AGENDA
REGULAR DRAINAGE MEETING
FEBRUARY 13, 2019
1:30 P.M.

1. Open Meeting
2. Approve Agenda
3. Approve Minutes
   February 6, 2019 Regular Drainage Meeting

   Documents:

   2_6_2019 - DRAINAGE MINUTES.PDF
4. DD 52 - Discuss, With Possible Action, Updates To Project
5. DD 56 - Acknowledge Receipt Of Engineer's Report And Set Hearing Date

   Documents:

   DD 56 6830.1 - ENGINEERS REPORT.PDF
6. DD 86 - Discuss, With Possible Action, Repair Summary For Work Order #172

   Documents:

   DD 86 WO 172 6789.1 REPAIR SUMMARY_2019_02_01.PDF
7. DD 148 - Discuss, With Possible Action, Current Classification

   Documents:

   DD 148 PARCEL DRAINAGE.PDF
8. Other Business
9. Adjourn Meeting

REGULAR DRAINAGE MEETING

2/6/2019 - Minutes

1. Open Meeting
   Hardin County Board of Supervisors Chairperson, Renee McClellan, opened the meeting. Also present were Supervisors, Lance Granzow and BJ Hoffman; Matt Mahler and Dan McGinnis with Iowa Regional Utilities Association (IRUA); Lee Gallentine with Clapsaddle-Garber Associates (CGA); Drainage Clerk, Tina Schlemme.

2. Approve Agenda
   Granzow moved, Hoffman seconded to approve the agenda as presented. All ayes. Motion carried.

3. Approve Minutes
   Hoffman moved, Granzow seconded to approve the minutes of the January 16, 2019 regular drainage meeting, the January 16, 2019 DD 148 hearing on repairs, the January 23, 2019 regular drainage meeting and the January 23, 2019 DD 55-3 Lat 9 landowner meeting. All ayes. Motion carried.

4. Discuss, With Possible Action, IRUA Utility Permits
   Mahler presented GPS coordinates of the drainage tile, maps and any needed variance requests for each outstanding utility permit. Gallentine added that depths of the tile and the utility would need to be added. Mahler explained that he a licensed engineer and would like to perform the necessary processes for future permits and submit them in the same package format. IRUA feels this will satisfy the drainage district concern of getting all the needed information in a quality format and also IRUA's concern of keeping costs down. Mahler presented a check to Hardin County for the amount owed to CGA minus finance charges and explained that if the Trustees agreed to the procedures, then they can cash the check and pay CGA. Granzow stated he did not like the tactic of getting paid only if the agreement was accepted, but did like the new processes and packet. The Trustees agreed that CGA should look at the information presented and provide an opinion if it covers all the needed information in two weeks. When asked by Hoffman, Gallentine estimated up to 5 hours of review, to which the Trustees agreed would be paid for by the Board of Supervisors budget. The Trustees added they would like Gallentine to work with IRUA with any concerns as they are found so a finished product can be submitted in two weeks.

5. DD 1 - Legal Opinion Regarding Engineering Fees
   Schlemme updated the Trustees that she received a legal opinion from Mike Richards that stated all costs, including engineering fees, should be paid for from the secondary roads funds. Schlemme will invoice the Hardin County Engineering Office to reimburse the district fund for the CGA invoice that was previously paid. The Trustees agreed that for this project, all engineering fees should be paid for by secondary roads.

6. DD 25 - Discuss, With Possible Action, Repair Summary For Work Order #226
   Gallentine updated the Trustees that Williams Excavation removed trees and stumps and replaced approximately 160 feet of tile. They recommend to verify the contractor removed the tree debris from the site and that the stumps were treated. The Trustees agreed for Schlemme to contact Williams to verify the debris removal.

7. DD 72 - Discuss, With Possible Action, Repair Summary For Work Order #213
   Gallentine updated the Trustees that Williams Excavation replaced approximately 14 feet of Lateral 2 tile. The tile is shallow and does not appear to be in good overall condition. CGA recommends if additional sinkholes/blowouts are reported, the replacement of the entire Lateral 2 tile, which is not very long, should be considered. It was discussed that signs stating "Shallow Tile - No Equipment Crossing" would be beneficial, paid for by the drainage district. The Trustees agreed for Gallentine to research sign types and let Schlemme know before she contacts John Tjarks with the DOT.

8. DD H-F 1 - Discuss, With Possible Action, Updates To Work Order #238
   Gallentine updated that Trustees that contractor, Adam Seward, suggested that the repair site north of Iowa Falls be mowed once to twice a year to manage future tree growth. The Trustees agreed they understood where Seward was coming from, but it would be best to just spray the area with no mowing. Schlemme is to contact Seward and inform him of the decision.

9. Other Business

   Drainage District Signs - It was discussed that it would save time and money going forward if tile location signs were posted during projects. It was discussed that a possible triangular post cover with steel post would be a good sign with stickers showing "Drainage District Tile". Stickers with the drainage district number could be placed on the sign for customization. It was also discussed that CGA could include this item in with the bid items. It was added that the sign locates, as issued, could be added as a layer under drainage in GIS. Schlemme will discuss the signs with John Tjarks with the DOT.

DD 26 Lat 4 - Schlemme updated the Trustees that she had just received a couple options from Heather Thomas for verifying the tile is flowing. Thomas stated the options as: #1. Hire a contractor to dig up the clay line at or just downstream of the wet spot and confirm clay line is operating. CGA has a 100' camera they could run upstream to verify the shape/operation. #2. Run the 100' camera from the intake located about 200' upstream of the wet spot. The intake is too small for larger televising cameras to access. This method wouldn't get to the wet spot, but does confirm if the clay line is operating upstream of the wet spot. Thomas prefers option #1 as it give the best investigation, but does come with a small cost. The Trustees agreed it was probably the best method to ensure the tile status to the landowner with concerns. Hoffman moved, Granzow seconded for CGA to move forward with option #1 per the lottery system. All ayes. Motion carried.

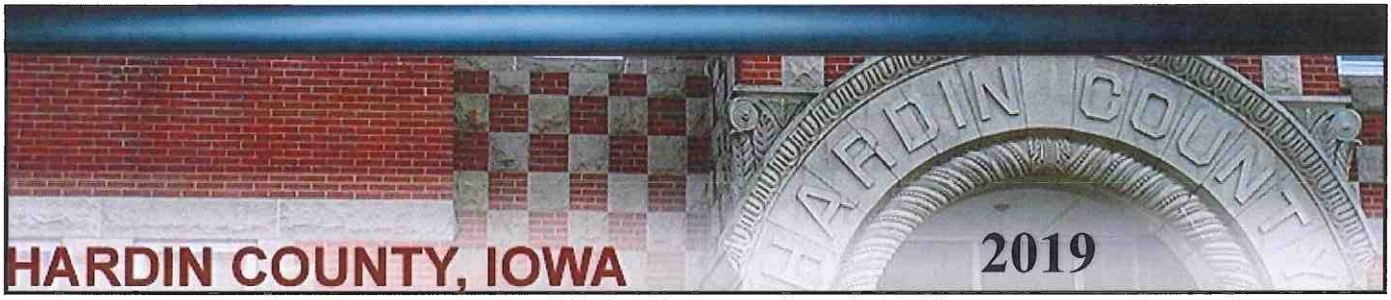
DD 52 - Schlemme updated the Trustees that Mike Richards has decided to file the petition with the County Auditor but was wanting a legal description of the district. Schlemme informed them that no such legal exists and is waiting to hear back from the attorney.

DD 55-3 Lat 12 - Schlemme updated the Trustees that she is still waiting to receive the go ahead from the railroad. They had requested history of the district, in which Schlemme replied that the Code of Iowa states approval is not needed for repairs under $50,000 and they notified them as a courtesy. The railroad official stated she is new to the Iowa territory and is reviewing the Code.

DD 148 - Gallentine updated the Trustees that there is a private 48" culvert crossing that is one foot higher than the design elevation. The Trustees agreed that it should be the landowner's responsibility to correct. They stated Schlemme is to research the district to see if the landowner received a permit to install. If not, she is to contact the landowner to find out if they are even still using the culvert and inform them that the intake will be removed during the project and they will need to re-install at the correct design elevation, if desired, at their cost.

It was discussed that the next week's regular drainage meeting will be set for 1:30 p.m., after the 1:00 bid letting.

10. Adjourn Meeting
    Hoffman moved, Granzow seconded to adjourn the meeting.



ENGINEER'S REPORT ON IMPROVEMENTS TO MAIN TILE DRAINAGE DISTRICT NO. 56 HARDIN COUNTY, IOWA

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

LEE O. GALLENTINE, P.E. DATE Feb 8, 2019

LICENSE NUMBER: 15745
MY LICENSE RENEWAL DATE IS DECEMBER 31, **2020**
PAGES OR SHEETS COVERED BY THIS SEAL:
SHOWN ON TABLE OF CONTENTS

CGA
ENGINEERS • LAND SURVEYORS

CLAPSADDLE-GARBER ASSOCIATES OFFICE LOCATIONS
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

Project Office
739 Park Avenue
Ackley, IA. 50601
Phone: 641-847-3273
Fax: 641-847-2303

Engineer's Report on Improvements to Main Tile, Drainage District No. 56 Hardin County, Iowa

Engineer's Report on Improvements to Main Tile, Drainage District No. 56 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 improvements to the Main tile of Drainage District No. 56. This report will summarize the history of repairs, investigate the necessity and feasibility of said improvements, and present opinions of probable construction costs associated with said improvements. At the Landowner's Meeting held on March 28, 2018, Work Order #204 was discussed and reviewed by the District Trustees. For reference, a copy of the meeting minutes is included in Appendix L and a copy of Work Order #204 is included in Appendix M. As a result of this meeting, the District Trustees requested Clapsaddle-Garber Associates to move ahead with an investigation and report concerning improvements to the Main tile.

- LOCATION – The area of investigation was the entire length of the Main tile. Said Main tile is located in Sections 1, 4, 7, 8, 9, 10, 11, 12, and 17, Township 87 North (T87N), Range 22 West (R22W), Hardin County, Iowa. Specifically, the downstream limit of investigation is in Section 1 where the Main tile outlets into the Main Open Ditch a few hundred feet north of 230th Street at approximately ½ mile east of G Avenue. Going upstream, the tile then crosses 230th Street and enters Section 12. It proceeds southwest across Section 12 and enters Section 11 when it crosses G Avenue at approximately ½ mile south of 230th Street. It then proceeds west, northwest, and southwest, and enters Section 10 when it crosses County Highway S27 at approximately ⅜ mile south of 230th Street. From here, it proceeds northwest and southwest across Section 10 and enters Section 9 when it crosses E Avenue at approximately ⅛ mile south of 230th Street. It then continues southwest and northwest and enters Section 4 when it crosses 230th Street at approximately ¼ mile east of D Avenue. In Section 4, it continues northwest and southwest and reenters Section 9 briefly at the intersection of D Avenue and 230th Street. From there it enters Section 8, where it proceeds southwest until it is approximately ⅜ mile south of 230th Street and approximately ⅜ mile east of County Highway S21. At that point, it turns south and southeast and enters Section 17 at approximately ⅜ mile east of County Highway S21. From there it continues south and ends at approximately ⅜ mile east and approximately ¼ south of the intersection of County Highway S21 and 240th Street. For reference, a map showing the limits of investigation is included in Appendix I.

2.0 DISTRICT HISTORY – The following is a summary of the pertinent history of Drainage District No. 56 as obtained from the Hardin County Auditor's drainage minutes and records.

1914, April 2	Petition for the establishment of a drain starting in Section 11 and terminating in Section 17.
1915, Feb 2	Report filed by S.B Gardner, Engineer, for the establishment of a drainage district. It included an estimate of the materials for the construction of a Main and Laterals.
1915	Notice of hearing for the petition. Hearing to take place on March 12th.
1915, Mar 12	Hearing on the establishment of a drainage district held. Further hearing to take place on March 24th.
1915, Mar 24	Hearing on the establishment of a drainage district held. Lacking a quorum, meeting was adjourned, and meeting continued.
1915, July 13	Revision to the Engineer's report recommending the elimination of Laterals 12, 14, 23, 24, 25, 26, 27, 36, 39, and 37. It also recommended that the Main tile not be constructed from Sta. 0+00 to 16+50 and that the bulkhead be constructed at Sta. 16+50.
1915, July 14	Drainage district established as specified in the report of E.W. Edwards, Engineer, and it was to be construction per the plans and specifications. E.W. Edwards appointed as engineer on the construction and the County Auditor instructed to advertise for bids for material and for labor for the construction. Said construction was to be completed by January 1, 1917.
1915, July	Notice to contractors for the bid letting. Bids to be received until August 9th.
1915, Aug 9	Contract awarded to Evens & Howard Fire Brick Company of St. Louis.
1915, Dec 15	E.W. Edwards resigns as Drainage Engineer for construction.
1915, Dec 17	W.S. Porter appointed as Drainage Engineer for construction.
1917, Mar 20	NW¼ NW¼ Section 20; NE¼ NW¼ Section 20; SE¼ SW¼ Section 17; SW¼ SW¼ Section 17; SW¼ SE¼ Section 17, NW¼ SE¼ Section 17; NE¼ SW¼ Section 17; and NW¼ SW¼ of Section 17 exempted from assessments.
1918, Mar 19	Approval of Engineer's letter recommending that the Main tile be constructed of cement 8" sewer pipe at Sta. 684+00 due to sand pockets found during construction.
1918, Nov 11	Bill for filling of ditch.
1918, Nov 18	Engineer's report recommended a 2,500 feet long 12" relief tile beginning at Sta. 625 on the Main tile.
1919, May 5	Engineer's report stated that Lateral 3 was found crushed at the connection to the Main tile and had been repaired.
1921, June 20	Engineer reported that the tile just above the outlet had never been filled and recommended that the four hundred feet be filled.
1929, Oct 15	3 bills for work done.
1929, Dec 17	Bill for work done.

1936, Nov 16	3 bills for work done.
1937, Apr 26	2 bills for work done to Main drain.
1937, Aug 13	Bill for work done.
1938, July 25	2 bills for work done.
1939, May 29	6 bills for work done.
1939, July 17	Bill for work done.
1941, May 6th	6 bills for work done.
1943, June 14	3 bills for work done.
1943, Nov 16	8 bills for work done.
1944, June 16	Bill for work done.
1944, Sept 5	Bill for work done.
1944, Oct 24	Bill for work done.
1944, Nov 21	3 bills for work done.
1945, Oct 2	Bill for work done.
1946, Dec 3	2 bills for work done.
1947, Jan 21	21 bills for work done.
1947, Feb	5 bills for work done.
1947, Mar	Bill for work done.
1947, Apr 8	4 bills for work done.
1947, May 6	3 bills for work done.
1947, June 3	Bill for work done.
1948, Feb 24	4 bills for work done.
1948, Apr	4 bills for work done.
1948, May 5	2 bills for work done.
1949, Feb 1	4 bills for work done.
1949, May 2	3 bills for work done.
1949, Aug 15	Bill for work done.
1950, Sept	5 bills for work done.
1950, Dec 21	5 bills for work done.
1951, Mar 19	Bill for work done.
1951, June 27	5 bills for work done.
1953, Jan	3 bills for work done.
1953, Jan 28	Bill for work done in NE¼ Section 8 and NW¼ Section 12.
1953, May	Bill for work done.

1953, May 11-13	Repair in SE¼ Section 11 and NW¼ Section 12.
1953, May 18	Repair to 32" Main tile in SE¼ Section 11.
1953, June 1h	Bill for work done.
1953, June 30	3 bills for work done.
1953, Nov	Bill for work done.
1954, Jan 14	Bill for repair in SE¼ Section 11 and NW¼ Section 12.
1955, Jan 14	Bill for repair in NW¼ Section 12.
1955, Aug 11	Repair to tile in NW¼ Section 11.
1955, Nov 15	Repair to riser in NE¼ Section 11.
1959, Apr 18	Bill for work done in N½ Section 11.
1959, May 13	Bill for repair to 30" Main tile in SE¼ Section 11.
1959, July 20	Bill for repair to 32" Main tile in E½ Section 11.
1961, May 11	Bill for work done in NE¼ Section 11.
1962, May 2	Bill for work done in Section 4.
1963, Aug 8	Repaired 32" Main tile in NW¼ Section 12.
1964, Oct 23	Repair to 18" Main tile in NW¼ Section 8.
1965, Oct 11	Work done in Section 12.
1965, Dec 15	Repair in NE¼ Section 8.
1966, Apr 14	Repair in Section 8.
1969, May 12	Repair in Section 8.
1969, Sept 24	Bill for work done in Section 1.
1969, Dec 1	Repair to Main tile in Section 11.
1971, Feb 2	Large tile reported broken in two places in Section 8.
1971, Dec 7	Bill for work done in Section 10.
1973, May 31	Bill for work done in Section 11.
1974, May 1	Repair to Main tile in Section 8
1974, June 4	Repair in Section 8.
1975, June 3	Repair to broken intake and tile in road ditch in Section 9.
1975, Sept 12	Bill for work done in Sections 11 and 12.
1976, June 2	Repair to Main tile in NW¼ Section 12.
1976, June 15	Engineer authorized to make preliminary report concerning cleanout and repair the Main drain.
1976, Dec 16	Request for cleanout of Main Open Ditch from Main tile outlet to Tipton Creek and creation of surface drain on west side of railroad in Section 11.

1977, Mar 11	Report on proposed improvement, repairs, and outlet extension submitted by Phil Haefner, engineer. Report included repairs to the Main tile, improvement to Main Open Ditch, and open channel extension from the Main tile outlet to Tipton Creek.
1977, Mar16	Preliminary report by Phil Haefner tentatively accepted. Hearing date set for April 26, 1977.
1977, Mar 28	Notice of hearing for the proposed repairs, improvements and extension of outlet. Hearing is to take place April 26, 1977.
1977, Apr 26	Hearing for proposed repairs and improvement. Engineer's report approved.
1977, May 11	Repair to Main tile in NE¼ Section 8.
1977, May 31	Engineer's report (including 450 feet of tile repairs) approved and bid opening date set for July 19th. Suggested commencement date set for October 30th and completion date set for May 1, 1978.
1977, June 25	Specifications for construction of drainage improvements and repairs submitted by Phil Haefner.
1977, July 19	Bid letting with bid from B & B Excavating of Parkersburg, Iowa accepted. Also, the design for the surface drain beneath the railroad was modified.
1977, Aug 3	Bill for repair to tile in Section 8.
1978, Apr 21	Request for extension of completion date granted due to weather.
1978, May 18	Modifications to proposed outlet extension due railroad pilings.
1978, June 26	Modifications to proposed outlet extension due to boulders.
1978, June 27	Engineer ordered to prepare report showing modifications to proposed outlet extension.
1978, Oct 16	Engineer submitted letter of completion.
1978, Oct 17	Engineer's report on completion accepted and hearing date set for November 9th.
1978, Nov 9	Repair and improvement accepted as completed by District Trustees.
1980, June 9	Repair to 12" tile in SW¼ Section 8.
1980, Aug 13	Bill for repair to 12" tile in Section 8.
1981, July 21st	Tile that outlets on surface reported washed out in SE¼ SW¼ Section 1. Secondary Road Department authorized to repair.
1981, Oct 21	Bill for repair of washed out tile in Section 1.
1982, July 12	Tile reported washed out in Section 11.
1983, May 2	36" Main tile reported broken in Section 12.
1983, Oct 24	Previously reported broken Main tile found to not be broken, but instead outlet needed repaired.
1984, Apr 24	Request for repair to broken 30" Main tile in NE¼ Section 9.
1984, Apr 30	Blowout/sinkhole reported where tile is broken in Section 9.
1984, Oct 8	Blowout over 28" Main tile reported in Section 9.

1984, Oct 23	Bill for repair of broken 30" Main tile in NE¼ Section 9.
1985, June 17	Bill for repair of broken 28" Main tile in NE¼ NW¼ Section 9.
1986, May 7	Request for repair of broken tile in NW¼ Section 9.
1986, May 14	Broken tile reported in Section 9.
1986, June 18	Bill for repair of broken 30" Main tile in NW¼ Section 9.
1986, Sept 8	Bill for replacement of 400 feet of 12" cement tile in SE¼ SW¼ Section 8.
1990, June 13	Bill for repair of broken intake and tile in NW¼ Section 11.
1990, July 24	Request for repair to tile in NE¼ Section 9 with crew to verify that tile is district tile.
1990, Aug 29	Request for repair with crew directed to check on condition of the Main tile.
1990, Oct 1	Bill for repair of broken tile in Section 9.
1991, Oct 30	Request for repair approved for broken tile in NE¼ Section 9.
1992, Apr 14	Crew directed to verify and repair tile as requested in Section 10.
1992, Apr 15	Bill for repair to broken tile in NE¼ Section 9.
1992, May 15	Bill for repair to broken tile in SE¼ NE¼ Section 10.
1994, May 11	Request for repair approved for broken tile in Section 8.
1994, May 23	Bill for repair of broken tile in NW¼ and SW¼ Section 8.
1998, July 15	Crew directed to verify and repair Main tile as requested in NE¼ Section 9.
1998, Nov 16	Request for repair approved for two broken tiles in NW¼ Section 10.
1999, July 21	Bill for repair to broken tile in NE¼ Section 9.
2001, Dec 3	Request for repair to broken tile in NE¼ SE¼ Section 11.
2001, Dec	Bill for repair to broken tile in Section 11.
2008, June 9	Bill for repair to two broken tiles in SW¼ Section 8.
2009, Apr 15	Repairs to tile intake approved in NW¼ NW¼ Section 8.
2009, May 20	Repairs approved for Lateral 29 connection to Main tile in NW¼ Section 8.
2010, Apr 21	Request for repair to sinkhole/blowout and broken tile approved in NE¼ Section 10.
2010, June 11	Bill for repair of broken Main tile in NW¼ NE¼ Section 10.

