# Preliminary Engineer's Report

## County Ditch No. 26 Lateral 1 Establishment

Faribault County, Minnesota

Date: September 19, 2022

ISG Project No.: 21-23548

Architecture
Engineering
Environmental
Planning

ISGInc.com

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# SIGNATURE SHEET

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

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County Ditch No. 26 Improvement

**Faribault County, Minnesota**

Engineer's Project Number: 21-23548

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# EXECUTIVE SUMMARY

Two petitions were submitted to the Faribault County Drainage Authority, one requesting a Lateral Establishment for the replacement of an existing private tile lateral within County Ditch (CD 26). The other petition requested an Outlet to the CD 26 system for the aforementioned lateral. Currently, the private lateral lies within the drainage watershed of CD 26, outlets into the CD 26 main open ditch, but does not lie within the benefited watershed of CD 26. This existing private lateral also serves as an outlet to County Ditch 45 (CD 45), however it does not have a public drainage system outlet. County Ditch No. 26 drains a 5,495-acre watershed, 1,036 of which is contributed by the watershed drained by the private lateral and CD 45.

The proposed project includes establishing the existing private lateral as proposed CD 26 Lateral 1 as part of the public drainage system and to provide a legal drainage outlet to the CD 45 tile drainage system. The proposed improvement is designed for modern drainage practices to increase farmability and decrease potential crop loss.

In early coordination meetings with landowners throughout the CD 26 and CD 45 watersheds, there was significant interest in expanding and enhancing an existing Minnesota Board of Water and Soil Resources (BWSR) easement area located at the junction of CD 45 and the private lateral. By expanding this wetland easement, additional water storage can be achieved which benefits water quality, wildlife habitat, and provides a better drainage system for the proposed project. This potential wetland enhancement area was included with the design of the project to provide additional water storage capacity above and beyond what is needed to make an adequate outlet. The wetland enhancement is conceptual at this point as further coordination and design is necessary with local and state agencies prior to any final planning.

Three options are prepared within this report. Option 1 reflects the petition which is designed to achieve a 1/2 inch/day drainage coefficient for the drainage area only up 440th Avenue. This option would also provide a public outlet for the existing CD 45 watershed; however it does not provide enough capacity for an improvement to CD 45 in the future and would limit the capacity of CD 45 to its existing capacity of 0.08 inch/day. When including the CD 45 drainage system, Option 1 provides a ¼ inch/day drainage coefficient to the private lateral however with the 0.08 inch/day restriction on CD 45; the actual capacity will be between the ¼ and ½ inch/day drainage coefficient.

Option 1 also includes the wetland expansion on the existing BWSR easement which would require tile reroute for portions of the CD 45 drainage system. The additional water storage in Option 1 helps with the overall drainage of the system but is not needed for Option 1 to hydraulically function and provide an adequate outlet. The added storage in the middle of the watershed will also help the hydraulic function of the proposed tile downstream of the wetland.

Option 2 includes upsizing the tile to a 3/8 inch/day drainage coefficient for the entire 1,036-acre watershed of the private lateral and CD 45. Modeling results for this option show adequate drainage for the private lateral watershed and provides an opportunity for an improvement to CD 45 in the future. The 3/8 inch/day drainage is in line with today's standards for drainage and does not have a significant increase in peak flows at the outlet, therefore the existing CD 26 open ditch has an adequate outlet for this improvement.

Option 3 proposes the same 3/8 inch/day drainage improvement as in Option 2; however it includes the wetland expansion as described in Option 1. This option was added to compare the hydrologic impacts from adding storage into the improvement watershed. Overall, the added water storage decreases peak flow rates, allows for more infiltration and less volume drained downstream, and increases the drain down time for areas in the private lateral watershed. It should be noted that the wetland enhancement/added storage is not needed in this option to provide an adequate outlet and would be above and beyond what is necessary for the project.

The preliminary estimated construction cost for the Faribault County Ditch No. 26/45 Improvement project is approximately $578,900 for Option 1, $927,300 for Option 2, and $845,400 for Option 3. The wetland expansion is estimated at $352,100 and can utilize outside funding for most of this cost.

# PETITION + ORDER

## Petition Summary

Two petitions regarding this project were submitted to the Drainage Authority. The first was a petition for a Lateral to Faribault County Ditch No. 26, which was submitted on March 12, 2021. The second was a petition for an Outlet to CD 26, which was submitted on September 7, 2021. These petitions requested that:

1. To improve the existing system by enlarging or replacing the tile line to improve and increase the overall drainage capacity of the system, and
2. To obtain a legal outlet into the CD 26 Public Drainage system, and
3. To establish Proposed Lateral 1 as a part of the CD 26 Public Drainage system, and
4. that the Engineer be specifically ordered to determine and offer alternate proposals for the consideration of the Drainage Authority which relate to the improvement of the drainage capacity of the tile that the Engineer deems feasible, if any, including any alternate alignments

Copies of the signed Petitions have been placed in Appendix B.

### Order Summary

On October 5, 2021, the Faribault County Drainage Authority, in regular session, made an Order related to both Petitions in which it appointed ISG as Engineer. The Drainage Authority did not order anything beyond what was stated in the petition. A copy of the signed Order has been placed in Appendix B.

## SYSTEM WATERSHED

### Location

The portions of CD 26 and CD 45 that this project effects are in Section 24 Blue Earth City Township and Sections 19, 20, 21, and 28 of Emerald Township. The CD 45 tile system outlets into the existing private lateral (Proposed Lateral 1) which then outlets into a private swale, whereafter it outlets into the CD 26 Main Open Ditch. The open ditch becomes an unnamed stream shortly thereafter where it immediately outlets to the East Branch Blue Earth River in the NE ¼ of the SW ¼ of Section 24 of Blue Earth City Township, which is a public water. See Public Waters, Public and Conservation Lands Map in Appendix C.

### Watershed Description

The entire CD 26 watershed drains a total of 5,495 acres. Of this, the private lateral and CD 45 drain a total of 1,036 acres. 553 of that acreage is drained by the private lateral within the CD 26 watershed. The remaining 483 acres is contributed by the CD 45 watershed which outlets into the private lateral at its upstream end. Originally CD 45 drained an additional 134 acres, but a portion of the watershed was rerouted to the north via a private tile and no longer contributes to the CD 45 watershed's acreage. Elevations within the 26 watershed range from approximately 1069 to 1121 Mean Sea Level (MSL), and exhibit relatively steep characteristics near its outlet. The hydrologic soil classification within the watershed are predominantly type "C/D" which is considered as a dual hydrological soil group. This means that this soil has the potential to be adequately drained. The "D" in this group corresponds to the soil having over 40 percent clay and restricted water movement. The "C" is named the drained condition. That means if adequately drained, the soil would have moderately high runoff potential when thoroughly wet. Complete maps of the existing system as well as the hydrologic soil classification and the unified soil classification for the existing CD 26 watershed can be found in Appendix C.

## HISTORY

### Original System

CD 26 and CD 45 were originally constructed in 1916, both of which being entirely public tile systems. The existing private lateral originally consisted of roughly 13,500 linear feet of private buried tile, and CD 45 consisted of nearly 14,500 linear feet of public buried tile. In 1919, the majority of CD 45 was reinstalled, which was a result of improper/off-grade initial construction in 1916. The private lateral in CD 26, which drains CD 45, is also assumed to have been constructed at or before 1916 as it would logically need to be present to accommodate the CD 45 tile and provide an outlet for that system. No records of major repair or improvements were found, and upon investigation through televising, it appears that the private lateral is experiencing widespread failure which would further indicate that it is the original drainage infrastructure. There have been recent tile repairs throughout the CD 26 tile system, however nothing known in the private lateral.

### Early Coordination and Feasibility Report

A feasibility report was prepared by the Engineer for a landowner meeting which took place in December of 2019. Following this, and due to a general desire to evaluate the condition of the Private lateral, landowners requested that ISG televise the system, which was completed in November of 2021. From this information, the Feasibility report was updated, and another landowner meeting was held in February 2022. This report contained a variety of repair and improvement options for both systems.

### Investigation of External Sources of Funding and Technical Assistance

Section 103E.015, Subd. 1a of the Drainage Statute requires that an investigation of external sources of funding and technical assistance be conducted prior to an order on the Engineer's preliminary survey report for a drainage project or the Engineer's report for a repair. The funding can be used for wetland preservation or restoration or creation of water quality improvements, flood control, or alternative measures (per Section 103E.015, Subd. 1, clause (2)). The sources of funding authorized under this Section can be used outside the benefited area but must be used in the watershed of the system.

There are a limited number of BMPs that are appropriate for use as a part of tile projects. One specific and integral BMP is the expansion and enhancement of the existing BWSR easement area into a functional storage and nutrient removal wetland, which exists at the outlet of CD 45 into the existing private tile. The wetland enhancement creates the possibility for grant funding and could also be funded or done by BWSR if the proposed wetland aligns with its goals for the existing easement area. This wetland enhancement area is above and beyond the proposed drainage project and is not needed to provide an adequate outlet. There are some BMPs that can be implemented by individual landowners including nutrient management, conservation tillage, cover crops, blind rock inlets, and controlled drainage. A Multipurpose Drainage Management (MDM) Plan is included in Appendix D.

# PRESENT CONDITION OF SYSTEM BY OBSERVATION AND ANALYSIS

The existing condition of the private lateral was determined through topographic and Drone LiDAR survey in April 2022 and televising portions of the existing tile system in November 2021. CD 45 was also evaluated in this manner, with the exception that it has not been televised to determine the condition of the existing tile. Televising images depicted below in Figures 2-16 give insight into the present condition of the system, which shows serious cracking, collapsing, sedimentation, and failure in general. A reference map for private lateral is shown below in Figure 1.

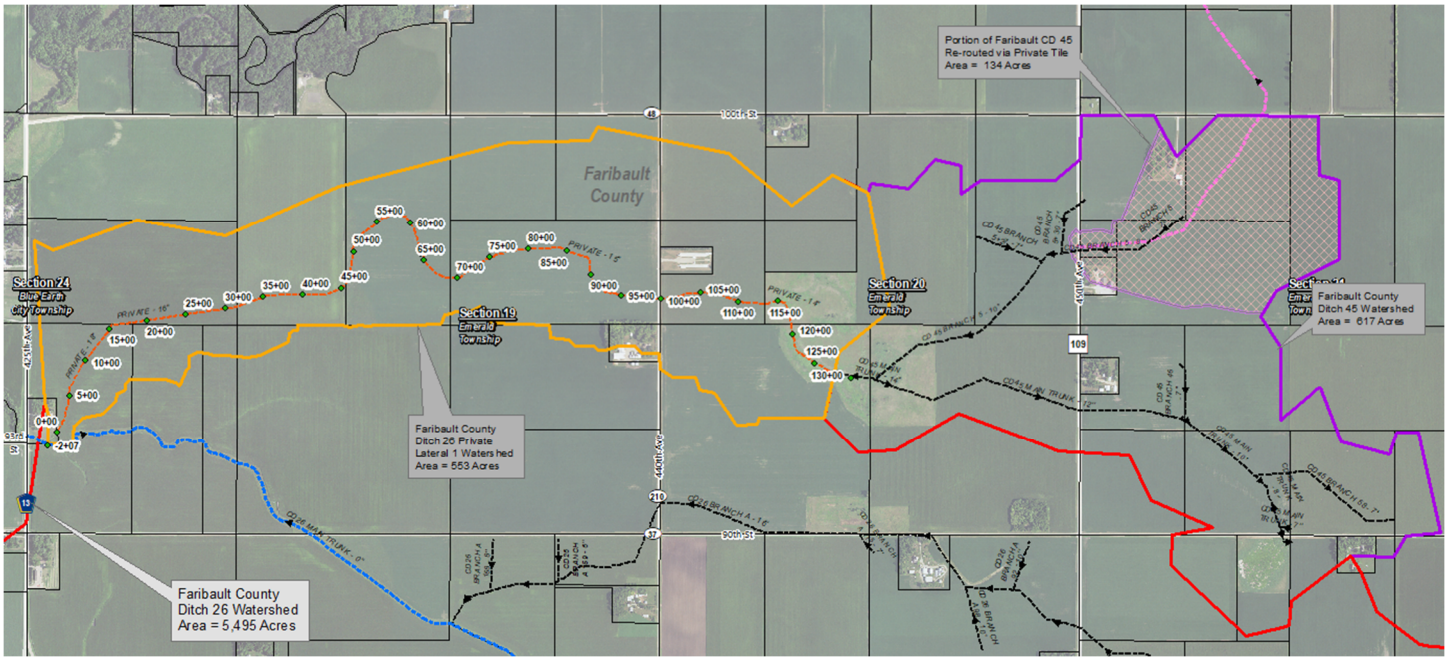



*Figure 1. Faribault 26 Existing Private Lateral & CD 45 Reference Map*

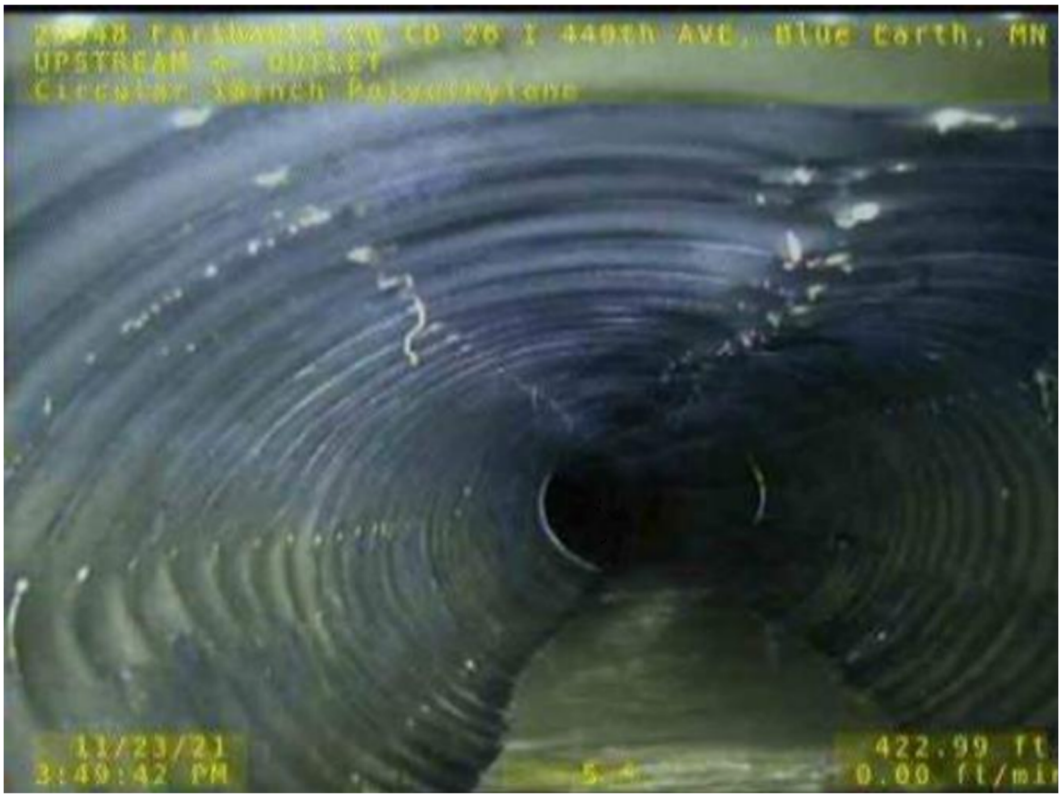



*Figure 2. Deflection and Deformation in Patch (Station 4+25)*

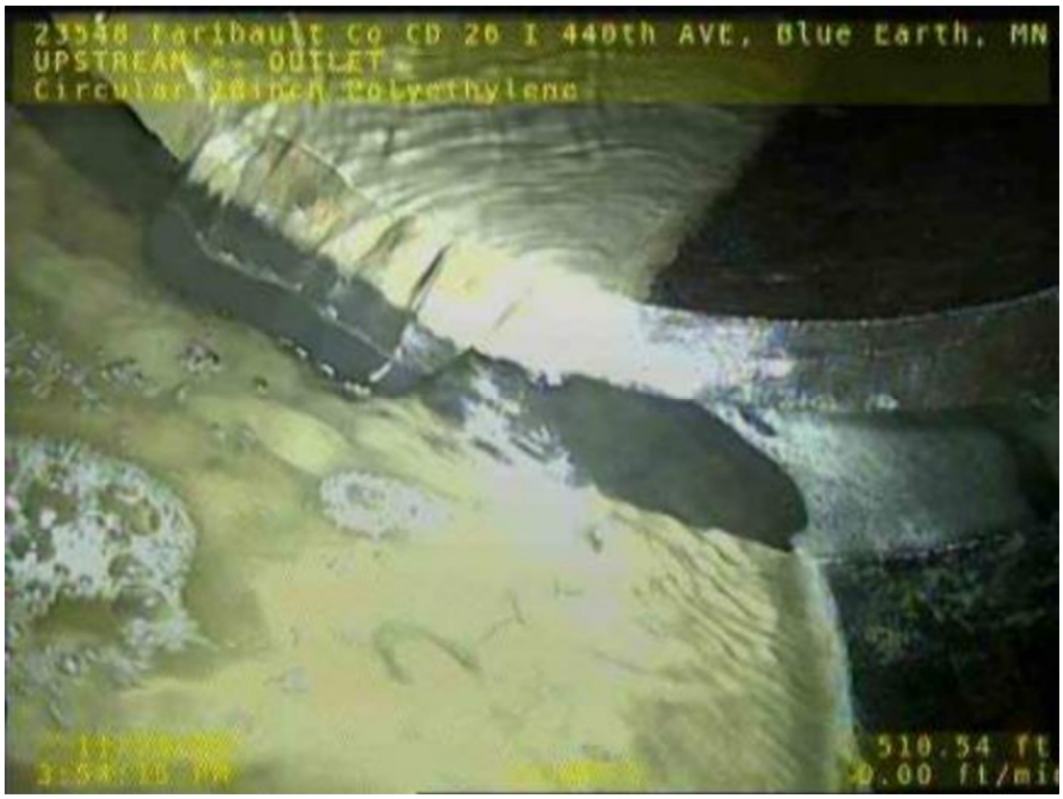



*Figure 3. Misalignment in Tile Sections (Station 5+10)*

*Figure 4. Misalignment in Tile Sections (Station 5+10)*

*Figure 5. Collapsing Tile & Root Intrusion (Station 5+25)*

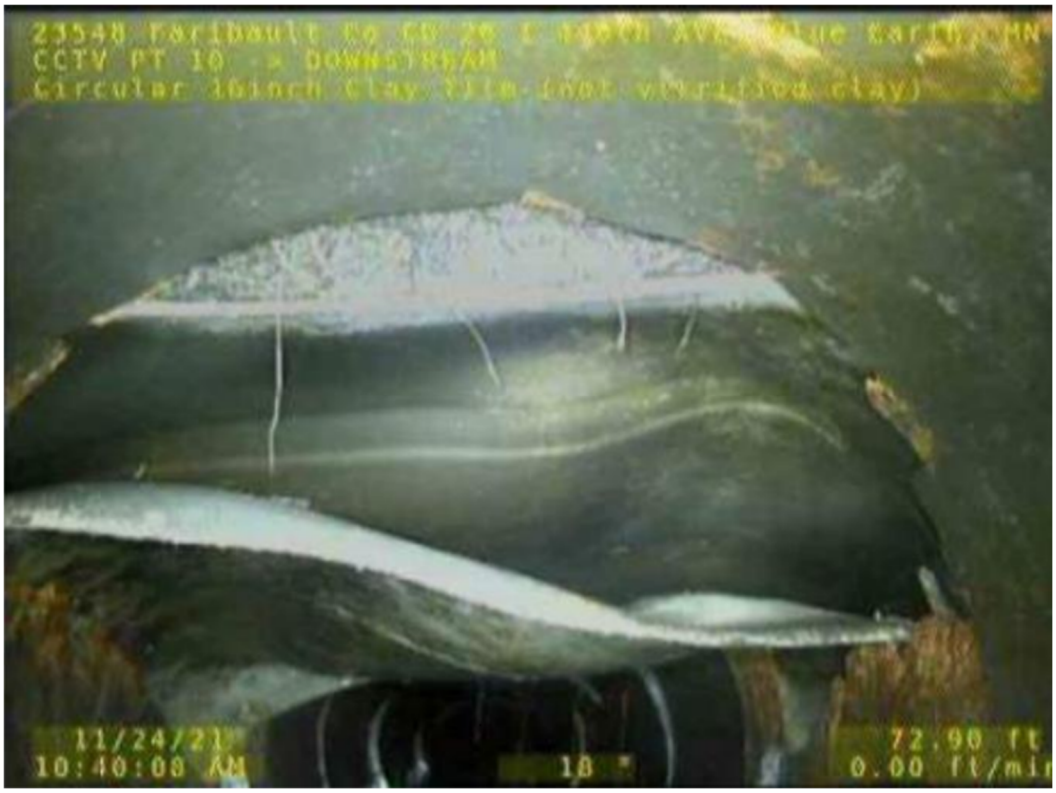



*Figure 6. Dual Wall Patch Collapse (Station 15+00)*

*Figure 7. Misalignment in Tile Sections (Station 40+10)*

*Figure 8. Gravel Deposits (Station 52+00)*

*Figure 9. Deflection in Dual Wall Patch (Station 58+75)*

*Figure 10. Collapsing Tile & Root Intrusion (Station 72+25)*

*Figure 11. Tile Chunk Obstruction (Station 73+25)*

*Figure 12. Connection Blocking Flow (Station 79+75)*

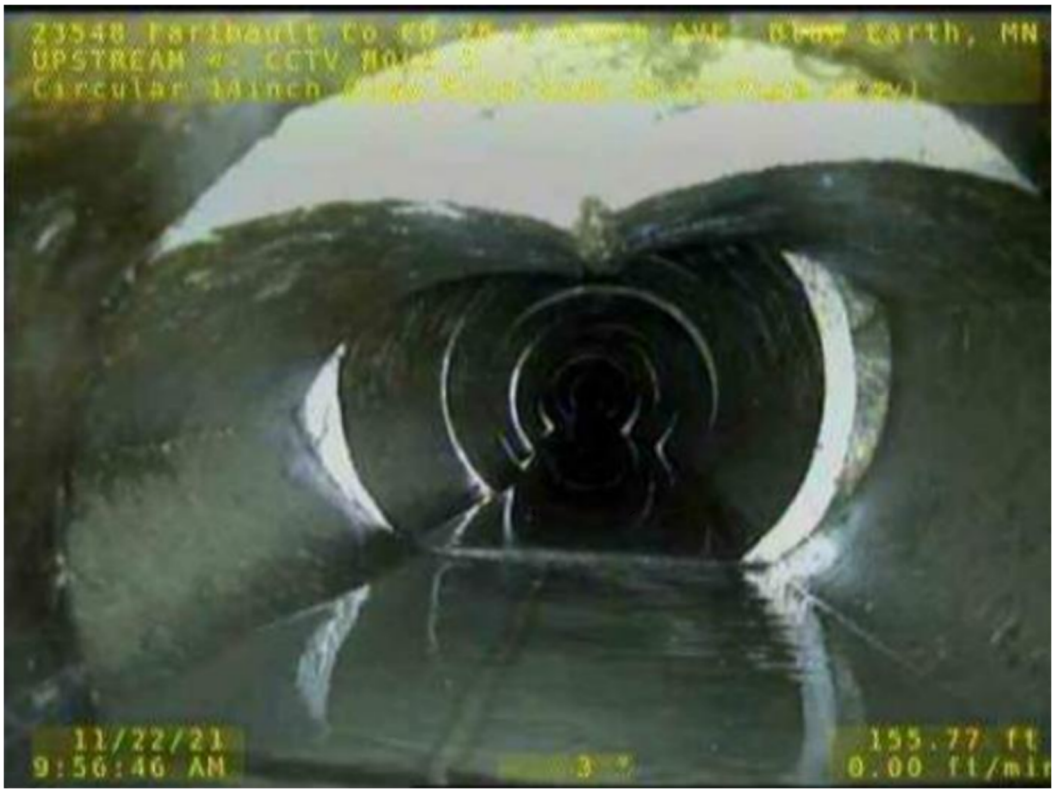



*Figure 13. Collapsing Tile (Station 99+00)*

*Figure 14. Root Ball (Station 111+50)*

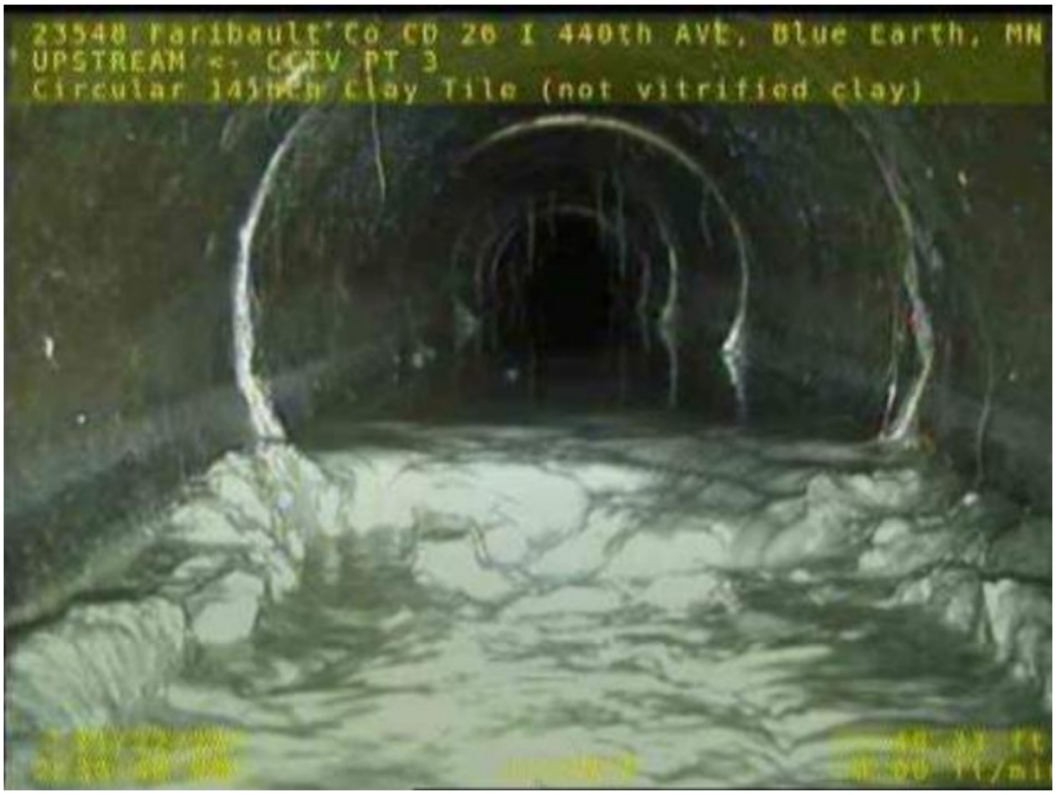



*Figure 15. Caly Deposits (Station 113+00)*

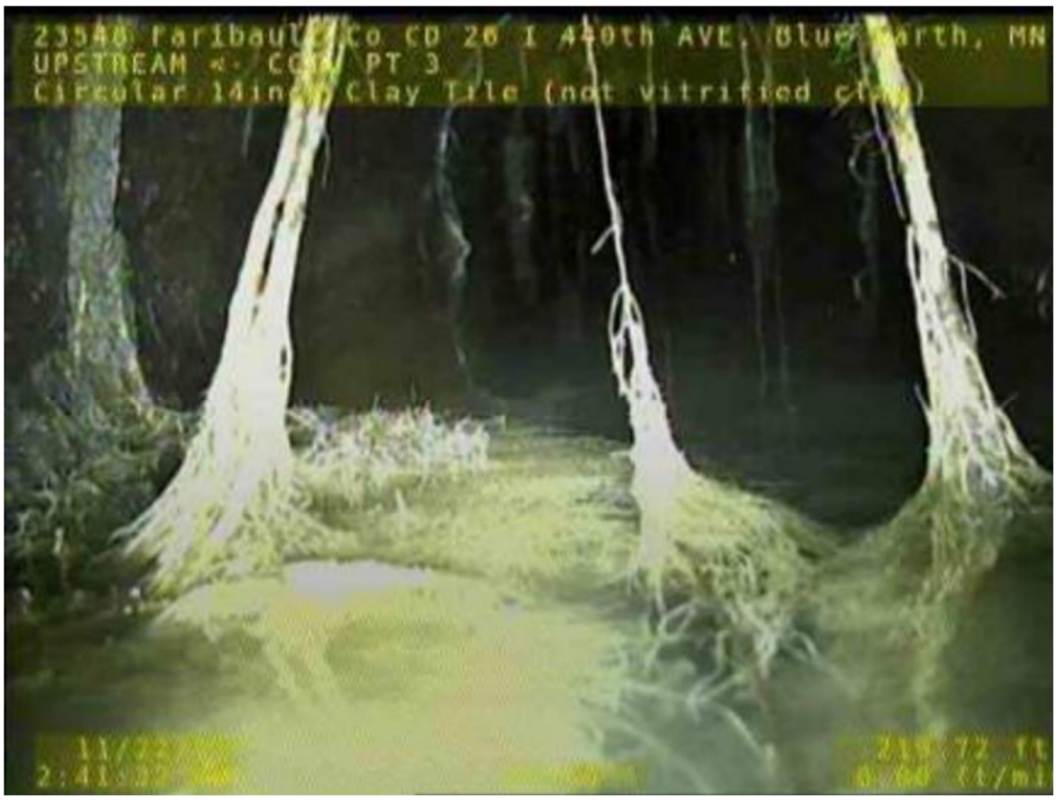



*Figure 16. Root Ball (Station 114+50)*

## System Capacity

The following tables summarize the drainage calculations for the existing private lateral and CD 45 System. The capacities listed in the table reference the capacity of agricultural drainage, which is expressed as a drainage coefficient and is defined as the depth of water over the entire upstream watershed that a tile or ditch can drain within a 24-hour period (inches per day (in/day)). For a system like CD 26 or CD 45, a 3/8 to 1/2 inch/day drainage coefficient for buried tile is recommended to meet today's drainage needs. Table 1 below, which details the existing private lateral, was determined using televising to determine grades and location along the tile. The CD 45 tile, which is described below in Table 2, was creating using the grades and lengths gathered from the original construction documents. Both systems exhibit drainage coefficients significantly lower than what is recommended, as low as 0.06 in/day in areas which drain over half of the watershed in question. In Table 2, the As Constructed or Subsequently Improved Condition (ACSIC) represents the legal repair capacity of the CD 45 system when factoring in the available pipe sizes.

TABLE 1. EXISTING PRIVATE TILE CAPACITIES

| Area | Existing Size (in) | Existing Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) |
|---|---|---|---|---|
| Private Tile | 18 | 0.37% | 1036 | 0.15 |
| | 16 | 0.37% | 1014 | 0.11 |
| | 16 | 0.37% | 953 | 0.12 |
| | 16 | 0.37% | 891 | 0.13 |
| | 16 | 0.15% | 891 | 0.08 |
| | 16 | 0.15% | 843 | 0.08 |
| | 16 | 0.15% | 769 | 0.09 |
| | 15 | 0.08% | 769 | 0.06 |
| | 15 | 0.08% | 636 | 0.07 |
| | 15 | 0.08% | 491 | 0.09 |
| | 15 | 0.08% | 459 | 0.10 |
| | 14 | 0.08% | 459 | 0.08 |
| | 14 | 1.34% | 459 | 0.32 |

TABLE 2. EXISTING/ACSIC CD 45 TILE CAPACITIES

| Area | Existing Size (in) | ACSIC Size (in) | ACSIC Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | ACSIC Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|
| Mainline Tile | 14 | 15 | 0.10% | 483 | 0.08 | 0.10 |
| | 12 | 12 | 0.08% | 323 | 0.07 | 0.07 |
| | 12 | 12 | 0.08% | 256 | 0.09 | 0.09 |
| | 10 | 10 | 0.08% | 150 | 0.10 | 0.10 |
| | 8 | 8 | 0.08% | 61 | 0.13 | 0.13 |
| | 7 | 8 | 0.08% | 44 | 0.13 | 0.18 |
| Branch 5 | 10 | 10 | 0.10% | 148 | 0.11 | 0.11 |
| | 10 | 10 | 0.66% | 124 | 0.34 | 0.34 |
| | 10 | 10 | 0.10% | 111 | 0.15 | 0.15 |
| Branch 46 | 7 | 8 | 0.25% | 51 | 0.20 | 0.28 |
| Branch 58 | 7 | 8 | 0.53% | 54 | 0.27 | 0.39 |
| | 7 | 8 | 0.11% | 33 | 0.20 | 0.29 |
| Branch 64 | 7 | 8 | 1.00% | 4 | 4.93 | 7.03 |
| Branh 5+27 | 7 | 8 | 0.19% | 47 | 0.19 | 0.27 |
| Branch 5+30 | 7 | 8 | 0.20% | 40 | 0.23 | 0.32 |
| | 7 | 8 | 0.18% | 28 | 0.31 | 0.44 |

## Nature of the Outlet

The existing private tile outlets into a private waterway before draining into the CD 26 Main Open Ditch upstream of County Road 13, located in Section 24 of Blue Earth City Township. This private waterway is proposed to be incorporated into the drainage system under the same Petition which establishes the Proposed Lateral 1 as a part of the public drainage system.

