

**AGENDA**  
**REGULAR DRAINAGE MEETING**  
**February 12, 2020 9:30 AM**

1. Open Meeting
2. Approve Agenda
3. Approve Minutes

Documents:

[02\\_05\\_2020 - DRAINAGE MINUTES.PDF](#)

4. Approve Claims For Payment

Documents:

[PAYABLES-DRAINAGE PUBLICATION 2-14-20.PDF](#)

5. DD 25 WO1 - Discuss W/ Possible Action, Update On RR Crossing  
DD 25 WO 1- Update from CGA on RR Crossing Permit.

Documents:

[DD 25 - UPRR REVISED PERMIT 02\\_11\\_20.PDF](#)

6. DD 48 WO 274 - Discuss W/ Possible Action, Investigation Summary

Documents:

[DD 48 WO 274 INVESTIGATION SUMMARY 02\\_11\\_20 6486.5 .PDF](#)

7. DD 55-3 Lat 9 WO 224 - Discuss W/ Possible Action - Repair Summary

Documents:

[DD 55 WO 224 REPAIR SUMMARY 02\\_11\\_20 6636.6.PDF](#)

8. DD 55-3 Lat 12 WO 201 - Discuss W Possible Action - Repair Summary

Documents:

[DD 55-3 LAT 12 WO 201 REPAIR SUMMARY 02\\_10\\_2020 6636.4.PDF](#)

9. DD 86 - Discuss W Possible Action - Engineer's Report On Main Tile Repairs

Documents:

[DD 86 ENGINEERS REPORT.PDF](#)  
[6789.3 - DD 86 SUPP ENGINEERS REPORT.PDF](#)

10. DD 165 - Set Election Date, Appoint Judges And Clerks

Documents:

[DD 165 ELECTION DATE, JUDGES AND CLERKS 02\\_11\\_20.PDF](#)

11. Other Business
12. Adjourn Meeting

**REGULAR DRAINAGE MEETING**  
**February 5, 2020 9:30 AM**

2/5/2020 - Minutes

1. Open Meeting  
Hardin County Drainage District Chairperson, Lance Granzow opened the meeting. Also present were Trustee BJ Hoffman; Landowner Curt Groen; Lee Gallentine of Clapsaddle-Garber Associates; and Drainage Clerk, Denise Smith.
2. Approve Agenda  
Granzow motioned to approve the agenda. Second by Hoffman. All ayes. Motion carried.
3. Approve Minutes  
Motion by Hoffman to approve the minutes to DD 55- DD 55-3 CREP Wetlands Meeting dated 01-22-20 and Regular Drainage Meeting dated 01-29-20. Second by Granzow. Motion carried.
4. DD 86 - Public Hearing On Engineer's Report On Main Tile Repairs To Reconvene

Granzow re-opened the Public Hearing on DD 86. The Trustees had directed Smith to verify date of the last classification for this district. The current classification was done in 1918 for \$5,845.25. There was some talk of reclassification in 2003 in the Ryken Study & Report dated December 2003, but the 2004 assessments were based on the original \$5,845.25 classification so the reclassification that was discussed must never have been approved/completed. There was an assessment done in 2018 for DD86 for \$58,750.00 for work done on work orders #150 & #172.

Landowner Randy Jennings had expressed concern in his letter, that the majority of the assessment for this project would have fallen on his parcels, \$15,000 of the estimated \$96,000 costs for this project would be assessed to Jennings. Randy Jennings had objected to the costs, and requested a reclassification. Landowner James Heddens, had requested a less costly option, to possibly include an open ditch option. CGA has submitted a Supplement to the Engineer's Reports on Repairs to the Main Tile DD86. Gallentine stated the cost on the open ditch option is \$81,578.13, which is about \$12,000 less than the partial tree removal, root cutting and tile lining tile cost of \$93,940.63 and full tree removal and partial tile replacement cost of \$93,006.25. Both of those options include full tree removal from Dago Lake up to the outlet.

Gallentine stated that this work order/project began north of Monarch Pond because there was water coming overland and there was a tree there, so they pulled the tree and replaced the outlet. It was discussed at that time, that the trees at Monarch Pond needed to come out, so those trees were removed, there was one tree left with a park bench around it, that the landowner wanted to keep, and the landowner wanted to know why his tree was to come out but other trees within 50' of the tile line were not. There was not an actual complaint on drainage, just on the tree removal being equitable.

Granzow stated the open ditch is along the railroad's property, on which much of the tree growth lies, and a new classification should be done and the expense should be done accordingly, because it will be costly to do anything along railroad property, let alone the difficulty in getting approval to do anything on railroad property. Gallentine stated last assessment was \$58,750.00 for 2 work orders, which involved engineering and construction costs for a small repair to take out trees after it is already plugged, this is \$80-90,000 to take out a larger section and remove trees, it is up to the Trustees on how much they want to spend on preventative maintenance. Granzow stated we should reclassify, as the request was made by Jennings, especially since it has not been classified since 1918, and it may no longer be accurate. A lot of the issues are in the railroads property, so Granzow likes the open ditch option, as it requires less overall maintenance, but that should be reflected in the classification because of the railroads lack of responsibility in keeping tree growth down. Gallentine noted that the recommendations of the Trustees are highly valued by the Classification Committee. Granzow stated he would like to look at reclassification first and then look at work on the project.

Hoffman would prefer to do the reclassification first, and considering the attendance of the DD 86 hearings, with only two letters of communication from landowners, then discuss the project options. Gallentine noted that water is flowing, the water hits the intake where the trees are, boils out of the intake, then goes overland, until it gets to the other side of the railroad tracks, then goes back under, it is flowing but only under pressure, it is not flowing with gravity, and that the Trustees can initiate repairs if needed without a landowner complaint if they so choose.

Hoffman would like to start the reclassification before the tile fails, so it is in place when repairs are needed. Hoffman, asked if we were to do tree removal alone, what would costs be? Gallentine stated without the railroads tree removal, just from their land to downstream, costs may be \$25,000-\$40,000, this would not address the issue in the railroads parcel where the issue with the tile is, but would go from there to Dago Lake. Hoffman, does not want to try to get around breaking a project into several pieces, but we could do the trees and reclassify and then determine down the road if any additional repairs are needed, and the reclassification may put costs to the railroad where they belong and may help the other landowners. Granzow stated that is where we started, and we would need to address the entire problem, and we should begin with the reclassification. Hoffman asked how long railroad permitting would take, Gallentine stated it could take 1 to 3 years for railroad permitting.

Motion to close the public hearing by Granzow. Hoffman seconded. All ayes. Motion carried.

Motion by Granzow to have Drainage Clerk Smith to add these discussion items to next week's regular drainage agenda. Second by Hoffman. All ayes. Motion carried.

5. DD 9 - Discuss W/ Possible Action - ROW Easement

Smith updated the Trustees that the DD 9 right of way easement document had been mailed out to landowner Ron Sailer and his tenant Kevin Vierkandt, via USPS Certified Mail and delivery has been verified. Smith asked the Trustees how they would like to proceed. Gallentine noted that plans and specs are ready, and it would take 4 weeks for bid letting which would hit the first part of March, and would prefer not to do a March, April or May bid letting, but that the project can not move forward until the right of way easement is signed.

Hoffman motioned to have Smith give Sailer and Vierkandt a courteous phone call and see if they have any questions that the Clerk can help them with and to find out a timeline of when it may be signed and submitted. Granzow seconded. All ayes. Motion carried.

6. DD 25 - WO 1 - Discuss W Possible Action - Update Project 6501 RR Crossing

DD 25 - WO 1 - Gallentine provided an update with communication on the amended RR permit we are working on, Gallentine stated that last Friday, the railroad emailed him back and stated "The formal correspondence may be signed and processed early next week". Gallentine will provide any new updates as soon as they are received from the railroad. Smith will add it to next week's agenda for possible action if no new updates are forthcoming.

7. DD 25 - Discuss W Possible Action - Crop Damage Claim

DD 25 - The Trustees had received a request for crop damage claim from DD 25 tenant Jason Martin for crop damages done in 2019 during work on the DD 25 crossing project. CGA verified acres of damage as .54 acres of beans and .14 acres of corn. Martin reported 1.5 acres of corn damaged, Smith reached out to Martin for clarification on the discrepancy between CGA's findings of .14 acres and his report of 1.5 acres. Martin reported he has an area near where they have been working next to the railroad tracks that floods out every year to about 3 acres in size, this year he thought the flooded acres looked larger due to the work they were doing so he reported the increased flooded acres. Jason says that the 1.5 acres of corn he reported was his best guesstimate on the size of the additional flooded acres.

Gallentine states CGA reported actual area that the contractor had disturbed, he stated that CGA does not shoot or report on flooded acres, because they do not have a history of what usually floods out. Gallentine stated the acres of beans reported by Martin matches up with CGA's reported findings pretty close, but the corn is quite a bit off from CGA's findings. Hoffman noted that flooded area can be flooded one day and not two weeks from now, it can be very subjective. Hoffman asked what precedence was, to accept engineer's numbers. Granzow stated we have always paid where we have damaged, but not always areas that have flooded.

Gallentine stated we have been working on this area for 2-3 years now. Hoffman stated he was more likely to accept CGA's findings of actual work disturbance to areas damaged rather than acres for flooding. Granzow stated we know what we damaged, and we must pay on that.

Motion to have Smith review crop insurance prices and tabulate loss damages using CGA totals for acres damaged, and bring back a revised crop loss damage claim for review. Second by Granzow. All ayes. Motion carried.

8. DD H-S 35-1 WO 240 - Discuss W Possible Action - Repair Summary

DD H-S 35-1 - Gallentine stated this work order had been out quite a while, McDowell had been going to do it, they did not get to it, so Adam Seward went out to work on it. It was a simple repair on a wide joint that was previously repaired on single wall tile. Single wall tile was removed and dual wall pipe with concrete collars was installed. After the freeze / thaw cycle there may be some leveling needed in the spring. It was unknown who had done previous repair. If more reports of restricted drainage appear in the area, it may be warranted to conduct a widespread study of the area, but at this time it looks like an isolated repair.

9. DD 36 - WO 268 - Discuss W Possible Action - Investigation Summary

DD 36 - WO 268 - Gallentine stated this had originally been turned in as DD 106 which is a defunct / inactive district. This work order was based on a report from Trustee McClellan, who noted an area of blowout on the shortcut to Hubbard. CGA investigated and it looked like someone had done a repair, if they want more details they could contact the tenant. Granzow stated he is not concerned about it if tile is flowing and we don't have a bill for the work. Landowner Curt Groen noted that area has always flooded, and the parcel just to the east had a lot of private tile installed this fall. Smith asked if this could be reported as complete. Granzow stated it could be marked as complete.

10. DD 154 - WO 277 - Discuss W Possible Action - Investigation Summary

DD 154 - WO 277 - Roger Woolworth turned this in, he is a landowner at the outlet of DD 154, and his biggest complaint was surface water coming upstream from him and flowing across his property, and CGA confirmed that is happening. When CGA was onsite, they noted several trees within 50' of the tile, so it is possible that they can be impacting the tile, it looks like the surface water runs towards the acreage, and not the old creek bank to the north. Downstream of the tile outlet there is a Missouri crossing or a low water crossing that is about 1.2' higher than the flowline of the tile outlet, that it is acting like a dam more than a low water crossing. That doesn't cause more surface water to come his way, but it does cause a continual backup in the tile outlet which could cause more surface water to come his way. The Missouri crossing is outside the district but it is impacting the district tile. After verifying the tile route, CGA recommends that all trees within 50' of the tile be removed and treated to prevent regrowth. CGA also recommends contacting the owner of the Missouri crossing so that it can be reworked and it does free flow, and there is no rodent guard on the outlet, CGA recommends that a rodent guard be installed.

All that said, it may still not alleviate Woolworth's problems with a big enough rain. Gallentine stated while this overland drainage isn't currently a district facility problem unless the district originally constructed this waterway, CGA did not see anything to indicate this on the maps this but could check into it. Granzow stated we could have Roger attend a meeting for an explanation and to answer his questions, because we can reach out to the landowner of the Missouri crossing, but we have no jurisdiction, it would be nice if we can talk with the landowners before we spend money on a project. Gallentine noted that we should send Woolworth a copy of the Engineer's Investigation Report.

Motion by Hoffman to have Smith contact Roger Woolworth to come in for a meeting in the next few weeks to discuss his concerns. Second by Granzow. All ayes. Motion Carried.

11. DD 55-3 Lat 10 - WO 284 Discuss W Possible Action

DD 55-3 Lat 10 - Smith reports that there was an active beaver dam reported by CGA staff working in the area. This was in the same area as previous WO 165, which was repaired in 2017, which included beaver trapping and dam removal at that time. Now there is a dam both north and south of the road, Gallentine noted there is a bend in the open ditch which changes the water velocity and there is an abandoned RR right of way full of trees just north of the road, and it is an inviting area for beavers. Hoffman recommended to send out a trapper to trap beavers, once beavers are removed it can be sent to lottery.

Motion by Hoffman to send out Nuisance Wildlife Control Operator to trap the beavers and report back once beavers are removed. Second by Granzow. All ayes. Motion carried.

12. DD 165 -Discuss W Possible Action - Acknowledge Receipt Of Petition For Private Trustee Management

DD 165 - Smith stated we received a petition for Private Trustee Management from DD 165, Smith stated she pulled the classification to verify that there was a majority of the landowners in the district's signature on the petition. There are 8 landowners in the district, one was the the Chicago Central & Pacific Railroad and one being Etna Township Roads. There were 5 signatures on the petition, establishing a majority of the landowners in the district.

Motion by Hoffman to acknowledge the petition for Private Trustee Election for DD 165 and the verified totals of the canvass of the petition and begin the election process. Second by Granzow. All ayes. Motion carried.

### 13. Other Business

DD 148 - There were 2 outlet repairs McDowell was going to do that they never got to, one was in DD 165 so that project will have to stop until the election process for DD 165 is over. The other project was on DD 146, and McDowell had bid it at \$10,240 but could not get to it at that time due to wet weather/scheduling, and now he has come back and said he can get to it in March, but his costs have gone up 10% so the cost will increase 10%, Gallentine asked if the Trustees want McDowell to proceed or have it go back to lottery. Granzow stated it should go to lottery. CGA will stop work on the DD 165 project until such time as the Special Election for Private Drainage Trustees has been held. and take DD 146 project to lottery.

DD 56 - Gallentine reports that the reclassification report for DD 56 is ready for review by the Reclassification Committee, which meets next Tuesday, and they are looking at maybe another week or two before reclassification report is ready to present.

DD 1 Gallentine reports that the DD 1 road crossing is ready to start construction within the next couple weeks.

### 14. Adjourn Meeting

Hoffman moved to adjourn. Granzow seconded. All ayes. Motion carried.



# Hardin County

## Drainage Claims with Pay Date of 2/14/2020

Description	Vendor	Amount
DD 26 WO 266 For Prof Serv 8/23/2019 to 1/31/2020	Clapsaddle-Garber Assoc	673.70
DD48 WO274 For Prof Serv 11/30/19 to 1/31/20	Clapsaddle-Garber Assoc	573.70
DD38 WO231 For Prof Serv 06/21/19 to 1/31/20	Clapsaddle-Garber Assoc	153.00
DD1 WO244 Const. Observ for D35 Rd Crossing	Clapsaddle-Garber Assoc	346.95
DD165 WO232 For Prof Serv 9/27/19 to 1/31/20	Clapsaddle-Garber Assoc	312.75
DD131 WO275 Inv Main Tile Blowout Svcs to 1/31/20	Clapsaddle-Garber Assoc	1,037.20
DD72 WO71 For Prof Svcs to 1/31/20	Clapsaddle-Garber Assoc	202.50
DD31 WO278 Blowout Repair Svcs to 1/31/20	Clapsaddle-Garber Assoc	754.50
DD86 WO 252 For Prof. Svcs 11/30/19 to 1/31/20	Clapsaddle-Garber Assoc	2,794.90
DD9 WO229 For Prof Svsc 9/27/19 to 1/31/20	Clapsaddle-Garber Assoc	1,030.75
DD25 WO1 - Prof Servs After 11/30/19 to 1/31/20	Clapsaddle-Garber Assoc	198.20
DD25-WO1 - UPRR Comm. SVCS After 11/30/19-1/31/19	Clapsaddle-Garber Assoc	572.75
DD34 WO189 For Prof Svcs 9/27/19 to 1/31/20	Clapsaddle-Garber Assoc	401.90
DD52 WO215 For Prof. Serv's 8/23/2019 to 1/31/20	Clapsaddle-Garber Assoc	4,274.55
DD55-3 WO 201 For Prof Svcs 8/23/19 to 1/31/20	Clapsaddle-Garber Assoc	2,161.15
DD55-3 WO224 For Prof Svcs 8/23/19 to 1/31/20	Clapsaddle-Garber Assoc	7,903.00
DD 55 Div 3 Wetlands Mtg Atndc- Svcs to 1/31/20	Clapsaddle-Garber Assoc	569.35
DD100 WO248 For Prof Svcs 5/31/19 to 1/31/20	Clapsaddle-Garber Assoc	2,203.25
DD109 WO269 For Prof. Svcs to 1/31/20	Clapsaddle-Garber Assoc	898.70
DD119 WO 249 - For Prof Svcs 7/26/19 to 1/31/20	Clapsaddle-Garber Assoc	1,653.55
DD128 WO279 For Prf. Svcs to 1/31/20 Inv. Wet Spot	Clapsaddle-Garber Assoc	622.90
DD143 - WO 167 For Prof Svcs 8/23/19 to 1/31/20	Clapsaddle-Garber Assoc	297.50
DD143 Survey ROW Report- Svcs 10/31/19 to 1/31/20	Clapsaddle-Garber Assoc	4,129.25
DD143 Splmnt to Eng. Report -Svcs to 1/31/20	Clapsaddle-Garber Assoc	2,746.20
DD154 WO277 For Prof Svcs to 1/31/20	Clapsaddle-Garber Assoc	1,019.25
DDH-S 35-1 WO240 For Prof Svcs to 2/06/20	Clapsaddle-Garber Assoc	2,774.70
DD 106 WO268 For Prof Svcs 9/27/19 to 2/06/20	Clapsaddle-Garber Assoc	1,059.90

**Total Regular Payables:** 4,054.30  
**Total Stamped Warrants:** 37,311.75



AUDIT 291269

January 31, 2020  
Folder: 03038-93

**HARDIN COUNTY DRAINAGE DISTRICT 25**

c/o Lee O. Gallentine, PLS & PE  
Clapsaddle-Garber Associates, Inc. (CGA)  
739 Park Avenue  
Ackley, Iowa 50601

RE: Proposed 18.0 Inch Encased Water – Drainage District Tile Pipeline Crossing at Mile Post 124.61, on the Mason City Subdivision at or near Garden City, Hardin County, Iowa.

Lee Gallentine:

This will acknowledge receipt of the following documentation relating to your intent to construct a pipeline crossing under Union Pacific Railroad Company's tracks and right of way at Mile Post 124.61 on the Mason City Subdivision, at or near Garden City, Hardin County, Iowa:

- Notice of Intent to construct
- Specification Exhibit A
- The \$750.00 License Fee. (If applicable)

This letter replaces the previous correspondence, dated October 30, 2018, as the crossing will hereby be shifted roughly 80 feet to the south, and the casing and carrier pipe sizes will be increased, as described in the attached Exhibit A.

You are required to comply with Iowa Code Section 476.27 and 199 IAC Chapter 42, including but not limited to, providing Union Pacific Railroad Company with written notice at least ten days prior to your commencing any construction, maintenance or repair of your facilities on Union Pacific's right of way. Please, contact the following parties directly before commencing any work on Railroad property:

**Railpros Flagging**  
[up.info@railpros.com](mailto:up.info@railpros.com)  
(877) 315-0513 x 116

**Zachery L. Chaney**  
MGR I SIGNAL MNTCE  
Phone: 402-690-8287  
[zlchaney@up.com](mailto:zlchaney@up.com)



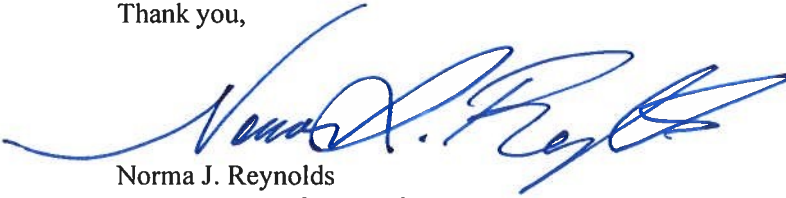
The Railroad Company has authorized the installation of fiber optic cable facilities on its property in certain areas. Prior to commencing any work on the Railroad Company's property, you should contact the Railroad Company at **1-800-336-9193** to **determine if a fiber optic cable is buried on the subject property**. Telephone numbers are provided for your convenience, and not as a substitute for written notice.

The Railroad Company requires Utility to provide monitoring of tracks and construction observation through Licensor approved observer named below during all construction and installation work. Licensee is to directly coordinate services with the named inspector:

**Railpros Field Services**  
**Email: [RP.Utility@railpros.com](mailto:RP.Utility@railpros.com)**  
**Phone (682)223-5271**

If you have any questions, comments, or concerns, please feel free to reach out to me, via email at [njreynolds@up.com](mailto:njreynolds@up.com), or via phone at (402) 544-8571.

Thank you,

A handwritten signature in blue ink, appearing to read 'Norma J. Reynolds', with a long, sweeping underline that extends to the left.

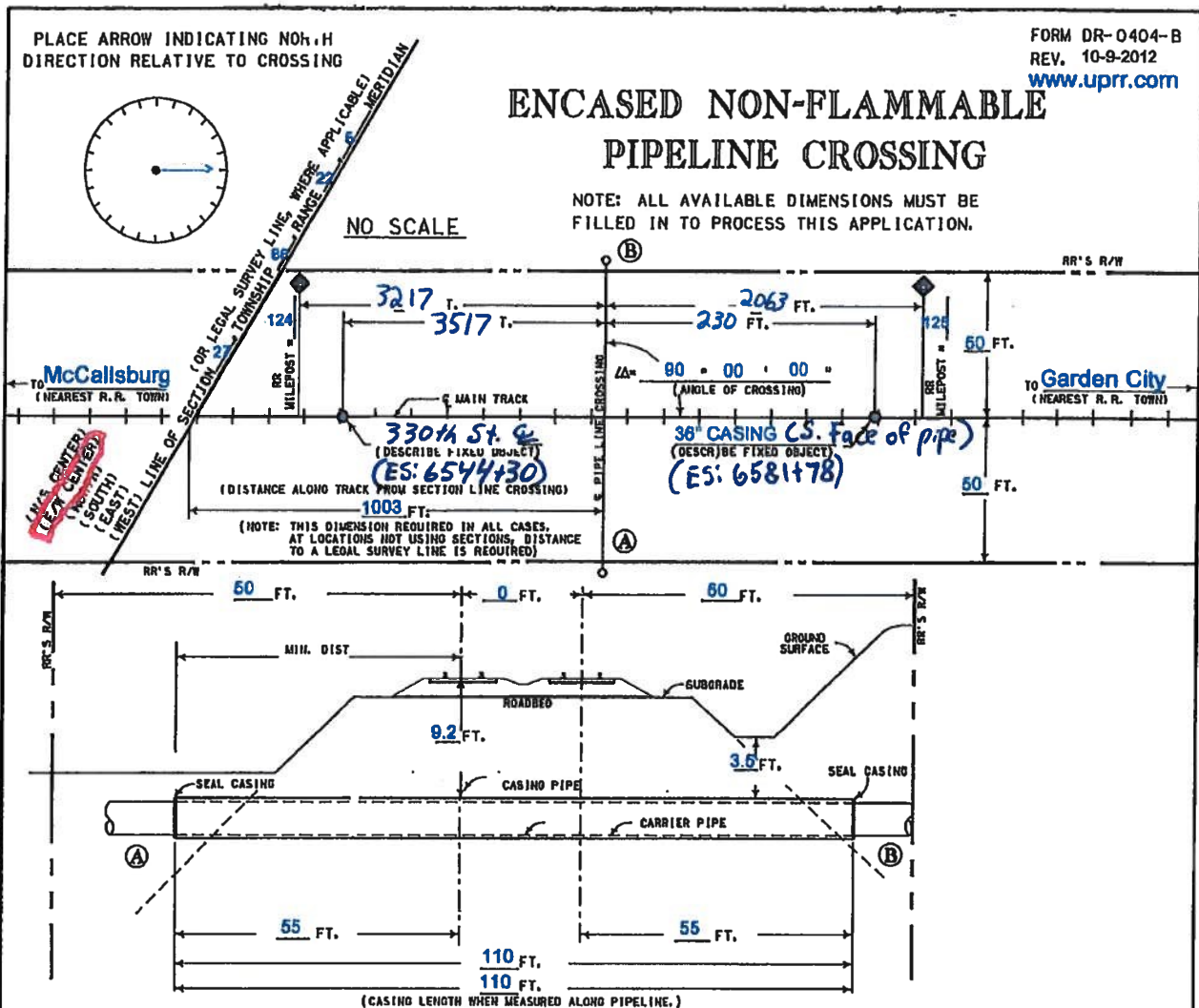
Norma J. Reynolds  
*Manager II Real Estate Contracts*

PLACE ARROW INDICATING NORTH DIRECTION RELATIVE TO CROSSING

FORM DR-0404-B  
REV. 10-9-2012  
www.uprr.com

# ENCASED NON-FLAMMABLE PIPELINE CROSSING

NOTE: ALL AVAILABLE DIMENSIONS MUST BE FILLED IN TO PROCESS THIS APPLICATION.



LAT: 42.233788°  
LNG: 93.395368°  
UPRR SUBDIVISION NAME: MASON CITY SUBDIVISION

NOTE: REFER TO AREMA VOLUME 1 PART 8 FOR REQUIREMENT RELATING TO PIPELINE CROSSINGS.

- A) IS PIPELINE CROSSING WITHIN DEDICATED STREET? YES;  NO;
- B) IF YES, NAME OF STREET NA.
- D) DISTRIBUTION LINE  OR TRANSMISSION LINE \_\_\_\_\_
- C) CARRIER PIPE :  
COMMODITY TO BE CONVEYED WATER - DRAINAGE DISTRICT TILE  
OPERATING PRESSURE 0 PSI  
WALL THICKNESS 0.41"; DIAMETER 18" ID; MATERIAL D.I.P.;
- E) CASING PIPE :  
WALL THICKNESS 0.46875; DIAMETER 29.06" ID; MATERIAL STEEL;  
NOTE: CASING MUST HAVE 2" CLEARANCE BETWEEN GREATEST OUTSIDE DIAMETER OF CARRIER PIPE AND INTERIOR DIAMETER OF CASING PIPE. WHEN FURNISHING DIMENSIONS, GIVE OUTSIDE OF CARRIER PIPE AND INSIDE OF CASING PIPE.
- F) METHOD OF INSTALLING CASING PIPE UNDER TRACK(S):  
 DRY BORE AND JACK (WET BORE NOT PERMITTED);  
\_\_\_\_ TUNNEL; OTHER \_\_\_\_\_
- G) WILL CONSTRUCTION BE BY AN OUTSIDE CONTRACTOR?  YES; \_\_\_\_\_ NO;
- H) DISTANCE FROM CENTER LINE OF TRACK TO NEAR FACE OF BORING AND JACKING PITS WHEN MEASURED AT RIGHT ANGLES TO TRACK. 65 (30" MIN.)
- I) APPLICANT HAS CONTACTED 1-800-336-9193, U. P. COMMUNICATION DEPARTMENT, AND HAS DETERMINED FIBER OPTIC CABLE  DOES; \_\_\_\_\_ DOES NOT; EXIST IN VICINITY OF WORK TO BE PERFORMED. TICKET NO. 2017-0208-022

**EXHIBIT "A"**  
(FOR RAILROAD USE ONLY)

UNION PACIFIC RAILROAD CO.  
Mason City Sub.  
(SUBDIVISION)

M. P. 124.61 — E. S. 6579+47

ENCASED \_\_\_\_\_ CROSSING AT  
Garden City Hardin IA  
(NEAREST CITY) (COUNTY) (STATE)

Hardin County Drainage District 25  
(APPLICANT)

RR FILE NO. 3038-93 DATE 1-28-2020

**WARNING**  
IN ALL OCCASIONS, U. P. COMMUNICATIONS DEPARTMENT MUST BE CONTACTED IN ADVANCE OF ANY WORK TO DETERMINE EXISTENCE AND LOCATION OF FIBER OPTIC CABLE.  
PHONE 1 1-800-336-9193



# Drainage Work Order Request For Repair

## Hardin County

Date: 10/11/2019

Work Order #: WO00000274

Drainage District: DDs\DD 48 (51072)

Sec-Twp-Rge: \_\_\_\_\_ Qtr Sec: \_\_\_\_\_

Location/GIS: 88-21-08-200-004

Requested By: Larry Dougan

Contact Phone: (641) 640-0536

Contact Email: \_\_\_\_\_

Landowner (if different): \_\_\_\_\_

Description: DD 48 Larry Dougan came in to report the open ditch is meandering from current track into field, and requested repair. Asked to be contacted by Engineer when looking at ditch. See work order 151 attached.

Repair labor, materials and equipment \_\_\_\_\_

Repaired By: \_\_\_\_\_ Date: \_\_\_\_\_

Please reference work order # and send statement for services to: Hardin County Auditor's Office  
Attn: Drainage Clerk  
1215 Edgington Ave, Suite 1  
Eldora, IA 50627  
Phone (641) 939-8111  
Fax (641) 939-8245

For Office Use Only

Approved: \_\_\_\_\_ Date: \_\_\_\_\_



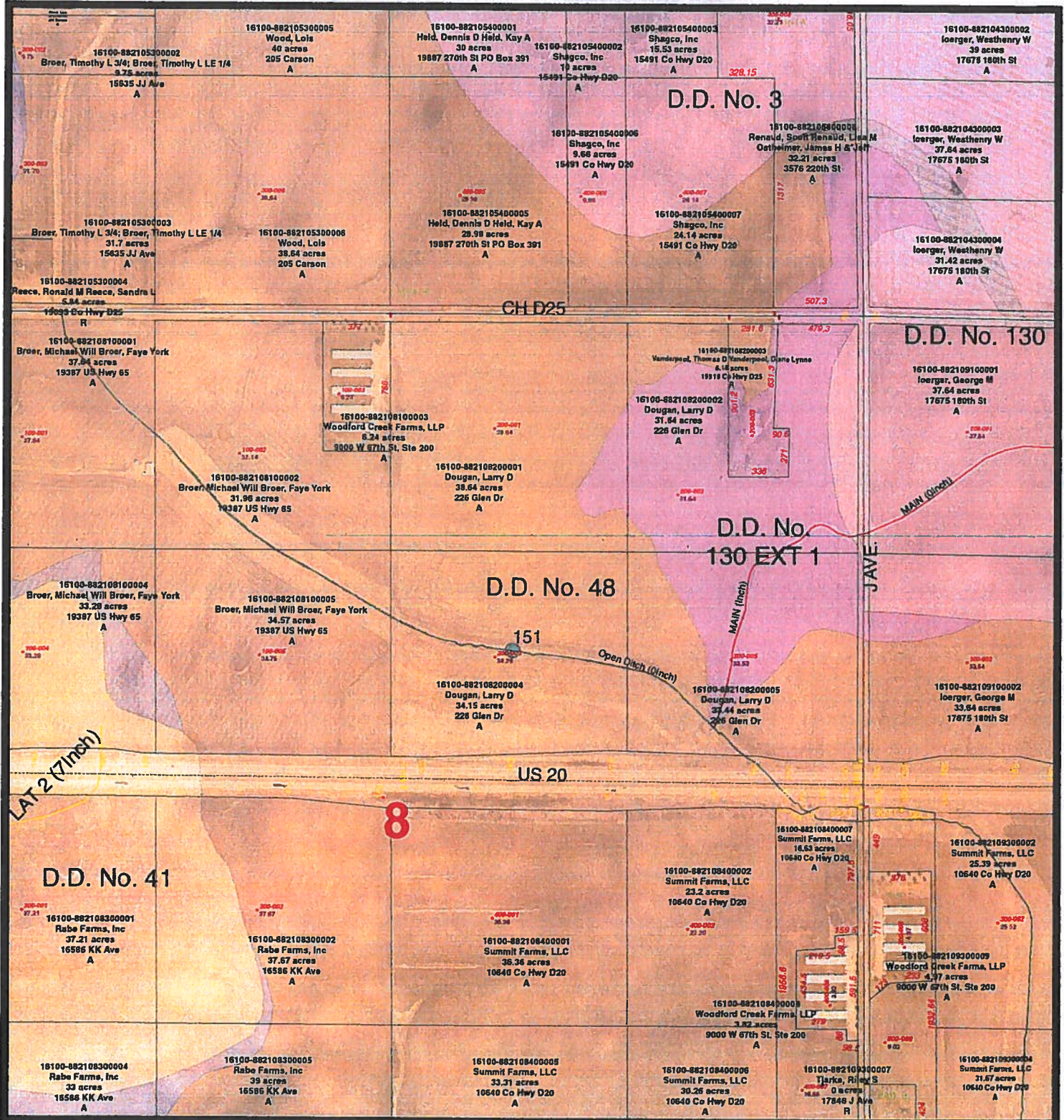
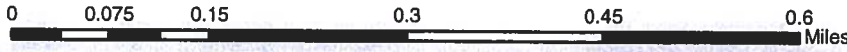
### Drainage Tiles

- Lateral
- Main
- Open Ditch
- Private Tile

# Hardin County Auditor's Office



Date: 10/11/2019



The Data is provided "as is" without warranty or any representation of accuracy, timeliness or completeness. The burden for determining accuracy, completeness, timeliness, merchantability and fitness for or the appropriateness for use rests solely on the requester. Hardin County makes no warranties, express or implied is to the use of the Data. There are no implied warranties of merchantability or fitness for a particular purpose. The requester acknowledges and accepts the limitations of the Data, including the fact that the Data is dynamic and is in a constant state of maintenance, correction and update. Cadastral Data represents land ownership, but does not define it. This Data does not replace a legal survey.



# Drainage Work Order Detail

## Hardin County

Date 8/11/2016 Project # 6486.1 Work Order # 151  
 District # 48 Lateral Open Ditch Fund # 51072  
 Township Ellis Section 8 Twp 88 Rge 21 Qtr Sec NE1/4  
 Repair Requested By Larry Dougan (641) 640-0536  
 Landowner Larry Dougan

Problem Description When ditch was cleaned out approx 10 years ago, all culverts were replaced but on in the SW NE Section 8. Is gone now and back into the field. Landowner requests to fix when crops are out. Does not want fixed if not district expense.

### Payments

Date	Vendor	Amount	Description
5/26/2017	WILLIAMS EXC	\$4,409.00	OUTLETS/SURF DRAINS
7/14/2017	RYKEN	\$2,116.00	ENG SVCS TD REPAIR
		\$0.00	
		\$0.00	
		\$0.00	
		\$0.00	
		\$0.00	
		\$0.00	
		\$0.00	

### Comments

- 8/17/16-BOS approve once crops are out. DD usually pays to help keep banks from eroding. Hire contractor via lottery system.
- 10/25/16-Larry called. Corn is out & culverts can be replaced now. Wants to go w/Eng when goes to look at. Emailed Lee.
- 11/8-Larry called. Someone came out. One outlet tile is completely gone (south side on east end of farm). If come back out to look at there is another tile only 6" below ground that he has concerns about.
- 11/9-Lee says no in county contractors available. BOS ok'd out of county contractors for outstanding work.
- 2/17/17-Not able to find contractors. Will try again this Spring after thaw.
- 3/7/17-Surface drain was never installed and is now eroding away. Approx 500' east from the drain that has eroded away.
- 3/8-BOS ok new surface drain to be part of repair proj. (3/9-Called Larry to let him know.)
- 3/15/17-Waiting for Winters to submit all req'd paperwork.
- 3/29/17-Lee to research if surface drain or outlet that needs to installed. Ldowners pay for outlets.
- 6/8/17-Repair Summ: Identified other surface drains & tile outlets in similar condition. If left unrepaired, will lead to erosion of banks & siltation in ditch. BOS agree no action as no ldowner complaints.

## Drainage District:

#48

### Investigation Summary:

- Landowner in the SW¼ NE¼ of Section 8, Township 88 North, Range 21 West reported the Main open ditch meandering within the Main open ditch channel.
- Visual observation found a portion of the Main open ditch in the area described by the landowner with sloughed/eroded banks, meandering channel, and possible siltation. There are also areas found to have the spoil bank washed away where overland water flow (from the field side of the Main open ditch) has concentrated enough to do so.

### Contractor Time and Materials (spent while CGA was on-site):

None recorded as only visual observation was performed.

### Additional Actions Recommended:

It is unclear if the issues encountered in the observation area are widespread along the entire length of the Main open ditch or not. Authorization of a larger scale study by the District Trustees would be necessary to determine this. Regardless of the extent of the issue, a repair is needed to the area observed.

If the issue does appear to be widespread along the district Main open ditch, an Engineer's Report and hearing would be necessary. If limited to the area observed, the costs of the repairs may be small enough that the work could be done by in-county contractors through the lottery system. However, CGA recommends a widespread observation be conducted to ascertain the condition of the entire Main open ditch as a whole before proceeding with a small-scale repair.



