



**JACOBSON-WESTERGARD & ASSOCIATES, INC.**  
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**PRELIMINARY ENGINEERING REPORT**

**DRAINAGE DISTRICT NO. 47**  
**PALO ALTO COUNTY, IOWA**  
JWA PROJECT NO: E16161

**OWNER: Palo Alto County Board of Supervisors**

Roger Faulstick  
Ron Graettinger  
Craig Merrill  
Linus Solberg  
Keith Wirtz

Carmen Moser, Auditor



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.

Richard A. Hopper Date 4/12/17  
Richard A. Hopper, P.E., License number 8106  
My license renewal date is December 31, 2017  
Pages or sheets covered by this seal: Title, Pgs 1-4, map

## **I. INTRODUCTION/HISTORY**

A petition to establish Drainage District No. 47 was filed August 26, 1910. Guy Campbell was appointed as the engineer on September 14, 1910, and filed his engineering report recommending the district be established with a main tile drain ranging in size from 6" to 24" and several laterals on February 3, 1911. The resolution establishing Drainage District No. 47 was approved April 4, 1911. The project was awarded May 8, 1911. The drainage books indicate the project was close to being finished once the weather improved in February, 1912, but then skips to 1960

An informal hearing regarding improvements on Drainage District No. 47 was held March 20, 1963, where the Board of Supervisors hired Marvin Kruse to investigate and report on Drainage District No. 47. They accepted his report on November 1, 1963.

A copy of the preliminary report recommended the Board of Supervisors call a hearing of the interested property owners to discuss the two options and determine which alternate to choose. One option was to install a parallel tile to supplement the existing tile and bring the capacity up to 3/8- inches of runoff in a 24-hour period. The second option was to construct an overflow ditch to carry surface drainage from the ponded areas along the Main drain and from Lateral "G". Either option would constitute an improvement and require a reclassification. It does not appear that the project moved forward.

Most recently, a petition was filed and Jacobson-Westergard & Associates were appointed to prepare a preliminary engineering report on November 15, 2016.

## **II. STARTING POINT, ROUTE AND TERMINUS**

The main tile outlets into Beaver Creek at the center of Section 33-94-32, Ellington Township. The tile continues north approximately one (1) mile to the center of Section 28-94-32 before turning northwest for 1250 feet to a point located 870 feet north and 1120 feet west of the center of Section 28. The tile then turns due west 400 feet before turning southwest and stopping at a point located 1980 feet south of the center of Section 20-94-32.

## **III. EXISTING IMPROVEMENTS**

The tile sizes of the existing system range from 6" at the very upper end to 24" at the outlet of Beaver Creek. The system is extremely undersized and has not been improved since it was installed over 100 years ago. Much of the system has a drainage coefficient of 1/8-inch or less.

## **IV. PROPOSED IMPROVEMENTS**

The proposed improvements include two options.

The first option would be a new parallel tile with a 1/2-inch drainage coefficient. The pipe for this option would range in size from 12-inch to 42-inch pipe. A cost estimate for this option can be seen following in this report.

The second option would be a new parallel tile with a 1-inch drainage coefficient. The pipe for this option would range in size from 12-inch to 60-inch. A cost estimate for this option can be seen following in this report.

## **V. RIGHT OF WAY**

Since the main tile improvements will be offset from the existing main tile, additional right-of-way will be required. This will be permanent right-of-way. The permanent right-of-way will be a 30-foot wide easement where most excavation will occur. There may also be crop damage to pay for, but the extent of this is unknown at this time.

## VI. COST ESTIMATES

The first estimate will be for a 1/2" drainage coefficient system.

### OPTION NO. 1 – 1/2" DRAINAGE COEFFICIENT

ITEM NO.	ITEM DESCRIPTION	QUANTITY & UNIT	UNIT PRICE	TOTAL PRICE
1.	Connection to existing structure	1 Each	\$ 2,000.00	\$ 2,000.00
2.	42" RCP, 1500D	8834 L.F.	\$ 60.00	\$ 530,040.00
*3.	42" RCP, 2000D	66 L.F.	\$ 75.00	\$ 4,950.00
4.	30" RCP, 1500D	1954 L.F.	\$ 38.00	\$ 74,252.00
*5.	30" RCP, 2000D	66 L.F.	\$ 48.00	\$ 3,168.00
6.	21" RCP, 1500D	1380 L.F.	\$ 28.00	\$ 38,640.00
7.	12" RCP, 1500D	1663 L.F.	\$ 17.00	\$ 28,271.00
8.	Junction Box	9 Each	\$ 5,000.00	\$ 45,000.00
9.	Tee – 12" x 12" x 12"	1 Each	\$ 500.00	\$ 500.00
10.	Tee – 24" x 24" x 12"	1 Each	\$ 670.00	\$ 670.00
11.	Tee – 24" x 24" x 18'	1 Each	\$ 700.00	\$ 700.00
12.	Tile Connections	30 Each	\$ 350.00	\$ 10,500.00
*13.	Granular Surfacing	40 Ton	\$ 18.00	\$ 720.00
14.	Exploratory Excavation	8 Hours	\$ 200.00	\$ 1,600.00
15.	Trench Stabilization	20 Ton	\$ 25.00	\$ 500.00
16.	Area Drain	6 Each	\$ 750.00	\$ 4,500.00
<b>ESTIMATED SUBTOTAL CONSTRUCTION COST</b>				<b>\$ 746,011.00</b>
<b>ESTIMATED TOTAL DISTRICT COST</b>				<b>\$ 737,173.00</b>
<b>CONTINGENCIES</b>				<b>\$ 73,717.00</b>
<b>ENGINEERING, LEGAL, PUBLICATION</b>				<b>\$ 95,000.00</b>
<b>CLASSIFICATION</b>				<b>\$ 8,350.00</b>
<b>PERMANENT EASEMENT (9.6 Acres @ \$2000)</b>				<b>\$ 19,200.00</b>

