

**STATE OF MINNESOTA
STEARNS COUNTY BOARD OF COMMISSIONERS
SITTING AS THE DRAINAGE AUTHORITY FOR
STEARNS COUNTY DITCH 28**

**In the Matter of:
the Reestablishment of Stearns County
Ditch 28 Drainage System Records**

**FINDINGS AND ORDER
REESTABLISHING DRAINAGE
SYSTEM RECORDS**

The Stearns County Board of Commissioners, sitting as the drainage authority for Stearns County Ditch 28 (CD 28) pursuant to Minn. Stat. § 103E.101, subd. 4a, based on the record and proceedings, Commissioner Notch moved, seconded by Commissioner Lenzmeier to adopt the following Findings and Order:

Findings:

1. The Stearns County Board of Commissioners is the drainage authority for CD 28.
2. Professional Engineers Chris Otterness and Garrett Monson of Houston Engineering Inc., along with drainage authority staff, investigated the CD 28 records and found that records establishing the alignment, cross-section, profile, or right-of-way of the drainage system were lost, destroyed, or otherwise incomplete.
3. On May 8, 2018, the drainage authority adopted a resolution to follow the procedures of Minn. Stat. § 103E.101, subd. 4a to reestablish and correct the drainage system record of CD 28.
4. Houston Engineering Inc. was appointed to conduct an investigation and a report of findings supported by existing records and evidence, including, but not limited to, applicable aerial photographs, soil borings, or test pits, culvert dimensions and invert elevations, and bridge design records.
5. As part of the analysis of the drainage system, the engineer has identified the existing functional alignment, dimension, and grade of the drainage system as it provides beneficial public drainage today. This functional alignment, dimension, and grade match the basic functional efficiency of the system as designed and established to provide beneficial public drainage.
6. The engineer has also identified the alignment; cross-section; profile; hydraulic structure locations, materials, dimensions, and elevations; and right-of-way of the drainage systems in their as constructed and subsequently improved state.

7. The engineer's study included evaluation of existing records and evidence, including, but not limited to, applicable aerial photographs, soil borings or test pits, culvert dimensions and invert elevations, field investigation and bridge design records.
8. The intent of these proceedings was to reconcile the historical record of the drainage system with the functional alignment, dimension, and grade of the system to describe the equivalent of the as constructed and subsequently improved condition.
9. Future work on the drainage system will utilize the as constructed and subsequently improved condition, established in these proceedings, as a baseline for determining repair, improvement, or other modification of the drainage system.
10. Houston Engineering, Inc. filed a report of findings with the drainage authority dated June 6, 2019 and a revised report on June 11, 2019.
11. On July 9, 2019, the drainage authority, in consultation with the Auditor, set a time and location for a hearing on the engineer's report and directed the Auditor and staff to provide notice, by mail, of the time and location of the hearing to the executive director of the Board of Water and Soil Resources, all property owners benefitted or damaged by the drainage system and the commissioner of Department of Natural Resources via email as directed on the Department's public website. Notice to other interested parties was provided by publication on the drainage authority's website.
12. Notice of the public hearing was properly provided as required by law. Evidence of all notices are on file with the drainage authority office.
13. The drainage authority held a public hearing on the correction of the drainage system records on August 20, 2019 at 9:00 a.m. at the Stearns County Administration Center, Board Room, 705 Courthouse Square, Saint Cloud, MN 56303.
14. At the public hearing, the engineer presented the engineer's report of findings. The engineer's report states that CD 28 is located in Sections 1, 12, and 13 of Albany Township (Township 125 North, Range 31 West), Section 36 of Krain Township (Township 126 North, Range 31 West), and Sections 17, 19, 20, 30, and 31 of Holding Township (Township 126 North, Range 30 West). CD 28 starts near the intersection of Rushmeyer Lake Road and Quaker Road, and terminates on the south side of County Road 17 in the City of Holdingford. It is approximately 7.8 miles in length and contains roughly 3,089 benefitted acres. CD 28 consists entirely of an open channel ditch. Several crossings exist on the open channel ditch that were not part of the establishment components of the drainage system. Appendix A of the engineer's report shows the existing and as constructed grades and alignment of the system. There is no record of significant modifications to CD 28 documented since its establishment in 1906.
15. The engineer's report states damages were awarded at the time of establishment for the areas physically occupied by the CD 28 drainage system along with an easement for the area required for construction activities, land clearing, and spoil disposal. The report states that right-of-way calculations were based on the ditch cross sectional area and top width

provided by the 1906 Engineering Report. The ditch cross sectional area was used to determine the spoil pile width. The spoil pile width was based off of 3:1 slopes on the ditch side, 5:1 slopes on the non-ditch side and a top width of 8 feet. The right-of-way width includes both the spoil pile width on both sides of the ditch and the width of the top of the ditch. Along portions of the public drainage system where excavation was not necessary for the grade profile of the system, the right-of-way is 55 feet centered on the ditch centerline. Table 1 and Figure 2 of the Engineer's Report show the right-of-way widths and locations.

16. The 1906 Engineer's Report shows that the CD 28 was designed with 1:1 side slopes and a constant 10-foot bottom width. The average top width and cross-sectional area were 18 feet and 53 square feet respectively. Since the 1906 design profiles were based on an assumed vertical datum referring to a benchmark which no longer exists, and as built plans are not available, the engineers used soil probes of the channel hard-bottom to determine as built excavation depths. A statistical comparison of these elevations and the original design profile elevations was performed for each section to convert the design profile from the original local datum to NAVD88 and to determine and corroborate the as constructed and subsequently improved condition of the system.
17. At the public hearing, the Chair opened the floor for members of the public to provide comments on the engineer's report. All comments made were recorded and became part of the record of proceedings for this reestablishment of drainage system records. Written comments were submitted by the Minnesota Department of Natural Resources and read during the public comment portion of the hearing. Verbal comments were submitted by Rich Klug, George Hadrich, Gary Hadrich, and Bob Guggenberger. After all comments pertaining to the reestablishment of drainage system records ceased, the Chair declared the public comment portion of the hearing closed.
18. Following the closing of the public comment portion of the hearing, the Board discussed the engineer's report, the proceedings, and comments. The Board and staff summarized the comments and responses to the comments in **Exhibit A** attached hereto. Based on comments submitted, the engineer's recommended changes to some aspects of their report and filed a revised report with the drainage authority attached hereto as **Exhibit B**.
19. The proposed functional alignment and grade of CD 28 as described in the engineer's report of findings reflects the level of performance similar in nature to the as constructed condition of the drainage system considering the function required by the change in land use to reestablish the historic drainage function to benefited lands.
20. Correction of the drainage system records to adopt the proposed functional alignment and grade of the drainage system, as described in the engineer's review memoranda, will provide for the efficient administration of the drainage system.

21. Adopting the proposed functional alignment and grade of the drainage system, as described in the engineer's report of findings, will reconcile the historical record of the drainage system with the functional alignment, dimension, and grade of the system as it has historically provided public benefit.

Order:

Based on the foregoing Findings and the entire record of proceedings before the Board, the Board, acting as the drainage authority for CD 28, hereby orders as follows:

- A. The Board hereby corrects the drainage system records of CD 28 to reflect the alignment; cross-section; profile; hydraulic structure locations, materials, dimensions, and elevations; and right-of-way of the drainage system as detailed in the engineer's report of findings dated June 6, 2019 and revised June 11, 2019 and September 17, 2019.
- B. The Board further directs filing and recording of documents necessary to reflect the reestablishment and correction of the public drainage system records established herein.

After discussion, the Board Chair called the question. The question was on the adoption of the foregoing findings and order, and there were 5 yeas, 0 nays, 0 absent, and 0 abstentions as follows:

	Yea	Nay	Absent	Abstain
Clark	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lenzmeier	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mergen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perske	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Upon vote, the Chair declared the motion passed and the Findings and Order adopted.



Joe Perske, Chairperson

Dated: September 24, 2019

* * * * *

I, Randy R. Schreifels, Stearns County Auditor, do hereby certify that I have compared the above motion; findings and order with the original thereof as the same appears of record and on file with the Stearns County Board of Commissioners and find the same to be a true and correct transcript thereof. The above order was filed with me, Stearns County Auditor, on September 24, 2019.

IN TESTIMONY WHEREOF, I hereunto set my hand this
24th day of September, 2019.



Randy R. Schreifels

SCD 28 Record Re-Establishment
EXHIBIT A

Commentor	Date	Type of Comment	Comment	Result in Change?	Response / Revision
DNR	19-Aug	Written	Attached comment 1, bullet point 1	No	The ACSIC includes the condition of the drainage system upon which benefits were determined when CD 28 was established and after original construction. For the portions of the stream where benefits were determined for the system based upon the existing, natural elevation of the stream bed, the natural elevation at the time of construction represents the as constructed condition of the drainage system. The report calls out the elevation of the natural streambed at the time CD 28 was originally constructed. The evidence in the report does not suggest a profile that changes or alters the condition of the South Two Rivers river from its elevation at the time CD 28 was originally constructed.
DNR	19-Aug	Written	Attached comment 2, bullet point 1	Yes	Four locations of the public drainage system were excavated in 1906. The report will be modified to clarify this point.
DNR	19-Aug	Written	Attached comment 2, bullet point 2	Yes	Correct. The County requested permission to repair three locations. The letter of permission provided by the DNR shows that permission was only granted, and repairs completed, for two locations. The report will be modified to clarify this point.
DNR	19-Aug	Written	Attached comment 3, bullet point 1	No	The comment provides no information or evidence that calls into question the report's evidence and findings in support of its contention that all crossings on CD 28 were constructed independent of the establishment of CD 28. DNR's comments highlight its concerns that a repair of CD 28 at the Quaker Road and County Road 154 may impact PWW 73-178W (Schwinghammer) and possibly 73-137W (Engelmein) and 73-136P (Pine Lake). These concerns may be addressed if a repair plan is proposed; however, the comments do not provide evidence regarding the definition of the alignment; cross-section; profile; hydraulic structure locations, materials, dimensions, and elevations; and right-of-way of the drainage system.
DNR	19-Aug	Written	Attached comment 4, bullet point 1	No	The report has been revised to provide clarity regarding the ROW. It is important to note that the report is not proposing an expansion of the ditch bottom beyond 10-feet and that the ROW is not exclusively for excavation, but also for access adjacent to the public drainage system to complete inspection and maintenance activities. Table 1 within the report has been corrected to reflect the stationing of the areas where excavation did originally occur at the time of construction for the ROWs greater than 55 feet.
DNR	19-Aug	Written	Attached comment 5, bullet point 1	No	The 2015 data was commissioned by the Two Rivers Lake Association to address work on the drainage system prompted by the Association. The focus of the data was not for purposes of reestablishing drainage system records under 103E.101, subd. 4. The appointed engineer and staff have completed a more thorough investigation of evidence to define the alignment; cross-section; profile; dimensions; elevations; and right-of-way of the drainage system as constructed than the work commissioned in 2015. The comment provides no evidence to the drainage authority contradicting the additional findings and evidence completed by HEI.
DNR	19-Aug	Written	Attached comment 5, bullet point 2	No	County staff completed the survey through the ice and approximate the channel center based on their technical experience. Because of the potential for uncertainty in identifying the channel center for any given individual point, the Engineer utilized weight of evidence from a statistical analysis numerous borings to identify the most likely grade excavated at the time of the establishment. This results in some individual data points being recognized as "outliers," meaning the magnitude of their likely error is too large to be considered with the analysis. The Stationing of repairs completed circa 2015 were based on a differing starting point and do not reflect the entire alignment of the ACSIC.

Commentor	Date	Type of Comment	Comment	Result in Change?	Response / Revision
DNR	19-Aug	Written	Attached comment 5, bullet point 3	No	The ACSIC includes the condition of the drainage system upon which benefits were determined when CD 28 was established and after original construction. For the portions of the stream where benefits were determined for the system based upon the existing, natural elevation of the stream bed, the natural elevation at the time of construction represents the as constructed condition of the drainage system. The report calls out the elevation of the natural streambed at the time CD 28 was originally constructed. The evidence in the report does not suggest a profile that changes or alters the condition of the South Two Rivers river from its elevation at the time CD 28 was originally constructed.
DNR	19-Aug	Written	Attached comment 5, bullet point 4	No	<p>The Drainage Authority clearly planned for and excavated the CD 28 open channel with portions of negative grade (downstream channel bottom higher than the upstream channel bottom) at the time of establishment. The rationale for doing so cannot be ascertained from available historic documentation. However, possible reasons for creating negative grades in the system could have included removing existing vegetation growth in the channel, widening the existing channel in an area that was narrowed, or creating a location to collect sediment</p> <p>DNR's comments highlight its concerns that a repair of CD 28 to the ACSIC profile may create headcutting in the public watercourse that connects Pine Lake (73-136P) to CD 28 and the possibility of affecting the runoff elevation of the lake, creating a negative (drainage impact). These concerns may be addressed if a repair plan is proposed; however, the comments do not provide evidence regarding the definition of the alignment; cross-section; profile; hydraulic structure locations, materials, dimensions, and elevations; and right-of-way of the drainage system.</p> <p>The Drainage authority will evaluate the potential for hydrologic impacts once a repair depth has been proposed.</p>
DNR	19-Aug	Written	Attached comment 5, bullet point 5	No	The County invited DNR staff to attend the survey and soil probing used in the determination of the channel hard bottom (see attached).
DNR	19-Aug	Written	Attached comment 6, bullet point 1	No	DNR's comments highlight its concerns that a repair of CD 28 to the ACSIC profile may impact Two Rivers Lake (73-138P), South Two River (Altered Natural Watercourse M-084), Pine Lake (73-136P), and two Public Water Wetlands (73-178W and 73-137W). These concerns may be addressed if a repair plan is proposed; however, the comments do not provide evidence regarding the definition of the alignment; cross-section; profile; hydraulic structure locations, materials, dimensions, and elevations; and right-of-way of the drainage system. however, the comments do not provide evidence regarding the construction of the drainage system in 1906.
DNR	19-Aug	Written	Attached comment 6, bullet point 2	No	This sentence will be struck from the report as it is not relevant to reestablishing the CD 28 record.
DNR	19-Aug	Written	Attached comment 6, bullet point 3	No	DNR's comments highlight its concerns that a repair of CD 28 to the ACSIC profile may impact Two Rivers Lake (73-138P). These concerns may be addressed if a repair plan is proposed; however, the comments do not provide evidence regarding the definition of the alignment; cross-section; profile; hydraulic structure locations, materials, dimensions, and elevations; and right-of-way of the drainage system.
Rich Klug	20-Aug	Verbal	Opposed to conversion of river to a ditch. (See transcript for full comment).	No	There is no conversion being proposed. Rather the proceeding is confirming and characterizing the features of the system that are already present. Garrett Monson (HEI) spoke with the landowner after the hearing and provided the clarification after which the landowner rescinded his opposition (not part of record).
George Hadrich	20-Aug	Verbal	Stated that development of the City of Albany has sent more water and debris into the ditch and opposes farmers in ditch benefit paying for it. (See transcript for full comment).	No	No response required. The comment pertains to a redetermination of benefits and not a reestablishment of records.

