

**ENGINEER'S REPORT  
ON REPAIR OR  
IMPROVEMENTS TO  
LATERAL 7 TILE,  
DRAINAGE DISTRICT 102  
HARDIN COUNTY**



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.*      *June 23, 2016*  
 LEE O. GALLENTINE, P.E.      DATE

LICENSE NUMBER: 15745  
 MY LICENSE RENEWAL DATE IS DECEMBER 31, 2016  
 PAGES OR SHEETS COVERED BY THIS SEAL:  
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# Engineer's Report on Repair or Improvements to Lateral 7 Tile, Drainage District 102, Hardin County, Iowa

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# Engineer's Report on Repair or Improvements to Lateral 7 Tile, Drainage District 102, Hardin County, Iowa

## 1.0 INTRODUCTION

- SCOPE OF WORK – The Hardin County Board of Supervisors, acting as District Trustees, requested Ryken Engineering to investigate and report concerning improvements to the Lateral 7 tile of Drainage District No. 102. This report will summarize the history of repairs and improvements to the main tile, investigate the necessity and feasibility of said repair or improvements, and present an opinion of probable construction costs associated with said repair or improvements. At the regular drainage meeting held on February 17, 2016, the recommend action shown in the Repair Summaries for Work Order Requests #58, #72 and #73 (copies included in Appendix A) were discussed and reviewed by the District Trustees. As a result, the District Trustees requested Ryken Engineering to move ahead with preparation of this report.
- LOCATION – The area of investigation included the entire Lateral 7 tile, which is located in Sections 18 and 19, Township 86 North, Range 20 West and Section 24, Township 86 North, Range 21 West Hardin County, Iowa. Specifically, the downstream limit was the Lateral 7 outlet at the main tile located in the Fractional Southwest Quarter of Section 18, approximately  $\frac{1}{8}$  mile southeast of the corner of 300th Street. The lateral tile then goes southerly across Section 18, skims across the Fractional Northwest Quarter of Section 19, and goes into the Northeast and Southeast Quarters of Section 24. The upstream limit of said tile is just south of 315th Street at approximately  $\frac{3}{8}$  mile east of MM Avenue in the Southeast Quarter of said Section 24. For reference, a copy of the 1917 Drainage District No. 102 map, showing said limits and the district boundary is included in Appendix C.

2.0 **DISTRICT HISTORY** – The following is a summary of the pertinent history of the main and Lateral 7 tiles of Drainage District No. 102 as obtained from the Hardin County Auditor's drainage minutes and records and those of Ryken Engineering and Land Surveying.

- 1917, May 28                      Petition for establishment of drainage district.
- 1917, Aug. 25                    Preliminary Engineer's Report by W.S. Porter was filed. It called for 6,700 feet main tile (28 inch diameter to 8 inch diameter), 3,260 feet of Lateral 1 tile (10 inch diameter to 7 inch diameter), 240 feet of Lateral 2 tile (6 inch diameter), 200 feet of Lateral 3 tile (6 inch diameter), 150 feet of Lateral 4 tile (6 inch diameter), 925 feet of Lateral 5 tile (6 inch diameter), 700 feet of Lateral 6 tile (6 inch diameter), 7,800 feet of Lateral 7 tile (18 inch diameter to 6 inch diameter), 390 feet of Lateral 8 tile (10 inch diameter), 650 feet of Lateral 9 tile (7 inch diameter), 800 feet of Lateral 10 tile (8 inch diameter to 6 inch diameter), 400 feet of Lateral 11 tile (6 inch diameter), 1,300 feet of Lateral 12 tile (6 inch diameter), 600 feet of Lateral 13 tile (8 inch diameter), and 900 feet of Lateral 14 tile (8 inch diameter).
- Lateral 1 was to be connected at station 23+75 of the main tile.  
Lateral 2 was to be connected at station 4+20 of the Lateral 1 tile.  
Lateral 3 was to be connected at station 4+40 of the Lateral 1 tile.  
Lateral 4 was to be connected at station 4+75 of the Lateral 1 tile.  
Lateral 5 was to be connected at station 4+85 of the Lateral 1 tile.  
Lateral 6 was to be connected at station 28+00 of the Lateral 1 tile.  
Lateral 7 was to be connected at station 29+00 of the main tile.  
Lateral 8 was to be connected at station 11+50 of the Lateral 7 tile.  
Lateral 9 was to be connected to private tile that connected to Lateral 8 tile.
- Lateral 10 was to be connected at station 55+00 of the Lateral 7 tile.  
Lateral 11 was to be connected at station 67+00 of the Lateral 7 tile.  
Lateral 12 was to be connected at station 70+50 of the Lateral 7 tile.  
Lateral 13 was to be connected at station 42+50 of the main tile.  
Lateral 14 was to be connected at station 49+00 of the main tile.  
The outlet of the main tile was to be constructed at station 14+00 of the main due to ground topography. The estimated total cost of construction was \$12,305.30
- 1917, Sept. 6                    Publication of Notice for hearing on establishment of drainage district.
- 1917, Oct. 10                    Supplemental Engineer's Report by W.S. Porter was filed. It called for the private tile located in the S½ of Section 13 and the E½ of Section 24 be made a part of the drainage district facilities.
- 1917, Oct. 11                    Publication of Notice to Contractors for construction of drainage district facilities with a bid date of Oct. 22, 1917.
- 1917, Oct. 22                    Bids were received on supplying tile and construction of drainage district facilities.
- 1917, Oct. 26                    Construction contract with Jens A. Jensen for \$4,898.30 for construction of drainage district facilities was entered.
- 1917, Oct. 31                    Tile contract with Eldora Pipe and Tile Co. for \$5,963.85 for supplying tile was entered.

- 1917, Nov. 12 Appointment of Commission to inspect and classify land in drainage district.
- 1918, Mar. 19 Petition by Ernest Hankemeier and A.J. DeWitt for the extension of Lateral No. 13.
- 1918, Jul. 1 Engineer's Report by W.S. Porter was filed. It recommended the extension of Lateral No. 13 to bring an outlet to the NE $\frac{1}{4}$  SE $\frac{1}{4}$  Section 18.
- 1918, Jul. 1 Engineer's Report by W.S. Porter was filed. It recommended that Lateral No. 7 not be constructed above Station 60.
- 1918, Jul. 1 Petition by J.W. Creson and Henry Pruessner to construct 750 feet of Lateral off Lateral No 7 at Station 70.
- 1918, Jul. 15 Engineer's Report by W.S. Porter recommending the construction of a lateral through J.W. Creson and Henry Pruessner land.
- 1918, Aug. 10 Final report on construction of drainage district facilities by W.S. Porter showing completion of contract was accepted with the deductions 'Lateral No. 7 600 feet 8" tile and 1,100 feet 6" tile. Lateral No. 11 400 feet 6" tile Lateral No. 12 1,300 feet 6" tile making a total cut off of 3,400 feet.' and with the additions 'The Pruesner & Creson Lateral 750 feet of 6" tile. For the Bales & DeWitt Lateral 715 feet 6" tile. For the Hankemier & DeWitt Lateral 500 feet 8" tile & 1,250 feet of 6" tile. For the Schnormeier & Hartwic Lateral 300 feet of 8" tile. Making a total added of 3,515 feet.'
- 1918, Sept. 4 Publication of Notice of Assessment of Benefits.
- 1922, Jan. 23 Letter from W.S. Porter recommending that "Lateral No. 8 be relaid at the point where they cross the first draw running west of Lateral No. 1 and that they be cemented in and extra filling be put on them."
- 1922, May 10 Engineer's Report by W.S. Porter on Lateral No. 8 was filed. It called for "...relaying of about 300 feet of the 16 inch tile relaying it in the west bank of the open ditch far enough away so that the overflow water will have no effect on it this will require us to purchase about 100 feet of new tile and to cement some of it also put in one intake 6 inch in size. I estimate will cost around two hundred dollars."
- 1922, May 22 Report by W.S. Porter was filed. It recommended "relaying at 300 feet of the 16 inch tile relaying in the west bank of the open ditch far enough away so that the over flow water will have no effect on it this will require us to purchase about 100 feet on new tile..." and "...estimate will cost around two hundred dollars"
- 1923, Feb. 19 District Trustees directed J.R. Maher to investigate and report the need for repairs on Drainage District No. 102.
- 1947, District Trustees met with landowners to discuss the possible construction of grass waterway in the SW $\frac{1}{4}$  NW $\frac{1}{4}$  and the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 18.
- 1948, Payment for right of way for waterway

- 1948, Jul. 12 Report from County Secondary Road Crew stating "Put in Culverts this spring but didn't level and didn't put on extensions N & S road on east side" located in Section 18.
- 1948, Sept. 1 Report from County Secondary Road Crew stating "culvert into pasture – put open ditch into field and needs extensions to cross with picker" located in Section 18.
- 1949, Feb. 9 Bill for construction of grassed waterway located in the SW $\frac{1}{4}$  NW $\frac{1}{4}$  and NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 18.
- 1951, Oct. 5 Bill for installation of 30 feet of 48 inch culvert located in Section 18.
- 1954, Jun. 14 Request for 'Repair by placing 18" along present Main from sta 14+00 to 29+00' located in the W $\frac{1}{2}$  Section 18.
- 1954, Jul. 31 Engineer's Report by F.J. Reigles was filed. It stated that "the outlet is quite badly block and the outlet gully needs cleaning out". It also indicated that the currently installed "...tiling system would never be very satisfactory because of the steep grades of the laterals and sizes of that laterals as compared with the grade of the main tile". Therefore, there was a request to install a relief main from the outlet to a point past the lateral connections. The estimated cost for this repair was \$3,112.95.
- 1954, Aug. 12 Resolution by the County Board of Supervisors to set a hearing on the improvement per F.J. Reigles Engineer's Report.
- 1954, Sept. 10 Publication of Notice of Hearing on improvement to drainage district facilities.
- 1954, Oct. 9 Resolution by the County Board of Supervisors to direct Engineer F.J. Reigles "...to make a primary survey and report of the feasibility of the construction of the continuation of the grass wasterway from the Hankemeier property into the Bales property"
- 1955, May 14 Engineer's Report by F.J. Reigles was filed in the County Auditor's Office. It stated that "...that the expense and other difficulties involved in making such a deep waterway would come to more that the benefits received from such operation". It also recommended that a 6 inch intake be replaced with 12 inch intake with a 10 inch riser, install a 18 inch intake with 12 inch tile hookup to other lateral across Bales property, and dig a waterway to the east and south on a very flat grade as far across the Bales Pond. Estimated cost \$300.00.
- 1956, Aug. 7 Bill for repair to tile.
- 1957, May 8 Bill for repair to tile.
- 1957, Dec. 4 Bill for repair to tile.
- 1967, May 17 Engineer's Report by Hollis E. Ryken was filed. It recommended "that the intake at the north line of the Lehemier land in the south half of section 18 be closed to eliminate part of the load on the tile." and "That the land southeast of this intake which presently drains to this intake be provided with surface drainage into the existing surface drain..."
- 1975, Feb. 10 Application to secure drainage rights by L.F. Lehmeier through the property owned by Martin Schnormeier (described as FrW $\frac{1}{2}$  Section 18)

- for the purposes of installing a 12 inch tile parallel to the main tile starting at the outlet and terminating at the junction of the main tile with Lateral No. 7.
- 1975, Jun. 11 Order between L.F. Lehmeier and Martin Schnormeier for the benefit of L.F. Lehmeier to install a 12 inch tile parallel to the main tile, starting at the outlet of the main and terminating at the south line of the Schnormeier property as recorded in County Recorder's Book 486 Pages 539-541.
- 1979, Jan. Bill for repair of tile located in Section 18.
- 1980, Jan. 31 Bill for repair of tile.
- 1981, Mar. 21 Request for repairs to tile located in SW¼ Section 18 to install 30' of 12" CMP in ditch.
- 1981, Apr. 9 Letter from Board of Supervisors informing landowners within drainage district of informal hearing regarding proposed improvements to the district.
- 1981, Apr. 23 Request for repairs to tile located in SW¼ Section 18. It stated "Main line too shallow, needs to be replaced with 10' of 12" CMP"
- 1981, Apr. 27 Preliminary Hearing on proposed improvement to drainage district facilities. Discussion stated that "...the general opinion was that something needed to be done to protect the landowners at the bottom of the ditch as the people on the top are getting drainage, but the water is setting on the bottom for days at a time. L.F. Lehmeier expressed his need for surface drainage, and his request for repair were presented as follows: Install 12 inch steel tube 12 foot long in the main. Clean and repair open ditch". The Board of Supervisors ordered Hollis E. Ryken, to prepare a report on the feasibility and cost to repairs.
- 1981, May 19 Letter from Hollis E. Ryken responding to the requested repairs from the preliminary hearing. It stated that before the replacement of 30 feet of the tile with ridge pipe, it should be decided "...the responsibility for the existing condition be determined prior to proceeding with any additional survey work". Also, regarding the request to "clean and repair the open ditch", it stated "to date, we have been unable to verify the inclusion of this waterway as a legal improvement to the District. As a result, we could not recommend the repair of the waterway be considered unless it can be found to be legally established as part of the District."
- 1981, May 20 Letter from attorney John L. Butler stating that his opinion is that the repair and work done on the open waterway located in N½ SW¼ Section 18 should be assessed to the drainage district.
- 1982, Jun. 17 Request for repair to "Use dragline & cast away N & S side of culvert crossing to allow pond to drain" located in the NE¼ Section 18.
- 1982, Jan. 18 Authorization of Secondary Road Department to make necessary repairs and 'installed 30 feet of 12" CMP in ditch, main line is too shallow' located in Section 18.

1982, May 17	Authorization of Secondary Road Department to make necessary repairs of broken tile located in ditch on east side of road by intake located in Section 18.
1982, Aug. 9	Authorization of Secondary Road Department to make necessary repairs of broken tile located in field of Martin Schnormeier Section 18.
1982, Nov. 1	Authorization of Secondary Road Department to make necessary repairs to tile located in the Lehmeier property and finish cleaning open ditch located in Section 18.
1983, Feb. 14	Letter from Hollis E. Ryken, in regards to repairs to Martin Schnormeier property located in the FrW $\frac{1}{2}$ of Section 18 and Schnormeier's interest in doing an improvement to the lower end of Drainage District No. 102.
1983, Mar. 24	Request for improvement to drainage district facilities by Lehmeier to build an open ditch from the outlet and go southerly across the Lehmeier-Schnormeier property then go southeasterly.
1983, Mar. 30	Letter from Hollis E. Ryken, recommending authorization of a survey and study for the proposed improvements and possible alternatives to the open ditch, depending on the economics.
1983, Apr. 4	Letter from the Board of Supervisors directing Hollis E. Ryken to perform a survey and study for the requested improvements.
1983,	Preliminary Engineer's Report on improvements to the lower end of Drainage District No. 102 by Hollis E. Ryken. It estimated the construction of an open ditch on a portion of the Main would cost \$68,293. The construction of an open ditch on Lateral No. 1 would cost \$2,969 and an open ditch on Lateral No. 7 would cost \$28,072.
1983, Nov. 28	Notice of hearing on Engineer's Report for the request improvements and for the feasibility of the proposed repairs.
1983, Dec. 29	Letter from engineer Wayne Gieselman, as privately hired for the Martin Schnormeier property. It indicated several issues with the requested improvements and offered alternatives to said improvements.
1984, Jan. 9	Board of Supervisors met in regards to the Engineer's Report on the requested improvements. Discussion was held and it was decided that the Board needed more time to look at alternatives concerning the project.
1984, Feb. 22	Letter from Ryken E. Hollis discussing the Engineer's Report and the alternatives submitted by Wayne Gieselman. It requested the Board of Supervisors discuss the following, <ul style="list-style-type: none"> <li>1. Determine if a remonstrance had been filed, or</li> <li>2. Accept the plans and report as filed, or</li> <li>3. Accept the minor amendments to the plans and report as filed, or</li> <li>4. Order the Engineer to prepare a detailed estimate, report and plans for the alternative method.</li> </ul>
1984, Feb. 28	Letter from Board of Supervisors stating the approximate cost of the improvement and reclassification was \$138,000.00.

1984, Mar. 5	Remonstrance was filed at the County Auditor's Office in regards to the requested improvement project.
1984, Mar. 12	Authorization of Secondary Road Department to investigate the need for a possible clean out of outlet on the main and install a pipe in Section 18.
1984, Mar. 20	Request for repair tile blow out, fix ditch, and level spoil bank located in Section 18.
1984, Nov. 13	Authorization of Secondary Road Department to make necessary repairs to broken tile in the ditch about 14' of 18" located in Section 13.
1984, Nov. 13	Authorization of Secondary Road Department to make necessary repairs on tile line where the Main is caved in and the tile cracked located in Section 13.
1984, Dec. 17	Authorization of Secondary Road Department to make necessary repairs 22' of Main tile located in Section 18.
1984, Dec. 28	Request for "Repair and Restore drainage from the outlet south across Marin Schormeier farm to N. fenceline of Lehmeier, Inc." located in Section 18.
1985, Mar. 13	Letter from Hollis E. Ryken in regards to the requested repair dated Dec. 28, 1984. Total estimated project cost \$9,338. It requested that the Board of Supervisors discuss the following options: Proceed with the requested repair or call a meeting to explore the possibility of an improvement project that would be agreeable to Schnormeier and Leheier.
1985, Apr. 9	Informal meeting in regards to the requested repair. It was decided to have formal hearing on the repair.
1985, Apr. 19	Publication of Notice for hearing on requested repairs.
1985, May 29	Remonstrance was filed at the County Auditor's Office in regards to the requested repair project.
1985, Jun. 5	Authorization of the Engineer to make necessary repairs where the outlet needs to be cleaned on the main located in Section 18.
1985, Oct. 30	Authorization of the Engineer to make necessary repairs to the 48 inch culvert which is separated and needs to be reset for surface water at the main located in Section 18.
1986, Apr. 28	Request for repair to clean and level banks and clean tile outlet located in Section 18.
1986, Apr. 30	Board of Supervisors decided that no action will be take on the requested repair dated Apr. 28, 1986 as the repairs go beyond the boundaries of drainage district.
1986, Oct. 15	Gehrke repaired a 10 inch tile with 12 inch plastic tile for approximately 20 feet and also two 6 inch tile lines. These repairs were necessary in order to complete the waterway described by the SCS. The question arose as to whether the county will pay for repairs.
1986, Nov. 6	Approval of request for repair of tile by Otto Schnormeier located in Section 24.

