



February 26, 2019

Osceola County Board of Supervisors  
300 7<sup>th</sup> St.  
Sibley, IA 51249

RE: Drainage District No. 43  
Landowners' Petition for Drainage Improvements

## INTRODUCTION

On December 26, 2018, a petition by Paul and Harold Feldkamp, landowners in Drainage District No. 43 (DD43), was filed requesting a study of the necessary drainage improvements needed to the Tile Main of DD43, to accommodate the increase drainage flows resulting from the planned Drainage District No. 9 (DD9) improvements.

On July 22, 2014, the Osceola County Board of Supervisors acting as Trustees for Drainage District No. 9 (DD9) received a petition from landowners in the northern part of the District requesting an investigation of the tile main capacity and need for improvements. In late October the Board of Supervisors hired I+S Group (ISG) to conduct a preliminary investigation and report our findings. A preliminary report was filed on February 3, 2015, with an informational meeting held with the landowners on February 26, 2015, to discuss our findings. Following the informational meeting, ISG was directed to evaluate the needs for joint improvements to Drainage District No. 9 and Drainage District No. 43 (DD43), since the tile capacity of DD43 was determined inadequate to handle the improved drainage needed for good agricultural production in DD9.

A letter report to the Board of Supervisors dated August 24, 2015, outlined the additional findings and recommendations for a joint improvement project. An informational meeting with the landowners of DD9 and DD43 was held on September 16, 2015. Landowners present from DD43 did not support the recommended joint improvements.

A formal Engineer's Report for the recommended improvements to DD9 was filed on December 29, 2015. A public hearing on this report was held on February 11, 2016, and continued until March 3, 2016. A remonstrance was filed by the landowners of DD9 ending any additional proceedings in regard to the drainage relief recommended by the Engineer.

On April 5, 2018, the Board again received a petition for drainage relief in Drainage District No. 9. The petition was signed by Mark Hayenga and Jackie Sonstegard representing ownership of 303.6 acres in the assessed watershed boundary of DD9. The 2015 Engineer's Report was reevaluated, updated and refiled with the Board on July 10, 2018. A public hearing was held on November 20, 2018, and continued to December 11, 2018. The recommended tile improvements were approved by the Board of Supervisors, acting as Trustees of DD9.

On January 8, 2019, the Osceola County Board of Supervisors acting as Trustees for DD43 accepted the petition by Paul and Harold Feldkamp and appointed ISG to prepare a preliminary report for use in holding an informational meeting with landowners of DD43. This preliminary letter report updates capacity relief information provided to the landowners of DD43 in 2015, along with an additional relief option considered. The following is our preliminary report.



## Drainage District No. 43

The Main Tile of DD43 extends from its junction with the tile main of DD9 in the SE-SE of Section 3, East Holman Township, west of Redwood Avenue. The tile main then traverses in a southeasterly direction passing under 160<sup>th</sup> Street and then continues in an easterly direction across Section 11, East Holman Township. The main tile then traverses under Highway No. 59 in the NW-NW of Section 12, East Holman Township before outletting into the open ditch of DD43. The open ditch of DD43 then outlets to Main Open Ditch of Drainage District No. 11 (DD11).

Surface flows from the upper portion of the combined watershed of DD9 and DD43 discharge by means of an existing box culvert under Redwood Avenue, to a private surface channel, which traverses approximately 2,800 feet across the SW-SW of Section 2, East Holman Township. After discharging under 160<sup>th</sup> Street, the flow follows a natural swale across Section 11, before outletting to the open ditch of DD43 by means of road culvert under Highway No. 59.

## INVESTIGATION

Our original investigation involved reviewing the records of DD43 at the Osceola County Courthouse. No design profile drawings showing elevations of the tile main of DD43 were found. However, the original Engineer's Report at time of establishment, does provide depths of cut for the proposed tile alignment. Based on these records it is apparent that the original tile main of DD43 used to outlet directly to the Main Open Ditch of DD11. However, sometime later approximately 360 feet of tile main was removed with an open ditch excavated from the original outlet into DD11 back to Highway 59.

