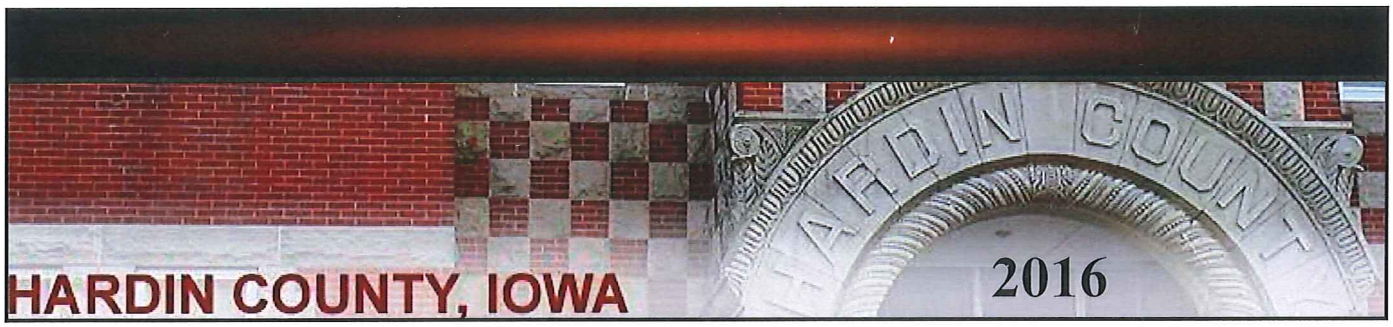

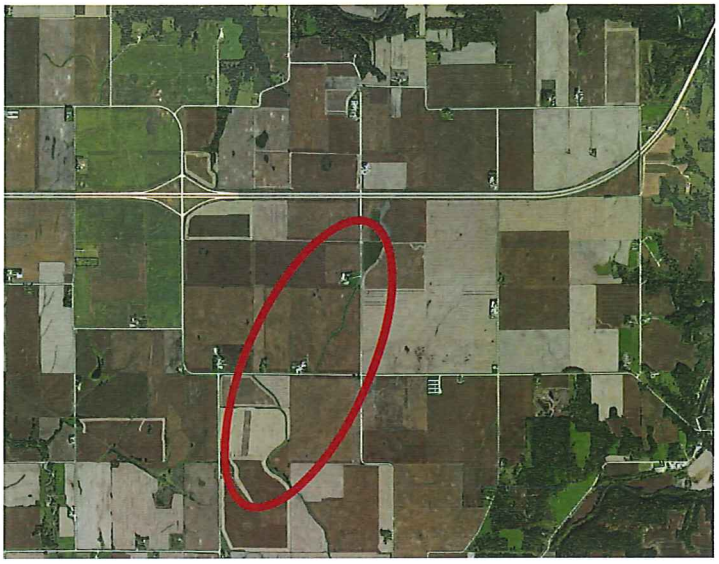

ENGINEER'S REPORT ON REPAIR OR IMPROVEMENT TO LOWER END OF MAIN OF DRAINAGE DISTRICT NO. 1 HARDIN COUNTY

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

PE Aug 9 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:
SHOWN ON TABLE OF CONTENTS

RYKEN
ENGINEERING & LAND SURVEYING, INC.

OFFICE LOCATIONS

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

103 East State Street, Ste 430
Mason City, IA 50401
Phone: 641-423-1451
Fax: 641-423-1659

511 Bank Street
Webster City, IA 50595
Phone: 515-832-1876
Fax: 515-832-1932

Engineer's Report on Repair or Improvement to Lower End of Main of Drainage District No. 1, Hardin County, Iowa

Table of Contents Pg. 1

Report

Introduction Pg. 2
District History Pgs. 3-8
Investigation Pg. 9
Discussion and Conclusions Pg. 9
Repair Methods Pg. 10
Improvement Methods Pgs. 11-12
Opinion of Probable Construction Costs Pg. 12
Ownership and Classifications Pg. 13
Recommendations Pg. 13

Appendices

Repair Summaries for Work Order Request #91 and #92 App. A
Investigation Map App. B
Main Map (Spot Repairs and Waterway Cleanout) App. C
Main Map (Tile Replacement) App. D
Main Map (Improvement) App. E
Main Capacities Chart Tile Replacement - (Repair) App. F
Main Capacities Chart Tile Replacement – Tile Upsizing (Improvement) App. G
Main Capacities Chart Tile Replacement - Open Ditch (Improvement) App. H
Opinion of Probable Construction Cost (Spot Repairs and Waterway Cleanout) App. I
Opinion of Probable Construction Cost Tile Replacement - (Repair) App. J
Opinion of Probable Construction Cost Tile Replacement – Tile Upsizing (Improvement) App. K
Opinion of Probable Construction Cost Tile Replacement - Open Ditch (Improvement) App. L