Commentor	Date	Type of Comment	Comment	Result in Change?	Response / Revision
Gary Hadrich	20-Aug	Verbal	Stated that he believes the carp trap at the lake outlet is the cause of lake flooding. (See transcript for full comment).	No	No response required. The comment pertains to a repair or potential obstruction of the drainage system and not a reestablishment of records.
Bob Guggenberger	20-Aug	Verbal	Requested that benefits be redetermined prior to any repair. (See transcript for full comment).	No	No response required. The comment pertains to a redetermination of benefits and not a reestablishment of records.

 **DEPARTMENT OF
NATURAL RESOURCES**

Minnesota Department of Natural Resources
Ecological and Water Resources Division
500 Lafayette Road
St. Paul, MN 55155-4032

August 19, 2019

Stearns County Drainage Authority
Chad Martini, Director -Stearns County Land Use Management
705 Courthouse Square
St. Cloud, MN 56303

Re: Stearns County Ditch 28, Reestablishment of Records Technical Memorandum

Dear Mr. Martini:

Thank you for submitting the Houston Engineering Reestablishment of Stearns County Ditch (CD 28) Public Drainage System Records Technical Memorandum (Report) to the Department of Natural Resources (DNR) for comment. We respectfully request that this letter be read into the record at the Public Hearing meeting on August 20, 2019.

A recent Supreme Court Order (attached) related to Chippewa-Swift Joint County Ditch 9 provides clarification that record reestablishment is similar to a drainage system establishment and has substantial effects on the rights of the parties. The process for reestablishment of record for CD 28 should be similar to establishment of a new drainage system.

Our review of the Report and recommended reestablishment of records together with our review of ditch information indicates that the proposed reestablishment is inconsistent with the actual ditch as constructed. We offer the following comments and recommendations to the Drainage Authority (DA) regarding this reestablishment:

1. **Definitions (pg 3)** "However, modifications that neither obstructed or improved the system, were maintained by the public drainage authority, and relied upon by benefitted landowners, may be considered part of the ACSIC, where that alteration has been maintained for a sufficient period of time to create rights in the benefitted landowners."
 - We disagree with this statement as it relates to this project. A significant portion of the upstream reach of South Two Rivers River was *never excavated* during the establishment of CD 28. Therefore, no "modifications were made that can be considered part of the ACSIC" (As Constructed, Subsequently Improved Condition). Proposed new

excavation beyond the natural stream bed is considered an **improvement**. How is it possible that there are probes or borings showing “original excavation” when excavation never occurred? The Report acknowledges that “Alterations to the public drainage system that were not performed per the requirements of Minn. Statute §103E or its predecessors are typically not part of the ACSIC.”

2. **History of the Public Drainage System** (pg 4) is inconsistent or incorrect.

- The report indicates only three areas of excavation during construction of the public ditch in 1906, but other portions of the report identify four areas (Sta. 84+46 to 89+99, 103+08 to 120+37, 235+15 to 264+00, and 296+72 to 450+48) three upstream of Two Rivers Lake and the entire reach of South Two Rivers River downstream of the lake.
- A second error is that it lists that three locations were “spot repaired” in July, 2014. Only two locations were authorized to be excavated under a Public Waters permit (#2015-1480) and the work was conducted in December, 2015. The third location requested for excavation was the location of the runout control for Two Rivers Lake and was not approved.

3. **Current Alignment** (pg 4) lists “All crossings of CD 28 were constructed independent of the establishment of CD 28 and therefore are not a component of the public drainage system.”

- We disagree with this statement. The proposed ditch grade (found in Attachment A of the Report) proposes to lower two culverts (Quaker Road and County Road 154) by approximately 1.5 feet each. Lowering the culvert at Quaker Road has the potential to cause a drainage effect upon public waters: PWW 73-178W (Schwinghammer) and possibly 73-137W (Engelmein). The lowering of both of these culverts would be considered an improvement to the drainage system. Lowering of the culvert at County Road 154 has the potential to negatively affect Pine Lake (73-136P).

4. **Right-of-Way [ROW]** (page 5 and 6) “Along portions of the public drainage system where excavation did not occur, the ROW is 55 feet centered on the ditch centerline.”

- We disagree with this statement and with the dimensions listed in Table 1. The Report claims the entire width of the watercourse as ROW for the purpose of excavation. The plans for the establishment of the ditch called for a 1:1 slope and **10 foot ditch bottom with an average top width of 18 feet**. The first entry in Table 1, Station 90 +72 to 95 +38 portion of upstream of Two Rivers Lake, was never excavated at all, yet it’s listed as an 80’ ROW. The second entry in Table 1 extends beyond the area that was excavated in 1906 (Station 103 + 08 to 120 + 37) and claims 90’ ROW. When the ditch was

constructed downstream of Two Rivers Lake, it had a bottom width of 10 feet. Over time, the river has widened to anywhere from 40 – 60 feet wide (or more). Somewhere within the bed of the river, the original ditch configuration exists. To claim the widening of the ditch from 10 foot bottom to 60 foot (showing a minimum ROW of 100 feet and maximum ROW of 120 feet) would be a significant improvement to the drainage system.

5. **As Constructed and Subsequently Improved Grade and Geometry (ACSIC)** (pages 6 and 7) *“To determine the ACSIC in a modern vertical datum, soil probes of the channel hard-bottom collected during field survey were used to determine “as built” excavation depths where the material transitions from accumulated sediment to native mineral soil.”*
- In 2015, it was noted for the reach downstream of Two Rivers Lake (Station 296+72 to 450+48) that the longitudinal profile provided by Houston Engineering indicates that the “as constructed” ditch bottom **could not be differentiated from natural conditions**, as sediment and natural channel bottom materials were very similar.
 - With regard to “high” outliers potentially having a location of soil probes outside the center of the historic channel, it was noted during discussion with Stearns County DA in 2014 and 2015 (by the DA) that they could not definitively state exactly where the ditch was located within the bank/bed of South Two Rivers. The DA was required to determine where the ditch was located in order to be able to excavate under permit 2015-1480. As-built documents submitted following excavation appear to locate the ditch in the center of the watercourse. NOTE: Stations shown on the As-built surveys provided by the DA do not match up with the survey submitted with the current request.
 - (Pg 7 second paragraph): “Much of CD 28 upstream of Two Rivers Lake was not identified as requiring excavation in the original design profile but was still established as part of the CD 28 condition upon which lands were determined to be damaged or benefited. **The ACSIC for this portion of CD 28 is identical to its 1906 condition.**” We disagree. The 1906 condition was a natural stream bottom, which is currently in place. The proposed survey shows excavation throughout. Again, this would be an improvement to the drainage system.
 - The proposed ACSIC from Station 112+00 (upstream) and 168+00 (downstream) requires water to run uphill before continuing to flow downstream [elevations 1126.8 to 1130.5]. This would not appear to be consistent with repairing to the necessary hydraulic capacity of the drainage system. The public watercourse that connects Pine Lake (73-136P) to CD 28 exists within this section. Excavation to the ACSIC has the

potential of creating headcutting in the public watercourse and the possibility of affecting the runout elevation of the lake, creating a negative (drainage) impact.

- DNR staff were not notified in advance or present at the time soil borings were taken on Stearns County Ditch #28 by Houston Engineering personnel. The DNR is requesting the Drainage Authority have the engineer gather a panel including DNR and SWCD staff to conduct soil borings to limit further disagreements on repair depth.

6. Wetland Impacts and Regulatory Considerations (pg 8)

- The document refers to CD 28 only possibly affecting 73-138P (Two Rivers Lake) and an Altered Natural Watercourse M-084 (South Two River). Any maintenance or repair of CD 28, upstream of Two Rivers Lake also has the potential to negatively impact Pine Lake (73-136P), and two Public Water Wetlands (73-178W and 73-137W). Excavating the ditch bottom and lowering the culverts to the proposed ACSIC grade would result in decreased water level regimes in all four public water basins and likely drainage of adjacent riparian wetlands.
- We disagree with the statement that "Repairs to a Public Ditch/Altered Natural Watercourse are exempt from permitting requirements". If a public water is going to be impacted as a result of the work conducted, a DNR Letter of Permission or a DNR permit will be required depending on the scope of the project. Please note that according to Minn Rule Chapter 4410.4300, subp. 27A, any work that will change or diminish the course, current, or cross-section of one acre or more of any public water or public waters wetlands will necessitate completion of an **Environmental Assessment Worksheet (EAW)**. Furthermore, a DNR Public Waters Work Permit may be required for any work below their respective OHWLs (Ordinary High Water Level) or work otherwise impacting the public waters even if beyond the OHWL.
- The runout for Two Rivers Lake was established by the DNR in 1984 at elevation 1128.6 NGVD 1929 (1129.125 NAVD 88). Excavation to the proposed ACSIC would remove the lower the runout Two Rivers Lake. The runout control has moved downstream from its original location at the carp trap at station 296+72 to Station 336+50 where the current elevation is approximately 1128.8 NAVD 88. The elevation at Station 296+72 is proposed at 1126.38 (a difference of -2.75 feet from the runout elevation established in 1982). Any proposal to change to the current runout of Two Rivers Lake would need to be submitted to the DNR prior to construction as per MN Statute 103G.245 and/or MN Statute 103E.011. Subd. 3 & MN Statute 103E.701 Subp. 2 Once DNR has the proposal, a determination can then be made as to whether the project can be authorized under a letter of permission or

requires a DNR permit. It should be noted that excavation to remove the runout control will not affect the elevation of the water during normal or high water (runoff) times, but during periods of low flow. Therefore, excavation may not have the desired effect.

Should this re-establishment or record be adopted any future repairs would likely have far reaching and negative effects on the area's water resources. If the desire is to lower the channel grade to the proposed elevation and significantly impact public waters, the proposal should receive the review rightfully afforded to Public Drainage Improvement Projects as per MN Statutes, Chapter 103E.

Thank you for the opportunity to review the project proposal. We strongly recommend the drainage authority reconsider the recommendations contained in the Technical Report and to adopt a re-establishment of records that more closely aligns with the original plans as evidenced by the historical records.

Please provide a written response to the issues raised in this letter as part of considering the Reestablishment of the Records for Stearns County Ditch 28. The response and any questions regarding this matter should be directed to Area Hydrologist, Nicki Blake-Bradley at (320) 223-7844 or Nicola.Blake-Bradley@state.mn.us.

Sincerely,



Randall Doneen
Conservation Assistance and Regulations (CAR) Manager

c: Dan Lais, DNR Regional Manager
Tim Crocker, DNR District Manager
Nicki Blake-Bradley, DNR Area Hydrologist
Becky Horton, DNR REAE
John Gleason, DNR Public Waters Program Hydrologist
Dennis Fuchs, Stearns Soil and Water Conservation District Administrator

From: [Blake-Bradley, Nicola \(DNR\)](#)
To: [Martini, Chad](#)
Subject: Nicki DNR desire to attend field work reestablishment
Date: Monday, October 29, 2018 4:41:32 PM
Attachments: [image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)

Hi Chad,

Thanks for the message. I'd love to join you in the field if I can make it work with my schedule. Do you know what date and time you'll be out there? ☺

Nicola Blake-Bradley
DNR Area Hydrologist
1035 South Benton Drive
Sauk Rapids, MN 56379
(320) 223-7844
Nicola.blake-bradley@state.mn.us



From: Martini, Chad [mailto:Chad.Martini@co.stearns.mn.us]
Sent: Monday, October 29, 2018 2:49 PM
To: Blake-Bradley, Nicola (DNR) <nicola.blake-bradley@state.mn.us>
Subject: Stearns County Ditch 28

Hey Nicki.

We are going to be doing some inspection / fieldwork in CD28 in the coming month that I thought you may be interested in knowing about. The Drainage Authority needs to complete an inspection of the lower portion of CD28 and at the direction of the Drainage Authority, we will be collecting field data for a 103 Reestablishment of records project as well. Houston Engineering is our vendor partner on the reestablishment project.

If you have any interest in our project or want to be on site during field collection, let me know.

Thanks

Chad

Chad Martini
Stearns County Auditor/Treasurer's Office
Division Director of Land Management

705 Courthouse Square
Saint Cloud, MN 56303
(320) 654-4690
FAX (320) 656-6396
chad.martini@cq.stearns.mn.us

From: [Blake-Bradley, Nicola \(DNR\)](#)
To: [Blommel, Jason](#)
Cc: [Martini, Chad](#); [Marlin, Scott](#); [Schramel, Dean](#)
Subject: RE: Stearns County Ditch 28
Date: Tuesday, November 13, 2018 10:09:53 AM
Attachments: [image003.png](#)
[image004.png](#)
[image005.png](#)
[image001.png](#)

Thank you, Jason for the location and meeting time. I was surprised at the location as we do not show that watercourse as being County Ditch... ?

I'll plan to see you out there! Dress warmly!

Nicola Blake-Bradley
DNR Area Hydrologist
1035 South Benton Drive
Sauk Rapids, MN 56379
(320) 223-7844
Nicola.blake-bradley@state.mn.us



From: Blommel, Jason [mailto:Jason.Blommel@co.stearns.mn.us]
Sent: Friday, November 09, 2018 10:41 AM
To: Blake-Bradley, Nicola (DNR) <nicola.blake-bradley@state.mn.us>
Cc: Martini, Chad <Chad.Martini@co.stearns.mn.us>; Marlin, Scott <Scott.Marlin@co.stearns.mn.us>; Schramel, Dean <Dean.Schramel@co.stearns.mn.us>
Subject: Stearns County Ditch 28

Good morning,

I wanted to give you a heads up that we **will** begin collecting data for Stearns County Ditch 28 on Tuesday, November 13, 2018. We plan on meeting at the intersection of Quaker Road and Rushmeyer Lake Road, in the Southwest Quarter of the Southwest Quarter of Section 13, T125N, R31W, at 1:00pm to have a "kickoff" meeting. I am hoping you are able to stop by to go over our plan for the survey.

I attempted to call your office, but your voicemail box was full, and I was not able to leave a message.

Thank you,

Jason Blommel, LS

Stearns County Surveyor's Office
Deputy Surveyor
320-656-3694

Exhibit B

Revised Report

Technical Memorandum

To: Jason Blommel
Interim Stearns County Surveyor

Cc: Chad Martini
Stearns County Director of Land Management

From: Chris Otterness, PE
Garrett Monson, PE
Houston Engineering, Inc.

Subject: Reestablishment of Stearns County Ditch 28
Public Drainage System Records

Date: June 6, 2019
Revised September 17, 2019

Project: 6364-0010

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am duly Licensed Professional Engineer under the laws of the State of Minnesota.



6/6/19

Chris Otterness
Reg. No. 41961

Date

Introduction

The purpose of this report is to provide Stearns County with the results of the investigation and analysis of the Stearns County Ditch 28 (CD 28) public drainage system. This report contains the necessary description of alignment; cross-section; profile; hydraulic structure locations, materials, dimensions, elevations; and right-of-way of the drainage system to reestablish records as requested by the County Board.

