

HARDIN COUNTY, IOWA

2015



ENGINEER'S REPORT ON REPAIR AND IMPROVEMENT TO EXISTING MAIN TILE OF DRAINAGE DISTRICT 98 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. GALLETINE, 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.

FILED

OCT - 7 2015

Hardin County Auditor
Eldora, Iowa

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Engineer's Report on Repair and Improvement to Existing Main Tile of Drainage District 98, Hardin County, Iowa

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Engineer's Report on Repair and Improvement to Existing Main Tile of Drainage District 98, 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 the capacity of and possible improvement the existing main tile of Drainage District No. 98. This report will summarize the history of improvements and repairs, investigate said existing capacity, determine the nature of any necessary repairs and improvements, and present an opinion of probable construction cost associated with said repairs and improvements. At the regular drainage meeting held on August 13, 2014, the request shown in Drainage Work Order Request #21 (copy included in Appendix A) was discussed and reviewed by the District Trustees. As a result, they requested Ryken Engineering to move ahead with said investigation.
- LOCATION – The investigation is limited to the main tile in the W½ Section 10 and the W½ Section 15, Township 89 North (T89N), Range 20 West (R20W), Hardin County, Iowa. Said main tile starts at its outlet in the SW¼ Section 15 (just south of County Highway D-15) at approximately ⅓ mile east of County Highway S-45. It then goes north for approximately 1 mile, where it crosses 115th street at approximately ⅓ mile east of County Highway S-45. It then proceeds north for approximately ¼ mile where it ends near the north line of the SE¼ NW¼ Section 10. For reference, a copy of the 1958 Composite Sketch by Reigles Engineering Company showing said main tile is included in Appendix B.

2.0 DISTRICT HISTORY – The following is a summary of the history of the main tile for Drainage District No. 98 as obtained from the Hardin County Auditor's drainage minutes and records.

1916, Dec. 10	Petition for Drainage District was filed for the NW¼, SE¼, SW¼ Section 10 and NW¼ Section 15, Township 89, Range 20.
1916, Dec. 11	Appointment of J.H. Farrington as Preliminary Engineer.
1917, Aug. 6	Resignation of J.H. Farrington as Preliminary Engineer.
1917, Aug. 17	Appointment of W.S. Porter as Preliminary Engineer.
1917, Nov. 26	Engineer's Report by W.S. Porter was filed. A portion of it called for 9000 feet of main tile with the northern end terminating in the SE¼ SE¼ Section 4 and lateral tiles only in the lower end of the district.
1917, Nov. 26	Supplemental Engineer's Report by W.S. Porter was filed. A portion of it allowed for changing the northern termination of the main tile to the SW¼ NW¼ Section 10.
1917, Dec.	Publication of Notice of hearing on establishment of Drainage District.

1918, Jan. 4 Amended Engineer's Report by W.S. Porter was filed. A portion of it called for 3200 feet of main tile with the northern termination matching the supplemental report and lateral tiles only in the lower end of the district.

1918, Feb. 11 Final hearing on the establishment of the Drainage District.

1918, Feb. 11 Appointment of W.S. Porter as Construction Engineer.

1918, Feb. 25 Bids were received for the design shown in Amended Engineer's Report for tile and construction.

1918, Mar. 4 Tile Contract with Hawkeye Construction Company of Webster City for a total of \$4,580.50 was signed.

1918, Mar. 4 Construction Contract with Hans Hanson & H.C. McKean of Iowa Falls for a total \$3,103.00 was signed.

1918, Apr. 11 Commission to inspect Drainage District for classification.

1918, May 27 Commission to inspect Drainage District for classification.

1918, Sept. 17 Engineer's Report on final pay estimate of Tile Contract with a total cost of \$4,580.50

1918, Nov. 5 Engineer's Report on completion of Construction Contract with a total cost of \$3,282.50

1918, Dec. 21 Petition for Extension of Drainage District as filed.

1918, Dec. 23 Engineer's Report on Extension of Drainage District by W.S. Porter was filed. It recommended to "Extend the main downward to the outlet of Drainage District No. 39, 2600 feet and take and relay 1000 feet of the present main" with no improvements to the upper end of the district.

1919, Jan. 22 Publication of Notice of hearing on extension of Drainage District.

1919, Feb. 24 Commission to inspect the Extension of Drainage District for classification.

1919, Feb. 24 Amended Engineer's Report by W.S. Porter was filed. It revised the location of the outlet and the locations and size of the laterals, but included no improvements to the upper end of the district.

1919, Feb. 25 Hearing on Extension of Drainage District.

1919, Feb. 25 W.S. Porter was appointed as Construction Engineer.

1919, Mar. 17 Bids were received for design shown in Amended Engineer's Report for tile and construction.

1919, Mar. 17 Tile Contract with Eldora Pipe and Tile Company of Eldora for a total of \$2,610.00 was signed.

1919, Mar. 17 Construction Contract with Jens A. Jensen of Eldora for a total of \$2,340.00 was signed.

1919, May 20 Publication of Notice for Assessment of benefits.

1919, Aug. 29 Engineer's Report of final pay estimate of Tile Contract with a total cost of \$2,295.75.

1919, Oct. 6	Engineer's Report of completion of Construction Contract for \$2,940.00 plus an additional \$127.00 for railroad crossing.
1927, Mar. 1	Engineer's Report by J.R. Maher investigating the tile and lands in the upper end of Drainage District No. 98 was filed. A complaint was filed by the landowner of the W $\frac{3}{4}$ N $\frac{1}{2}$ Section 10, which stated "a pond on the north side of the road near the center of said section 10 was tiled into the Main but the Main being constructed to shallow the pond could not be properly drained." When investigated, this was found to be true and that the lands in the upper end of Drainage District No. 98 did not have outlets with sufficient depth to provide adequate drainage. It was recommended "that the Main be lowered for about 800 feet south." The owners of said land asked "that nothing be done at the time for relief to this land". The report further recommended that this work be "postponed until further request is made for relief by landowners in the district".
No Date	Plat of Part of Drainage District 98 showing "private tile at upper end of main" was drawn by J.R. Maher.
1955, Nov. 29	Engineer's Report by F.J. Reigles investigating the depths of the Main and private Lateral B was filed. It determined that the main was too shallow to provide Lateral B an outlet and recommended 1,548 feet of Lateral B be installed to connect to the main farther south.
1958, Apr.	Reigles Engineering Company produced a composite map from the 1918 and 1919 district maps and the undated J.R. Maher map to show both district and private tiles.
1992, Dec. 16	Request for new tile outlet as existing 12 inch diameter private tile was too shallow to outlet to main in the SW $\frac{1}{4}$ Section 10.
1993, Apr. 13	Request for repair at location that existing 12 inch diameter private tile connects to main tile in the SW $\frac{1}{4}$ Section 10.
1993, Jul. 26	Request for repair of three tile blowouts on 1955 tile in the SW $\frac{1}{4}$ Section 10.
1993, Sept. 1	Engineer's Report on determination of ownership of tile lines as directed by Board of Supervisors. After reviewing available records it was the opinion of Hollis E. Ryken (Drainage Engineer) and John Whitesell (Drainage Attorney) that the 1958 plat "most accurately depicts" district and private tiles.
1993, Sept. 1	Determination of official map of Drainage District showing all tile north of 1918 main tile termination to be private tile.
1993, Sept. 1	Board of Supervisors denied the request for repair dated Dec. 16, 1992 as it is private tile.
1993, Sept. 1	Board of Supervisors denied the request for repair dated Jul. 26, 1993 as it is private tile.
1997, Apr. 1	Request for repair of broken Main tile in the NW $\frac{1}{4}$ Section 15.
2004, Nov. 26	Request for repair of 2 broken Main tile in Section 15.
2007, May 18	Request for repair of broken Main tile in Section 15.