In the summer of 2015, we gathered field survey data along the drainage course of DD43. We also gathered cross-sectional data of the open ditch of DD43. Additionally, as part of the study of the Tile Main of DD9, the tile connection between the DD43 and DD9 was dug up on May 10, 2018, by Mega Inc. and the elevation of the tile surveyed. Our field review in 2015 and 2018 also revealed that the tile main of DD43 generally follows the natural drainage swale across Section 11, but is likely offset to one side to maintain protective cover over the tile line. Using our survey data, Lidar topographic data and the cuts of the original tile design, we have prepared a profile of the existing DD43 tile along with the overlying ground surface.

## Tile Capacity

Current standards for good agricultural drainage recommend that tile systems serving lands without surface drainage be sized to drain 1/2 inch of runoff per acre per 24 hour period. For lands with surface drainage, the tile system is recommended to be sized based on a 3/8 inch drainage coefficient. Based on our investigation, we found that 1,022 (44%) acres of the combined watershed of DD43 and DD9 have insufficient surface drainage and 1,302 (56%) acres do have surface drainage relief. The lands below DD9 in the lower portion of DD43 were found to have adequate surface relief, except for 72 acres in the southwest portion of the watershed. Our capacity analysis of the existing DD43 tile main can be seen in Table 1: *Existing Tile Capacity*. The computed capacity is based on the existing tile being in good condition.



Table 1: Existing Tile Capacity

STATION	Tile Size Existing	SLOPE (S) ft/ft	n	1/2"		District Q	Proposed Q / Needed Q (%)
				Acres Total 3/8"	Needed Q 3/8"		
				(CFS)		(CFS)	
<b>OUTLET</b>				1022	21.46		
0+00	30	0.0035	0.0108	<b>2324</b>	<b>41.97</b>	<b>29.21</b>	69.6%
				1302	20.51		
<b>Downstream Br. 24</b>				1022	21.46		
24+00	30	0.0035	0.0108	<b>2234</b>	<b>40.55</b>	<b>29.21</b>	72.0%
				1212	19.09		
<b>Upstream Br. 24</b>				1022	21.46		
24+00	28	0.0035	0.0108	<b>2060</b>	<b>37.81</b>	<b>24.30</b>	64.3%
				1038	16.35		
<b>Downstream Br. 36</b>				1022	21.46		
36+00	28	0.0035	0.0108	<b>2047</b>	<b>37.61</b>	<b>24.30</b>	64.6%
				1025	16.14		
<b>Upstream Br. 36</b>				1022	21.46		
36+00	24	0.0035	0.0108	<b>1680</b>	<b>35.28</b>	<b>16.11</b>	45.7%
				658	13.82		
<b>Main below DD9</b>				950	19.95		
71+00	24	0.0035	0.0108	<b>1470</b>	<b>28.14</b>	<b>16.11</b>	57.2%
				520	8.19		

The tile main of DD43 can provide approximately 70% of the needed capacity at its outlet. However, the most restrictive section of DD43 only provides 45.7% of the recommended capacity for all the lands above the junction of Tile Branch No. 36 (Br36).

The current DD43 system has been operating adequately because the existing tile main of DD9 only has a capacity of 7.5 cfs. However, DD9 new main will have a capacity of 27.0 cfs resulting in an increased demand for capacity of the DD43 tile system. The lands in DD43 without surface relief may be significantly impacted if the capacity of DD43 is not also improved. In addition, because of the increased flow from DD9, the tile line of DD43 will also relieve to the surface more frequently and for longer periods of time due to the pressure caused by DD9's improved tile capacity.

## IMPROVEMENT OPTIONS

Drainage District No. 9 has the full right to improve its facilities and increase the discharge to the lands downstream in Drainage District No. 43 and No. 11. However, DD43 has the right to improve their facilities and assess all of the lands served, their fair share of these costs to improve their facilities including all of the lands in DD9. Currently, the facilities of DD43 are considered to have inadequate capacity for the agricultural watershed it serves. While DD9 will not have a free flowing outlet, without an improvement to DD43, DD9 tile system does have elevation and will be able pressure relieve to the surface and maintain most of the drainage capacity in its system.

The following are three (3) options for providing partial to full drainage relief to the existing tile system of DD43. Additionally, the open ditch of DD43 has been evaluated for stability and capacity and it is recommended, that regardless of improvement option selected, the open ditch be cleaned out and pipes and crossings addressed.