CD 28 is an open channel ditch, which serves predominantly agricultural land, located in Holding, Krain, and Albany Townships. CD 28 is not within the jurisdiction of an existing watershed district. Minnesota Statute 103E.101 subd. 4a allows for the drainage authority to reestablish records if, after an investigation of drainage system records, it is found that the records establishing the alignment, cross-section, profile, or right-of-way of a drainage system are lost, destroyed or otherwise incomplete. The drainage authority may, by order, reestablish records defining the alignment; cross-section; profile; hydraulic structure locations, materials, dimensions, and elevations; and right-of-way of the drainage system which define the "As Constructed and Subsequently Improved Condition" or ACSIC. This report documents the investigation of drainage system records and physical investigation of the drainage system used by the engineer to recommend reestablished records to define the alignment, grade and geometry as necessary to maintain the historic function of the

drainage system. No other historical reviews or reviews of the as-constructed profile of this system are known to exist.

RELATIONSHIP TO DRAINAGE SYSTEM MAINTENANCE AND REPAIR

This memorandum establishes the ACSIC as the basis for future maintenance and repair of the public drainage system. A future repair report or similar document is expected to include the evaluation of alternatives relative to these systems serving as outlets for agricultural drainage and/or other land uses, and address issues related to the volume of runoff, water quality, and flooding. Normally, the repair report may include alternatives which adjust the elevation of the open channel and culverts, realign or abandon portions of the public system, or evaluate similar modifications as authorized by MS 103E and consistent with the ACSIC. The range of alternatives evaluated within a repair report is typically based in part on discussions with landowners served by the public drainage system and other interested parties.

DEFINITIONS

This memorandum defines the condition and therefore by inference the capacity (i.e. the existing flow rate in cubic feet per second) of the public drainage systems using three definitions:

As-Designed / Established Condition: The geometry of the public drainage systems as designed in 1906 including all subsequent designs for legal repairs and alterations. A repair or alteration is considered legal if formally authorized in some legal proceedings. The details of the As-designed / Established condition are relatively unknown due to the scarcity of the original design plan and profiles that identify the dimensions, lengths and grade elevations. The As-Designed / Established Condition may or may not reflect the As-Constructed and Subsequently Improved Condition and is generally shown on construction plans and engineering drawings.

As-Constructed and Subsequently Improved Condition: The geometry of the public drainage systems as constructed in 1908 including all subsequent legal repairs and alterations as well as other actions which maintain and are consistent with the general character and efficiency of the drainage systems. Often, survey data (and only rarely as-built drawings) show that the alignment, grade and geometry (i.e., cross sectional area) of the existing public drainage system is altered from the As-Designed / Established Condition. The definition of As-Constructed and Subsequently Improved Condition (ACSIC) is intended to establish the condition to which the system can legally be repaired consistent with the definition in MS 103E.701, which states:

The term, "repair" means to restore all or a part of a drainage system, as nearly as practicable to the same condition as originally constructed, and subsequently improved, including re-sloping of ditches and leveling of waste banks if necessary to prevent further deterioration, realignment to original construction if necessary to restore the effectiveness of the drainage system, and routine operations that may be required to remove obstructions and maintain the efficiency of the drainage system. "Repair" also includes:

- (1) incidental straightening of a tile system resulting from the tile-laying technology used to replace tiles; and
- (2) replacement of tiles with the next larger size that is readily available, if the original size is not readily available.

Available records provide limited information regarding originally constructed alignment, grade (profile) and geometry (cross-section) of CD 28. Alterations to the public drainage system alignment, grade and geometry from the As-Designed / Established Condition likely resulted from the use of less accurate survey methods and construction techniques than currently exist, inaccurate culvert and crossing installation, and a need to “fit” the drainage system to the existing topography. Alterations to the public drainage system that were not performed per the requirements of MS 103E (i.e., ditch law) or its predecessors are typically not considered part of the ACSIC. However, modifications that neither obstructed or improved the system, were maintained by the public drainage authority, and relied upon by benefitted landowners, may be considered part of the ACSIC, where that alteration has been maintained for a sufficient period of time to create rights in the benefitted landowners.

Repaired Condition: The condition to which the drainage authority repairs the public drainage system. If the capacity of the Repaired Condition exceeds the ACSIC, the work is considered an improvement under MS 103E and its predecessors. The Board may decide for a variety of reasons to repair the public drainage system to some condition less than the As-Constructed and Subsequently Improved Condition.

Maintenance: There is no statutory distinction between the terms “maintenance” and “repair.” However, historically, drainage authorities have drawn a distinction between the two terms as a function of the scope of work performed for each. The primary difference between maintenance and repair, is that maintenance activities are generally completed at a select (more isolated) location or locations along portions of the public drainage system, rather than a drainage system-wide assessment, analysis, recommendation, or alteration that occurs in association with a repair proceeding. Maintenance activities are those that generally occur at a specific location or some portion of the system.

Maintenance generally includes activities such as vegetation management, the removal of open channel and tile blockages (e.g., beaver dams, sediment), the replacement of tile ruptures, the installation of tile inlets and access manholes, the replacement of portions of a tile system, the stabilization and repair of slopes and spoil material, and the removal of sediment up to the repair condition. Maintenance also includes the resetting or resizing of culverts or other crossings which were inaccurately placed and result in the obstruction of the public drainage system. Maintenance activities are usually exempt from wetland permitting requirements under the Wetland Conservation Act and Section 404 of the Clean Water Act.

Location, General Description and History of the Public Drainage System

LOCATION

The Stearns County 28 public drainage system is located in Sections 1, 12, and 13 (of T125 R31) within the township of Albany, and Section 36 (of T126 R31) within the township of Krain, and Sections 17, 19, 20, 30, and 31 (of T126 R30) within the township of Holding (see **Figure 1**). CD 28 flows from south to north. The drainage system starts near the intersection of Rushmeyer Lake Road and Quaker Road and terminates on the south side of County RD 17 in the City of Holdingford. The ditch is approximately 7.8 miles in length and contains roughly 3,089 benefitted acres. The drainage area is predominantly developed for agricultural land use.

HISTORY OF THE PUBLIC DRAINAGE SYSTEM

The Stearns County 28 public drainage system was established in 1906 at which time only four specific areas were excavated (Sta. 84+46 to 89+99, 103+08 to 120+37, 235+15 to 264+00, and 296+72 to 450+48). The County performed spot repairs at two locations downstream of Two Rivers Lake in July of 2014. The repairs were described in a report by Pinnacle Engineering and permitted via MnDNR Public Waters Permit 2015-1480.

CURRENT ALIGNMENT

This portion of the memorandum describes the current condition of the public drainage system as observed “on-the-ground” (i.e., existing) as determined by a review of the available records, field survey, aerial imagery, and other available historical evidence. CD 28 consists entirely of an open channel ditch with several culvert crossings. The stationing used to describe the alignment proceeds from upstream to downstream. **Appendix A** shows the existing and ACSIC grades and alignment.

The upstream end of the CD 28 alignment begins at Sta 0+00 approximately 100ft southeast of Quaker Road. The alignment then continues north under County Road 154 at Station 150+00, and St Anna Drive at Station 206+00, until it reaches Two Rivers Lake at Station 264+00, where the upper portion of the alignment ends. The lower portion of the public drainage then resumes at the outlet of Two Rivers Lake at Station 296+72. CD 28 then continues north and flows under a bridge at Lake Wobegon Trail near Station 440+00. The public drainage system terminates at Station 450+48 in the City of Holdingford at the downstream end of County Road 17 (Rivers Street). The channel continues as a natural, meandering stream. All crossings of CD 28 were constructed independent of the establishment of CD 28 and therefore are not a component of the public drainage system.

SOURCE OF SURVEY DATA USED IN THIS ASSESSMENT

Survey data was collected by Stearns County staff in the spring of 2018 to determine the existing condition of the public drainage system. All survey data collected utilizes the Stearns County Coordinate System and North American Vertical Datum 1988 (NAVD'88). (Note: Unless otherwise noted, all elevations provided herein are based on NAVD'88 vertical datum).

Analysis of Current Function in Historical Context

SYSTEM MODIFICATIONS AFFECTING FUNCTION

No significant modifications on the CD 28 public drainage system have been documented in the available records since its establishment in 1906. The survey indicated no substantial modifications from the ACSIC.

RIGHT-OF-WAY

Proceedings for the original establishment of drainage systems typically award damages for the areas physically occupied by the drainage system along with an easement for the area required for construction activities such as land clearing and spoil disposal. This combination of areas constitutes the right-of-way for the drainage system and is often described as the area reasonably necessary for the drainage authority to perform its repair, maintenance, inspection obligations, along with an area of reasonable set-back to protect the drainage system. The right of way required was estimated by computing the approximate geometry of the spoil piles and the width needed for continued maintenance which is measured from the top of bank of the channel. The right of way calculations were based on the ditch cross sectional area and top width provided by the 1906 Engineering Report. The ditch cross sectional area was used to determine the spoil pile width. The spoil pile width was based off a 3:1 slope on the ditch side, 5:1 slope on the non-ditch side, and a top width of 8 feet.

The ROW width includes both the spoil pile width on both sides of the ditch and the width of the top of channel. Due to this drainage system being an altered natural watercourse where the ditch bottom was excavated within the middle of an existing channel, the top widths used to determine ROW may be much greater than the ditch bottom width. It is not practicable to place spoils within the existing channel immediately adjacent to the excavated ditch. Therefore, the spoils would be placed adjacent to the natural channel and the ROW widths are therefore much larger than the ditch bottom width of 10 feet. Along portions of the public drainage system where excavation did not occur, the ROW is 55 feet centered on the ditch centerline. This is the average top width of the channel plus one rod (16.5-foot) on either side of the channel to provide access for inspection and maintenance. See **Table 1** and **Figure 2** for right of way widths and locations.

Table 1

Beginning Station	Ending Station	ROW Width (feet, centered on ditch CL)
84+46	89+99	80
103+08	120+37	90
235+15	264+00	100
296+72	383+00	100
383+00	432+00	120
432+00	450+48	110
All others		55

AS-CONSTRUCTED AND SUBSEQUENTLY IMPROVED GRADE AND GEOMETRY

Ideally, the grade of the ACSIC would be determined through the use of as-built drawings that identify the constructed alignment, grade and geometry. However, since as-built plans were rarely recorded for public drainage systems in the late 19th century, engineers have frequently utilized the profile drawings from the original design of the public drainage system in conjunction with probes to the hard ditch bottom (which typically indicated the bottom of accumulated sediment and the historic ditch bottom) to determine and/or corroborate the ACSIC. The 1906 Engineers Report shows that the ditch was designed with 1:1 side slopes and a constant 10-foot bottom width. The average top width and cross-sectional area were 18 feet and 53 square feet respectively.

The CD 28 original 1906 design profiles were based on an assumed vertical datum referring to a benchmark no longer in existence. As-built plans are not available. To determine the ACSIC in a modern vertical datum, soil probes of the channel hard-bottom collected during field survey were used to determine “as-built” excavation depths where the material transitions from accumulated sediment to native mineral soil. A statistical comparison of the hard-bottom elevations and original design profile elevations was then performed for each section of ditch previously excavated. Through the comparison process, datum adjustment factors were calculated to convert the design profile from the local datum to NAVD88 (See **Appendix B**). Hard-bottom elevations that were not within the standard deviation from the datum adjustments calculated from each set of hard-bottom elevations were deemed to be outliers and were removed from the final datum adjustment calculation.

Multiple outliers are located throughout each of the statistical analyses as noted in **Appendix B**. The hard-bottom interface identified at these locations provided a difference from the historic elevation of more than one standard deviation and thus were not used in the calculation of the datum adjustments. There are many likely causes of the outliers. “Low” outliers may be a result of scouring, soft soils, or previous attempts at maintenance. “High” outliers may be due to bank sloughing,

deposition of mineral sediments, or location of soil probes outside of the center of the historic channel.

Two excavated portions of CD 28 that had a good statistical fit (STA 103+08 – 120+37 and downstream of Two Rivers Lake), when analyzed separately, both result in a vertical datum adjustment of 1036.6. The furthest upstream portion of CD 28 that was excavated (STA 84+46 - 89+99), did not have an acceptable fit of the 1906 design profile to the observed hard bottom shots. Similarly, the ACSIC grade directly upstream of Two Rivers Lake (Sta. 238+78 – 264+00) did not have an acceptable fit to 1906 design profile.

Additionally, much of CD 28 upstream of Two Rivers Lake was not identified as requiring excavation in the original design profile but was still established as part of the CD 28 condition upon which lands were determined to be damaged or benefited. The ACSIC for this portion of CD 28 is identical to its 1906 condition. To determine the ACSIC in the portions of CD 28 upstream of Two Rivers Lake that were originally unexcavated or did not provide an acceptable fit when analyzed, a datum adjustment of 1036.6 was applied to key highpoints and breaks in grade to determine an approximate profile. This was compared to the surveyed hard-bottom survey gathered in 2018 and revealed that connecting the highpoint of the channel to the high confidence portion of the ACSIC near STA 103+08 provided a good fit to both the historical high points and the hard-bottom survey.

There is an inconsistency in the 1906 profile near historic STA 110+00 that results in a poor fit of the profile from current STA 120+37 to 264+00. In this reach the ACSIC was determined by drawing a “best fit” line to match the hard-bottom survey. When this was compared to the historic 1906 profile, it was found that the best fit line reflected the general rising and falling characteristics of the original profile. See **Appendix A** for the ACSIC profile, as compared to existing open channel bottom survey elevations.

WETLAND IMPACTS AND REGULATORY CONSIDERATIONS

The CD 28 public drainage system runs through a series of wetland complexes, as shown by the National Wetland Inventory (NWI) in **Figure 3** and the Public Waters Inventory (PWI) of **Figure 3**. Under most regulatory programs (i.e. Minnesota Wetland Conservation Act (WCA), Federal Clean Water Act (CWA); and Minnesota Public Waters Law) activities related to maintenance of a public drainage system, though potentially taking place within wetlands, are generally exempt from regulation, including mitigation requirements. These activities related to public drainage system maintenance include:

- Excavation in the drainage system channel when limited to removal of sediment or debris such as trees, logs, stumps, beaver dams, blockage of culverts, and trash, provided the removal does not result in alteration of the original cross-section of the drainage system
- Removing those materials placed by beaver;

- Removing or moving materials blocking installed roadway culverts and related drainage structures; and
- Temporary or seasonal water level management activities done for the purpose of performing maintenance.

As seen in **Figure 3**, the CD 28 public drainage system flows through one MnDNR listed Public Water Basin (Two River Lake, #73-138W). Additionally, the entirety of the CD 28 drainage system is also listed as Public Ditch / Altered Natural Watercourse (South Two River, # M-084) within the Public Waters Inventory. The MnDNR regulates many activities within listed Public Waters. Drainage system repair activities within Public Waters (below the OHW elevation of the PW) require notification to the MnDNR.

Under the federal CWA, all drainage system repair is exempt from regulation, as outlined in Regulatory Guidance Letter 07-02: “Exemptions for Construction or Maintenance of Irrigation Ditches and Maintenance of Drainage Ditches under Section 404 of the Clean Water Act”. Repairs to CD 28 consistent with the ACSIC meet the criteria of maintenance of drainage ditches and are exempt from regulation under the federal CWA.