Engineer's Report on Repair or Improvement to Lower End of Main of Drainage District No. 1, 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 repair or improvement to the lower end of the main of Drainage District No. 1. This report will summarize the history of improvements and repairs, investigate the necessity and feasibility of said repair or improvement, and present an opinion of probable construction costs associated with said repair or improvement. At the informational drainage meeting held on July 13, 2016, the recommended actions shown in the Repair Summary for Work Order Requests #91 and #92 (copies included in Appendix A) were discussed and reviewed by the District Trustees. At this meeting, discussions ensued about additional possible repair or improvement methods beyond those listed in the above mentioned Repair Summary. As a result, at said informational meeting the District Trustees requested Ryken Engineering to move ahead with an investigation and report concerning repair or improvement to said lower end of the main.

- LOCATION – The area of investigation was limited to parts of the main tile located in Sections 24 and 25, Township 88 North (T88N), Range 20 West (R20W), Hardin County, Iowa. Specifically, the downstream limit was the historical main tile outlet at the current headwall in the South Half of Section 25 at approximately ½ mile east of County Highway S55. The main tile then goes west and northeast across Section 25 and crosses County Highway D35 at approximately ⅜ mile west of T Avenue. It then continues northeast across the Southeast Quarter of Section 24 with the upstream limit of investigation ending on the west side of T Avenue at approximately ½ mile north of the intersection of T Avenue and County Highway D35. For reference, a copy of the Investigation Map imposed on a 1960 map of a Drainage District No. 1 showing said limits is included in Appendix B.

2.0 DISTRICT HISTORY – The following is a summary of the pertinent history of the main of Drainage District No. 1 as obtained from the Hardin County Auditor's drainage minutes and records and those of Ryken Engineering and Land Surveying.

1905, Aug. 8	Petition and Bond for establishment of Drainage District was filed. Said petition indicated that a main drain, sub-mains, and lateral should be installed. Specifically, it indicated that the main should start near the south (later corrected to North) line of the SW¼ of Section 17, T88N, R19W and extend southwesterly through Sections 18 and 19, T88N, R19W and through Sections 24 and 25, T88W, R20W. It called for an outlet about 40 rods north and 10 rods west of the center of said Section 25. It also called for a lateral ditch or branch beginning about 10 rods west of the center of Section 18 and running south to the main ditch.
1905, Aug. 28	Engineer's Report by W.W. Hale was filed. It called for the construction of an open ditch and 3 laterals tiles. The estimated cost for construction was $0.09¼ - $0.15 per cubic yard.
1905, Sept. 7	Publication of Notice of Drainage District establishment.
1905, Oct. 23	Notice of appraisers and report of appraisers of Drainage District.
1905, Nov. 8	Petition to amend the petition for establishment of Drainage District. Specifically, it added additional language to the original petition that allowed the Board of Supervisors to construction additional laterals as necessary to drain the area.
1906, Mar. 17	Publication of Notice to Contractors for construction of Drainage District facilities.
1908, Jun. 5	Classification Commission to inspect the lands in Drainage District was appointed.
1908, Jun. 7	Bids for construction of Drainage District were received. R.A. Elzy was the lowest bid of $0.16 per cubic yard.
1908, Jun. 11	Construction contract with R.A. Elzy for construction of drainage district facilities was entered.
1908, Jun. 15	Report of commission to inspect and assess benefits was filed.
1908, Jun. 22	Notice of Publication Assessments for Drainage
1908, Aug. 18	Additional Engineer's Report by W.W. Hale was filed. It called for taking in additional drainage area into the watershed.
1908, Sept. 1	Additional Engineer's Report by W.W. Hale was filed. It recommended changes to the district boundary with additions and subtractions to the district. It also called for the construction of Lateral No. 1 and Lateral No. 2 according to the construction bids.
1908, Oct. 8	Engineer's Bond for S.B. Gardner was filed.
1908, Nov. 5	Notice of hearing for the Amended Engineer's Report.
1908, Nov. 25	Commission to Inspect the route was appointed.
1908, Dec. 10	Notice of Assessment of Drainage was filed and delivered.

