

Implementing a geocoding strategy

Geo-Enabling Elections

May 20, 2021



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Housekeeping

- **Slides** are available on the registration page
- Use the **chat panel** to say hello, chat with other attendees, and ask questions

What we'll cover today

- Define and discuss geocoding and a geocoding strategy
- Describe the geocoding process in an election administration context
- Practice manually geocoding addresses and correcting possible errors

Today's agenda

- Introduction (5 minutes)
- What is geocoding (15 minutes)
- Building a strategy (5 minutes)
- Case study (10 minutes)
- Breakout activity (10 minutes)
- Q&A (10 minutes)
- Wrapping up and course survey (5 minutes)

Hello, there!



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NSGIC

National States Geographic Information Council

Best Practices for Geo-Enabling Elections



An introduction

What is geocoding?



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Geocoding

Matching individual voter addresses to specific geographic point locations, expressed as geographic coordinates.

The basics

- Turning locations into geospatial data points
 - Ex: 1600 Pennsylvania Ave NW = 38.8977° N, 77.0365° W



38°53'51.7"N 77°02'11.4"W
38.897700, -77.036500



Directions



Save



Nearby



Send to your
phone



Share



The White House, 1600 Pennsylvania Avenue
NW, Washington, D.C., DC 20500



VXX7+3C Washington, D.C., District of Columbia

Source: Google Maps 2021

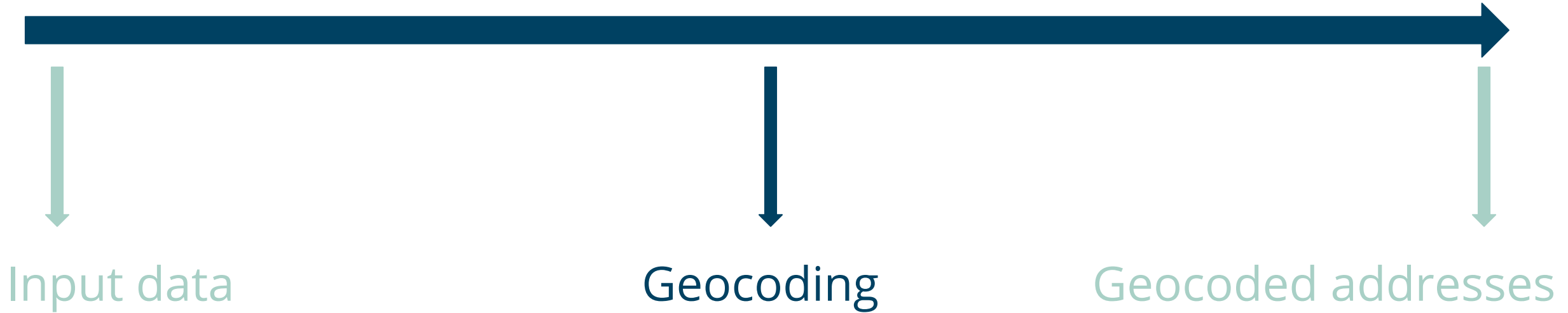
Why convert addresses?

- Humans like addresses, computers like data.
- Geospatial data, like latitude and longitude, is more precise.