3.0 INVESTIGATION – Review of district history shows that there have been several complaints from landowners in the district that the main tile does not afford an adequate outlet. These complaints have occurred since the inception of the district and are mainly related to the elevation of the main, but there is no doubt that the capacity of the main tile also factors into the complaints. In addition, landowners in Section 15, T89N, R20W reported broken main tile 3 times over a span of 10 years. Finally, the most recent repair request indicated that drainage was differing along the length of the main tile as drainage was better on the downstream side of the railroad tracks versus the upstream side. Based on this, the decision was made to televise the main tile on both sides of the railroad tracks in 2014.

For the 2014 televising on the north side of railroad tracks, televised the main tile for approximately 1000 feet upstream from the south railroad right of way line. Discovered that the tile upstream has:

- 1 location that had been replaced with single wall HDPE tile.
- 2 locations that have broken VCP tile.

For the 2014 televising on the south side of railroad tracks, televised the main tile for approximately 1000 feet downstream from the south railroad right of way line. Discovered that the tile downstream has:

- 13 locations with broken VCP tile that is on verge of collapse.
- 2 locations with a broken VCP tile with a void above or beside the tile. A sinkhole is eminent.

While performing said televising, one of the landowners in the district indicated that there were also several sinkholes/blowouts in the main tile just north of County Highway D-15, which is just north of the outlet. The site was visually inspected and several sinkholes/blowouts were located in a grassed waterway just north of County Highway D-15. As a result, the decision was made to televise upstream from the main tile outlet to determine the condition of the main tile.

For the 2014 televising from the outlet, televised the main tile for approximately 100 feet upstream from the outlet. Televising could not continue any farther due to a solidified layer of hard mud deposits laying horizontal in the middle of the tile. No televising occurred in the area of the sinkholes/blowouts.

Since the 2014 televising did not provide any information relative to the area of the sinkholes/blowouts, the District Trustees authorized additional televising from the north side of County Highway D-15 to be performed in 2015.

For the 2015 televising on the north side of County Highway D-15, televised the main tile for approximately 930 feet upstream. Discovered that the tile upstream has:

- 1 location that had been replaced with CMP tile and the CMP is rusted.
- 5 locations with broken VCP tile that is on verge of collapse.
- Approximately 8 locations that have sinkholes/blowouts at tile joints due to missing tile bats at said joints.

For the 2015 televising on the north side of County Highway D-15, televised the main tile for approximately 50 feet downstream. Discovered that the tile downstream has:

- 1 location that has broken VCP tile in the flowline of the tile.
- Approximately 4 locations that have sinkholes/blowouts at tile joints due to missing tile bats at said joints.
- 1 utility line (possibly telecommunications) installed through a broken VCP tile. This prevented further televising downstream.

4.0 DISCUSSION AND CONCLUSIONS – Based on the above, it is obvious that portions of original VCP tile on the main tile is at or past the end of its useful life. As such, it will only continue to collapse and plug with tile pieces and soil. To speed this deterioration and hinder drainage there is a utility line that has been installed through the VCP tile. Although a couple of repairs have been made in the vicinity, they are varying in material and are also starting to fall into disrepair. When these are combined with the missing tile bats over joints at near the outlet, it is a matter of time until more of the main tile will fail and create sinkholes/blowouts. It is also important to note that televising was limited to approximately 2980 feet, which is less than ½ of the 6335 feet which compose the main tile.

5.0 REPAIR METHOD – To repair the above discussed issue, the most straightforward method is to perform individual repairs at the locations identified above. This is accomplished using the following steps:

- Replace the 2 locations of the main tile that have single wall HDPE and CMP tile with dual wall HDPE tile or concrete pipe (dependent upon depth).
- Replace the 20 locations of the main tile that have broken VCP tile with dual wall HDPE tile or concrete pipe (dependent upon depth).
- Replace the 2 locations of the main tile that have broken VCP tile and voids with dual wall HDPE tile or concrete pipe (dependent upon depth).
- Replace the 12 locations of the main tile that are missing tile bats at the joints with concrete pipe.
- Replace the 1 location of the main tile that has a utility line bored through it with concrete pipe and either raise or lower the utility line.
- Jet clean the solidified mud deposits at the outlet of the main tile.

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

- The drainage capacities of the main tile are as shown Appendices C and D. Said repair will not increase the "installed" drainage capacities shown.
- The above repair methods are for those portions of the main tile that have been televised only. No 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 next section of this report exceeds said \$50,000 limit. Therefore, a hearing will be required. Per Iowa Code Chapter 468.126.1.g, the right of remonstrance does not apply to the proposed repairs.

6.0 IMPROVEMENT METHODS – To improve drainage for the main tile, the following are some of the options available:

Replacement Tile

- Replace the existing main tile with a new tile at the same location (see Appendix C for tile sizes). This would be done for the entire length of the existing main tile.

Parallel Tile

- Perform all the items mentioned above in the repair section to ensure that the existing main tile will provide additional years of service.
- Install a supplemental tile adjacent to and parallel with the existing main tile (see Appendix D for tile sizes). Said supplemental tile would be on a different grade than the existing main tile and would provide additional drainage for the existing main tile through interconnections between the two at various intervals. This would be done for the entire length of the existing main tile.

Replacement Tile with Open Ditch

- Replace the existing main tile with an open ditch at the same location. This would be done for the length of the existing main tile downstream of the CN Railroad.
- Replace the existing main tile with a new tile at the same location (see Appendix C for tile sizes). This would be done for the length of the existing main tile upstream of the CN Railroad.