3.0 INVESTIGATION – For the investigation portion of this report, field observations and office investigations were performed. The field observation for this report was limited to determining a possible route for an upper Main tile outlet near E Avenue from the existing Main tile to the Main Open Ditch of Drainage District 26. Said observation was limited to visual observation (without excavation) and preliminary field survey of the same.

Office investigation started with a review of district history. Said review shows that there were repairs requested within 15 years after the initial construction of the Main tile. This is probably an indication of poor workmanship during construction, usage of inferior materials, or inadequate design. Since then, repairs have been pretty common with over 100 repairs during the last 90 years. Many details of these repairs have been lost to time, but it appears many of them have consisted of tile replacements due to blowouts and sinkholes. In addition, these repairs have been fairly consistent in their occurrence and do not appear to have accelerated over recent years.

All other office investigations were limited to office calculations and records research. Using this information, calculations were performed to determine the drainage coefficient for the length of the existing Main tile. It appears that the Main tile was designed to provide a drainage coefficient of 0.07 inches per day at the downstream and upstream ends, with the length of the Main tile varying from 0.03 to 0.22 inches per day.

4.0 DISCUSSION AND CONCLUSIONS – Based on the above, it is apparent that the Main tile has issues which warrant corrective actions. First, the Main tile has a history of failure based on the sheer number of repairs. In many drainage districts, repairs are attributable to physical deterioration as the tile reaches the end of its lifecycle. Although this may be true in this district also, the regularity of the repairs over the last 90 years indicates that something else is at play. These historic repairs are probably due to a combination of overloading of the tile, poor soil conditions, lack of soil over, or differential drainage capacity along the length of the Main tile. As mentioned in the Investigation section above, all of these can probably be attributed to poor workmanship during construction, usage of inferior materials, or inadequate design. Finally, the capacity of the existing Main tile is far below that of modern preferred drainage coefficients of ½ inch per day to 1 inch per day.

If some corrective action is not undertaken, the physical failures of the Main tile will accelerate. This will allow soil to enter the tile and the physical failures will manifest themselves as more sinkholes and soil infiltration. Also, if said corrective action does not increase the drainage capacity, the Main tile will continue to provide less than desirable drainage performance at best and in some locations continue the pattern of almost annual failures. When all the issues are combined, it will lead to further reduced drainage and liability exposure by the drainage district.

5.0 IMPROVEMENT METHODS – To improve the drainage capacity for the existing Main tile, the following options are the most straightforward available:

Upper Main Tile Outlet

- Sever the existing Main tile, install a new outlet to the Main Open Ditch of Drainage District 26, and divert flows from the upper portion of the Main tile to the new outlet. For reference, a chart with the required tile sizes and capacities is included in Appendix P.
- The point of severing and the new outlet would be at approximately ¼ mile east of E Avenue and run in a northerly direction (following the lower points of the land) until reaching the Main Open Ditch of Drainage District 26. For reference, the general route is shown on the map included in Appendix O.

Single Tile Upsizing

- For the entire length of the Main tile, remove and replace the existing Main tile with a single new Main tile of greater capacity. For reference, a chart with the required tile sizes and capacities is included in Appendix R.
- Typically, the replacement Main tile would be in the same location as the existing Main tile in order to locate and reconnect private tile and lateral connections. For reference, the general route is shown on the map included in Appendix Q.

Dual Tile Upsizing

- For the entire length of the Main tile, remove and replace the existing Main tile with two new Main tiles of greater combined capacity with interconnections for flow equalization. For reference, a chart with the required tile sizes and capacities is included in Appendix S.
- Typically, the replacement Main tiles would be in the same location as the existing Main tile in order to locate and reconnect private tile and lateral connections. For reference, the general route is shown on the map included in Appendix Q.

Parallel Tile Upsizing

- For the entire length of the Main tile, leave the existing Main tile in place and install a new parallel Main tile for greater combined capacity. For reference, a chart with the required tile sizes and capacities is included in in Appendix T.
- Typically, the supplemental Main tile would be near the location of the existing Main tile in order to locate and reconnect private tile and lateral connections and interconnect the two for flow equalization. For reference, the general route is shown on the map included in Appendix Q.

Open Ditch Construction

- For the entire length of the Main tile, remove and replace the existing Main tile with a Main Open Ditch. For reference, a chart with the open ditch depths and capacities is included in Appendix U.
- Typically, the Main Open Ditch would be in the same location and same depth as the existing Main tile in order to locate and outlet private tile and lateral connections. For reference, the general route is shown on the map included in Appendix Q.

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

- Due to the soil types and soil cover, all tile will have rock bedding for additional stability and strength.
- The existing ground elevations shown in the original design are still accurate.

- The only tiles being improved are the tiles identified in Appendices P, R, S, and T. The remainder of the tiles are not being improved or modified in any manner.
- The proposed pipe sizes shown in Appendices P, R, S, and T are those that are currently manufactured that meet or exceed the ½" or 1" drainage coefficient.
- The proposed and existing capacities shown in Appendices P, R, S, and T are based on the assumptions that the Main tile is installed per the original design and that it is functioning at full capacity (i.e. are not collapsed, broken, plugged, etc).
- The proposed and existing pipe sizes and capacities shown in Appendices P, R, S, and T are those to serve the lands within the existing District boundaries and not any discharges from other lands outside the District boundaries.
- Portions of the Single Tile Upsizing, Dual Tile Upsizing, and Parallel Tile Upsizing options may prohibit farming over the proposed Main tile at certain areas due to a lack of soil cover and may even require mounding of soil above the proposed Main tile.
- The Single Tile Upsizing, Dual Tile Upsizing, and Open Ditch Construction options would allow for lower maintenance costs in the future as the entire Main is new.
- The Upper Main Tile Outlet and Parallel Tile Upsizing options would require higher maintenance costs in the future as the remaining portions of the existing Main tile are left in service and are over 100 years old.
- The Upper Main Tile Outlet and Open Ditch Construction options would require the taking of right of way, which is not included in the opinion of probable construction costs contained in the next section of this report
- The Upper Main Tile Outlet option does not increase drainage capacity for those portions of the Main tile upstream of the upper main tile outlet. It just shortens the length of restrictions between that point and the Main Open Ditch of Drainage District 26.
- The Upper Main Tile Outlet option does increase drainage capacity for those portions of the Main tile downstream of the upper main tile outlet as a large portion of the Drainage District drainage area has been removed from the Main tile.
- The Upper Main Tile Outlet option would turn the drainage area upstream of the Upper Main Tile Outlet into a separate Drainage District.
- The Upper Main Tile Outlet option can freely discharge into the Main Open Ditch of Drainage District 26 without charge.
- The proposed tile on the Upper Main Tile Outlet would be installed at some large depths (20'±).
- The Upper Main Tile Outlet option may require annexation to extend the district boundary to the north to allow for installation of the proposed tile.
- Improvements have historically been viewed as having an impact on jurisdictional wetlands. As such, individual landowners should consult with applicable staff at the Hardin County NRCS office to determine the existence of said jurisdictional wetlands and what said impact may be on them.

Per Iowa Code Chapter 468.126, the above actions would be considered an improvement. As such, Subsection 4, paragraph c of Chapter 468.126 states "If the estimated cost of the improvement 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 on whether to construct the proposed improvement and whether there shall be a reclassification of benefits for the cost of the proposed improvement." The opinion of probable construction costs contained in the next section of this report exceeds said $50,000 limit. Therefore, a hearing will be required. Per Iowa Code Chapter 468.126.4.e, the right of remonstrance may apply to the proposed improvements.

6.0 OPINION OF PROBABLE CONSTRUCTION COSTS – Using the above methods of improvement, an itemized list of project quantities and associated opinions of probable construction cost for each option were compiled and are included in Appendices V, W, X, Y and Z of this report. A summary of said costs are as follows:

METHOD	DRAINAGE COEFF.	DISTRICT COST	ROAD CROSSING COST
Upper Main Tile Outlet	Varies	$ 468,625.00	$ 22,281.25
Single Tile Upsizing	½"	$ 5,641,191.60	$206,353.13
	1"	$ 7,803,417.60	$236,971.88
Dual Tile Upsizing	½"	$ 7,448,733.60	$281,318.75
	1"	$10,681,413.60	$326,384.38
Parallel Tile Upsizing	½"	$ 4,769,397.60	$193,990.63
	1"	$ 7,471,305.60	$225.903.13
Open Ditch Construction	Varies	$ 1,989,504.00	$862,125.00

It should be noted that said costs include materials, labor, and equipment supplied by the contractor to complete the necessary improvement 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.

7.0 OWNERSHIP AND CLASSIFICATIONS – Any and all information concerning ownership of lands and classifications of said lands within Drainage District No. 56 can be obtained from the Hardin County Auditor's office.

It should also be noted that Iowa Code Chapter 468.131 states "When an assessment for improvements . . . exceeds twenty-five percent of the original assessment and the original or subsequent assessment . . . did not designate separately the amount each tract should pay for the main ditch and tile lateral drains then the board shall order a reclassification . . ." Based on this, it appears that a reclassification separating laterals may be required if any of the above options were deemed to be an improvement, said improvement were to move forward, and the laterals had not already been separated. Since the proposed project does not involve the laterals, it is not clear if this portion of code is applicable and it is our recommendation that the District Trustees seek advice from their legal counsel.

8.0 RECOMMENDATIONS – There is a definite need to perform one of the above mentioned actions. The improvements would remove the current restrictions and impediments to the Main tile, extend the lifespan of the same, even out the capacity . 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 improvements.
- Adopt one of the recommendations of the Engineer's Report.
- If the Upper Main Tile Outlet option is selected:
  - Confirm that Drainage District 56 should be split into two separate districts.
  - Confirm that the upper Main tile outlet can discharge freely into the Main Open Ditch of Drainage District 26 without charge.
  - Confirm if annexation is necessary to extend the the upper Main tile outlet to the north.
- Direct plans and specifications for the proposed improvements be prepared by Clapsaddle-Garber Associates.
- Proceed with receiving bids from interested contractors by Clapsaddle-Garber Associates.
- Award contract to the lowest responsible contractor.
- Seek legal advice whether reclassification is required.
- If desired or required by Iowa Code, proceed with reclassification proceedings.

DRAINAGE DISTRICT 56
LANDOWNER MEETING

3/28/2018 - Minutes

1. Open Meeting
   Hardin County Board of Supervisors Co-Chairperson, Renee McClellan, opened the meeting. Also present was Hardin County Supervisor, Lance Granzow; Landowner, Matt Topp, Bob Topp, Betty Thomas, Kevin Sheldahl, Lynn Holechek, Jon Kuhfus, Mike Bostrom, Brad Fjelland, Brian Krause, Ben Krause, Harold Bahr Jr, Marjorie Krause, Jacob Handsaker and Mike McCartney; Lee Gallentine and Heather Thomas with Clapsaddle-Garber Associates (CGA); Drainage Clerk, Tina Schlemme. Absent: BJ Hoffman.

2. Approve Agenda
   Granzow moved, McClellan seconded to approve the agenda as presented. All ayes. Motion carried.

3. Attendance/Introductions
   Introductions were made and attendance verified.

4. Explanation Of Landowner Request
   Schlemme explained that a landowner had requested that his drainage west of E Avenue be improved. There were a couple possibilities mentioned to him that included upsizing the tile lying west of E Avenue or severing the tile from DD 56 and draining north into DD 26 open ditch.

5. Comments/Discussion

   There was much discussion between landowners and the Trustees. Gallentine stated that a project this size would more than likely not be less than $500,000. Landowners asked approximately how much an engineer's report cost to produce, in which Gallentine answered roughly $3,000 to $5,000. It was discussed that this project would probably be considered an improvement so a reclassification would need completed, in which Gallentine estimated another $3,000 to $6,000 for the reclass report.

   Other options were discussed, such as not severing the tile but adding a tile that would go north along E Avenue and pay an outlet fee to DD 26. Replacing all tile in the district with larger tile, an open ditch and installing a parallel tile were also discussed. When Trustees asked for a show of hands from landowners who supported the engineer creating a report, all hands were raised.

6. Possible Action
   Granzow moved, McClellan seconded for CGA to research the district and create an engineer's report with multiple options, as discussed. (1. Install tile to the north along E Avenue so all water from the west would flow north. 2. Replace all tile in the district with larger tile. 3. Install two new parallel tiles. 4. Install an open ditch. 5. Parallel the old tile with a new.) All ayes. Motion carried.

7. Other Business
   None.

8. Adjourn Meeting
   Granzow moved, McClellan seconded to adjourn the meeting. All ayes. Motion carried.

Drainage Work Order Request For Repair
Hardin County

Work Order # 204

Date 3/1/2018

District # 56 Lateral Fund # 51087

Township Sherman Section 9 Twp 87 Rge 22 Qtr Sec NW1/4

Repair Requested By Lynn Holechek

Address lynn.holechek@gmail.com Phone (515) 460-1425

Landowner same

Address Phone

Request Taken By Tina Schlemme

Available for Repair Now? ☐Yes Date Available

Problem Description: Lynn would like more drg capacity for his land. Sheldahl Bros believe it best to sever the tile west of E Ave & annex into DD 26 to drain to Tipton Creek. The land east of E Ave, that's flat, would benefit from not taking all the water from the west.

Repair labor, materials and equipment

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

Repaired By:

Date:

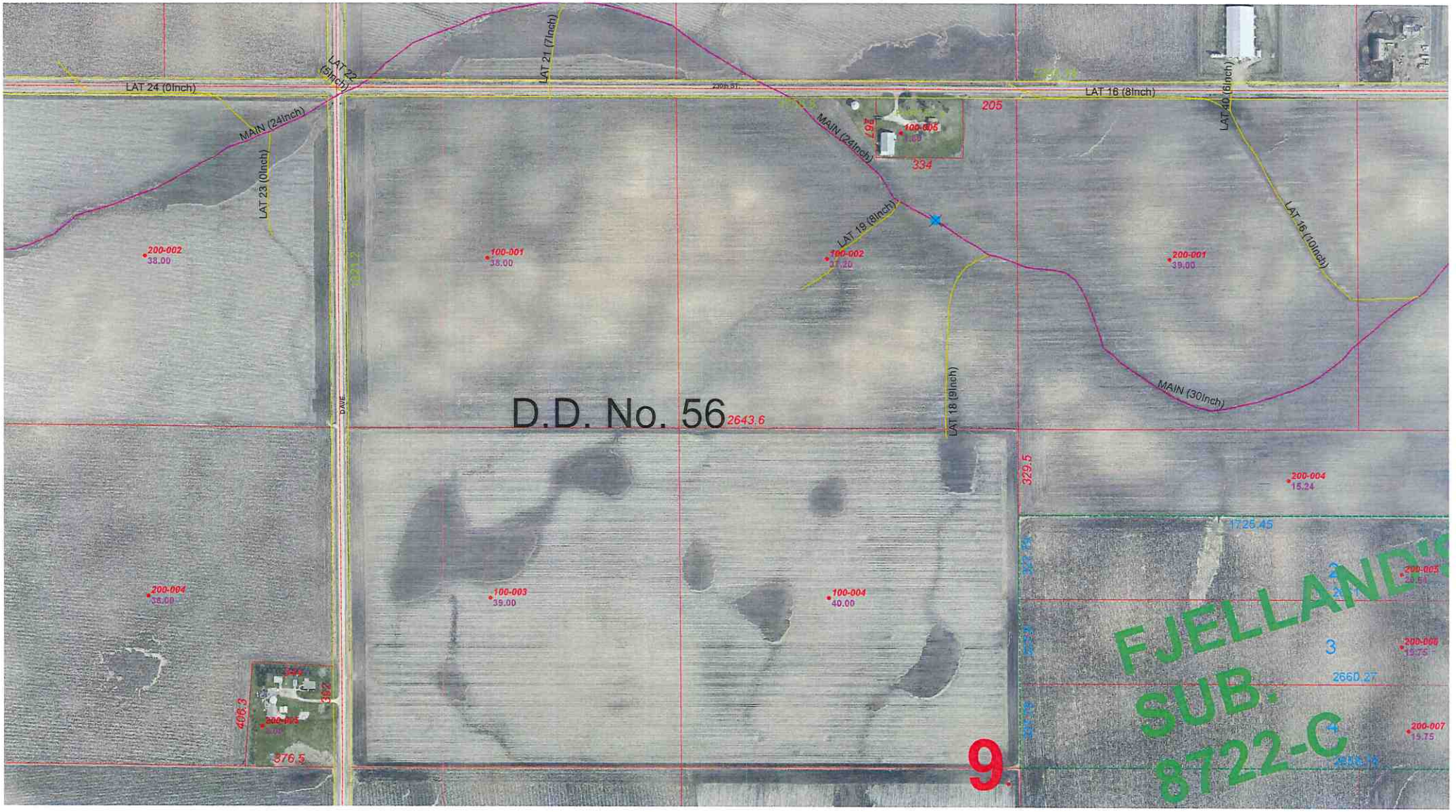
Please send statement for services to:

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

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

For Office Use Only

Approved: *Date:*


LAT 24 (0Inch)
LAT 22 (5Inch)
LAT 21 (7Inch)
LAT 16 (8Inch)
LAT 40 (6Inch)
MAIN (24Inch)
LAT 23 (0Inch)
LAT 19 (8Inch)
LAT 16 (10Inch)
LAT 18 (9Inch)
MAIN (30Inch)
D.D. No. 56
2643.6
205
334
200-002
38.00
100-001
38.00
100-002
39.00
200-001
39.00
200-004
15.24
100-003
39.00
100-004
40.00
200-004
38.00
200-005
1725.45
FJELLAND'S
SUB.
8722-C
3
2660.27
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15.75
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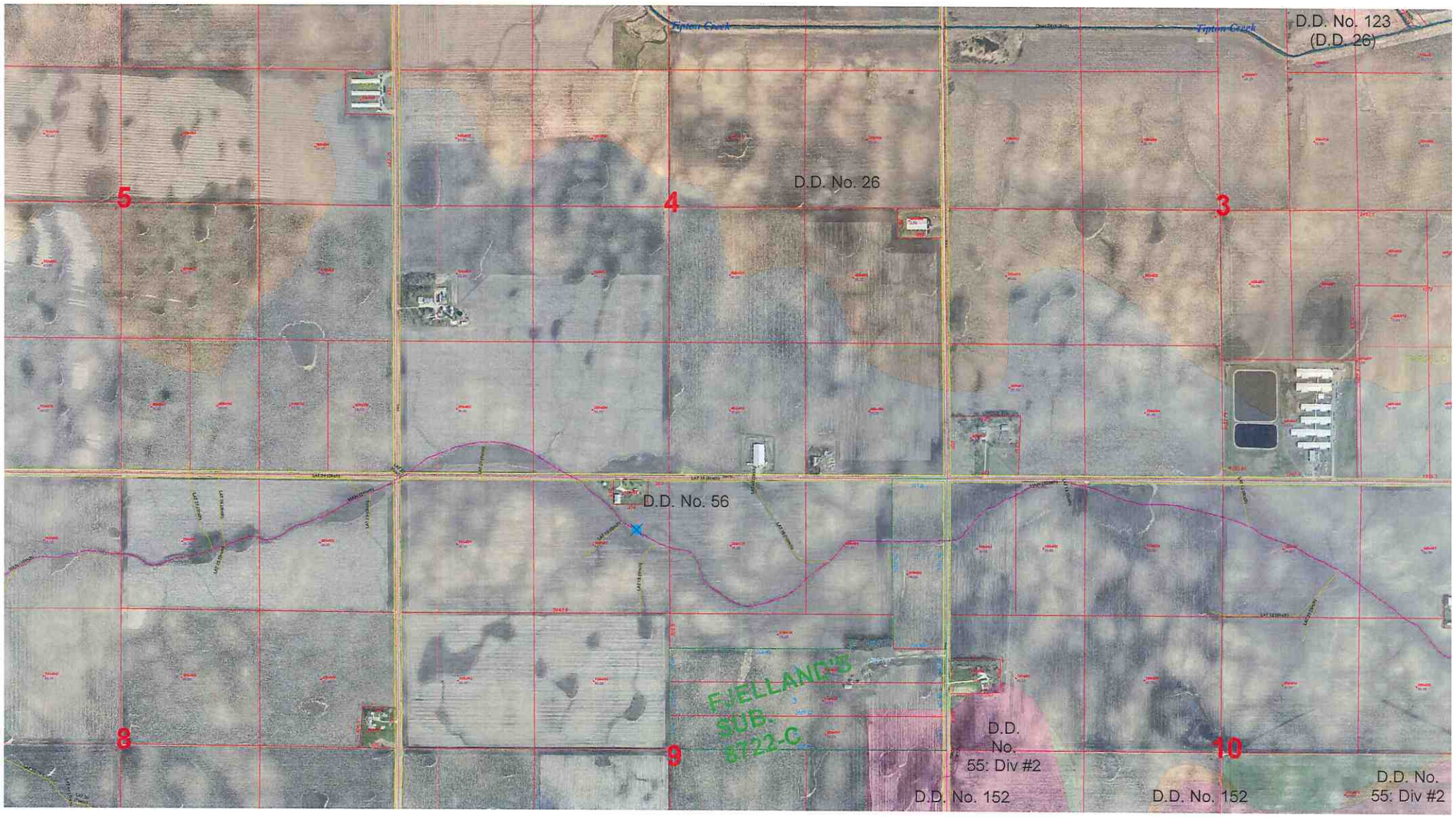

Tipton Creek
Tipton Creek
D.D. No. 123
(D.D. 26)
D.D. No. 26
5
4
3
D.D. No. 56
FJELLANG'S
SUB.
8722-C
8
9
10
D.D.
No.
55: Div #2
D.D. No. 152
D.D. No. 152
D.D. No.
55: Div #2