1986, Nov. 6 Approval of request for repair of broken tile by Otto Schnormeier located in Section 18.

1986, Nov. 10 Approval of request for repair of 2 broken tile by Otto Schnormeier located in Section 18.

1986, Nov. 19 The Board of Supervisors tabled the request for repairs by Martin Schnoreier until they had a chance to go out and look at the tile. Said request was located in Section 24 and Section 18.

1986, Dec. 1 Approval of request for repair by William Leheier for tile located in Section 18.

1987, Numerous letters and correspondences regarding the reshaping the land above Lateral No. 1 by Mr. Lehmeier. Board of Supervisors indicated as long as the tile is not damaged or the drain tile affected, Mr. Lehmeier can build terraces.

1987, Mar. 5 Approval of request for repair by Mr. Lehmeier located in Section 18.

1987, Mar. 21 Approval of request for repair to install 30 inch of 12" CMP in ditch by Mr. Lehmeier located in Section 18.

1987, May 13 Approval of request of repair of broken tile by Martin Schnormeier located in Section 18.

1988, Jan. 21 Engineer's Report by Hollis E. Ryken (as directed by the Board of Supervisors) to survey and reestablish the location and boundary of grass waterway located in SW $\frac{1}{4}$  NW $\frac{1}{4}$  and the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 18.

1988, Mar. 9 Resolution by the Board of Supervisors to reestablish the right of way of the grass waterway located within the SW $\frac{1}{4}$  NW $\frac{1}{4}$  and the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 18.

1988, Apr. 13 Engineer's Report by Hollis E. Ryken estimated the cost of construction for the clean out of grass waterway located within the SW $\frac{1}{4}$  NW $\frac{1}{4}$  and the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 18 would be \$9,338.

1989, Apr. 5 Approval of request for repair of tile blowout located in the NW $\frac{1}{4}$  NE $\frac{1}{4}$  Section 24.

1990, Apr. 4 Approval of request for repair of drainage district.

1990, Apr. 9 Approval of request for repair of tile blowout located in Section 18.

1990, Aug. 1 Approval of request for repair of tile blowout located in Section 13.

1990, Nov. 30 Approval of request for repairs of 2 tile blowouts located in Section 18.

1991, Apr. 3 Approval of request for repairs located in Section 24.

1991, Apr. 9 Approval of request for repair of tile blowout located in Section 24.

1991, Jun. 18 Proposal by Martin Schnormeier to give access to the open waterway in exchange for the District to maintain the open waterway, repair and maintain the crossing over the open ditch, straighten the open ditch north of the open waterway and provide a bulkhead on the open waterway on the north fenceline of Schnormeier's property.

- 1992, Mar. 4                   Petition for repairs to drainage district facilities.
1. Repair the outlet of the main.
  2. Replace the bulkhead at the outlet.
  3. Established a berm along the waterway to prevent rilling.
  4. New 96 inch pipe to be placed under the crossing.
  5. A soil or earth berm should be installed at the top of the bank.
  6. Clean out all waterways.
  7. Reconstruct the intakes on both sides of the road located in the SE $\frac{1}{4}$  NE $\frac{1}{4}$  of Section 13 and SW $\frac{1}{4}$  NW $\frac{1}{4}$  of Section 18.
  8. Cleanout the road ditches and fix the intakes located in the NE $\frac{1}{4}$  SW $\frac{1}{4}$  and NW $\frac{1}{4}$  SE $\frac{1}{4}$  Section 13.
  9. Cleanout the road ditches and fix the intakes located in the SE $\frac{1}{4}$  SW $\frac{1}{4}$  and SW $\frac{1}{4}$  SE $\frac{1}{4}$  Section 13.
  10. Tile blowout and tile holes located in Section 13 need to be repaired.
- 1992, Apr. 15               Request for repair of broken tile located in the NW $\frac{1}{4}$  SE $\frac{1}{4}$  Section 13.
- 1992, Apr. 18               Request for repair of tile blowout located in the NE $\frac{1}{4}$  Section 24.
- 1992, May 26               Letter from Hollis E. Ryken stating "I believe it would be in the best interests of all concerned to retain an engineer with no former affiliation with the District's problems..."
- 1993, Apr. 14               Bill for repairs to broken tile located in Section 18.
- 1993, Apr. 21               Request for repair to clean out at bulkhead at tile outlet located in NW $\frac{1}{4}$  Section 18.
- 1993, May 26               Bill for repair of 2 broken tile located in the SE $\frac{1}{4}$  Section 13.
- 1993, May 27               Request for repair of broken tile located in the NW $\frac{1}{4}$  Section 18.
- 1993, Aug. 6               Request for repair of blowout tile located in the SE $\frac{1}{4}$  Section 13.
- 1993, Oct. 19               Request for repairs of broken tile located in the NW $\frac{1}{4}$  Section 18.
- 1993, Oct. 19               Request for repairs of broken tile located in the NW $\frac{1}{4}$  and SE $\frac{1}{4}$  Section 13.
- 1993, Nov. 17               Request for repairs of 3 broken tile located in the NE $\frac{1}{4}$  Section 18.
- 1994, Feb. 15               Request for repair of blowout tile on Lateral 7 located in the SW $\frac{1}{4}$  Section 18.
- 1994, Jun. 2               Letter from Hollis E. Ryken in regards to Petition for Repairs dated Mar. 4, 1992. He declined to do the engineering work for this issue, but would recommend another engineer firm.
- 1994, Jun. 8               Board of Supervisors approved of rates from Brent W. Johnson of McClure Engineering Company.
- 1994, Sept.16               Engineer's Report on repairs to drainage district facilities by Brent W. Johnson was filed. It recommended open ditch clean out of 250', construction of an new wood bulkhead, filling gully between bulkhead and 48 inch culvert, repair 48 inch RCP farm crossing culvert and riprap

rill erosion. The total estimated construction cost is \$35,580.00 (This was in response to the petition for repairs dated Mar. 4, 1992)

1995, Jan. 10 Publication of Notice to Contractors for repairs with a bid date of Feb. 8, 1995.

1995, Feb. 6 Addendum No. 1 to Plans and Specification for repairs to Drainage District No. 102 by Brent W. Johnson, Engineer was filed.

1995, Feb. 8 Bids were received on construction of repairs to drainage district facilities.

1995, Feb. 15 Construction contract with Ingraham Construction, Inc. for \$18,885.00 for repairs to drainage district facilities was entered.

1995, Jun. 1 Statement of completion of construction of repairs to drainage district facilities by Ingraham Construction, Inc.

1995, Jun. 24 Publication of Notice of Completion of repairs to drainage district facilities.

1992 -1995 Numerous letters, legal statements, reports, objections and Equity Case No. 76-257-793 in regards to the petition for repairs, date Mar. 4, 1992

- A. Original Notice – Jul. 14, 1993
- B. Petition for Writ of Mandamus – Jul. 14, 1993
- C. Answer – Jul. 19, 1993
- D. Deposition of Martin Schnormeier – Aug. 27, 1993
- E. Answers to Interrogatories Propounded to Plaintiff – Oct. 15, 1993
- F. Scheduling Agreement – Nov. 10, 1993
- G. Motion to Continue – Mar. 14, 1994
- H. Stipulation – Jun. 10, 1994
- I. Order – Jun. 20, 1994
- J. Amendment to Answer – Nov. 29, 1994
- K. Answer to Application for Submission of Plaintiff to Mental Examination – Feb. 27, 1995
- L. Answer to Application – Feb. 27, 1995
- M. Affidavit for Attorney Fees – Feb. 27, 1995
- N. Defendants’ Reply Brief – Apr. 10, 1995
- O. Plaintiff’s Trial Brief – Mar. 31, 1995
- P. Finding, Conclusions and Order – May 30, 1995
- Q. Order – Jun. 12, 1995

1997, Jul. 10 Approval of request for repair located in Section 18.

1997, Jul. 16 Request for repairs to broken tile and intake located in the NW¼ Section 13.

1997, Jul. 16 Request for repairs to 2 tile blowouts located in NW¼ Section 18.

1997, Jul. 23 Request for repair tile blowout on Lateral No 7 located SW¼ SW¼ Section 18.

1998, Apr. 16 Letter to attorney John Whitesell in regards to Martin Schnormeier property. It indicated several issues with the drainage district and listed a few areas that were in need of repair.

1998, Nov. 5	Request for repair to have dirt removed and grassway cleaned out located in Section 18.
1999, Apr. 14	Approval of request of repair by Steve Perry located in Section 18.
1999, Apr. 15	Request for repairs to 2 tile blowouts located in the SE $\frac{1}{4}$ Section 18.
1999, May 12	Letter from Robert L. Haylock, Hardin County Engineer, indicating no work will be done at this time for the requested repair dated Nov. 5, 1998.
2000, Jul. 12	Request for repair of tile blowout on Lateral No. 7 located in SW $\frac{1}{4}$ Section 18.
2000, Dec. 14	Request for repair of tile blowout to main tile located in W $\frac{1}{2}$ Section 18.
2001, Apr. 24	Request for repair of broken tile on Lateral No. 7 located in SE $\frac{1}{4}$ Section 24.
2001, Aug. 30	Request for repair of broken tile located in SW $\frac{1}{4}$ Section 18.
2003, May 20	Request for repair of tile blowout on Lateral No. 7 located in NW $\frac{1}{4}$ Section 19.
2005, Apr. 4	Request for repair of tile blowout located in SW $\frac{1}{4}$ Section 18.
2005, Apr. 15	Request for repair of outlet of main tile located in NW $\frac{1}{4}$ Section 18.
2005, Jun. 20	Request for repair of hole in tile located in Section 18.
2006, Apr. 3	Request for repair of cleanout of outlet and bulkhead located in Section 18.
2006, Jun. 22	Request for repair of broken tile located in SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 18.
2007, May 1	Request for repair of tile blowout located in SW $\frac{1}{4}$ Section 24.
2008, May 21	Request for repair of plugged tile on Lateral No. 12 located in SE $\frac{1}{4}$ Section 24.
2009, Apr. 16	Request for repairs of 2 tile blowouts on Lateral No. 14 located in SW $\frac{1}{4}$ Section 18.
2009, Apr. 20	Request for repair of 2 tile blowouts located in NE $\frac{1}{4}$ Section 19.
2009, Jun. 26	Request for repair of 2 holes in tile located in NW $\frac{1}{4}$ Section 18.
2009, Aug. 24	Request for repairs of 2 holes in tile located in SW $\frac{1}{4}$ Section 18.
2010, Jun. 7	Request for repair of tile blowout located in SW $\frac{1}{4}$ Section 18.
2015, Feb. 23	Request for repair of 2 large collapses in waterway located in SW $\frac{1}{4}$ Section 18.
2015, Apr. 27	Request for repair of tile blowout located in NW $\frac{1}{4}$ Section 19.
2015, Apr. 27	Request for repair of tile blowout located in SW $\frac{1}{4}$ Section 18.

- 3.0 **INVESTIGATION** – Review of district history shows that repairs to the district tile (main and laterals) were first requested within 4 or 5 years of the original construction. In addition, landowners within the district have requested over 77 repairs for broken tiles, blowouts, and other repairs over the last 100 years. The majority of these repairs (75%) were located within Section 18. In addition to the history review, all the Engineer's Reports and corresponding plans and profile of the Lateral 7 tile were reviewed. Field investigation was performed along with televising of approximately 1900 feet of Lateral 7 tile (see Work Order Requests #58, #72 and #73 included in Appendix A). Said field investigation and televising showed that the lower end and the middle section of the Lateral 7 tile has 10 tile blowouts/sinkholes and showed tile that was in poor condition (cracked, egg shaped and starting to collapse). For locations of specific types of investigations, see Investigation Map included in Appendix B. All other investigations were limited to office and records research as mentioned. Based on the Engineer's Reports and resulting plans and profile, the current Lateral 7 tile consists of the original 1917 tile. For our investigation, calculations were performed to see what the original drainage coefficient for the length of the Lateral 7 tile is and it appears that the Lateral 7 tile was designed to provide a drainage coefficient of 0.29 to 0.73 inches per acre per day.
- 4.0 **DISCUSSION AND CONCLUSIONS** – Based on the above, it is obvious that the installed 1917 Lateral 7 tile is undersized when compared to current agricultural demands for a drainage. In addition, this district has experienced an extremely high level of repairs on a regular basis (average of one every 10½ months over the last 62 years). This coupled with repairs requested within the first 4 or 5 years of the tile life cycle possibly indicate inferior material during the 1917 construction or improper construction methods. All told, the Lateral 7 tile provides a patchwork of 1917 pipe linked together by various previous repairs. This is all in a severe state of decay. Therefore, the Lateral 7 tile will only continue to collapse, which will lead to the creation of sinkholes and blowouts. As a result, siltation in the tile and blockage of tile with tile pieces and soil will occur, further restricting drainage in the Lateral 7 tile.

- 5.0 **REPAIR METHODS** – To repair the existing Lateral 7 tile, the following option is the most straightforward available:

**Tile Replacement**

- Remove and replace the existing Lateral 7 tile with new tile of equal or comparable size. For reference, a chart with the required tile sizes and capacities is included in Appendix E.
- Typically, the replacement Lateral 7 tile would be in the same location as the existing Lateral 7 tile in order to locate and reconnect private tile and laterals. For reference, the route is shown on the map included in Appendix D.

With the above mentioned repair method, the following should be noted:

- The proposed and existing capacities shown in Appendix E are based on the assumption that the 1917 Lateral 7 tile is both installed per its respective design and that it is functioning at full capacity (i.e. not collapsed, broken, etc).
- The proposed repair will not increase the drainage capacity of the Lateral 7 tile beyond those shown in Appendix E.
- The proposed pipe sizes shown in Appendix E are those that are currently manufactured that most closely meet the current main tile size.
- Repairs have historically been viewed as not having an impact on jurisdictional wetlands. As such, individual landowners should consult with applicable staff at the Hardin County NRCS office to verify the existence of said jurisdictional wetlands and that there will be no impact on them.

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

- 6.0 **IMPROVEMENT METHODS** – To improve drainage for the Lateral 7 tile, the following are some of the options available:

**Dual Tile Installation**

- Remove the existing Lateral 7 tile and install dual parallel Lateral 7 tiles in the location of the existing Lateral 7 tile. For reference, a chart with the required parallel tile sizes and capacities is included in Appendix F.
- Typically, the dual parallel Lateral 7 tiles would be in the same location as the existing Lateral 7 tile in order to locate and reconnect private and lateral tile. For reference, the route is shown on the map included in Appendix D.
- Disconnect all private and lateral tile encountered from the main tile.
- Reconnect all private and lateral tile to the new main tile.
- The dual parallel Lateral 7 tile would be connected at various locations along the route with manholes or buried interconnections to prevent one of them from overloading while the other one is empty.

### Tile Replacement Upsizing

- Remove and replace the existing Lateral 7 tile with new Lateral 7 tile of a larger size. For reference, a chart with the required tile sizes and capacities is included in Appendix G.
- Typically, the replacement Lateral 7 tile would be in the same location as the existing Lateral 7 tile in order to locate and reconnect private and lateral tile. For reference, the route is shown on the map included in Appendix D.
- Disconnect all private and lateral tile encountered from the Lateral 7 tile.
- Reconnect all private and lateral tile to the new Lateral 7 tile.

### Open Ditch Installation

- Remove and replace the existing Lateral 7 tile with an open ditch. For reference, a chart with the open ditch capacities is included in Appendix H.
- Typically, the open ditch would be in the same location as the existing Lateral 7 tile in order to locate and outlet private and lateral tile. For reference, the route is shown on the map included in Appendix D.
- Extend all private and lateral tile encountered to discharge into the open ditch.

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

- The proposed and existing, capacities shown in Appendices F, G, and H are based on the assumptions that the 1917 Lateral 7 tile is both installed per its respective design and that it is functioning at full capacity (i.e. not collapsed, broken, etc).
- The open ditch installation method would involve the taking of right of way. However, some of this right of way is currently grassed waterway.
- The pipe sizes shown in Appendices F and G are those that are currently manufactured that meet or exceed the ½" and 1" drainage coefficients.
- 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.
- The dual tile installation method would allow for greater soil cover as the tile size is smaller.

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 cost contained in the Opinion of Probable Construction Costs 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.

- 7.0 **OPINION OF PROBABLE CONSTRUCTION COSTS** – Using the above methods of repair and improvements, an itemized list of project quantities and associated opinions of probable construction cost for each option was compiled and are included in Appendices I, J, K, and L of this report. A summary of said costs are as follows:

<u>METHOD</u>	<u>DRAINAGE COEFF.</u>	<u>TOTAL COST</u>	<u>ROAD CROSSING COST</u>
Tile Replacement (Repair)	Existing	\$ 480,150	\$ 2,750
Dual Tile Installation (Improvement)	½" 1"	\$ 852,588 \$ 988,020	\$ 3,250 \$ 6,000
Tile Replacement Upsizing (Improvement)	½" 1"	\$ 516,780 \$ 588,390	\$ 3,000 \$ 3,500
Open Ditch (Improvement)	Varies	\$ 670,758	\$ 3,500

It should be noted that said costs include materials, labor, and equipment supplied by the contractor to complete the necessary repair or improvement and includes applicable engineering, construction observation, and project administration fees by Ryken Engineering. It also includes right of way acquisition for the open ditch option only (assumed to require 13.5 acres at \$12,000 per acre). However, said costs do not include any interest, legal fees, county administrative fees, crop damages, other damages, previous repairs, engineering fees to date, or reclassification fees (if applicable). As always, all costs shown are opinions of Ryken Engineering based on previous lettings on other projects. Said costs are just a guideline and are not a guarantee of actual costs.

