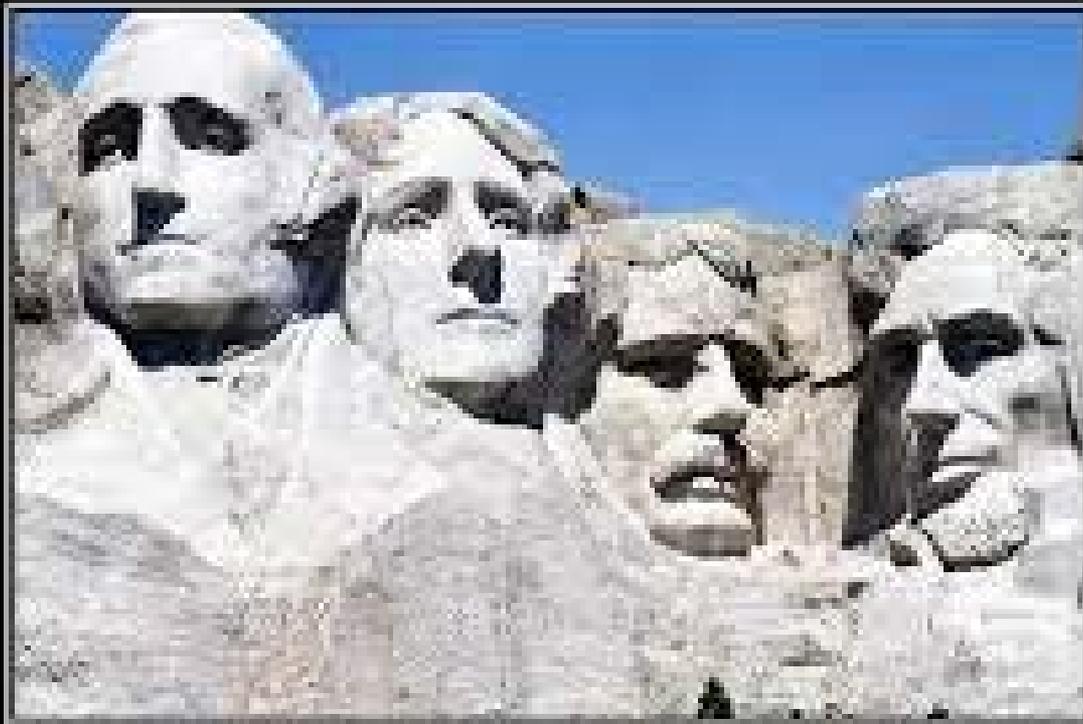


# The Public Land Survey System (PLSS) and You

Daniel Frick, PLS  
Dane County Surveyor  
October, 12 2017

# A FEW NOTABLE LAND SURVEYORS IN HISTORY

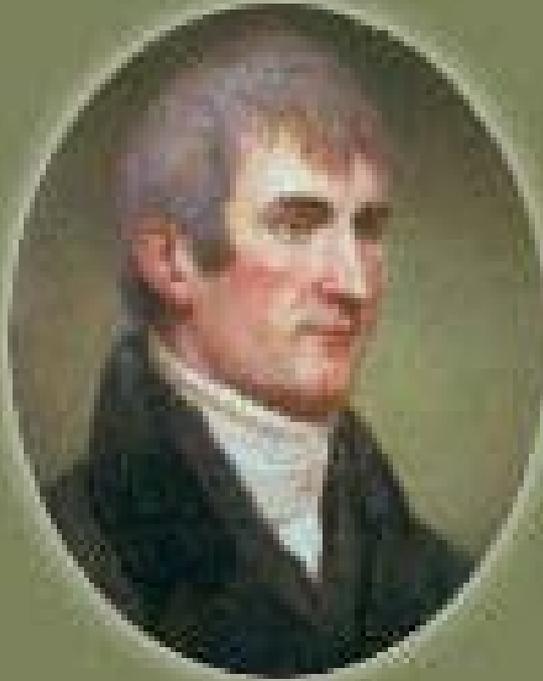


RUSHMORE

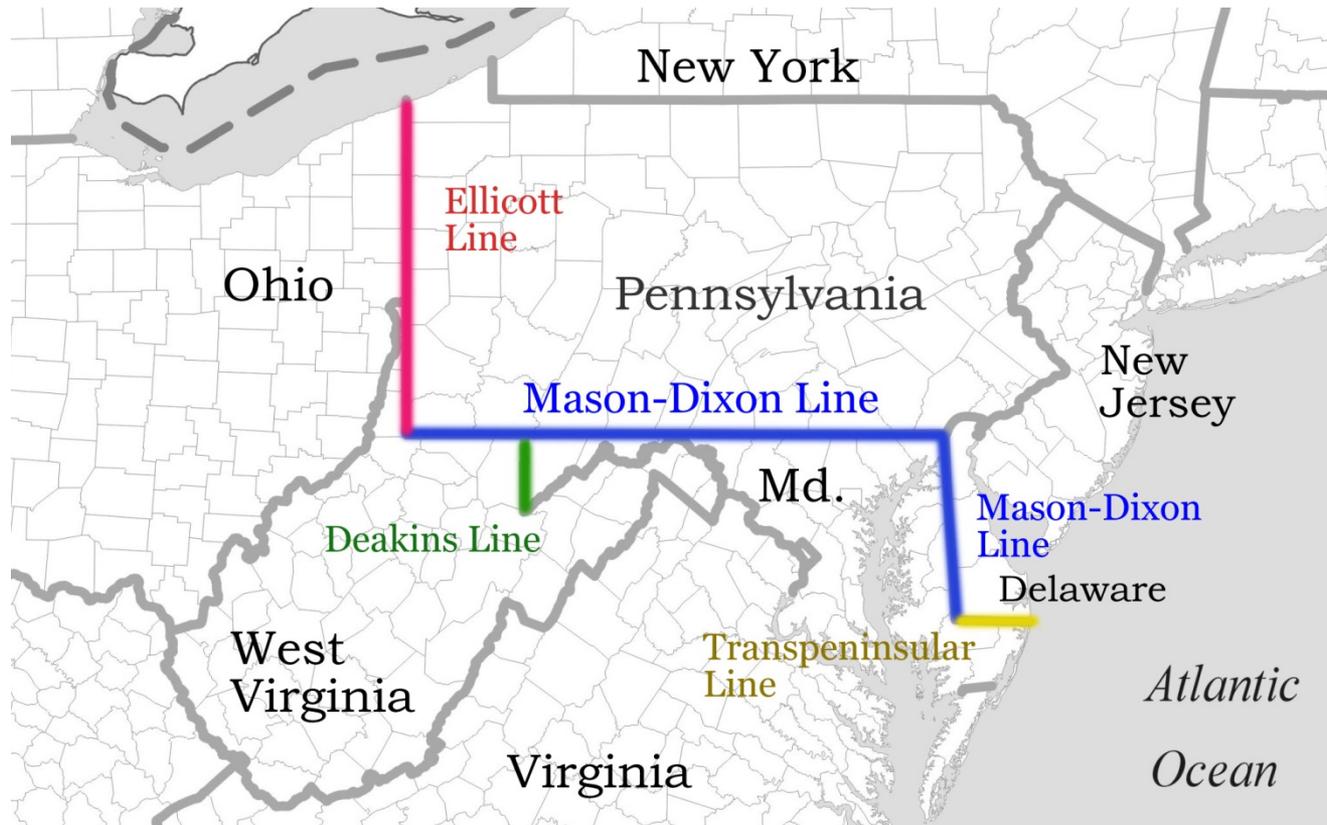
Three Surveyors and Some Other Guy

# Surveyor and Cartographer

Lewis was a secret secretary to Thomas Jefferson



Lewis & Clark



Heard of the Mason Dixon line? Charles Mason and Jerimiah Dixon are the men who surveyed the boundaries between lands granted to the Penn's and the Calvert's (largely Pennsylvania and Maryland). Andrew Ellicott is the surveyor who conducted much of Meriwether Lewis' training.

# Henry David Thoreau

---



- ❑ Writer, Naturalist, Teacher, Lecturer, Surveyor
- ❑ Actively puts into practice the tenets of Transcendentalism
- ❑ Path to a better humanity through the soul of the individual
- ❑ All humans have potential to be truth seekers
- ❑ Can effect social change
- ❑ Died at 44 of TB

Far less notable is Daniel Frick,  
Dane County Surveyor from 2006 to present.

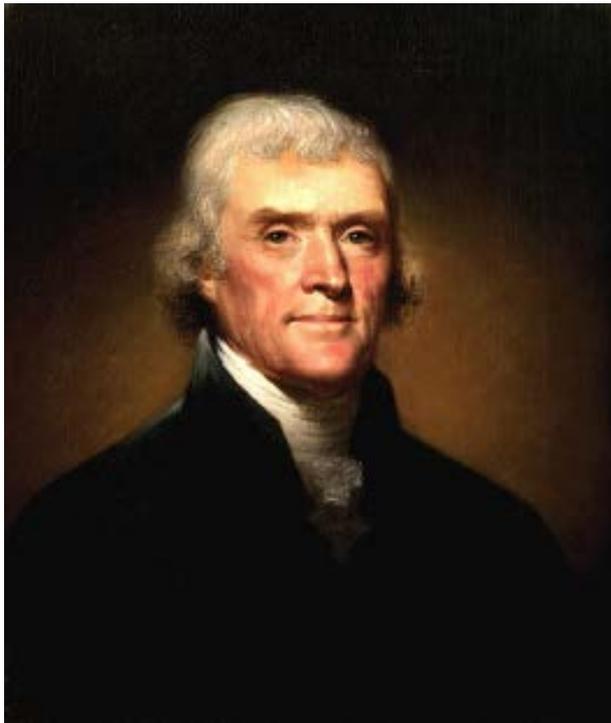
Born to fish, forced to work!



The oldest historical records known indicate that surveying had its beginning in ancient Egypt (1400 B.C.). Land was divided into plots for the purpose of taxation. Annual floods of the Nile River swept away portions of these plots, and surveyors were appointed to replace the bounds. These early surveyors were called rope stretchers, since there measurements were made with ropes having markers at unit distances.

Those basic principles are still at work. The Public Land Survey System was devised to have a uniform system of land boundary describing, marking and mapping of the United States expansion westward.

# PLSS - Championed by Thomas Jefferson



LAND ORDINANCE OF 1785

AN ORDINANCE FOR  
ASCERTAINING THE MODE OF  
DISPOSING OF LANDS IN THE  
WESTERN TERRITORY  
Passed May 20, 1785.