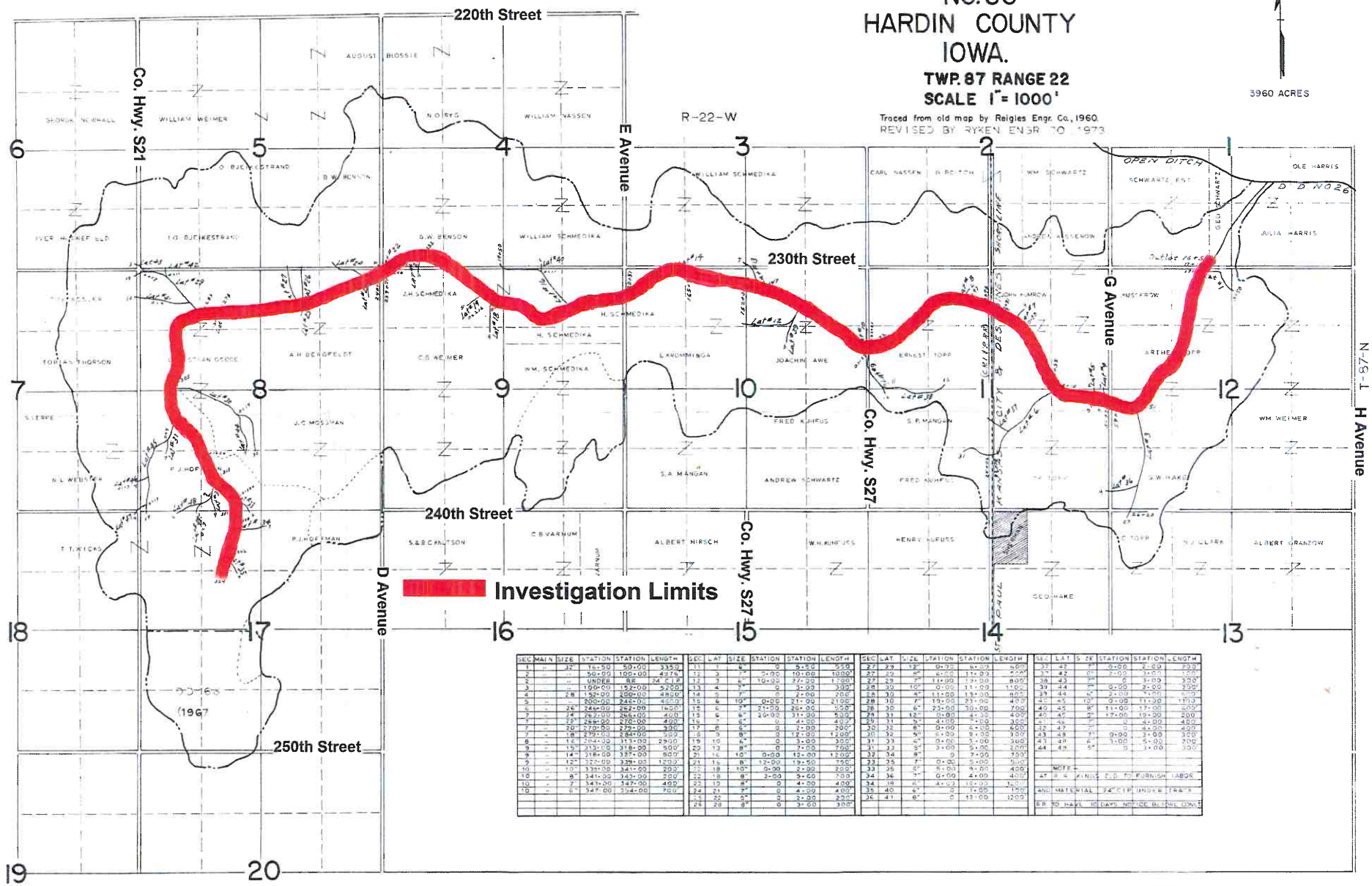
N

PLAT
OF
WICKS DRAINAGE DISTRICT
NO. 56
HARDIN COUNTY
IOWA.

TWP. 87 RANGE 22
SCALE 1" = 1000'

Traced from old map by Reigles Engr. Co., 1960.
REVISED BY RYKEN ENGR. CO. 1973

3960 ACRES



SEC	MAIN	SIZE	STATION	STATION	LENGTH
1	"	12"	96+50	50+00	3350
2	"	"	50+00	100+00	4378
2	"	"	UNDER	RR	24' C.I.P.
3	"	"	100+00	152+00	5200
4	"	24	152+00	200+00	4800
5	"		200+00	246+00	4600
6	"	24"	246+00	262+00	1600
7	"	24"	262+00	266+00	400
7	"	24"	266+00	270+00	400
7	"	24"	270+00	279+00	900
7	"	18	279+00	284+00	500
8	"	18"	284+00	313+00	2900
9	"	15"	313+00	318+00	500
9	"	14"	318+00	337+00	800
9	"	12"	337+00	339+00	1200
10	"	10"	339+00	341+00	200
10	"	8"	341+00	343+00	200
10	"	7"	343+00	347+00	400
10	"	6"	347+00	354+00	700

SEC	LAT	SIZE	STATION	STATION	LENGTH
11	1	6"	0	5+50	550
12	3	7"	0+00	10+00	1000
12	3	6"	10+00	37+00	1700
13	4	7"	0	3+00	300
14	5	7"	0	2+00	200
15	6	10"	0+00	21+00	2100
15	6	7"	21+00	26+00	500
15	6	6"	26+00	31+00	500
16	7	6"	0	4+00	400
17	8	6"	0	2+00	200
18	9	8"	0	12+00	1200
19	10	8"	0	3+00	300
20	12	8"	0	7+00	700
21	16	10"	0+00	12+00	1200
21	16	8"	12+00	19+50	750
22	18	10"	0+00	2+00	200
22	18	8"	2+00	9+00	700
23	19	8"	0	4+00	400
24	21	7"	0	4+00	400
25	22	9"	0	3+00	300
25	28	8"	0	3+00	300

SEC	LAT	SIZE	STATION	STATION	LENGTH
27	29	12"	0+00	4+00	400
27	29	8"	4+00	11+00	700
27	29	7"	11+00	19+00	800
28	30	10"	0+00	11+00	1100
28	30	8"	11+00	13+00	800
28	30	7"	19+00	23+00	400
28	30	6"	23+00	30+00	700
29	31	12"	0+00	4+00	400
29	31	8"	4+00	7+00	300
30	32	8"	0+00	6+00	600
30	32	8"	0+00	8+00	800
31	33	6"	0+00	3+00	300
31	33	8"	3+00	5+96	200
32	34	8"	0	7+00	700
33	35	7"	0+00	5+00	500
33	35	6"	5+00	9+00	400
34	36	7"	0+00	4+00	400
34	18	8"	4+00	16+30	1230
35	40	8"	0	1+00	100
36	41	8"	0	12+00	1200

SEC	LAT	SIZE	STATION	STATION	LENGTH
37	42	8"	0+00	2+00	200
37	42	6"	2+00	3+00	100
38	43	8"	0	3+00	300
39	44	8"	0+00	2+00	200
39	44	6"	2+00	7+00	500
40	45	10"	0+00	11+30	1130
40	45	8"	11+00	17+00	600
40	47	8"	17+00	19+00	200
41	46	8"	0	4+00	400
42	47	8"	0	4+00	400
43	48	7"	0+00	3+00	300
43	48	6"	3+00	5+00	200
44	49	6"	0	3+00	300

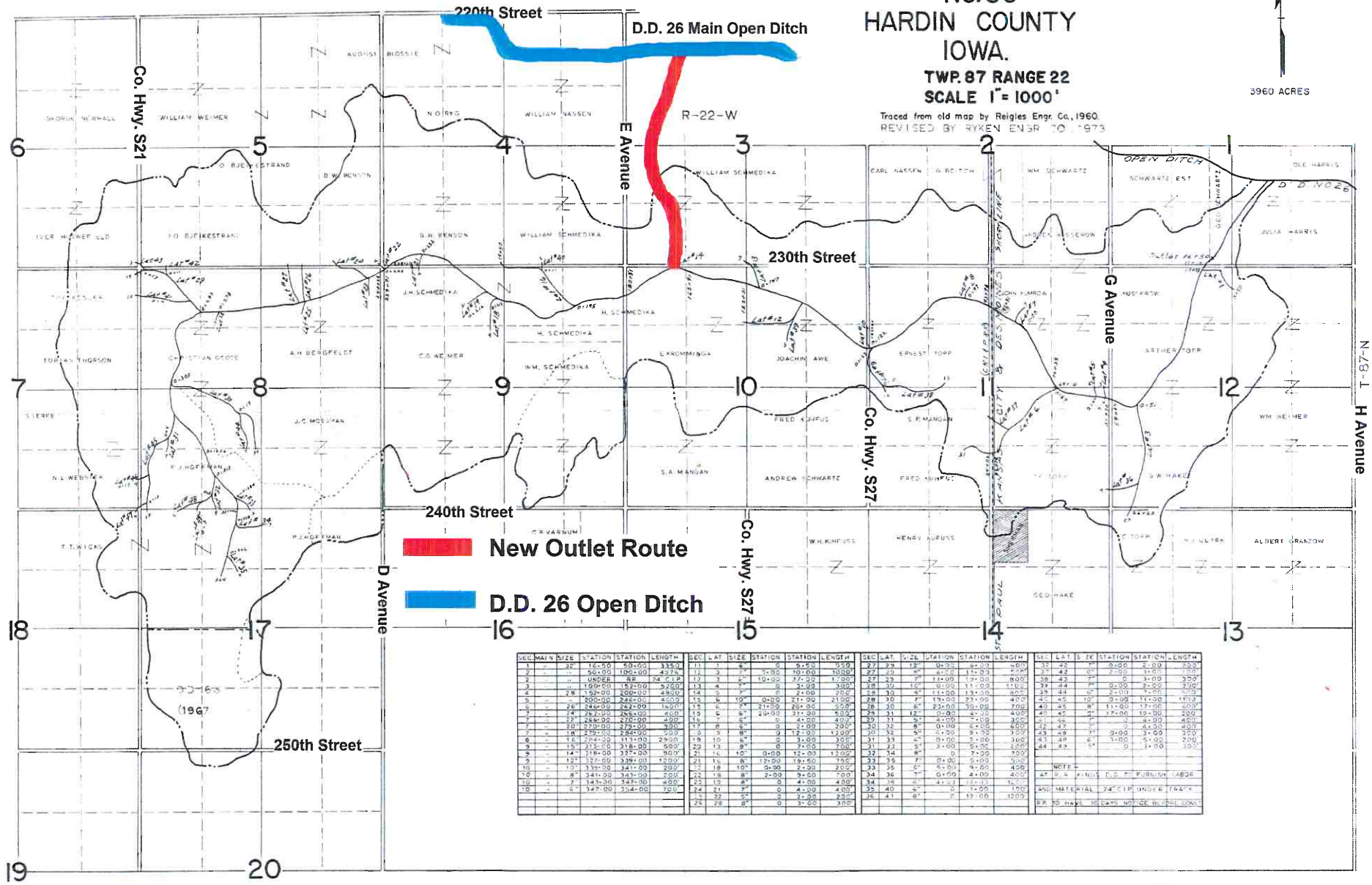
NOTE -
AT R. R. XINGS P.D. TO FURNISH LABOR AND MATERIAL 24" C.I.P. UNDER TRACKS
SHALL HAVE 10 DAYS NOTICE BEFORE WORK

PLAT OF WICKS DRAINAGE DISTRICT NO. 56 HARDIN COUNTY IOWA.

TWP. 87 RANGE 22
SCALE 1" = 1000'

Traced from old map by Reigles Engr. Co., 1960.
REVISED BY RYKEN ENGR CO. 1973

3960 ACRES



SEC	MAIN	SIZE	STATION	STATION	LENGTH
1	"	32"	16+50	40+00	3350
2	"	"	50+00	100+00	4975
2	"	"	UNDER	RR	74' C.I.P.
3	"	"	190+00	192+00	5200
4	"	28"	192+00	200+00	4800
5	"	"	200+00	246+00	4600
6	"	26"	246+00	262+00	1600
7	"	24"	262+00	266+00	400
7	"	22"	266+00	270+00	400
7	"	20"	270+00	273+00	300
7	"	18"	273+00	284+00	1100
8	"	16"	284+00	313+00	2900
9	"	15"	313+00	318+00	500
9	"	14"	318+00	337+00	900
9	"	12"	337+00	349+00	1200
10	"	10"	339+00	341+00	200
10	"	8"	341+00	343+00	200
10	"	7"	343+00	347+00	400
10	"	6"	347+00	354+00	700

SEC	LAT.	SIZE	STATION	STATION	LENGTH
13	1	6"	0	5+50	550
13	2	7"	0+90	10+00	1090
13	3	6"	19+00	37+00	1,790
13	4	7"	0	3+00	300
14	2	7"	0	2+00	200
15	6	10"	0+00	21+90	2190
15	6	9"	21+00	29+00	800
15	6	8"	29+00	34+90	590
16	7	6"	0	4+00	400
17	8	6"	0	2+00	200
18	3	8"	2	152+00	1500
19	10	6"	0	3+00	300
20	13	8"	0	7+00	700
21	16	10"	0+00	12+00	1200
21	14	8"	12+00	19+50	750
22	18	10"	0+00	2+00	200
22	18	8"	2+00	9+00	700
23	13	8"	0	4+00	400
24	21	7"	0	4+00	400
24	22	6"	0	2+20	220
25	28	8"	0	3+00	300

SEC	LAT.	SIZE	STATION	STATION	LENGTH
27	29	12"	0+00	6+00	600
27	29	8"	6+00	11+00	500
27	29	7"	11+00	19+00	800
28	30	10"	0+00	11+00	1100
28	30	8"	11+00	13+00	200
28	30	7"	19+00	23+00	400
28	30	6"	23+00	30+00	700
29	31	12"	0+00	4+00	400
29	31	9"	4+00	7+00	300
30	32	8"	0+00	6+00	600
30	32	6"	6+00	9+00	300
31	33	6"	0+00	3+00	300
31	32	6"	3+00	5+30	230
32	34	8"	0	7+00	700
33	35	7"	0+00	9+00	900
33	36	6"	5+00	9+00	400
34	36	7"	0+00	4+00	400
34	38	6"	4+00	18+00	1400
35	40	6"	0	1+00	100
36	41	6"	0	12+00	1200

SEC	LAT.	S. TE	STATION	STATION	LENGTH
37	42	7"	0+00	2+00	200
37	42	6"	2+00	3+70	370
38	43	7"	0	3+00	300
39	44	7"	0+00	2+00	200
39	44	6"	2+00	7+00	500
40	45	10"	0+00	11+00	1100
40	45	8"	11+00	17+00	600
40	45	7"	17+00	19+00	200
41	46	7"	0	4+00	400
42	47	7"	0	4+00	400
43	49	7"	0+00	3+00	300
43	48	6"	3+00	5+00	200
44	49	6"	0	3+00	300

NOTE:
AT R.R. XINGS C.D. TO FURNISH LABOR AND MATERIAL 74' C.I.P. UNDER TRACK
RR TO HAVE 10 DAYS NOTICE BEFORE XING

CGA
ENGINEERS • LAND SURVEYORS

By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Main tile Capacities

Project: Upper Main Tile Outlet for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

IMPROVED - DOWNSTREAM OF UPPER MAIN TILE OUTLET

DOWNSTREAM OF UPPER MAIN TILE OUTLET (IMPROVEMENT)

STA	EXISTING DESCRIPTION	INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (cfs)	INSTALLED TILE CAPACITY (in/day)	IMPROVED TILE CAPACITY (cfs)	IMPROVED TILE CAPACITY (in/day)
16+50	Existing Main tile empties into open ditch	32	12.0	0.07	12.0	0.19
28+00	Grade change: 0.06% - 0.18%	32	20.7	0.13	20.7	0.37
51+00	Lateral 3	32	20.7	0.14	20.7	0.44
70+00	Grade change: 0.18% - 0.14%	32	18.3	0.13	18.3	0.53
100+00	Grade change: 0.14% - 0.12%	32	16.9	0.13	16.9	0.64
122+76	West side Co Hwy S27	32	16.9	0.14	16.9	0.98
152+00	Size change: 32" - 28", Grade change: 0.12% - 0.28%	32/28	18.1	0.17	18.1	3.01
168+50	Lateral 14/End of Lower Stretch	28	18.1		18.1	

CGA
ENGINEERS · LAND SURVEYORS

By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Main tile Capacities

Project: Upper Main Tile Outlet for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

UPSTREAM OF UPPER MAIN TILE OUTLET (IMPROVEMENT)

		IMPROVED - UPSTREAM OF UPPER MAIN TILE OUTLET					
STA	EXISTING DESCRIPTION	INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (cfs)	INSTALLED TILE CAPACITY (in/day)	IMPROVED TILE SIZE (in)	IMPROVED TILE CAPACITY (cfs)	IMPROVED TILE CAPACITY (in/day)
0+00	Proposed Main tile empties into D.D. 26 Open Ditch				48	70.6	0.68
19+40/168+50	Lateral 14, Grade change: 0.24% - 0.28%	28	18.1	0.18			
180+00	Grade change: 0.28% - 0.24%	28	16.8	0.17			
190+00	Grade change: 0.24% - 0.22%	28	16.0	0.17			
200+00	Grade change: 0.22% - 0.18%	28	14.5	0.17			
220+00	Grade change 0.18% - 0.14%	28	12.8	0.18			
230+00	Grade change 0.14% - 0.10%	28	10.8	0.17			
246+00	Size change: 28" - 26"	28/26	8.9	0.17			
260+00	Grade change: 0.10% - 0.16%	26	11.2	0.22			
262+00	Size change: 26" - 24"	26/24	9.1	0.19			
266+00	Size change: 24" - 22"	24/22	7.2	0.17			
270+00	Size change: 22" - 20", Grade change: 0.16% - 0.26%	22/20	7.1	0.17			
279+00	Size change: 20" - 18"	20/18	5.4	0.14			
284+00	Size change: 18" - 16"	18/16	3.9	0.13			
286+00	Grade change: 0.26% - 0.18%	16	3.3	0.11			
308+00	Grade change: 0.18% - 0.10%	16	2.4	0.10			
313+00	Size change: 16" - 15"	16/15	2.0	0.09			
318+00	Size change: 15" - 14"	15/14	1.7	0.10			
327+00	Size change: 14" - 12"	14/12	1.1	0.07			
339+00	Size change: 12" - 10"	12/10	0.7	0.06			
341+00	Size change: 10" - 8"	10/8	0.4	0.04			
343+00	Size change: 8" - 7"	8/7	0.3	0.03			
347+00	Size change: 7" - 6", Grade change: 0.10% - 0.48%	7/6	0.4	0.05			
351+00	Grade change: 0.48% - 0.90%	6	0.5	0.07			
354+00	End of Main tile	6					

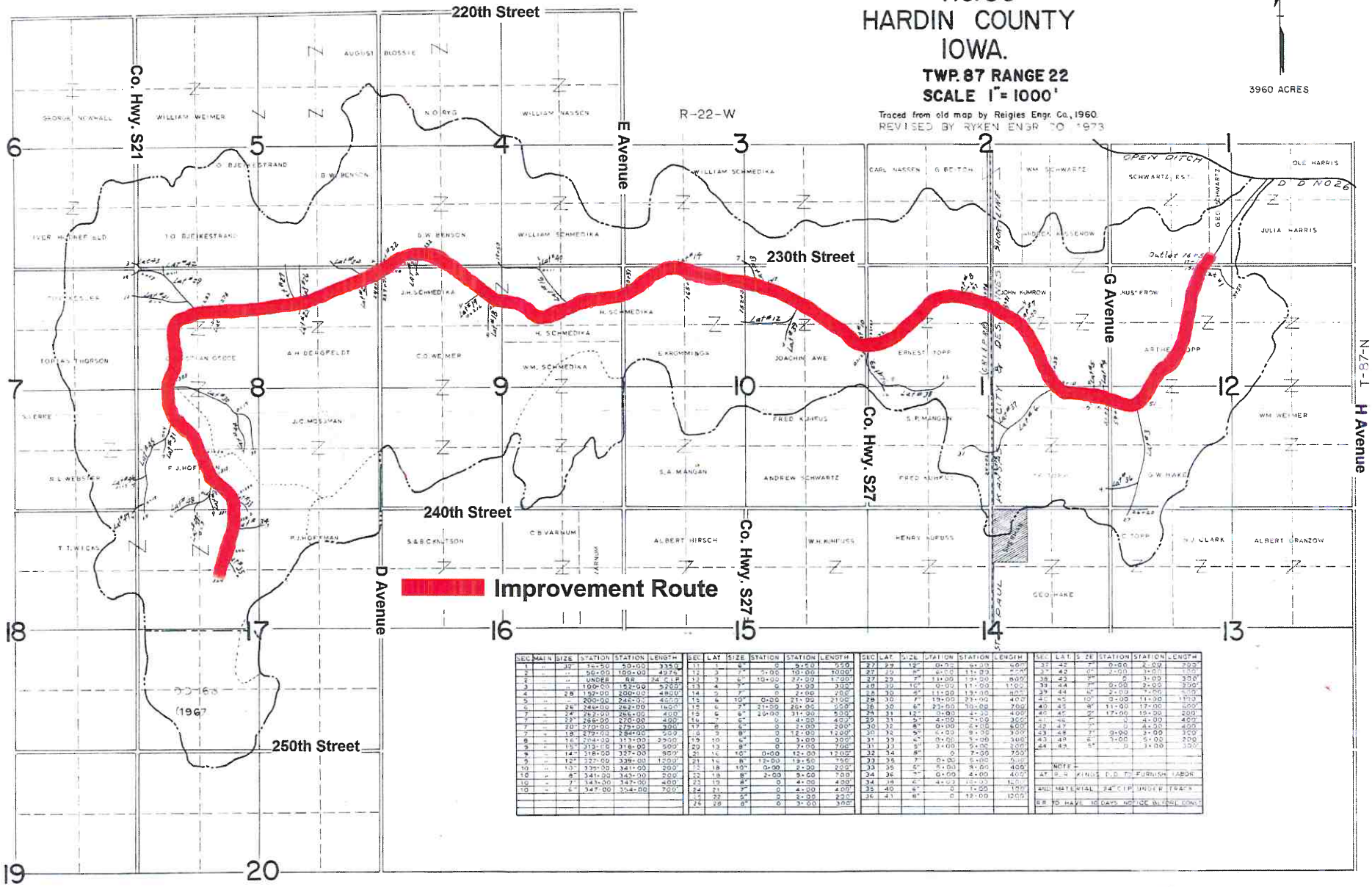
Q

PLAT
OF
WICKS DRAINAGE DISTRICT
NO. 56
HARDIN COUNTY
IOWA.