Under the WCA, activities related to maintenance or repair of a public drainage system may result in wetland impacts but are exempt from replacement, which include:

- Maintenance or repair of a public drainage system which drains Type 1, 2, 6, 7, or 8 wetlands; and
- Maintenance or repair of a public drainage system which drains Type 3, 4, or 5 wetlands that have existed for 25 years or less.

Activities considered to be exempt or would result in “no-loss”, do not require the preparation of wetland replacement plans under the WCA. Though not required, in these cases it may be prudent for the drainage authority to apply to the Local Government Unit (LGU) for a no-loss or exemption decision prior to proceeding with the repair activity. The LGU for this location is Stearns County.

Several public drainage system repair activities may result in wetland impacts that are not exempt under the WCA and would likely require wetland replacement. These activities include, but are not limited to:

- Maintenance or repair of a public drainage system which drains Type 3, 4, or 5 wetlands that have existed for more than 25 years; and
- Maintenance or repair of a public drainage system not authorized by the drainage authority.

Because the CD 28 public drainage system intersects several Type 3, 4 and 5 wetlands, modifications to the current public drainage system grade may require a permit application to the

Local Government Unit (LGU) with a replacement plan or an application for a No Loss determination. Further investigation, including field delineation or review, is recommended before drainage system repairs are completed.

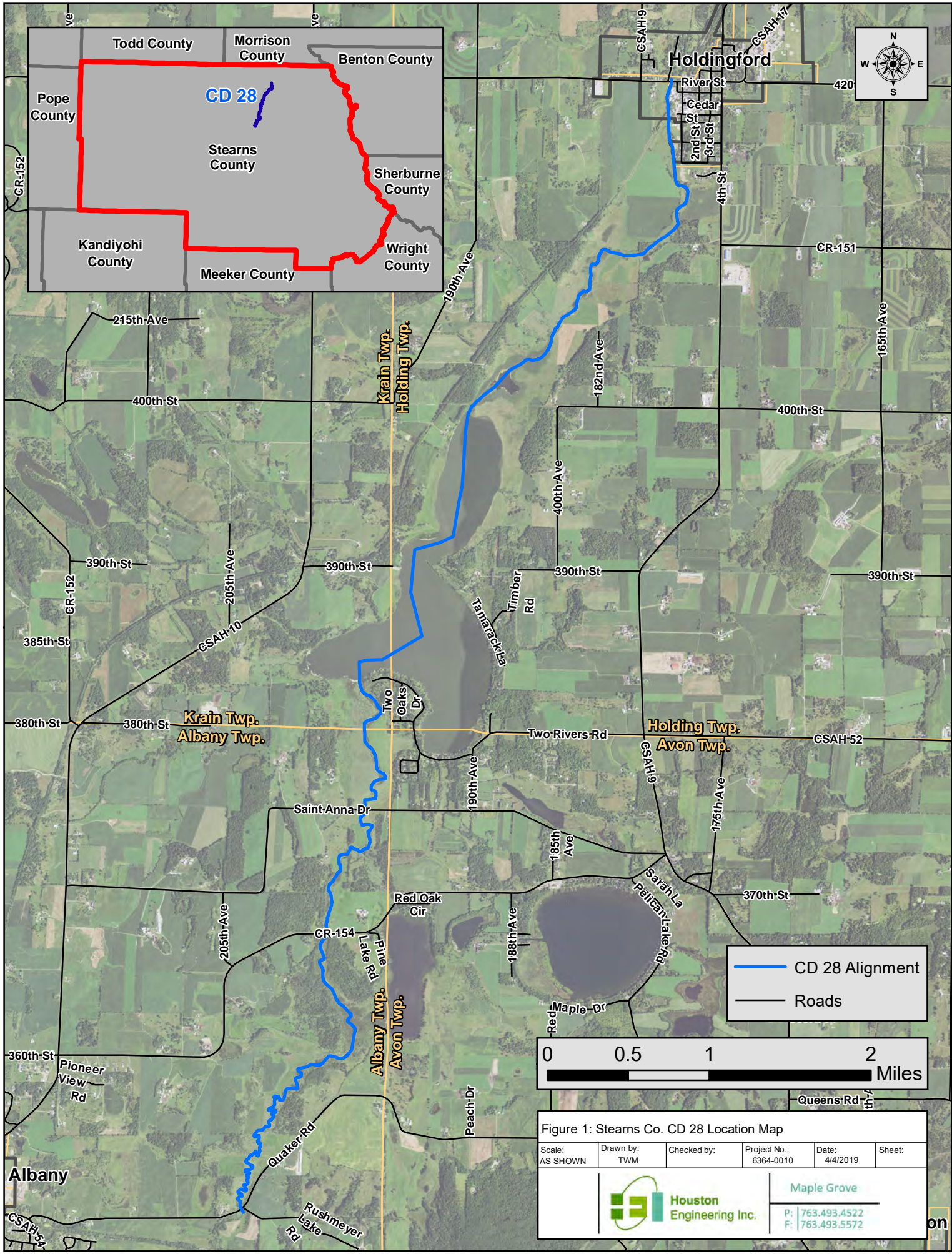
RECOMMENDATIONS

We recommend that this report be submitted to the Minnesota Department of Natural Resources. The Engineer then recommends that the Drainage Authority schedule, notice and hold a public hearing, and consider adopting corrected records consistent with this report. The corrected drainage system records should be based on the alignment, grade, and geometry described within this historical review. The alignment, grade, and geometry is, in the Opinion of the Engineer, necessary to reestablish the historic function of the legal drainage system to be the basis for maintenance and repair of the public drainage systems, future redeterminations of benefits, and other drainage proceedings.

AVAILABLE INFORMATION/HISTORIC RECORDS

Historic records for the CD 28 public drainage system are available from the County digital records. The following documents have been specifically utilized or referenced for this report:

- 1906 CD 28 Map and Profile
- CD 28 Ditch Map
- Stearns County CD 28 Original Construction Documents
- CD 28 Pinnacle Engineering Study
- County Ditch 28 Hydraulic Report (Bolton & Menk)



Todd County Morrison County Benton County
 Pope County **CD 28**
 Stearns County
 Sherburne County
 Kandiyohi County Meeker County Wright County



— CD 28 Alignment
 — Roads

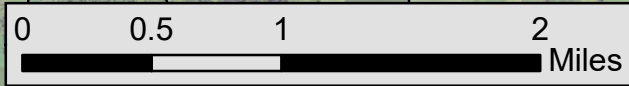
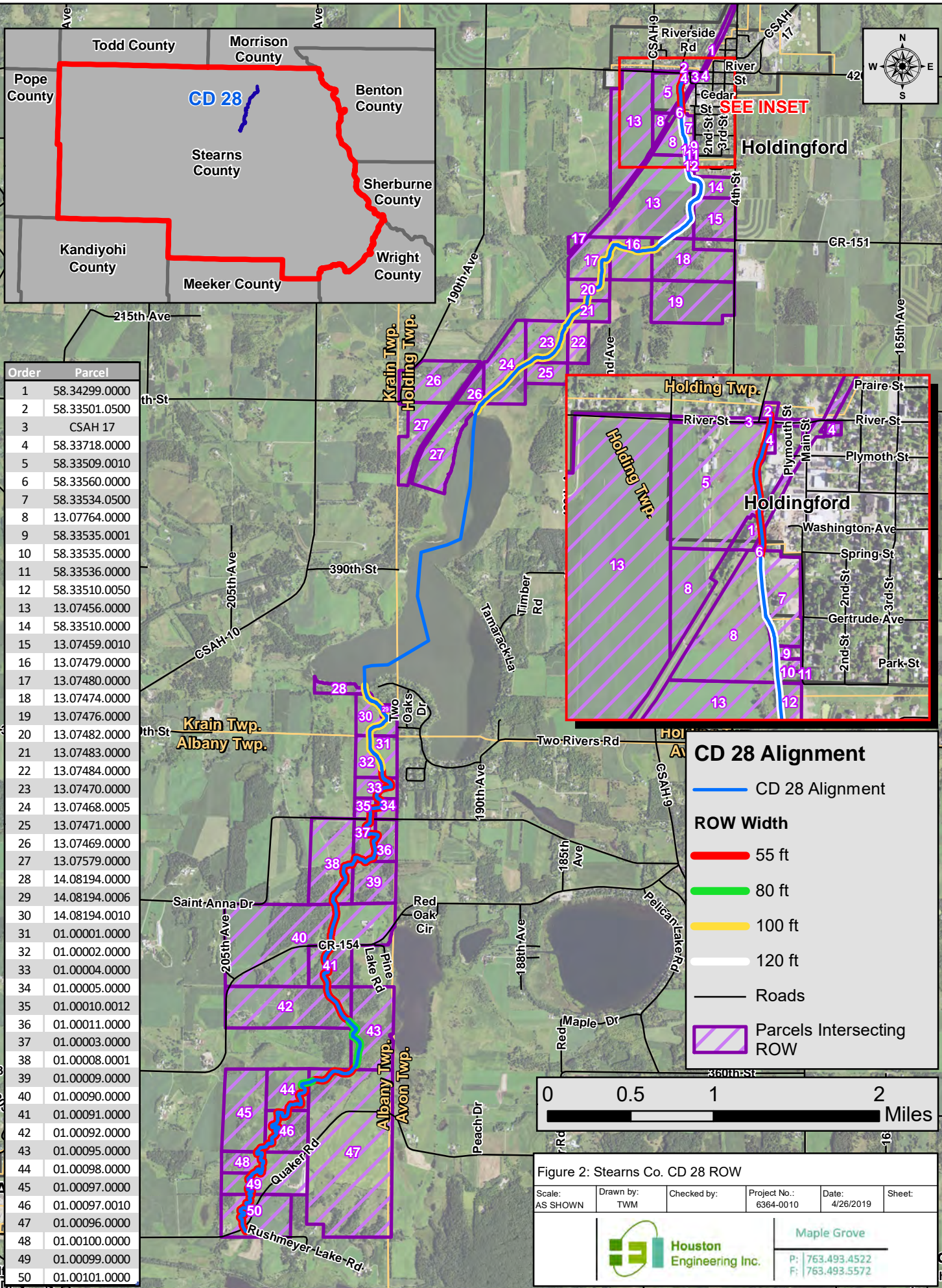


Figure 1: Stearns Co. CD 28 Location Map

Scale: AS SHOWN	Drawn by: TWM	Checked by:	Project No.: 6364-0010	Date: 4/4/2019	Sheet:
--------------------	------------------	-------------	---------------------------	-------------------	--------

Maple Grove
 P: 763.493.4522
 F: 763.493.5572



Order	Parcel
1	58.34299.0000
2	58.33501.0500
3	CSAH 17
4	58.33718.0000
5	58.33509.0010
6	58.33560.0000
7	58.33534.0500
8	13.07764.0000
9	58.33535.0001
10	58.33535.0000
11	58.33536.0000
12	58.33510.0050
13	13.07456.0000
14	58.33510.0000
15	13.07459.0010
16	13.07479.0000
17	13.07480.0000
18	13.07474.0000
19	13.07476.0000
20	13.07482.0000
21	13.07483.0000
22	13.07484.0000
23	13.07470.0000
24	13.07468.0005
25	13.07471.0000
26	13.07469.0000
27	13.07579.0000
28	14.08194.0000
29	14.08194.0006
30	14.08194.0010
31	01.00001.0000
32	01.00002.0000
33	01.00004.0000
34	01.00005.0000
35	01.00010.0012
36	01.00011.0000
37	01.00003.0000
38	01.00008.0001
39	01.00009.0000
40	01.00090.0000
41	01.00091.0000
42	01.00092.0000
43	01.00095.0000
44	01.00098.0000
45	01.00097.0000
46	01.00097.0010
47	01.00096.0000
48	01.00100.0000
49	01.00099.0000
50	01.00101.0000

CD 28 Alignment

- CD 28 Alignment

ROW Width

- 55 ft
- 80 ft
- 100 ft
- 120 ft
- Roads
- Parcels Intersecting ROW

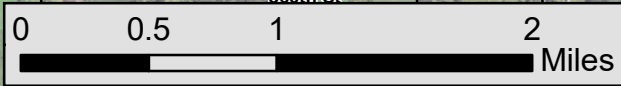


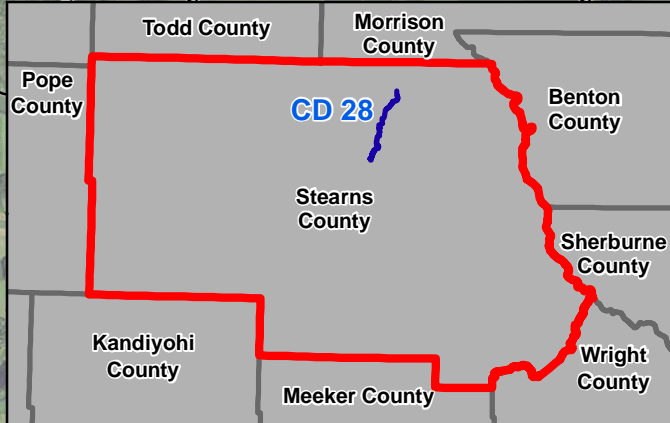
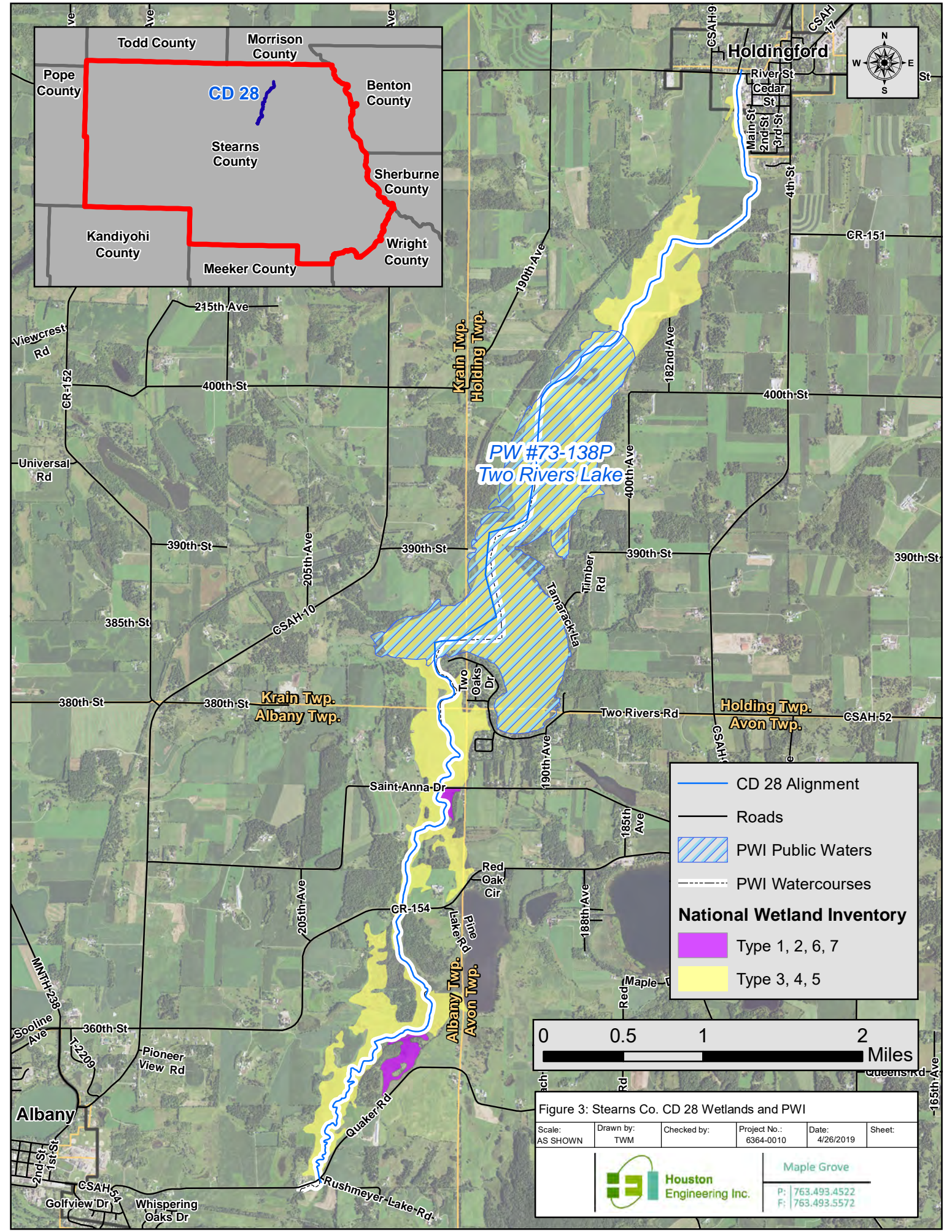
Figure 2: Stearns Co. CD 28 ROW

