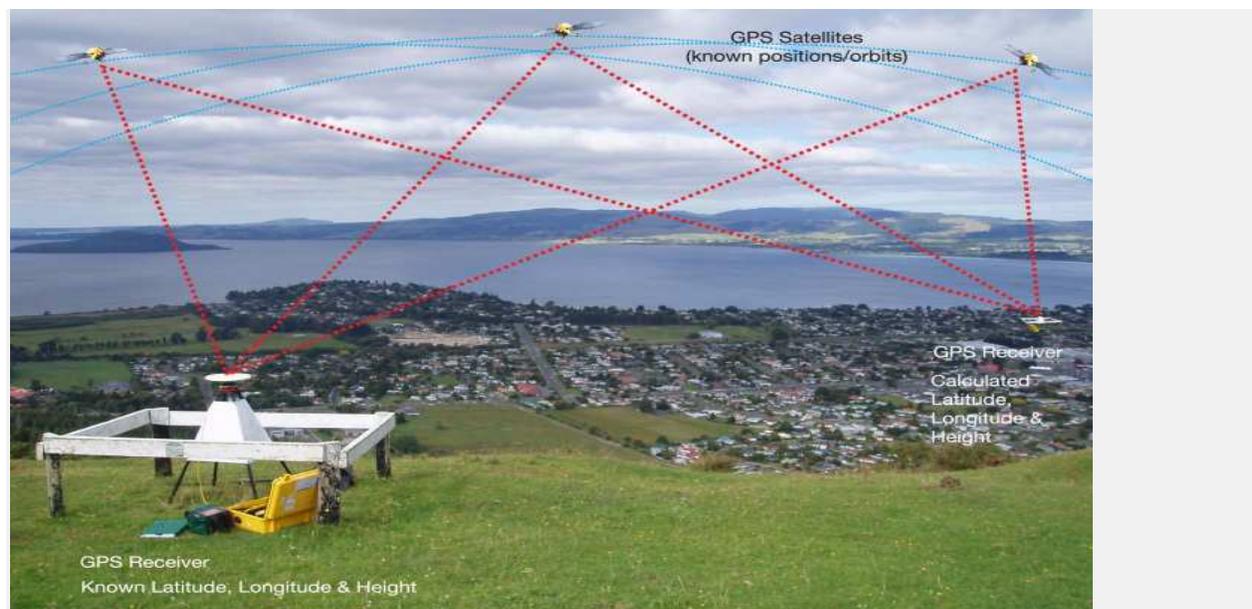


Section Corner restoration and the advancing technology of measuring

By: Warren Delles, Mille Lacs County Surveyor

Date: February, 2014

Global Positioning System (GPS) surveying equipment enables the capture of positions of points on the earth with a great degree of precision, confidence, and ease. The use of GPS equipment allows us the ability to efficiently collect the field data essential for the Section¹ corner restoration and maintenance efforts throughout Mille Lacs County.



When the original Public Land Survey was executed throughout Mille Lacs County in the mid 1800's, far less sophisticated surveying equipment was utilized. Although astronomic observations were used to establish some controlling survey positions, much of the Section corner work was performed with a Gunter's chain (recorded in chain lengths of 66 feet) and a surveying compass. Section corner locations were typically marked with a wood 'post'. Reference positions to nearby trees or other objects were noted with regard to relationship with the corner 'post' location. The established method was well documented, and the work was well done by the original surveyors with the equipment of the time, however, the process was subject to systematic, accidental, and human errors.

Footnote ¹

In 1785, Congress enacted a law which provided for the subdivision of the public lands into townships six miles square, with townships subdivided into thirty-six (36) sections, most of which are one mile on a side.



