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"Bettering Iowa since 1970"

November 20, 2024

RE: Joint Drainage District No. 2 Branch 60 Tile
Letter Report on Repairs/Improvements
Dickinson & Osceola County, Iowa
JWA PROJECT NO: E24142

Dear Board members:

A. Introduction

On September 10, 2024, a repair request was submitted for collapsing tile in Branch 60 of Dickinson and Osceola County Joint Drainage District No. 2 (JDD2), located in Section 31 of Excelsior Township, Dickinson County, Iowa. Jacobson-Westergard & Associates, Inc. was appointed to investigate the situation and provide appropriate recommendations.

B. Investigation

The Branch 60 tile drains approximately 689 acres in Dickinson and Osceola Counties. Our field investigation on November 1, 2024, revealed several issues within the tile system. We identified four tile blowouts, two near the outlet to the Main Open Ditch, and two approximately 2,500 to 3,000 feet from the outlet. We are also aware that contractor Rocky Marco has repaired multiple collapses within the last year, and he observed that the district tile adjacent to the collapses to be cracked and in very poor condition. Over the past year, the tile has experienced multiple breaks, and it is likely this will continue to occur. If further inspection of the tile condition is desired, a contractor with a crawler camera could be hired to record a video. This could cost somewhere in the range of $5,000 - $7,500 to hire a contractor to dig access holes and repair the tile, and to hire a contractor with a camera.

At a very minimum, the existing tile blowouts need to be repaired. The cost could vary depending on what is found when the tile is dug up, and how much tile needs to be replaced. This would be the lowest short-term cost option. However, given the current condition of the tile system, blowouts are expected to continue to occur, and additional repairs will be needed.

Now may be the time to consider replacing a significant portion of the Branch 60 tile. As a repair, this would include replacing the existing tile in poor condition with the same size (or first commercially available larger size) tile at the same grade. We estimate that approximately 4,400 feet of tile ranging in size from 20-inches to 12-inches in diameter would need to be replaced. We estimate that a repair of this nature would cost approximately **$460,000** or $667 per acre on average.

Before committing to a repair project of this magnitude, it is advisable to investigate the design capacities of the existing tile. If the existing system is inadequate, now is the time to consider a drainage improvement. The design parameter commonly used for drainage tile is known as the *drainage coefficient (DC)*. According to the Iowa Drainage Guide, the drainage coefficient is the rate at which water can be removed from the land and is expressed as the equivalent depth of water covering the surface of the drained area that can be removed in 24 hours. A design drainage coefficient of 1/2" – 1" per day is commonly used in Iowa. However, in the early 1900's tile systems were commonly designed at a drainage coefficient of 1/4" to 1/8" or less.

As part of our investigation, we analyzed the existing tile system to determine its adequacy for the 689 acres it serves. See the table below and the enclosed drainage coefficient map. Note that the

capacities shown assume the tile is in good condition, which is not the case. The results indicate that the system is undersized with drainage coefficients ranging from 0.18" per day at the outlet to 0.29" per day at the upper end. A drainage coefficient (DC) of at least 1/2" per day is recommended, but the current system falls short of this standard. At a minimum, to provide adequate drainage 2 – 3X the current system capacity, or more, would be required.

Original Design of Branch 60 Tile System								
Lateral	**Starting Station**	**Dia. (in)**	**Grade (%)**	**Ex Capac. (cfs)**	**Velocity (fps)**	**Approx. Length**	**Acres Drained**	**DC (in/day)**
Branch 60	0+00	20	0.10%	5.20	2.38	2,100	689.2	0.18
	21+00	18	0.10%	3.93	2.22	900	519.7	0.18
	30+00	16	0.10%	2.87	2.05	800	370.1	0.18
	38+00	14	0.10%	2.01	1.88	1,200	166.0	0.29
	50+00	12	0.10%	1.33	1.70	900	130.2	0.24

C. Possible Improvement

If an improvement were to be pursued, we would recommend installing approximately 5,000 feet ranging from 30-inch diameter at the outlet to 18-inch diameter at the upper end at a continuous grade of 0.10%. The tile improvement would end approximately 600 feet into the SW NE ¼ of Excelsior Township in Dickinson County. This design would ensure the Branch 60 tile would have a drainage coefficient of at least 1/2" per day. We estimate that an improvement of this nature would cost approximately **$560,000** or an average per acre cost of $814. We could complete a preliminary classification to give landowners a better idea of what their specific cost may be.