CD 26 outlets into the unnamed stream the NW ¼ of the SE ¼ of Section 24 of Blue Earth City Township. The Blue Earth River is impaired for turbidity, fish bioassessments, and E. coli. The open ditch of CD 26 is also in itself impaired for benthic macroinvertebrate bioassessments.

# STATUTE REQUIRED + SUGGESTED EFFORTS

## Project Necessity

After examining the Petition and present condition of the tile observationally and by analysis, it is deemed necessary to improve the private tile by establishing Lateral 1, as well as its private outletting waterway, as a public lateral to give its direct users a public outlet. This would also give a public outlet to the currently orphaned CD 45 system, whose current outlet is private and in disrepair. Beyond the legal benefits and future repair benefits through the 103E, the system would see drainage improvements, combined with a large wetland enhancement, inundation times decrease along with ponded water depth for increased farmability and decreased crop loss.

## Environmental, Land Use, and Multipurpose Water Management Considerations (Section 103E.015, Subd. 1)

The Drainage Statute requires that the drainage authority assess the necessity and feasibility of a drainage project in relation to the environmental, land use, and multipurpose water management criteria of Section 103E.015, Subd. 1. To assist in providing thoroughness and clarity, the Statute will be used as the outline for this portion of the report.

*103E.015 CONSIDERATIONS BEFORE DRAINAGE WORK IS DONE.*

*Subdivision 1. Environmental, land use, and multipurpose water management criteria. Before establishing a drainage project, the drainage authority must consider each of the following criteria:*

*(1) private and public benefits and costs of the proposed drainage project;*

The proposed drainage system will replace failing infrastructure to meet today's farming needs for drainage and support a sustainable agricultural economy. The proposed system will decrease the duration of standing water in farm fields, which reduces the potential for crop loss and improves the farmability of land within the watershed.

The proposed project will also decrease the rate of overland flow, which will in turn decrease the amount of sediment and sediment bound phosphorous that leaves the system. Secondarily it will also increase retention time of a wetland within the system reducing sediment and nutrients bound for the Blue Earth River. Since the proposed tile improvement is for a public drainage system, the financial cost will be borne by the benefitted landowners. The proposed project will improve the drainage of the benefitted landowners and will not negatively impact the environment.

The improvement of Lateral 1 and its addition to the public drainage system would allow this area of the CD 26 system a legal outlet and provide a public outlet for the existing public CD 45 watershed which currently drains to a private tile system as its outlet.

(2*) alternative measures, including measures identified in applicable state-approved and locally adopted water management plans, to:*

- *(i) conserve, allocate, and use drainage waters for agriculture, stream flow augmentation, or other beneficial uses;*
- *(ii) reduce downstream peak flows and flooding;*
- *(iii) provide adequate drainage system capacity;*
- *(iv) reduce erosion and sedimentation; and*
- *(v) protect or improve water quality;*

The following water management plans were consulted to see what alternative measures might be applicable to the proposed drainage project:

- Faribault County Water Management Plan (Local Water Management Plan)
- Blue Earth River Total Maximum Daily Load (TMDL)
- Blue Earth River Watershed Restoration and Protection Strategies (WRAPS)

The plans listed above are concerned with improving surface water quality through the reduction of agricultural non-point source pollution. The plans propose to reach their water quality goals through preventative multi-purpose drainage management practices. BMPs in the proposed project include using water quality intakes at road crossings and increasing storage and nutrient removal by the enhancement of an existing BWSR easement. This project aligns with local water management plans by reducing sediment delivery downstream using water quality intakes and the wetland enhancement.

(3) *the present and anticipated land use within the drainage project or system, including compatibility of the project with local land use plans;*

The present land use for the system watershed is primarily agricultural land. The project would result in an increase in wetland acreage by converting some farmland to the proposed wetland enhancement.

(4) *current and potential flooding characteristics of property in the drainage project or system and downstream for 5-, 10-, 25-, and 50-year flood events, including adequacy of the outlet for the drainage project;*

A detailed 2-dimensional hydrologic and hydraulic model utilizing InfoWorks Integrated Catchment Model (ICM) was completed for the design of the drainage project. The 5, 10, 25, and 50-year flood events were modeled for a 24-hour storm duration. The models showed that peak flow rates would generally decrease at the outlet for Option 1, and a slight increase in flows for Option 2 and Option 3. The models also indicated that overall peak flood elevations, flood duration, and overall flood extents throughout the improved watershed areas would decrease. Flood

duration, depth, and extent was increased in the BWSR easement in the areas where the wetland is currently proposed to be deepened. A summary of the modeled outlet flows can be seen below in Tables 3, 4, & 5.

TABLE 3. LATERAL 1 SYSTEM OUTLET FLOW COMPARISON OPTION 1

| Event | Existing (cfs) | Proposed (cfs) | % Change |
|---|---|---|---|
| 5-Yr | 133 | 127 | -5% |
| 10-Yr | 179 | 174 | -3% |
| 25-Yr | 256 | 252 | -2% |
| 50-Yr | 330 | 326 | -1% |

Denotes peak flows less than or equal to existing.

TABLE 4. LATETAL 1 SYSTEM OUTLET FLOW COMPARISON OPTION 2

| Event | Existing (cfs) | Proposed (cfs) | % Change |
|---|---|---|---|
| 5-Yr | 133 | 152 | 14% |
| 10-Yr | 179 | 205 | 15% |
| 25-Yr | 256 | 295 | 15% |
| 50-Yr | 330 | 377 | 14% |

TABLE 5. LATERAL 1 SYSTEM OUTLET FLOW COMPARISON OPTION 3

| Event | Existing (cfs) | Proposed (cfs) | % Change |
|---|---|---|---|
| 5-Yr | 133 | 145 | 9% |
| 10-Yr | 179 | 189 | 6% |
| 25-Yr | 256 | 264 | 3% |
| 50-Yr | 330 | 334 | 1% |

While the entire CD 26 system was not modeled for the purposes of this analysis, peak flowrates at the outlet of the CD 26 Main open ditch were gathered from StreamStats for a comparison between the existing and proposed peak flowrate conditions. This comparison can be seen below in Table 6.

TABLE 6. CD 26 OUTLET FLOW COMPARISON OPTION 1, 2, & 3

| Event | Existing (cfs) | Proposed Option 1 (cfs) | % Change Option 1 | Proposed Option 2 (cfs) | % Change Option 2 | Proposed Option 3 (cfs) | % Change Option 3 |
|---|---|---|---|---|---|---|---|
| 5-Yr | 276 | 269 | -2% | 295 | 7% | 288 | 4% |
| 10-Yr | 393 | 388 | -1% | 419 | 7% | 404 | 3% |
| 25-Yr | 570 | 566 | -1% | 609 | 7% | 577 | 1% |
| 50-Yr | 724 | 721 | 0% | 771 | 7% | 729 | 1% |

Denotes peak flows less than or equal to existing.

When considering the adequacy of the outlet, the CD 26 system outlet at the County Road 13 culvert crossing was evaluated. The existing 12' X 8', Bridge No. 22J43, box culvert was designed for the 50-year event and does not overtop at the 100-year event in any of the proposed improvement options. After reviewing the greatest increase option (Option 2), the modeled results do not significantly increase the peak flowrates, water elevations, and velocities. Therefore, the outlet is deemed adequate for Option 2 and thus Options 1 and 3 as they have lesser

impacts. Storage in the middle of the watershed as identified in the existing easement area will help the system function hydraulically, however the storage is not needed to create an adequate outlet. The referenced hydrologic/hydraulic modeled results can be found in Appendix F.

With the increased buried tile in all options, sizeable reductions in overland flow were observed from the existing easement area to the outlet of the private branch into the CD 26 main open ditch. Station 35+00 which can be seen on the previously referenced map, was used to compare the existing and proposed conditions. The nature of this area of the watershed is relatively erosive in that it exhibits steep characteristics and contains its flow to a relatively channelized area which is currently being farmed and has bare soils exposed for portions of the year. These reductions will aid in sediment transport reduction as well as reducing topsoil loss for impacted landowners. The total suspended solids (TSS) reductions were estimated at 11.75, 19.5, and 23.5 tons/year for Options 1, 2, & 3, respectively. This overland flow reductions can be seen detailed below in Table 7.

TABLE 7. OVERLAND FLOW COMPARISON

| Location | Conveyence | 5-yr | | | 10-yr | | |
|---|---|---|---|---|---|---|---|
| | | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change |
| CD 26 Overland Flow | Option 1 | 51.56 | 44.71 | -13% | 80.04 | 71.93 | -10% |
| | Option 2 | 51.56 | 42.66 | -17% | 80.04 | 64.76 | -19% |
| | Option 3 | 51.56 | 34.06 | -34% | 80.04 | 63.77 | -20% |
| Location | Conveyence | 25-yr | | | 50-yr | | |
| | | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change |
| CD 26 Overland Flow | Option 1 | 132.50 | 122.25 | -8% | 182.38 | 170.92 | -6% |
| | Option 2 | 132.50 | 119.79 | -10% | 182.38 | 172.60 | -5% |
| | Option 3 | 132.50 | 118.36 | -11% | 182.38 | 170.05 | -7% |

Denotes peak flows less than or equal to existing

Detailed modeling results and discussions related to the hydrologic and hydraulic (H/H) analysis of the Faribault CD 26/45 system and adequacy of the outlet can be found in Appendix F.

*(5) the effects of the proposed drainage project on wetlands;*

Drainage projects must comply with a variety of state and federal wetland regulations: USACOE 404, Minnesota Wetland Conservation Act, and USDA Swampbuster. There are several wetlands as identified by the National Wetland Inventory and a Level 1 wetland delineation within the watershed Lateral 1 drains. The only one that is to be impacted by the proposed tile is the existing BWSR easement area. Future design work and coordination with BWSR and WCA is necessary before final approval of the project. Where the tile improvements encroach on identified wetland areas, non-perforated tile and watertight connections will be utilized. Connections of existing private tiles will not be enlarged with the improvement in these areas. The disturbed ground through these areas will be returned to the pre-project elevations. Therefore, there are no anticipated negative wetland impacts with this drainage project.

*(6) the effects of the proposed drainage project on water quality;*

Water quality issues pertinent to drainage projects can include erosion, sediment transport potential, and non-point sources of pollution (e.g. nutrients, pesticides, and bacteria). The outlet of CD 26, the Blue Earth River, was listed as an impaired water due to turbidity, fish bioassessments, and E. coli by the MPCA. The project is not anticipated to negatively impact existing water quality conditions of the Blue Earth River. Water quality inlets seek to reduce sediment transport, which will have a beneficial impact on downstream turbidity. As detailed previously, the proposed Improvement would significantly reduce overland flow in the event of a major rainfall event, reducing the potential for sediment transport, which will also have a beneficial impact on downstream sediment delivery. Finally, the additional capacity and residency time allowed by the expanded wetland would reduce peak flowrates as well as improve water quality. The proposed wetland's potential reduction in TP and TSS (Total Phosphorous and Total Suspended Solids) was calculated for this report, and is currently estimated at 32 tons per year for TSS and 49 tons per year for TP.

*(7) the effects of the proposed drainage project on fish and wildlife resources;*

The proposed drainage project is not expected to negatively impact fish and wildlife resources and no landscape changes are anticipated. Reductions in overland flow and increased residency time for stormwater would work toward reducing downstream sediment loading and turbidity as well as nutrient levels, which would aid in preserving spawning habitat within the river, as well as stepping toward reducing algal blooms and subsequent reduced dissolved oxygen levels downstream which both result from excess dissolved nutrients. These impacts would have a positive impact on downstream fish habitat, and the wetland would produce a more diverse and robust habitat for the area wildlife.

By enhancing the existing BWSR easement area, the wildlife and especially waterfowl habitat would see an increase with the completion of the project. A reduction in nesting and staging areas in an around wetlands in Minnesota's historic prairie-pothole region have been occurring for over the last century and a half because of an ever-growing agricultural economy. Improvements which seek to remediate this reduction and

place permanent wetland enhancements in tandem with drainage solutions are becoming ever more critical to preserve, conserve, and remediate our wetland losses while functioning as a critical element of the design.

Natural Heritage Information System (NHIS) data for Faribault County has been obtained by ISG via a license agreement with the Minnesota Department of Natural Resources (MNDNR). A review of this database was conducted by ISG staff to identify any rare features that could potentially be located within the Faribault CD 26 or CD 45 watersheds. No rare features were identified in the project area. The Green Dragon (Arisaema dracontium) was observed and documented in 2020 roughly 3,500 feet downstream from the CD 26 system outlet. The Green Dragon primarily inhabits wooded floodplain areas of major tributary rivers to the Mississippi River within Minnesota. There are no anticipated impacts to the species as a direct result of the proposed project.

*(8) the effects of the proposed drainage project on shallow groundwater availability, distribution, and use; and*

There are no anticipated effects to shallow groundwater from the proposed project. The project will only impact soil saturation levels. There are no known irrigation or personal wells located close enough to the proposed improvement to be affected by the drainage tiles. There are 6 private wells located in the project's watershed. The closest well is approximately 600-feet away from any proposed tile. Therefore, the wells are not located within a proximity that would be affected by the drainage tiles of the proposed improvement

*(9) the overall environmental impact of all the above criteria.*

The project will have minimal environmental impact as there are no major land use changes, fish and wildlife habitat changes, or any adverse effects to water quality. As a result of the wetland expansion, CD 26 is expected to deliver reduced amounts of both sediment and nutrients to the Blue Earth River. Along with water quality benefits, the increased acreage of maintained wetlands would provide critical nesting and staging habitat for waterfowl and numerous habitat benefits for a wide variety of other species.

### Statement of Necessity and Feasibility, Section 103E.015, Subd. 1,

The Engineer deems the proposed project to be both necessary and feasible as the project does not lie within a public watercourse nor has significant impacts of such watercourses.

### Public Waters and Potential Permits

To ascertain whether the drainage project will have substantial effect on Public Waters, this report will be sent to the MNDNR in the PER phase and further discussion (if necessary) can occur in the development of the Final Engineering Report. However, the Engineer believes that if the project moves forward, the Drainage Authority will not need to apply for a Public Waters Work Permit from the MNDNR as there are no substantial impacts on Public Waters.

## PROPOSED PROJECT

The following project has been proposed in response to the Petition with due regard to the results of the Preliminary Survey:

### Project Design Parameters

While alternatives will be analyzed, there are certain things that will, by necessity, characterize any configuration of the proposed drainage project.

#### COEFFICIENT OF DRAINAGE

The capacity of agricultural drainage is expressed as a drainage coefficient which is defined as the depth of water over the entire area of the upstream watershed that a tile or ditch can drain in a 24-hour period (inches per day (in/day)). A drainage coefficient of 3/8 to 1/2 in/day for tile is recommended with timing further influencing design. With the expanded wetland, the additional storage allows for more drainage capacity in the system and allows Option 1 to have less drainage coefficients while still providing adequate drainage capacity.

#### SYSTEM DEPTH

The depth of Proposed Lateral 1 is controlled by four criteria: 1. Provide a minimum of five feet of cover in low spots along public tile alignments, 2. Increase ditch or tile grades to improve capacity, 3. Provide deeper outlets for private tile, and 4. Maintain adequate depth to allow an outlet for the proposed wetland/storage areas. A stretch of the proposed Lateral 1 tile near the outlet may need additional fill to provide adequate cover over the tile. This fill can be borrowed from the potential wetland enhancement area or adjacent hill sides. The final fill requirement will be determined as options narrow depending on proposed pipe size.

#### EROSION CONTROL

Required temporary erosion control will consist of silt fence or bio-roll around all surface intakes until vegetation is established. The temporary erosion control will be maintained throughout the construction process according to the Minnesota Pollution Control Agency (MPCA) regulations.

Permanent erosion control will consist of riprap around the Proposed Lateral 1 tile outlet. Seeding and erosion control blanket will be placed on all disrupted areas around road crossings. All disturbed vegetation throughout the project will be reseeded with the appropriate seed mix and mulch.

An Erosion Control Plan or a Storm Water Pollution Prevention Plan will be developed before final construction plans are complete and a National Pollution Discharge and Elimination System (NPDES) permit application will be filed before construction.

### TILE AND CONNECTION MATERIALS

All public tile is solid non-perforated dual wall HDPE or RCP pipe with watertight gaskets at all straight-line pipe joints. All angle pipe joints and prefabricated fitting connections will be soil tight.

### TILE REPLACEMENT AND CONNECTIONS

When tiles are replaced, whether through repair or improvement proceedings, the replaced tiles are left in the ground and are segmented. The segments are then used as headers for private tiles. Segments are connected to the replacement tile at property lines and before the tile outlets. The abandoned tile will be the responsibility of the landowner into the future. Proposed tiles will connect existing tiles under the roadways and also provide a surface intake to aide in draining the roadway/ditch. At no point will "doubling" of drainage capacity occur with two lines since all flow will eventually be directed back into the mainline at one outlet point. See connection detail within the details section of the Preliminary Plans in Appendix A.

## Project Components

### TILE

The Proposed Lateral 1 Option 1 Improvement includes the realignment and subsequent alteration of tile sizes and grades for the tile up to 440th Avenue. Option 1 is designed to achieve 1/2 inch/day drainage coefficient for the drainage area up to 440th Avenue, however it will provide a drainage outlet to the CD 45 drainage system. This includes a 24-inch tile outlet into the CD 26 main open ditch and tile sizes decreasing to 15 inches. With the CD 45 drainage system watershed factored in, the mathematical drainage coefficient of the Proposed Lateral 1 is ¼ inch/day. However, CD 45 will be limited to a 0.08 inch/day drainage coefficient that will hydraulically provide more drainage for Proposed Lateral 1.

A wetland expansion concept is planned for the BWSR easement area to provide more storage to the system. This will help with the slightly undersized Option 1 tile in its hydraulic efficiency. The wetland enhancement will require the CD 45 tile to be rerouted around the proposed wetland and will be connected into the existing 14-inch tile at the BWSR easement line. The 1,350 feet of existing 14-inch tile from 440th Avenue to the existing BWSR easement line will remain in place and connect the CD 45 reroute tile to the Proposed Lateral 1 tile. This stretch of tile while is still existing will become part of the public tile system of Proposed Lateral 1. The capacities of the CD 45 reroute will match the ACSIC capacities to follow the impoundment and abandonment Statute of MN 103E.

Improvement Option 2 includes upsizing the tile to a 3/8 inch/day drainage coefficient for the entire 1,036-acre watershed of the private lateral and CD 45. This includes a 30-inch tile outlet sizing down to a 24-inch tile at the junction of CD 45 to provide a 3/8 inch/day drainage coefficient for future improvements to CD 45. The Proposed Lateral 1 tile will connect into the CD 45 outlet near the center of the existing BWSR easement area and no modifications to the easement will be made in Option 2.

Option 3 proposes the same 3/8 inch/day drainage improvement as in Option 2, however it includes the wetland enhancement as described in Option 1. The Proposed Lateral 1 tile will span through 440th Avenue and up to the BWSR easement line to provide a new outlet for the wetland expansion. The CD 45 reroute tile will also connect directly into the new 24-inch Proposed Lateral 1 line at this location.

This option was added to compare the hydrologic impacts from adding storage into the improvement watershed. Overall, the added water storage decreases peak flow rates, allows for more infiltration and less volume drained downstream, and increases the drain down time for areas in the private lateral watershed. It should be noted that the wetland enhancement/added storage is not needed in this option to provide an adequate outlet and would be above and beyond what is necessary for the project.

The proposed tile outlet could be potentially extended to reach the CD 26 Main Open Ditch for all options, currently it is proposed to continue utilizing the existing waterway. Table 8 below shows the proposed tile sizes for Option 1 while Tables 9 & 10 show the sizes for Options 2 and 3. Table 11 shows the reroute capacities included with the wetland expansion project, matching the ACSIC capacities.

TABLE 8. PROPOSED OPTION 1 TILE CAPACITIES

| Area | Start Location | End Location | Existing Size (in) | Proposed Size (in) | Existing Slope (%) | Proposed Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|---|---|
| Lateral 1 | 0+00 | 5+30 | 18 | 24 | 0.37% | 0.12% | 378.0 | 0.15 | 0.49 |
| | 5+30 | 10+65 | 16 | 24 | 0.37% | 0.11% | 356.0 | 0.11 | 0.50 |
| | 10+65 | 26+50 | 16 | 18 | 0.37% | 0.32% | 295.0 | 0.12 | 0.48 |
| | 26+50 | 30+20 | 16 | 18 | 0.37% | 0.20% | 233.0 | 0.13 | 0.48 |
| | 30+20 | 39+50 | 16 | 15 | 0.15% | 0.55% | 233.0 | 0.08 | 0.49 |
| | 39+50 | 46+00 | 16 | 18 | 0.15% | 0.13% | 185.0 | 0.08 | 0.49 |
| | 46+00 | 63+00 | 16 | 15 | 0.15% | 0.35% | 185.0 | 0.08 | 0.49 |
| | 63+00 | 73+70 | 16 | 15 | 0.15% | 0.12% | 111.0 | 0.09 | 0.48 |
| | 73+70 | 93+84 | 15 | 15 | 0.08% | 0.12% | 111.0 | 0.06 | 0.48 |
| | 93+84 | 100+00 | 15 | 15 | 0.08% | 0.10% | 42.0 | 0.07 | 1.16 |

TABLE 9. PROPOSED OPTION 2 TILE CAPACITIES

| Area | Start Location | End Location | Existing Size (in) | Proposed Size (in) | Existing Slope (%) | Proposed Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|---|---|
| Lateral 1 | 0+00 | 5+30 | 18 | 30 | 0.37% | 0.15% | 1036.0 | 0.15 | 0.37 |
| | 5+30 | 10+65 | 16 | 30 | 0.37% | 0.15% | 1014.0 | 0.11 | 0.37 |
| | 10+65 | 17+00 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 17+00 | 23+50 | 16 | 24 | 0.37% | 0.45% | 953.0 | 0.12 | 0.38 |
| | 23+50 | 26+50 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 26+50 | 30+20 | 16 | 24 | 0.37% | 0.40% | 891.0 | 0.13 | 0.38 |
| | 30+20 | 39+50 | 16 | 24 | 0.15% | 0.40% | 891.0 | 0.08 | 0.38 |
| | 39+50 | 46+50 | 16 | 30 | 0.15% | 0.10% | 843.0 | 0.08 | 0.37 |
| | 46+50 | 63+00 | 16 | 24 | 0.15% | 0.36% | 843.0 | 0.08 | 0.38 |
| | 63+00 | 73+70 | 16 | 30 | 0.15% | 0.10% | 769.0 | 0.09 | 0.40 |
| | 73+70 | 93+84 | 15 | 30 | 0.08% | 0.08% | 769.0 | 0.06 | 0.36 |
| | 93+84 | 112+75 | 15 | 24 | 0.08% | 0.20% | 636.0 | 0.07 | 0.38 |
| | 112+75 | 122+45 | 15 | 24 | 0.08% | 0.11% | 491.0 | 0.09 | 0.36 |
| | 122+45 | 131+19 | 15 | 24 | 0.08% | 0.10% | 459.0 | 0.10 | 0.37 |
| | 131+19 | 133+67 | 14 | 24 | 0.08% | 0.10% | 459.0 | 0.08 | 0.37 |
| | 133+67 | 136+78 | 14 | 24 | 1.34% | 0.10% | 459.0 | 0.32 | 0.37 |

TABLE 10. PROPOSED OPTION 3 TILE CAPACITIES

| Area | Start Location | End Location | Existing Size (in) | Proposed Size (in) | Existing Slope (%) | Proposed Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|---|---|
| Lateral 1 | 0+00 | 5+30 | 18 | 30 | 0.37% | 0.15% | 1036.0 | 0.15 | 0.37 |
| | 5+30 | 10+65 | 16 | 30 | 0.37% | 0.15% | 1014.0 | 0.11 | 0.37 |
| | 10+65 | 17+00 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 17+00 | 23+50 | 16 | 24 | 0.37% | 0.45% | 953.0 | 0.12 | 0.38 |
| | 23+50 | 26+50 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 26+50 | 30+20 | 16 | 24 | 0.37% | 0.40% | 891.0 | 0.13 | 0.38 |
| | 30+20 | 39+50 | 16 | 24 | 0.15% | 0.40% | 891.0 | 0.08 | 0.38 |
| | 39+50 | 46+50 | 16 | 30 | 0.15% | 0.10% | 843.0 | 0.08 | 0.37 |
| | 46+50 | 63+00 | 16 | 24 | 0.15% | 0.36% | 843.0 | 0.08 | 0.38 |
| | 63+00 | 73+70 | 16 | 30 | 0.15% | 0.10% | 769.0 | 0.09 | 0.40 |
| | 73+70 | 93+84 | 15 | 30 | 0.08% | 0.08% | 769.0 | 0.06 | 0.36 |
| | 93+84 | 112+75 | 15 | 24 | 0.08% | 0.20% | 636.0 | 0.07 | 0.38 |

TABLE 11. PROPOSED OPTION 1 & 3 WETLAND REROUTE TILE CAPACITIES

| Area | Existing Size (in) | Proposed/ ACSIC Size (in) | Existing Slope (%) | Proposed/ACSIC Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed/ACSIC Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|
| CD 26 Lateral 1 Reroute Potion | 14 | 15 | 0.08% | 0.08% | 491.0 | 0.09 | 0.09 |
| CD 45 Mainline Reroute Portion | 14 | 15 | 0.10% | 0.08% | 483.3 | 0.08 | 0.09 |
| Branch 5 Reroute Portion | 10 | 10 | 0.10% | 0.10% | 147.9 | 0.11 | 0.11 |

### *Wetland Enhancement*

This project proposes the enhancement of a wetland on an existing BWSR easement. The existing extent of the easement encompasses the historic wetland basin which is currently vegetated area with no permanent wetland pool. This basin is currently drained by the CD 45 and private lateral tile. The conceptual project would entail sediment scraping within the basin and berming around portions of the basin to increase the functional storage capabilities as well as to form a wetland with a maintained water level, thus increasing habitat potential and bolstering water quality improvement capabilities. To achieve this maintained water level, a new wetland outlet structure is proposed to both raise the water level as well as to accommodate the substantial passage surface flow out of the wetland area. An additional 13 .5 acres of easement acquisitions are proposed to maximize the storage capabilities of the proposed enhancement. The Proposed Lateral 1 tile and existing CD 45 tile would be routed around this enhancement to mitigate any adverse hydraulic affects from the tile. Additional coordination with BWSR would be necessary to move forward with this enhancement. The conceptual wetland project includes 22.8 acres of permanent pool and 53.8 acres of upland buffer for a total of 76.6 acres of wetland. This expands the current easement from 63.1 acres to 76.6 acres. The conceptual wetland expansion is design for the same area as Option 1 and Option 3. Preliminary plans and concepts can be found within Appendix D.

### *Drop Intakes*

A drop intake is a structure used along a tile to aid in televising tile, accessing the tile to check for sediment accumulation, and draining surface water. They are installed periodically along tile alignments, generally in low areas and/or on each side of road crossings. They are also placed at property lines and as replacements for existing drop intakes.

Standard drop intakes are designed to provide surface drainage through slotted intakes during low flow events. The slots are cut in each rib from 10-inches above grade to as much as 4-feet below grade (surrounded with rock to promote sedimentation and infiltration). During high flow events, a standard surface inlet trash grates provides an overflow to prevent extensive flooding.

With the existing private lateral tile line remaining in place, the new Proposed Lateral 1 may not be constructed through the lowest point of road ditches or fields. To assure proper drainage, water quality intakes will be offset into these low areas and connected to the drop intake. Water quality intakes are designed to provide surface drainage infiltration through a washed rock filter during low flow events. This allows for increased settling out of sediment. An integrated slotted (or perforated) intake provides an overflow during high flow events, preventing extensive flooding similar to a standard drop intake.

# PRELIMINARY COST ESTIMATES

## Separable Maintenance

When proposing to do an improvement and a separable portion of a larger system needs repair, the drainage statute, Section 103E.215, Subd. 6, allows the separation of the cost of repair from the cost of the improvement project. Separable maintenance can be applied to the portions of the existing system that will be replaced or improved by the proposed project. Detailed cost estimates of the potential repair and potential improvement costs have been included in Appendix G which is summarized below in Tables 12-15. Since the existing private lateral tile is not part of a public drainage system, there are no separable maintenance costs associated with the project.

## Road Authority Costs

Basic to understanding of Road Authority costs associated with a drainage project is that the road authority is responsible for their road crossings. To that end the road authority is responsible for the cost to replace the crossing as it was originally installed within their right of way. Therefore, if it was an open cut and they now require boring, they need to pay that amount. However, any cost associated with increasing the size or depth of the crossing are improvement costs and should be included in the project costs. Side inlets or intakes could be an improvement benefit, meaning they would have to be specifically listed and benefited, or if they currently exist, they would be road costs. Either way they are a benefit to the road more than the lands. There are no anticipated road authority costs associated with the Proposed Lateral 1 project.

## Other Project Related Costs

All drainage projects have indirect costs that must be accounted for in project cost estimates and used in cost benefit analyses. They include costs related to drainage authority administration; topographic survey; reports, plans and specifications; and construction staking and administration. The temporary damage cost covers any damages or loss of crops because of project construction. The county administration costs are an estimate of the total cost for the hearings and meetings required for the project. The survey, staking, and construction administration costs are estimates for the total cost of construction for the project. The report and plan cost are an estimate of the total engineering costs for the project.

## Cost Estimates

The following tables summarize the estimated cost for the proposed improvement options. The wetland enhancement project does qualify for several outside grant funded practices. In most cases, these grants will fund up to 75 percent of the project with a match requirement of 25 percent. There are other outside funding options that may cover more of the cost, or other obtained grants can be used as match.

TABLE 12. PRELIMINARY COST ESTIMATE OPTION 1

| Area | Separable Maintenance | Improvement Cost | Net Cost |
|---|---|---|---|
| Lateral 1 Tile | NA | $ 563,655 | $ 563,655 |
| Improvement Road Crossing Costs | $ - | $ 15,238 | $ 15,238 |
| **Total Project Costs** | **$ -** | **$ 578,893** | **$ 578,893** |

TABLE 13. PRELIMINARY COST ESTIMATE OPTION 2

| Area | Separable Maintenance | Improvement Cost | Net Cost |
|---|---|---|---|
| Lateral 1 Tile | NA | $ 910,606 | $ 910,606 |
| Improvement Road Crossing Costs | $ - | $ 16,733 | $ 16,733 |
| **Total Project Costs** | **$ -** | **$ 927,339** | **$ 927,339** |

TABLE 14. PRELIMINARY COST ESTIMATE OPTION 3

| Area | Separable Maintenance | Improvement Cost | Net Cost |
|---|---|---|---|
| Lateral 1 Tile | NA | $ 828,694 | $ 828,694 |
| Improvement Road Crossing Costs | $ - | $ 16,733 | $ 16,733 |
| **Total Project Costs** | **$ -** | **$ 845,428** | **$ 845,428** |

TABLE 15. PRELIMINARY COST ESTIMATE WETLAND ENHANCEMENT/REROUTE

| Area | Estimated Cost | Potential Grant Funding |
|---|---|---|
| Wetland Enhancement & Reroute | $ 352,066 | $ 264,050 |

## SUMMARY OF FINDINGS, CONCLUSIONS + RECOMMENDATIONS

After review, most of the private lateral tile in question for this improvement was determined to have lower capacities than the recommended which is necessary to meet the needs of today's standard farming practices. The original portions of the tile are assumed to be over 100-years old, which is above the life expectancy of tile systems like CD 26 and CD 45. This improvement would be a public benefit and contribute to the public welfare of the area.

Proposed Lateral 1 would be improved as part of the legal CD 26 drainage system and sized accurately to provide the needed drainage capacity for the system. The existing BWSR RIM easement would be enhanced and given additional capacity by the removal of tile within its extents and berms to allow additional storage. This would enhance wildlife/waterfowl habitat by creating a maintained wetland level. The water storage added by the proposed wetland expansion is not needed for an adequate outlet but is a good management practice that can be included into the watershed and is favorable by landowners.

A hydraulic/hydrologic model was created to compare the existing system with the three proposed tile improvement options to compare flood extents, durations, and outlet flows. All options reduce peak overland flows, Option 2 shows volume reductions at the outlet for larger storm events, where Option 1 shows reduction in peak flowrates and volumes for all modeled storm events. All options are considered cost effective and feasible improvements and are recommended by the Engineer.

In accordance with Section 103E.245, Subd. 1: Whereas the Engineer has examined the petition and order and conducted a preliminary survey and, whereas the Engineer has found the proposed drainage project to be necessary due to problems found and clarified during the survey, and whereas the Engineer has determined the proposed drainage project is necessary and feasible with reference to the environmental, land use, and multipurpose water management criteria in section 103E.015, subdivision 1 and, whereas the Engineer determined that the proposed drainage project does not substantially affect Public Waters, and whereas the Engineer has examined the nature and capacity of the outlet and any extension of the outlet, therefore the Engineer recommends the proposed project to the Drainage Authority for preliminary approval.

## PRELIMINARY PLANS

Since the Engineer finds the proposed drainage project in the petition is feasible and complies with the environmental, land use, and multipurpose water management criteria in section 103E.015, Subdivision 1, the Engineer has in accordance with Section 103E.245, Subd. 4 included a set of preliminary plans of the drainage project in Appendix A. They are preliminary plans and are unsigned.