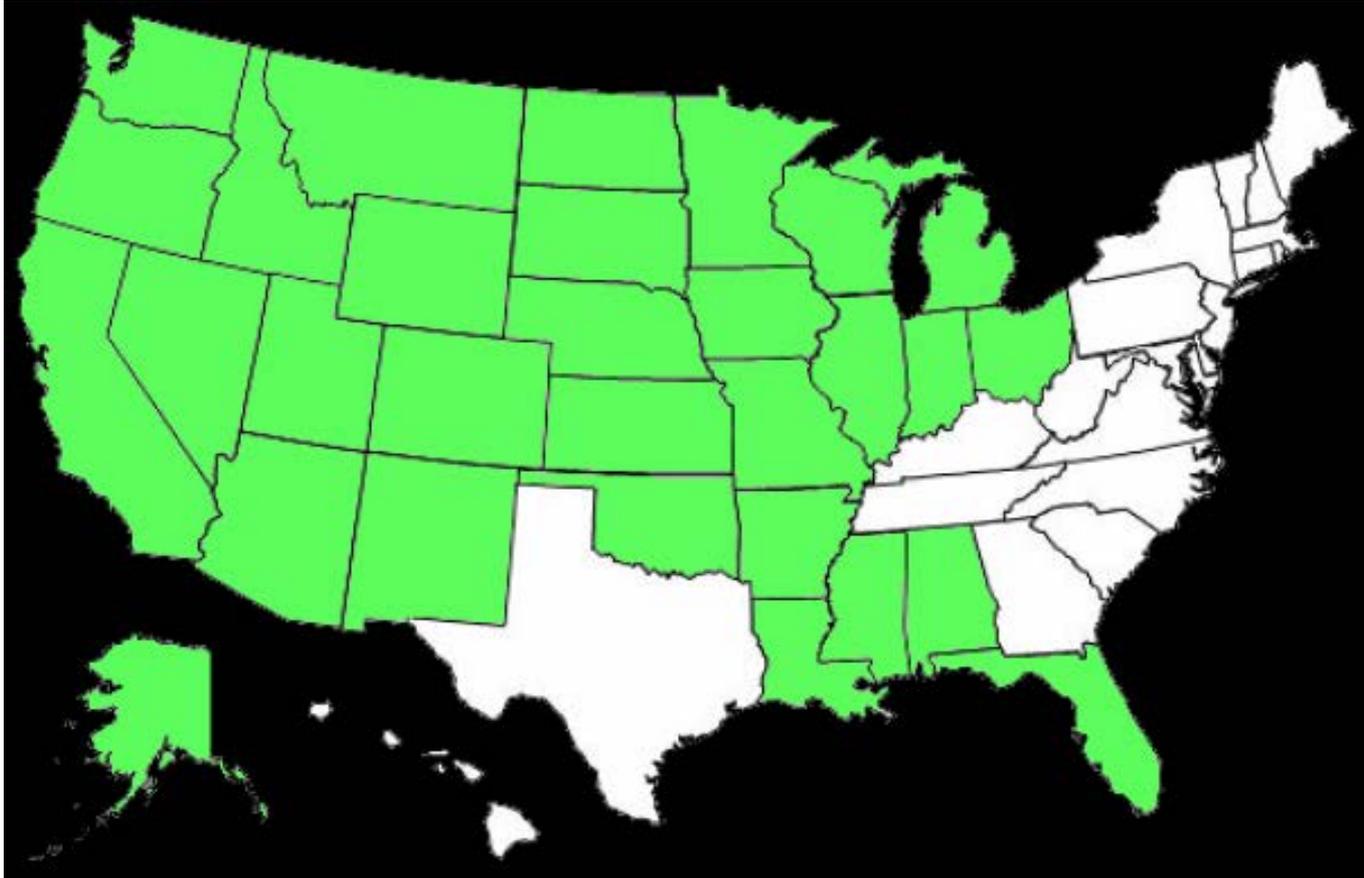
This is the first paragraph of a letter of introduction in *“A History of the Rectangular Survey System”* That was published by the U. S. Department of The Interior, Bureau of Land Management.

January 1983

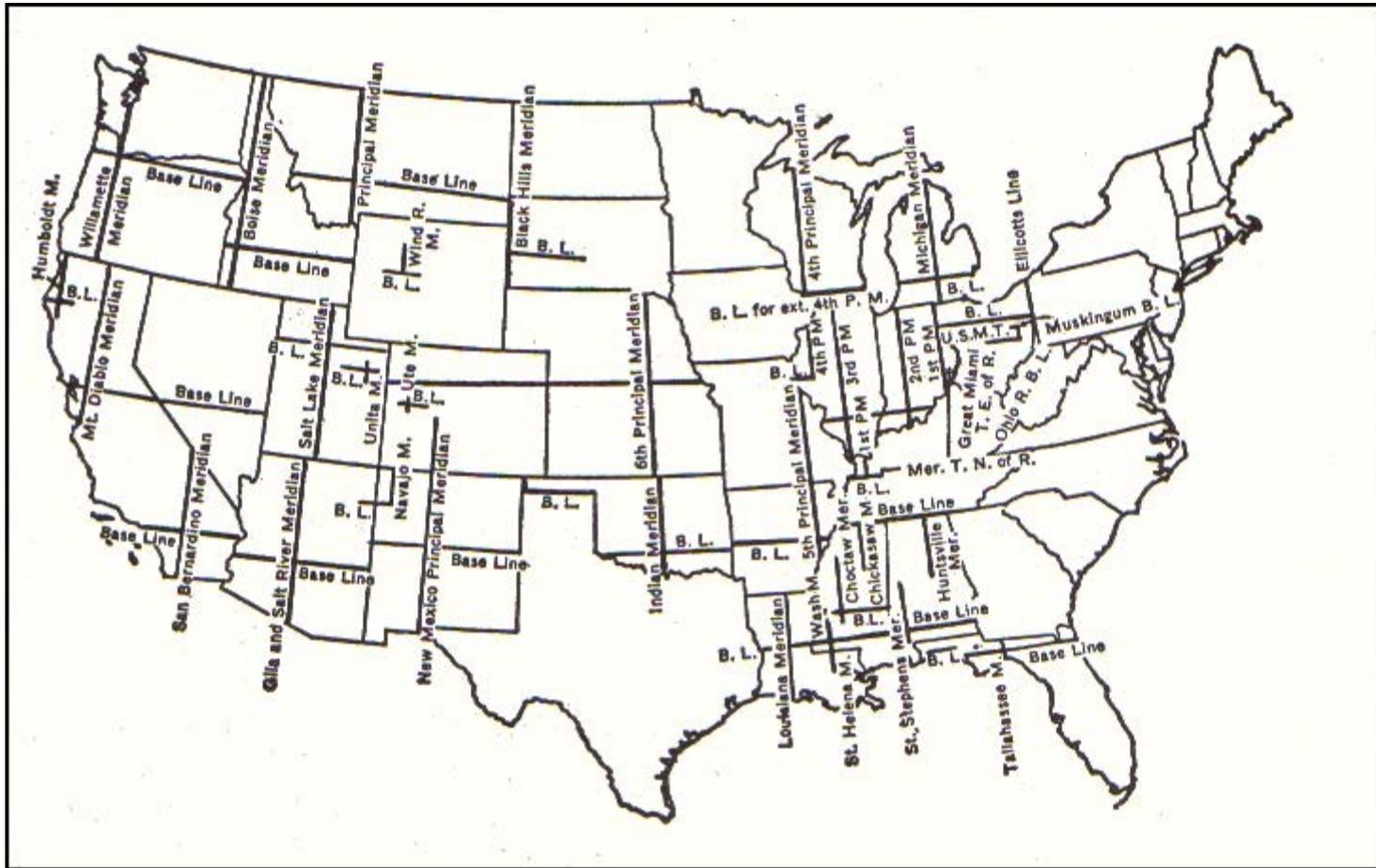
Dear Reader:

With its beginning more than two hundred years ago, the United States Rectangular Survey System is typically, and yet somewhat uniquely, a record of the American frontier spirit blended with the concept of government for the people.