Scale: AS SHOWN	Drawn by: TWM	Checked by:	Project No.: 6364-0010	Date: 4/26/2019	Sheet:
--------------------	------------------	-------------	---------------------------	--------------------	--------



Maple Grove
P: 763.493.4522
F: 763.493.5572

on
h
Ave



— CD 28 Alignment
 — Roads
 PWI Public Waters
 - - - PWI Watercourses
National Wetland Inventory
 Type 1, 2, 6, 7
 Type 3, 4, 5

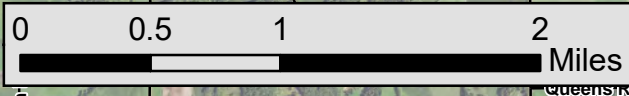


Figure 3: Stearns Co. CD 28 Wetlands and PWI

Scale: AS SHOWN	Drawn by: TWM	Checked by:	Project No.: 6364-0010	Date: 4/26/2019	Sheet:
--------------------	------------------	-------------	---------------------------	--------------------	--------

Houston Engineering Inc.

Maple Grove
 P: 763.493.4522
 F: 763.493.5572

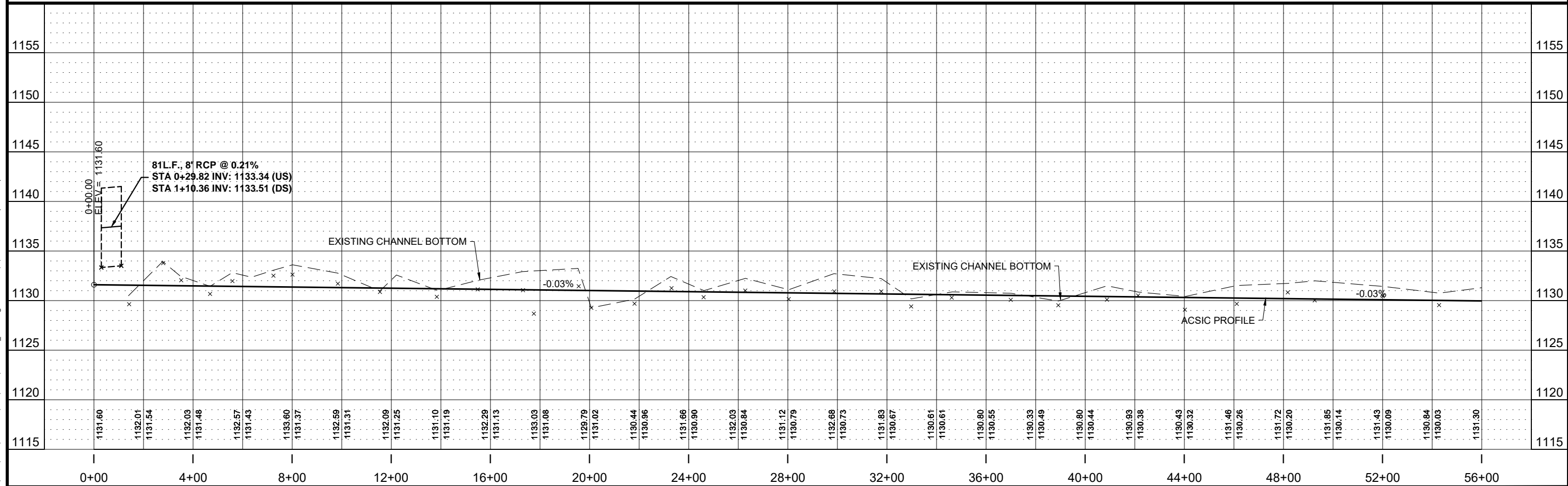
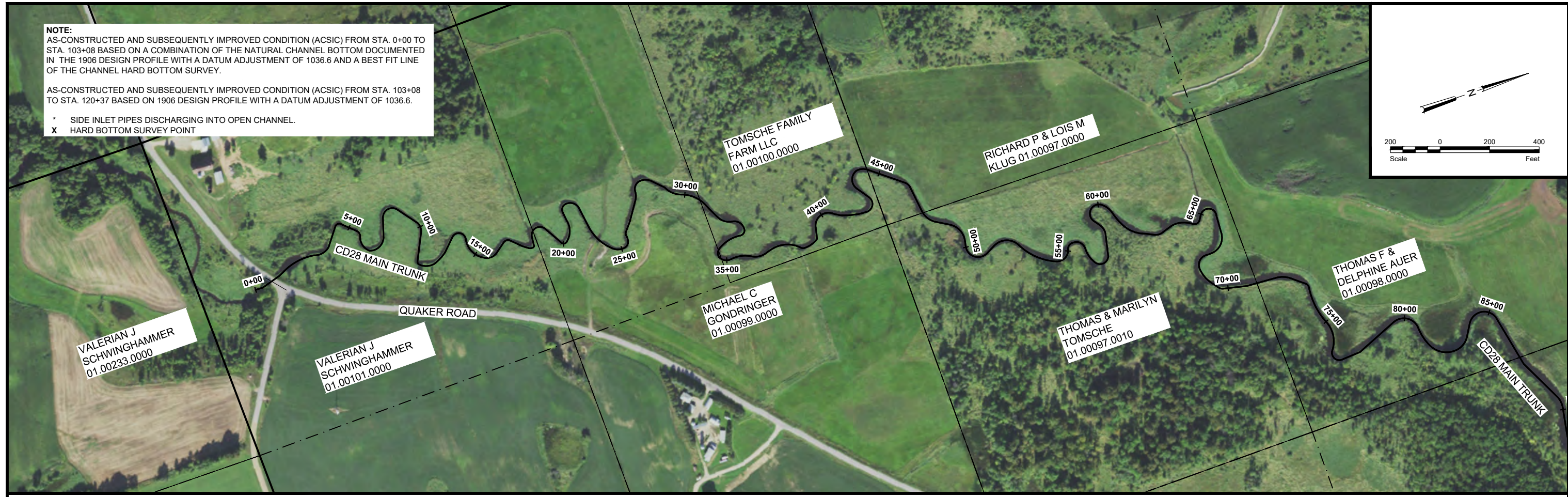
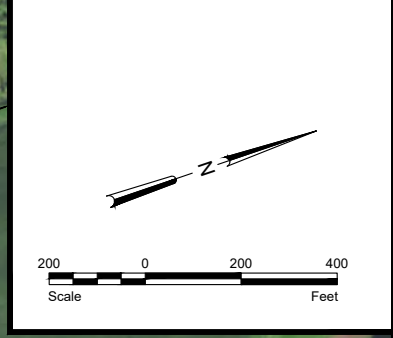
Appendix A

Plans and Profiles

NOTE:
 AS-CONSTRUCTED AND SUBSEQUENTLY IMPROVED CONDITION (ACSIC) FROM STA. 0+00 TO STA. 103+08 BASED ON A COMBINATION OF THE NATURAL CHANNEL BOTTOM DOCUMENTED IN THE 1906 DESIGN PROFILE WITH A DATUM ADJUSTMENT OF 1036.6 AND A BEST FIT LINE OF THE CHANNEL HARD BOTTOM SURVEY.

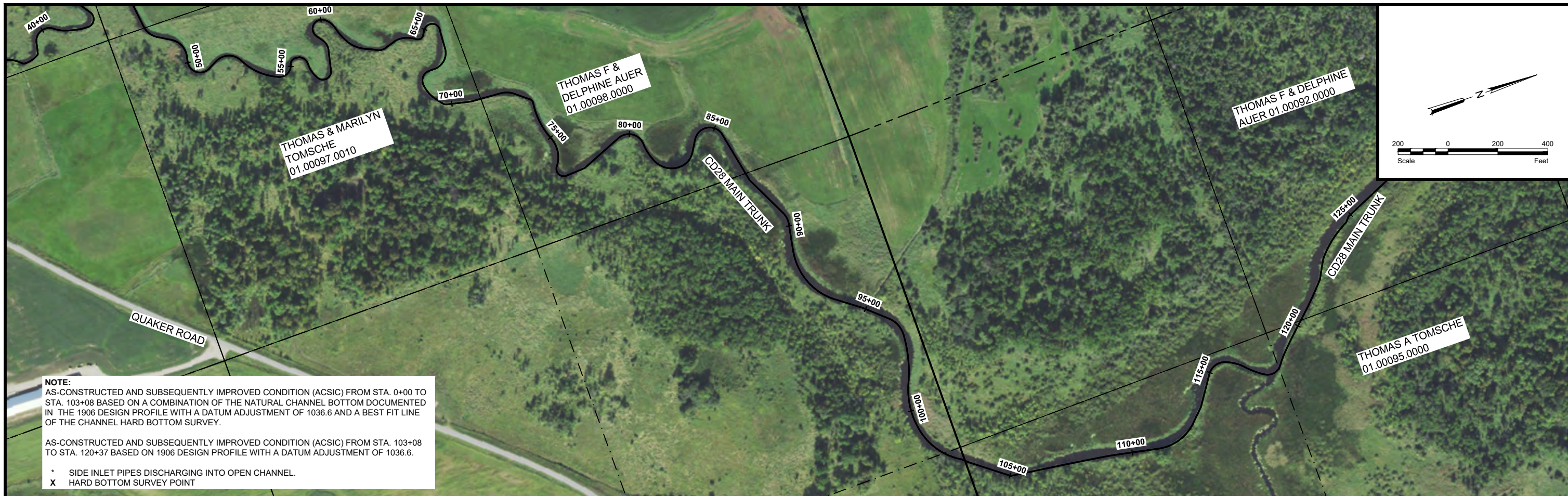
AS-CONSTRUCTED AND SUBSEQUENTLY IMPROVED CONDITION (ACSIC) FROM STA. 103+08 TO STA. 120+37 BASED ON 1906 DESIGN PROFILE WITH A DATUM ADJUSTMENT OF 1036.6.

* SIDE INLET PIPES DISCHARGING INTO OPEN CHANNEL.
 X HARD BOTTOM SURVEY POINT



H:\Maple Grove\JBN\6364-010\CAD\Plans\CD28\Plan_Prof.dwg-STA. 0-56-6/3/2019 9:39 AM-(tmaslow)

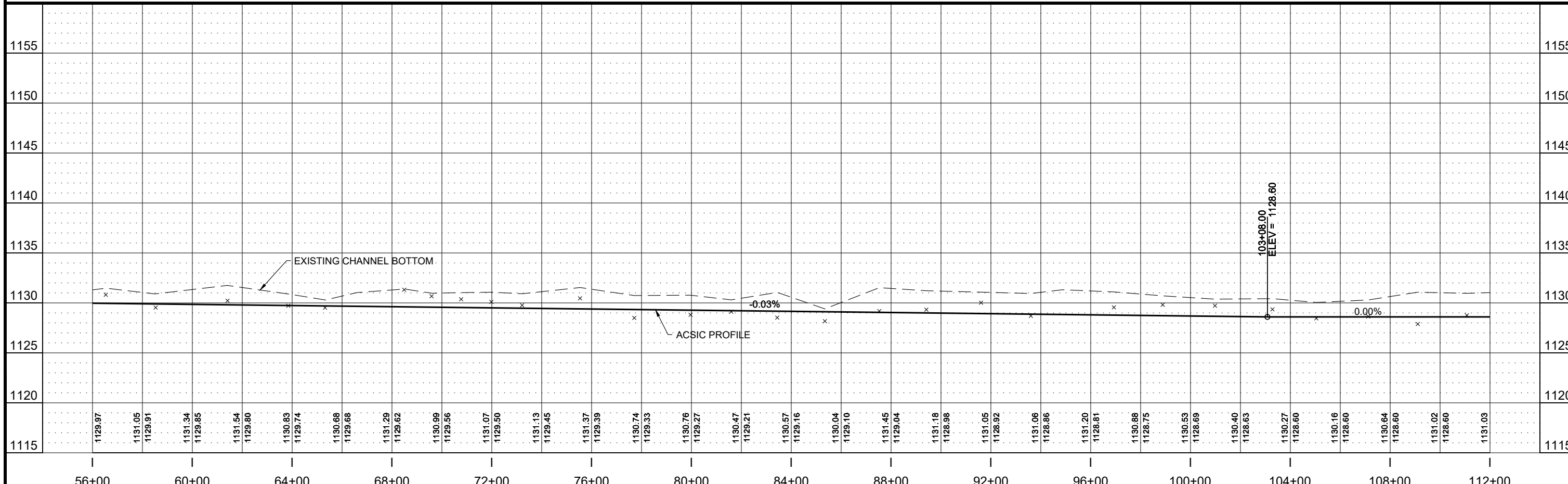
	PRELIMINARY Not for Construction	Houston Engineering Inc.	Maple Grove P: 763.493.4522 F: 763.493.5572	Drawn by TAM Date 5-09-2019 Checked by GM Scale AS SHOWN	REESTABLISHMENT OF STEARNS COUNTY DITCH 28 STEARNS COUNTY HOLDINGFORD, MN	STEARNS COUNTY DITCH 28 STA. 0+00 - 56+00 PROJECT NO. 6364-010	SHEET 1 of 8	
No.	Revision	Date	By					



NOTE:
 AS-CONSTRUCTED AND SUBSEQUENTLY IMPROVED CONDITION (ACSIC) FROM STA. 0+00 TO STA. 103+08 BASED ON A COMBINATION OF THE NATURAL CHANNEL BOTTOM DOCUMENTED IN THE 1906 DESIGN PROFILE WITH A DATUM ADJUSTMENT OF 1036.6 AND A BEST FIT LINE OF THE CHANNEL HARD BOTTOM SURVEY.