# Appendix A: Preliminary Plans

# FARIBAULT COUNTY
# COUNTY DITCH 26 IMPROVEMENT

**FARIBAULT COUNTY, MINNESOTA** **PRELIMINARY ENGINEERING REPORT** **ISG PROJECT # 21-23548**

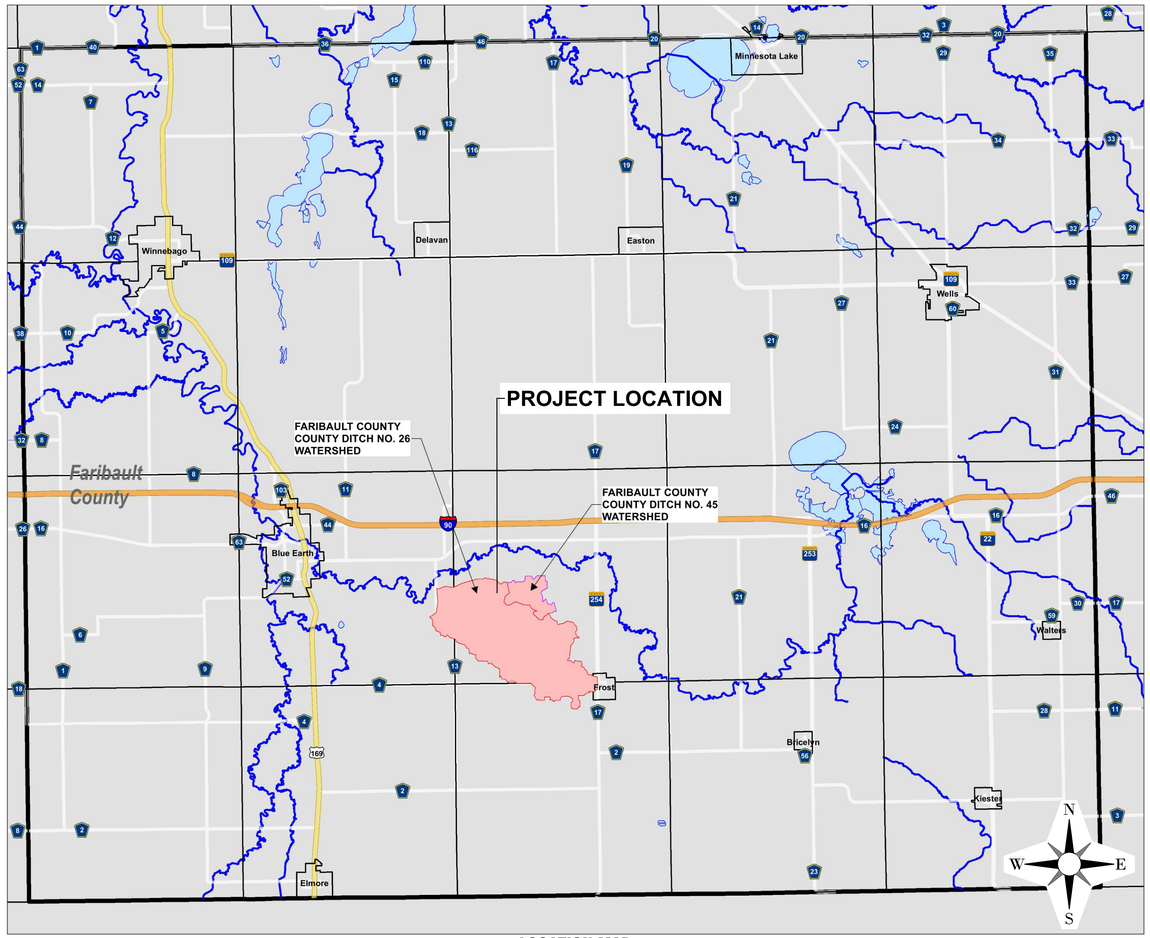
## LEGEND

### EXISTING

- WATERSHED BOUNDARY
- CITY LIMITS
- SECTION LINE
- QUARTER SECTION LINE
- RIGHT OF WAY LINE
- PROPERTY / LOTLINE
- EASEMENT LINE
- ACCESS CONTROL
- WATER EDGE
- WETLAND BOUNDARY
- FENCE LINE
- EXISTING OPEN DITCH
- CULVERT
- TILE
- PRIVATE TILE
- WATER
- GAS
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERGROUND TELEPHONE
- UNDERGROUND TV
- OVERHEAD UTILITY
- UNDERGROUND UTILITY
- UNDERGROUND FIBER OPTIC
- CONTOUR (MAJOR)
- CONTOUR (MINOR)
- DECIDUOUS TREE
- CONIFEROUS TREE
- TREE LINE
- DROP INTAKE
- HYDRANT
- POWER POLE

### PROPOSED

- EASEMENT
- PROPOSED OPEN DITCH
- OPEN DITCH REPAIR
- CULVERT (RCP)
- CULVERT (CMP)
- CULVERT (HDPE)
- TILE
- TILE (PIPE WIDTH)
- PRIVATE TILE
- WATER
- GAS
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERGROUND TV
- CONTOUR (MAJOR)
- CONTOUR (MINOR)
- DROP INTAKE
- SLOUGH REPAIR
- SPOIL PLACEMENT
- TREE CLEARING
- REMOVE TREE
- BUFFER




**LOCATION MAP**

## SHEET INDEX


| | |
|---|---|
| 1 | TITLE |
| 2 | OVERALL WATERSHED MAP |
| 3 | PROJECT AREA MAP |
| 4 | NOTES & QUANTITIES |
| 5-8 | DETAILS |
| 9-12 | CD26 MAIN PLAN ROFILE |
| 13-14 | CD26-45 MAIN PLAN ROFILE |
| 15 | WETLAND OVERALL PLAN |


GIS DISCLAIMER:

INFORMATION FOR THE BOUNDARY / LOT LINES, AND UNDERGROUND UTILITIES SHOWN WAS DERIVED FROM DIGITAL DATABASES AND IS FOR INFORMATIONAL PURPOSES ONLY. DATA MAY NOT HAVE BEEN PREPARED FOR, OR BE SUITABLE FOR: LEGAL, ENGINEERING, OR SURVEYING PURPOSES.

## PROJECT GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE CONTRACT DOCUMENTS, WHICH INCLUDE, BUT ARE NOT LIMITED TO, THE OWNER - CONTRACTOR AGREEMENT, THE PROJECT MANUAL (WHICH INCLUDES GENERAL SUPPLEMENTARY CONDITIONS AND SPECIFICATIONS), DRAWINGS OF ALL DISCIPLINES AND ALL ADDENDA, MODIFICATIONS AND CLARIFICATIONS ISSUED BY THE ARCHITECT/ENGINEER.
2. CONTRACT DOCUMENTS SHALL BE ISSUED TO ALL SUBCONTRACTORS BY THE GENERAL CONTRACTOR IN COMPLETE SETS IN ORDER TO ACHIEVE THE FULL EXTENT AND COMPLETE COORDINATION OF ALL WORK.
3. WRITTEN DIMENSIONS TAKE PRECEDENCE OVER SCALED DIMENSIONS. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES OR CONDITIONS REQUIRING INFORMATION OR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.
4. FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES OR CONDITIONS REQUIRING INFORMATION OR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.
5. DETAILS SHOWN ARE INTENDED TO BE INDICATIVE OF THE PROFILES AND TYPE OF DETAILING REQUIRED THROUGHOUT THE WORK. DETAILS NOT SHOWN ARE SIMILAR IN CHARACTER TO DETAILS SHOWN. WHERE SPECIFIC DIMENSIONS, DETAILS OR DESIGN INTENT CANNOT BE DETERMINED, NOTIFY ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.
6. ALL MANUFACTURED ARTICLES, MATERIALS AND EQUIPMENT SHALL BE APPLIED, INSTALLED, CONNECTED, ERECTED, CLEANED AND CONDITIONED ACCORDING TO MANUFACTURERS' INSTRUCTIONS. IN CASE OF DISCREPANCIES BETWEEN MANUFACTURERS' INSTRUCTIONS AND THE CONTRACT DOCUMENTS, NOTIFY ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.
7. ALL DISSIMILAR METALS SHALL BE EFFECTIVELY ISOLATED FROM EACH OTHER TO AVOID GALVANIC CORROSION.
8. THE LOCATION AND TYPE OF ALL INPLACE UTILITIES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY AND ARE ACCURATE AND COMPLETE TO THE BEST OF THE KNOWLEDGE OF I & S GROUP, INC. (ISG). NO WARRANTY OR GUARANTEE IS IMPLIED. THE CONTRACTOR SHALL VERIFY THE SIZES, LOCATIONS AND ELEVATIONS OF ALL INPLACE UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY ENGINEER OF ANY DISCREPANCIES OR VARIATIONS FROM PLAN.
9. THE CONTRACTOR IS TO CONTACT "GOPHER STATE ONE CALL" FOR UTILITY LOCATIONS, MINIMUM 2 BUSINESS DAYS PRIOR TO ANY EXCAVATION / CONSTRUCTION (1-800-252-1166).

## PROJECT INDEX:

**OWNER:**

**FARIBAULT COUNTY DRAINAGE AUTHORITY**
**415 SOUTH GROVE STREET**
**BLUE EARTH, MN, 56013**

**PH: 507-304-4253**

**PROJECT ADDRESS / LOCATION:**

**BLUE EARTH CITY TOWNSHIP, SECTION: 24**

**EMERALD TOWNSHIP, SECTIONS: 19, 20, 21, 28**

**MANAGING OFFICE:**


**MANKATO OFFICE**
**115 EAST HICKORY STREET**
**SUITE 300**
**MANKATO, MN 56001**
**PHONE: 507.387.6651**

**PROJECT MANAGER: MARK ORIGER**
**EMAIL: MARK.ORIGER@ISGINC.COM**


SPECIFICATIONS REFERENCE

ALL CONSTRUCTION SHALL COMPLY WITH THE COUNTY OF FARIBAULT REQUIREMENTS AND MnDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2020 EDITION, AND THE STANDARD SPECIFICATIONS FOR SANITARY SEWER, STORM DRAIN AND WATERMAIN AS PROPOSED BY THE CITY ENGINEERS ASSOCIATION OF MINNESOTA 2018, UNLESS DIRECTED OTHERWISE.

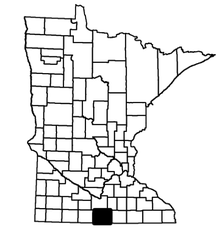
PROJECT DATUM

HORIZONTAL COORDINATES HAVE BEEN REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), 1996 ADJUSTMENT (NAD83(1996)) ON THE FARIBAULT COUNTY COORDINATE SYSTEM, IN U.S. SURVEY FEET.
ELEVATIONS HAVE BEEN REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
RTK GPS METHODS WERE USED TO ESTABLISH HORIZONTAL AND VERTICAL COORDINATES FOR THIS PROJECT.

**B.M. ELEVATION=1116.95**
EMERALD MnDOT

TOPOGRAPHIC SURVEY

THIS PROJECT'S TOPOGRAPHIC SURVEY CONSISTS OF DATA COLLECTED IN MARCH 2022 BY ISG.



NOTE:
THE CLARITY OF THESE PLANS DEPEND UPON COLOR COPIES. IF THIS TEXT DOES NOT APPEAR IN COLOR, THIS IS NOT AN ORIGINAL PLAN SET AND MAY RESULT IN MISINTERPRETATION.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF STATE OF MINNESOTA.

PRELIMINARY NOT FOR CONSTRUCTION

DATE_____ LIC. NO._____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PROJECT

**FARIBAULT COUNTY DITCH No. 26/45 IMPROVEMENT**

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

| DATE | DESCRIPTION | BY |
|---|---|---|
| | | |

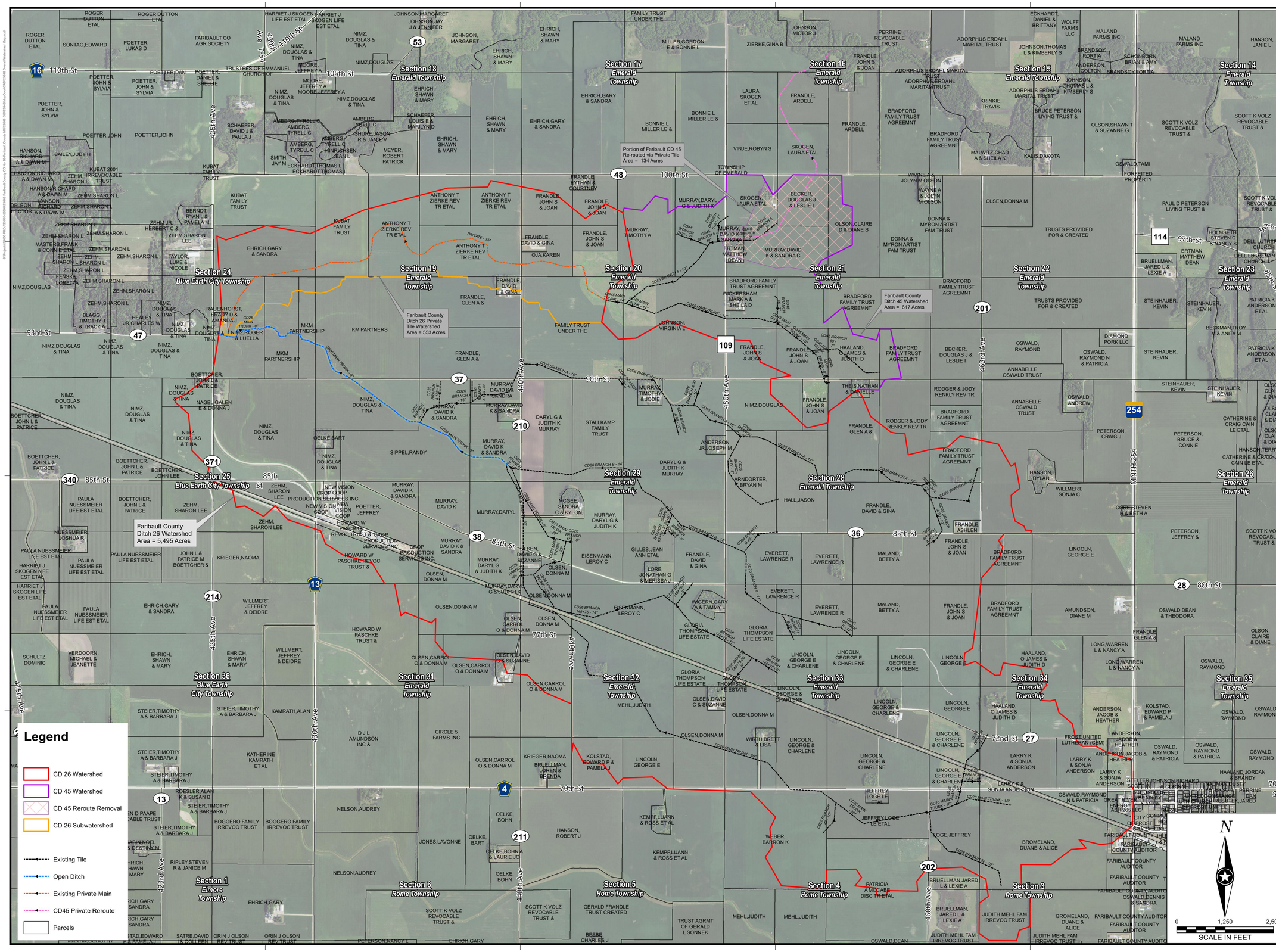
| | |
|---|---|
| PROJECT NO. | 21-23548 |
| FILE NAME | 23548 TITLE |
| DRAWN BY | JJM |
| DESIGNED BY | JJM |
| REVIEWED BY | MAO |
| ORIGINAL ISSUE DATE | --/--/-- |
| CLIENT PROJECT NO. | - |

TITLE

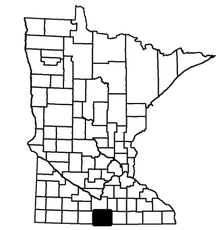
**TITLE**

SHEET

**1** OF 15




ISG



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DATE_____ LIC. NO. _____

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PROJECT

# FARIBAULT COUNTY DITCH No. 26/45 IMPROVEMENT

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

| DATE | DESCRIPTION | BY |
|---|---|---|
| | | |

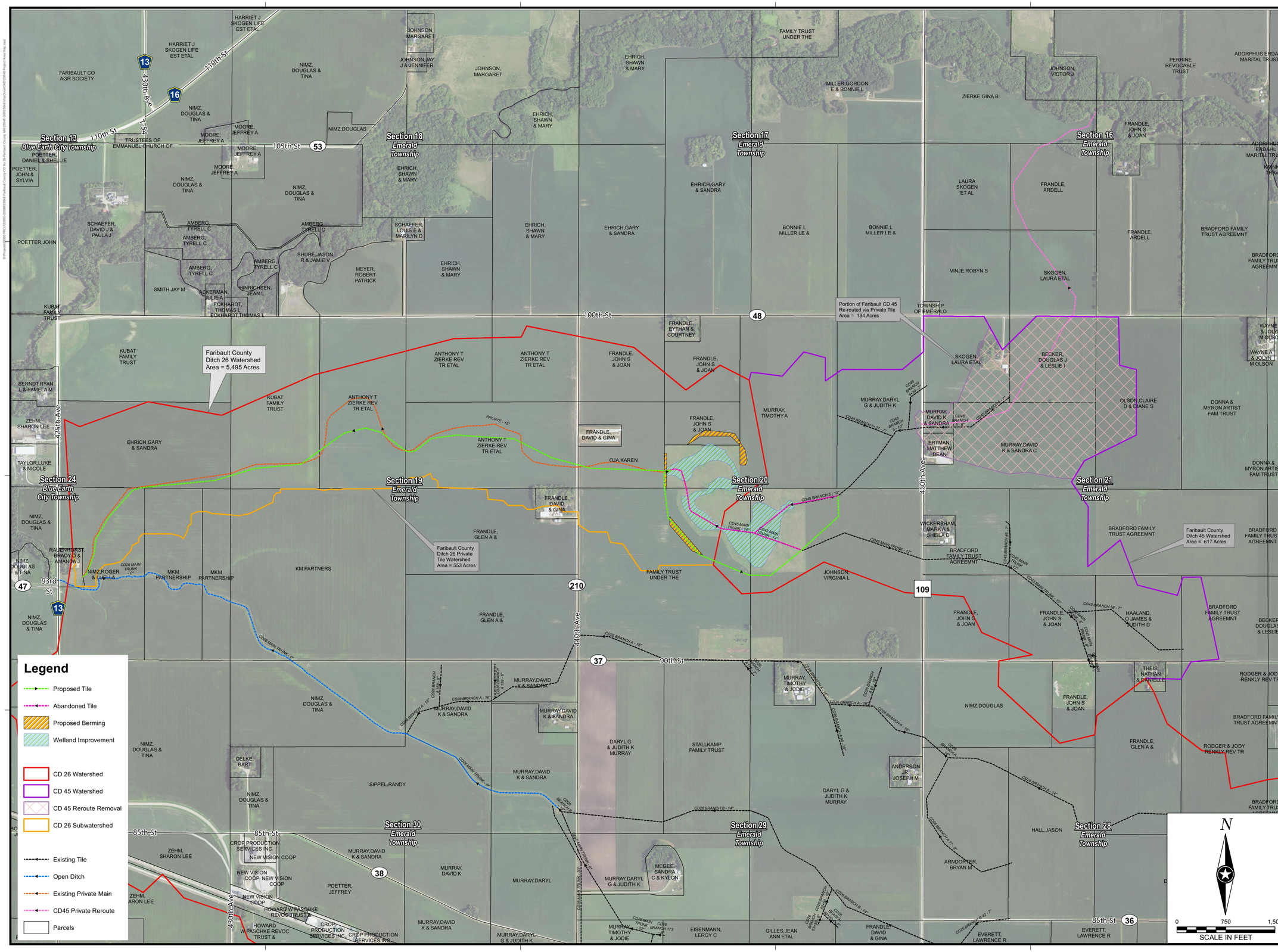
| | |
|---|---|
| PROJECT NO. | 21-23548 |
| FILE NAME | 23548 WATERSHED MAPS |
| DRAWN BY | JJM |
| DESIGNED BY | JJM |
| REVIEWED BY | MAO |
| ORIGINAL ISSUE DATE | --/--/-- |
| CLIENT PROJECT NO. | - |

TITLE

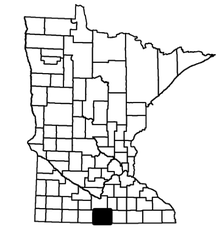
# OVERALL WATERSHED MAP

SHEET

2 OF 15




ISG



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PROJECT

# FARIBAULT COUNTY DITCH No. 26/45 IMPROVEMENT

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

| DATE | DESCRIPTION | BY |
|---|---|---|
| | | |

| | |
|---|---|
| PROJECT NO. | 21-23548 |
| FILE NAME | 23548 WATERSHED MAPS |
| DRAWN BY | JJM |
| DESIGNED BY | JJM |
| REVIEWED BY | MAO |
| ORIGINAL ISSUE DATE | --/--/-- |
| CLIENT PROJECT NO. | - |

TITLE

# PROJECT AREA MAP

SHEET

3 OF 15

## GENERAL PROJECT NOTES:

1. DURING CONSTRUCTION, CONTRACTOR SHALL MAINTAIN A DRAINAGE OUTLET FOR THE ENTIRE CD 26/45 PROJECT AREA.
2. ALL PIPE DIMENSIONS REFERENCED IN THE PLANS REFER TO THE INSIDE DIAMETER.
3. RODENT GUARDS SHALL BE INSTALLED ON ALL OUTLETS 18" AND SMALLER. (INCIDENTAL TO RESPECTIVE BID ITEMS).
4. ALL ROAD SIGNAGE, COORDINATION, AND TRAFFIC CONTROL SIGNAGE SHALL BE INCIDENTAL TO ROAD RESTORATIONS AND SHALL CONFORM TO LOCAL ROAD AUTHORITY PERMITS AND REGULATIONS.
5. THE CONTRACTOR SHALL SUBMIT A WINTER CONSTRUCTION PLAN FOR SITE STABILIZATION, EROSION PREVENTION, AND SEDIMENT CONTROL IF THE PROJECT IS NOT COMPLETED BY OCTOBER 15 OF THE GIVEN CONSTRUCTION SEASON, UNLESS APPROVED BY THE ENGINEER. THE PLAN SHALL BE DEVELOPED TO SPECIFICALLY ADDRESS SHUTDOWN PROCEDURES OR ACTIVE CONSTRUCTION PLANS.
6. ALL DEWATERING FOR THE PROJECT IS INCIDENTAL.
7. PRODUCT MATERIAL SHALL BE AS SPECIFIED IN THE PLANS. IF NO SPECIFIC MATERIAL IS CALLED OUT, MATERIAL SHALL CONFORM TO THE APPROVED PRODUCT LIST IN THE APPROPRIATE SPECIFICATION.
8. ALL EFFORTS SHALL BE MADE DURING CONSTRUCTION TO SEPARATE SOIL TYPES. BACKFILL SHALL BE COMPACTED PRIOR TO PLACEMENT OF TOPSOIL, EXCEPT THE TOP TWO (2) FEET, FOR WHICH COMPACTION SHALL BE MINIMIZED TO THE EXTENT POSSIBLE. TOPSOIL SHALL BE PLACED TO A MINIMUM DEPTH OF 18", OR UNIFORM TO THE TOPSOIL DEPTH OF THE SURROUNDING AREA UNLESS SPECIFIED ELSEWHERE IN THE PLANS. EXCAVATED SPOILS SHALL BE SPREAD EVENLY IN CONSTRUCTION AREA AS TO NOT IMPEDE DRAINAGE. ALL EFFORTS SHALL BE MADE TO KEEP TOPSOIL ON TOP AND SEPARATED. NO TOPSOIL SHALL BE PLACED IN THE TRENCH BELOW 2' FROM EXISTING GROUND UNLESS APPROVED BY THE ENGINEER.
9. ALL SPOIL LEVELING, GRADING, AND RESTORATION OF DISTURBED AREAS SHALL BE IN ACCORDANCE TO THE CONTRACT DOCUMENTS AND SHALL BE INCIDENTAL TO THE WORK UNLESS OTHERWISE SPECIFIED.
10. HEAVY VEGETATIVE CLEARING WITH TREE REMOVAL SHALL ONLY BE COMPLETED AS NECESSARY FOR SAFE CONSTRUCTION PRACTICES AND WITHIN THE ALLOWED CONSTRUCTION EASEMENT, UNLESS APPROVED BY THE ENGINEER. TREE REMOVAL AND GRUBBING SHALL BE INCIDENTAL TO HEAVY VEGETATIVE CLEARING WITH TREE REMOVAL BID ITEM.
11. TREES CALLED OUT AS "REMOVE TREE" SHALL BE PAID FOR BY EACH OCCURRENCE. IF TREES ARE NOT CALLED OUT IN THE CONSTRUCTION DOCUMENTS AS REMOVE TREE, THEN THE REMOVAL SHALL BE PAID FOR BY THE ACRE AS HEAVY VEGETATIVE CLEARING WITH TREE REMOVAL.
12. AGGREGATE SURFACE SHALL BE INCIDENTAL TO CROSSING OR ROAD RESTORATION.
13. RIPRAP QUANTITIES ARE ESTIMATED. ADDITIONAL QUANTITY MAY BE REQUIRED BY THE ENGINEER. ALL RIPRAP QUANTITIES SHALL BE PAID BY THE CUBIC YARD INSTALLED, UNLESS RIPRAP IS INCIDENTAL TO A SEPARATE PAY ITEM. ALL EXCAVATION AND GEOTEXTILE FABRIC SHALL BE INCIDENTAL TO RESPECTIVE BID ITEM.
14. ALL WORK SHALL BE DONE IN 2,500 LF SECTIONS, UNLESS APPROVED OF BY THE ENGINEER. PRIOR TO COMMENCING ON A NEW SECTION, ALL WORK IN THE PREVIOUS SECTION MUST BE COMPLETED IN ADHERENCE WITH THE CONTRACT DOCUMENTS. THE ENGINEER RESERVES THE RIGHT TO CEASE OPERATIONS AND/OR WITHHOLD PAYMENT UNTIL COMPLIANCE HAS BEEN ACHIEVED.
15. EXISTING TILES THAT ARE DISTURBED DURING CONSTRUCTION SHALL BE REPAIRED AT NO COST TO THE PROJECT, UNLESS OTHERWISE SPECIFIED.
16. ALL SIGNS AND MARKERS SHALL BE PROTECTED OR REMOVED AND REINSTALLED AT NO ADDITIONAL COST TO THE PROJECT, UNLESS OTHERWISE SPECIFIED. THE ENGINEER SHALL BE NOTIFIED OF ANY SIGNS OR MARKERS IN POOR CONDITION PRIOR TO REMOVAL.
17. THE DRAINAGE AUTHORITY TAKES NO AUTHORITY OVER OR RESPONSIBILITY FOR ANY AND ALL PRIVATE TILE SHOWN ON THESE PLANS. PRIVATE TILE LOCATIONS HAVE BEEN SUPPLIED BY LANDOWNERS FOR USE BY THE CONTRACTOR.
18. THE CONTRACTOR SHALL PAY ALL DAMAGES OUTSIDE OF THE AGREED UPON EASEMENT IN AN AMOUNT OF $1,200 PER ACRE OF DISTURBANCE, AS MEASURED BY THE ENGINEER.

## UTILITY NOTES:

1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY LEVEL D. THE UTILITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED: STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA.

## NOTE TO BE ADDED TO TILE NOTES IF MAJOR UTILITY CROSSING:

1. MAJOR UTILITY CROSSING IS ONLY APPLICABLE TO RURAL WATER LINES, WINDMILL TRANSMISSION LINES, GAS LINES, INSERT OR REMOVE UTILITIES AS NECESSARY UNLESS OTHERWISE APPROVED BY THE ENGINEER PRIOR TO CROSSING. ALL OTHER UTILITY CROSSINGS ARE INCIDENTAL TO TILE INSTALLATION.

## GENERAL TILE INSTALLATION NOTES:

1. UNLESS OTHERWISE NOTED, CONTRACTOR SHALL LIMIT CONSTRUCTION ACTIVITY TO WITHIN A 100-FOOT WIDE SWATH ALONG PROPOSED TILE ALIGNMENTS FOR 24" TILE OR LESS, AND A 150-FOOT SWATH ALONG PROPOSED TILE ALIGNMENTS FOR TILES LARGER THAN 24". THE SWATH NEED NOT BE CENTERED ON THE PROPOSED TILE ALIGNMENT. ALL ACCESS ROADS SHOULD FOLLOW THE PROPOSED ALIGNMENTS. THE SWATH SHALL NOT DISTURB ANY NON-AGRICULTURAL PRIVATE PROPERTY. DISTURBANCE THROUGH ROAD CROSSINGS, ROAD DITCHES, AND GRASS BUFFERS SHALL BE LIMITED TO THE WIDTH OF A TRENCH NECESSARY FOR SAFE CONSTRUCTION PRACTICES AND MUST BE RE-SEEDED WHERE NEEDED.
2. MISCELLANEOUS TREE CLEARING SHALL BE INCIDENTAL TO TILE INSTALLATION UNLESS SPECIFIED IN THE PLANS.
3. ALL PIPE BEDDING AND ENCASEMENT IS INCIDENTAL TO STANDARD TILE INSTALLATION. REFER TO SPECIFICATIONS FOR DEFINITIONS. GRANULAR FOUNDATION MATERIAL SHALL BE USED IF UNSUITABLE OR UNSTABLE SOILS ARE PRESENT. THE USE OF FOUNDATION MATERIAL SHALL BE APPROVED BY THE ENGINEER BEFORE PLACEMENT AND WILL BE PAID FOR BY THE CUBIC YARD.
4. ALL BENDS, FITTINGS, AND TEES SHALL BE BEDDED AND ENCASED IN GRANULAR FOUNDATION MATERIAL, BANDED, AND WRAPPED IN GEOTEXTILE FABRIC. INCIDENTAL TO RESPECTIVE BID ITEM.
5. ALL TILE ENDS MUST BE CAPPED TO NOT TAKE SEDIMENT UNLESS ANOTHER TILE (PRIVATE OR PUBLIC) IS CONNECTED INTO THE PROPOSED TILE. CAPPING SHALL BE INCIDENTAL TO TILE INSTALLATION.
6. THE CONNECTION OF DISSIMILAR PROPOSED PIPE TYPES SHALL BE BEDDED AND ENCASED IN GRANULAR FOUNDATION MATERIAL AND BE MADE WITH A WATERTIGHT COUPLER APPROVED OF BY THE ENGINEER. THE CONNECTION SHALL BE INCIDENTAL TO TILE INSTALLATION.
7. ALL BENDS SHALL BE CONSTRUCTED AS PRE-FABRICATED BENDS, UNLESS APPROVED BY THE ENGINEER. ANY BENDS LARGER THAN 45° MUST BE CONSTRUCTED WITH MULTIPLE BENDS WITH AT LEAST 40 FEET IN BETWEEN EACH BEND. 45° BENDS SHALL NOT BE USED ON TILE 18 INCHES AND SMALLER.
8. UNLESS SPECIFICALLY NOTED, HDPE AND RCP WILL BE THE ONLY ACCEPTABLE MATERIALS FOR ALL AGRICULTURAL DRAIN TILE. REFER TO SPECIFICATIONS FOR PROPER INSTALLATION REQUIREMENTS AND MATERIALS.
9. VERIFY EXISTING TILE LOCATIONS AND ELEVATIONS PRIOR TO CONSTRUCTION, PAID FOR AS TILE INVESTIGATION BY THE HOUR.
10. ANY ALIGNMENT CHANGES MADE DUE TO TILE INVESTIGATION SHALL BE APPROVED BY THE ENGINEER DURING CONSTRUCTION. ALL EFFORTS WILL BE MADE TO UTILIZE THE SAME FITTINGS AS ORIGINALLY DESIGNED. THE CONTRACTOR WILL ONLY BE COMPENSATED FOR ADDITIONAL LINEAR FOOTAGE OF INSTALLED TILE DUE TO THE ALIGNMENT CHANGE PER THE UNIT BID PRICE.
11. DROP INTAKES WILL BE PAID FOR BY EACH AND NO ADDITIONAL COMPENSATION WILL BE MADE FOR IN-FIELD ELEVATIONS THAT VARY FROM THE PLANS. MINOR SHAPING AROUND DROP INTAKES AND CULVERT INLETS SHALL BE INCIDENTAL TO THEIR RESPECTIVE PAY ITEMS.
12. DROP INTAKES THAT ARE NOT INTENDED TO TAKE SURFACE FLOW MAY BE CAPPED, AS DETERMINED BY THE ENGINEER. INTAKES MAY BE CUT DOWN AND BURIED AFTER FINAL TELEVISING, PER LANDOWNER REQUEST PRIOR TO CLOSEOUT, AND WILL BE PAID FOR AS "CAP DROP INTAKE."
13. DROP INTAKES THAT ARE DESIGNED TO BE ON PROPERTY LINES SHALL BE ADJUSTED IN THE FIELD TO MATCH ACTUAL LOCATION OF PROPERTY LINE.
14. AT CROSSINGS OF EXISTING TILE, ONLY THE UPSTREAM SIDE NEED BE CONNECTED, UNLESS OTHERWISE DEEMED NECESSARY. ALL BENDS, TEES, CONNECTING TILE, AND OTHER FITTINGS NECESSARY FOR CONNECTION SHALL BE INCIDENTAL TO RESPECTIVE BID ITEM.
15. ALL TILE CONNECTIONS MUST BE CONNECTED TO THE PROPOSED TILE ON THE UPSTREAM SIDE OF THE EXISTING TILE.
16. TILE CONNECTIONS SHALL BE CONSTRUCTED WITH TILE THE SAME SIZE OR THE NEXT SIZE LARGER THAN THE EXISTING TILE, UNLESS OTHERWISE SPECIFIED OR APPROVED BY THE ENGINEER. HDPE SHALL BE USED FOR THE CONNECTION OF ALL EXISTING PUBLIC TILES AS WELL AS ALL PRIVATE TILES WHERE THE FILL HEIGHT OVER THE PROPOSED TILE IS GREATER THAN 10 FEET. PE SHALL ONLY BE ALLOWED FOR PRIVATE TILE WITH A PROPOSED FILL HEIGHT LESS THAN OR EQUAL TO 10 FEET. (SEE CONNECT TO EXISTING TILE DETAIL)

## GENERAL POND EXCAVATION NOTES:

1. A 16.5-FOOT GRASS STRIP SHALL BE ESTABLISHED AROUND THE TOP OF THE POND EXCAVATION AREA. SEEDING SHALL OCCUR IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
2. CONSTRUCTION ACTIVITY OUTSIDE OF THE PROPOSED POND TOP AND FILL AREA SHALL BE LIMITED TO SAFE CONSTRUCTION PRACTICES OR A MAXIMUM OF 50 FEET WITHOUT APPROVAL FROM THE ENGINEER. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ANY DISTURBANCE OUTSIDE OF THE APPROVED AREA BEFORE THE WORK BEGINS. ALL DISTURBED AREA SHALL BE RESTORED AS SPECIFIED IN THE CONTRACT DOCUMENTS.
3. A MINIMUM OF 6" OF TOPSOIL SHALL BE PLACED ON POND BOTTOM AND SIDE SLOPES, UNLESS APPROVED BY THE ENGINEER (INCIDENTAL TO POND EXCAVATION).
4. TOPSOIL STRIPPING IN THE AREA OF THE POND SHALL BE PAID FOR AS COMMON EXCAVATION TO THE POND. SEE GRADING CALCULATIONS AND SPECIFICATIONS FOR FURTHER CLARIFICATION.
5. PLACE ALL SPOILS FROM POND EXCAVATION IN DESIGNATED SPOIL AREAS IDENTIFIED ON PLANS, UNLESS OTHERWISE DETERMINED BY THE ENGINEER. SPOIL LEVELING/GRADING IS INCIDENTAL TO POND EXCAVATION UNLESS OTHERWISE SPECIFIED. CONTRACTOR MAY REMOVE CLAY MATERIAL FROM SITE FOR OTHER USE AT NO ADDITIONAL COST TO THE PROJECT IF APPROVED BY THE ENGINEER. ALL TOPSOIL SHALL REMAIN ON SITE.
6. TOPSOIL IN TOPSOIL STRIP AREAS DESIGNATED ON THE PLANS SHALL BE STRIPPED PRIOR TO PLACEMENT OF FILL MATERIAL FROM POND EXCAVATION. RECLAIMING, LEVELING, AND RIPPING OF THE TOPSOIL ON TOP OF THE SPOILS SHALL BE INCIDENTAL TO TOPSOIL STRIPPING.
7. EXISTING TOPSOIL DEPTH IN FILL AREA MAY DIFFER FROM THE DEPTH AT THE POND LOCATION. THE FILL AREA SHALL HAVE A MINIMUM OF 18" IN DEPTH AFTER WORK IS COMPLETED, UNLESS APPROVED OF BY THE ENGINEER.
8. TOPSOIL SHALL BE PLACED IN AN UNIFORM MANNER AS SPECIFIED BY THE CONTRACT DOCUMENTS UNLESS APPROVED BY THE ENGINEER.
9. ALL CONCRETE PIPE SECTIONS FOR THE POND OUTLET SHALL CONSIST OF CLASS III RCP CONFORMING TO MNDOT 3006G. ALL SECTIONS SHALL BE TIED TOGETHER.
10. CONTRACTOR SHALL SUBMIT A GRADING PLAN TO THE ENGINEER FOR APPROVAL PRIOR TO COMMENCING ON POND CONSTRUCTION.
11. FILL AREAS SHALL BE TILED WITH 5" PERFORATED SINGLE WALL (PE) TILE. THE PROPOSED LAYOUT IS SHOWN IN THE PLANS. ANY VARIANCE FROM THE PROPOSED LAYOUT SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.

