS file should include either:
    a) a field with a **DESCRIPTION** of the class name for each zoning feature, **or**
    b) a field or metadata populated with a **LINK** to a valid webpage or web document that contains authoritative/official descriptions of the specific zoning class or all zoning classes within the jurisdiction.

- **No Export Format Option.** There is no longer an option to submit in the Export Format. The Export Format was a flexible format which was converted to the Searchable Format on behalf of counties, requiring a join to be made after the county had submitted. It was permitted for parcel data submission in 2016 and 2017, while the Searchable Format was being phased in, but is no longer accepted. By the annual submission deadline of March 31st, *all* counties must meet the Searchable Format (also known as Benchmarks 1 and 2 – Parcel and zoning data submission/Extended parcel attribute set submission). Counties must meet the Searchable Format in order to execute their WLIP Strategic Initiative grant.

- **Clarified Documentation.** The V4 documentation was revised. Some attribute definitions were clarified.

1.2.2 Standards for Parcel Site Addresses

This section focuses on the schema for parcel site addresses developed for the Statewide Parcel Map Initiative—including the SITEADRESS field and the individual parsed address elements that comprise it.

An important aspect of the schema is the use of **address fields that are fully spelled out**; for example, the STREETTYPE field requires fully spelled out street type values, such as STREET, AVENUE, and BOULEVARD. Over the years a number of counties have commented that this schema is in conflict with US Postal Service (USPS) abbreviation standards adopted by many counties decades ago as a component of E9-1-1 (Enhanced 911).

Standard Formats for Enhanced 9-1-1

Indeed USPS abbreviations are included in the E9-1-1 standard. NENA (the National Emergency Number Association) document NENA-STA-015.10-2018[2] sets forth the standard formats for E9-1-1 data exchange and GIS mapping.

The first version of this standard was originally published as NENA 02-010 v1 in 1991. The standard was created to provide consistent formats for exchange of 9-1-1 data between service providers and the database management system providers. The standard specifically mentions USPS Publication 28 as the source for valid street suffix abbreviations, such as AVE for Avenue.

Standard Formats for Next Generation 9-1-1 Data

For Next Generation 9-1-1 (NG9-1-1) data the situation is different. NENA document NENA-STA-006.1-2018[3] sets forth the standard formats for NG9-1-1 data.

The document updates previous GIS data models for use in the NG9-1-1 system while retaining backwards compatibility with E9-1-1 GIS data needs. As such **the NG9-1-1 standard does accommodate USPS abbreviations, but only as part of a set of "legacy" address fields**. These legacy fields include Legacy Street Name, Legacy Street Name Post Directional, Legacy Street Name Pre Directional, and Legacy Street Name Type.

Legacy Street Name Type is defined as the "valid street abbreviation as it previously existed prior to the adoption of the NG9-1-1 Data Model as assigned by the local addressing authority" (p. 63). Abbreviations such as "ST" and "BLVD" are acceptable; the domain is as it existed "prior to the adoption of the NG9-1-1 Data Model" (p. 63).

However, the legacy address is intended to be used in legacy systems and "is not used in a full NG9-1-1 implementation" (p. 25). The legacy address components are "included in the GIS Data Model to provide backward compatibility with legacy map displays and Computer Aided Dispatch (CAD) systems" (p. 62). None of the legacy fields are mandatory.

NENA's NG9-1-1 address model includes the following fields: Address Number Prefix; Address Number; Address Number Suffix; Street Name Pre Modifier; Street Name Pre Directional; Street Name Pre Type; Street Name Pre Type Separator; Street Name; Street Name Post Type; Street Name Post Directional; and Street Name Post Modifier. **The NENA NG9-1-1 standard prescribes that these fields are fully spelled out and are NOT abbreviated.**

For example, Street Name Pre Type and Street Name Post Type (elements that identify the type of thoroughfare in a complete street name) are restricted to values found in the NENA Registry of Street Name Pre Types and Street Name Post Types[4] (pp. 78-79).

Examples include "Avenue" in "Avenue A," "Highway" in "Highway 443," "Bypass Highway" in "Bypass Highway 22" and "Boulevard" in "Boulevard of the Allies."

Further clarification of these concepts is provided in NENA document NENA-STA-004.1.1-2014, NENA Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF) Standard[5], on which the NG9-1-1 address standard is partly based.

The CLDXF standard states that Street Name Pre Type and Street Name Post Type "must be spelled out in full for data exchange. No abbreviations are recognized within this standard" (pp. 46, 51).

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[2] National Emergency Number Association. (2018, August 12). NENA Standard Data Formats For E9-1-1 Data Exchange & GIS Mapping (NENA-STA-015.10-2018). Retrieved from https://cdn.ymaws.com/www.nena.org/resource/resmgr/standards/nena-sta-015.10-2018_datafor.pdf

[3] National Emergency Number Association. (2018, June 16). NENA Standard for NG9-1-1 GIS Data Model (NENA-STA-006.1-2018). Retrieved from https://cdn.ymaws.com/www.nena.org/resource/resmgr/standards/nena-sta-006_ng9-1-1_gis_dat.pdf

[4] National Emergency Number Association. (2018, October 16). NENA Registry of Street Name Pre Types and Street Name Post Types. Retrieved from http://technet.nena.org/nrs/registry/StreetNamePreTypesAndStreetNamePostTypes.xml

[5] National Emergency Number Association. (2014, March 23). NENA Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF) Standard (NENA-STA-004.1.1-2014). Retrieved from https://cdn.ymaws.com/www.nena.org/resource/resmgr/Standards/NENA-STA-004.1.1-2014_CLDXF.pdf

As explained elsewhere in the standard:

> Prior NENA address data standards have followed the USPS Publication 28 postal addressing standards . . . . but USPS purposes differ, in two fundamental respects, from NG9-1-1 purposes:
>
> 1. The USPS standard specifies how to standardize addresses for matching against the USPS master list of postal addresses to determine if they are valid for mail delivery. NG9-1-1 call records include non-mailable addresses as well as mailable addresses.
> 2. To format addresses for mailing labels, the USPS standard specifies how to abbreviate and compress address components so that the addresses do not exceed 40 characters per line. NG9-1-1 call records are stored in databases, so line length and typographical formatting is irrelevant. **Abbreviations and word compression lose information, and conflict with NG9-1-1 needs for complete, correct, unambiguous address data** [emphasis added]. (p. 39)

A Forward-Looking Statewide Parcel Schema

The address standard developed for Wisconsin parcel data is informed by the latest NENA standards related to NG9-1-1. As such, the statewide parcel standard points to future practices rather than to practices that are becoming antiquated. While USPS abbreviations had a role to play in earlier implementations of 911 data, their future utility is limited. It would make little sense for the statewide parcel schema to be modified to move back to a decades-old standard in order to accommodate legacy data. If any movement in the parcel standard were to occur, it would make sense for this to reflect even closer alignment to the NG9-1-1 model.

While NG9-1-1 is not the only thing to consider in terms of an address model, it is likely that Wisconsin's counties will be impacted in the near future by the adoption of NG9-1-1. It thus makes sense for counties to begin to prepare for this eventuality. The Statewide Parcel Map Initiative, while not specifically designed to produce NG9-1-1 data, can at least provide an opportunity for counties to move closer to developing standards within the framework of a funded strategic effort.

Maintaining Data in Different Formats

For those counties who wish to have data available in multiple standard formats, there are several options.

- Maintain a lookup table.
- Use the Data Standardize Tool.
- Maintain a **joinable file** (e.g., file geodatabase table, .dbf file, .csv file) that contains values for the data in all of the various desired formats.
    - In the example of STREETTYPE, the joinable file would contain both:
        - A) the abbreviated STREETTYPE value, and
        - B) the corresponding spelled out STREETTYPE value.
    - The joinable file will allow for a join on the abbreviated fields and the copying of the spelled out values into a new field.
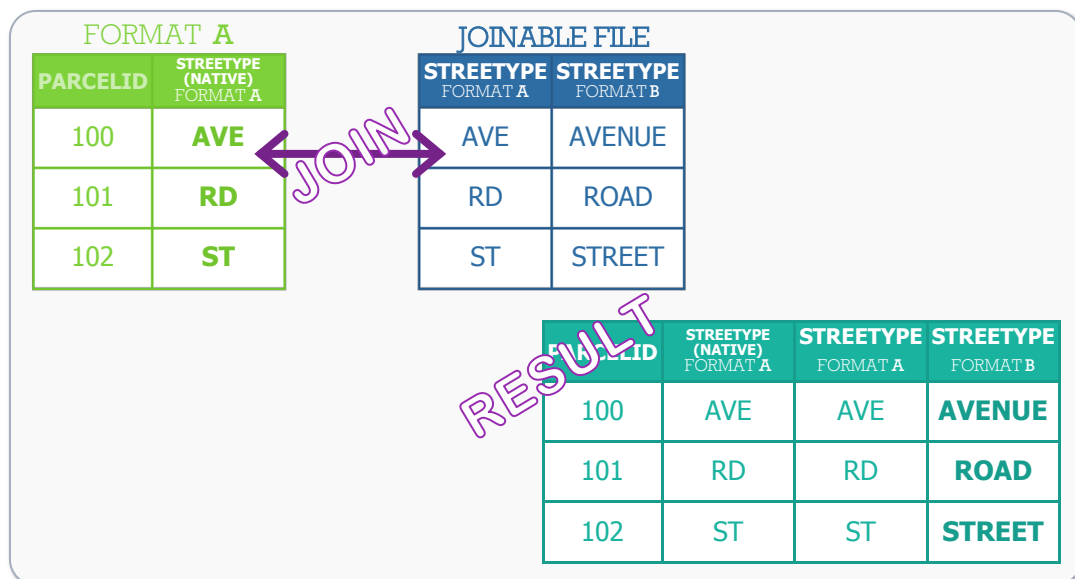

Figure 2. Utilizing a Joinable File

These are only a few possible methods, but they can reduce the amount of manual data processing required each time the data is needed in a different standard format.

1.3 Call for Data

The official V4 data request was sent to each county land information officer on January 22, 2018 via email, and appears as Figure 3. It included a link to the Submission Documentation, which serves as a manual detailing the requirements of the Searchable Format.

Dear LIO,

On behalf of the Department of Administration, I am writing to request a subset of your GIS data. The data acquired through this request will be used to develop a statewide parcel layer for the next version of the Statewide Parcel Map Database Project, Version 4.

All counties must submit parcel data in the Searchable Format standard no later than March 31, 2018. Submissions falling significantly short of the specs for the Searchable Format will not be processed. A successful data submittal adhering to the Searchable Format is necessary in order to execute your county's 2018 Strategic Initiative grant agreement and receive the first payment.

V4 SUBMISSION DOCUMENTATION & V4 WEBPAGE
The V4 checklist summarizes the data we are asking you to submit. The digital PDF checklist contains hyperlinks to attribute definitions and links to the full schema. Although the schema remains the same, a page titled New for V4 summarizes what's new. You'll want to read the Submission Documentation in full, in order to understand the details of the V4 request.

In addition, the V4 webpage contains all the necessary submission information, and links to several tools to help you format your data.

SUBMIT OTHER LAYERS + PLSS
New for V4, all counties must **also submit PLSS corner data**, as per Appendix C. Again this year, additional layers are being requested in order to aid in analysis of the statewide layer, as well as part of a collaborative effort with the UW-Madison Robinson Map Library. See Appendix D of the Submission Documentation for details.

Note that the DOA request is distinct from the LTSB request for ward level GIS data, which was due to LTSB on January 18th.

VALIDATION AND SUBMISSION TOOL
Like last year, there is a tool you must run before you submit your data called the Validation and Submission Tool. The tool can check your data for deviations from the schema, and it is also required to create the mandatory Submission Form.

SUBMIT DATA THROUGH WISE-DECADE
After prepping your data and running the tool to create your Submission Form, submit your data to the WISE-Decade platform. Log in with the user information you received on December 27th from the Legislative Technology Services Bureau.

Please submit your data by **March 31, 2018**.

FEEDBACK AND HELP
You may have questions about making your data align with the statewide schema. Your peer counties are a great resource, as is the FAQs section on the V4 webpage.

For technical questions, you can contact Codie See at csee@wisc.edu or 608-890-3793. Feel free to contact me with general questions as well.

We know that it could take a considerable amount of work to get your data into the statewide schema. Strategic Initiative grants were designed to aid in this task. We sincerely appreciate your efforts to help make V4 a success.

Thank you,

Peter Herreid
608-267-3369
Grant Administrator
Wisconsin Land Information Program

Figure 3. V4 Call for Data

2 TECHNICAL APPROACH

This chapter describes the strategy or a high-level version of the approach employed by the technical team in processing and aggregating local-level data for inclusion in the V4 final deliverable and statewide parcel map.

2.1 Tool Development

2.1.1 Updated Validation and Submission Tool

V4 featured an updated tool built by the State Cartographer's Office that counties were required to use before submitting data. The Validation and Submission Tool checked data for deviations from the schema, and was also required to create the mandatory Submission Form.

Data submitters could run the tool in TEST mode to flag potential errors in the data. The tool was run again in FINAL mode in order to create the ".ini" Submission Form, which was a required part of the submission package.

For more details or to download the tool, see the Validation and Submission Tool Guide.