Process overview

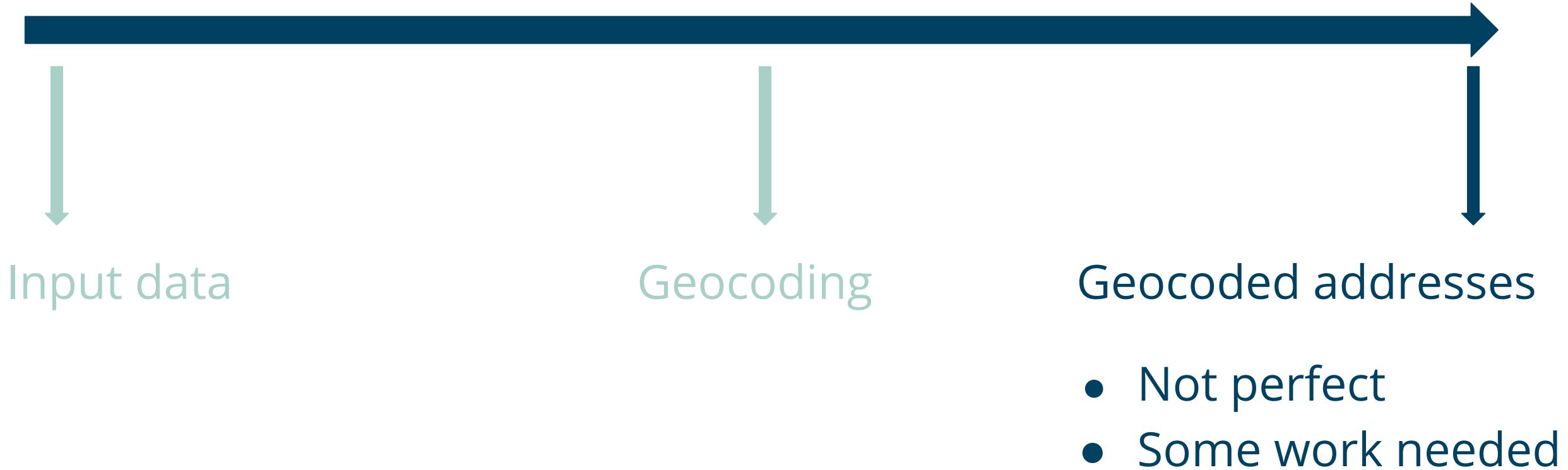


Process overview



- Enter data in geocoder
- Geocoder converts

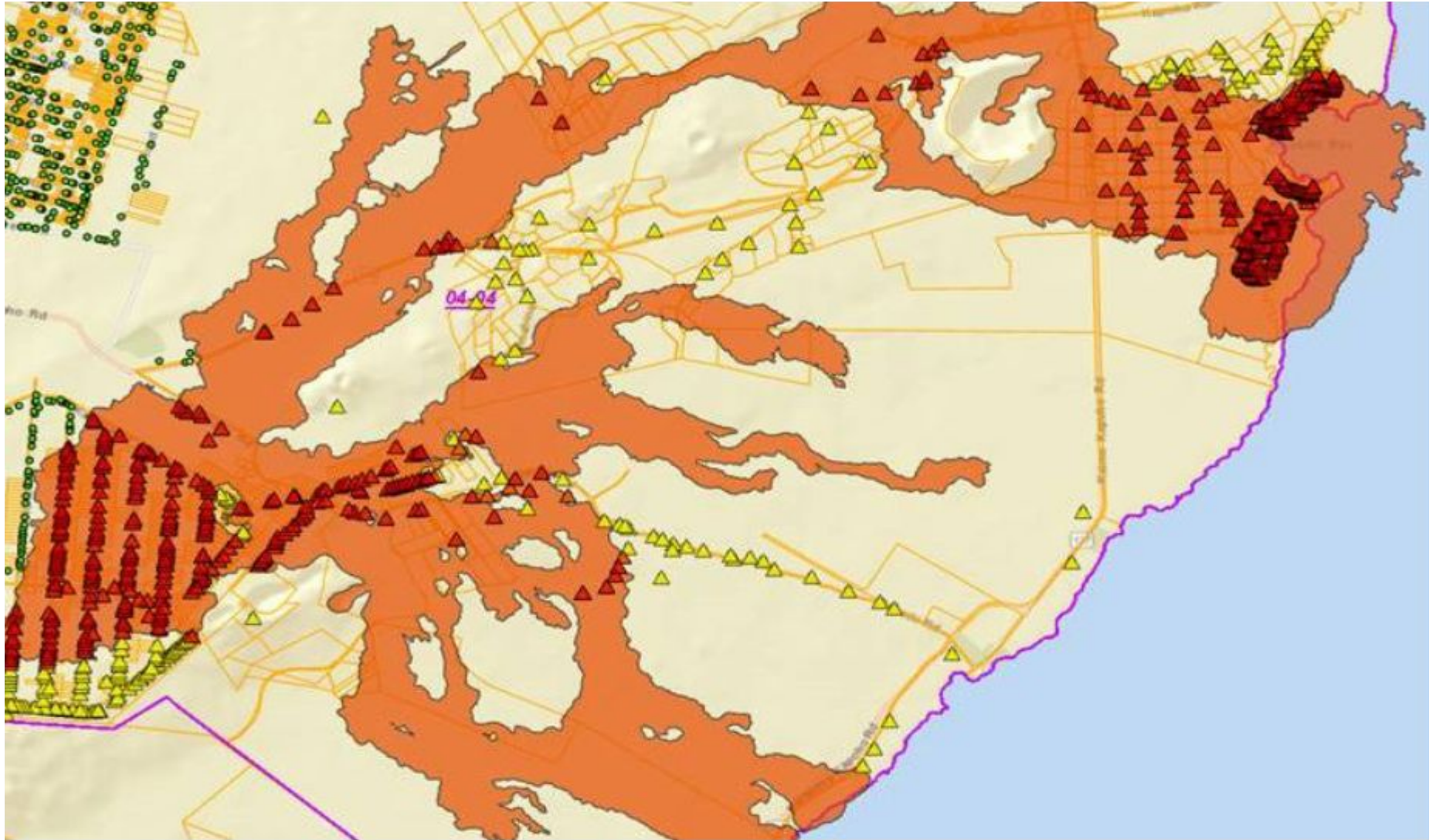
Process overview



How geocoding is used?

- Common uses
 - Next Generation 9-1-1
 - Postal Service
 - Elections
- Other possibilities
 - Tax assessor/commission
 - Planning, zoning & development
 - Other law enforcement uses

Applied geocoding



Source: "Case Study #5: Hawaii," NSGIC 2019

Visualizing elections data with APIs

- What are APIs?
 - Common
 - Convenient
- Voter registration integration

The screenshot displays the WISVOTE web application interface. At the top, there's a navigation bar with 'WISVOTE' and a home icon, followed by a dropdown menu for 'Address'. Below this is a breadcrumb trail: 'Addresses > N49W25202 SEVEN ...'. A toolbar contains various action buttons: 'SAVE', 'SAVE & CLOSE', 'CONFIRM', '+ NEW', 'DEACTIVATE', 'CANCEL', 'AUDIT HISTORY', and 'RUN WORKFLOW'. The main content area is titled 'ADDRESS' and shows the full address: 'N49W25202 SEVEN STONES DR, PEWAUKEE, WI 53072-1347'. Below this, there's a 'GENERAL' tab with a 'RESIDENCE' section containing fields for House Number (N49W25202), Street Name (SEVEN STONES DR), Building Name, Unit Type, Unit Number, Postal City (PEWAUKEE), State (WI), and Postal Code (53072-1347). A 'Process' button is at the bottom of this section. To the right of the form is a map view with 'Map' and 'Satellite' tabs, showing the location on a Google Map. Below the map, there's a 'DETAILS' section with 'Jurisdiction' (VILLAGE OF SUSSEX - WAUKESHA COUNTY), 'District Combo' (68181-008-3122-1), and 'Care Facility'. At the bottom, a metadata section shows 'Created On' (4/1/2016 4:13 PM), 'Created By' (Freiheit, Susan), 'Modified On' (4/1/2016 4:13 PM), and 'Owner' (VILLAGE OF SUSSEX - WAUKESHA COUNTY). The status 'Active' is shown at the bottom left.

Source: Wisconsin Elections Commission 2021

Geocoding formats

- Multiple formats exist
- Address will be the common denominator
- Beneficial to work with more than one format



38°53'51.7"N 77°02'11.4"W

38.897700, -77.036500



Directions



Save



Nearby



Send to your
phone



Share



The White House, 1600 Pennsylvania Avenue
NW, Washington, D.C., DC 20500

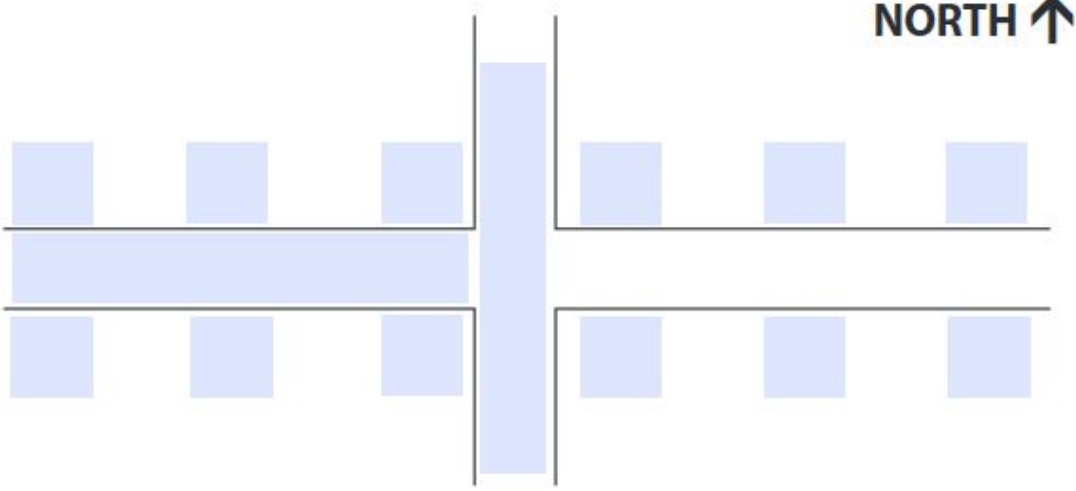


VXX7+3C Washington, D.C., District of Columbia

Source: Google Maps 2021

Geocoding formats

If you live in a rural area but do not have a street number, or if you have no address, please show on the map where you live.

C	■ Write in the names of the crossroads (or streets) nearest to where you live. ■ Draw an X to show where you live. ■ Use a dot to show any schools, churches, stores, or other landmarks near where you live, and write the name of the landmark.			
	Example	Route #2	● Grocery Store	
			Woodchuck Road	
	Public School ●		X	

Source: National Voter Registration Application Form, U.S. Election Assistance Commission 2021

Policy & technical considerations

Building a geocoding strategy



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Policy considerations

- Geocoding strategy could be dictated by:
 - State policy
 - Voter registration system format
- Develop formal coordination
- Create a plan for how to handle manual assignments



Technical considerations

- Locate the best available master address resources
- Determine what GIS software or APIs can enable you to geocode
- Find expertise to conduct the geocoding process



Geocoding for elections

Case study: Wisconsin Elections Commission



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Implementing geocoding

- First used geocoding in our system after 2010 redistricting process.
- Instead of spending time recreating street range tables, it was decided to create a more sustainable option by our IT staff.
- Ran every address in our SVRS through a geocoder and placed on a map overlaid with districts.
- Asked staff and clerks to review the results.