# Inspector's Project Diary

<b>Project:</b> Hardin County Drainage District <u>48</u>			
<b>CGA PN:</b> <u>6486.5</u> <u>0048</u>		<b>Days Charged:</b>	<b>Report No.</b>
<b>Contractor:</b>		<b>Date:</b> <u>11/11/19</u>	
<b>Superintendent:</b>	<b>Weather Conditions:</b> <u>Clear, Windy, Cold</u>	<b>Precip.:</b> <u>2" Snow</u>	<b>Temp. Hi:</b> <u>17</u> ° <b>Temp. Low:</b> <u>10</u> °
<b>INSPECTOR:</b> Time Arrived: <u>11:35 A.M.</u> Time Left:		<b>Contractor:</b> Time Arrived:    Time Left:	
<p>1. General Remarks and Work Accomplished:</p> <p>ARRIVED @ JOB SITE IN LARRY DUGAN'S FIELD, LARRY IS GOING TO MEET @ FIELD DRIVE OF HARVESTED FIELD CORN. 11:45, LARRY ARRIVED AND WE DROVE TO S.W. TO OPEN DITCH, FOUND VARIOUS PLACES WHERE SLOUGHS CAUSED BY THROWING CURTING WITHIN OPEN DITCH BOUNDARY. THESE COULD BE FIXED ON A INDIVIDUAL BASIS BUT THE WHOLE OPEN DITCH IS FULL OF DIRT AND NEEDS A CLEAN OUT. ALSO A SURF DRAIN TUBE IS NEEDED NEXT TO DOT P/W IN A TOP BANK WASH-OUT. 3" SLOUGHS NEED REPAIRED AND 1 SURF WASH-OUT. N. DITCH OF HWY 20 ALSO NEEDS CLEANED @ BOX CULVERT.</p> <div style="text-align: center;"> </div>			
<p>2. Changes or Extra Work Ordered:</p> <div style="text-align: center;"> </div>			
<p>3. Test Samples Taken:</p>			
<p>4. Visitors to Site:</p>			
<p>5. Other Work Crews or Project (utilities, subcontractors, etc.) and Work Done:</p>			
<p>6. Attachments (total sheets attached <u>0</u>):</p>			

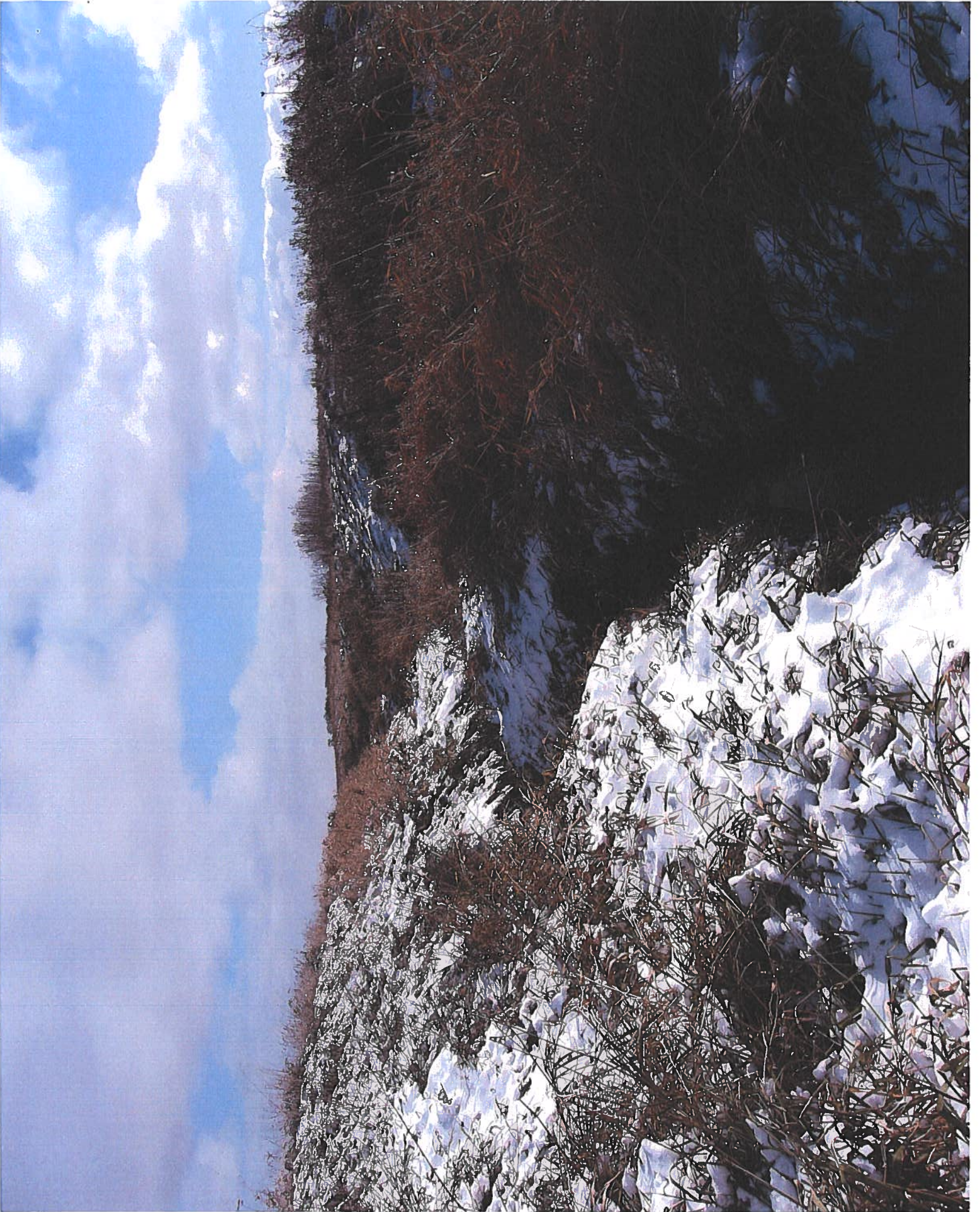
0048 OPEN DITCH















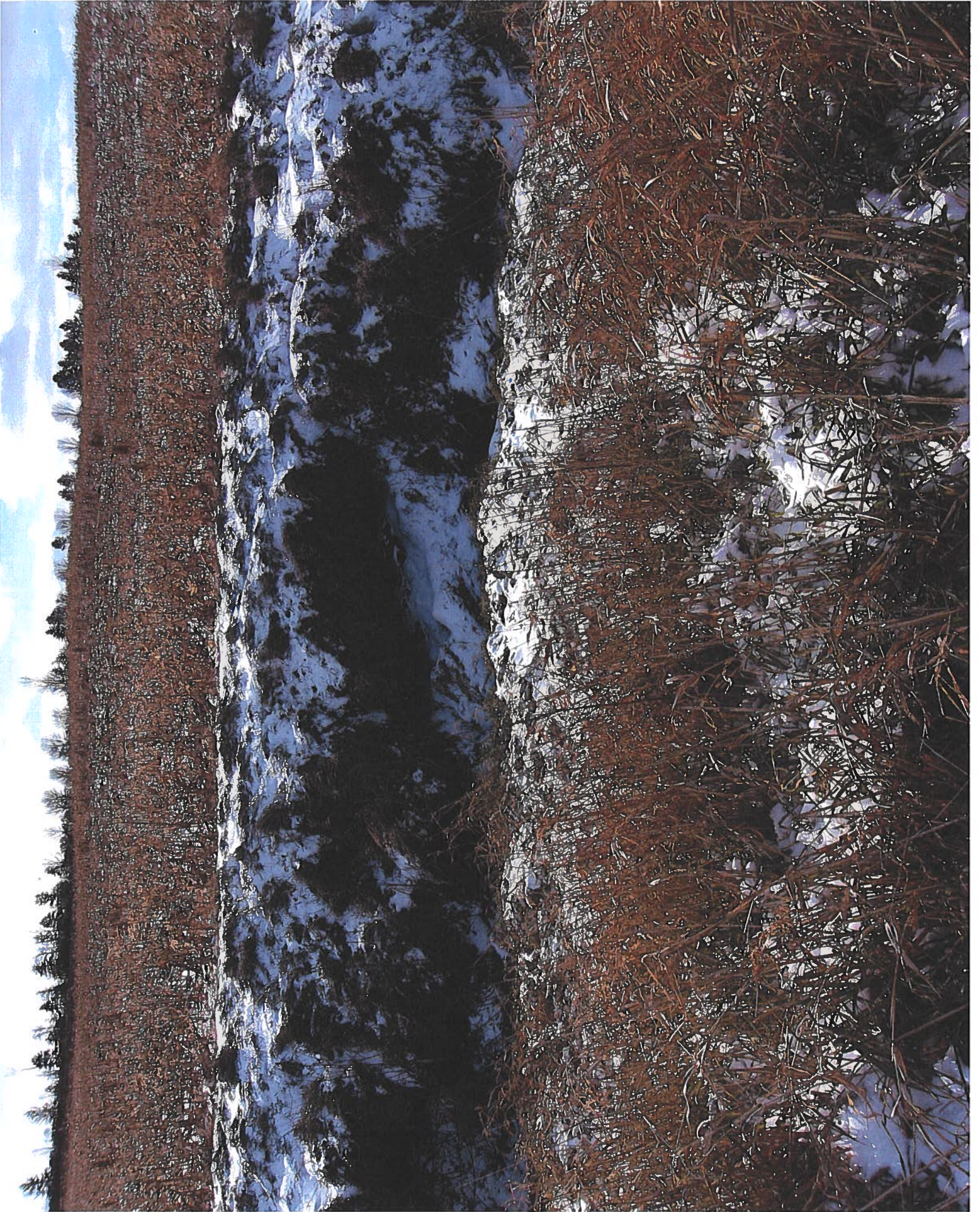
Looking W. @ D.O.T. Hwy 20 R/W

















# Drainage Work Order Request For Repair

## Hardin County

**Date:** 8/9/2018

**Work Order #:** WO00000224

**Drainage District:** Drainage Districts \DD 55-3 (51085)\DD 55-3 Lat 9(5124

**Sec-Twp-Rge:** 01-86-20      **Qtr Sec:** NE1/4

**Location/GIS:** 86-22-01-200-001

**Requested By:** Randy Dubberke

**Contact Phone:** (641) 864-3388

**Contact Email:** randeb@netins.net

**Landowner (if different):** RanShell, LLC

**Description:** Outlet seems plugged and land from NE1/4 Section 2 & NW1/4 Section 1 (outside district boundaries but draining into DD) overflowing land in NE1/4 Section 1 to get to ditch lying east of H Avenue.

**Repair labor, materials and equipment:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

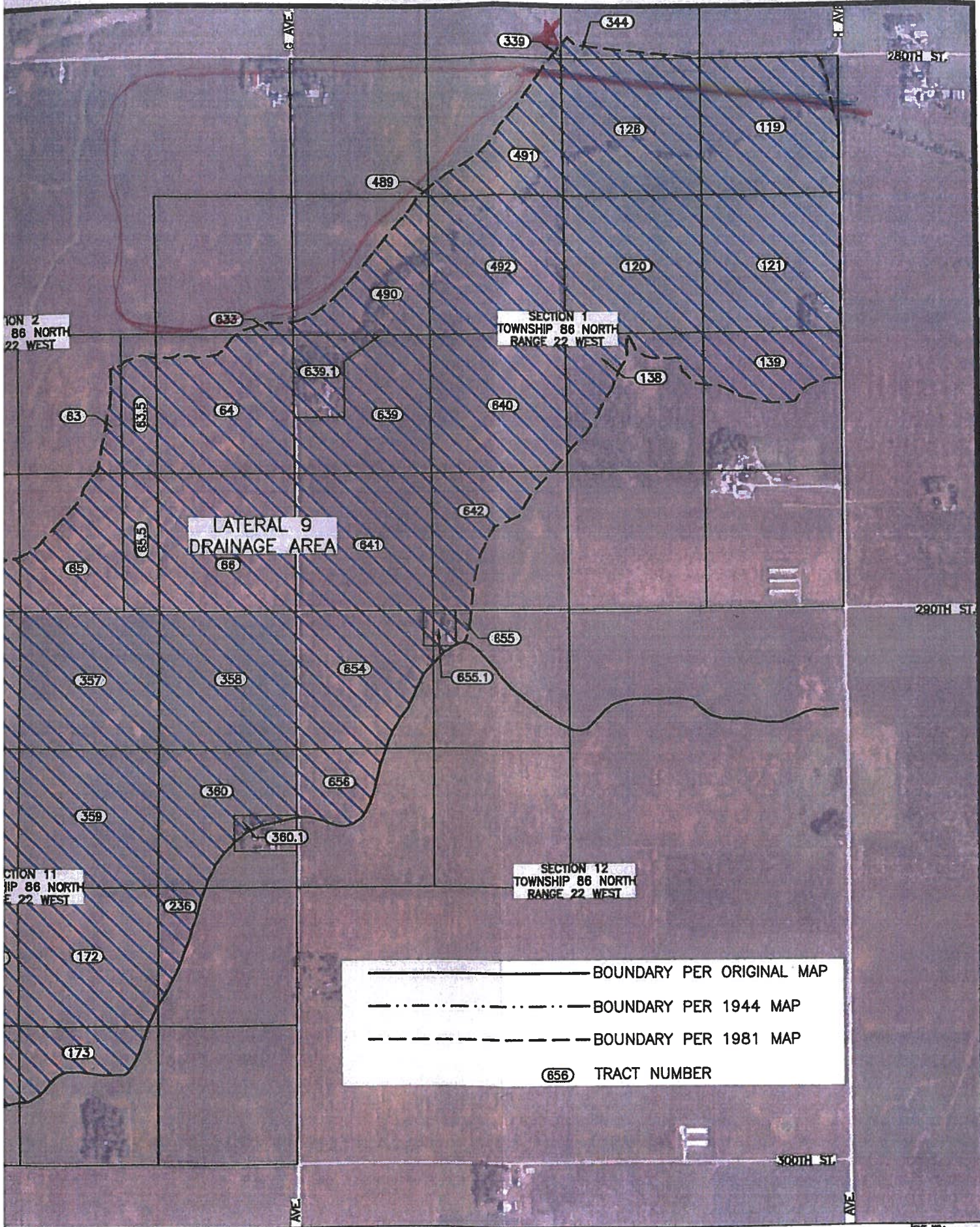
**Repaired By:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Please reference work order # and send statement for services to:**

Hardin County Auditor's Office  
Attn: Drainage Clerk  
1215 Edgington Ave, Suite 1  
Eldora, IA 50627  
Phone (641) 939-8111  
Fax (641) 939-8245

For Office Use Only

**Approved:** \_\_\_\_\_ **Date:** \_\_\_\_\_



LATERAL 9  
DRAINAGE AREA

SECTION 1  
TOWNSHIP 86 NORTH  
RANGE 22 WEST

SECTION 12  
TOWNSHIP 86 NORTH  
RANGE 22 WEST

SECTION 2  
TOWNSHIP 86 NORTH  
RANGE 22 WEST

SECTION 11  
TOWNSHIP 86 NORTH  
RANGE 22 WEST

— BOUNDARY PER ORIGINAL MAP  
 - - - BOUNDARY PER 1944 MAP  
 - - - BOUNDARY PER 1981 MAP  
 (656) TRACT NUMBER



## Drainage District:

#55 – Division 3 – Lateral 9

## Repair Summary:

- Per the recommended actions of the Investigation Summary, the District Trustees directed replacement of the Lateral 9 tile and outlet along with removal of trees in the vicinity of the same in the NE¼ NW¼ Section 1, Township 86 North, Range 22 West and the SE¼ SW¼ Section 36, Township 87 North Range 22 West.
- Repair began with locating the existing Lateral 9 tile through the wooded area leading to the outlet as well as the fiberoptic cable that was crossed during the repair.
- Trees and woody brush within the vicinity of the tile repair were cut down and stumps removed. Woody brush and branches were burned on-site with the permission of the landowner, while stumps were trailered off-site. Concrete and stone revetment at the outlet were also removed and set aside for reuse. Note, CGA was not on-site full time for this portion of the repair, and the associated time is not included on the Time and Materials tabulation.
- Began removal of the tile with the rusted 12-inch CMP outlet, removing the tile in an upstream direction. During this excavation, encountered tile that varied in size between 10-inches and 12-inches, and varied in material between collapsing VCP, rusty CMP, and concrete. Varying grades were also encountered during excavation, with a sag being found in one point. Before road was excavated, an excavation was made on the south side of 280<sup>th</sup> Street to plug upstream tile for the replacement of said tile, and said excavation quickly filled with water. Water was pumped from the south excavation until roots were removed from tile and the backed-up water quickly drained. Continued replacement through the road.
- Repair of the Lateral 9 tile consisted of a rock bedding, 12-inch polypropylene tile (installed at a consistent grade), and rock backfill to the top of the tile. At the outlet, a 20-foot section of 15-inch CMP with an HDPE anti-seep collar was installed. Within the roadway, the repair excavation was fully backfilled with road stone, which was then compacted in-place with a jumping jack compactor. At upstream end of replacement, factory 10x12-inch reducer was installed with an external/internal coupler between the 10-inch concrete tile and new 12-inch polypropylene tile. ¾ concrete collars were installed at the connection to the original upstream tile as well as the connection between the polypropylene and CMP outlet. A hole was found in the 8-inch concrete Lat 9 tile upstream of the repair during work. Said hole was excavated and fixed with a ¾ concrete collar.
- All excavations were filled with on-site soil (with the exception of the roadway).

## Contractor Time and Materials (spent while CGA was on-site):

See attached Tabulated Contractor Time and Materials Sheet.

## Additional Actions Recommended:

1. The excavations were filled with loose on-site soil, then topped with frozen pieces of on-site soil. CGA recommends checking this soil after the spring thaw to determine if grading of said soil, or importing additional soil, will be necessary.
2. The contractor set aside concrete pieces and rocks for future use as revetment around the new CMP outlet. This was not installed while CGA was on-site. It will need to be verified with the contractor to have been installed to prevent future erosion around the CMP outlet.
3. Monitor area for additional tree growth to prevent root intrusion again.
4. Verify with landowners that they will fill any of their exploratory excavations that are still open.



## Tabulated Contractor Time and Materials

Date	Totals	12/10/2019	1/3/2020	1/6/2020	1/7/2020	1/8/2020
Workman (hrs)	69	2	18	19 1/2	20 1/2	9
Mini Excavator (hrs)	33 1/4		9	9 1/2	10 1/4	4 1/2
Excavator (hrs)	2	2				
Skid Loader (hrs)	33 1/4		9	9 1/2	10 1/4	4 1/2
Water Pump (hrs.)	1/2		1/2			
Chainsaw (hrs.)	9		9			
12" Non-Perforated Polypropylene Tile (ft.)	94				94	
10" HDPE external/internal coupler (ea.)	1				1	
12"x10" HDPE Reducer (ea.)	1				1	
Concrete Collars	Yes					
Rock Bedding	Yes				3	
Anti-Seep collar (ea.)	1					1
Loads of Road Stone (ea.)	2					2
15" CMP Tile (ft.)	20					20





NO.	REVISION	BY	DATE	NO.	REVISION	BY	DATE

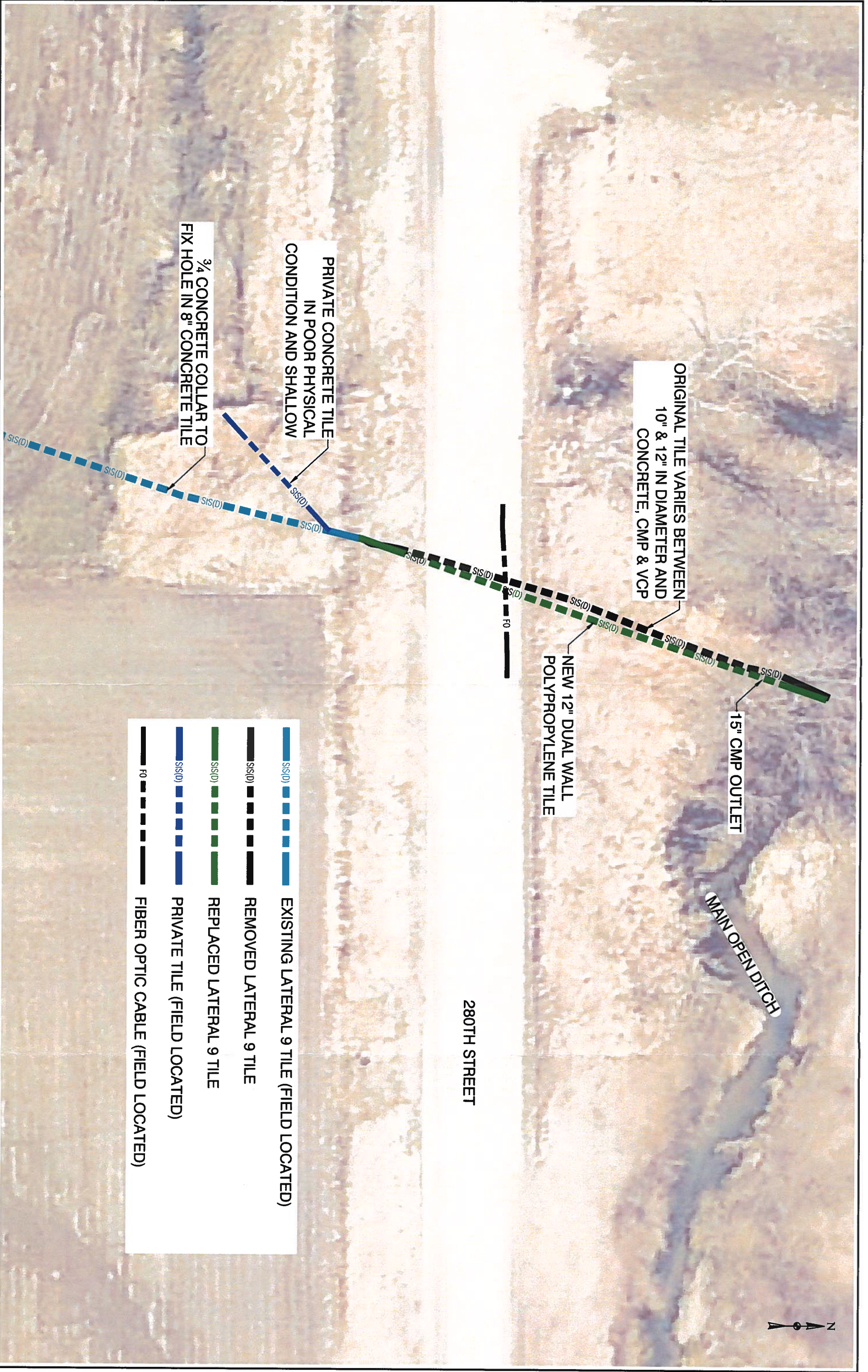







DESIGNED	DATE	DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
JMS	10/12/2020	JMS	10/12/2020	JMS	10/12/2020	JMS	10/12/2020

**D.D. 55 DIV 3 LAT 9**  
HARDIN COUNTY, IOWA

**LATERAL 9 REPAIR**

PROJECT NO. 0636.6  
SHEET NO. 1 OF 1



	EXISTING LATERAL 9 TILE (FIELD LOCATED)
	REMOVED LATERAL 9 TILE
	REPLACED LATERAL 9 TILE
	PRIVATE TILE (FIELD LOCATED)
	FIBER OPTIC CABLE (FIELD LOCATED)

ORIGINAL TILE VARIES BETWEEN 10" & 12" IN DIAMETER AND CONCRETE, CMP & VCP

PRIVATE CONCRETE TILE IN POOR PHYSICAL CONDITION AND SHALLOW

3/4 CONCRETE COLLAR TO FIX HOLE IN 8" CONCRETE TILE

15" CMP OUTLET

NEW 12" DUAL WALL POLYPROPYLENE TILE

280TH STREET

MAIN OPEN DITCH



# Drainage Work Order Request For Repair Hardin County

Date 12/4/2017 Work Order # 201  
 District # 55-3 Lateral 12 Fund # 51085  
 Township Concord Section 3 Twp 86 Rge 22 Qtr Sec NW1/4

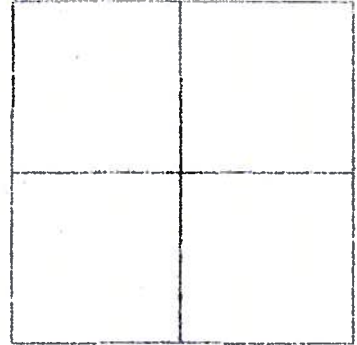
Repair Requested By Jerry Hindman  
 Address \_\_\_\_\_ Phone (515) 689-2761

Landowner Jerry Hindman  
 Address GIS 862203100002 Phone \_\_\_\_\_

Request Taken By Tina Schlemme

Available for Repair Now?  Yes Date Available \_\_\_\_\_

Problem Description Tile plugged in the RR ROW about 450' south of 280th Street.



Repair labor, materials and equipment \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Potential Wetlands?  Yes-Repair existing tile only  No-Repair and maintain tile

Repaired By: \_\_\_\_\_

Date: \_\_\_\_\_

Please send statement for services to:

Phone (641) 939-8111  
 Fax (641) 939-8245

Hardin County Auditor's Office  
 Attn: Tina Schlemme  
 1215 Edgington Ave, Suite 1  
 Eldora, IA 50627

For Office Use Only

Approved: \_\_\_\_\_ Date: \_\_\_\_\_



# Hardin County Auditor's Office

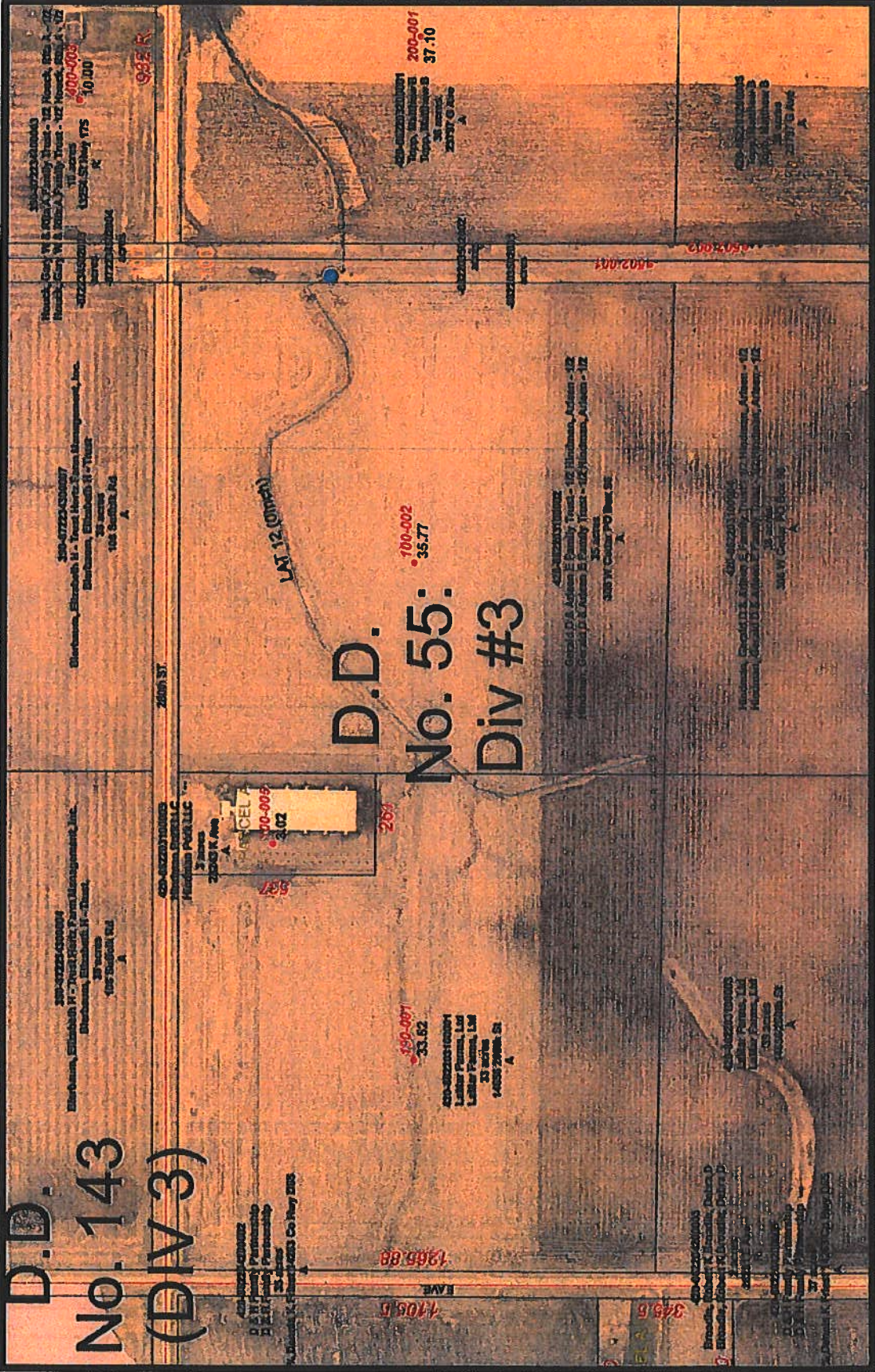


Date: 11/29/2017



## D.D. No. 143 (DIV 3)

## D.D. No. 55: Div #3



The Data is provided "as is" without warranty or any representation of accuracy, timeliness or completeness. The burden for determining accuracy, completeness, timeliness, merchantability and fitness for or the appropriateness for use rests solely on the requester. Hardin County makes no warranties, express or implied, as to the Data. There are no implied warranties of merchantability or fitness for a particular purpose. The requester acknowledges and accepts the limitations of the Data, including the fact that the Data is dynamic and is in a constant state of maintenance, correction and update. Collected Data represents land ownership, but does not define it. This Data does not replace a legal survey.

## Drainage District:

#55 – Division 3 – Lateral 12

## Investigation Summary:

- Per the recommended actions of the previous report, CGA was directed to facilitate investigation of the condition of the Lateral 12 tile on the west side of the tracks for a broader idea of the condition of the Lateral 12 tile.
- Excavated on the east side of the Railroad ROW and found 8-inch single wall HDPE Lateral 12 tile with approximately 2½-inches of mud and fine roots in the base, and approximately 5½-inches of slow-moving water (same as previous report). Single wall HDPE tile had north and south private tile connections.
- Excavated on west side of the Railroad ROW and found 8-inch VCP tile with roots visible downstream, along with north and south private tile connections intruding into the flow line of the single wall HDPE Lateral 12 tile shortly downstream.
- Attempted CCTV inspection. From east excavation, it was stopped by excessive sediment in the upstream direction. In the downstream inspection from the west excavation two intruding taps hampered, but did not stop, inspection of the tile. Said taps were found to have private single wall HDPE in each direction, and the tap to the southerly direction appeared to be crushed further upstream. Inspection was stopped shortly downstream due to a large root in the tile from trees on the west side of the railroad inside the railroad right of way. Details of said inspection are on the attached CCTV sheets.
- After CCTV, trees on west side were drilled and poisoned to prevent future root growth but left in place while CGA wasn't on-site. Exploratory excavations were left open.
- During visual observation, the railroad box culvert (not a district facility) was found to have structural issues beneath the tracks, with the roof of said culvert being gone.

## Contractor Time and Materials (spent while CGA was on-site):

See attached Tabulated Contractor Time and Materials Sheet.

## Additional Actions Recommended:

Given the findings of the previous investigation summary, and the findings of this recent investigation, it is apparent that root infiltration combined with excessive sediment are reducing the capacity of the Lateral 12 tile. What is not clear is if the presence of this sediment is an indication of a tile collapse in railroad right of way, or a slow accumulation due to the root infiltration taking place. However, the following actions are recommended:

- Inform the railroad regarding observed structural issues of the box culvert.
- Since the UPRR has historically not allowed jet cleaning of tile in their right of way, the only solution left is the construction of a new railroad tile crossing. The cost of this is well over \$50,000 and an Engineer's Report and hearing would be required.
- Direct the temporary repair of the excavations used for investigation. Permanent repairs may be initiated with the completion of a new railroad crossing.



## Tabulated Contractor Time and Materials

Date	Totals	12/4/2019	12/5/2019	12/11/2019
Workman (hrs)	12 1/2	3 1/2	4	5
Mini Excavator (hrs)	9	3 1/2	3	2 1/2
CCTV (hrs)	2 1/2			2 1/2
Jet Truck (hrs)	2			2

## Tabulated Defects

	Total	GPS #11012 UPSTREAM	GPS #11003 DOWNSTREAM
Total Length Televised (ft)	12	3	9
Date:		12/11/2019	12/11/2019
Light Roots (ft)	7	2	5
Heavy Roots (ft)	1	0	1
Sediment/Debris (ft)	11	2	9
Heavy Sediment/Debris (ft)	1	1	0
Taps (intruding) (#)	2	0	2
Offset Joint (#)	1	1	0
Soil/Voids Visible in Offset Joint (#)	1	1	0
Single Wall HDPE (non-deformed) (ft)	3	1	2

280TH STREET

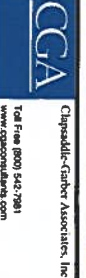
UNION PACIFIC RAILROAD



--- SIS(D) LATERAL 12 TILE (FIELD LOCATED)  
--- SIS(D) LATERAL 12 TILE (MAP LOCATED, APPROXIMATE)  
--- SIS(D) PRIVATE TILE (FIELD LOCATED)



NO.	REVISION	BY	DATE	NO.	REVISION	BY	DATE



DESIGNED	JOS	DATE	1/22/2020
DRAWN	JOS	DATE	1/22/2020
CHECKED	JOS	DATE	1/22/2020
APPROVED	JOS	DATE	1/22/2020

**D.D. 55 DIV 3 LAT 12**  
HARDIN CO., IOWA

LAT 12 FIELD INVESTIGATION

PROJECT NO.	06368_4
SHEET NO.	1 OF 1

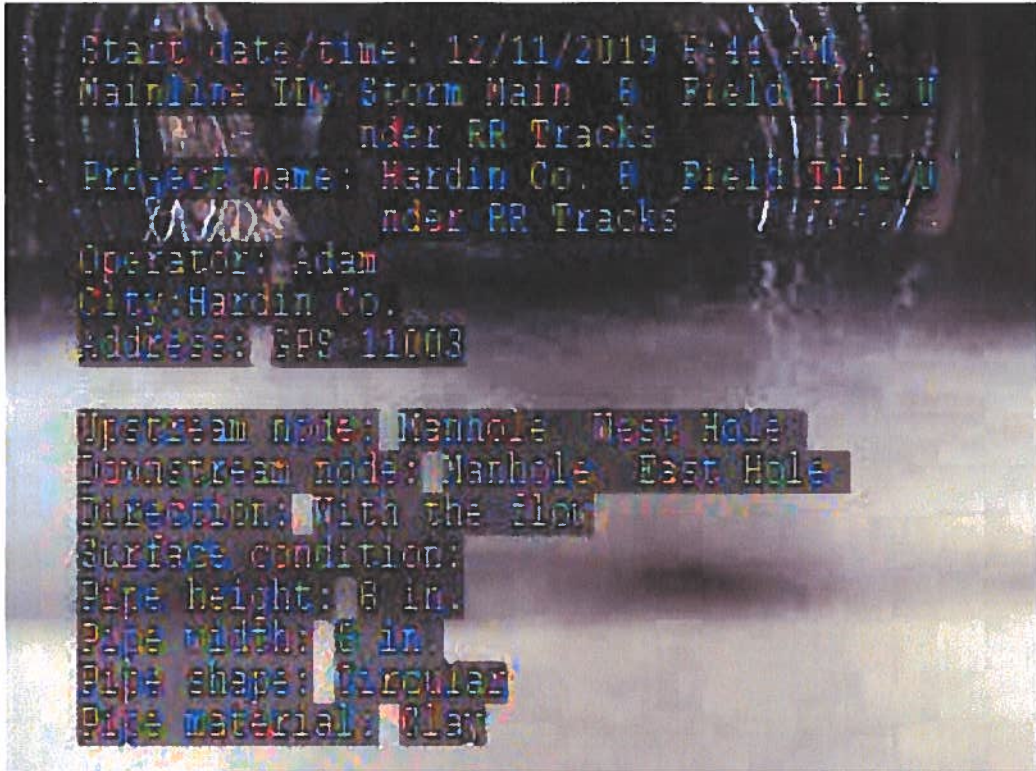


Figure 1: Insertion point GPS#11003, televising downstream.

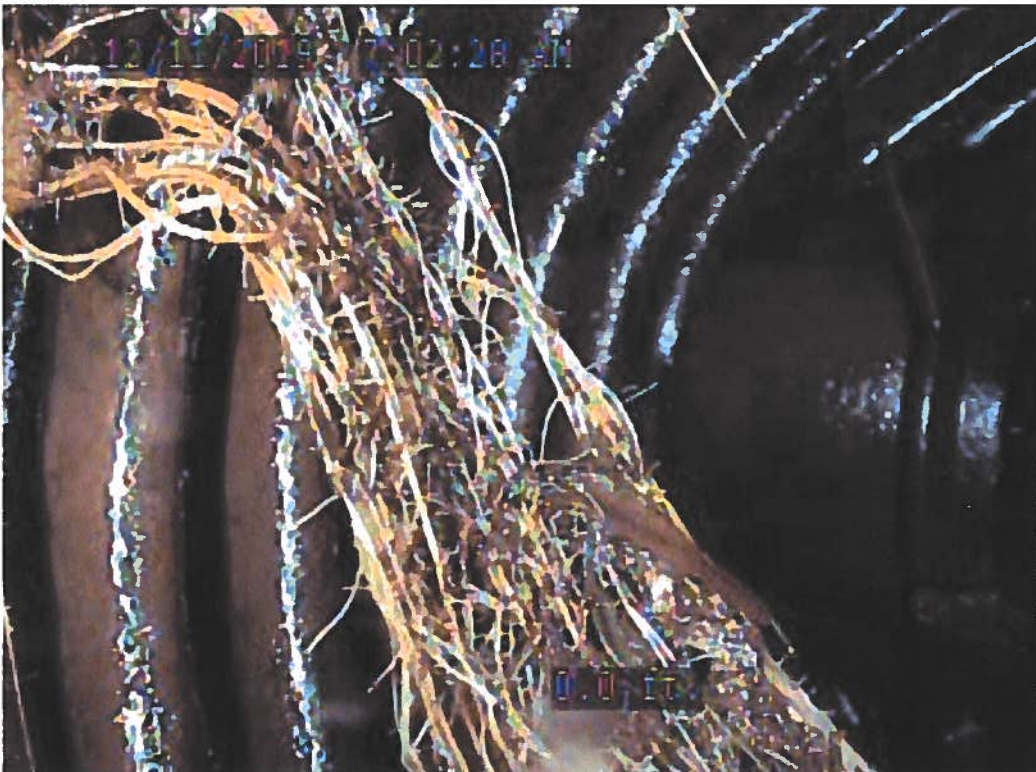


Figure 2: Roots infiltrating joint between VCP and single wall HDPE.



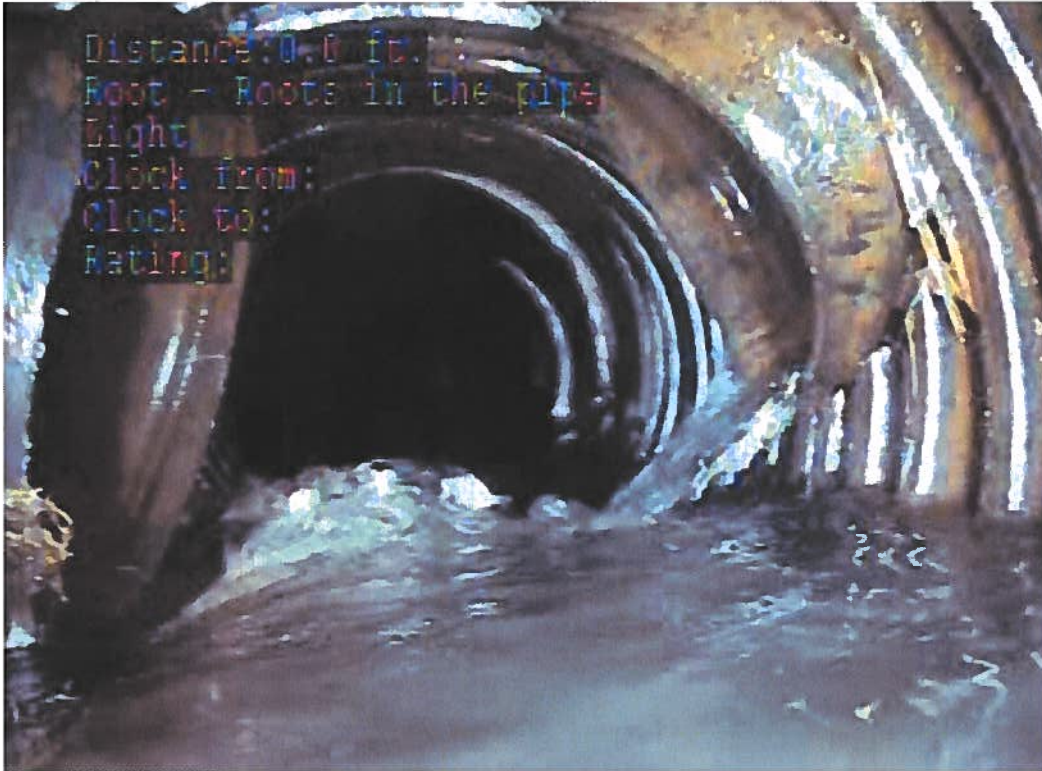


Figure 3: Two intruding taps.