TWP. 87 RANGE 22
SCALE 1" = 1000'

Traced from old map by Reigles Engr. Co., 1960.
REVISED BY RYKEN ENGR CO 1973

3960 ACRES



SEC.	MAIN	SIZE	STATION	STATION	LENGTH
1	"	30"	14+50	50+00	3350
2	"	"	50+00	100+00	4975
2	"	"	UNDER	RR	34 C.I.P.
3	"		100+00	152+00	5200
4	"	28	152+00	200+00	4800
5	"	"	200+00	245+00	4500
6	"	24"	246+00	262+00	1600
7	"	"	262+00	266+00	400
7	"	22"	266+00	270+00	400
7	"	20"	270+00	273+00	300
7	"	18	273+00	284+00	1100
8	"	16"	304+00	313+00	2900
9	"	15"	313+00	318+00	500
9	"	14"	318+00	327+00	900
5	"	12"	327+00	339+00	1200
10	"	10"	339+00	341+00	200
10	"	8"	341+00	343+00	200
10	"	7"	343+00	347+00	400
10	"	6"	347+00	354+00	700

SEC.	LAT.	SIZE	STATION	STATION	LENGTH
11	2	8"	0	3+50	350
12	3	7"	3+50	10+00	1000
13	3	6"	10+00	27+00	1700
13	4	7"	0	3+00	300
14	5	7"	0	2+00	200
15	6	10"	0+00	21+00	2100
15	6	8"	21+00	26+00	500
15	5	6"	26+00	31+00	500
16	7	6"	0	4+00	400
17	8	6"	0	2+00	200
18	9	8"	0	12+00	1200
19	10	6"	0	3+00	300
20	11	8"	0	7+00	700
21	14	10"	0+00	12+00	1200
21	14	8"	12+00	13+50	750
22	18	10"	0+00	2+00	200
22	18	8"	2+00	9+00	700
23	19	8"	0	4+00	400
24	21	7"	0	4+00	400
25	22	7"	0	2+00	200
26	26	8"	0	3+00	300

SEC.	LAT.	SIZE	STATION	STATION	LENGTH
27	29	12"	0+00	14+00	1400
27	29	8"	14+00	18+00	400
27	29	7"	18+00	19+00	800
28	30	10"	0+00	11+00	1100
28	30	8"	11+00	19+00	800
28	30	7"	19+00	23+00	400
28	30	6"	23+00	30+00	700
29	31	12"	0+00	4+00	400
29	31	6"	4+00	7+00	300
30	32	8"	0+00	6+00	600
30	32	6"	6+00	9+00	300
31	33	6"	0+00	5+00	500
31	33	5"	3+00	5+00	200
32	34	8"	0	7+00	700
33	36	7"	0+00	5+00	500
33	35	6"	5+00	9+00	400
34	36	7"	0+00	4+00	400
34	18	6"	4+00	18+00	1400
35	40	6"	0	14+00	1400
36	41	8"	0	12+00	1200

SEC.	LAT.	SIZE	STATION	STATION	LENGTH
37	42	7"	0+00	2+00	200
37	42	6"	2+00	3+00	100
38	43	5"	0	3+00	350
39	44	7"	0+00	2+00	200
39	44	6"	2+00	7+00	500
40	45	10"	0+00	11+00	1100
40	45	8"	11+00	17+00	600
40	46	7"	17+00	19+00	200
41	46	7"	0	4+00	400
42	47	7"	0	4+00	400
43	48	7"	0+00	3+00	300
43	48	6"	3+00	5+00	200
44	49	6"	0	3+00	300

NOTE -
AT R.R. XINGS D.D. TO FURNISH LABOR
AND MATERIAL 24" C.I.P. UNDER TRACKS
R.R. TO HAVE 10 DAYS NOTICE BEFORE CONST.

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By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Main tile Capacities

Project: Single Tile Upsizing for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

SINGLE TILE UPSIZING (IMPROVEMENT)

	EXISTING				IMPROVEMENT						
						1/2" DRAINAGE COEFFICIENT			1" DRAINAGE COEFFICIENT		
STA	EXISTING DESCRIPTION	INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (cfs)	INSTALLED TILE CAPACITY (in/day)	PROPOSED DESCRIPTION	IMPROVED TILE SIZE (in)	IMPROVED TILE CAPACITY (cfs)	IMPROVED TILE CAPACITY (in/day)	IMPROVED TILE SIZE (in)	IMPROVED TILE CAPACITY (cfs)	IMPROVED TILE CAPACITY (in/day)
16+50	Existing Main tile empties into open ditch	32	12.0	0.07	Existing Main tile empties into open ditch	66	82.5	0.50	90	188.6	1.15
28+00	Grade change: 0.06% - 0.18%	32	20.7	0.13	Grade change: 0.06% - 0.18%	66/54	83.7	0.53	90/72	180.2	1.14
51+00	Lateral 3	32	20.7	0.14	Lateral 3	54	83.7	0.56	72	180.2	1.21
70+00	Grade change: 0.18% - 0.14%	32	18.3	0.13	Grade change: 0.18% - 0.14%	54	73.8	0.54	72	158.9	1.17
100+00	Grade change: 0.14% - 0.12%	32	16.9	0.13	Grade change: 0.14% - 0.12%	54	68.3	0.53	72	147.1	1.15
122+76	West side Co Hwy S27	32	16.9	0.14	West side Co Hwy S27	54	68.3	0.57	72	147.1	1.24
152+00	Size change: 32" - 28", Grade change: 0.12% - 0.28%	32/28	18.1	0.17	Grade change: 0.12% - 0.28%	54/48	76.2	0.71	72/60	138.2	1.28
168+50	Lateral 14	28	18.1	0.18	Lateral 14	48	76.2	0.75	60	138.2	1.36
180+00	Grade change: 0.28% - 0.24%	28	16.8	0.17	Grade change: 0.28% - 0.24%	48	70.6	0.72	60	127.9	1.30
190+00	Grade change: 0.24% - 0.22%	28	16.0	0.17	Grade change: 0.24% - 0.22%	48	67.6	0.70	60	122.5	1.27
200+00	Grade change: 0.22% - 0.18%	28	14.5	0.17	Grade change: 0.22% - 0.18%	48	61.1	0.72	60	110.8	1.31
220+00	Grade change 0.18% - 0.14%	28	12.8	0.18	Grade change 0.18% - 0.14%	48	53.9	0.75	60	97.7	1.36
230+00	Grade change 0.14% - 0.10%	28	10.8	0.17	Grade change 0.14% - 0.10%	48	45.5	0.70	60	82.6	1.27
246+00	Size change: 28" - 26"	28/26	8.9	0.17		48/42	31.9	0.62	60/54	62.4	1.22
260+00	Grade change: 0.10% - 0.16%	26	11.2	0.22	Grade change: 0.10% - 0.16%	42/36	26.8	0.53	54/48	57.6	1.14
262+00	Size change: 26" - 24"	26/24	9.1	0.19		36	26.8	0.56	48	57.6	1.21
266+00	Size change: 24" - 22"	24/22	7.2	0.17		36	26.8	0.63	48	57.6	1.35
270+00	Size change: 22" - 20", Grade change: 0.16% - 0.26%	22/20	7.1	0.17	Grade change: 0.16% - 0.26%	36	34.1	0.81	48/42	51.4	1.21
279+00	Size change: 20" - 18"	20/18	5.4	0.14		36/30	21.0	0.54	42	51.4	1.32
284+00	Size change: 18" - 16"	18/16	3.9	0.13		30	21.0	0.71	42	51.4	1.75
286+00	Grade change: 0.26% - 0.18%	16	3.3	0.11	Grade change: 0.26% - 0.18%	30	17.4	0.59	42	42.8	1.46
308+00	Grade change: 0.18% - 0.10%	16	2.4	0.10	Grade change: 0.18% - 0.10%	30	13.0	0.52	42	31.9	1.27
313+00	Size change: 16" - 15"	16/15	2.0	0.09		30	13.0	0.58	42	31.9	1.42
318+00	Size change: 15" - 14"	15/14	1.7	0.10		30/27	9.8	0.59	42/36	21.1	1.27
327+00	Size change: 14" - 12"	14/12	1.1	0.07		27	9.8	0.63	36	21.1	1.36
339+00	Size change: 12" - 10"	12/10	0.7	0.06		27/24	7.2	0.63	36/30	13.0	1.13
341+00	Size change: 10" - 8"	10/8	0.4	0.04		24/21	5.0	0.52	30/27	9.8	1.02
343+00	Size change: 8" - 7"	8/7	0.3	0.03		21	5.0	0.52	27	9.8	1.02
347+00	Size change: 7" - 6", Grade change: 0.10% - 0.48%	7/6	0.4	0.05	Grade change: 0.10% - 0.48%	21/15	4.5	0.55	27/21	11.0	1.36
351+00	Grade change: 0.48% - 0.90%	6	0.5	0.07	Grade change: 0.48% - 0.90%	15	6.1	0.80	21/18	10.0	1.30
354+00	End of Main tile	6			End of Main tile	15			18		

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By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Main tile Capacities

Project: Dual Tile Upsizing for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

DUAL TILE UPSIZING (IMPROVEMENT)

	EXISTING				IMPROVEMENT							
						1/2" DRAINAGE COEFFICIENT				1" DRAINAGE COEFFICIENT			
STA	EXISTING DESCRIPTION	INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (cfs)	INSTALLED TILE CAPACITY (in/day)	PROPOSED DESCRIPTION	IMPROVED PIPE 1TILE SIZE (in)	IMPROVED PIPE 2 TILE SIZE (in)	TOTAL IMPROVED TILE CAPACITY (cfs)	TOTAL IMPROVED TILE CAPACITY (in/day)	IMPROVED PIPE 1TILE SIZE (in)	IMPROVED PIPE 2 TILE SIZE (in)	TOTAL IMPROVED TILE CAPACITY (cfs)	TOTAL IMPROVED TILE CAPACITY (in/day)
16+50	Existing Main tile empties into open ditch	32	12.0	0.07	Existing Main tile empties into open ditch	51	51	82.9	0.51	72	60	168.0	1.02
28+00	Grade change: 0.06% - 0.18%	32	20.7	0.13	Grade change: 0.06% - 0.18%	51/42	51/42	85.6	0.54	72/54	60/54	167.3	1.06
51+00	Lateral 3	32	20.7	0.14	Lateral 3	42	42	85.6	0.58	54	54	167.3	1.13
70+00	Grade change: 0.18% - 0.14%	32	18.3	0.13	Grade change: 0.18% - 0.14%	42	42	75.5	0.55	54	54	147.6	1.08
100+00	Grade change: 0.14% - 0.12%	32	16.9	0.13	Grade change: 0.14% - 0.12%	42	42	69.9	0.54	54	54	136.6	1.06
122+76	West side Co Hwy S27	32	16.9	0.14	West side Co Hwy S27	42	42	69.9	0.59	54	54	136.6	1.15
152+00	Size change: 32" - 28", Grade change: 0.12% - 0.28%	32/28	18.1	0.17	Grade change: 0.12% - 0.28%	42/36	42/30	57.2	0.53	54/48	54/36	111.6	1.04
168+50	Lateral 14	28	18.1	0.18	Lateral 14	36	30	57.2	0.56	48	36	111.6	1.10
180+00	Grade change: 0.28% - 0.24%	28	16.8	0.17	Grade change: 0.28% - 0.24%	36	30	52.9	0.54	48	36	103.3	1.05
190+00	Grade change: 0.24% - 0.22%	28	16.0	0.17	Grade change: 0.24% - 0.22%	36	30	50.7	0.52	48	36	98.9	1.02
200+00	Grade change: 0.22% - 0.18%	28	14.5	0.17	Grade change: 0.22 - 0.18%	36	30	45.8	0.54	48	36	89.5	1.06
220+00	Grade change 0.18% - 0.14%	28	12.8	0.18	Grade change 0.18% - 0.14%	36	30	40.4	0.56	48	36	78.9	1.10
230+00	Grade change 0.14% - 0.10%	28	10.8	0.17	Grade change 0.14% - 0.10%	36	30	34.2	0.53	48	36	66.7	1.03
246+00	Size change: 28" - 26"	28/26	8.9	0.17	Size change: 28" - 26"	36/30	30	26.0	0.51	48/42	36	53.0	1.04
260+00	Grade change: 0.10% - 0.16%	26	11.2	0.22	Grade change: 0.10% - 0.16%	30	30/27	28.9	0.57	42/36	36	53.5	1.06
262+00	Size change: 26" - 24"	26/24	9.1	0.19		30/27	27	24.8	0.52	36	36	53.5	1.13
266+00	Size change: 24" - 22"	24/22	7.2	0.17		27	27/24	21.5	0.50	36	36/30	43.2	1.01
270+00	Size change: 22" - 20", Grade change: 0.16% - 0.26%	22/20	7.1	0.17	Grade change: 0.16% - 0.26%	27/24	24	23.1	0.55	36	30	55.1	1.30
279+00	Size change: 20" - 18"	20/18	5.4	0.14		24	24	23.1	0.59	36/30	30	41.9	1.08
284+00	Size change: 18" - 16"	18/16	3.9	0.13		24	24	23.1	0.78	30	30	41.9	1.42
286+00	Grade change: 0.26% - 0.18%	16	3.3	0.11	Grade change: 0.26% - 0.18%	24	24	19.2	0.66	30	30	34.9	1.19
308+00	Grade change: 0.18% - 0.10%	16	2.4	0.10	Grade change: 0.18% - 0.10%	24	24	14.3	0.57	30	30	26.0	1.04
313+00	Size change: 16" - 15"	16/15	2.0	0.09		24	24	14.3	0.64	30	30	26.0	1.16
318+00	Size change: 15" - 14"	15/14	1.7	0.10		24	24/18	10.5	0.63	30/27	30/27	19.6	1.18
327+00	Size change: 14" - 12"	14/12	1.1	0.07		24	18	10.5	0.67	27	27/24	17.0	1.09
339+00	Size change: 12" - 10"	12/10	0.7	0.06		24/18	18	6.7	0.58	27/24	24	14.3	1.25
341+00	Size change: 10" - 8"	10/8	0.4	0.04		18	18/15	5.4	0.56	24/21	24/21	10.0	1.04
343+00	Size change: 8" - 7"	8/7	0.3	0.03		18	15	5.4	0.56	21	21	10.0	1.05
347+00	Size change: 7" - 6", Grade change: 0.10% - 0.48%	7/6	0.4	0.05	Grade change: 0.10% - 0.48%	18/12	15/12	5.0	0.61	21/15	21/15	9.0	1.11
351+00	Grade change: 0.48% - 0.90%	6	0.5	0.07	Grade change: 0.48% - 0.90%	12/10	12/10	4.2	0.54	15	15	12.3	1.60
354+00	End of Main tile	6			End of Main tile	10	10			15	15		

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By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Main tile Capacities

Project: Parallel Tile Upsizing for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

PARALLEL TILE UPSIZING (IMPROVEMENT)

	EXISTING				IMPROVEMENT						
						1/2" DRAINAGE COEFFICIENT			1" DRAINAGE COEFFICIENT		
STA	EXISTING DESCRIPTION	INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (cfs)	INSTALLED TILE CAPACITY (in/day)	PROPOSED DESCRIPTION	IMPROVED PARALLEL TILE SIZE (in)	TOTAL IMPROVED TILE CAPACITY (cfs)	TOTAL IMPROVED TILE CAPACITY (in/day)	IMPROVED PARALLEL TILE SIZE (in)	TOTAL IMPROVED TILE CAPACITY (cfs)	TOTAL IMPROVED TILE CAPACITY (in/day)
16+50	Existing Main tile empties into open ditch	32	12.0	0.07	Existing Main tile empties into open ditch	66	94.4	0.58	90	200.6	1.22
28+00	Grade change: 0.06% - 0.18%	32	20.7	0.13	Grade change: 0.06% - 0.18%	66/48	81.8	0.52	90/66	163.6	1.03
51+00	Lateral 3	32	20.7	0.14	Lateral 3	48	81.8	0.55	66	163.6	1.10
70+00	Grade change: 0.18% - 0.14%	32	18.3	0.13	Grade change: 0.18% - 0.14%	48	72.2	0.53	66	144.3	1.06
100+00	Grade change: 0.14% - 0.12%	32	16.9	0.13	Grade change: 0.14% - 0.12%	48	66.8	0.52	66	133.6	1.04
122+76	West side Co Hwy S27	32	16.9	0.14	West side Co Hwy S27	48	66.8	0.56	66	133.6	1.12
152+00	Size change: 32" - 28", Grade change: 0.12% - 0.28%	32/28	18.1	0.17	Grade change: 0.12% - 0.28%	48/42	71.5	0.66	66/54	122.4	1.14
168+50	Lateral 14	28	18.1	0.18	Lateral 14	42	71.5	0.70	54	122.4	1.20
180+00	Grade change: 0.28% - 0.24%	28	16.8	0.17	Grade change: 0.28% - 0.24%	42	66.2	0.67	54	113.4	1.15
190+00	Grade change: 0.24% - 0.22%	28	16.0	0.17	Grade change: 0.24% - 0.22%	42	63.4	0.65	54	108.5	1.12
200+00	Grade change: 0.22% - 0.18%	28	14.5	0.17	Grade change: 0.22 - 0.18%	42	57.3	0.68	54	98.2	1.16
220+00	Grade change 0.18% - 0.14%	28	12.8	0.18	Grade change 0.18% - 0.14%	42	50.5	0.70	54	86.6	1.21
230+00	Grade change 0.14% - 0.10%	28	10.8	0.17	Grade change 0.14% - 0.10%	42	42.7	0.66	54	73.2	1.13
246+00	Size change: 28" - 26"	28/26	8.9	0.17	Size change: 28" - 26"	42/36	30.0	0.59	54/48	54.4	1.07
260+00	Grade change: 0.10% - 0.16%	26	11.2	0.22	Grade change: 0.10% - 0.16%	36/30	27.7	0.55	48/42	51.6	1.03
262+00	Size change: 26" - 24"	26/24	9.1	0.19		30	25.5	0.54	42	49.4	1.04
266+00	Size change: 24" - 22"	24/22	7.2	0.17		30	23.6	0.55	42	47.5	1.11
270+00	Size change: 22" - 20", Grade change: 0.16% - 0.26%	22/20	7.1	0.17	Grade change: 0.16% - 0.26%	30	28.1	0.66	42	58.6	1.38
279+00	Size change: 20" - 18"	20/18	5.4	0.14		30	26.3	0.68	42	56.8	1.46
284+00	Size change: 18" - 16"	18/16	3.9	0.13		30	24.9	0.84	42	55.4	1.88
286+00	Grade change: 0.26% - 0.18%	16	3.3	0.11	Grade change: 0.26% - 0.18%	30	20.7	0.71	42	46.1	1.57
308+00	Grade change: 0.18% - 0.10%	16	2.4	0.10	Grade change: 0.18% - 0.10%	30	15.4	0.62	42	34.3	1.37
313+00	Size change: 16" - 15"	16/15	2.0	0.09		30	15.1	0.67	42/36	23.2	1.03
318+00	Size change: 15" - 14"	15/14	1.7	0.10		30/24	8.9	0.53	36	22.9	1.37
327+00	Size change: 14" - 12"	14/12	1.1	0.07		24	8.3	0.53	36	22.3	1.43
339+00	Size change: 12" - 10"	12/10	0.7	0.06		24	7.9	0.69	36/30	13.7	1.19
341+00	Size change: 10" - 8"	10/8	0.4	0.04		24/21	5.4	0.56	30/27	10.2	1.06
343+00	Size change: 8" - 7"	8/7	0.3	0.03		21	5.3	0.55	27	10.1	1.05
347+00	Size change: 7" - 6", Grade change: 0.10% - 0.48%	7/6	0.4	0.05	Grade change: 0.10% - 0.48%	21/15	4.9	0.60	27/21	11.4	1.41
351+00	Grade change: 0.48% - 0.90%	6	0.5	0.07	Grade change: 0.48% - 0.90%	15/12	3.9	0.51	21/18	10.5	1.37
354+00	End of Main tile	6			End of Main tile	12			18		

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By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Main tile Capacities

Project: Open Ditch Construction for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

OPEN DITCH CONSTRUCTION (IMPROVEMENT)