Initial barriers

- Without a GIS person on staff and adequate address QA/QC, many locations were inaccurate.
- Many of the addresses that were geocoded landed in the wrong place (some in the wrong state/country).
- Relied heavily on clerks and state staff to review every address, with very mixed results.
- Without proper classification or auditing, it was difficult to tell which addresses were wrong.

Wards, schools and sanitary districts

- Contains registered voter information which are connected to address records.
- Smallest voting units determined by combination of Wards, Schools and Sanitary Districts (District Combos).
- Municipal and County Clerks assign voters to a ballot style using a Google Maps API plug-in and ESRI geocoder.



ADDRESS

101 OSTHOFF AVE, ELKHART LAKE, WI 53020-19...

GENERAL

RESIDENCE

House Number*	101
Street Name*	OSTHOFF AVE
Building Name	--
Unit Type	--
Unit Number	--
Postal City*	ELKHART LAKE
State*	WI
Postal Code*	53020-1976
<button>Process</button>	

DETAILS

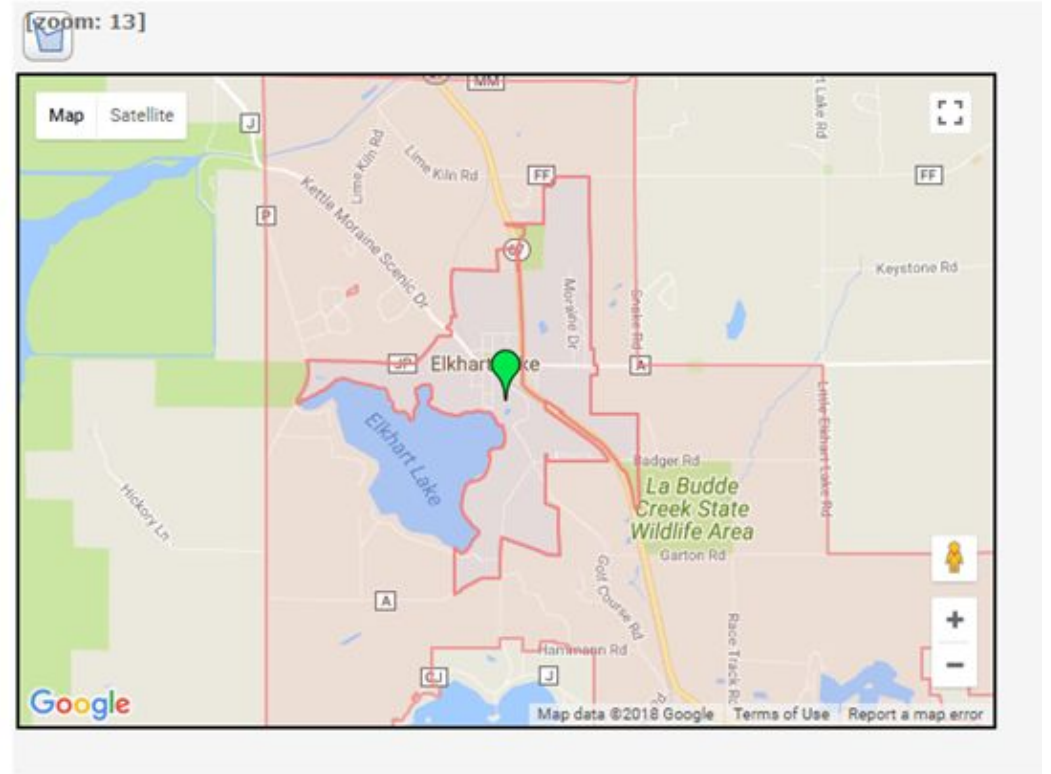
Jurisdiction*	VILLAGE OF ELKHART LAKE - SHEBOYGAN COUNTY
District Combo*	60121-001-1631-1
Care Facility	--

Municipality

Ward

School district

Sanitary split



GeoCode Source	OTHER
Geo DC Mismatch	No
District Combo Change	--
District Combo By Geo	60121-001-1631-1
Address Status	Valid



DISTRICT COMBO : INFORMATION

60121-001-1631-1

Name

60121-001-1631-1

District Combo Code

60121-001-1631-1

Description

Village Of Elkhart Lake - Ward 1 - Split 1

County

SHEBOYGAN COUNTY

Jurisdiction

VILLAGE OF ELKHART LAKE - SHEBOYGAN COUNTY

Map

☒

DISTRICT DETAILS

DISTRICTS

+ NEW

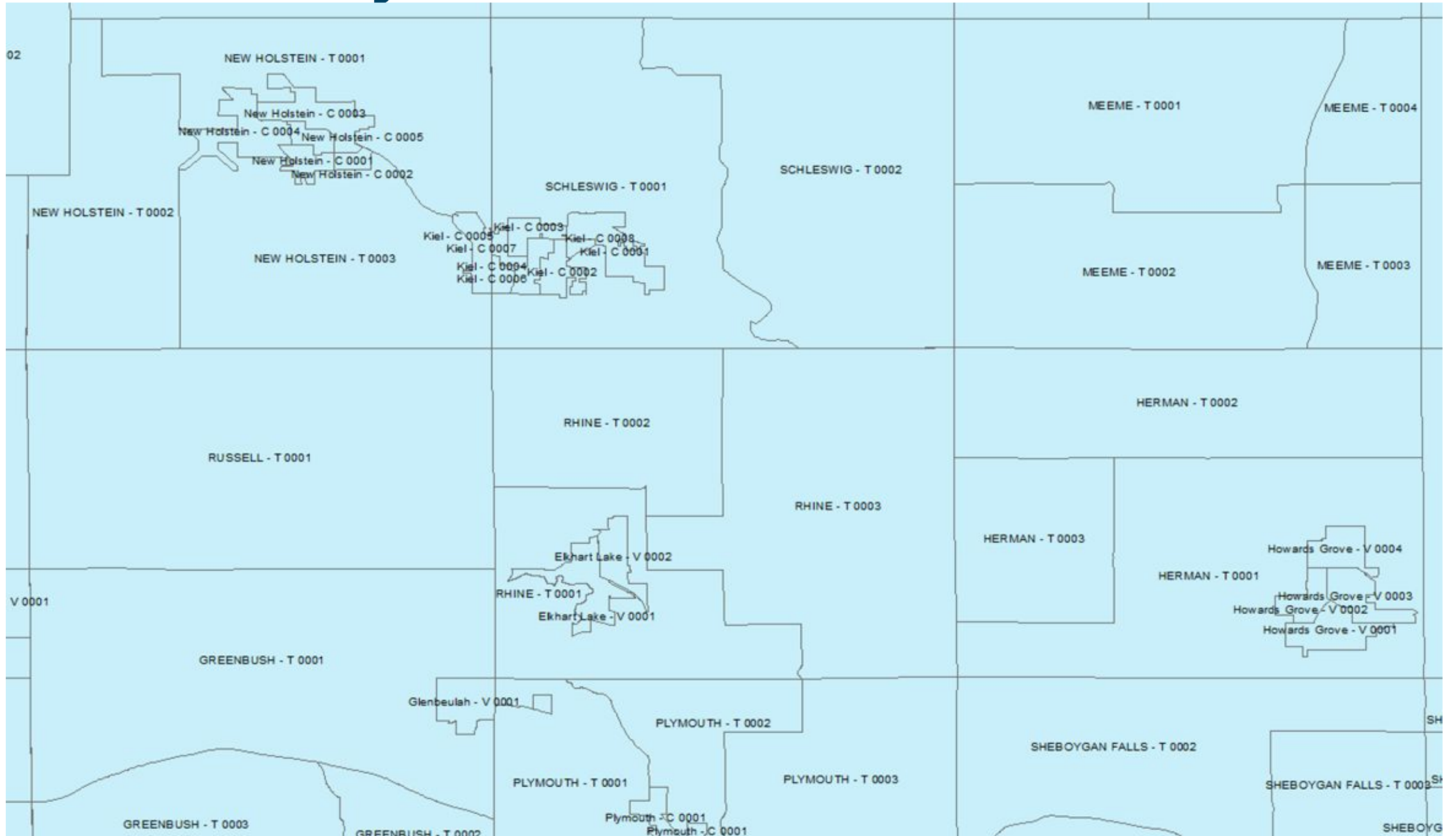
Name	District Type	Jurisdiction	
Wisconsin	State	STATE OF WISCONSIN	0
Village of Elkhart Lake - Ward 1	Ward	VILLAGE OF ELKHART LAKE - SHEBOYGAN COUNTY	1
Congressional - District 6	Congressional	STATE OF WISCONSIN	6
State Senate - District 9	State Senate	STATE OF WISCONSIN	9
Assembly - District 27	State Assembly	STATE OF WISCONSIN	27
Court of Appeals - District 2	Court of Appeals	STATE OF WISCONSIN	2
Sheboygan County	County	SHEBOYGAN COUNTY	60
Sheboygan County Supervisory District 14	County Supervisory	SHEBOYGAN COUNTY	14
Village of Elkhart Lake	Municipality	VILLAGE OF ELKHART LAKE - SHEBOYGAN COUNTY	121
Sheboygan County District Attorney	District Attorney	STATE OF WISCONSIN	60
Sheboygan County Circuit Court Judge	Circuit Court	STATE OF WISCONSIN	60
NORTHERN MORaine JOINT MUNICIPAL COURT	Multi-Jurisdictional Judge	STATE OF WISCONSIN	16
Elkhart Lake - Glenbeulah School District	School	STATE OF WISCONSIN	1,...
Lakeshore Technical College	Technical College	STATE OF WISCONSIN	11