Parallel Tile with Open Ditch

- Perform the items mentioned above in the repair section to ensure that the existing main tile will provide additional years of service. This would be done for the length of the existing main tile upstream of the CN Railroad.
- Replace the existing main tile with an open ditch at the same location. This would be done for the length of the existing main tile downstream of the CN Railroad.
- Install a supplemental tile adjacent to and parallel with the existing main tile (see Appendix D for tile sizes). Said supplemental tile would be on a different grade than the existing main tile and would provide additional drainage for the existing main tile through interconnections between the two at various intervals. This would be done for the length of the existing main tile upstream of the CN Railroad.

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

- The parallel tile method may have the lower initial cost, but it would also require higher maintenance costs in the near future as a key part of the existing main tile is near 100 years old.
- The replacement tile method may have the higher initial cost, but it would also allow for lower maintenance costs in the near future as the entire main tile is new.
- The pipe sizes shown in Appendices C and D are those that are currently manufactured to meet 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.

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 next section of this report exceeds said \$50,000 limit. Therefore, a hearing will be required. Per Iowa Code Chapter 468.126.4.e, the right of remonstrance may apply to the proposed improvements.

7.0 OPINION OF PROBABLE CONSTRUCTION COST – Using the above methods of repair or improvement, an itemized list of project quantities and associated opinions of probable construction cost for each option was compiled and are included in Appendices E, F, F, H, and I of this report. A summary of said costs are as follows:

<u>METHOD</u>	<u>DRAINAGE COEFFICIENT</u>	<u>DISTRICT COST</u>	<u>TOTAL COST</u>
Repair	Existing	\$ 64,800	\$ 64,800
Replacement Tile	½"	\$ 654,750	\$ 697,110
	1"	\$ 969,570	\$1,020,570
Parallel Tile	½"	\$ 512,790	\$ 550,830
	1"	\$ 844,380	\$ 891,060
Replacement Tile with Open Ditch	½"	\$ 555,030	\$ 619,590
	1"	\$ 627,870	\$ 688,470
Parallel Tile with Open Ditch	½"	\$ 523,050	\$ 581,490
	1"	\$ 599,610	\$ 659,490

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 open ditch. However, said costs do not include any interest, legal fees, county administrative fees, crop 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. 98 can be obtained from the Hardin County Auditor’s office.

It should 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, a reclassification separating the Main and Laterals would be required if an improvement were to move forward.

9.0 RECOMMENDATIONS – There is a definite need to perform the above mentioned repair or improvement. These are necessary to prevent restricted drainage and loss of crop productivity. 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 on the proposed repair and/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 required by Iowa Code, proceed with reclassification proceedings for improvement to the Main tile.

AUG - 8 2014

Hardin County Auditor
Eldora, Iowa

**DRAINAGE WORK ORDER
REQUEST FOR REPAIRS
HARDIN COUNTY, IOWA**

District# 98 Lateral _____ Date 08/08/2014

Township East Hardin Section 10 TWP 89 RGE 20

Repair requested by Kent Picht & other landowners in District

Address _____ Phone 641-373-2111

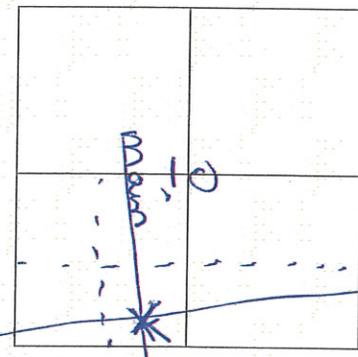
Landowner _____

Address _____ Phone _____

Request taken by Jane

Site available for repair now? YES NO Kent will call when beans are out, Date available _____

Identification of repair: Land above railroad
not draining Landowners would like to
have the main investigated - maybe
televised - S. of + possibly under Railroad
to see where it is restricted



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
ATTN: JANE GEERDES
1215 EDGINGTON AVE
SUITE 1
ELDORA, IA 50627

PHONE (641) 939-8111
FAX (641) 939-8245

Approved: [Signature] Date: 8-13-2014

ALDINGER

HENRY F. ROSKE

SOPHIA

T.R. ST

WATER SHED

ALDINGER

J.

MEYER

W.E. MEYER

LAT. A

STA. 39

STA. 5

8" ASS

BRIGHTWELL

E. C.

CHAPLIN

LOUIS

F. SAILER

MAIN

LAT. 1

ENT. BR.

R. A.



LAT. D

A.L.

HEB

LAT. C

LAT. C

LAT. B

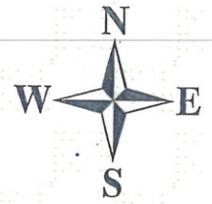
LAT. 2

10

5



HARDIN COUNTY AUDITOR



Date: 8/8/2014

DD 98
10-89-20

The Data is provided "as is" without warranty or any representation of accuracy, timeliness or completeness. The user for determining accuracy, completeness, timeliness, merchantability and fitness for use or the appropriateness for use must rely on the recipient. Hardin County makes no warranties, express or implied as to the use of the Data. There are no financial warranties of merchantability or fitness for a particular purpose. The recipient acknowledges and accepts the inclusion of the Data, including the fact that the Data is dynamic and is in a constant state of maintenance, correction and update. Digital Orthophotography from Spring 2013. Cadastral Data represents land ownership, but does not define it. This Data does not replace a legal survey.