1909, Apr. 22	Engineer's Letter by S.B. Gardner to the District Trustees recommending the open ditch between stations 234 to 318 be changed to the following drainage tile: 200 feet of 16"; 1100 feet of 15"; 1650 feet of 14"; 1250 feet of 12" at an average depth of 5 feet.
1909, Sept. 15	Engineer's Report by S.B. Gardner, recommending rectifying the boundary of Drainage District.
1915, May 5	Motion to have N.S. Carpenter make the necessary repairs to Drainage District facilities.
1917, Apr. 2	W.S. Porter was directed by the Board of Supervisors to investigate and report on defects to Drainage District.
1917, Apr. 25	Engineer's Report by W.S. Porter stated that the outlet of Lateral No. 1 was washed out and need to be repaired.
1917, May 7	Approval of repair recommend in Engineer's Report.
1917, Nov. 19	W.S. Porter was directed to inspect the tile through the John Strauss land and report accordingly.
1918, May 4	Petition to repair Drainage District facilities by converting the open ditch to closed drain was filed.
1918, Aug. 26	Engineer's Report of the Re-Construction of Drainage District facilities by W. S. Porter was filed. It recommended the open ditch be enclosed with tile from Station 0+00 to Station 118+00. The estimated cost to be between $13,924 - $19,121.
1918, Sept. 19	Publication of Notice for Re-Construction and Repair to Drainage District.
1919, Apr. 12	Appointment of Commission to inspect and classify land in Drainage District.
1919, May 21	Bill of indebtedness for 300 feet of tile.
1919, May 23	Supplemental Engineer's Report by W.S. Porter was filed. It recommended substituting the entire length of the open ditch with tile and construction of a bulkhead. It estimated the cost to be $15,537.00
1919, Jun. 2	Amendment to Engineer's Report by W.S. Porter was filed. It recommended to leave a waterway between the old open ditch banks and following the grade of the tile as near as practicable.
1919, Jun. 9	Publication of Notice to Contractors for construction of Drainage District facilities.
1919, Jul. 14	Appointment of Commission to inspect and classify land in Drainage District.
1919, Jul. 3	Publication of Notice to Contractors for construction of Drainage District facilities with a bid date of July 14, 1919.
1919, Jul. 14	Construction contract with Jens A. Jensen for $20,290.00 for construction of drainage district facilities was entered.

1919, Aug. 18	Letter to the Board of Supervisors requesting extending the tile to the east line of the SW¼ of Section 25 and moving the bulkhead accordingly. W.S. Porter agreed with the request.
1919, Oct. 20	Appointment of Commission to inspect and classify land in Drainage District.
1919, Nov. 24	Letter from W.S. Porter recommending changes to the upper end of Drainage District located in Sections 17 and 18.
1920, Jun. 8	Engineer's Final report on Re-Construction of Drainage District.
1920, Aug. 12	Publication of Notice Assessment of benefits for Re-Construction of Drainage District.
1920, Oct. 11	Appointment of Commission to inspect and classify land in drainage district.
1920, Nov. 15	Report of Commission to Inspect and Assess Benefits.
1924, Nov. 17	W.S. Porter was employed to represent Drainage District.
1925, May 8	Court Decree No. 10147
1946, Feb. 4	Petition for improvement to Drainage District, by constructing a wide shallow surface waterway north of the Rose Bridge with sideslopes of 4 to 1 to permit farming over the area and by constructing intakes to the present tile at the Chaney-Steinfeldt property line and at the Rose Bridge.
1946, Feb. 7	Engineer's Report by Robt. T. Johnson was filed. It called for the construction for a 'standard 18" intake' to the main tile at the Chaney-Steinfeldt line in Section 25 and two 'standard 25" intakes' or water boxes at the east and west highway on the south line of Section 24. Also to construct a wide shallow overflow channel from Station 39+00 to Station 77+00. The estimated total cost of construction was $1,200.00
1946, Mar. 14	Publication of Notice for Improvement to Drainage District.
1946, Jul. 24	Agreement on Construction work to Drainage District.
1947, Dec. 1	Engineer's Report on Completion of improvements to the outlet of Drainage District.
1952, Dec. 31	Bill for repair of tile.
1953, Jan. 19	Bill for repair of tile located in Section 25.
1953, Jan. 20	Bill for repair of tile located in SW¼ Section 25.
1953, Jan. 28	Bill for repair of tile located in Section 25.
1953, Apr. 29	Bill for repair of tile located in SW¼ Section 25.
1953, May 5	Bill for repair of tile located in Section 25.
1953, Jun. 4	Bill for repair of tile.
1953, Jun. 13	Bill for repair of tile on Steinfeldt Farm.
1953, Jun. 15	Bill for repair of tile located in SW¼ Section 25.
1953, May 11	Bill for repair of tile located in SW¼ Section 25.