JURISDICTIONWIDE DISTRICTS

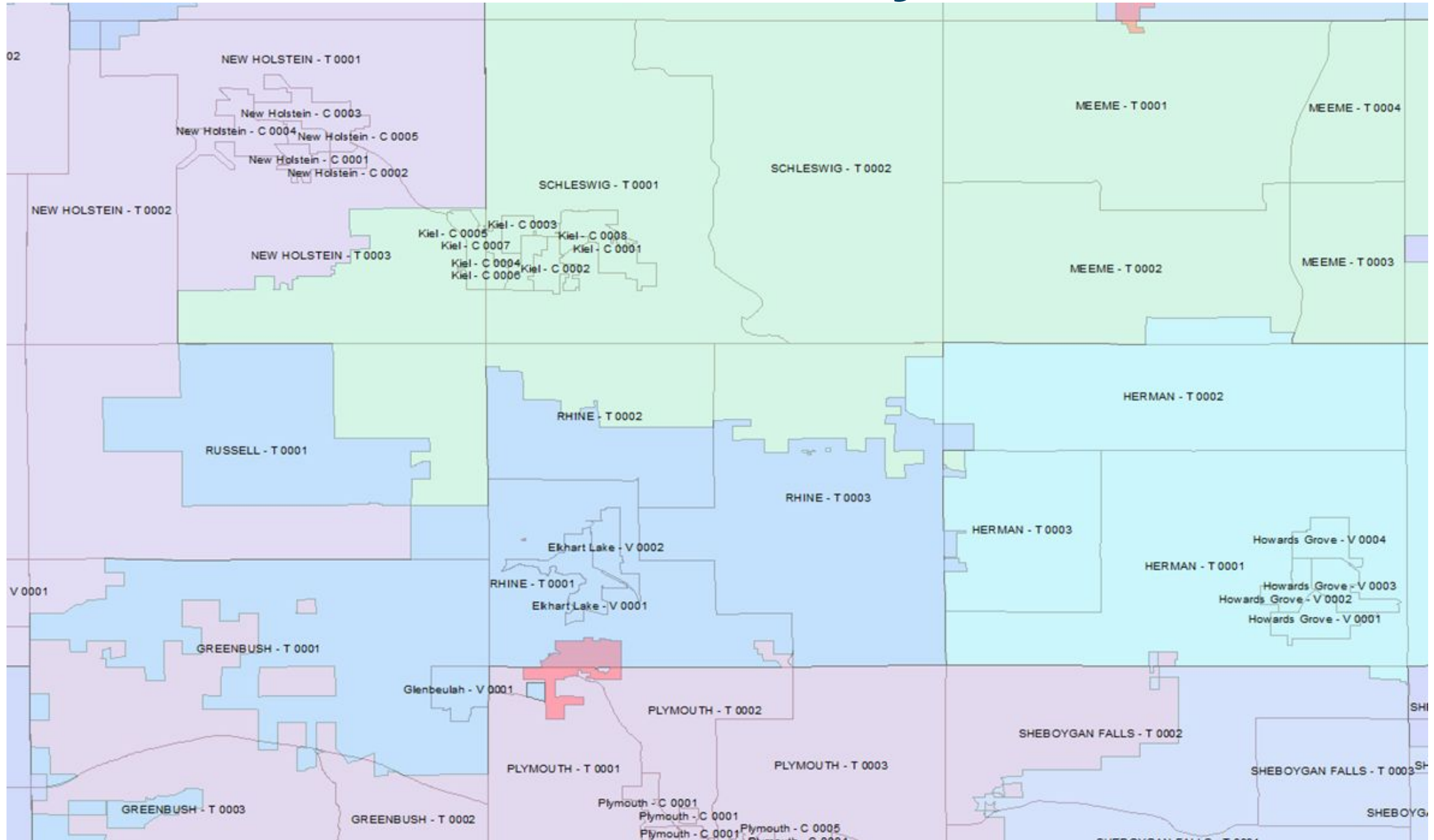
Changes made to these districts will affect all district combos in this municipality.