2.1.2 Geoprocessing Tool Development

To support counties in achieving efficient and accurate adherence to the standards in the Submission Documentation, the SCO developed a suite of publicly available geoprocessing tools using the ArcGIS ArcPy Module, Python 2.7, and open source libraries. In total, seven tools were created, and made publicly available through the data submission webpage.
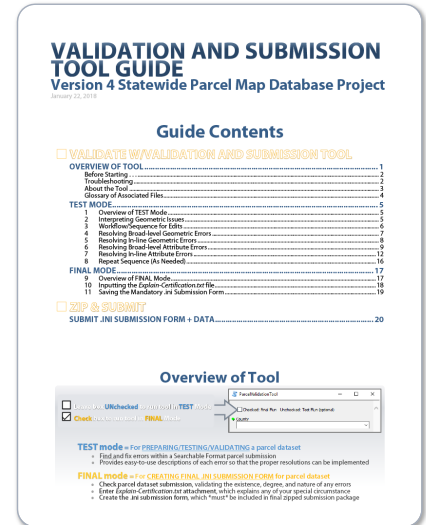

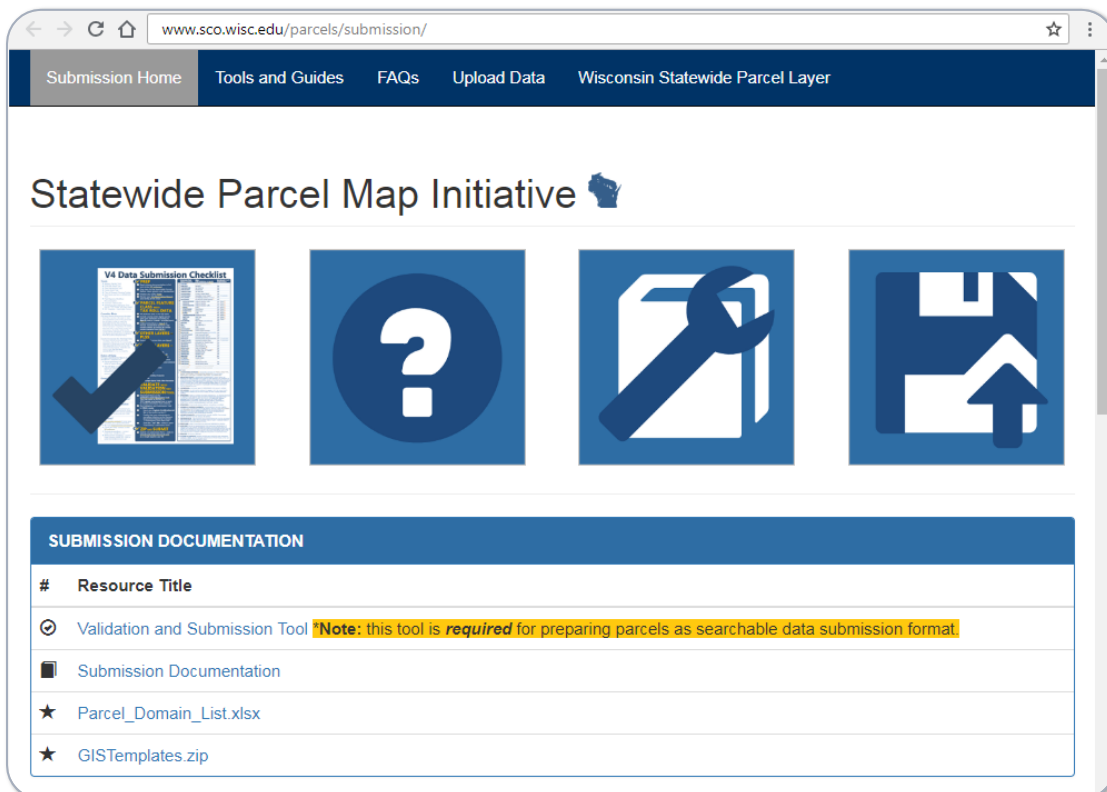*Figure 4. Validation and Submission Tool Guide*

Figure 5. V4 Data Submission Webpage with Links to Schema and Tools

The tools were supported under ArcGIS version 10.1 through version 10.5. Each of these tools were designed to enable efficient solutions to the most common and time-consuming problems related to preparing parcel and tax roll data to be submitted in the statewide schema. Accompanying the tools were user guides that documented how to prepare the data, run the tool, and troubleshoot if necessary.

- **Address Parsing Tool.** Allows the user to parse site addresses from one long string into sub-address elements. Data submitters might use this tool if the county's parcel SITEADDRESS data is not available as fully parsed address elements and they would like to use the data to help meet the Searchable Format.

- **DOR XML Parse Tool.** Allows the user to translate Department of Revenue Tax Roll XML into a GIS table. For tax roll data in XML format that is to be used for parcel submission.

- **Data Standardize Tool.** Allows the user to standardize file geodatabase feature class data via the creation of a lookup table through a two-tool sequence. The first tool is used to create a summary table of a field. This table is edited and subsequently used as input to the secondary tool. The output of the second tool includes all original field domains as well as newly standardized domains in a new field.

- **Condo Stack Tool.** Allows the user to model condominiums by stacking condo parcel geometries by owner. A data submitter might use this tool to model condo parcel geometries to match tax roll records with a 1:1 relationship.

- **Class of Property Dissolve Toolset.** Allows the user to format class of property data to statewide schema definitions. This suite of tools may be helpful if a submitter wishes to reformat their class of property information so as to meet the requirements of the schema definitions of PROPCLASS and AUXCLASS. This tool also handles various common formats that class of property exists as and may be helpful if the submitters data exists in one of these formats.

- **Null Fields and Set to UPPERCASE Tool.** Allows the user to format all attributes within a feature class to <Null> and UPPERCASE. This tool may be helpful to a submitter if they wish to format their blank fields or fields annotated with a specific string to a true SQL <Null> or if they wish to set all fields to UPPERCASE alpha characters.

- **Field Mapping Workflow Documentation.** Allows a user to map parcel or zoning attributes to the statewide schema. This is not a tool but rather a guide that may be useful to a submitter if they have PARCEL or ZONING data formatted to the schema specifications of the V4 Project but the fields do not have the appropriate FIELD NAME, ALIAS NAME, DATA TYPE, or PRECISION.

- **Summary Table Guide.** Not a tool but a guide for GIS software summary tables, to examine data in preparation for submitting searchable format data. This guide is of particular use for cleaning, validating, and standardizing data.

The following table displays the number of downloads for each of the respective tools:

Tool Download Stats				
	# of Downloads V1 (2015)	# of Downloads V2 (2016)	# of Downloads V3 (2017)	# of Downloads V4 (2018)
Validation and Submission Tool	Not applicable	Not applicable	108	118
Address Parsing Tool	Not available	Not available	48	46
DOR XML Parse Tool	Not available	Not available	24	36
Data Standardize Tool	Not available	Not available	28	27
Condo Stack Tool	Not available	Not available	21	19
Class of Property Dissolve Toolset	Not available	Not available	20	19
Null Fields and Set to UPPERCASE Tool	Not available	Not available	51	59
Field Mapping Workflow Documentation	Not available	Not available	36	34
Summary Table Guide	Not available	Not available	13	11

Note. • Source of data is Google Analytics. Numbers represent unique downloads.
• Validation and Submission Tool began with V3 in 2016.

2.1.3 Preparation and Ingest

In the data request, land information officers were asked to submit data to the Legislative Technology Services Bureau (LTSB) of the Wisconsin State Legislature, through their WISE-Decade platform. WISE-Decade is LTSB's suite of mapping tools designed to assist counties and municipalities with legislative and legal requirements as required by state statute. Some file uploads were also accommodated using UW-Madison's enterprise Box.com account through an alternative upload widget.

The ingest phase began after the call for data. An automated email notification was sent to the project team any time a data submission to the WISE-Decade platform occurred. Once notified, the technical team would download the data via FTP login through Windows Explorer. After download, the data underwent a brief inspection, was documented as submitted, and then classified within the project's file directory. Depending on the amount of data submitted at any given time, the new data would either be assessed immediately or be queued for assessment according to the date the data was received. Also upon receipt of data, the county data directory was backed-up locally, while additional data backups were routinely made to an external drive throughout the development phases.

The submission package was incomplete for some counties upon initial submission. For **11 counties**, either the geodatabase initially submitted was empty, or part of the required .ini Submission Form was missing. This may have been a result of the fact that the Validation and Submission tool for V4 did not automatically populate an output feature class when run the last time in Final Mode. In any case, to obtain complete information, follow-up to receive a submission with all required components was required in these cases.

Robinson Map Library and Other GIS Data

For other GIS layers, the Robinson Map Library (RML) also completed an intake assessment. **For V4, RML added 446 new datasets to GeoData@Wisconsin**. For just the non-parcel layers, 347 layers were added—comprised of rights-of-way; roads/streets/centerlines; hydrography; address points; buildings/building footprints; land use and parks/open space; trails; other recreation data. By the end of September 2018, RML staff and students had completed ingest and written metadata for all of the data layers and made them available for download on GeoData@Wisconsin.

2.1.4 Intake Assessment

Once data was copied to local directories, the required .ini Submission Form was automatically ingested into the technical team's master intake spreadsheet. This .ini file played an important role in cataloging the data submitted. Information obtained from the .ini file included feature class names, condo modeling format, submitter name and email address, generic error counts, completeness relative to V3 data, and a section that allowed contributors to explain unsolvable errors, missing data, and other known issues present within the data submitted.

Next, the team recorded general notes related to attribute quality and completeness, geometric location, and other issues observed. The focus of this assessment was to determine if data met the submission requirements and establish what processing steps would need to be performed to get the data into the Searchable Format for aggregation, as the majority of counties did not submit data that exactly matched the Searchable Format.

Showstop, Re-Approach, and Resubmit Requests

If, upon internal team discussion, it was determined that data was missing or incomplete, the county was re-approached and asked to resubmit corrected data or provide justification for the missing data. Roughly 38 counties had to be re-approached to obtain data missing from initial submission, to get clarification on peculiar data observations, and for the correction of erroneous data. In total, more than 60 emails were sent to resolve these issues. In a few cases, up to four follow-up emails were required to an individual county before their data submission could be deemed complete and proceed past the initial assessment phase.

V4 Versus V3 Re-submits and Clarifications			
	V3 (2017)	V4 (2018)	Change
# of counties that had to be re-approached	29 counties (40%)	**38** counties (53%)	🔺 **+ 9** more counties
# of emails sent to resolve issues	83 emails	60 emails	🔻 **−23** fewer emails

After it was determined that the data submitted could be efficiently manipulated and processed, detailed processing steps were written and recorded in a Microsoft OneNote notebook. These steps provided the team with the information needed to massage the data into the final format and prepare it for the aggregation phase.

2.1.5 Geometric Gap Analysis

To identify gaps in the statewide parcel coverage where digital parcels do not exist, a manual inspection was performed on every dataset. It is the responsibility of the county to integrate all available parcel datasets into their parcel data submission, even if the municipal jurisdiction (city, village) is the data steward for the parcel dataset.

The geometric incompleteness of the V4 statewide parcel layer and the **4 counties yet to complete county-wide digital parcel mapping** are summarized in the table below. Notably, since V3, one county completed parcel digitization—Marquette County!

V4 Geometric Gaps Summary		
County	**Number of Municipalities with Gaps**	**Municipalities with Gaps in Parcel Coverage**
Buffalo	2	Part of: Alma (C), Cochrane (V)
Burnett	6	Part of: Swiss (T), Oakland (T), Union (T), West Marshland (T), Grantsburg (T), Anderson (T)
Crawford	8	Entirety of: Bridgeport (T), Lynxville (V), Wauzeka (T), Wauzeka (V) Part of: Eastman (V), Eastman (T), Gays Mills (V), Prairie du Chien (T)
Vernon	14	Entirety of: Coon Valley (V), Genoa (V), La Farge (V), Ontario (V), Viola (V) Part of: Bergen (T), Chaseburg (V), Clinton (T), Genoa (T), Greenwood (T), Harmony (T), Stoddard (V), Sterling (T), Union (T)

For V4, there was no missing geometric data in the form of gaps where parcel data is maintained by a municipality but not aggregated to county-level parcels. However, some tax roll data that is maintained by municipalities independent of counties presented some challenges.

V4 Tax Roll Gaps Summary	
County	**Municipalities with Independent Tax Roll Data***
Dane	City of Madison
Manitowoc	City of Manitowoc, City of Two Rivers
Milwaukee	City of Milwaukee, City of Wauwatosa, and all other municipalities
Racine	City of Racine
Washington	City of West Bend

Note. * This list is not exhaustive. Other municipalities that maintain tax roll data independently of the county may exist.
• The fact that a county is listed here does not necessarily indicate that the county submission was incomplete—rather, it shows that extra effort was required by either the county and/or the project team to acquire and/or format the municipal tax roll data.
• DOA seeks information on additional independent municipalities. Please send information to WLIP@wisconsin.gov.

2.1.6 Aggregation

The process of aggregating individual county datasets began upon the completion of all required processing tasks for each county. After verifying these tasks were complete and ensuring that data was in the Searchable Format, the finalized feature class for each individual county was identified and the full path was documented to allow the technical team to run a batch processing tool for aggregation.

Next, a new statewide working database was created that contained a merged feature class consisting of all 72 individual county parcel datasets.

State-level processing was performed on the resulting feature class. This processing included steps such as: casting select fields from string to double, construction of the STATEID attribute for all records, creation of LATITUDE and LONGITUDE fields (populated with values for the inside centroid of each parcel polygon), and general data cleaning tasks (e.g., removal of leading/trailing whitespace, converting empty strings to <Null>, setting all attributes to UPPERCASE).

2.1.7 Quality Assurance/Quality Control

Beginning with the V2 call for data in the year 2016, data submitted has been required to meet certain documented standards, which make up the Searchable Format. These attribute field standards, attribute domain standards, and geometric representation standards were assessed as part of the QA/QC phase. Maintaining high quality datasets from one version to the next is of paramount importance to the Parcel Initiative. A variety of QA/QC methods were used throughout the project, including manually-focused techniques, as well as more automated techniques that allowed for visualization across the entire state.

Manual cleanup techniques and tasks were performed across many of the datasets submitted. These included: address element standardization, mailing address cleanup, address number cleanup, miscellaneous street name element parsing, excess field removal, etc. Often, the tasks were completed during the processing phase, prior to aggregation into the statewide feature class.

The automated QA/QC techniques were most often performed after the statewide feature class had been aggregated. With 3.49 million parcels, it was not feasible to manually inspect every record. For this reason, summary tables and a variety of maps were created during this process.

Summary tables were created as a byproduct of the state-level processing and provided a discrete set of domains that existed for a particular attribute field. These tables are particularly valuable for fields such as PREFIX, STREETTYPE, SUFFIX, and PROPCLASS, which have specific attribute domain standards. These tables, used in conjunction with the Data Standardize Tool, allowed for corrections to be made efficiently and accurately. Maps were produced, typically using a choropleth scheme, allowing the visualization of spatial trends within individual municipalities, counties, and statewide. These trends could be hard to observe from the tabular data alone. Maps provided another valuable tool for discovering errors and issues that existed in the data and allowed for corrections to be made.

2.1.8 Final Deliverables

The final parcel layer totaled 3.49 million parcels shown in Map 1 on the following page.

Geometric Coverage

Continued progress is being made in completing the digitization of parcels across the Wisconsin landscape, as indicated by the statistics below.

V1-V3 Versus V4 Spatial Coverage						
	V1	V2	V3	V4	Additional Coverage in V4	Percent Additional Coverage in V4
Number of features	3,434,149	3,466,359	3,486,200	3,491,037	**4,837 features**	0.14%
Coverage (in square miles)	53,656	55,280	56,060	56,193	**133 square miles**	0.24%

Note. The coverage in square miles calculation does not represent a true 1:1 comparison between the actual area of the state in square miles and total parcel coverage in square miles. In instances where condo parcels are stacked, the square mileage value is inflated.