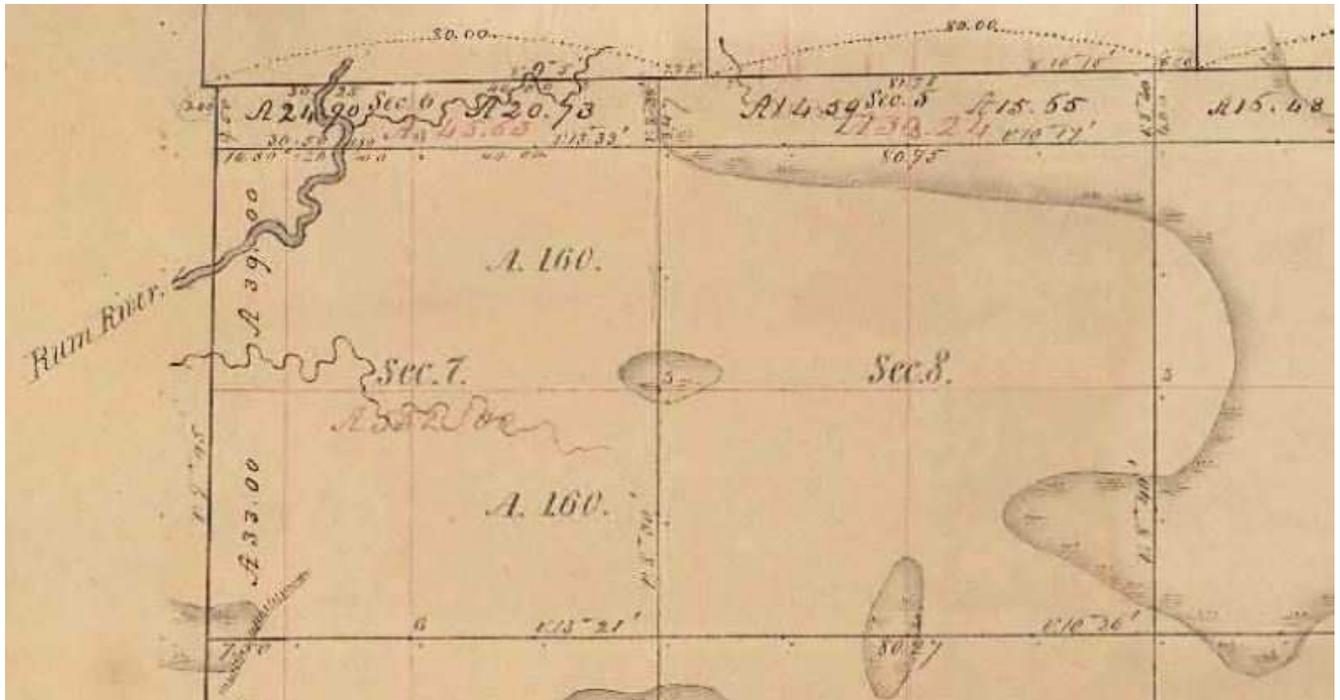
Basic surveying principles established by Acts of Congress and documented by the Bureau of Land Management as controlling upon the location of all public lands are of significant importance to the Mille Lacs County Section corner restoration and maintenance program:

That the boundaries of the public lands as surveyed under the approved instructions, the physical evidence of which survey consists of monuments established upon the ground, and the record evidence of which consists of field notes and plats duly approved by the authorities constituted by law, are unchangeable after the passing of the title by the United States.

That the physical evidence of the original Township, Section, Quarter Section and other monuments must stand as the true corners which they were intended to represent, whether in the place shown by the field notes or not.

The Public Land Survey System was developed to establish permanency to the positions of the corner markers placed by the original surveyors for the purpose of disposal of land by the Federal Government. Court decisions have held that the physical evidence of the corner markers placed by the original surveyors controls the location of the corner, even if in conflict with other information in the record. When the Federal Government issued a patent to a parcel of land, the corner locations as marked in the original Public Land Survey controlled the location of the rights issued to the patentee.

Although technology continuously allows us to obtain measurements with greater accuracy and precision, the evidence of the location of the original corner is paramount. The foresight of the permanency of the original corners protects and maintains the rights of the landowners, which could otherwise be jeopardized as technology continuously improves our measuring capabilities.