- 8.0 **OWNERSHIP AND CLASSIFICATIONS** – Any and all information concerning ownership of lands and classifications of said lands within Lateral 7, Drainage District No. 102 can be obtained from the Hardin County Auditor's office.

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

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 is our opinion that a reclassification separating all Laterals would be required if the improvement were to move forward.

- 9.0 **RECOMMENDATIONS** – There is a definite need to perform the repair or one of the improvements (mentioned above) to either restore the drainage capacity to the original design levels or to increase the capacity to more closely meet the needs of current agricultural drainage. 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 Ryken Engineering.
  - Hold the required hearing or hearings on the proposed repair or improvements.
  - Adopt one of the recommendations of the Engineer’s Report.
  - Direct Ryken Engineering to prepare plans and specifications for the proposed repair or improvements.
  - Direct Ryken Engineering to proceed with receiving bids from interested contractors.
  - Award contract to the lowest responsible contractor.
  - If desired or required by Iowa Code, proceed with reclassification proceedings.



# Drainage Work Order Request For Repair Hardin County

Date 2/23/2015

Work Order # 58

District # 102

Lateral 1

Township Providence

Section 18 Twp 86

Rge 20

Qtr Sec SW1/4

Repair Requested By Steve Perry

Address 30634 O Ave; New Providence

Phone (641) 751-1553

Landowner Lehmeier

Address \_\_\_\_\_

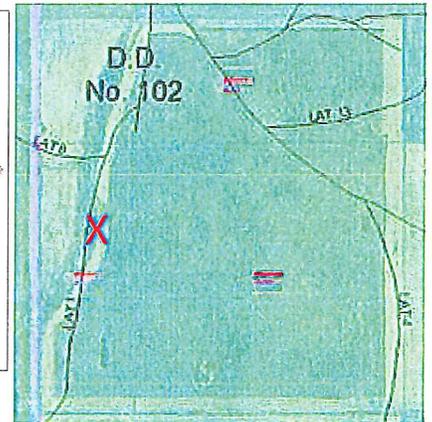
Phone \_\_\_\_\_

Request Taken By Tina Schlemme

Available for Repair Now?  Yes  No

Date Available \_\_\_\_\_

Problem Description Two large collapses in waterway (big enough for tractor to go through). Gehrke will be out to do work for tenant if want to coordinate work with them. Steve wants to know who is responsible for maintaining actual waterway.  
SW FRL SW Sec 18.



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: \_\_\_\_\_

*1st*

## Drainage District:

#102-Lateral 7

## Repair Summary:

Landowner reported 2 tile collapses located in SW1/4 of Section 18, Township 86 North, Range 20 West. Excavated at 3 sinkholes and found collapsed 15" or 16" VCP lateral tile. Televised 1750' (upstream and downstream) and found:

- 3 pieces of broken VCP tile in flowline blocking flow
- 10 locations of partially collapsed VCP tile
- 2 previous repairs with single wall HDPE tile (deformed pipe)
- 4 previous repairs with CMP (very rusty)
- 1 small hole in VCP tile with void behind

Temporarily repaired only 3 sinkholes with 15" Dual Wall HDPE tile and fabric wrapped joints as it is not possible to properly repair VCP lateral tile without major work.

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

5 hours of Rubber Tired Backhoe and Operator

5 hours of Workman

1750' of Televising

## Additional Actions Recommended:

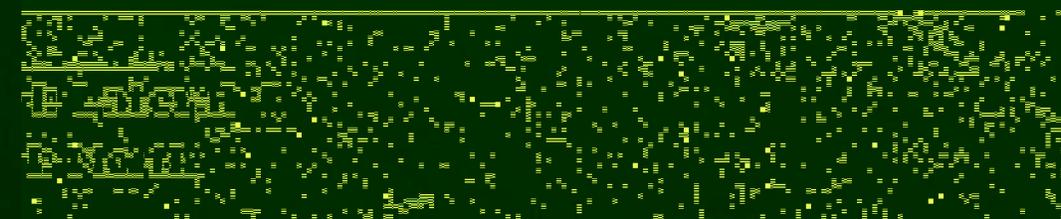
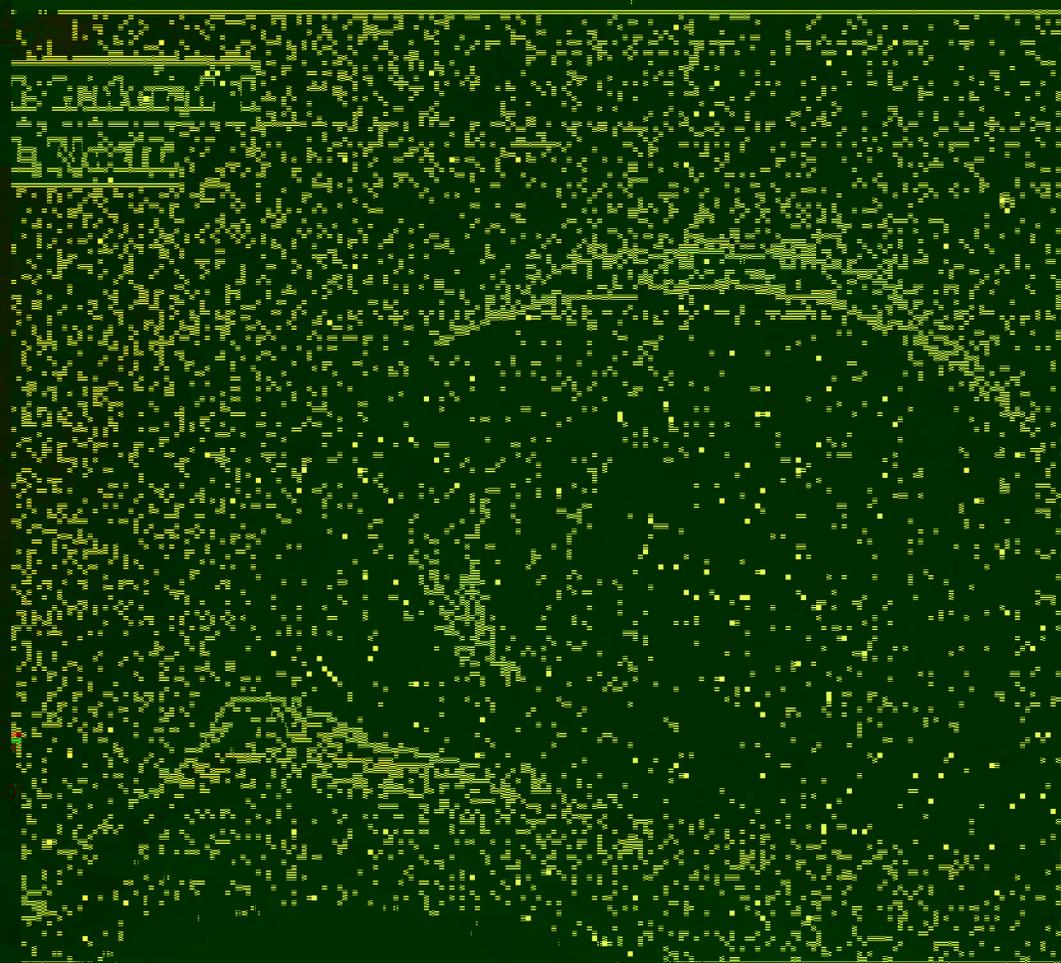
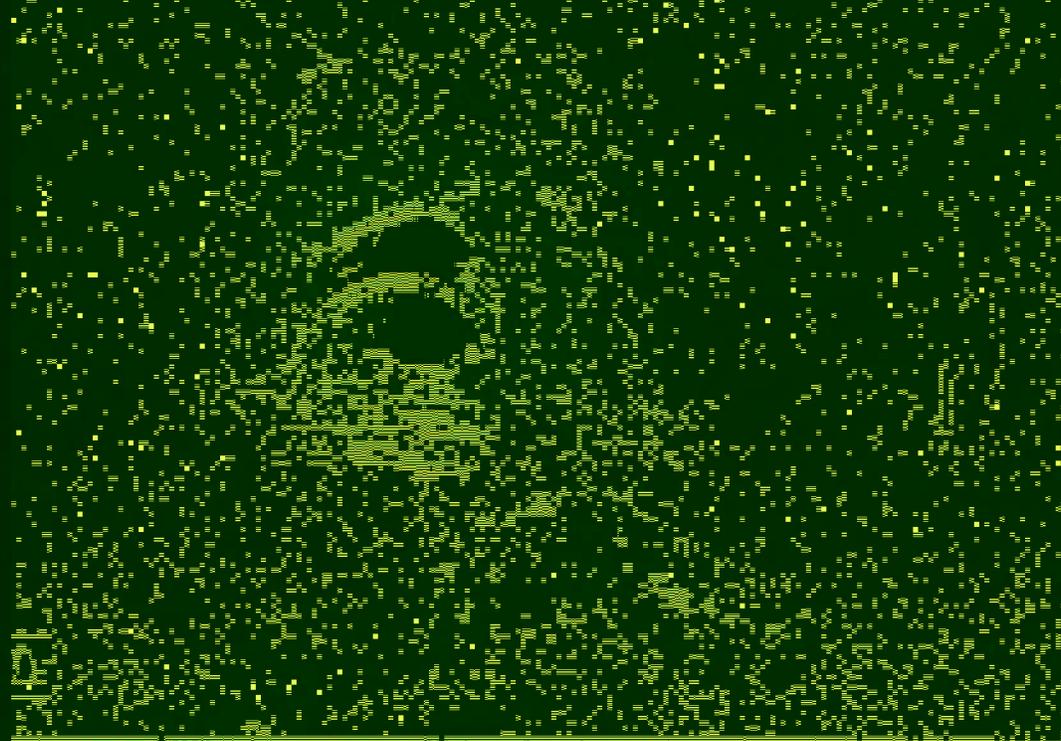
Given that there were 40'± defects or previous repairs in 3000'± of televising (Work Order Request #58, 72, and 73 combined) and much of the remaining VCP is cracked and egg shaped, it is obvious that the VCP is past the end of its useful life. Based on this, I would recommend total replacement of the 3000' of tile televised and televising an additional 1000' past the replacement limits to verify the VCP tile condition. If desired by the District Trustees, potholing and televising could be performed prior to replacement to determine exact limits. Based on this, the cost would be over \$50,000. This cost is high enough that a hearing and engineering report would be required for said repair.