AS-CONSTRUCTED AND SUBSEQUENTLY IMPROVED CONDITION (ACSIC) FROM STA. 103+08 TO STA. 120+37 BASED ON 1906 DESIGN PROFILE WITH A DATUM ADJUSTMENT OF 1036.6.

* SIDE INLET PIPES DISCHARGING INTO OPEN CHANNEL.
 X HARD BOTTOM SURVEY POINT

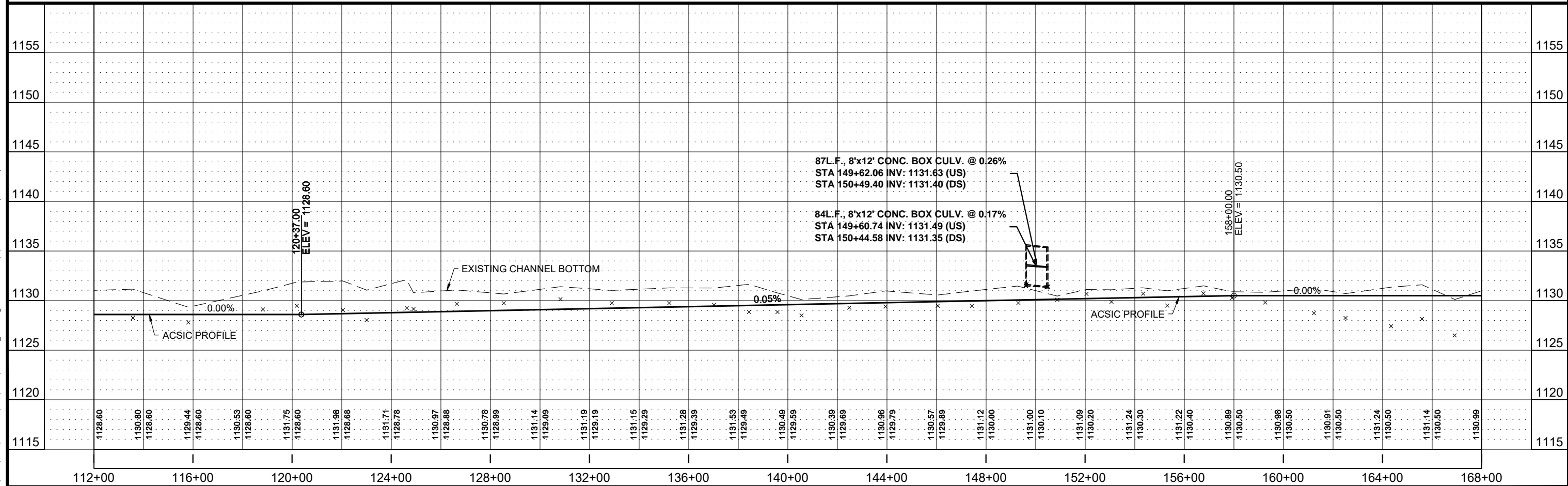
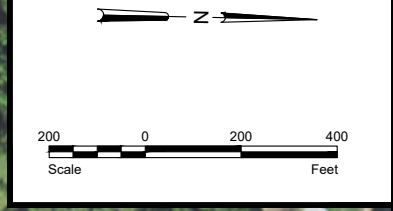


H:\Maple Grove\JBN\6364-010\CAD\Plans\CD28 Plan_Prof.dwg STA. 56-112-6/3/2019 9:39 AM (tmaslow)

No.	Revision	Date	By	<h1 style="text-align: center;">PRELIMINARY</h1> <p style="text-align: center;">Not for Construction</p>		Maple Grove	Drawn by TAM	Date 5-09-2019	REESTABLISHMENT OF STEARNS COUNTY DITCH 28 STEARNS COUNTY HOLDINGFORD, MN	STEARNS COUNTY DITCH 28 STA. 56+00 - 112+00 PROJECT NO. 6364-010	SHEET 2 of 8
						P: 763.493.4522 F: 763.493.5572	Checked by GM	Scale AS SHOWN			

NOTE:
 AS-CONSTRUCTED AND SUBSEQUENTLY APPROVED CONDITION (ACSIC) FROM STA. 120+37 TO STA. 264+00 BASED ON A BEST FIT LINE OF THE CHANNEL HARD BOTTOM SURVEY AND CONSISTENT WITH THE RISING AND FALLING CHARACTERISTICS OF THE NATURAL CHANNEL BOTTOM DOCUMENTED IN 1906 DESIGN PROFILE.

* SIDE INLET PIPES DISCHARGING INTO OPEN CHANNEL.
 X HARD BOTTOM SURVEY POINT

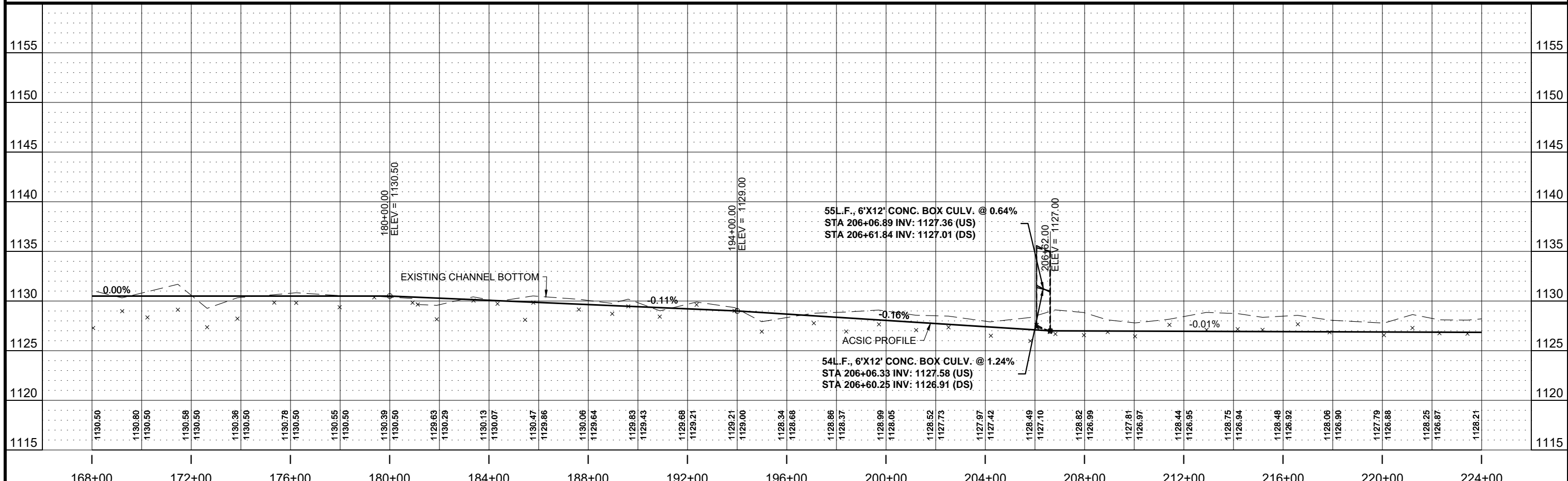
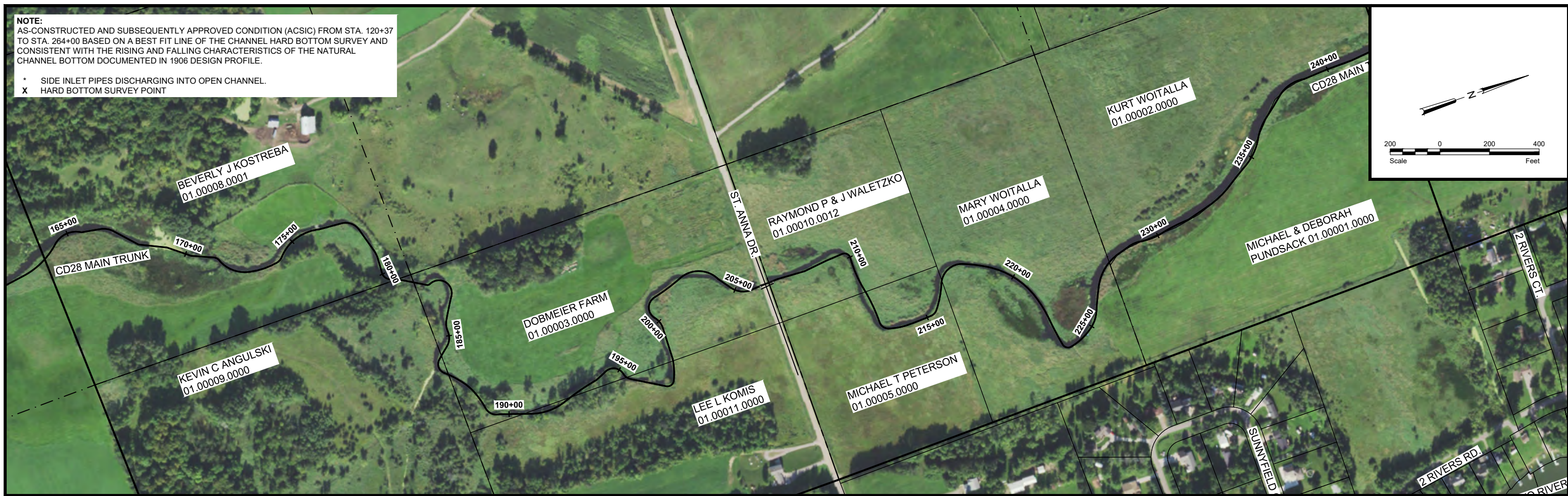
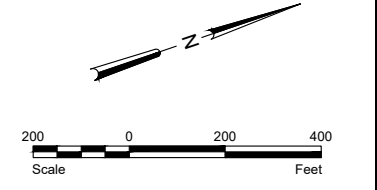


H:\Maple Grove\UBN\6364-010\CAD\Plans\CD28 Plan_Prof.dwg-STA. 112-168-6/3/2019 9:39 AM-(tmaslow)

No.		Revision		Date	By	<p>PRELIMINARY Not for Construction</p>	Maple Grove	Drawn by TAM	Date 5-09-2019	REESTABLISHMENT OF STEARNS COUNTY DITCH 28 STEARNS COUNTY HOLDINGFORD, MN	STEARNS COUNTY DITCH 28 STA. 112+00 - 168+00 PROJECT NO. 6364-010	SHEET 3 of 8
P:		F:					Checked by GM	Scale AS SHOWN				

NOTE:
 AS-CONSTRUCTED AND SUBSEQUENTLY APPROVED CONDITION (AC SIC) FROM STA. 120+37 TO STA. 264+00 BASED ON A BEST FIT LINE OF THE CHANNEL HARD BOTTOM SURVEY AND CONSISTENT WITH THE RISING AND FALLING CHARACTERISTICS OF THE NATURAL CHANNEL BOTTOM DOCUMENTED IN 1906 DESIGN PROFILE.

* SIDE INLET PIPES DISCHARGING INTO OPEN CHANNEL.
 X HARD BOTTOM SURVEY POINT

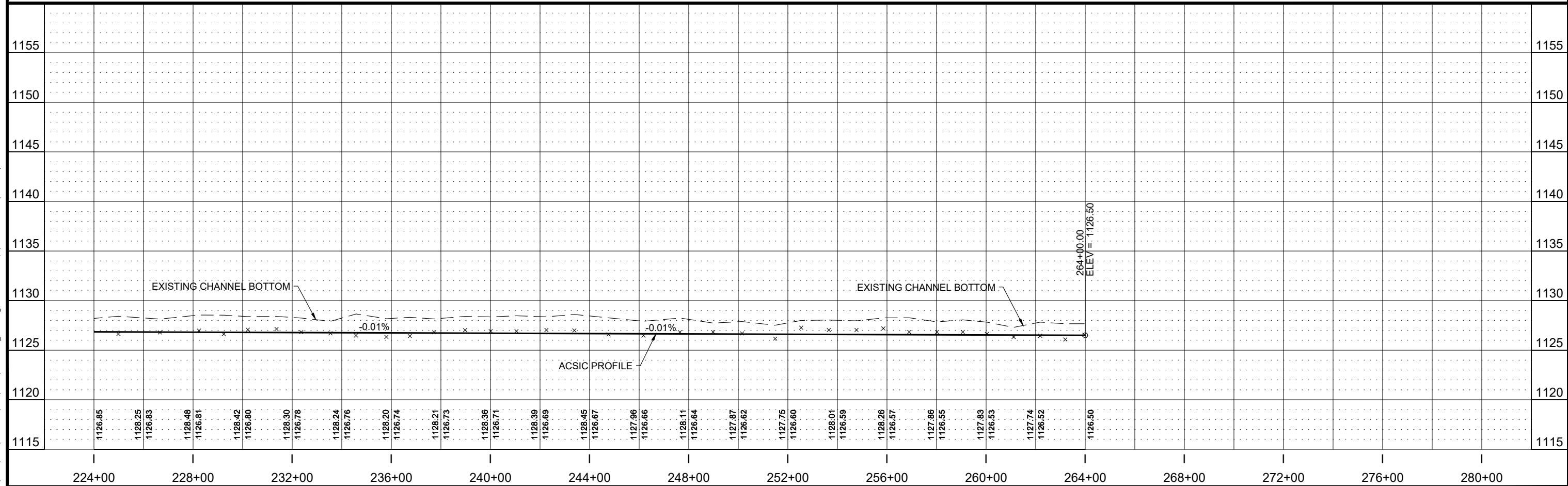
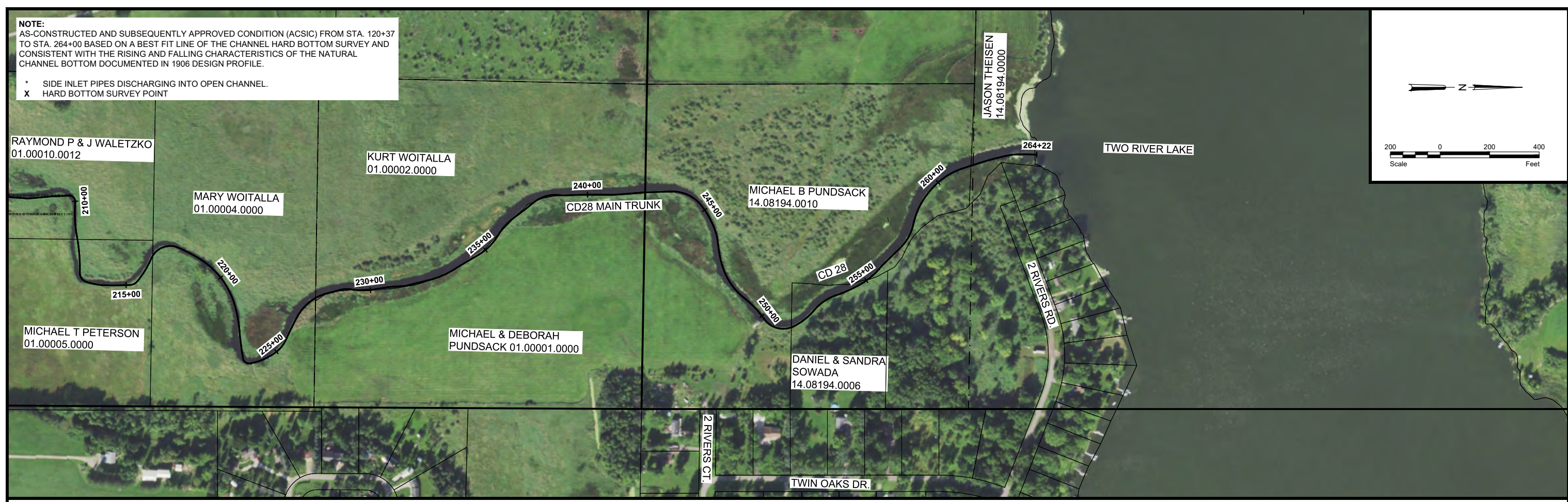
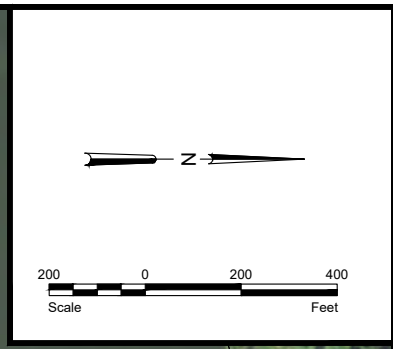