The corners established by the original surveyors were intended to mark the position in perpetuity; however, the physical evidence of original corners on the ground continues to deteriorate with age, neglect, development, etc. Some of the government corners were perpetuated following the original survey by the placement of an identified object at the location of the deteriorating 'post'.

Corner No 1	Gov't Corner	grindstone ^{wagon hub} and single post at corner in center of road, relocation of gov't. corner from all available information. S. & W. 9-20-1910. Later official stone above. Spike in Whelpoint 16" S. 72° 30' E. 162.7' (187.8 ft). Tam. 10" S. 48° 0' E. 161.5' (106.7 feet)
Corner No 3	Gov't Corner	stones and iron wood hub in center of road, roads E. W. T. S. line fence runs North ranches are Mr. Athinson and Mr. Northway
Corner No 5	Gov't Corner	Reported drag tooth at corner from gov't. voucher M. A. Northway
Corner No 10		Piece of st. cloud granite at corner guard stake (1/2 S.) on North side.
Corner No 11	P. D. Corner	Official stone at corner. Iron wood guard (1/2 S.) on N. side. 4" x 4" long
Corner No 13		Whiskey bottle at corner in road.
Corner No 15	Gov't Corner	McBrellans iron at corner from gov't. voucher M. A. Northway
Corner No 20		Red elm post in S. E. edge of pine stump. marked 1/2 S.
Corner No 21	Gov't Corner	Official stone at corner. Road E. W. T. S. line fence North McBrellans iron corner 3 ft N. E.; X on boul. N. 46° 0' W. 42 1/2' (28.1 feet) S. W. corner of Andersons lichen N. 50° 0' E. 333.7' (220.2 feet)
Corner No 23	Gov't Corner	Old marked grindstone at corner set by McBrellan when one mitrus tree was plain. Set iron in hole in grindstone iron is 1 1/2" dia. and top 6 in. below road surface. Road runs E. & W. line fence runs south fence N. of road is 46' (30.4 ft) North. Corner of new fence South 49 1/2' (32.7 ft) corner of new fence N. W. 1/4 52' (34.3 ft). voucher M. A. Northway. (Record by S. L. Kimbly 8-26-1915)

The corner restoration program strives to determine the best available evidence of the original corner post locations by reviewing the records found in various public and private locations; and making a thorough field search for remnants of the corner location. The purpose of the restoration process is to maintain the integrity of the original survey.

The capability of land surveying measuring tools continues to improve as technology advances, however, only a thorough examination of the historic survey records along with an analysis of field collected data can resolve the best available evidence of the location of the original corner position.

Attached are notes written for the survey file concerning a corner in Milo Township, followed by a Certificate of Location of Government Corner filed pursuant to Minnesota Statutes Chapters 381.12 and 160.15 summarizing the corner evidence for public record.

N ¼ Corner of Section 28, Milo Township

A former County landfill exists in the South Half of the Southeast Quarter of Section 28, Township 37, Range 27, Mille Lacs County, Minnesota. The landfill site was surveyed in May of 2008 by a large consulting firm from Minneapolis. The survey required the position of the North Quarter corner of Section 28, although, no Certificate of Location of Government Corner was on file for the North Quarter corner. The surveyor completed the survey using a computed 'lost' position for the Quarter corner with a note stating: *'The north quarter corner of Section 28 is either lost or obliterated. Its position was determined by single proportion measurement and placed on line, midway between the northeast and northwest corners of said Section 28'*. The surveyor did not file a Certificate of Location of Government Corner following the survey.

The North Quarter corner position came into question in 2010 due to the description of record of the above mentioned landfill site. Below is a summary of information compiled for the North Quarter corner:

The North Quarter corner of Section 28 in Milo Township was originally placed by Deputy Surveyor James M. Marsh in 1855. In notes returned from the field, Marsh indicated a measured distance of 80.75 chains along the north line of Section 28. At 40.37 ½ chains west from the northeast corner of Section 28, Marsh indicated 'Set ¼ sec. post'. Two bearing trees were noted at the North Quarter corner of Section 28.