**USMH: South**  
**DSMH: Lateral 1**

**745.1 ft.**

**USMH: Lateral 1**  
**DSMH: North**

**20.5 ft.**

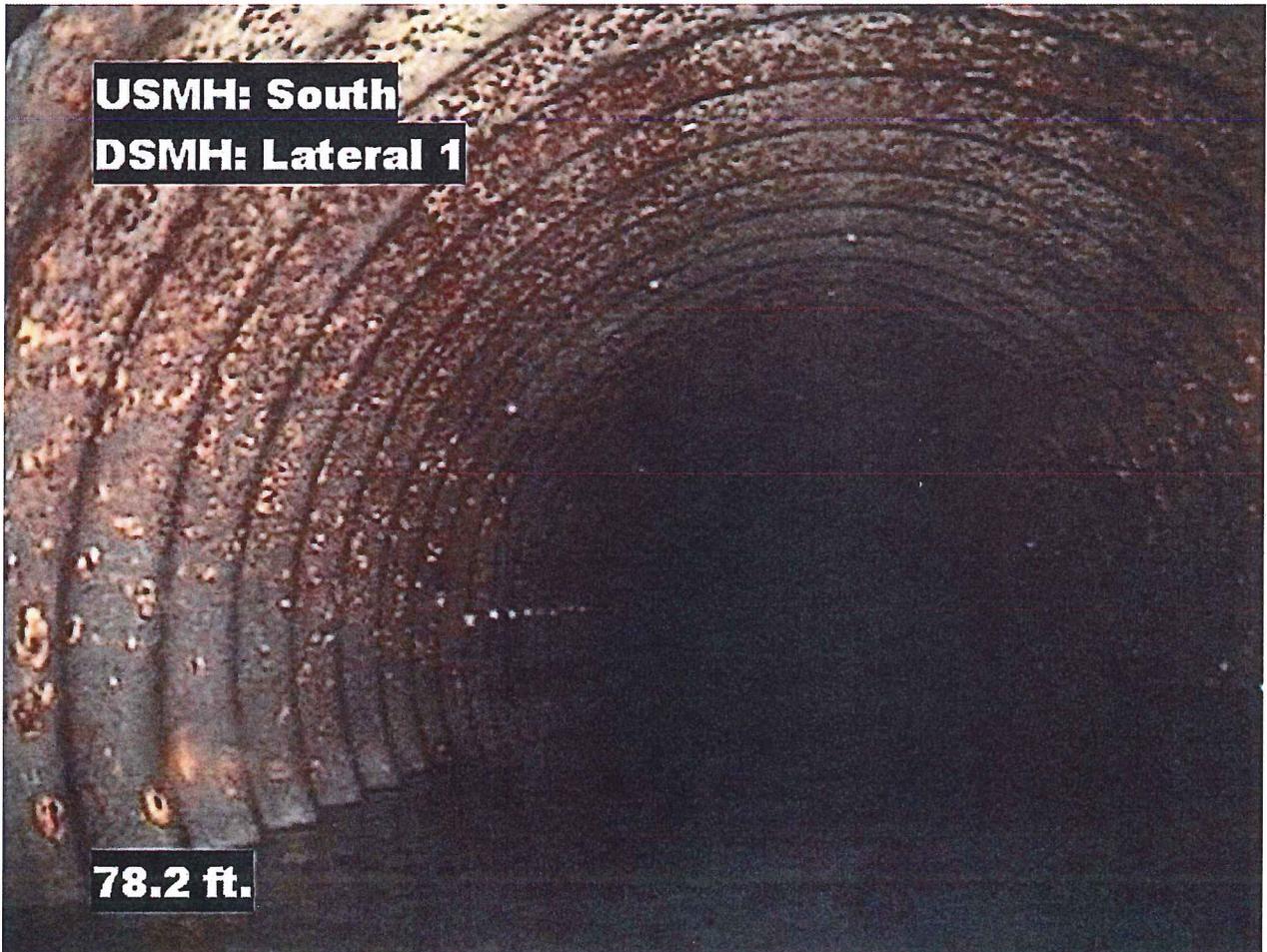


**USMH: South**  
**DSMH: Lateral 1**

**40.1 ft.**

**USMH: South**  
**DSMH: Lateral 1**

**65.4 ft.**



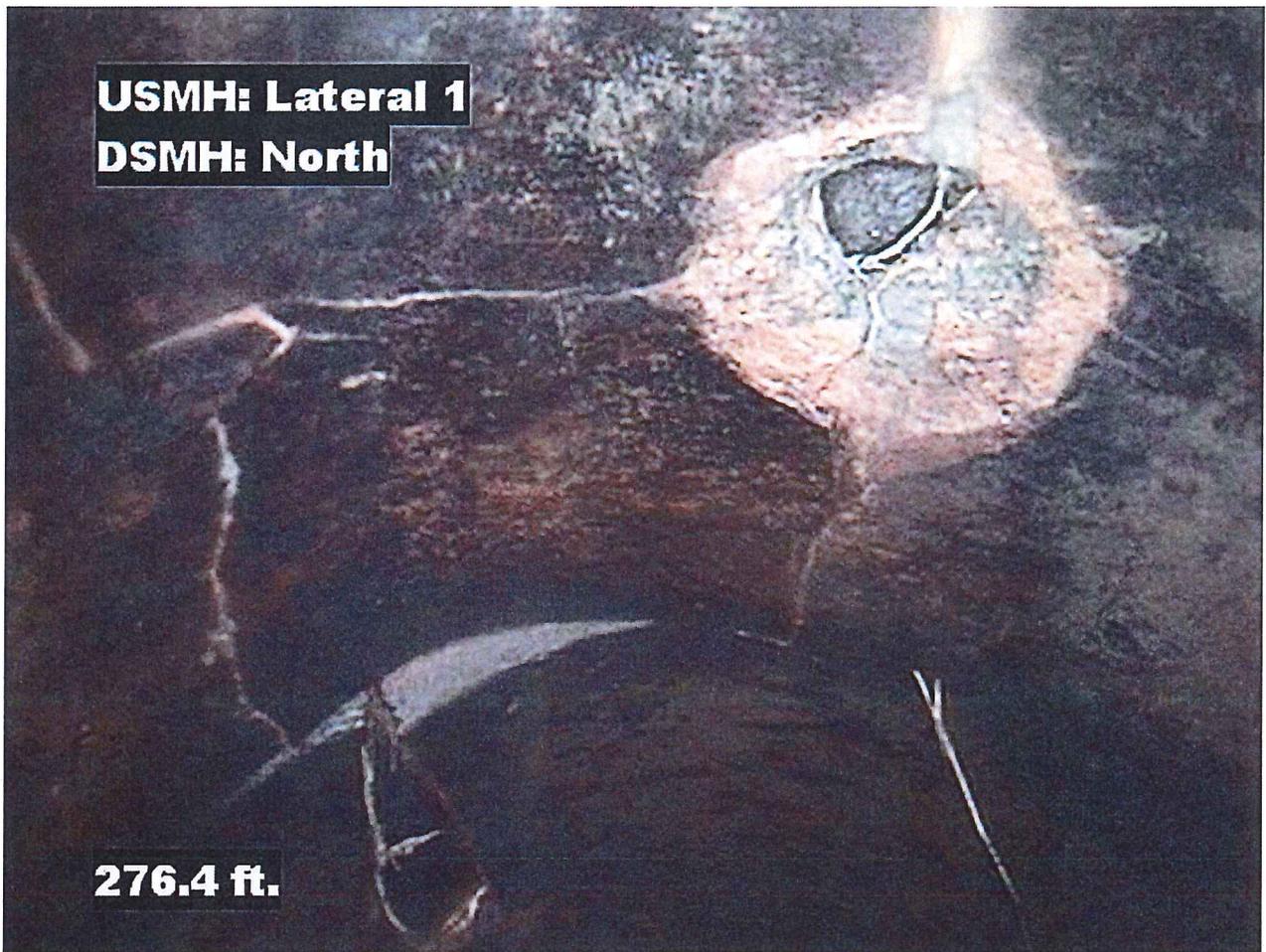


**USMH: South**  
**DSMH: Lateral 1**

**238.7 ft.**

**USMH: South**  
**DSMH: Lateral 1**

**241.3 ft.**



**USMH: Lateral 1**  
**DSMH: North**

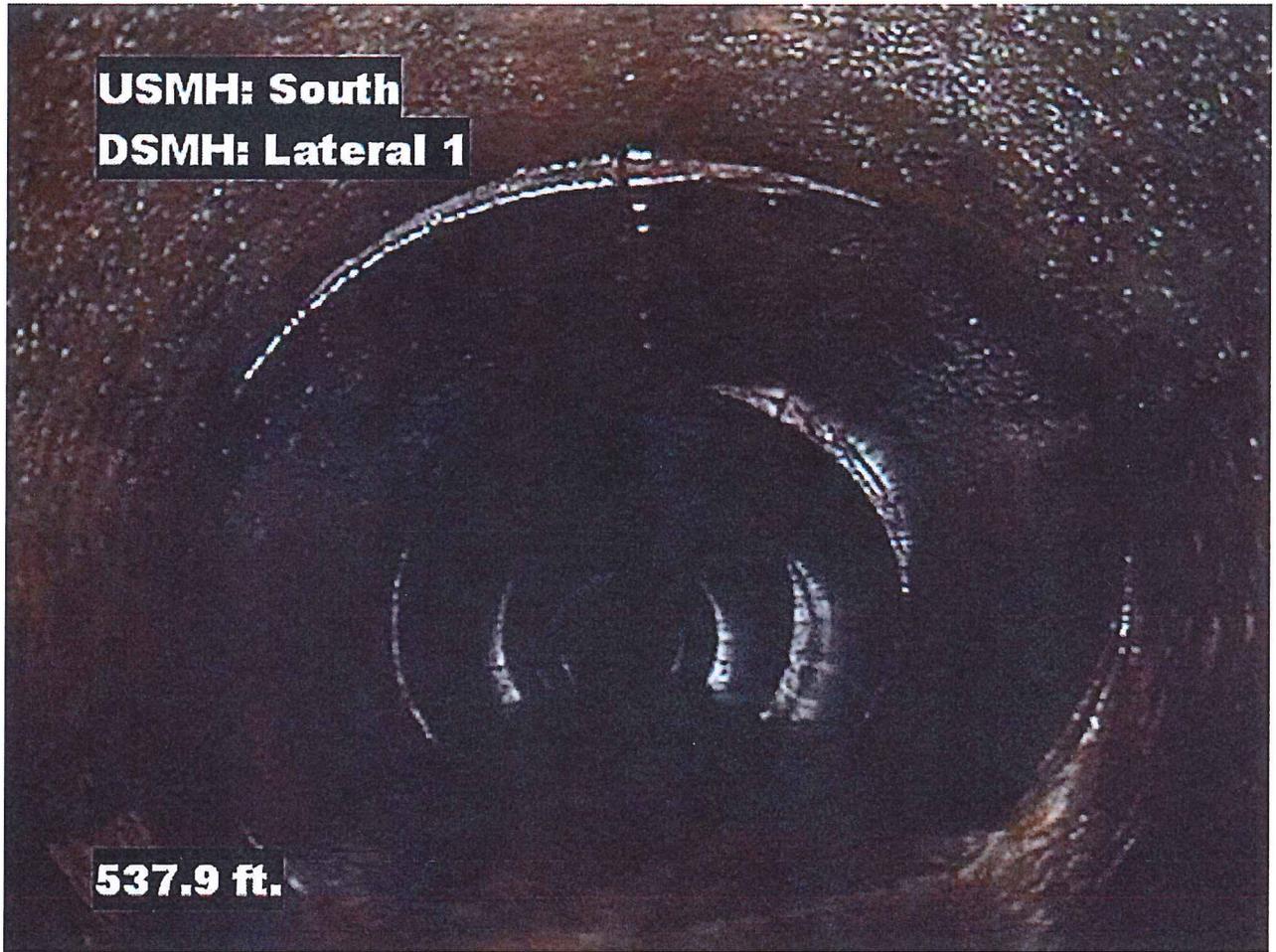
**315.5 ft.**

**USMH: South**  
**DSMH: Lateral 1**

**317.8 ft.**

**USMH: South**  
**DSMH: Lateral 1**

**537.9 ft.**





# Drainage Work Order Request For Repair Hardin County

Date 4/27/2015

Work Order # 72

District # 102

Lateral + 7

Township Providence

Section 19 Twp 86 Rge 20 Qtr Sec NW1/4

Repair Requested By Luke Mannetter

Address \_\_\_\_\_ Phone (515) 689-8879

Landowner Marlyn Brandt Trust

Address \_\_\_\_\_ Phone \_\_\_\_\_

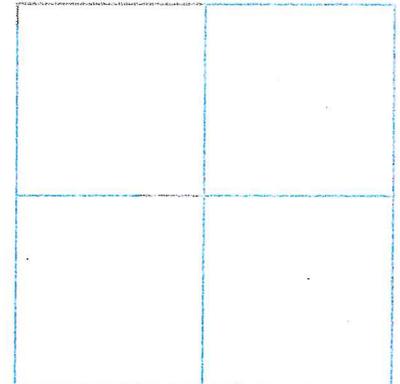
Request Taken By Tina Schlemme

Available for Repair Now?  Yes  No

Date Available \_\_\_\_\_

Problem Description Blowout in very corner of NW NW.

Call Luke when coming out.



Repair labor, materials and equipment 2 MAN CREW + BACKHOE 7.5 HRS., TV CREW 6 HRS., 24.5' 15" DUAL WALL PERE TILE, 40' FABRIC ON 10 JOINTS

Potential Wetlands?  Yes-Repair existing tile only

No-Repair and maintain tile

Repaired By: Larry Sturson

Date: 5/19/15

Please send statement for services to:

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

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

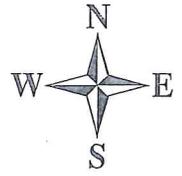
For Office Use Only

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

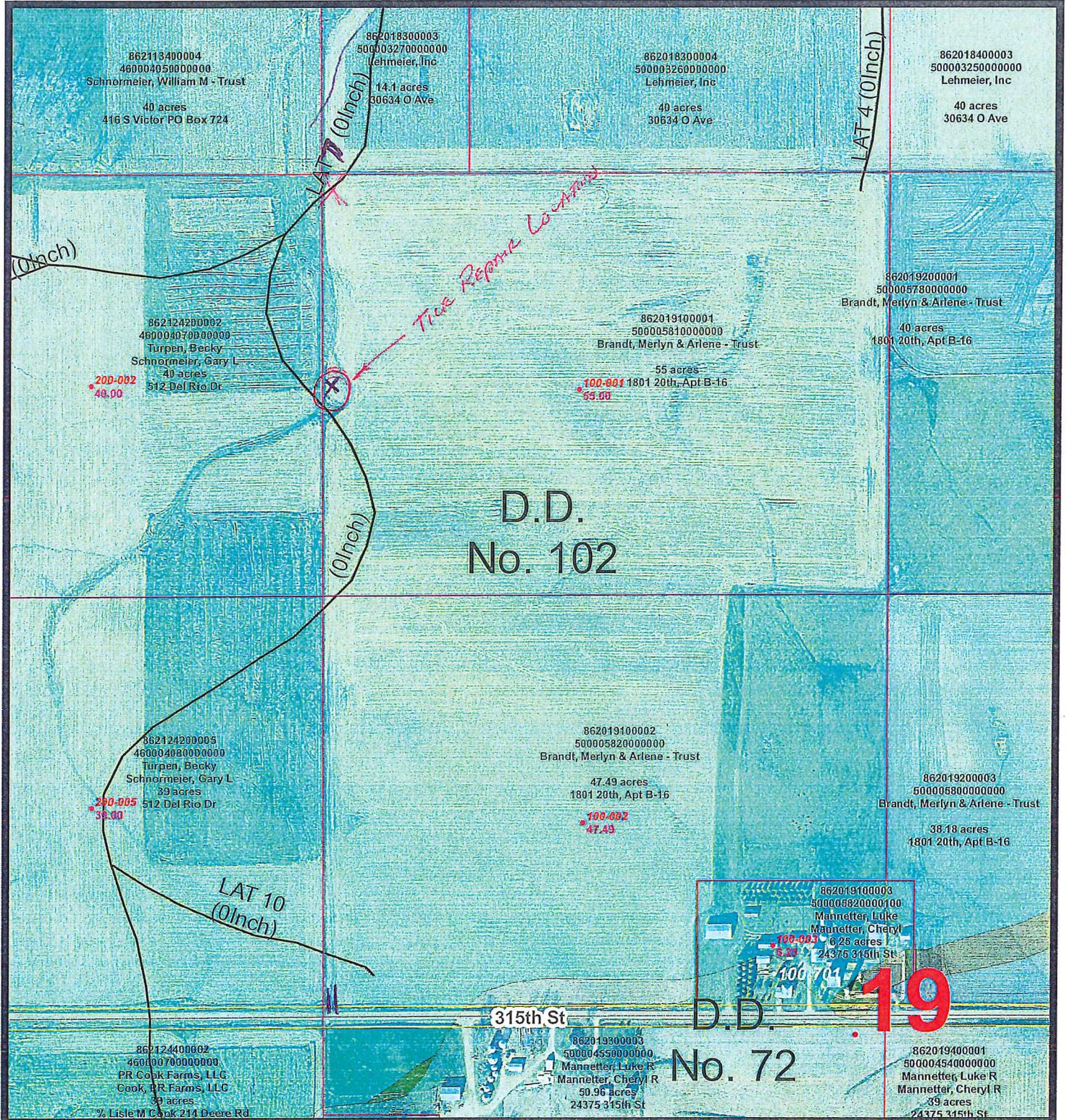
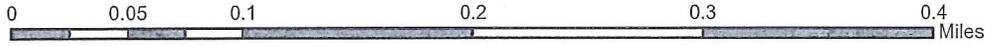
Date: 1st



# Hardin County Auditor's Office



Date: 4/27/2015



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### Drainage District:

#102 - Lateral 7

### Repair Summary:

Landowner reported a tile blowout located in NW1/4 of Section 19, Township 86 North, Range 20 West. Excavated at blowout and found collapsed 15" VCP lateral tile. Televised downstream (250'±) and found 1 previous repair with single wall HDPE (deformed pipe) and 2 small holes in VCP tile with voids behind. Televised upstream (950'±) and found 3 total VCP collapses, 8 partial VCP collapses, and 3 previous repairs with single wall HDPE (deformed pipe). Temporarily repaired 4 total collapses with 15" Dual Wall HDPE tile and fabric wrapped joints as it is not possible to properly repair VCP lateral tile without major work.

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

24.5' of 15" Dual Wall HDPE Pipe with fabric wrapped joints  
7.5 hours of Rubber Tired Backhoe and Operator  
7.5 hours of Workman  
1203.9' of Televising

### Additional Actions Recommended:

See recommended actions under Drainage Work Order Request #58 (Ryken Project #6762)

**USMH: DD 102**

**DSMH: MH 4**

**Upstream**

**598.1 ft.**

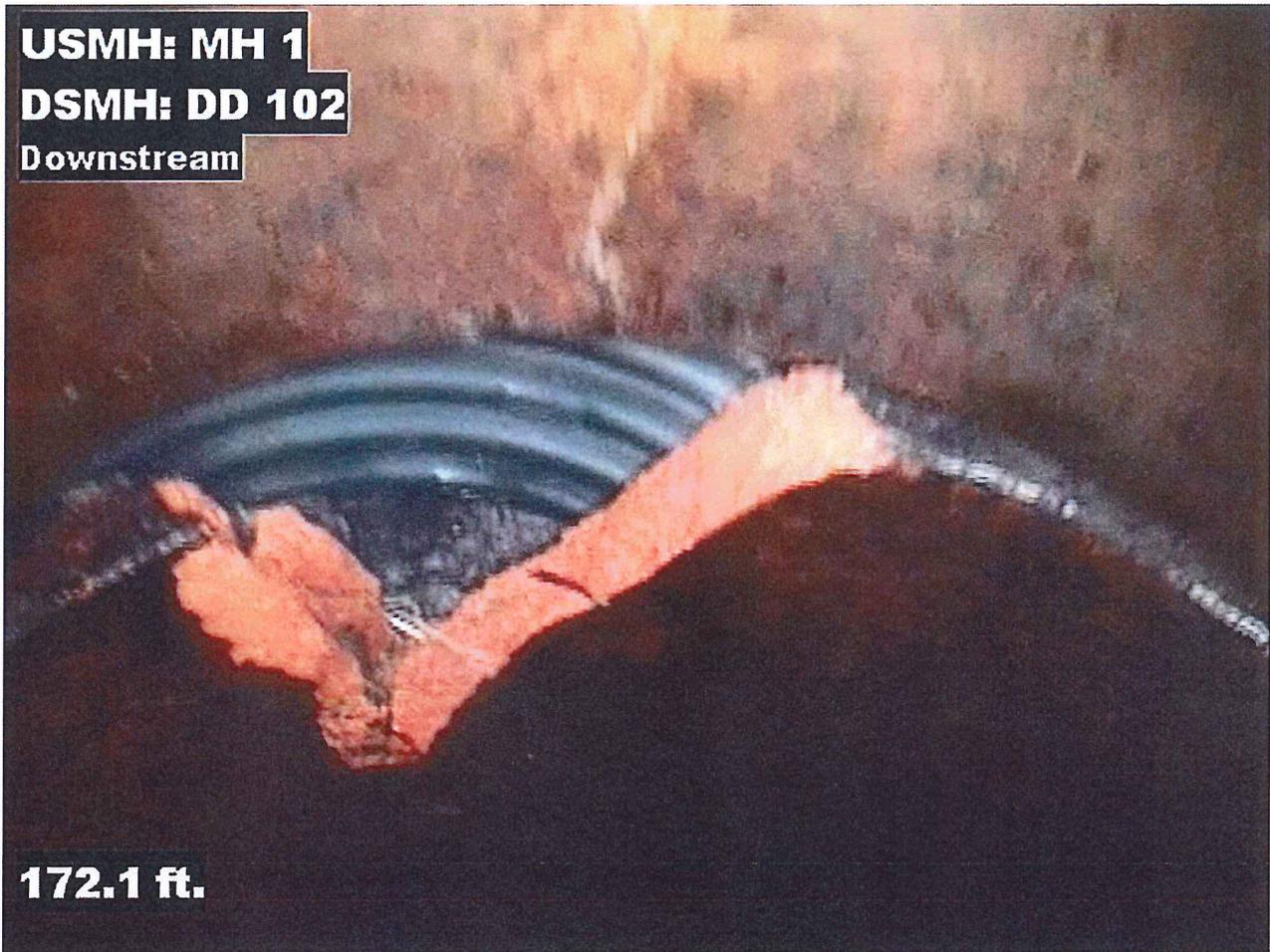
**USMH: MH 1**

**DSMH: DD 102**

**Downstream**

**152.4 ft.**

**USMH: MH 1**  
**DSMH: DD 102**  
**Downstream**



**172.1 ft.**

**USMH: DD 102**  
**DSMH: MH 4**  
**Upstream**



**261.2 ft.**

**USMH: DD 102**

**DSMH: MH 4**

**Upstream**

**348.3 ft.**

**USMH: DD 102**

**DSMH: MH 4**

**Upstream**

**435.4 ft.**



# Drainage Work Order Request For Repair

## Hardin County

Date 4/27/2015

Work Order # 73

District # 102

Lateral 17-7

Township Pleasant

Section 18 Twp 86 Rge 20 Qtr Sec SW1/4

Repair Requested By Luke Mannerter

Address \_\_\_\_\_ Phone (515) 689-8879

Landowner William Schnormeier Trust

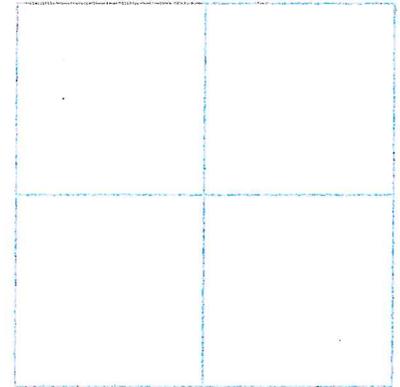
Address \_\_\_\_\_ Phone \_\_\_\_\_

Request Taken By Tina Schlemme

Available for Repair Now?  Yes  No

Date Available \_\_\_\_\_

Problem Description Blowout south of hog buildings, east of where 305th turns north.  
Call Luke before come out. Needing to do field work.