H:\Maple Grove\JBA\6364-010\CAD\Plans\CD28 Plan_Prof.dwg-STA. 168-224-6/3/2019 9:39 AM-(tmalaw)

No.		Revision		Date	By	<h1 style="text-align: center;">PRELIMINARY</h1> <p style="text-align: center;">Not for Construction</p>	<p>Houston Engineering Inc.</p>	Maple Grove	Drawn by TAM	Date 5-09-2019	REESTABLISHMENT OF STEARNS COUNTY DITCH 28 STEARNS COUNTY HOLDINGFORD, MN	STEARNS COUNTY DITCH 28 STA. 168+00 - 224+00 PROJECT NO. 6364-010	SHEET
								P: 763.493.4522 F: 763.493.5572	Checked by GM	Scale AS SHOWN			

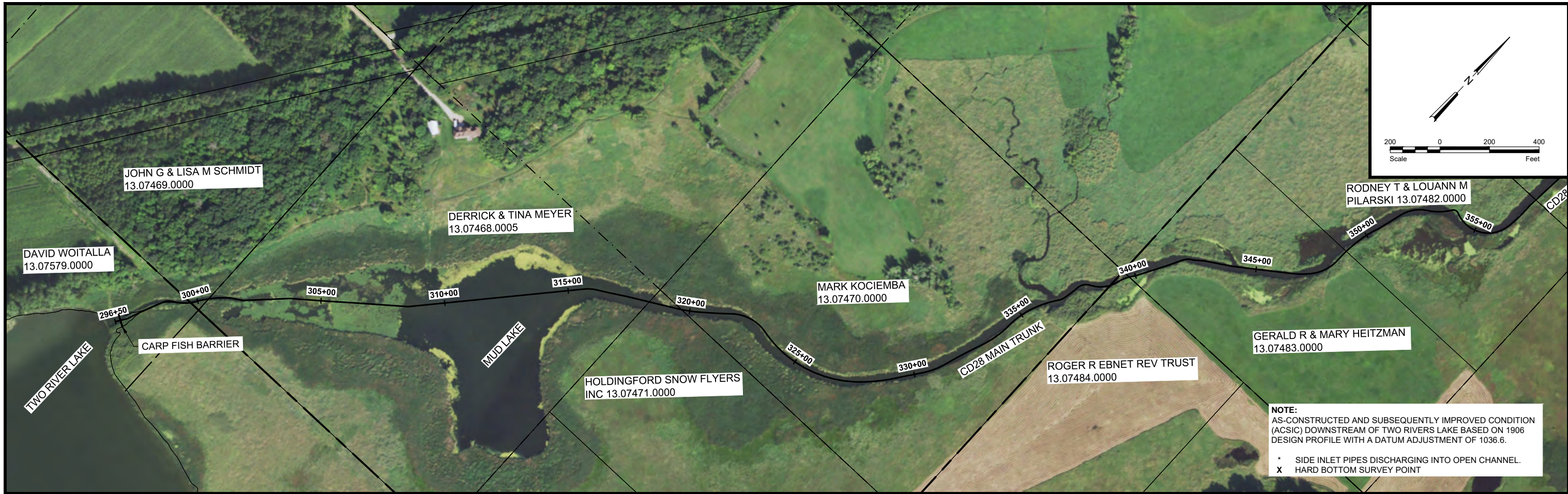
NOTE:
 AS-CONSTRUCTED AND SUBSEQUENTLY APPROVED CONDITION (ACSIC) FROM STA. 120+37 TO STA. 264+00 BASED ON A BEST FIT LINE OF THE CHANNEL HARD BOTTOM SURVEY AND CONSISTENT WITH THE RISING AND FALLING CHARACTERISTICS OF THE NATURAL CHANNEL BOTTOM DOCUMENTED IN 1906 DESIGN PROFILE.

* SIDE INLET PIPES DISCHARGING INTO OPEN CHANNEL.
 X HARD BOTTOM SURVEY POINT

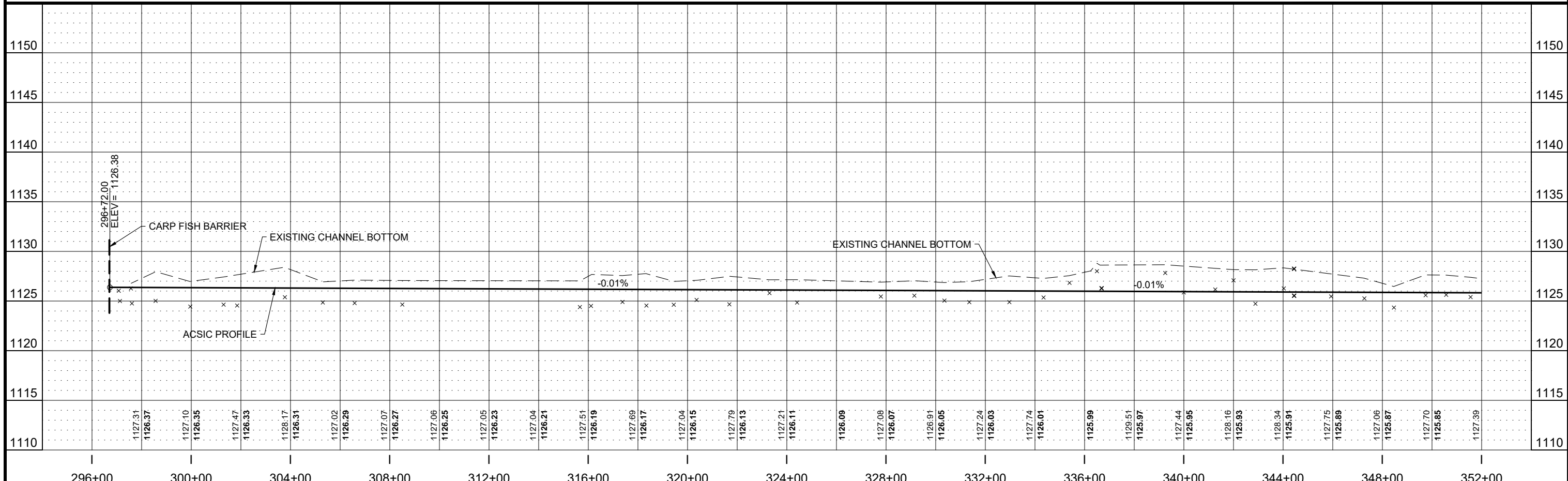


H:\Maple Grove\UBN\6364\6364-010\CAD\Plans\CD28\Plan_Prof.dwg-STA. 224-264-6/3/2019 9:39 AM (tmaslow)

No.		Revision		Date	By	<p>PRELIMINARY Not for Construction</p>	Maple Grove	Drawn by TAM	Date 5-09-2019	REESTABLISHMENT OF STEARNS COUNTY DITCH 28 STEARNS COUNTY HOLDINGFORD, MN	STEARNS COUNTY DITCH 28 STA. 224+00 - 264+00 PROJECT NO. 6364-010	SHEET 5 of 8
P:		F:						Checked by GM	Scale AS SHOWN			



NOTE:
 AS-CONSTRUCTED AND SUBSEQUENTLY IMPROVED CONDITION (ACSIC) DOWNSTREAM OF TWO RIVERS LAKE BASED ON 1906 DESIGN PROFILE WITH A DATUM ADJUSTMENT OF 1036.6.
 * SIDE INLET PIPES DISCHARGING INTO OPEN CHANNEL.
 X HARD BOTTOM SURVEY POINT

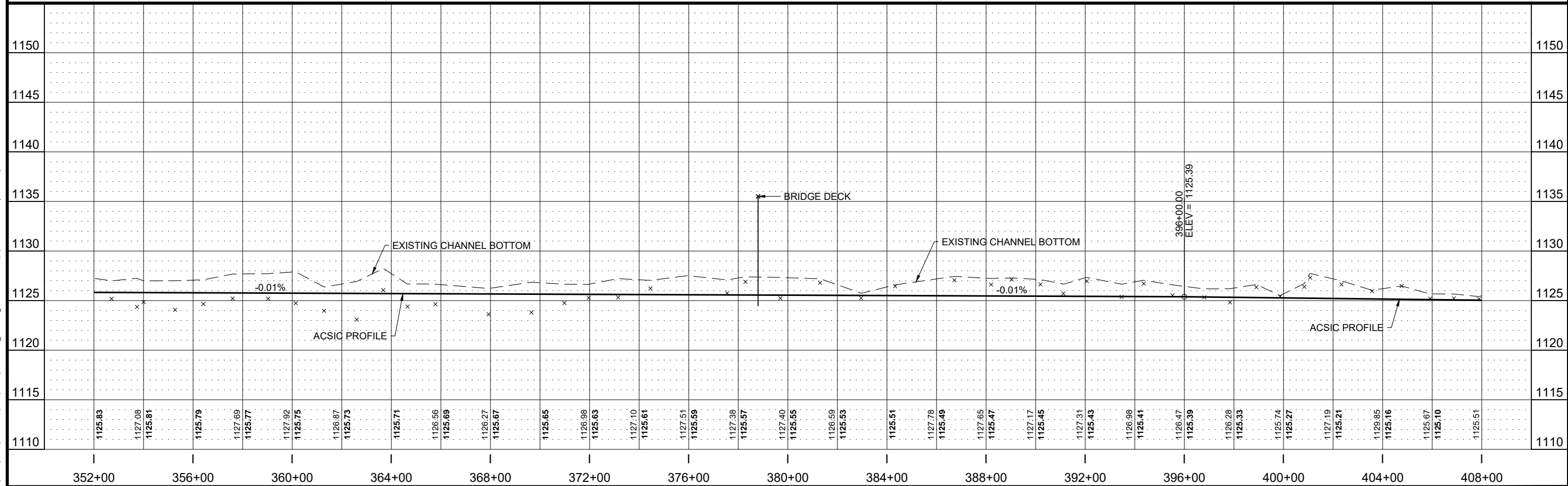
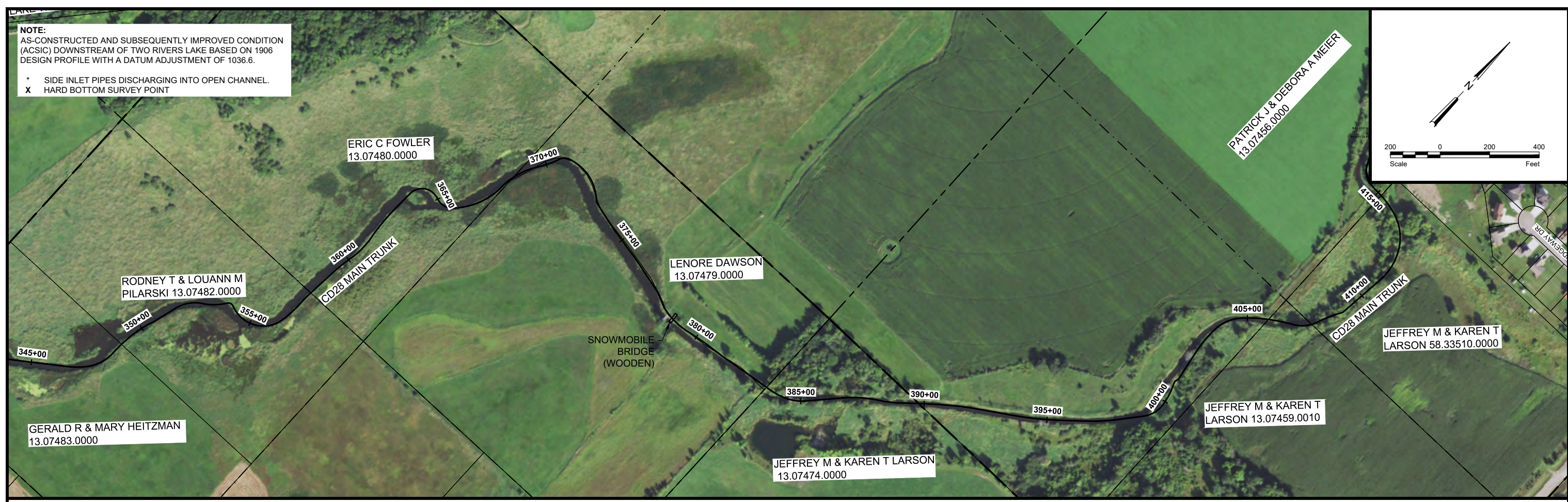
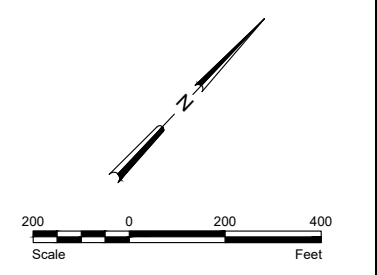


No.		Revision		Date	By	PRELIMINARY Not for Construction		Maple Grove	Drawn by TAM	Date 5-09-2019	REESTABLISHMENT OF STEARNS COUNTY DITCH 28 STEARNS COUNTY HOLDINGFORD, MN	STEARNS COUNTY DITCH 28 STA. 296+00 - 352+00 PROJECT NO. 6364-010	SHEET
								P: 763.493.4522 F: 763.493.5572	Checked by GM	Scale AS SHOWN			6 of 8

H:\Maple Grove\JBW\6364-010\CAD\Plans\CD28 Plan_Prof.dwg STA. 296-352/6/3/2019 9:39 AM (tmaslow)

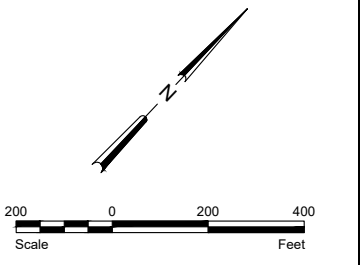
NOTE:
 AS-CONSTRUCTED AND SUBSEQUENTLY IMPROVED CONDITION (ACSIC) DOWNSTREAM OF TWO RIVERS LAKE BASED ON 1906 DESIGN PROFILE WITH A DATUM ADJUSTMENT OF 1036.6.