Name	District Type
Village of Elkhart Lake	Municipality

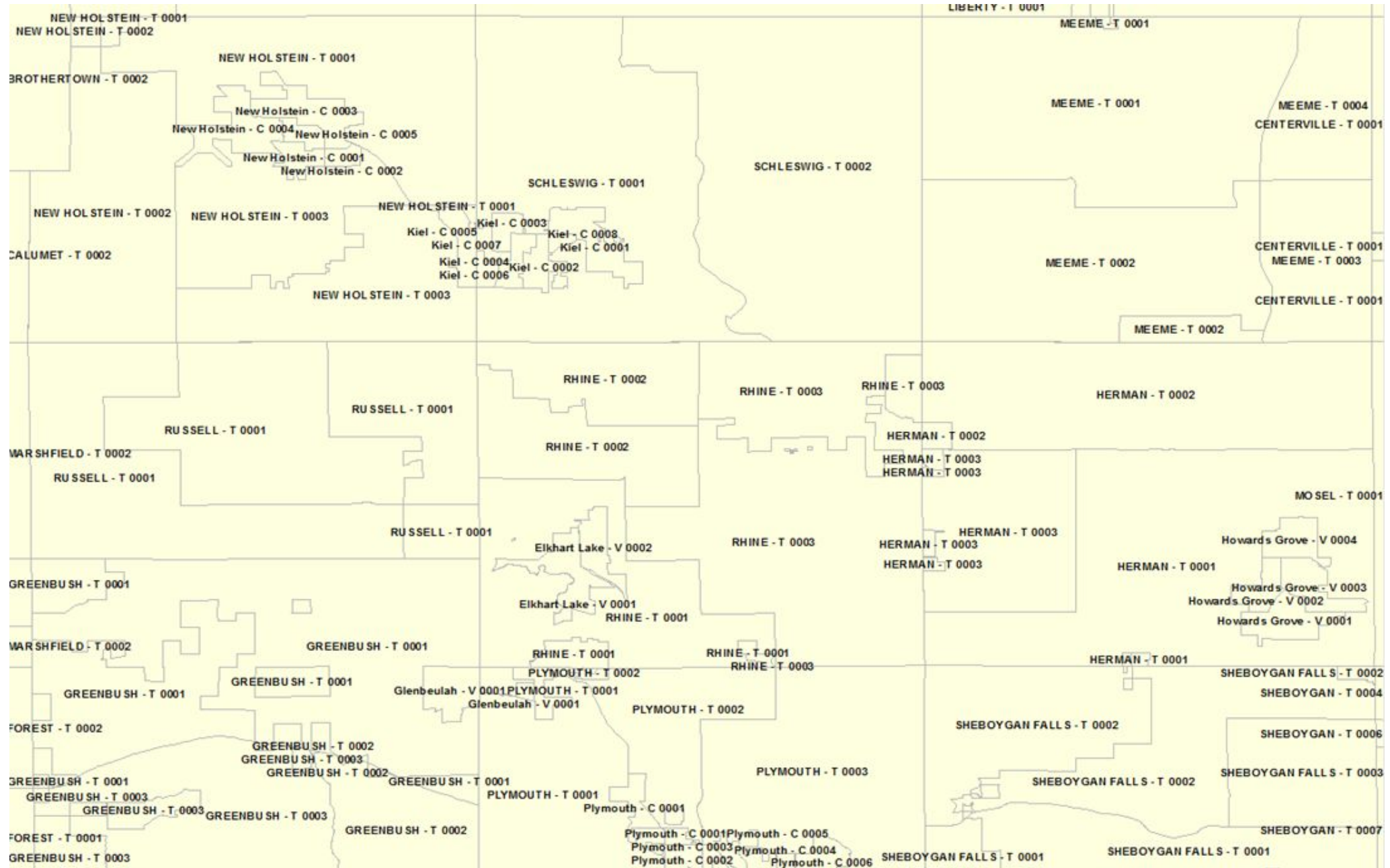
Wards only



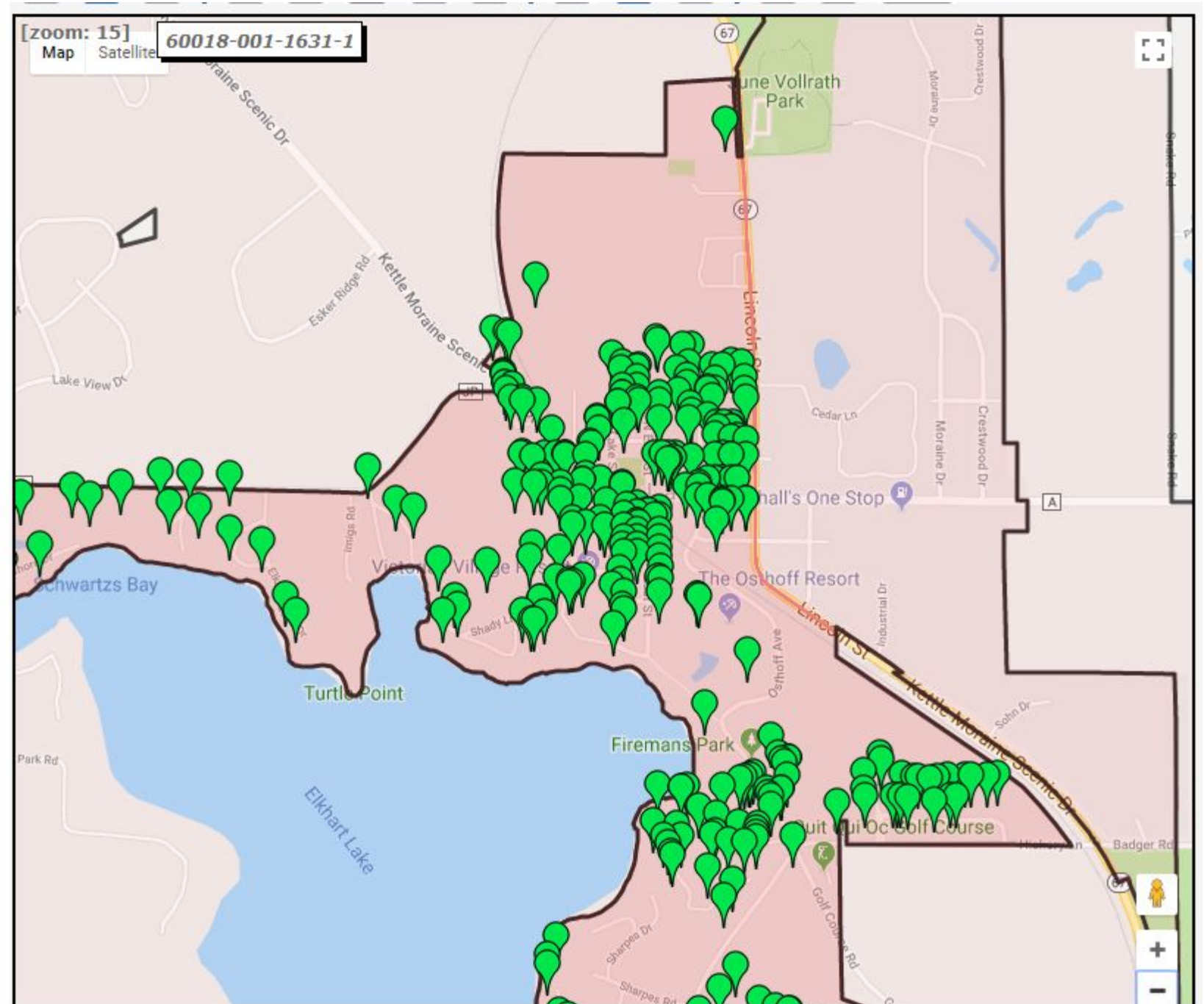
Wards, schools and sanitary districts



District combos



District combos with address locations



How addresses are geocoded

- Improvements have been made since 2011 to provide better feedback to users.
- When added, addresses are validated through USPS and then given a confidence level.
- Addresses are assigned one of four colors: Green, Orange, Red and Black.

Confidence level

- Green addresses should be rooftop level quality and can be generated without manual review
- Orange and Red addresses are usually street level or within a few blocks.
- If confidence score is low enough (black), the addresses are placed in a neutral location and clerks need to assign manually.