## GENERAL CULVERT NOTES:

1. ALL CULVERTS SHALL BE CONSTRUCTED WITH CLASS III RCP ONLY, UNLESS OTHERWISE SPECIFIED ON PLANS OR APPROVED BY THE ENGINEER.
2. ALL PIPE SECTIONS SHALL BE TIED TOGETHER, WATERTIGHT, GASKETED, AND TONGUE AND GROOVE DESIGN CONFORMING TO MnDOT 3006G. ALL JOINTS SHALL BE WRAPPED IN GEOTEXTILE FABRIC.
3. WHEN A CULVERT SECTION IS TO BE REINSTALLED, THE CONTRACTOR MUST NOTIFY THE ENGINEER OF ANY CULVERT SECTIONS DEEMED NOT SALVAGEABLE PRIOR TO REMOVAL AND SHALL BE ADDRESSED BEFORE CULVERT WORK IS DONE.
4. THE CONTRACTOR SHALL VERIFY PROPER POSITIONING OF THE CULVERT PRIOR TO COMMENCEMENT OF CONSTRUCTION. IF THE CULVERT POSITIONING IS NOT COMPATIBLE WITH THE FLOW OF THE DITCH WHEN STAKING IS COMPLETED, THE ENGINEER SHALL BE NOTIFIED.

**OPTION 2 TOTAL ESTIMATED QUANTITIES**

| Item Code | Item | Unit | Estimated Quantity |
|---|---|---|---|
| 01.7113.1000.01 | MOBILIZATION | LS | 1 |
| 31.2311.1000.03 | DITCH CLEANING (4' WIDE DITCH BOTTOM) | LF | 160 |
| 32.9219.1000.10 | 16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH) | AC | 0.13 |
| 32.9219.1000.10 | SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH) | AC | 0.08 |
| 32.9219.1000.10 | MOWING | AC | 0.26 |
| 32.9219.1000.10 | WEED SPRAYING | AC | 0.34 |
| 33.0513.1000.02 | FURNISH & INSTALL WATER QUALITY INLET | EA | 2 |
| 33.0513.1000.02 | INSTALL DROP INTAKE (18-INCH) | EA | 11 |
| 33.0513.1000.02 | CAP DROP INTAKE (18-INCH) | EA | 2 |
| 33.4510.1000.02 | CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY) | EA | 47 |
| 33.4510.1000.02 | 18-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 2 |
| 33.4510.1000.02 | 15-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 3 |
| 33.4510.1000.02 | 30-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC) | EA | 1 |
| 33.4510.1000.03 | 30-INCH AGRICULTURAL TILE | LF | 5324 |
| 33.4510.1000.03 | 24-INCH AGRICULTURAL TILE | LF | 6273 |
| 33.4510.1000.03 | INSTALL 8-INCH PERFORATED TILE (WATER QUALITY INLET) | LF | 80 |
| 33.4510.1000.07 | GRANULAR PIPE FOUNDATION | CY | 298 |
| 33.4510.1000.10 | TILE INVESTIGATION | HR | 24 |
| 34.0100.1000.02 | OPEN CUT & RESTORE GRAVEL ROAD OR DRIVEWAY | EA | 1 |

**OPTION 1 TOTAL ESTIMATED QUANTITIES**

| Item Code | Item | Unit | Estimated Quantity |
|---|---|---|---|
| 01.7113.1000.01 | MOBILIZATION | LS | 1 |
| 31.2311.1000.03 | DITCH CLEANING (4' WIDE DITCH BOTTOM) | LF | 160 |
| 31.2316.1000.05 | WETLAND SCRAPING & SPOIL PLACEMENT | AC | 3 |
| 31.2316.1000.07 | CLAY BORROW (P) (CV) | CY | 750 |
| 32.9219.1000.10 | 16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH) | AC | 0.13 |
| 32.9219.1000.10 | SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH) | AC | 0.08 |
| 32.9219.1000.10 | MOWING | AC | 0.26 |
| 32.9219.1000.10 | WEED SPRAYING | AC | 0.34 |
| 33.0513.1000.02 | FURNISH & INSTALL 12-INCH WETLAND OUTLET | EA | 1 |
| 33.0513.1000.02 | FURNISH & INSTALL WATER QUALITY INLET | EA | 2 |
| 33.0513.1000.02 | INSTALL DROP INTAKE (15-INCH) | EA | 1 |
| 33.0513.1000.02 | INSTALL DROP INTAKE (18-INCH) | EA | 12 |
| 33.0513.1000.02 | CAP DROP INTAKE (18-INCH) | EA | 4 |
| 33.4510.1000.02 | CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY) | EA | 55 |
| 33.4510.1000.02 | 18-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 2 |
| 33.4510.1000.02 | 15-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 3 |
| 33.4510.1000.02 | BWSR TILE BLOCK | EA | 5 |
| 33.4510.1000.02 | 24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC) | EA | 1 |
| 33.4510.1000.03 | 24-INCH AGRICULTURAL TILE | LF | 1070 |
| 33.4510.1000.03 | 18-INCH AGRICULTURAL TILE | LF | 2560 |
| 33.4510.1000.03 | 15-INCH AGRICULTURAL TILE | LF | 8422 |
| 33.4510.1000.03 | 12-INCH AGRICULTURAL TILE | LF | 30 |
| 33.4510.1000.03 | 10-INCH AGRICULTURAL TILE | LF | 1145 |
| 33.4510.1000.03 | INSTALL 8-INCH PERFORATED TILE (WATER QUALITY INLET) | LF | 80 |
| 33.4510.1000.07 | GRANULAR PIPE FOUNDATION | CY | 264 |
| 33.4510.1000.10 | TILE INVESTIGATION | HR | 28 |
| 34.0100.1000.02 | OPEN CUT & RESTORE GRAVEL ROAD OR DRIVEWAY | EA | 1 |

**OPTION 3 TOTAL ESTIMATED QUANTITIES**

| Item Code | Item | Unit | Estimated Quantity |
|---|---|---|---|
| 01.7113.1000.01 | MOBILIZATION | LS | 1 |
| 31.2311.1000.03 | DITCH CLEANING (4' WIDE DITCH BOTTOM) | LF | 160 |
| 31.2316.1000.05 | WETLAND SCRAPING & SPOIL PLACEMENT | AC | 3 |
| 31.2316.1000.07 | CLAY BORROW (P) (CV) | CY | 750 |
| 32.9219.1000.10 | 16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH) | AC | 0.13 |
| 32.9219.1000.10 | SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH) | AC | 0.08 |
| 32.9219.1000.10 | MOWING | AC | 0.26 |
| 32.9219.1000.10 | WEED SPRAYING | AC | 0.34 |
| 33.0513.1000.02 | FURNISH & INSTALL 12-INCH WETLAND OUTLET | EA | 1 |
| 33.0513.1000.02 | FURNISH & INSTALL WATER QUALITY INLET | EA | 2 |
| 33.0513.1000.02 | INSTALL DROP INTAKE (15-INCH) | EA | 1 |
| 33.0513.1000.02 | INSTALL DROP INTAKE (18-INCH) | EA | 14 |
| 33.0513.1000.02 | CAP DROP INTAKE (18-INCH) | EA | 4 |
| 33.4510.1000.02 | CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY) | EA | 60 |
| 33.4510.1000.02 | 18-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 2 |
| 33.4510.1000.02 | 15-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 3 |
| 33.4510.1000.02 | BWSR TILE BLOCK | EA | 5 |
| 33.4510.1000.02 | 30-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC) | EA | 1 |
| 33.4510.1000.03 | 30-INCH AGRICULTURAL TILE | LF | 5324 |
| 33.4510.1000.03 | 24-INCH AGRICULTURAL TILE | LF | 4873 |
| 33.4510.1000.03 | 15-INCH AGRICULTURAL TILE | LF | 3155 |
| 33.4510.1000.03 | 12-INCH AGRICULTURAL TILE | LF | 30 |
| 33.4510.1000.03 | 10-INCH AGRICULTURAL TILE | LF | 1145 |
| 33.4510.1000.03 | INSTALL 8-INCH PERFORATED TILE (WATER QUALITY INLET) | LF | 80 |
| 33.4510.1000.07 | GRANULAR PIPE FOUNDATION | CY | 346 |
| 33.4510.1000.10 | TILE INVESTIGATION | HR | 31 |
| 34.0100.1000.02 | OPEN CUT & RESTORE GRAVEL ROAD OR DRIVEWAY | EA | 1 |

## ABBREVIATIONS

| | | | | | |
|---|---|---|---|---|---|
| AC | ACRE | GA | GAUGE | PP | POLYPROPYLENE |
| ADD | ADDENDUM | GAL | GALLON | PSI | POUNDS PER SQUARE INCH |
| AGG | AGGREGATE | GPM | GALLONS PER MINUTE | PVC | POLYVINYL CHLORIDE |
| APPROX | APPROXIMATE | HDPE | HIGH DENSITY POLYETHYLENE | PVMT | PAVEMENT |
| BIT | BITUMINOUS | HORIZ | HORIZONTAL | QTY | QUANTITY |
| CAD | COMPUTER-AIDED DESIGN | HR | HOUR | RCP | REINFORCED CONCRETE PIPE |
| CFS | CUBIC FEET PER SECOND | HWL | HIGH WATER LEVEL | REBAR | REINFORCING BAR |
| CF | CUBIC FOOT | HWY | HIGHWAY | REM | REMOVE |
| CL | CENTERLINE | HYD | HYDRANT | ROW | RIGHT OF WAY |
| CMP | CORRUGATED METAL PIPE | I | INVERT | R/W | RIGHT OF WAY |
| CONC | CONCRETE | ID | INSIDE DIAMETER | SCH | SCHEDULE |
| CONST | CONSTRUCTION | IN | INCH | SF | SQUARE FOOT |
| CONT | CONTINUOUS | INV | INVERT | SPEC | SPECIFICATION |
| CR | COUNTY ROAD | LF | LINEAR FEET | SQ | SQUARE |
| CSAH | COUNTY STATE AID HIGHWAY | LIN | LINEAR | STA | STATION |
| CY | CUBIC YARD | LS | LUMP SUM | SY | SQUARE YARD |
| DI | DROP INTAKE | MAX | MAXIMUM | TEMP | TEMPORARY |
| DIA | DIAMETER | MH | MANHOLE | THRU | THROUGH |
| DIM | DIMENSION | MIN | MINIMUM | TRANS | TRANSFORMER |
| EA | EACH | MISC | MISCELLANEOUS | TV | TELEVISION |
| ELEC | ELECTRICAL | NO | NUMBER | TYP | TYPICAL |
| ELEV | ELEVATION | NTS | NOT TO SCALE | UT | UTILITY, UNDERGROUND TELEPHONE |
| EOF | EMERGENCY OVERFLOW | NWL | NORMAL WATER LEVEL | VCP | VITRIFIED CLAY PIPE |
| EQ | EQUAL | OC | ON CENTER | W/O | WITHOUT |
| EX | EXISTING | OCEW | ON CENTER EACH WAY | W/ | WITH |
| FDN | FOUNDATION | OH | OVERHEAD | YD | YARD |
| FPM | FEET PER MINUTE | OHWL | ORDINARY HIGH WATER | YR | YEAR |
| FPS | FEET PER SECOND | OZ | OUNCE | | |
| FT | FOOT, FEET | PERF | PERFORATED | | |
| | | PL | PROPERTY LINE | | |

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PROJECT

**FARIBAULT COUNTY DITCH No. 26/45 IMPROVEMENT**

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

| DATE | DESCRIPTION | BY |
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|---|---|
| PROJECT NO. | 21-23548 |
| FILE NAME | 23548 DETAILS |
| DRAWN BY | - |
| DESIGNED BY | - |
| REVIEWED BY | - |
| ORIGINAL ISSUE DATE | --/--/-- |
| CLIENT PROJECT NO. | - |

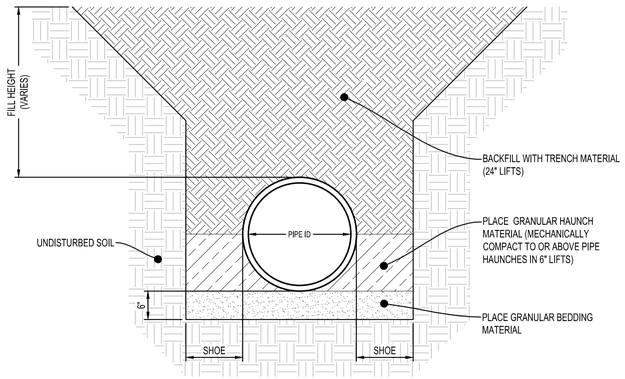
TITLE

**NOTES & QUANTITIES**

SHEET

**4**

OF 15




## NOTES:

GRANULAR BEDDING, GRANULAR ENCASEMENT, AND BACKFILL SHALL BE INCIDENTAL TO CONSTRUCTION.

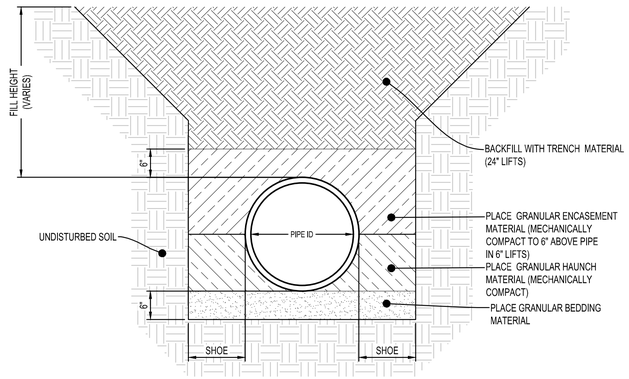
ALL PIPE WITH A FILL HEIGHT GREATER THAN 15-FEET SHALL BE FULLY ENCASED IN ASTM CLASS I MATERIAL.

THE SHOE WIDTH SHALL BE THE SAME AS THE COMPACTING MECHANISMS WIDTH OR THE PIPE MANUFACTURER SPECIFICATIONS, WHICHEVER IS GREATER.

THE CLASS OF RCP REQUIRED SHALL BE BASED ON THE PIPE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED.

## RCP FLAT BOTTOM TRENCH

NTS




## NOTE:

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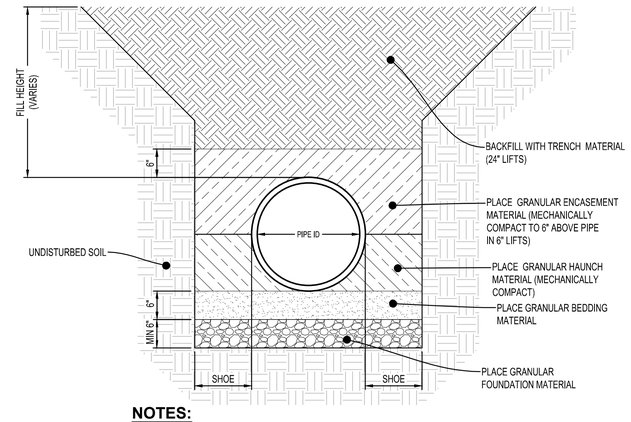
ALL PIPE WITH A FILL HEIGHT GREATER THAN 15-FEET SHALL BE FULLY ENCASED IN ASTM CLASS I MATERIAL.

THE SHOE WIDTH SHALL BE THE SAME AS THE COMPACTING MECHANISMS WIDTH OR THE PIPE MANUFACTURER'S SPECIFICATIONS, WHICHEVER IS GREATER.

## HDPE FLAT BOTTOM TRENCH

NTS




## NOTES:

GRANULAR BEDDING, GRANULAR ENCASEMENT, AND BACKFILL SHALL BE INCIDENTAL TO CONSTRUCTION.

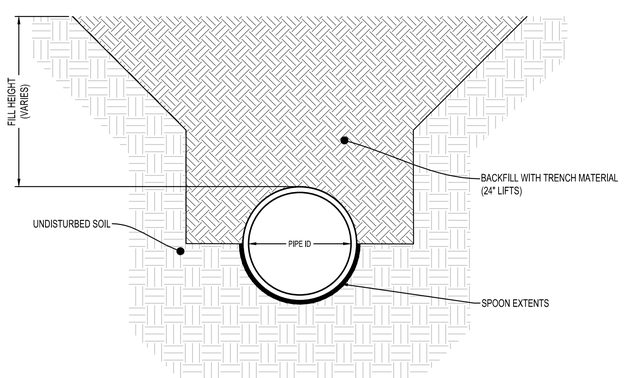
GRANULAR FOUNDATION BELOW THE PIPE SHALL BE PAID FOR BY THE CUBIC YARD, ONLY WHERE APPROVED BY THE FIELD ENGINEER.

ALL PIPE WITH A FILL HEIGHT GREATER THAN 15-FEET SHALL BE FULLY ENCASED IN ASTM CLASS I MATERIAL.

THE SHOE WIDTH SHALL BE THE SAME AS THE COMPACTING MECHANISMS WIDTH OR THE PIPE MANUFACTURER'S SPECIFICATIONS, WHICHEVER IS GREATER.

## HDPE FLAT BOTTOM TRENCH WITH GRANULAR FOUNDATION

NTS




## NOTES:

BACKFILL SHALL BE INCIDENTAL TO CONSTRUCTION.

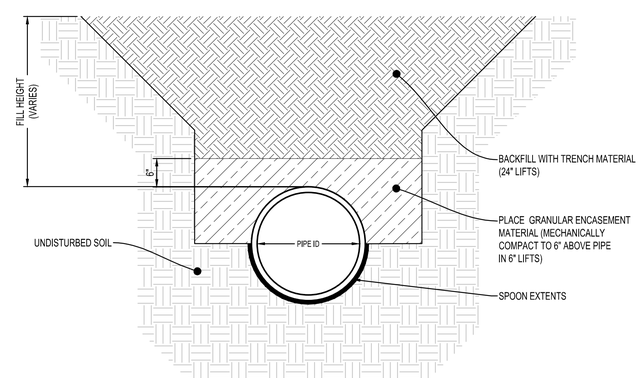
SPOON DIMENSIONS SHALL COMPLY WITH PIPE MANUFACTURER'S SPECIFICATIONS.

ALL PIPE WITH A FILL HEIGHT GREATER THAN 15-FEET SHALL BE FULLY ENCASED IN ASTM CLASS I MATERIAL.

THE CLASS OF RCP REQUIRED SHALL BE BASED ON THE PIPE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED.

## RCP SPOON TRENCH

NTS




## NOTES:

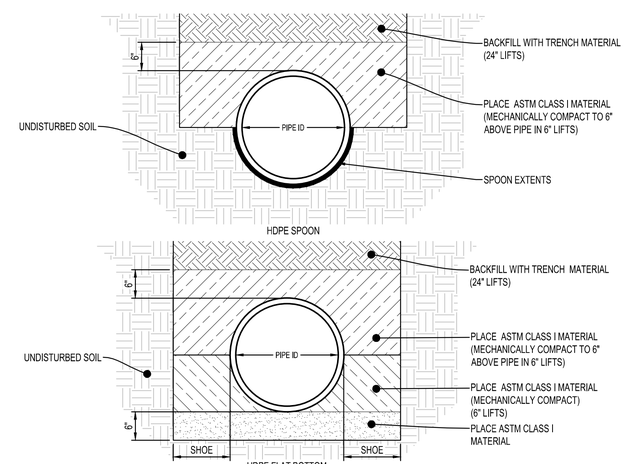
GRANULAR ENCASEMENT AND BACKFILL SHALL BE INCIDENTAL TO CONSTRUCTION.

SPOON DIMENSIONS SHALL COMPLY WITH PIPE MANUFACTURER'S SPECIFICATIONS.

ALL PIPE WITH A FILL HEIGHT GREATER THAN 15-FEET SHALL BE FULLY ENCASED IN ASTM CLASS I MATERIAL.

## HDPE SPOON TRENCH

NTS




## NOTES:

GRANULAR BEDDING AND BACKFILL SHALL BE INCIDENTAL TO CONSTRUCTION.

SPOON DIMENSIONS SHALL COMPLY WITH PIPE MANUFACTURER'S SPECIFICATIONS.

THE SHOE WIDTH SHALL BE THE SAME AS THE COMPACTING MECHANISMS WIDTH OR THE PIPE MANUFACTURER'S SPECIFICATIONS, WHICHEVER IS GREATER.

ALL PIPE WITH A FILL HEIGHT GREATER THAN 15-FEET SHALL BE FULLY ENCASED IN ASTM CLASS I MATERIAL.

## HDPE WITH ASTM CLASS I COVER HEIGHT OVER 15'

NTS

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FARIBAULT COUNTY MINNESOTA

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| CLIENT PROJECT NO. | - |

TITLE

**DETAILS**

SHEET

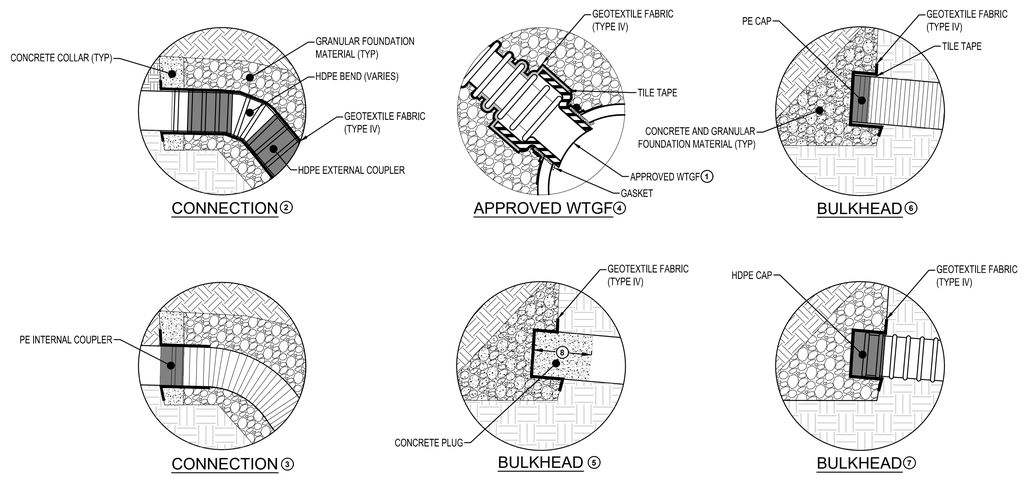
**5** OF 15

## NOTES:

1. APPROVED WATERTIGHT GASKETED FITTING (WTGF) SHALL ONLY BE USED WHEN THE PIPE TO BE CONNECTED IS 1/2 (OR SMALLER) THE DIAMETER OF THE PIPE TO BE TAPPED. A MOLDED TEE SHALL BE USED IN ALL OTHER SITUATIONS. APPROVED WTGF SHALL NOT BE INSTALLED COMPLETELY VERTICAL OR INTO THE BOTTOM HALF OF THE PIPE TO BE TAPPED.
2. CONNECTION OF HDPE TO CLAY, CONCRETE, OR PE TILE.
3. CONNECTION OF PE TO CLAY, CONCRETE, OR PE TILE.
4. CONNECTION OF PE OR HDPE TO PIPE TO BE TAPPED.
5. BULKHEAD OF EXISTING CLAY OR CONCRETE TILE.
6. BULKHEAD OF EXISTING PE TILE.
7. BULKHEAD OF EXISTING HDPE TILE.
8. CONCRETE BULKHEAD SHALL EXTEND INTO THE PIPE A MINIMUM LENGTH EQUIVALENT TO ONE DIAMETER OF THE PIPE.

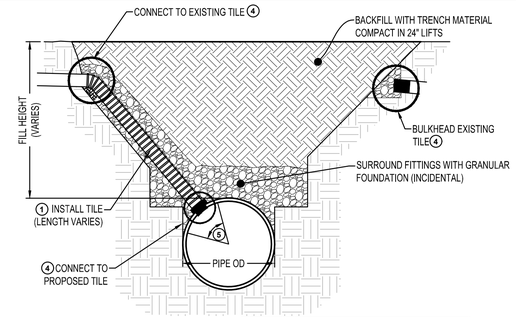
ALL TILE, FITTINGS, GEOTEXTILE FABRIC, FOUNDATION ROCK, TILE TAPE, CONCRETE, AND EXCAVATION SHALL BE INCIDENTAL TO RESPECTIVE BID ITEM UNLESS OTHERWISE NOTED.

NOT ALL SITUATIONS OR APPROVED EQUALS ARE DEMONSTRATED IN DETAIL. ENGINEER SHALL APPROVE OF EQUALS.




## TYPICAL CONNECTION DETAILS

NTS




| EXISTING TILE TYPE | FILL HEIGHT | CONNECTION MATERIAL 2 |
|---|---|---|
| EXISTING PUBLIC TILES | ALL | HDPE |
| EXISTING PRIVATE TILES | >15 FEET | HDPE |
| EXISTING PRIVATE TILES | ≤15 FEET | 3 |

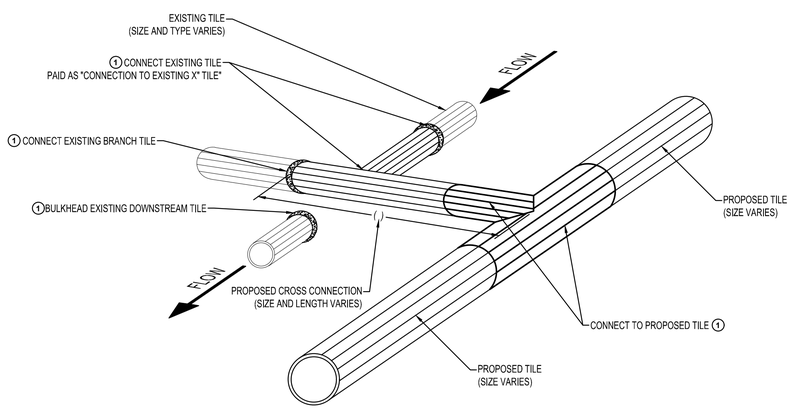
## NOTES:

1. REFER TO THE TABLE FOR MATERIAL. SIZE VARIES. THE TILE SHALL BE THE SAME AS OR THE NEXT AVAILABLE SIZE, UNLESS OTHERWISE SPECIFIED OR APPROVED BY THE ENGINEER.
2. HDPE SHALL BE USED IF THE EXISTING TILE IS HDPE, REGARDLESS OF THE FILL HEIGHT.
3. HDPE SHALL BE USED FOR FIRST 5 FEET AWAY FROM THE PROPOSED PIPE AND THEN PE MAY BE USED.
4. REFER TO TYPICAL CONNECTION DETAILS.
5. CONNECTION TO PROPOSED TILE SHALL BE LIMITED TO 15 TO 75 DEGREES FROM SPRING LINE.

ALL TILE, FITTINGS, GEOTEXTILE FABRIC, FOUNDATION ROCK, TILE TAPE, CONCRETE, AND EXCAVATION SHALL BE INCIDENTAL.

## CONNECT TO EXISTING TILE

NTS




## NOTES:

1. REFER TO TYPICAL CONNECTION DETAILS.

CROSS CONNECT SHALL BE PAID AS THREE (3) SEPARATE PAY ITEMS:

1. X-INCH CROSS CONNECT W/ 40 LF OF SPECIFIED PIPE
2. X-INCH AGRICULTURAL TILE FOR LENGTHS GREATER THAN 40'
3. CONNECTION TO EXISTING X" TILE

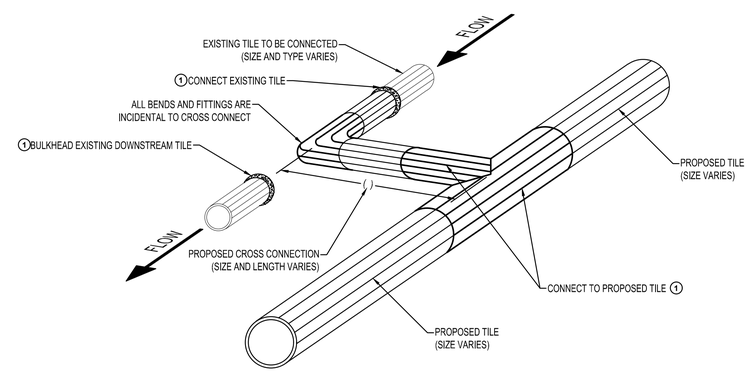
CROSS CONNECTION SHALL BE CONSTRUCTED WITH HDPE TILE.

CONNECTION TO PROPOSED TILE AND EXISTING BRANCH TILE ARE INCIDENTAL TO CROSS CONNECT. BULKHEAD IS INCIDENTAL TO CONNECTION TO EXISTING X" TILE.