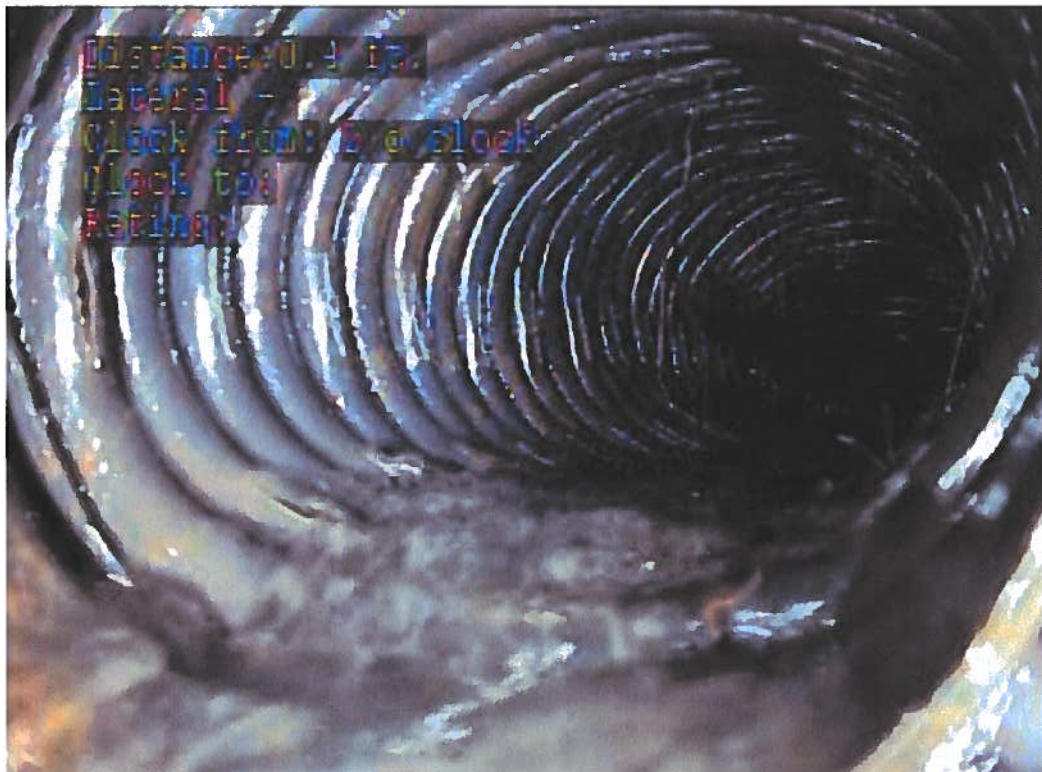


Figure 4: Tap from surface drain to south. Can be seen crushed further upstream.

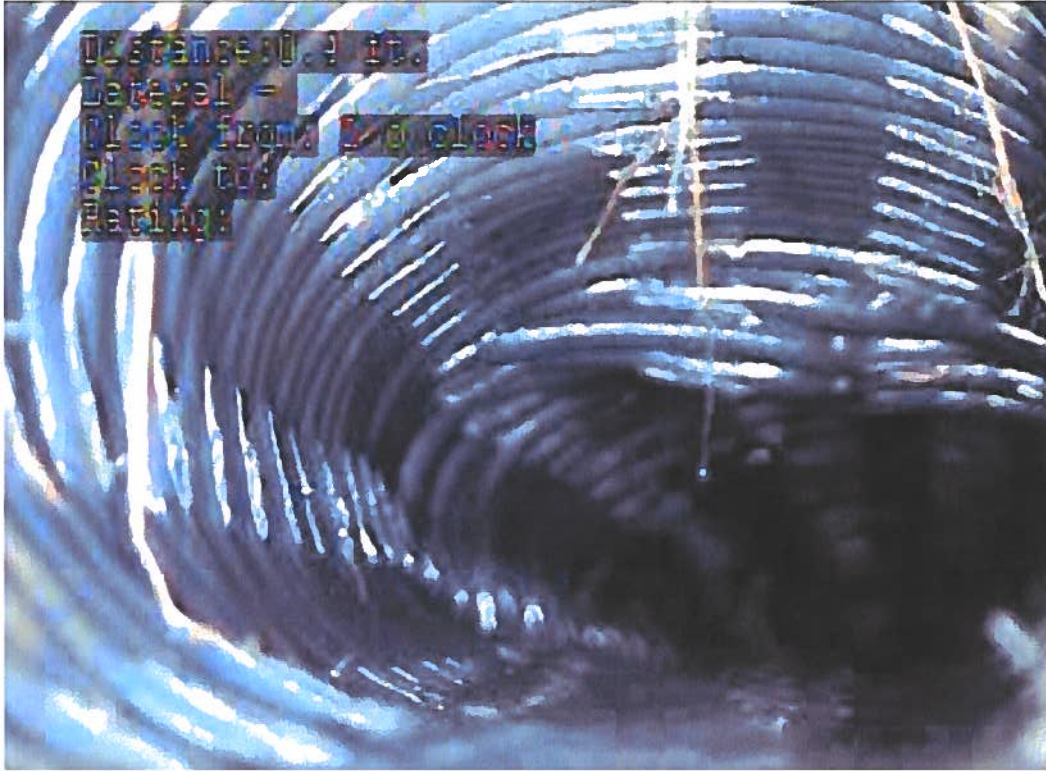


Figure 5: Tap from surface drain to south. Can be seen crushed further upstream.



Figure 6: Tap from unknown origin to the north.



Figure 7: Single wall HDPE to VCP.



Figure 8: Intermittent, light roots.



Figure 9: Intermittent roots.



Figure 10: VCP to single wall HDPE.

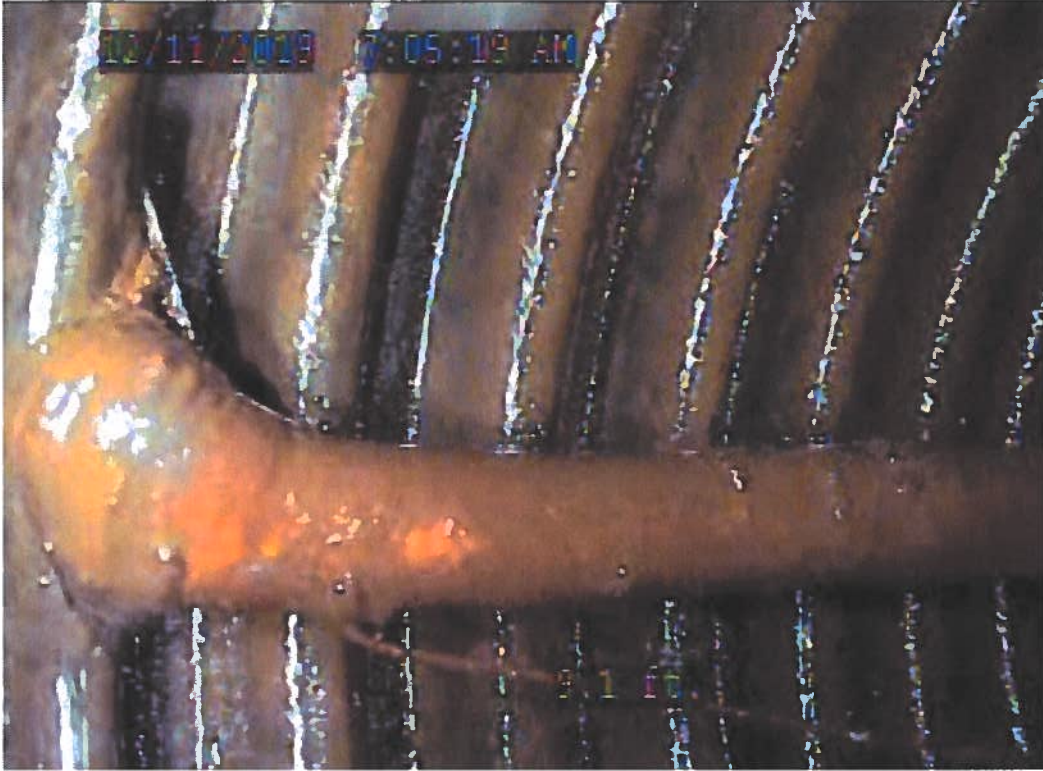


Figure 11: Large root infiltrating tile. Blocking progress of CCTV inspection, retaining sediment, and restricting flow of water.

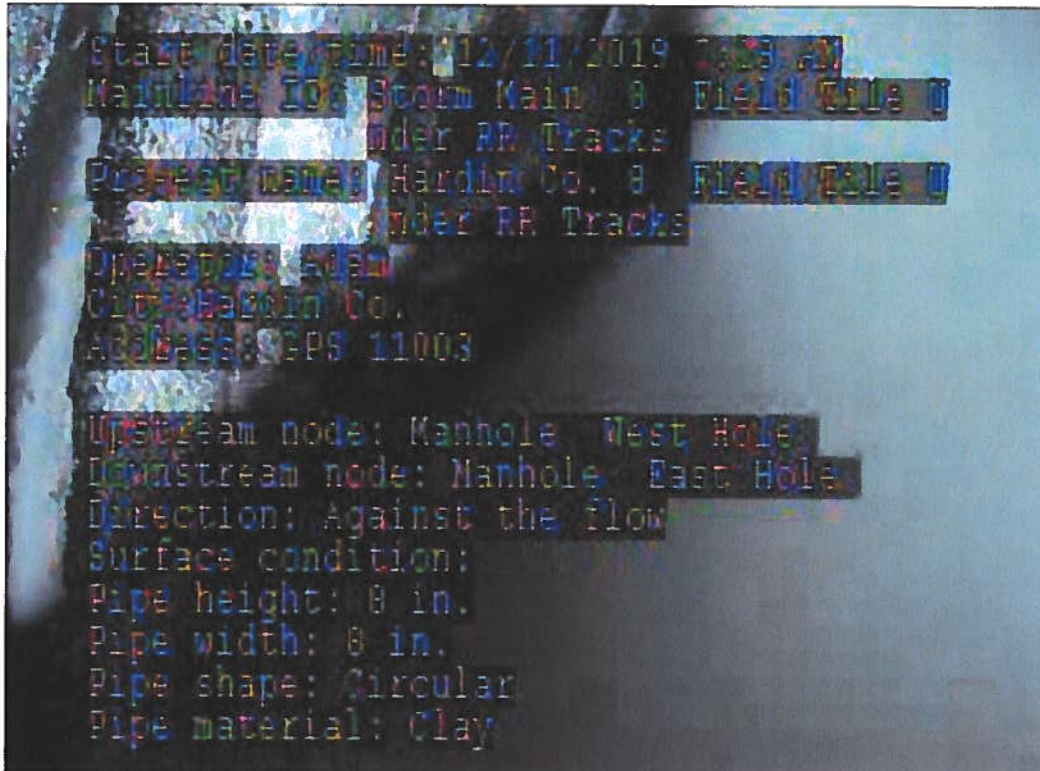


Figure 12: Insertion point GPS#11012, televising upstream.



Figure 13: Single wall HDPE to VCP. Joint misshapen.

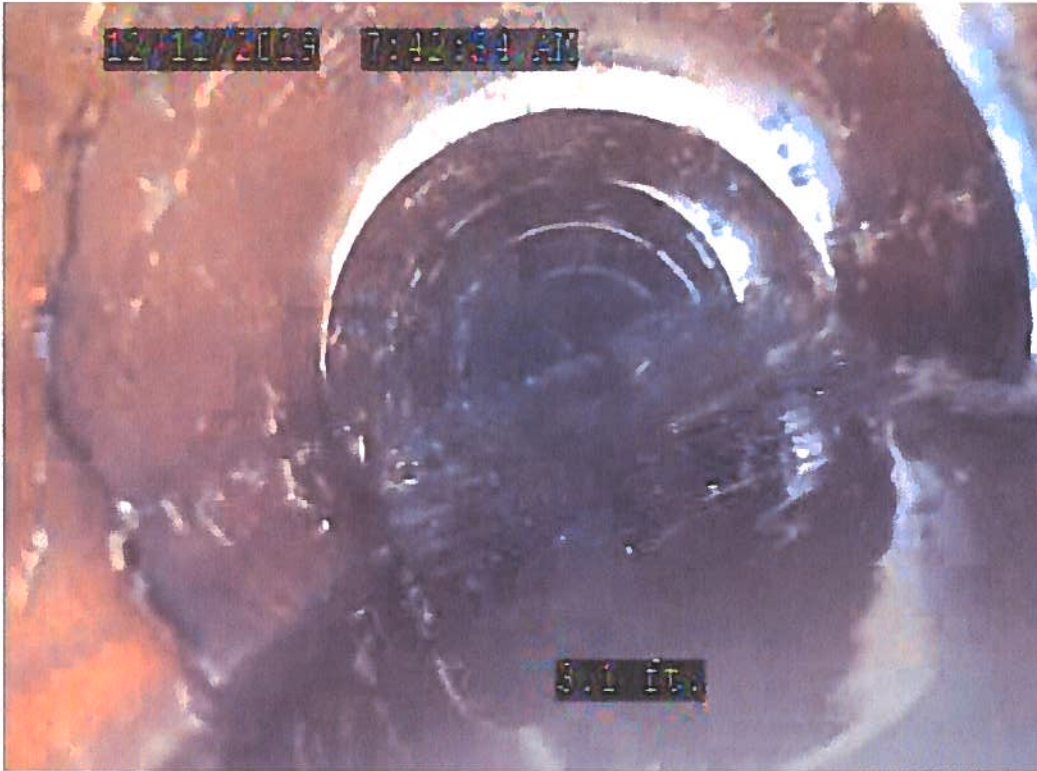


Figure 14: Heavy sediment visible ahead.

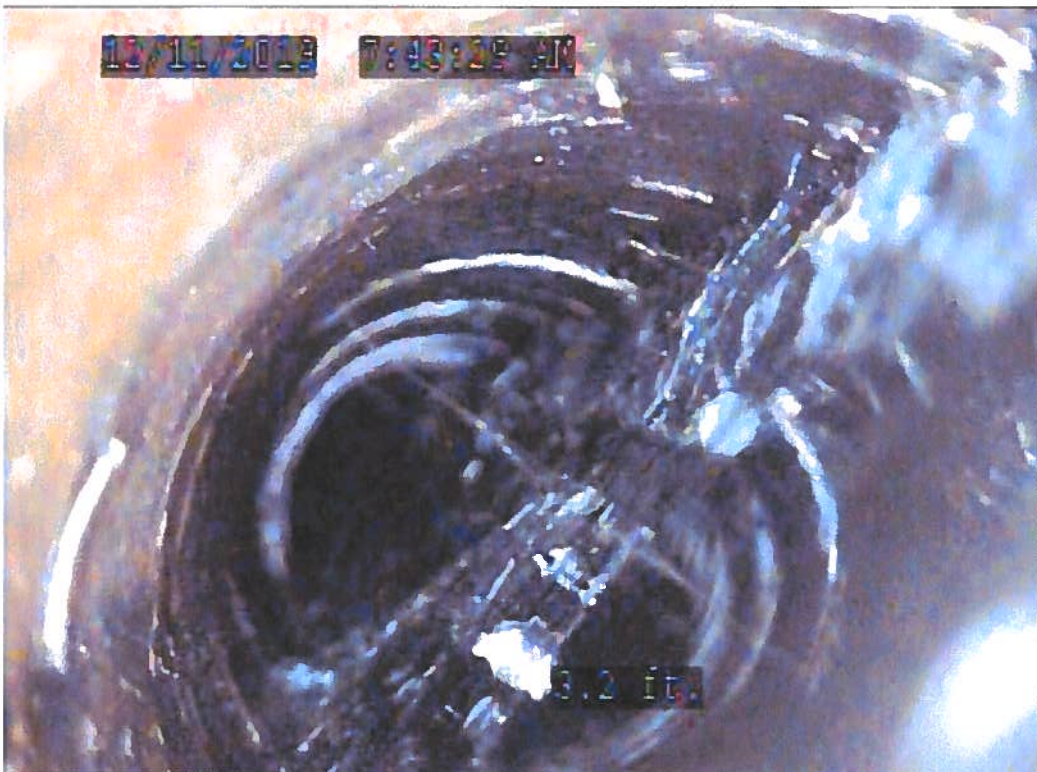


Figure 15: Sediment filling 60%± of tile and blocking CCTV inspection.

CONSTRUCTION ENGINEERING  
OBSERVATION REPORT

DATE:

12/4/2019

DAYS OF WEEK:

S M T W T F S

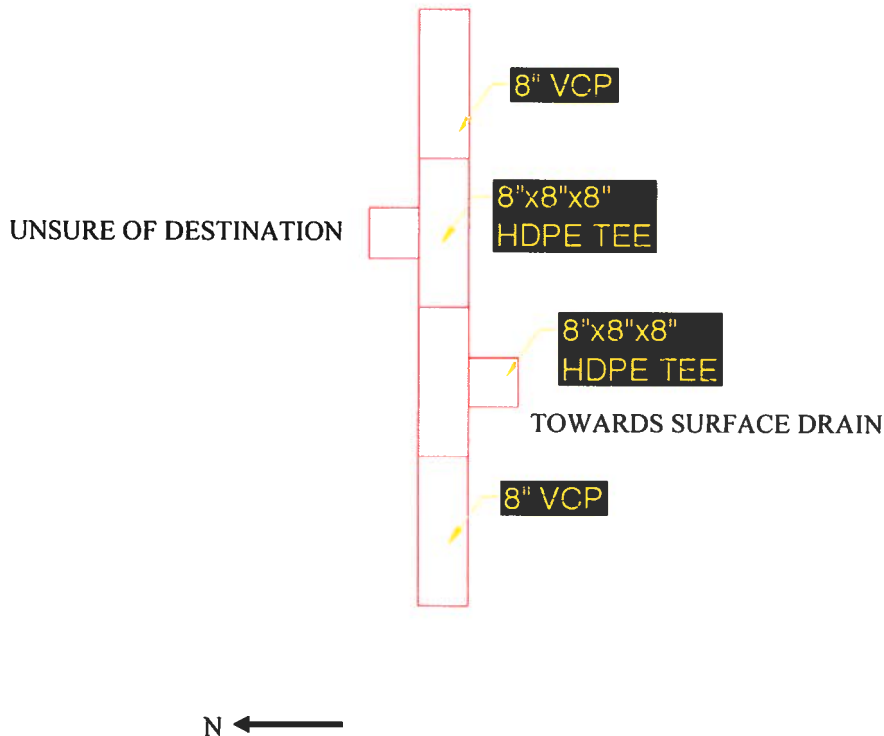
SHEET NO.

1 OF 1

PROJECT NUMBER: 6636.4  
COUNTY, ROUTE, ROAD: \_\_\_\_\_  
LOCATION: DD 55-3 \_\_\_\_\_

DESCRIPTION OF WORK AND MATERIAL USED FOR EACH OPERATION, INCLUDING CONTRACTOR/SUB NAME, ITEM NO. AND LOCATION

- 2:00 P.M. At job site. Jeff and Takeuchi TB145 Mini excavator on-site.
- 2:30 P.M. Setting up GPS on GPS monument 8013  
2-1/2" mud and fine roots in tile, 5-1/2" of water on east side of tracks.
- 4:50 P.M. Observer left site



I Certify that the work described in this report was incorporated into this contract unless otherwise noted.

Observer's Signature: \_\_\_\_\_ Date Prepared: \_\_\_\_\_

Reviewed by: \_\_\_\_\_  Engineer \_\_\_\_\_

Date Reviewed \_\_\_\_\_



PICTURE# 2462



PICTURE# 2463



21 ↑

PICTURE# 2464

PICTURE# 2465



↓ N



↓ N

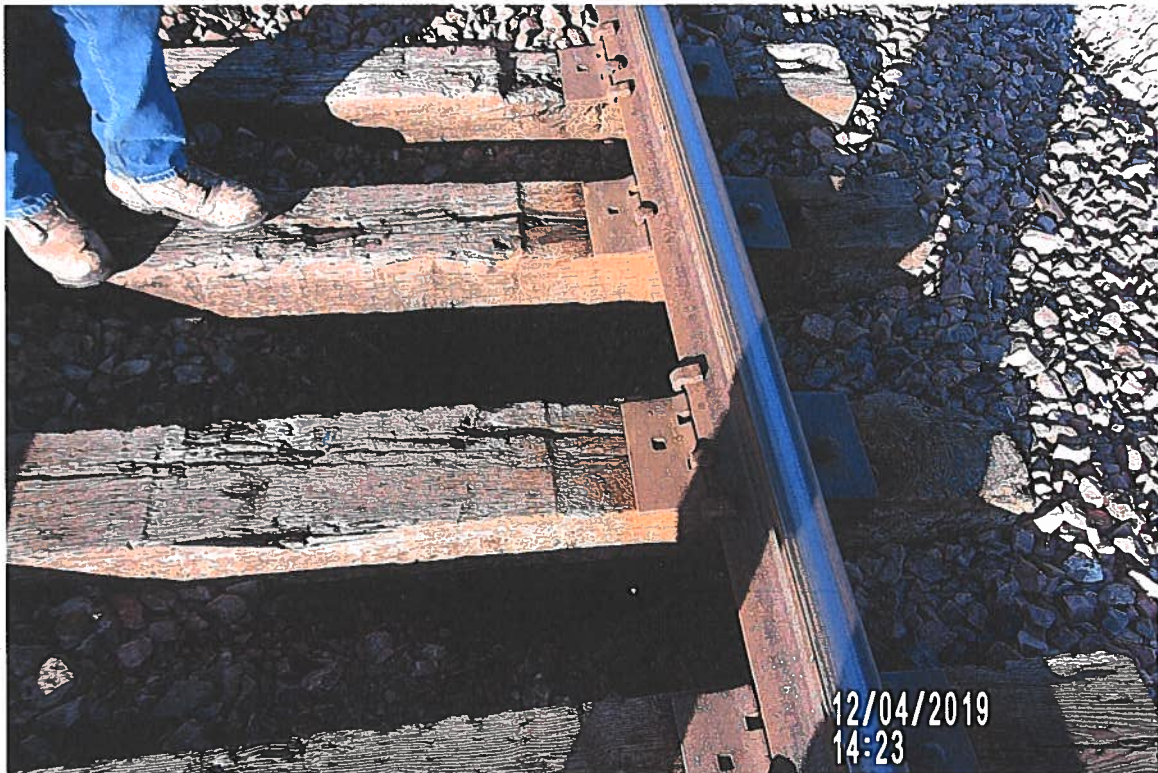
PICTURE# 2466

PICTURE # 2458

HOLE IN BOX CULVERT BELOW TRACKS



↑ N



↑ N

PICTURE # 2459

HOLE UNDER RR TRACKS

PICTURE BALLAST ROCK FALLING IN BOX CULVERT  
# 2460



PICTURE # 2461  
HOLE IN TOP BOX CULVERT

CONSTRUCTION ENGINEERING  
OBSERVATION REPORT

DATE:

12/5/2019

DAYS OF WEEK:

S M T W T F S

SHEET NO.

1 OF 1

PROJECT NUMBER:	6636.4
COUNTY, ROUTE, ROAD:	_____
LOCATION: DD 55-3	_____

DESCRIPTION OF WORK AND MATERIAL USED FOR EACH OPERATION, INCLUDING CONTRACTOR/SUB NAME, ITEM NO. AND LOCATION

- 1:20 P.M.** At job site
- 1:36** Contractor on-site. Look over job with Adam. Discuss with lee about cottonwood cut down: Wait until line is jetted and televise down. Excavate on west side of tracks to find tile..
- 2:40** Back on other site.
- 3:15** Headed back to site
- 1 hr Adam  
3 hr Excavator and Jeff
- 4:20 P.M.** Set up GPS base.
- 5:10** Base set up , check into GPS #1224 P ave N Ave NW Corner field drive  
Jeff and mini excavator left site. Had tile west side RR track. Set 1/2" diameter Iron Rerod 0.2' deep NE corner 1st field drive north of 280th Street east RR tracks. Check #1 3/4" diameter iron rerod NE corner field drive north side of 290th Street 0.3' deep. 1978' ± west of G Ave. and 290th.
- 7:40** Tore down GPS base.

I Certify that the work described in this report was incorporated into this contract unless otherwise noted.	
Observer's Signature: _____	Date Prepared: _____
Reviewed by: _____	<input type="checkbox"/> Engineer
	Date Reviewed _____

PICTURE# 2484



N  
←



N  
↓

PICTURE# 2485

PICTURE# 2486

↑  
N



12/05/2019  
18:10



CONSTRUCTION ENGINEERING  
OBSERVATION REPORT

DATE:

12/11/2019

DAYS OF WEEK:

S M T W T F S

SHEET NO.

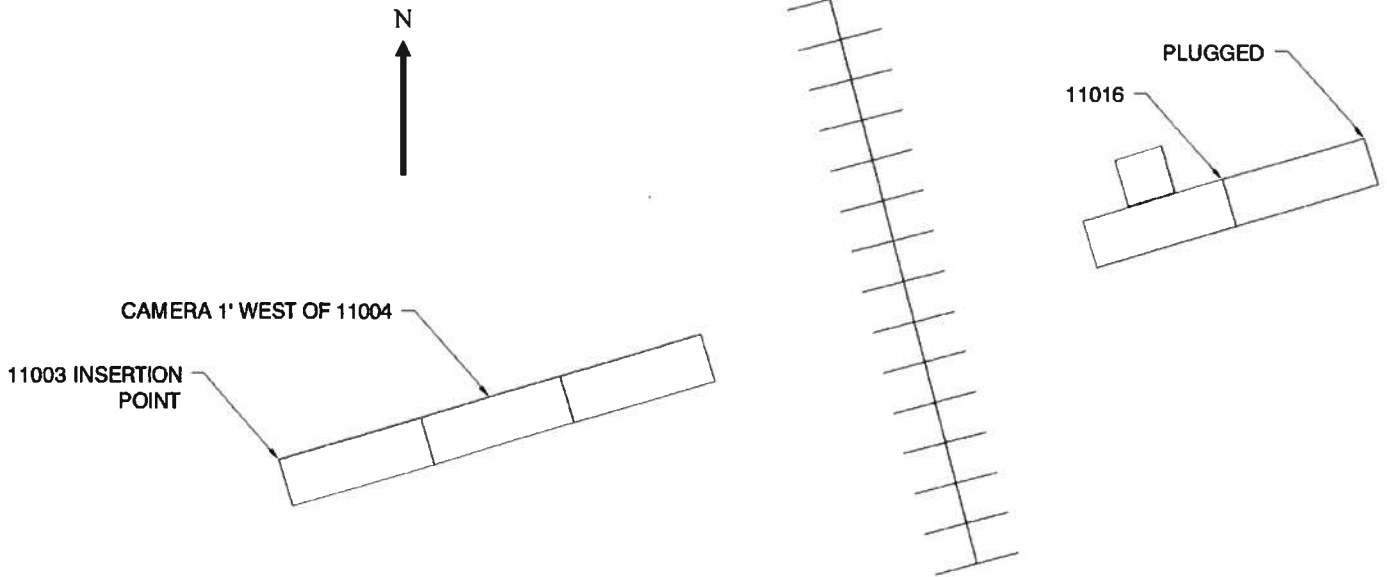
1 OF 1

PROJECT NUMBER: 6636.4  
COUNTY, ROUTE, ROAD: \_\_\_\_\_  
LOCATION: DD 55-3 \_\_\_\_\_

DESCRIPTION OF WORK AND MATERIAL USED FOR EACH OPERATION, INCLUDING CONTRACTOR/SUB  
NAME, ITEM NO. AND LOCATION

- 3:55 A.M. Left office  
6:15 Adam on site  
6:45 Crew on site with Takeuchi TB145 mini excavator, Adam and Televising crew.  
6:57 Camera inserted at 11003  
0.4' Lateral at 2. 9.1' roots  
7:20 Camera done, can not get past roots in tile.  
7:40 Mud in flowline.  
7:58 Pull camera out of tile.  
8:20 Jetting guy left site.  
9:00 Left site

2 man crew, mini excavator; 2.5 hrs



I Certify that the work described in this report was incorporated into this contract unless otherwise noted.

Observer's Signature: \_\_\_\_\_

Date Prepared: \_\_\_\_\_

Reviewed by: \_\_\_\_\_

Engineer

Date Reviewed \_\_\_\_\_

PICTURE # 2544



PICTURE # 2545

PICTURE # 2546



PICTURE # 2547

PICTURE# 2548



PICTURE# 2549

1, 3565705.042, 4955510.158, 1145.063, CPT 3/4IR  
2, 3565150.351, 4954217.931, 1138.975, FL 10"MAIN  
3, 3565151.887, 4954221.381, 1142.546, GS  
4, 3565216.747, 4954370.027, 1138.517, FL 10"CLAY  
5, 3565223.502, 4954384.597, 1142.558, GS TILELOCATE  
6, 3565223.595, 4954396.826, 1142.562, GS TILELOCATE  
7, 3565233.493, 4954415.754, 1142.643, GS TILELOCATE  
8, 3565442.193, 4955175.126, 1139.818, GS TILELOCATE  
9, 3565045.900, 4953055.581, 1140.831, FL 8"MAIN  
10, 3565022.874, 4953087.249, 1140.846, FL 8"MAIN 9C  
11, 3565010.689, 4953102.426, 1140.593, FL 8"MAIN 9C  
12, 3565394.082, 4952579.883, 1141.219, FL 8"MAIN 9C  
13, 3565597.593, 4952371.921, 1144.530, GS TILELOCATE  
14, 3565450.031, 4952508.919, 1141.829, HDPE FIX  
15, 3565459.916, 4952497.260, 1141.884, HDPE FIX  
16, 3565392.559, 4952581.111, 1141.904, HDPE FIX  
17, 3565394.395, 4952579.941, 1141.888, HDPE FIX  
18, 3565132.336, 4952924.783, 1141.591, HDPE FIX  
19, 3565133.481, 4952923.056, 1141.613, HDPE FIX  
20, 3565023.413, 4953086.411, 1141.533, HDPE FIX  
21, 3565022.955, 4953087.436, 1141.528, HDPE FIX  
22, 3565048.974, 4953050.941, 1141.465, HDPE FIX  
23, 3565045.515, 4953056.093, 1141.477, HDPE FIX  
24, 3565010.640, 4953102.441, 1141.392, HDPE FIX  
25, 3565014.739, 4953097.947, 1141.519, HDPE FIX  
26, 3565148.159, 4954214.162, 1139.671, HDPE 10" FIX  
27, 3565150.127, 4954218.250, 1139.786, HDPE 10" FIX  
28, 3565090.563, 4954081.862, 1139.969, CONC 10" FIX  
29, 3565090.336, 4954080.829, 1139.996, CONC 10" FIX  
30, 3565217.335, 4954371.267, 1139.492, HDPE 10" FIX  
31, 3565216.392, 4954369.293, 1139.493, HDPE 10" FIX  
32, 3565596.777, 4952372.847, 1141.175, FL 8"CLAY  
33, 3565665.660, 4952304.913, 1141.760, FL INTKE 8"CLAY  
34, 3564769.636, 4953449.379, 1140.535, FL 10"CONC TILE  
35, 3564908.412, 4953652.195, 1143.784, GS LOCATE Y10" S  
36, 3565442.741, 4955172.024, 1134.997, FL 10"CLAY TILE  
37, 3565622.264, 4955281.966, 1138.919, GS10"CLAY TILE  
38, 3565620.435, 4955283.931, 1134.992, FL 12"CLAY TILE  
39, 3565443.425, 4955173.410, 1135.021, FL 12"CLAY TILEFIX  
40, 3565442.020, 4955170.534, 1135.071, FL 10"CLAY TILE FIX  
41, 3565445.860, 4955178.028, 1140.051, GS  
42, 3564769.802, 4953449.314, 1140.425, FL 10"CONC  
43, 3564767.889, 4953447.061, 1140.430, FL 10"CONC  
44, 3564984.898, 4953127.131, 1140.788, FL 8"CLAYFIX  
45, 3564978.840, 4953132.434, 1140.879, FL 8"CLAYFIX  
46, 3565653.246, 4955309.028, 1136.910, FL CMP  
47, 3565705.611, 4955311.145, 1139.242, CMP TOP  
48, 3565706.131, 4955311.212, 1136.773, FL CMP  
49, 3565717.045, 4955311.899, 1138.393, CL SWALE  
50, 3565824.059, 4955311.044, 1137.095, CL SWALE

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58, 3566388.865, 4955690.151, 1130.350, TOP TILE BLOWOUT  
59, 3566438.629, 4955767.354, 1131.005, CL SWALE  
60, 3566485.894, 4955854.593, 1130.559, CL SWALE  
61, 3566508.176, 4955922.374, 1128.471, WET HOLE  
62, 3566517.009, 4955969.272, 1129.021, CL SWALE  
63, 3566568.476, 4956065.189, 1128.258, CL SWALE  
64, 3566573.162, 4956068.546, 1127.022, BLOWOUT  
65, 3566591.363, 4956084.150, 1124.791, TOP TILE CLAY?  
66, 3566591.827, 4956085.730, 1127.623, BLOW OUT  
67, 3566621.756, 4956108.194, 1126.294, BLOW OUT  
68, 3566623.827, 4956110.372, 1127.207, CL SWALE  
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72, 3566853.594, 4956317.177, 1124.905, STANDING WATER  
73, 3566881.063, 4956345.871, 1125.029, STANDING WATER  
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198,3565704.106,4955380.872,1139.553,GS  
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203, 3565715.100, 4955333.547, 1139.234, TB  
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205, 3565701.480, 4955333.902, 1138.101, TOE  
206, 3565705.579, 4955333.869, 1137.902, GS  
207, 3565692.786, 4955334.174, 1143.272, TB  
208, 3565689.425, 4955334.519, 1143.332, EOG  
209, 3565668.047, 4955334.506, 1143.269, EOG  
210, 3565663.318, 4955334.196, 1143.007, TB  
211, 3565656.036, 4955334.304, 1138.399, TOE  
212, 3565648.349, 4955333.356, 1138.069, TOE  
213, 3565652.054, 4955333.756, 1138.090, GS  
214, 3565643.536, 4955332.909, 1140.284, TB  
215, 3565645.461, 4955333.314, 1139.396, EOHL  
216, 3565646.669, 4955318.274, 1139.681, PP  
217, 3565593.718, 4955333.321, 1140.159, GS  
218, 3565594.057, 4955283.203, 1139.183, GS  
219, 3565639.635, 4955284.169, 1138.684, GS  
220, 3565641.291, 4955284.092, 1139.527, GS  
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225, 3565651.426, 4955283.516, 1138.138, GS  
226, 3565656.352, 4955302.555, 1138.291, TOE  
227, 3565653.213, 4955304.232, 1138.199, GS  
228, 3565649.416, 4955308.619, 1138.281, GS  
229, 3565651.245, 4955313.146, 1138.043, GS  
230, 3565655.412, 4955314.019, 1138.298, TOE  
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233, 3565669.090, 4955284.167, 1142.847, EOG  
234, 3565690.651, 4955284.218, 1142.883, EOG  
235, 3565695.227, 4955284.389, 1142.642, TB  
236, 3565704.449, 4955286.520, 1139.762, TB DR  
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239, 3565696.876, 4955248.409, 1142.106, TB DR  
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241, 3565706.731, 4955252.208, 1139.962, TB DR  
242, 3565711.618, 4955250.835, 1139.118, TB DR  
243, 3565707.510, 4955248.111, 1136.732, FL CMP  
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245, 3565707.377, 4955248.848, 1138.297, CMP TOP  
246, 3565705.981, 4955269.181, 1140.747, GS  
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248, 3565707.927, 4955289.089, 1136.972, FL CMP  
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311, 3565299.663, 4954862.775, 1141.101, GS  
312, 3565339.825, 4954821.714, 1141.808, GS  
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314, 3565270.004, 4954784.147, 1141.560, GS  
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316, 3565225.787, 4954799.131, 1141.231, GS  
317, 3565175.067, 4954819.622, 1142.563, GS  
318, 3565153.940, 4954765.561, 1142.636, GS  
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325, 3565227.735, 4954656.776, 1141.445, GS  
326, 3565211.958, 4954661.005, 1141.598, GS  
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331, 3565231.081, 4954595.482, 1141.686, GS  
332, 3565283.449, 4954567.691, 1143.246, GS  
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334, 3565237.835, 4954512.929, 1142.231, GS  
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336, 3565187.461, 4954525.431, 1142.106, GS  
337, 3565139.948, 4954537.565, 1142.765, GS  
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839, 3565931.292, 4952050.199, 1151.875, GS  
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985, 3567960.857, 4957463.659, 1114.424, TOE  
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994, 3568054.587, 4957465.100, 1113.755, TOE  
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1004, 3567957.652, 4957374.721, 1114.248, GS CROPLN  
1005, 3567965.800, 4957366.946, 1113.301, GS  
1006, 3567972.391, 4957358.134, 1113.676, GS  
1007, 3567977.192, 4957351.785, 1114.275, GS CROPLN  
1008, 3567994.342, 4957331.168, 1115.079, GS  
1009, 3567965.669, 4957290.623, 1115.360, GS  
1010, 3567940.019, 4957317.565, 1115.094, GS CROPLN  
1011, 3567924.069, 4957339.650, 1113.939, GS CROPLN  
1012, 3567919.606, 4957345.885, 1113.656, GS  
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1014, 3567900.823, 4957369.842, 1116.241, GS  
1015, 3567856.463, 4957356.069, 1116.980, GS  
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1018, 3567879.856, 4957302.939, 1115.372, GS  
1019, 3567884.625, 4957286.314, 1115.568, GS CROPLN  
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1023, 3567922.057, 4957278.261, 1115.566, GS CROPLN  
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1025, 3567888.406, 4957264.207, 1115.931, GS  
1026, 3567840.324, 4957249.555, 1116.119, GS  
1027, 3567821.848, 4957280.078, 1115.565, GS CROPLN  
1028, 3567817.072, 4957286.967, 1115.128, GS  
1029, 3567806.199, 4957301.715, 1115.003, GS  
1030, 3567796.900, 4957316.190, 1116.927, GS CROPLN  
1031, 3567781.789, 4957339.603, 1118.410, GS  
1032, 3567730.765, 4957321.142, 1118.757, GS  
1033, 3567743.411, 4957296.810, 1117.564, GS CROPLN  
1034, 3567751.861, 4957286.705, 1116.657, GS  
1035, 3567768.549, 4957260.953, 1115.386, GS  
1036, 3567774.130, 4957253.972, 1115.613, GS CROPLN  
1037, 3567793.518, 4957229.662, 1116.428, GS  
1038, 3567769.637, 4957182.939, 1118.238, GS  
1039, 3567728.998, 4957195.220, 1116.960, GS CROPLN  
1040, 3567716.269, 4957202.220, 1116.139, GS  
1041, 3567706.287, 4957208.086, 1115.866, GS  
1042, 3567694.791, 4957214.671, 1116.236, GS  
1043, 3567678.052, 4957222.977, 1117.080, GS CROPLN  
1044, 3567644.151, 4957241.485, 1118.030, GS  
1045, 3567620.171, 4957178.627, 1117.980, GS  
1046, 3567660.329, 4957167.354, 1116.968, GS CROPLN  
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1048, 3567683.941, 4957159.646, 1116.087, GS  
1049, 3567699.784, 4957153.883, 1116.932, GS  
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1062, 3567702.364, 4956944.354, 1120.073, GS  
1063, 3567655.233, 4956962.251, 1118.281, GS  
1064, 3567643.016, 4956969.167, 1117.922, GS  
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1072, 3567631.777, 4956822.766, 1121.236, GS  
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1083, 3567566.622, 4956772.748, 1121.983, GS  
1084, 3567525.448, 4956721.866, 1122.480, GS  
1085, 3567498.080, 4956746.865, 1121.639, GS  
1086, 3567483.659, 4956759.139, 1120.213, GS  
1087, 3567475.679, 4956765.669, 1120.145, GS  
1088, 3567458.546, 4956777.353, 1121.121, GS  
1089, 3567452.232, 4956781.252, 1120.883, GS CROPLN  
1090, 3567422.129, 4956804.180, 1121.113, GS  
1091, 3567384.507, 4956757.226, 1121.585, GS  
1092, 3567412.032, 4956734.777, 1121.072, GS CROPLN  
1093, 3567435.190, 4956715.821, 1120.593, GS  
1094, 3567441.994, 4956711.046, 1120.642, GS  
1095, 3567461.788, 4956696.013, 1122.343, GS CROPLN  
1096, 3567487.182, 4956678.724, 1122.672, GS  
1097, 3567446.510, 4956630.769, 1122.740, GS  
1098, 3567418.042, 4956652.376, 1122.207, GS CROPLN  
1099, 3567406.696, 4956661.874, 1121.104, GS  
1100, 3567393.969, 4956673.089, 1120.726, GS