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

Phone (641) 939-8111

1215 Edgington Ave, Suite 1

Fax (641) 939-8245

Eldora, IA 50627

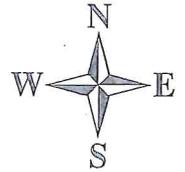
For Office Use Only

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

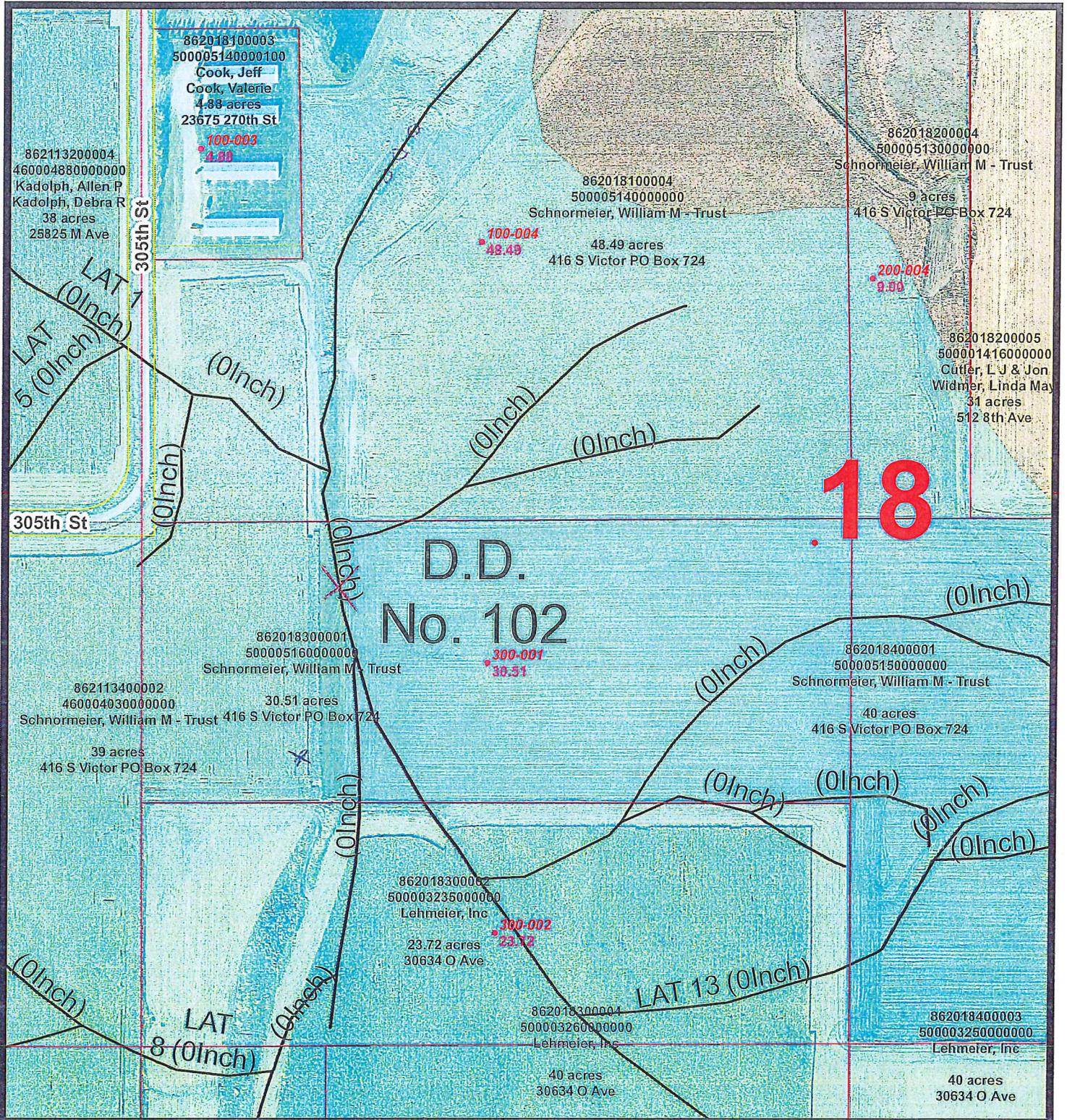
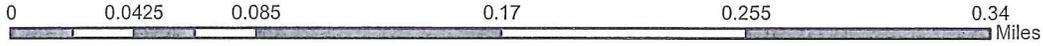
Date: 1st



# Hardin County Auditor's Office



Date: 4/27/2015



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Drainage District:

#107 - Lateral 7

Repair Summary:

Repaired and televised as part of Work Order Request #58 (Ryken Engineering Project Number #6762)

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

See Work Order Request #58

Additional Actions Recommended:

See Work Order Request #58



# Drainage Work Order Request For Repair

## Hardin County

Date 2/23/2015

Work Order # 58

District # 102

Lateral 1

Township Providence

Section 18 Twp 86

Rge 20

Qtr Sec SW1/4

Repair Requested By Steve Perry

Address 30634 O Ave; New Providence

Phone (641) 751-1553

Landowner Lehmeier

Address \_\_\_\_\_

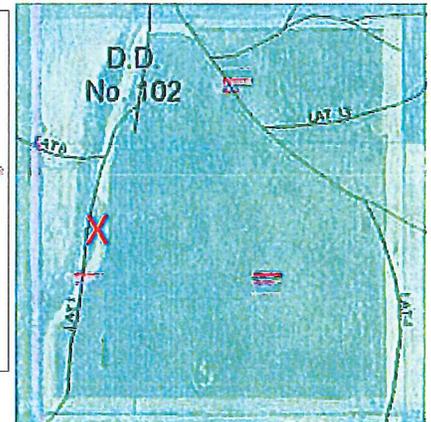
Phone \_\_\_\_\_

Request Taken By Tina Schlemme

Available for Repair Now?  Yes  No

Date Available \_\_\_\_\_

Problem Description Two large collapses in waterway (big enough for tractor to go through). Gehrke will be out to do work for tenant if want to coordinate work with them. Steve wants to know who is responsible for maintaining actual waterway. SW FRL SW Sec 18.



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

Potential Wetlands?  Yes-Repair existing tile only

No-Repair and maintain tile

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

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

Please send statement for services to:

Phone (641) 939-8111

Fax (641) 939-8245

Hardin County Auditor's Office

Attn: Tina Schlemme

1215 Edgington Ave, Suite 1

Eldora, IA 50627

For Office Use Only

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

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

*2nd*



# Drainage Work Order Request For Repair

## Hardin County

Date 4/27/2015

Work Order # 72

District # 102

Lateral +7

Township Providence

Section 19 Twp 86 Rge 20 Qtr Sec NW1/4

Repair Requested By Luke Mannerter

Address \_\_\_\_\_ Phone (515) 689-8879

Landowner Marlyn Brandt Trust

Address \_\_\_\_\_ Phone \_\_\_\_\_

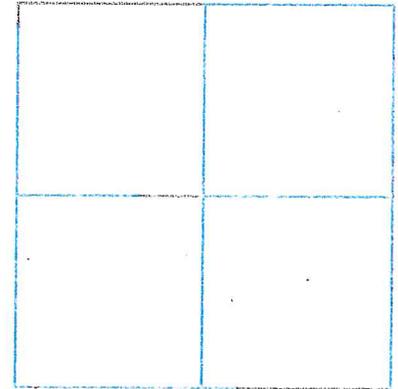
Request Taken By Tina Schlemme

Available for Repair Now?  Yes  No

Date Available \_\_\_\_\_

Problem Description Blowout in very corner of NW NW.

Call Luke when coming out.



Repair labor, materials and equipment 2 MAN CREW + BACKHOE 7.5 HRS, TV CREW 6 HRS, 24.5' 15" DUAL WALL

PERE TILE, 40' FABRIC ON 10 JOINTS

Potential Wetlands?  Yes-Repair existing tile only

No-Repair and maintain tile

Repaired By: Larry Sturson

Date: 5/19/15

Please send statement for services to:

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

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

For Office Use Only

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

Date: 2nd



# Drainage Work Order Request For Repair

## Hardin County

Date 4/27/2015 Work Order # 73  
District # 102 Lateral 17-7  
Township Pleasant Section 18 Twp 86 Rge 20 Qtr Sec SW1/4

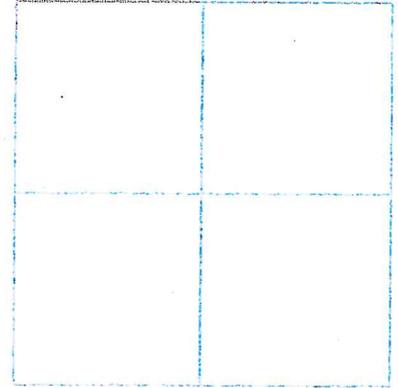
Repair Requested By Luke Mannetter  
Address \_\_\_\_\_ Phone (515) 689-8879

Landowner William Schnormeier Trust  
Address \_\_\_\_\_ Phone \_\_\_\_\_

Request Taken By Tina Schlemme

Available for Repair Now?  Yes  No Date Available \_\_\_\_\_

Problem Description Blowout south of hog buildings, east of where 305th turns north.  
Call Luke before come out. Needing to do field work.



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: 2nd

## Drainage District:

#102-Lateral 7

## Repair Summary:

In follow-up to previous repair report, excavated the VCP Lateral 7 tile at upstream and downstream limits of 2015 CCTV inspection. Attempted two CCTV inspections, but both had to be abandoned (one was only 82'± long and the other was only 42'± long) due to either broken tile in flowline or 6" rock in tile. In order to televise farther, multiple excavations would be required, similar to 2015 CCTV inspection. However, all CCTV inspections performed show Lateral 7 tile to be in similar condition as that of 2015 CCTV inspection (broken tile in flowline, previous repair, partially collapsed VCP tile, etc). Therefore, did not "chase" defects with backhoe in order to continue televising. Temporarily repaired VCP Lateral 7 tile with HDPE tile and fabric wrapped joints as it is not possible to properly repair Lateral 7 tile without major work.

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

4.75 hours of Excavator and Operator  
4.75 hours of Workman  
124'± of Televising  
4.1' of 18" diameter Dual Wall HDPE Tile  
Fabric Wrapped Joints

## Additional Actions Recommended:

Based on this inspection and the inspection from 2015, it is obvious that the entire length of the Lateral 7 tile is at the end of its life (in various states of collapse and partial blockages). Although it is currently flowing (restricted), another collapse could occur at multiple locations at any time. I would recommend total replacement of the entire length of the existing Lateral 7 tile. The cost would be well over \$50,000, which is high enough that a hearing and engineering report would be required for said repair.

**USMH: South East**

**DSMH: 178**

**Upstream**



**City: hardin county lat 7**

**Street: DD 102**

**USMH: South East**

**DSMH: 178**

**Direction: Upstream**

**Sewer Use: Stormwater**

**Purpose of Inspection: Routine Assessment**

**Pre-Cleaning: No Pre-Cleaning**

**Shape: Circular**

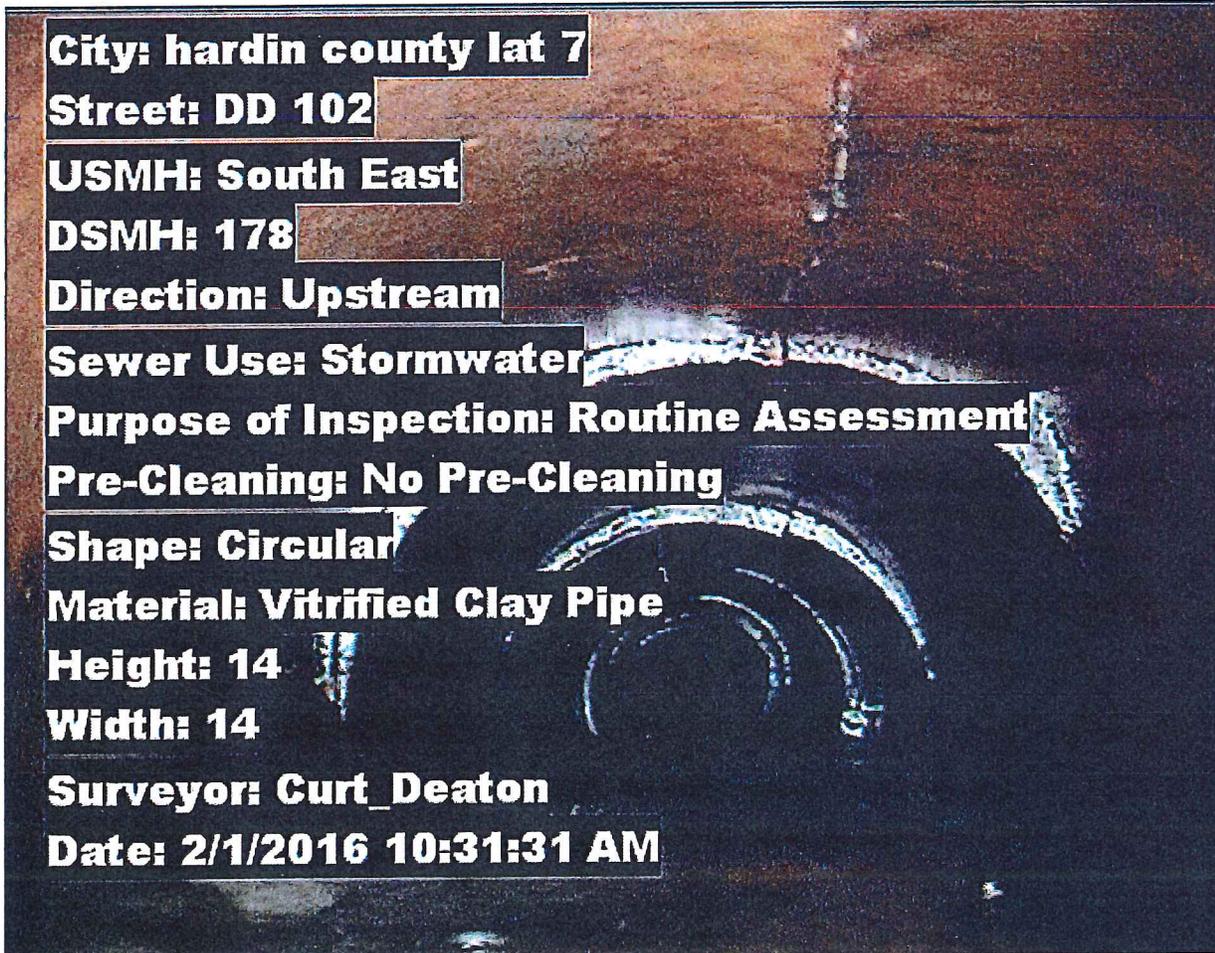
**Material: Vitrified Clay Pipe**

**Height: 14**

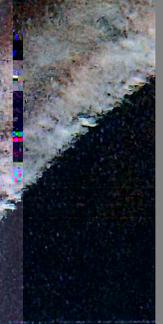
**Width: 14**

**Surveyor: Curt Deaton**

**Date: 2/1/2016 10:31:31 AM**



**USMH:**  
**DSMH:**  
Upstream



**Fracture**

At 9 O'clock  
To 3 O'clock

**USMH:**  
**DSMH:**  
Upstream



**USMH: South East**

**DSMH: 178**

**Upstream**

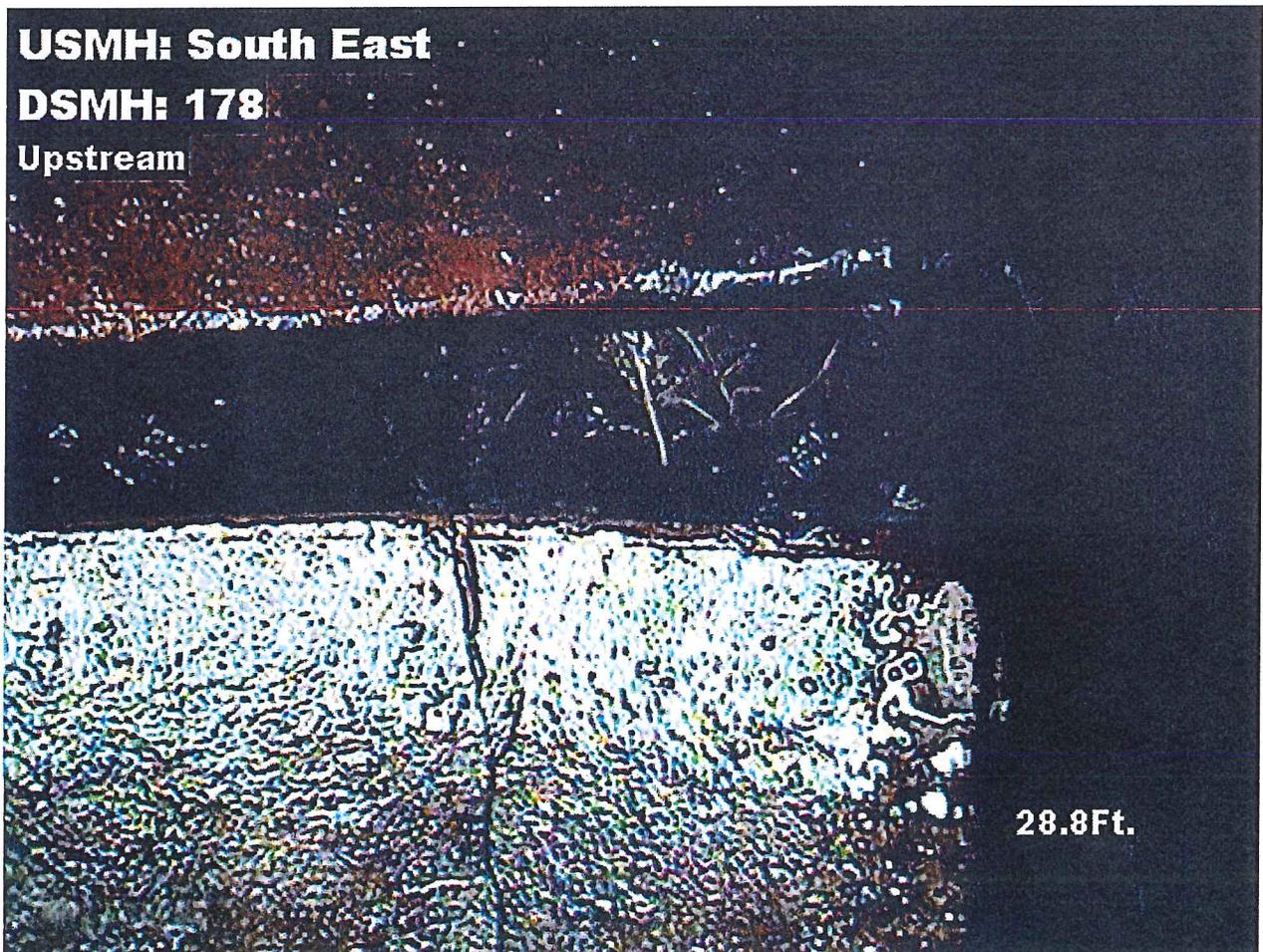


26.7Ft.