TILE CONNECTIONS SHALL NOT BE INSTALLED COMPLETELY VERTICAL FROM TOP OF PIPE.

## CROSS CONNECT TO EXISTING BRANCH TILE

NTS




## NOTES:

1. REFER TO TYPICAL CONNECTION DETAILS.

CROSS CONNECT SHALL BE PAID AS TWO (2) SEPARATE PAY ITEMS:

1. X-INCH CROSS CONNECT W/ 40 LF OF SPECIFIED PIPE
2. X-INCH AGRICULTURAL TILE FOR LENGTHS GREATER THAN 40'

CROSS CONNECTION SHALL BE CONSTRUCTED WITH HDPE TILE.

CONNECTION TO PROPOSED TILE, EXISTING TILE, AND BULKHEAD ARE INCIDENTAL TO CROSS CONNECT.

TILE CONNECTIONS SHALL NOT BE INSTALLED COMPLETELY VERTICAL FROM TOP OF PIPE.

## CROSS CONNECT TO EXISTING TILE

NTS

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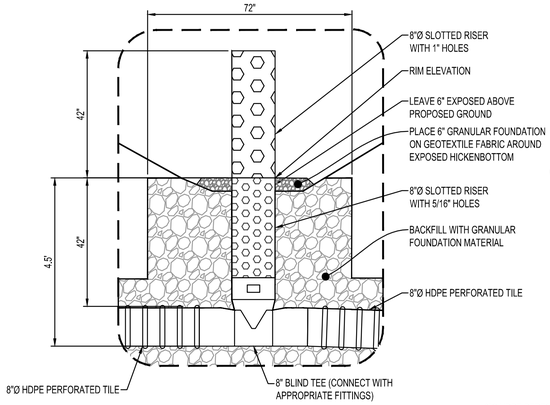
TITLE

**DETAILS**

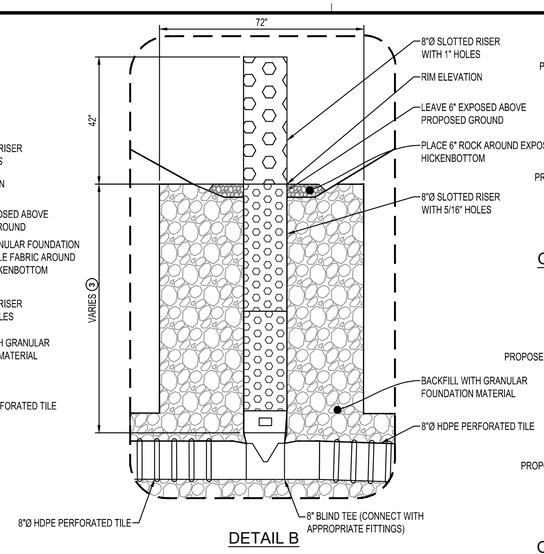
SHEET

**6**

OF 15




DETAIL A

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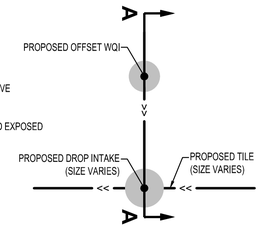
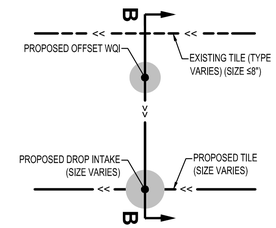
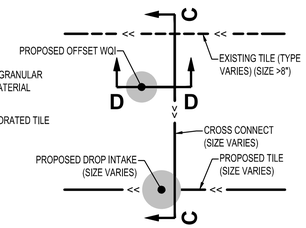


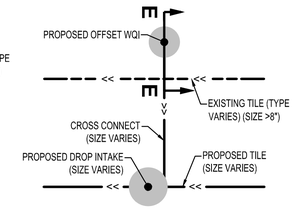

OFFSET WATER QUALITY INLET
WITH NO TILE CONNECTION




OFFSET WATER QUALITY INLET
WITH TILE CONNECTION (≤8")




OFFSET WATER QUALITY INLET
MID CROSS CONNECTION




OFFSET WATER QUALITY INLET
END OF CROSS CONNECTION

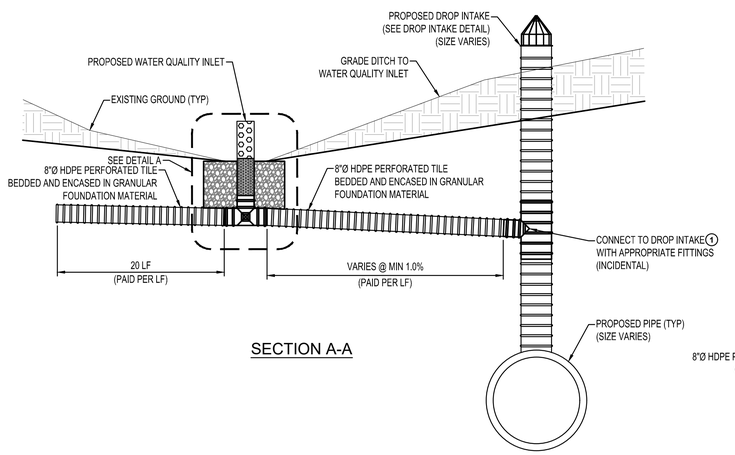
PLAN VIEWS

## TYPICAL BID ITEM BREAKDOWN:

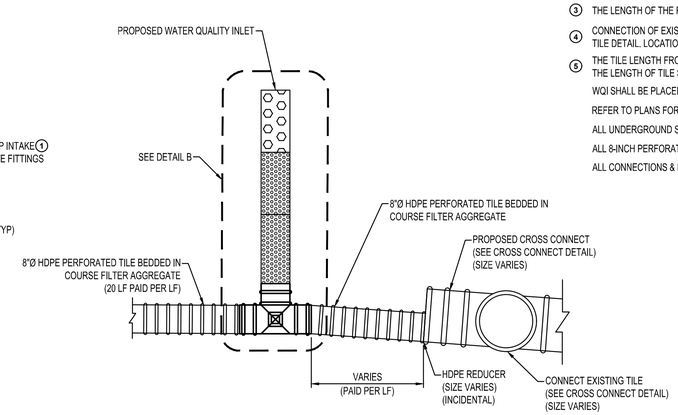
| SITUATION | BID ITEMS |
|---|---|
| OFFSET WATER QUALITY INLET WITH NO TILE CONNECTION | 1. FURNISH & INSTALL WATER QUALITY INLET (EA)<br>2. INSTALL 8-INCH PERFORATED TILE (WATER QUALITY INLET) (LF) |
| OFFSET WATER QUALITY INLET WITH TILE CONNECTION (≤8") | 1. FURNISH & INSTALL WATER QUALITY INLET (EA)<br>2. INSTALL 8-INCH PERFORATED TILE (WATER QUALITY INLET) (LF)<br>3. CONNECT EXISTING X-INCH TILE |
| OFFSET WATER QUALITY INLET MID CROSS CONNECTION | 1. XX-INCH CROSS CONNECT W/ 40 LF OF SPECIFIED TILE (EA)<br>2. FURNISH & INSTALL WATER QUALITY INLET (EA)<br>3. INSTALL 8-INCH PERFORATED TILE (WATER QUALITY INLET) (LF) |
| OFFSET WATER QUALITY INLET END OF CROSS CONNECTION | 1. XX-INCH CROSS CONNECT W/ 40 LF OF SPECIFIED TILE (EA)<br>2. FURNISH & INSTALL WATER QUALITY INLET (EA)<br>3. INSTALL 8-INCH PERFORATED TILE (WATER QUALITY INLET) (LF) |

## BID ITEM INCIDENTALS:

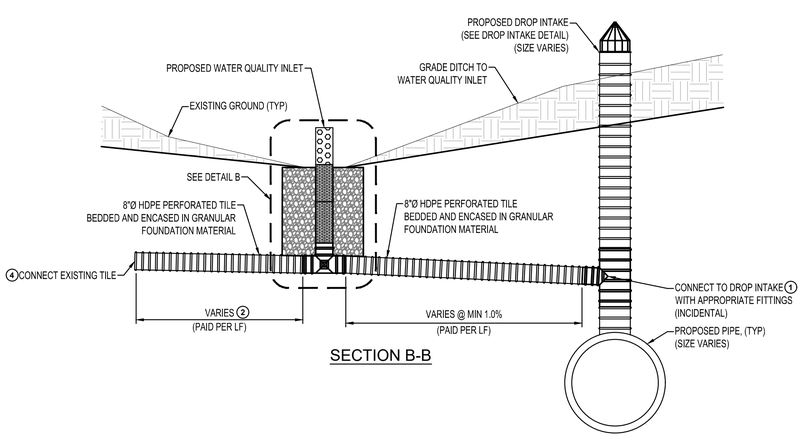
| BID ITEM | UNIT | INCIDENTALS |
|---|---|---|
| FURNISH & INSTALL WATER QUALITY INLET | EA | ROCK, GEOTEXTILE FABRIC, RISER PIECES, BLIND TEE, FITTINGS, ALL CONNECTIONS |
| INSTALL 8-INCH PERFORATED TILE (WATER QUALITY INLET) | LF | PIPE, BEDDING AND ENCASEMENT MATERIAL |
| CONNECT EXISTING X-INCH TILE | EA | REFER TO CONNECT TO EXISTING TILE DETAIL |
| XX-INCH CROSS CONNECT W/ 40 LF OF SPECIFIED TILE | EA | REFER TO CROSS CONNECT TO EXISTING TILE DETAIL |




SECTION A-A




SECTION E-E

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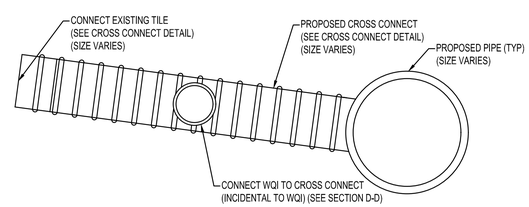



SECTION C-C

TYPICAL OFFSET WATER QUALITY INLET
NTS

## NOTES:

1. THE ELEVATION AND DEPTH OF THE CONNECTION VARIES. IF NECESSARY, THE CONNECTION SHALL BE MADE INTO THE PROPOSED TILE IN ORDER TO OBTAIN APPROPRIATE GRADE. IF APPROPRIATE GRADE CANNOT BE OBTAINED, THE ENGINEER SHALL BE NOTIFIED FOR GRADE ADJUSTMENTS. ANY ADDITIONAL MATERIAL AND FITTINGS SHALL BE INCIDENTAL.
2. THE TILE SHALL EXTEND TO THE EXISTING TILE TO BE CONNECTED OR 20 LF PAST THE OFFSET WQI, WHICHEVER IS GREATER.
3. THE LENGTH OF THE RISER VARIES BASED ON THE DEPTH REQUIRED TO CONNECT THE EXISTING TILE. THE EXTRA RISER LENGTH SHALL BE INCIDENTAL TO THE WQI.
4. CONNECTION OF EXISTING TILES TO THE PERFORATED TILE OF THE OFFSET WATER QUALITY INLET SHALL BE PAID FOR AS A CONNECTION AND CONFORM TO THE CONNECT EXISTING TILE DETAIL. LOCATION OF CONNECTION VARIES.
5. THE TILE LENGTH FROM THE CROSS CONNECT TO THE OFFSET WQI VARIES BASED ON THE LOCATION OF THE CROSS CONNECT COMPARED WITH THE BOTTOM OF THE ROAD DITCH. THE LENGTH OF TILE SHALL BE PAID FOR BY THE LINEAR FOOT.

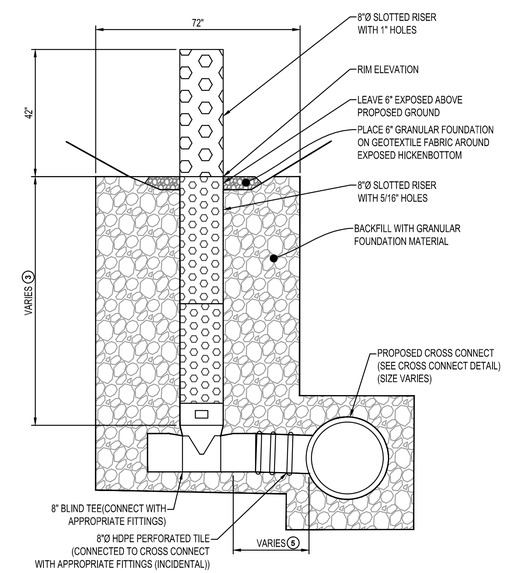
WQI SHALL BE PLACED IN THE LOW SPOT OF THE ROAD DITCH.

REFER TO PLANS FOR SIZES.

ALL UNDERGROUND SEGMENTS OF THE RISER SHALL BE WRAPPED IN MnDOT TYPE I GEOTEXTILE FABRIC.

ALL 8-INCH PERFORATED TILE SHALL BE BEDDED AND ENCASED IN GRANULAR FOUNDATION MATERIAL.

ALL CONNECTIONS & FITTINGS SHALL BE WRAPPED IN FABRIC, ENCASED IN SPECIFIED ROCK, AND BE APPROVED BY THE ENGINEER.




SECTION D-D

ISG

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PROJECT

**FARIBAULT COUNTY DITCH No. 26/45 IMPROVEMENT**

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

| DATE | DESCRIPTION | BY |
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| PROJECT NO. | 21-23548 |
| FILE NAME | 23548 DETAILS |
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| CLIENT PROJECT NO. | - |

TITLE

**DETAILS**

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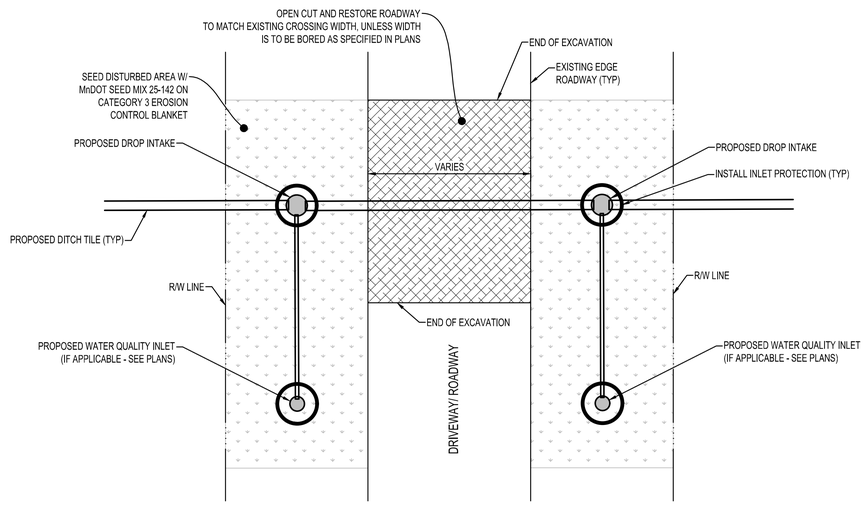
**7**

OF 15



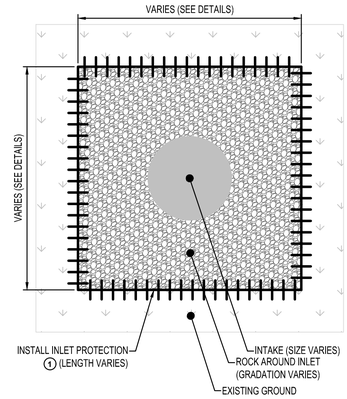

**NOTES:**

WATER QUALITY INLETS SHOULD BE INSTALLED AT LOW POINTS OF THE DITCH.

SEE ROADSIDE SEEDING SCHEDULE

TYPICAL ROAD CROSSING EROSION CONTROL

NTS




**NOTES:**

1. INLET PROTECTION SHALL BE SILT FENCE, SEDIMENT CONTROL LOG, OR AN APPROVED EQUAL. INLET PROTECTION SHALL BE INSTALLED IN ACCORDANCE WITH CONTRACT DOCUMENTS.

   INLET PROTECTION SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.

   INSTALLATION, MAINTENANCE, AND REMOVAL OF INLET PROTECTION IN ACCORDANCE WITH CONTRACT DOCUMENTS SHALL BE INCIDENTAL TO THE INSTALL INLET PROTECTION BID ITEM. (REFER TO PAYMENT SCHEDULE)

TYPICAL INLET PROTECTION

NTS

## INLINE WATER LEVEL CONTROL STRUCTURE™ INSTALLATION INSTRUCTIONS

***Important!*** **—To minimize seepage, align stoplogs firmly against one side of the stoplog track.**
**—Stoplogs must remain in track during structure installation.**
**—Structures are intended for gravity flow: Low pressure and some seepage may occur.**

### *1.) EXCAVATION AND GRADING*

Structure base, inlet pipe, & outlet pipe must be set on compacted soil or fill sand to provide a solid, stable base. This will reduce settling and reduce stress or misalignment of pipe connections.

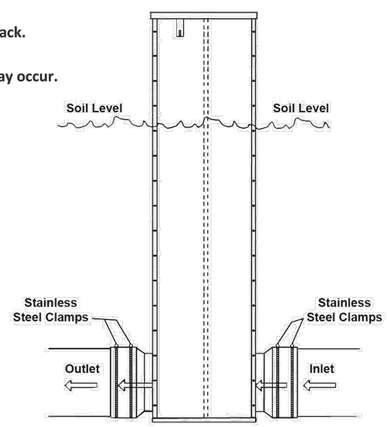
### *2.) PIPE CONNECTION*

Remove stainless steel clamps from inside structure. Place pipe inside flex couplers and tighten SS clamps.

### *3.) BACKFILL AND COMPACTION*

Level structure vertically before placing backfill. Backfill around control structure by hand in 6" lifts. Hand tamp only - **do not** mechanically compact. **Do not** use a backhoe or blade to place backfill directly against the water control structure.

**—Seal on stoplog faces downstream/outlet side of structure.**



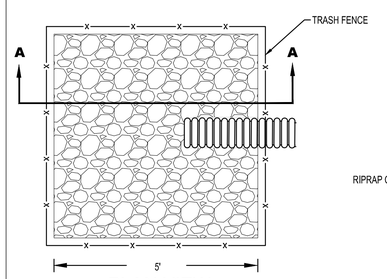

### Excessive compaction may cause structural damage or failure.

- Either the inlet or inline structure may be used for primary or secondary outlet, with larger pipe or emergency spillway as primary.
- Inline structure removes subsurface water.
- On the inline installation, the inlet end of the pipe should be held off the bottom of the impoundment to allow for siltation, and be protected with an inlet guard. The outlet end of the structure should be protected with a rodent guard.
- In a controlled drainage or subsurface irrigation application, the structure nearest the outlet should be installed with a minimum of 20' of non-perforated pipe on the downstream end. Anti-Seep Collars are recommended.


Agri Drain CORPORATION

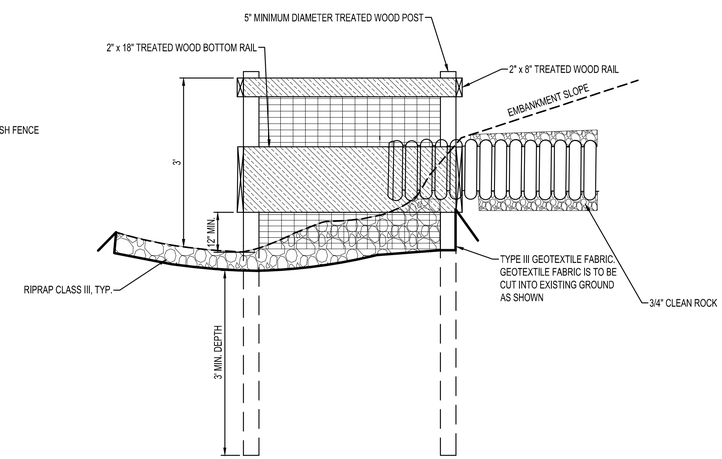
*1462 340th Street*
*Adair, Iowa 50002*
*P: 800-232-4742*
*F: 800-282-3353*
*www.agridrain.com*
*info@agridrain.com*

*— Since 1976 —*


PLAN VIEW

NTS




TRASH FENCE & RIPRAP DETAIL

NTS

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PROJECT

**FARIBAULT COUNTY DITCH No. 26/45 IMPROVEMENT**

FARIBAULT COUNTY MINNESOTA

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TITLE

**DETAILS**

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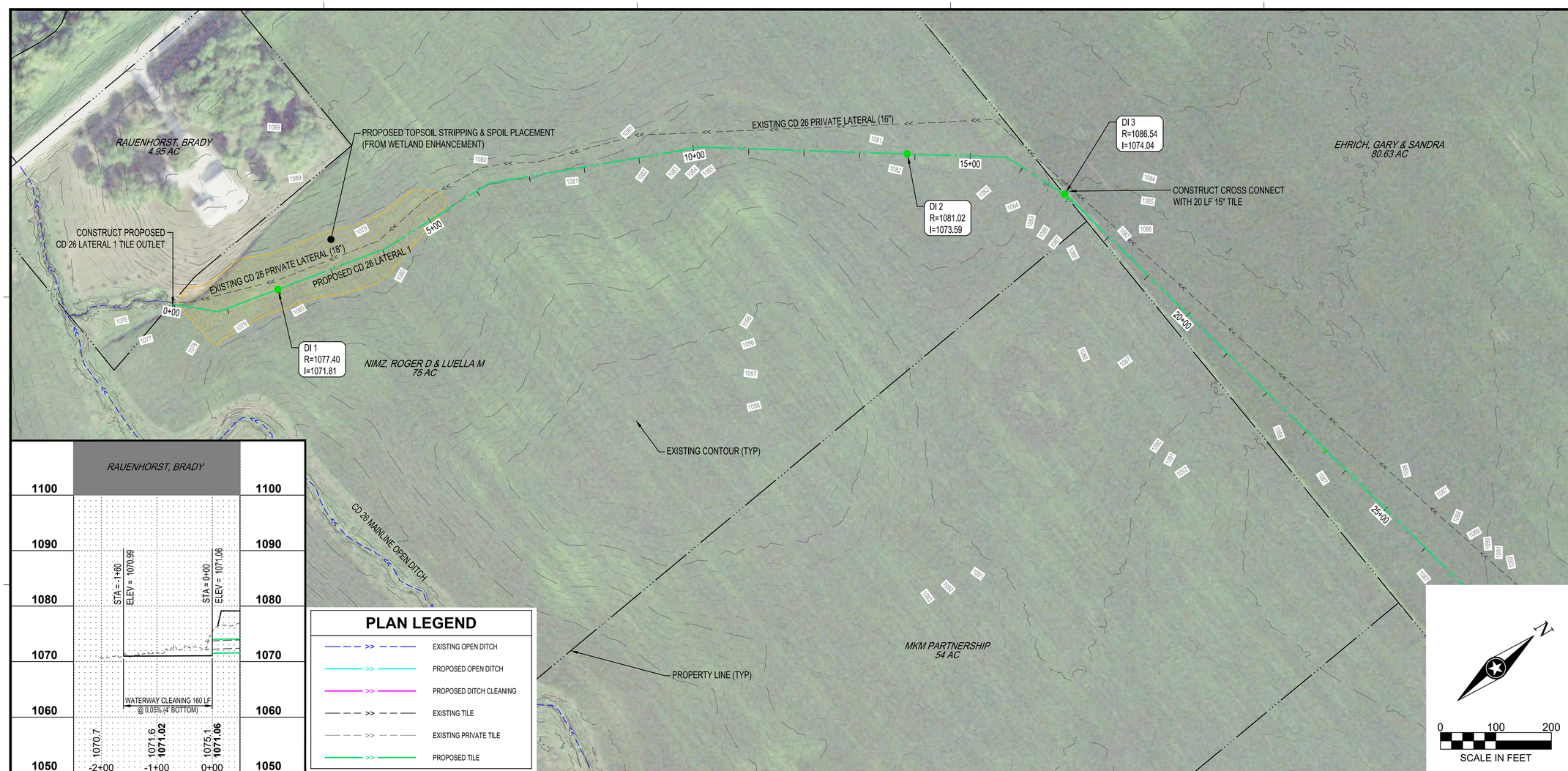
OF 15



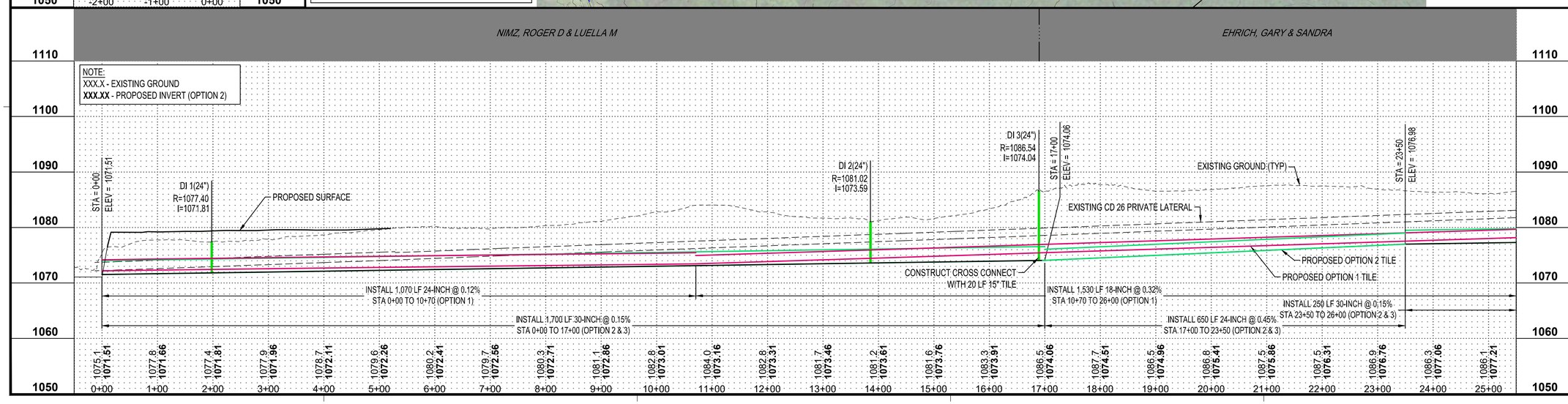




## PLAN LEGEND

- EXISTING OPEN DITCH
- PROPOSED OPEN DITCH
- PROPOSED DITCH CLEANING
- EXISTING TILE
- EXISTING PRIVATE TILE
- PROPOSED TILE

0 100 200
SCALE IN FEET

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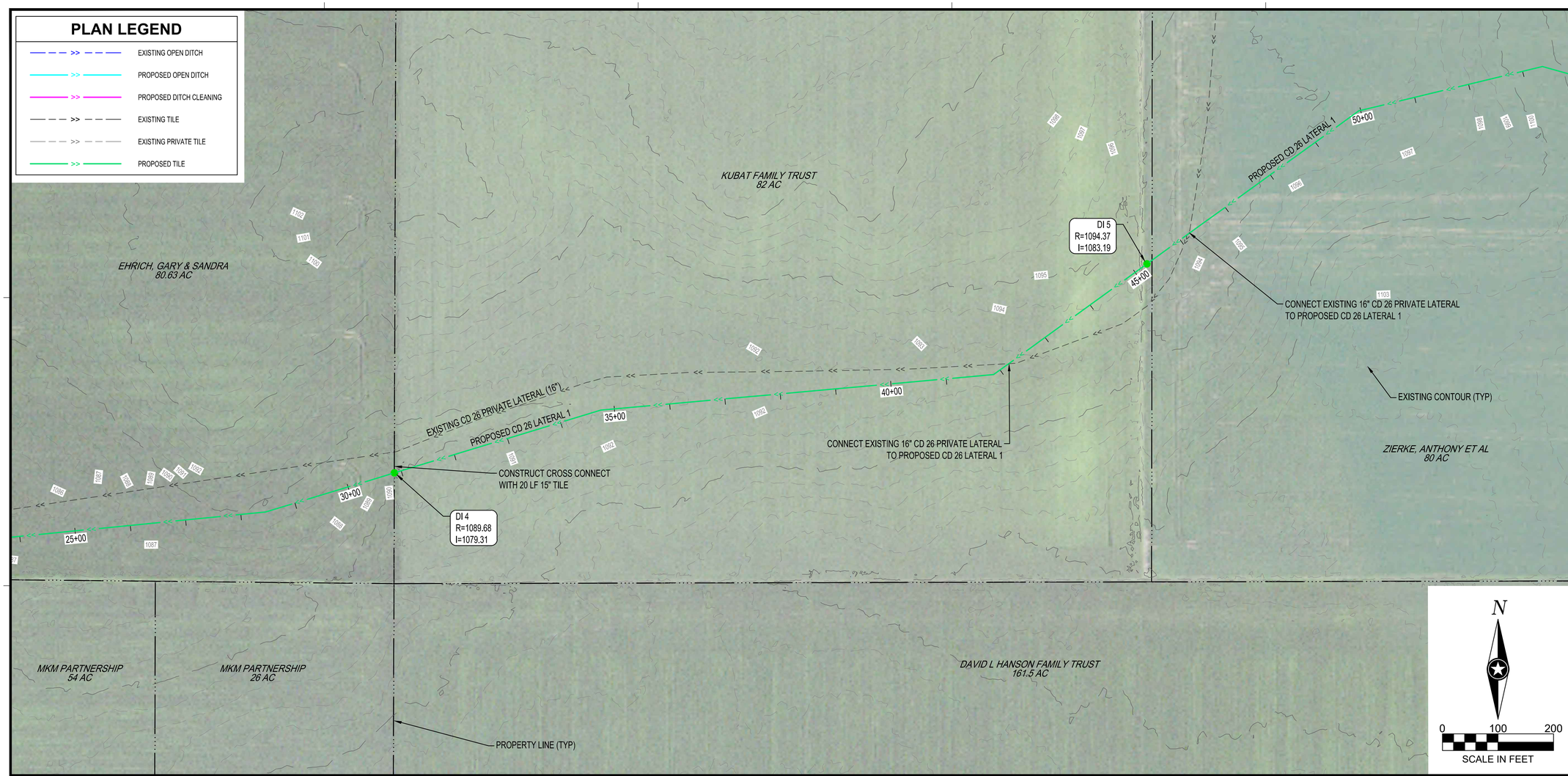
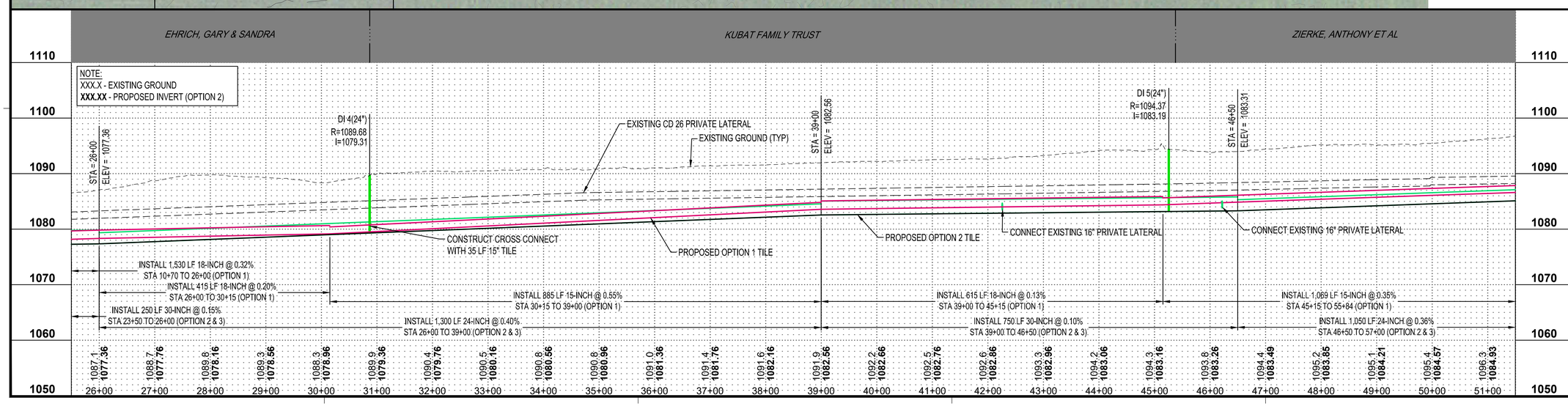
## CD26 MAIN PLAN PROFILE