### Option 1: Clean and Repair Existing Tile

The tile line of DD43 can currently relieve to the surface through the existing intake in the bottom of the west road ditch of Redwood Avenue and flow overland by an existing private surface channel and then the existing natural drainage swale outletting to the open ditch east of Highway 59. Therefore, this



option would be improving on the existing surface drainage and involve installing a junction box acting as a relief structure between the two (2) district lines and constructing a grassed waterway along the natural drainage swale to handle the increased discharge of DD9 tile main. The waterway would provide for a stable means of handling these flows. The surface channel would be constructed with a 14' bottom and 8H:1V side slopes, with the District acquiring easement and paying damages for the land necessary for construction of the waterway. This would be a District facility with the District responsible for the maintenance and upkeep of the surface channel. It is our opinion, that this would be the lowest cost option for the District. However, waterways require more maintenance than an open ditch or tile system. Also, it has been found that over time farming operations often encroach on waterways and reduce functionality. The proposed alignment of the waterway is shown on Sheet A.02 of the drawings in Appendix C.

**Option 2: Parallel Relief Tile**

This option evaluates upsizing the existing main to a 36 inch diameter tile, from the outlet of the open ditch to just west of Highway 59. From there, a parallel 24 inch diameter tile is proposed along the main tile crossing 160<sup>th</sup> Street and Redwood Avenue connecting to DD9's Main Tile. The relief line in combination with the existing main would provide 100% of the recommended drainage capacity for both DD9 and DD43. The construction of a relief line would be cheaper than a full replacement. However, part of the capacity is dependent on an existing main that is nearing a 100 years of age. Therefore, the District will be maintaining two (2) tile line, one (1) of which may need additional repairs in the near future. The computed capacity of the relief tile, combined with the existing DD43 tile main can be seen in Table 2: *Relief Tile Combined Capacity*.

*Table 2: Relief Tile Combined Capacity*

STATION	Tile Size Existing with Relief	SLOPE (S) ft/ft	n	Acres Total	1/2"	Combined District Q	Proposed Q /Needed Q (%)
					Needed Q 3/8"		
					(CFS)	(CFS)	
<b>OUTLET</b>					21.46		
0+00	36	0.0035	0.0108	1022	<b>41.97</b>	<b>47.50</b>	113.2%
				1302	20.51		
<b>HWY 59</b>					21.46		
9+06	30	0.0035	0.0108	1022	<b>41.97</b>	<b>45.32</b>	108.0%
	24	0.0035	0.0108	1302	20.51		
<b>Downstream Br. 24</b>					21.46		
24+00	30	0.0035	0.0108	1022	<b>40.55</b>	<b>45.32</b>	111.8%
	24	0.0035	0.0108	1212	19.09		
<b>Upstream Br. 24</b>					21.46		
24+00	28	0.0035	0.0108	1022	<b>37.81</b>	<b>40.41</b>	106.9%
	24	0.0035	0.0108	1038	16.35		
<b>Downstream Br. 36</b>					21.46		
36+00	28	0.0035	0.0108	1022	<b>37.61</b>	<b>40.41</b>	107.5%
	24	0.0035	0.0108	1025	16.14		
<b>Upstream Br. 36</b>					21.46		
36+00	24	0.0035	0.0108	1022	<b>31.83</b>	<b>32.22</b>	101.2%
	24	0.0035	0.0108	658	10.36		
<b>Main below DD9</b>					19.95		
71+00	24	0.0035	0.0108	950	<b>28.14</b>	<b>32.22</b>	114.5%
	24	0.0035	0.0108	520	8.19		

Sheets E.01-E.03 in Appendix C, show the alignment and profile of the existing tile main along with the for proposed parallel relief tile.





## PARTIAL IMPROVEMENT CAPACITIES

This option involves addressing the most restrictive segment of the DD43 Tile Main, the segment upstream of Branch 36; current capacity (16 cfs). By replacing this 24 inch tile with a new 30 inch tile, this segment would have 100% of the needed capacity (27 cfs) for the entire DD9 watershed. Below the junction of Br36, the existing tile main of DD43 currently has 65% of this necessary capacity for good agricultural drainage. However, by replacing the most restrictive segment of the existing DD43 Main, the partial improvement will reduce the frequency that the tile system of DD43 will pressurize after the improvements of DD9 are constructed. Since the lands below DD9 have surface relief (slope) the intermitted flow relieving from the tile system to the surface will have minimal impact to lands below DD9. This option will still provide good subsurface drainage for the lands below DD9, with a small increase in times that the tile main will relieve itself to the surface. If surface erosion has not been a problem during the last 100 years, we would not expect enough increase in frequency of flow that it will be a problem after the improvements of DD9 and replacement of this segment of DD43 Tile Main is completed. The computed capacity of the partial replacement system can be seen in Table 3: *Partial Improvement Capacities*.