V4 Statewide Parcel Layer - 2018
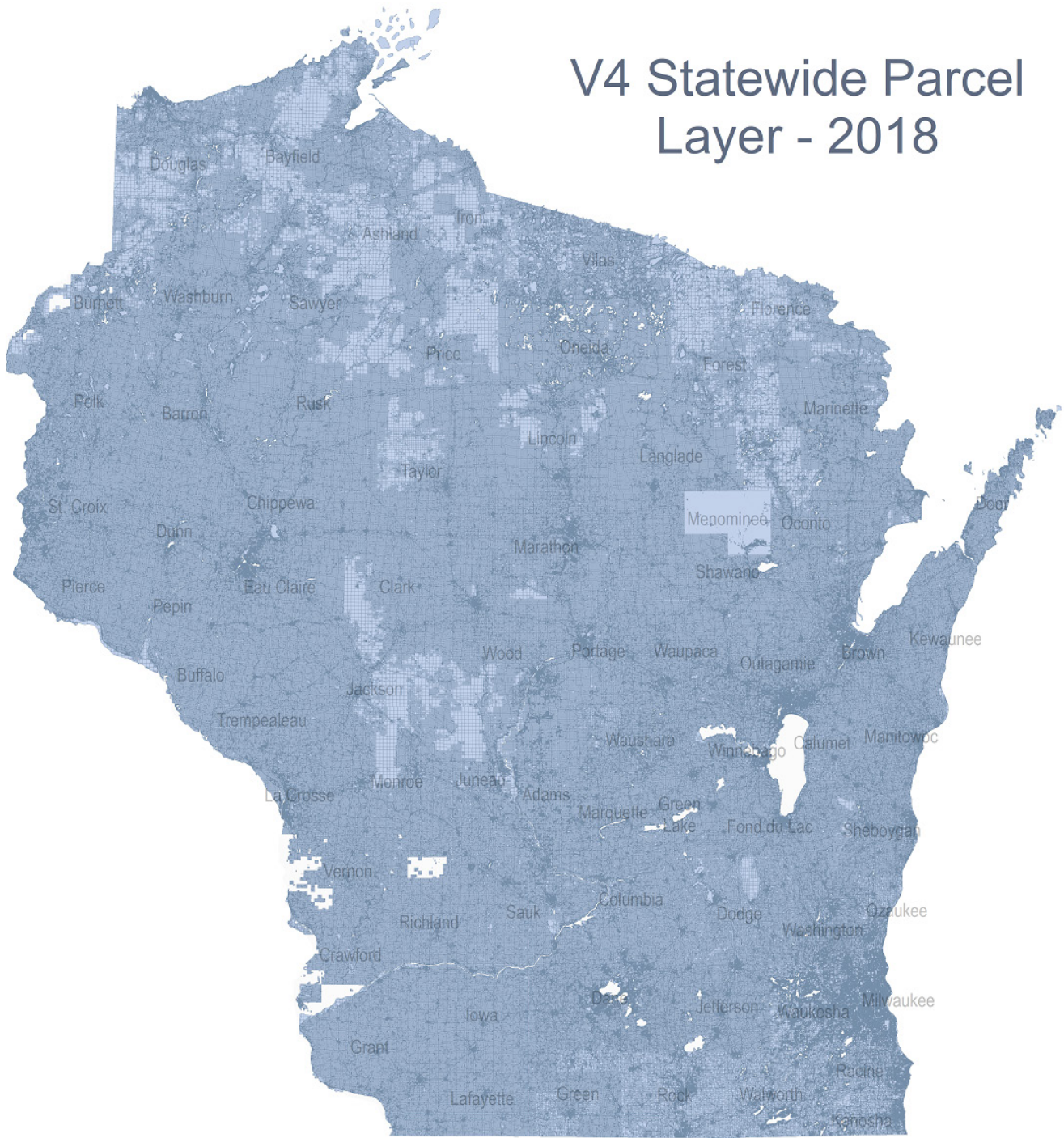
Map 1. Version 4 Statewide Parcel Layer Completed in July 2018

2.1.9 Note on Zoning
Although five publicly available Wisconsin county-administered zoning layers were aggregated as part of the Statewide Parcel Map Initiative for V3 and V2 (in 2017 and 2016), **zoning data was not aggregated at the statewide level for V4** in 2018. However, individual county datasets are still publicly available through UW-Madison Robinson Map Library's GeoData@Wisconsin.

V4 Zoning Data Submitted In 2018	
Zoning Type	**# of Datasets**
County General Zoning	**54** Counties
Shoreland Zoning	**24** Counties
Airport Protection Zoning	**12** Counties

For information regarding the zoning layers, please see the Parcel Project Zoning Change Log and page 5 of the V3_Wisconsin_Statewide_Parcels_Schema_Documentation.

For the most current county zoning data, consult the individual county's land records websites.

2.2 Data Distribution

2.2.1 Database Download Webpage
The data was distributed via two primary means: a website with download links and a web-based mapping application. The V4 database was formally released to the general public on July 31, 2018, through the DOA land information email listserv and the data page.
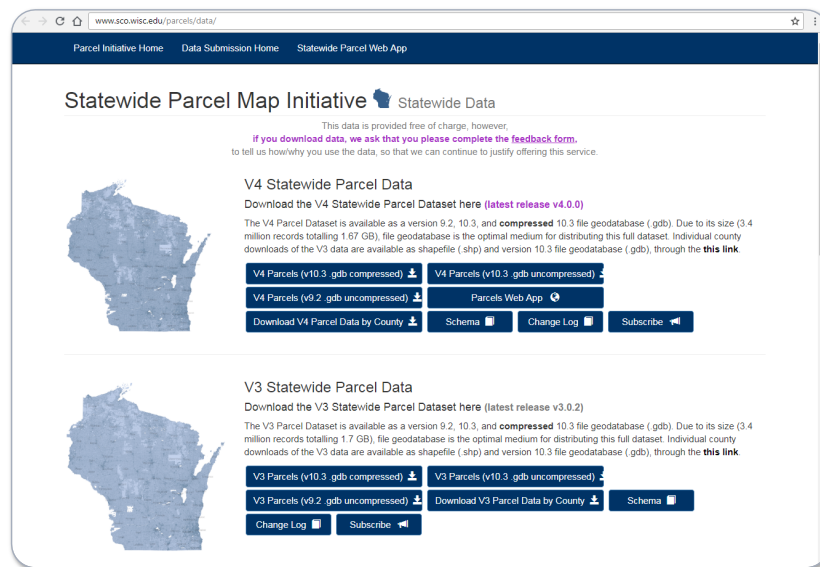

Figure 6. V4 Data Page

The custom webpage for data distribution was built and hosted by SCO, with the aim of flexibility. The site supports desktop, mobile, and tablet devices.

2.2.2 Web Application
Development of the web application for V4 followed suit with the technology used in developing the V1-V3 web applications—Web AppBuilder, the ArcGIS API for JavaScript, and feature services hosted by Wisconsin's LTSB. The V4 app design reflected the elements of the V3 app with the addition of some enhancements added through custom code to target functionality not supported through Web AppBuilder.

As a GIS layer and application covering the entire state of Wisconsin, functionality for displaying and querying parcel data at statewide and regional levels—in addition to county and neighborhood levels—was important. The sheer amount of data in the parcel layer requires a unique strategy be employed to provide users with a fluid and seamless experience at all scale levels.
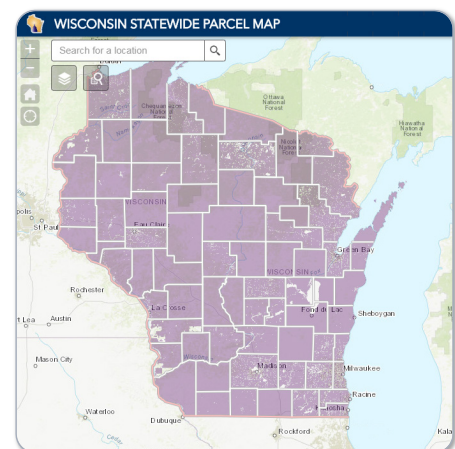

Figure 7. V4 Web App

Improvements to the V4 Web App

- **Removal of V1 and V2 parcel data feature layers.** At the time of the release of the V4 statewide layer, it was expected that the V1 and V2 parcel data feature layers would be decommissioned by LTSB in order to reallocate and save resources. The impending retirement of the V1 and V2 feature layers led to their removal from the application. However, users can still download a historic copy of the data at sco.wisc.edu/parcels/data and from the Robinson Map Library.

- **Updates to supporting text/links and User Feedback Form.** All of the supporting text and links associated with the parcel application including, the Statewide Parcel Map splash screen, *About* section, *Search Tips*, and data download links were updated. Updates were also made to the user feedback form (shown in Figure 8) and land information county contacts page, which directs users to Wisconsin's county-maintained land information websites.

- **Standardized site address field for searching.** By way of the LTSB feature service, the V4 parcel application includes a field called "**STAND_SITEADD**," which facilitates a simplified, more streamlined search of parcels by site address.
    - In the file geodatabase for the statewide layer, the site address field—SITEADDRESS—appears "as is," with the physical street address of the parcel appearing exactly as it is provided by the county.

Figure 8. V4 User Feedback Form

- As a result of the differences in formatting for site address data at the county level, an end-user might need to perform multiple iterations of a search in order to find one desired address.
- Particularly for the PREFIX and STREETTYPE fields, variations in spelling and abbreviations can be found in the SITEADDRESS field.
- The standardized site address field, STAND_SITEADD, is created by:
- ❶ **Concatenating the elements that make up SITEADRESS**, which counties submit as parsed address elements:

ADDNUMPREFIX	ADDNUM	ADDNUMSUFFIX	PREFIX	STREETNAME	STREETTYPE	SUFFIX	UNITTYPE	UNITID

- ❷ **Further refining the PREFIX field**, so that it is standardized to a select number of domains:

CTH	STH	USH	INTERSTATE
N CTH	N STH	N USH	
E CTH	E STH	E USH	
S CTH	S STH	S USH	
W CTH	W STH	W USH	

2.2.3 Data Access and Download Statistics

Across the various formats that are offered, the statewide parcel database has received large numbers of downloads and access via web mapping services.

V2 received a total of over 4,000 downloads and nearly 1.8 million hits on web services in the year following the V2 release date. **V3 received a total of over 3,070 downloads and nearly 2.6 million hits on web services in the year following its release date**. Download and web app statistics appear on the following page.

V1 **V1 Parcels**	**Downloads**	**Hits on Services or App Views/Requests**
V1 Parcels (during V1 year)	3,625 Total	unknown
[*No zoning or individual county data was produced for V1]		

V2 **V2 Parcels and V2 Zoning**

	Downloads	**Hits on Services or App Views/Requests**
V1 Parcels (during V2 year)	131	451,374
V2 Parcels (during V2 year; all formats)	859	1,341,401
V2 Individual County Parcels, all 72 counties combined (all formats)	3,248	NA
	4,238 Total	1,792,775 Total
V2 Zoning		
Wisconsin_Zoning_2016 - All 5 zoning layers in one database	128-174	NA
Airport	19-36	3,524
Farmland	39-56	3,837
Floodplain	26-44	4,448
General	61-80	8,138
Shoreland	27- 47	4,469
	300-437 Total	24,416 Total

V3 **V3 Parcels and V3 Zoning**

	Downloads	**Hits on Services or App Views/Requests**
V3 Parcels (during year after release; all formats)	868	unknown
V3 Individual County Parcels, all 72 counties combined (all formats)	2,203	unknown
	3,071 Total	
V3 Zoning (during year after release)		
Wisconsin_Zoning_2017 - All 5 zoning layers in one database	127	unknown
Airport	17	unknown
Farmland	37	unknown
Floodplain	27	unknown
General	65	unknown
Shoreland	2,203	unknown
	301 Total	

V4 **V4 Parcels**

	Downloads	**Hits on Services or App Views/Requests**
V4 Parcels (during first 1.5 months after release; all formats)	176	601,487
V4 Individual County Parcels, all 72 counties combined (all formats)	322	NA
	498 Total	601,487 Total

Note.
- Data that is not available is denoted with "unknown."
- The source for V2 data is Google Analytic events (through July 31, 2017), as well as Box access statistics.
- Numbers are approximate.
  - For V2 download figures, an error in the Google Analytics code for the first month caused issues with segmenting the numbers.
  - Downloads from this period are supplemented with Box stats to arrive at the above totals.
- For V2 hits figures, LTSB's server was switched during the early portion of V2, therefore, figures for V2 hits are approximate, and may not include hits prior to the server change.
- V2 zoning figures appear as a range (e.g., 128-174) due to differences in Google Analytics versus Box access statistics.
  - "**Hits**" numbers are subject to variation in definition. Here, hits may be "transactions." For ArcGIS server, a transaction is defined as any time the server or services is hit or pinged. Therefore, the number of hits is not an indicator of the number of unique users. A transaction is counted each time that a user makes a request to the service and data is returned.
  - For example, each of these actions within the parcel web app would be counted as a transaction:
    a) searching the web app on owner name, parcel ID or site address;
    b) panning the map to an uncashed area when viewing the map at neighborhood level (large scale); and
    c) clicking on the map to procure the parcel attribute information of an area.

Statewide Parcel Layer Web Mapping Application Statistics

	Sessions	**Users**	**Pageviews**
V1 App (July 31, 2015 – Oct 16, 2016)	Data not available	Data not available	Data not available
V2 App (Oct 17, 2016 – Sep 6, 2017)	9,788	4,271	16,402
V3 App (Sep 7, 2017 – July 30, 2018)	31,013	15,602	56,423
V4 App (July 31, 2018 – Nov 7, 2018 – ~3 months only)	19,282	11,501	31,097

Note.
- The first date in the date range represents the public release date for the web app.
- Data Source is Google Analytics.

3 BENCHMARK PROGRESS ASSESSMENT

3.1 Observation Reports

The notes from the V4 Statewide Parcel Map Database Project intake process and assessment were communicated to counties through documents called the V4 Observation Reports. The reports were individualized for each county, and contained observations related to the data submitted, with focus on how local data compared to the statewide schema. The V4 Observation Reports showed precisely how local data compared to the benchmarks for parcel data laid out in the WLIP grant application and the Submission Documentation, evaluating how close counties came to the Searchable Format for submission of parcel data.

SCO staff documented what must be done yet to achieve the Searchable Format and thus meet Benchmarks 1 and 2. The intention is that the action items from the V4 Observation Report be used as a checklist to help develop and groom the county's data to meet the Searchable Format in the future.

Figure 9 shows an example of a V4 Observation Report.

Figure 9. V4 Observation Report (Example)

3.1.1 OWNERNME1 – Redaction of Owner Names

For the owner name attribute, some counties redacted owner names. Partial owner name redaction was conducted by eight counties for V3, although some counties redacted only a very small number of records. An additional county—Kenosha—withheld all owner names, consistent with a local county board resolution. Notably, since V3, Outagamie and Waukesha Counties and the City of Appleton have stopped redacting owner names.

Over time, this represents an improvement compared to the V1 database, in which 22 counties did not permit owner name display in the V1 statewide layer.

