RYKEN
ENGINEERING & LAND SURVEYING, INC.

By: Z.J.S.
Date: 7/18/2016
Checked By: L.O.G.
Date: 8/8/2016

Engineer's Opinion of Main Capacities

Project: Main Repairs for D.D. #1

Location: Sections 24 and 25, T88N, R20W, Hardin County, Iowa

TILE REPLACEMENT

		INSTALLED		REPAIR	
STA	DESCRIPTION	INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (in*acres/day)	REPAIRED TILE SIZE (in)	REPAIRED TILE CAPACITY (in*acres/day)
	Main				
0+00	Main Tile Outlet to open ditch	26	0.08	30	0.11
2+50	Grade Change 0.10% - 0.16%	26	0.10	30	0.15
37+00	Pipe size change 26" - 24"	24	0.10	24	0.10
53+45	Connection with Lateral No. 1	24	0.12	24	0.12
53+46	Upstream of Connection with Lateral No. 1	24	0.15	24	0.15
57+00	Pipe size change 24" - 22"	22	0.12	24	0.15
71+35	West Side of T Avenue				

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Project: Main Improvements for D.D. #1

Location: Sections 24 and 25, T88N, R20W, Hardin County, Iowa

TILE REPLACEMENT - UPSIZING

		INSTALLED		IMPROVEMENT (UPSIZING)			
				½" DRAINAGE COEF.		1" DRAINAGE COEF.	
STA	DESCRIPTION	INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (in*acres/day)	UPSIZING TILE SIZE (in)	IMPROVED TILE CAPACITY (in*acres/day)	UPSIZING TILE SIZE (in)	IMPROVED TILE CAPACITY (in*acres/day)
	Main						
0+00	Main Tile Outlet to open ditch	26	0.08	54	0.55	N.A.	N.A.
2+50	Grade Change 0.10% - 0.16%	26	0.10	48	0.52	N.A.	N.A.
37+00	Pipe size change 26" - 24"	24	0.10	48	0.66	N.A.	N.A.
53+45	Connection with Lateral No. 1	24	0.12	42	0.54	N.A.	N.A.
53+46	Upstream of Connection with Lateral No. 1	24	0.15	42	0.67	N.A.	N.A.
57+00	Pipe size change 24" - 22"	22	0.12	42	0.67	N.A.	N.A.
71+35	West Side of T Avenue						

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Engineer's Opinion of Main Capacities

Project: Main Improvements for D.D. #1

Location: Sections 25 and 26, T88N, R20W, Hardin County, Iowa

TILE REPLACEMENTS - OPEN DITCH INSTALLATION

			INSTALLED		IMPROVEMENT (OPEN DITCH)	
	STA	DESCRIPTION	INSTALLED TILE SIZE (in)	INSTALLED TILE CAPACITY (in*acres/day)	MAIN	IMPROVED MAIN CAPACITY (in*acres/day)
		Main				
	0+00	Main Tile Outlet to open ditch	26	0.08	Open	2.84
	2+50	Grade Change 0.10% - 0.16%	26	0.10	Open	3.71
	37+00	Pipe size change 26" - 24"	24	0.10	Open	4.64
	53+45	Connection with Lateral No. 1	24	0.12	Open	5.43
	53+46	Upstream of Connection with Lateral No. 1	24	0.15	Open	6.74
	57+00	Pipe size change 24" - 22"	22	0.12	Open	6.78
	71+35	West Side of T Avenue				

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By: Z.J.S.
Date: 7/19/2016
Checked By: L.O.G.
Date: 8/1/2016

Engineer's Opinion of Probable Construction Cost

Project: Main Repairs for D.D. #1

Location: Sections 24 & 25, T88N, R20W, Hardin County, Iowa

SPOT REPAIRS AND WATERWAY CLEANOUT

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	CONSTRUCTION COSTS					
101	SPOT REPAIR	$ 2,000.00	EA	29	EA	$ 58,000.00
102	CLEAN OUT EXISTING WATERWAY	$ 1,000.00	STA	22	STA	$ 22,000.00
103	30" CMP OUTLET	$ 125.00	LF	40	LF	$ 5,000.00
104	CONCRETE COLLAR	$ 400.00	EA	1	EA	$ 400.00
105	HEADWALL	$ 10,000.00	EA	1	EA	$ 10,000.00
106	RIP-RAP	$ 40.00	TN	50	TN	$ 2,000.00
107	SEEDING	$ 5,000.00	LS	1	LS	$ 5,000.00
108	REMOVE EXISTING HEADWALL	$ 5,000.00	EA	1	EA	$ 5,000.00
109	REMOVE EXISTING TILE	$ 10.00	LF	590	LF	$ 5,900.00
		CONSTRUCTION SUBTOTAL				$ 113,300.00
		Contingency (10%)				$ 11,330.00
		CONSTRUCTION TOTAL				**$ 124,630.00**
		Engr. & Const. Observation (20%)				$ 24,926.00
		TOTAL COST				**$ 149,556.00**