A cemetery is situated in the Southwest Quarter of Section 28. A sign at the entrance to the cemetery reads 'MILO CEMETERY 1885'.

A plat named UNION CEMETERY in the Southwest Quarter of Section 28 (dated 1885) is on file at the office of the County Recorder. Many interior lot corner monuments were field located. The lot corner monuments appeared to fit well within the plat, however, extrapolation of the data did not seem to correspond well with the exterior Section lines.

Supervisors' Road Orders from 1900 and 1902 indicate that the centerline of a road was intended to run along the north line of Section 28.

No other survey records have been recovered between 1855 and 1915.

A record of a 1915 survey of part of Section 21, Township 37, Range 27 by Deputy County Surveyor S.L. Kennedy is filed in Record of Surveys Book B, Pages 48 and 49. The south line of Section 21 corresponds with the north line of Section 28.

Kennedy indicates an 'Official Stone' at the southeast corner of Section 21 (northeast corner of Section 28). In Kennedy's survey record, he indicates 'S.W. corner of

Anderson's kitchen N 60 degrees East 333.7 links (220.2 feet)'. The recorded distance conforms to the remains of the southwest corner of a dilapidated house.

In Kennedy's 1915 survey record, the following statement concerning the North Quarter corner of Section 28 is particularly significant '*Old marked grindstone at corner set by McClellan when one witness tree was plain. Set iron in hole in grindstone. Iron is 1 ½" in dia. and top 6 in. below road surface*'. Kennedy notes that the '*road runs E & W*' and indicates a measured distance of 2658.5 feet between the North Quarter corner and Northeast Section corner. No information is given for the northwest corner of Section 28.

James F. McClellan (referred to as 'McClellan' in Kennedy's survey records) served as Mille Lacs County Surveyor in 1895 and references to monuments placed by McClellan are frequently found in Kennedy's survey records. Records of McClellan's survey activity have not been recovered.

Conversations with longtime area land owners Rueben and Doris Northway indicated that the east-west road is not known to have changed in location, however, the road to the north is east of the west line of the South Half of the Southeast Quarter of Section 21 by one rod. Deed information furnished by Mr. and Mrs. Northway (owners of the SW ¼ of Section 21) supports the shift in the road. Note: The Northway family has had ownership of the Southwest Quarter of Section 21 since the late 1800's.

No angle is indicated in Kennedy's 1915 survey to reposition the North Quarter corner, and the field notes for Kennedy's survey have not been found.

Historic aerial photography, historic plat maps, cemetery records, adjoining landowner testimony, previous surveys, and found monuments in the vicinity were examined for their relationship to the North Quarter corner of Section 28

On May 10, 2010, a backhoe was utilized to dig into the roadbed at a computed position of the North Quarter corner based on compiled data.

Approximately 5 feet below the gravel road surface, the top of a solid 1 ½ inch iron post was encountered. Excavation surrounding the found iron post continued, and at the base of the pointed solid iron post, a grinding wheel was located. The position of the square hole in the center of the grinding wheel was obtained, and a photograph of the monument was taken for the record. The photograph is attached to the end of this document.

The found 'grindstone' measured 2657.17 feet to the northeast corner of Section 28 (document number 1108), and 2663.72 feet to the northwest corner of Section 28

(document number 874). The 'grindstone' is approximately 27 feet south of the 'lost' corner position according to the 2008 consulting firm survey of the landfill site.

Federal surveying instructions state that the physical evidence of an original government survey corner must stand as the true corner it was intended to represent. Kennedy's statement in the 1915 survey record seems to indicate his acceptance of McClellan's grindstone placed from a 'witness' tree. Kennedy appears to have been very critical of McClellan's monuments, accepting only a small number of McClellan's monuments, and rejecting many others for unspecified reasons.