Table 3: *Partial Improvement Capacities*

STATION	Tile Size Existing	SLOPE (S) ft/ft	n	1/2"	1/2"	District Q	Proposed Q / Needed Q (%)
				Acres Total 3/8"	Needed Q 3/8"		
				(CFS)		(CFS)	
<b>OUTLET</b> 0+00	30	0.0035	0.0108	1022 <b>2324</b> 1302	21.46 <b>41.97</b> 20.51	<b>29.21</b>	69.6%
<b>Downstream Br. 24</b> 24+00	30	0.0035	0.0108	1022 <b>2234</b> 1212	21.46 <b>40.55</b> 19.09	<b>29.21</b>	72.0%
<b>Upstream Br. 24</b> 24+00	28	0.0035	0.0108	1022 <b>2060</b> 1038	21.46 <b>37.81</b> 16.35	<b>24.30</b>	64.3%
<b>Downstream Br. 36</b> 36+00	28	0.0035	0.0108	1022 <b>2047</b> 1025	21.46 <b>37.61</b> 16.14	<b>24.30</b>	64.6%
<b>Upstream Br. 36</b> 36+00	30	0.0035	0.0108	1022 <b>1680</b> 658	21.46 <b>31.83</b> 10.36	<b>29.21</b>	91.8%
<b>Main below DD9</b> 71+00	30	0.0035	0.0108	950 <b>1470</b> 520	19.95 <b>28.14</b> 8.19	<b>29.21</b>	103.8%

## DISCUSSION & RECOMMENDATIONS

As part of our field investigation, we have mapped the watershed boundary of DD43 and DD9 using LIDAR data and aerial photography to determine the lands that drain by surface or subsurface into the District. Sheet A.03 of the drawings show the lands currently within the assessment boundary of DD43 which includes the benefitted lands of DD9. From our review it is apparent that there are approximately 255 acres of land draining to facilities of DD43, which are not included in the original assessment boundary of the overall District. These lands are recommended to be annexed to the District and included in a reclassification of the District. DD9 has already completed annexation of benefitted lands to their District and will be reclassifying their District as part of the planned improvements. Therefore, even if an improvement project is not approved for DD43, we would recommend the Trustees of the District proceed with annexation and reclassification of DD43.



#### WETLANDS AND WETLANDS

We have also reviewed the US Fish and Wildlife Services National Wetland Inventory current listing of potential wetlands, currently there are no potential wetlands shown that would be impacted by any of the proposed improvement options; therefore, no mitigation is expected or estimated as part of the overall project costs.

To verify there are no farmed wetlands that will be impacted, the NRCS requires that all lands in the watershed must have a wetland determination completed prior to any construction by the District. The landowners or their tenants are the only individuals that can request these determinations. If any of the options proposed are approved, all landowners will be asked to provide a certified wetland determination for their land. A certified wetland determination can be requested by signing a 1026 form at the Osceola County FSA office.

#### ESTIMATED PROJECT COSTS

We have prepared updated cost estimates for the three (3) Options discussed about; they are included as Appendix B. These estimates represent our best judgement of the probable cost based upon our experience with similar projects. The quantities and unit costs are believed to be reasonably accurate for use in this preliminary report. Actual costs are subject to the market for the respective components and other economic forces. If DD43 were to improve their facilities, there would be potential costs savings if construction was coordinated with DD9's improvements. The opinions of costs in Appendix B reflect the costs if DD43 were improve their facilities on their own accord.

DD43 assessment schedule includes land within DD9, so any of the recommended improvement would be paid for by landowners within both Districts. The estimated construction cost for the waterway improvement (Option 1) is \$120,800.90. However, other associated non-construction costs for acquiring right-of-way, annexation, reclassification and engineering costs brings the total waterway project cost to \$273,467. The parallel tile improvement (Option 2) construction cost was estimated assuming both RCP and dual wall HDPE tile. The HDPE estimate was found cheaper with the estimated construction cost being \$327,014.80. Again, non-construction costs bring the total estimated project cost to \$458,436.80. The partial replacement of the 24 inch tile with 30 inch tile (Option 3) was also estimated using HDPE tile with the construction cost being \$223,402.80 and the total estimated project cost of \$332,939.80.