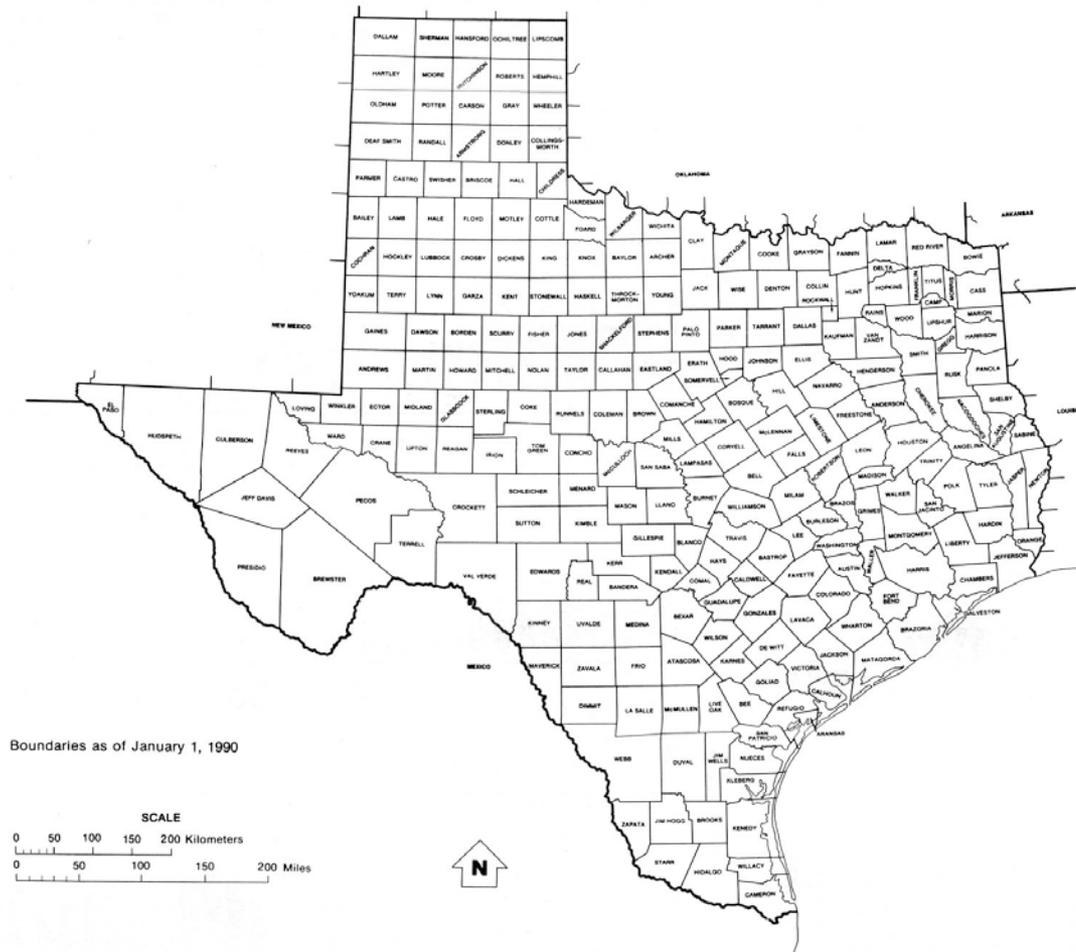
# States included in the PLSS



# Baselines and Principal Meridians



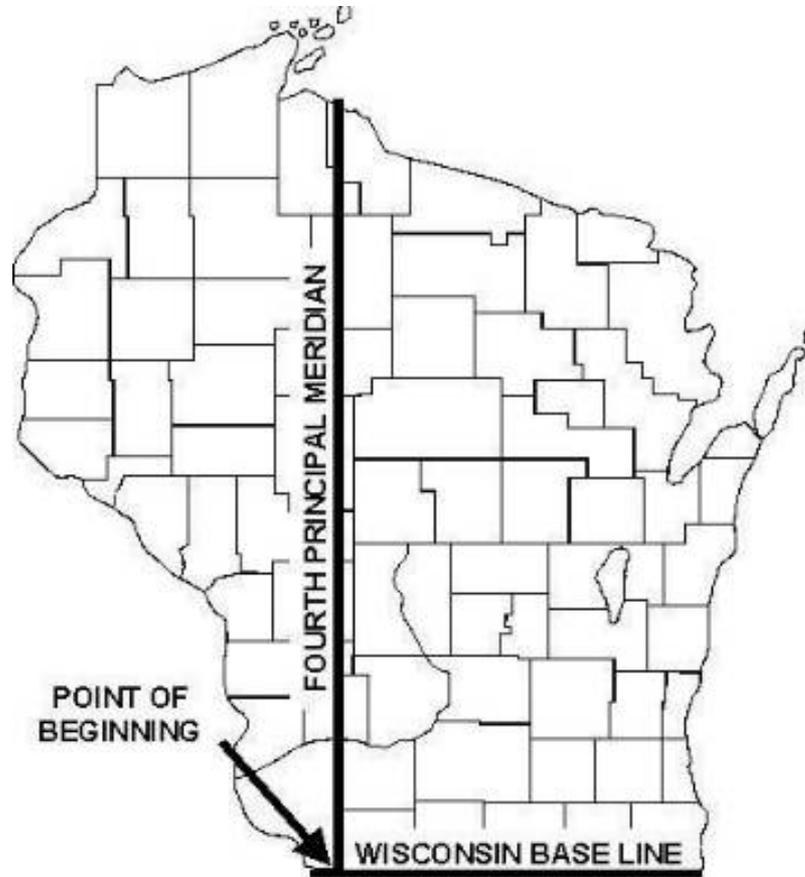
Texas is a great example of rectangular system's benefits. This is a map of County boundaries.



# Map of Wisconsin counties.

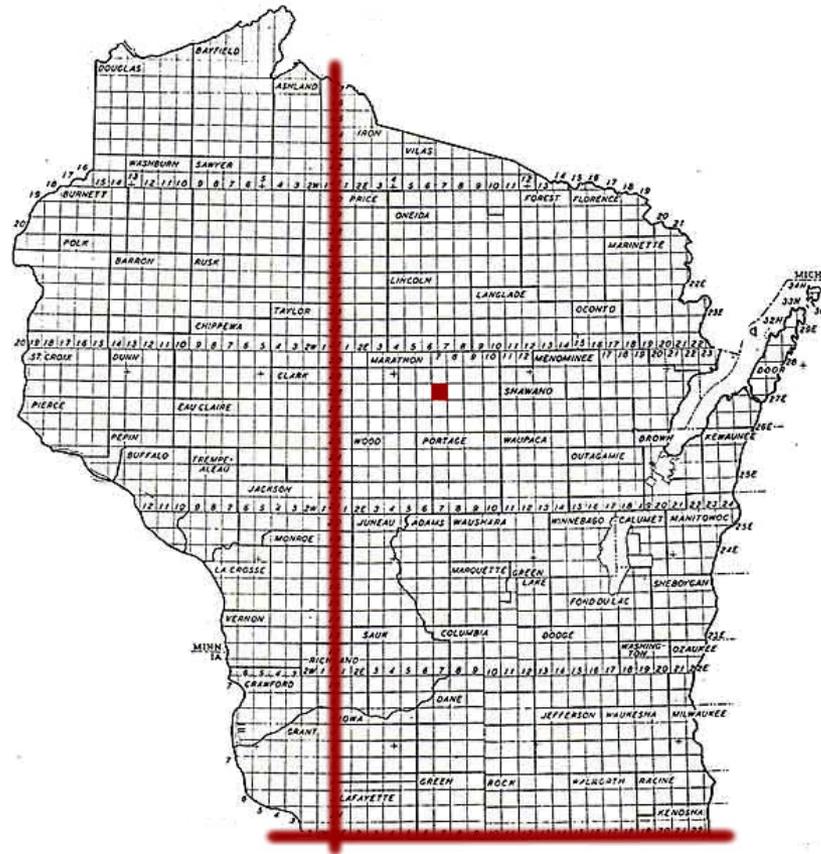


The basis of the PLSS here in Wisconsin  
The POB is near Hazel Green, Wi.



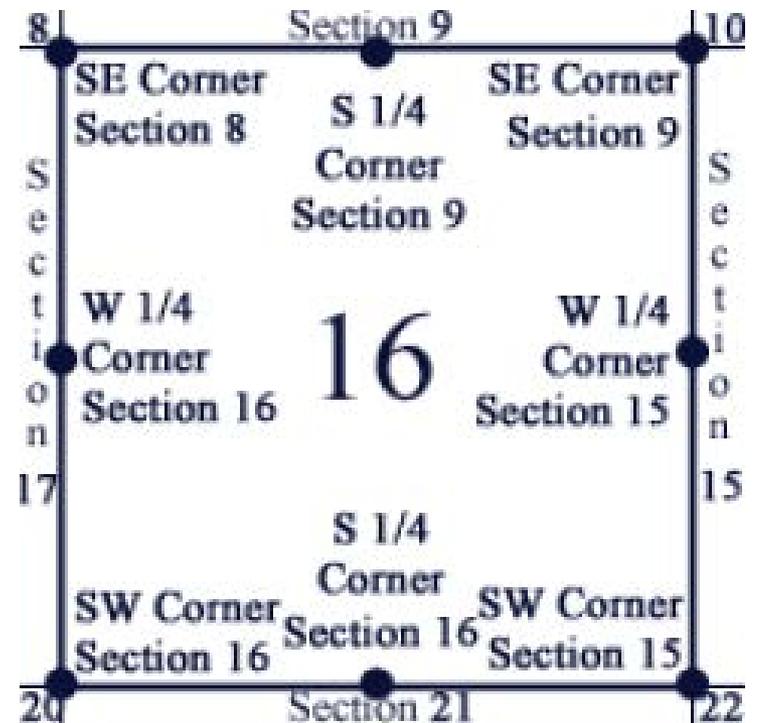
# Here with all of the townships shown.

Note: A Town is a unit of government, a township is a surveyed area of 36 Sections, most of the time. The original government surveys in Wisconsin occurred from the 1830s to the 1860s.



# Corners established by the PLSS

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

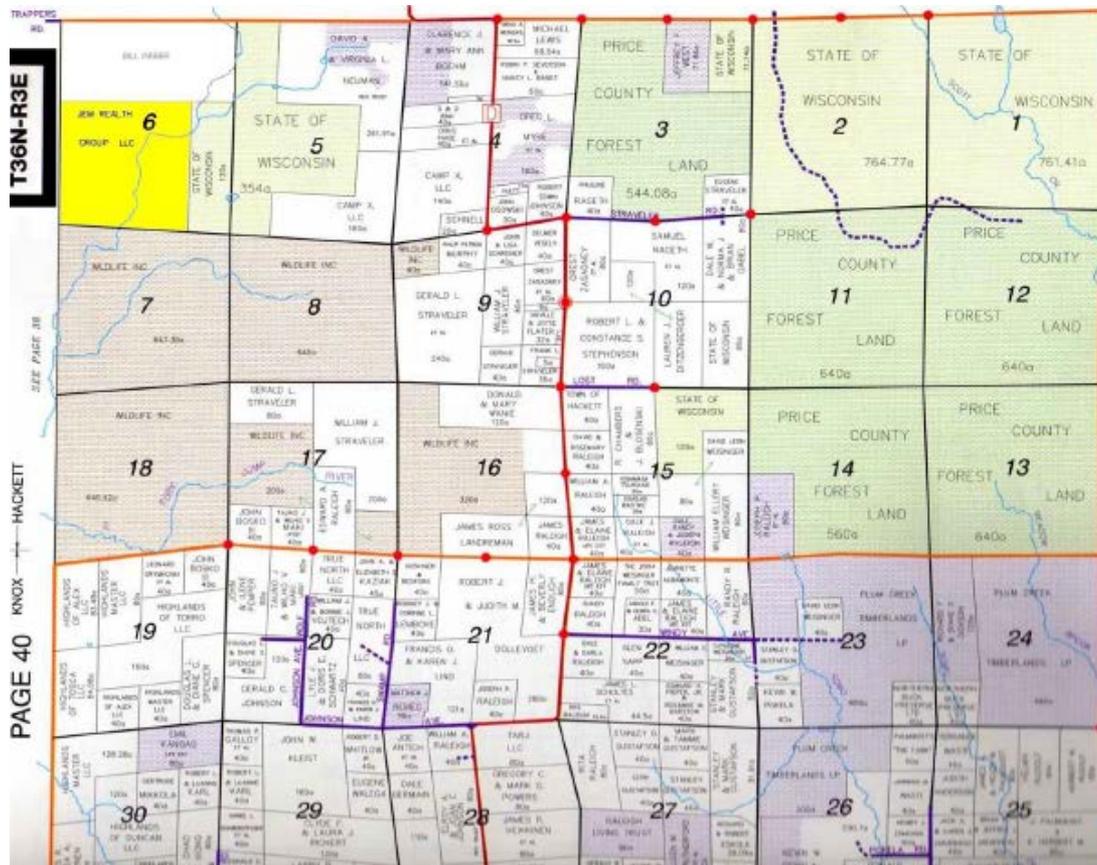


Support for public education in the United States predates the constitution; two years before the adoption of the United States Constitution of 1787, the Congress of the Confederation provided support for public schooling by establishing the land grants in the Land Ordinance of May 20, 1785 which granted Section 16 (one square mile) of every township to be used for public education: "There shall be reserved the Lot No. 16, of every township, for the maintenance of public schools within said township."