* SIDE INLET PIPES DISCHARGING INTO OPEN CHANNEL.
 X HARD BOTTOM SURVEY POINT

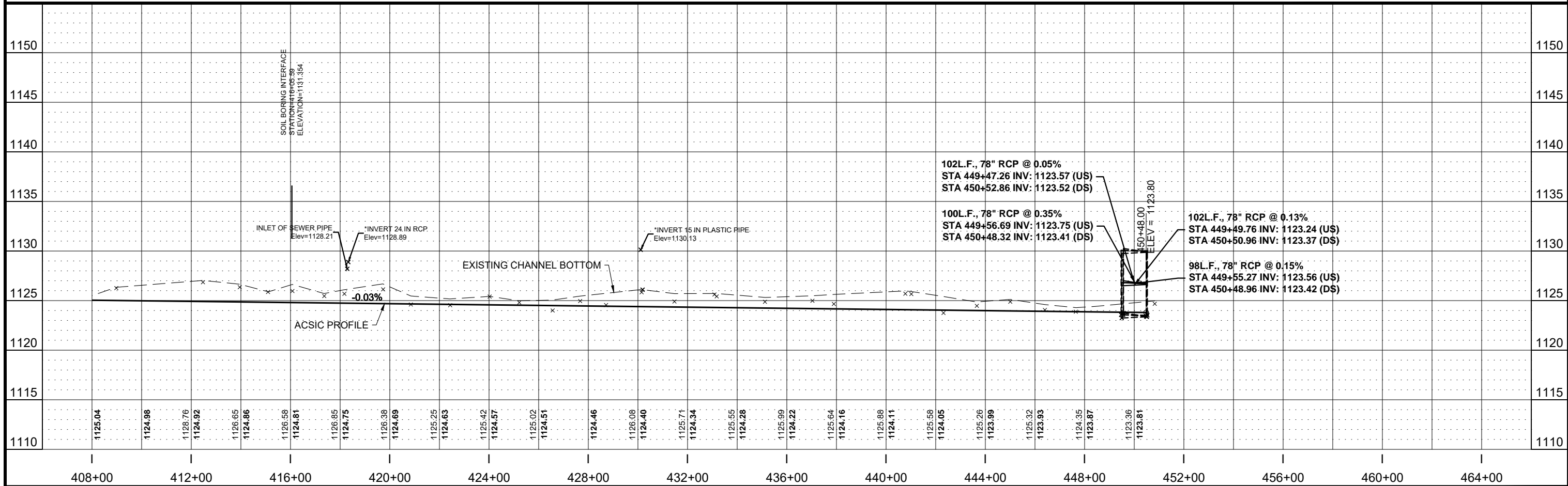


H:\Maple Grove\JBA\6364-010\CAD\Plans\CD28 Plan_Prof.dwg STA. 352-408 6/3/2019 9:40 AM (tmaslow)

No.		Revision		Date	By	<h1 style="text-align: center;">PRELIMINARY</h1> <p style="text-align: center;">Not for Construction</p>		Maple Grove	Drawn by TAM	Date 5-09-2019	REESTABLISHMENT OF STEARNS COUNTY DITCH 28 STEARNS COUNTY HOLDINGFORD, MN	STEARNS COUNTY DITCH 28 STA. 356+00 - 408+00 PROJECT NO. 6364-010	SHEET
								P: 763.493.4522 F: 763.493.5572	Checked by GM	Scale AS SHOWN			7 of 8



NOTE:
 AS-CONSTRUCTED AND SUBSEQUENTLY IMPROVED CONDITION (ACSIC) DOWNSTREAM OF TWO RIVERS LAKE BASED ON 1906 DESIGN PROFILE WITH A DATUM ADJUSTMENT OF 1036.6.
 * SIDE INLET PIPES DISCHARGING INTO OPEN CHANNEL.
 X HARD BOTTOM SURVEY POINT



H:\Maple Grove\JBW\6364-010\CAD\Plans\CD28\Plan_Prof.dwg-STA_416-460-6/3/2019 9:40 AM-(tmaslow)

<p>PRELIMINARY Not for Construction</p>				<p>Maple Grove P: 763.493.4522 F: 763.493.5572</p>		<p>Drawn by TAM Checked by GM</p>		<p>Date 5-09-2019 Scale AS SHOWN</p>		<p>REESTABLISHMENT OF STEARNS COUNTY DITCH 28 STEARNS COUNTY HOLDINGFORD, MN</p>				<p>STEARNS COUNTY DITCH 28 STA. 408+00 - 464+00 PROJECT NO. 6364-010</p>		<p>SHEET 8 of 8</p>	
No.	Revision	Date	By														

Appendix B

ACSIC Determination

STA 84+46 - 89+99

Survey (Current) Station	Hard Bottom (Survey) Elevation	Historic Elevation	Difference	Deviation from Datum Adjustment of 1038.6
85+35	1128.17	91.46	1,036.71	1.89
87+53	1129.18	90.59	1,038.59	0.01
89+41	1129.33	89.66	1,039.67	-1.07

This analysis inconclusive. Used best fit line as shown in plan and profiles

STA 103+08 - 120+37

Survey (Current) Station	Hard Bottom (Survey) Elevation	Historic Elevation	Difference	Deviation from Datum Adjustment of 1036.6
103+28	1,129.35	92.00	1,037.35	-0.75*
105+04	1,128.45	92.00	1,036.45	0.15
107+12	1,128.65	92.00	1,036.65	-0.05
109+11	1,127.89	92.00	1,035.89	0.71*
111+07	1,128.76	92.00	1,036.76	-0.16
113+57	1,128.26	92.00	1,036.26	0.34
115+81	1,127.80	92.00	1,035.80	0.80*
118+82	1,129.11	92.00	1,037.11	-0.51
120+19	1,129.48	92.00	1,037.48	-0.88*

* Indicates outliers that was not used in determining the Datum Adjustment (standard deviation value of 0.57

**Root-Mean-Square Error = 0.29

STA 235+15 - 264+00

Survey (Current) Station	Hard Bottom (Survey) Elevation	Historic Elevation	Difference	Deviation from Datum Adjustment of 1033.4
236+75	1,126.34	96.21	1,030.13	3.27
237+73	1,126.92	95.88	1,031.04	2.36
238+98	1,126.92	95.52	1,031.40	2.00
240+01	1,127.04	95.21	1,031.83	1.57
241+05	1,126.99	94.90	1,032.09	1.31
242+26	1,126.59	94.54	1,032.05	1.35
243+38	1,126.48	94.25	1,032.23	1.17
244+77	1,126.82	93.91	1,032.91	0.49
247+65	1,126.83	93.75	1,033.08	0.32
248+98	1,126.69	93.56	1,033.13	0.27
250+16	1,126.17	93.36	1,032.81	0.59
251+49	1,127.27	93.02	1,034.25	-0.85
252+54	1,127.03	92.75	1,034.28	-0.88
253+65	1,127.04	92.45	1,034.59	-1.19
254+77	1,127.19	92.13	1,035.06	-1.66
255+85	1,126.84	91.86	1,034.98	-1.58
256+90	1,126.83	91.61	1,035.22	-1.82
258+02	1,126.84	91.40	1,035.44	-2.04
259+06	1,126.63	91.25	1,035.38	-1.98
260+03	1,126.33	91.03	1,035.30	-1.90
261+11	1,126.45	90.73	1,035.72	-2.32
262+18	1,126.08	90.41	1,035.67	-2.27

This analysis inconclusive. Used best fit line as shown in plan and profiles

STA 296+72 - 450+48

Survey (Current) Station	Hard Bottom (Survey) Elevation	Historic Elevation	Difference	Deviation from Datum Adjustment of 1036.6
297+13	1,125.00	89.62	1,035.38	1.22*
297+61	1,124.76	89.61	1,035.15	1.45*
298+56	1,125.01	89.60	1,035.41	1.19*
299+96	1,124.44	89.59	1,034.85	1.75*
301+30	1,124.64	89.58	1,035.06	1.54*
301+85	1,124.55	89.57	1,034.98	1.62*
303+77	1,125.39	89.55	1,035.84	0.76
305+30	1,124.85	89.54	1,035.31	1.29*
306+58	1,124.79	89.52	1,035.27	1.33*
308+51	1,124.65	89.51	1,035.14	1.46*
315+66	1,124.39	89.43	1,034.96	1.64*
316+11	1,124.51	89.43	1,035.08	1.52*
317+38	1,124.91	89.42	1,035.49	1.11*
318+34	1,124.54	89.41	1,035.13	1.47*
319+44	1,124.63	89.40	1,035.23	1.37*
320+37	1,125.11	89.39	1,035.72	0.88
321+68	1,124.67	89.37	1,035.30	1.30*
323+30	1,125.80	89.36	1,036.44	0.16
324+41	1,124.85	89.35	1,035.50	1.10*
327+79	1,125.45	89.31	1,036.14	0.46
329+14	1,125.54	89.30	1,036.24	0.36
331+35	1,124.89	89.28	1,035.61	0.99
332+97	1,124.89	89.26	1,035.63	0.97
334+35	1,125.36	89.25	1,036.11	0.49
335+39	1,126.83	89.24	1,037.59	-0.99
336+50	1,128.01	89.23	1,038.78	-2.18*
339+25	1,127.82	89.20	1,038.62	-2.02*
340+00	1,125.87	89.19	1,036.68	-0.08
341+27	1,126.16	89.18	1,036.98	-0.38
342+00	1,127.08	89.17	1,037.91	-1.31*
342+88	1,124.73	89.17	1,035.56	1.04
344+03	1,126.27	89.15	1,037.12	-0.52
345+93	1,125.47	89.14	1,036.33	0.27
347+27	1,125.27	89.12	1,036.15	0.45
348+47	1,124.34	89.11	1,035.23	1.37*
349+74	1,125.58	89.10	1,036.48	0.12
350+57	1,125.62	89.09	1,036.53	0.07
351+55	1,125.40	89.08	1,036.32	0.28
352+71	1,125.19	89.07	1,036.12	0.48
353+74	1,124.36	89.06	1,035.30	1.30*
354+00	1,124.86	89.06	1,035.80	0.80
355+27	1,124.07	89.05	1,035.02	1.58*
356+42	1,124.66	89.04	1,035.62	0.98
357+60	1,125.21	89.02	1,036.19	0.41
359+03	1,125.20	89.01	1,036.19	0.41
360+14	1,124.74	89.00	1,035.74	0.86
361+29	1,123.97	88.99	1,034.98	1.62*
362+61	1,123.08	88.97	1,034.11	2.49*
363+67	1,126.06	88.96	1,037.10	-0.50
364+66	1,124.40	88.96	1,035.44	1.16*
365+78	1,124.63	88.95	1,035.68	0.92
367+93	1,123.62	88.93	1,034.69	1.91*
369+66	1,123.81	88.91	1,034.90	1.70*
370+98	1,124.76	88.90	1,035.86	0.74
371+97	1,125.28	88.89	1,036.39	0.21
373+15	1,125.32	88.87	1,036.45	0.15

STA 296+72 - 450+48

Survey Station	Hard Bottom (Survey) Elevation	Historic Elevation	Difference	Deviation from Datum Adjustment of 1036.6
374+45	1,126.23	88.86	1,037.37	-0.77
377+55	1,125.76	88.83	1,036.93	-0.33
379+70	1,125.24	88.81	1,036.43	0.17
381+30	1,126.79	88.79	1,038.00	-1.40*
382+95	1,125.25	88.78	1,036.47	0.13
384+33	1,126.45	88.76	1,037.69	-1.09
386+72	1,127.05	88.74	1,038.31	-1.71*
388+20	1,126.49	88.73	1,037.76	-1.16*
389+03	1,127.12	88.72	1,038.40	-1.80*
390+19	1,126.63	88.71	1,037.92	-1.32*
391+12	1,125.71	88.70	1,037.01	-0.41
392+06	1,126.96	88.69	1,038.27	-1.67*
393+47	1,125.37	88.67	1,036.70	-0.10
394+36	1,126.71	88.66	1,038.05	-1.45*
395+52	1,125.53	88.65	1,036.88	-0.28
396+80	1,125.34	88.64	1,036.70	-0.10
397+84	1,124.82	88.63	1,036.19	0.41
398+90	1,126.36	88.62	1,037.74	-1.14*
399+86	1,125.42	88.61	1,036.81	-0.21
400+84	1,126.40	88.60	1,037.80	-1.20*
401+08	1,127.32	88.60	1,038.72	-2.12*
402+34	1,126.64	88.58	1,038.06	-1.46*
403+58	1,125.96	88.54	1,037.42	-0.82
404+77	1,126.47	88.51	1,037.96	-1.36*
405+92	1,125.20	88.47	1,036.73	-0.13
406+87	1,125.22	88.44	1,036.78	-0.18
407+89	1,125.16	88.41	1,036.75	-0.15
408+98	1,126.26	88.38	1,037.88	-1.28*
412+47	1,126.85	88.27	1,038.58	-1.98*
413+95	1,126.36	88.23	1,038.13	-1.53*
415+09	1,125.87	88.20	1,037.67	-1.07
416+08	1,125.96	88.17	1,037.79	-1.19*
417+36	1,125.46	88.13	1,037.33	-0.73
418+17	1,125.68	88.10	1,037.58	-0.98
419+73	1,126.13	88.06	1,038.07	-1.47*
420+85	1,124.61	88.02	1,036.59	0.01
422+43	1,124.53	87.98	1,036.55	0.05
424+02	1,125.41	87.93	1,037.48	-0.88
425+22	1,124.81	87.89	1,036.92	-0.32
426+56	1,124.00	87.85	1,036.15	0.45
427+67	1,124.96	87.82	1,037.14	-0.54
428+72	1,124.55	87.79	1,036.76	-0.16
430+15	1,125.84	87.75	1,038.09	-1.49*
431+47	1,124.91	87.71	1,037.20	-0.60
433+08	1,125.62	87.66	1,037.96	-1.36*
433+17	1,125.42	87.65	1,037.77	-1.17*
435+12	1,124.88	87.60	1,037.28	-0.68
437+03	1,124.98	87.54	1,037.44	-0.84
437+90	1,124.66	87.51	1,037.15	-0.55
440+78	1,125.70	87.43	1,038.27	-1.67*
441+02	1,125.66	87.42	1,038.24	-1.64*
442+31	1,123.76	87.38	1,036.38	0.22
443+66	1,124.47	87.34	1,037.13	-0.53
445+00	1,124.89	87.30	1,037.59	-0.99
446+40	1,124.06	87.26	1,036.80	-0.20
447+65	1,123.88	87.22	1,036.66	-0.06

* Indicates outliers that was not used in determining the Datum Adjustment (standard deviation value of 1.1

**Root-Mean-Square Error = 0.58