We recommend the proposed tile be constructed using reinforced concrete pipe (RCP). Dual wall HDPE is much more susceptible to deflection and relies heavily on the strength of the backfill material around it. Public installation standards require installation in a water-free trench and that the pipe be encased in a crushed rock envelope. Video testing is required 30 days after final backfill. Excessively deflected pipe is required to be replaced.

Due to the condition of the old Branch 60 Tile, it would be best if it is crushed in place, and the new tile is installed in the same trench. In times of dry weather where the existing tile is not running, this is feasible but is very difficult if not impossible for a contractor when the tiles are flowing. An alternative would be to install the new Branch 60 Tile parallel to the old tile and either separately dig up and crush the old tile (and run all private tile lines encountered to the new tile).

When installing new larger tile, it is important to consider cover over the pipe. In this case, we have found that the Branch 60 tile drops approximately 2 feet quickly at the outlet into the Main Open Ditch. We can use this fall to install the new tile deeper in order to ensure that adequate cover (2 ½ – 3 feet) is maintained.

If any farmed wetlands exist on property within the lands drained by the Branch 60 Tile of JDD2, the construction of drainage improvements could be considered by the NRCS to be a conversion and place landowners in jeopardy of being in violation of farm program rules and may be required to forfeit and/or refund farm program payments received after the work commences.

Also, if an improvement is desired, an improvement petition must be filed by one or more of the landowners served by the Branch 60 Tile system. If an improvement is not desired, a repair will still be required.

D. Conclusion

Assuming the Branch 60 tile is in poor condition throughout and considering the inadequacy of the design to meet current drainage needs, we recommend serious consideration of an improvement. We estimate that an improvement project would cost approximately **$560,000**. For roughly 22% more cost than a full repair project, an improvement would provide almost 3X the flow rate. Yield increases and increased market value of the property are all potential benefits of the project. There are tax benefits (write-offs) to improvements as well.

We recommend that the Boards of Supervisors of Dickinson and Osceola Counties, acting as trustees for Branch 60 of Joint Drainage District No. 2, schedule an informational meeting to discuss our findings, receive landowner input, and decide what next steps should be taken. Letters should be mailed to the landowners benefited by the Branch 60 Tile system.

Specific decision items include, but are not limited to:

- Whether to camera the existing Branch 60 tile
- Whether there is interest in pursuing an improvement vs. repair
- Whether to do pre-classification

Sincerely,

JACOBSON-WESTERGARD & ASSOCIATES, INC.

Collin J. Klingbeil, PE

Encl: Repair Request
Drainage Coefficient Map

REQUEST FOR REPAIRS

IN THE MATTER OF DRAINAGE DISTRICT Number: _____ Lateral: _____
To the Board of Supervisors, Dickinson County, Iowa:

I, the undersigned, hereby state that I am the owner of land described below and that repairs are necessary to tile lines and/or open ditches of the organized drainage district and I hereby request that repairs be made at the earliest possible date.

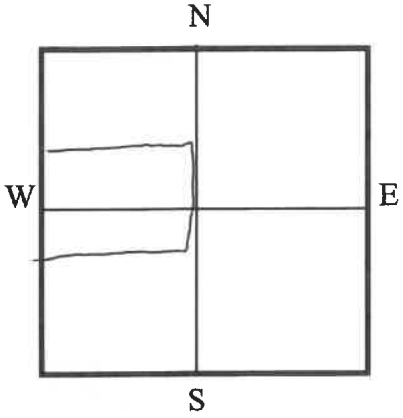
Drainage Ditch Number J-2 Dto

Section Number 31

Township Exc.

NW ¼ NE ¼

SW ¼ SE ¼



Please locate any adjoining buildings, fences, etc., that may help locate site.

Name of owner-operator Treven Howard Phone 712-330-3696

Requested by [signature]

Nature of problem /work to be done: ☐ Beaver Dam ☐ Hole ☐ Pooling Water ☐ Blowout

☒ Other (describe) tile collapsing

Authorized by [signature] Date 9-10-24

Comments 18-inch tile has collapsed multiple times. Will likely require ~1000 ft of replacement to remedy.