NW 1/4		NW 1/4 NE 1/4		NE 1/4 NE 1/4	
		SW 1/4 NE 1/4		SE 1/4 NE 1/4	
W 1/2 SW 1/4	E 1/2 SW 1/4	N 1/2 NW 1/4 SE 1/4		NW 1/4	NE 1/4
		S 1/2 NW 1/4 SE 1/4		NE 1/4	NE 1/4
				SE 1/4	SE 1/4
		W 1/2 SW 1/4 SE 1/4	E 1/2 SW 1/4 SE 1/4		

Typical Section Subdivisions

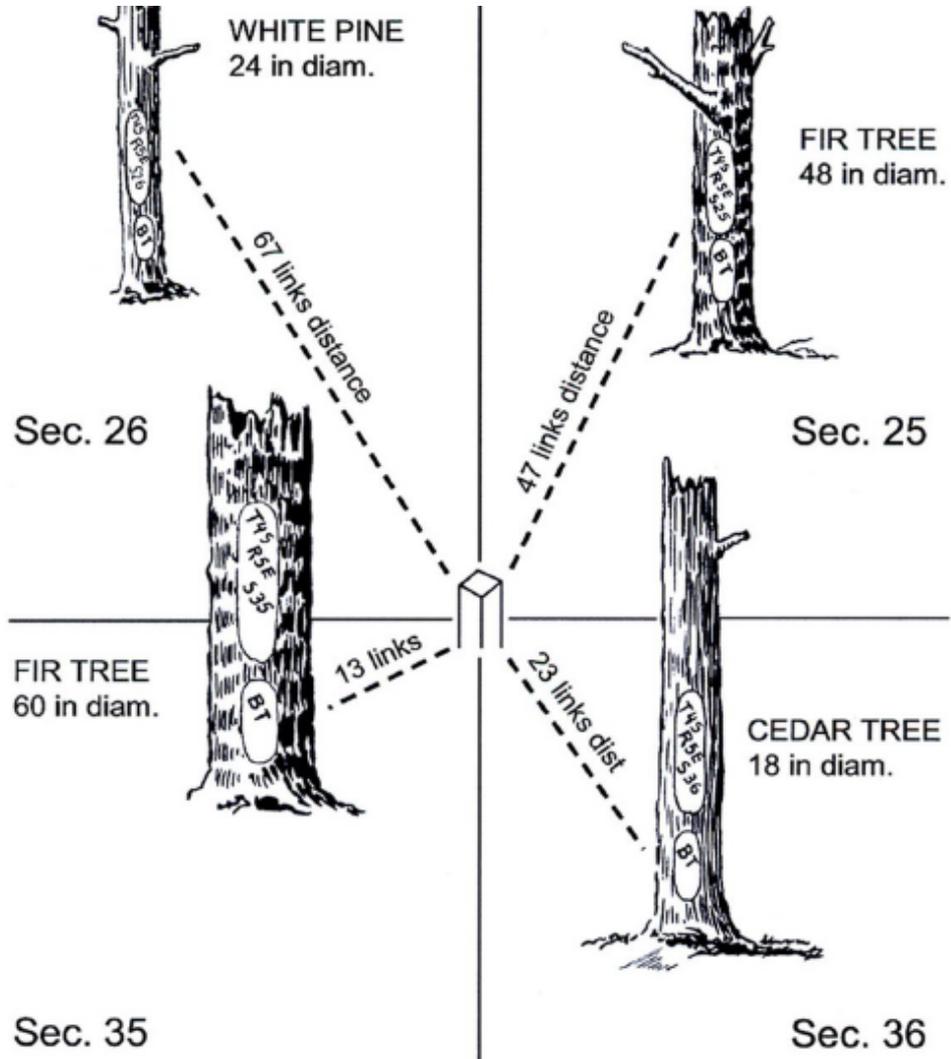
For a multitude of reasons the pretty, square sections with all lines running in cardinal directions is not a reality.



# Original tools and corners of the PLSS



In most cases the monuments in Wisconsin were a wood post. Some were stones, depending on terrain and what was available. Bearing trees were noted as witness to each section corner set if at all possible. For most land surveyors, recovering this original evidence is like finding a big gold nugget.



Corner # 1643

Edgar Sears Original Post  
May - June 1856



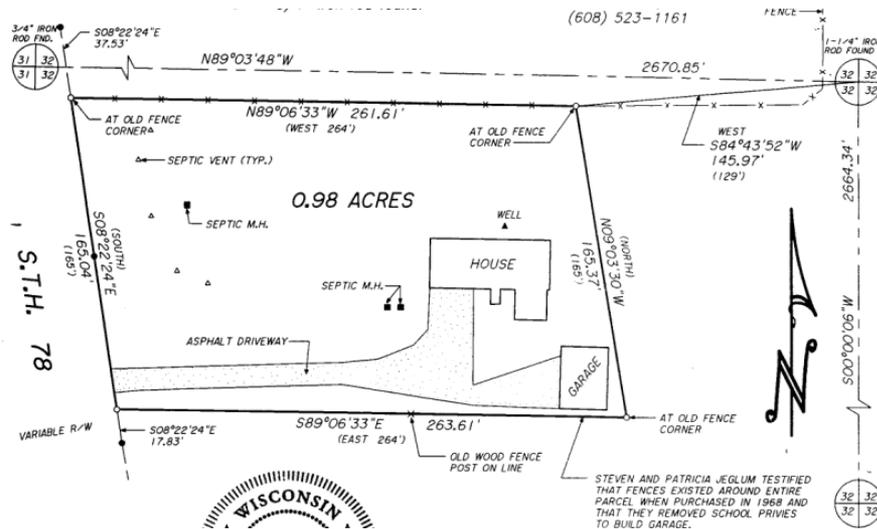
- Where the original corners were established, is the monument or section corner location. Perpetuating those locations is paramount in determining property boundaries, both past and present.
- When these monuments are lost, determining that location is very difficult. It is also very time consuming and expensive to re-establish, and the original location may be difficult if not impossible to recover. This can create many ambiguities in title, road locations and so on.



Grantor, for a valuable consideration, conveys to Grantee the following described real estate, together with rents, profits, fixtures and other appurtenant interests, in Dane County, State of Wisconsin (the "Property"):

That part of the NE ¼ of the SW ¼ of Section 32, Township 5 North, Range 6 East, in the Town of Perry, Dane County, Wisconsin, described as follows: Beginning at a point which is 7 rods 13 ½ feet West of the Northeast corner of said NE ¼ of the SW ¼; thence West 16 rods; thence South along STH 78, 10 rods; thence East 16 rods; thence North 10 rods to the point of beginning.

Excepting lands to the State of Wisconsin, Department of Transportation as recorded in Warranty Deed on December 28, 2006 as Document No. 4266324.

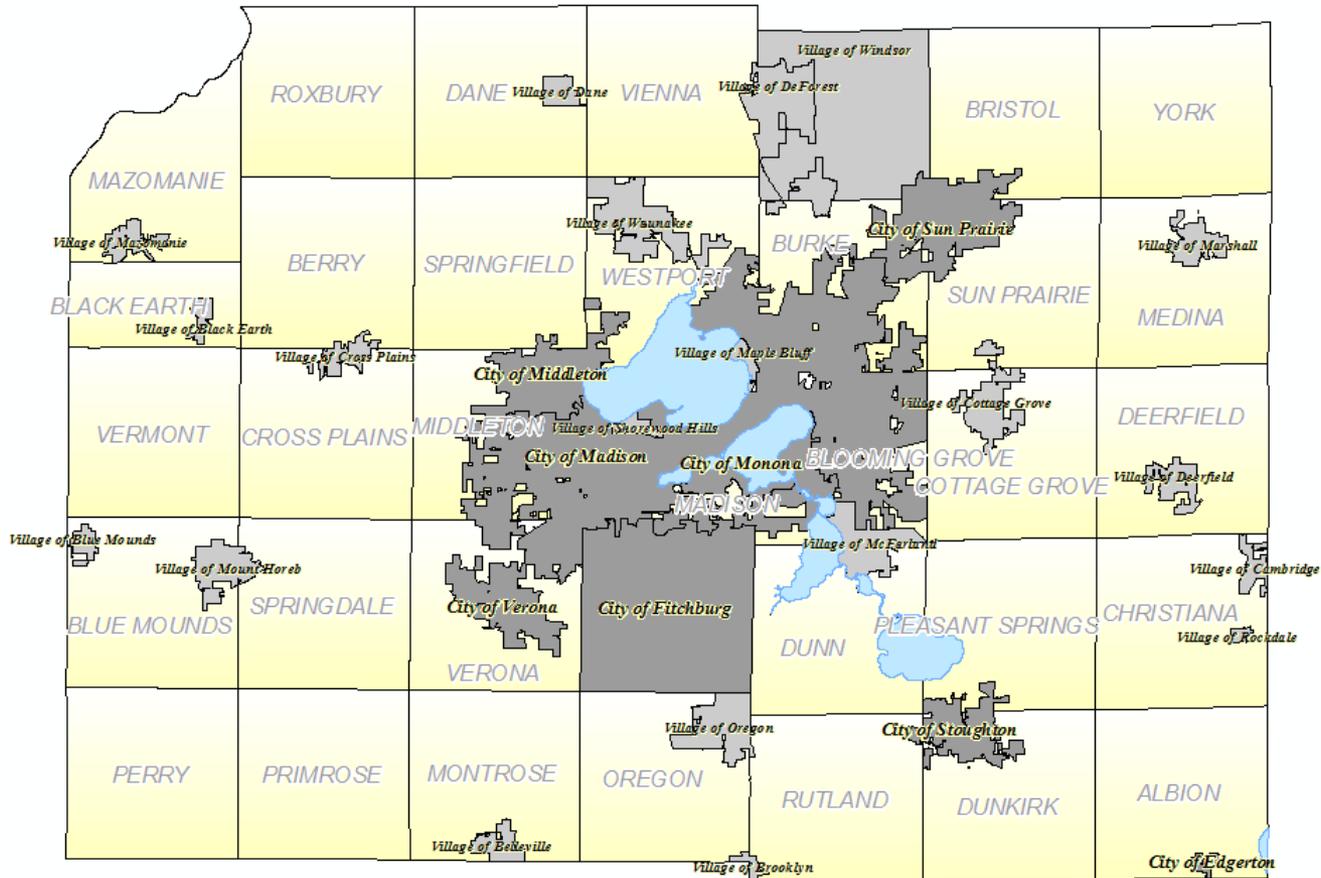


Sorry for all the history. I felt it necessary to give some background before jumping into modern day re-monumentation.