The grindstone and 1 ½" iron were left in place (as found). The gravel road was repaired, and a ¾" iron pipe with a plastic cap inscribed 'RLS 41890' was placed directly above the found 'grindstone' approximately 0.3' below the gravel road surface.

A Certificate of Location of Government Corner was prepared (and is now on file as document number 1561) for the 'grindstone' found at the North Quarter corner of Section 28.



CERTIFICATE OF LOCATION OF GOVERNMENT CORNER

North Quarter Corner of Section 28, Township 37 North, Range 27 West, 4th P.M.
County of Mille Lacs, State of Minnesota.

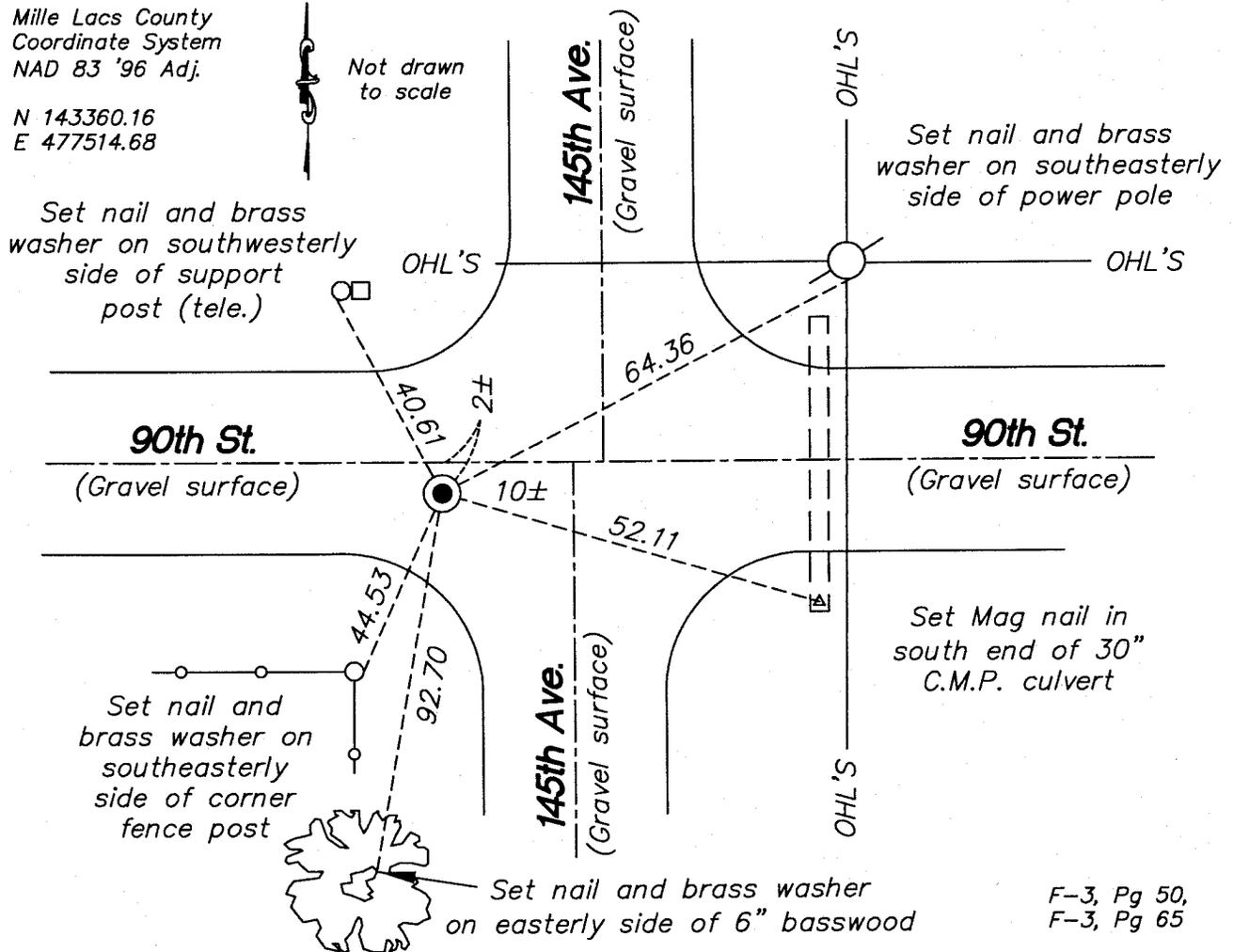
On May 10, 2010, a 1 1/2" solid iron post along with a grinding wheel at the base of solid iron post was found approximately 5' below the gravel road surface. The iron post and 'grindstone' are consistent with monuments described in historic survey records. Set a 3/4" iron pipe with plastic cap inscribed 'RLS 41890' directly above found monuments approximately 0.3 feet below gravel road surface.