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REPAIRS: (for County use ONLY):

Supervisor: Wermersen

Work Order #: _____

Foreman: Ehlers

Other Vendor: _____

Joint Drainage District No. 2 Branch 60
Existing Drainage Coefficient Map

Dickinson & Osceola County, Iowa

JACOBSON-WESTERGARD
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Consulting Engineers & Land Surveyors
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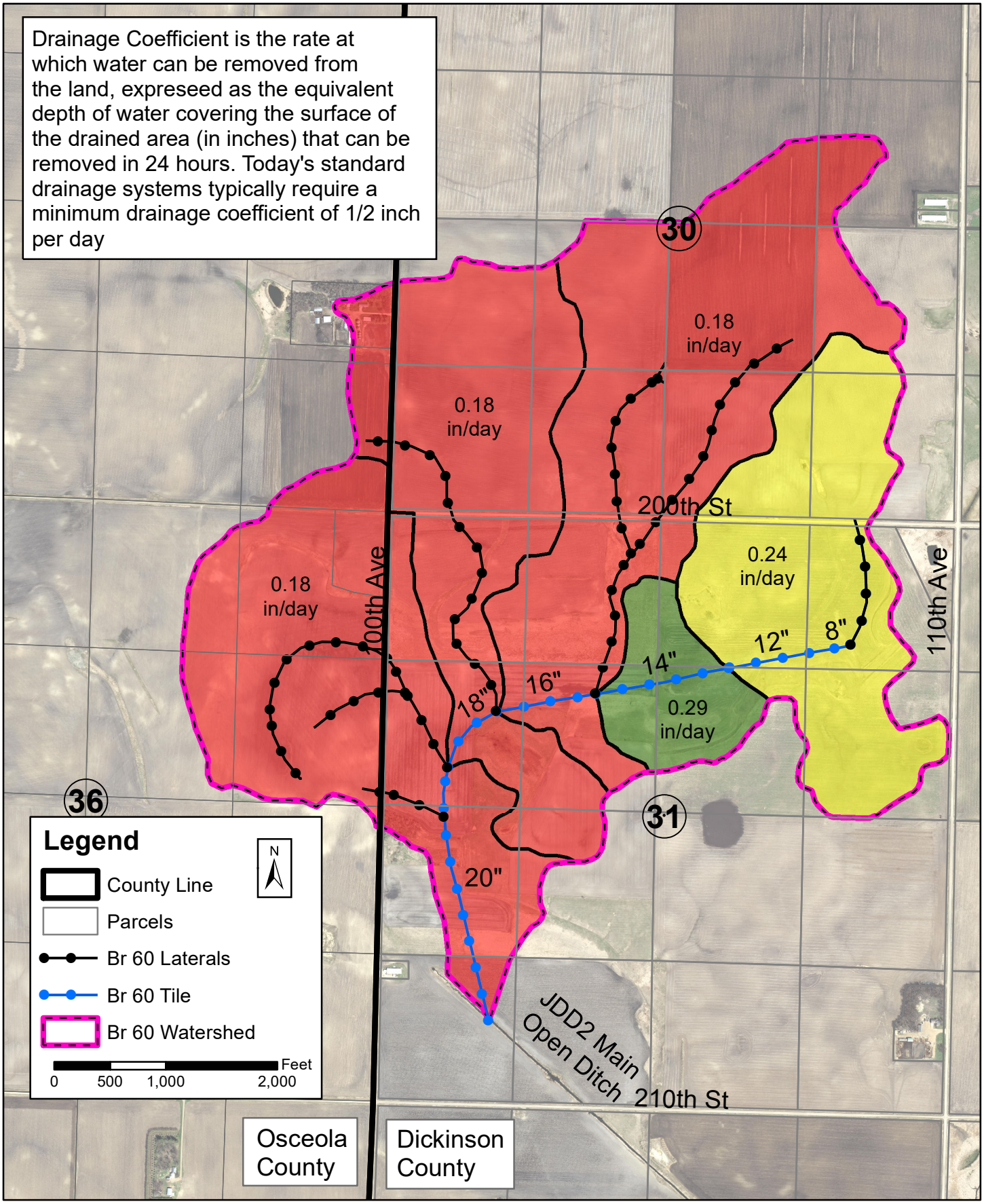

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