	EXISTING				IMPROVEMENT			
						OPEN DITCH		
STA	EXISTING DESCRIPTION	INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (cfs)	INSTALLED TILE CAPACITY (in/day)	PROPOSED DESCRIPTION	APPROX. OPEN DITCH DEPTH (ft)	IMPROVED OPEN DITCH CAPACITY (cfs)	IMPROVED OPEN DITCH CAPACITY (in/day)
16+50	Existing Main tile empties into open ditch	32	12.0	0.07	Start of Proposed Open Ditch	6	276.7	1.69
28+00	Grade change: 0.06% - 0.18%	32	20.7	0.13	Grade change: 0.06% - 0.18%	6	479.3	3.03
51+00	Lateral 3	32	20.7	0.14	Lateral 3	6	479.3	3.22
70+00	Grade change: 0.18% - 0.14%	32	18.3	0.13	Grade change: 0.18% - 0.14%	6	422.7	3.11
100+00	Grade change: 0.14% - 0.12%	32	16.9	0.13	Grade change: 0.14% - 0.12%	7	562.5	4.38
122+76	West side Co Hwy S27	32	16.9	0.14	West side Co Hwy S27	7	562.5	4.73
152+00	Size change: 32" - 28", Grade change: 0.12% - 0.28%	32/28	18.1	0.17	Grade change: 0.12% - 0.28%	6	597.7	5.54
168+50	Lateral 14	28	18.1	0.18	Lateral 14	5	392.0	3.85
180+00	Grade change: 0.28% - 0.24%	28	16.8	0.17	Grade change: 0.28% - 0.24%	5	362.9	3.70
190+00	Grade change: 0.24% - 0.22%	28	16.0	0.17	Grade change: 0.24% - 0.22%	5	347.5	3.59
200+00	Grade change: 0.22% - 0.18%	28	14.5	0.17	Grade change: 0.22 - 0.18%	5	314.3	3.73
220+00	Grade change 0.18% - 0.14%	28	12.8	0.18	Grade change 0.18% - 0.14%	5	277.2	3.86
230+00	Grade change 0.14% - 0.10%	28	10.8	0.17	Grade change 0.14% - 0.10%	6	357.2	5.50
246+00	Size change: 28" - 26"	28/26	8.9	0.17		6	357.2	7.00
260+00	Grade change: 0.10% - 0.16%	26	11.2	0.22	Grade change: 0.10% - 0.16%	5	296.3	5.89
262+00	Size change: 26" - 24"	26/24	9.1	0.19		5	296.3	6.23
266+00	Size change: 24" - 22"	24/22	7.2	0.17		5	296.3	6.94
270+00	Size change: 22" - 20", Grade change: 0.16% - 0.26%	22/20	7.1	0.17	Grade change: 0.16% - 0.26%	6	576.0	13.60
279+00	Size change: 20" - 18"	20/18	5.4	0.14		6	576.0	14.81
284+00	Size change: 18" - 16"	18/16	3.9	0.13		6	576.0	19.55
286+00	Grade change: 0.26% - 0.18%	16	3.3	0.11	Grade change: 0.26% - 0.18%	6	479.3	16.34
308+00	Grade change: 0.18% - 0.10%	16	2.4	0.10	Grade change: 0.18% - 0.10%	7	513.5	20.50
313+00	Size change: 16" - 15"	16/15	2.0	0.09		7	513.5	22.91
318+00	Size change: 15" - 14"	15/14	1.7	0.10		7	513.5	30.81
327+00	Size change: 14" - 12"	14/12	1.1	0.07		7	513.5	32.96
339+00	Size change: 12" - 10"	12/10	0.7	0.06		7	513.5	44.77
341+00	Size change: 10" - 8"	10/8	0.4	0.04		6	357.2	36.95
343+00	Size change: 8" - 7"	8/7	0.3	0.03		6	357.2	37.19
347+00	Size change: 7" - 6", Grade change: 0.10% - 0.48%	7/6	0.4	0.05	Grade change: 0.10% - 0.48%	6	782.6	96.62
351+00	Grade change: 0.48% - 0.90%	6	0.5	0.07	Grade change: 0.48% - 0.90%	5	702.8	91.35
354+00	End of Main tile	6			End of Open Ditch	4		

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By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Probable Construction Cost

Project: Upper Main Tile Outlet for D.D. #56

Location: Sections 3 & 10 T87N, R22W Hardin County, Iowa

UPPER MAIN TILE OUTLET (IMPROVEMENT)

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	DISTRICT CONSTRUCTION COSTS					
1	54" CMP TILE OUTLET	$ 140.00	LF	40	LF	$ 5,600.00
2	48" TRIPLE WALL PPE or RCP TILE	$ 150.00	LF	1900	LF	$ 285,000.00
3	54" RODENT GUARD	$ 1,000.00	EA	1	EA	$ 1,000.00
4	JUNCTION STRUCTURE	$ 10,000.00	EA	1	EA	$ 10,000.00
5	BANK STABILIZATION	$ 50.00	TON	50	TON	$ 2,500.00
6	PLUG EXISTING DOWNSTREAM MAIN TILE	$ 1,000.00	LOC	1	LOC	$ 1,000.00
7	CONCRETE COLLAR	$ 600.00	EA	1	EA	$ 600.00
8	PRIVATE TILE CONNECTIONS	$ 1,000.00	EA	20	EA	$ 20,000.00
9	TILE LOCATION	$ 150.00	STA	2	STA	$ 300.00
		CONSTRUCTION SUBTOTAL				$ 326,000.00
		Contingency (15%)				$ 48,900.00
		CONSTRUCTION TOTAL				**$ 374,900.00**
		Engr. & Const. Observation (25%)				$ 93,725.00
		TOTAL COST				**$ 468,625.00**
	ROAD CROSSING CONSTRUCTION COSTS					
10	48" TILE - OPEN CUT (230TH STREET)	$ 250.00	LF	30	LF	$ 7,500.00
11	HICKENBOTTOM INTAKE	$ 2,000.00	EA	2	EA	$ 4,000.00
12	PERMANENT SEEDING AND WARRANTY	$ 2,000.00	LOC	1	LOC	$ 2,000.00
13	TRAFFIC CONTROL	$ 2,000.00	LOC	1	LOC	$ 2,000.00
		CONSTRUCTION SUBTOTAL				$ 15,500.00
		Contingency (15%)				$ 2,325.00
		CONSTRUCTION TOTAL				**$ 17,825.00**
		Engr. & Const. Observation (25%)				$ 4,456.25
		TOTAL COST				**$ 22,281.25**

Note: Per Iowa Code, road crossings (highlighted red) are not typically district expense

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By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Probable Construction Cost

Project: Single Tile Upsizing for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

SINGLE TILE UPSIZING - IMPROVEMENT (1/2")

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	DISTRICT CONSTRUCTION COSTS					
101	72" CMP TILE OUTLET	$ 175.00	LF	40	LF	$ 7,000.00
102	66" RCP TILE	$ 200.00	LF	1080	LF	$ 216,000.00
103	54" TRIPLE WALL PPE or RCP TILE	$ 150.00	LF	12230	EA	$ 1,834,500.00
104	48" TRIPLE WALL PPE or RCP TILE	$ 110.00	LF	9270	EA	$ 1,019,700.00
105	42" TRIPLE WALL PPE or RCP TILE	$ 90.00	LF	1400	LF	$ 126,000.00
106	36" TRIPLE WALL PPE or RCP TILE	$ 75.00	LF	1900	LF	$ 142,500.00
107	30" DUAL WALL PPE or RCP TILE	$ 60.00	LF	3900	LF	$ 234,000.00
108	27" DUAL WALL PPE or RCP TILE	$ 50.00	LF	2100	EA	$ 105,000.00
109	24" DUAL WALL PPE or RCP TILE	$ 40.00	LF	200	LF	$ 8,000.00
110	21" DUAL WALL PPE or RCP TILE	$ 32.50	LF	600	LF	$ 19,500.00
111	15" DUAL WALL PPE or RCP TILE	$ 27.50	LF	700	LF	$ 19,250.00
112	54" TILE - JACK AND BORE (RAILROAD)	$ 1,400.00	LF	100	LF	$ 140,000.00
113	66" x 54" REDUCER	$ 4,000.00	EA	1	EA	$ 4,000.00
114	54" x 48" REDUCER	$ 3,500.00	EA	1	EA	$ 3,500.00
115	48" x 42" REDUCER	$ 3,000.00	EA	1	EA	$ 3,000.00
116	42" x 36" REDUCER	$ 2,500.00	EA	1	EA	$ 2,500.00
117	36" x 30" REDUCER	$ 2,000.00	EA	1	EA	$ 2,000.00
118	30" x 27" REDUCER	$ 1,800.00	EA	1	EA	$ 1,800.00
119	27" x 24" REDUCER	$ 1,600.00	EA	1	EA	$ 1,600.00
120	24" x 21" REDUCER	$ 1,400.00	EA	1	EA	$ 1,400.00
121	21" x 15" REDUCER	$ 1,200.00	EA	1	EA	$ 1,200.00
122	72" RODENT GUARD	$ 2,000.00	EA	1	EA	$ 2,000.00
123	BANK STABILIZATION	$ 50.00	TON	75	TON	$ 3,750.00
124	HEADWALL REMOVAL AND REPLACEMENT	$25,000.00	EA	1	EA	$ 25,000.00
125	LATERAL TILE CONNECTIONS	$ 1,000.00	EA	22	EA	$ 22,000.00
126	CONCRETE COLLAR	$ 600.00	EA	2	EA	$ 1,200.00
127	PRIVATE TILE CONNECTIONS	$ 500.00	EA	200	EA	$ 100,000.00
128	TILE LOCATION	$ 150.00	STA	334.2	STA	$ 50,130.00
129	TILE ABANDONMENT	$ 100.00	LF	100	LF	$ 10,000.00
130	TILE REMOVAL	$ 5.00	LF	33420	LF	$ 167,100.00
		CONSTRUCTION SUBTOTAL				$ 4,273,630.00
		Contingency (10%)				$ 427,363.00
		CONSTRUCTION TOTAL				**$ 4,700,993.00**
		Engr. & Const. Observation (20%)				$ 940,198.60
		TOTAL COST				**$ 5,641,191.60**
	ROAD CROSSING CONSTRUCTION COSTS					
131	54" TILE - JACK AND BORE (CO HWY S27)	$ 1,400.00	LF	40	LF	$ 56,000.00
132	66" TILE - OPEN CUT (230TH STREET)	$ 250.00	LF	30	LF	$ 7,500.00
133	54" TILE - OPEN CUT (G AVENUE)	$ 200.00	LF	30	LF	$ 6,000.00
134	48" TILE - OPEN CUT (E AND D AVENUE AND 230TH STREET)	$ 155.00	LF	130	LF	$ 20,150.00
135	TILE ABANDONMENT	$ 100.00	LF	40	LF	$ 4,000.00
136	TILE REMOVAL	$ 10.00	LF	190	LF	$ 1,900.00
137	HICKENBOTTOM INTAKE	$ 2,000.00	EA	12	EA	$ 24,000.00
138	PERMANENT SEEDING AND WARRANTY	$ 2,000.00	LOC	6	LOC	$ 12,000.00
139	TRAFFIC CONTROL	$ 2,000.00	LOC	6	LOC	$ 12,000.00
		CONSTRUCTION SUBTOTAL				$ 143,550.00
		Contingency (15%)				$ 21,532.50
		CONSTRUCTION TOTAL				**$ 165,082.50**
		Engr. & Const. Observation (25%)				$ 41,270.63
		TOTAL COST				**$ 206,353.13**

Note: Per Iowa Code, road crossings (highlighted red) are not typically district expense

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By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Probable Construction Cost

Project: Single Tile Upsizing for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

SINGLE TILE UPSIZING - IMPROVEMENT (1")

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	DISTRICT CONSTRUCTION COSTS					
201	90" CMP TILE OUTLET	$ 200.00	LF	40	LF	$ 8,000.00
202	90" RCP TILE	$ 250.00	LF	1080	LF	$ 270,000.00
203	72" RCP TILE	$ 200.00	LF	12230	EA	$ 2,446,000.00
204	60" TRIPLE WALL PPE or RCP TILE	$ 175.00	LF	9270	EA	$ 1,622,250.00
205	54" TRIPLE WALL PPE or RCP TILE	$ 150.00	LF	1400	EA	$ 210,000.00
206	48" TRIPLE WALL PPE or RCP TILE	$ 110.00	LF	1000	LF	$ 110,000.00
207	42" TRIPLE WALL PPE or RCP TILE	$ 90.00	LF	4800	LF	$ 432,000.00
208	36" TRIPLE WALL PPE or RCP TILE	$ 75.00	LF	2100	LF	$ 157,500.00
209	30" DUAL WALL PPE or RCP TILE	$ 60.00	LF	200	EA	$ 12,000.00
210	27" DUAL WALL PPE or RCP TILE	$ 50.00	LF	600	LF	$ 30,000.00
211	21" DUAL WALL PPE or RCP TILE	$ 32.50	LF	400	LF	$ 13,000.00
212	18" DUAL WALL PPE or RCP TILE	$ 30.00	LF	300	LF	$ 9,000.00
213	72" TILE - JACK AND BORE (RAILROAD)	$ 1,600.00	LF	100	LF	$ 160,000.00
214	90" x 72" REDUCER	$ 5,000.00	EA	1	EA	$ 5,000.00
215	72" x 60" REDUCER	$ 4,500.00	EA	1	EA	$ 4,500.00
216	60" x 54" REDUCER	$ 4,000.00	EA	1	EA	$ 4,000.00
217	54" x 48" REDUCER	$ 3,500.00	EA	1	EA	$ 3,500.00
218	48" x 42" REDUCER	$ 3,000.00	EA	1	EA	$ 3,000.00
219	42" x 36" REDUCER	$ 2,500.00	EA	1	EA	$ 2,500.00
220	36" x 30" REDUCER	$ 2,000.00	EA	1	EA	$ 2,000.00
221	30" x 27" REDUCER	$ 1,800.00	EA	1	EA	$ 1,800.00
222	27" x 21" REDUCER	$ 1,500.00	EA	1	EA	$ 1,500.00
223	21" x 18" REDUCER	$ 1,200.00	EA	1	EA	$ 1,200.00
224	90" RODENT GUARD	$ 2,500.00	EA	1	EA	$ 2,500.00
225	BANK STABILIZATION	$ 50.00	TON	100	TON	$ 5,000.00
226	HEADWALL REMOVAL AND REPLACEMENT	$ 25,000.00	EA	1	EA	$ 25,000.00
227	LATERAL TILE CONNECTIONS	$ 1,000.00	EA	22	EA	$ 22,000.00
228	CONCRETE COLLAR	$ 600.00	EA	2	EA	$ 1,200.00
229	PRIVATE TILE CONNECTIONS	$ 500.00	EA	200	EA	$ 100,000.00
230	TILE LOCATION	$ 150.00	STA	334.2	STA	$ 50,130.00
231	TILE ABANDONMENT	$ 100.00	LF	300	LF	$ 30,000.00
232	TILE REMOVAL	$ 5.00	LF	33420	LF	$ 167,100.00
		CONSTRUCTION SUBTOTAL				$ 5,911,680.00
		Contingency (10%)				$ 591,168.00
		CONSTRUCTION TOTAL				**$ 6,502,848.00**
		Engr. & Const. Observation (20%)				$ 1,300,569.60
		TOTAL COST				**$ 7,803,417.60**
	ROAD CROSSING CONSTRUCTION COSTS					
233	72" TILE - JACK AND BORE (CO HWY S27)	$ 1,600.00	LF	40	LF	$ 64,000.00
234	90" TILE - OPEN CUT (230TH STREET)	$ 325.00	LF	30	LF	$ 9,750.00
235	72" TILE - OPEN CUT (G AVENUE)	$ 265.00	LF	30	LF	$ 7,950.00
236	60" TILE - OPEN CUT (E AND D AVENUE AND 230TH STREET)	$ 225.00	LF	130	LF	$ 29,250.00
237	TILE ABANDONMENT	$ 100.00	LF	40	LF	$ 4,000.00
238	TILE REMOVAL	$ 10.00	LF	190	LF	$ 1,900.00
239	HICKENBOTTOM INTAKE	$ 2,000.00	EA	12	EA	$ 24,000.00
240	PERMANENT SEEDING AND WARRANTY	$ 2,000.00	LOC	6	LOC	$ 12,000.00
241	TRAFFIC CONTROL	$ 2,000.00	LOC	6	LOC	$ 12,000.00
		CONSTRUCTION SUBTOTAL				$ 164,850.00
		Contingency (15%)				$ 24,727.50
		CONSTRUCTION TOTAL				**$ 189,577.50**
		Engr. & Const. Observation (25%)				$ 47,394.38
		TOTAL COST				**$ 236,971.88**

Note: Per Iowa Code, road crossings (highlighted red) are not typically district expense

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ENGINEERS • LAND SURVEYORS

By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Probable Construction Cost

Project: Dual Tile Upsizing for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

DUAL TILE UPSIZING - IMPROVEMENT (1/2")

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	DISTRICT CONSTRUCTION COSTS					
301	60" CMP TILE OUTLET	$ 110.00	LF	80	LF	$ 8,800.00
302	54" TRIPLE WALL PPE or RCP TILE	$ 150.00	LF	2160	LF	$ 324,000.00
303	42" TRIPLE WALL PPE or RCP TILE	$ 90.00	LF	24460	EA	$ 2,201,400.00
304	36" TRIPLE WALL PPE or RCP TILE	$ 75.00	LF	9270	EA	$ 695,250.00
305	30" DUAL WALL PPE or RCP TILE	$ 60.00	LF	12270	EA	$ 736,200.00
306	27" DUAL WALL PPE or RCP TILE	$ 50.00	LF	1400	LF	$ 70,000.00
307	24" DUAL WALL PPE or RCP TILE	$ 40.00	LF	12100	LF	$ 484,000.00
308	18" DUAL WALL PPE or RCP TILE	$ 30.00	LF	3100	LF	$ 93,000.00
309	15" DUAL WALL PPE or RCP TILE	$ 27.50	LF	600	EA	$ 16,500.00
310	12" DUAL WALL PPE or RCP TILE	$ 25.00	LF	800	LF	$ 20,000.00
311	10" DUAL WALL PPE or RCP TILE	$ 22.50	LF	600	LF	$ 13,500.00
312	42" TILE - JACK AND BORE (RAILROAD)	$ 1,200.00	LF	200	LF	$ 240,000.00
313	54" x 42" REDUCER	$ 3,250.00	EA	2	EA	$ 6,500.00
314	42" x 36" REDUCER	$ 2,500.00	EA	1	EA	$ 2,500.00
314	42" x 30" REDUCER	$ 2,500.00	EA	1	EA	$ 2,500.00
315	36" x 30" REDUCER	$ 2,000.00	EA	1	EA	$ 2,000.00
316	30" x 27" REDUCER	$ 1,800.00	EA	2	EA	$ 3,600.00
317	27" x 24" REDUCER	$ 1,600.00	EA	2	EA	$ 3,200.00
318	24" x 18" REDUCER	$ 1,400.00	EA	2	EA	$ 2,800.00
319	18" x 15" REDUCER	$ 1,000.00	EA	1	EA	$ 1,000.00
320	18" x 12" REDUCER	$ 800.00	EA	1	EA	$ 800.00
321	15" x 12" REDUCER	$ 600.00	EA	1	EA	$ 600.00
322	12" x 10" REDUCER	$ 400.00	EA	2	EA	$ 800.00
323	FLOW EQUALIZATION STRUCTURE	$10,000.00	EA	33	EA	$ 330,000.00
324	54" RODENT GUARD	$ 1,500.00	EA	2	EA	$ 3,000.00
325	BANK STABILIZATION	$ 50.00	TON	100	TON	$ 5,000.00
326	HEADWALL REMOVAL AND REPLACEMENT	$25,000.00	EA	1	EA	$ 25,000.00
327	LATERAL TILE CONNECTIONS	$ 1,000.00	EA	22	EA	$ 22,000.00
328	CONCRETE COLLAR	$ 600.00	EA	3	EA	$ 1,800.00
329	PRIVATE TILE CONNECTIONS	$ 500.00	EA	200	EA	$ 100,000.00
330	TILE LOCATION	$ 150.00	STA	334.2	STA	$ 50,130.00
331	TILE ABANDONMENT	$ 100.00	LF	100	LF	$ 10,000.00
332	TILE REMOVAL	$ 5.00	LF	33420	LF	$ 167,100.00
		CONSTRUCTION SUBTOTAL				$ 5,642,980.00
		Contingency (10%)				$ 564,298.00
		CONSTRUCTION TOTAL				**$ 6,207,278.00**
		Engr. & Const. Observation (20%)				$ 1,241,455.60
		TOTAL COST				**$ 7,448,733.60**
	ROAD CROSSING CONSTRUCTION COSTS					
333	42" TILE - JACK AND BORE (CO HWY S27)	$ 1,200.00	LF	80	LF	$ 96,000.00
334	54" TILE - OPEN CUT (230TH STREET)	$ 200.00	LF	60	LF	$ 12,000.00
335	42" TILE - OPEN CUT (G AVENUE)	$ 130.00	LF	60	LF	$ 7,800.00
336	36" TILE - OPEN CUT (E AND D AVENUE AND 230TH STREET)	$ 110.00	LF	130	LF	$ 14,300.00
337	30" TILE - OPEN CUT (E AND D AVENUE AND 230TH STREET)	$ 90.00	LF	130	LF	$ 11,700.00
338	TILE ABANDONMENT	$ 100.00	LF	40	LF	$ 4,000.00
339	TILE REMOVAL	$ 10.00	LF	190	LF	$ 1,900.00
340	HICKENBOTTOM INTAKE	$ 2,000.00	EA	12	EA	$ 24,000.00
341	PERMANENT SEEDING AND WARRANTY	$ 2,000.00	LOC	6	LOC	$ 12,000.00
342	TRAFFIC CONTROL	$ 2,000.00	LOC	6	LOC	$ 12,000.00
		CONSTRUCTION SUBTOTAL				$ 195,700.00
		Contingency (15%)				$ 29,355.00
		CONSTRUCTION TOTAL				**$ 225,055.00**
		Engr. & Const. Observation (25%)				$ 56,263.75
		TOTAL COST				**$ 281,318.75**