Address on road with a red color – needs review

**ADDRESS**

302 GRAND CROSSING DR UNIT 103, MADISON, WI 53... 

GENERAL

RESIDENCE

House Number *

302

Street Name *

GRAND CROSSING DR

Building Name

Unit Type

UNIT

Unit Number *

103

Postal City *

MADISON

State *

 WI

Postal Code *

53705

Process 

DETAILS

 Jurisdiction *

CITY OF MADISON - DANE COUNTY

District Combo *

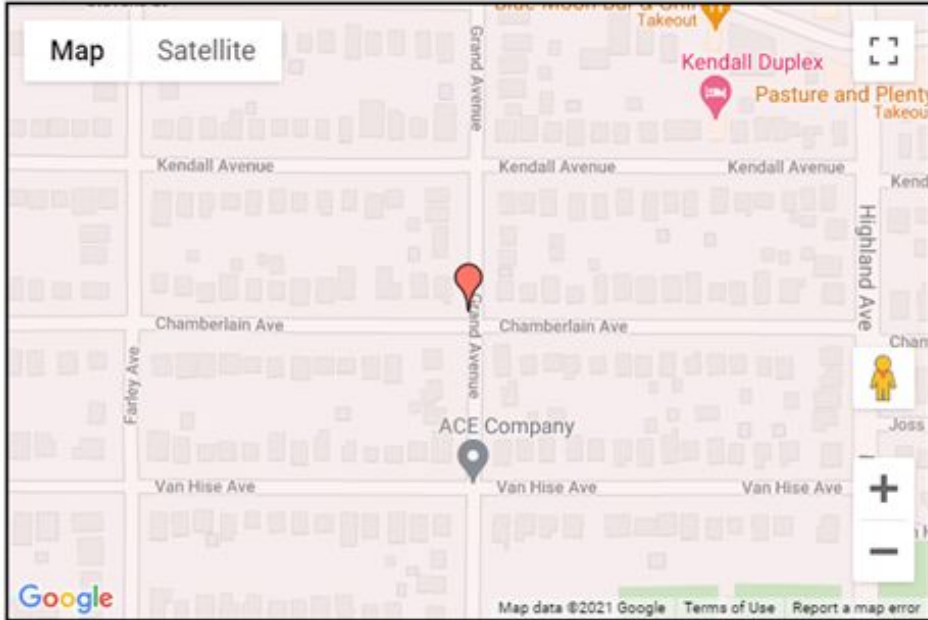
13251-063-3269-1

Care Facility

 [zoom: 17]

Map

Satellite



Map data ©2021 Google Terms of Use Report a map error

GeoCode Source 

ESRI

Geo DC Mismatch 

No

DC Changed 

No

Lake Michigan - try again or place manually



ADDRESS

New Address 

RESIDENCE

House Number *

0

Street Name *

BAD ADDRESS

Building Name

Unit Type

Unit Number

Postal City *

MADISON

State *

 WI

Postal Code *

53241

Process 

DETAILS

 Jurisdiction *

CITY OF MADISON - DANE COUNTY

District Combo *

Care Facility

Status Reason

 Active

GeoCode Source

 ESRI

Geo DC Mismatch

 No

DC Changed

 No

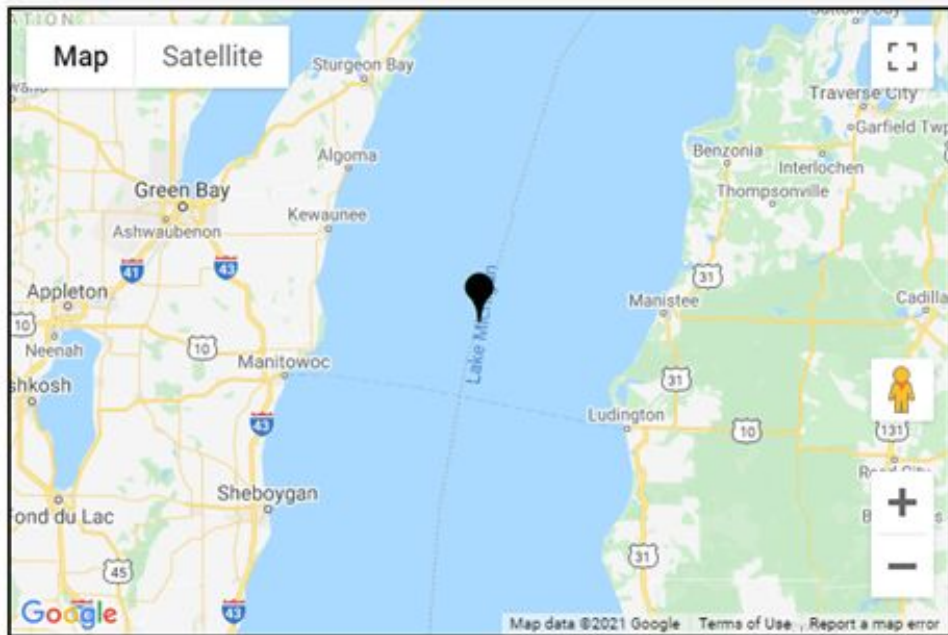
DC By Geography

 No

Zoom: 8

Map

Satellite



Map data ©2021 Google Terms of Use Report a map error

Benefits of geocoding

- Many of our addressing issues are problems with the address location or the district shapes.
- Because this is a visual process, it is much easier to see where the problems lie instead of searching through spreadsheets.
- Having proper auditing of addresses allows us to find out WHY something is assigned improperly. Who created/assigned it, when and in what context.
- There have been many cases where we need to contact the counties to fix issues with their school district or ward maps. This improves data quality on all ends.

Address located correctly, but ward lines don't match parcel



ADDRESS

26025 WINDERMERE DR, WIND LAKE, WI 53185-...

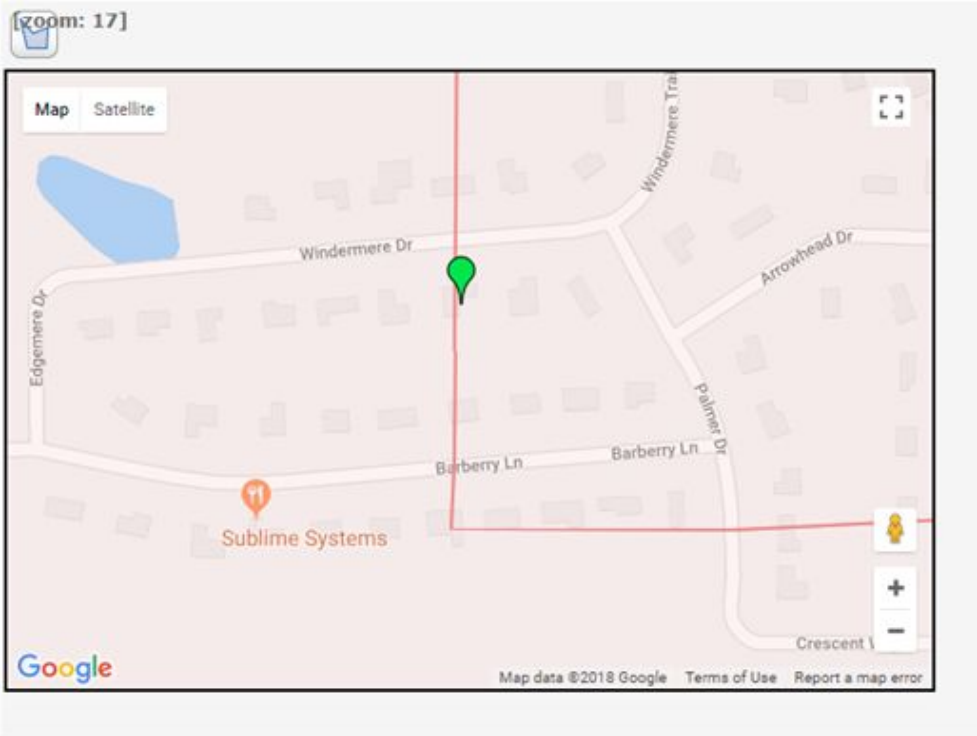
GENERAL

RESIDENCE

House Number *	26025
Street Name *	WINDERMERE DR
Building Name	--
Unit Type	--
Unit Number	--
Postal City *	WIND LAKE
State *	WI
Postal Code *	53185-2745
<button>Process</button>	