# Welcome to Dane County

35 townships





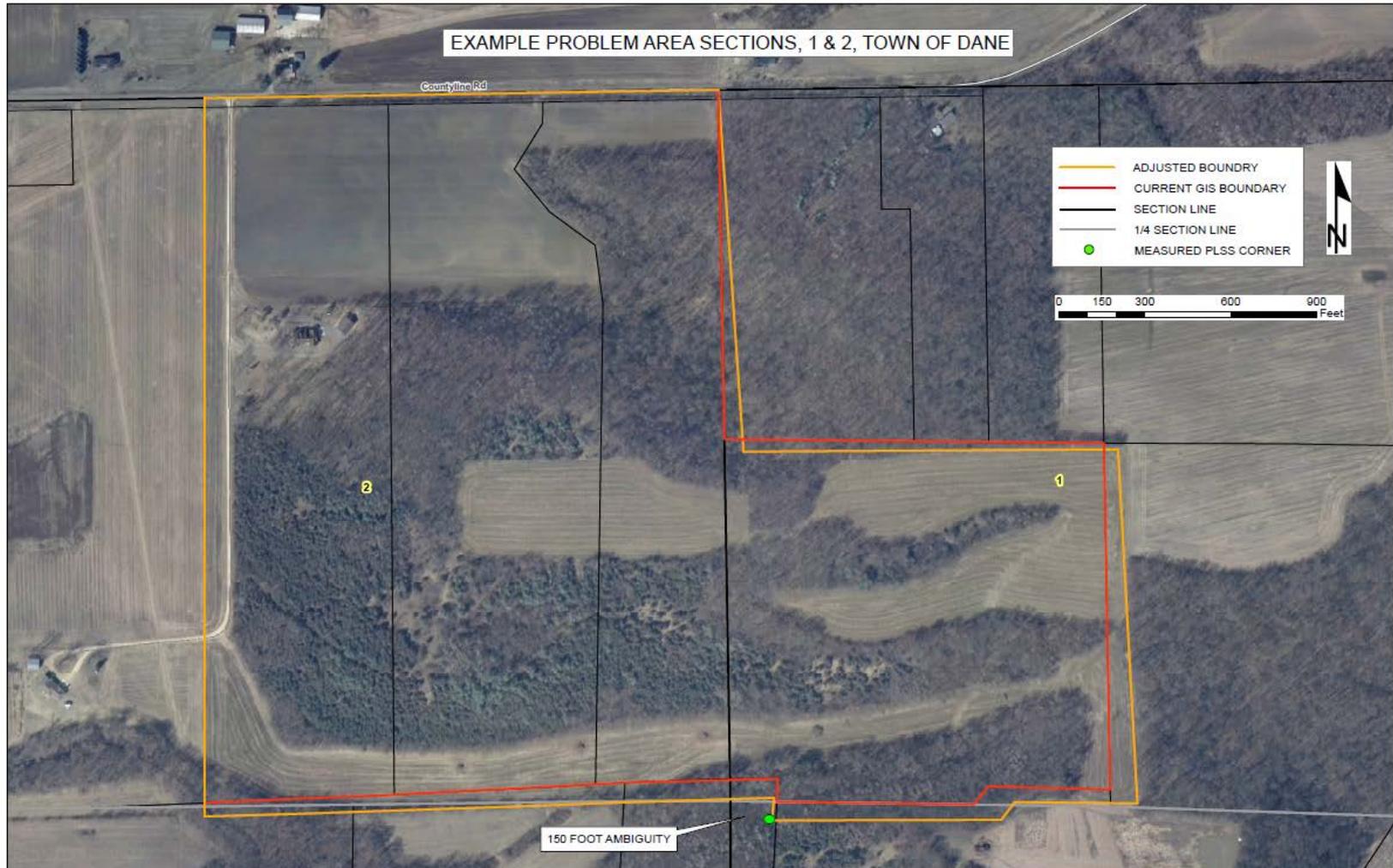
In comparison to much of the state, Dane County has had and maintains a high rate of population growth. As a result, there has been a great deal of surveying since the 1830s. Many of the PLSS corners have been perpetuated. Some of them are even in the right location, I think. 😊 There are still areas of the county where there are essentially lost corners, but few. Most of these perpetuation records pre-date the use of GPS and the creation of modern day coordinate datums.

Dane County developed our Geographic Information System (GIS) without the advantage of accurate observed coordinate values. It is a well run and dynamic GIS, but has many accuracy issues. Numerous methods were used in determining the PLSS corner locations. All the Subdivision Plats, Certified Survey Maps, deeds, etc. were drafted from these locations. If the PLSS corner locations are inaccurate, so is everything else related to it.

Some of the problems.



This land owner was losing a very significant amount of funding from CRP and MFL programs because the FSA uses our mapping containing large errors in PLSS locations.

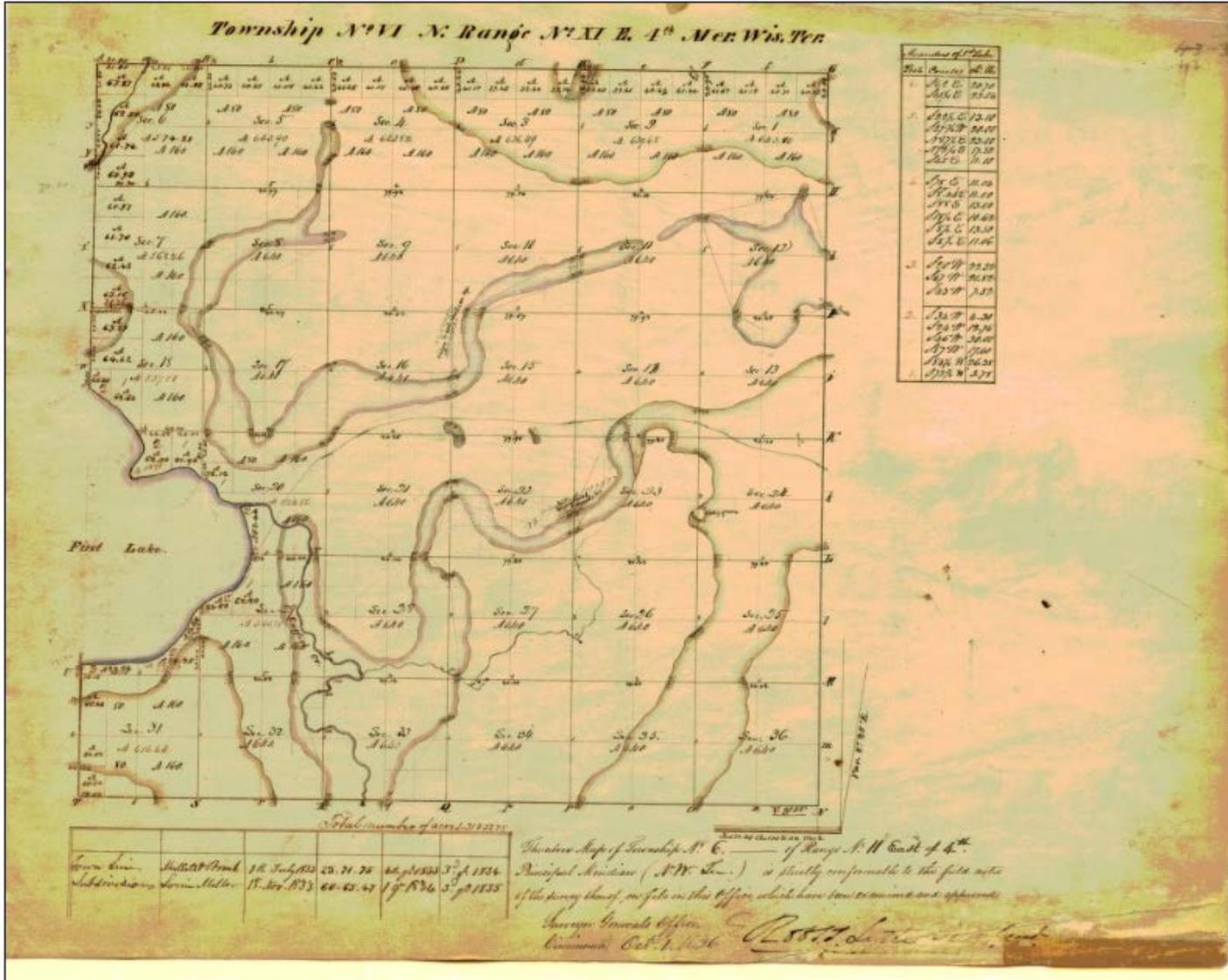


When lot lines are going through houses, roads aren't in rights-of-way, and nothing lines up with the georeferenced imagery, the GIS is not as useful a tool as it could be. We just don't know if the issue is the PLSS and our parcel mapping, or if something is actually constructed in the incorrectly.

We were able to start a new re-monumentation program in 2012. All work is being completed through contracts with multiple surveying firms. We are moving at a decent rate.

The contracts include coordinate acquisition and datum information, as well as a vertical component where reasonable. We include very explicit language in our contracts for redundant measurements and coordinate values. It also includes all the applicable research and history of each corner location.