SHEET

9 OF 15

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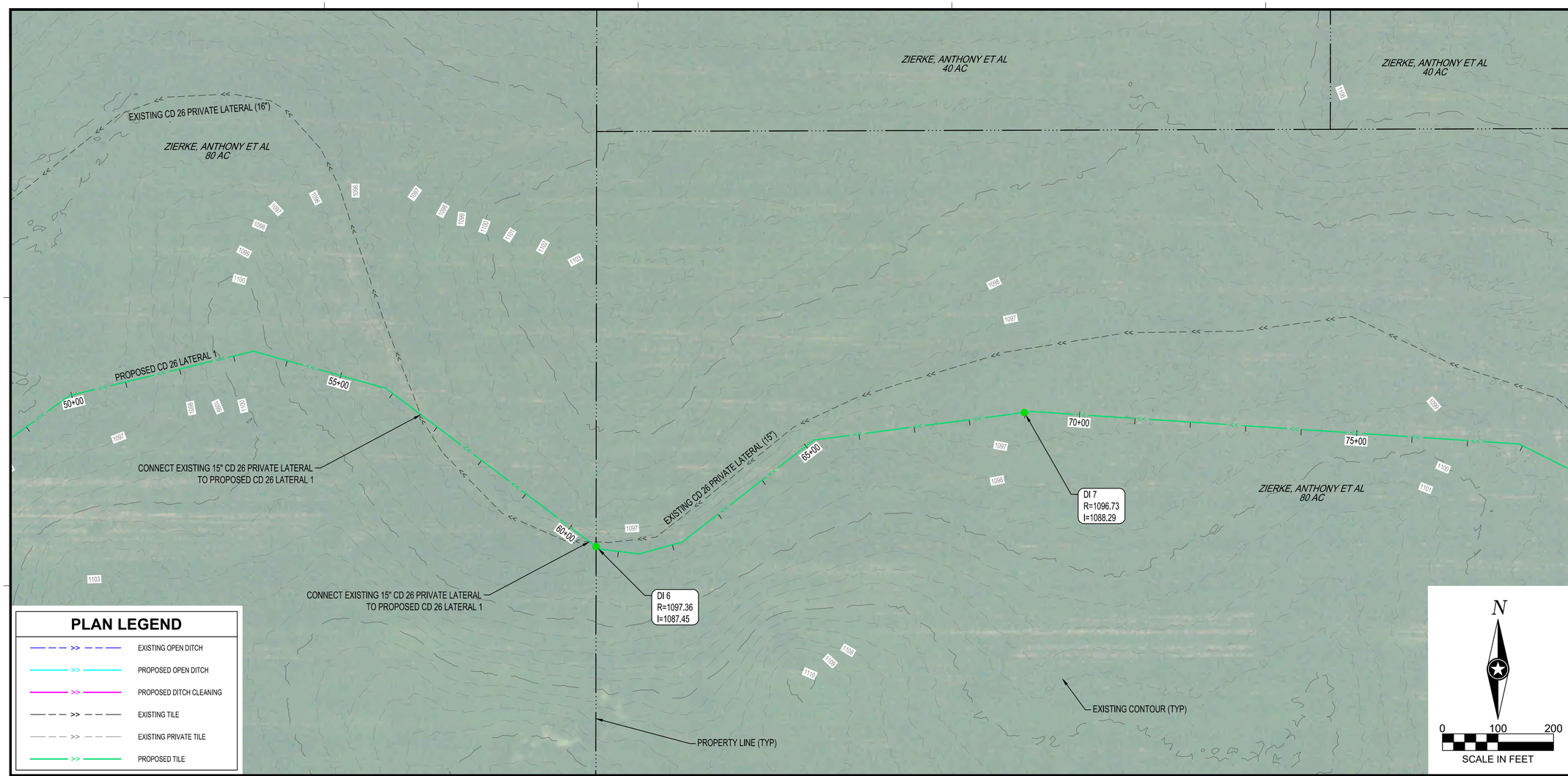
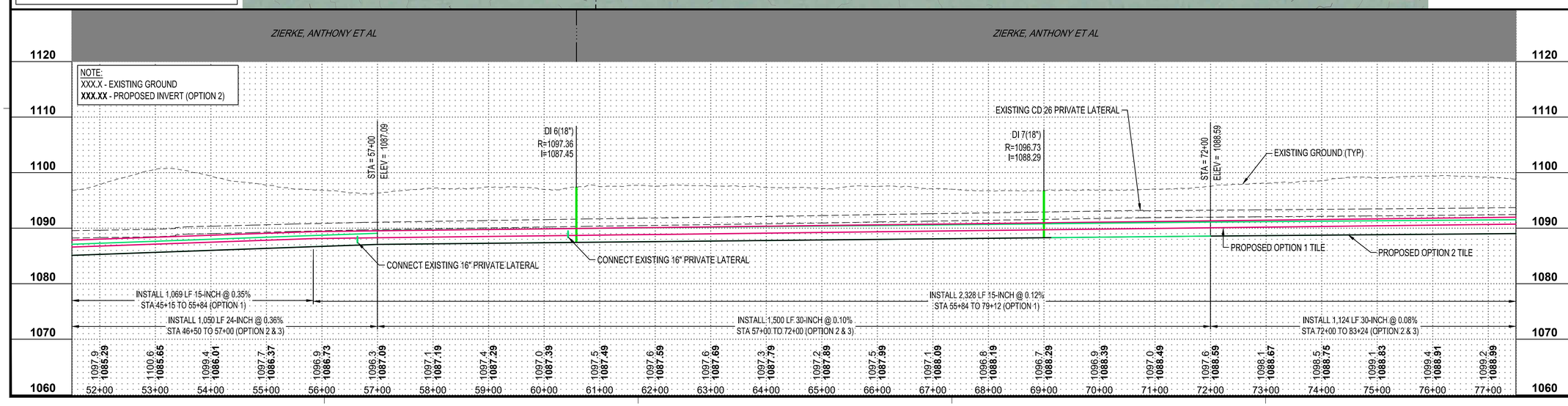
## CD26 MAIN PLAN PROFILE

SHEET

10 OF 15

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**CD26 MAIN PLAN PROFILE**

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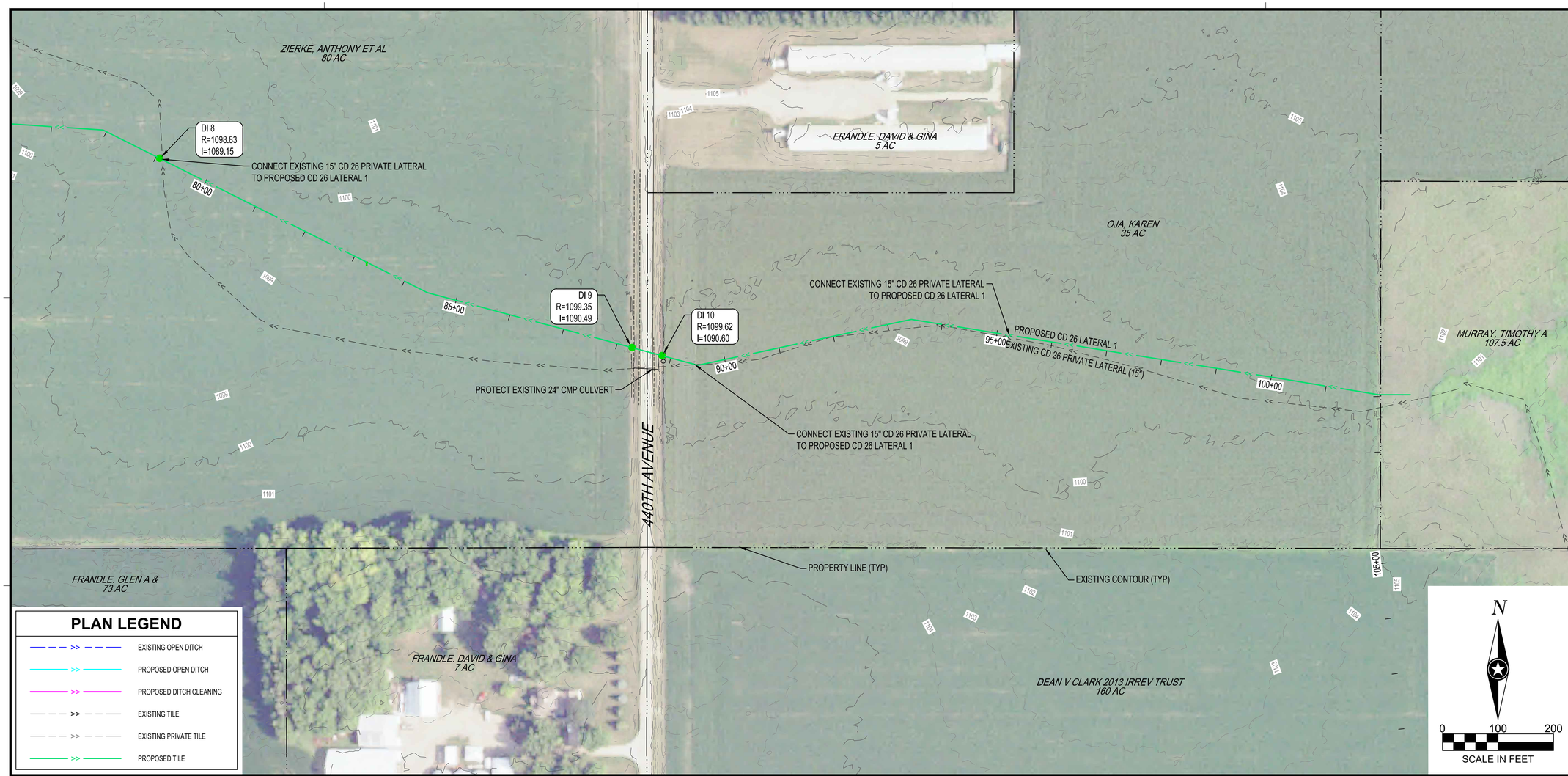


## PLAN LEGEND

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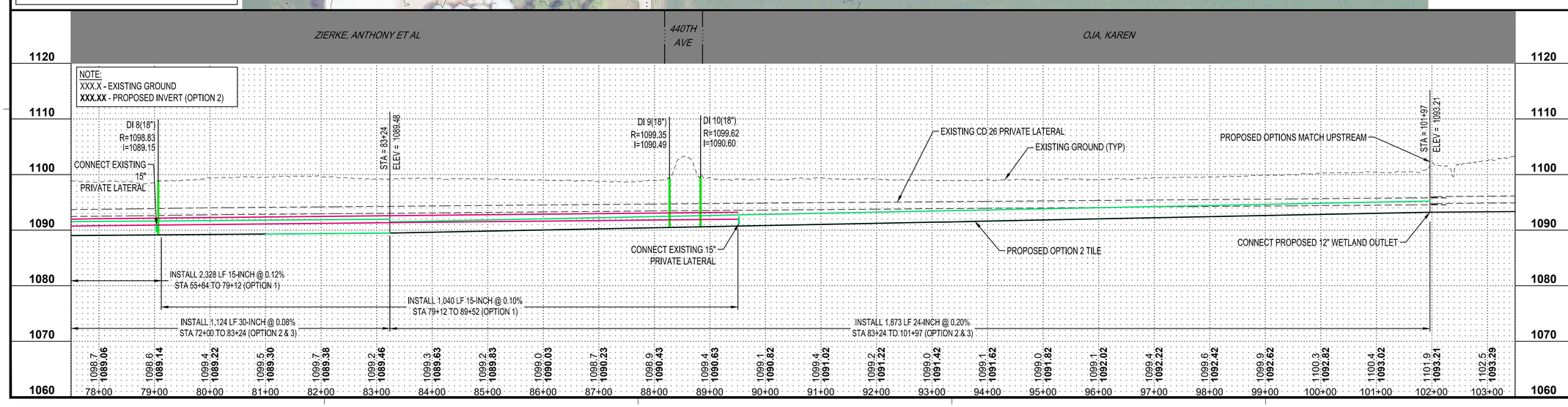
- PROPOSED OPEN DITCH
- PROPOSED DITCH CLEANING
- EXISTING TILE
- EXISTING PRIVATE TILE
- PROPOSED TILE

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# CD26 MAIN PLAN PROFILE

SHEET

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# Appendix B: Petition + Order

(4)

STATE OF MINNESOTA
*Before the*
FARIBAULT COUNTY BOARD OF COMMISSIONERS
SITTING AS THE DRAINAGE AUTHORITY FOR
COUNTY DITCH #26

| | |
|---|---|
| **In the Matter of:**<br><br>**the Petition for a Lateral to County Ditch #26** | **PRELIMINARY FINDINGS AND ORDER** |

The Faribault County Board of Commissioners, sitting as the drainage authority County Ditch #26, convened on October 5th, 2021, at 1:00 p.m. at the Board Room of the Faribault County Courthouse, 415 North Main Street Blue Earth, Minnesota. Based on the record and proceedings, Commissioner Groskreutz moved, seconded by Commissioner Young to adopt the following Findings and Order:

**Findings:**

1. The Faribault County Board of Commissioners is the drainage authority for County Ditch #26.

2. A petition dated March 12th, 2021, was received by the Faribault County Auditor requesting construction of a lateral to County Ditch #26 pursuant to Minn. Stat. §103E.225.

3. Kurt Deter, Attorney for the Drainage Authority, reviewed the petition and bond filed with the county and determined that the petition and bond met the requirement of the proceedings for a lateral to County Ditch #26.

4. Upon further review of the existing benefit roll of County Ditch #26, it was determined that the property listed in the lateral petition was not currently assigned benefits into County Ditch #26. Pursuant Minn. Stat. §103E.225 subd. 3 the Drainage Authority notified the petitioners' attorney that a petition for authority to use County Ditch #26 as an outlet was necessary to construct the lateral; therefore, the petition for lateral will not be accepted until the petition for outlet is received.

5. The petition for authority to use County Ditch #26 as an outlet was received on September 7th, 2021.

6. The drainage authority finds that it has jurisdiction over these proceedings and pursuant to Minn. Stat. § 103E.241, subd. 1 desires to appoint an engineer to make a preliminary survey.

**Order:**

Based on the foregoing Findings and the entire record of proceedings before the Board, the Board, acting as the drainage authority for County Ditch #26, hereby orders as follows:

A. That Mark Origer, I&S Group (ISG), is hereby appointed as the project engineer for these proceedings and shall make a preliminary survey pursuant to Minn. Stat. Ch. 103E.

B. Prior to commencing any work, the engineer must subscribe to an oath to faithfully perform the assigned duties in the best manner possible and file a bond in the amount of $10,000 with the Faribault County Auditor within ten days after being appointed.

C. The engineer may appoint assistant engineers and hire help necessary to complete the engineer's duties. The engineer shall be responsible for the assistant engineers and may remove them.

D. The engineer shall make an expense report every two weeks after the beginning of the engineer's work until the construction of the contract is awarded. The report must show costs incurred by the engineer and expenses incurred under the engineer's direction relating to the proceeding, and include the names of the engineer, engineer assistants, and employees and the time each was employed, and every item of expense incurred by the engineer. The engineer must file this report with the auditor as soon as possible and may not incur expenses for the proceeding greater than the petitioner's bond.

After discussion, the Board Chair called the question. The question was on the adoption of the foregoing findings and order, and there were 3 yeas, 0 nays, 2 absent, and 0 abstentions as follows:

| | Yea | Nay | Absent | Abstain |
|---|---|---|---|---|
| Roper | ☑ | ☐ | ☐ | ☐ |
| Young | ☑ | ☐ | ☐ | ☐ |
| Groskreutz | ☑ | ☐ | ☐ | ☐ |
| Loveall | ☐ | ☐ | ☑ | ☐ |
| Anderson | ☐ | ☐ | ☑ | ☐ |

Upon vote, the Chair declared the motion passed and the Findings and Order adopted.

John Roper, Chairperson

Dated: 10-5-2021

* * * * * * * * * * *

I, Darren Esser, Faribault County Auditor-Treasurer-Coordinator do hereby certify that I have compared the above motion; findings and order with the original thereof as the same appears of record and on file with this office and find the same to be a true and correct transcript thereof. The above order was filed with me, on October 5th, 2021.

IN TESTIMONY WHEREOF, I hereunto set my hand this
5th day of October, 2021.

Darren Esser
Faribault County Auditor-Treasurer-Coordinator

# Wendland Sellers Law Office

ATTORNEYS AT LAW

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MAPLETON, MN 56065
TELEPHONE: (507) 524-4110

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SELLERS@WENDLANDLAW.COM

REPLY TO BLUE EARTH OFFICE


March 10, 2021


RECEIVED
MAR 12 2021
FARIBAULT COUNTY AUDITOR


Mr. Darren Esser
Faribault County Auditor
Faribault County Courthouse
PO Box 130
Blue Earth, MN 56013

RE: Petition for Lateral to Faribault County Ditch No. 26
Our File No.: 3509.01

Dear Mr. Esser:

Our office represents petitioners for the proposed construction of a lateral to Faribault County Ditch No. 26 ("C.D. 26" or "the system"). Pursuant to Minn. Stat. §103E.225, enclosed please find the following for filing:

1. Petition for a Lateral to Faribault County Ditch No. 26 ("Petition") signed by Anthony Zierke, Brad Zierke, Tracy Zierke, and Carolyn Zierke;
2. A Map referred to and incorporated as "Exhibit A" depicting the starting point and general course and terminus of the proposed lateral project and the property traversed by the proposed lateral, which adequately satisfies the requirement under Minn. Stat. §103E.225, Subd. 1(a)(1) and (2); and
3. Corporate Surety Bond ("Bond") in the face amount of $10,000.00 payable to the Drainage Authority of Faribault County Ditch No. 26.

All information used to determine the general terms the starting point, general course, and terminus of the proposed lateral and the description of the property traversed by the lateral, as depicted on Exhibit A, were obtained from I+S Group engineers ("ISG") using the Surface Water Hydrology Atlas from Minnesota State University-Mankato, current Geographical Information Systems software, Lidar Contour Lines, ArcGIS, and original tile maps received from Faribault County and landowners.

Exhibit A depicts "Tracts" which indicate the number of owners of 40-acre tracts or government lots within the watershed, the boundary of which was also provided by ISG using the ArcGIS software. ArcGIS is a

geographic information system that provides the infrastructure for making and working with maps and geographic information by compiling geographic data and analyzing mapped information. The parcel data is provided by Faribault County, and, based on the section information (also provided by the County), the parcel areas are "split" to identify the 40 acre "Tracts", and another software program is used to calculate the parcel area for each "Tract" within the information developed by the ArcGIS. Additionally, I personally cross-referenced the landowner information, including the names and addresses of the property owners, with the records available through the Faribault Assessor's Office, as well as information available through Faribault County's GIS website, and/or using the online Beacon software.

Pursuant to Minn. Stat. §103E.225, Subd. 1(a), a petition is considered to be adequate if it is signed by at least 26 percent of the owners of the property or by the owners of at least 26 percent of the area of the property that the lateral passes over.

With respect to the adequacy of this Petition as it relates to satisfying those requirements, the proposed lateral includes a total of 7 owners of the property and 395.16 acres of the area of the property that the lateral passes over, and I have submitted a Petition which is signed by 1 of those owners whom own 29.60% of the property area that the proposed lateral passes over. Therefore, as the petition is signed by at least 26 percent of the area of the property that the lateral passes over, I believe the petition satisfies the requirements of Minn. Stat. §103E.225, Subd. 1(a).

After you have had an adequate opportunity to review and verify the information provided, I would request that this Petition be presented to the Faribault County Board of Commissioners acting as Drainage Authority for Ditch No. 26.

Chuck Brandel, civil engineer with ISG, has been involved with the proposed project from the initial stages. At the request of the Petitioner, Mr. Brandel provided the preliminary review and feasibility study to landowners for their review and consideration, and that information was used by Petitioner to assist them with their decision to move forward with this Petition. As such, for the sake of convenience and expense, the Petitioner would request that Mr. Brandel and ISG be appointed as engineer for this proposed lateral project.

Please contact me at your earliest convenience if you have further questions, require further information, or believe there are issues that need to be addressed prior to acceptance of the Petition. Thank you in advance for your consideration and prompt attention with this matter.

Sincerely yours,

WENDLAND SELLERS LAW OFFICE

Bruce E. Sellers

Bruce E. Sellers
FOR THE FIRM

**PETITION FOR LATERAL TO**
**FARIBAULT COUNTY DITCH NO. 26**

TO THE FARIBAULT COUNTY BOARD OF COMMISSIONERS AS DRAINAGE AUTHORITY IN RELATION TO FARIBAULT COUNTY DITCH NO. 26

Pursuant to the provisions of Minn. Stat. §103E.225, Petitioners herein make the following representations:

WHEREAS, this Petition relates to an existing private subsurface drain tile line ("private line"); and

WHEREAS, said existing private line is situated in Section 24 of Blue Earth Township and Sections 19 and 20 of Emerald Township, and lies wholly within the established Faribault County Ditch No. 26 ("C.D. 26" or "the system"), said system consisting of a combination of open ditch and subsurface drain tile; and

WHEREAS, the system and said private line, specifically, serves as an outlet to Faribault County Ditch No. 45 main subsurface trunk tile line ("C.D. 45"); and

WHEREAS, said private line commences at said C.D. 45 outlet in Section 20 of Emerald Township and flows westerly across the west half of Section Twenty (20) and across Section 19 in Emerald Township; thence continues to flow westerly and southerly to the east half of Section 24 in Blue Earth Township before outletting into the main open ditch of C.D. 26, which is less than 200 feet from the system's outlet into a tributary of the east branch of the Blue Earth River; and

WHEREAS, the starting point, general course and terminus of the existing private tile line is depicted on Exhibit A, which is attached hereto for reference; and

WHEREAS, the proposed lateral is necessary to maintain the efficiency of the system for agricultural drain purposes; reducing channel erosion and otherwise protecting or improving water quality; for the equitable assessment of benefits to those properties currently served by the private and public systems; and to provide an adequate outlet to C.D. 45;

WHEREAS, the names and addresses of owners of the parcel areas the proposed lateral passes over (identified in 40-acre tracts) as depicted on the attached Exhibit A are as follows:

| | |
|---|---|
| Tract 1<br>Owner/Address: | Gary & Sandra Ehrich<br>6375 430th Ave.<br>Blue Earth, MN 56013 |

| | |
|---|---|
| Tract 2<br>Owner/Address: | Gary & Sandra Ehrich<br>6375 430th Ave.<br>Blue Earth, MN 56013 |

| | |
|---|---|
| Tract 3<br>Owner/Address: | Kubat Family Trust<br>Susan & Charles Kubat, Trustees<br>5346 Golden Gossamer St.<br>Las Vegas, NV 89149 |

| | |
|---|---|
| Tract 4<br>Owner/Address: | Anthony Zierke, et al.<br>Attn: Tony Zierke<br>37600 40th St.<br>Elmore, MN 56027 |

| | |
|---|---|
| Tract 5<br>Owner/Address: | Anthony Zierke, et al.<br>Attn: Tony Zierke<br>37600 40th St.<br>Elmore, MN 56027 |

| | |
|---|---|
| Tract 6<br>Owner/Address: | Anthony Zierke, et al.<br>Attn: Tony Zierke<br>37600 40th St.<br>Elmore, MN 56027 |

| | |
|---|---|
| Tract 7<br>Owner/Address: | Karen Oja<br>12508 Skyline Dr.<br>Burnsville, MN 55337 |

| | |
|---|---|
| Tract 8<br>Owner/Address: | Brady Rauenhorst<br>9276 425th Ave.<br>Blue Earth, MN 56013 |

| | |
|---|---|
| Tract 8<br>Owner/Address: | Roger D. & Luella M. Nimz<br>311 Oak Knoll Court<br>Blue Earth, MN 56013 |

| | |
|---|---|
| Tract 9<br>Owner/Address: | Dean V. Clark 2013 Irrevocable Trust<br>P.O. Box 6294<br>Rochester, MN 55903 |

| | |
|---|---|
| Tract 10<br>Owner/Address: | Dean V. Clark 2013 Irrevocable Trust<br>P.O. Box 6294<br>Rochester, MN 55903 |

| | |
|---|---|
| Tract 11<br>Owner/Address: | Brady Rauenhorst<br>9276 425th Ave.<br>Blue Earth, MN 56013 |

| | |
|---|---|
| Tract 11<br>Owner/Address: | Roger D. & Luella M. Nimz<br>311 Oak Knoll Court<br>Blue Earth, MN 56013 |

WHEREAS, this Petition is signed by (1) at least 26% of the owners of the property; and (2) the owners of at least 26% of the area of the property that the lateral passes over; and

WHEREAS, Petitioners provide herewith a corporate surety bond in the face amount of $50,000 payable to the Drainage Authority of Faribault County Ditch No. 26 ("Drainage Authority"), said bond conditioned to pay the costs incurred if the proceeding is dismissed or a contract is not awarded, to not allow the costs incurred to exceed the amount of the bond, and that Petitioners will cause additional bond to be filed if it appears that the costs exceed the amount of the bond; and

WHEREAS, Petitioners have been informed and understand that they may not withdraw as a Petitioner at any time after this Petition is accepted by the Drainage Authority. Petitioners further acknowledge that if the proposed drainage project is dismissed or a contract is not awarded that Petitioners are liable to the Drainage Authority for all of the costs incurred, including engineering, legal, and miscellaneous fees and expenses in relation to this Petition as outlined under Minnesota Statutes 103E; and

WHEREAS, Petitioners request that the engineer be specifically ordered to determine and offer alternative proposals for the consideration of the Drainage Authority, which relate to the proposed lateral that the engineer deems feasible, if any, including re-routing or any alternative outlets, if any; and

WHEREAS, Petitioners assert that the proposed lateral project will benefit and be useful to the public and will promote the public health; and

WHEREAS, this Petition may be signed in counterparts; and

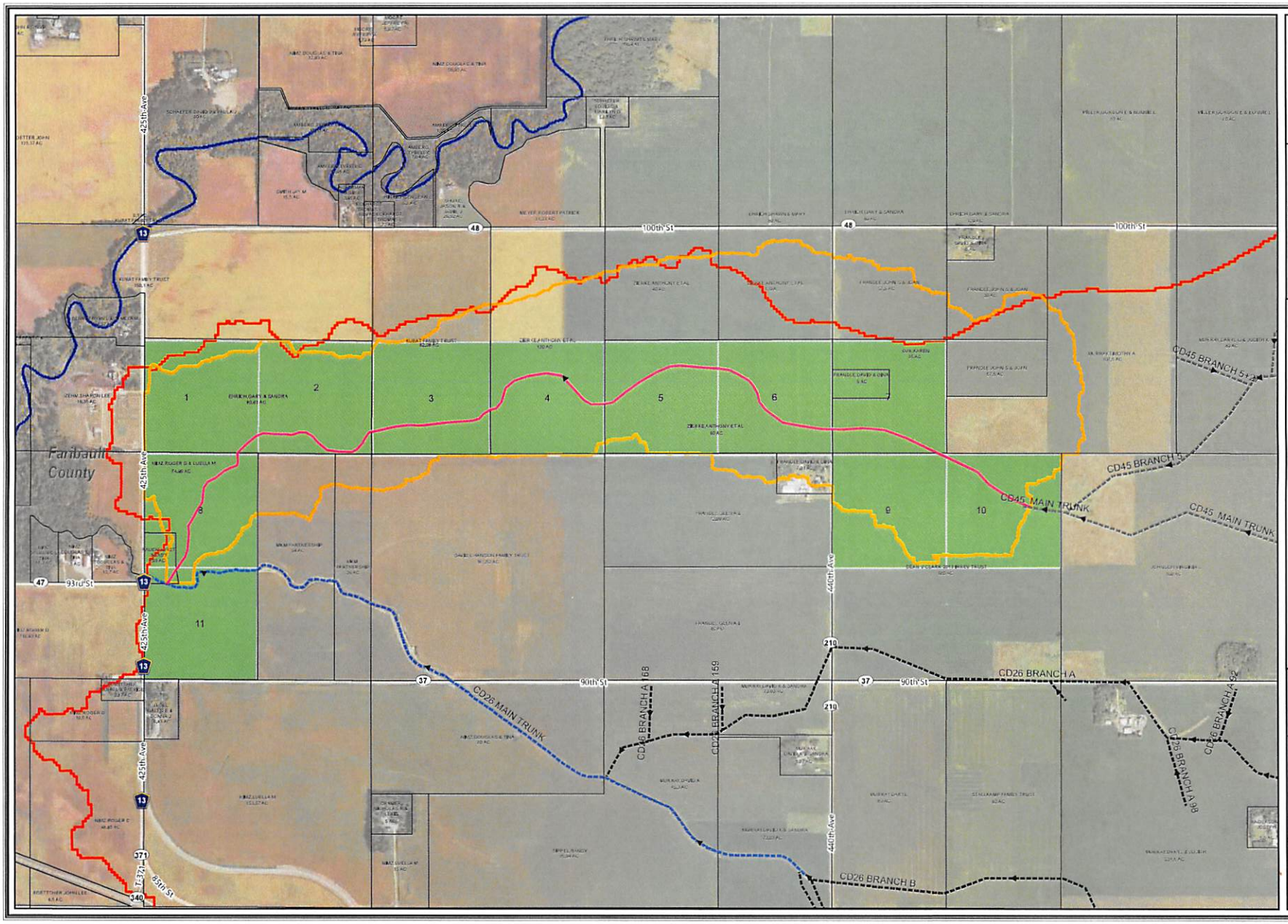
NOW THEREFORE, Petitioners request the Faribault County Auditor present this Petition to the Faribault County Board of Commissioners (after examination by legal counsel), acting as Drainage Authority for Faribault County Judicial Ditch No. 26, to act as the drainage authority to oversee this proposed proceeding; and, after formation, further request the acceptance of the Petition and for the appointment of Chuck Brandel from ISG, Mankato, or, in the alternative, a qualified civil engineer skilled in public drainage matters, to examine the proposed work.

| Owner Signature | Property Owned | Acres |
|---|---|---|
| Anthony Zierke<br>Brad Zierke<br>Tracy Zierke<br>Carolyn Zierke | Tract 4<br>Tract 5<br>Tract 6 | 39.33<br>37.44<br>40.02 |

Bruce E. Sellers
Attorney for Petitioner
Wendland Sellers Law Office
825 East Second St.
P.O. Box 247
Blue Earth, MN 56013
507-526-2196

This petition is prepared by:

Bruce E. Sellers, Attorney at Law
Wendland Sellers Law Office
825 East Second St.
P.O. Box 247
Blue Earth, MN 56013
507-526-2196




ISG

# Exhibit A

County Ditch No 26

Faribault County, Minnesota

Tuesday, December 3, 2019

**Legend**

- Private Tile
- CD 26 Tile
- CD 26 Open Ditch
- CD 45 Tile
- Faribault County Parcels
- Private Tile Watershed
- Private Tile 40s
- CD 26 Watershed

PN: 19-23548

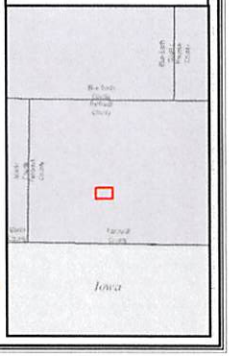
**Source:**

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County MN DNR, 2017)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N W E S

0 250 500 1,000 Feet

1 inch = 1,000 feet



Auto-Owners Insurance
Life Home Car Business
The No Problem People®

Bond No. 66363240

SURETY BOND
Public Official, Bid, Contract, License or Permit Bonds and Probate Bonds

# SURETY BOND

KNOW ALL MEN BY THESE PRESENTS

That we, Anthony Zierke and Faribault County Ditch #26 landowners/petitioners, as Principal, and the Auto-Owners Insurance Company, a corporation organized under the laws of the State of Michigan, and having its principal office at Lansing, Michigan, as Surety, are held and firmly bound unto Drainage Authority of Faribault County in the penal sum of ($ 50,000.00 ) Fifty Thousand and no/100---------- Dollars, lawful money of the United States of America, for which payment, well and truly to be made, we jointly and severally bind ourselves, our successors, administrators and assigns, firmly by these presents.

SIGNED, SEALED, and DATED this 26 day of February, 2021.

WHEREAS the aforesaid Principal has petitioned to proceed in the matter of the petition for a lateral of
(If a bid bond insert "submitted its bid for, etc.")
Faribault County Ditch #26. Said petition is being addressed before the Board of Commissioners
(If a Contract Bond insert "entered into written contract with aforesaid Obligee dated, etc.")
Drainage Authority of Faribault County pursuant to Minnesota Statutes 103E.225 with respect to a petition for a
(If a Public Official Bond insert "been elected or appointed (name) for the terms beginning (date) and ending (date)")
lateral. (See #1)
(If a License or Permit Bond insert "been granted a license or permit as (name business) by the said Obligee for the period of one year from (date)")
This bond may be automatically renewed for additional terms by Continuation Certificate issued by the Surety.
(If a Probate Bond insert "been appointed [Executor, Administrator, Guardian, Conservator] of the estate of [name of deceased, minor or incompetent]")

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the aforesaid Principal shall pay all cost and expenses which may be incurred in case the proceedings herein are dismissed for any reason and no
(If a Bid Bond insert "be awarded the contract upon said bid and undertake said contract")
contract is entered into for the construction of such improvement as proposed in the petition. Petitioners covenant they
(If a Contract Bond insert "comply with the terms and conditions of the aforesaid contract")
will not allow the costs incurred to exceed the amount of the bond submitted herewith. Being part of a County Ditch
(If a Public Official Bond insert "faithfully perform the duties of said office")
the improvement will be a public (See #2)
(If a License or Permit Bond insert "comply with the laws of the aforesaid Obligee governing said License or Permit")

Then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED: FIRST: - That the liability of the Surety shall in no event exceed the penalty of this Bond.
SECOND: - If this is a Bid Bond, any proceedings at law or in equity brought against said Surety to recover any claim hereunder, must be instituted within six (6) months from the date of this instrument.

The petitioners acknowledge that they have been informed and understand that they may not withdraw as a petitioner
(If no further conditions insert "no further conditions")
at any time once this petition is filed. The petitioners understand that if the proposed drainage proceedings are dismissed each of them is responsible for the payment of all costs incurred. The Surety may terminate this bond at any time by giving thirty (30) days written notice of cancellation to both the Obligee and the Principal.