DETAILS

Jurisdiction *	TOWN OF NORWAY - RACINE COUNTY
District Combo *	52010-011-3857-1
Care Facility	--



GeoCode Source	BING
Geo DC Mismatch	No
District Combo Change	--
District Combo By Geo	52010-011-3857-1
Address Status	Valid

Address located correctly, but ward lines don't match parcel



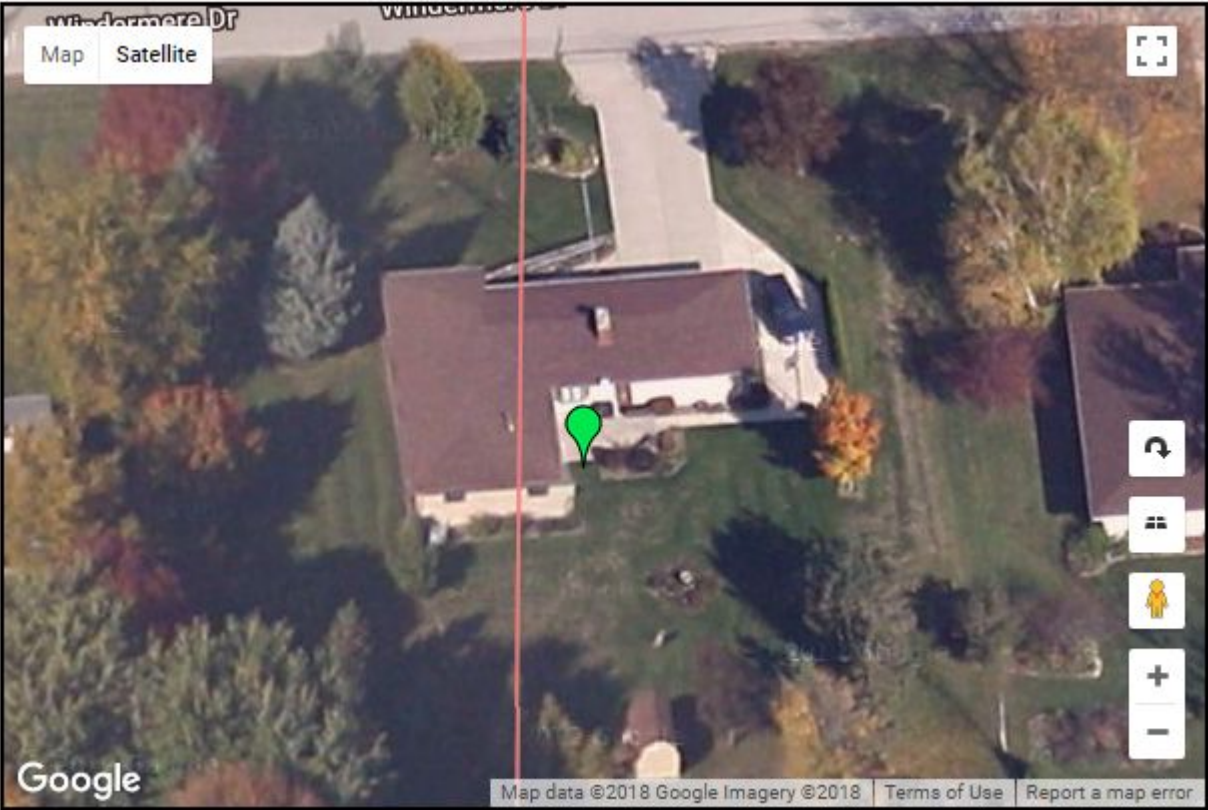
ADDRESS

26025 WINDERMERE DR, WIND LAKE, WI 53185-...

GENERAL

Map

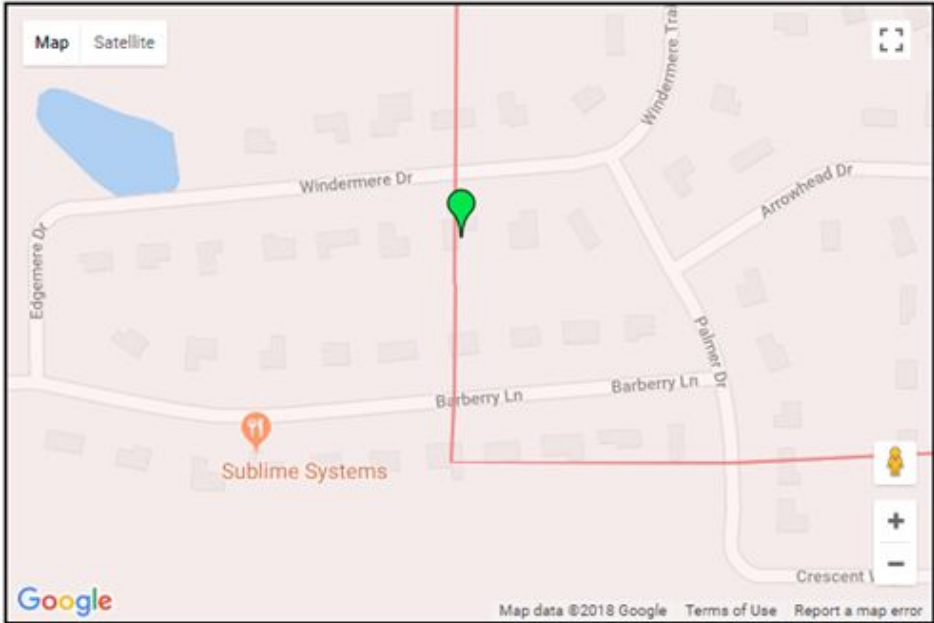
Satellite



Map data ©2018 Google Imagery ©2018 Terms of Use Report a map error

Map

Satellite



Map data ©2018 Google Terms of Use Report a map error

GeoCode Source

Geo DC Mismatch

District Combo Change

District Combo By Geo

Address Status

 BING

 No

 --

 52010-011-3857-1

 Valid

Future improvements

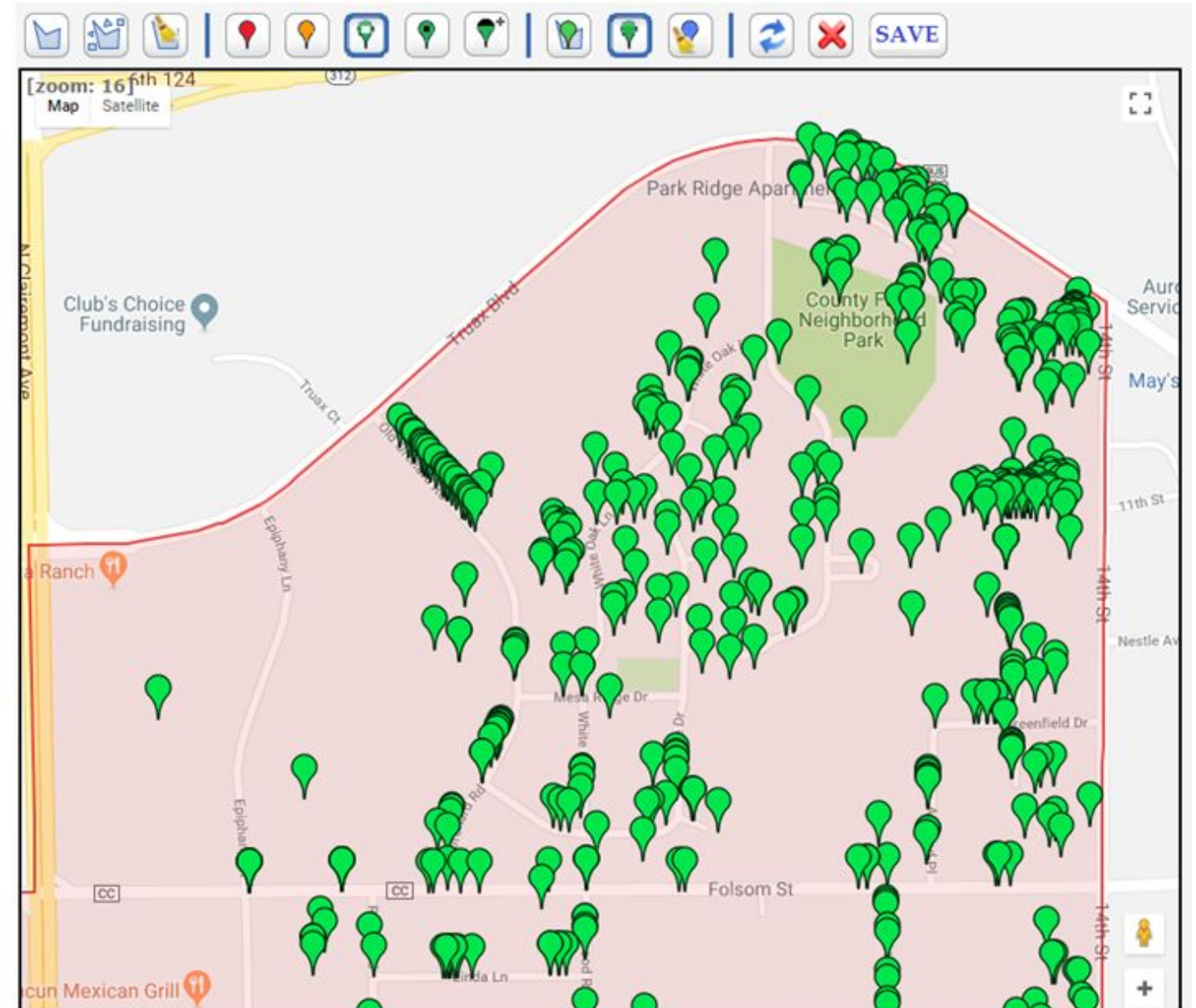
- Eliminate Overlaps (and Gaps) between Wards, School Districts and Sanitary Districts.
- Fix any differences between census blocks, wards and parcel boundaries (hopefully 2020 data is improved).
- Clean up old address information and keep addresses updated in a regular cycle.
- Use county (or statewide) address points to compare to addresses already in the system, instead of using commercial geocodes.

**Addresses don't match
on WisVote, not an
easy fix**



DISTRICT COMBO : INFORMATION

18221-023-1554-1



Breakout: Manual geocoding



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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1		N. Oak St					2002	N. Main St						N. Elm St			
2			2001												2001		
3					103					103		105					
4			1st Ave NW						1st Ave NE						1st Ave NE		
5		S. Oak St		104		102		S. Main St		102		104		S. Elm St			204
6			1001												1001		
7																	
8				103		101				101		103				201	
9		W. Washington Ave						E. Washington Ave						E. Washington			
10		S. Oak St			102			S. Main St		102		104		S. Elm St		202	
11	1002		1001				1002						1002				
12	1004						1004										
13			105		103					101		103				201	
14		1st Ave SW						1st Ave SE						1st Ave SE			
15				104		102			102		104						
16	2002		2001						2001								
17							2002						2002				
18	2004		2003						2003								
19							2004						2004				

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1		N. Oak St					2002	N. Main St						N. Elm St			
2			2001												2001		
3					103					103		105					
4		S. Oak St	1st Ave NW					S. Main St	1st Ave NE					S. Elm St	1st Ave NE		
5				104		102				102		104					204
6			1001												1001		
7																	
8				103		101				101		103				201	
9		S. Oak St	W. Washington Ave					S. Main St	E. Washington Ave					S. Elm St	E. Washington		
10					102					102		104				202	