Left monument as found Lowered monument Removed mon. (explain)

Mille Lacs County
Coordinate System
NAD 83 '96 Adj.

N 143360.16
E 477514.68

Not drawn
to scale



F-3, Pg 50,
F-3, Pg 65

Statement of evidence relative to this corner location is on back of page.

I hereby certify that this document and the data contained herein was prepared by me or under my direct supervision.

Warren L. Delles Date 6-01-10
Warren L. Delles
Mille Lacs County Surveyor
Minnesota License No. 41890

OFFICE OF THE COUNTY RECORDER,
MILLE LACS COUNTY, MINNESOTA

I hereby certify that this document was filed in the Office of the County Recorder for record at 3:30 P.M. on the 1st day of JUNE, 2010 A.D.
County Recorder Michelle McAllister
By _____, Deputy
Document Number 1561

Statement of Evidence:

North Quarter corner of Section 28, Township 37, Range 27, Mille Lacs County, Minnesota.

The North Quarter corner of Section 28 was originally established by James M. Marsh in 1855. Survey notes indicate that a 'post' was placed at distances of 40.375 chains between the subject North Quarter corner and the northeast and northwest corners of Section 28.

No Certificate of Location of Government Corner was found on file for the subject North Quarter corner.

A survey record of part of Section 21, Township 37, Range 27 by S.L. Kennedy from 1915 was found in Record of Surveys Book B, Pages 48 and 49. Kennedy indicates an 'Official Stone' at the southeast corner of Section 21 (northeast corner of Section 28). Kennedy also notes the following information for the subject North Quarter corner of Section 28:

'Old marked grindstone at corner set by McClellan when one witness tree was plain. Set iron in hole of grindstone, iron is 1 ½" in dia. and top 6 in. below road surface. Road runs E & W...'

Kennedy notes a distance of 2658.5 feet between the above mentioned northeast corner of Section 28 and the subject north quarter corner of Section 28.

Supervisors' Road Orders from 1900 and 1902 indicate that the centerline of a road was to run along the north line of Section 28.

Historic aerial photography, historic plat maps, cemetery records, adjoining landowner testimony, previous surveys, and found monuments in the vicinity were examined for their relationship to the subject north quarter corner.

On May 10, 2010, a backhoe was utilized to dig into the roadbed at a computed position of the subject corner based on compiled data.

Approximately 5 feet below the gravel road surface, the top of a solid 1 ½ inch iron post was encountered. Excavation surrounding the found iron post continued, and at the base of the pointed solid iron post, a grinding wheel was located. The position of the square hole in the center of the grinding wheel was obtained, and a photograph of the monument was taken for the record.

The found 'grindstone' measured 2657.17 feet to the northeast corner of Section 28 (document number 1108), and 2663.72 feet to the northwest corner of Section 28 (document number 874).

The monuments were left in place (as found). The gravel road was repaired, and a ¾" iron pipe with a plastic cap inscribed 'RLS 41890' was placed directly above the found 'grindstone' approximately 0.3' below the gravel road surface.

Reference ties to the ¾" capped iron pipe are as shown on the front of page.