# Original government plat of T06N, R11E

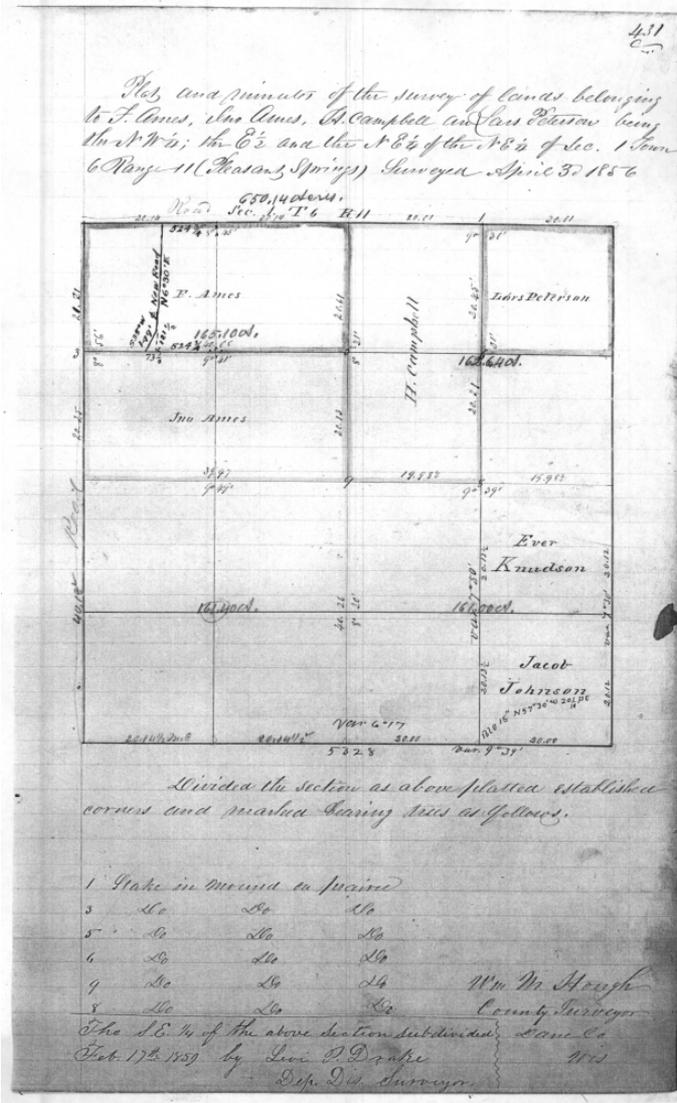


# Notes for line between 1 and 12

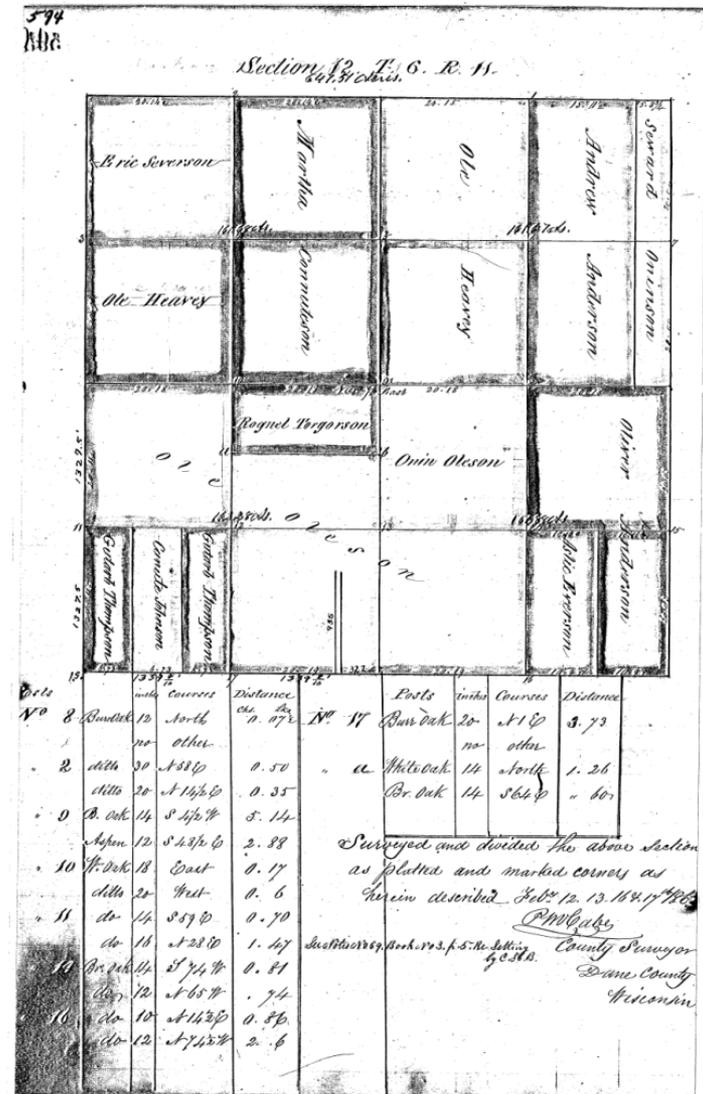
Page

S. 6 N. R. 11 E. 4th Mer		S. 6 N. R. 11 E. 4th Mer	
East Random between Sect. 1 & 12		North Between Sections 1 & 2	
61.	Marsh 3.	2.77	W Oak 12 in
65.	hard sand	8.15	Do " 20 "
71, 84	Intersuch, R line 67 S. A. Post	13.90	Do " 19 "
	Sandy level 2' rate. Timber + hard growth sand - Prairie + marsh Eng (e)	26.58	Entire Prairie
		10.	Set 1/4 Sec 1 Cross in mound of earth + sand
		80.96	Intersuch, down line at Post in mound
West, Connected between Sect. 1 & 12			Sandy level 2' rate W. 13. +
11.86	Yel Oak 14 in		Yel Oak - Oak + Hazel under growth + Brakes + Sweet Robin
39.92	Set 1/4 Sec. Post		Sandigo Prairie Eng + W
73.	T.R. 14 in S 88° E. 630		
	Do 6. N 5° 30' W. 125		
62.97	W Oak 12 in		
66.16	Yel Oak 28		
79.84	Sec. Post		

# Blue Book entry 1856



# Blue Book entry 1863



# Tie Sheet 1983 (rev 1988)

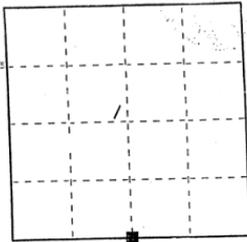
# Tie Sheet 1987

## U. S. PUBLIC LAND SURVEY MONUMENT RECORD

INSTRUCTIONS: This record shall show the location of the corner and shall include all of the following nine elements (a through i).

- (a) Identify the corner by reference to the U.S. public land survey system.  
 O = Corner monument restored.

TOWN OF PLEASANT SPRINGS  
 DANE COUNTY WISC.



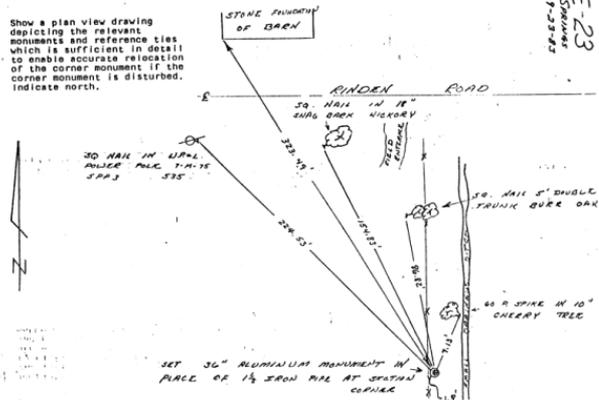
REVISED: 2-1-88 TRG.  
 I NOW ACCEPT 6" SQUARE  
 HINTZE CONC. MONUMENT FOUND  
 & TIED BY RESOP ON 12-27-87

- (b) Describe any record evidence, monument evidence, occupational evidence, testimonial evidence or any other material evidence you considered, and whether the monument was found or placed.

I FOUND A 1/2" IRON PIPE SET BY PREVIOUS SURVEY AND PLACED AN 36" ALUMINUM MONUMENT AT THAT LOCATION, IT SEEMS TO FIT A PROPORTION OF THE HINTZE RESURVEY OF 1918 QUITE WELL, AND THE HINTZE BEARING TREE IS STILL IN  
 REVISED 2-1-88 - I NOW ACCEPT FOUND CONC. MONUMENT

- (c) In the plan view drawing below, provide reference ties to at least 4 witness monuments, or, if the location is within a municipality, to at least 2 witness monuments. [Witness monuments shall be made of concrete, natural stone, iron or other equally durable materials.] Describe witness monuments.

- (d) Show a plan view drawing depicting the relevant monuments and reference ties which is sufficient in detail to enable accurate relocation of the corner monument if the corner monument is disturbed. Indicate north.



## U.S. PUBLIC LAND SURVEY MONUMENT RECORD

Note: This form is intended and designed to fulfill all requirements of Wisconsin Administrative Code, Chapter A-E 5.02, U.S. Public Land Survey Monument Record (3) (a) (b) (c) (d) (e) (f) (g) (h) (i). An additional sheet may be added if necessary to conform with said requirements.

(a) Corner location: Township 6 North

Range 11 East

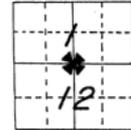
Town/City/Village PLEASANT SPRINGS

County DANE

RECEIVED

JAN 29 1988

DANE COUNTY  
 LAND REG. & RECORDS



Section \_\_\_\_\_

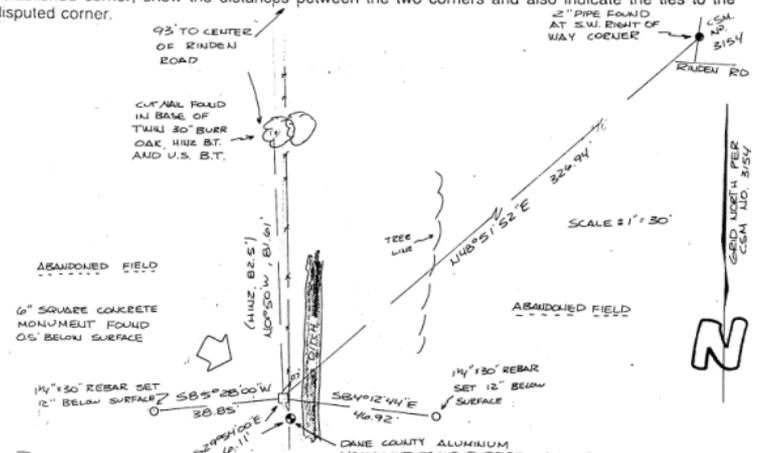
- (b) (f) (g) (h) Description of monument found at this corner and if it was accepted, state all evidence (material, testimonial, occupational, plats, records, other monuments) used as a basis for accepting. If not accepted or if nothing was found, state evidence used as basis for establishing location. If reestablished through lost corner proportionate methods, indicate all monuments, distances and directions used to establish.

Original U.S. survey set wood post and bearing trees.

During his 1918 resurvey of Pleasant Springs, Philip Hintze set a 6" square concrete monument from the original N.W. bearing tree.

In 1987, I found the bearing tree still standing and the Hintze monument 6" below the surface. The concrete monument is 6" N.W. of an aluminum monument also found at the corner. I accepted the Hintze monument and tied as shown.

- (c) (d) (e) Plan view of corner with ties to at least 4 witness monuments. If in disagreement with previously established corner, show the distances between the two corners and also indicate the ties to the disputed corner.



E-23

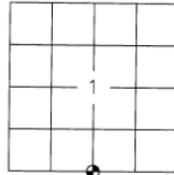
2

# Tie Sheet 2012

## U. S. PUBLIC LAND SURVEY MONUMENT RECORD

(A) IDENTIFY THE CORNER BY REFERENCE TO THE U.S. PUBLIC LAND SURVEY SYSTEM.

● = CORNER MONUMENT RESTORED.



SOUTH QUARTER CORNER  
SECTION 1  
TOWN 6 NORTH  
RANGE 11 EAST  
TOWN OF PLEASANT SPRINGS  
DANE COUNTY  
WISCONSIN

DANE COUNTY COORDINATES

N: 458179.463'

E: 886393.457'

HORIZONTAL DATUM: NAD83 (2007)

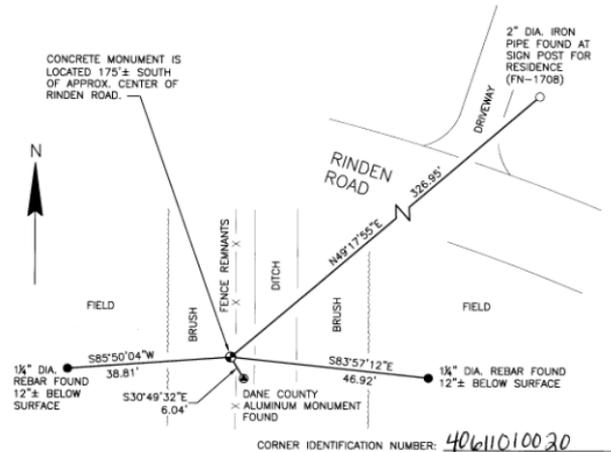
(B) DESCRIBE ANY RECORD EVIDENCE, MONUMENT EVIDENCE, OCCUPATIONAL EVIDENCE, TESTIMONIAL EVIDENCE OR ANY OTHER MATERIAL EVIDENCE YOU CONSIDERED, AND WHETHER THE MONUMENT WAS FOUND OR PLACED.

PREVIOUS MONUMENT RECORDS: PHILIP H. HINTZE (1918), THOM R. GRENLE (6/15/1983, REVISED 2/1/1988) AND DAVID C. REISOP (12/27/1987).

HINTZE SET A 6" SQUARE CONCRETE MONUMENT BASED ON EXISTING U.S.B.T. EVIDENCE IN A 1918 RESURVEY OF PLEASANT SPRINGS TOWNSHIP (VOL. 5, PAGE 24-24A). I FOUND THE 6" SQUARE CONCRETE MONUMENT SET BY PHILIP HINTZE (1918) AND FOUR WITNESS MONUMENTS AS NOTED BY D. REISOP (1987). GRENLE SET THE ALUMINUM MONUMENT FOR THE CORNER IN 1983 BUT NOW ACCEPTS THE CONCRETE MONUMENT PER 1988 REVISION NOTE ON HIS MONUMENT RECORD.

(C) IN THE PLAN VIEW DRAWING BELOW, PROVIDE REFERENCE TIES TO AT LEAST 4 WITNESS MONUMENTS. DESCRIBE WITNESS MONUMENTS.