1101, 3567374.711, 4956687.347, 1121.732, GS CROPLN  
1102, 3567339.950, 4956709.204, 1121.884, GS  
1103, 3567280.867, 4956657.490, 1122.579, GS  
1104, 3567300.087, 4956618.759, 1122.106, GS CROPLN  
1105, 3567304.444, 4956607.520, 1121.409, GS  
1106, 3567307.319, 4956599.983, 1121.508, GS  
1107, 3567317.935, 4956579.450, 1122.761, GS CROPLN  
1108, 3567341.754, 4956546.921, 1123.019, GS  
1109, 3567288.666, 4956530.753, 1123.318, GS  
1110, 3567272.933, 4956562.548, 1123.024, GS CROPLN  
1111, 3567265.518, 4956577.993, 1121.688, GS  
1112, 3567263.307, 4956582.251, 1121.625, GS  
1113, 3567256.227, 4956598.737, 1122.501, GS CROPLN  
1114, 3567233.682, 4956627.654, 1123.301, GS  
1115, 3567178.037, 4956619.750, 1124.448, GS  
1116, 3567181.714, 4956585.068, 1123.405, GS CROPLN  
1117, 3567182.959, 4956575.787, 1123.170, GS  
1118, 3567184.760, 4956563.045, 1122.280, GS  
1119, 3567188.031, 4956543.875, 1123.138, GS CROPLN  
1120, 3567199.629, 4956504.536, 1123.395, GS  
1121, 3567144.773, 4956472.885, 1124.359, GS  
1122, 3567114.186, 4956518.572, 1123.818, GS CROPLN  
1123, 3567105.188, 4956530.830, 1123.077, GS  
1124, 3567096.576, 4956541.600, 1123.033, GS  
1125, 3567088.620, 4956553.056, 1124.150, GS  
1126, 3567081.102, 4956565.068, 1124.727, GS CROPLN  
1127, 3567053.196, 4956599.114, 1126.410, GS  
1128, 3566987.307, 4956543.035, 1125.735, GS  
1129, 3567015.561, 4956515.033, 1124.671, GS CROPLN  
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1131, 3567028.845, 4956502.599, 1123.542, GS  
1132, 3567034.790, 4956496.476, 1123.633, GS  
1133, 3567046.247, 4956483.066, 1123.987, GS  
1134, 3567056.613, 4956471.565, 1124.669, GS CROPLN  
1135, 3567077.824, 4956452.916, 1125.208, GS  
1136, 3567036.293, 4956408.623, 1126.392, GS  
1137, 3567013.785, 4956429.113, 1125.593, GS CROPLN  
1138, 3567002.246, 4956438.275, 1124.735, GS  
1139, 3566993.393, 4956445.343, 1123.856, GS  
1140, 3566980.412, 4956457.509, 1124.150, GS  
1141, 3566969.277, 4956469.196, 1124.749, GS CROPLN  
1142, 3566942.156, 4956493.107, 1125.781, GS  
1143, 3566892.175, 4956443.669, 1126.684, GS  
1144, 3566917.582, 4956418.620, 1125.328, GS CROPLN  
1145, 3566926.640, 4956409.045, 1124.871, GS  
1146, 3566936.386, 4956398.259, 1124.486, GS  
1147, 3566949.964, 4956381.946, 1124.902, GS  
1148, 3566956.258, 4956373.834, 1125.831, GS CROPLN  
1149, 3566974.013, 4956353.793, 1126.439, GS  
1150, 3566881.062, 4956379.061, 1126.028, GS CROPLN

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1153,3567119.578,4956578.963,1124.292,GS CROPLN  
1154,3567216.344,4956590.164,1122.906,GS CROPLN  
1155,3567259.975,4956601.069,1122.386,GS CROPLN  
1156,3567301.514,4956620.545,1122.149,GS CROPLN  
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1179,3565783.581,4952262.767,1146.422,GS TILE LOCATE  
1180,3565829.504,4952228.253,1147.133,GS TILE LOCATE  
1181,3565872.322,4952193.382,1148.109,GS TILE LOCATE  
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1184,3565961.264,4952246.341,1149.012,GS  
1185,3566011.139,4952246.303,1150.182,GS  
1186,3566057.324,4952246.700,1151.442,GS  
1187,3566055.946,4952190.051,1151.829,GS  
1188,3566006.612,4952189.345,1150.460,GS  
1189,3565998.369,4952170.307,1151.371,GS CROP LN  
1190,3566059.756,4952171.295,1153.084,GS CROP LN  
1191,3566056.384,4952166.701,1154.017,FNL LONE COR PST  
1192,3566059.067,4952130.094,1155.644,GS CROP LN  
1193,3566057.726,4952082.205,1156.134,GS CROP LN  
1194,3566056.827,4952031.098,1156.649,GS CROP LN  
1195,3566010.514,4952031.918,1154.030,GS  
1196,3566011.226,4952081.932,1152.814,GS  
1197,3566013.108,4952131.952,1152.193,GS  
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1202, 3565858.117, 4952036.262, 1152.311, GS  
1203, 3565650.690, 4955302.040, 1135.672, FL 6"CLAY INTK  
1204, 3565656.630, 4955296.684, 1138.735, GS TILE LOCATE  
1205, 3565665.135, 4955297.461, 1142.804, GS TILE LOCATE  
1206, 3565694.552, 4955303.919, 1142.376, GS TILE LOCATE  
1207, 3565721.154, 4955306.800, 1138.605, GS TILE LOCATE  
1208, 3565768.278, 4955313.526, 1137.883, GS TILE LOCATE  
1209, 3565814.892, 4955319.336, 1137.215, GS TILE LOCATE  
1210, 3565861.075, 4955325.857, 1136.748, GS TILE LOCATE  
1211, 3565912.722, 4955333.062, 1136.375, GS TILE LOCATE  
1212, 3565080.497, 4953981.099, 1137.177, TOP ATT FIBER  
1213, 3565067.497, 4953973.226, 1143.196, GS FIBER OPTIC  
1214, 3565946.684, 4955338.374, 1136.128, GS TILE LOCATE  
1215, 3565045.589, 4953957.133, 1143.686, GS FIBER OPTIC  
1216, 3565028.947, 4953944.198, 1144.252, GS FIBER OPTIC  
1217, 3564660.519, 4953015.485, 1141.415, FL CLAYTILE STARTEXPLOR  
1218, 3564594.591, 4952766.471, 1142.756, TOP CLAYTILE ENDEXPLOR  
1219, 3564632.895, 4952868.929, 1143.130, FL 4"CLAY LAT  
1220, 3568044.907, 4957462.085, 1114.446, TOP WIER@ROAD  
1221, 3567953.608, 4957338.839, 1114.790, HUB 47+00RT  
1222, 3567870.337, 4957280.275, 1116.102, HUB 48+00RT  
1223, 3567792.892, 4957226.941, 1116.969, HUB 49+00RT  
1224, 3568324.845, 4957460.291, 1122.748, CPT PAVENAIL  
1224\_GNSS, 3568324.845, 4957460.291, 1122.748, Base Setup  
1225, 3568010.724, 4957439.699, 1108.252, FL 2.5"WL  
1226, 3568016.517, 4957439.851, 1107.681, top 2.5" water main  
1227, 3568043.494, 4957458.568, 1111.351, top 30" hdpe  
1228, 3568027.595, 4957448.519, 1111.192, top 30" hdpe  
1229, 3568011.644, 4957437.673, 1111.194, top 30" hdpe  
1230, 3568043.779, 4957458.582, 1111.298, top 30" hdpe  
1231, 3567995.396, 4957426.288, 1111.214, top 30" hdpe  
1232, 3567994.337, 4957425.469, 1108.261, fl 30" hdpe  
1233, 3568044.751, 4957459.440, 1108.576, fl 30" hdpe  
1234, 3567977.981, 4957414.193, 1108.255, fl 30" hdpe  
1235, 3567683.566, 4957208.839, 1111.194, Cogo  
1236, 3567683.566, 4957208.839, 1109.200, fl 30" hdpe calc  
1237, 3568011.644, 4957437.673, 1108.400, fl 30" hdpe calc  
1238, 3567961.710, 4957402.892, 1108.466, fl 30" hdpe  
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1251, 3567716.272, 4957236.100, 1111.715, top 30" hdpe  
1252, 3567703.124, 4957221.047, 1111.847, top 30" hdpe  
1253, 3567701.329, 4957218.274, 1111.761, top 30" hdpe end  
1254, 3567701.190, 4957218.118, 1111.372, top 24" hdpe reducer  
1255, 3567690.298, 4957203.510, 1111.293, top 24" hdpe  
1256, 3567679.482, 4957187.106, 1111.419, top 24" hdpe  
1257, 3567669.415, 4957170.176, 1111.601, top 24" hdpe  
1258, 3567661.575, 4957152.088, 1111.745, top 24" hdpe  
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1267, 3567606.882, 4956984.086, 1112.609, top 24" hdpe  
1268, 3567600.532, 4956965.512, 1112.664, top 24" hdpe  
1269, 3567593.074, 4956947.285, 1112.744, top 24" hdpe  
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1271, 3567572.531, 4956913.491, 1113.191, top 24" hdpe  
1272, 3567561.031, 4956897.685, 1113.243, top 24" hdpe  
1273, 3567548.204, 4956882.848, 1113.492, top 24" hdpe  
1274, 3567534.505, 4956868.940, 1113.520, top 24" hdpe  
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1287, 3567352.329, 4956690.280, 1114.823, top 24" hdpe  
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1289, 3567321.258, 4956667.071, 1115.095, top 24" hdpe  
1290, 3567305.099, 4956656.348, 1115.227, top 24" hdpe  
1291, 3567287.365, 4956646.046, 1115.305, top 24" hdpe  
1292, 3567269.889, 4956637.159, 1115.450, top 24" hdpe  
1293, 3567252.451, 4956628.354, 1115.541, top 24" hdpe  
1294, 3567234.657, 4956619.773, 1115.662, top 24" hdpe  
1295, 3567216.899, 4956611.446, 1115.764, top 24" hdpe  
1296, 3567198.704, 4956603.893, 1115.753, top 24" hdpe  
1297, 3567180.612, 4956596.346, 1116.001, top 24" hdpe  
1298, 3567162.409, 4956588.979, 1116.181, top 24" hdpe  
1299, 3567144.082, 4956581.892, 1116.212, top 24" hdpe

1300, 3567125.661, 4956575.050, 1116.390, top 24" hdpe  
1301, 3567107.526, 4956567.549, 1116.520, top 24" hdpe  
1302, 3567089.564, 4956559.491, 1116.520, top 24" hdpe  
1303, 3567072.259, 4956550.171, 1116.690, top 24" hdpe  
1304, 3567055.414, 4956539.940, 1116.772, top 24" hdpe  
1305, 3567039.273, 4956528.770, 1116.851, top 24" hdpe  
1306, 3567023.577, 4956516.975, 1116.938, top 24" hdpe  
1307, 3567008.347, 4956504.389, 1117.033, top 24" hdpe  
1308, 3566993.924, 4956490.960, 1117.171, top 24" hdpe  
1309, 3566979.720, 4956477.476, 1117.300, top 24" hdpe  
1310, 3566965.679, 4956463.596, 1117.426, top 24" hdpe  
1311, 3566952.300, 4956449.535, 1117.461, top 24" hdpe  
1312, 3566937.928, 4956435.858, 1117.606, top 24" hdpe  
1313, 3566923.876, 4956422.058, 1117.665, top 24" hdpe  
1314, 3566909.785, 4956408.401, 1117.803, top 24" hdpe  
1315, 3566895.934, 4956394.502, 1117.869, top 24" hdpe  
1316, 3566881.921, 4956380.520, 1118.017, top 24" hdpe  
1317, 3566868.157, 4956366.671, 1118.070, top 24" hdpe  
1318, 3566854.317, 4956352.850, 1118.243, top 24" hdpe  
1319, 3566840.362, 4956338.971, 1118.395, top 24" hdpe  
1320, 3566826.046, 4956325.517, 1118.465, top 24" hdpe  
1321, 3566811.135, 4956312.751, 1118.609, top 24" hdpe  
1322, 3566795.904, 4956300.150, 1118.655, top 24" hdpe  
1323, 3566780.123, 4956288.680, 1118.778, top 24" hdpe  
1324, 3566764.437, 4956276.815, 1118.852, top 24" hdpe  
1325, 3566748.878, 4956264.770, 1119.047, top 24" hdpe  
1326, 3566733.624, 4956252.431, 1119.125, top 24" hdpe  
1327, 3566718.474, 4956240.019, 1119.221, top 24" hdpe  
1328, 3566703.484, 4956227.234, 1119.313, top 24" hdpe  
1329, 3566688.371, 4956214.635, 1119.470, top 24" hdpe  
1330, 3566673.306, 4956202.145, 1119.520, top 24" hdpe  
1331, 3566658.214, 4956189.476, 1119.633, top 24" hdpe  
1332, 3566643.197, 4956176.918, 1119.719, top 24" hdpe  
1333, 3566628.330, 4956164.144, 1119.840, top 24" hdpe  
1334, 3566614.190, 4956150.501, 1119.963, top hdpe tile  
1335, 3566600.243, 4956136.576, 1120.063, top hdpe tile  
1336, 3566587.378, 4956121.679, 1120.251, top hdpe tile  
1337, 3566575.314, 4956106.046, 1120.266, top hdpe tile  
1338, 3566564.818, 4956089.540, 1120.412, top 24" hdpe  
1339, 3566554.994, 4956072.432, 1120.489, top 24" hdpe  
1340, 3566545.972, 4956054.835, 1120.629, top 24" hdpe  
1341, 3566537.833, 4956037.037, 1120.714, top 24" hdpe  
1342, 3566529.909, 4956018.861, 1120.855, top 24" hdpe  
1343, 3566522.840, 4956000.464, 1121.023, top 24" hdpe  
1344, 3566517.323, 4955981.492, 1121.043, top 24" hdpe  
1345, 3566512.528, 4955962.410, 1121.118, top 24" hdpe  
1346, 3566508.725, 4955943.024, 1121.204, top 24" hdpe  
1347, 3566505.082, 4955923.724, 1121.358, top 24" hdpe  
1348, 3566501.017, 4955904.448, 1121.526, top 24" hdpe  
1349, 3566496.288, 4955885.355, 1121.573, top 24" hdpe

1350, 3566490.492, 4955866.542, 1121.616, top 24" hdpe  
1351, 3566483.336, 4955848.124, 1121.759, top 24" hdpe  
1352, 3566475.192, 4955830.255, 1121.877, top 24" hdpe  
1353, 3566466.006, 4955812.911, 1121.977, top 24" hdpe  
1354, 3566456.238, 4955795.845, 1122.075, top 24" hdpe  
1355, 3566446.317, 4955778.910, 1122.136, top 24" hdpe  
1356, 3566436.030, 4955762.162, 1122.320, top 24" hdpe  
1357, 3566425.121, 4955745.779, 1122.402, top 24" hdpe  
1358, 3566413.754, 4955729.701, 1122.535, top 24" hdpe  
1359, 3566402.559, 4955713.549, 1122.692, top 24" hdpe  
1360, 3566391.591, 4955697.297, 1122.727, top 24" hdpe  
1361, 3566381.035, 4955680.770, 1122.876, top 24" hdpe  
1362, 3566370.710, 4955664.019, 1122.974, top 24" hdpe  
1363, 3566360.104, 4955647.457, 1123.029, top 24" hdpe  
1364, 3566349.212, 4955631.176, 1123.104, top 24" hdpe  
1365, 3566338.507, 4955614.679, 1123.325, top 24" hdpe  
1366, 3566327.514, 4955598.397, 1123.465, top 24" hdpe  
1367, 3566316.523, 4955582.137, 1123.571, top 24" hdpe  
1368, 3566305.532, 4955565.866, 1123.652, top 24" hdpe  
1369, 3566294.577, 4955549.548, 1123.820, top 24" hdpe  
1370, 3566283.687, 4955533.176, 1123.930, top 24" hdpe  
1371, 3566272.008, 4955517.405, 1124.041, top 24" hdpe  
1372, 3566259.754, 4955501.883, 1124.104, top 24" hdpe  
1373, 3566247.179, 4955486.677, 1124.260, top 24" hdpe  
1374, 3566234.150, 4955471.933, 1124.358, top 24" hdpe  
1375, 3566220.516, 4955457.744, 1124.507, top 24" hdpe  
1376, 3566207.071, 4955443.467, 1124.569, top 24" hdpe  
1377, 3566192.381, 4955430.330, 1124.603, top 24" hdpe  
1378, 3566176.318, 4955418.898, 1124.780, top 24" hdpe  
1379, 3566159.431, 4955408.764, 1124.801, top 24" hdpe  
1380, 3566141.147, 4955400.952, 1124.959, top 24" hdpe  
1381, 3566122.799, 4955393.697, 1125.066, top 24" hdpe  
1382, 3566104.111, 4955387.653, 1125.174, top 24" hdpe  
1383, 3566085.132, 4955382.508, 1125.265, top 24" hdpe  
1384, 3566066.117, 4955377.481, 1125.353, top 24" hdpe  
1385, 3566047.064, 4955372.857, 1125.441, top 24" hdpe  
1386, 3566027.916, 4955368.284, 1125.589, top 24" hdpe  
1387, 3566009.002, 4955362.812, 1125.716, top 24" hdpe  
1388, 3565990.101, 4955356.968, 1125.851, top 24" hdpe  
1389, 3565971.602, 4955350.588, 1125.994, top 24" hdpe  
1390, 3565952.935, 4955344.502, 1126.110, top 24" hdpe  
1391, 3565934.301, 4955338.525, 1126.246, top 24" hdpe  
1392, 3565915.373, 4955333.285, 1126.265, top 24" hdpe  
1393, 3565896.198, 4955328.696, 1126.301, top 24" hdpe  
1394, 3565877.268, 4955323.687, 1126.474, top 24" hdpe  
1395, 3565858.251, 4955318.975, 1126.581, top 24" hdpe  
1396, 3565838.995, 4955314.614, 1126.641, top 24" hdpe  
1397, 3565819.843, 4955310.248, 1126.732, top 24" hdpe  
1398, 3565800.579, 4955306.529, 1126.871, top 24" hdpe  
1399, 3565781.031, 4955303.936, 1126.929, top 24" hdpe



1400, 3565761.404, 4955302.518, 1127.069, top 24" hdpe  
1401, 3565741.834, 4955300.828, 1127.221, top 24" hdpe  
1402, 3565722.209, 4955299.231, 1127.325, top 24" hdpe  
1403, 3565657.581, 4955295.646, 1127.372, top 24" hdpe  
1404, 3565644.574, 4955293.945, 1127.680, top 24" hdpe  
1405, 3565625.018, 4955289.902, 1127.749, top 24" hdpe  
1406, 3565612.548, 4955286.750, 1127.876, top 24" hdpe  
1407, 3565593.973, 4955280.248, 1127.987, top 24" hdpe  
1408, 3565575.872, 4955272.338, 1128.103, top 24" hdpe  
1409, 3565558.169, 4955263.550, 1128.199, top 24" hdpe  
1410, 3565540.799, 4955254.353, 1128.271, top 24" hdpe  
1411, 3565523.889, 4955244.182, 1128.521, top 24" hdpe  
1412, 3565507.517, 4955233.231, 1128.497, top 24" hdpe  
1413, 3565492.109, 4955220.977, 1128.624, top 24" hdpe  
1414, 3565477.407, 4955207.973, 1128.763, top 24" hdpe  
1415, 3565463.343, 4955194.181, 1128.859, top 24" hdpe  
1416, 3565449.930, 4955179.735, 1128.944, top 24" hdpe  
1417, 3565438.236, 4955163.741, 1129.080, top 24" hdpe  
1418, 3565426.810, 4955147.859, 1129.209, top 24" hdpe  
1419, 3565416.279, 4955131.245, 1129.331, top 24" hdpe  
1420, 3565406.047, 4955114.456, 1129.475, top 24" hdpe  
1421, 3565396.769, 4955097.167, 1129.532, top 24" hdpe  
1422, 3565388.313, 4955079.370, 1129.654, top 24" hdpe  
1423, 3565380.173, 4955061.446, 1129.785, top 24" hdpe  
1424, 3565371.499, 4955043.826, 1129.847, top 24" hdpe  
1425, 3565362.465, 4955026.332, 1129.865, top 24" hdpe  
1426, 3565354.192, 4955008.510, 1130.093, top 24" hdpe  
1427, 3565345.345, 4954990.966, 1130.034, top 24" hdpe  
1428, 3565336.850, 4954973.223, 1130.278, top 24" hdpe  
1429, 3565328.386, 4954955.596, 1130.368, top 24" hdpe  
1430, 3565320.650, 4954937.550, 1130.511, top 24" hdpe  
1431, 3565313.258, 4954919.325, 1130.615, top 24" hdpe  
1432, 3565305.230, 4954901.318, 1130.760, top 24" hdpe  
1433, 3565297.117, 4954883.457, 1130.897, top 24" hdpe  
1434, 3565289.391, 4954865.332, 1131.022, top 24" hdpe  
1435, 3565282.262, 4954847.130, 1131.002, top 24" hdpe  
1436, 3565276.194, 4954828.929, 1131.197, top 24" hdpe  
1437, 3565269.889, 4954809.833, 1131.317, top 24" hdpe  
1438, 3565263.993, 4954791.097, 1131.393, top 24" hdpe  
1439, 3565257.770, 4954772.563, 1131.568, top 24" hdpe3  
1440, 3565251.947, 4954753.800, 1131.614, top 24" hdpe  
1441, 3565246.334, 4954734.967, 1131.720, top 24" hdpe  
1442, 3565241.882, 4954715.676, 1131.851, top 24" hdpe  
1443, 3565239.495, 4954696.027, 1131.947, top 24" hdpe  
1444, 3565237.535, 4954676.470, 1132.017, top 24" hdpe  
1445, 3565236.174, 4954656.905, 1132.156, top 24" hdpe  
1446, 3565235.030, 4954637.283, 1132.260, top 24" hdpe  
1447, 3565234.113, 4954617.614, 1132.238, top 24" hdpe  
1448, 3565233.147, 4954597.973, 1132.386, top 24" hdpe  
1449, 3565233.583, 4954578.211, 1132.541, top 24" hdpe

1450, 3565233.938, 4954558.586, 1132.715, top 24" hdpe  
1451, 3565234.219, 4954538.980, 1132.755, top 24" hdpe  
1452, 3565234.672, 4954519.462, 1132.838, top 24" hdpe  
1453, 3565235.048, 4954499.619, 1133.029, top 24" hdpe  
1454, 3565234.711, 4954479.936, 1133.147, top 24" hdpe  
1455, 3565234.573, 4954460.266, 1133.210, top 24" hdpe  
1456, 3565234.001, 4954440.713, 1133.360, top 24" hdpe  
1457, 3565232.512, 4954421.146, 1133.431, top 24" hdpe  
1458, 3565230.278, 4954401.480, 1133.541, top 24" hdpe  
1459, 3565225.372, 4954382.491, 1133.680, top 24" hdpe  
1460, 3565218.414, 4954364.362, 1133.846, top 24" hdpe  
1461, 3565209.644, 4954346.192, 1133.935, top 24" hdpe  
1462, 3565201.194, 4954328.444, 1133.979, top 24" hdpe  
1463, 3565192.766, 4954310.747, 1134.174, top 24" hdpe  
1464, 3565183.937, 4954293.183, 1134.233, top 24" hdpe  
1465, 3565175.604, 4954275.396, 1134.277, top 24" hdpe  
1466, 3565167.309, 4954257.439, 1134.412, top 24" hdpe  
1467, 3565159.577, 4954239.405, 1134.528, top 24" hdpe  
1468, 3565150.756, 4954221.806, 1134.676, top 24" hdpe  
1469, 3565142.315, 4954204.032, 1134.803, top 24" hdpe  
1470, 3565133.444, 4954186.468, 1134.833, top 24" hdpe end 24"  
1471, 3565132.699, 4954185.333, 1134.931, top 24" hdpe end  
1472, 3565132.526, 4954184.947, 1134.398, top 18" reducer  
1473, 3565124.118, 4954168.393, 1134.332, top 18" hdpe  
1474, 3565115.462, 4954150.117, 1134.554, top 18" hdpe  
1475, 3565108.100, 4954131.781, 1134.605, top 18" hdpe  
1476, 3565101.069, 4954113.461, 1134.745, top 18" hdpe  
1477, 3565094.651, 4954094.955, 1134.875, top 18" hdpe  
1478, 3565089.026, 4954076.134, 1134.951, top 18" hdpe  
1479, 3565084.224, 4954057.069, 1135.035, top 18" hdpe  
1480, 3565080.288, 4954037.786, 1135.190, top 18" hdpe  
1481, 3565076.627, 4954018.522, 1135.273, top 18" hdpe  
1482, 3565073.078, 4953999.249, 1135.375, top 18" hdpe  
1483, 3565069.221, 4953979.912, 1135.461, top 18" hdpe  
1484, 3565031.759, 4953848.079, 1136.099, TOP 18" HDPE  
1485, 3565021.516, 4953831.251, 1136.172, TOP 18" HDPE  
1486, 3565011.088, 4953814.660, 1136.217, TOP 18" HDPE  
1487, 3565000.781, 4953798.089, 1136.459, TOP 18" HDPE  
1488, 3564989.900, 4953781.550, 1136.538, TOP 18" HDPE  
1489, 3564978.781, 4953765.378, 1136.650, TOP 18" HDPE  
1490, 3564967.527, 4953749.337, 1136.800, TOP 18" HDPE  
1491, 3564956.514, 4953732.835, 1136.899, TOP 18" HDPE  
1492, 3564945.896, 4953716.387, 1136.949, TOP 18" HDPE  
1493, 3564935.576, 4953699.689, 1137.081, TOP 18" HDPE  
1494, 3564925.807, 4953682.607, 1137.046, TOP 18" HDPE  
1495, 3564915.808, 4953665.690, 1137.329, TOP 18" HDPE  
1496, 3564905.593, 4953648.864, 1137.377, TOP 18" HDPE  
1497, 3564895.712, 4953631.863, 1137.603, TOP 18" HDPE  
1498, 3564885.540, 4953614.961, 1137.616, TOP 18" HDPE  
1499, 3564875.250, 4953598.420, 1137.653, TOP 18" HDPE

1500,3564865.229,4953581.391,1137.831, TOP 18"HDPE  
1501,3564854.656,4953564.928,1137.998, TOP 18"HDPE  
1502,3564843.911,4953548.305,1137.988, TOP 18"HDPE  
1503,3564833.180,4953531.768,1138.218, TOP 18"HDPE  
1504,3564822.154,4953515.560,1138.208, TOP 18"HDPE  
1505,3564810.787,4953499.541,1138.314, TOP 18"HDPE  
1506,3564799.004,4953483.549,1138.535, TOP 18"HDPE  
1507,3564760.060,4953439.305,1139.104, top 18" hdpe  
1508,3564746.422,4953425.527,1139.226, top 18" hdpe  
1509,3564708.938,4953379.879,1139.394, top 18" hdpe  
1510,3564698.286,4953363.617,1139.449, top 18" hdpe  
1511,3564698.318,4953364.294,1139.439, top 18" hdpe end 9  
1512,3564697.075,4953362.641,1139.493, cl 18x18x18 tee  
1513,3564696.071,4953360.950,1138.562,8" reducer begin 8" hdpe  
1514,3564681.915,4953261.645,1139.372, top 8" hdpe  
1515,3564681.175,4953241.674,1139.336, top 8" hdpe  
1516,3564679.704,4953201.605,1139.558, top 8" hdpe  
1517,3564678.792,4953181.647,1139.639, top 8" hdpe  
1518,3564677.306,4953161.676,1139.607, top 8" hdpe  
1519,3564675.107,4953141.773,1139.774, top 8" hdpe  
1520,3564672.486,4953121.796,1139.930, top 8" hdpe  
1521,3564670.033,4953101.942,1140.053, top 8" hdpe  
1522,3564664.692,4953062.259,1140.207, top 8" hdpe  
1523,3564657.043,4953002.582,1140.474, top 8" hdpe  
1524,3564654.580,4952982.636,1140.600, top 8" hdpe  
1525,3564651.368,4952962.867,1140.726, top 8" hdpe  
1526,3564649.042,4952942.967,1140.796, top 8" hdpe  
1527,3564646.233,4952923.004,1140.917, top 8" hdpe  
1528,3564641.503,4952903.488,1141.054, top 8" hdpe  
1529,3564635.767,4952884.398,1141.144, top 8" hdpe  
1530,3564629.779,4952864.998,1141.245, top 8" hdpe  
1531,3564624.517,4952845.654,1141.308, top 8" hdpe  
1532,3564618.534,4952826.575,1141.430, top 8" hdpe  
1533,3564612.929,4952807.200,1141.530, top 8" hdpe  
1534,3564606.163,4952788.222,1141.658, top 8" hdpe  
1535,3564597.180,4952770.164,1141.770, top 8" hdpe  
1536,3564587.621,4952752.554,1141.899, top 8" hdpe  
1537,3564523.967,4952675.013,1142.342, top 8" hdpe  
1538,3564508.857,4952661.746,1142.440, top 8" hdpe  
1539,3564476.140,4952638.270,1142.436, top 8" hdpe  
1540,3564458.568,4952628.211,1142.482, top 8" hdpe  
1541,3564440.389,4952619.636,1142.526, top 8" hdpe  
1542,3564421.694,4952612.441,1142.590, top 8" hdpe  
1543,3564402.647,4952605.880,1142.651, top 8" hdpe  
1544,3564383.501,4952600.168,1142.621, top 8" hdpe  
1545,3564363.911,4952595.770,1142.744, top 8" hdpe  
1546,3564344.208,4952592.184,1142.800, top 8" hdpe  
1547,3564186.964,4952560.988,1143.327, top 8" hdpe  
1548,3564147.828,4952552.732,1143.394, top 8" hdpe  
1549,3564128.270,4952548.351,1143.514, top 8" hdpe

1550,3564108.584,4952544.455,1143.609,top 8" hdpe  
1551,3564088.851,4952541.404,1143.668,top 8" hdpe end 8"  
1552,3564082.753,4952540.896,1144.544,top 8" clay  
1553,3565415.217,4955129.994,1129.080,lateralconnection  
1554,3565736.220,4952286.916,1141.034,top 12" hdpe  
1555,3565753.873,4952277.789,1141.109,top 12" hdpe  
1556,3565770.917,4952267.511,1141.055,top 12" hdpe  
1557,3565787.791,4952256.978,1141.155,top 12" hdpe  
1558,3565804.097,4952245.715,1141.176,top 12" hdpe  
1559,3565835.090,4952220.708,1141.101,top 12" hdpe  
1560,3565856.756,4952205.916,1141.704,top 12" hdpe end 9c  
1600,3565807.808,4952248.941,1142.458,fl 4" clay  
1601,3567427.049,4956840.932,1111.651,fl 5" clay tile  
1602,3566197.695,4955383.240,1135.263,gs 5" pcc tile repair  
2500,3564699.002,4953361.199,1139.371,top 18" hdpe begin  
2501,3564713.412,4953349.284,1139.313,top 18" hdpe  
2502,3564728.528,4953336.855,1139.324,top 18" hdpe  
2503,3564758.630,4953311.469,1139.340,top 18" hdpe  
2504,3564789.851,4953287.551,1139.406,top 18" hdpe  
2505,3564805.575,4953275.735,1139.362,top 18" hdpe  
2506,3564821.505,4953263.920,1139.422,top 18" hdpe  
2507,3564837.203,4953252.498,1139.412,top 18" hdpe  
2508,3564837.434,4953252.618,1139.524,top hdpe tile  
2509,3564852.383,4953240.408,1139.571,top hdpe tile  
2510,3564867.784,4953227.299,1139.588,top 18" hdpe  
2511,3564883.382,4953214.724,1139.672,top 18" hdpe  
2512,3564897.338,4953201.123,1139.625,top 18" hdpe  
2513,3564911.209,4953187.146,1139.753,top 18" hdpe  
2514,3564925.586,4953173.754,1139.794,top 18" hdpe  
2515,3564939.305,4953159.532,1139.811,top 18" hdpe  
2516,3564952.174,4953144.705,1139.764,top 18" hdpe  
2517,3564964.614,4953129.339,1139.757,top 18" hdpe  
2518,3564976.998,4953114.403,1139.728,top 18" hdpe  
2519,3564989.965,4953099.369,1139.812,top 18" hdpe  
2520,3565002.452,4953084.239,1139.794,top 18" hdpe  
2521,3565015.660,4953069.672,1139.940,top 18" hdpe  
2522,3565028.336,4953054.599,1139.790,top 18" hdpe  
2523,3565040.017,4953038.830,1139.840,top 18" hdpe  
2524,3565052.732,4953023.808,1139.869,top 18" hdpe  
2525,3565064.350,4953008.046,1139.941,top 18" hdpe  
2526,3565075.523,4952991.803,1139.840,top 18" hdpe  
2527,3565085.943,4952976.185,1139.792,top 18" hdpe  
2528,3565096.996,4952958.864,1139.870,top 18" hdpe  
2529,3565130.592,4952911.017,1139.951,top 18" hdpe  
2530,3565143.183,4952895.606,1139.960,top 18" hdpe  
2531,3565155.620,4952880.135,1139.961,top 18" hdpe  
2532,3565167.472,4952864.468,1140.014,top 18" hdpe  
2533,3565179.148,4952848.754,1140.047,top 18" hdpe  
2534,3565191.464,4952833.394,1140.084,top 18" hdpe  
2535,3565203.706,4952818.022,1140.060,top 18" hdpe

2536, 3565216.288, 4952802.932, 1140.028, top 18" hdpe  
2537, 3565228.663, 4952787.625, 1140.179, top 18" hdpe  
2538, 3565240.748, 4952772.143, 1140.138, top 18" hdpe  
2539, 3565253.296, 4952756.930, 1140.082, top 18" hdpe  
2540, 3565265.585, 4952741.699, 1140.148, top 18" hdpe  
2541, 3565278.211, 4952726.592, 1140.193, top 18" hdpe  
2542, 3565291.089, 4952711.680, 1140.194, top 18" hdpe  
2543, 3565304.122, 4952696.971, 1140.160, top 18" hdpe  
2544, 3565317.344, 4952682.594, 1140.139, top 18" hdpe  
2545, 3565330.729, 4952667.917, 1140.264, top 18" hdpe  
2546, 3565343.643, 4952653.068, 1140.230, top 18" hdpe  
2547, 3565357.062, 4952638.708, 1140.323, top 18" hdpe  
2548, 3565370.227, 4952624.140, 1140.273, top 18" hdpe  
2549, 3565383.408, 4952609.611, 1140.406, top 18" hdpe  
2550, 3565396.408, 4952594.816, 1140.351, top 18" hdpe  
2551, 3565408.657, 4952579.426, 1140.435, top 18" hdpe  
2552, 3565421.263, 4952564.419, 1140.457, top 18" hdpe  
2553, 3565434.408, 4952549.814, 1140.359, top 18" hdpe  
2554, 3565546.782, 4952437.843, 1140.191, 18" - 12" reducer  
2555, 3565575.117, 4952409.609, 1140.191, top 12" hdpe  
2556, 3565589.258, 4952395.366, 1140.153, top 12" hdpe  
2557, 3565601.422, 4952379.593, 1140.208, top 12" hdpe  
2558, 3565613.070, 4952363.128, 1140.275, top 12" hdpe  
2559, 3565623.173, 4952345.595, 1140.271, top 12" hdpe  
2560, 3565632.996, 4952328.416, 1140.296, top 12" hdpe  
2561, 3565642.917, 4952311.249, 1140.345, top 12" hdpe  
2562, 3565671.260, 4952292.823, 1141.693, fl 5" vcp tile  
2563, 3565657.274, 4952297.371, 1140.394, top 12" hdpe  
2564, 3565658.195, 4952296.696, 1140.464, top 12" hdpe wye  
2565, 3565659.395, 4952295.221, 1140.489, top 12" hdpe cap  
2566, 3565659.961, 4952296.770, 1140.549, top 12" hdpe  
2567, 3565668.385, 4952296.393, 1141.009, top 12" hdpe tee for hickenbottom  
2568, 3565679.124, 4952294.543, 1139.648, ugfo 1.5+- deaper  
2569, 3565687.168, 4952293.306, 1140.781, top 12" hdpe  
2570, 3565668.729, 4952296.325, 1140.825, top 12" hdpe  
2571, 3565707.044, 4952291.702, 1140.843, top 12" hdpe  
2572, 3565705.969, 4952289.783, 1141.906, fl 6" clay  
2573, 3565714.229, 4952291.121, 1140.935, top 12" hdpe s side hickenbottom  
2574, 3565735.931, 4952287.041, 1141.042, top 12" hdpe  
4000, 3566780.370, 4956294.744, 1124.046, fl 5" clay tile  
4001, 3566634.065, 4956158.075, 1129.250, GS  
4002, 3566545.409, 4956061.738, 1124.860, fl 12" pcc tile  
4003, 3566542.299, 4956059.706, 1125.933, top 12" pcc tile  
4004, 3566546.800, 4956037.577, 1128.404, GS  
4005, 3566547.755, 4956039.992, 1126.377, fl 10" clay tile plugged  
4006, 3566033.546, 4955376.024, 1133.324, fl 4" glay tile  
4007, 3565635.003, 4955295.691, 1133.305, top 2.5 rural water  
4008, 3565635.063, 4955289.623, 1133.075, top 2.5 rural water  
4009, 3565630.365, 4955294.958, 1135.716, 5" clay lateral999  
4010, 3565295.615, 4954855.255, 1137.702, top 6" lateral