1953, May 18	Bill for repair of tile located in SW¼ Section 25.
1954, Jan. 14	Bill for repair of tile located in SW¼ Section 25.
1955, Feb. 8	Bill for repair of tile.
1958, Feb. 3	Bill for repair of tile located in Section 17.
1958, Sept. 29	Bill for repair of tile located in NE¼ Section 25.
1958, Oct. 24	Bill for repair of tile located in NW¼ Section 19.
1959, Jan. 3	Bill for inspection of open ditch located in Section 19.
1959, Jun. 3-4	Bill for repair of tile located in SE¼ Section 24.
1959, Jun. 19	Bill for inspection of tile located in Section 24.
1959, Jul. 8	Bill for tile located in Section 24.
1960, Sept. 9	Bill for repair of tile located in Section 25.
1960, Sept. 12	Bill for repair of tile located in NW¼ Section 25.
1961, Oct. 18	Bill for repair of tile located in Section 24.
1961, Nov. 30	Bill for repair of tile located in Section 19.
1962, May 16	Bill for repair of tile located in Section 25.
1962, Nov. 15	Bill for repair of tile located in Section 19.
1963, Jul. 26	Bill for repair of tile located in Section 25.
1964, Jun. 10	Bill for repair of tile located in Section 25.
1964, May 7	Bill for repair of tile located in Section 25.
1964, May 15	Bill for inspection of tile located in Section 25.
1965, May 11	Bill for repair of tile located in Section 25.
1965, Jun. 1	Request for tile repair and removal of silt and soil deposited in the open ditch located in NW¼ NW¼ Section 19 and NE¼ Section 24.
1965, Jun. 1-Nov. 22	Bill for Engineering Services in connection with investigation and repair of waterway over the Main.
1965, Oct. 19	Bill for repair of tile located in Section 24.
1965, Oct. 29	Bill for repair of tile located in Section 19.
1965, Nov. 15	Bill for repair of tile located in Section 19.
1966, May 9	Bill for repair of tile located in Section 19.
1966, Sept. 26	Bill for repair of tile located in Section 25.
1967, Jul. 18	Bill for repair of tile located in Section 19.
1967, Oct. 3	Petition for Repairs to cleanout ditch and to repair the tile draining the pond located in Section 18 and Section 24.
1967, Oct. 10	Bill for repair of tile located in Section 18.

1968, May 21	Engineer's Report by Hollis E. Ryken was filed. It recommended that the waterway be restored to the 1946 agreement. The estimated total cost of construction was $1,260.00.
1968, Aug. 27	Bill for engineering services from Ryken Engineering Company for proposed repair project.
1969, Jun. 2	Bill for repair of tile located in NE¼ SW¼ Section 25.
1970, Mar. 17	Engineer's Report by Hollis E. Ryken was filed. It revised the May, 21, 1968 Engineer's Report with an estimated cost of $1,890.00
1970, Dec. 8	Petition for cleanout of Drainage Ditch waterway.
1971, Jan. 13	Publication of Notice for repairs or improvements to Drainage District facilities.
1971, Apr. 6	District Trustees accepted the bid of $686.79 from Wiechmann, Inc. for the repairs to Drainage District facilities.
1971, Oct. 1	Letter from Hollis E. Ryken stating that the work by Wiechmann, Inc. had been completed.
1971, Sept. 8	Bill of repair of tile located in Section 24.
1972, Nov. 6	Request for repair of 4 broken tiles located in SE¼ SW¼ Section 18.
1973, Mar. 29	Bill for repair of tile located in SW¼ Section 18.
1973, Jun. 27	Bill for repair of tile located in Section 18.
1973, Aug. 16	Bill for repair of tile located in Section 18.
1974, Sept. 24	Bill for repair of tile located in Section 24.
1975, May 29	Bill for repair of tile located in Section 18.
1977, Jan. 28	Request for repair of broken tile located in NE¼ Section 25.
1977, Feb. 14	Request for repair of broken tile located in Section 25.
1977, Mar. 9	Request for repair of broken tile and bulkhead.
1977, Apr. 1	Bill for repair of tile located in Section 25.
1979, Jul. 9	Request for repair of broken tile located in SE¼ Section 24.
1979, Oct. 30	Bill for repair of tile located in Section 24.
1980, Apr. 18	Bill for repair of tile located in Section 17.
1980, May 7	Bill for repair of tile located in Section 18.
1981, Jun. 9	Request for repair of broken tile located in NE¼ NW¼ Section 25.
1983, Aug. 1	Bill of repair of broken tile located in Section 25.
1984, Jan. 12	Proposal for repair work on Drainage District facilities, by Hollis E. Ryken, to "Clean, shape, and level waterway of district in Section 24 involving approximately 3400 cu. yrd. of excavation"
1984, Feb. 24	Bid proposal for repair work of Drainage District facilities by Robert R. Gehrke for a total of $2,500 was filed.
1984, May 21	Request for repair of hole in tile located in Section 25.