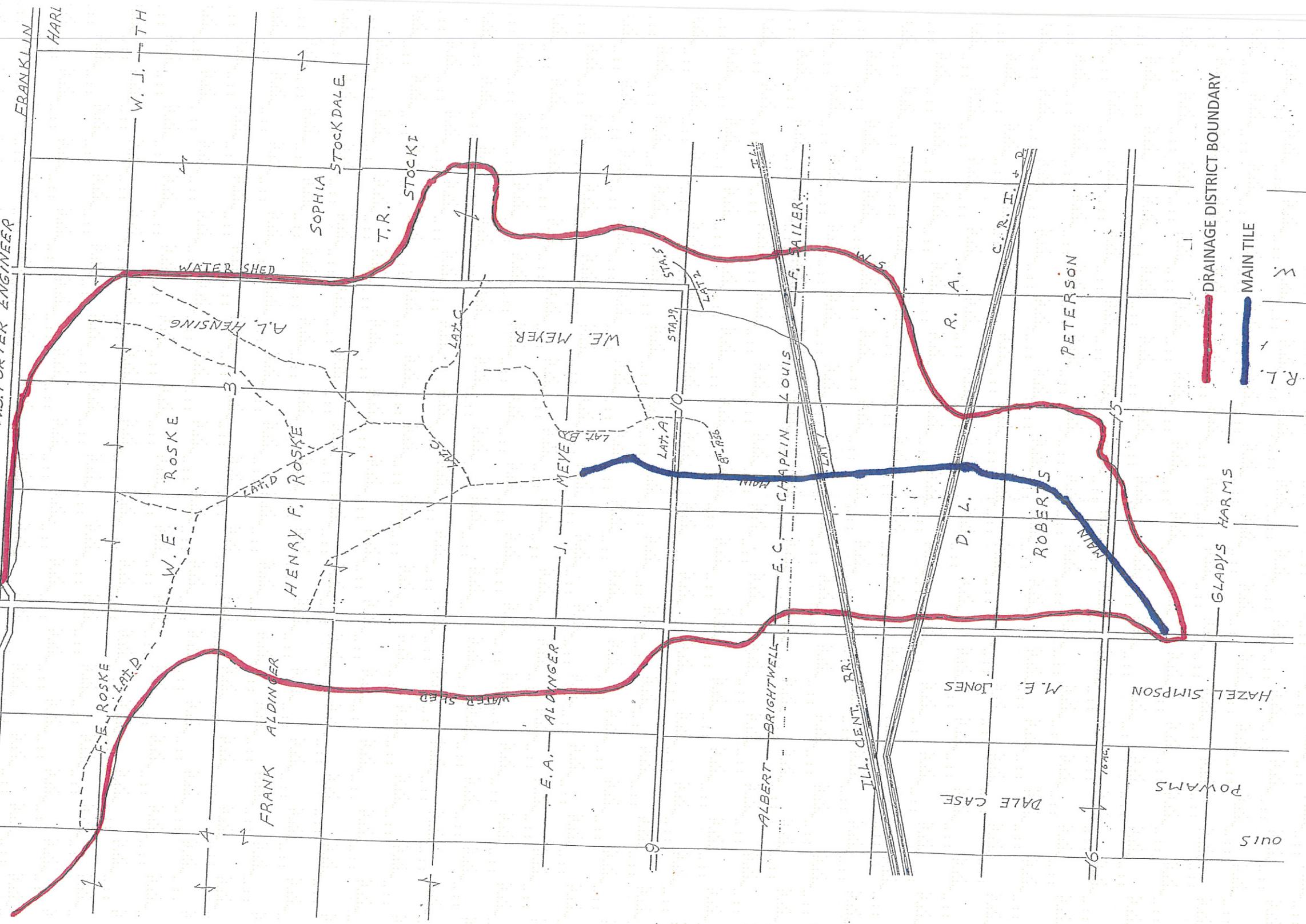


2-1-02 THIS MAP WAS DETERMINED OFFICIAL MAP FOR D.D. 98.

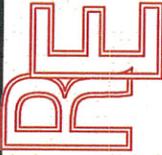
DRAINAGE DISTRICT NO. 98 OCT. 1917

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

Approved by Trustees



DRAINAGE DISTRICT BOUNDARY
 MAIN TILE
 R.L. 3



Tile Capacities

Project: Improvement to Existing Main Tile of D.D. #98 (Replacement Tile)

Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.

Date: 9/30/2015

Checked By: L.O.G.

Date: 10/6/2015

STA	DESCRIPTION	INSTALLED		IMPROVEMENT					
		INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (in ² *acres/day)	1/2" DRAINAGE COEF.		1" DRAINAGE COEF.			
				IMPROVED TILE SIZE (in)	IMPROVED TILE CAPACITY (in ² *acres/day)	IMPROVED TILE SIZE (in)	IMPROVED TILE CAPACITY (in ² *acres/day)		
	Construction Costs								
0+00	Outlet of Existing Main Tile	26	0.27	36	0.58	48	1.24		
32+00	Connection with Lateral 1	26	0.31	36	0.67	42	1.01		
32+01	Upstream of connection with Lateral 1	26	0.36	36	0.77	42	1.17		
34+61	North side of Existing CNRR Tracks	26	0.36	36	0.77	42	1.17		
36+00	Existing Size Change 26" to 22"	22	0.25	30	0.51	42	1.26		
40+15	Connection with Lateral B (Private Tile 1956)	22	0.25	30	0.52	42	1.27		
40+16	Upstream of connection with Lateral B (Private Tile 1956)	22	0.27	30	0.56	42	1.38		
46+90	Connection with J.R. Maher Recommended Tile	28	0.30	30	0.57	42	1.39		
55+25	Connection with Lateral A (Private Tile)	28	0.30	30	0.58	42	1.41		
55+26	Upstream of connection with Lateral A (Private Tile)	28	0.30	30	0.58	42	1.42		
56+00	Grade Change 0.10% to 0.08%	28	0.27	30	0.58	42	1.42		
63+35	End of Existing Main Tile								



Tile Capacities

Project: Improvement to Existing Main Tile of D.D. #98 (Parallel Tile with Constant Grade)

Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.

Date: 9/30/2015

Checked By: L.O.G.

Date: 10/6/2015

STA	DESCRIPTION	INSTALLED		1/2" DRAINAGE COEF.			1" DRAINAGE COEF.		
		INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (in ³ acres/day)	SUPPLEMENTAL TILE SIZE (in)	SUPPLEMENTAL TILE CAPACITY (in ³ acres/day)	COMBINED IMPROVED CAPACITY (in ³ acres/day)	SUPPLEMENTAL TILE SIZE (in)	SUPPLEMENTAL TILE CAPACITY (in ³ acres/day)	COMBINED IMPROVED TILE CAPACITY (in ³ acres/day)
	Construction Costs								
0+00	Outlet of Existing Main Tile	26	0.27	30	0.35	0.62	42	0.87	1.14
32+00	Connection with Lateral 1	26	0.31	24	0.23	0.54	36	1.01	1.32
32+01	Upstream of connection with Lateral 1	26	0.36	24	0.26	0.62	36	0.77	1.13
34+61	North side of Existing CNRR Tracks	26	0.36	24	0.26	0.62	36	0.77	1.13
36+00	Existing Size Change 26" to 22"	22	0.25	24	0.28	0.53	36	0.83	1.08
40+15	Connection with Lateral B (Private Tile 1956)	22	0.25	24	0.29	0.54	36	0.84	1.09
40+16	Upstream of connection with Lateral B (Private Tile 1956)	22	0.27	24	0.31	0.58	36	0.91	1.18
46+90	Connection with J.R. Maher Recommended Tile	28	0.30	24	0.31	0.61	36	0.92	1.22
55+25	Connection with Lateral A (Private Tile)	28	0.30	24	0.32	0.62	36	0.94	1.24
55+26	Upstream of connection with Lateral A (Private Tile)	28	0.30	24	0.32	0.62	36	0.94	1.24
56+00	Grade Change 0.10% to 0.08%	28	0.27	24	0.32	0.59	36	0.94	1.21
63+35	End of Existing Main Tile								



Engineer's Opinion of Probable Construction Cost

Project: Repair to Existing Main Tile of D.D. #98
Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.
Date: 9/30/2015
Checked By: L.O.G.
Date: 10/6/2015