4011, 3565226.475, 4954363.720, 1139.658, fl 4" ads  
4012, 3565224.081, 4954357.780, 1139.748, fl 4" vcp  
4013, 3565216.565, 4954353.179, 1140.773, top 6" ads  
4014, 3565214.706, 4954367.577, 1139.407, top 6" ads  
4015, 3565191.498, 4954322.933, 1139.950, 4" vcp abandoned  
4030, 3565349.883, 4954831.519, 1141.266, crop dmge soybeans  
4031, 3565340.116, 4954805.527, 1141.970, crop dmge soybeans  
4032, 3565327.755, 4954778.963, 1142.144, crop dmge soybeans  
4033, 3565320.902, 4954723.150, 1142.802, crop dmge soybeans  
4034, 3565312.096, 4954694.226, 1143.101, crop dmge soybeans  
4035, 3565310.206, 4954640.635, 1143.714, crop dmge soybeans  
4036, 3565228.461, 4954643.029, 1141.503, crop dmge soybeans  
4037, 3565228.686, 4954679.713, 1141.308, crop dmge soybeans  
4038, 3565192.213, 4954682.381, 1141.970, crop dmge soybeans  
4039, 3565201.304, 4954726.726, 1141.709, crop dmge soybeans  
4040, 3565194.376, 4954740.315, 1141.869, crop dmge soybeans  
4041, 3565211.018, 4954800.950, 1141.557, crop dmge soybeans  
4042, 3565219.438, 4954829.833, 1141.088, crop dmge soybeans  
4043, 3565215.333, 4954342.479, 1139.954, fl 6" ads  
4999, 3567703.125, 4957221.047, 1109.130, top 30" hdpe  
5000, 3567683.861, 4957207.730, 1116.346, gs for polyline  
5001, 3567654.885, 4957152.435, 1116.955, gs for polyline  
5002, 3567641.808, 4957081.278, 1118.044, gs for polyline  
5003, 3567629.166, 4957009.233, 1118.427, gs for polyline  
5004, 3567620.723, 4956961.570, 1119.176, gs for polyline  
5005, 3567683.861, 4957207.730, 1109.200, polyline  
5006, 3567654.885, 4957152.435, 1109.543, polyline  
5007, 3567641.808, 4957081.278, 1109.941, polyline  
5008, 3567629.166, 4957009.233, 1110.344, polyline  
5009, 3567617.324, 4956977.023, 1110.529, polyline  
5010, 3567590.758, 4956933.953, 1110.807, polyline  
5011, 3567556.237, 4956894.828, 1111.094, polyline  
5012, 3567514.283, 4956852.854, 1111.420, polyline  
5013, 3567460.693, 4956792.991, 1111.862, polyline  
5014, 3567406.436, 4956729.846, 1112.320, polyline  
5015, 3567358.241, 4956672.273, 1112.733, polyline  
5016, 3567301.514, 4956620.544, 1113.155, polyline  
5017, 3567259.975, 4956601.070, 1113.407, polyline  
5018, 3567216.344, 4956590.163, 1113.654, polyline  
5019, 3567119.578, 4956578.963, 1114.190, polyline  
5020, 3567045.890, 4956541.374, 1114.645, polyline  
5021, 3566984.355, 4956485.515, 1115.102, polyline  
5022, 3566881.062, 4956379.061, 1115.922, polyline  
5023, 3566858.580, 4956353.185, 1116.112, polyline  
5024, 3566794.140, 4956296.248, 1116.582, polyline  
5025, 3566758.603, 4956273.238, 1116.812, polyline  
5026, 3566738.858, 4956252.861, 1116.972, polyline  
5027, 3566695.165, 4956216.885, 1117.282, polyline  
5028, 3565078.789, 4954011.326, 1142.831, exploratory  
5029, 3564912.728, 4953652.917, 1141.773, exploratory

5030,3565075.865,4953992.013,1140.444,top 6" ads lateral6  
5031,3564914.007,4953651.460,1142.100,LOCATE LAT LT 6"CLAY  
5032,3565055.001,4953928.403,1140.003,fl 4" ads lateral  
5033,3565391.853,4955142.225,1135.354,7" clay lateral  
5034,3564672.474,4953159.032,1141.116,fl 5" vcp lat  
5035,3564636.598,4952865.958,1143.235,4" clay fl  
5100,3565342.480,4954832.478,1141.264,crop dmg  
5101,3565355.644,4954878.697,1140.940,crop dmg  
5102,3565372.501,4954922.098,1141.080,crop dmg  
5103,3565393.615,4954967.861,1141.278,crop dmg  
5104,3565418.257,4955016.364,1140.916,crop dmg  
5105,3565439.784,4955076.698,1140.237,crop dmg  
5106,3565457.630,4955089.175,1140.285,crop dmg  
5107,3565486.091,4955143.946,1140.071,crop dmg  
5108,3565505.475,4955167.664,1140.121,crop dmg  
5109,3565534.534,4955188.195,1139.824,crop dmg  
5110,3565586.306,4955209.955,1139.562,crop dmg  
5111,3565597.953,4955194.860,1140.211,crop dmg  
5112,3565609.453,4955207.087,1139.963,crop dmg  
5113,3565638.249,4955223.818,1139.974,crop dmg  
5114,3565637.954,4955358.218,1141.248,crop dmg  
5115,3565625.555,4955351.921,1140.962,crop dmg  
5116,3565625.368,4955327.282,1140.132,crop dmg  
5117,3565581.212,4955321.729,1139.941,crop dmg  
5118,3565538.238,4955305.923,1139.898,crop dmg  
5119,3565496.439,4955281.753,1140.006,crop dmg  
5120,3565459.980,4955253.478,1139.917,crop dmg  
5121,3565427.581,4955221.112,1139.830,crop dmg  
5122,3565393.758,4955186.972,1139.865,crop dmg  
5123,3565356.777,4955172.721,1140.122,crop dmg  
5124,3565358.496,4955129.872,1140.262,crop dmg  
5125,3565336.220,4955083.185,1140.457,crop dmg  
5126,3565312.953,4955032.987,1140.614,crop dmg  
5127,3565289.299,4954983.406,1140.847,crop dmg  
5128,3565268.059,4954931.972,1140.956,crop dmg  
5129,3565247.489,4954881.976,1140.791,crop dmg  
5130,3565229.563,4954832.691,1141.039,crop dmg  
5150,3567978.993,4957444.913,1115.448,crqp damage  
5151,3567935.627,4957412.488,1116.266,crqp damage  
5152,3567855.316,4957359.244,1117.190,crqp damage  
5153,3567799.810,4957321.173,1117.609,crqp damage  
5154,3567750.231,4957305.943,1117.626,crqp damage  
5155,3567714.446,4957294.230,1117.935,crqp damage  
5156,3567685.876,4957250.703,1117.522,crqp damage  
5157,3567667.246,4957208.068,1117.118,crqp damage  
5158,3567613.328,4957163.024,1118.299,crqp damage  
5159,3567633.596,4957153.054,1117.674,crqp damage  
5160,3567620.739,4957098.082,1118.077,crqp damage  
5161,3567596.227,4957032.895,1118.785,crqp damage  
5162,3567572.608,4956977.415,1119.573,crqp damage

5163, 3567540.965, 4956929.918, 1120.121, crqp damage  
5164, 3567499.362, 4956889.452, 1120.560, crqp damage  
5165, 3567466.589, 4956866.542, 1120.810, crqp damage  
5166, 3567413.230, 4956863.038, 1121.256, crqp damage  
5167, 3567383.490, 4956818.425, 1121.528, crqp damage  
5168, 3567356.611, 4956784.547, 1121.829, crqp damage  
5169, 3567341.821, 4956725.610, 1122.056, crqp damage  
5170, 3567255.597, 4956667.333, 1123.455, crqp damage  
5171, 3567055.630, 4956593.774, 1126.144, crqp damage  
5172, 3567019.140, 4956565.060, 1125.774, crqp damage  
5173, 3566859.226, 4956412.938, 1127.411, crqp damage  
5174, 3566813.490, 4956362.463, 1127.444, crqp damage  
5175, 3566758.437, 4956323.956, 1127.138, crqp damage  
5176, 3566725.980, 4956297.071, 1127.458, crqp damage  
5177, 3566615.959, 4956203.745, 1130.736, crqp damage  
5178, 3566552.839, 4956147.712, 1132.144, crqp damage  
5179, 3566528.069, 4956109.253, 1131.565, crqp damage  
5180, 3566492.011, 4956071.029, 1131.486, crqp damage  
5181, 3566472.615, 4955996.731, 1131.001, crqp damage  
5182, 3566453.674, 4955912.133, 1131.768, crqp damage  
5183, 3566432.879, 4955854.035, 1132.772, crqp damage  
5184, 3566403.671, 4955802.085, 1133.684, crqp damage  
5185, 3566369.350, 4955746.203, 1134.325, crqp damage  
5186, 3566330.798, 4955699.873, 1135.199, crqp damage  
5187, 3566297.256, 4955643.073, 1135.038, crqp damage  
5188, 3566209.182, 4955515.239, 1135.783, crqp damage  
5189, 3566201.218, 4955495.058, 1135.750, crqp damage  
5190, 3566178.582, 4955472.118, 1135.969, crqp damage  
5191, 3566102.630, 4955440.550, 1137.110, crqp damage  
5192, 3566048.556, 4955431.220, 1137.846, crqp damage  
5193, 3566045.750, 4955419.188, 1137.334, crqp damage  
5194, 3565997.075, 4955404.678, 1137.430, crqp damage  
5195, 3565975.712, 4955394.675, 1137.523, crqp damage  
5196, 3565854.607, 4955362.719, 1138.010, crqp damage  
5197, 3565803.697, 4955350.335, 1138.323, crqp damage  
5198, 3565743.860, 4955343.841, 1139.032, crqp damage  
5199, 3565718.964, 4955347.515, 1139.199, crqp damage  
5201, 3565872.253, 4955289.590, 1137.513, crqp damage  
5202, 3565923.623, 4955287.222, 1137.647, crqp damage  
5203, 3565925.390, 4955293.811, 1137.502, crqp damage  
5204, 3565968.927, 4955302.938, 1136.879, crqp damage  
5205, 3565996.209, 4955326.538, 1136.252, crqp damage  
5206, 3565930.684, 4955307.023, 1136.951, crqp damage  
5208, 3566096.227, 4955340.803, 1136.088, crqp damage  
5209, 3566139.807, 4955352.202, 1135.926, crqp damage  
5210, 3566201.113, 4955357.030, 1136.242, crqp damage  
5211, 3566190.894, 4955370.568, 1136.155, crqp damage  
5212, 3566151.678, 4955364.440, 1135.787, crqp damage  
5213, 3566097.064, 4955350.602, 1135.859, crqp damage  
5215, 3567078.904, 4956489.334, 1124.331, crqp damage



5216,3567141.781,4956506.401,1123.696,crqp damage  
5217,3567174.170,4956509.094,1123.530,crqp damage  
5218,3567233.389,4956530.256,1123.257,crqp damage  
5219,3567272.462,4956547.956,1123.163,crqp damage  
5220,3567310.407,4956575.884,1122.980,crqp damage  
5221,3567261.183,4956561.601,1122.904,crqp damage  
5222,3567212.568,4956547.226,1123.040,crqp damage  
5223,3567157.501,4956535.649,1123.344,crqp damage  
5224,3567110.747,4956516.048,1123.860,crqp damage  
6000,3568130.470,4960007.454,1105.526,top 18" pcc begin  
6001,3568145.022,4960013.503,1105.661,top 18" rcp  
6002,3568159.620,4960020.266,1105.697,top 18" rcp  
6003,3568173.706,4960027.986,1105.447,top 18" rcp  
6004,3568187.434,4960036.691,1104.846,top 18" rcp  
6005,3568201.482,4960044.737,1104.458,top 18" rcp  
6006,3568215.504,4960052.641,1104.028,top 18" rcp  
6007,3568229.412,4960060.884,1103.743,top 18" rcp  
6008,3568243.048,4960069.728,1103.569,top 18" rcp  
6009,3568255.597,4960079.708,1103.407,top 18" rcp  
6010,3568268.476,4960089.394,1103.082,top 18" rcp  
6011,3568293.902,4960107.047,1100.580,fl 24" cmp outlet  
6012,3568296.987,4960109.145,1102.452,top 24" cmp  
6100,3568266.705,4960088.119,1104.022,top rim inlet  
6101,3568306.947,4960088.588,1106.942,end headwall sheet piling  
6102,3568295.117,4960107.583,1104.440,cl headwall sheet piling  
6103,3568282.754,4960126.873,1106.654,end headwall sheet piling  
6104,3568297.511,4960101.464,1104.695,edge revetment  
6105,3568265.978,4960081.310,1104.911,edge revetment  
6106,3568261.473,4960091.158,1104.707,edge revetment  
6107,3568289.106,4960114.006,1103.614,edge revetment  
6108,3568285.416,4960122.784,1106.926,top headwall cap  
6109,3568290.267,4960114.462,1106.966,top headwall cap  
6110,3568293.418,4960109.591,1104.496,top headwall cap  
6111,3568296.463,4960105.478,1104.516,top headwall cap  
6112,3568298.873,4960100.868,1107.146,top headwall cap  
6113,3568305.021,4960091.526,1107.002,top headwall cap  
6114,3568296.929,4960145.504,1109.703,seeding limits  
6115,3568271.299,4960149.767,1111.334,seeding limits  
6116,3568244.072,4960137.133,1110.802,seeding limits  
6117,3568198.501,4960122.053,1109.875,seeding limits  
6118,3568195.804,4960077.594,1108.427,seeding limits  
6119,3568223.115,4960026.116,1110.251,seeding limits  
6120,3568266.981,4960033.222,1110.166,seeding limits  
6121,3568340.402,4960086.749,1108.987,seeding limits  
6122,3568329.340,4960099.481,1108.814,seeding limits  
6123,3568325.849,4960104.455,1106.877,eo rip rap  
6124,3568305.467,4960092.047,1106.253,eo rip rap  
6125,3568286.661,4960121.461,1105.223,eo rip rap  
6126,3568304.381,4960131.518,1105.763,eo rip rap  
6127,3568303.217,4960123.535,1102.012,eo grouted rip rap

6128,3568290.156,4960116.231,1101.667,eo grouted rip rap  
6129,3568315.439,4960106.290,1103.024,eo grouted rip rap  
6130,3568302.275,4960097.967,1102.199,eo grouted rip rap  
7000,3566797.138,4956293.485,1126.658,gs for polyline  
8000,3566505.873,4960123.554,1138.950,cpt #3  
8013,3570961.250,4946914.650,1189.250,ALUM DISK  
8028,3570914.710,4964044.160,1087.480,ALUM DISK  
8028\_GNSS,3570914.710,4964044.160,1087.480,Autonomous Setup  
9000,3568022.614,4960121.025,1117.441,FNL N S  
9001,3568021.875,4960117.643,1115.375,GS  
9002,3568020.630,4960104.060,1114.375,GS  
9003,3568020.858,4960077.642,1111.934,GS  
9004,3568020.936,4960049.808,1110.651,GS  
9005,3568020.853,4960019.639,1110.817,GS  
9006,3568020.628,4959985.230,1111.100,GS  
9007,3568020.316,4959950.128,1113.151,GS  
9008,3568020.003,4959915.191,1116.334,GS  
9009,3568018.927,4959882.431,1120.650,GS  
9010,3568019.192,4959842.577,1124.543,GS  
9011,3568058.611,4959842.602,1125.143,GS  
9012,3568059.042,4959877.657,1122.352,GS  
9013,3568059.193,4959911.695,1118.145,GS  
9014,3568059.198,4959946.562,1113.819,GS  
9015,3568059.563,4959979.486,1111.552,GS  
9016,3568059.653,4960014.157,1110.539,GS  
9017,3568060.608,4960049.729,1110.582,GS  
9018,3568062.569,4960085.544,1110.725,GS  
9019,3568062.742,4960111.510,1112.051,GS  
9020,3568062.994,4960117.885,1112.857,GS  
9021,3568065.031,4960121.661,1114.728,FNL  
9022,3568065.086,4960131.278,1115.207,GS  
9023,3568064.823,4960161.871,1116.162,GS  
9024,3568065.047,4960199.411,1118.617,GS  
9025,3568024.527,4960197.866,1119.465,GS  
9026,3568103.599,4960198.645,1117.075,GS  
9027,3568103.363,4960153.784,1114.039,GS  
9028,3568104.547,4960129.961,1113.550,GS  
9029,3568105.242,4960121.852,1112.495,FNL  
9030,3568145.733,4960122.492,1111.054,FNL  
9031,3568145.618,4960129.234,1112.248,GS  
9032,3568146.720,4960160.484,1113.005,GS  
9033,3568149.345,4960203.040,1115.953,GS  
9034,3568151.625,4960244.831,1120.548,GS  
9035,3568195.519,4960245.383,1119.370,GS  
9036,3568197.166,4960203.399,1114.676,GS  
9037,3568199.938,4960161.828,1112.134,GS  
9038,3568201.593,4960132.946,1111.273,GS  
9039,3568201.633,4960121.948,1109.718,FNL  
9040,3568193.590,4960115.026,1108.977,TRD EDGE OF BRUSH  
9041,3568191.394,4960124.633,1110.917,TRD EDGE OF BRUSH

9042,3568181.427,4960124.635,1110.865,TRD EDGE OF BRUSH  
9043,3568195.841,4960112.441,1108.593,GS RUBBLE  
9044,3568200.944,4960101.949,1105.802,GS RUBBLE  
9045,3568209.245,4960097.487,1104.177,FL RUBBLE  
9046,3568202.787,4960094.408,1104.175,FL RUBBLE  
9047,3568213.883,4960087.850,1102.076,FL RUBBLE  
9048,3568212.984,4960075.025,1106.471,GS EDGE OF BRUSH  
9049,3568218.272,4960070.759,1107.459,TB  
9050,3568218.333,4960074.570,1106.632,TB  
9051,3568227.638,4960079.885,1104.598,TOP CMP  
9052,3568228.338,4960080.653,1102.669,CMP FL  
9053,3568222.189,4960077.732,1099.945,TOE  
9054,3568226.207,4960075.984,1100.366,TOE  
9055,3568222.318,4960065.922,1099.554,TOE  
9057,3568226.273,4960062.871,1099.818,TOE  
9058,3568219.934,4960055.663,1099.842,TOE  
9059,3568223.181,4960056.353,1099.849,TOE  
9060,3568217.957,4960048.099,1100.268,TOE  
9061,3568214.836,4960051.071,1100.163,TOE  
9062,3568209.748,4960045.189,1100.172,TOE  
9063,3568217.312,4960037.649,1101.668,TOE  
9064,3568209.660,4960030.528,1101.818,TOE  
9065,3568206.740,4960032.685,1101.677,TOE  
9066,3568198.565,4960027.961,1101.717,TOE  
9067,3568196.859,4960025.548,1101.969,TOE  
9068,3568195.328,4960031.811,1101.789,TOE  
9069,3568193.011,4960030.618,1101.582,TOE  
9070,3568188.462,4960031.267,1101.812,TOE  
9071,3568186.353,4960033.749,1101.826,TOE  
9072,3568179.557,4960027.222,1102.144,TOE  
9073,3568180.511,4960020.260,1103.594,GS  
9074,3568175.646,4960035.420,1104.266,GS  
9075,3568162.357,4960030.179,1103.707,GS  
9076,3568165.871,4960023.304,1102.285,TOE  
9077,3568167.449,4960021.201,1102.115,TOE  
9078,3568168.355,4960015.855,1103.906,GS  
9079,3568157.067,4960014.968,1102.541,TOE  
9080,3568152.762,4960012.123,1102.531,TOE  
9081,3568149.103,4960012.888,1102.608,TOE  
9082,3568147.179,4960016.369,1102.631,TOE  
9083,3568146.940,4960013.653,1105.568,TOP CONC TILE  
9084,3568147.485,4960013.957,1103.931,FL CONC TILE  
9085,3568143.983,4960016.012,1104.374,GS  
9086,3568143.245,4960020.424,1103.396,TOE  
9087,3568153.430,4960026.314,1102.920,TOE  
9088,3568144.918,4960028.966,1103.139,TOE  
9089,3568137.138,4960027.745,1103.304,TOE  
9090,3568135.756,4960020.050,1103.465,TOE  
9091,3568127.197,4960022.952,1103.212,TOE  
9092,3568124.324,4960025.315,1102.938,TOE

9093, 3568126.237, 4960027.719, 1103.058, TOE  
9094, 3568120.349, 4960017.369, 1110.295, TB  
9095, 3568118.060, 4960023.637, 1110.240, TB  
9096, 3568127.317, 4960015.879, 1110.341, TB  
9097, 3568139.779, 4960010.931, 1110.804, TB  
9098, 3568151.462, 4960007.261, 1110.939, TB  
9099, 3568148.195, 4960008.371, 1110.876, TB  
9100, 3568146.767, 4960010.762, 1110.641, TB  
9101, 3568157.049, 4960008.099, 1110.918, TB  
9102, 3568162.766, 4960011.249, 1110.634, TB  
9103, 3568174.384, 4960008.844, 1110.664, TB  
9104, 3568183.256, 4960014.559, 1109.888, TB  
9105, 3568186.334, 4960013.514, 1110.195, TB  
9106, 3568193.620, 4960009.628, 1110.313, TB  
9107, 3568194.066, 4960012.077, 1106.152, GS  
9108, 3568204.467, 4960008.702, 1110.278, TB  
9109, 3568205.075, 4960011.941, 1106.622, GS  
9110, 3568213.989, 4960008.872, 1110.337, TB  
9111, 3568212.850, 4960011.745, 1106.593, GS  
9112, 3568222.797, 4960014.862, 1109.962, TB  
9113, 3568220.748, 4960016.937, 1105.411, GS  
9114, 3568229.091, 4960023.647, 1109.654, TB  
9115, 3568225.625, 4960024.797, 1105.925, GS  
9116, 3568233.701, 4960034.589, 1109.062, TB  
9117, 3568230.135, 4960033.525, 1104.482, GS  
9118, 3568234.825, 4960036.562, 1109.033, TRD 6"BOXELD MULTIPLE  
9119, 3568236.699, 4960044.363, 1108.458, TB  
9120, 3568234.239, 4960045.215, 1105.611, GS  
9121, 3568243.217, 4960052.075, 1108.414, TB  
9122, 3568240.816, 4960053.026, 1105.758, GS  
9123, 3568243.592, 4960055.507, 1108.085, TRD 20"COTTON [3] 10'E  
9124, 3568244.509, 4960061.898, 1108.029, TB  
9125, 3568242.291, 4960061.286, 1105.976, GS  
9126, 3568243.071, 4960067.535, 1108.035, TB  
9127, 3568240.593, 4960067.332, 1104.065, GS  
9128, 3568250.887, 4960071.768, 1107.573, TB  
9129, 3568248.989, 4960074.751, 1105.121, GS  
9130, 3568257.148, 4960074.385, 1106.751, TB  
9131, 3568246.557, 4960081.357, 1103.219, GS  
9132, 3568246.678, 4960083.823, 1099.443, TOE  
9133, 3568235.500, 4960083.145, 1099.688, TOE  
9134, 3568229.963, 4960088.846, 1098.802, TOE  
9135, 3568226.162, 4960094.359, 1100.771, GS  
9136, 3568234.388, 4960100.895, 1106.319, GS  
9137, 3568236.238, 4960104.407, 1107.388, TB  
9138, 3568235.793, 4960109.356, 1107.696, GS RUBBLE  
9139, 3568238.834, 4960113.872, 1108.221, GS RUBBLE  
9140, 3568243.265, 4960119.769, 1109.018, GS RUBBLE  
9141, 3568247.151, 4960125.498, 1110.505, GS RUBBLE  
9142, 3568239.576, 4960132.444, 1110.279, GS RUBBLE

9143, 3568236.683, 4960120.508, 1109.756, TB RUBBLE  
9144, 3568232.292, 4960136.984, 1110.651, GS RUBBLE  
9145, 3568223.093, 4960133.174, 1110.526, GS RUBBLE  
9146, 3568219.243, 4960128.334, 1110.698, GS RUBBLE  
9147, 3568218.202, 4960116.001, 1107.857, GS RUBBLE TILE  
9148, 3568221.294, 4960109.779, 1107.056, GS RUBBLE TILE6"ALUM CMP  
9149, 3568208.720, 4960114.654, 1108.257, GS RUBBLE  
9150, 3568211.658, 4960106.972, 1107.170, TB RUBBLE  
9151, 3568227.651, 4960141.160, 1110.917, GS CROP LN  
9152, 3568227.802, 4960162.509, 1111.775, GS CROP LN  
9153, 3568229.322, 4960200.864, 1113.754, GS CROP LN  
9154, 3568229.852, 4960239.339, 1116.990, GS CROP LN  
9155, 3568263.301, 4960264.823, 1120.758, GS  
9156, 3568282.133, 4960266.274, 1120.687, FNL E W  
9157, 3568283.386, 4960224.340, 1114.920, FNL E W  
9158, 3568271.581, 4960222.831, 1115.213, GS  
9159, 3568269.183, 4960191.490, 1112.588, GS  
9160, 3568282.436, 4960191.412, 1111.508, FNL  
9161, 3568283.160, 4960158.671, 1109.969, FNL  
9162, 3568271.932, 4960157.940, 1111.618, GS  
9163, 3568267.360, 4960134.903, 1110.525, GS  
9164, 3568283.006, 4960122.324, 1109.188, FNL WCP  
9165, 3568081.858, 4960114.694, 1111.420, GS CROPLN  
9166, 3568083.386, 4960095.196, 1110.723, GS CROPLN  
9167, 3568085.813, 4960065.908, 1110.317, GS CROPLN  
9168, 3568089.748, 4960047.013, 1110.154, GS CROPLN  
9169, 3568100.668, 4960027.760, 1110.205, GS CROPLN  
9170, 3568114.920, 4960020.077, 1110.330, GS CROPLN  
9171, 3568116.317, 4960000.386, 1110.978, GS  
9172, 3568117.772, 4959961.389, 1113.694, GS  
9173, 3568118.138, 4959924.054, 1117.691, GS  
9174, 3568153.602, 4959907.253, 1120.263, GS  
9175, 3568155.219, 4959944.022, 1115.251, GS  
9176, 3568158.653, 4959979.917, 1112.393, GS  
9177, 3568187.103, 4959999.048, 1111.542, GS  
9178, 3568184.024, 4960005.465, 1111.301, GS CROPLN  
9179, 3568211.684, 4959998.423, 1111.568, GS CROPLN  
9180, 3568211.511, 4959959.550, 1114.487, GS  
9181, 3568213.229, 4959918.710, 1119.638, GS  
9182, 3568247.616, 4959888.167, 1121.915, GS  
9183, 3568272.945, 4959887.941, 1122.185, GS CROPLN  
9184, 3568284.372, 4959888.485, 1122.885, FNL E W  
9185, 3568283.797, 4959923.448, 1120.939, FNL E W  
9186, 3568270.610, 4959923.419, 1119.023, GS CROPLN  
9187, 3568245.607, 4959923.905, 1118.487, GS  
9188, 3568245.983, 4959959.580, 1114.163, GS  
9189, 3568245.789, 4959976.155, 1112.569, GS CROPLN  
9190, 3568258.189, 4959963.049, 1114.006, GS CROPLN  
9191, 3568277.753, 4959962.739, 1115.172, GS  
9192, 3568283.025, 4959959.923, 1117.308, FNL CEDAR POST

9193, 3568282.460, 4960005.421, 1112.631, FNL  
9194, 3568277.827, 4960004.875, 1111.423, GS  
9195, 3568253.108, 4960006.366, 1110.945, GS  
9196, 3568251.500, 4960039.996, 1109.500, GS  
9197, 3568280.037, 4960041.410, 1109.378, GS  
9198, 3568283.180, 4960067.379, 1108.126, FNL  
9199, 3568277.218, 4960066.048, 1107.632, GS  
9200, 3568282.679, 4960084.890, 1106.765, FNL ENDS  
9201, 3568275.326, 4960082.476, 1106.766, TB  
9202, 3568274.262, 4960088.057, 1102.870, GS  
9203, 3568271.094, 4960068.212, 1107.815, GS  
9204, 3568121.374, 4960030.501, 1107.419, TB RUBBLE  
9205, 3568124.608, 4960031.947, 1109.582, TB  
9206, 3568137.095, 4960032.922, 1110.097, TB  
9207, 3568150.470, 4960033.824, 1109.722, TB  
9208, 3568157.475, 4960032.272, 1109.579, TB  
9209, 3568160.153, 4960036.750, 1109.248, TB  
9210, 3568160.391, 4960041.098, 1110.087, TRD 12PRONG MUL 10'E  
9211, 3568173.314, 4960039.083, 1109.484, TB  
9212, 3568187.398, 4960037.290, 1109.203, TB  
9213, 3568196.935, 4960036.499, 1109.433, TB  
9214, 3568205.469, 4960050.868, 1109.009, TB  
9215, 3568210.319, 4960056.513, 1108.905, TB  
9216, 3568216.824, 4960063.605, 1108.344, TB  
9217, 3568217.922, 4960068.907, 1107.661, TB  
9218, 3568206.276, 4960069.476, 1107.939, GS  
9219, 3568197.645, 4960068.784, 1107.566, GS  
9220, 3568193.010, 4960073.136, 1106.709, GS RUBBLE  
9221, 3568188.742, 4960073.720, 1104.689, FL RUBBLE  
9222, 3568186.220, 4960074.507, 1106.512, GS RUBBLE  
9223, 3568179.755, 4960068.088, 1105.557, GS RUBBLE  
9224, 3568171.950, 4960065.812, 1106.833, GS RUBBLE  
9225, 3568166.551, 4960071.277, 1109.082, GS  
9226, 3568169.367, 4960078.006, 1109.052, GS  
9227, 3568172.853, 4960087.189, 1107.130, GS  
9228, 3568181.404, 4960092.236, 1107.990, GS RUBBLE  
9229, 3568179.115, 4960104.005, 1107.132, GS RUBBLE  
9230, 3568172.995, 4960104.007, 1107.690, GS  
9231, 3568169.893, 4960109.003, 1109.093, GS  
9232, 3568170.064, 4960120.573, 1109.693, FNL  
9233, 3568146.776, 4960120.364, 1109.900, FNL  
9234, 3568147.571, 4960110.048, 1109.467, GS  
9235, 3568151.582, 4960102.520, 1109.480, GS EDGE BRUSH  
9236, 3568143.912, 4960093.175, 1109.982, GS EDGE BRUSH  
9237, 3568147.351, 4960081.227, 1109.525, GS EDGE BRUSH  
9238, 3568156.983, 4960074.618, 1109.502, GS EDGE BRUSH  
9239, 3568164.597, 4960071.777, 1109.272, GS  
9240, 3568158.150, 4960065.543, 1108.958, GS  
9241, 3568158.142, 4960060.627, 1107.646, GS  
9242, 3568142.418, 4960064.780, 1109.741, GS

9243, 3568133.516, 4960057.928, 1110.167, GS  
9244, 3568137.516, 4960051.535, 1108.105, GS  
9245, 3568138.278, 4960046.653, 1108.618, GS  
9246, 3568138.462, 4960041.079, 1109.972, GS  
9247, 3568127.141, 4960041.462, 1110.160, GS  
9248, 3568126.017, 4960045.539, 1108.709, GS  
9249, 3568125.641, 4960049.266, 1108.884, GS  
9250, 3568125.087, 4960053.094, 1110.009, GS  
9251, 3568125.038, 4960071.449, 1110.322, GS  
9252, 3568122.681, 4960088.317, 1110.042, GS OLDWIREPLANTER  
9253, 3568126.078, 4960100.520, 1109.866, GS  
9254, 3568119.078, 4960116.021, 1110.077, GS  
9255, 3568104.614, 4960100.229, 1110.363, GS  
9256, 3568289.020, 4959879.506, 1121.822, GS  
9257, 3568324.024, 4959877.670, 1119.552, GS  
9258, 3568365.581, 4959874.851, 1117.777, GS  
9259, 3568408.342, 4959872.687, 1116.162, GS  
9260, 3568453.004, 4959868.449, 1114.603, GS  
9261, 3568490.967, 4959862.668, 1112.765, GS GRASS/FIELD  
9262, 3568492.321, 4959911.972, 1114.448, GS GRASS/FIELD  
9263, 3568444.773, 4959910.174, 1116.366, GS  
9264, 3568399.339, 4959908.174, 1117.417, GS  
9265, 3568354.487, 4959907.049, 1118.673, GS  
9266, 3568291.556, 4959910.243, 1120.272, GS  
9267, 3568290.107, 4959961.915, 1116.151, GS  
9268, 3568335.520, 4959962.895, 1117.849, GS  
9269, 3568386.106, 4959958.036, 1119.414, GS  
9270, 3568434.783, 4959950.993, 1117.818, GS  
9271, 3568481.648, 4959944.667, 1115.830, GS  
9272, 3568493.458, 4959943.005, 1115.298, GS FIELD/GRASS  
9273, 3568493.473, 4959993.910, 1113.357, GS FIELD/GRASS  
9274, 3568449.053, 4959994.352, 1116.282, GS  
9275, 3568404.861, 4959993.084, 1118.097, GS  
9276, 3568356.164, 4959992.041, 1117.385, GS  
9277, 3568311.861, 4959991.715, 1113.889, GS  
9278, 3568311.022, 4960002.681, 1112.934, CPT  
9279, 3568291.564, 4959991.227, 1113.380, GS  
9280, 3568293.522, 4960041.201, 1110.321, GS  
9281, 3568338.237, 4960041.219, 1111.377, GS  
9282, 3568381.225, 4960038.975, 1113.261, GS  
9283, 3568424.356, 4960037.418, 1113.256, GS  
9284, 3568467.294, 4960038.517, 1111.355, GS  
9285, 3568504.155, 4960039.635, 1109.596, GS  
9286, 3568505.982, 4960029.329, 1110.441, GS GRASS/FIELD  
9287, 3568493.553, 4960030.053, 1110.970, GS GRASS/FIELD  
9288, 3568504.032, 4960089.196, 1106.834, GS  
9289, 3568460.140, 4960090.639, 1107.829, GS  
9290, 3568420.488, 4960091.878, 1108.496, GS  
9291, 3568374.926, 4960091.358, 1109.056, GS  
9292, 3568344.701, 4960090.856, 1108.943, GS TREEEDGE

9293, 3568391.640, 4960105.630, 1108.572, GS TREEEDGE  
9294, 3568433.249, 4960105.687, 1108.108, GS TREEEDGE  
9295, 3568434.658, 4960115.903, 1106.783, GS TB TREEEDGE  
9296, 3568448.905, 4960120.667, 1106.196, GS TB TREEEDGE  
9297, 3568272.201, 4960079.314, 1106.980, CPT  
9298, 3568278.130, 4960089.395, 1105.294, TB  
9299, 3568287.791, 4960108.783, 1100.046, CPT NAIL  
9300, 3568276.760, 4960093.237, 1099.473, TOE  
9301, 3568273.608, 4960102.423, 1100.511, TOE  
9302, 3568246.494, 4960086.649, 1099.900, TOE  
9303, 3568249.218, 4960093.938, 1099.901, TOE  
9304, 3568249.319, 4960099.306, 1106.339, TB  
9305, 3568277.466, 4960113.325, 1107.085, TB  
9306, 3568284.832, 4960093.009, 1105.398, TB  
9307, 3568309.734, 4960111.038, 1099.631, TOE  
9308, 3568311.905, 4960098.414, 1107.139, TB  
9309, 3568304.110, 4960119.032, 1098.785, TOE  
9310, 3568299.167, 4960119.316, 1105.197, TB  
9311, 3568331.083, 4960131.991, 1098.587, TOE  
9312, 3568329.001, 4960136.541, 1106.384, TB  
9313, 3568332.732, 4960120.781, 1098.754, TOE  
9314, 3568368.649, 4960136.577, 1098.849, CPT X  
9315, 3568355.635, 4960117.938, 1106.925, TB  
9316, 3568356.592, 4960126.887, 1099.002, TOE  
9317, 3568355.781, 4960137.803, 1098.697, TOE  
9318, 3568349.519, 4960142.444, 1105.221, TB  
9319, 3568384.190, 4960142.156, 1098.018, TOE  
9320, 3568383.410, 4960133.525, 1098.022, TOE  
9321, 3568381.775, 4960126.126, 1105.138, TB  
9322, 3568378.220, 4960149.461, 1105.034, TB  
9323, 3568418.811, 4960132.848, 1097.796, TOE  
9324, 3568416.617, 4960126.256, 1097.940, TOE  
9325, 3568430.308, 4960132.682, 1097.000, TOE  
9326, 3568430.420, 4960128.260, 1096.677, TOE  
9327, 3568451.334, 4960138.023, 1097.493, TOE  
9328, 3568451.477, 4960131.479, 1097.429, TOE  
9329, 3568471.479, 4960124.283, 1097.397, TOE  
9330, 3568471.715, 4960132.713, 1097.052, TOE  
9331, 3568472.210, 4960110.628, 1106.407, TB  
9332, 3568427.222, 4960114.947, 1107.104, TB  
9333, 3568411.548, 4960120.162, 1106.477, TB  
9334, 3568334.320, 4960100.555, 1107.826, TB  
9335, 3568282.856, 4960416.624, 1131.620, FNL E-W  
9336, 3568288.410, 4960417.399, 1130.823, GS  
9337, 3568331.117, 4960420.291, 1129.320, GS  
9338, 3568378.503, 4960418.595, 1127.807, GS  
9339, 3568422.178, 4960416.853, 1126.827, GS  
9340, 3568463.611, 4960416.574, 1125.044, GS  
9341, 3568505.734, 4960416.406, 1122.988, GS  
9342, 3568505.689, 4960366.360, 1123.134, GS



9343, 3568462.452, 4960365.611, 1124.835, GS  
9344, 3568415.043, 4960363.227, 1126.240, GS  
9345, 3568366.059, 4960361.585, 1125.860, GS  
9346, 3568318.807, 4960360.278, 1126.579, GS  
9347, 3568297.827, 4960356.425, 1126.905, GS  
9348, 3568282.421, 4960351.859, 1128.839, FNL E-W  
9349, 3568253.217, 4960354.239, 1127.697, GS  
9350, 3568207.952, 4960350.858, 1127.314, GS  
9351, 3568163.118, 4960349.680, 1126.489, GS  
9352, 3568136.897, 4960349.203, 1125.934, GS  
9353, 3568146.594, 4960391.921, 1127.063, GS  
9354, 3568195.002, 4960392.515, 1128.486, GS  
9355, 3568242.216, 4960393.404, 1129.413, GS  
9356, 3568268.102, 4960390.320, 1129.657, GS CROPLN  
9357, 3568254.968, 4960361.784, 1128.254, GS CROPLN  
9358, 3568234.361, 4960361.237, 1127.937, GS CROPLN  
9359, 3568268.837, 4960375.609, 1129.442, TRD 48 MUL 18' TO N  
9360, 3568271.752, 4960294.374, 1123.841, TRD 72 MAPLE 12' TO N  
9361, 3568282.313, 4960309.408, 1125.538, FNL E-W  
9362, 3568293.977, 4960307.514, 1122.459, GS  
9363, 3568347.985, 4960300.264, 1119.528, GS  
9364, 3568399.781, 4960300.533, 1119.568, GS  
9365, 3568452.979, 4960298.384, 1118.733, GS  
9366, 3568505.675, 4960297.183, 1117.772, GS  
9367, 3568513.124, 4960249.101, 1111.634, GS  
9368, 3568462.630, 4960249.932, 1112.943, GS  
9369, 3568411.050, 4960248.734, 1113.796, GS  
9370, 3568361.264, 4960248.843, 1114.230, GS  
9371, 3568312.551, 4960246.444, 1115.180, GS  
9372, 3568292.179, 4960238.654, 1115.142, GS  
9373, 3568291.630, 4960195.756, 1111.873, GS TREE JUNK  
9374, 3568327.470, 4960194.320, 1112.322, GS TREE JUNK  
9375, 3568382.016, 4960196.533, 1110.318, GS TREE JUNK  
9376, 3568441.115, 4960173.796, 1108.273, GS TREE JUNK  
9377, 3568495.082, 4960163.454, 1106.674, GS TREE JUNK  
9378, 3568518.232, 4960170.058, 1106.329, GS TREE JUNK  
9379, 3568548.430, 4960165.018, 1105.583, GS TREE JUNK  
9380, 3568517.582, 4960146.000, 1103.575, TB  
9381, 3568494.516, 4960145.674, 1103.922, TB  
9382, 3568461.785, 4960151.131, 1105.738, TB  
9383, 3568407.995, 4960153.627, 1107.998, TB  
9384, 3568381.169, 4960154.608, 1106.829, TB  
9401, 3568131.480, 4960000.965, 1089.750, connect to existing  
9402, 3568193.319, 4960051.718, 1089.750, concrete collar  
9403, 3568245.231, 4960080.614, 1089.750, tee  
9404, 3568271.881, 4960095.448, 1089.750, intake  
9405, 3568298.094, 4960110.038, 1089.750, outlet  
9406, 3568304.425, 4960088.384, 1089.750, headwall  
9407, 3568283.025, 4960126.829, 1089.750, headwall  
9408, 3568221.294, 4960109.779, 1089.750, concrete collar