**USMH: South East**

**DSMH: 178**

**Upstream**



28.8Ft.

**USMH: South East**

**DSMH: 178**

**Upstream**

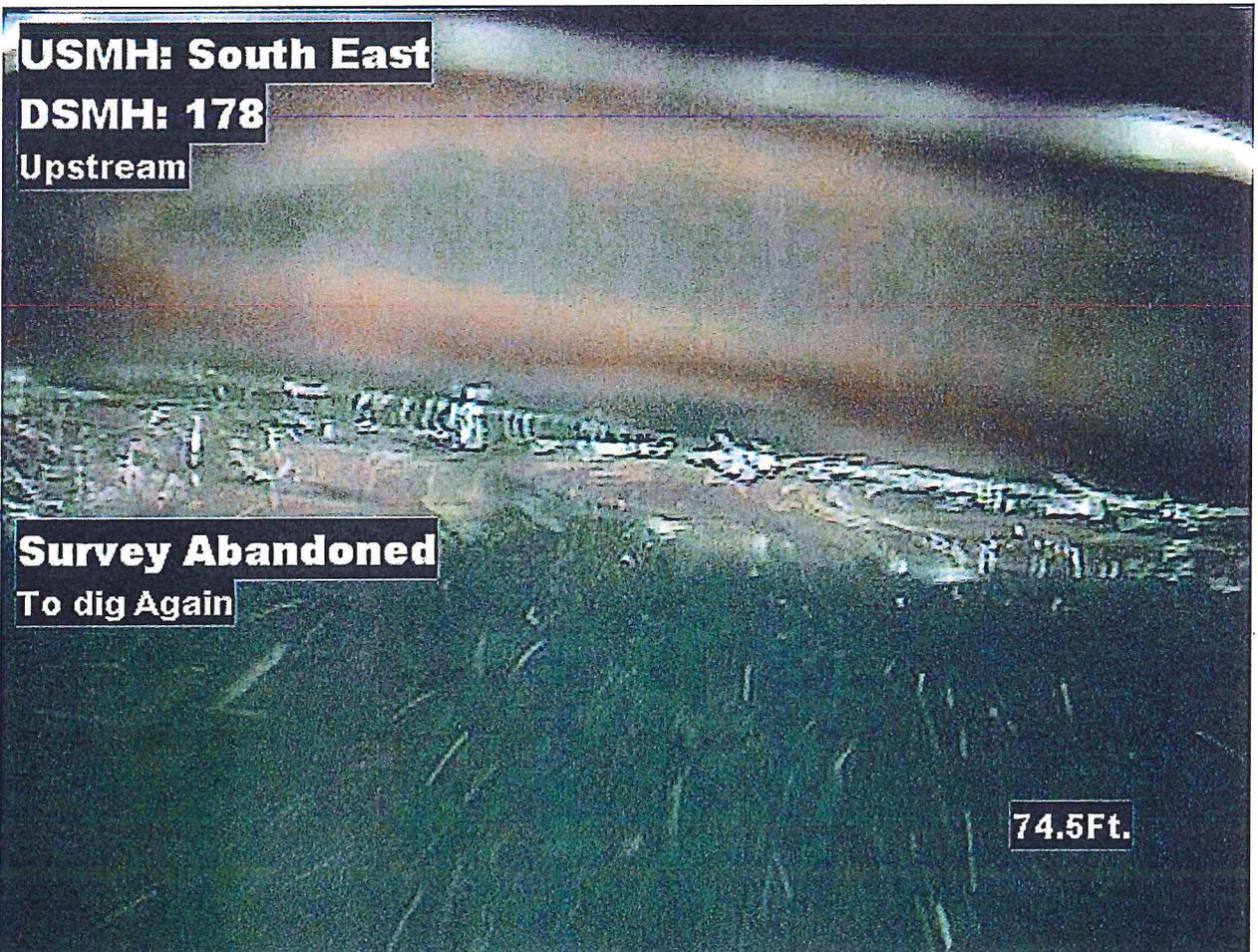


**35.2Ft.**

**USMH: South East**

**DSMH: 178**

**Upstream**



**Survey Abandoned**

**To dig Again**

**74.5Ft.**

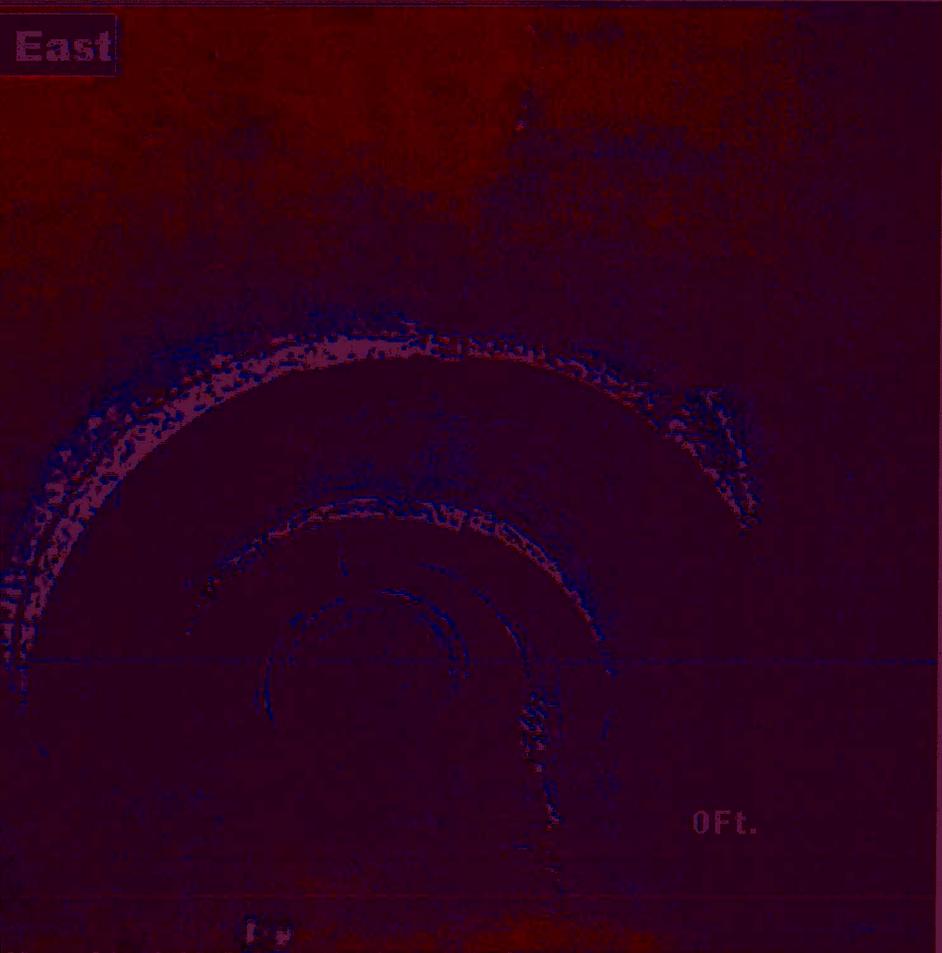
**USMH: South East**

**DSMH: 178**

**Upstream**

**Water Level**

**20%**



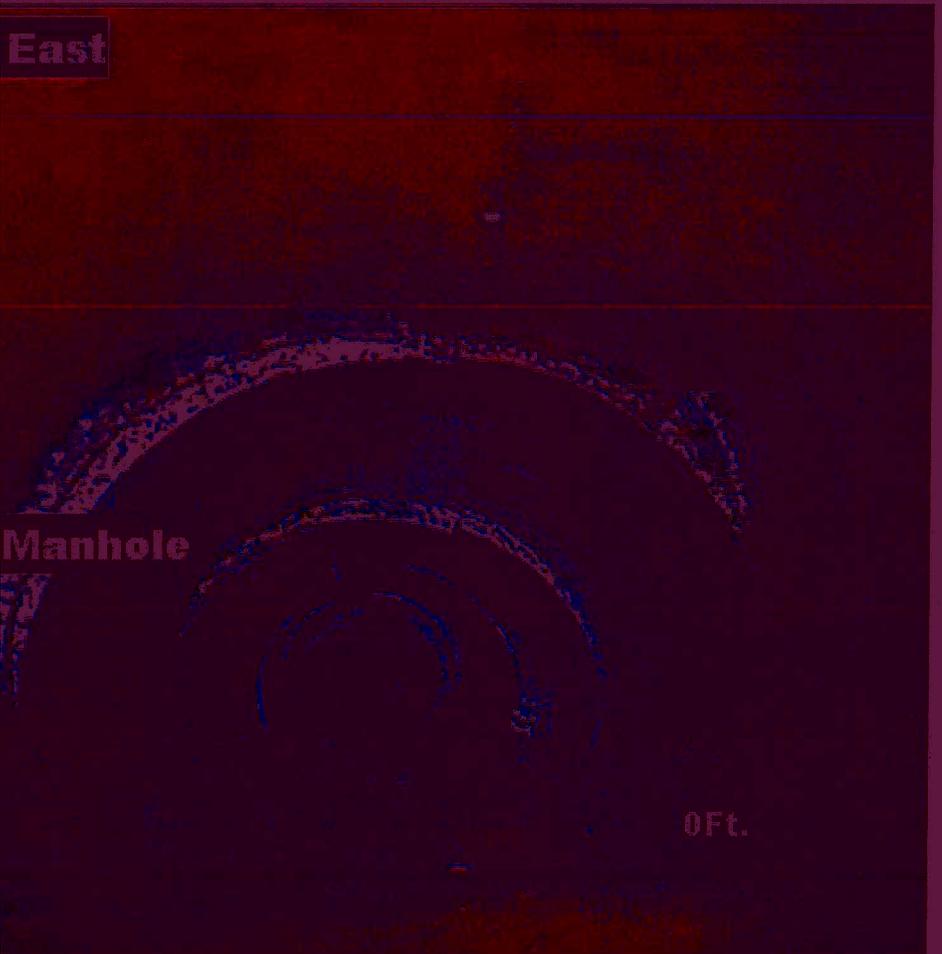
**USMH: South East**

**DSMH: 178**

**Upstream**

**Access Point Manhole**

**178**



**USMH: South East**

**DSMH: 178**

**Upstream**

**Fracture Longitudinal**

**At 12 0'clock**

**15.3Ft.**

**USMH: South East**

**DSMH: 178**

**Upstream**

**Fracture Multiple**

**At 9 0'clock  
To 3 0'clock**

**9.1Ft.**

**USMH: South East**

**DSMH: 178**

**Upstream**

**Joint Separated Medium**

28.8Ft.

**USMH: South East**

**DSMH: 178**

**Upstream**

**Survey Abandoned**

**To dig Again**

74.5Ft.

**USMH: South East**

**DSMH: 211**

**Upstream**

**Survey Abandoned**

**Chunk of Tile**

**41.9Ft.**

**City: hardin county**

**Street: DD 102**

**USMH: South East**

**DSMH: 211**

**Direction: Upstream**

**Sewer Use: Stormwater**

**Purpose of Inspection: Routine Assessment**

**Pre-Cleaning: No Pre-Cleaning**

**Shape: Circular**

**Material: Vitrified Clay Pipe**

**Height: 14**

**Width: 14**

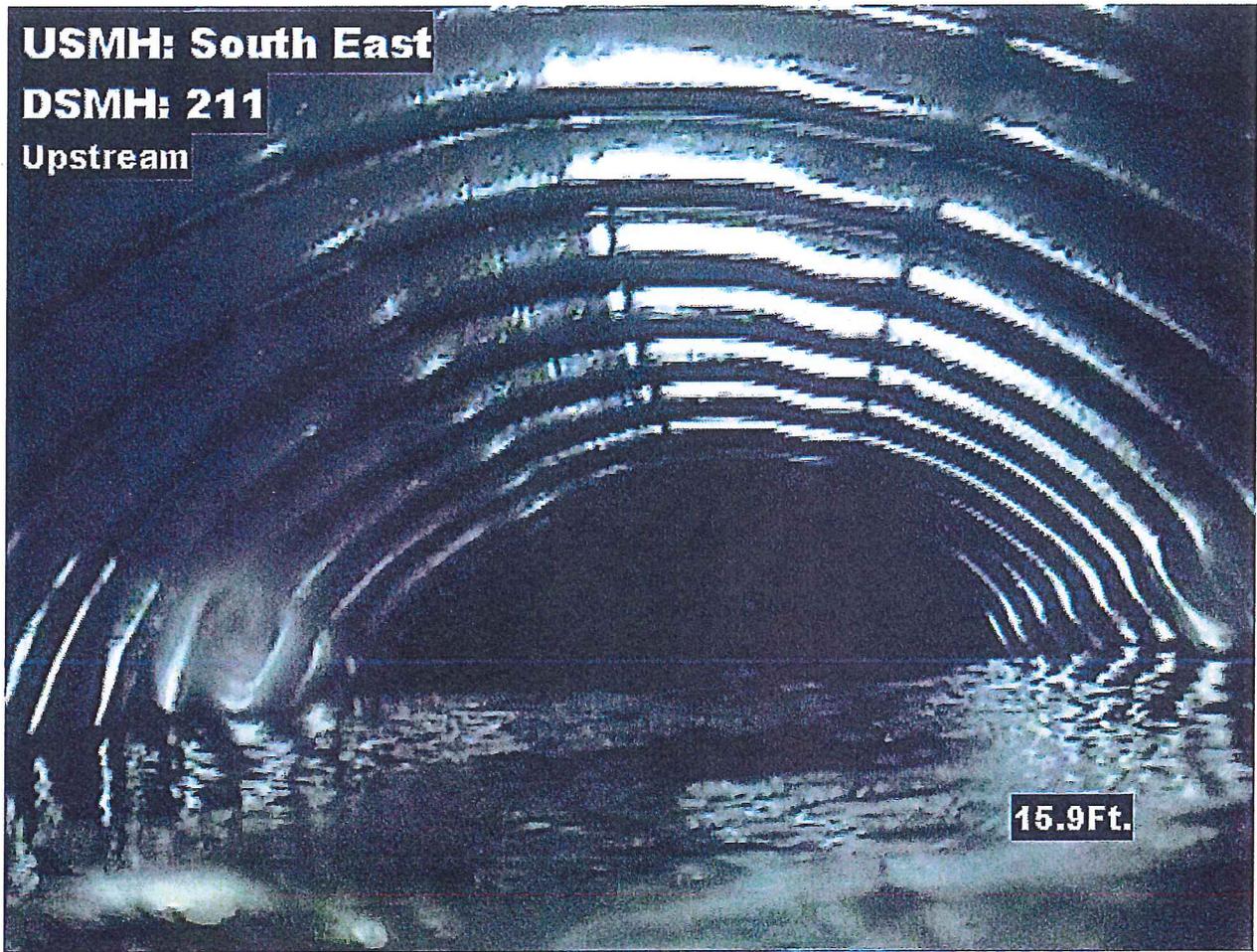
**Surveyor: Curt Deaton**

**Date: 2/1/2016 11:17:03 AM**

**USMH: South East**

**DSMH: 211**

**Upstream**



**15.9Ft.**

**USMH: South East**

**DSMH: 211**

**Upstream**



**20.1Ft.**

**USMH: South East**

**DSMH: 211**

**Upstream**



**USMH: South East**

**DSMH: 211**

**Upstream**



**USMH: South East**  
**DSMH: 211**  
**Upstream**



33.2Ft.