11	1002		1001				1002						1002				
12	1004						1004										
13			105		103					101		103				201	
14		S. Oak St	1st Ave SW					S. Main St	1st Ave SE					S. Elm St	1st Ave SE		
15				104		102			102		104						
16	2002		2001						2001								
17							2002						2002				
18	2004		2003						2003								
19							2004						2004				

Addresses to geocode

- 2001 N. Elm St
- 104 E. Washington Ave
- 204 1st Ave NE
- 103 1st Ave N
- 202 1st Ave SE

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1		N. Oak St					2002	N. Main St						N. Elm St			
2			2001												2001		
3					103					103		105					
4			1st Ave NW						1st Ave NE						1st Ave NE		
5		S. Oak St		104		102		S. Main St		102		104		S. Elm St			204
6			1001												1001		
7																	
8				103		101				101		103				201	
9		W. Washington Ave						E. Washington Ave						E. Washington			
10		S. Oak St			102			S. Main St		102		104		S. Elm St		202	
11	1002		1001				1002						1002				
12	1004						1004										
13			105		103					101		103				201	
14		1st Ave SW						1st Ave SE						1st Ave SE			
15				104		102			102		104						
16	2002		2001						2001								
17							2002						2002				
18	2004		2003						2003								
19							2004						2004				

Let's talk

Discussion



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Next steps

- Have a conversation with NSGIC about developing a geocoding strategy
- Locate and gather authoritative address information for voters
- Clean and standardize address data
- Assess geocoding software and API options
- Work with state or local officials to develop or implement a geocoding strategy
- Develop a plan to manually place voters that do not geocode properly
- Ask an expert questions to learn more about geocoding
- I'm not sure

Share your thoughts

- What resonated with you from today's webinar? (Any "ah-ha" moments?)
- What questions do you have about what we covered today?
- What questions do you have about what we didn't cover today?

We've covered a lot

Wrapping up



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What was your experience with today's webinar?

- A brief survey is linked in the chat box
- Please complete the survey now to provide feedback and improve the webinar for future participants

Geo-Enabling Election Series: Up next

- Convening a team of specialists
- Collecting & sustaining a voting unit GIS layer
- Implementing a geocoding strategy
- Assembling best available contextual layers
- Defining & implementing data validation processes

techandciviclelife.org/course/geo-enabled-elections/

Thanks!

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