Anthony Zierke and Faribault County Ditch #26 petitioners
Principal

Auto-Owners Insurance Company
Surety

By
Attorney-in-Fact

AUTO-OWNERS INSURANCE SEAL LANSING, MICHIGAN

2948 (11-99)

BOND NUMBER 66363240, Anthony Zierke and Faribault County Ditch #26 landowners/petitioners

#1 This bond may be automatically renewed for additional terms by Continuation Certificate issued by the Surety.

#2 utility. If a contract is entered into for the construction of such improvement the petitioners acknowledge that they have been informed and understand that they may not withdraw as petitioner at any time once this petition is filed. The petitioners understand that if the proposed drainage proceedings are dismissed each of them is responsible for the payments of all costs incurred. The Surety may terminate this bond at any time by giving thirty (30) as written notice of cancellation to both the Obligee and the Principal.

DATE AND ATTACH TO ORIGINAL BOND

# AUTO-OWNERS INSURANCE COMPANY

LANSING, MICHIGAN

POWER OF ATTORNEY

NO. 66363240

KNOW ALL MEN BY THESE PRESENTS: That the AUTO-OWNERS INSURANCE COMPANY AT LANSING, MICHIGAN, a Michigan Corporation, having its principal office at Lansing, County of Eaton, State of Michigan, adopted the following Resolution by the directors of the Company on January 27, 1971, to wit:

"RESOLVED, That the President or any Vice President or Secretary or Assistant Secretary of the Company shall have the power and authority to appoint Attorneys-in-fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity, and other writings obligatory in the nature thereof. Signatures of officers and seal of Company imprinted on such powers of attorney by facsimile shall have same force and effect as if manually affixed. Said officers may at any time remove and revoke the authority of any such appointee."

Does hereby constitute and appoint CHAD W OSTERMANN

its true and lawful attorney(s)-in-fact, to execute, seal and deliver for and on its behalf as surety, any and all bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof, and the execution of such instrument(s) shall be as binding upon the AUTO-OWNERS INSURANCE COMPANY AT LANSING, MICHIGAN as fully and amply, to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal office.

IN WITNESS WHEREOF, the AUTO-OWNERS INSURANCE COMPANY AT LANSING, MICHIGAN, has caused this to be signed by its authorized officer this 1st day of August, 2016.

Denise Williams

Denise Williams — Senior Vice President

STATE OF MICHIGAN }ss.
COUNTY OF EATON

On this 1st day of August, 2016, before me personally came Denise Williams, to me known, who being duly sworn, did depose and say that they are Denise Williams, Senior Vice President of AUTO-OWNERS INSURANCE COMPANY, the corporation described in and which executed the above instrument, that they know the seal of said corporation, that the seal affixed to said instrument is such Corporate Seal, and that they received said instrument on behalf of the corporation by authority of their office pursuant to a Resolution of the Board of Directors of said corporation.

SUSAN E. THEISEN — NOTARY PUBLIC COUNTY OF KENT My Commission Expires MARCH 10, 2022 Acting in the County of ____ — STATE OF MICHIGAN

My commission expires March 10, 2022.

Susan E. Theisen

Susan E. Theisen — Notary Public

STATE OF MICHIGAN }ss.
COUNTY OF EATON

I, the undersigned First Vice President, Secretary and General Counsel of AUTO-OWNERS INSURANCE COMPANY, do hereby certify that the authority to issue a power of attorney as outlined in the above board of directors resolution remains in full force and effect as written and has not been revoked and the resolution as set forth is now in force.

Signed and sealed at Lansing, Michigan. Dated this 3rd day of March, 2021.

AUTO-OWNERS INSURANCE — CORPORATE SEAL — LANSING, MICHIGAN

William F. Woodbury

William F. Woodbury, First Vice President, Secretary and General Counsel

Auto-Owners
INSURANCE
LIFE · HOME · CAR · BUSINESS

**EXECUTION REPORT**
*(Detach and return with a copy of original bond.)*

Bond Number 66363240

Agency: M & M INSURANCE AGENCY LLC
PO BOX 422
MAPLETON, MN 56065-0422

Agency Code: 06-0636-00
Agency Phone Number: (507) 524-3810

---

Name of Principal ANTHONY ZIERKE & FARIBAULT COUNTY DITCH 26 PETITIONERS

Effective Date 02/26/2021

Mailing Address 37600 40TH ST, ELMORE, MN 56027-070

Premium Charge $1,080.00

Name of Obligee DRAINAGE AUTHORITY OF FARIBAULT COUNTY

Amount of Bond $50,000.00

Address of Obligee PO BOX 130, BLUE EARTH, MN 56013-0130

Type of Bond License/Permit

**COMPLETE AND ATTACH ALL PAPERS UNDER THIS REPORT THE SAME DAY THE BOND IS SIGNED**

| PIN | Tract No. | Owner | Passed Over Property Owners | Passed Over Property Owners Received | Total Passed Over Property Area | Passed Over Property Area Received |
|---|---|---|---|---|---|---|
| 020240100 | 1 | GARY & SANDRA EHRICH | 1 | | 32.08 | |
| 020240100 | 2 | GARY & SANDRA EHRICH | | | 36.34 | |
| 080190200 | 3 | KUBAT FAMILY TRUST | 1 | | 40.81 | |
| 080190500 | 4 | ANTHONY ZIERKE ET AL | 1 | 1 | 39.33 | 39.33 |
| 080190400 | 5 | ANTHONY ZIERKE ET AL | | | 37.44 | 37.44 |
| 080190400 | 6 | ANTHONY ZIERKE ET AL | | | 40.02 | 40.02 |
| 080200100 | 7 | KAREN OJA | 1 | | 34.52 | |
| 020240400 | 8 | BRADY RAUENHORST | 1 | | 3.07 | |
| 020240401 | 8 | ROGER D & LUELLA M NIMZ | 1 | | 36.90 | |
| 080200400 | 9 | DEAN V CLARK 2013 IRREVOCABLE TRUST & BETTY L CLARK TRUST (FAMILY) | 1 | | 27.98 | |
| 080200400 | 10 | DEAN V CLARK 2013 IRREVOCABLE TRUST & BETTY L CLARK TRUST (FAMILY) | | | 26.70 | |
| 020240400 | 11 | BRADY RAUENHORST | | | 1.88 | |
| 020240401 | 11 | ROGER D & LUELLA M NIMZ | | | 38.09 | |
| | | | 7 | 1 | 395.16 | 116.79 |
| | | | | 14.29% | | 29.56% |

# Wendland Sellers Law Office

ATTORNEYS AT LAW

BLUE EARTH OFFICE:
825 EAST SECOND STREET
P.O. BOX 247
BLUE EARTH, MN 56013
TELEPHONE: (507) 526-2196
FAX: (507) 526-3065

MAPLETON OFFICE:
101 SMITH STREET NE
MAPLETON, MN 56065
TELEPHONE: (507) 524-4110

BRUCE E. SELLERS
SELLERS@WENDLANDLAW.COM

REPLY TO BLUE EARTH OFFICE


September 3, 2021

Mr. Darren Esser
Faribault County Auditor
Faribault County Courthouse
PO Box 130
Blue Earth, MN 56013

RE: Petition for Lateral to Faribault County Ditch No. 26
Our File No.: 3509.01

Dear Mr. Esser:

Enclosed herein please find a Petition for an Outlet to Faribault County Ditch No. 26.

Sincerely yours,

WENDLAND SELLERS LAW OFFICE

Bruce E. Sellers

Bruce E. Sellers
FOR THE FIRM

* Qualified Neutral under Rule 114 of Minnesota General Rules of Practice

RECEIVED
SEP 07 2021
FARIBAULT COUNTY AUDITOR

# PETITION FOR AN OUTLET TO FARIBAULT COUNTY DITCH NO. 26

TO THE FARIBAULT COUNTY BOARD OF COMMISSIONERS AS DRAINAGE AUTHORITY IN RELATION TO FARIBAULT COUNTY DITCH NO. 26

Pursuant to the provisions of Minn. Stat. §103E.401, Petitioners herein make the following representations:

WHEREAS, this Petition relates to an existing private subsurface drain tile line ("private line"); and

WHEREAS, said existing private line is situated in Section 24 of Blue Earth Township and Sections 19 and 20 of Emerald Township, and lies wholly within the established Faribault County Ditch No. 26 ("C.D. 26" or "the system"), said system consisting of a combination of open ditch and subsurface drain tile; and

WHEREAS, the starting point, general course and terminus of the existing private line is depicted on Exhibit A; and

WHEREAS, the existing private line and system also serve as an outlet to Faribault County Ditch No. 45 main subsurface trunk line ("C.D. 45"); and

WHEREAS, the starting point, general course and terminus of the existing private tile line is depicted on Exhibit A, which is attached hereto for reference; and

WHEREAS, pursuant to Minn. Stat. §103E.401, Petitioners are requesting express authority for an outlet to the C.D. 26 main trunk open ditch in Section 13 for land not already assessed into Faribault Co. Ditch No. 26; and

WHEREAS, the names and addresses of owners of the 40-acre tracts within Faribault Co. Ditch No. 26 as depicted on the attached Exhibit A are as follows:

| | |
|---|---|
| Tract 1<br>Owner/Address: | Gary & Sandra Ehrich<br>6375 430th Ave.<br>Blue Earth, MN 56013 |

| | |
|---|---|
| Tract 2<br>Owner/Address: | Gary & Sandra Ehrich<br>6375 430th Ave.<br>Blue Earth, MN 56013 |

| | |
|---|---|
| Tract 3<br>Owner/Address: | Kubat Family Trust<br>Susan & Charles Kubat, Trustees<br>5346 Golden Gossamer St.<br>Las Vegas, NV 89149 |

| | |
|---|---|
| Tract 4<br>Owner/Address: | Anthony Zierke, et al.<br>Attn: Tony Zierke<br>37600 40th St.<br>Elmore, MN 56027 |

| | |
|---|---|
| Tract 5<br>Owner/Address: | Anthony Zierke, et al.<br>Attn: Tony Zierke<br>37600 40th St.<br>Elmore, MN 56027 |

| | |
|---|---|
| Tract 6<br>Owner/Address: | Anthony Zierke, et al.<br>Attn: Tony Zierke<br>37600 40th St.<br>Elmore, MN 56027 |

| | |
|---|---|
| Tract 7<br>Owner/Address: | Karen Oja<br>12508 Skyline Dr.<br>Burnsville, MN 55337 |

| | |
|---|---|
| Tract 8<br>Owner/Address: | Brady Rauenhorst<br>9276 425th Ave.<br>Blue Earth, MN 56013 |

| | |
|---|---|
| Tract 8<br>Owner/Address: | Roger D. & Luella M. Nimz<br>311 Oak Knoll Court<br>Blue Earth, MN 56013 |

| | |
|---|---|
| Tract 9<br>Owner/Address: | Dean V. Clark 2013 Irrevocable Trust<br>P.O. Box 6294<br>Rochester, MN 55903 |

| | |
|---|---|
| Tract 10<br>Owner/Address: | Dean V. Clark 2013 Irrevocable Trust<br>P.O. Box 6294<br>Rochester, MN 55903 |

| | |
|---|---|
| Tract 11<br>Owner/Address: | Brady Rauenhorst<br>9276 425th Ave.<br>Blue Earth, MN 56013 |

| | |
|---|---|
| Tract 11<br>Owner/Address: | Roger D. & Luella M. Nimz<br>311 Oak Knoll Court<br>Blue Earth, MN 56013 |

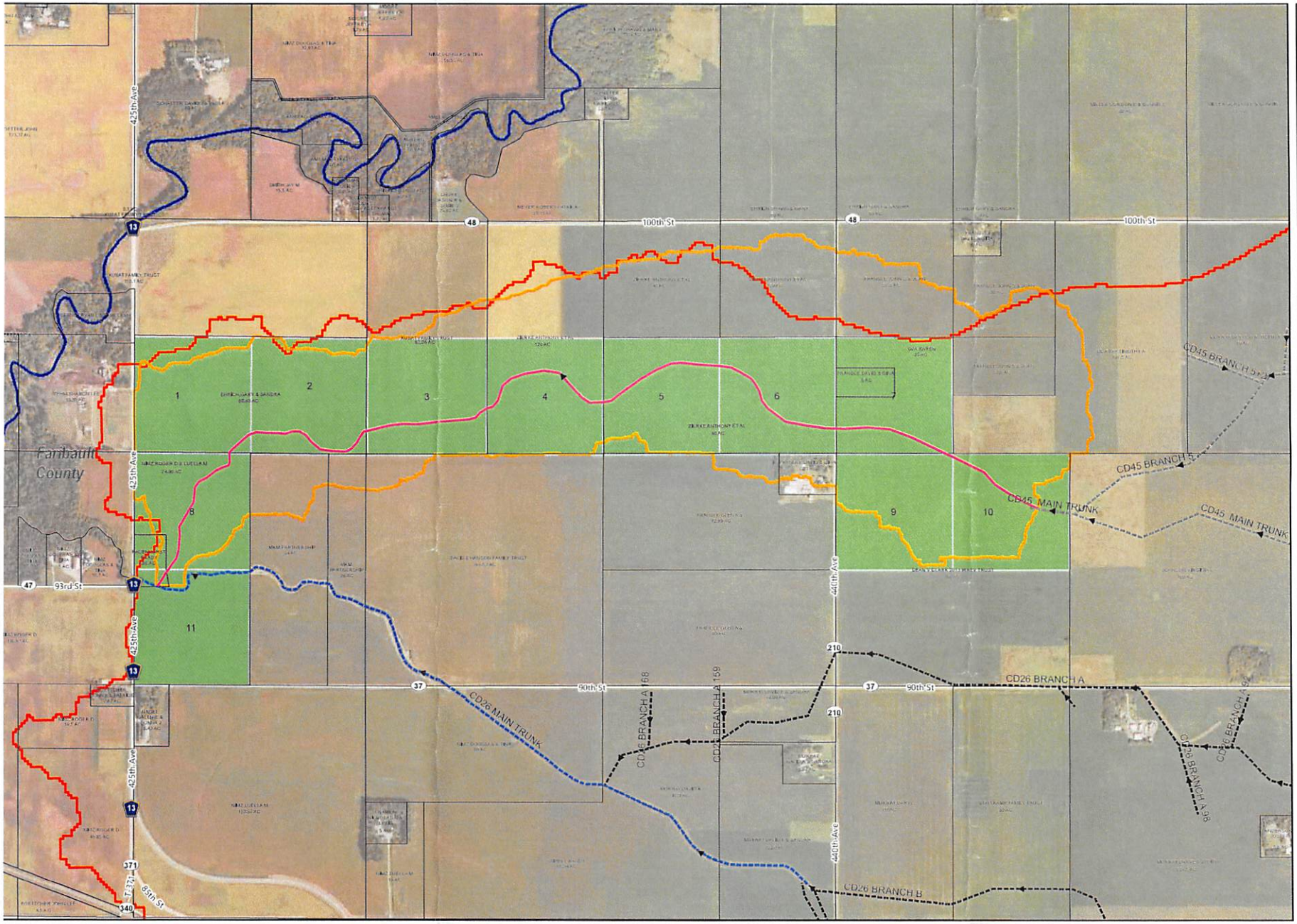
WHEREAS, Petitioners request that the Board, for practical purposes and feasibility considerations, at its earliest opportunity, consolidate this Petition—or schedule to be simultaneously considered by the Drainage Authority—with a Petition for Lateral to Faribault County Ditch No. 26, said Petition having already been filed separately with the Faribault County Auditor; and

NOW THEREFORE, Petitioners request the Faribault County Auditor present this petition to the Faribault County Board of Commissioners, acting as Drainage Authority for Faribault County C.D. 26 (after examination by legal counsel), and further request a hearing be held, pursuant to Minn. Stat. §103E.401, Subd. 3, to grant an outlet and to set any appropriate outlet fee and benefits.

| Owner Signature | Property Owned | Acres |
|---|---|---|
| Anthony Zierke<br>Brad Zierke<br>Tracy Zierke<br>Carolyn Zierke | Tract 4<br>Tract 5<br>Tract 6 | 39.33<br>37.44<br>40.02 |

Bruce E. Sellers
Attorney for Petitioners
Wendland Sellers Law Office
825 East Second Street
P.O. Box 247
Blue Earth, MN 56013
507-526-2196

This petition is prepared by:
Bruce E. Sellers, Attorney at Law
Wendland Sellers Law Office
P.O. Box 247
825 East Second Street
Blue Earth, MN 56013
507-526-2196




ISG

# Exhibit A

County Ditch No 26

Faribault County, Minnesota

Tuesday, December 3, 2019

**Legend**

- Private Tile
- CD 26 Tile
- CD 26 Open Ditch
- CD 45 Tile
- Faribault County Parcels
- Private Tile Watershed
- Private Tile 40s
- CD 26 Watershed

PN: 19-23548

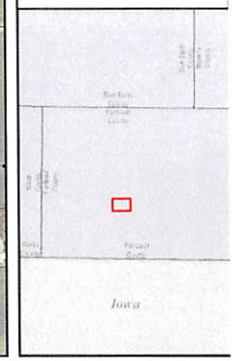
**Source:**

Orthophotographs (MnGeo WMS, 2015); Tile/Ditch (Faribault County, 12/16/2016); Parcels (Faribault County MN DNR, 2017); Major Stream (MN DNR, July 2008); Counties (MN DNR, July 2013); PLSS (MnGeo/USGS)

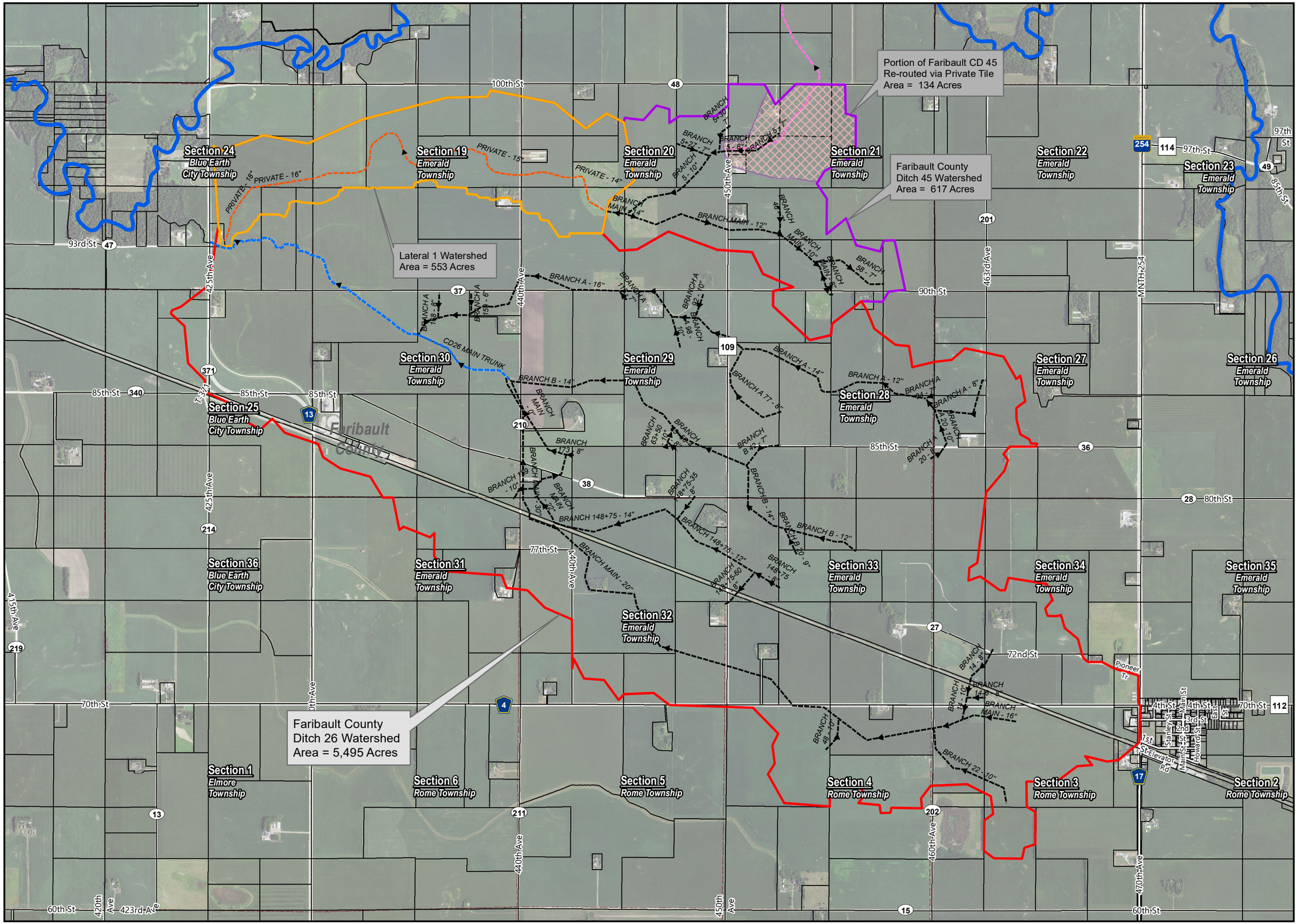
N W E S

0 250 500 1,000 Feet

1 inch = 1,000 feet



# Appendix C: Maps




ISG

# Existing Overall Watershed Map

County Ditch No 26/45

Faribault County, Minnesota

Thursday, August 18, 2022

**Legend**

- Blue Earth River
- CD 26 Watershed
- CD 45 Watershed
- Lateral 1 Subwatershed
- CD 45 Reroute Removal
- Existing Tile
- Open Ditch
- Existing Lateral 1
- Parcels

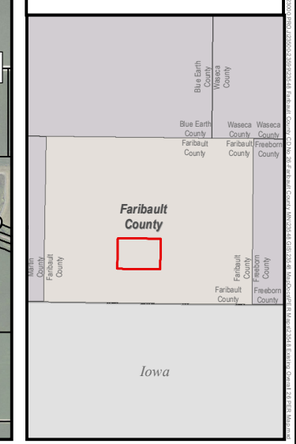
PN: 19-23548

**Source:**

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

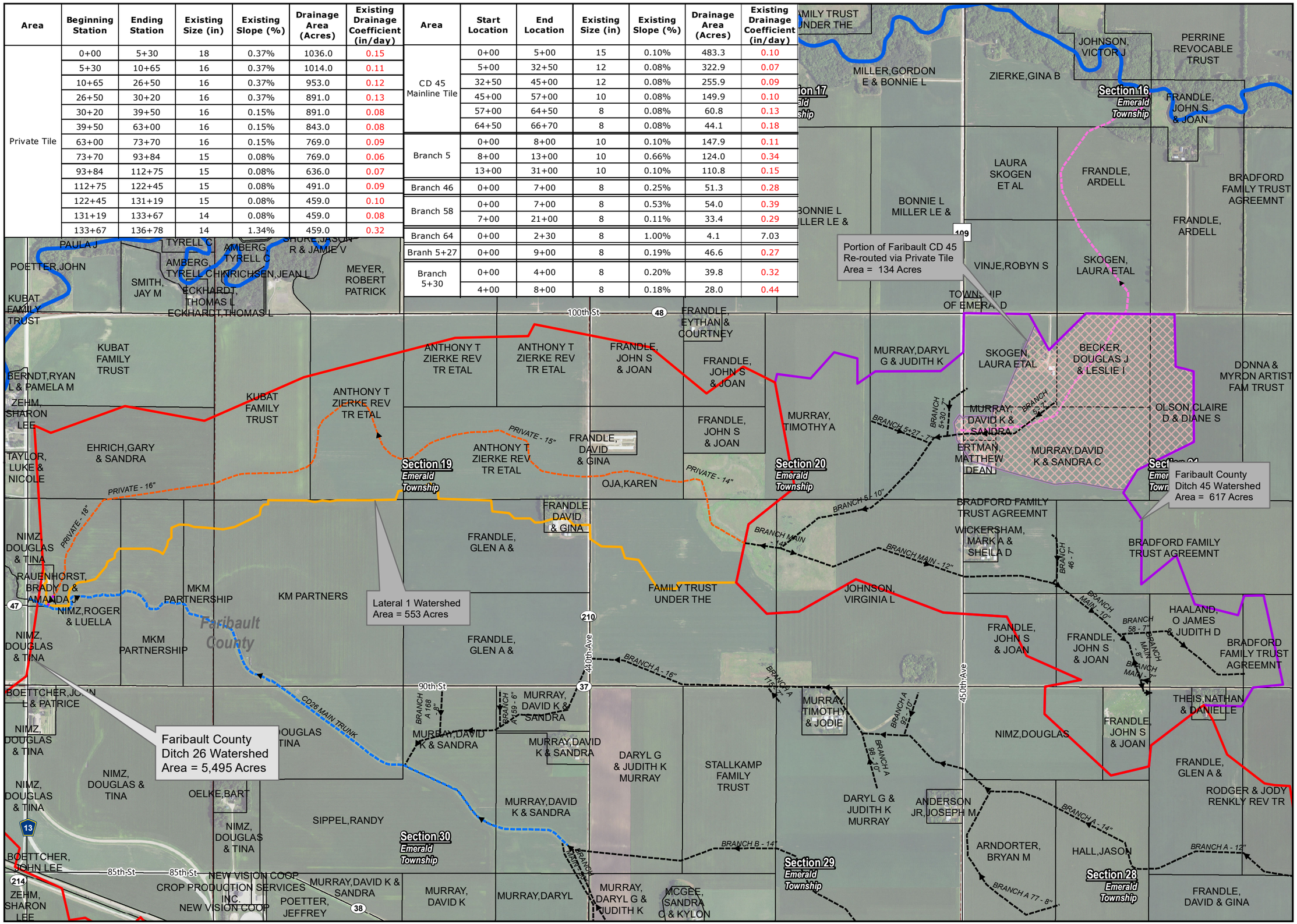
N

0 1,500 3,000 Feet



| Area | Beginning Station | Ending Station | Existing Size (in) | Existing Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|
| Private Tile | 0+00 | 5+30 | 18 | 0.37% | 1036.0 | 0.15 |
| | 5+30 | 10+65 | 16 | 0.37% | 1014.0 | 0.11 |
| | 10+65 | 26+50 | 16 | 0.37% | 953.0 | 0.12 |
| | 26+50 | 30+20 | 16 | 0.37% | 891.0 | 0.13 |
| | 30+20 | 39+50 | 16 | 0.15% | 891.0 | 0.08 |
| | 39+50 | 63+00 | 16 | 0.15% | 843.0 | 0.08 |
| | 63+00 | 73+70 | 16 | 0.15% | 769.0 | 0.09 |
| | 73+70 | 93+84 | 15 | 0.08% | 769.0 | 0.06 |
| | 93+84 | 112+75 | 15 | 0.08% | 636.0 | 0.07 |
| | 112+75 | 122+45 | 15 | 0.08% | 491.0 | 0.09 |
| | 122+45 | 131+19 | 15 | 0.08% | 459.0 | 0.10 |
| | 131+19 | 133+67 | 14 | 0.08% | 459.0 | 0.08 |
| | 133+67 | 136+78 | 14 | 1.34% | 459.0 | 0.32 |

| Area | Start Location | End Location | Existing Size (in) | Existing Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|
| CD 45 Mainline Tile | 0+00 | 5+00 | 15 | 0.10% | 483.3 | 0.10 |
| | 5+00 | 32+50 | 12 | 0.08% | 322.9 | 0.07 |
| | 32+50 | 45+00 | 12 | 0.08% | 255.9 | 0.09 |
| | 45+00 | 57+00 | 10 | 0.08% | 149.9 | 0.10 |
| | 57+00 | 64+50 | 8 | 0.08% | 60.8 | 0.13 |
| | 64+50 | 66+70 | 8 | 0.08% | 44.1 | 0.18 |
| Branch 5 | 0+00 | 8+00 | 10 | 0.10% | 147.9 | 0.11 |
| | 8+00 | 13+00 | 10 | 0.66% | 124.0 | 0.34 |
| | 13+00 | 31+00 | 10 | 0.10% | 110.8 | 0.15 |
| Branch 46 | 0+00 | 7+00 | 8 | 0.25% | 51.3 | 0.28 |
| Branch 58 | 0+00 | 7+00 | 8 | 0.53% | 54.0 | 0.39 |
| | 7+00 | 21+00 | 8 | 0.11% | 33.4 | 0.29 |
| Branch 64 | 0+00 | 2+30 | 8 | 1.00% | 4.1 | 7.03 |
| Branh 5+27 | 0+00 | 9+00 | 8 | 0.19% | 46.6 | 0.27 |
| Branch 5+30 | 0+00 | 4+00 | 8 | 0.20% | 39.8 | 0.32 |
| | 4+00 | 8+00 | 8 | 0.18% | 28.0 | 0.44 |




# Existing Watershed Map

County Ditch No 26/45

Faribault County, Minnesota

Wednesday, September 14, 2022

**Legend**

- Blue Earth River
- Existing Tile
- Open Ditch
- Outlet Swale
- Existing Lateral 1
- CD 26 Watershed
- CD 45 Watershed
- Lateral 1 Subwatershed
- CD 45 Reroute Removal
- Parcels

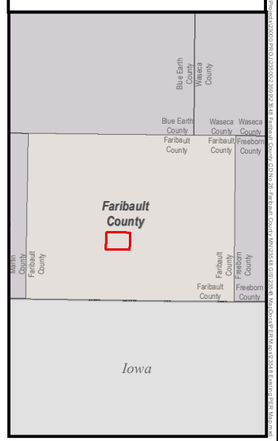
PN: 19-23548

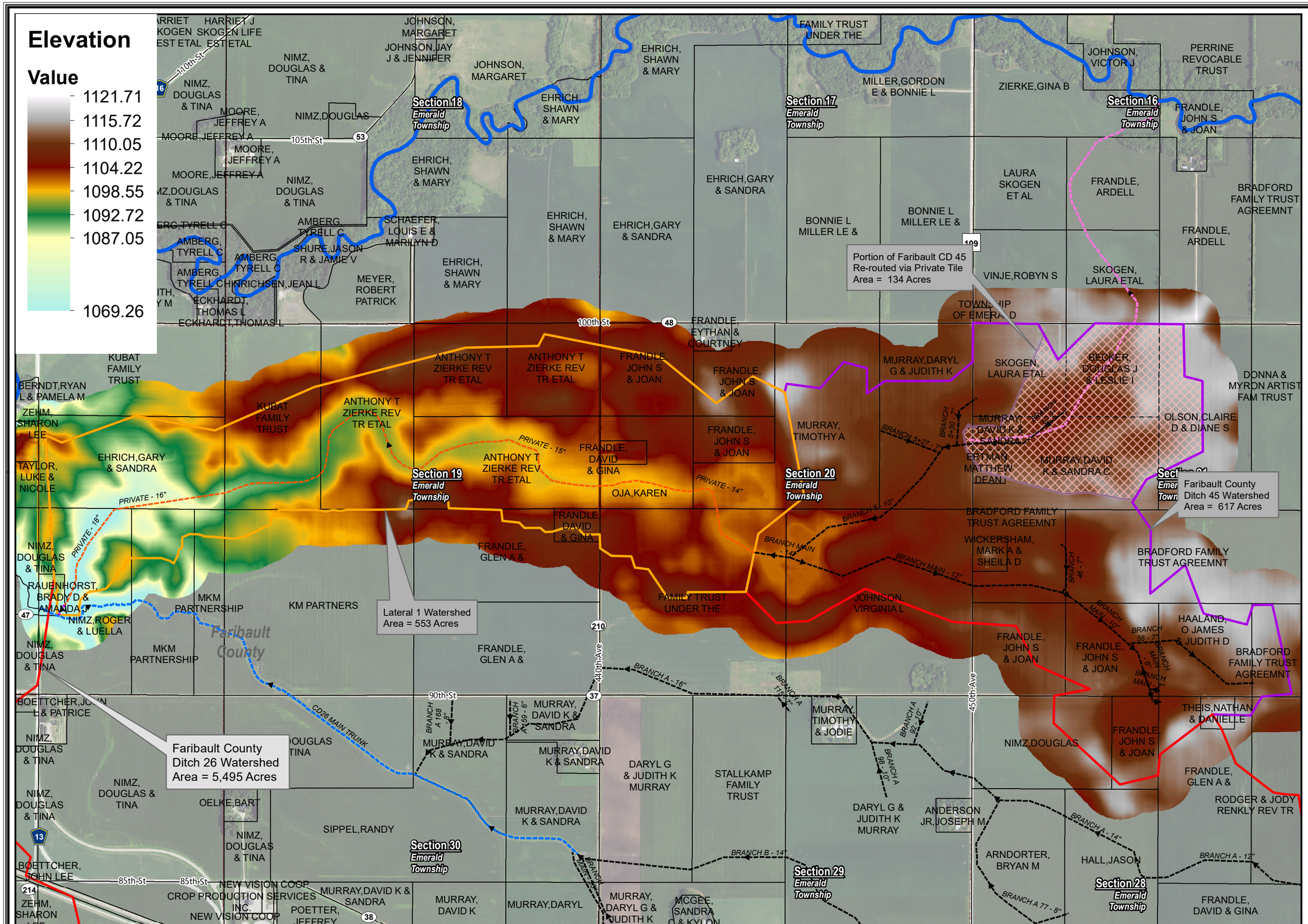
**Source:**

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N

0 750 1,500 Feet






ISG

# Existing Elevation Map

County Ditch No 26/45
Faribault County,
Minnesota
Wednesday, September 14, 2022

**Legend**

- Blue Earth River
- Existing Tile
- Open Ditch
- Existing Private Main
- Outlet Swale
- CD 26 Subwatershed
- CD 26 Watershed
- CD 45 Watershed
- CD 45 Reroute Removal
- Parcels