#### CONCLUSIONS

It is apparent from our investigation, that the current tile facilities of DD43 are undersized and do not provide the drainage recommended for current day agricultural crop production. DD9 has already been approved for an improvement project, which will increase flows to DD43. DD9 has the full right to improve its facilities and increase the discharge to lands downstream in DD43 and DD11. However, DD43 has the right to improve their facilities and assess all the lands served, for the cost of the improvement, including all lands in DD9.

The first option proposed is a constructed grass waterway along the natural drainage course through DD43. A grass waterway would be constructed to handle the increased discharge from DD9. The waterway would require the acquisition of approximately 7.8 acres of land along its alignment. This option does not provide any additional tile capacity for DD43, but it does provide a surface outlet for the additional pressure relief flows from DD9. Additionally, the waterway would prevent soil erosion and reduce sedimentation downstream. This option is the lowest cost to the district, but again does not provide additional tile drainage capacity.



The second option includes replacing the lower 470 feet of existing tile with new 36 inch tile and then installing a parallel 24 inch relief tile along the entire length of existing tile main above Highway 59. A cross tie between the two tile lines near the junction with DD9, will allow flows to enter both the existing main and parallel relief tile. Additional, cross-connections would also be made along the tile system, to allow flows to equalize between the main and relief tile. This option provides the capacity to serve 100% of the drainage needs DD43 and DD9, but is also the most expensive.

The third option is replacing the most restrictive segment of DD43 tile main with a new 30 inch tile. The 30 inch tile would provide additional capacity, which would reduce the number of times the tile system would surcharge and surface relieve due to flows from DD9. During large storm events, the tile would still surcharge and create surface flows, but smaller storm events would be less likely to result in surface flows. This option does not address all the capacity needs for DD43, but would provide some relief at a lower cost than the relief tile option.

All three (3) options would involve cleaning out 826 feet of DD43 Open Ditch, from its junction with DD11 to U.S. Highway 59. The current facility has sediment accumulation ranging between 0 to 3 feet above the proposed gradeline. At the junction with DD11, three (3) 42 inch culverts were installed to allow a private crossing over DD43. The three (3) culvert pipes are currently in poor condition, decreasing flowrates and increasing sedimentation upstream. It is recommended that these culverts be removed and a two-stage ditch be constructed. The first stage of the ditch would consist of a 4' bottom with 1.5:1 side slopes 3' high. The second stage of the ditch would be a 6' bench with 1.5:1 side slopes. A two stage ditch is recommended for construction due to the steep grade of the open ditch, and unstable banks. The two-stage ditch would decrease flow velocities during large storm events and decrease sedimentation during low flows. Additionally, trees would need to be removed 50 feet on each side of the tile. The roots of trees and shrubs seek water in tile lines and can eventually fill and plug tile. For the waterway option, trees would still need to be cleared over the top of the existing tile. For a parallel relief tile, trees would need to be removed 50 feet on each side of both the existing and relief tiles.

#### Recommendations

We would recommend that an improvement to DD43 take place, in order to handle the increased discharge that will occur from the DD9 improvement. To save costs for both DD9 and DD43, it is recommended that if DD43 chooses to improve their system, those improvements be bid and constructed with DD9's tile improvements. An informational meeting should be held with the landowners of DD43, to discuss improvement options and determine if they want to proceed with improvements.

Sincerely,

Ivan D. Droessler, P.E.  
Civil Engineering Group  
I+S GROUP

enc: Appendix A: Petition of Landowners within the District  
Appendix B: Estimates of Probable Costs  
Appendix C: Preliminary Plans

c: Rochelle Van Tilburg, Osceola County Auditor

APPENDIX A:  
PETITION



### DRAINAGE PETITION

TO THE BOARD OF SUPERVISORS OF Osceola COUNTY, IOWA:

The undersigned ask that a drainage study and improvement (perhaps parallel relief tile) commencing at outlet of DD 9 Sec 2 East Holman

and running thence SE along existing DD 43 main

and terminating at outlet in Sec 12 East Holman

be  
Your petitioners further state, that the lands situated in DD 43 will be adversely affected by the increased volume from DD 9 improvements and will be  
subject to overflow (or are too wet for cultivation or subject to erosion or flood danger), and the public benefit, utility, health, convenience and welfare will be promoted by the above mentioned project.