V4 Owner Name Redaction		
County	**Scope**	**Percent Redacted**
Kenosha	**Entire county dataset**	**100.00**
Barron (began w/V3)	Partial	0.82
Columbia	Partial	0.13
Dane	Partial	6.61
Jackson (began w/V3)	Partial	0.71
Oneida	Partial	0.01
Sauk	Partial	0.08
Sheboygan (began w/V3)	Partial	0.11
Vilas	Partial	0.19

3.2 Benchmark 1 and 2 Progress Assessment

Benchmarks 1-4 were initially defined in detail within the V1 Interim Report:

- Benchmark 1 – Parcel and Zoning Data Submission
- Benchmark 2 – Extended Parcel Attribute Set Submission
- Benchmark 3 – Completion of County Parcel Fabric
- Benchmark 4 – Completion and Integration of PLSS
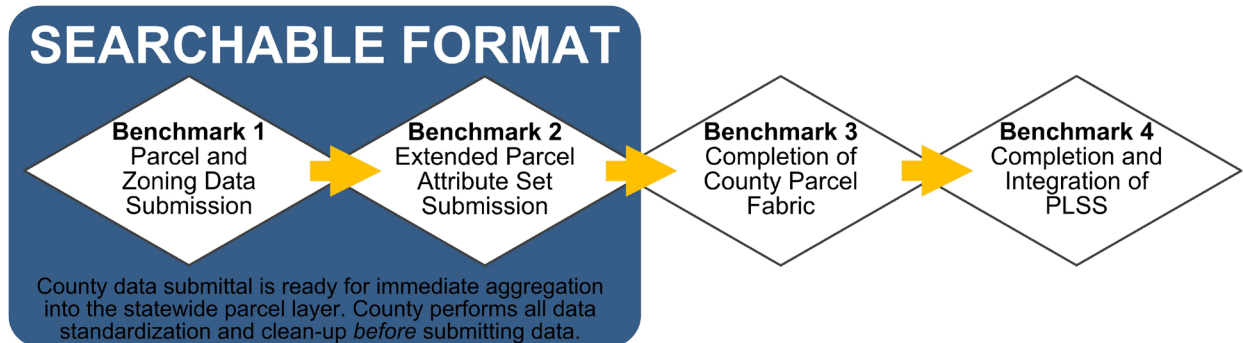
Figure 10. Searchable Format with Benchmarks

Benchmark 1 and 2 are explored below for the purpose of assessing progress between V2, V3, and V4. For both of these benchmarks, progress between the successive projects is captured in comparing the individual V2 Observation Reports, V3 Observation Reports, and V4 Observation Reports.

3.2.1 Benchmark 1 and 2 – Parcel and Zoning Data Submission and Extended Parcel Attribute Set Submission

Benchmark 1 and 2 were satisfied by submitting parcel, tax roll, and relevant zoning information using the required standards detailed in the Submission Documentation. Because Benchmark 1 and 2 are closely related and go hand-in-hand, they are often discussed together. The main distinction is that for Benchmark 2, counties must submit parsed address components with their parcel data.

For parcel and tax roll data submitted for V1, V2, and V3, there were two submission format options—the Export Format and the Searchable Format. For V4, the Searchable Format was the only submission option.

The Searchable Format is a format that directly meets the data model requirements of the final statewide parcel layer. This format is not expected to change in the foreseeable future and is intended that only essential modifications be made for future iterations of the statewide parcel database. The Searchable Format is the format that all counties will be expected to use for future versions of the project.

The "Export Format" was a format for data exchange. Data received in this format—from 2016-2017—was processed by the parcel aggregation team to meet the data model requirements of the final statewide parcel layer. This format was acceptable for counties to use for submitting parcel and tax roll data for the V1, V2, and V3 projects, but the Export Format was phased out for the V4 Project, when it was no longer accepted. The Export format is not compatible with the intended asynchronous update model and is a major obstacle to achieving the objective of automation and efficiency in statewide parcel aggregation. It was originally devised to accommodate variations in local data and allow counties time to gradually adjust to the submission requirements of the Searchable Format.

Parcel Data Evaluated Against Benchmark 1 and 2

Assessing progress in county achievement of the Searchable Format—equivalent to attaining Benchmark 1 and 2—for parcel data can be performed by referencing the V2, V3, and V4 Observation Reports. The reports track all substantial manipulation that needed to be performed on each county parcel data submission, on a per attribute basis. The table below summarizes the progress between V2 and V4, **for parcel data**.

Benchmark 1 and 2 Progress Assessment – For PARCEL Data			
Attributes	**V2 Attribute Errors**	**V3 Attribute Errors**	**V4 Attribute Errors**
PARCELID	3	0	4
TAXPARCELID	1	30	4
PARCELDATE	40	8	4
TAXROLLYEAR	7	1	2
OWNERNME1	1	1	1
OWNERNME2	0	6	6
PSTLADRESS	31	42	**30**
SITEADRESS	19	3	1
ADDNUMPREFIX	12	4	5
ADDNUM	35	8	8
ADDNUMSUFFIX	17	10	8
PREFIX	19	5	11
STREETNAME	34	21	**32**
STREETTYPE	37	5	5
SUFFIX	15	3	2
LANDMARKNAME	8	0	0
UNITTYPE	16	1	1
UNITID	22	4	2
PLACENAME	11	1	0
ZIPCODE	59	1	3
ZIP4	8	1	1
STATE	11	1	1
SCHOOLDIST	8	11	4
SCHOOLDISTNO	19	1	2
IMPROVED	18	0	3
CNTASSDVALUE	7	0	4
LNDVALUE	3	0	2
IMPVALUE	3	0	2
FORESTVALUE	4	0	0
ESTFMKVALUE	7	2	**50**
NETPRPTA	7	2	2
GRSPRPTA	6	1	1
PROPCLASS	4	4	6
AUXCLASS	20	3	6
ASSDACRES	2	0	2
DEEDACRES	2	0	0
GISACRES	1	1	1
CONAME	7	2	2
PARCELFIPS	6	3	2
PARCELSRC	7	3	2
PROJECTION	19	5	2
NET TOTAL	**556**	**194**	**218**

The vast majority of counties came close to meeting the Searchable Format in their initial V4 parcel data submissions. Given the complexity and size of the local data, not all counties submit "perfect" Searchable Format submissions on their first attempt. Few counties met the standard for parcel data exactly with their initial data submission.

- Met Searchable Format for V4 parcel data submission on initial data submission: ~2 counties
- Missed Searchable Format for V4 parcel data submission by one attribute: ~8 counties

Zoning Data Evaluated Against Benchmark 1 and 2

For zoning data, the results indicate that several counties had an issue with achieving the Searchable Format for V4 zoning data—which for V4, meant including **DESCRIPTION/LINK** information with the submission, thus defining the zoning classes.

It should be noted only three zoning types were collected for V4 (county general, shoreland, and airport protection). The submission requirements were also looser than in previous years, as zoning data was not aggregated at the statewide level for V4 in 2018.

The table below summarizes the zoning data collection between V2 and V4, **for zoning data**.

Benchmark 1 and 2 Progress Assessment – For ZONING Data			
Zoning Type	**V2 Layers with Errors**	**V3 Layers with Errors**	**V4 Layers with Errors**
County General	19	28	**7** (of 54)
Farmland Preservation	30	26	not collected
Shoreland	46	42	**4** (of 24)
Floodplain	38	36	not collected
Airport Protection	30	16	**1** (of 12)
NET TOTAL	**179**	**164**	**12**

Individual county datasets are publicly available through UW-Madison Robinson Map Library's GeoData@Wisconsin. For the most current county data, consult the individual county's land records websites.

For information regarding the zoning layers, please see the Parcel Project Zoning Change Log and page 5 of the V3_Wisconsin_Statewide_Parcels_Schema_Documentation.

3.3 Benchmark 3 Progress Assessment

Data for Benchmark 3—Completion of County Parcel Fabric—collected via the 2018 WLIP grant application (at the end of calendar year 2017) is summarized below. These are the four counties who have yet to complete county-wide digital parcel mapping.

Benchmark 3 Progress		
As of 2017	**Counties with Incomplete Parcel Fabric**	**Estimated Year of Parcel Fabric Completion**
	Buffalo	2018
	Burnett	2022
	Crawford	2022
	Vernon	2019

3.4 Benchmark 4 Progress Assessment

Data for Benchmark 4—Completion and Integration of PLSS—collected via the 2018 WLIP grant application (at the end of calendar year 2017) is summarized below.

Benchmark 4 Progress	
As of 2017	**Counties with Incomplete PLSS (Self-Reported)**	**Estimated Year of PLSS Network Completion**

Counties with Incomplete PLSS (Self-Reported)	Estimated Year of PLSS Network Completion
Adams	2020
Ashland	2022
Bayfield	2041
Brown	2019
Buffalo	2027
Burnett	2022
Chippewa	2020
Clark	2023
Columbia	2020
Crawford	2022
Dane	2024
Door	2018
Douglas	2030
Dunn	2025
Eau Claire	2025
Florence	2019
Forest	2040
Grant	2050
Green	2030
Green Lake	2021
Iowa	2021
Iron	2030
Jackson	2028
Lafayette	2035
Langlade	2030
Marathon	2019
Marinette	2030
Marquette	2025
Menominee	2020
Monroe	2022
Oconto	2031
Oneida	2025
Outagamie	2019
Ozaukee	2018
Polk	2019
Portage	2022
Price	2030
Racine	2018
Richland	2019
Rock	2025
Rusk	2030
Sauk	2030
Sawyer	2030
Shawano	2018
StCroix	2021
Taylor	2021
Vernon	2019
Vilas	2025
Walworth	2019
Washburn	2018
Waupaca	2023
Waushara	2030

E0 PLSS Sub-Project

As part of V4, a pilot statewide Public Land Survey System (PLSS) layer, Edition 0, was created.

For background information on PLSS in Wisconsin, see the State Cartographer's Office webpage on Land Surveying and PLSS Topics.

The E0 feature class representing 29 counties totaled 83,688 points and will serve internal purposes of research and development. The V5 Project will produce comprehensive reporting on the planned update to the 1996 "24K Landnet" statewide PLSS database and a publicly available Edition 1 statewide PLSS database at the end of 2019, and will analyze the nature of county PLSS corner point data.

4 RECOMMENDATIONS

Several opportunities for improvement became apparent during the V4 Project. These opportunities were logged in the project team's documentation and were revisited for sake of proposing recommendations for V5 or subsequent projects. While some of the recommendations are simple changes that have little effect on the project workflow, data contributors, or public consumers, others have certain and significant impact and should be weighed accordingly.

4.1 Parcel Recommendations

Technology and Tools

1. **Strengthen Validation Tool Checks**
   - The creation of the Validation and Submission Tool has aided counties in identifying possible deficiencies in their data prior to submission. Identifying potential problems ahead of time allows counties to assess the flagged records, make corrections as needed, and overall, reduce the amount back-and-forth communication required to resolve issues that are observed during the assessment phase. While this tool has helped ensure that data more closely resembles the requirements of the statewide schema, there are further improvements that can be made.
     ▶ Further strengthen the logic of the Validation and Submission Tool to help **flag records** that could contain deficient data including:
       ▷ Checking parcels annotated with future tax roll years for "tax" values that should not exist for these records (CNTASSDVALUE, LNDVALUE, IMPVALUE, NETPRPTA, GRSPRPTA, et cetera).
       ▷ Flag fields that are provided with <Null> values for the entire dataset when values are expected (e.g., ESTFMKVALUE is missing for all records in the submitted dataset).
       ▷ Flag fields that contain coded domain values, not "flat" attribute fields as required.
       ▷ ADDNUM: Check for an atypically large number of instances of "0" in ADDNUM, where IMPVALUE is <Null>.
         - Note that some counties, such as Brown, might utilize "0" as a placeholder for all parcels with unassigned addresses.
       ▷ Improve ValidationSummary.txt file to better alert submitters to major issues observed.
       ▷ Update flag messages as necessary to provided additional information to users.
     ▶ Set a goal date, prior to the call for data, for Validation Tool edits to be complete.
     ▶ Add further tool clarifications and modifications based on the content of **Appendix A**.
     ▶ Add further tool clarifications and modifications based on the content of **Appendix B**.

2. **Research County Migration to ArcGIS Pro & Impact on Project Tools**
   - ESRI's continued focus on ArcGIS Pro warrants consideration if and when counties may be considering making the shift to ArcGIS Pro in the future. The most immediate impact a shift to Pro would have relates to the tools that have been made available for preparing data. ArcGIS Pro uses Python 3.x, as opposed to Python 2.7, which is used by ArcMap.
   - The 2019-2021 county land information plans available at the time of writing indicate that no counties exclusively use ArcGIS Pro. Approximately **seven counties** are using both ArcGIS Desktop and ArcGIS Pro: Ashland, Buffalo, Rock, Washington, Waukesha, Waupaca, and Winnebago.
   - One of these counties—Rock—is the only one with a plan to remove ArcMap from all county machines, which is targeted for the date of November 2020.
     ▶ Discuss the implications of counties making the switch to Pro and the timelines for such a transition.
     ▶ If appropriate for V6, test tools available to port code from 2.7 to 3.x, and determine which tools will present the most complexity in updating/upgrading so that efficient planning of tasks can occur.

3. **Explore Additional Data Preparation Tools and Retiring Tools**
   - Although the majority of counties came close to meeting the Searchable Format, very few counties met the standard specifications exactly. After strengthening Validation Tool checks as recommended, another option is to develop additional data submission tools to increasing the quality of initial data submissions.
     ▶ Assess the tools download statistics (page 9 of the current document) and email history on tools-related topics, to arrive at an estimate of the **statistics for tool download and usage**.
     ▶ Consider whether additional tools would be beneficial to the counties and decrease the amount of post-submission processing required by the project team.
     ▶ Consider integrating tool functions into Validation Tool, and/or retiring tools that get little use and are not worth the staff resources to offer and maintain them.

4. **Make Statewide Parcel Map Data Available in CSV or Excel Formats**
   - Many users or potential users of parcel data do not have ESRI software of their computer and therefore are unable to export the attribute tables or unaware that this is an option.
   - For V2 and V3, CSV deliverables were created upon request.

- To avoid record limitations in Microsoft Excel, the statewide database was divided into seven .xlsx files with an index, and, when zipped, was approximately 800 MB in size.
▶ Consider making the attribute tables publicly available in CSV or Excel formats, broken down into regions, as part of the annual list of deliverables.

5. Consider Parcel Web App Updates and Alternatives to Web App
- Since the release of the V1 web mapping application, user feedback has been collected related to the parcel databases and web app. This feedback can be useful in identifying additional features to consider developing for inclusion within the web application for future years.
- The V5 MOU requires **hosting and display** of the statewide parcel map database.
- Specifically, the V5 MOU requires that SCO, "Employ a hosting solution for the statewide parcel database and map layer (with the potential for a third-party hosting solution), and publicly display the statewide parcel database and map layer."
- Because the V5 MOU does not contain a requirement for a web app per se, this opens up the option of discussing efficiencies and alternatives for the web application.
  ▶ For V5, review Google analytics statistics for app use, perform an optional content analysis of the user feedback collected from V1–V4 to help identify highly requested app features that are desired by end-users, determine if development of those features is feasible, and decide on the best course of action for designing, developing, and implementing new features.
  ▶ For the medium- and long-term, discuss **alternative possibilities** for the statewide parcel web application.
    ▷ For example, is it possible that another state agency, such as DNR or LTSB, could engage the LTSB statewide parcel feature service and utilize one of their existing applications—like the Public Access Lands mapping application—to provide a parcel search function as does the current parcel app?
    ▷ Consider more basic alternatives for the V5 parcel layer, such as a simple Leaflet map or static map display which directs users to county interactive web maps that are more current, comprehensive, and have user-friendly search tools because they search far fewer records.
  ▶ For the medium- and long-term, consider **ways to differentiate feedback** from web app users versus those users who download the database.

6. Review .Ini Submission Form Format and V4_Intake_Spreadsheet_Active
- The outputs of the Validation Tool—the .ini submission form and the scripted aggregated form, V4_Intake_Spreadsheet_ACTIVE.xls—have out-of-date fields (e.g., "GrantAppFormat").
- There is potential for different organization, that perhaps aligns more closely with the schema or Observation Report format.
- Note, however, that any changes may be dependent on the configuration of the Validation Tool.
  ▶ Review the .ini submission form and V4_Intake_Spreadsheet_Active.xlsx and make changes to the Validation Tool as needed.