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By: Z.J.S.
Date: 7/18/2016
Checked By: L.O.G.
Date: 8/1/2016

Engineer's Opinion of Probable Construction Cost

Project: Main Repairs for D.D. #1

Location: Sections 24 & 25, T88N, R20W, Hardin County, Iowa

TILE REPLACEMENT

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	CONSTRUCTION COSTS					
201	30" DUAL WALL POLYPROPYLENE TILE	$ 70.00	LF	3560	LF	$ 249,200.00
202	24" DUAL WALL POLYPROPYLENE TILE	$ 65.00	LF	3435	LF	$ 223,275.00
203	30" X 24" POLYPROPYLENE REDUCER	$ 1,250.00	EA	1	EA	$ 1,250.00
204	36" CMP OUTLET	$ 150.00	LF	40	LF	$ 6,000.00
205	LATERAL CONNECTION	$ 2,000.00	EA	1	EA	$ 2,000.00
206	HEADWALL	$ 10,000.00	EA	1	EA	$ 10,000.00
207	RIP-RAP	$ 40.00	TN	50	TN	$ 2,000.00
208	CONCRETE COLLAR	$ 400.00	EA	3	EA	$ 1,200.00
209	PRIVATE TILE CONNECTIONS	$ 500.00	EA	30	EA	$ 15,000.00
210	REMOVE EXISTING TILE	$ 8.00	LF	7035	LF	$ 56,280.00
211	REMOVE EXISTING HEADWALL	$ 5,000.00	EA	1	EA	$ 5,000.00
		CONSTRUCTION SUBTOTAL				$ 571,205.00
		Contingency (10%)				$ 57,120.50
		CONSTRUCTION TOTAL				**$ 628,325.50**
		Engr. & Const. Observation (15%)				$ 94,248.83
		TOTAL COST				**$ 722,574.33**
	ROAD CROSSING CONSTRUCTION COSTS					
212	HICKENBOTTOM INTAKE	$ 1,500.00	EA	3	EA	$ 4,500.00
213	TILE ABANDONMENT	$ 50.00	LF	100	LF	$ 5,000.00
214	JACK AND BORE (D35 ROAD CROSSING)	$ 700.00	LF	100	LF	$ 70,000.00
215	SEEDING (D35 ROAD CROSSING)	$ 2,000.00	LS	1	LS	$ 2,000.00
216	TRAFFIC CONTROL	$ 5,000.00	LS	1	LS	$ 5,000.00
		CONSTRUCTION SUBTOTAL				$ 86,500.00
		Contingency (10%)				$ 8,650.00
		CONSTRUCTION TOTAL				**$ 95,150.00**
		Engr. & Const. Observation (15%)				$ 14,272.50
		TOTAL COST				**$ 109,422.50**

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

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By: Z.J.S.
Date: 7/18/2016
Checked By: L.O.G.
Date: 8/1/2016

Engineer's Opinion of Probable Construction Cost

Project: Main Improvements for D.D. #1

Location: Sections 24 & 25, T88N, R20W, Hardin County, Iowa

TILE REPLACEMENT - UPSIZING (½" COEFFICIENT)