1984, Dec. 13	Bill for repair of broken tile located in Section 24.
1987, Jul. 9	Bill for repair of broken tile located in Section 25.
1989, May 30	Request for repair of broken tile located in SE¼ NE¼ Section 24.
1989, Jun. 1	Bill for repair of broken tile located in Section 24.
1991, Jun. 12	Bill for repair of broken tile located in Section 24.
1992, Jul. 30	Request for repair of broken tile located in SE¼ Section 24.
1992, Oct. 6	Bill for repair of broken tile located in Section 24.
1995, Jun. 14	Bill for repair of tile located in Section 17.
1999, Sept. 22	Request for repair of open ditch by cleanout located in SE¼ Section 24.
1999, Nov. 1	Request for repair of lateral not draining properly located in SE¼ Section 25.
1999, Nov. 3	Engineer's Report by Gary E. Sindelar in regards to the request for repairs Drainage District facilities. It called for 385 cu. yds. of excavation and bank leveling, repair six tile blowout areas, and examine and repair lateral No. 1 tile. The estimated total cost of construction was $8,500.
1999, Dec. 6	Engineer's Plans and Report by Gary E. Sindelar was filed. It called for repairing 4 locations on the lateral No. 1 tile, repairing 6 locations on the main tile and cleaning out 1600 ft of open ditch in Section 24.
2000, Feb. 14	Construction contract with Brian Nettleton Exc., Inc. for $5,050.00 for repairs to the drainage district facilities was entered.
2000, Jul. 19	Request for repair of tile blowout located in SE¼ Section 24.
2007, Jan. 4	Request for repair of broken tile located in SE¼ Section 24.
2010, Feb. 25	Request for repair to reshape the waterway located in Section 25.
2010, Mar. 31	District Trustees approval to allow Ken Reece to reshape the waterway and to be careful of the main tile underneath.
2010, Apr. 9	Request for repair drainage located in SE¼ Section 24.
2010, May 11	Request for repair of 3 tile blowouts located in SW¼ Section 25.
2015, Jul. 2	Request for repair of tile blowout located in NE¼ Section 24.
2015, Jul. 2	Request for waterway cleanout located in SE¼ Section 24.

3.0 INVESTIGATION – Review of district history shows that modifications and repairs to the original district facilities were first requested within 10 years of the original construction. In addition, the original open ditch was converted to in closed tile system within 12 years after the original district construction. Finally, landowners within the district have requested over 83 repairs of broken tiles, blowouts and other repairs over the last 64 years. The majority of these repairs (approximately 75%) were located within Sections 24 and 25. Beyond the history review, all the Engineer's Reports and corresponding plans and profiles of were reviewed. Field investigation was performed along with televising of approximately 3,960 feet of Main tile (see Work Order Requests #91 and #92 included in Appendix A). Said field investigation and televising showed that the lower end of the Main tile had approximately 44 previous repairs, 29 partially collapsed tile (9 of which have reflected as sinkholes to the surface) and first 550 feet of tile is either missing, blown out, or has sinkholes reflecting to surface. In addition, field investigation revealed that the soil upstream of the existing headwall is severely eroded/missing and 2200± feet of waterway in Section 24 has siltation to a depth of 0.2 feet to 2.8 feet and needs cleaned out. 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 Main consists of the Main tile and a grassed waterway. For our investigation, calculations were performed to see what the drainage coefficient for the length of the existing Main tile is and it appears that the Main tile was designed to provide a drainage coefficient of 0.08 to 0.15 inches per acre per day. It should be noted that no calculations were performed concerning the waterway as it varies greatly along its length due to deformities from previous cleanouts and erosion.