7. Encourage County Review of Observation Report Items
- To reduce the repetition of errors from previous years, encourage county review of Observation Report items and/or add Observation Report items as something for the county to check off upon data submittal.
  ▶ Remove the word "(optional)" that appears at the end of the LIO certification line in the Validation Tool.
  ▶ Review the V1 Interim Report (page 9), the certification prompt:
    ▷ "By typing my name in the line below, I hereby certify that this submission is complete (relative to the Element Occurrence Standard), and that the data I am submitting has been formatted and standardized according to the submission documentation to meet the Searchable Format standard. (optional)"
  ▶ Consider adding the language of the certification as a graphic in the Submission Documentation so it it clear that the certification need be true and meaningful.
  ▶ The grant administrator for the WLIP should cross-check future county grant applications with Searchable Format deficiencies noted in the Observation Reports.

8. Internal Pilot Run Test of Validation Tool
  ▶ Schedule a pilot run test of Validation Tool and data prep/upload process to identify possible areas of improvement and unification with a standard structure.
    ▷ If possible, unify the format with the schema or Observation Report format.
    ▷ Conduct test of Validation Tool with enough time to implement changes to the tool and Validation Tool Guide, if necessary.

Schema and Submission Documentation

9. IMPROVED – Discuss Entirely Omitting Requirement for IMPROVED Attribute
- IMPROVED is the one and only "calculated" attribute that is calculated on the county-end.
- IMPROVED is redundant, as it is calculated based on value in IMPVALUE.
- IMPROVED can be misleading, specifically in the case of tax-exempt parcels—because it indicates there is no structure on a property when there often is a structure (albeit not taxed).
  - ▶ Consider omitting the requirement that counties populate the IMPROVED field—thus making the field optional.
    - ▶ Discuss implications of omitting IMPROVED from schema.

10. PSTLADRESS and STREETNAME– Review Most Frequent Observation Report Comments
  - ▶ Review Observation Report comments on PSTLADRESS and STREETNAME—the most frequently commented-on attributes—for any documentation clarifications that could be added.
    - ▶ For example, add to the list of acceptable domains for each relevant attribute, and/or instructions for "standard exceptions" where necessary.
  - ▶ Discuss and reevaluate the need for a SCO-maintained comprehensive statewide street name catalog.
  - ▶ Consider any potential alternatives for validation checks which ensure that values in STREETNAME do not inappropriately have any other elements attached.

11. Multipart Polygons – Multiple Polygons with the Same Parcel ID
- Counties have asked whether multiple polygons can have the same parcel ID—such as adjacent lots that have the same owner or parcels that are split by a road/river/railway/ROW/easement/et cetera.
- For multiple polygons with the same PARCELID, they can provide the parcel geometries as "multipart polygons"—which essentially means that they should be non-contiguous geometries that correspond to only one (tax) record in the table.
  - This is consistent with section on One-to-One relationships in the Submission Documentation.
  - If each of the polygons in the native data have the exact same attributes within each instance in the attribute table (if they have the same PARCELID, this would likely be true), run the ArcGIS Dissolve tool over the features to convert them to multipart polygons. This effectively removes all cases of duplicate PARCELIDs.
  - ▶ Update documentation:
    - ▶ Add multipart polygons section to "One-to-One relationships" in the Submission Documentation.

12. Revisit Zoning Submission Requirements
- As defined by Act 20 and s. 59.72(2)(a), for the statewide parcel map, information related to individual land parcels should include "any zoning information maintained by the county." This has been interpreted by DOA to mean zoning ordinances administered by the county.
- This includes five separate county-administered zoning types: 1) county general zoning, 2) airport protection zoning, 3) farmland preservation zoning, 4) floodplain zoning, and shoreland zoning.
- Based partly on conclusions from the V3 Final Report, additional research, and consideration of federal and state agency stewardship of various zoning information, for V4, county general zoning, airport protection, and shoreland zoning were collected.
  - For V4 and prior years, all individual county datasets are still publicly available through UW-Madison Robinson Map Library's GeoData@Wisconsin.
  - Government stewards of county-maintained zoning data are actively encouraged to share their statewide GIS databases with RML—such as DATCP for farmland protection zoning, DOT's Bureau of Aeronautics for airport zoning, and FEMA for floodplain data.
  - ▶ Review zoning download statistics, consult with Robinson Map Library, and with the Wisconsin DNR Shoreland Zoning Program to evaluate the submission requirements for zoning data.
    - ▶ If appropriate, discuss collecting only **county general zoning** (with mandatory LINK/DESCRIPTION information to provide definitions of zoning classes) for V5—eliminating the collection of airport protection and shoreland zoning layers.

13. NETPRPTA and GRSPRPTA – Exclude Special Charges
- See NETPRPTA document. Special charges, special assessments, delinquent taxes, and special taxes are <u>not</u> included.
- Changes should be made to make NETPRPTA and GRSPRPTA consistent with the tax bill and to have both values based on sum of the taxes levied on real property according to the net assessed value rate.
  - ▶ Change documentation:
    - ▶ Update schema definition of NETPRPTA and GRSPRPTA.

14. Rounding for Assessed and Fair Market Values
- For assessed and fair market values, the V4 directions tell submitters to round "up" to the nearest cent.

- Assessed values (land, improvements, total) and estimated fair market value are rounded to the nearest hundred dollars: "It is not possible to estimate market value . . . therefore value estimates are generally rounded to the nearest hundred dollars" (WPAM 12-24).
  - ▶ Update documentation:
    - ▶ Consider dropping the rounding directions for LNDVALUE, IMPVALUE, and CNTASSEDVALUE (because the values for these fields are up to the assessor).
    - ▶ Change directions for ESTFMKVALUE to round to the nearest hundred dollars (in order to be consistent with the value shown on the property tax bill).
    - ▶ Decide whether the decimal comment is still relevant and omit if appropriate.

15. AUXCLASS – For Tax-Exempt Status
- More boldly emphasize in the documentation that AUXCLASS is where "tax-exempt" status is indicated.
- Add any clarifications for non-standard AUXCLASS values, if needed.
- If appropriate, address whether AUXCLASS can be used to designate "AWO" (**A**ssessed **W**ith **O**thers) parcels.
  - ▶ Change documentation:
    - ▶ Highlight AUXCLASS as the means to designate tax-exempt status and make other necessary clarifications.

16. No Way to Know "Assessed With" Parcels
- The schema does not allow a way to find "**assessed with**" parcels, which legitimately lack values in tax roll fields.
- The only way we know them on intake is if they are noted in the submission form.
- "AWO" might be a way to refer to assessed with parcels. At least one county has referred to AWO parcels as, "Assessed with Others where the tax key's values are wholly grouped with another parcel."
  - ▶ Research whether the DOR XML schema/PA-500 property record card has a field for an AWO indicator, and whether AWO parcels even appear as a record in the XML tax roll.
  - ▶ Update documentation:
    - ▶ "Assessed with" parcels should be added as an example, at a minimum, in the text box example of Explain-Certification.txt that tells counties to indicate all missing data.
  - ▶ Add to the Explain-Certification.txt a question to ask whether counties utilize the "assessed with" practice, and if so, how many records it applies to.

17. Determine Whether References to DOR XML and Formats are Up-To-Date
- In the past year, DOR may have updated their XML schema, PA-500 Property Record Card, CAMA database structure, et cetera.
  - ▶ Determine and discuss actions based on DOR updates during the last year.
    - ▶ Check DOR XML codes for AUXCLASS for tax-exempt parcels for consistency with schema.
    - ▶ Reference 2018 Assessment and Tax Roll Electronic File Transmissions and DOR Government Publications.

18. Coordinate with Vendors on Nulling Out Estimated Fair Market Value for Agricultural Parcels
- ▶ Notify the vendor GCS that for V4, the most common comment was for the attribute ESTFMKVALUE:
  - ▶ Null out ESTFMKVALUE values for parcels/portions of parcels that are Agricultural (PROPCLASS = 4). Parcels/portions of parcels that are Agricultural are assessed at "use value," therefore, ESTFMKVALUE = <Null>.

19. Make Improvements to Submission Documentation Checklist
- Improve the checklist in the Submission Documentation to address common problems from V4.
  - ▶ Change documentation:
    - ▶ Footnote TAXROLLYEAR for new parcels/splits.
    - ▶ Footnote the three attributes to be populated for all records (CONAME, PARCELFIPS, and PARCELSRC).
    - ▶ Emphasize Observation Report items to check off upon submittal.
    - ▶ Other V5 checklist updates and improvements as appropriate.

20. Owner Name Redaction Standard Enforcement
- Some counties redact the names of parcel owners in the OWNERNME1/OWNERNM2 fields.
- In addition to submitting a formal redaction policy, the county is instructed to denote redacted names as "NOT AVAILABLE."
- Over the years, there have been are inconsistencies in the collection of policies, and at least one county—Dane—submits redacted names as "CURRENT OWNER" instead of "NOT AVAILABLE."
  - ▶ Actions for redaction workflow:
    - ▶ 1) During intake assessment, ensure that written policy reflects the condition of the data.
    - ▶ 2) To the extent feasible, standardized redacted values to "NOT AVAILABLE."
    - ▶ 3) Provide a summary with percentage of redacted records per county.

21. PSTLADRESS/SITEADRESS – Add Explicit Directions for Non-Parcel Features
- ▶ Change documentation:
  - ▶ If non-parcel features are to be <Null> in PSTLADRESS/SITEADRESS, explicitly state this.

22. SCHOOLDIST/ SCHOOLDISTNO – Add Explicit Directions for Non-Parcel Features/New Parcels
- SCHOOLDIST/SCHOOLDISTNO are often null for many records, which is appropriate in some cases.
- As of V4, the Validation Tool does not consider future taxroll years and taxroll years of Null.
  - ▶ Change documentation:
    - ▷ Add directions on how to populate SCHOOLDIST/SCHOOLDISTNO for newly created parcels and non-parcel features.
      - New parcels/splits: May be <Null> in SCHOOLDIST/SCHOOLDISTNO
      - Non-parcel features: Should be <Null> in SCHOOLDIST/SCHOOLDISTNO

23. Update Comprehensive PIN Skips List
- The current practice is for SCO to document PIN skips for non-parcel features on a per-county basis, and record them in OneNote, as well as a comprehensive PIN skips list.
  - ▶ Discuss creating a separate appendix or database with PIN skips that is easily accessible for project team staff, and automating the task of disregarding the comprehensive list of PIN skips for all counties.
    - ▷ Discuss options for how to document newly uncovered PIN skips for non-parcel features.

24. Submission Documentation Section on Special Multi-Attribute Commonalities
- In several different places, there are numerous special notes that might apply to multiple attributes of different types, similar to "Commonalities across all schema elements."
- A new section might make it easier to follow the submission requirements for these special attribute classes.
  - ① **NEW PARCELS/SPLITS**
    - Explain how to use TAXROLLYEAR field to designate new parcels/splits
    - List in bullet form all of the attribute fields that must be <Null> because a newly created parcel should legitimately lack values in certain fields.
  - ② **TAX ROLL ATTRIBUTES**
    - List the so-called "tax roll attributes" in a bulleted list and/or with footnotes in the attribute table.
    - "Tax roll attributes" for purposes of the Parcel Initiative are not an exhaustive list of all attributes that appear in the tax roll. Instead, they are select attributes which often require calculations to be made by the county made in order to derive their values.
    - Tax Roll Attributes are:
      - CNTASSDVALUE   Total Assessed Value
      - LNDVALUE   Assessed Value of Land
      - IMPVALUE   Assessed Value of Improvements
      - FORESTVALUE   Assessed Forested Value
      - ESTFMKVALUE   Estimated Fair Market Value
      - NETPRPTA   Net Property Tax
      - GRSPRPTA   Gross Property Tax
      - PROPCLASS   Class of Property
      - AUXCLASS   Auxiliary Class of Property
    - Example Note:
      - Tax roll attributes with *both* AUXCLASS and PROPCLASS VALUES – Some parcels can have portions that are both tax-exempt and taxable in the same parcel. This is allowed under s. 70.1105 and often applies to church-owned or not-for-profit parcels. If a parcel contains both exempt (AUXCLASS) and taxable (PROCLASS) codes, then it is appropriate to populate field with the value for the taxable portion of the parcel.
  - ③ **NON-PARCEL FEATURES**
    - Reiterate that non-parcel features are designated by way of the PARCELID field.
    - List in bullet form all of the fields that can/should be <Null> for non-parcel features.
    - Reiterate that 3 fields must be populated for all records in the dataset—CONAME, PARCELFIPS, and PARCELSRC.
    - Example Notes:
      - – Non-parcel features – populate PSTLADRESS/SITEADRESS with <Null>
      - – Non-parcel features – how to populate SCHOOLDIST/SCHOOLDISTNO
- ▶ Add a section to the Submission Documentation to bring together in one place all of the special notes that might apply to multiple attributes of different types.

Addresses and USPS Standards

25. PREFIX – Division into PreDirectional and PreType
- Some counties have asked that the field for PREFIX, which combines two fields, be divided into two separate fields: **Street Name Pre Type** and **Street Name Pre Directional**.
- Dane, Jackson, and Richland Counties have made this suggestion.
- Care should be taken to balance the current workflow, and shifting national standards as they solidify.
  - ▶ Update documentation:
    - ▷ Add a NENA crosswalk or other notation in the Submission Documentation (e.g., Appendix B notation in legend; per attribute listing) so that the NENA field names are listed next to the statewide schema field names and FGDC notations.
      - ADDNUMPREFIX **AddNum_Pre**
      - ADDNUM **Add_Number**
      - ADDNUMSUFFIX **AddNum_Suf**
      - PREFIX **St_PreDir** *and* **St_PreTyp**
      - STREETNAME **St_Name** (formerly "StreetName" –NENA Standard for NG9-1-1)
      - STREETTYPE **St_PosType**
      - SUFFIX **St_PosDir**
      - LANDMARKNAME **LandmkName**
      - ZIPCODE **Post_Code**
      - ZIP4 **Post_Code4**

26. PSTLADRESS Contains Secondary Owner Name Elements
- There is an unresolved issue of how to address allowing or prohibiting any part of "line 2" (secondary owner name/OWNERNME2) of a mailing label being present in the PSTLADRESS field.
- Research has been gathered in the document PSTLADRESS Issue research options V2 regarding how some counties natively maintain address data.
  - Often records contain some type of owner name attached to the beginning of the PSTLADRESS value.
  - This is likely a result of concatenating all the PSTLADRESS elements together from various mailing label lines.
  - Secondary owner names should be in the OWNERNME2 field, not the PSTLADRESS field.
  - ▶ Review documentation:
    - ▷ Specify what to do with owner names from postal mailing address.
    - ▷ If appropriate, note that there may be legitimate reasons to include owner name elements, such as in the cases of trustees, agents, "C/O," and "ATTN" in the full mailing address field (PSTLADRESS).
    - ▷ If appropriate, add to the instructions for PSTLADRESS that counties should ensure that OWNERNME2 does not repeat elements that appear in the PSTLADRESS field.