INTEREST \$ 38,000.00

ESTIMATED TOTAL DISTRICT COST \$ 971,440.00

AVERAGE COST PER ACRE: \$581.70 (Based on 1670 Acres)  
(\$47/acre/year for 20 years)  
(\$76/acre/year for 10 years)

\*Secondary Road Costs

The second option is for a parallel 1" coefficient system.

**OPTION NO. 2 – 1" DRAINAGE COEFFICIENT**

ITEM NO.	ITEM DESCRIPTION	QUANTITY & UNIT	UNIT PRICE	TOTAL PRICE
1.	Connection to existing structure	1 Each	\$ 2,500.00	\$ 2,500.00
2.	60" RCP, 1500D	234 L.F.	\$ 110.00	\$ 25,740.00
*3.	60" RCP, 2000D	66 L.F.	\$ 120.00	\$ 7,920.00
4.	54" RCP, 1500D	8600 L.F.	\$ 95.00	\$ 817,000.00
5.	36" RCP, 1500D	1954 L.F.	\$ 50.00	\$ 97,700.00
*6.	36" RCP, 2000D	66 L.F.	\$ 55.00	\$ 3,630.00
7.	24" RCP, 1500D	1380 L.F.	\$ 32.00	\$ 44,160.00
8.	15" RCP, 1500D	1000 L.F.	\$ 20.00	\$ 20,000.00
9.	12" RCP, 1500D	663 L.F.	\$ 17.00	\$ 11,271.00
10.	Junction Box	9 Each	\$ 4,000.00	\$ 36,000.00
11.	Tee – 12" x 12" x 12"	1 Each	\$ 500.00	\$ 500.00
12.	Tee – 24" x 24" x 12"	1 Each	\$ 670.00	\$ 670.00
13.	Tee – 24" x 24" x 18'	1 Each	\$ 700.00	\$ 700.00
14.	Tile Connections	33 Each	\$ 350.00	\$ 11,550.00
*15.	Granular Surfacing	40 Ton	\$ 18.00	\$ 720.00
16.	Exploratory Excavation	8 Hours	\$ 200.00	\$ 1,600.00
17.	Trench Stabilization	20 Ton	\$ 25.00	\$ 500.00
18.	Area Drain	6 Each	\$ 750.00	\$ 4,500.00
<b>ESTIMATED SUBTOTAL CONSTRUCTION COST</b>				<b>\$1,086,661.00</b>
<b>ESTIMATED TOTAL DISTRICT COST</b>				<b>\$1,074,391.00</b>
<b>CONTINGENCIES</b>				<b>\$ 107,439.00</b>

ENGINEERING, LEGAL, PUBLICATION	\$ 95,000.00
CLASSIFICATION	\$ 8,350.00
PERMANENT EASEMENT (9.6 Acres @ \$2000)	\$ 19,200.00
INTEREST	\$ 55,000.00
ESTIMATED TOTAL DISTRICT COST	<u>\$1,359,380.00</u>

AVERAGE COST PER ACRE: \$814.00 (Based on 1670 Acres)  
(\$66/acre/year for 20 years)  
(106/acre/year for 10 years)

\*Secondary Road Costs

## **VII. CONCLUSION/RECOMMENDATION**

The proposed improvements include systems with 1/2-inch and 1-inch drainage coefficients. Either of the options will provide greatly improved drainage in the main of the drainage district.

The minimum improvement we would recommend is the 1/2-inch coefficient system.