NAMES  
Paul Feldkamp Trust - by  
Harold Feldkamp Land Trust -

NAMES  
Paul Feldkamp trustee  
by Paul Feldkamp trustee  
by Kristin Nagley, trustee

**FILED**  
OSCEOLA COUNTY, IOWA

DEC 26 2018

OSCEOLA COUNTY AUDITOR  
Barbara J. Echter

**RECEIVED**  
JAN 17 2019

APPENDIX B:  
ESTIMATES OF PROBABLE COSTS

TILE IMPROVEMENT/REPLACEMENT  
 DRAINAGE DISTRICT 48 OSCEOLA COUNTY  
 ENGINEER'S ESTIMATE OF PROBABLE COSTS



DATE: 04/11/2014 10:00 AM

PROJECT NUMBER:15-17781

**DD43 PROPOSED WATERWAY IMPROVEMENTS**

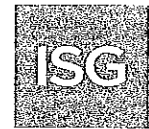
ITEM	DESCRIPTION	QUANTITY	UNIT	PRICE	TOTAL
1.	Mobilization	1	JOB	5,760.00	\$5,760.00
2.	Open Ditch Excavation	1,754	CY	2.80	\$4,911.20
3.	Spoil Bank Leveling (Two Sides)	8.26	STA	120.00	\$991.20
4.	Furnish & Install Corrugated Metal Surface Pipe				
a.	15" Dia.	20	LF	32.00	\$640.00
b.	18" Dia.	20	LF	36.00	\$720.00
5.	Furnish & Install Corrugated Metal Tile Ext. Pipe				
a.	12" Dia.	60	LF	24.00	\$1,440.00
b.	36" Dia.	20	LF	55.00	\$1,100.00
6.	Waterway Excavation	14,906	CY	2.60	\$38,755.60
7.	Waterway Fertilizing, Seeding, & Mulching	7.8	AC	1,200.00	\$9,360.00
8.	Topsoil Strip, Stockpile, Respread	17,238	CY	2.50	\$43,095.00
9.	Furnish & Install Riprap	42	TN	48.00	\$2,016.00
10.	Load, Haul, Place & Compact Bench	345	CY	9.00	\$3,105.00
11.	Furnish & Install Rock Check Dams	5	TN	47.00	\$235.00
12.	Remove & Dispose Existing 42" CMP pipes	3	EA	1,000.00	\$3,000.00
13.	Fence Removal & Disposal	1	STA	135.00	\$135.00
14.	Tree Removal	1	JOB	5,000.00	\$5,000.00
15.	Open Ditch Fertilizing & Seeding	8.26	STA	65.00	\$536.90
<b>CONSTRUCTION COST SUBTOTAL</b>					<b>\$120,800.90</b>

**NON-CONSTRUCTION COSTS**

Engineering Services:	
Tile Investigation/Survey	\$2,500.00
Engineering Report	\$11,500.00
Engineering Admin and Hearing	\$3,000.00
Final Plans & Specs	\$4,000.00
Construction Admin/Staking/Observation	\$5,000.00
Legal & Auditor Services, Publication, Misc.	\$1,500.00
Damages (10.0 AC @ \$600/AC)	\$6,000.00
Contingencies	\$12,100.00
<b>IMPROVEMENT PROJECT COST SUBTOTAL</b>	<b>\$166,400.90</b>

**OTHER DISTRICT COSTS**

Right-of-Way	
Engineering	\$3,000.00
Taken ROW (7.8 AC @ \$9,200/AC)	\$71,760.00
Annexation (255 AC)	\$3,000.00
Reclassification (2,324 AC @ \$6.00/AC, 540 AC Branch Tiles @ \$5.00/AC)	\$16,647.00
Project Warrant Interest	\$12,660.00
<b>TOTAL ESTIMATED PROJECT COST</b>	<b>\$273,467.90</b>
Average Cost per Watershed Acre (2,324.5 acres)	\$117.65
Average Cost per Watershed Acre for 20 years	\$5.88