27. Re-Evaluate Benchmark 2 – Address Parse and Site Address Requirements

- Benchmark 1 & 2 are "Parcel and Zoning Data Submission/Extended Parcel Attribute Set Submission."
- Benchmark 2 requires that counties **parse address elements** for the jurisdictional SITEADRESS of the parcel. This can be time-consuming for the counties, who often do not maintain parsed address elements, and the state—where project staff spend a vast amount of time locating and remedying errors in parsing.
- SITEADRESS is the full physical street address of the parcel. It is a single field, consisting of a single line.
- City, state, and zip code are <u>not</u> part of site address—but they are required as separate and distinct fields.
- Counties need <u>not</u> populate zip code for the jurisdictional site address of the parcel. The V2 Project revealed that 82% of counties do not maintain zip codes for site addresses (V2 Final Report).
- Both PSTLADRESS of owner and jurisdictional SITEADRESS of parcel are accepted as is, appearing in the statewide database unaltered.
- No standardized site address for the jurisdictional location of the parcel appears in the statewide parcel database (although the standardized field STAND_SITEADD does exist in the feature service).
- Some counties have pointed out the inconsistency of the parcel Searchable Format schema and USPS standards. The following list, which is not necessarily exhaustive of all comments received, represents comments that DOA has received on the topic of USPS standards and address element standardization.

Statewide Field Name	Alias	Benchmark 1 & 2 Requirement
OWNERNME1	Primary Owner Name	Yes
OWNERNME2	Secondary Owner Name	Yes – If available
PSTLADRESS	Full Mailing Address (Owner)	Yes
SITEADRESS	Full Physical Street Address	Yes
ADDNUMPREFIX	Address Number Prefix	Yes – Parse
ADDNUM	Address Number	Yes – Parse
ADDNUMSUFFIX	Address Number Suffix	Yes – Parse
PREFIX	Prefix	Yes – Parse
STREETNAME	Street Name	Yes – Parse
STREETTYPE	Street Type	Yes – Parse
SUFFIX	Suffix	Yes – Parse
LANDMARKNAME	Landmark Name	Yes – Parse
UNITTYPE	Unit Type	Yes – Parse
UNITID	Unit ID	Yes – Parse
PLACENAME	Place Name (Jurisdictional)	Yes
ZIPCODE	Zip Code	Yes
ZIP4	Zip Code Plus 4	Yes
STATE	State	Yes

- **Burnett** – We are following the USPS standard with our road name abbreviations, however these were flagged as needing to be fixed to fit the state format. These should follow the USPS standards as that is a national format.
- **Eau Claire** – We asked the Post Office about changing all of our County Roads to CTH and they did not respond positively. According to their Address Standardization publication Appendix F we are doing correctly and you are asking us to change.
- **Jackson** – I asked other counties why they don't change their address information to reflect the statutes. The response I commonly received was, "We list what the post office accepts, what they tell us." . . . . In the meantime, I'll change my root data to match that of the USPS standard, because "USH" and some "STH" addresses are getting kicked back, and I need addresses to validate during the tax bill season. . . .
  I received another call about our addressing format for physical addresses of parcels . . . from a banker, who was running into issues with Fannie Mae, trying to prove that County Road was the same as County Highway. Has the State DOA thought any more about . . . setting a preferred standard for abbreviations of County/State/US Highways?
- **Jefferson** – Has there been any movement on the antiquated address standard that is called for? I know the counties around us don't use those abbreviations for county, state and federal roads anymore. We look at their address data when we decided to move away from those abbreviations because USPS tells us that they are invalid for addressing mail . . . . If you want to use this data for direct mailing, USPS has to be high up on the list.
- **La Crosse** – As I've indicated in the past via email and in person, LaCrosse County formats their property address to meet postal standards, so we do not use the Prefix field in the since that you expect this to be used, it is used as Pre DIRECTIONAL. We do not use it as an abbreviate Hwy, because we follow the recommend naming convention to Highways (see USPS.gov Pub28).
- **Oneida** – Looking thru the V2 data lists etc., I noticed there is a requirement of the required Domain for roads type to be Road, Alley etc. Why wouldn't the Accepted Domain be the NENA or postal standard that is being used in County 911 systems and elsewhere. Many counties have converted to that standard with the wireless 911 grants and now there may be a different requirement for this data set . . . . What is going on with STREETNAME issue. Based on some of the string of emails, it appears the State is not complying with the postal standard and I do not want to change to something that is not an already recognized standard. When we standardized our names in the early 1990's we were in contact with the post office at that time and they approved of the way we have them in our data. Our 911 system is built around that structure now. I brought this up before and want to know if the state looked at the differences with the US postal Standard (Publication 28). Seems to me we are going backwards particularly when the state wants road spelled out as a type when the postal standard does not.
- **Richland** – I'm wondering if there has been any movement in trying to determine a statewide "street suffix abbreviation" guide? We would like to start updating our addresses so they will meet the State requirements. Currently, our labeling is consistent with the USPS guidelines . . .
- **Waukesha** – [In response to Validation Tool flag, "Value provided in STREETTYPE not in acceptable domain list."] These are in both your list and the USPS list of abbreviations, these should not be errors.

- Beginning with V3, the schema was expanded to accept USPS domains for PREFIX (e.g., CTH, or COUNTY HIGHWAY, or COUNTY ROAD). However, USPS abbreviations for STREETTPE are not accommodated for.
- There are benefits to parsed address elements. They enable search of the site address field in both the statewide database and the web app.
  ▶ Discuss why parsing of address elements is necessary and justified, including whether there is documented evidence of any end-users utilizing the parsed address elements.
    ▷ Discuss the county-required standardization of elements that make up SITEADRESS and the justification.
    ▷ Discuss parsing of address elements in relation to the SCO-created **standardized site address** field.
  ▶ Discuss whether site address element standardization/STREETTYPE can be accepted formatted to **USPS standards**?

Observation Reports

28. Intake to Observation Report Workflow
- Currently the various phases of ingest, re-requesting data, documenting deficiencies, and creating Observation Reports takes several months.
- The timeline for Observation Report generation in the V5 MOU is accelerated. The V5 MOU requires "parcel benchmark data to be provided to counties **within six weeks** after data submission date."
    - This means six weeks after a *complete* submission is received. If resubmission is necessary, the six week timeline restarts.
    - If many counties come in at once, the timeline has the potential to exceed six weeks.
    - The accelerated timeline has some drawbacks. For example, there may be some cases where an issue could be discovered during later phases, like statewide logic. Also, the pool of comments may not be as standardized as in the past.
- There are a few places that efficiencies might be realized. Options might include (but are not limited to):
    - Make a standard **template for showstop/resubmit emails**, for each major scenario. The template should make the issue easy to see, and highlight the action that the county should take to resolve the issue.
    - Make showstop/resubmit comments more closely resemble the final Observation Report CSV comments.

    - Current Intake-to-Observation Report Workflow:
        - First Round
            - Notes in OneNote
            - Notes to students/internal SCO notes/queries
            - Draft showstop/resubmit email to DOA
            - DOA showstop/resubmit email
            - Re-submittal of data by county
        - Second Round
            - Notes in OneNote (additional)
            - Notes to students/internal SCO notes/queries
            - Highlights in "Parcel Ingest Notes"/other sub-sections
            - Populate "Processing Steps" with comments as standardized as possible
        - Third Round
            - Copy "Processing Steps" from OneNote to CSV, removing extraneous information/characters
            - Copy highlighted notes outside of "Processing Steps" to CSV
            - Copy showstop/resubmit/re-submit email comments to CSV
            - Standardize comments in CSV into final Observation Report form
    - ▶ Locate and realize efficiencies in the Intake-to-Observation Report workflow.
        - ▷ SCO/DOA will work together to harmonize styling rules and streamlining to make the process as seamless as feasible (e.g., highlighting relevant text in OneNote).
        - ▷ Decide upon a system for distinguishing things that belong in Processing Steps but not Observation Report and vice versa.

29. Establish Showstop/Resubmit Email Template
- Currently the various phases of ingest, re-requesting data is time-consuming, and involves multiple people handling the same data or notes on data deficiencies in order to re-request data.
- SCO provides the raw data, then DOA translates, edits, and sends to counties showstop/resubmit and submission inquiry emails.
    - ▶ Establish a standard showstop email workflow.
        - ▷ Consider an **automated option for showstop/resubmit emails**, or method for SCO to author showstop/resubmit email content that is ready for DOA to send or as close as possible to final format.
        - ▷ This could involve an innovative **draft showstop/resubmit email template technology**. Ideally this will feature a county name and a with a uniform subject line (so that emails are easily indexed, made searchable, and can be transformed into quantitative data), and utilize the same email/technology platform for both DOA and SCO.
    - ▶ As a project team, meet to identify a workflow, compile a list of email templates, categorize them.

30. Confirm Design of OneNote Template
- Some elements of the OneNote template change each year, as the data submission requirements change.
    - ▶ For V5, confirm design of the OneNote Template.
        - ▷ What is the relation between OneNote and the showstop/resubmit template email?
        - ▷ Is there one standard section for "standard exceptions"/county known issues?
        - ▷ Does every county have a PIN skips section? Can they be listed in a separate storage space?
        - ▷ What goes on the "__STATUS_BOARD__"?
    - ▶ Consider keeping notes on another page within the tab, having a specific box for Observation Report notes, or a special highlight color for Observation Report comments.

31. Establish Best Practice for County Data "Standard Exceptions"
- Some counties have "standard exceptions"—perennial issues with legitimate data that presents exceptions to the logic of the statewide schema and tools.
- One example is directionals in various fields, like ADDNUMSUFFIX/ADDNUM field, and street names that have alpha characters that are legitimately not directional abbreviations.
    - Iron and Sawyer: ADDNUMSUFFIX values of "N" or "W" are attached to address number and are not a street directional prefix, such as 7943N POST AVENUE and 435N SPRINGSTEAD ROAD
    - LaCrosse: STREETNAME containing "E" or "W" are a true part of street name, not a prefix, such as E OLSON and W SEVERSON.
    - Chippewa: S SOUTH is a legitimate STREETNAME value.
  ▶ Establish best practices for county data "standard exceptions."
    ▷ SCO: Add to standard exceptions list based on content of **Appendix A** and **Appendix B**.

The 4 A's, Workflow, and Sustainability

32. Project Staff Roles And Responsibilities
- For V5, the project team has been fortunate to add another staff member, and roles for other staff have slightly changed.
  ▶ For V5, set forth roles and responsibilities for each team member, similar to the EBM Staff_Roles document.

33. Increase Education and Outreach on Success Stories and Testimonials
- The number of downloads, hits, and users of the statewide parcel map database, from V1 to V4, is sizable.
- While the project team is aware of some of the ways the data is used, and how it benefits some businesses and citizens in the state, there has been little public communication surrounded on success stories and testimonials related to database usage.
- It is important for decision-makers in government, including those at the county-level such as county boards, to understand the benefits of the Parcel Initiative.
  ▶ For V5, perform a content analysis of the user feedback collected from V1–V4 and develop plain language material(s) that can be widely distributed to explain the positive uses and benefits of statewide parcel data.

34. Make the Call for Data Date Earlier
- There is evidence that many LIOs do not read the Submission Documentation.
- Some counties have requested earlier notification of the submission requirements, such as Dane County:
    - "Because this publish is directly tied to calculations in the Treasurers systems it is critical to provide a clean year end snapshot of the data. Having a clear understanding of the data requirements in December provides us some time to modify the routines/scripts so that it can be part of the year-end publishing process. This generally takes place the second week in January. With the year-end rollover there are changes that are implemented in the tax system that does not allow us to reproduce the exact data after the rollover."
  ▶ Complete the call for data in December, beginning with a timeline for accelerated call for data finalization.
  ▶ Have the Submission Documentation printed, perhaps by DOA's Print and Distribution Services.

35. Preempt Call for Data for Counties in Most Need of Direction
- Some counties have fewer resources than others, lack full-time GIS staff, and/or have problems that seem to show up year after year.
  ▶ Discuss the option of calling counties with repeat problems to discuss issues pre-emptively.
    ▷ DOA or SCO can call counties at the time of the call for data, to walk through their Observation Reports and offer assistance.
    ▷ Identifying counties to target prior to the start of V5.
  ▶ Make a quick reference list of flagged counties/counties with numerous, repeat, or egregious errors.

36. Consider a Plan for Independent Municipalities, Especially in Milwaukee County
- Municipalities, especially those in Milwaukee County, sometimes do their own tax listing.
- Independent municipalities require extra attention to acquire and format data. In some cases, the data is a year old, because some municipalities do not share their tax roll datasets from the previous year until August, when the county takes over collection of payments from those municipalities. In those cases it is not possible for the county to meet the March 31st deadline for data submittal, hence those municipalities run a year behind on currency of their tax roll data.
  ▶ Inventory independent municipalities and consider a plan to eventually get most current tax roll data from them, especially those in Milwaukee County.
    ▷ Consult county land information plans and make comprehensive list of municipal exceptions.
    ▷ DOA follow-up with GCS on independent municipalities.

37. Revisit Overall Approach and the 4A's
- In terms of overall approach, it can be argued that there is tension or a mismatch between county native data formats and the DOA submission requirements.
- The V1-V4 Projects have taken the approach that **counties do not have to change their native workflow/ databases**, but the annual submission requirements from DOA require the native data be re-formatted for export in to meet the submission requirements.
- The **formatting of native data to meet the requirements must happen each year**. Otherwise, counties would have to maintain the data in the structure of the statewide parcel data model.
- It should be recognized that on the state-end, an external change may be needed before a drastically different approach is viable (e.g., county-wide assessment, a legislative change, DOR XML standard achieved by all counties and independent municipalities, developments facilitated by another state or federal agency).
  - ▶ Discuss the tension/mismatch between counties-don't-have-to-change-their-native-workflow approach versus the annual submission requirements from DOA.
  - ▶ Discuss remedies for counties being conditioned to suffer no (significant) consequences for submitting data that deviates from the submission requirements, and for taking responsibility of the condition of the data submittal.
  - ▶ Discuss implications of the change of the 4A's to a "long-term" goal, evaluate V4 progress on that goal, and what actions might be taken toward further automation and sustainability.
  - ▶ Explore avenues for counties to share best practices, especially with regard to areas like maintaining parsed address elements.

38. Establish PLSS Workflow
- For V5, as with V4, PLSS data will be collected for a sub-project to create a statewide PLSS layer.
  - ▶ Discuss a workflow for intake and processing of PLSS data submissions for V5.
    - ▷ Establish which parts of PLSS data intake are performed by whom and when.
    - ▷ Establish standard workflow for Brenda Hemstead's showstop/resubmit requests, with clear showstop criteria established prior to call for data, as well as showstop email template, if appropriate.
    - ▷ Clarify the relation between the the parcel OneNote versus the PLSS OneNote, and whether PLSS data need be a separate or integrated part of the V5 Observation Reports.
  - ▶ Finalize a 1-2 page PLSS call for data with PLSS requirements, to be included with the V5 call for data.