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	CONSTRUCTION COSTS					
301	54" DUAL WALL POLYPROPYLENE TILE	$ 130.00	LF	210	LF	$ 27,300.00
302	48" DUAL WALL POLYPROPYLENE TILE	$ 120.00	LF	4995	LF	$ 599,400.00
303	42" DUAL WALL POLYPROPYLENE TILE	$ 100.00	LF	1790	LF	$ 179,000.00
304	54" X 48" POLYPROPYLENE REDUCER	$ 3,000.00	EA	1	EA	$ 3,000.00
305	48" X 42" POLYPROPYLENE REDUCER	$ 3,000.00	EA	1	EA	$ 3,000.00
306	54" CMP OUTLET	$ 200.00	LF	40	LF	$ 8,000.00
307	LATERAL CONNECTION	$ 3,000.00	EA	1	EA	$ 3,000.00
308	HEADWALL	$ 10,000.00	EA	1	EA	$ 10,000.00
309	RIP-RAP	$ 40.00	TN	50	TN	$ 2,000.00
310	CONCRETE COLLAR	$ 400.00	EA	3	EA	$ 1,200.00
311	PRIVATE TILE CONNECTIONS	$ 500.00	EA	30	EA	$ 15,000.00
312	REMOVE EXISTING TILE	$ 8.00	LF	7035	LF	$ 56,280.00
313	REMOVE EXISTING HEADWALL	$ 5,000.00	EA	1	EA	$ 5,000.00
		CONSTRUCTION SUBTOTAL				$ 912,180.00
		Contingency (10%)				$ 91,218.00
		CONSTRUCTION TOTAL				**$ 1,003,398.00**
		Engr. & Const. Observation (15%)				$ 150,509.70
		TOTAL COST				**$ 1,153,907.70**
	ROAD CROSSING CONSTRUCTION COSTS					
314	HICKENBOTTOM INTAKE	$ 1,500.00	EA	3	EA	$ 4,500.00
315	TILE ABANDONMENT	$ 50.00	LF	100	LF	$ 5,000.00
316	JACK AND BORE (D35 ROAD CROSSING)	$ 1,000.00	LF	100	LF	$ 100,000.00
317	SEEDING (D35 ROAD CROSSING)	$ 2,000.00	LS	1	LS	$ 2,000.00
318	TRAFFIC CONTROL	$ 5,000.00	LS	1	LS	$ 5,000.00
		CONSTRUCTION SUBTOTAL				$ 116,500.00
		Contingency (10%)				$ 11,650.00
		CONSTRUCTION TOTAL				**$ 128,150.00**
		Engr. & Const. Observation (15%)				$ 19,222.50
		TOTAL COST				**$ 147,372.50**

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Engineer's Opinion of Probable Construction Cost

Project: Main Improvements for D.D. #1

Location: Sections 24 & 25, T88N, R20W, Hardin County, Iowa

TILE REPLACEMENT - OPEN DITCH INSTALLATION

ITEM #	DESCRIPTION	Unit Cost	Units	Quantity	Units	Total Cost
	DISTRICT CONSTRUCTION COSTS					
401	OPEN DITCH CONSTRUCTION	$ 2,500.00	STA	71	STA	$ 177,500.00
402	CMP OUTLET	$ 100.00	LF	80	LF	$ 8,000.00
403	HEADWALL	$ 10,000.00	EA	2	EA	$ 20,000.00
404	RIP-RAP	$ 40.00	TN	100	TN	$ 4,000.00
405	CONCRETE COLLAR	$ 400.00	EA	2	EA	$ 800.00
406	SURFACE DRAINS	$ 1,500.00	EA	30	EA	$ 45,000.00
407	PRIVATE TILE OUTLETS	$ 1,500.00	EA	30	EA	$ 45,000.00
408	SEEDING (OPEN DITCH)	$ 500.00	STA	71	STA	$ 35,500.00
409	REMOVE EXISTING TILE	$ 8.00	LF	7135	LF	$ 57,080.00
410	RIGHT OF WAY	$ 12,000.00	AC	5.5	AC	$ 66,000.00
		CONSTRUCTION SUBTOTAL				$ 458,880.00
		Contingency (10%)				$ 45,888.00
		CONSTRUCTION TOTAL				**$ 504,768.00**
		Engr. & Const. Observation (15%)				$ 75,715.20
		TOTAL COST				**$ 580,483.20**
	ROAD CROSSING CONSTRUCTION COSTS					
411	RCB CULVERT (D35 ROAD CROSSING)	$ 200,000.00	LS	1	LS	$ 200,000.00
412	SEEDING (RIGHT OF WAY)	$ 2,000.00	LS	1	LS	$ 2,000.00
413	TRAFFIC CONTROL	$ 5,000.00	LS	1	LS	$ 5,000.00
		CONSTRUCTION SUBTOTAL				$ 207,000.00
		Contingency (10%)				$ 20,700.00
		CONSTRUCTION TOTAL				**$ 227,700.00**
		Engr. & Const. Observation (20%)				$ 45,540.00
		TOTAL COST				**$ 273,240.00**

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