ITEM #	DESCRIPTION	Unit Cost	UNITS	QUANTITY	Units	Total Cost
CONSTRUCTION COSTS - MAIN IMPROVEMENT						
1	TILE SPOT REPAIRS	\$ 1,500.00	EA	24	EA	\$ 36,000.00
2	REPLACE EXISTING TILE WHERE TILE BATTS ARE MISSING	\$ 125.00	LF	100	LF	\$ 12,500.00
3	JET CLEAN OUTLET OF MAIN	\$ 20.00	LF	200	LF	\$ 4,000.00
4	PERMANENT SEEDING	\$ 3,000.00	AC	0.5	AC	\$ 1,500.00
CONSTRUCTION SUBTOTAL						\$ 54,000.00
Contingency (10%)						\$ 5,400.00
CONSTRUCTION TOTAL						\$ 59,400.00
Engr. & Const. Observation (25%)						\$ 14,850.00
TOTAL COST						\$ 64,800.00

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



Engineer's Opinion of Probable Construction Cost

Project: Improvement (1/2") to Existing Main Tile of D.D. #98 (Replacement Tile)
Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.
Date: 9/30/2015
Checked By: L.O.G.
Date: 10/6/2015

ITEM #	DESCRIPTION	Unit Cost	UNITS	QUANTITY	Units	Total Cost
CONSTRUCTION COSTS - MAIN IMPROVEMENT						
1	36" CONCRETE PIPE	\$ 125.00	LF	1730	LF	\$ 216,250.00
2	36" DUAL WALL HDPE PIPE	\$ 65.00	LF	1800	LF	\$ 117,000.00
3	30" DUAL WALL HDPE PIPE	\$ 55.00	LF	2705	LF	\$ 148,775.00
4	30" X 30" X 8" WYE (PRIVATE LATERAL B CONNECTION)	\$ 500.00	EA	1	EA	\$ 500.00
5	30" X 30" X 10" WYE (PRIVATE LATERAL A CONNECTION)	\$ 500.00	EA	1	EA	\$ 500.00
6	36" X 36" X 16" WYE (LATERAL 1 CONNECTION)	\$ 500.00	EA	1	EA	\$ 500.00
7	36" TO 30" HDPE REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
8	PRIVATE TILE CONNECTIONS	\$ 300.00	EA	20	EA	\$ 6,000.00
9	CONCRETE COLLAR	\$ 500.00	EA	5	EA	\$ 2,500.00
10	36" JACK AND BORE RAILROAD CROSSING	\$ 750.00	LF	50	LF	\$ 37,500.00
11	PERMANENT SEEDING (RAILROAD RIGHT OF WAY)	\$ 3,000.00	EA	0.2	EA	\$ 600.00
12	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	2	EA	\$ 2,000.00
13	42" CMP OUTLET PIPE	\$ 75.00	LF	40	LF	\$ 3,000.00
14	OUTLET HEADWALL	\$ 10,000.00	EA	1	EA	\$ 10,000.00
15	36" JACK AND BORE ROAD CROSSING (CO HWY D-15)	\$ 800.00	LF	30	LF	\$ 24,000.00
16	30" OPEN CUT ROAD CROSSING (115TH ST)	\$ 110.00	LF	30	LF	\$ 3,300.00
17	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	4	EA	\$ 4,000.00
18	TRAFFIC CONTROL	\$ 2,500.00	LS	1	LS	\$ 2,500.00
19	PERMANENT SEEDING (CO HWY D-15 AND 115TH ST)	\$ 3,000.00	AC	0.5	AC	\$ 1,500.00
CONSTRUCTION SUBTOTAL						\$ 580,925.00
Contingency (10%)						\$ 58,092.50
CONSTRUCTION TOTAL						\$ 639,017.50
Engr. & Const. Observation (20%)						\$ 127,803.50
TOTAL COST						\$ 697,110.00

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



Engineer's Opinion of Probable Construction Cost

Project: Improvement (1") to Existing Main Tile of D.D. #98 (Replacement Tile)
Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.
Date: 9/30/2015
Checked By: L.O.G.
Date: 10/6/2015

ITEM #	DESCRIPTION	Unit Cost	UNITS	QUANTITY	Units	Total Cost
CONSTRUCTION COSTS - MAIN IMPROVEMENT						
1	48" CONCRETE PIPE	\$ 200.00	LF	2065	LF	\$ 413,000.00
2	48" DUAL WALL HDPE PIPE	\$ 90.00	LF	1065	LF	\$ 95,850.00
3	42" DUAL WALL HDPE PIPE	\$ 75.00	LF	3055	LF	\$ 229,125.00
4	42" X 42" X 8" WYE (PRIVATE LATERAL B CONNECTION)	\$ 500.00	EA	1	EA	\$ 500.00
5	42" X 42" X 10" WYE (PRIVATE LATERAL A CONNECTION)	\$ 500.00	EA	1	EA	\$ 500.00
6	42" X 42" X 16" WYE (LATERAL 1 CONNECTION)	\$ 500.00	EA	1	EA	\$ 500.00
7	48" TO 42" HDPE REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
8	PRIVATE TILE CONNECTIONS	\$ 300.00	EA	20	EA	\$ 6,000.00
9	CONCRETE COLLAR	\$ 500.00	EA	5	EA	\$ 2,500.00
10	42" JACK AND BORE RAILROAD CROSSING	\$ 850.00	LF	50	LF	\$ 42,500.00
11	PERMANENT SEEDING (RAILROAD RIGHT OF WAY)	\$ 3,000.00	EA	0.2	EA	\$ 600.00
12	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	2	EA	\$ 2,000.00
13	54" CMP OUTLET PIPE	\$ 110.00	LF	40	LF	\$ 4,400.00
14	OUTLET HEADWALL	\$ 10,000.00	EA	1	EA	\$ 10,000.00
15	48" JACK AND BORE ROAD CROSSING (CO HWY D-15)	\$ 1,000.00	LF	30	LF	\$ 30,000.00
16	42" OPEN CUT ROAD CROSSING (115TH ST)	\$ 150.00	LF	30	LF	\$ 4,500.00
17	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	4	EA	\$ 4,000.00
18	TRAFFIC CONTROL	\$ 2,500.00	LS	1	LS	\$ 2,500.00
19	PERMANENT SEEDING (CO HWY D-15 AND 115TH ST)	\$ 3,000.00	AC	0.5	AC	\$ 1,500.00
CONSTRUCTION SUBTOTAL						\$ 850,475.00
Contingency (10%)						\$ 85,047.50
CONSTRUCTION TOTAL						\$ 935,522.50
Engr. & Const. Observation (20%)						\$ 187,104.50
TOTAL COST						\$ 1,020,570.00

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



Engineer's Opinion of Probable Construction Cost

**Project: Improvement (1/2") to Existing Main Tile of D.D. #98
(Parallel Tile at Different Grade than Existing Tile)**

Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.