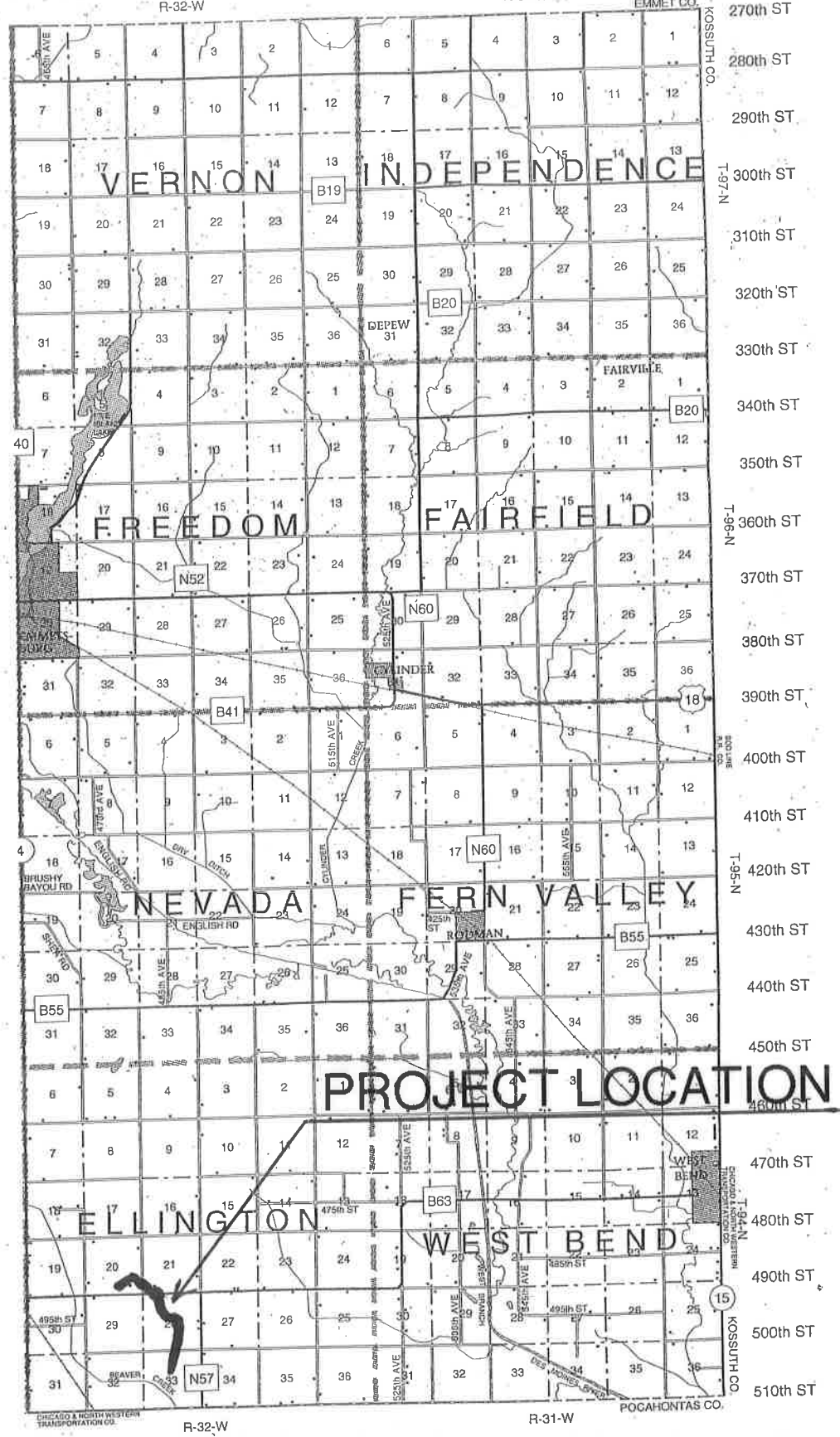
The Board of Supervisors, as trustees, for DD#47, should accept this report and set a date for a public hearing.

At the hearing the trustees should seek input from landowners regarding which options to pursue. More than one option could be bid with the final decision on which one to construct coming after the bid.

A reclassification will be required with either of the options.

Improvements are drastically needed in this drainage district and we strongly recommend proceeding with improvements.

400th AVE  
470th AVE  
480th AVE  
490th AVE  
500th AVE  
510th AVE  
520th AVE  
530th AVE  
540th AVE  
550th AVE  
560th AVE  
570th AVE  
580th AVE



CHICAGO & NORTH WESTERN TRANSPORTATION CO.

R-32-W

R-31-W

POCAHONTAS CO.

EMMET CO.  
KOSSUTH CO.  
T-97-N  
T-96-N  
T-95-N  
T-94-N  
KOSSUTH CO.

270th ST  
280th ST  
290th ST  
300th ST  
310th ST  
320th ST  
330th ST  
340th ST  
350th ST  
360th ST  
370th ST  
380th ST  
390th ST  
400th ST  
410th ST  
420th ST  
430th ST  
440th ST  
450th ST  
460th ST  
470th ST  
480th ST  
490th ST  
500th ST  
510th ST

**PROJECT LOCATION**