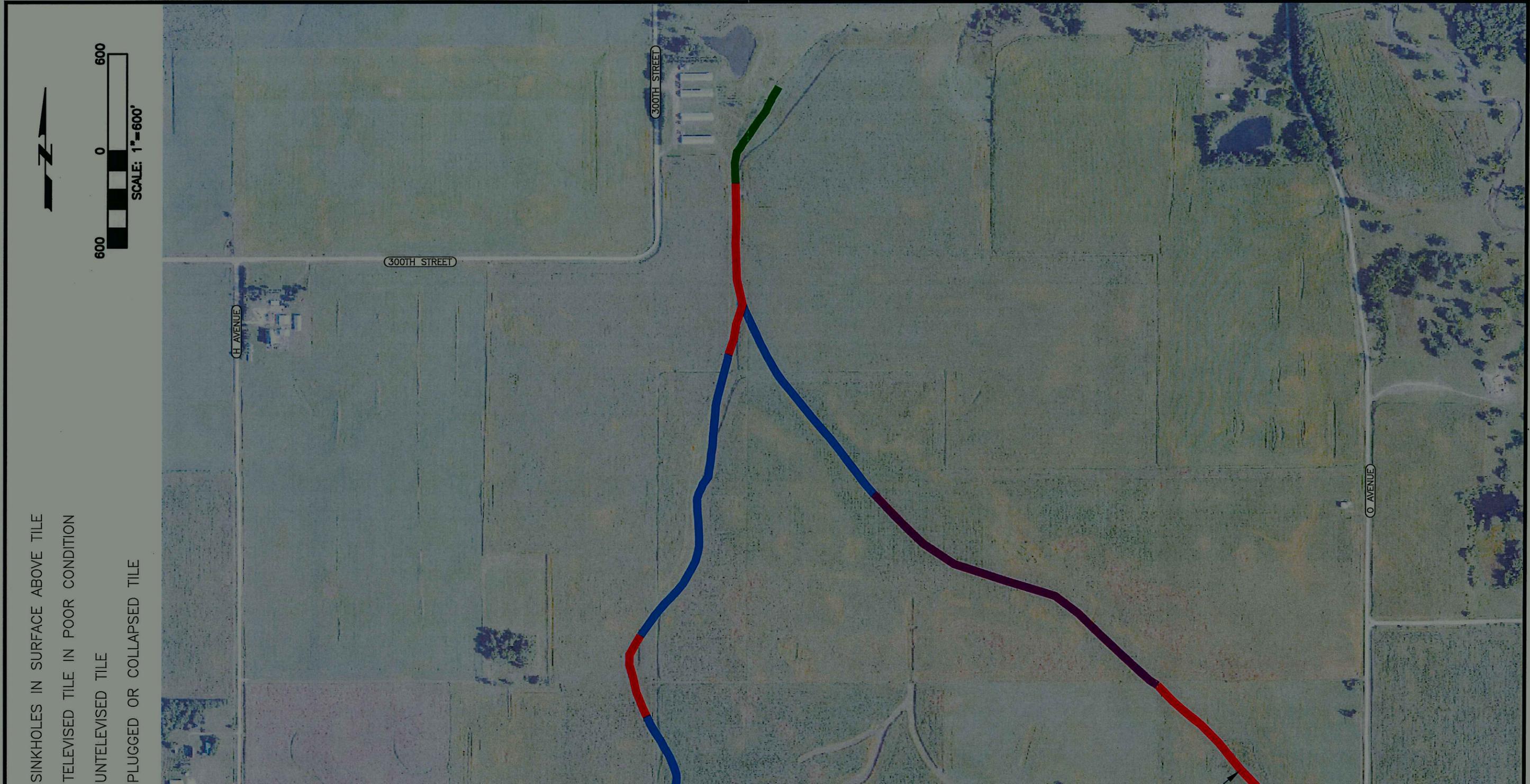
**USMH: South East**  
**DSMH: 211**  
**Upstream**



41.6Ft.



DRAWN BY: MAH DATE: 4/30/2015 FIELD BK: - <small>P:\6762.3\CADD\CONCEPTS\6762 - EXCON - MERGED - REPORT.DWG; 5/27/2016</small>	APPROVED BY: LOG PROJ. NO.: 6762 REVISIONS:	<b>RYKEN</b> ENGINEERING & LAND SURVEYING, INC. ACKLEY, MASON CITY & WEBSTER CITY, IOWA PH 641-847-3273 FAX 641-847-2303	ADDRESS: 739 PARK AVENUE ACKLEY, IOWA 50601 PH 641-847-3273 FAX 641-847-2303	PROJECT: DRAINAGE DISTRICT 102 HARDIN COUNTY, IOWA 2015	SHT. NAME: INVESTIGATION MAP FOR WORK ORDER #66 DD 102	SHT. NO.: 1 OF 1
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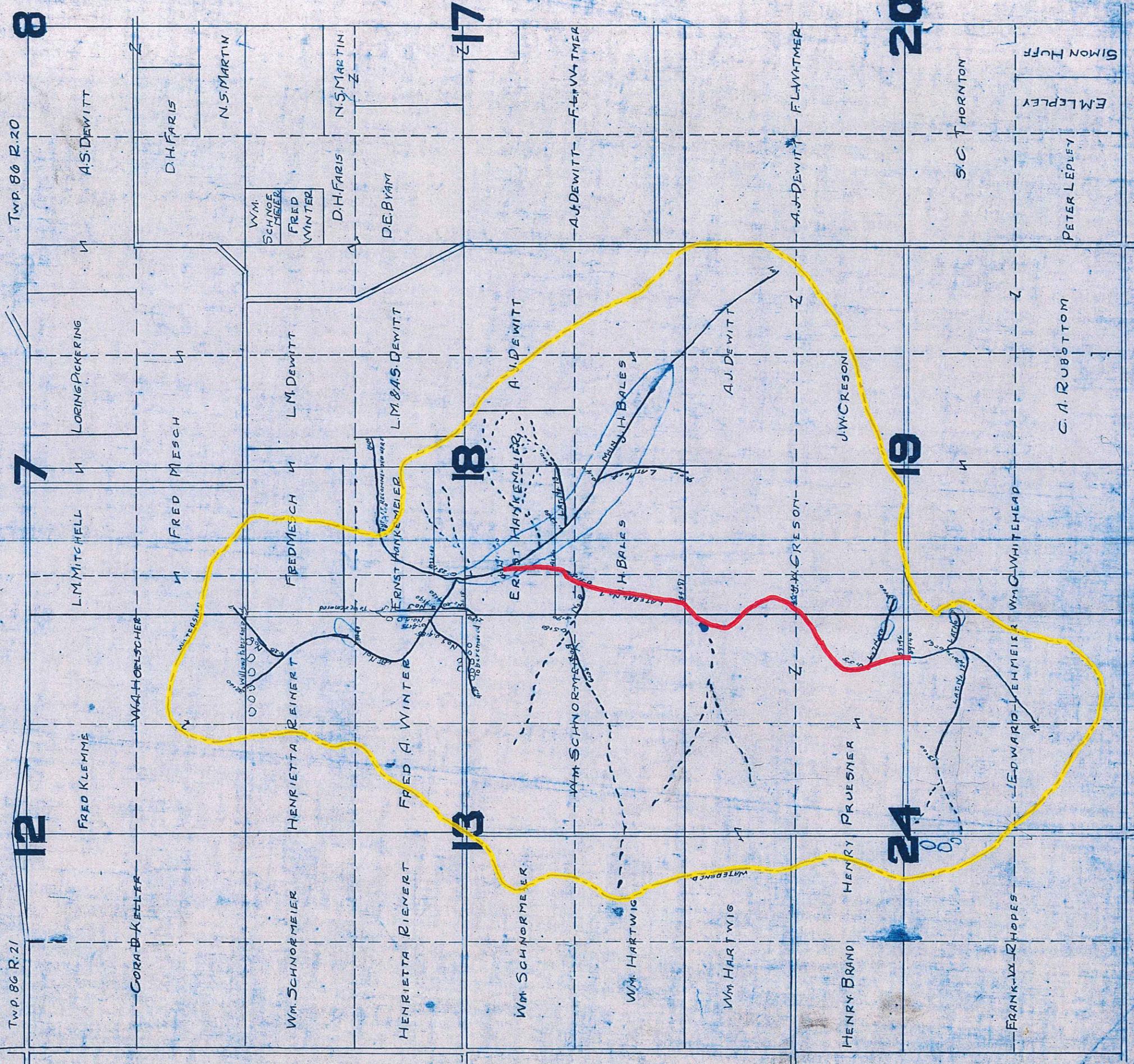


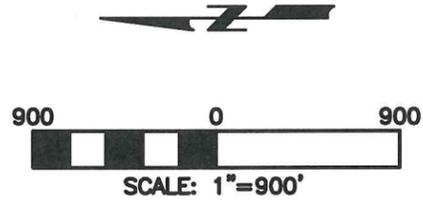
SINKHOLES IN SURFACE ABOVE TILE  
 TELEVIEWED TILE IN POOR CONDITION  
 UNTELEVIEWED TILE  
 PLUGGED OR COLLAPSED TILE

# PLAT OF ERNEST HANKEMEIER DRAINAGE DISTRICT NO. 102 AUG. 1917

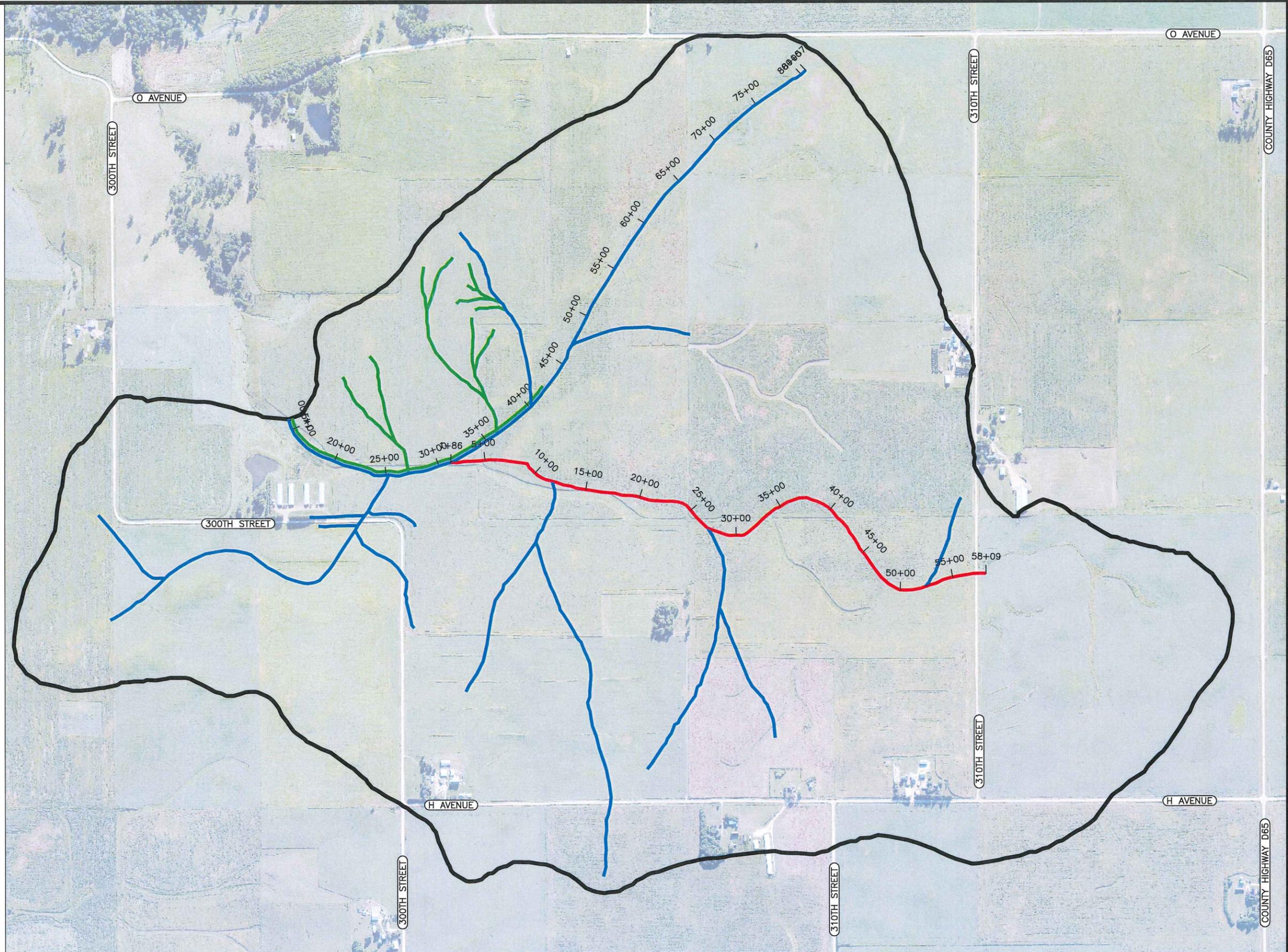
CONTAINING 1140 ACRES  
SCALE 800' = 1"  
W.S. PORTER - ENGINEER

— Drainage District Lateral #7  
— Drainage District Boundary





- 1917 EXISTING PRIVATE TILE
- EXISTING MAIN OR LATERAL TILE
- EXISTING LATERAL 7 TILE TO BE REPAIRED OR IMPROVED



DRAWN BY: MAH	APPROVED BY: LOG	REVISIONS:
DATE: 4/30/2015	PROJ. NO.: 6762.1	
FIELD B/C:		
P:\6762.1\CADD\CONCEPTS\6762.1 - CONCEPTS.DWG; 6/23/2016		

**RYKEN**  
ENGINEERING & LAND SURVEYING, INC.  
ACKLEY, MASON CITY, & WEBSTER CITY, IOWA

ADDRESS:  
739 PARK AVENUE  
ACKLEY, IOWA 50601  
PH 641-847-3273 FAX 641-847-2303

PROJECT:  
DRAINAGE DISTRICT #102  
HARDIN COUNTY, IOWA  
2016

SHT. NAME:  
LOCATION MAP OF REPAIRS OR IMPROVEMENTS

SHT. NO.:  
1 OF 1



**Engineer's Opinion of Main Capacities**

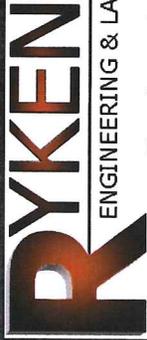
**Project: Lateral 7 Tile Repair for D.D. #102**

Location: Sections 18 and 19, T86N, R20W, Hardin County, Iowa  
 Section 24, T86N, R21W, Hardin County, Iowa

By: Z.J.S.  
 Date: 5/2/2016  
 Checked By: L.O.G.  
 Date: 6/22/2016

STA	DESCRIPTION	INSTALLED		REPAIR	
		ORIGINAL INSTALLED TILE SIZE (in)	ORIGINAL INSTALLED TILE CAPACITY (in <sup>2</sup> *acres/day)	REPAIR TILE SIZE (in)	REPAIR CAPACITY (in <sup>2</sup> *acres/day)
	<b>Lateral 7</b>				
0+00	Lateral 7 Tile Connection with Main Tile	18	0.33	18	0.33
10+00	Tile size change 18" - 16" Grade change 0.50% - 1.40%	16	0.60	18	0.56
11+80	Connection with Lateral 8	16	0.60	18	0.57
11+81	Upstream of Connection with Lateral 8	16	0.73	18	0.69
17+50	Grade Change 1.40% - 0.60%	16	0.33	18	0.47
25+00	Pipe size change 16" - 14" Grade change 0.60% - 0.90%	14	0.31	15	0.37
30+00	Grade change 0.90% - 0.80%	14	0.30	15	0.36
37+64	Connection with Private Lateral made District Tile	14	0.32	15	0.38
37+65	Upstream of Connection with Private Lateral made District Tile	14	0.38	15	0.45
43+00	Grade change 0.80% - 0.30%	14	0.34	15	0.41
55+00	Connection with Lateral 10 Pipe size change 14" - 10" Grade Change 0.30% - 0.80%	10	0.31	10	0.31
55+01	Upstream of Connection with Lateral 10	10	0.35	10	0.35
58+00	Pipe size change 10" - 8" Grade Change 0.80% - 1.70%	8	0.29	8	0.29
60+00	End Lateral 7 Tile				

TILE INSTALLATION - REPAIR



**Engineer's Opinion of Main Capacities**

**Project: Lateral 7 Tile Improvements for D.D. #102**

Location: Sections 18 and 19, T86N, R20W, Hardin County, Iowa  
 Section 24, T86N, R21W, Hardin County, Iowa

By: Z.J.S.

Date: 5/2/2016

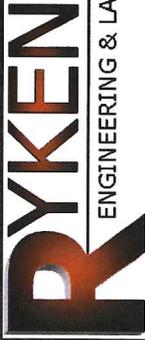
Checked By: L.O.G.

Date: 6/22/2016

**DUAL TILE INSTALLATION - IMPROVEMENT**

STA	DESCRIPTION	INSTALLED		IMPROVEMENT (DUAL TILE)					
		ORIGINAL INSTALLED TILE SIZE (in)	ORIGINAL INSTALLED TILE CAPACITY (in*acres/day)	1/2" DRAINAGE COEF.		COMBINED TILE CAPACITY (in*acres/day)			
				NEW DUAL PARALLEL TILE SIZE (in)	COMBINED TILE CAPACITY (in*acres/day)		NEW DUAL PARALLEL TILE SIZE (in)	COMBINED TILE CAPACITY (in*acres/day)	
	<b>Lateral 7</b>								
0+00	Lateral 7 Connection with Main Tile	18	0.33	18	0.66	24	1.43		
10+00	Tile size change 18" - 16" Grade change 0.50% - 1.40%	16	0.60	15	0.69	18	1.13		
11+80	Connection with Lateral 8	16	0.60	15	0.70	18	1.13		
11+81	Upstream of Connection with Lateral 8	16	0.73	15	0.85	18	1.37		
17+50	Grade Change 1.40% - 0.60%	16	0.33	15	0.57	18	0.93		
25+00	Pipe size change 16" - 14" Grade change 0.60% - 0.90%	14	0.31	15	0.74	18	1.20		
30+00	Grade change 0.90% - 0.80%	14	0.30	15	0.76	18	1.17		
37+64	Connection with Private Lateral made District Tile	14	0.32	15	0.80	18	1.23		
37+65	Upstream of Connection with Private Lateral made District Tile	14	0.38	12	0.50	18	1.47		
43+00	Grade change 0.80% - 0.30%	14	0.34	12	0.46	18	1.35		
55+00	Connection with Lateral 10 Pipe size change 14" - 10" Grade Change 0.30% - 0.80%	10	0.31	12	0.51	12	1.02		
55+01	Upstream of Connection with Lateral 10	10	0.35	12	0.57	12	1.15		
58+00	Pipe size change 10" - 8" Grade Change 0.80% - 1.70%	8	0.29	12	0.84	10	1.04		
60+00	End Lateral 7 Tile								

\* Single pipe to be installed



**Engineer's Opinion of Main Capacities**

**Project: Lateral 7 Tile Improvements for D.D. #102**

Location: Sections 18 and 19, T86N, R20W, Hardin County, Iowa  
 Sections 24, T86N, R21W, Hardin County, Iowa

By: Z.J.S.

Date: 5/2/2016

Checked By: L.O.G.