Note: Per Iowa Code, road crossings (highlighted red) are not typically district expense

CGA
ENGINEERS • LAND SURVEYORS

By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Probable Construction Cost

Project: Dual Tile Upsizing for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

DUAL TILE UPSIZING - IMPROVEMENT (1")

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	DISTRICT CONSTRUCTION COSTS					
401	84" CMP TILE OUTLET	$ 200.00	LF	40	LF	$ 8,000.00
402	72" CMP TILE OUTLET	$ 175.00	LF	40	LF	$ 7,000.00
403	72" RCP TILE	$ 200.00	LF	1080	LF	$ 216,000.00
404	60" TRIPLE WALL PPE or RCP TILE	$ 175.00	LF	1080	LF	$ 189,000.00
405	54" TRIPLE WALL PPE or RCP TILE	$ 150.00	LF	24460	LF	$ 3,669,000.00
406	48" TRIPLE WALL PPE or RCP TILE	$ 110.00	LF	9270	EA	$ 1,019,700.00
407	42" TRIPLE WALL PPE or RCP TILE	$ 90.00	LF	1400	EA	$ 126,000.00
408	36" TRIPLE WALL PPE or RCP TILE	$ 75.00	LF	13170	EA	$ 987,750.00
409	30" DUAL WALL PPE or RCP TILE	$ 60.00	LF	9100	EA	$ 546,000.00
410	27" DUAL WALL PPE or RCP TILE	$ 50.00	LF	3000	LF	$ 150,000.00
411	24" DUAL WALL PPE or RCP TILE	$ 40.00	LF	1600	LF	$ 64,000.00
412	21" DUAL WALL PPE or RCP TILE	$ 32.50	LF	1200	LF	$ 39,000.00
413	15" DUAL WALL PPE or RCP TILE	$ 27.50	LF	1400	EA	$ 38,500.00
414	54" TILE - JACK AND BORE (RAILROAD)	$ 1,400.00	LF	200	LF	$ 280,000.00
415	72" x 54" REDUCER	$ 4,500.00	EA	1	EA	$ 4,500.00
416	60" x 54" REDUCER	$ 4,000.00	EA	1	EA	$ 4,000.00
416	54" x 48" REDUCER	$ 3,500.00	EA	1	EA	$ 3,500.00
417	54" x 36" REDUCER	$ 3,250.00	EA	1	EA	$ 3,250.00
418	48" x 42" REDUCER	$ 3,000.00	EA	1	EA	$ 3,000.00
419	42" x 36" REDUCER	$ 2,500.00	EA	1	EA	$ 2,500.00
420	36" x 30" REDUCER	$ 2,000.00	EA	2	EA	$ 4,000.00
421	30" x 27" REDUCER	$ 1,800.00	EA	2	EA	$ 3,600.00
422	27" x 24" REDUCER	$ 1,600.00	EA	2	EA	$ 3,200.00
423	24" x 21" REDUCER	$ 1,400.00	EA	2	EA	$ 2,800.00
424	21" x 15" REDUCER	$ 1,200.00	EA	2	EA	$ 2,400.00
425	FLOW EQUALIZATION STRUCTURE	$ 10,000.00	EA	33	EA	$ 330,000.00
426	84" RODENT GUARD	$ 2,250.00	EA	1	EA	$ 2,250.00
427	72" RODENT GUARD	$ 2,000.00	EA	1	EA	$ 2,000.00
427	BANK STABILIZATION	$ 50.00	TON	100	TON	$ 5,000.00
428	HEADWALL REMOVAL AND REPLACEMENT	$ 25,000.00	EA	1	EA	$ 25,000.00
429	LATERAL TILE CONNECTIONS	$ 1,000.00	EA	22	EA	$ 22,000.00
430	CONCRETE COLLAR	$ 600.00	EA	3	EA	$ 1,800.00
431	PRIVATE TILE CONNECTIONS	$ 500.00	EA	200	EA	$ 100,000.00
432	TILE LOCATION	$ 150.00	STA	334.2	STA	$ 50,130.00
433	TILE ABANDONMENT	$ 100.00	LF	100	LF	$ 10,000.00
434	TILE REMOVAL	$ 5.00	LF	33420	LF	$ 167,100.00
		CONSTRUCTION SUBTOTAL				$ 8,091,980.00
		Contingency (10%)				$ 809,198.00
		CONSTRUCTION TOTAL				**$ 8,901,178.00**
		Engr. & Const. Observation (20%)				$ 1,780,235.60
		TOTAL COST				**$ 10,681,413.60**
	ROAD CROSSING CONSTRUCTION COSTS					
435	54" TILE - JACK AND BORE (CO HWY S27)	$ 1,400.00	LF	80	LF	$ 112,000.00
436	72" TILE - OPEN CUT (230TH STREET)	$ 265.00	LF	30	LF	$ 7,950.00
437	60" TILE - OPEN CUT (230TH STREET)	$ 225.00	LF	30	LF	$ 6,750.00
438	54" TILE - OPEN CUT (G AVENUE)	$ 200.00	LF	60	LF	$ 12,000.00
439	48" TILE - OPEN CUT (E AND D AVENUE AND 230TH STREET)	$ 155.00	LF	130	LF	$ 20,150.00
440	36" TILE - OPEN CUT (E AND D AVENUE AND 230TH STREET)	$ 110.00	LF	130	LF	$ 14,300.00
441	TILE ABANDONMENT	$ 100.00	LF	40	LF	$ 4,000.00
442	TILE REMOVAL	$ 10.00	LF	190	LF	$ 1,900.00
443	HICKENBOTTOM INTAKE	$ 2,000.00	EA	12	EA	$ 24,000.00
444	PERMANENT SEEDING AND WARRANTY	$ 2,000.00	LOC	6	LOC	$ 12,000.00
445	TRAFFIC CONTROL	$ 2,000.00	LOC	6	LOC	$ 12,000.00
		CONSTRUCTION SUBTOTAL				$ 227,050.00
		Contingency (15%)				$ 34,057.50
		CONSTRUCTION TOTAL				**$ 261,107.50**
		Engr. & Const. Observation (25%)				$ 65,276.88
		TOTAL COST				**$ 326,384.38**

Note: Per Iowa Code, road crossings (highlighted red) are not typically district expense

CGA
ENGINEERS • LAND SURVEYORS

By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Probable Construction Cost

Project: Parallel Tile Upsizing for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

PARALLEL TILE UPSIZING - IMPROVEMENT (1/2")

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	DISTRICT CONSTRUCTION COSTS					
501	72" CMP TILE OUTLET	$ 175.00	LF	40	LF	$ 7,000.00
502	66" RCP TILE	$ 200.00	LF	1080	LF	$ 216,000.00
503	48" TRIPLE WALL PPE or RCP TILE	$ 110.00	LF	12230	EA	$ 1,345,300.00
504	42" TRIPLE WALL PPE or RCP TILE	$ 90.00	LF	9270	LF	$ 834,300.00
505	36" TRIPLE WALL PPE or RCP TILE	$ 75.00	LF	1400	LF	$ 105,000.00
506	30" DUAL WALL PPE or RCP TILE	$ 60.00	LF	5800	LF	$ 348,000.00
507	24" DUAL WALL PPE or RCP TILE	$ 40.00	LF	2300	LF	$ 92,000.00
508	21" DUAL WALL PPE or RCP TILE	$ 32.50	LF	600	LF	$ 19,500.00
509	15" DUAL WALL PPE or RCP TILE	$ 27.50	LF	400	LF	$ 11,000.00
510	12" DUAL WALL PPE or RCP TILE	$ 25.00	LF	300	LF	$ 7,500.00
511	48" TILE - JACK AND BORE (RAILROAD)	$ 1,300.00	LF	100	LF	$ 130,000.00
512	66" x 48" REDUCER	$ 3,750.00	EA	1	EA	$ 3,750.00
513	48" x 42" REDUCER	$ 3,000.00	EA	1	EA	$ 3,000.00
514	42" x 36" REDUCER	$ 2,500.00	EA	1	EA	$ 2,500.00
515	36" x 30" REDUCER	$ 2,000.00	EA	1	EA	$ 2,000.00
516	30" x 24" REDUCER	$ 1,800.00	EA	1	EA	$ 1,800.00
517	24" x 21" REDUCER	$ 1,400.00	EA	1	EA	$ 1,400.00
518	21" x 15" REDUCER	$ 1,200.00	EA	1	EA	$ 1,200.00
519	15" x 12" REDUCER	$ 600.00	EA	1	EA	$ 600.00
520	FLOW EQUALIZATION STRUCTURE	$ 10,000.00	EA	33	EA	$ 330,000.00
521	72" RODENT GUARD	$ 2,000.00	EA	1	EA	$ 2,000.00
522	BANK STABILIZATION	$ 50.00	TON	100	TON	$ 5,000.00
523	HEADWALL REMOVAL AND REPLACEMENT	$ 25,000.00	EA	1	EA	$ 25,000.00
524	LATERAL TILE CONNECTIONS	$ 1,000.00	EA	8	EA	$ 8,000.00
525	CONCRETE COLLAR	$ 600.00	EA	2	EA	$ 1,200.00
526	PRIVATE TILE CONNECTIONS	$ 500.00	EA	100	EA	$ 50,000.00
527	TILE ABANDONMENT	$ 100.00	LF	100	LF	$ 10,000.00
528	TILE LOCATION	$ 150.00	STA	334.2	STA	$ 50,130.00
		CONSTRUCTION SUBTOTAL				$ 3,613,180.00
		Contingency (10%)				$ 361,318.00
		CONSTRUCTION TOTAL				**$ 3,974,498.00**
		Engr. & Const. Observation (20%)				$ 794,899.60
		TOTAL COST				**$ 4,769,397.60**
	ROAD CROSSING CONSTRUCTION COSTS					
529	48" TILE - JACK AND BORE (CO HWY S27)	$ 1,300.00	LF	40	LF	$ 52,000.00
530	66" TILE - OPEN CUT (230TH STREET)	$ 250.00	LF	30	LF	$ 7,500.00
531	48" TILE - OPEN CUT (G AVENUE)	$ 155.00	LF	30	LF	$ 4,650.00
532	42" TILE - OPEN CUT (E AND D AVENUE AND 230TH STREET)	$ 130.00	LF	130	LF	$ 16,900.00
533	TILE ABANDONMENT	$ 100.00	LF	40	LF	$ 4,000.00
534	TILE REMOVAL	$ 10.00	LF	190	LF	$ 1,900.00
535	HICKENBOTTOM INTAKE	$ 2,000.00	EA	12	EA	$ 24,000.00
536	PERMANENT SEEDING AND WARRANTY	$ 2,000.00	LOC	6	LOC	$ 12,000.00
537	TRAFFIC CONTROL	$ 2,000.00	LOC	6	LOC	$ 12,000.00
		CONSTRUCTION SUBTOTAL				$ 134,950.00
		Contingency (15%)				$ 20,242.50
		CONSTRUCTION TOTAL				**$ 155,192.50**
		Engr. & Const. Observation (25%)				$ 38,798.13
		TOTAL COST				**$ 193,990.63**

Note: Per Iowa Code, road crossings (highlighted red) are not typically district expense

CGA
ENGINEERS • LAND SURVEYORS

By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Probable Construction Cost

Project: Parallel Tile Upsizing for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

PARALLEL TILE UPSIZING - IMPROVEMENT (1")

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	DISTRICT CONSTRUCTION COSTS					
601	90" CMP TILE OUTLET	$ 200.00	LF	40	LF	$ 8,000.00
602	90" RCP TILE	$ 250.00	LF	1080	LF	$ 270,000.00
603	66" RCP TILE	$ 200.00	LF	12230	LF	$ 2,446,000.00
604	54" TRIPLE WALL PPE or RCP TILE	$ 150.00	LF	9270	EA	$ 1,390,500.00
605	48" TRIPLE WALL PPE or RCP TILE	$ 110.00	LF	1400	LF	$ 154,000.00
606	42" TRIPLE WALL PPE or RCP TILE	$ 90.00	LF	5300	LF	$ 477,000.00
607	36" DUAL WALL PPE or RCP TILE	$ 75.00	LF	2600	LF	$ 195,000.00
608	30" DUAL WALL PPE or RCP TILE	$ 60.00	LF	200	LF	$ 12,000.00
609	27" DUAL WALL PPE or RCP TILE	$ 50.00	LF	600	LF	$ 30,000.00
610	21" DUAL WALL PPE or RCP TILE	$ 32.50	LF	400	LF	$ 13,000.00
611	18" DUAL WALL PPE or RCP TILE	$ 30.00	LF	300	LF	$ 9,000.00
612	66" TILE - JACK AND BORE (RAILROAD)	$ 1,500.00	LF	100	LF	$ 150,000.00
613	90" x 66" REDUCER	$ 4,750.00	EA	1	EA	$ 4,750.00
614	66" x 54" REDUCER	$ 4,000.00	EA	1	EA	$ 4,000.00
615	54" x 48" REDUCER	$ 3,500.00	EA	1	EA	$ 3,500.00
616	48" x 42" REDUCER	$ 3,000.00	EA	1	EA	$ 3,000.00
617	42" x 36" REDUCER	$ 2,500.00	EA	1	EA	$ 2,500.00
618	36" x 30" REDUCER	$ 2,000.00	EA	1	EA	$ 2,000.00
619	30" x 27" REDUCER	$ 1,800.00	EA	1	EA	$ 1,800.00
620	27" x 21" REDUCER	$ 1,500.00	EA	1	EA	$ 1,500.00
621	21" x 18" REDUCER	$ 1,200.00	EA	1	EA	$ 1,200.00
622	FLOW EQUALIZATION STRUCTURE	$ 10,000.00	EA	33	EA	$ 330,000.00
623	90" RODENT GUARD	$ 2,000.00	EA	1	EA	$ 2,000.00
624	BANK STABILIZATION	$ 50.00	TON	100	TON	$ 5,000.00
625	HEADWALL REMOVAL AND REPLACEMENT	$ 25,000.00	EA	1	EA	$ 25,000.00
626	LATERAL TILE CONNECTIONS	$ 1,000.00	EA	8	EA	$ 8,000.00
627	CONCRETE COLLAR	$ 600.00	EA	2	EA	$ 1,200.00
628	PRIVATE TILE CONNECTIONS	$ 500.00	EA	100	EA	$ 50,000.00
629	TILE ABANDONMENT	$ 100.00	LF	100	LF	$ 10,000.00
630	TILE LOCATION	$ 150.00	STA	334.2	STA	$ 50,130.00
		CONSTRUCTION SUBTOTAL				$ 5,660,080.00
		Contingency (10%)				$ 566,008.00
		CONSTRUCTION TOTAL				**$ 6,226,088.00**
		Engr. & Const. Observation (20%)				$ 1,245,217.60
		TOTAL COST				**$ 7,471,305.60**
	ROAD CROSSING CONSTRUCTION COSTS					
631	66" TILE - JACK AND BORE (CO HWY S27)	$ 1,500.00	LF	40	LF	$ 60,000.00
632	90" TILE - OPEN CUT (230TH STREET)	$ 325.00	LF	30	LF	$ 9,750.00
633	66" TILE - OPEN CUT (G AVENUE)	$ 250.00	LF	30	LF	$ 7,500.00
634	54" TILE - OPEN CUT (E AND D AVENUE AND 230TH STREET)	$ 200.00	LF	130	LF	$ 26,000.00
635	TILE ABANDONMENT	$ 100.00	LF	40	LF	$ 4,000.00
636	TILE REMOVAL	$ 10.00	LF	190	LF	$ 1,900.00
637	HICKENBOTTOM INTAKE	$ 2,000.00	EA	12	EA	$ 24,000.00
638	PERMANENT SEEDING AND WARRANTY	$ 2,000.00	LOC	6	LOC	$ 12,000.00
639	TRAFFIC CONTROL	$ 2,000.00	LOC	6	LOC	$ 12,000.00
		CONSTRUCTION SUBTOTAL				$ 157,150.00
		Contingency (15%)				$ 23,572.50
		CONSTRUCTION TOTAL				**$ 180,722.50**
		Engr. & Const. Observation (25%)				$ 45,180.63
		TOTAL COST				**$ 225,903.13**

Note: Per Iowa Code, road crossings (highlighted red) are not typically district expense

CGA
ENGINEERS • LAND SURVEYORS

By: J.V.S.
Date: 1/28/2019
Checked By: L.O.G.
Date: 2/4/2019

Engineer's Opinion of Probable Construction Cost

Project: Open Ditch Construction for D.D. #56

Location: Sections 1, 4, 7, 8, 9, 10, 11, 12 & 17 T87N, R22W Hardin County, Iowa

OPEN DITCH CONSTRUCTION (IMPROVEMENT)

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	DISTRICT CONSTRUCTION COSTS					
701	OPEN DITCH EXCAVATION	$ 1,850.00	STA	337.5	STA	$ 624,375.00
702	OPEN DITCH SEEDING	$ 100.00	STA	337.5	STA	$ 33,750.00
703	CULVERT - JACK AND BORE (RAILROAD)	$ 2,500.00	LF	50	LF	$ 125,000.00
704	SURFACE DRAINS	$ 1,900.00	EA	100	EA	$ 190,000.00
705	LATERAL TILE OUTLET	$ 1,350.00	EA	22	EA	$ 29,700.00
706	PRIVATE TILE OUTLET	$ 1,350.00	EA	200	EA	$ 270,000.00
707	HEADWALL REMOVAL	$ 5,000.00	EA	1	EA	$ 5,000.00
708	TILE LOCATION	$ 150.00	STA	337.5	STA	$ 50,625.00
709	TILE ABANDONMENT	$ 100.00	LF	100	LF	$ 10,000.00
710	TILE REMOVAL	$ 5.00	LF	33750	LF	$ 168,750.00
		CONSTRUCTION SUBTOTAL				$ 1,507,200.00
		Contingency (10%)				$ 150,720.00
		CONSTRUCTION TOTAL				**$ 1,657,920.00**
		Engr. & Const. Observation (20%)				$ 331,584.00
		TOTAL COST				**$ 1,989,504.00**
	ROAD CROSSING CONSTRUCTION COSTS					
711	CULVERT - OPEN CUT (ALL ROADS)	$ 90,000.00	LOC	6	LOC	$ 540,000.00
712	TILE REMOVAL	$ 10.00	LF	300	LF	$ 3,000.00
713	REVETMENT	$ 50.00	TN	1200	TN	$ 60,000.00
714	PERMANENT SEEDING AND WARRANTY	$ 2,000.00	LOC	6	LOC	$ 12,000.00
715	TRAFFIC CONTROL	$ 2,000.00	LOC	6	LOC	$ 12,000.00
		CONSTRUCTION SUBTOTAL				$ 627,000.00
		Contingency (10%)				$ 62,700.00
		CONSTRUCTION TOTAL				**$ 689,700.00**
		Engr. & Const. Observation (25%)				$ 172,425.00
		TOTAL COST				**$ 862,125.00**

Note: Per Iowa Code, road crossings (highlighted red) are not typically district expense

Drainage District:

#86

Repair Summary:

- Per direction of District Trustees and recommendations of previous repair summary, performed following on the Main tile located in the NW¼ Section 24, Township 89 North, Range 21 West:
  - First repair was in front of house at 1605 Georgetown Road. Excavated and found 18" VCP Main tile starting to collapse. Removed 8' of VCP Main tile and replaced with 18" Dual Wall HDPE tile with rock bedding/backfill and concrete collar connections.
  - Second repair was in front of house 1340 Georgetown Road. Excavated and found 18" Single Wall Main tile with intruding 2" PVC connection. Water service for house is directly over tile and sanitary sewer service for house is surrounded by concrete directly under tile. Removed 4' of VCP Main tile and 4'± of 2" PCV pipe. Replaced Main tile with 4' of 18" Dual Wall HDPE tile placed in existing concrete collar along with rock backfill and concrete collar connections. Reconnected 2" PVC connection at 45° angle with a 45° x 2" bend and 4' of 2" PVC pipe.
  - Called Jeremiah Silvey and left message, but never received return phone call.

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

See attached Tabulated Contractor Time and Materials Sheet.

Additional Actions Recommended:

- The Main tile under Georgetown Road (downstream of first repair) is cracked and egged shaped. It should be monitored for signs of failure (i.e. sinkholes, restricted drainage, etc). If such signs are reported, it should be replaced. Alternatively, if any road rehabilitation occurs before this point in time, is should be replaced.
- Since the landowner at Monarch Pond never called back about the remaining tree south of the railroad, the District Trustees should either pursue a written agreement with him or remove the tree before it impairs tile flow again.