10000,3568056.478,4957436.881,1113.537,GS RURAL WATER  
10001,3568006.905,4957437.404,1113.686,GS RURAL WATER  
10002,3567968.332,4957440.733,1115.720,GS RURAL WATER  
10003,3568001.388,4957431.738,1109.662,FL CONC TILE  
10004,3567979.930,4957417.234,1115.045,GS TILELOCATE  
10005,3567945.068,4957393.808,1115.602,GS TILELOCATE  
10006,3567964.142,4957406.515,1115.084,GS TILELOCATE  
10007,3567945.139,4957393.989,1115.564,GS TILELOCATE  
10008,3567909.624,4957369.160,1115.895,GS TILELOCATE  
10009,3567906.893,4957368.237,1110.111,GS TILELOCATE  
10010,3567871.945,4957340.848,1115.471,GS TILELOCATE  
10011,3567818.696,4957306.430,1115.245,GS TILELOCATE  
10012,3567767.298,4957270.355,1115.529,GS TILELOCATE  
10013,3567742.890,4957250.333,1115.802,GS TILELOCATE  
10014,3567734.845,4957247.969,1110.130,FL CONC TILE  
10015,3567701.094,4957227.446,1116.252,GS TILELOCATE  
10016,3567667.644,4957194.671,1116.734,GS TILELOCATE  
10017,3567647.923,4957176.327,1111.614,FL CONCTILE  
10018,3567642.660,4957138.861,1117.441,GS TILELOCATE  
10019,3567636.506,4957095.956,1117.820,GS TILELOCATE  
10020,3567629.824,4957045.778,1118.334,GS TILELOCATE  
10021,3567621.675,4957003.155,1113.230,FL CLAYTILE  
10022,3567598.004,4956955.911,1119.336,GS TILELOCATE  
10023,3567544.786,4956913.871,1114.151,FL CLAYTILE  
10024,3567500.506,4956881.668,1120.498,GS TILELOCATE  
10025,3567463.837,4956854.641,1120.866,GS TILELOCATE  
10026,3567419.864,4956830.866,1121.132,GS TILELOCATE  
10027,3567408.665,4956823.802,1115.634,FL CLAYTILE  
10028,3567383.013,4956804.090,1121.474,GS TILELOCATE  
10029,3567361.540,4956757.520,1121.911,GS TILELOCATE  
10030,3567357.361,4956720.181,1116.129,FL CLAYTILE  
10031,3567352.181,4956686.427,1121.883,GS TILELOCATE  
10032,3567332.313,4956638.200,1122.061,GS TILELOCATE  
10033,3567305.318,4956584.941,1116.763,FL CLAYTILE  
10034,3567278.768,4956561.299,1123.003,GS TILELOCATE  
10035,3567239.052,4956543.011,1123.104,GS TILELOCATE  
10036,3567200.495,4956531.305,1123.264,GS TILELOCATE  
10037,3567172.386,4956523.892,1118.485,FL CLAYTILE  
10038,3567116.628,4956509.962,1123.870,GS TILELOCATE  
10039,3567061.363,4956495.593,1123.982,GS TILELOCATE  
10040,3567011.474,4956479.332,1119.815,FL CLAYTILE  
10041,3566969.492,4956446.278,1124.388,GS TILELOCATE  
10042,3566937.742,4956406.365,1120.842,FL CLAYTILE  
10043,3566909.127,4956351.961,1125.215,GS TILELOCATE  
10044,3566868.362,4956315.600,1125.459,GS TILELOCATE  
10045,3566825.245,4956282.835,1125.878,GS TILELOCATE  
10046,3566776.905,4956245.248,1122.577,FL CLAYTILE  
10047,3566733.671,4956198.613,1126.799,GS TILELOCATE  
10048,3566692.954,4956171.219,1126.519,GS TILELOCATE  
10049,3566650.050,4956137.062,1127.264,GS TILELOCATE

10050, 3566608.584, 4956100.041, 1124.406, FL CLAYTILE  
10051, 3566549.601, 4956063.633, 1128.532, GS TILELOCATE  
10052, 3566520.120, 4956038.280, 1129.654, GS TILELOCATE  
10053, 3566512.153, 4956012.017, 1125.306, FL CONCTILE  
10054, 3566496.044, 4955953.034, 1130.244, GS TILELOCATE  
10055, 3566486.922, 4955903.116, 1130.894, GS TILELOCATE  
10056, 3566475.208, 4955849.925, 1130.666, GS TILELOCATE  
10057, 3566461.985, 4955803.413, 1130.926, GS TILELOCATE  
10058, 3566460.316, 4955801.540, 1128.813, FL CLAYTILE  
10059, 3566423.143, 4955744.295, 1129.238, FL CONCTILE  
10060, 3566397.965, 4955703.732, 1131.727, GS TILELOCATE  
10061, 3566371.047, 4955662.885, 1132.565, GS TILELOCATE  
10062, 3566342.122, 4955618.235, 1132.968, GS TILELOCATE  
10063, 3566315.386, 4955572.802, 1133.417, GS TILELOCATE  
10064, 3566312.519, 4955567.381, 1130.360, FL CLAYTILE  
10065, 3566285.516, 4955521.497, 1133.787, GS TILELOCATE  
10066, 3566255.714, 4955475.287, 1134.610, GS TILELOCATE  
10067, 3566231.301, 4955435.069, 1134.756, GS TILELOCATE  
10068, 3566216.728, 4955414.608, 1134.928, GS TILELOCATE  
10069, 3566213.587, 4955409.284, 1131.163, FL CLAYTILE  
10070, 3566187.272, 4955378.290, 1135.747, GS TILELOCATE  
10071, 3566141.617, 4955366.655, 1135.545, GS TILELOCATE  
10072, 3566090.286, 4955357.672, 1135.539, GS TILELOCATE  
10073, 3566041.080, 4955350.294, 1135.608, GS TILELOCATE  
10074, 3566036.816, 4955349.512, 1132.469, FL CLAYTILE  
10075, 3566002.775, 4955345.126, 1135.738, GS TILELOCATE  
10076, 3565945.848, 4955338.607, 1136.084, GS TILELOCATE  
10077, 3565912.533, 4955333.228, 1136.406, GS TILELOCATE  
10078, 3565861.753, 4955325.866, 1136.752, GS TILELOCATE  
10079, 3565857.178, 4955325.369, 1133.536, FL CLAYTILE  
10080, 3565814.758, 4955319.404, 1137.185, GS TILELOCATE  
10081, 3565770.290, 4955313.064, 1137.820, GS TILELOCATE  
10082, 3565762.986, 4955312.690, 1134.135, FL CLAYTILE  
10083, 3565721.587, 4955306.727, 1138.579, GS TILELOCATE  
10084, 3565679.300, 4955302.554, 1143.156, GRAV TILELOCATE  
10085, 3565638.424, 4955290.574, 1138.590, GS TILELOCATE  
10086, 3565627.019, 4955286.765, 1139.011, GS TILELOCATE  
10087, 3565617.866, 4955283.182, 1135.009, FL CLAYTILE  
10088, 3565581.296, 4955266.202, 1139.110, GS TILELOCATE  
10089, 3565535.772, 4955242.143, 1139.197, GS TILELOCATE  
10090, 3565485.815, 4955214.997, 1139.598, GS TILELOCATE  
10091, 3565451.321, 4955186.381, 1134.776, FL CLAYTILE  
10092, 3565423.652, 4955135.716, 1140.059, GS TILELOCATE  
10093, 3565397.209, 4955088.683, 1140.156, GS TILELOCATE  
10094, 3565378.525, 4955054.809, 1135.600, FL CLAYTILE  
10095, 3565351.653, 4955001.431, 1140.339, GS TILELOCATE  
10096, 3565329.131, 4954952.822, 1140.710, GS TILELOCATE  
10097, 3565309.325, 4954902.830, 1140.750, GS TILELOCATE  
10098, 3565289.542, 4954853.682, 1137.031, FL CLAYTILE  
10099, 3565264.819, 4954803.124, 1141.305, GS TILELOCATE

10100,3565252.448,4954754.322,1137.433,FL CLAYTILE  
10101,3565240.400,4954696.042,1141.408,GS TILELOCATE  
10102,3565236.524,4954642.945,1141.640,GS TILELOCATE  
10103,3565236.307,4954588.135,1141.788,GS TILELOCATE  
10104,3565235.342,4954533.782,1138.167,FL CLAYTILE  
10105,3565234.773,4954476.864,1142.144,GS TILELOCATE  
10106,3565231.017,4954423.931,1142.514,GS TILELOCATE  
10107,3565217.731,4954371.299,1138.540,FL CLAYTILE  
10108,3565193.640,4954314.388,1142.368,GS TILELOCATE  
10109,3565171.144,4954261.682,1142.282,GS TILELOCATE  
10110,3565146.706,4954211.090,1142.430,GS TILELOCATE  
10111,3565119.778,4954161.427,1138.956,FL CLAYTILE  
10112,3565121.845,4954165.824,1142.430,GS TILELOCATE  
10113,3565097.830,4954113.928,1142.708,GS TILELOCATE  
10114,3565086.705,4954062.124,1142.862,GS TILELOCATE  
10115,3565079.106,4954023.407,1139.120,FL CLAYTILE  
10116,3565066.636,4953961.846,1143.156,GS TILELOCATE  
10117,3565055.520,4953910.425,1143.303,GS TILELOCATE  
10118,3565038.732,4953860.034,1143.328,GS TILELOCATE  
10119,3565002.611,4953804.031,1139.664,FL TILELOCATE  
10120,3564964.625,4953745.651,1143.620,GS TILELOCATE  
10121,3564934.660,4953697.373,1143.606,GS TILELOCATE  
10122,3564907.334,4953649.142,1143.902,GS TILELOCATE  
10123,3564876.272,4953598.358,1140.204,FL CLAYTILE  
10124,3564852.863,4953557.865,1144.108,GS TILELOCATE  
10125,3564813.089,4953501.928,1144.421,GS TILELOCATE  
10126,3564809.851,4953498.147,1140.460,FL CONC TILE  
10127,3564769.245,4953448.975,1144.532,GS TILELOCATE  
10128,3564733.509,4953405.729,1144.520,GS TILELOCATE  
10129,3564695.255,4953361.066,1140.614,FL TILELOCATE  
10130,3564693.642,4953360.090,1140.723,FL CLAYTILE  
10131,3564687.783,4953303.911,1144.487,GS TILELOCATE  
10132,3564682.380,4953247.698,1140.856,FL TILELOCATE  
10133,3564693.678,4953360.260,1140.726,FL CLAY BRICKPLUG  
10134,3564692.110,4953350.256,1141.455,TOP CLAYTILE  
10135,3564677.108,4953180.151,1145.194,GS TILELOCATE  
10136,3564671.462,4953125.891,1145.382,GS TILELOCATE  
10137,3564666.730,4953073.053,1145.634,GS TILELOCATE  
10138,3564660.381,4953015.091,1141.382,FL CLAYTILE  
10139,3564654.840,4952969.850,1145.629,GS TILELOCATE  
10140,3564642.041,4952910.877,1141.592,FL CLAYTILE  
10141,3564754.187,4953317.243,1144.049,GS TILELOCATE  
10142,3564775.272,4953299.713,1144.079,GS TILELOCATE  
10143,3564816.172,4953266.992,1143.848,GS TILELOCATE  
10144,3564857.192,4953233.197,1143.815,GS TILELOCATE  
10145,3564899.285,4953198.233,1143.904,GS TILELOCATE  
10146,3564941.759,4953164.000,1144.304,GS TILELOCATE  
10147,3564986.832,4953125.179,1140.832,FL 8"CLAY  
10148,3565026.876,4953082.058,1144.276,GS TILELOCATE  
10149,3565058.045,4953038.892,1144.072,GS TILELOCATE

10150, 3565088.189, 4952995.296, 1144.105, GS TILELOCATE  
10151, 3565112.102, 4952957.715, 1140.765, FL 8"CLAY  
10152, 3565145.191, 4952905.090, 1144.551, GS TILELOCATE  
10153, 3565171.988, 4952857.527, 1144.369, GS TILELOCATE  
10154, 3565197.912, 4952811.296, 1144.856, GS TILELOCATE  
10155, 3565228.293, 4952772.029, 1144.828, GS TILELOCATE  
10156, 3565263.602, 4952734.620, 1144.566, GS TILELOCATE  
10157, 3565300.606, 4952697.756, 1144.903, GS TILELOCATE  
10158, 3565331.600, 4952661.024, 1144.916, GS TILELOCATE  
10159, 3565227.739, 4952773.280, 1140.885, FL 8"CLAY  
10160, 3565334.408, 4952655.812, 1141.139, FL 8"CLAY  
10161, 3565372.405, 4952607.924, 1145.048, GS TILELOCATE  
10162, 3565404.180, 4952566.099, 1145.060, GS TILELOCATE  
10163, 3565437.517, 4952522.844, 1145.000, GS TILELOCATE  
10164, 3565474.961, 4952485.550, 1141.132, FL 8"CLAYTILE  
10165, 3565516.223, 4952452.396, 1144.566, GS TILELOCATE  
10166, 3565553.666, 4952416.610, 1144.604, GS TILELOCATE  
10167, 3565592.854, 4952376.476, 1141.242, FL 8" TILE  
10168, 3565627.403, 4952341.417, 1144.740, GS TILELOCATE  
10169, 3565658.574, 4952308.606, 1145.412, GS TILELOCATE  
10170, 3565722.871, 4952296.669, 1144.807, GS TILELOCATE  
10171, 3565714.833, 4952298.096, 1144.766, GS TILELOCATE  
10172, 3565745.392, 4952288.131, 1141.823, FL 5"CLAY  
10173, 3565798.825, 4952251.188, 1146.713, GS TILELOCATE  
10174, 3565840.716, 4952220.288, 1147.560, GS TILELOCATE  
10175, 3565877.630, 4952189.332, 1143.842, FL 5"CLAYTILE END  
10176, 3565884.160, 4952187.327, 1144.820, FL 5"CLAYTILE  
10177, 3565885.466, 4952182.354, 1144.918, FL 5"CLAYTILE  
10178, 3564627.058, 4952849.784, 1145.942, GS TILELOCATE  
10179, 3564612.931, 4952802.147, 1146.266, GS TILELOCATE  
10180, 3564585.895, 4952753.858, 1146.679, GS TILELOCATE  
10181, 3564553.773, 4952705.694, 1147.096, GS TILELOCATE  
10182, 3564514.616, 4952666.020, 1147.004, GS TILELOCATE  
10183, 3564473.014, 4952634.584, 1147.343, GS TILELOCATE  
10184, 3564454.520, 4952624.725, 1147.341, GS TILELOCATE  
10185, 3564811.861, 4953270.333, 1140.632, FL 11"CLAYTILE  
10186, 3564702.598, 4953370.314, 1144.039, GS TILELOCATE Y NORTH  
10187, 3564549.245, 4952701.856, 1142.228, FL 8"CLAYTILE  
10188, 3564448.098, 4952622.440, 1142.687, FL 8"CLAYTILE  
10189, 3564387.233, 4952600.823, 1147.582, GS TILELOCATE  
10190, 3564333.907, 4952589.747, 1147.637, GS TILELOCATE  
10191, 3564271.586, 4952576.848, 1143.204, FL 8"CLAYTILE  
10192, 3564224.661, 4952567.317, 1148.165, GS TILELOCATE  
10193, 3564158.566, 4952554.094, 1143.662, FL 8"CLAYTILE  
10194, 3564094.727, 4952542.790, 1148.515, GS TILELOCATE  
10195, 3564039.966, 4952535.470, 1148.680, GS TILELOCATE  
10196, 3563983.353, 4952524.047, 1148.532, GS TILELOCATE  
10197, 3563925.853, 4952507.578, 1144.079, FL 8"CLAYTILE  
10198, 3563884.253, 4952494.279, 1149.054, GS TILELOCATE  
10199, 3563847.381, 4952466.937, 1149.196, GS TILELOCATE

10200,3563824.349,4952441.689,1144.827,FL 8"CLAYTILE  
10201,3563785.477,4952396.536,1149.073,GS TILELOCATE  
10202,3563751.250,4952356.173,1148.854,GS TILELOCATE  
10203,3563740.120,4952343.236,1145.029,FL 6"CLAYTILE  
10204,3563695.134,4952291.941,1149.064,GS TILELOCATE  
10205,3563662.740,4952252.270,1149.326,GS TILELOCATE  
10206,3563648.482,4952235.745,1145.590,FL 6"CLAYTILE  
10207,3563612.365,4952193.848,1149.717,GS END TILELOCATE  
11000,3570993.170,4946913.307,1189.279,HC GPS MON 8013  
11001,3570955.176,4949557.255,1168.508,CL RR TRACKS CL 280TH  
11002,3570507.053,4949459.366,1163.399,GS ABOVE TILE  
11003,3570512.542,4949472.154,1158.374,8" CLAY TOP 0.71'TOPTOFL  
11004,3570513.246,4949474.102,1158.277,top 8" hdpe tile  
11005,3570514.565,4949477.433,1163.289,gs above tile  
11006,3570521.957,4949506.816,1162.969,foc sign  
11007,3570524.640,4949521.781,1158.500,GS ABOVE TILE  
11008,3570512.540,4949536.870,1159.322,fl box culvert  
11009,3570508.894,4949557.043,1169.003,cl rr track  
11010,3570512.103,4949577.527,1158.634,fl box culvert  
11011,3570508.745,4949612.171,1157.059,fl 8"hdpe sw inlet  
11012,3570524.788,4949610.585,1156.206,top 8"\*8" hdpe tee south  
11013,3570525.102,4949611.823,1156.189,top 8"\*8" hdpe tee north  
11014,3570527.130,4949611.675,1156.383,top 8" hdpe  
11015,3570524.606,4949609.591,1156.252,top 8" clay tile  
11016,3570525.436,4949612.707,1156.222,top 8" clay tile  
11017,3570525.923,4949614.617,1156.223,top 8" clay tile  
11018,3570512.518,4949570.383,1165.549,cl hdwl box culvert  
11019,3570512.605,4949542.544,1167.761,cl hdwl box culvert  
11020,3570529.397,4949606.591,1160.326,wfp  
11021,3570479.822,4949606.350,1160.667,wfp  
11022,3570983.968,4949698.972,1164.387,cpt 12 ir 0.2'd  
12000,3570952.391,4960283.819,1084.147,gs FOC locate mark  
12001,3570952.000,4960254.380,1084.170,gs FOC locate mark  
12002,3570951.797,4960224.934,1084.302,gs FOC locate mark  
12003,3570951.489,4960195.495,1084.341,gs FOC locate mark  
12004,3570949.915,4960104.045,1084.348,gs FOC locate mark  
12005,3570950.616,4960072.607,1084.310,gs FOC locate mark  
12006,3570950.660,4960042.703,1084.143,gs FOC locate mark  
12007,3570975.739,4960099.022,1081.562,fows heartiowa,minerva,radcliffe  
12008,3571007.457,4960089.453,1078.820,wws irua  
12009,3571007.498,4960090.743,1079.456,gs wl locate  
12010,3571010.148,4960107.614,1080.115,gs wl locate  
12011,3571013.089,4960116.327,1081.176,gs wl locate  
12012,3571019.274,4960129.534,1080.050,gs wl locate  
12013,3571011.498,4960138.554,1080.745,gs above tile  
12014,3571013.606,4960138.720,1080.451,gs top bank  
12015,3571018.649,4960152.967,1073.147,gs toe bank  
12016,3571022.810,4960144.466,1073.376,gs toe bank  
12017,3571024.220,4960141.431,1073.469,gs toe bank  
12019,3570921.278,4960107.898,1080.037,gs ditch @ lath

12021,3571040.995,4960153.562,1078.377,gs wl locate  
12022,3571031.730,4960145.120,1072.748,gs fl creek  
12023,3570996.926,4960133.145,1075.778,tile top 10" 0.91'toptofl  
12024,3571006.373,4960136.620,1075.784,tile top 12"cmp 1.06'toptofl  
12025,3571025.238,4960143.522,1074.574,tile top 12"cmp 1.02'toptofl  
12026,3570984.994,4960129.642,1081.276,Gs above tile  
12027,3570951.130,4960133.954,1084.280,gs FOC locate mark  
12028,3570951.096,4960162.734,1084.325,gs FOC locate mark  
12029,3570955.732,4960168.729,1084.135,eog  
12030,3570955.453,4960125.141,1084.016,eog  
12031,3570955.707,4960076.246,1083.948,eog  
12032,3570931.866,4960076.377,1084.146,eog  
12033,3570932.528,4960108.964,1084.098,eog  
12034,3570931.687,4960163.677,1084.070,eog  
12035,3571027.708,4960135.289,1073.287,gs toe bank  
20000,3576281.925,4955030.645,1091.220,EOA PARA RBC  
20001,3576282.596,4954998.359,1091.248,EOA PARA RBC  
20002,3576282.274,4955013.809,1091.256,BM DOT BRASS  
20003,3576325.999,4954931.733,1090.095,TB START RIPRAP  
20004,3576343.904,4954907.375,1090.361,TB END RIPRAP  
20005,3576338.427,4954914.828,1090.642,TB CL BEAVER DAM  
20006,3576294.514,4954863.829,1089.750,ROW RAIL N EDGE T



**ENGINEER'S REPORT  
ON REPAIRS  
TO MAIN TILE  
DRAINAGE DISTRICT  
NO. 86  
HARDIN COUNTY,  
IOWA**

	<p>I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA</p> <p><i>Lee O. Gallentine</i>, P.E.      Dec 3, 2019          LEE O. GALLENTINE, P.E.      DATE</p> <p>LICENSE NUMBER: 15745          MY LICENSE RENEWAL DATE IS DECEMBER 31, 2020          PAGES OR SHEETS COVERED BY THIS SEAL:          SHOWN ON TABLE OF CONTENTS</p>
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	<p><b>CLAPSADDLE-GARBER ASSOCIATES OFFICE LOCATIONS</b></p>	<p><b>Project Office</b>          739 Park Avenue          Ackley, IA, 50601          Phone: 641-847-3273          Fax: 641-847-2303</p>
<p>16 East Main Street, PO Box 754   Marshalltown, IA 50158          1523 S. Bell Avenue, Suite 101   Ames, IA 50010          5106 Nordic Drive   Cedar Falls, IA 50613          739 Park Avenue   Ackley, IA 50601          511 Bank Street   Webster City, IA 50595</p>		



# **Engineer's Report on Repairs to Main Tile, Drainage District No. 86 Hardin County, Iowa**

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# **Engineer's Report on Repairs to Main Tile, Drainage District No. 86 Hardin County, Iowa**

## 1.0 INTRODUCTION

- SCOPE OF WORK – The Hardin County Board of Supervisors, acting as District Trustees, requested Clapsaddle-Garber Associates to investigate and report concerning repairs to the Main tile of Drainage District No. 86. This report will summarize the history of repairs, investigate the necessity and feasibility of said repairs, and present opinions of probable construction costs associated with said repairs. At the Landowner Meeting held on July 17, 2019, the preliminary results of the investigation for Work Order #252 were discussed and reviewed by the District Trustees. For reference, a copy of the meeting minutes is included in Appendix A and a copy of the Investigation Summary for Work Order #252 (as discussed at the July 17, 2019 Landowner Meeting) is included in Appendix B. As a result of this meeting, the District Trustees requested Clapsaddle-Garber Associates to move ahead with an investigation and report concerning repairs to the Main tile.
  
- LOCATION – The area of investigation for Work Order #252 was the portion of the Main tile downstream from Dago Lake. After said Landowner Meeting, additional detailed investigation was performed on the very lower portion of the Main tile. Said lower portion is located in Section 13, Township 89 North (T89N), Range 21 West (R21W), Hardin County, Iowa. Specifically, the downstream limit of the detailed investigation was at the current outlet of Main tile, approximately 100 feet south of Ellis Avenue and approximately 100 feet east of Sarah Avenue. Going upstream, the tile proceeds west generally paralleling Ellis Avenue for approximately 800 feet. It then turns south and goes south for approximately 200 feet where it crosses the former C&NW railroad. It then continues south, with the upstream limit of the investigation ending approximately 300 feet south of said railroad. For reference, a map showing the limits of detailed investigation is included in Appendix D and a map showing the limits of investigation for said Investigation Summary is included in Appendix C.

2.0 PARTIAL DISTRICT HISTORY – The following is a summary of the partial history of Drainage District No. 86 as obtained from the Hardin County Auditor’s drainage minutes and records.

- 1909, Aug. 30 Application for establishment of Drainage District.
- 1915, Dec. 15 Petition for Drainage District.
- 1916, Apr. 6 Preliminary Engineer’s Report by J.H. Farrington.
- 1916, May 16 Publication of Notice for hearing on establishment of Drainage District.
- 1916, Jun. 5 Claim for damages by Chicago & Northwestern Railway Company.
- No Date Memorandum agreement between Illinois Central Railroad Company and District Trustees.
- 1916, Jun. 20 Supplementary Engineer’s Report by J.H. Farrington.
- 1916, Jun. 27 Agreement with Chicago & Northwestern Railway Company and District Trustees.
- 1916, Jun. 30 Publication of Notice to Contractors for construction of Drainage District facilities.
- 1916, Jul. 25 Contract for tile bond with Eldora Pipe and Tile Co. for \$1,869.95
- 1916, Jul. 27 Contract for Construction of Drains with Ole Johnson for \$2,335.00
- 1916, Oct. 7 Appointment of Commission to inspect and classify lands within Drainage District.
- 1917, May 9 Termination of J.H. Farrington.
- 1917, Jun. 4 Report by landowner that “the intake at upper end of main is to high and allows “Daga Lake” to overflow manly as had as before tile was laid”.
- 1917, Jul. 30 Letter by Drainage Engineer W.S. Porter concerning the investigation of Drainage District facilities. It recommends extending tile from the east side of lake an additional 75 feet and making elevation of new tile the same as what drains into lake.
- 1917, Oct. 29 Resignation of one of the members of the Commissioners to assessment of benefits.
- 1917, Oct. 29 Appointment of Commission to inspect and classify land within Drainage District.
- 1918, Jan. 2 Appraisers report on assessments of benefits was filed.
- 1918, Jan. 24 Publication of Assessments of Benefits.
- 1918, Jun. 18 Objections in behalf of Chicago & Northwestern Railway Company “to the location and establishment of drainage district”.
- 1953, Oct. 19 Bill of indebtedness for repair located in NW¼ Section 24, T89N, R21W.
- 1953, Nov. 12 Bill of indebtedness for repair located in NW¼ Section 24, T89N, R21W.
- 1954, Jan. 13 Bill of indebtedness for repair located in NW¼ Section 24, T89N, R21W.

1954, May 12 Request for repair located in Section 13, T89N, R21W – “Outlet should be extended and Rock channel filled. Probably a joint Project check up with Mr. King”.

1960, Jun. 6 Bill of indebtedness for inspection of outlet.

1963, Oct. 22 Request for repair located Section 23, T89N, R21W – “north of Rock island railroad east of small lake” – “inlet need possible work”.

1965, Dec. 7 Bill of indebtedness for repair.

1966, Apr. 4 Bill of indebtedness for “Re-lay county drain above bulkhead on McClure Property in Iowa falls south of Ellis Ave. per agreement” in Section 13, T89N, R21W.

1967, Apr. 25 Request for repairs located NW¼ NW¼ Section 24, T89N, R21W.

1967, May 2 Bill of indebtedness for repair.

1967, May 9-11 Bill of indebtedness for repair.

1973, Jun. 13 Request for repair of 3 blowouts.

1973, Jun. 27 Bill of indebtedness for repair.

1973, Nov. 29 Bill of indebtedness for repair.

1974, Feb. 28 Request of repair of 3 broken tile located in Section 23, T89N, R21W.

1974, Aug. 1 Bill of indebtedness for repair.

1974, Oct. 21 Request for repair – “Haul dirt on ... repaired last spring” located in Section 23, T89N, R21W.

1974, Oct. 21-22 Bill of indebtedness for repair.

1976, Nov. 15 Request for repair – “Fix blow out” located Section 23, T89N, R21W.

1979, Jul. 30 Request for repair – “Repair tile between tracks” located in Section 24, T89N, R21W.

1979, Aug. 6 Bill of indebtedness for repair.

1979, Oct. 18-19 Bill of indebtedness for repair.

1984, Jun. 9 Request for repair – “Outlet of Daga Lake is tipped on east side of Pond” located in Section 23, T89N, R21W.

1984, Sept. 12 Request for repair – “Main line tile is broken in road ditch @ intersection at NW Cor. Sec. 35”

1984, Dec. 4 Bill of indebtedness for repair of broken tile located in Section 23, T89N, R21W.

1992, Oct. 28 Approval of repair of tile that is exposed located in Section 23, T89N, R21W.

1993, Nov. 10 Approval of request for repair tile “blowout” located in NE¼ NE¼ Section 23, T89N, R21W.

1994, Apr. 13 Approval of request for repair of broken tile.

1997, Jun. 29 Request for repair “Main Tile blocked” Section 13, T89N, R21W.

1997, Jul. 16	Approval of request for repair "Tile plugged with roots south of railroad".
1998, Oct. 28	Approval of request for repair "approx. 5 breaks in this tile line" located in Section 23, T89N, R21W.
1999, Jun. 25	Request for repair – "Main line is plugged" Section 13, T89N, R21W.
1999, Jul. 2	Bill from Hydro-Klean – "Jet cleaned 16" field tile line approx. 600' "
2007, Apr. 4	Request for repair "plugged 16" county tile on the south side of Georgetown Rd." located in Section 24, T89N, R21W.
2008, May 7	Request for repair – "2 blowouts" located in NE¼ Section 23, T89N, R21W.
2008, Jun. 18	Request for repair – "large pond in middle of property" located in Section 23, T89N, R21W.
2017, Feb. 27	Request for repair – "tile area has progressively turned into a stream" due to tree roots plugging tile located in Section 24, T89N, R21W.

- 3.0 INVESTIGATION –A field investigation for the detailed investigation area was performed. Said investigation was limited to locating Main tile (including GPS survey), noting the general condition of the tile, and noting the extent that tree roots had invaded the tile and are restricting drainage. For reference, a copy of the Project Dairy with pictures is included in Appendix E.

A field investigation was also performed for the portion of the Main tile downstream of Dago Lake, including the detailed investigation area. Said investigation was limited to noting the existence of trees along the assumed Main tile route. For reference, a copy of the Investigation Summary for Work Order #252 is included in Appendix B.

The remaining investigation was limited to review of the district history. Said review shows that there have been several repairs since the district was originally constructed. Some of the noteworthy ones include:

- In 1997 and 1999, landowners reported that the Main tile was plugged and full of tree roots in
- In 1966, the main tile upstream of the bulkhead south of Ellis Avenue was relaid per “the agreement”.

- 4.0 DISCUSSION AND CONCLUSIONS – Based on the above, it is obvious that the Main tile has a history of tree roots invading the tile. This is especially true in or near areas that haven’t been actively maintained by private landowners, such as railroad right of way. This has a detrimental impact on the drainage capacity of the Main tile as the tree roots not only reduce the cross-sectional area of the tile, they also cause drainage to slow, which encourages siltation of the tile.

Also, the following key items from the investigation should be noted:

- It appears that the Main tile south of the former C&NW railroad tracks is severely plugged with trees roots for approximately 190 feet and is not draining. Instead, this area is relying solely on overland drainage through an existing beehive intake when the tile becomes surcharged.
- It appears that the Main tile under the former C&NW railroad tracks is not severely plugged with tree roots as it is draining.
- There are over 200 trees within 50 feet of the assumed Main tile route downstream of Dago Lake.
- The 1966 “agreement” was not investigated as to ownership of the resulting pipe or the current users of the same as it appears to be draining.

If repairs are not performed, the Main tile will not properly drain any of the land upstream of the former C&NW railroad tracks due to its current tree root infested state. In addition, there are several locations downstream of Dago Lake that have trees close enough to the Main tile to likely impede drainage. When combined, these issues will probably prevent or hinder crop production on a portion of the upstream area which is the majority of the district.

5.0 REPAIR METHODS – To repair the existing Main tile, the following options are the most straightforward available:

Partial Tree Removal, Root Cutting, and Tile Lining

- For the portion of the Main tile south of the former C&NW railroad tracks that is severely plugged with tree roots, remove trees as needed to access the Main tile.
- For the portion of the Main tile south of the former C&NW railroad tracks that is severely plugged with tree roots, remove tree roots from the existing Main tile by either jetting cleaning or mechanical cutting.
- For the portion of the Main tile south of the former C&NW railroad tracks that is severely plugged with tree roots, prevent roots from infiltrating the Main tile again by installing a CIPP liner. Typically, existing private and district tile could be reinstated after the lining has been completed.
- For reference, the detailed location of the proposed work near the C&NW railroad tracks is shown on the map included in Appendix F.
- For the remainder of the Main tile between Dago Lake and the former C&NW railroad tracks, verify the Main tile route and remove any trees within 50' of the Main tile.
- For reference, the assumed Main tile route is shown on the map included in Appendix C and further information concerning these trees is included in the copy of the Investigation Summary for Work Order #252 included in Appendix A.

Full Tree Removal and Partial Tile Replacement

- For the portion of the Main tile south of the former C&NW railroad tracks that is severely plugged with tree roots, remove trees within 50' of the Main tile.
- For the portion of the Main tile south of the former C&NW railroad tracks that is severely plugged with tree roots, remove and replace the existing Main tile with replacement Main tile of equal or comparable size. Typically, the replacement Main tile would be in the same location as the existing Main tile in order to locate and reconnect private and district tile.
- For reference, the detailed location of the proposed work near the C&NW railroad tracks is shown on the map included in Appendix F.
- For the remainder of the Main tile between Dago Lake and the former C&NW railroad tracks, verify the Main tile route and remove any trees within 50' of the Main tile.
- For reference, the assumed Main tile route is shown on the map included in Appendix C and further information concerning these trees is included in the copy of the Investigation Summary for Work Order #252 included in Appendix A.

With the above-mentioned repair methods, the following should be noted:

- Due to history of trees in the vicinity, the Full Tree Removal and Partial Tile Replacement option would use gasketed pipe to slow future root infiltration.
- The Full Tree Removal and Partial Tile Replacement option would use rock bedding and backfill for strength due to soil cover and soil characteristics.
- In the area of pipe replacement, the Full Tree Removal and Partial Tile Replacement option would require future monitoring for additional tree growth and root infiltration.
- It is assumed that for the Full Tree Removal and Partial Tile Replacement option, the existing tile is in good enough physical condition to withstand jetting and root cutting and no spot repairs are needed.

- In the area of pipe lining, the Partial Tree Removal, Root Cutting, and Tile Lining option would not allow drainage of the adjacent soil.
- The Partial Tree Removal, Root Cutting, and Tile Lining option would require installation of 2 access manholes in the area of repair.
- The Partial Tree Removal, Root Cutting, and Tile Lining option would only require removal of trees to allow installation of the access manholes.
- For the Full Tree Removal and Partial Tile Replacement option, the pipe sizes used are those that are currently manufactured that most closely meet or exceed the current Main tile size.
- All of the above options would only remove obstructions in the Main tile at locations of proposed tile replacement or tile lining. Any obstructions at other locations would remain in the existing Main tile.
- Repairs have historically been viewed as not having an impact on jurisdictional wetlands. As such, individual landowners should consult with applicable staff at the Hardin County NRCS office to verify the existence of said jurisdictional wetlands and that there will be no impact on them.

Per Iowa Code Chapter 468.126, any of the above actions that do not increase capacity would be considered a repair. As such, Subsection 1, paragraph c of Chapter 468.126 states "If the estimated cost of the repair does not exceed fifty thousand dollars, the board may order the work done without conducting a hearing on the matter. Otherwise, the board shall set a date for a hearing. . ." The opinion of probable construction cost contained in the next section of this report exceeds said \$50,000 limit. Therefore, a hearing will be required. Per Iowa Code Chapter 468.126.1.g, the right of remonstrance does not apply to the proposed repairs.

6.0 OPINIONS OF PROBABLE CONSTRUCTION COSTS – Using the above methods of repair, an itemized list of project quantities and associated opinions of probable construction cost for each option were compiled and are included in Appendices G and H of this report. A summary of said costs are as follows:

REPAIR METHOD	DRAINAGE COEFF.	CONSTRUCTION COST
Partial Tree Removal, Root Cutting, and Tile Lining	Existing	\$93,940.63
Full Tree Removal and Partial Tile Replacement	Existing	\$93,006.25

It should be noted that said costs include materials, labor, and equipment supplied by the contractor to complete the necessary repair and include applicable engineering, construction observation, and project administration fees by Clapsaddle-Garber Associates. However, said costs do not include any interest, legal fees, county administrative fees, crop damages, other damages, previous repairs, engineering fees to date, wetland mitigation fees, or reclassification fees (if applicable). As always, all costs shown are opinions of Clapsaddle-Garber Associates based on previous lettings on other projects. Said costs are just a guideline and are not a guarantee of actual costs.



7.0 OWNERSHIP AND CLASSIFICATIONS – Any and all information concerning ownership of lands and classifications of said lands within Drainage District No. 86 can be obtained from the Hardin County Auditor's office.

It should be noted that Iowa Code Chapter 468.65 states "When, after a drainage . . . district has been established . . ." and ". . . a repair . . . has become necessary, the board may consider whether the existing assessments are equitable as a basis for payment of the expense of . . . making the repair . . ." and "If they find the same to be inequitable in any particular . . . they shall . . . order a reclassification . . ." Based on this, it is our opinion that a reclassification may be required if the repair were to move forward.