(D) SHOW A PLAN VIEW DRAWING DEPICTING THE RELEVANT MONUMENTS AND REFERENCE TIES WHICH IS SUFFICIENT IN DETAIL FOR ENABLE ACCURATE RELOCATION OF THE CORNER MONUMENT IF THE CORNER MONUMENT IS DISTURBED. INDICATE NORTH.



# Tie Sheet 2016 Dane County Re-mon Project

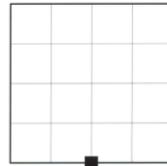
## DANE COUNTY PUBLIC LAND SURVEY MONUMENT RECORD

This record shall show the location of the corner and shall include all of the following nine elements (a through j).

**(a) CORNER LOCATION**

SECTION NUMBER: 1  
 TOWNSHIP 6 NORTH, RANGE 11 EAST  
 DANE COUNTY COORDINATES  
 NORTHING: 458179.37'  
 EASTING: 886393.55'  
 HORIZONTAL DATUM & ADJUSTMENT: NAD 83 (2011)  
 ORTHOMETRIC HEIGHT: 901.45' VERTICAL DATUM: NAVD 88

**MARK CORNER LOCATION**



**(b) Describe any record evidence, monument evidence, occupational evidence, testimonial evidence or any other material evidence you considered, and whether the monument was found or placed.**

I found the concrete monument as per Monument Reference Sheet by David Riesop and James Baker.

**(c) CORNER LOCATION SKETCH:** In the sketch, provide reference ties to at least 4 witness monuments of lasting durable material.

**(d) The sketch shall include physical features surrounding the monument location sufficient to easily find the monument when in the general area, such as but not limited to utility poles, signs, trees, edges of forests or cropland, field lanes, water bodies, pavement, buildings, etc. Sketch shall also indicate north and scale, and include descriptions of symbols, in sketch or by legend.**

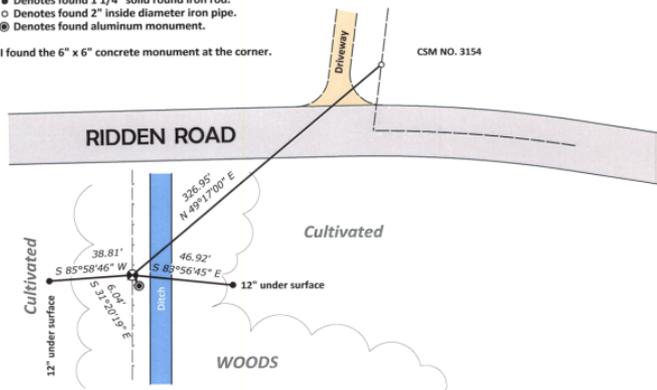
Bearings are grid based on the Dane County coordinate system designed by the Wisconsin Department of Transportation. NAD83 (2011)

Scale: 1" = 40'



- Denotes found 1 1/4" solid round iron rod.
- Denotes found 2" inside diameter iron pipe.
- ⊙ Denotes found aluminum monument.

I found the 6" x 6" concrete monument at the corner.



CORNER IDENTIFICATION NUMBER 40611010020

**(e) Describe any material discrepancy between the location of the corner as restored or reestablished and the location of that corner as previously restored or reestablished by distance and direction. Show the discrepancy in the sketch on sheet 1.**

None

**(f) Was the corner restored through acceptance of (1) an obliterated evidence location, or (2) a found perpetuated location?**

(2) a found perpetuated location

**(g&h) Was the corner reestablished through proportionate methods? If so, show the method, including the directions and distances to other public land survey corners used as evidence or used for proportioning in determining the corner location.**

No

**(i) List all previous Monument Records found, previously filed for the subject corner, including monument types set or found, surveyor, and date of survey.**

- On April 3, 1856, William Hough was at this corner while working in Section 1. - Bluebook volume 1, page 431
- On February 12 to 17, 1863 P. McCabe was at this corner while working in Section 12. - Bluebook volume 5, page 594
- On February 1, 1918, Phillip Hintze set a concrete monument by second growth tree on U. S. B. T. Resurvey of Township of Pleasant Springs.
- On June 15, 1983, Thom R. Grenlie found a 1 1/2" iron pipe and set an aluminum monument - Monument Reference Sheet.
- On December 27, 1987, David Riesop found a 6" x 6" concrete monument 6" under surface which matches Hintze bearing tree still standing. - Monument Reference Sheet.
- On May 30, 2012, James Baker found the 6" x 6" concrete monument referenced by David Riesop. - Monument Reference Sheet.

**(j) I, Richard Marks, Professional Land Surveyor number S-1473 hereby certify that the corner location shown on this record was determined by me or under my direction and is correct. This U.S. Public Land Survey Monument Record is complete to the best of my knowledge and belief.**

*Richard Marks* 6/29/2016

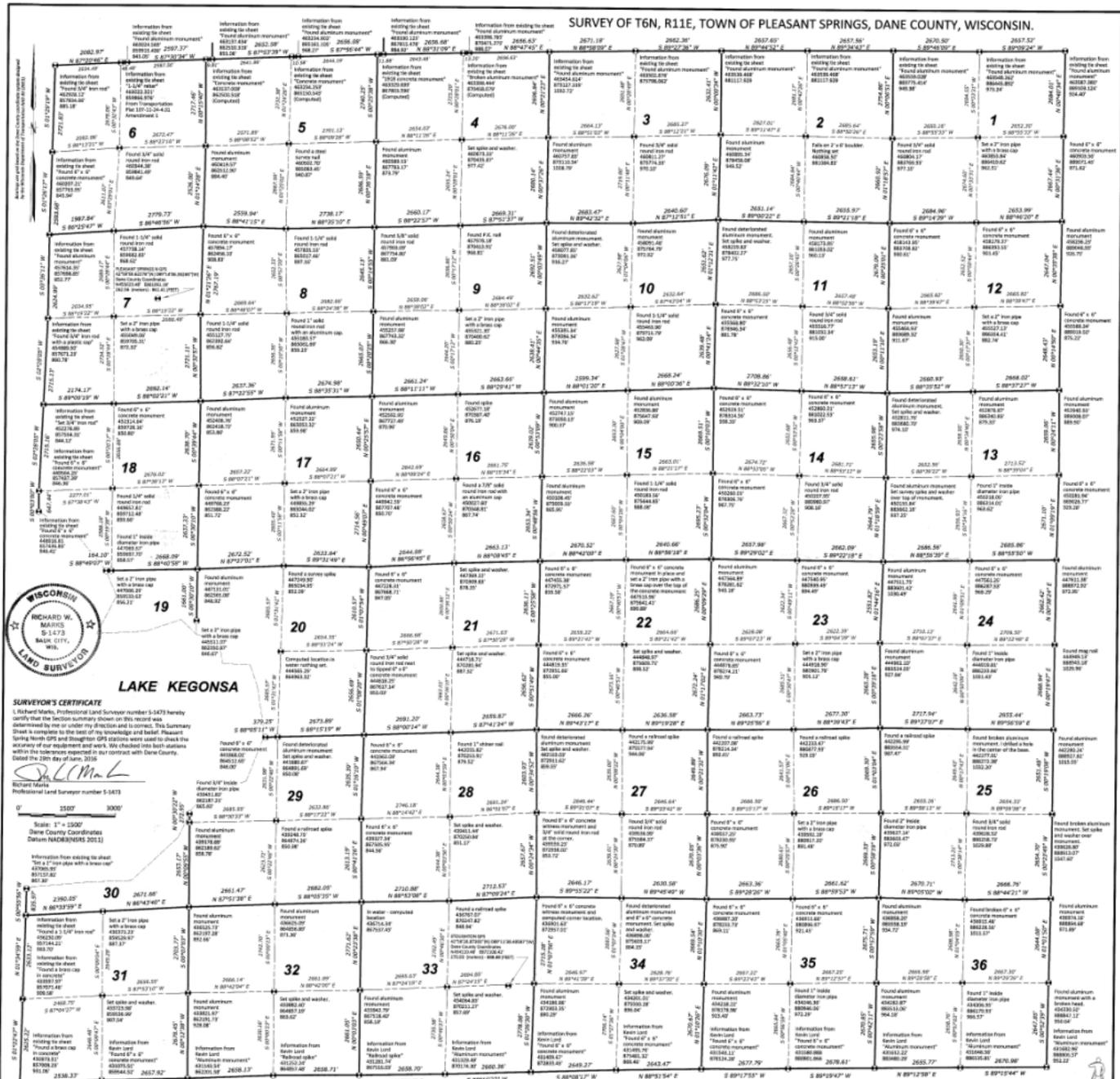
Richard Marks Date  
 Professional Land Surveyor number S-1473

Affix Land Surveyor seal



CORNER IDENTIFICATION NUMBER 40611010020

SURVEY OF T6N, R11E, TOWN OF PLEASANT SPRINGS, DANE COUNTY, WISCONSIN.



**SURVEYOR'S CERTIFICATE**  
I, Richard Marks, Professional Land Surveyor number 51473 hereby certify that the Section survey shown on this record was determined by me or under my direction and control. This Surveyor's Certificate is a true and correct copy of the original. This Surveyor's Certificate is a true and correct copy of the original. This Surveyor's Certificate is a true and correct copy of the original. Dated the 19th day of June, 2016.

Scale: 1" = 1500'  
Dane County Coordinates  
Datum NAD83(NAEPS 2011)

We are actively re-mapping each township after replacing the old PLSS structure with the new measured locations in the GIS. A lot of work, but a much more dynamic, useful and accurate system.