Date: 6/22/2016

**TILE REPLACEMENT UPSIZING - IMPROVEMENT**

STA	DESCRIPTION	INSTALLED		IMPROVEMENT (UPSIZING)					
		ORIGINAL INSTALLED TILE SIZE (in)	ORIGINAL INSTALLED TILE CAPACITY (in*acres/day)	1/2" DRAINAGE COEF.		1" DRAINAGE COEF.			
				UPSIZING TILE SIZE (in)	IMPROVED TILE CAPACITY (in*acres/day)	UPSIZING TILE SIZE (in)	IMPROVED TILE CAPACITY (in*acres/day)		
	<b>Lateral 7</b>								
0+00	Lateral 7 Tile Connection with Main Tile	18	0.33	24	0.71	30	1.29		
10+00	Tile size change 18" - 16" Grade change 0.50% - 1.40%	16	0.60	18	0.56	24	1.22		
11+80	Connection with Lateral 8	16	0.60	18	0.57	24	1.22		
11+81	Upstream of Connection with Lateral 8	16	0.73	18	0.69	24	1.48		
17+50	Grade Change 1.40% - 0.60%	16	0.33	18	0.47	24	1.00		
25+00	Pipe size change 16" - 14" Grade change 0.60% - 0.90%	14	0.31	18	0.60	24	1.29		
30+00	Grade change 0.90% - 0.80%	14	0.30	18	0.58	24	1.26		
37+64	Connection with Private Lateral made District Tile	14	0.32	18	0.62	24	1.33		
37+65	Upstream of Connection with Private Lateral made District Tile	14	0.38	18	0.74	24	1.59		
43+00	Grade change 0.80% - 0.30%	14	0.34	18	0.67	24	1.45		
55+00	Connection with Lateral 10 Pipe size change 14" - 10" Grade Change 0.30% - 0.80%	10	0.31	12	0.51	18	1.51		
55+01	Upstream of Connection with Lateral 10	10	0.35	12	0.57	15	1.04		
58+00	Pipe size change 10" - 8" Grade Change 0.80% - 1.70%	8	0.29	10	0.52	15	1.53		
60+00	End Lateral 7 Tile								



**Engineer's Opinion of Main Capacities**

**Project: Lateral 7 Improvements for D.D. #102**

Location: Sections 18 and 19, T86N, R20W, Hardin County, Iowa  
 Section 24, T86N, R21W, Hardin County, Iowa

By: Z.J.S.  
 Date: 5/2/2016  
 Checked By: L.O.G.  
 Date: 6/22/2016

STA	DESCRIPTION	INSTALLED		IMPROVEMENT (OPEN DITCH)	
		ORIGINAL INSTALLED TILE SIZE (in)	ORIGINAL INSTALLED TILE CAPACITY (in*acres/day)	MAIN	IMPROVED DITCH CAPACITY (in*acres/day)
	<b>Lateral 7</b>				
0+00	Lateral 7 Connection with Main Tile	28	0.30	Open	32.10
10+00	Tile size change 18" - 16" Grade change 0.50% - 1.40%	26	0.25	Open	54.66
11+80	Connection with Lateral 8	26	0.31	Open	54.52
11+81	Upstream of Connection with Lateral 8	20	0.12	Open	66.54
17+50	Grade Change 1.40% - 0.60%	20	0.30	Open	45.13
25+00	Pipe size change 16" - 14"	18	0.25	Open	57.99
30+00	Grade change 0.60% - 0.90%	18	0.26	Open	56.54
37+64	Grade change 0.90% - 0.80%	15	0.18	Open	59.57
37+65	Connection with Private Lateral made District Tile	15	0.31	Open	71.29
43+00	Upstream of Connection with Private Lateral made District Tile	12	0.27	Open	65.16
55+00	Grade change 0.80% - 0.30%				
	Connection with Lateral 10				
	Pipe size change 14" - 10"	8	0.20	Open	146.07
55+01	Grade Change 0.30% - 0.80%				
	Upstream of Connection with Lateral 10	6	0.40	Open	163.46
58+00	Pipe size change 10" - 8"				
	Grade Change 0.80% - 1.70%	6	0.95	Open	240.49
60+00	End Lateral 7				

OPEN DITCH - IMPROVEMENT



ENGINEERING & LAND SURVEYING, INC.

By: Z.J.S.  
 Date: 5/3/2016  
 Checked By: L.O.G.  
 Date: 6/22/2016

**Engineer's Opinion of Probable Construction Cost**  
**Project: Lateral 7 Repair for D.D. #102**  
 Location: Sections 18 and 19, T86N, R20W, Hardin County, Iowa  
 Section 24, T86N, R21W, Hardin County, Iowa

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
<b>CONSTRUCTION COSTS</b>						
101	18" DUAL WALL TILE	\$ 50.00	LF	2500	LF	\$ 125,000.00
102	15" DUAL WALL TILE	\$ 45.00	LF	3000	LF	\$ 135,000.00
103	10" DUAL WALL TILE	\$ 35.00	LF	300	LF	\$ 10,500.00
104	8" DUAL WALL TILE	\$ 30.00	LF	150	LF	\$ 4,500.00
105	8" DUAL WALL TILE (ROAD CROSSING)	\$ 55.00	LF	50	LF	\$ 2,750.00
106	18" X 15" DUAL WALL REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
107	15" X 10" DUAL WALL REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
108	10" X 8" DUAL WALL REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
109	18" X 18" X 10" DUAL WALL WYE (LATERAL 8 CONNECTION)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
110	15" X 15" X 10" DUAL WALL WYE (PRIVATE LATERAL CONNECTION MADE DISTRICT)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
111	10" X 10" X 8" DUAL WALL WYE (LATERAL 10 CONNECTION)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
112	HICKENBOTTOM INTAKE	\$ 1,500.00	EA	3	EA	\$ 4,500.00
113	CONCRETE COLLAR	\$ 400.00	EA	5	EA	\$ 2,000.00
114	PRIVATE TILE CONNECTIONS	\$ 500.00	EA	30	EA	\$ 15,000.00
115	REMOVE EXISTING TILE	\$ 10.00	LF	6000	LF	\$ 60,000.00
<b>CONSTRUCTION SUBTOTAL</b>						\$ 363,750.00
Contingency (10%)						\$ 36,375.00
<b>CONSTRUCTION TOTAL</b>						\$ 400,125.00
Engr. & Const. Observation (20%)						\$ 80,025.00
<b>TOTAL COST</b>						\$ 480,150.00

TILE REPLACEMENT - REPAIR

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



ENGINEERING & LAND SURVEYING, INC.

By: Z.J.S.  
 Date: 5/3/2016  
 Checked By: L.O.G.  
 Date: 6/22/2016

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

**Project: Lateral 7 Tile Improvements for D.D. #102**

Location: Sections 18 and 19, T86N, R20W, Hardin County, Iowa  
 Section 24, T86N, R21W, Hardin County, Iowa

	ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	<b>DUAL TILE INSTALLATION -IMPROVEMENT (1/2" COEFFICIENT)</b>	<b>CONSTRUCTION COSTS</b>					
101		18" DUAL WALL TILE	\$ 50.00	LF	2000	LF	\$ 100,000.00
102		15" DUAL WALL TILE	\$ 45.00	LF	5530	LF	\$ 248,850.00
103		12" DUAL WALL TILE	\$ 40.00	LF	3920	LF	\$ 156,800.00
104		12" DUAL WALL TILE (ROAD CROSSING)	\$ 65.00	LF	50	LF	\$ 3,250.00
105		18" X 15" DUAL WALL REDUCER	\$ 500.00	EA	2	EA	\$ 1,000.00
106		15" X 12" DUAL WALL REDUCER	\$ 500.00	EA	2	EA	\$ 1,000.00
107		15" X 15" X 10" DUAL WALL WYE (LATERAL 8 CONNECTION)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
108		15" X 15" X 10" DUAL WALL WYE (PRAIVATE LATERAL CONNECTION MADE DISTRICT LATERAL)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
109		12" X 12" X 8" DUAL WALL WYE (LATERAL 10 CONNECTION)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
110		HICKENBOTTOM INTAKE	\$ 1,500.00	EA	3	EA	\$ 4,500.00
111		INTERCONNECTIONS	\$ 10,000.00	EA	5	EA	\$ 50,000.00
112		CONCRETE COLLAR	\$ 400.00	EA	5	EA	\$ 2,000.00
113		PRIVATE TILE CONNECTIONS	\$ 500.00	EA	30	EA	\$ 15,000.00
114		REMOVE STURCTURE	\$ 500.00	EA	1	EA	\$ 500.00
115		REMOVE EXISTING TILE	\$ 10.00	LF	6000	LF	\$ 60,000.00
<b>CONSTRUCTION SUBTOTAL</b>							\$ 645,900.00
Contingency (10%)							\$ 64,590.00
<b>CONSTRUCTION TOTAL</b>							\$ 710,490.00
Engr. & Const. Observation (20%)							\$ 142,098.00
<b>TOTAL COST</b>							\$ 852,588.00
<b>DUAL TILE INSTALLATION -IMPROVEMENT (1" COEFFICIENT)</b>	<b>CONSTRUCTION COSTS</b>						
	201	24" DUAL WALL TILE	\$ 60.00	LF	2000	LF	\$ 120,000.00
	202	18" DUAL WALL TILE	\$ 50.00	LF	9000	LF	\$ 450,000.00
	203	12" DUAL WALL TILE	\$ 40.00	LF	600	LF	\$ 24,000.00
	204	10" DUAL WALL TILE	\$ 35.00	LF	300	LF	\$ 10,500.00
	205	10" DUAL WALL HDPE TILE (ROAD CROSSING)	\$ 60.00	LF	100	LF	\$ 6,000.00
	206	24" X 18" DUAL WALL REDUCER	\$ 750.00	EA	2	EA	\$ 1,500.00
	207	18" X 12" DUAL WALL REDUCER	\$ 500.00	EA	2	EA	\$ 1,000.00
	208	12" X 10" DUAL WALL REDUCER	\$ 500.00	EA	2	EA	\$ 1,000.00
	209	18" X 18" X 10" DUAL WALL WYE (LATERAL 8 CONNECTION)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
	210	18" X 18" X 10" DUAL WALL WYE (PRIVATE LATERAL CONNECTION MADE DISTRICT TILE)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
	211	18" X 18" X 8" DUAL WALL WYE (LATERAL 10 CONNECTION)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
	212	HICKENBOTTOM INTAKE	\$ 1,500.00	EA	3	EA	\$ 4,500.00
	213	CONCRETE COLLAR	\$ 400.00	EA	5	EA	\$ 2,000.00
	214	INTERCONNECTIONS	\$ 10,000.00	EA	5	EA	\$ 50,000.00
	215	PRIVATE TILE CONNECTIONS	\$ 500.00	EA	30	EA	\$ 15,000.00
216	REMOVE EXISTING TILE	\$ 10.00	LF	6000	LF	\$ 60,000.00	
<b>CONSTRUCTION SUBTOTAL</b>							\$ 748,500.00
Contingency (10%)							\$ 74,850.00
<b>CONSTRUCTION TOTAL</b>							\$ 823,350.00
Engr. & Const. Observation (220%)							\$ 164,670.00
<b>TOTAL COST</b>							\$ 988,020.00

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



ENGINEERING & LAND SURVEYING, INC.

By: Z.J.S.  
 Date: 5/3/2016  
 Checked By: L.O.G.  
 Date: 6/22/2016

**Engineer's Opinion of Probable Construction Cost**  
**Project: Lateral 7 Tile Improvements for D.D. #102**  
 Location: Sections 18 and 19, T86N, R20W, Hardin County, Iowa  
 Section 24, T86N, R21W, Hardin County, Iowa

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
<b>CONSTRUCTION COSTS</b>						
301	24" DUAL WALL TILE	\$ 60.00	LF	1000	LF	\$ 60,000.00
302	18" DUAL WALL TILE	\$ 50.00	LF	4500	LF	\$ 225,000.00
303	12" DUAL WALL TILE	\$ 40.00	LF	300	LF	\$ 12,000.00
304	10" DUAL WALL TILE	\$ 35.00	LF	150	LF	\$ 5,250.00
305	10" DUAL WALL TILE (ROAD CROSSING)	\$ 60.00	LF	50	LF	\$ 3,000.00
306	24" X 18" DUAL WALL REDUCER	\$ 750.00	EA	1	EA	\$ 750.00
307	18" X 12" DUAL WALL REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
308	12" X 10" DUAL WALL REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
309	18" X 18" X 10" DUAL WALL WYE (LATERAL 8 CONNECTION)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
310	30" X 30" X 18" DUAL WALL WYE (PRIVATE LATERAL CONNECTION MADE DISTRICT TILE)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
311	18" X 18" X 8" DUAL WALL WYE (LATERAL 10 CONNECTION)	\$ 1,000.00	EA	1	EA	\$ 1,000.00
312	HICKENBOTTOM INTAKE	\$ 1,500.00	EA	3	EA	\$ 4,500.00
313	CONCRETE COLLAR	\$ 400.00	EA	5	EA	\$ 2,000.00
314	REMOVE EXISTING TILE	\$ 10.00	LF	6000	LF	\$ 60,000.00
315	PRIVATE TILE CONNECTIONS	\$ 500.00	EA	30	EA	\$ 15,000.00
<b>CONSTRUCTION SUBTOTAL</b>						\$ 391,500.00
Contingency (10%)						\$ 39,150.00
<b>CONSTRUCTION TOTAL</b>						\$ 430,650.00
Engr. & Const. Observation (20%)						\$ 86,130.00
<b>TOTAL COST</b>						\$ 516,780.00
<b>CONSTRUCTION COSTS</b>						
401	30" DUAL WALL TILE	\$ 65.00	LF	1000	LF	\$ 65,000.00
402	24" DUAL WALL TILE	\$ 60.00	LF	4500	LF	\$ 270,000.00
403	15" DUAL WALL TILE	\$ 45.00	LF	450	LF	\$ 20,250.00
404	15" DUAL WALL TILE (ROAD CROSSING)	\$ 70.00	LF	50	LF	\$ 3,500.00
405	30" X 24" DUAL WALL REDUCER	\$ 1,000.00	EA	1	EA	\$ 1,000.00
406	24" X 15" DUAL WALL REDUCER	\$ 750.00	EA	1	EA	\$ 750.00
407	24" X 24" X 10" DUAL WALL WYE (LATERAL 8 CONNECTION)	\$ 1,250.00	EA	1	EA	\$ 1,250.00
408	24" X 24" X 10" DUAL WALL WYE (PRIVATE LATERAL CONNECTION MADE DISTRICT TILE)	\$ 1,250.00	EA	1	EA	\$ 1,250.00
409	24" X 24" X 8" DUAL WALL WYE (LATERAL 10 CONNECTION)	\$ 1,250.00	EA	1	EA	\$ 1,250.00
410	HICKENBOTTOM INTAKE	\$ 1,500.00	EA	3	EA	\$ 4,500.00
411	CONCRETE COLLAR	\$ 400.00	EA	5	EA	\$ 2,000.00
412	REMOVE EXISTING TILE	\$ 10.00	LF	6000	LF	\$ 60,000.00
413	PRIVATE TILE CONNECTIONS	\$ 500.00	EA	30	EA	\$ 15,000.00
<b>CONSTRUCTION SUBTOTAL</b>						\$ 445,750.00
Contingency (10%)						\$ 44,575.00
<b>CONSTRUCTION TOTAL</b>						\$ 490,325.00
Engr. & Const. Observation (20%)						\$ 98,065.00
<b>TOTAL COST</b>						\$ 588,390.00

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



ENGINEERING & LAND SURVEYING, INC.

By: Z.J.S.

Date: 5/3/2015

Checked By: L.O.G.

Date: 6/22/2016

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

Project: Lateral 7 Improvements for D.D. #102

Location: Sections 18 and 19, T86N, R20W, Hardin County, Iowa  
Section 24, T86N, R21W, Hardin County, Iowa

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity		Units	Total Cost
<b>CONSTRUCTION COSTS</b>							
501	OPEN DITCH CONSTRUCTION	\$ 2,500.00	STA	59	STA		\$ 147,500.00
502	15" DUAL WALL TILE	\$ 45.00	LF	50	LF		\$ 2,250.00
503	15" DUAL WALL TILE (ROAD CROSSING)	\$ 70.00	LF	50	LF		\$ 3,500.00
504	CMP OUTLET (LATERAL 8)	\$ 55.00	LF	40	LF		\$ 2,200.00
505	CMP OUTLET (PRIVATE LATERAL MADE DISTRICT TILE)	\$ 55.00	LF	40	LF		\$ 2,200.00
506	CMP OUTLET (LATERAL 10)	\$ 55.00	LF	40	LF		\$ 2,200.00
507	CMP OUTLET (LATERAL 7)	\$ 55.00	LF	40	LF		\$ 2,200.00
508	HEADWALL	\$ 10,000.00	EA	1	EA		\$ 10,000.00
509	RIP-RAP	\$ 40.00	TN	200	TN		\$ 8,000.00
510	CONCRETE COLLAR	\$ 400.00	EA	4	EA		\$ 1,600.00
511	SURFACE DRAINS	\$ 2,000.00	EA	30	EA		\$ 60,000.00
512	PRIVATE TILE OUTLETS	\$ 1,500.00	EA	30	EA		\$ 45,000.00
513	SEEDING (OPEN DITCH)	\$ 500.00	STA	59	STA		\$ 29,500.00
514	REMOVE EXISTING TILE	\$ 5.00	LF	6000	LF		\$ 30,000.00
515	RIGHT OF WAY	\$ 12,000.00	AC	13.5	AC		\$ 162,000.00
<b>CONSTRUCTION SUBTOTAL</b>							\$ 508,150.00
Contingency (10%)							\$ 50,815.00
<b>CONSTRUCTION TOTAL</b>							\$ 558,965.00
Engr. & Const. Observation (20%)							\$ 111,793.00
<b>TOTAL COST</b>							\$ 670,758.00

OPEN DITCH - IMPROVEMENT

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