Date: 9/30/2015

Checked By: L.O.G.

Date: 10/6/2015

ITEM #	DESCRIPTION	Unit Cost	UNITS	QUANTITY	Units	Total Cost
CONSTRUCTION COSTS - MAIN REPAIR						
1	TILE SPOT REPAIRS	\$ 1,500.00	EA	24	EA	\$ 36,000.00
2	REPLACE EXISTING TILE WHERE TILE BATTS ARE MISSING	\$ 125.00	LF	100	LF	\$ 12,500.00
3	JET CLEAN OUTLET OF MAIN	\$ 20.00	LF	200	LF	\$ 4,000.00
4	PERMANENT SEEDING	\$ 3,000.00	AC	0.5	AC	\$ 1,500.00
CONSTRUCTION COSTS - MAIN IMPROVEMENT						
1	30" DUAL WALL HDPE PIPE	\$ 55.00	LF	3130	LF	\$ 172,150.00
2	24" DUAL WALL HDPE PIPE	\$ 45.00	LF	3055	LF	\$ 137,475.00
3	30" X 30" X 30" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	6	EA	\$ 3,000.00
4	24" X 24" X 24" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	4	EA	\$ 2,000.00
5	30" X 30" X 24" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	2	EA	\$ 1,000.00
6	30" X 30" X 24" HDPE WYE (CONNECTION WITH EXISTING MAIN)	\$ 500.00	EA	1	EA	\$ 500.00
7	24" X 45° HDPE BEND	\$ 500.00	EA	1	EA	\$ 500.00
8	30" TO 24" HDPE REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
9	PRIVATE TILE CONNECTIONS	\$ 300.00	EA	10	EA	\$ 3,000.00
10	CONCRETE COLLAR	\$ 500.00	EA	16	EA	\$ 8,000.00
11	24" JACK AND BORE RAILROAD CROSSING	\$ 600.00	LF	50	LF	\$ 30,000.00
12	PERMANENT SEEDING (RAILROAD RIGHT OF WAY)	\$ 3,000.00	EA	0.2	EA	\$ 600.00
13	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	2	EA	\$ 2,000.00
14	36" CMP OUTLET PIPE	\$ 65.00	LF	40	LF	\$ 2,600.00
15	OUTLET HEADWALL	\$ 10,000.00	EA	1	EA	\$ 10,000.00
16	30" JACK AND BORE ROAD CROSSING (CO HWY D-15)	\$ 700.00	LF	30	LF	\$ 21,000.00
17	24" OPEN CUT ROAD CROSSING (115TH ST)	\$ 90.00	LF	30	LF	\$ 2,700.00
18	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	4	EA	\$ 4,000.00
19	TRAFFIC CONTROL	\$ 2,500.00	LS	1	LS	\$ 2,500.00
20	PERMANENT SEEDING (CO HWY D-15 AND 115TH ST)	\$ 3,000.00	AC	0.5	AC	\$ 1,500.00
CONSTRUCTION SUBTOTAL						\$ 459,025.00
Contingency (10%)						\$ 45,902.50
CONSTRUCTION TOTAL						\$ 504,927.50
Engr. & Const. Observation (20%)						\$ 100,985.50
TOTAL COST						\$ 550,830.00

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



Engineer's Opinion of Probable Construction Cost

**Project: Improvement (1") to Existing Main Tile of D.D. #98
(Parallel Tile at Different Grade than Existing Tile)**

Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.

Date: 9/30/2015

Checked By: L.O.G.

Date: 10/6/2015

ITEM #	DESCRIPTION	Unit Cost	UNITS	QUANTITY	Units	Total Cost
CONSTRUCTION COSTS - MAIN REPAIR						
1	TILE SPOT REPAIRS	\$ 1,500.00	EA	24	EA	\$ 36,000.00
2	REPLACE EXISTING TILE WHERE TILE BATTS ARE MISSING	\$ 125.00	LF	100	LF	\$ 12,500.00
3	JET CLEAN OUTLET OF MAIN	\$ 20.00	LF	200	LF	\$ 4,000.00
4	PERMANENT SEEDING	\$ 3,000.00	AC	0.5	AC	\$ 1,500.00
CONSTRUCTION COSTS - MAIN IMPROVEMENT						
1	42" CONCRETE PIPE	\$ 150.00	LF	1915	LF	\$ 287,250.00
2	42" DUAL WALL HDPE PIPE	\$ 75.00	LF	1215	LF	\$ 91,125.00
3	36" DUAL WALL HDPE PIPE	\$ 65.00	LF	3055	LF	\$ 198,575.00
4	30" X 30" X 30" CONCRETE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	1	EA	\$ 500.00
5	30" X 30" X 30" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	4	EA	\$ 2,000.00
6	42" X 42" X 30" CONCRETE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	1	EA	\$ 500.00
7	42" X 42" X 30" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	2	EA	\$ 1,000.00
8	24" X 24" X 24" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	1	EA	\$ 500.00
9	36" X 36" X 24" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	1	EA	\$ 500.00
10	36" X 36" X 30" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	2	EA	\$ 1,000.00
11	30" X 30" X 30" HDPE WYE (CONNECTION WITH EXISTING MAIN)	\$ 500.00	EA	1	EA	\$ 500.00
12	36" X 45° HDPE BEND	\$ 500.00	EA	1	EA	\$ 500.00
13	42" TO 36" HDPE REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
14	36" TO 30" HDPE REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
15	PRIVATE TILE CONNECTIONS	\$ 300.00	EA	10	EA	\$ 3,000.00
16	CONCRETE COLLAR	\$ 500.00	EA	16	EA	\$ 8,000.00
17	36" JACK AND BORE RAILROAD CROSSING	\$ 750.00	LF	50	LF	\$ 37,500.00
18	PERMANENT SEEDING (RAILROAD RIGHT OF WAY)	\$ 3,000.00	EA	0.2	EA	\$ 600.00
19	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	2	EA	\$ 2,000.00
20	48" CMP OUTLET PIPE	\$ 90.00	LF	40	LF	\$ 3,600.00
21	OUTLET HEADWALL	\$ 10,000.00	EA	1	EA	\$ 10,000.00
22	42" JACK AND BORE ROAD CROSSING (CO HWY D-15)	\$ 900.00	LF	30	LF	\$ 27,000.00
23	36" OPEN CUT ROAD CROSSING (115TH ST)	\$ 130.00	LF	30	LF	\$ 3,900.00
24	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	4	EA	\$ 4,000.00
25	TRAFFIC CONTROL	\$ 2,500.00	LS	1	LS	\$ 2,500.00
26	PERMANENT SEEDING (CO HWY D-15 AND 115TH ST)	\$ 3,000.00	AC	0.5	AC	\$ 1,500.00
CONSTRUCTION SUBTOTAL						\$ 742,550.00
Contingency (10%)						\$ 74,255.00
CONSTRUCTION TOTAL						\$ 816,805.00
Engr. & Const. Observation (20%)						\$ 163,361.00
TOTAL COST						\$ 891,060.00