Appendix
A. V4 MOU Excerpt

Specific V4 Project deliverables:[6]

- **A statewide parcel database and map layer**.
- ~~Statewide county-maintained zoning layers~~.
- **Display of V4 parcel** ~~and zoning~~ **layer**s.
- **Hosting solution for V4 parcel** ~~and zoning~~ **layer**s.
- ~~Implement the Four A's solution~~. ~~August–December 2018~~
- **Download/Export of data and data subset capabilities**, including a clip, zip, and ship, download by filter, or download subset function.
- **Tools for the automation of data standardization and submission**.
- **Benchmarking data**. Provide data evaluating counties against current benchmarks.
- **Collection and delivery of ancillary data layers to the UW-Madison Arthur H. Robinson Map Library**, including county-maintained zoning layers that are not collected and/or aggregated by another government entity.
- **Collection of PLSS corner data for V4**. Collection of PLSS corner data as part of V4 call for data, with the exception of datasets that have not changed since they were last submitted to PLSSFinder.
- **Version 0 Statewide PLSS database**. Create a Version 0 (V0) statewide PLSS database aggregated from current county datasets using a documented process that, at a minimum, has the following characteristics:
  - Includes corner point data (may exclude polygon geometry)
  - Select points attributed and indexed
  - Select points include the PLSS attributes required by the 2018 WLIP grant application:
    - Accuracy class tag for new/updated corners: *survey-grade*, *sub-meter*, or *approximate*
  - Download only (no web app)
- **Draft of *Expanded Benchmark 4* for PLSS data submittal.** By June 30th, 2018, draft specifications for the submission of PLSS corner data for Benchmark 4, created with an eye toward standards for statewide aggregation of PLSS data.
- **A final project report for V4**, by November 15, 2018, written in collaboration with DOA. At a minimum, the report shall address:
  - Project background
  - Technical approach
  - Benchmark progress assessment – Assessment of where each county is at in terms of meeting the four benchmarks listed by the *V1 Interim Report* and the requirement for counties to achieve by the V4 call for data deadline of March 31, 2018.
    - Benchmark 1 – Parcel and Zoning Data Submission
    - Benchmark 2 – Extended Parcel Attribute Set Submission
    - Benchmark 3 – Completion of County Parcel Fabric
    - Benchmark 4 – Completion and Integration of PLSS
  - Final recommendations related to *Expanded Benchmark 4 for PLSS data submittal* – Recommendations related to specifications for the submission of PLSS corner data for Benchmark 4 (to be included as part of V5 call for data)
  - Recommendations for V5

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[6] From V4 MOU (2018, January), https://doa.wi.gov/DIR/V3_V4_Parcel_Project_MOU_AMENDED.pdf

Appendix
B. V4 User Feedback

ABOUT V4 USER FEEDBACK

This appendix is compilation of comments provided by users of the **V4** Wisconsin statewide parcel layer, received via email and by way of the V4 online user feedback form. This data has been cleaned. Questions and comments dealing with technical subject matter have been omitted. Some comments have been omitted due to lack of content, or combined, in the case of multiple comments from the same user. To view user feedback on V1-V3, see the V3 Final Report, Appendix B.

Total number of V4 responses that appear below: **147 responses**
Date of last update: **July 22, 2019** (last and final update)

> **Legend**
> - Purple text indicates Organization/Affiliation
> - User responses are broken down into the following sub-groups:
>
>   STATE GOVERNMENT
>   FEDERAL GOVERNMENT
>   LOCAL GOVERNMENT
>   PRIVATE SECTOR
>   NON-PROFIT ORGANIZATIONS
>   EDUCATIONAL INSTITUTIONS
>   PRIVATE CITIZENS

STATE GOVERNMENT USERS

V4 – STATE GOVERNMENT

▪ Wisconsin Department of Public Instruction (DPI)
USES • I oversee school district boundary changes for the DPI. This database has been of great value to find the location of parcels that are proposed for detachment from their district, and to ensure that the description of the parcel matches the actual territory. We are also currently working with county mapping personnel to determine if legally-ordered boundary changes have been properly recorded in county records—and find that there are mismatches between the parcel data and what the county map-makers have—so are able to point the county officials to discrepancies in their own data files. We have also used the parcel maps along with historical files to trace the boundary changes that may have affected a particular parcel for the use of current owners and school districts.
BENEFITS • Our agency is responsible for updating the federal Census maps with school district boundary changes. Being able to see the properties on the parcel map makes it much easier to draw those changes on the Census maps.
There is a state board that hears appeals of school boundary changes that were denied by the school districts. It has been very helpful to use the parcel information to show the appeal panel the exact shape and location of the territories under appeal.
We have provided information to the state elections board when issues of voting for school board elections have been raised.

▪ State of Wisconsin Board of Commissioners of Public Lands
USES • We use the parcel map as a basis for property line and parcel locations that we manage as well as the state parcel ID for joining other records that we have (i.e., mineral rights). Our staff also use the parcel layer to identify adjacent landowners to our managed properties. We find the parcel layer to be a much more accurate representation of property, corner, and line locations than the older Landnet (DTRSQQ) layer.
BENEFITS • All of our ownerships are now mapped from the older landnet layer to the 2017 parcel fabric. Review and modifications will now be made to the new 2018 parcel fabric.

▪ State of Wisconsin Board of Commissioners of Public Lands
USES • Used to help manage BCPL's ~78,000 acres of property
BENEFITS • Enabled us to find parcels with incorrectly identified owners.

- [Anonymous]
  USES • Try to identify land use type for assessment of stormwater runoff water quality for a particular area.

- Wisconsin Historical Society, Historic Preservation
  USES • Mapping, planning, analysis, decision making

- [Anonymous]
  USES • Property owners

- [Anonymous]
  USES • Looking for public hunting land and private land boundaries
  BENEFITS • I can see land boundaries

- Wisconsin Emergency Management
  USES • Used statewide parcel layer after 2018 flooding events, but could use it more in the future.
  Would like current aerial imagery—only really useful as a seamless statewide layer during an emergency event.

- [Anonymous]
  USES • Tracking deer

- State of Wisconsin [Agency unknown]
  USES • State of Wisconsin official business.

- Wisconsin Department of Natural Resources & Kickapoo Valley Reserve
  USES • The Kickapoo Valley Reserve is collaborating with Valley Stewardship Network (Viroqua), Mississippi Valley Conservancy (La Crosse) and WI DNR (La Crosse Office) for regional/area planning for bird conservation and other similar conservation objectives for the Kickapoo Valley.

- [Anonymous]
  USES • Determine a more accurate mapping pin location for addresses when a voter registers to that address
  BENEFITS • When county gis sites do not provide the address information we are looking for, using this site helps.

- [Anonymous]
  USES • Hope to view ortho and property lines for obvious encroachments

- [Anonymous]
  USES • Looking for the name of the body of water on a parcel

- [Anonymous]
  USES • Find out property owners

FEDERAL GOVERNMENT USERS

V4 – FEDERAL GOVERNMENT

- USDA-NRCS (Natural Resources Conservation Service)
  USES • USDA-NRCS uses it daily implementing our mission of putting conservation planning on private lands.
  BENEFITS • We use it to evaluate legal description for our environmental easement program. It is used extensively to target landowners in falling in particular regions such as 10 digit-hucs for specific programs.

- U.S. Fish and Wildlife Service, Marquette Biological Station
  USES • I work for the U.S. Fish and Wildlife Service and use this parcel layer to look up landowners to contact prior to surveying streams for sea lamprey. This dataset is more current then a platbook that may have been printed a few years ago. I love that I can overlay with our data to make sure I get the correct information that I need. I wish the state of Michigan had this. Thanks and please continue to do this.
  BENEFITS • Overlaying the parcel layer over our survey sites layers on streams so we know whom to contact about accessing their property. We use to use platbooks which are not always current.

- USDA Forest Service, Chequamegon Nicolet National Forest
  USES • Double checking our ownership boundaries, identifying neighboring landowners, identifying possible acquisition/exchange parcels, investigating access issues for special use permits, etc. We mainly use the gdb in GIS but will also likely use the map service through AGOL in the near future.

BENEFITS • Allows for more efficient workflows than working from plat books or individual county websites, much easier than having to request the GIS from each county individually

■ [Anonymous]
USES • I forwarded your update to both Census and Wildland fire which are two agencies that I know use this data set extensively - At Census the boundaries of the parcels align the boundaries of the county subdivisions and cities and are an important reference for the digitizing work when Census is updating boundary data. for fire the parcel data are used to identify "strategic planning" level structures - obviously if there is a wildland fire more specific tactical structure locations are needed. I know the BIA will need this information to identify tribal lands mapping as well. I have a call with them later this week and will share it with them at that time.
BENEFITS • The work you are doing is a product many of us "early planners" for the Wisconsin land informant program always envisioned and your efforts in carrying this through to reality is a vision realized. Just seeing your outcomes is a gratifying feeling and I have never really properly thanked you for this. Thank you - from my heart. this is good work you are doing and it is important in many ways.

■ USDA-NRCS (Natural Resources Conservation Service)
USES • Select by ownername1 properties of individual landowners with whom we are working in order to analyze land resources and resource concerns. This database also benefits us in understanding the relationships of private to public land for areawide planning.
BENEFITS • Thank you for all of your work on this it saves the USDA NRCS and FSA a tremendous amount of time having all the data easily accessible in one place.

■ U.S. Department of the Interior Land Buy-Back Program for Tribal Nations (LBBP)
USES • I need current GIS parcel layers for appraisal work.
BENEFITS • It is easy to access and saves time. We can start mapping sooner and hit deadlines on time.

LOCAL GOVERNMENT USERS

V4 – LOCAL GOVERNMENT
■ [Anonymous]
USES • I don't really plan to use it other than, perhaps, for personal use identifying parcels of public land for hunting.
BENEFITS • I am a former WI resident living in an adjacent MN county. I can see collaborative efforts benefiting from more "seamless" parcel data. Appreciate this data being available though.

■ Town of Hughes, Town Clerk
USES • Checking land ownership
Checking road locations
BENEFITS • Faster than download from county

■ Town Of Willard Zoning Committee
USES • Create Zoning map for Town of Willard, Rusk County. http:\\townofwillard.com\zoning
BENEFITS • We are able to make changes to our zoning map as parcel data changes

■ West Central Wisconsin Regional Planning Commission
USES • For development of a county housing study
BENEFITS • Since we are a regional organization, the statewide data set gives us data that is up-to-date enough for our purposes and we can get our entire geography without having to go to each county and request the data. It also ensures uniform attributes from cou

PRIVATE SECTOR USERS

V4 – PRIVATE SECTOR
■ O'Brien & Gere (OBG) [Engineering consulting firm]
USES • Parcel reference data for project / site location maps.
BENEFITS • This is a great resource and is very beneficial to us. Without it, we'd have to hire a surveyor to map individual parcels, which is expensive and takes a long time. Having this authoritative dataset at my fingertips makes my job so much easier!

■ Milestone Materials, Mathy Construction Company
USES • Access for information, planning purposes, public hearing maps
BENEFITS • So much easier and more efficient than accessing individual county's GIS sites.

- **Hiawatha Broadband Communicaitons**
  USES • Base layer for planning and design of broadband fiber optic networks.
  BENEFITS • In the planning stages the parcel data help us determine whether it is cost effective to build fiber optics into a particular area. During design we use it for selecting route, and infrastructure locations such as pedestals and handholes. It also helps us in design for making sure we are placing infrastructure within the public right of way and near property lines in order to better serve customers.

- **GAI Consultants - GIS Department**
  USES • State and Local Agency permit maps for related to environmental features in Wisconsin. Notification mailers for large Energy Projects.
  BENEFITS • One stop shop for a nice statewide layer with consistent attributes.

- **Northwoods Lands Trust**
  USES • We use parcel data for mapping of conservation easements and fee-owned properties
  BENEFITS • We use parcel data for mapping of conservation easements and fee-owned properties.

- **OMNNI Associates, Inc. [Engineering consulting firm]**
  USES • We use this as a reference layer in our basemaps for environmental and transportation projects.
  BENEFITS • It eliminates the need to maintain separate parcel maps from each county that we work in.

- **Divine Redeemer Lutheran School**
  USES • Verify address for state aide
  BENEFITS • In the past we have used the search bar that was located in the upper left to verify address for state aide. However, that search bar is now gone - this created a big problem for us.

- **Kickapoo Woods Cooperative**
  USES • Forestry projects- management planning, timber sales, MFL, etc
  BENEFITS • We use it often for property line data during field visits and on maps.

- **TRC [Consulting and engineering firm]**
  USES • Generally used for cartography, research, and reference. I had used it more dynamically in the 2016 version, see improvement suggestion below.
  BENEFITS • It is very convenient to have the entire state's dataset. It saves time in searching for data and it is very nice to have it centralized. Great for reference and cartographic needs!

- **Coldwell Banker Real Estate**
  USES • To include in a listing presentation of a parcel.

- **UW-Milwaukee**
  USES • Delineating extent of landowner permissions for mapping projet
  BENEFITS • Furthering research and streamlining the process of displaying geographic information visually

- **[Anonymous]**
  USES • Real estate
  BENEFITS • Being able to access property tax data across multiple counties

- **[Anonymous]**
  USES • We acquired a company located in WI and we were trying to gather information on the property included with the business

- **Mi-Tech Services Inc., GIS Department**
  USES • We use the parcel data to conduct high and low level utilities (primarily telecom and electrical distribution) planning and design. The parcel information greatly assists our company, Mi-Tech, in finding property owners throughout the state of WI.
  BENEFITS • The parcel dataset provides a unified dataset, which is far more efficient and convenient than seeking out GIS data from each county.

- **Resource Data [Software and GIS consulting company]**
  USES • Land use & ecological planning
  Research
  NOTE: I am consulting for a group inside of WI, Applied Ecological Services, Brodhead.
  BENEFITS • Collecting parcel data from each county is problematic and extremely time consuming. We are looking at several statewide issues. Having the data all in one location is a great time saver. Being able to process a large number of parcels at one time is extremely helpful.

- **[Anonymous]**
  USES • Looking for real estate to purchase throughout Wisconsin
  BENEFITS • Have benefited from local datasets on the county level but haven't used the statewide data yet

- **[Anonymous]**
  USES • Identifying property owners within project area

- **Continental Properties Company, Inc.**
  USES • Researching property values and real estate taxes of newer residential properties, both single-family and multifamily.
  BENEFITS • We have used the statewide parcel layer as a resource for multiple real estate development projects throughout Wisconsin. Our land planners use the parcel data to show property lines adjacent to our development sites.

- **The Westmark Group [Consulting firm]**
  USES • I used this map to look up the parcel number, acres, and county name for properties that I was doing a Phase I Environmental Site Assessment.
  BENEFITS • I was easily able to look up the parcel that my Property of interest sits on as well as more info, such as owner, acreage, etc. without having to call any government agencies to help me.

- **Town and Country Engineering**
  USES • We work with many communities throughout the state for various engineering projects, WWTF upgrades, etc.
  BENEFITS • Much easier to obtain then dealing with individual counties.

- **Coleman Engineering**
  USES • Search points for property corners to help pinpointing locations for surveyors in the field, basic map reference for parcel lines, acreage calculations, line intersects
  BENEFITS • Saves time with data collection in the field, nice having the knowledge that if any projects come up in WI we already have the parcel data, saves money in not having to purchase parcel data from counties or other external source.