PROJECT NUMBER: 15-17781

**DD43 PROPOSED PARALLEL IMPROVEMENTS-HDPE TILE**

ITEM	DESCRIPTION	QUANTITY	UNIT	PRICE	TOTAL
1.	Mobilization	1	JOB	15,580.00	\$15,580.00
2.	Open Ditch Excavation	1,754	CY	2.80	\$4,911.20
3.	Spoil Bank Leveling (Two Sides)	8.26	STA	120.00	\$991.20
4.	Furnish & Install Corrugated Metal Surface Pipe				
a.	15" Dia.	20	LF	32.00	\$640.00
b.	18" Dia.	20	LF	36.00	\$720.00
5.	Furnish & Install Corrugated Metal Tile Ext. Pipe				
a.	12" Dia.	60	LF	24.00	\$1,440.00
b.	48" Dia.	20	LF	67.00	\$1,340.00
6.	HDPE Pipe, Dual Wall Pipe, 24" Dia.	6,049	LF	33.00	\$199,617.00
7.	HDPE Pipe, Dual Wall Pipe, 36" Dia.	470	LF	60.00	\$28,200.00
8.	Alignment Turns				
a.	24" Dia. Elbow Section, Fabrication Only	8	EA	600.00	\$4,800.00
b.	36" Dia. Elbow Section, Fabrication Only	1	EA	950.00	\$950.00
9.	Junction Structure	1	EA	6,500.00	\$6,500.00
10.	Misc. Drain Tile Repairs & Connections	11	EA	415.00	\$4,565.00
11.	Tile Cross-Connection				
a.	12" Sta. 24+00 & 36+00	2	EA	900.00	\$1,800.00
b.	24" w/ Tee Connections Sta. 69+30	1	EA	2,500.00	\$2,500.00
12.	Crush & Bury Existing Tile	470	LF	6.00	\$2,820.00
13.	Tile Abandonment (Grout)	1	JOB	2,500.00	\$2,500.00
14.	Topsoil Strip, Stockpile, Respread	12,073	CY	2.50	\$30,182.50
15.	Tile Trench Stabilization and Cradling Rock	75	TN	30.00	\$2,250.00
16.	Spot Tile Exploration	4	HR	170.00	\$680.00
17.	Furnish & Install Riprap	42	TN	48.00	\$2,016.00
18.	Load, Haul, Place & Compact Bench	345	CY	9.00	\$3,105.00
19.	Furnish & Install Rock Check Dams	5	TN	47.00	\$235.00
20.	Remove & Dispose Existing 42" CMP pipes	3	EA	1,000.00	\$3,000.00
21.	Fence Removal & Disposal	1	STA	135.00	\$135.00
22.	Tree Removal	1	JOB	5,000.00	\$5,000.00
23.	Open Ditch Fertilizing & Seeding	8.26	STA	65.00	\$536.90
<b>CONSTRUCTION COST SUBTOTAL</b>					<b>\$327,014.80</b>

**NON-CONSTRUCTION COSTS**

Engineering Services:		
Tile Investigation/Survey		\$3,500.00
Supplemental Engineering Report		\$16,500.00
Engineering Admin and Hearing		\$4,500.00
Final Plans & Specs		\$10,975.00
Construction Admin/Staking/Observation		\$10,750.00
Legal & Auditor Services, Publication, Misc.		\$1,500.00
Damages (17.0 AC @ \$600/AC)		\$10,200.00
Contingencies		\$32,800.00
<b>IMPROVEMENT PROJECT COST SUBTOTAL</b>		<b>\$417,739.80</b>

**OTHER DISTRICT COSTS**

Annexation (255 AC)		\$3,000.00
Reclassification (2,324.5 AC @ \$6.00/AC, 540 AC Branch Tile @ \$5.00/AC)		\$16,647.00
Project Warrant Interest		\$21,050.00
<b>TOTAL ESTIMATED PROJECT COST</b>		<b>\$458,436.80</b>
Average Cost per Watershed Acre (2,324.5 acres)		\$197.22
Average Cost per Watershed Acre for 20 years		\$9.86