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



Engineer's Opinion of Probable Construction Cost

**Project: Improvement (1/2") to Existing Main Tile of D.D. #98
(Replacement Tile and Open Ditch)**
Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.
Date: 9/30/2015
Checked By: L.O.G.
Date: 10/6/2015

ITEM #	DESCRIPTION	Unit Cost	UNITS	QUANTITY	Units	Total Cost
CONSTRUCTION COSTS - MAIN IMPROVEMENT						
1	OPEN DITCH CONSTRUCTION	\$ 3,000.00	STA	34.5	STA	\$ 103,500.00
2	OPEN DITCH SEEDING	\$ 700.00	STA	34.5	STA	\$ 24,150.00
3	36" DUAL WALL HDPE PIPE	\$ 65.00	LF	100	LF	\$ 6,500.00
4	30" DUAL WALL HDPE PIPE	\$ 55.00	LF	2705	LF	\$ 148,775.00
5	30" X 30" X 8" WYE (PRIVATE LATERAL B CONNECTION)	\$ 500.00	EA	1	EA	\$ 500.00
6	30" X 30" X 10" WYE (PRIVATE LATERAL A CONNECTION)	\$ 500.00	EA	1	EA	\$ 500.00
7	18" CMP OUTLET (LATERAL 1 CONNECTION)	\$ 1,500.00	EA	1	EA	\$ 1,500.00
8	42" CMP OUTLET	\$ 75.00	LF	40	LF	\$ 3,000.00
9	36" TO 30" HDPE REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
10	PRIVATE TILE CONNECTIONS	\$ 300.00	EA	10	EA	\$ 3,000.00
11	CONCRETE COLLAR	\$ 500.00	EA	5	EA	\$ 2,500.00
12	36" JACK AND BORE RAILROAD CROSSING	\$ 750.00	LF	50	LF	\$ 37,500.00
13	PERMANENT SEEDING (RAILROAD RIGHT OF WAY)	\$ 3,000.00	EA	0.2	EA	\$ 600.00
14	PRIVATE TILE OUTLETS	\$ 1,000.00	EA	10	EA	\$ 10,000.00
15	RIGHT OF WAY	\$ 10,000.00	AC	12	AC	\$ 120,000.00
16	RCB WITH END SECTIONS (CO HWY D-15)	\$ 40,000.00	LS	1	LS	\$ 40,000.00
17	30" OPEN CUT ROAD CROSSING (115TH ST)	\$ 110.00	LF	30	LF	\$ 3,300.00
18	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	2	EA	\$ 2,000.00
19	TRAFFIC CONTROL	\$ 2,500.00	LS	1	LS	\$ 2,500.00
20	PERMANENT SEEDING (CO HWY D-15 AND 115TH ST)	\$ 3,000.00	AC	2	AC	\$ 6,000.00
CONSTRUCTION SUBTOTAL						\$ 516,325.00
Contingency (10%)						\$ 51,632.50
CONSTRUCTION TOTAL						\$ 567,957.50
Engr. & Const. Observation (20%)						\$ 113,591.50
TOTAL COST						\$ 619,590.00

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



Engineer's Opinion of Probable Construction Cost

**Project: Improvement (1") to Existing Main Tile of D.D. #98
(Replacement Tile and Open Ditch)**

Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.

Date: 9/30/2015

Checked By: L.O.G.

Date: 10/6/2015

ITEM #	DESCRIPTION	Unit Cost	UNITS	QUANTITY	Units	Total Cost
CONSTRUCTION COSTS - MAIN IMPROVEMENT						
1	OPEN DITCH CONSTRUCTION	\$ 3,000.00	STA	34.5	STA	\$ 103,500.00
2	OPEN DITCH SEEDING	\$ 700.00	STA	34.5	STA	\$ 24,150.00
3	42" DUAL WALL HDPE PIPE	\$ 75.00	LF	2805	LF	\$ 210,375.00
4	42" X 42" X 8" WYE (PRIVATE LATERAL B CONNECTION)	\$ 500.00	EA	1	EA	\$ 500.00
5	42" X 42" X 10" WYE (PRIVATE LATERAL A CONNECTION)	\$ 500.00	EA	1	EA	\$ 500.00
6	18" CMP OUTLET (LATERAL 1 CONNECTION)	\$ 1,500.00	EA	1	EA	\$ 1,500.00
7	48" CMP OUTLET	\$ 90.00	LF	40	LF	\$ 3,600.00
8	48" TO 42" HDPE REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
9	PRIVATE TILE CONNECTIONS	\$ 300.00	EA	10	EA	\$ 3,000.00
10	CONCRETE COLLAR	\$ 500.00	EA	5	EA	\$ 2,500.00
11	42" JACK AND BORE RAILROAD CROSSING	\$ 850.00	LF	50	LF	\$ 42,500.00
12	PERMANENT SEEDING (RAILROAD RIGHT OF WAY)	\$ 3,000.00	EA	0.2	EA	\$ 600.00
13	PRIVATE TILE OUTLETS	\$ 1,000.00	EA	10	EA	\$ 10,000.00
14	RIGHT OF WAY	\$ 10,000.00	AC	12	AC	\$ 120,000.00
15	RCB WITH END SECTIONS (CO HWY D-15)	\$ 40,000.00	LS	1	LS	\$ 40,000.00
16	42" OPEN CUT ROAD CROSSING (115TH ST)	\$ 150.00	LF	30	LF	\$ 4,500.00
17	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	2	EA	\$ 2,000.00
18	TRAFFIC CONTROL	\$ 2,500.00	LS	1	LS	\$ 2,500.00
19	PERMANENT SEEDING (CO HWY D-15 AND 115TH ST)	\$ 3,000.00	AC	0.5	AC	\$ 1,500.00
CONSTRUCTION SUBTOTAL						\$ 573,725.00
Contingency (10%)						\$ 57,372.50
CONSTRUCTION TOTAL						\$ 631,097.50
Engr. & Const. Observation (20%)						\$ 126,219.50
TOTAL COST						\$ 688,470.00

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



Engineer's Opinion of Probable Construction Cost

**Project: Improvement (1/2") to Existing Main Tile of D.D. #98
(Parallel Tile at Different Grade than Existing Tile and Open Ditch)**
Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.
Date: 9/30/2015
Checked By: L.O.G.
Date: 10/6/2015