8.0 RECOMMENDATIONS – There is a definite need to perform one of the above-mentioned actions. The repair would remove the identified current and future restrictions and impediments to the Main tile and extend the serviceable lifespan of the same. Therefore, it is recommended that the Hardin County Board of Supervisors, acting as District Trustees, should take action to accomplish the following:

- Approve the Engineer's Report as prepared by Clapsaddle-Garber Associates.
- Hold the required hearing on the proposed repairs.
- Adopt one of the recommendations of the Engineer's Report.
- Direct plans and specifications for the proposed repairs be prepared by Clapsaddle-Garber Associates.
- Proceed with receiving bids from interested contractors by Clapsaddle-Garber Associates.
- Award contract to the lowest responsible contractor.
- If desired or required by Iowa Code, proceed with reclassification proceedings.

**DD 86 LANDOWNER MEETING MINUTES**  
**JULY 17, 2019**

7/17/2019 - Minutes

1. Open Meeting

Hardin County Board of Supervisors Chairperson, Renee McClellan, opened the meeting. Also present were Supervisors Lance Granzow and BJ Hoffman; Landowner John Nissley; Lee Gallentine and Zeb Stanbrough with Clapsaddle-Garber Associates (CGA); Drainage Clerk, Becca Junker.

2. Approve Agenda

Granzow moved, Hoffman seconded to approve the agenda as provided. All ayes. Motion carried.

3. Approve Claims For Payment

Hoffman moved, Granzow seconded to approve the claims for payment with pay date of Friday, July 19, 2019. All ayes. Motion carried.

DD 22- Construction Phase Clapsaddle-Garber Assoc 456.7  
DD 78 - Investigation of ponding Clapsaddle-Garber Assoc 365.2  
DD 86 - Inv. outlet structure, trees and siltation Clapsaddle-Garber Assoc 352.2  
DD 9 - Hearing for Eng Rpt & Supp Eng Rpt for Main Clapsaddle-Garber Assoc 1118.8  
DD 38 - Finalization of repair to lat 4 Clapsaddle-Garber Assoc 308.7  
DD 52 - Communicating with Shawn Piel The Davis Brown Law Firm 40  
DD HF 5-75 - Notice of Public Hearing Times Citizen 97.76

4. Introductions/Attendance

Introductions were made and attendance verified.

5. Explanation Of Investigation Report

Nissley explained he was representing Grove Revocable Trust, he went on to say that there was work done in this district a few years ago and he is concerned with the talk of another project. He went on to express his concerns over the investigation report saying, "friend of Monarch pond landowner reported", Granzow clarified that although the friend spoke, the owner was also present at the meeting. The meeting was turned over to Gallentine who explained his findings from the investigation report. Gallentine explained that there is already restricted drainage in the Main tile because of the trees. CGA's suggestion is to have all the trees within 50' of the Main tile downstream of Dago Lake be removed, following the removal of trees it is recommended to find out the condition of the tile. He went on to explain that his estimated cost for tree removal is between \$25,000- \$40,000, which is low enough that neither a hearing nor an engineer's report would be required.

Granzow then asked what it would cost to cut and dig the trees and replace the tile. Gallentine explained that it is in the railroad right of way so by the time the trees are removed, and the pipe is replaced it could easily be \$80-\$100 per foot plus the fees from the railroad. McClellan asked if Canadian National was easier to deal with and Gallentine explained that they have a new point of contact that he has not worked with yet. He further went on to say that there is no way to give a firm estimated cost without doing an engineer's report.

6. Comments/Discussion

None.

7. Possible Action

Hoffman moved, McClellan seconded to instruct CGA to further investigate and create an engineers report, prioritizing areas for concern by televising in reverse. All ayes. Motion carried.

8. Other Business

None.

9. Adjourn Meeting

Hoffman moved, Granzow seconded to adjourn the meeting. All ayes. Motion carried.



# Drainage Work Order Request For Repair Hardin County

Date: 4/29/2019

Work Order #: WO00000252

Drainage District: DDs\DD 86 (511.14)

Sec-Twp-Rge: \_\_\_\_\_ Qtr Sec: \_\_\_\_\_

Location/GIS: \_\_\_\_\_

Requested By: Aaron Matthews

Contact Phone: \_\_\_\_\_

Contact Email: \_\_\_\_\_

Landowner (if different): \_\_\_\_\_

Description: DD 86 - Outlet structure on Matthews property is becoming washed out with ponding problems

Repair labor, materials and equipment: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Repaired By: \_\_\_\_\_ Date: \_\_\_\_\_

Please reference work order # and send statement for services to:

Hardin County Auditor's Office  
Attn: Drainage Clerk  
1215 Edgington Ave, Suite 1  
Eldora, IA 50627  
Phone (641) 939-8111  
Fax (641) 939-8245

For Office Use Only

Approved: \_\_\_\_\_ Date: \_\_\_\_\_

## Drainage District:

86

## Investigation Report:

- Friend of Monarch pond landowner reported erosion around Monarch pond outlet structure and siltation from adjoining properties located in NW¼ of Section 24, Township 89 North, Range 21 West.
- Met with friend, visually observed Monarch pond area, and found the following:
  - Erosion of Monarch pond outlet/district tile inlet appears to be solely affecting decorative field stone in area and does not appear to be endangering district facility.
  - Sand washing onto Monarch pond property is from surface water south of railroad tracks and from field to the west (both are within district boundaries).
- Visually searched area along Main tile route downstream (to end of mapped Main tile) and upstream (to Dago Lake) and found the following trees to be within approximately 50' of assumed Main tile route.
  - 20 - Maples (less than 6"Ø)
  - 1 - Maple (5'Ø or larger)
  - 40 - Box Elders and Mulberries (less than 12"Ø) in Railroad Right of way
  - 3 - Cottonwood (30"Ø or larger)
  - 1 - Elm (12"Ø)
  - 5 - Elms and Ash (less than 12"Ø)
  - 14 - Box Elders and Honeysuckle Brush (less than 15"Ø)
  - 31 - Box Elders (20"Ø)
  - 15 - Box Elders and Elderberry Brush (less than 6"Ø)
  - 24 - Box Elders and Ash (20"Ø)
  - 50 - Box Elders and Ash (less than 15"Ø)

Said trees appear to be impeding drainage as there are intakes downstream of Georgetown Road that are full of stagnant water and surrounded by siltation (evidence of overflow).

## Contractor Time and Materials (spent while CGA was on-site):

None as only investigation was performed

## Additional Actions Recommended:

All the trees listed above are the species that typically have major negative impacts on the capacity of district tile. It is CGA's opinion that they already have restricted the drainage the Main Tile and will fully plug it if allowed to continue to grow. Therefore, it is our recommendation that the Main tile route be verified, all trees within 50' of the Main tile downstream of Dago Lake be removed, and the drainage capacity of the Main tile reinstated. It is our opinion that the cost of verifying the Main tile route and removing these trees would be between \$25,000-\$40,000. This cost is low enough that neither a hearing nor an engineer's report would not be required. However, the extent of restriction in the Main tile and appropriate corrective actions cannot be identified until the trees are removed. Therefore, an opinion of probable construction cost cannot be generated for this portion of the recommended work.

Also based on the above, the siltation of concern is carried by surface water between private landowners and is not a district issue.



CONSTRUCTION ENGINEERING  
OBSERVATION REPORT

DATE:

4/25/19

PROJECT NUMBER:

6789,3

DAYS OF WEEK:

S M T W T F S

COUNTY, ROUTE, ROAD:

DD86

SHEET NO.

1 OF 2

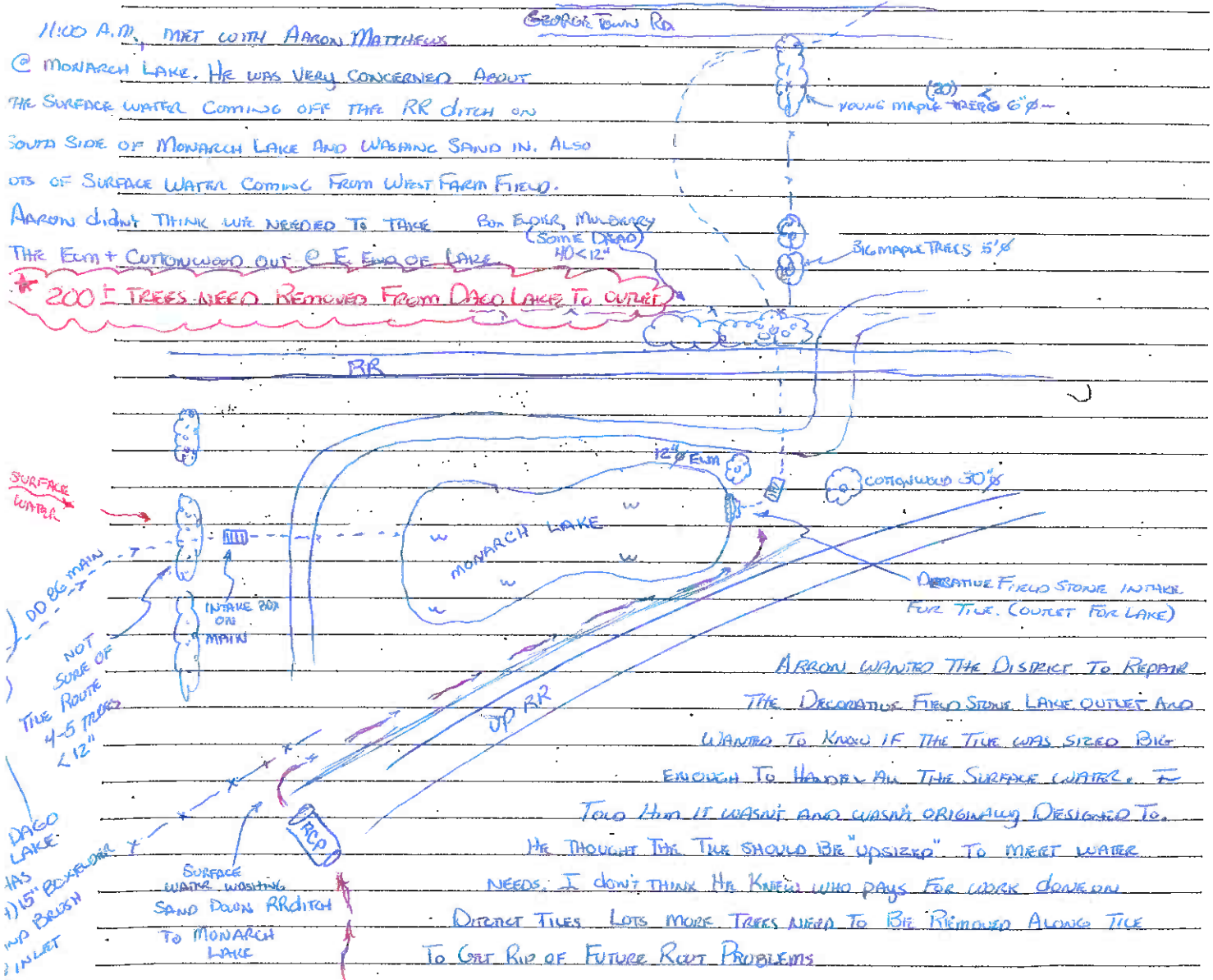
LOCATION:

MONARCH LAKE

RAIN, 60°, WIND FROM NW

DESCRIPTION OF WORK AND MATERIAL USED FOR EACH OPERATION, INCLUDING CONTRACTOR/SUI NAME, ITEM NO. AND LOCATION

11:00 A.M. MET WITH ARON MATTHEWS  
@ MONARCH LAKE. HE WAS VERY CONCERNED ABOUT  
THE SURFACE WATER COMING OFF THE RR DITCH ON  
SOUTH SIDE OF MONARCH LAKE AND WASHING SAND IN. ALSO  
LOTS OF SURFACE WATER COMING FROM WEST FARM FIELD.  
ARON DIDN'T THINK WE NEEDED TO TAKE  
THE ELM + COTONWOOD OUT @ E. END OF LAKE  
\* 200+ TREES NEED REMOVED FROM DAGO LAKE TO OUTLET



ARON WANTED THE DISTRICT TO REPAIR  
THE DECORATIVE FIELD STONE LAKE OUTLET AND  
WANTED TO KNOW IF THE TILE WAS SIZED BIG  
ENOUGH TO HANDLE ALL THE SURFACE WATER. I  
TOLD HIM IT WASN'T AND WASN'T ORIGINALLY DESIGNED TO.  
HE THOUGHT THE TILE SHOULD BE "UPSIZED" TO MEET WATER  
NEEDS. I DON'T THINK HE KNEW WHO PAYS FOR WORK DOWN IN  
DISTRICT TILES. LOTS MORE TREES NEED TO BE REMOVED ALONG TILE  
TO GET RID OF FUTURE ROOT PROBLEMS

SURFACE WATER  
DO BE MAIN  
NOT SORE OF  
TILE ROUTE  
4-5 TREES  
< 12"  
DAGO LAKE  
HAS  
1) 15" BOXED  
AND BRUSH  
INLET  
SURFACE WATER WASHING SAND DOWN RR DITCH TO MONARCH LAKE

I Certify that the work described in this report was incorporated into this contract unless otherwise noted.

Observer's Signature: *[Signature]*

Date Prepared: 4/25/19

Reviewed by: \_\_\_\_\_

Engineer

Date Reviewed: \_\_\_\_\_

CONSTRUCTION ENGINEERING  
OBSERVATION REPORT

DATE:

PROJECT NUMBER: 67893  
 COUNTY, ROUTE, ROAD: DD 86  
 LOCATION: \_\_\_\_\_

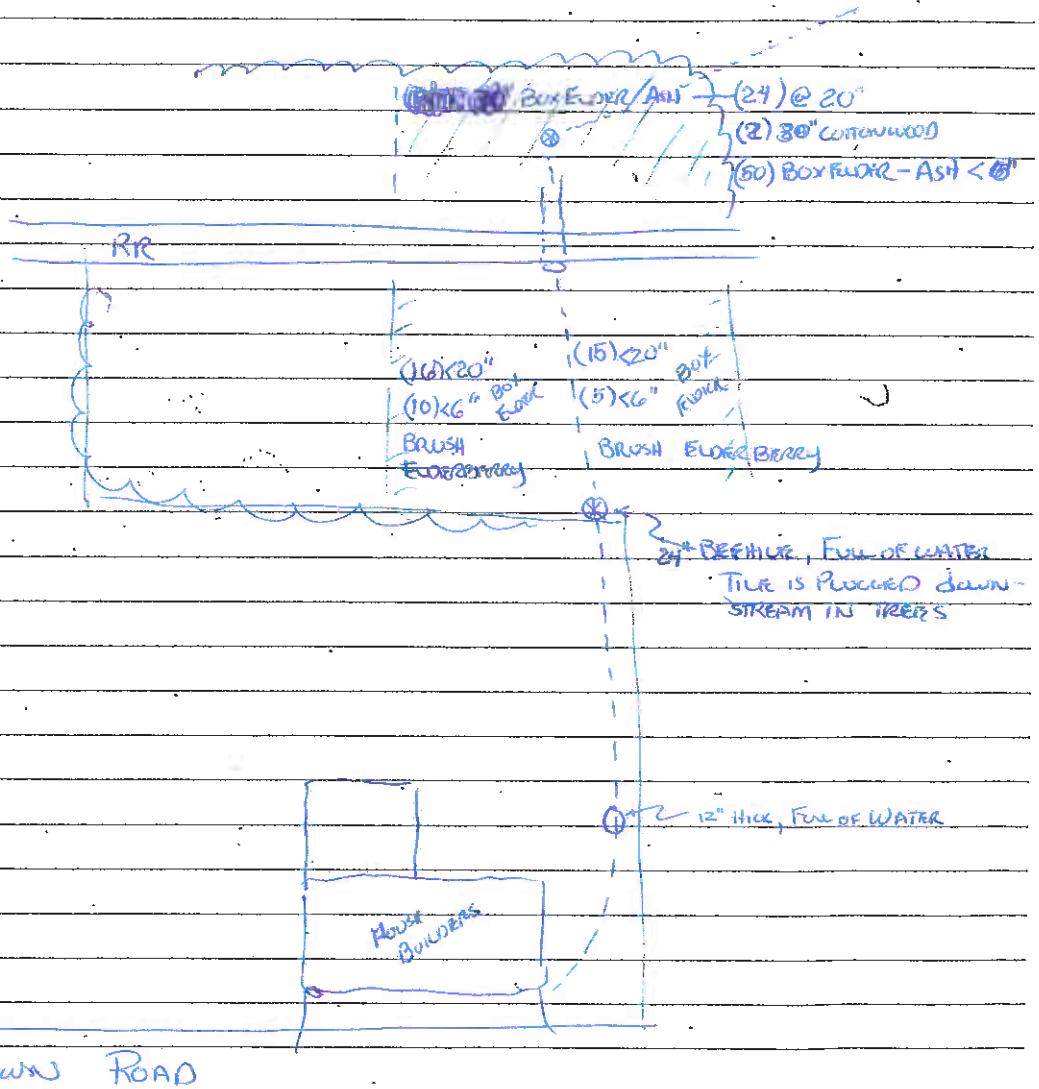
DAYS OF WEEK:

S M T W T F S

SHEET NO.

1 OF 2

DESCRIPTION OF WORK AND MATERIAL USED FOR EACH OPERATION, INCLUDING CONTRACTOR/SUB  
NAME, ITEM NO. AND LOCATION



GEORGETOWN ROAD

I Certify that the work described in this report was incorporated into this contract unless otherwise noted.

Observer's Signature: [Signature]

Date Prepared: 4/25/13

Reviewed by: \_\_\_\_\_

Engineer

Date Reviewed \_\_\_\_\_

DAGO LAKE INLET (DD86 OLD MAIN) (14) 15" BOX ELDER AND HONEYSUCKLE BRUSH NEEDS REMOVED





LOOKING WEST FROM MONARCH TO DAGO LAKE



LOOKING EAST @ MONARCH LAKE TIRE ROUTE (5) TREES NEED REMOVED (NOT CEDAR TREES)



INTAKE ON TILE @ E. END OF MONARCH LAKE



LOOKING W. FROM INTAKE



SURFACE DRAINAGE From S. RR @ MONARCH LAKE



LOOKING E. ON N. R/W RR @ S. EDGE MONARCH PROP.



Looking upstream From Georgetown Road



Looking upstream From S. Side RR To Georgetown Road





LOOKING DOWNSTREAM @ RR MAINLINE, SURFACE TUBE DRAINS INTO DD86 TILE



Looking upstream @ Tile Route towards Georgetown, Bee Hive is @ Tile Turn To East



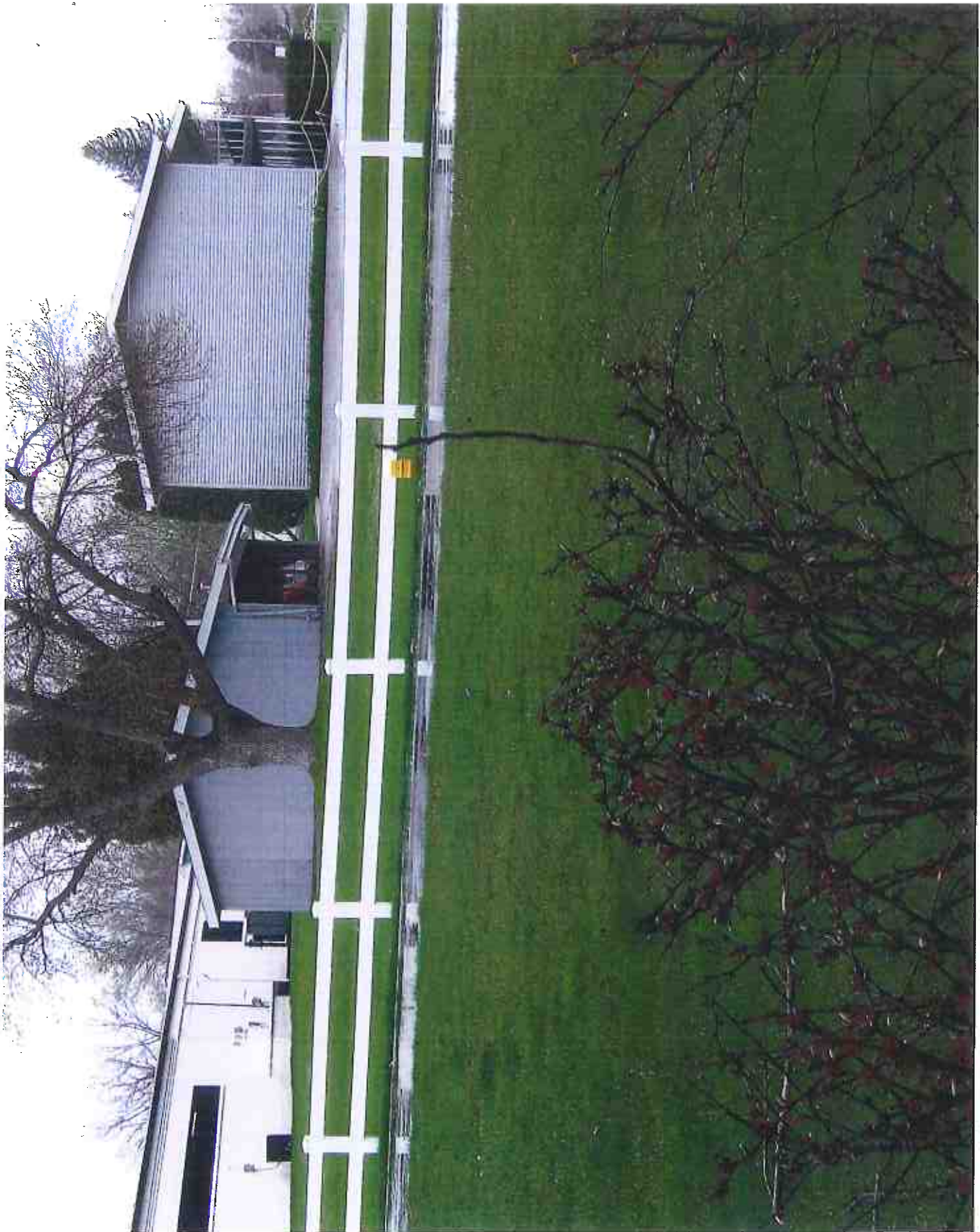
LOOKING EASTERLY FROM BEEHIVE TO OUTLET IN CITY STORM SEWER



CITY STORM SEWER OUTLET



Looking upstream from City Storm Sewer Outlet



BEEHIVE INTAKE IS IN TREES SOMEWHERE 90+ TREES IN THE R/W N. OF RR



LOOKING DOWNSTREAM FROM TREES



TILE ROUTE  
↓

Looking upstream From where surface water dumps into TIE (I'm standing on it)





LOOKING UPSTREAM TOWARDS GEORGETOWN RD.



Looking downstream From S R/w spur RR



TILE ROUTE MARKED WITH BROKEN TILE



TILE ROUTE WITH CHARDS IN TREE ROOTS



TILE CHARDS THRU ELDERBERRY BRUSH



TILE REPAIR PIECES DISCARDED



BREEZIE OVERFLOWING @ NE COR OF GEORGETOWN ADD.



TILE HAS BEEN PARTIALLY PLUGGED FOR SOME TIME  
LOOKING DOWN STREAM, NOTE ALL SEDIMENT SAND BLOWN OUT OF INTAKE





LOOKING @ NEW TILE UPSTREAM TOWARDS GEORGETOWN RO.



Looking downstream @ NE cor. of Georgetown AOD.



12" HICK INTAKE FULL OF WATER, SWIRLING



Looking downstream From SE Cor Georgetown AOD.



LOOKING W. @ TILE ROUTE ON N. SIDE GEORGETOWN RD.



LOOKING UPSTREAM @ RR @ N. SIDE MONARCH LAKE, 40± <12"Ø TREES IN RR R/W



TREES IN RR R/W



LOOKING DOWNSTREAM WITH 5' Ø MAPLE THAT NEEDS REMOVED





**PLAT OF  
BUCKTON**  
DRAINAGE DISTRICT NO. 86  
HARDY COUNTY, IA.  
J.H. FARRINGTON, ENGR. IOWA FALLS, IA.

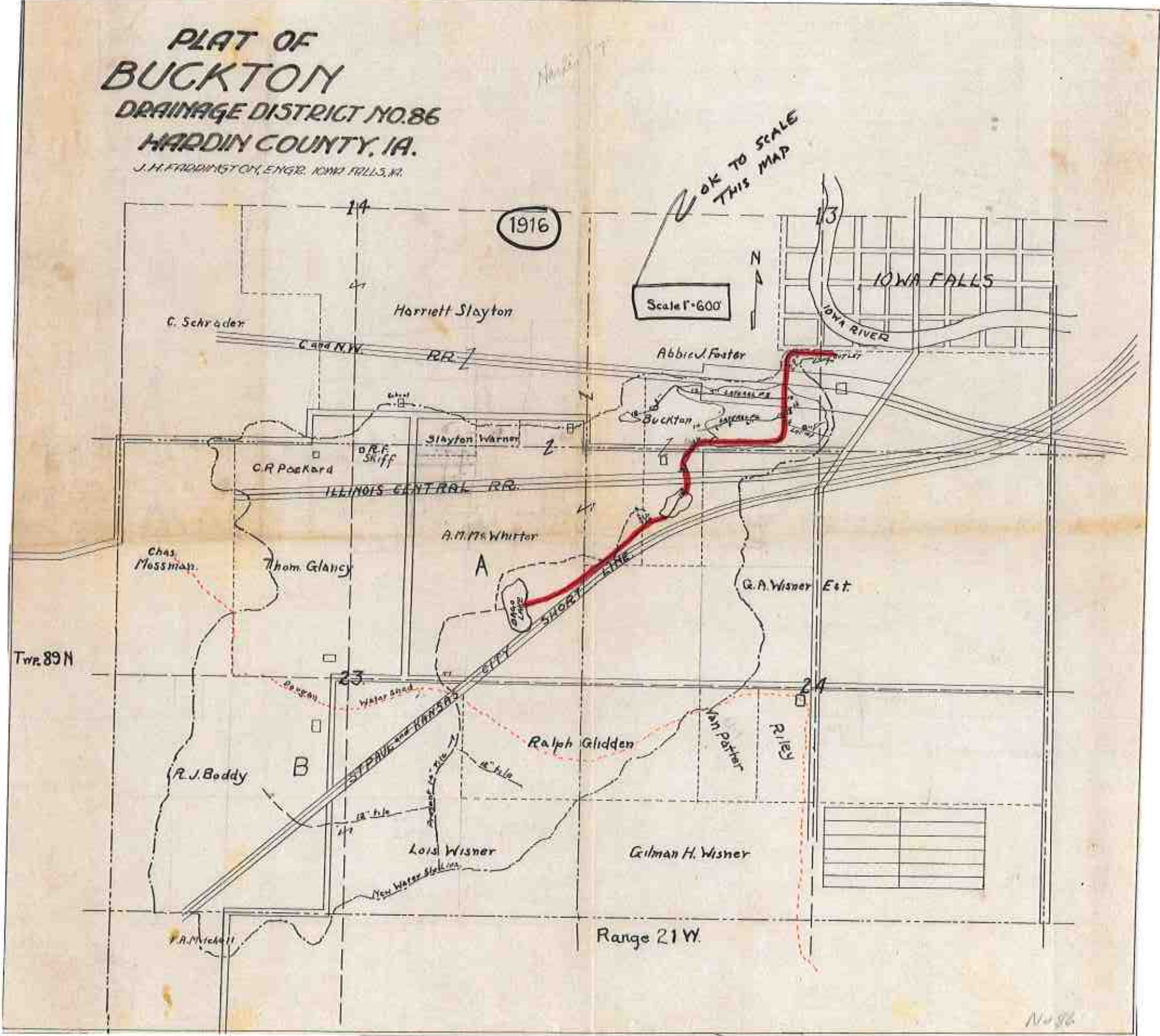
1916

OK TO SCALE  
THIS MAP

Scale 1"=600'

Twp. 89 N

Range 21 W

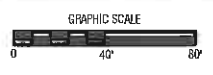
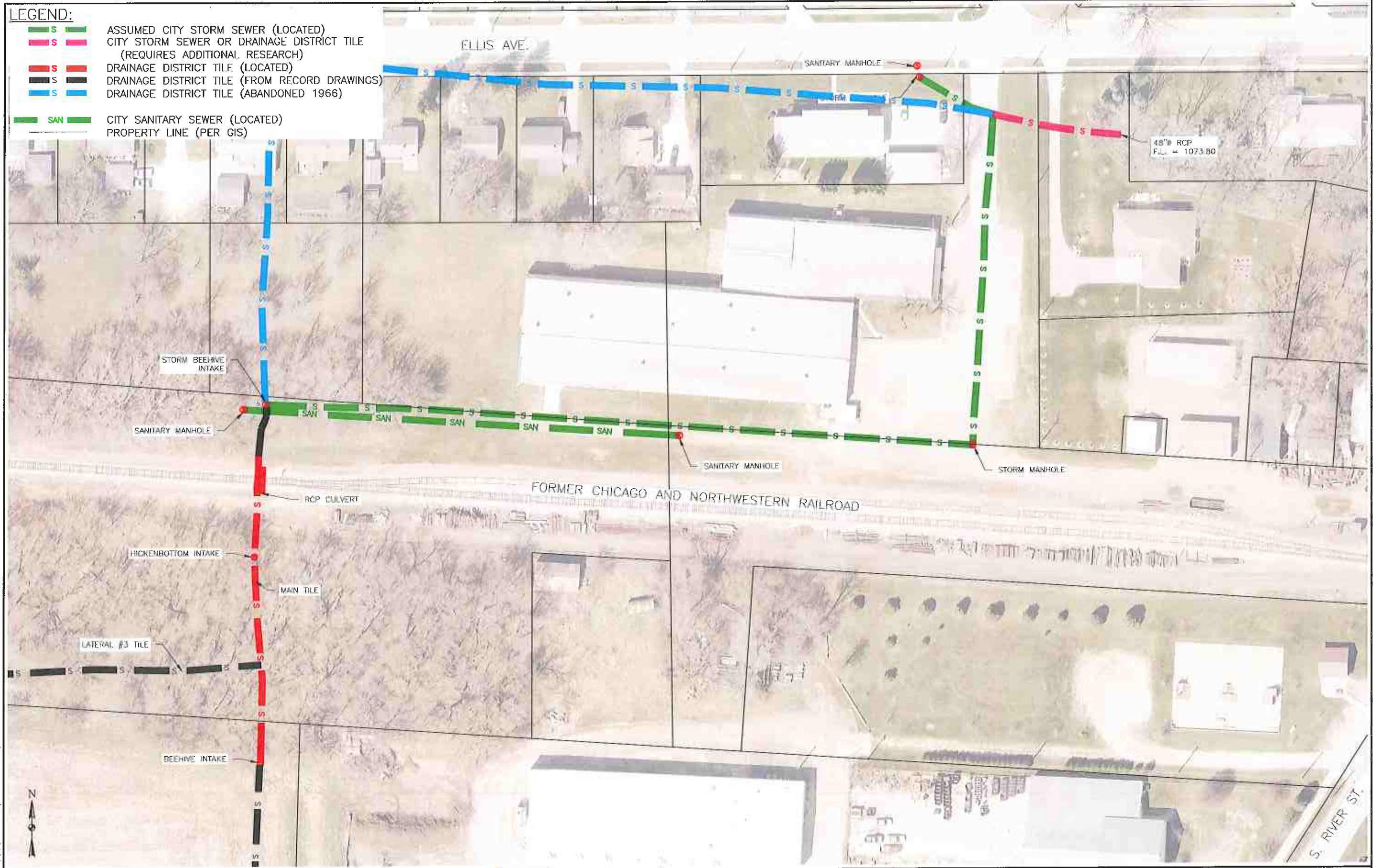


— Investigation  
Limits for  
WO #252

No. 86

**LEGEND:**

- S— ASSUMED CITY STORM SEWER (LOCATED)
- S— CITY STORM SEWER OR DRAINAGE DISTRICT TILE (REQUIRES ADDITIONAL RESEARCH)
- S— DRAINAGE DISTRICT TILE (LOCATED)
- S— DRAINAGE DISTRICT TILE (FROM RECORD DRAWINGS)
- S— DRAINAGE DISTRICT TILE (ABANDONED 1966)
  
- SAN— CITY SANITARY SEWER (LOCATED)
- PROPERTY LINE (PER GIS)



NO.	REVISION	BY	DATE	NO.	REVISION	BY	DATE

**CGA** Chesedillo-Gerber Associates, Inc.  
 Toll Free (800) 940-7081  
 www.cgsocservices.com

DESIGNED: ZJS DATE: 2019-11-04  
 DRAWN: ZJS DATE: 2019-11-09  
 CHECKED: LOG DATE: 2019-11-04  
 APPROVED: LOG DATE: 2019-11-04

**DRAINAGE DISTRICT #86**  
 HARDIN, IOWA

**DETAILED INVESTIGATION MAP**

PROJECT NO. 6789.3  
 SHEET NO. 1

J:\7893\_2-DIV\dwg\Topographic\7893\_2\DCD.dwg - Plan - 12/22/19 - 2:42pm - 2/28/24

# Project Diary

Project: Main Tile Repairs Drainage District No.			
CGA PN: <u>6789.3</u>	Days Charged: <u>NA</u>	Report No. <u>1</u>	Proj. Mgr. <input checked="" type="checkbox"/> <u>LEE GALINTINE</u>
Contractor: <u>NA</u>		Date: <u>9/26/19</u>	
Superintendent: <u>NA</u>	Weather Conditions: <u>CLEAR</u>	Precip.: <u>0"</u>	Temp. Hi: <u>48</u> ° Temp. Low: <u>75</u> °
INSPECTOR: Time Arrived: <u>8:30</u>	Time Left: <u>2:00</u>	Contractor: Time Arrived:	Time Left:
<p>1. General Remarks and Work Accomplished: <u>SETX ON CPT # 3380, INTO SEC COR. 3414. WENT TO OUTLET @ 48" RCP #3478. PUT IN TILE LOCATOR UPSTREAM TOWARDS MH 3475. GOT WITH GPS TO #3474, WENT NEXT TO BEEHIVE #3487. PUT IN LOCATOR DOWNSTREAM (E.) TO #3485. FOUND WHERE TILE CAME IN ON W. SIDE OF RR CASING 8' S. OF MH #3487. TRIED TO LOCATE UP TILE LINE, COULD ONLY GET 2' ±, MUST BE ELBOW. WENT NEXT TO HICK INTAKE ON CLAY TILE @ 3491, LOCATED WITH CABLE N. + S. AND ALSO PROBED TILE TO BEEHIVE McDOWELL SET @ #3503 E. WENT NEXT TO MH #3513, LOCATED W. + N. TO CONNECTION (BLIND) @ 3512 WITH 48" RCP. GOT MAG READING @ POSSIBLE MH LID @ 3512. (UNDER NEW HMA ROAD) FOR AG PRODUCTS. TILE @ MH 3487 IS RUNNING 8" DEEP TO OUTLET. BEEHIVE INTAKE @ 3503 IS FULL TO GROUND EL.</u></p> <p>ACTION: <u>① TV RCP FROM 3487 DOWNSTREAM (CABLE RAN INTO BLOCKAGE @ 3485)</u>  <u>② CLEAN AND, OR REPLACE TILE FROM 3495-3503</u>  <u>③ REMOVE ALL TREES IN TILE ROUTE.</u></p>			
<p>2. Changes or Extra Work Ordered:</p> <p><u>④ CLEAN MH # 3513, STICKS AND LOGS IN MH BLOCKING FLOW</u>  <u>⑤ NEED SURFACE INTAKE TO PICK UP WATER ALONG SURFACE SWALE ROUTE. (CITY)? ESPECIALLY IN PARKING LOT AREA</u></p>			
3. Test Samples Taken:			
4. Visitors to Site:			
5. Other Work Crews or Project (utilities, subcontractors, etc.) and Work Done:			
6. Attachments (total sheets attached <u>0</u> ):			

RANDY B, CRIS S.