**NON-DISTRICT COST**

<b>Open Cut</b>				
Furnish & Install 24" 2000D RCP, Red Wood Ave	66	LF	100.00	\$6,600.00
Furnish & Install 24" 2000D RCP, 160th St	66	LF	100.00	\$6,600.00
<b>Jack &amp; Bore</b>				
Furnish & Install 36" 3000D RCP, US HWY 59	70	LF	500.00	\$35,000.00
<b>TOTAL ESTIMATED NON-DISTRICT COSTS</b>				<b>\$48,200.00</b>



**DD43 PROPOSED PARTIAL TILE REPLACEMENT - HDPE**

ITEM	DESCRIPTION	QUANTITY	UNIT	PRICE	TOTAL
1.	Mobilization	1	JOB	10,640.00	\$10,640.00
2.	Open Ditch Excavation	1,754	CY	2.80	\$4,911.20
3.	Spoil Bank Leveling (Two Sides)	8.26	STA	120.00	\$991.20
4.	Furnish & Install Corrugated Metal Surface Pipe				
	a. 15" Dia.	20	LF	32.00	\$640.00
	b. 18" Dia.	20	LF	36.00	\$720.00
5.	Furnish & Install Corrugated Metal Tile Ext. Pipe				
	a. 12" Dia.	60	LF	24.00	\$1,440.00
	b. 36" Dia.	20	LF	55.00	\$1,100.00
6.	HDPE, Dual Wall Pipe, 30" Dia.	3,264	LF	44.00	\$143,616.00
7.	Alignment Turns				
	a. 30" Dia. HDPE Elbow Section, Fabrication Only	5	EA	822.00	\$4,110.00
8.	Junction Structure	1	EA	6,500.00	\$6,500.00
9.	Misc. Drain Tile Repairs & Connections	8	EA	415.00	\$3,320.00
10.	Crush & Bury Existing Tile	3,264	LF	6.00	\$19,584.00
11.	Topsoil Strip, Stockpile, Respread	6,045	CY	2.50	\$15,112.50
12.	Tile Trench Stabilization and Cradling Rock	45	TN	30.00	\$1,350.00
13.	Spot Tile Exploration	2	HR	170.00	\$340.00
14.	Furnish & Install Riprap	42	TN	48.00	\$2,016.00
15.	Load, Haul, Place & Compact Bench	345	CY	9.00	\$3,105.00
16.	Furnish & Install Rock Check Dams	5	TN	47.00	\$235.00
17.	Remove & Dispose Existing 42" CMP pipes	3	EA	1,000.00	\$3,000.00
18.	Fence Removal & Disposal	1	STA	135.00	\$135.00
19.	Open Ditch Fertilizing & Seeding	8.26	STA	65.00	\$536.90
<b>CONSTRUCTION COST SUBTOTAL</b>					<b>\$223,402.80</b>

**NON-CONSTRUCTION COSTS**

Engineering Services:		
Tile Investigation/Survey		\$3,500.00
Supplemental Engineering Report		\$16,500.00
Engineering Admin and Hearing		\$4,500.00
Final Plans & Specs		\$8,500.00
Construction Admin/Staking/Observation		\$7,500.00
Legal & Auditor Services, Publication, Misc.		\$1,500.00
Damages (7.5 AC @ \$600/AC)		\$10,200.00
Contingencies		\$22,400.00
<b>IMPROVEMENT PROJECT COST SUBTOTAL</b>		<b>\$298,002.80</b>

**OTHER DISTRICT COSTS**

Annexation (255 AC)		\$3,000.00
Reclassification (2,324.5 AC @ \$6.00/AC, 540 AC Branch Tile @ \$5.00/AC)		\$16,647.00
Project Warrant Interest		\$15,290.00
<b>TOTAL ESTIMATED PROJECT COST</b>		<b>\$332,939.80</b>
Average Cost per Watershed Acre (2,324.5 acres)		\$143.23
Average Cost per Watershed Acre for 20 years		\$7.16

**NON-DISTRICT COST**

<b>Open Cut</b>				
Furnish & Install 30" 2000D RCP, Red Wood Ave	66	LF	100.00	\$6,600.00
Furnish & Install 30" 2000D RCP, 160th St	66	LF	100.00	\$6,600.00
<b>TOTAL ESTIMATED NON-DISTRICT COSTS</b>				<b>\$13,200.00</b>

APPENDIX C:  
PRELIMINARY PLANS