ITEM #	DESCRIPTION	Unit Cost	UNITS	QUANTITY	Units	Total Cost
CONSTRUCTION COSTS - MAIN REPAIR						
1	TILE SPOT REPAIRS	\$ 1,500.00	EA	3	EA	\$ 4,500.00
CONSTRUCTION COSTS - MAIN IMPROVEMENT						
1	OPEN DITCH CONSTRUCTION	\$ 3,000.00	STA	34.5	STA	\$ 103,500.00
2	OPEN DITCH SEEDING	\$ 700.00	STA	34.5	STA	\$ 24,150.00
3	24" DUAL WALL HDPE PIPE	\$ 45.00	LF	2805	LF	\$ 126,225.00
4	24" X 24" X 24" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	2	EA	\$ 1,000.00
5	30" X 30" X 24" HDPE TEE (INTER -CONNECTIONS)	\$ 500.00	EA	2	EA	\$ 1,000.00
6	30" X 30" X 24" HDPE WYE (CONNECTION WITH EXISTING MAIN)	\$ 500.00	EA	1	EA	\$ 500.00
7	24" X 45° HDPE BEND	\$ 500.00	EA	1	EA	\$ 500.00
8	30" TO 24" HDPE REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
9	18" CMP OUTLET (LATERAL 1 CONNECTION)	\$ 1,500.00	EA	1	EA	\$ 1,500.00
10	24" CMP OUTLET	\$ 60.00	LF	40	LF	\$ 2,400.00
11	PRIVATE TILE CONNECTIONS	\$ 300.00	EA	5	EA	\$ 1,500.00
12	CONCRETE COLLAR	\$ 500.00	EA	16	EA	\$ 8,000.00
13	24" JACK AND BORE RAILROAD CROSSING	\$ 600.00	LF	50	LF	\$ 30,000.00
14	PERMANENT SEEDING (RAILROAD RIGHT OF WAY)	\$ 3,000.00	EA	0.2	EA	\$ 600.00
15	PRIVATE TILE OUTLETS	\$ 1,000.00	EA	10	EA	\$ 10,000.00
16	RIGHT OF WAY	\$ 10,000.00	AC	12	AC	\$ 120,000.00
17	RCB WITH END SECTIONS (CO HWY D-15)	\$ 40,000.00	LS	1	LS	\$ 40,000.00
18	24" OPEN CUT ROAD CROSSING (115TH ST)	\$ 90.00	LF	30	LF	\$ 2,700.00
19	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	2	EA	\$ 2,000.00
20	TRAFFIC CONTROL	\$ 2,500.00	LS	1	LS	\$ 2,500.00
21	PERMANENT SEEDING (CO HWY D-15 AND 115TH ST)	\$ 3,000.00	AC	0.5	AC	\$ 1,500.00
CONSTRUCTION SUBTOTAL						\$ 484,575.00
Contingency (10%)						\$ 48,457.50
CONSTRUCTION TOTAL						\$ 533,032.50
Engr. & Const. Observation (20%)						\$ 106,606.50
TOTAL COST						\$ 581,490.00

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



Engineer's Opinion of Probable Construction Cost

Project: Improvement (1") to Existing Main Tile of D.D. #98
(Parallel Tile at Different Grade than Existing Tile and Open
 Location: Sections 10 and 15, T89N, R20W, Hardin County, Iowa

By: Z.J.S.
 Date: 9/30/2015
 Checked By: L.O.G.
 Date: 10/6/2015

ITEM #	DESCRIPTION	Unit Cost	UNITS	QUANTITY	Units	Total Cost
CONSTRUCTION COSTS - MAIN REPAIR						
1	TILE SPOT REPAIRS	\$ 1,500.00	EA	3	EA	\$ 4,500.00
CONSTRUCTION COSTS - MAIN IMPROVEMENT						
1	OPEN DITCH CONSTRUCTION	\$ 3,000.00	STA	34.5	STA	\$ 103,500.00
2	OPEN DITCH SEEDING	\$ 700.00	STA	34.5	STA	\$ 24,150.00
3	36" DUAL WALL HDPE PIPE	\$ 65.00	LF	2805	LF	\$ 182,325.00
4	30" X 30" X 30" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	2	EA	\$ 1,000.00
5	24" X 24" X 24" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	1	EA	\$ 500.00
6	36" X 36" X 24" HDPE TEE (INTER-CONNECTIONS)	\$ 500.00	EA	1	EA	\$ 500.00
7	30" X 30" X 30" HDPE WYE (CONNECTION WITH EXISTING MAIN)	\$ 500.00	EA	1	EA	\$ 500.00
8	36" X 45° HDPE BEND	\$ 500.00	EA	1	EA	\$ 500.00
9	36" TO 30" HDPE REDUCER	\$ 500.00	EA	1	EA	\$ 500.00
10	18" CMP OUTLET (LATERAL 1 CONNECTION)	\$ 1,500.00	EA	1	EA	\$ 1,500.00
11	36" CMP OUTLET	\$ 65.00	LF	40	LF	\$ 2,600.00
12	PRIVATE TILE CONNECTIONS	\$ 300.00	EA	5	EA	\$ 1,500.00
13	CONCRETE COLLAR	\$ 500.00	EA	16	EA	\$ 8,000.00
14	36" JACK AND BORE RAILROAD CROSSING	\$ 750.00	LF	50	LF	\$ 37,500.00
15	PERMANENT SEEDING (RAILROAD RIGHT OF WAY)	\$ 3,000.00	EA	0.2	EA	\$ 600.00
16	PRIVATE TILE OUTLETS	\$ 1,000.00	EA	10	EA	\$ 10,000.00
17	RIGHT OF WAY	\$ 10,000.00	AC	12	AC	\$ 120,000.00
18	RCB WITH END SECTIONS (CO HWY D-15)	\$ 40,000.00	LS	1	LS	\$ 40,000.00
19	36" OPEN CUT ROAD CROSSING (115TH ST)	\$ 130.00	LF	30	LF	\$ 3,900.00
20	HICKENBOTTOM INTAKE	\$ 1,000.00	EA	2	EA	\$ 2,000.00
21	TRAFFIC CONTROL	\$ 2,500.00	LS	1	LS	\$ 2,500.00
22	PERMANENT SEEDING (CO HWY D-15 AND 115TH ST)	\$ 3,000.00	AC	0.5	AC	\$ 1,500.00
CONSTRUCTION SUBTOTAL						\$ 549,575.00
Contingency (10%)						\$ 54,957.50
CONSTRUCTION TOTAL						\$ 604,532.50
Engr. & Const. Observation (20%)						\$ 120,906.50
TOTAL COST						\$ 659,490.00

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