- **[Anonymous]**
  USES • For GIS system

- **[Anonymous]**
  USES • GIS software for forest harvesters
  BENEFITS • The data, provided freely, in vector file and of all county combined, saved us cost and time in both research and data integration in our system.
  The team is also supportive with providing additional information whenever needed.

- **Geographic Techniques LLC – Madison WI**
  USES • This particular download of parcel data will be to develop maps to be used in the Driftless Trail planning area study, and to identify land use types and potential friendly land owners.
  BENEFITS • Through the identification of land owners and land area in conservation and archeologically sensitive areas.

- **Anderson Engineering of Minnesota, LLC**
  USES • Map display for USACE Flowage projects
  BENEFITS • Parcel data is useful for display pirposes and also for preliminary survey investigation

- **Green County Mutual Insurance Company – Monroe WI**
  USES • Find the Tax Parcel ID, Find the registered owner and mailing address of owner of properties.
  We are a mutual insurance company - Green County Mutual in Monroe WI
  BENEFITS • Make sure we properly cover all the owners of a property for liability insurance, and make sure people are true owners of house.

- **Valley View Forestry, LLC – Mosinee, WI**
  USES • Identifying client and adjacent properties, final map product layers/data, aiding in field location of property lines during timber sale establishment
  BENEFITS • By success in achieving the uses outlined above.

- **CORRE Inc. [Engineering firm]**
  USES • Information for appraisal for WisDOT.

- Snyder & Associates [Engineering firm]
  USES • Mapping & Preliminary Engineering
  BENEFITS • It is very beneficial in preliminary design and mapping for land surveying and civil engineering. Please continue this service!

- A&M Professional Services, LLC
  USES • Parcels are a phenomenal base map for almost any application in local mapping. Parcels are perfect to join data sets to because of the address field, and this allows for easier integration of spreadsheets and other data that has parcel numbers, or more commonly addresses.

- Valley View Forestry
  USES • Preparation of maps for: Managed Forest Law entry, navigation for timber sale establishment, timber sales
  BENEFITS • Access to landowner data is exceedingly helpful for preparation for the various projects our company undertakes, and having the data downloaded and on hand for querying and manipulation on our own county basemaps is much more convenient than having to check . . .

- [Anonymous]
  USES • To show property lines on utility project exhibits.

- Big Oaks Hunting Club
  USES • Find out owners of land for possible leasing

- Cooper Engineering/Survey
  USES • Project planning - This is my first time downloading the data.

- [Anonymous]
  USES • Land appraisal
  BENEFITS • It is easier to make maps

- [Anonymous]
  USES • General research for information on parcel number, owner, size and approximate value.
  BENEFITS • We research the entire state so this is a huge benefit and time saver as we no longer have to find each individual county's parcel layer. This layer serves as our "first start" to obtain parcel information which we can then reference the county data if n

- [Anonymous]
  USES • I use this data to locate our company parcels throughout the state. I also use it to find neighboring parcels to our property in order to send out neighbor letters.
  BENEFITS • Being able to see all of the property we own at the tips of our fingers is invaluable.

- SVA Consulting/ Consulting division/Data Solution COE
  USES • I have a client who needs to understand the distance to shoreline for every home in WI. I will get more details about the needs but I see the use cases for parcel to be substantially beneficial to associations in WI when related to the attributes that des
  BENEFITS • I want to yes we are in the process...and I see us benefiting tremendously from this source.

- Hiawatha Broadband Communications
  USES • I am with a broadband company in Eastern MN and we use the parcel data for planning and design of communications networks.
  BENEFITS • My company has benefited by having quality data that is easily accessible. This data is difficult to obtain in other states and is often of questionable quality with a wide variety of the attributes provided with the data.

- Infrastructure Research - Large Corporation
  USES • We use parcel data for analysing service locations for communications products.
  BENEFITS • Yes. We use the site address data to assist geocoding and we use the parcels boundaries in conjunction with building data to analyse service locations.

- Motorola Solutions, Inc. Post-Sales Engineering, Territory 5 North.
  USES • Showing County boundary on maps analyzing coverage for public safety radio systems
  BENEFITS • The shapefiles will enable us to show the Pierce County boundary on radio system coverage maps, that we are using to help test radio coverage in Pierce and nearby Wisconsin counties.

- **Adaptive Restoration LLC**
  USES • Mapping and delivery of data to private and public clients, in forestry and ecological restoration applications
  BENEFITS • Allows us to improve accuracy of mapping, which benefits our clients (public and private), and improves the quality of maps which are essential to state programs like the Managed Forest Law (MFL), and federal programs such as EQIP, through NRCS.

- **BayView Real Estate Inc.**
  USES • Real estate work.
  BENEFITS • Property info to the public for real estate purposes.

- **[Anonymous]**
  USES • Solar farm layout

- **Global Minerals Engineering LLC**
  USES • ARC/GIS layers extracted for various government ownership.

- **Ruekert-Mielke, Inc/GIS**
  USES • Analysis and mapping

- **Hauke Honey Corp.**
  USES • Location of property owners for location of honey bee aprairies.

- **[Anonymous]**
  USES • We are using the parcel data to help create a more accurate landbase for tracking customers, etc.

- **[Anonymous]**
  USES • Used for project planning and communication with landowners.
  BENEFITS • Having public access to the parcel data allows us to have accurate up-to-date reference data for informational purposes and communication efforts with landowners.

- **Delta 3 Engineering**
  USES • I intend to use the data to check PLSS geometry for re-monumentation in Iowa County.
  BENEFITS • We perform property survey's and use county parcel viewers to access data.

- **Tim Mulhern Forestry**
  USES • Assist in mapping forest land ownerships for entry into the Managed Forest Law.
  BENEFITS • Very accurate parcel mapping helps with determining ownership and allows for downloading parcel onto my GIS program which greatly assists in mapping.

- **[Anonymous]**
  BENEFITS • We put parcel data into a CRE Viewer that allows brokers to quickly and easily find information about various properties.

- **Geographic Techniques LLC**
  USES • Flood zone mapping, neighborhood reference maps
  BENEFITS • Parcel boundaries are a fantastic reference for many mapping applications, from hiking trail corridor analyses to land use.

- **General Engineering Company**
  USES • Creating parcel ownership mapping for township in Adams County

- **Conservation Strategies Group, Joanne Kline, Western Great Lakes Region**
  USES • GIS based land protection and restoration projects for private landowners and nonprofit conservation groups
  BENEFITS • The parcel layer helps to prioritize potential conservation areas that have been selected based on a suite of other attributes, e.g. the feasibility of restoring a wetland in an area identified as having restoration potential is higher where the area coin

- **Square One Heating & Cooling**
  USES • I use the parcel website to determine permit municipality. I am currently unable to use the search by address option. Please advise as soon as possible. This has been an issue for approximately two weeks.
  BENEFITS • Ease of determining municipality for permit applications

NON-PROFIT USERS

V4 – NON-PROFIT

▪ Gathering Waters: Wisconsin's Alliance for Land Trusts
USES • I work with the state's nonprofit conservation land trusts. We have used (and will continue to use) the statewide parcel database to map the locations of the properties protected by these organizations, both those owned and those protected via easement.
BENEFITS • The parcel database allows us to create our _own_ database of protected natural lands. This benefits both individual land trusts in their programmatic work, as well as, perhaps more importantly, the entire land conservation sector by enabling diverse groups and individuals to understand how their work is relevant in a larger geographic context. In addition, the land trusts use the data to assess future project opportunities; something for which a detailed understanding of ownership and boundaries is, obviously, absolutely essential.
It also permits these groups and other supporting organizations to effectively work on cross-organizational projects and initiatives; something that simply would not be practical without a resource as thorough and well designed as the statewide parcel database.

▪ Ice Age Trail Alliance - GIS
USES • We use the Wisconsin statewide parcel layer to view land ownership around the Ice Age Trail, parcels we own, or in areas where we are planning the route of the IAT. We have also used the parcel layer in partnership with the USFWS to determine property owners that have habitat suitable for the Karner Blue Butterfly.
BENEFITS • It saves us a lot of time being able to see all the parcels in one place (instead of on multiple county websites) and being able to bring them directly into our GIS software, where we can see how the parcels overlap with our own data layers and perform analyses.

▪ Ice Age Trail Alliance
USES • Landowner information for land preservation and to notify nearby landowners when working in their area
BENEFITS • Made it a lot easier to find (relatively) current landowner data for mapping purposes

▪ UW-Parkside
USES • Generating lists of parcels by watershed location. Also getting property information for economic analyses.
BENEFITS • More targeted outreach efforts, and the statistical benefit of having a large dataset to work with.

▪ OpenStreetMap
USES • Populate addresses in OpenStreetMap
BENEFITS • By making the OSM dataset as accurate and thorough as possible, end-users of our data (of which there are many, including small businesses and non-profits) will be able to make better, more accurate decisions.

▪ Vernon Electric Cooperative/GIS Mapping
USES • We plan on using the data to identify land owners who are not coop members on our system that have our utility lines running across there property as well as use the parcel data to identify property lines when members are installing a new service to get a general idea where there property lines run
BENEFITS • Just downloaded yesterday and have not used it extensively yet. So far the feedback has been positive for us and our linemen and staking technicians are looking forward to using it as a great and useful tool for outages, line rebuilds, and new connects.

▪ Cooper Engineering/Survey
USES • Project Planning - This is my first time downloading the data.

▪ World Wildlife Fund
USES • World Wildlife Fund
BENEFITS • Using it to support the WWF Water Risk Filter. Thanks!

EDUCATIONAL INSTITUTION USERS

V4 – EDUCATIONAL INSTITUTION

▪ UW-Madison (Nelson Institute, WSGC/NASA Fellowship)
USES • Research on cover crop and no-till practices in Grant, Green, and Dane counties

▪ St John Lutheran School
USES • Address search

- UW - CLUE
  USES • Land use planning ideas
  BENEFITS • It is very information and a great additional layer for students to see current development patterns

- Monroe Public Library
  USES • Looking to use in public library

- University of Wisconsin-Green Bay
  USES • To contact landowners for streambank erosion and instream habitat surveys
  BENEFITS • Readily available landowner access. Makes contacting landowners for permission to access property to conduct ecological monitoring so much easier!

- [Anonymous]
  USES • I am using the parcel database to help map and inventory livestock operations across the state.
  BENEFITS • The publicly available licensed dairy producer list available from DATCP only includes mailing addresses and township and section info but I need to verify the actual location of livestock. Parcel boundaries are really helpful for that.

- UW Extension Center for Land Use Education at UW Stevens Point
  USES • Analyzing statewide conservation opportunities with a specific interest in lake protection.

PRIVATE CITIZEN USERS

V4 – PRIVATE CITIZENS

- Private Citizen
  USES • Recent land purchase will research other parcels in the area.

- Private Citizen
  USES • Permit requirements

- Private Citizen
  USES • Determine the value of the lots and lands that surrounding properties.
  BENEFITS • Determine the size, location, and value of lands.

- Private Citizen
  USES • I put in the parcel number and come up with names not on my parcel number

- Private Citizen
  USES • Finding new places to go deer hunting in new areas

- Private Citizen
  USES • Curiosity and evaluating a recent sale of adjacent property to ours.
  BENEFITS • Knowing it's a private individual and not a corporation.

- Private Citizen
  USES • It's enjoyable to just look through the data and analyze it.
  BENEFITS • Easy to look at data

- Private Citizen
  USES • Using the data to determine best locations for certain types of businesses based on property value and home proximity.

- Private Citizen
  USES • Looking for hiking areas.
  BENEFITS • We see what land is private to respect their property and not disturb their privacy and abide by all applicable trespassing laws.

- Private Citizen
  USES • Obtaining information on our family's property, finding out who owns the neighbor's property to bill for tree services (since we are unable to get a hold of the tenants)
  BENEFITS • public information to reach the right people

Private Citizen
USES • For hunting public land to ensure I am on state or county land.

Private Citizen
USES • To determine private land ownership for purposes of hunting wild game

Private Citizen
USES • Add data to an Arc Map project

Private Citizen
USES • Property search

Private Citizen
USES • Tax

Private Citizen
USES • Personal

Private Citizen
USES • I bought a property and wanted to see the property lines and the neighboring property lines.
BENEFITS • I could see the neighboring parcels.

Private Citizen
USES • Determine property lines
BENEFITS • Hunting edge of property

Private Citizen
USES • This is a great source for looking at where the state land is by my property in Oneida County.

Private Citizen
USES • Exploring real estate options.
BENEFITS • We have ideas for comparison shopping, and can target locations based on proximity to state trails.

Private Citizen
USES • For general parcel map and address info

Private Citizen
USES • I am part owner of this parcel and was trying to get a better idea of where the lot lines are.

Private Citizen
USES • Just wondering why the solar panels face the wrong direction. Hoping to talk to real persons about it.

Private Citizen
USES • Looking for owner of land

Private Citizen
USES • Needed to look up an easement

Private Citizen
USES • Review data as we plan to better management of our wooded propertis

Private Citizen
USES • To get an outline of my property lines

Private Citizen
USES • To talk to the owner about the solar energy he had installed.

Private Citizen
USES • Personal information about my property

Private Citizen
USES • Searching a house

Private Citizen
USES • Understanding my yard

- **Private Citizen**
  USES • Displaying public land on openstreet maps in the LaCrosse area
  BENEFITS • This a great tool THANK YOU FOR MAKING THE AVALABLE it makes my task much easer and acurate I was unable to get this raw data from the county's online map viewer i wish i could get this type of data from Minnesota to map there public land near lacrescent

- **Private Citizen**
  USES • Determine boundary lines, GPS coordinates for property corners
  BENEFITS • Being able to determine boundary lines and parcel locations

- **Private Citizen**
  USES • As an official data and information source

- **Private Citizen**
  USES • Searching for Kralcek TwelfthStreet Acres unrecorded plat map for 1925. I'm doing research on a 100-year old house for Preservation Racine, WI

- **Private Citizen**
  USES • Camping, hiking, swimming, possible land purchase
  BENEFITS • Not wanting to trespass

- **Private Citizen - Property owner**
  USES • Family property understanding
  BENEFITS • A better understanding of property assessments

- **Private Citizen**
  USES • Want to see how our new property is depicted.

- **Private Citizen**
  USES • Looking for boundry lines for potential backyard fence

- **Private Citizen**
  USES • Proof of Residency/County

- **Private Citizen**
  USES • I am a student, and plan to use these layers for a GIS research project with the hopes of presenting my project not only to my class/instructor, but also to my city council.

- **Private Citizen**
  USES • To send mailers to purchase property

- **Private Citizen**
  USES • To ask permission to hunt on properties.

- **Private Citizen**
  USES • House shopping - land information research

- **Private Citizen**
  USES • I'm searching for a home to buy and land to start a business. Possibly combining the two on one property. I've been searching for an interactive map that shows lot outlines, tax information, acreage and ownership. This is a beautiful resource—Thank you.
  BENEFITS • Some land I was considering is clearly part of a bigger project. Other plots I'm surprised of ownership which makes them a possibility.

- **Private Citizen**
  USES • Plat of survey showing property lines

- **Private Citizen**
  USES • Map of my land for county land use permit application
  BENEFITS • Permit application

- **Private Citizen**
  USES • Prepare feasibility study for light rail corridor in downtown Madison.
  BENEFITS • Yes, I have access to information on land ownership etc.