4.0 DISCUSSION AND CONCLUSIONS – Based on the above, it is obvious that the existing Main tile is undersized when compared to current agricultural demands for drainage. In addition, this district has experienced a high level of repairs on a regular basis (average of one every 9½ months over 64 years). All told, the existing Main tile provides a patchwork of 1919 pipe linked together by various previous repairs, which is all in a severe state of decay. Therefore, the Main tile will only continue to collapse, which will lead to creation of more 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 Main tile. Although drainage capacity is supplemented by the waterway, it too has its own issues as it has been cleaned out several times at regular intervals throughout its history and once again needs cleaned out due to siltation which restricts drainage.

5.0 REPAIR METHODS – To repair the above discussed issues there are several options, but the following are the most straightforward ones:

Spot Repairs and Waterway Cleanout

- Repair 29 partially collapsed main tile locations.
- Remove existing headwall.
- Remove lower 550'± of the main tile and shape up the resulting open channel.
- Construct new headwall at 550'± upstream from the current headwall location.
- Clean out the 2200'± of waterway in Section 24.
- The above repairs would be in the same location as the existing Main tile in order to preserve private tile and lateral connections. For reference, the route and locations are shown on the map included in Appendix C.

Tile Replacement

- Remove and replace the existing Main tile with new tile of equal or comparable size. For reference, a chart with the required tile sizes and capacities is included in Appendix F.
- 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 route is shown on the map included in Appendix D.
- Remove and replace existing headwall.

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

- The proposed and existing capacities shown in Appendix F are based on the assumption that the existing Main 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 methods will not increase the drainage capacity of the Main tile beyond those shown in Appendix F.
- The proposed pipe sizes shown in Appendix F are those that are currently manufactured that most closely meet the current main tile size.
- The above spot repair method is for those portions of the main tile that have been televised or have sinkholes reflected to the surface. No spot repairs are proposed for those portions of the main tile that have not been televised.
- 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, it is our understanding that a hearing will be required. It is also our understanding that 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 the drainage capacity for the Main, the following are some of the options available:

Tile Replacement Upsizing

- Remove and replace the existing Main tile with new Main tile of a larger size. For reference, a chart with the required tile sizes and capacities is included in Appendix G.
- 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 route is shown on the map included in Appendix E.
- Disconnect all private and lateral tile encountered from the existing Main tile.
- Reconnect all private and lateral tile to the new Main tile.

Open Ditch Installation

- Remove and replace the existing Main 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 Main tile in order to locate and outlet private and lateral tile. For reference, the route is shown on the map included in Appendix E.
- 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 G and H are based on the assumptions that the Main tile is both installed per its respective design and that it is functioning at full capacity (i.e. not collapsed, broken, etc).
- The tile replacement upsizing method was proposed for only the ½" drainage coefficient and not the 1" drainage coefficient. This was done as there isn't adequate soil cover to allow installation of tile large enough for the 1" drainage coefficient.
- The open ditch installation method may involve the taking of right of way. However, some of this right of way is currently grassed waterway and not in agricultural production. It is our recommendation that the drainage district seek legal advice as to whether the drainage district obtained right of way to construct the original open ditch and subsequent waterway. If it did, it should then seek legal advice as to whether said right of way is still in the drainage districts possession or needs to be obtained.
- The pipe sizes shown in Appendices G are those that are currently manufactured that meet or exceed the ½" drainage coefficient.
- 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 cost contained in the Opinion of Probable Construction Costs section of this report exceeds said $50,000 limit. Therefore, it is our understanding that a hearing will be required. It is also our understanding that

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 improvement, 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:

METHOD	DRAINAGE COEFF.	DRAINAGE DISTRICT COST	ROAD CROSSING COST	TOTAL COST
Spot Repairs and Waterway Cleanout (Repair)	Existing	$ 149,556.00	$ 0	$ 149,556.00
Tile Replacement (Repair)	Existing	$ 722,574.33	$ 109,422.50	$ 831,996.83
Tile Replacement – Upsizing (Improvement)	½"	$1,153,907.70	$ 147,372.50	$1,301,280.20
Tile Replacement – Open Ditch (Improvement)	N.A.	$ 580,483.20	$ 273,240.00	$ 853,723.20

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 5.5 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 Drainage District No. 1 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 one of the above mentioned repairs or improvements. The repair would remove the current restrictions to the main tile, restore design capacity and prevent future maintenance to varying degrees. The improvement would increase the capacity to more closely match the agricultural needs within the watershed. 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 improvement.
- Adopt one of the recommendations of the Engineer's Report.
- Direct Ryken Engineering to prepare plans and specifications for the proposed repair or improvement.
- 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.