Drainage Work Order Request For Repair
Hardin County

Date 2/27/2017 Work Order # 172

District # 86 Lateral Main Fund # 51114

Township Hardin Section 24 Twp 89 Rge 21 Qtr Sec NW1/4

Repair Requested By Randy Harman

Address 1725 Georgetown-Iowa Falls Phone (641) 373-7402

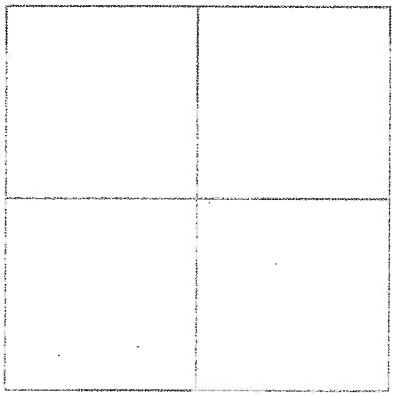
Landowner Randy Harman

Address Phone

Request Taken By Tina Schlemme

Available for Repair Now? ☑ Yes Date Available

Problem Description Tile area has progressively turned into a stream and causing flooding.
GIS 596-892124100002



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:

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

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

For Office Use Only

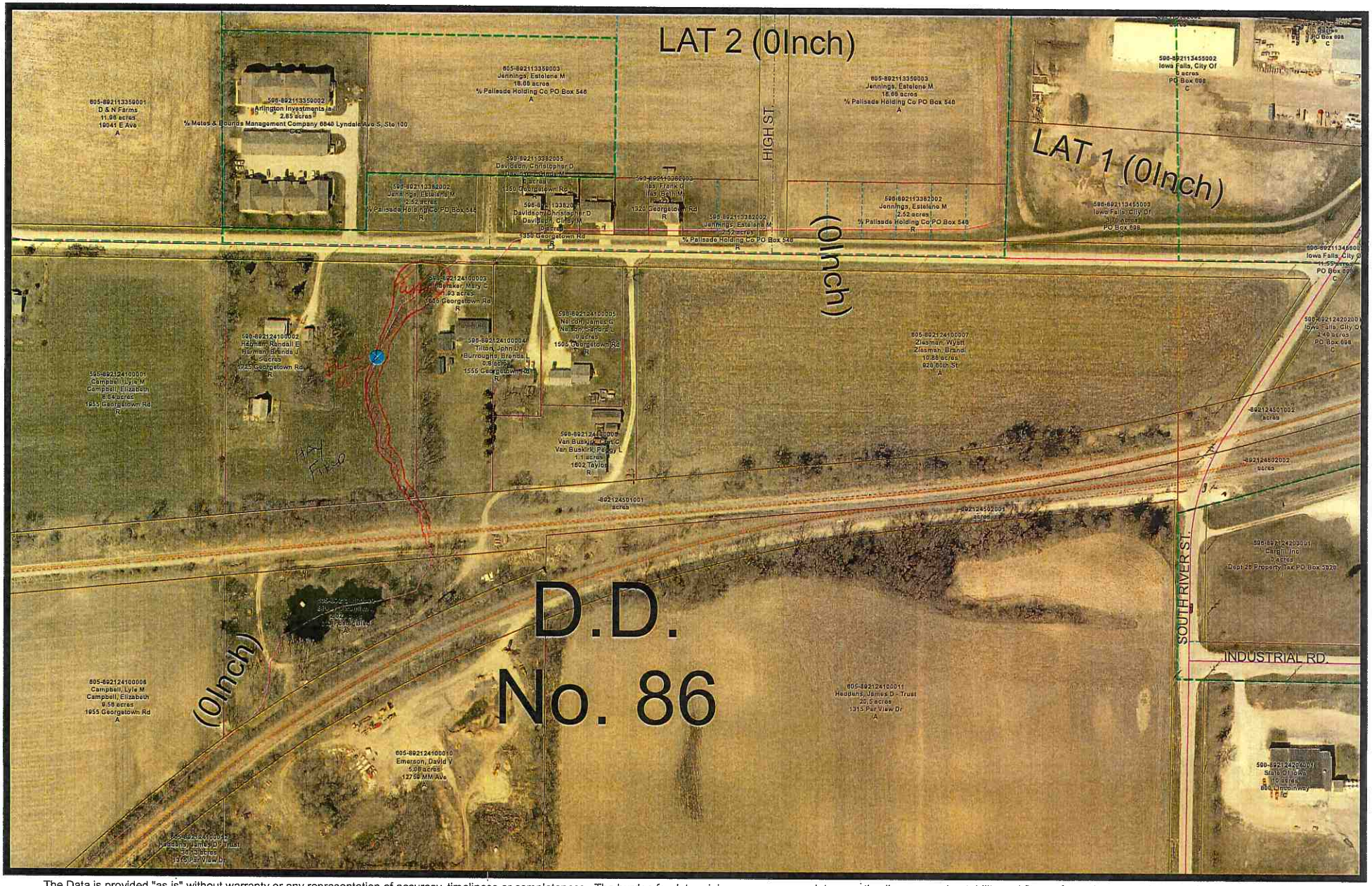
Approved: *Date:*

Hardin County Auditor's Office

0 0.0225 0.045 0.09 0.135 0.18 Miles

N W E S

Date: 2/27/2017



Tabulated Contractor Time and Materials

Date	Totals	1/11/2019	1/14/2019
Workman (hrs.)	58	30	28
Mini Excavator (hrs.)	22	15	7
Dump Truck (hrs.)	14.5	7.5	7
18" Dual Wall HDPE (ft.)	12	8	4
Concrete Collars (ea.)	4	2	2
1" Clean Rock (tn.)	3	3	
Road Stone (tn.)	15	15	
Vac Truck (hrs.)	7		7
2" PVC (ft.)	2		2
45 x 2" bend (ea.)	1		1
Compresion Fitting (ea.)	1		1

CONSTRUCTION ENGINEERING
OBSERVATION REPORT

DATE: 1/8/19

DAYS OF WEEK: S M T W T F S

SHEET NO. 1 OF 1

PROJECT NUMBER: 6789.1

COUNTY, ROUTE, ROAD: DD 86

LOCATION: GEORGETOWN ROAD, IOWA FALLS

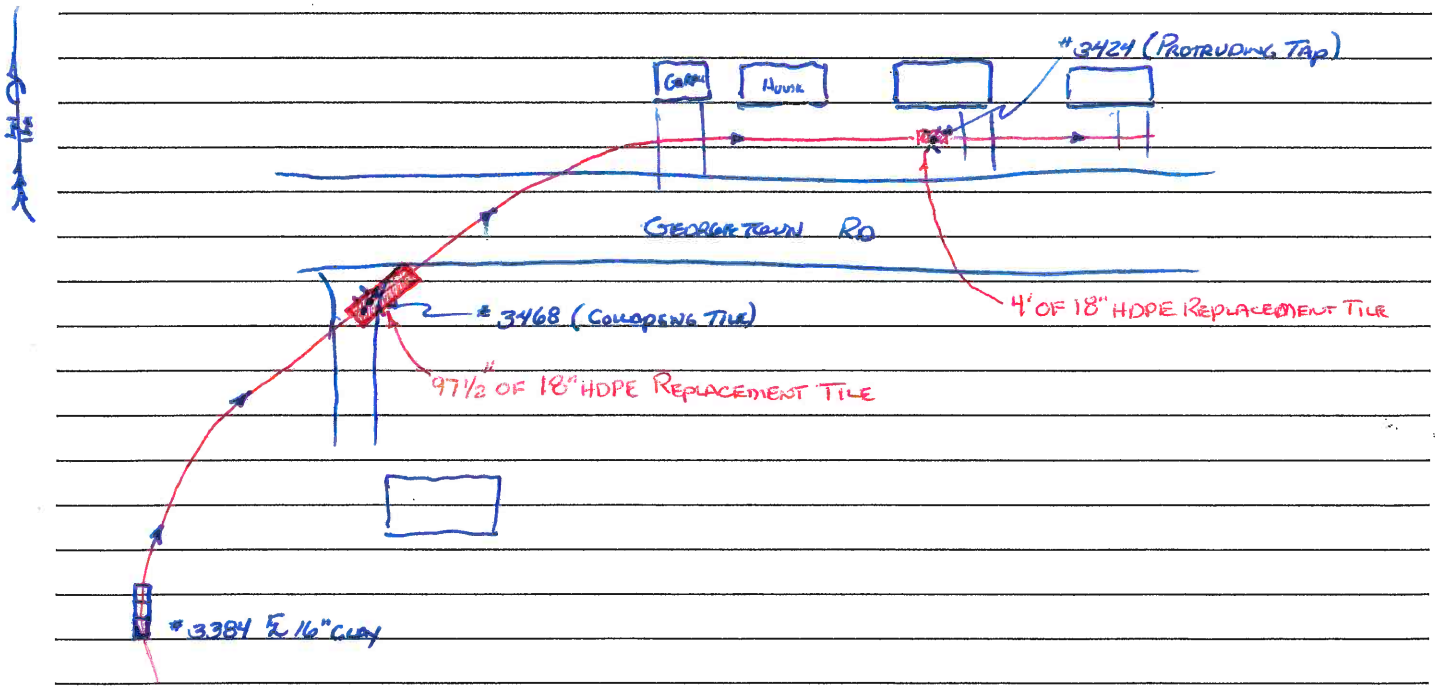
DESCRIPTION OF WORK AND MATERIAL USED FOR EACH OPERATION, INCLUDING CONTRACTOR/SUB NAME, ITEM NO. AND LOCATION Sunny, 38°, Very Windy From N.W.

Arrived @ Job Site @ 11:00 A.M., Set ☆ on 3380, 3/4" IR ✓OK Staked out GPS #3424 (End TV) @ PVC Protruding Tap For New House Sump Pump.

Also Staked out Collapsing main @ #3468 CoGo, 436' downstream From #3384, FE 16" Clay, Start TV.

Crew not on site yet.

12:30 Crew shows, 3 men + mini Ex, [redacted] But Realizes that Nobody has Talked To Either Land Owners To Coordinate Access @ #3468 And Just To Advise Owner About Repair @ His Sump outlet. So Crew Left.



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

Observer's Signature: [signature] Date Prepared: 1/8/19

Reviewed by: _____ ☐ Engineer

Date Reviewed _____

CONSTRUCTION ENGINEERING OBSERVATION REPORT

DATE: 1/11/19

DAYS OF WEEK: S M T W T F S

SHEET NO. 1 OF 1

PROJECT NUMBER: 6789.1

COUNTY, ROUTE, ROAD: DD86

LOCATION: GEORGETOWN RD., IOWA FALLS

DESCRIPTION OF WORK AND MATERIAL USED FOR EACH OPERATION, INCLUDING CONTRACTOR/SUB NAME, ITEM NO. AND LOCATION Cloudy, Calm, 25°, Predicted For 35°

8:30 Arrived @ Job Site, 4 man crew +(2) mini Excavators, with Breaker and Frost Tooth on Site working in Drive on S. Side Road @ Collapsed Tile Replacement. 12" of Frost in Drive, Crew using Breaker on 337 Bobcat, and Frost Tooth on E50 Bobcat Excavators. Dump Truck Also on Site for dirt Removal and Rock Import For Full depth Rock driveway. Collapsed Tile @ GPS #3468. See Pic Drawing on 1/8/19 Report.

10:00 A.M., Crew Found 6" VCP Intake @ R100 on Pipe causing Collapse on Main. Top was Capped with a 24"x24"x24" Rock, 200#. Crew is Hauling Away dirt spoil and will Fill with Full depth Rock For Drive.

Took out 8' of Clay Tile That was Hinge Top, 2' upstream From 3468 and 6' down Stream @ Edge of Asphalt Rd. (Georgetown Rd.) South Edge. Took Pic downstream under Road and Found wide ~~crack~~ crack on Top of Tile, But Tile is Still Round. Old Clay Tile is Also Setting ~~on~~ on Top of Limestone Flag Rock. Crew had Hard Time making Room For The 18" Hope Tile used For Repair. 2:00: poured 1 yd. of Conc. From C. I. with Fabric/wire mesh For Collars. Carefully Covered Collars with 1" Clean Rock since Temps. are Still @ 25°. 2:15 PM., Paul Shows up with Full Truck Load of 1" ~~Clean~~ Rock (Road Stone). Haunch of Pipe was Chomped. Tile has 6' of Cover @ Driveway. 2:30 P.M., Crew put Vib. Plate on 337 Excav. and Vib. Compacted 2' lifts of Road Stone. 2:38 P.M; 2nd Load of 1" Road Stone Arrives. 3:30 Crew parks up Equipment and Leaves

Future Action: Replace Tile under Georgetown Road

(4) man crew, (2) mini Excavators, Vib. Plate, Breaker, Dump Truck 7½ hrs

(2) Conc. Collars, wire mesh, Fabric, 1 yd. Conc.

(8') of 18" Hope Dual wall (97½") long

(3) Ton 1" clean Bedding Rock For Haunch and Sides of Hope.