By: [Signature]  
Inspector

Distribution: Project Mgr. (Original), Inspector (Copy)  
Form 9753

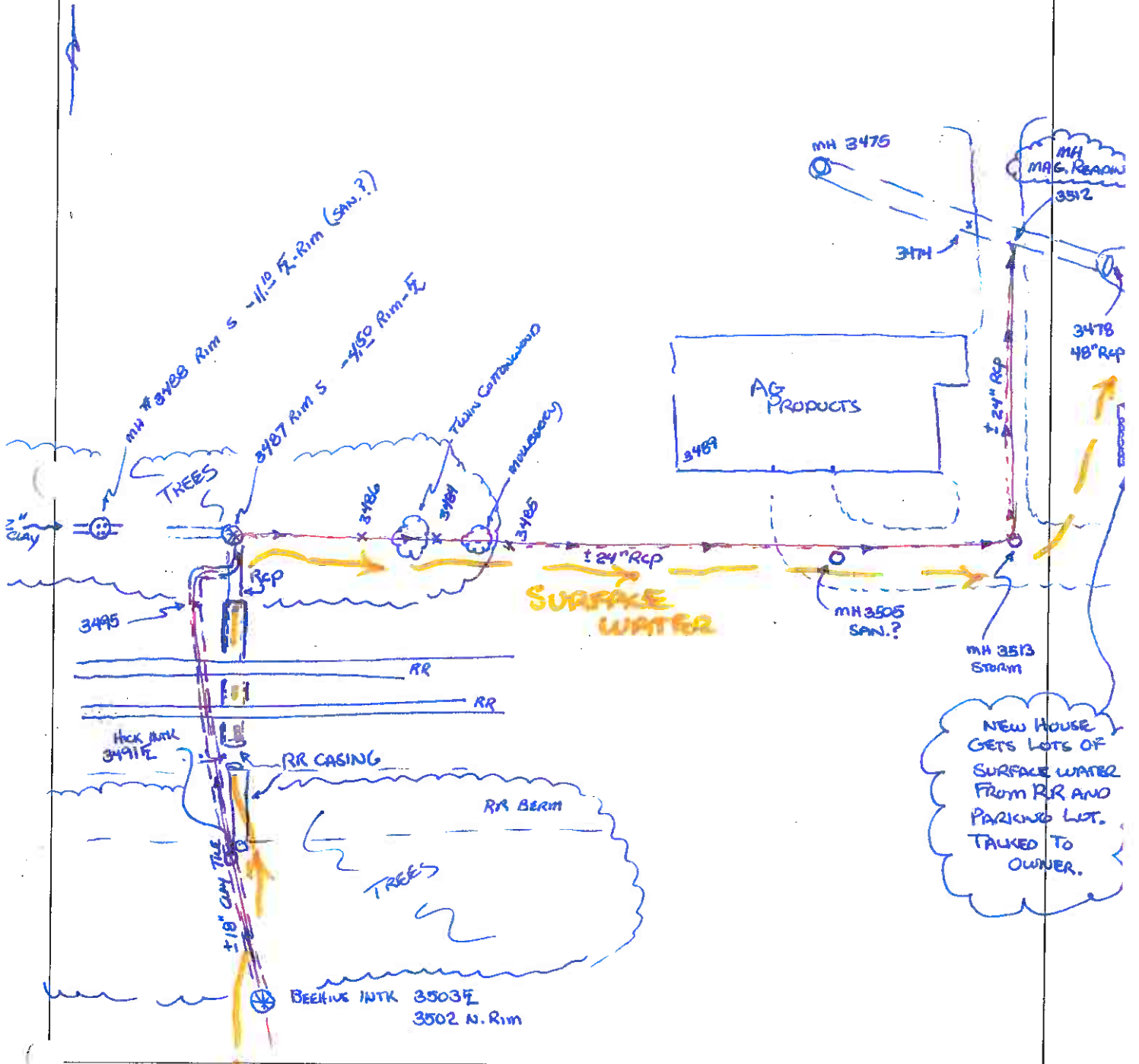
# Project Diary (continued)

CGA PN: 6789.3

Report  
No. 1

Date: 9/26/19

1. General Remarks and Work Accomplished (Continued):



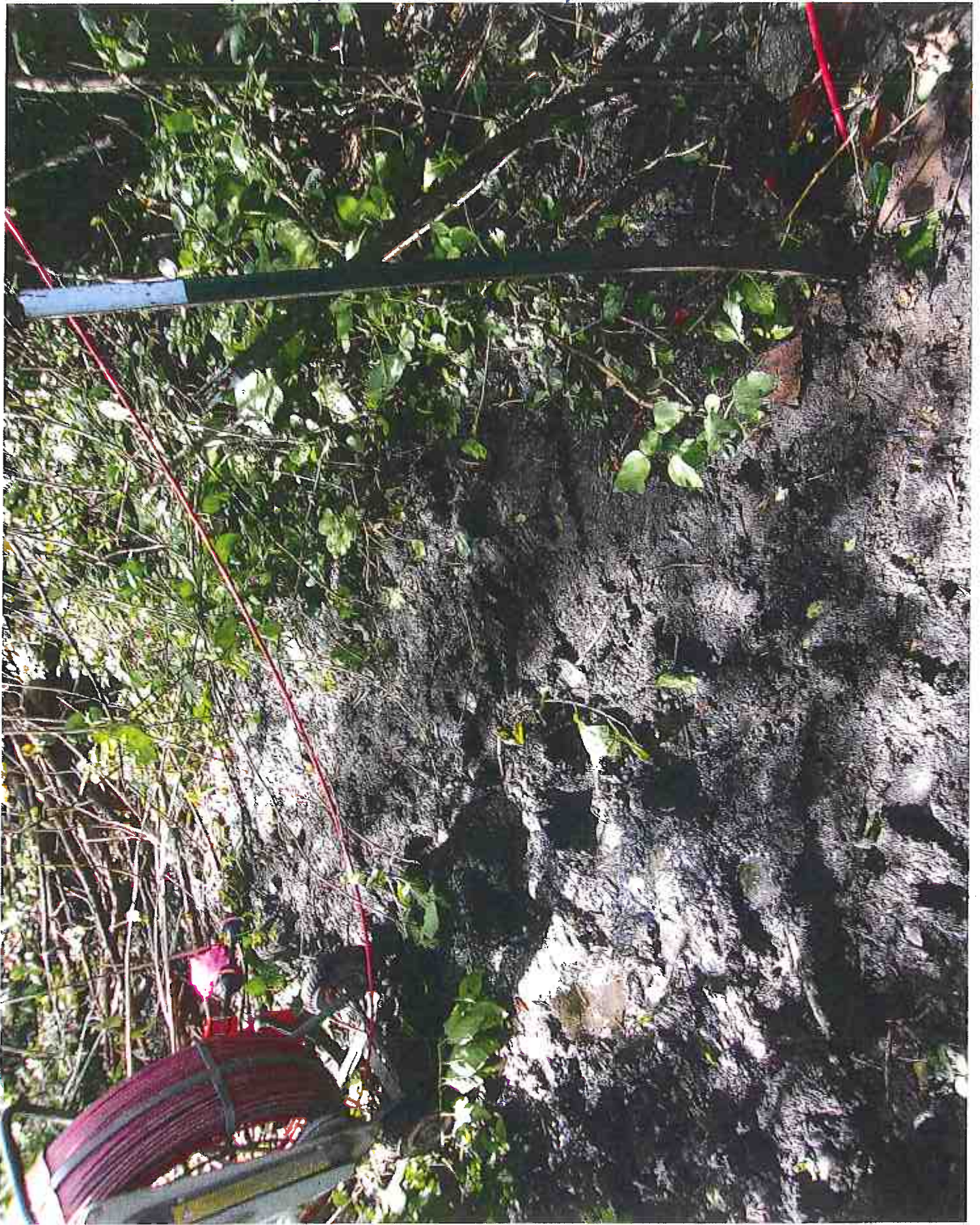
6789 dd86 9-26-19RB

3477,3651680.440,4983104.455,1078.355, TOP RCP OUTLET  
3478,3651680.313,4983105.608,1073.799, FL RCP  
3479,3651354.081,4982314.182,1086.545, FL CASING  
3480,3651355.160,4982314.183,1089.612, TOP CASING  
3481,3651364.616,4982315.482,1091.678, TOP RR RAIL  
3482,3651369.515,4982315.581,1091.676, TOP RR RAIL  
3483,3651379.609,4982315.031,1089.631, TOP RCP  
3484,3651433.008,4982441.711,1088.871, GS STORM LOCATE  
3485,3651431.455,4982473.316,1089.120, GS STORM LOCATE  
3486,3651433.578,4982388.504,1088.327, GS STORM LOCATE  
3487,3651436.488,4982317.765,1087.828, S RIM BEEHIVE  
3488,3651431.921,4982296.898,1088.592, S RIM MH  
3489,3651456.960,4982549.944,1088.684, BLDG COR E-N  
3490,3651297.162,4982307.748,1087.020, GS 1'E OF HICK INTK/TILE  
3491,3651297.027,4982307.497,1085.007, FL CLAYTILE  
3492,3651360.122,4982309.657,1090.503, GS TILE LOCATE  
3493,3651347.395,4982310.398,1086.973, GS TILE LOCATE  
3494,3651376.522,4982311.324,1089.935, EOG TILE LOCATE  
3495,3651389.767,4982311.278,1089.232, GS TILE LOCATE  
3496,3651275.255,4982308.771,1088.404, GS TILE LOCATE  
3497,3651275.184,4982308.284,1088.482, GS PROBED TILE  
3498,3651249.013,4982309.842,1089.084, GS PROBED TILE -3.0  
3499,3651235.237,4982310.759,1089.114, GS PROBED TILE -3.0  
3500,3651212.757,4982312.685,1088.970, GS PROBED TILE -3.0  
3501,3651184.503,4982315.255,1088.984, GS PROBED TILE -3.0  
3502,3651109.137,4982314.245,1088.881, N RIM BEEHIVE  
3503,3651108.629,4982313.740,1085.078, FL TILE  
3504,3651101.068,4982315.033,1089.399, GS TREELN  
3505,3651407.060,4982698.344,1088.055, N RIM MH -11.5FL  
3506,3651420.308,4982970.309,1084.316, GRAV STORMLOCATE  
3507,3651463.129,4982973.477,1084.120, GRAV STORMLOCATE  
3508,3651510.313,4982976.162,1085.181, EOA STORMLOCATE  
3509,3651565.740,4982979.843,1085.831, HMA STORMLOCATE  
3510,3651610.135,4982981.047,1085.829, HMA STORMLOCATE  
3511,3651650.538,4982985.129,1085.340, HMA STORMLOCATE  
3512,3651694.518,4982988.143,1084.778, HMA STORMLOCATE  
3513,3651397.016,4982969.243,1085.472, N RIM MH-5.4FL

San. Sewer @ \*3488



Looking S. (upstream) @ Hicc Intake on Clay Tive @ #3491

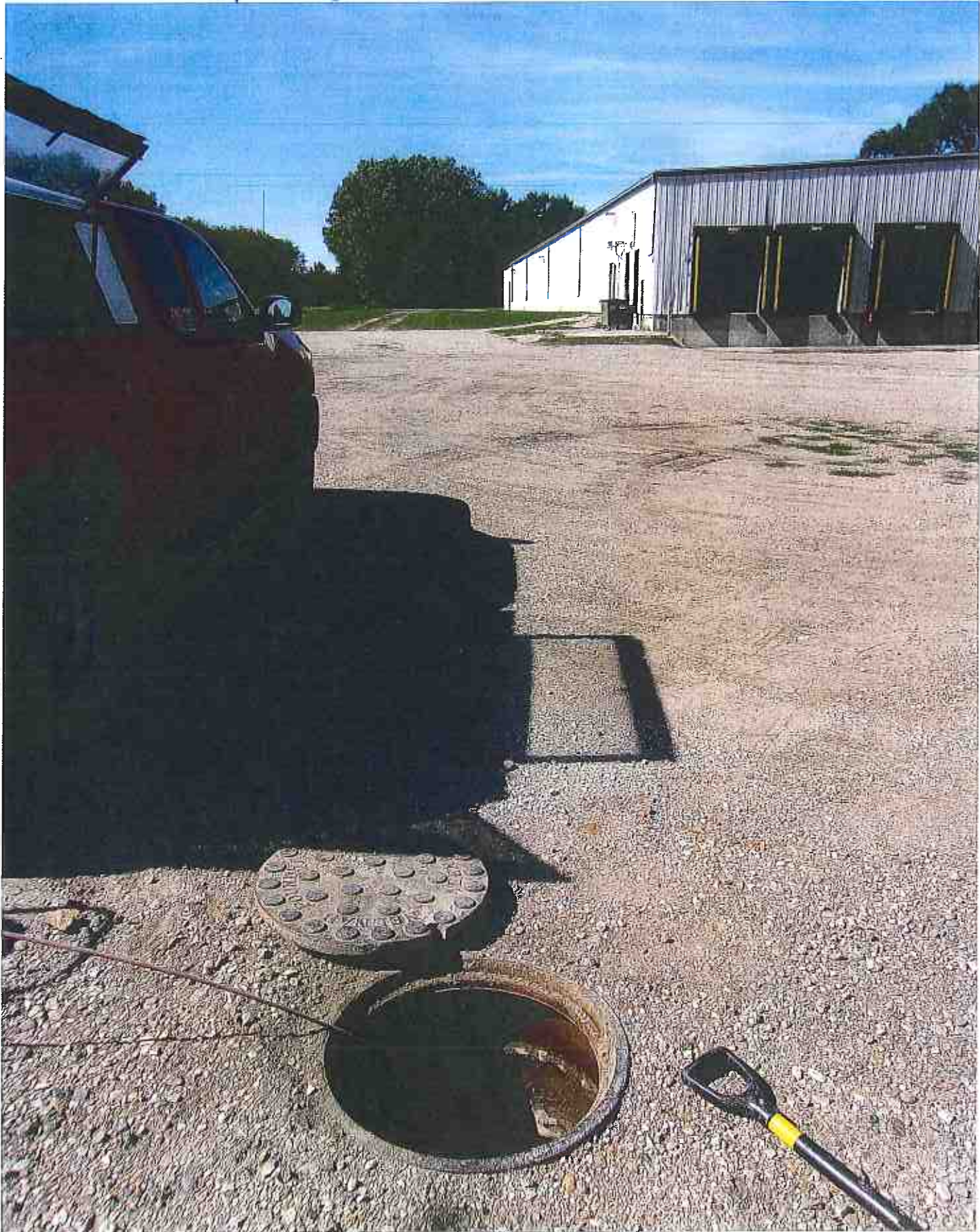


LOCKING N. (UPSTREAM) @ HICK INTAKE ON CLAY TILE #8491

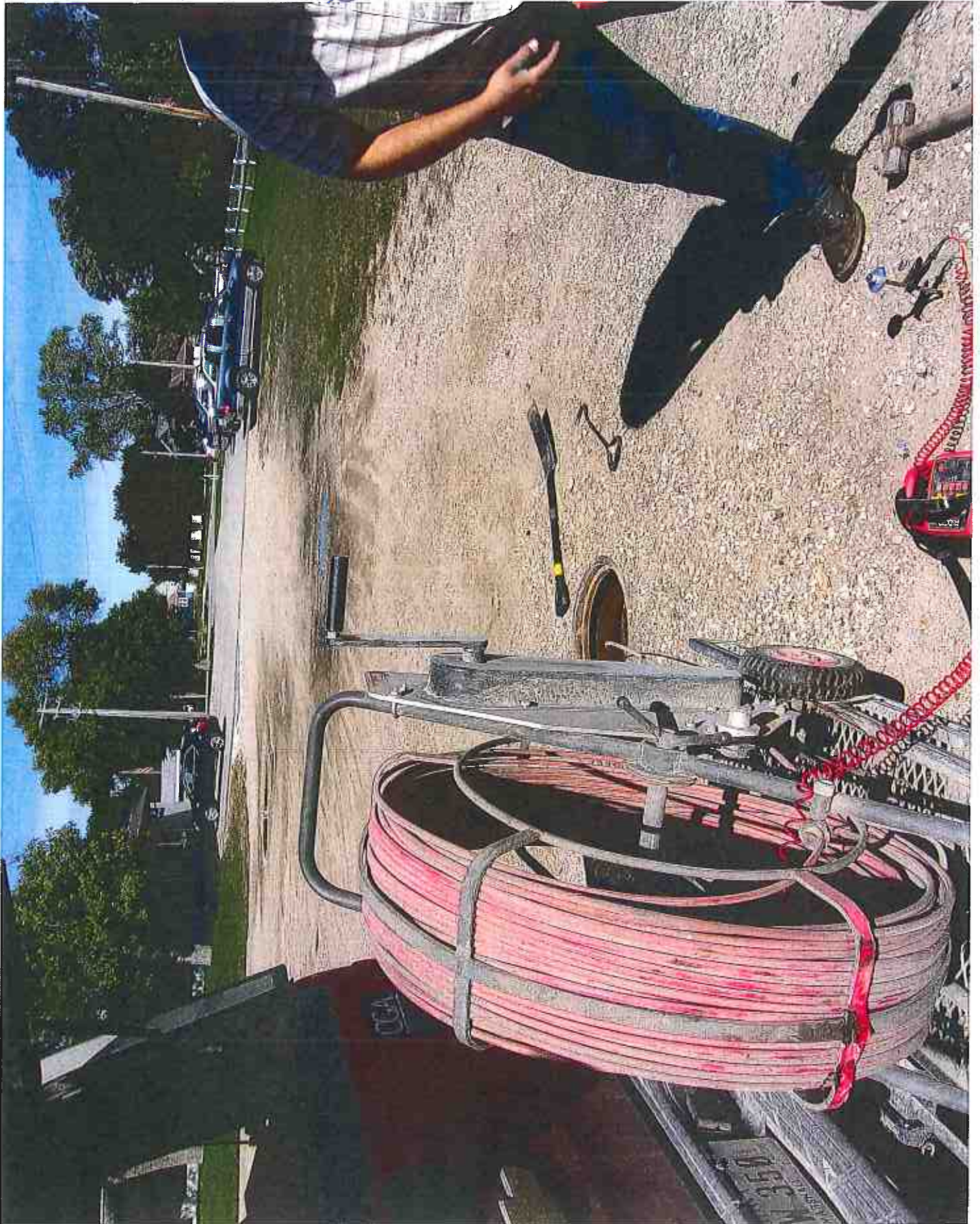




Looking W. (upstream) @ MH # 3513



Looking N. (downstream) @ MH. #3513



LOOKING E. ON RCP ROUTE (OUTLET @ REEL)



Looking upstream on RCP Route



LOOKING E. (DOWNSTREAM) IN MH #3487



LOOKING @ DD68 OUTLET @ SIDE OF RR CASING



Looking WEST From MH#3487



MA # 3487 DO G8 OUTLET





LOOKING SOUTH (UPSTREAM) @ MH #3487 . NOTE: OUR TILE OUTLET ON RT. SIDE.

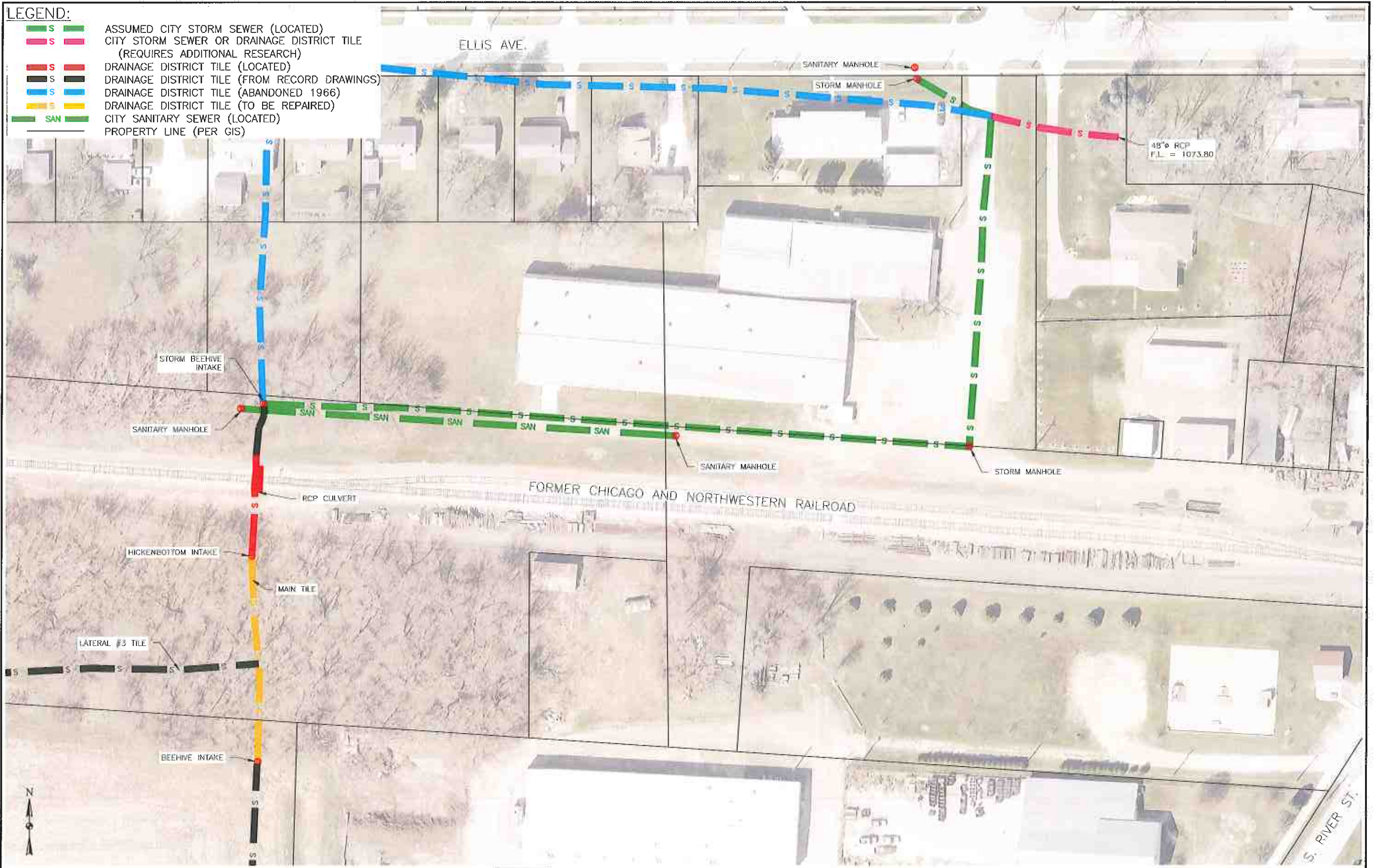


MH. #3488 SAN.?

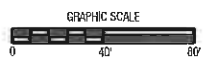


**LEGEND:**

- S— ASSUMED CITY STORM SEWER (LOCATED)
- S— CITY STORM SEWER OR DRAINAGE DISTRICT TILE (REQUIRES ADDITIONAL RESEARCH)
- S— DRAINAGE DISTRICT TILE (LOCATED)
- S— DRAINAGE DISTRICT TILE (FROM RECORD DRAWINGS)
- S— DRAINAGE DISTRICT TILE (ABANDONED 1966)
- S— DRAINAGE DISTRICT TILE (TO BE REPAIRED)
- SAN— CITY SANITARY SEWER (LOCATED)
- PROPERTY LINE (PER GIS)



J:\6789.3\Drawings\Design\6789.3\_TDPD\_SIGNED\_REPORT.dwg - Plan - 12-02-19 - 2:59pm - ZJS43



NO.	REVISION	BY	DATE	NO.	REVISION	BY	DATE



DESIGNED: ZJS DATE: 2019-11-04  
 DRAWN: ZJS DATE: 2019-11-04  
 CHECKED: LQG DATE: 2019-11-04  
 APPROVED: LQG DATE: 2019-11-04

**DRAINAGE DISTRICT #86**  
 HARDIN, IOWA

**DETAILED REPAIR MAP**

PROJECT NO. 6789.3  
 SHEET NO. 1



By: Z.J.S.

Date: 11/8/2019

Checked By: L.O.G.

Date: 12/2/2019

**Engineer's Opinion of Probable Construction Cost**

Project: Main Tile **Repair** for D.D. #86

Location: Section 13, T90N, R22W Hardin County, Iowa

PARTIAL TREE REMOVAL, ROOT CUTTING, AND TILE LINING	ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost	
	<b>DISTRICT CONSTRUCTION COSTS</b>							
	1	ROOT CUTTING (18")	\$ 15.00	LF	190	LF	\$ 2,850.00	
	2	CIPP TILE LINING (18")	\$ 100.00	LF	190	LF	\$ 19,000.00	
	3	LATERAL 3 REINSTATEMENT	\$ 500.00	EA	1	EA	\$ 500.00	
	4	PRIVATE TILE REINSTATEMENT	\$ 500.00	EA	2	EA	\$ 1,000.00	
	5	INTAKE STRUCTURE (ACCESS FOR LINING)	\$ 4,000.00	EA	2	EA	\$ 8,000.00	
	6	INTAKE REMOVAL	\$ 500.00	EA	2	EA	\$ 1,000.00	
	7	TREE REMOVAL (FOR ACCESS)	\$ 3,000.00	LS	1	LS	\$ 3,000.00	
	8	TILE LOCATE (FROM DAGO LAKE TO START OF LINING)	\$ 5,000.00	LS	1	LS	\$ 5,000.00	
9	TREE REMOVAL (FROM DAGO LAKE TO START OF LINING)	\$ 25,000.00	LS	1	LS	\$ 25,000.00		
		<b>CONSTRUCTION SUBTOTAL</b>					\$ 65,350.00	
		Contingency (15%)					\$ 9,802.50	
		<b>CONSTRUCTION TOTAL</b>					\$ 75,152.50	
		Engr. & Const. Observation (25%)					\$ 18,788.13	
		<b>TOTAL COST</b>					\$ 93,940.63	



By: Z.J.S.

Date: 11/8/2019

Checked By: L.O.G.

Date: 12/2/2019

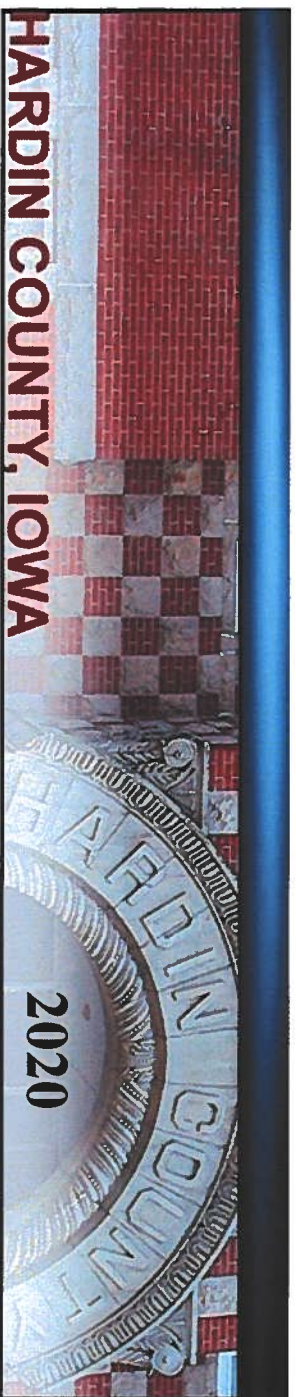
**Engineer's Opinion of Probable Construction Cost**

Project: Main Tile **Repair** for D.D. #86

Location: Section 13, T90N, R22W Hardin County, Iowa


FULL TREE REMOVAL AND PARTIAL TILE REPLACEMENT


ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
<b>DISTRICT CONSTRUCTION COSTS</b>						
101	18" DUAL WALL PPE TILE WITH ROCK BEDDING	\$ 75.00	LF	190	LF	\$ 14,250.00
102	LATERAL 3 CONNECTION	\$ 1,500.00	EA	1	EA	\$ 1,500.00
103	PRIVATE TILE CONNECTION	\$ 1,500.00	EA	2	EA	\$ 3,000.00
104	INTAKE STRUCTURE	\$ 2,000.00	EA	2	EA	\$ 4,000.00
105	TILE REMOVAL	\$ 5.00	LF	190	LF	\$ 950.00
106	INTAKE REMOVAL	\$ 500.00	EA	2	EA	\$ 1,000.00
107	TREE REMOVAL (FOR 100' AT REPLACEMENT)	\$ 10,000.00	LS	1	LS	\$ 10,000.00
108	TILE LOCATE (FROM DAGO LAKE TO START OF REPLACEMENT)	\$ 5,000.00	LS	1	LS	\$ 5,000.00
109	TREE REMOVAL (FROM DAGO LAKE TO START OF REPLACEMENT)	\$ 25,000.00	LS	1	LS	\$ 25,000.00
CONSTRUCTION SUBTOTAL						\$ 64,700.00
Contingency (15%)						\$ 9,705.00
CONSTRUCTION TOTAL						\$ 74,405.00
Engr. & Const. Observation (25%)						\$ 18,601.25
<b>TOTAL COST</b>						<b>\$ 93,006.25</b>



**SUPPLEMENT TO  
ENGINEER'S REPORT  
ON REPAIRS  
TO MAIN TILE  
DRAINAGE DISTRICT  
NO. 86  
HARDIN COUNTY,  
IOWA**



	<p>I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA</p> <p><i>Lee O. Gallentine</i>, P.E. DATE: <u>10/25/2020</u></p> <p>LEE O. GALLETINNE, P.E. DATE</p> <p>LICENSE NUMBER: 15745 MY LICENSE RENEWAL DATE IS DECEMBER 31, 2020 PAGES OR SHEETS COVERED BY THIS SEAL: SHOWN ON TABLE OF CONTENTS</p>
---	--

	<p><b>CLAPSADDLE-GARBER ASSOCIATES OFFICE LOCATIONS</b></p> <p>16 East Main Street, PO Box 754   Marshalltown, IA 50158 1523 S. Bell Avenue, Suite 101   Ames, IA 50010 5106 Nordic Drive   Cedar Falls, IA 50613 739 Park Avenue   Ackley, IA 50601 511 Bank Street   Webster City, IA 50595</p>	<p><b>Project Office</b> 739 Park Avenue Ackley, IA 50601 Phone: 641-847-3273 Fax: 641-847-2303</p>
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**Supplement to Engineer's Report on Repairs  
to Main Tile, Drainage District No. 86  
Hardin County, Iowa**

<b>Table of Contents</b>	Pg. 1
<b>Report</b>	
Introduction	Pg. 2
Repair Method	Pg. 3
Opinion of Probable Construction Costs	Pg. 4
Recommendations	Pg. 4
<b>Appendices</b>	
Map – Detailed Repair Location	App. 1
Opinion of Probable Construction Costs – Full Tree Removal and Open Ditch Installation	App. J

**Supplement to Engineer's Report on Repairs  
to Main Tile, Drainage District No. 86  
Hardin County, Iowa**

1.0 INTRODUCTION

- **SCOPE OF WORK** – The Hardin County Board of Supervisors, acting as District Trustees, requested Clapsaddle-Garber Associates to investigate and report concerning repairs to the Main tile of Drainage District No. 86. At the hearing held on January 22, 2020, the original Engineer's Report was discussed and reviewed by the District Trustees along with comments received by landowners. As a result, the District Trustees requested Clapsaddle-Garber Associates to move ahead with this supplement for an additional option for the detailed investigation area.



**REPAIR METHOD** – To repair the issues discussed in the original report for the detailed study area, there are several options, but the following is one that was discussed at the above mentioned hearing:

Full Tree Removal and Open Ditch Installation

- For the portion of the Main tile south of the former C&NW railroad tracks that is severely plugged with tree roots, remove trees within 50' of the Main tile.
- For the portion of the Main tile south of the former C&NW railroad tracks that is severely plugged with tree roots, remove and replace the existing Main tile with an open ditch. Typically, an open ditch would be in the same location as the existing Main tile in order to locate and outlet private and district tile.
- For reference, the detailed location of the proposed work near the C&NW railroad tracks is shown on the map included in Appendix I.
- For the remainder of the Main tile between Dago Lake and the former C&NW railroad tracks, verify the Main tile route and remove any trees within 50' of the Main tile.

With the above-mentioned repair methods, the following should be noted:

- The above option would involve taking of right of way.
- In the area of open ditch installation, the above option would require future monitoring for additional tree growth and beaver activity.
- The above option would only remove obstructions in the Main tile at the location of proposed open ditch installation. Any obstructions at other locations would remain in the existing Main tile.
- Repairs have historically been viewed as not having an impact on jurisdictional wetlands. As such, individual landowners should consult with applicable staff at the Hardin County NRCS office to verify the existence of said jurisdictional wetlands and that there will be no impact on them.

Per Iowa Code Chapter 468.126, any of the above actions that do not increase capacity would be considered a repair. As such, Subsection 1, paragraph c of Chapter 468.126 states "If the estimated cost of the repair does not exceed fifty thousand dollars, the board may order the work done without conducting a hearing on the matter. Otherwise, the board shall set a date for a hearing. . . ." The opinion of probable construction cost contained in the next section of this report exceeds said \$50,000 limit. Therefore, a hearing will be required. Per Iowa Code Chapter 468.126.1.g, the right of remonstrance does not apply to the proposed repairs.

3.0

**OPINION OF PROBABLE CONSTRUCTION COSTS** – Using the above method of repair, an itemized list of project quantities and associated opinion of probable construction cost for this option was compiled and are included in Appendix J of this report. A summary of said cost is as follows:

<b>REPAIR METHOD</b>	<b>DRAINAGE COEFF.</b>	<b>CONSTRUCTION COST</b>
Full Tree Removal and Open Ditch Installation	Existing	\$81,578.13

It should be noted that said costs include materials, labor, and equipment supplied by the contractor to complete the necessary repair and include applicable engineering, construction observation, and project administration fees by Clapsaddle-Garber Associates. However, said costs do not include any interest, legal fees, county administrative fees, crop damages, other damages, previous repairs, engineering fees to date, wetland mitigation fees, right of way acquisition, or reclassification fees (if applicable). As always, all costs shown are opinions of Clapsaddle-Garber Associates based on previous lettings on other projects. Said costs are just a guideline and are not a guarantee of actual costs.

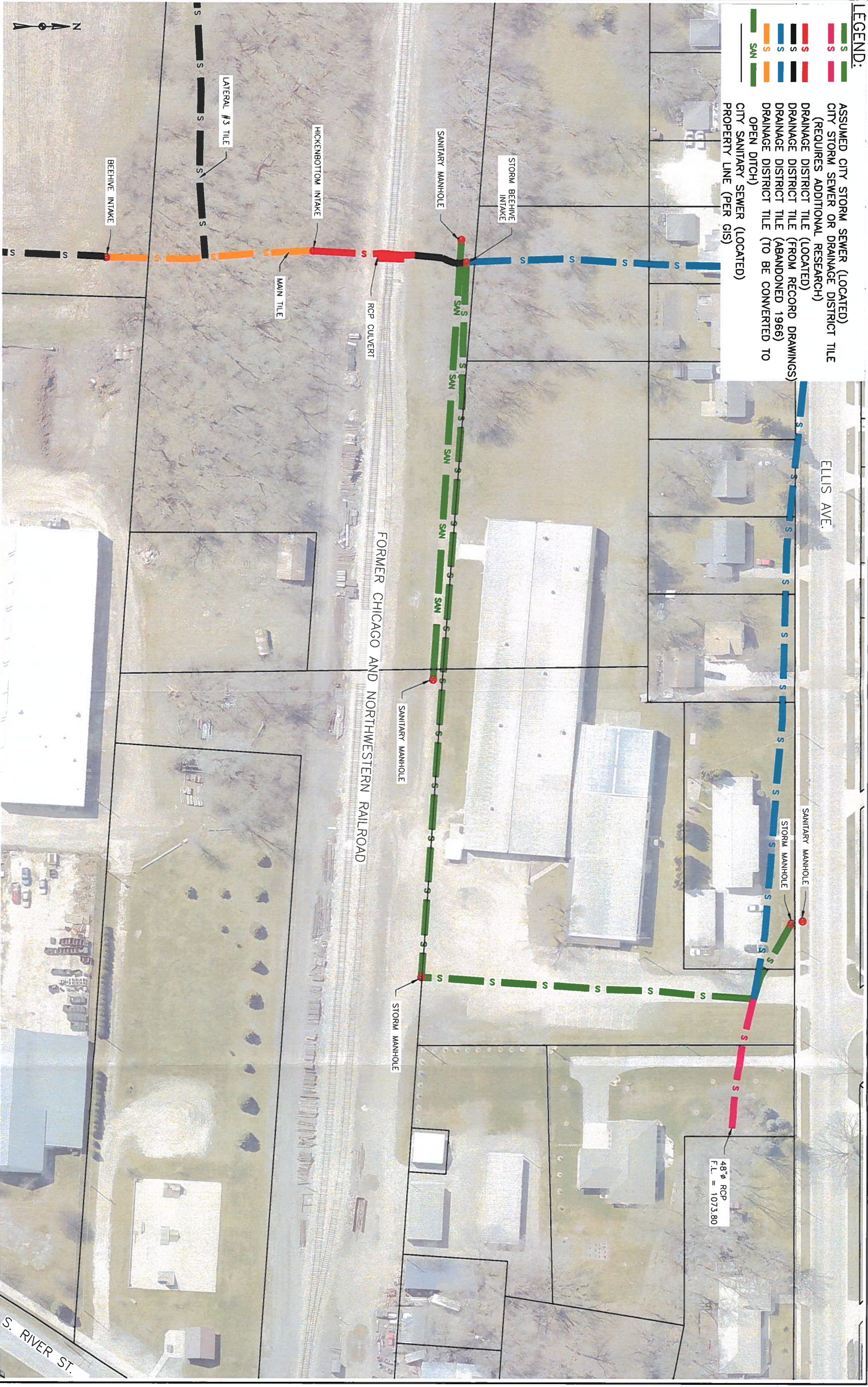
4.0

**RECOMMENDATIONS** – There is a definite need to perform one of the repairs from the original report or this supplement. The repair would remove the identified current and future restrictions and impediments to the Main tile and extend the serviceable lifespan of the same. Therefore, it is recommended that the Hardin County Board of Supervisors, acting as District Trustees, should take action to accomplish the following:

- Approve the Supplement to Engineer's Report as prepared by Clapsaddle-Garber Associates.
- Hold the required hearing on the proposed repairs.
- Adopt one of the recommendations of the Original Report or Supplement to Engineer's Report.
- Direct Clapsaddle-Garber Associates to prepare plans and specifications for the proposed repair.
- Direct Clapsaddle-Garber Associates to proceed with receiving bids from interested contractors.
- Award contract to the lowest responsible contractor.
- If desired or required by Iowa Code, proceed with reclassification proceedings.

**LEGEND:**

- ASSUMED CITY STORM SEWER (LOCATED)
- CITY STORM SEWER OR DRAINAGE DISTRICT TILE (REQUIRES ADDITIONAL RESEARCH)
- DRAINAGE DISTRICT TILE (LOCATED)
- DRAINAGE DISTRICT TILE (FROM RECORDED DRAWINGS)
- DRAINAGE DISTRICT TILE (ABANDONED 1966)
- DRAINAGE DISTRICT TILE (TO BE CONVERTED TO OPEN DITCH)
- CITY SANITARY SEWER (LOCATED)
- PROPERTY LINE (PER GIS)



GRAPHIC SCALE  
0 40' 80'

NO.	REVISION	BY	DATE	NO.	REVISION	BY	DATE

**CGA**  
Chicago-Garber Associates, Inc.  
Total Free 800-542-7981  
www.chicagogarber.com

DESIGNED: ZJS DATE: 2019.11.04  
DRAWN: ZJS DATE: 2019.11.04  
CHECKED: JMG DATE: 2019.11.04  
APPROVED: JMG DATE: 2019.11.04

**DRAINAGE DISTRICT #86**

**DETAILED REPAIR MAP**



ENGINEERS • LAND SURVEYORS

**Engineer's Opinion of Probable Construction Cost**  
**Project: Main Tile Repair for D.D. #86**  
 Location: Section 13, T90N, R22W Hardin County, Iowa

By: Z.J.S.  
 Date: 1/23/2020  
 Checked By: L.O.G.  
 Date: 1/27/2020

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
<b>DISTRICT CONSTRUCTION COSTS</b>						
201	OPEN DITCH CONSTRUCTION	\$ 30.00	LF	190	LF	\$ 5,700.00
202	LATERAL 3 OUTLET	\$ 1,500.00	EA	1	EA	\$ 1,500.00
203	PRIVATE TILE OUTLET	\$ 1,500.00	EA	2	EA	\$ 3,000.00
204	FLARED END SECTIONS	\$ 1,500.00	EA	2	EA	\$ 3,000.00
205	REVEMENT	\$ 40.00	TN	40	TN	\$ 1,600.00
206	TILE REMOVAL	\$ 5.00	LF	190	LF	\$ 950.00
207	INTAKE REMOVAL	\$ 500.00	EA	2	EA	\$ 1,000.00
208	TREE REMOVAL (FOR 100' AT REPLACEMENT)	\$ 10,000.00	LS	1	LS	\$ 10,000.00
209	TILE LOCATE (FROM DAGO LAKE TO START OF REPLACEMENT)	\$ 5,000.00	LS	1	LS	\$ 5,000.00
210	TREE REMOVAL (FROM DAGO LAKE TO START OF REPLACEMENT)	\$ 25,000.00	LS	1	LS	\$ 25,000.00
<b>CONSTRUCTION SUBTOTAL</b>						<b>\$ 56,750.00</b>
Contingency (15%)						\$ 8,512.50
<b>CONSTRUCTION TOTAL</b>						<b>\$ 65,262.50</b>
Engr. & Const. Observation (25%)						\$ 16,315.63
<b>TOTAL COST</b>						<b>\$ 81,578.13</b>

**FULL TREE REMOVAL AND OPEN DITCH INSTALLATION**

**DRAINAGE ELECTION DRAINAGE DISTRICT 165,  
HARDIN COUNTY**

**FILED**

**FEB 11 2020**

**HARDIN COUNTY AUDITOR**

**Please return this completed form to the Auditor's office by Monday, February 17, 2020.**

Election Date: March 28- 2020  
(Per Code of Iowa Election Must be no less than 40 days and no more than 60 days past April 24, 2019)

Election Location: 10123 Saw Acker Ia 50601  
(Per Code of Iowa Election must be held at some convenient place in the district. Please provide the address above.)

Election Time: 1:00 pm - 5:00 pm  
(Per Code of Iowa Election must be held from 1:00 pm - 5:00 pm on the day of the election)

Appointed Judge: Bill Ibeling

Appointed Judge: Karen Smith

Appointed Judge: Doris Ibeling

Appointed Clerk: Mary Smith

Appointed Clerk: Jelene Ibeling

Address to send the Election Packet: 10123 S Ave Acker Ia 50601

**Fax**