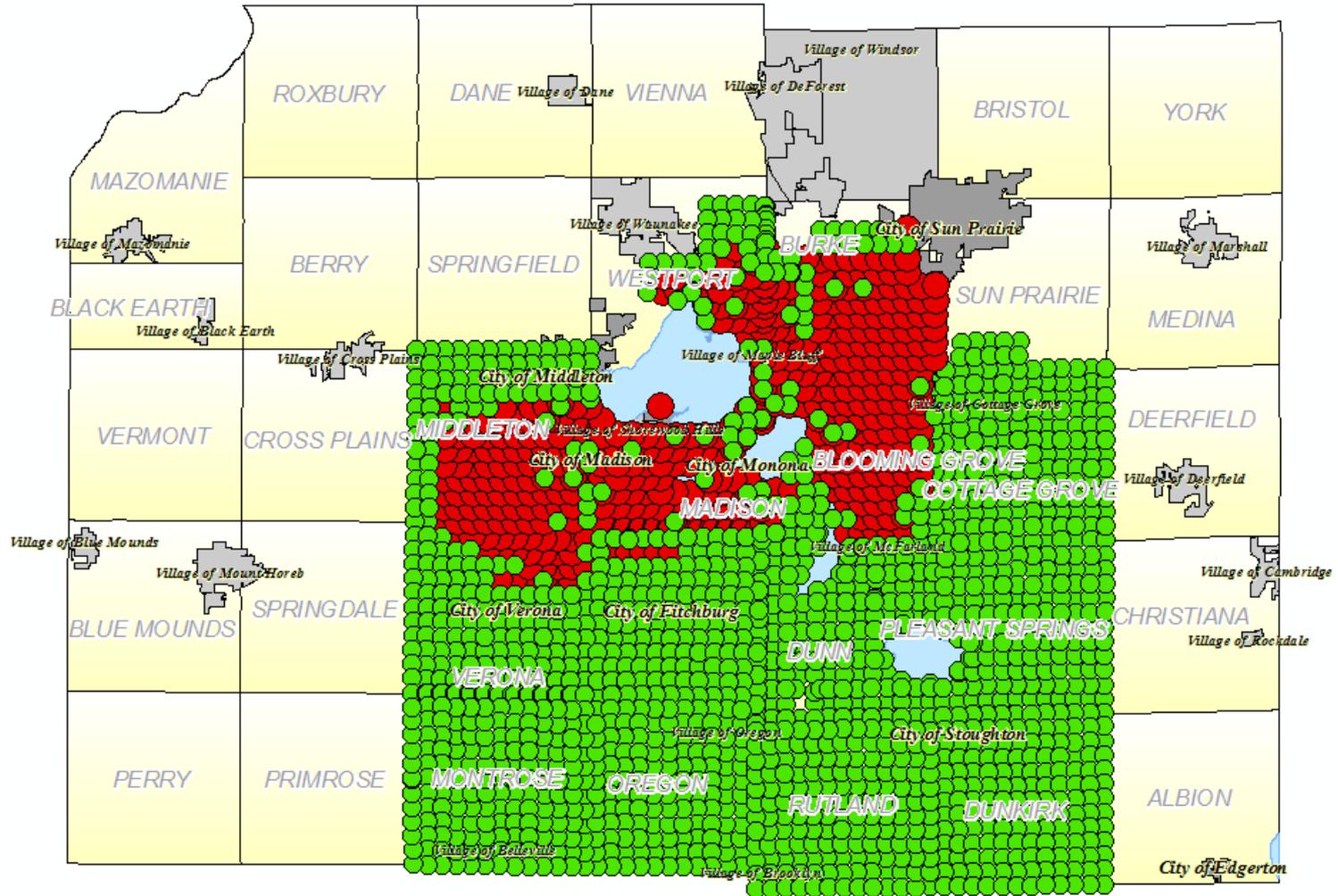
# Before and after re-mon and re-map



This re-monumentation effort in Dane County pairs well with the Wisconsin Land Information Program initiative to create a statewide parcel map.

The Wisconsin County Surveyors Association has advocated strongly for this effort to include an emphasis on building an accurate system statewide by basing it on the perpetuated and measured PLSS.

# Progress



**WAKE UP, THIS IS YOUR PART!**



So why should code administrators care?

As you already know, many of the rules you enforce from shoreland / wetland zoning, floodplain restrictions, building setbacks, etc., are relative to Ordinary High Water Mark, Property boundaries, road right-of-way locations, and so on. These are all relative to the PLSS and we rely upon this system to locate everything. This is especially true in rural areas.

# Dane County Location Survey Checklist

## Dane County Planning & Development Division of Zoning

### \*\*\* NOTICE \*\*\*

Your Dane County Zoning Permit requires that a location survey be submitted to the Zoning Division for proof of compliance. There are no exceptions to this requirement. If you do not fully understand the conditions of your permit, please ask the Zoning Division for clarification.

To satisfy this requirement, you must mail or deliver a copy of the completed location survey to the attention of:

DANE COUNTY ZONING  
210 MARTIN LUTHER KING, JR. BLVD., ROOM 116  
MADISON, WI 53703-3342

Do not fax the survey – faxed surveys will not be accepted due to scale and legibility issues.

The survey must be received when the foundation / basement walls are constructed, or if the project does not include foundation / basement walls, at the time the location of the structure is established, and before any other work is done.

A location survey is an “as-built” survey. It is not required to have a surveyor lay out your structure; however it may be very beneficial to contact a surveyor prior to construction to ensure proper structure location.

If this survey is not submitted and in compliance with all applicable provisions, all owners, agents, and / or contractors will be subject to enforcement and fines each day of the offense.

If your project is subject to shoreland, wetland, or flood plain zoning, more information may be required on the survey in addition to the checklist on the reverse side of this document. Please ask the Zoning Division for more information.

## LOCATION SURVEY CHECKLIST

A Dane County Location Survey is not exempt from the minimum standards for property surveys, Chapter A-E 7 of Wisconsin Administrative Code. All of the items listed on this checklist must be included for Dane County Zoning Division acceptance.

\_\_\_ CONVENIENT SCALE. (1" = 10', 20', 30', 40', 50', 60', 100', 200')  
*A-E 7.05(1)*

\_\_\_ NORTH ARROW AND REFERENCE NOTE. *A-E 7.05(2)*

\_\_\_ BEARINGS AND DISTANCES OF PARCEL BOUNDARIES DETERMINED TO A MINIMUM ACCURACY OF THE NEAREST 30 SECONDS AND 1/100<sup>TH</sup> OF A FOOT. *A-E 7.05(3), A-E 7.06(5)*

\_\_\_ BOUNDARY MONUMENT SYMBOLS WITH LEGEND OR NOTE INDICATING FOUND OR PLACED. *A-E 7.05(4)*

\_\_\_ LEGAL DESCRIPTION  
(Description must commence from a USPLSS corner or existing platted corner)  
*A-E 7.05(5), A-E 7.04*

\_\_\_ “SURVEYED FOR” NOTE. *A-E 7.05(5)*

\_\_\_ DATE OF SURVEY. *A-E 7.05(5)*

\_\_\_ SURVEYORS CERTIFICATE WITH STAMP OR SEAL AND SIGNATURE  
(Must certify “this survey is correct to the best of surveyor’s knowledge and belief”.)  
*A-E 7.05(6)*

\_\_\_ ALL NECESSARY SETBACKS AND DISTANCES FROM STRUCTURES REQUIRED BY CONDITIONS OF PERMIT. MAP MUST ALSO NOTE PERMIT NUMBER. *DCO 10.01(30m), 10.25(3)(a)1*

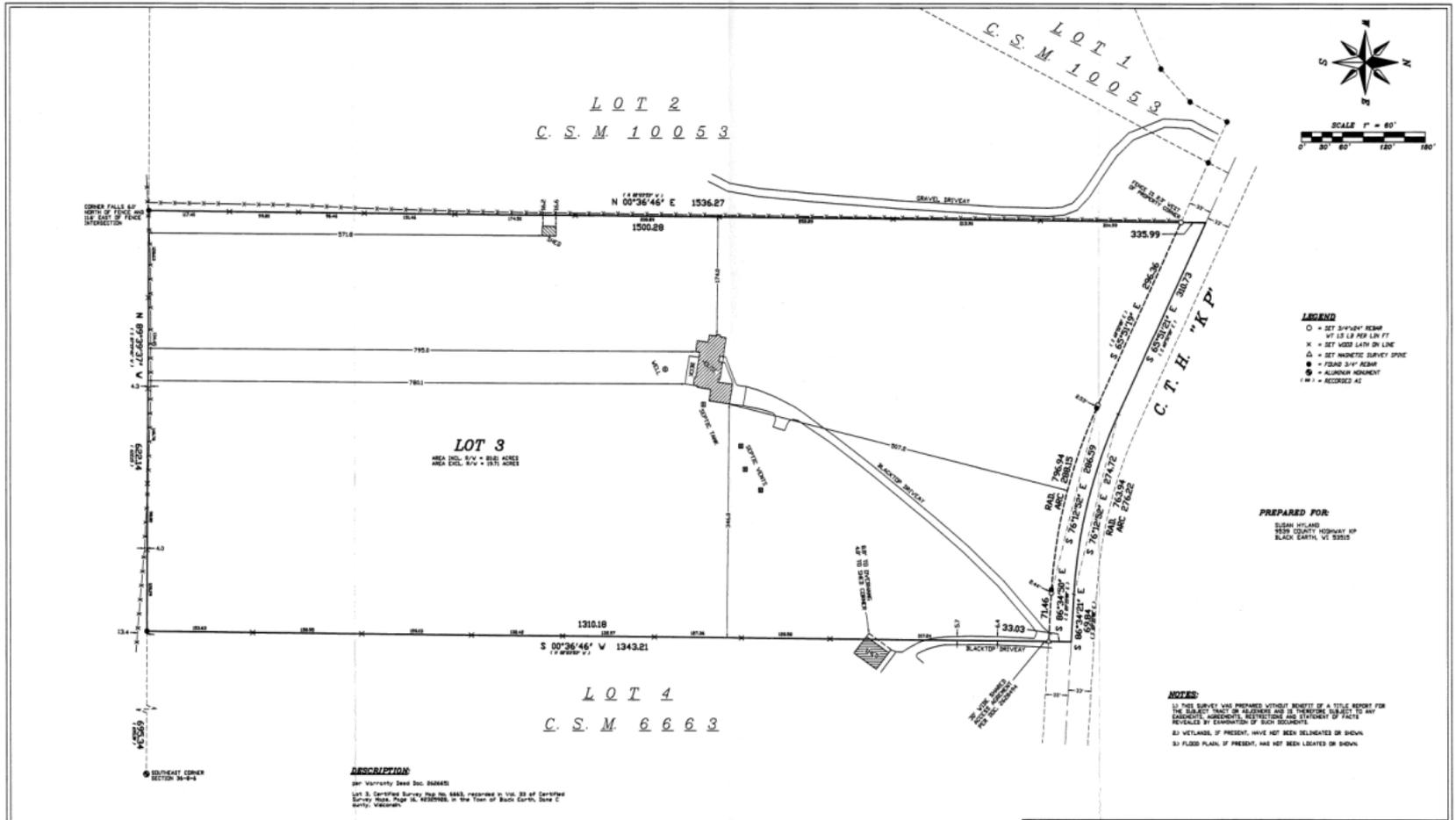
THE SURVEYOR IS RESPONSIBLE FOR FILING THE SURVEY MAP IN THE COUNTY SURVEYORS OFFICE WITHIN 60 DAYS OF COMPLETION.  
*A-E 7.05(7), ss39.45(1)b*

Surveyor and client may agree, in a signed statement, to exclude monumentation requirement. To do so, survey map must include a note, which states that an agreement to exclude work from the requirements of A-E 7 has been made and the names of the parties making the agreement.

All other items are required either by Administrative Code or Dane County Ordinance.

If you rely on Land Surveyors to confirm setbacks, roads, structures and any other physical location, they are using the PLSS. If the PLSS isn't reliable or lost, it is very expensive and far more time consuming to have private surveys prepared. Land owners end up footing the bill. It also leads to major boundary disputes that fill our courts.

# Re-mon can't fix everything.



One of the goals of re-monumentation is to get the GIS to an accuracy level that it can be used for a more site specific analysis with a high level of dependability.

You will not likely ever be able to confirm a very tight setback, but you will hopefully be able to see clear violations, non-permitted structures and so on.

# OOPS!



I am happy to take questions on any of the items discussed, or any other surveying questions you may have.