(2) 15 Ton Loads of Road Stone

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

Observer's Signature: 1/11/19 Date Prepared: 1/11/19

Reviewed by: ☐ Engineer

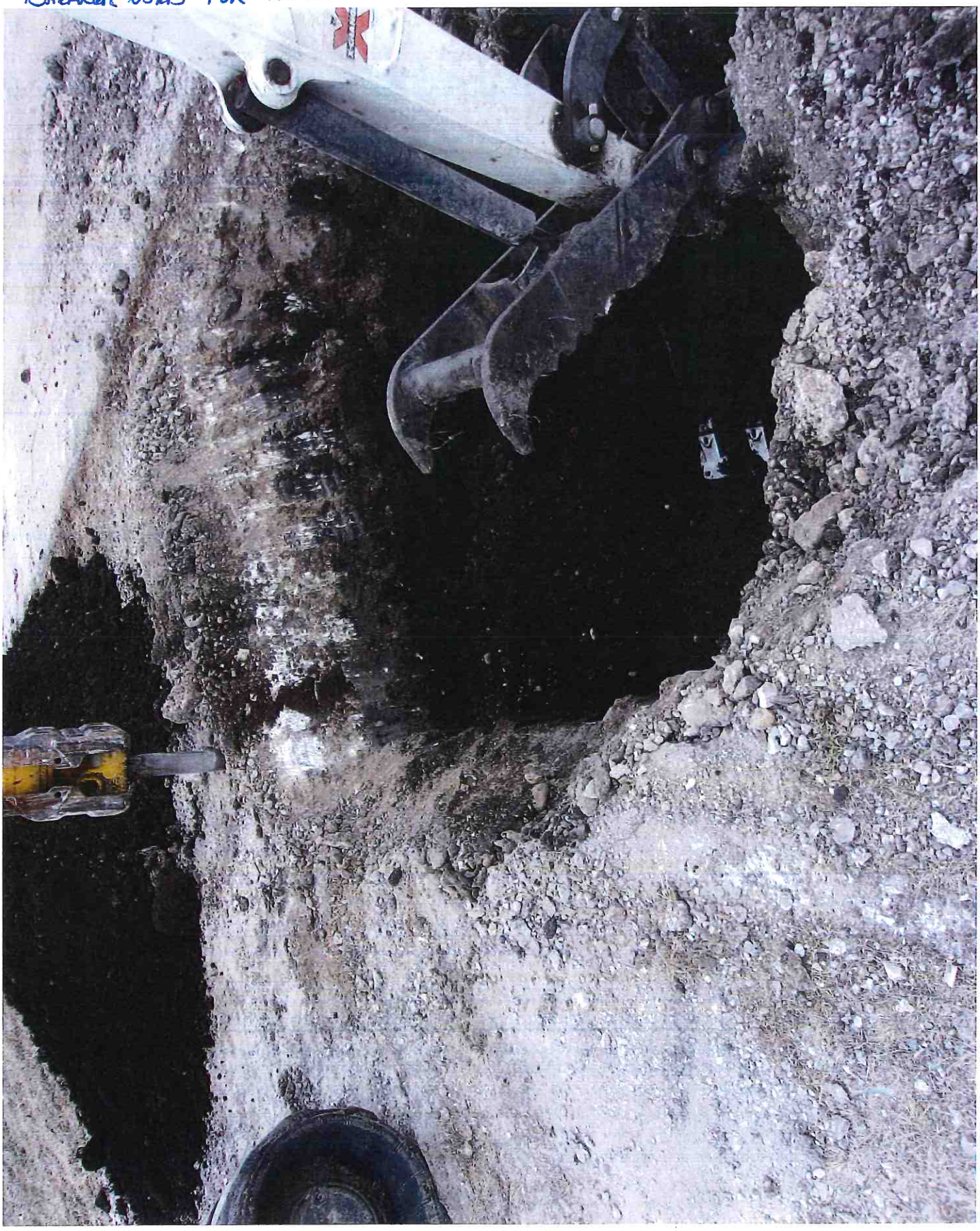
Date Reviewed

BREAKING UP FROST WITH FROST TOOTH

DIRT IS HAULED AWAY

STAND PIPE LOCATED

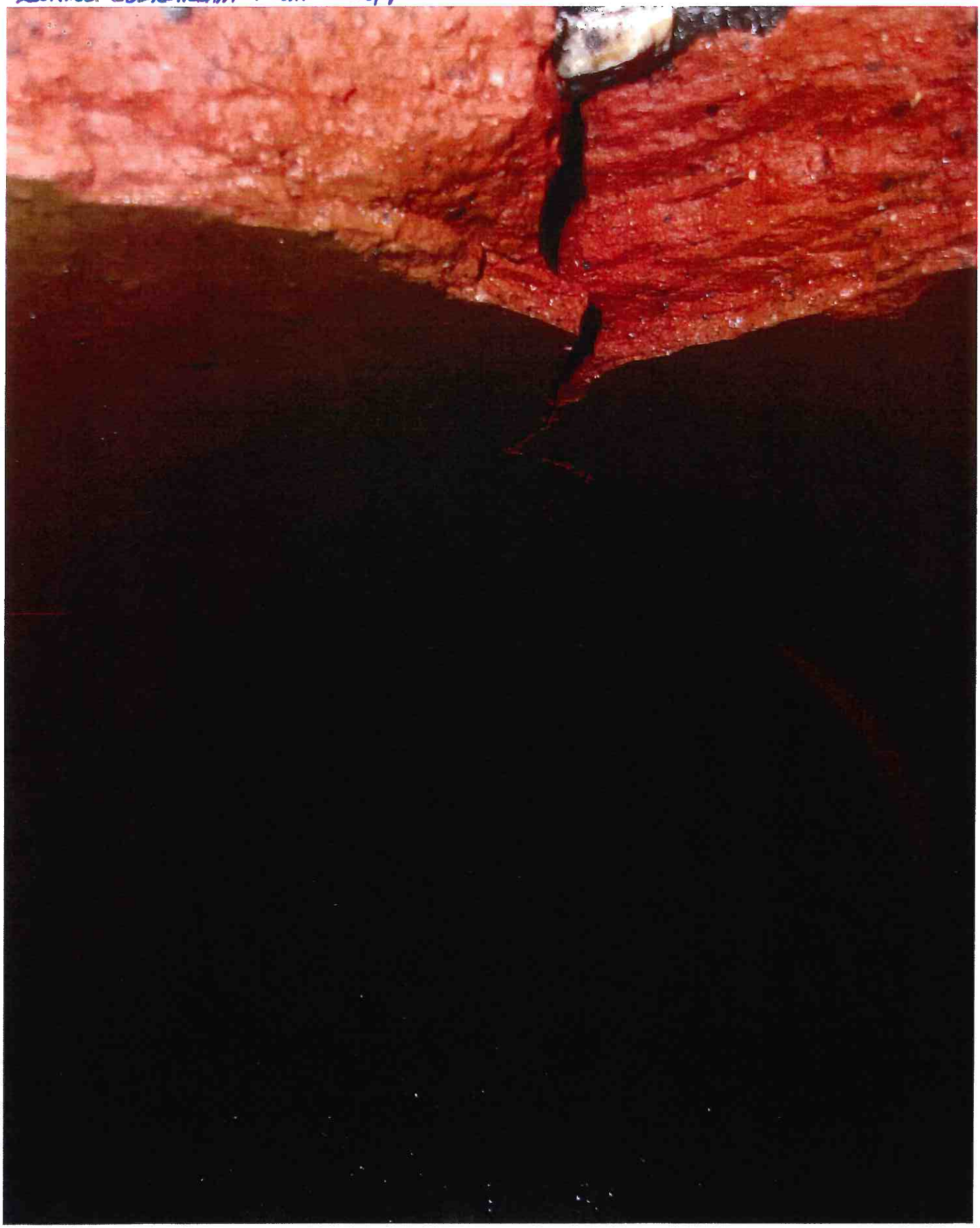
BREAKER USED FOR FROZEN GROUND



OLD INTAKE BEING REMOVED

STANDPIPE REMOVED

Looking downstream from Stanhope Hole

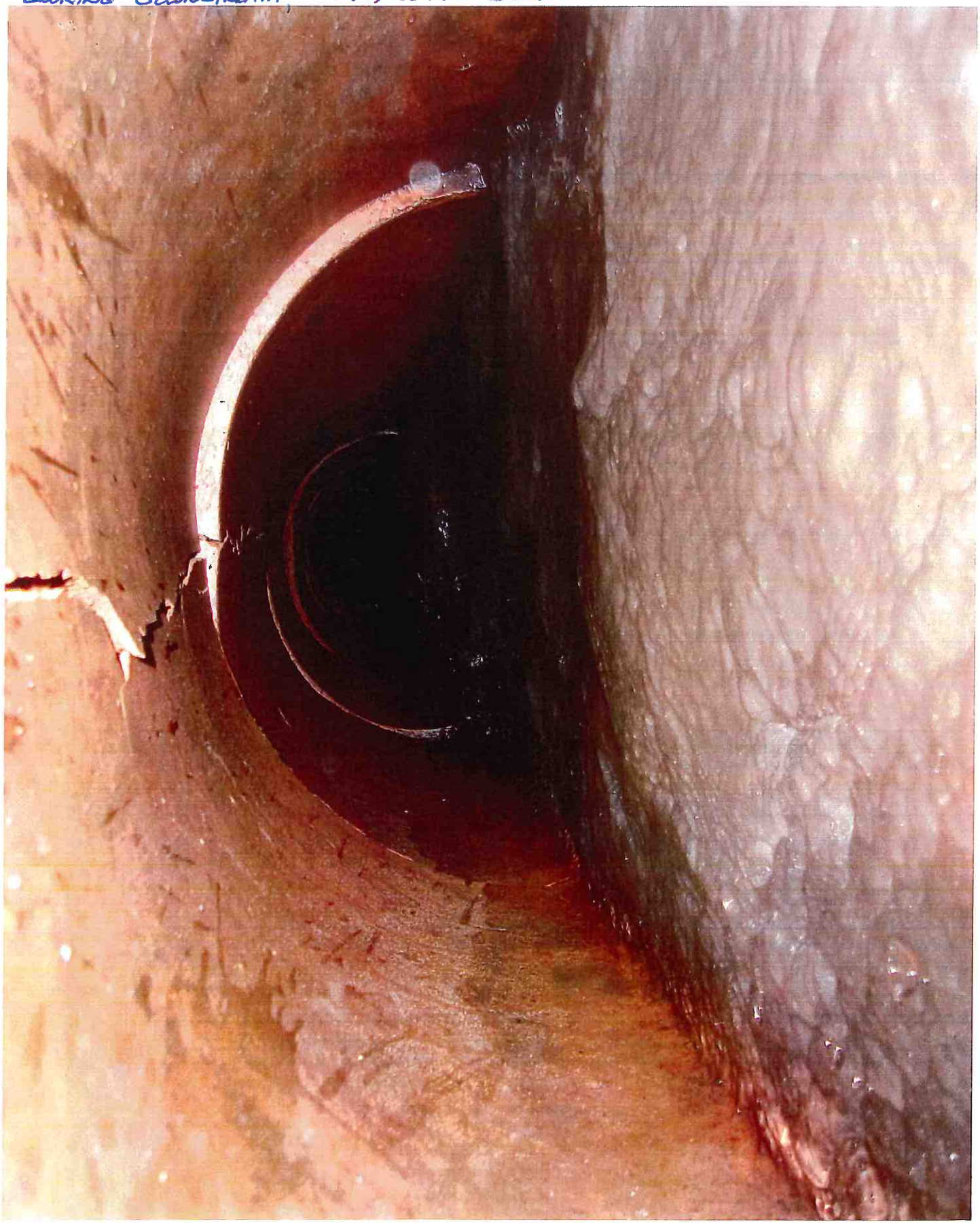


LOOKING UPSTREAM FROM STANDPIPE LOCATION

CLEARING AROUND TILE

Removing Broken Tile

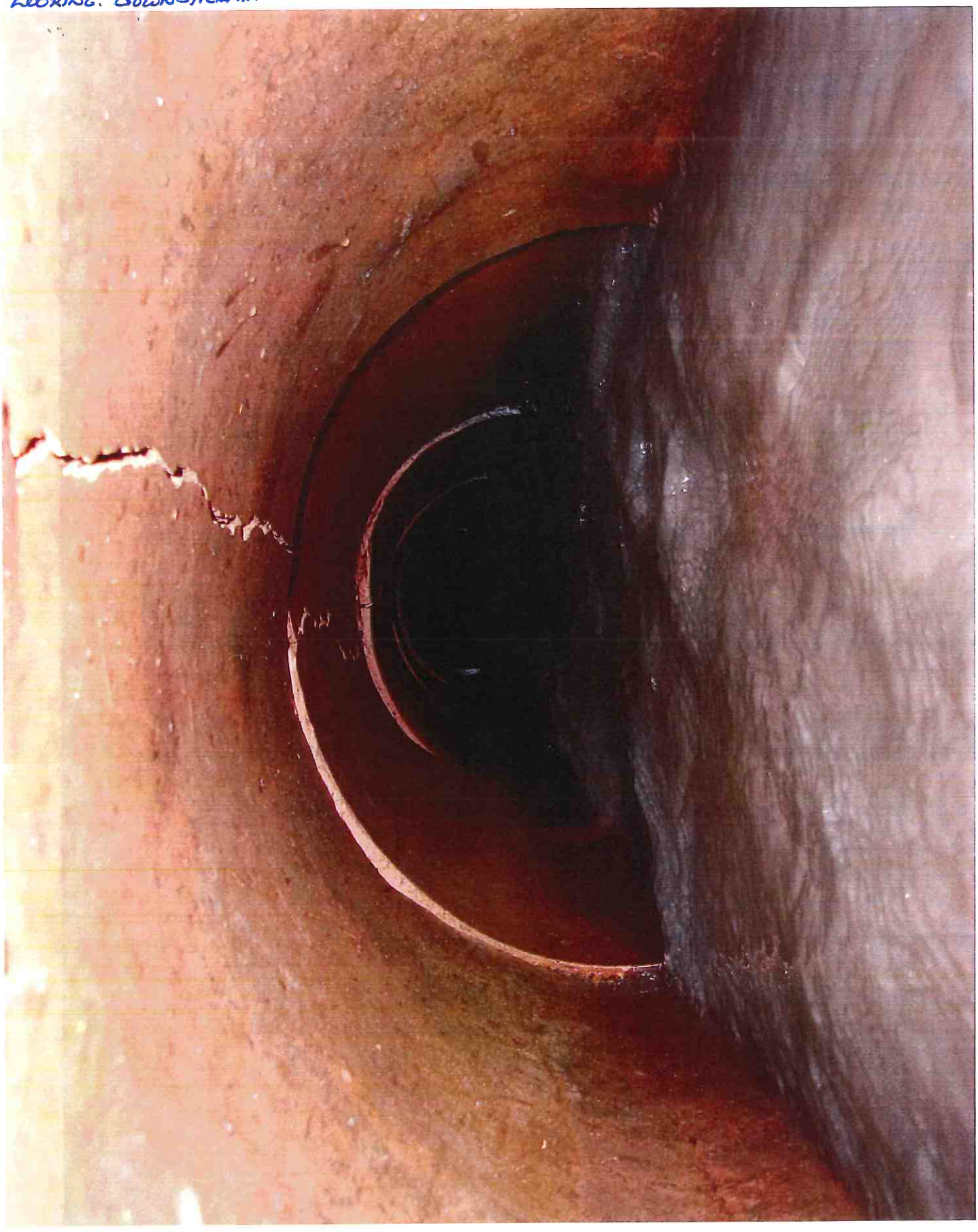
LOOKING DOWNSTREAM, 1ST (2) SECTIONS [redacted] WAS REMOVED



Looking upstream

LOOKING DOWNSTREAM, 1ST TILE IN PIC. REMOVED

LOOKING DOWNSTREAM



BURY HOPE WITH ROCK, 1" CLEAN, 3TON

Holding down HDPE For Conc. Collars

C.I. TRUCK ARRIVES #74

Pouring ... Collars

Conc. Collars with 6' cover in Driveway

1" ROAD STONE, FULL DEPTH

Vib Plate Compaction of Road Stone

2ND LOAD OF ROAD STONE

Compacting driveway

FINISHED JOB.

CONSTRUCTION ENGINEERING
OBSERVATION REPORT

DATE: 1/14/19

PROJECT NUMBER: 6789.1

COUNTY, ROUTE, ROAD: DD 86 H.

LOCATION: GEORGETOWN RD. IAVA FALLS

DAYS OF WEEK: S (M) T W T F S

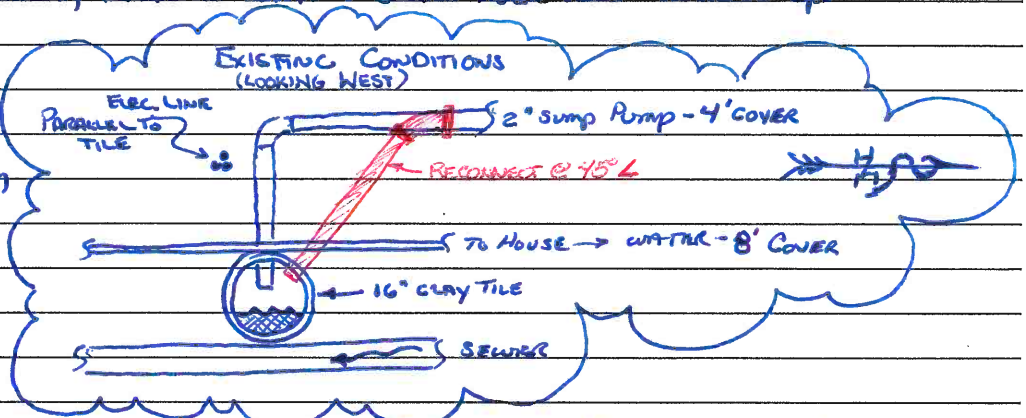
SHEET NO. 1 OF 1

DESCRIPTION OF WORK AND MATERIAL USED FOR EACH OPERATION, INCLUDING CONTRACTOR/SUB NAME, ITEM NO. AND LOCATION Cloudy, Foggy, 22°, Fresh Snow, 1"

8:15, Paul Williams Crew Arrives @ Job Site, 4 man crew, Vac Truck, mini Excavator. 8:35, start Exposing Elec. utility over Tile Line To Be Repaired @ Protruding Tap @ GPS# 3424 on N. side of Georgetown Road. Lots of small Stones and 12" stones.

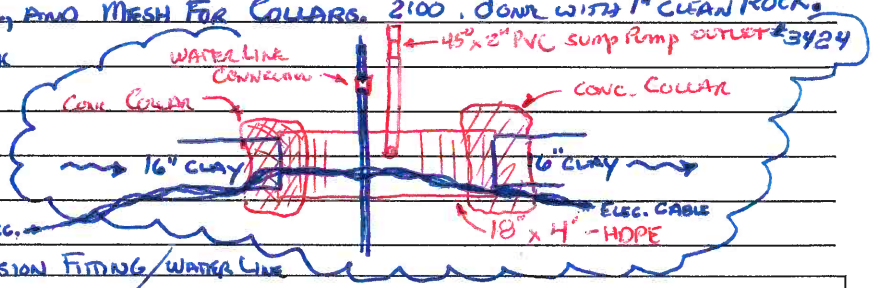
9:00 Vac Truck is Full and is Leaving To Dump. Crew is working with Mini Ex. To Expose Elec. Line Around Tile.

Found 2" PVC Sumpump outlet @ 3424, Going To Tile, Also Found 3/4" copper Water Line Laying on Top of Tile, and Sewer Service Going under Tile, with Zero Clearance. Will Try To put some Styrofoam Between Tile and Sewer and Water Services, Backfill with 1" clean Rock and Re Hook up Sump Pump.



City Worker Arrived, Found Water Service Valve, and Shut Off. Plan is Going To Cut Line, Fix Tile, and Reconnect.

11:00 A.M., water Line is cut and out of way. 12:00 Noon; Tile Exposed, 48" of 18" Hope Dual Wall set in place with Fabric, and Mesh For Collars. 2:00, done with 1" clean Rock.



7) Hr. 4 man crew, Vac Truck, mini Ex., Dump Truck
(4') 18" Hope Dual Wall
(3½) Ton 1" clean Rock
(1) yds Conc.
(2) conc. Collars, Mesh, Fabric
(4) Ft of 2" PVC/45° Fitting, (1) Compression Fitting/water Line

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

Observer's Signature: [signature] Date Prepared: 1/14/19

Reviewed by: ☐ Engineer

Date Reviewed

2:45; Crew done Backfilling Dirt, They Have 5 cu.yds dirt Leftover, Filling Dump Truck with Extra dirt. 3:10, Crew Loads up Machines and Leaves

VAC TRUCK ARRIVES

GETTING STARTED

TAKING OFF SOO.

LOOKING FOR BURIED ELEC. CABLE

"Pot Hole" for Utilities

Bucket Compaction Backfill

EXPOSING ELEC. CABLE

PVC Riser, 2"

HOLE IN PE TILE FOR 2" SUMP OUTLET

PLASTIC USED TO POUR COLLAR ON P.E./CLAY JOINT

Exposing Clay Tile

TAKING OUT OLD P.E. TILE.

Getting 3/4 Collars Ready

3/4 Collars Ready For Conc.

Conc. Truck From C.I.

Paving Collars; Too wet 8" slump

1 yd Conc. with Fabric wrapped water line

1" BEDDING ROCK

1" CLEAN ROCK OVER TILE + COLLARS

3 TON? CLEAN ROCK

Placing 1" clean Rock

LOADING UP EXTRA DIRT

FINISHED

Parcel Number	Owner	Benefited Acres
891918200006	Ainley, Joshua D & Kandice C	3.14
891907300003	Bartling Land & Livestock, Inc	7.00
891907300002	Bartling, James F & Nancy K	7.00
891907300004	Bartling, James F & Nancy K	20.00
891907300005	Bartling, James F & Nancy K	40.00
891917100003	Bennett, Jayne A; Stalzer, Dennis L & Johnson, Susan M	12.00
891917100004	Bennett, Jayne A; Stalzer, Dennis L & Johnson, Susan M	40.00
891917100005	Bennett, Jayne A; Stalzer, Dennis L & Johnson, Susan M	7.00
891907400005	Bonewitz, Michael Bonewitz, Beverly	4.59
891917200008	Ellingson, Chase B	1.91
891918100002	Enslin, Marcia	40.00
891918200001	Enslin, Marcia	40.00
891918200003	Enslin, Marcia	32.86
891918200004	Enslin, Marcia Enslin, Paul	4.79
891908100013	Flying Eagle, Inc	1.80
891917200004	Halter, William H Halter, Patty S	7.35
891917200005	Halter, William H Halter, Patty S	5.25
891918400001	Hansen Farms, LC	33.00
891918400003	Hansen Farms, LC	10.00
15	Hardin County Roads	-
891918300003	Holmgaard, Kent Horace - 1/2 Holmgaard, Kent Horace - Contract - 1/2	4.50
891918300006	Holmgaard, Kent Horace - 1/2 Holmgaard, Kent Horace - Contract - 1/2	9.00
891907200003	Ibeling, Will Ibeling, Jolene	10.13
891907200006	Ibeling, Will Ibeling, Jolene	17.09
891907400001	Ibeling, Will Ibeling, Jolene	35.94
891907400003	Ibeling, Will Ibeling, Jolene	40.00
891917100001	Ibeling, Will R Ibeling, Jolene D	19.00
891908100007	Ibeling, Will Robert Ibeling, Jolene Dianne	22.76
891908200003	Ibeling, Will Robert Ibeling, Jolene Dianne	35.00
891908200007	Ibeling, Will Robert Ibeling, Jolene Dianne	6.00
891918300002	Keninger, David Keninger, Barbara	39.00
891917200003	Keninger, David L Keninger, Barbara J	28.70
891917200010	Keninger, David L Keninger, Barbara J	29.70
891907200005	Kuper Family Living Trust	7.00
891918100001	Miller, Dorothy Ann	25.55
891918100003	Miller, Dorothy Ann	20.25
891918200007	Morton, John Brandt, Ashley	0.34
891917400002	Muller, Harold J Muller, Debra L	2.00
891908400001	Pieper, Brandon A	40.00
891908400003	Pieper, Brandon A	37.00
891908400004	Pieper, Brandon A	38.50
891908400005	Pieper, Brandon A	10.29
891908400006	Pieper, Brandon A Pieper, Lisette C	8.80
891918100004	Rameyer, Marie K Revocable Trust	39.00
891907400002	Rameyer, Marie K Revocable Trust, etal-1/2 Knipfel, Patricia K-1/3; Rameyer, Robert-1/6	39.00

891907400004	Rameyer, Marie K Revocable Trust, etal-1/2 Knipfel, Patricia K-1/3; Rameyer, Robert-1/6	39.00
891918200002	Rameyer, Randy M	32.00
891908100012	Smith, Kenneth E Smith, Mary C	9.20
891908300001	Smith, Kenneth E Smith, Mary C	37.00
891908300002	Smith, Kenneth E Smith, Mary C	37.00
891918300001	Stalzer, Mark A	31.75
891917200007	Thomas, Jacob R Ibeling, Janelle	0.51
891908300003	Vanderloo, Lance E - Trust	39.24
891908300004	Vanderloo, Lance E - Trust	22.73
891908300005	Vanderloo, Lance E - Trust	17.27
891917200001	Vanderloo, Lance E - Trust	40.00
891917200002	Vanderloo, Lance E - Trust	2.00
891917200006	Vanderloo, Lance E - Trust	22.39
891917200009	Vanderloo, Lance E - Trust	0.19
59		**1,212.52**

Original Assessment	Per Acre	District
$ 29.87	$ 9.51	DD 148
$ 145.70	$ 20.81	DD 148
$ 145.70	$ 20.81	DD 148
$ 477.35	$ 23.87	DD 148
$ 1,708.32	$ 42.71	DD 148
$ 55.38	$ 4.62	DD 148
$ 124.60	$ 3.12	DD 148
$ 10.86	$ 1.55	DD 148
$ 123.85	$ 26.98	DD 148
$ 4.67	$ 2.45	DD 148
$ 2,759.53	$ 68.99	DD 148
$ 217.57	$ 5.44	DD 148
$ 312.61	$ 9.51	DD 148
$ 58.27	$ 12.16	DD 148
$ 7.35	$ 4.08	DD 148
$ 106.13	$ 14.44	DD 148
$ 38.58	$ 7.35	DD 148
$ 371.27	$ 11.25	DD 148
$ 123.68	$ 12.37	DD 148
$ 400.00		DD 148
$ 57.33	$ 12.74	DD 148
$ 106.47	$ 11.83	DD 148
$ 86.50	$ 8.54	DD 148
$ 158.72	$ 9.29	DD 148
$ 1,721.77	$ 47.91	DD 148
$ 999.03	$ 24.98	DD 148
$ 88.46	$ 4.66	DD 148
$ 71.24	$ 3.13	DD 148
$ 93.72	$ 2.68	DD 148
$ 9.37	$ 1.56	DD 148
$ 730.28	$ 18.73	DD 148
$ 414.40	$ 14.44	DD 148
$ 93.77	$ 3.16	DD 148
$ 58.08	$ 8.30	DD 148
$ 676.07	$ 26.46	DD 148
$ 319.46	$ 15.78	DD 148
$ 4.14	$ 12.18	DD 148
$ 5.96	$ 2.98	DD 148
$ 82.43	$ 2.06	DD 148
$ 676.23	$ 18.28	DD 148
$ 207.32	$ 5.38	DD 148
$ 18.98	$ 1.84	DD 148
$ 16.38	$ 1.86	DD 148
$ 682.69	$ 17.50	DD 148
$ 1,792.70	$ 45.97	DD 148

$	603.59	$ 15.48	DD 148
$	239.70	$ 7.49	DD 148
$	37.59	$ 4.09	DD 148
$	528.22	$ 14.28	DD 148
$	827.97	$ 22.38	DD 148
$	532.74	$ 16.78	DD 148
$	1.85	$ 3.63	DD 148
$	71.47	$ 1.82	DD 148
$	617.25	$ 27.16	DD 148
$	468.96	$ 27.15	DD 148
$	242.82	$ 6.07	DD 148
$	17.60	$ 8.80	DD 148
$	81.07	$ 3.62	DD 148
$	0.16	$ 0.84	DD 148
$	**20,663.78**	**$ 17.04**	

Legal
PARCEL A IN SW NE 18-89-19
S490' SW FRL SW 7-89-19
SW SW EXC S490' 7-89-19
NE SW 7-89-19
SE SW 7-89-19
E20A W1/2 NW 17-89-19
NE NW 17-89-19
SE NW 17-89-19
PARCEL "A" IN NW SE, S1/2 SE NE & S1/2 SW NE 7-89-19
PARCEL IN S1/2 NE (COM E1/4 COR W1144.1' POB N250.5' W405.8' S250.5' E399' POB) 17-89-19
NE NW 18-89-19
NW NE 18-89-19
SW NE EX PARCEL A 18-89-19
SE NE EX TRACT & EX PARCEL B 18-89-19
COM W1/4 COR N155' POB N368'NE322'S368' SW322'POB(PAR A & B) 8-89-19
COM E1/4 COR N1513.7 BEG N737' W472.7' S737' E472.7' BEG 17-89-19
COM E1/4COR N855.7' BEG NW265' NW304.7' SW161.2' NW353.4' E472.7' S658' POB 17-89-19
NW SE 18-89-19
SW SE 18-89-19
SW FRL SW EX TRACT 18-89-19
SE SW EX TRACT 18-89-19
S1/2 SW NE EX PART PARCEL "A" 7-89-19
S1/2 SE NE EX PART PARCEL "A" 7-89-19
NW SE EX PARCEL "A" 7-89-19
SW SE 7-89-19
W30A NW NW 17-89-19
SE NW & BEG NW COR E1/2 SW E80RDS S24' W80RDS N30' POB 8-89-19
SW NE 8-89-19
SE NE 8-89-19
NE SW 18-89-19
NE NE EX W1A & EX TRACT 17-89-19
SE NE EX 1A & EX W117.5FT S369FT & EX TRACT 17-89-19
N1/2 SE NE 7-89-19
NW FRL NW 18-89-19
SW FRL NW 18-89-19
PARCEL B IN SE NE 18-89-19
NE SE 17-89-19
NW SE 8-89-19
SW SE 8-89-19
SE SE 8-89-19
NE SE EX 9.71A TR 8-89-19
COM NE COR SE1/4 S884.7'POB S379.5' W1157'NE279.15' E1140.78' POB 8-89-19
SE NW 18-89-19
NE SE 7-89-19

SE SE 7-89-19
NE NE 18-89-19
S13A SW NW EX 1.22A TR & EX 1.05A TR 8-89-19
NW SW 8-89-19
SW SW 8-89-19
NW SW 18-89-19
COM E1/4COR W1543.1' BEG N378'W266'S378' E266'POB 17-89-19
NE SW EX BEG NW COR E80RDS S24FT W TO PT. 30FT S OF BEG 8-89-19
SE SW EX 17.27A TRACT 8-89-19
BEG S1/4 COR N220.4' NW'LY 1534' S906' E1336.93' POB 8-89-19
NW NE 17-89-19
W 2 RODS E1/2 NE EX TR ON S 17-89-19
SW NE EX 2 TRACTS 17-89-19
E117.5' W150.5' N118.5' S369' SE NE 17-89-19