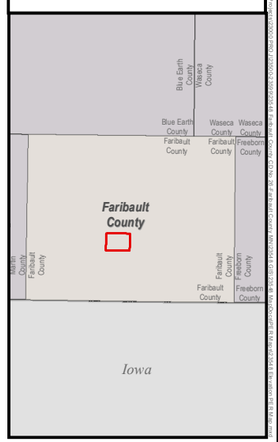
PN: 19-23548

**Source:**

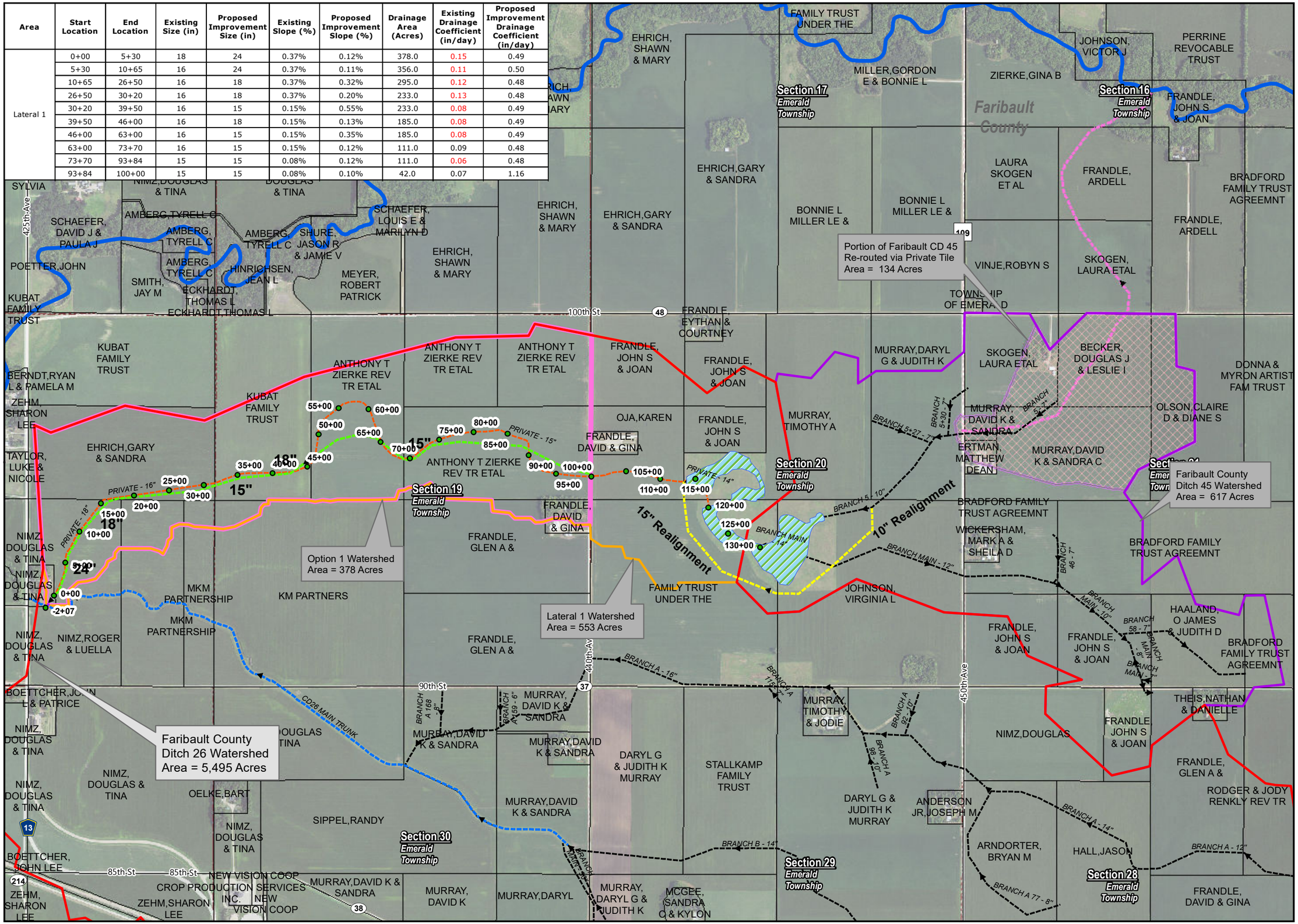
Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N

0 750 1,500 Feet



| Area | Start Location | End Location | Existing Size (in) | Proposed Improvement Size (in) | Existing Slope (%) | Proposed Improvement Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed Improvement Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|---|---|
| Lateral 1 | 0+00 | 5+30 | 18 | 24 | 0.37% | 0.12% | 378.0 | 0.15 | 0.49 |
| | 5+30 | 10+65 | 16 | 24 | 0.37% | 0.11% | 356.0 | 0.11 | 0.50 |
| | 10+65 | 26+50 | 16 | 18 | 0.37% | 0.32% | 295.0 | 0.12 | 0.48 |
| | 26+50 | 30+20 | 16 | 18 | 0.37% | 0.20% | 233.0 | 0.13 | 0.48 |
| | 30+20 | 39+50 | 16 | 15 | 0.15% | 0.55% | 233.0 | 0.08 | 0.49 |
| | 39+50 | 46+00 | 16 | 18 | 0.15% | 0.13% | 185.0 | 0.08 | 0.49 |
| | 46+00 | 63+00 | 16 | 15 | 0.15% | 0.35% | 185.0 | 0.08 | 0.49 |
| | 63+00 | 73+70 | 16 | 15 | 0.15% | 0.12% | 111.0 | 0.09 | 0.48 |
| | 73+70 | 93+84 | 15 | 15 | 0.08% | 0.12% | 111.0 | 0.06 | 0.48 |
| | 93+84 | 100+00 | 15 | 15 | 0.08% | 0.10% | 42.0 | 0.07 | 1.16 |




ISG

# Proposed Option 1 Watershed Map

County Ditch No 26/45

Faribault County, Minnesota

Monday, September 19, 2022

**Legend**

- Proposed Option 1 Tile
- Blue Earth River
- Wetland Enhancement
- Proposed Reroute
- Existing Tile
- Open Ditch
- Outlet Swale
- Existing Lateral 1
- CD 26 Watershed
- CD 45 Watershed
- Lateral 1 Subwatershed
- Option 1 Watershed
- CD 45 Reroute Removal
- Parcels

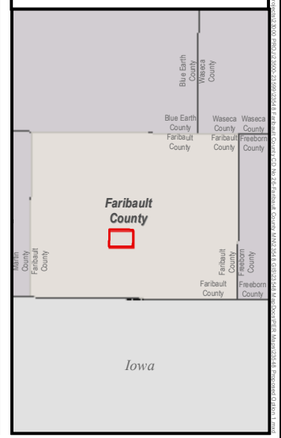
PN: 19-23548

**Source:**

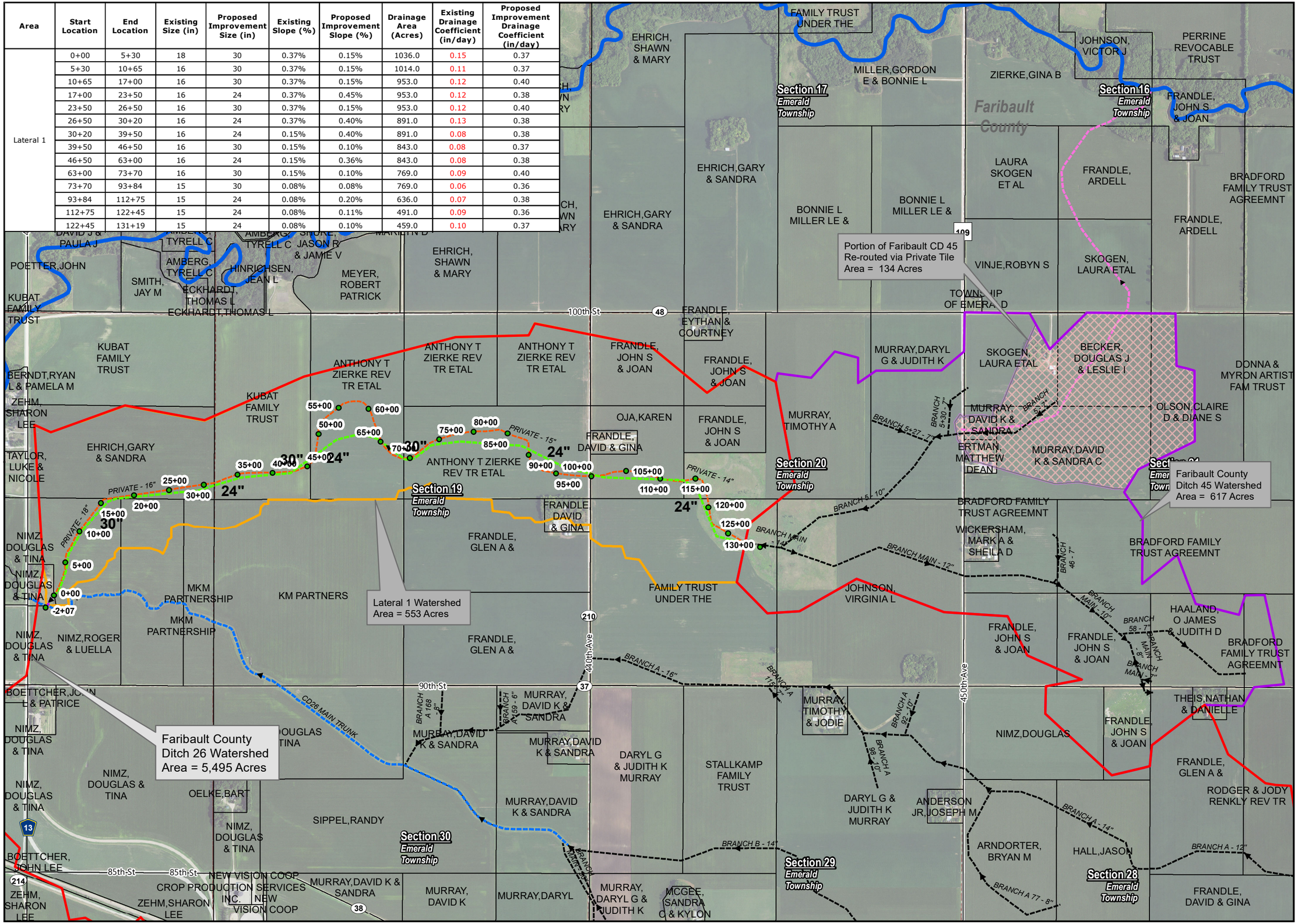
Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N

0 750 1,500 Feet



| Area | Start Location | End Location | Existing Size (in) | Proposed Improvement Size (in) | Existing Slope (%) | Proposed Improvement Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed Improvement Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|---|---|
| Lateral 1 | 0+00 | 5+30 | 18 | 30 | 0.37% | 0.15% | 1036.0 | 0.15 | 0.37 |
| | 5+30 | 10+65 | 16 | 30 | 0.37% | 0.15% | 1014.0 | 0.11 | 0.37 |
| | 10+65 | 17+00 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 17+00 | 23+50 | 16 | 24 | 0.37% | 0.45% | 953.0 | 0.12 | 0.38 |
| | 23+50 | 26+50 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 26+50 | 30+20 | 16 | 24 | 0.37% | 0.40% | 891.0 | 0.13 | 0.38 |
| | 30+20 | 39+50 | 16 | 24 | 0.15% | 0.40% | 891.0 | 0.08 | 0.38 |
| | 39+50 | 46+50 | 16 | 30 | 0.15% | 0.10% | 843.0 | 0.08 | 0.37 |
| | 46+50 | 63+00 | 16 | 24 | 0.15% | 0.36% | 843.0 | 0.08 | 0.38 |
| | 63+00 | 73+70 | 16 | 30 | 0.15% | 0.10% | 769.0 | 0.09 | 0.40 |
| | 73+70 | 93+84 | 15 | 30 | 0.08% | 0.08% | 769.0 | 0.06 | 0.36 |
| | 93+84 | 112+75 | 15 | 24 | 0.08% | 0.20% | 636.0 | 0.07 | 0.38 |
| | 112+75 | 122+45 | 15 | 24 | 0.08% | 0.11% | 491.0 | 0.09 | 0.36 |
| | 122+45 | 131+19 | 15 | 24 | 0.08% | 0.10% | 459.0 | 0.10 | 0.37 |




# Proposed Option 2 Watershed Map

County Ditch No 26/45

Faribault County, Minnesota

Wednesday, September 14, 2022

**Legend**

- Proposed Option 2 Tile
- Blue Earth River
- Existing Tile
- Open Ditch
- Outlet Swale
- Existing Lateral 1
- CD 26 Watershed
- CD 45 Watershed
- CD 45 Reroute Removal
- Lateral 1 Subwatershed
- Parcels

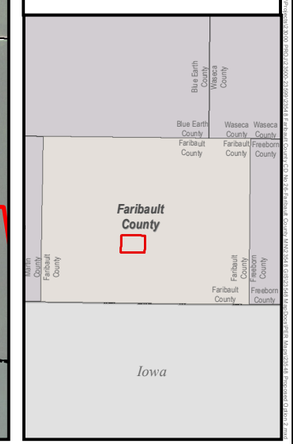
PN: 19-23548

**Source:**

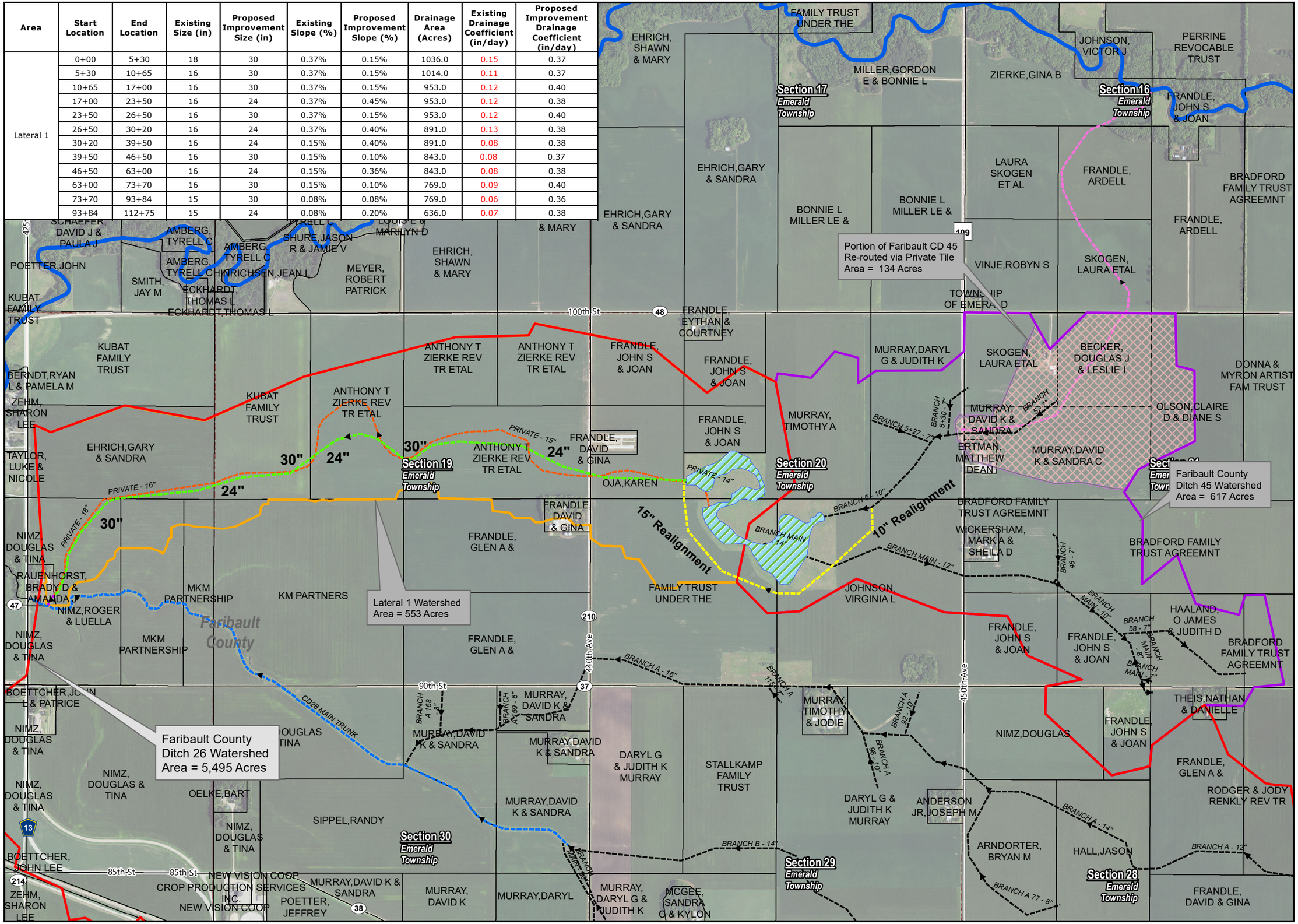
Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N

0 750 1,500 Feet



| Area | Start Location | End Location | Existing Size (in) | Proposed Improvement Size (in) | Existing Slope (%) | Proposed Improvement Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed Improvement Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|---|---|
| Lateral 1 | 0+00 | 5+30 | 18 | 30 | 0.37% | 0.15% | 1036.0 | 0.15 | 0.37 |
| | 5+30 | 10+65 | 16 | 30 | 0.37% | 0.15% | 1014.0 | 0.11 | 0.37 |
| | 10+65 | 17+00 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 17+00 | 23+50 | 16 | 24 | 0.37% | 0.45% | 953.0 | 0.12 | 0.38 |
| | 23+50 | 26+50 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 26+50 | 30+20 | 16 | 24 | 0.37% | 0.40% | 891.0 | 0.13 | 0.38 |
| | 30+20 | 39+50 | 16 | 24 | 0.15% | 0.40% | 891.0 | 0.08 | 0.38 |
| | 39+50 | 46+50 | 16 | 30 | 0.15% | 0.10% | 843.0 | 0.08 | 0.37 |
| | 46+50 | 63+00 | 16 | 24 | 0.15% | 0.36% | 843.0 | 0.08 | 0.38 |
| | 63+00 | 73+70 | 16 | 30 | 0.15% | 0.10% | 769.0 | 0.09 | 0.40 |
| | 73+70 | 93+84 | 15 | 30 | 0.08% | 0.08% | 769.0 | 0.06 | 0.36 |
| | 93+84 | 112+75 | 15 | 24 | 0.08% | 0.20% | 636.0 | 0.07 | 0.38 |




# Proposed Option 3 Watershed Map

County Ditch No 26/45

Faribault County, Minnesota

Wednesday, September 14, 2022

**Legend**

- Blue Earth River
- Wetland Enhancement
- Proposed Optoin 3 Tile
- Proposed Reroute
- Existing Tile
- Open Ditch
- Outlet Swale
- Existing Lateral 1
- CD 26 Watershed
- CD 45 Watershed
- CD 45 Reroute Removal
- Lateral 1 Subwatershed
- Parcels

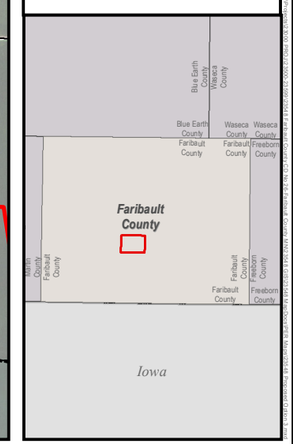
PN: 19-23548

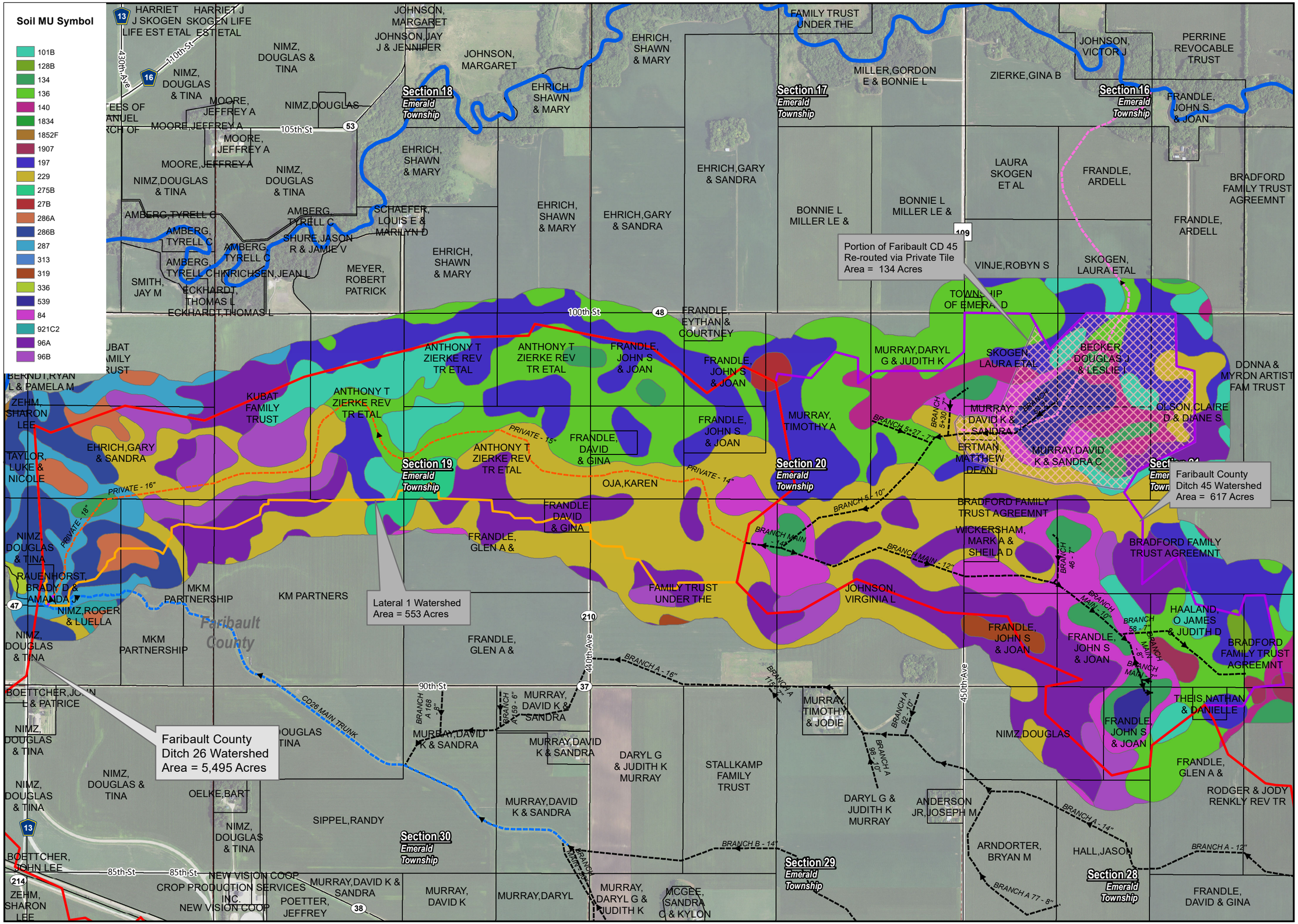
**Source:**

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N

0 750 1,500 Feet






ISG

# Soils Map

County Ditch No 26/45
Faribault County, Minnesota
Thursday, August 18, 2022

**Legend**

- Blue Earth River
- Existing Tile
- Open Ditch
- Outlet Swale
- Existing Lateral 1
- CD 26 Watershed
- CD 45 Watershed
- Lateral 1 Subwatershed
- CD 45 Reroute Removal
- Parcels

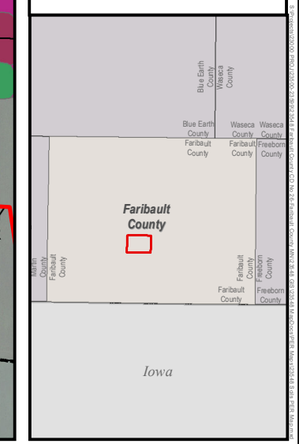
PN: 19-23548

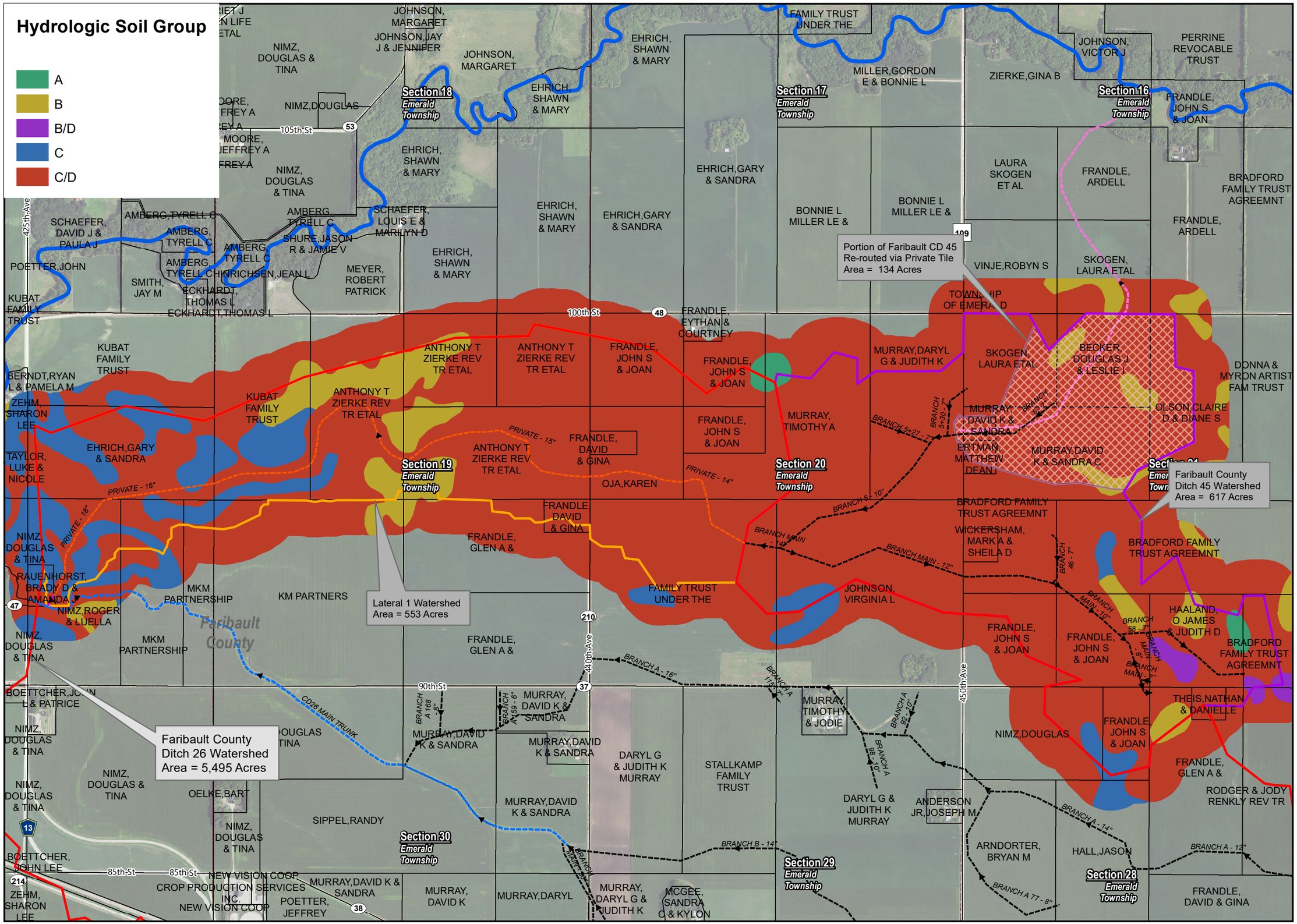
**Source:**

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N

0 750 1,500 Feet






ISG

# Hydrologic Soils Map

County Ditch No 26/45
Faribault County, Minnesota
Thursday, August 18, 2022

**Legend**

- Blue Earth River
- Existing Tile
- Open Ditch
- Existing Lateral 1
- Outlet Swale
- CD 26 Watershed
- CD 45 Watershed
- Lateral 1 Subwatershed
- CD 45 Reroute Removal
- Parcels

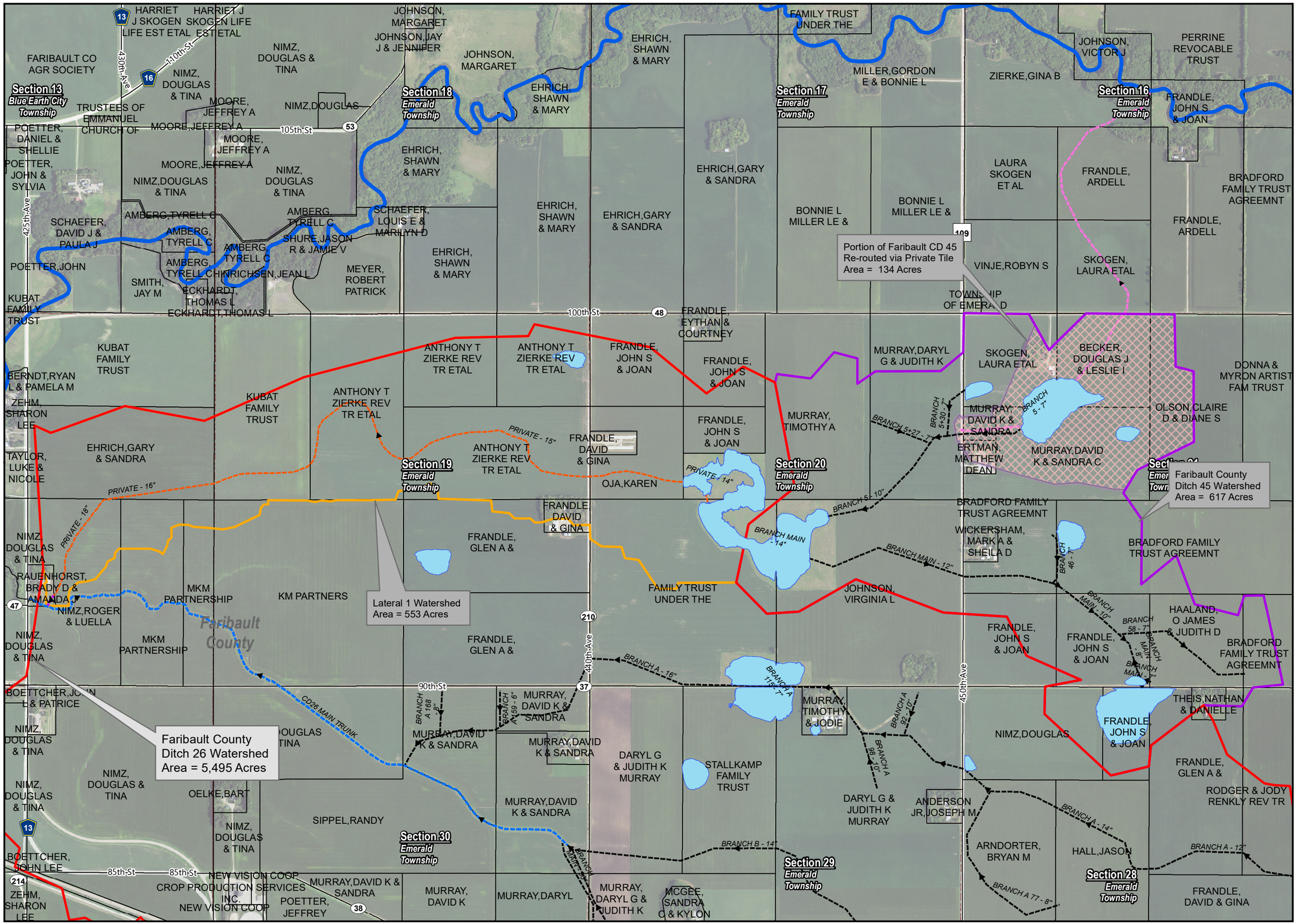
PN: 19-23548

**Source:**

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N

0 750 1,500 Feet




ISG

# Level 1 Wetland Delineation Map

County Ditch No 26/45
Faribault County, Minnesota
Thursday, August 18, 2022

**Legend**

- Blue Earth River
- Potential Wetlands
- Existing Tile
- Open Ditch
- Outlet Swale
- Existing Lateral 1
- CD 26 Watershed
- CD 45 Watershed
- Lateral 1 Subwatershed
- CD 45 Reroute Removal
- Parcels

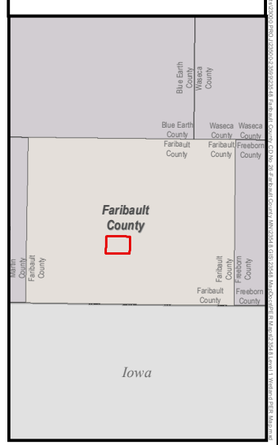
PN: 19-23548

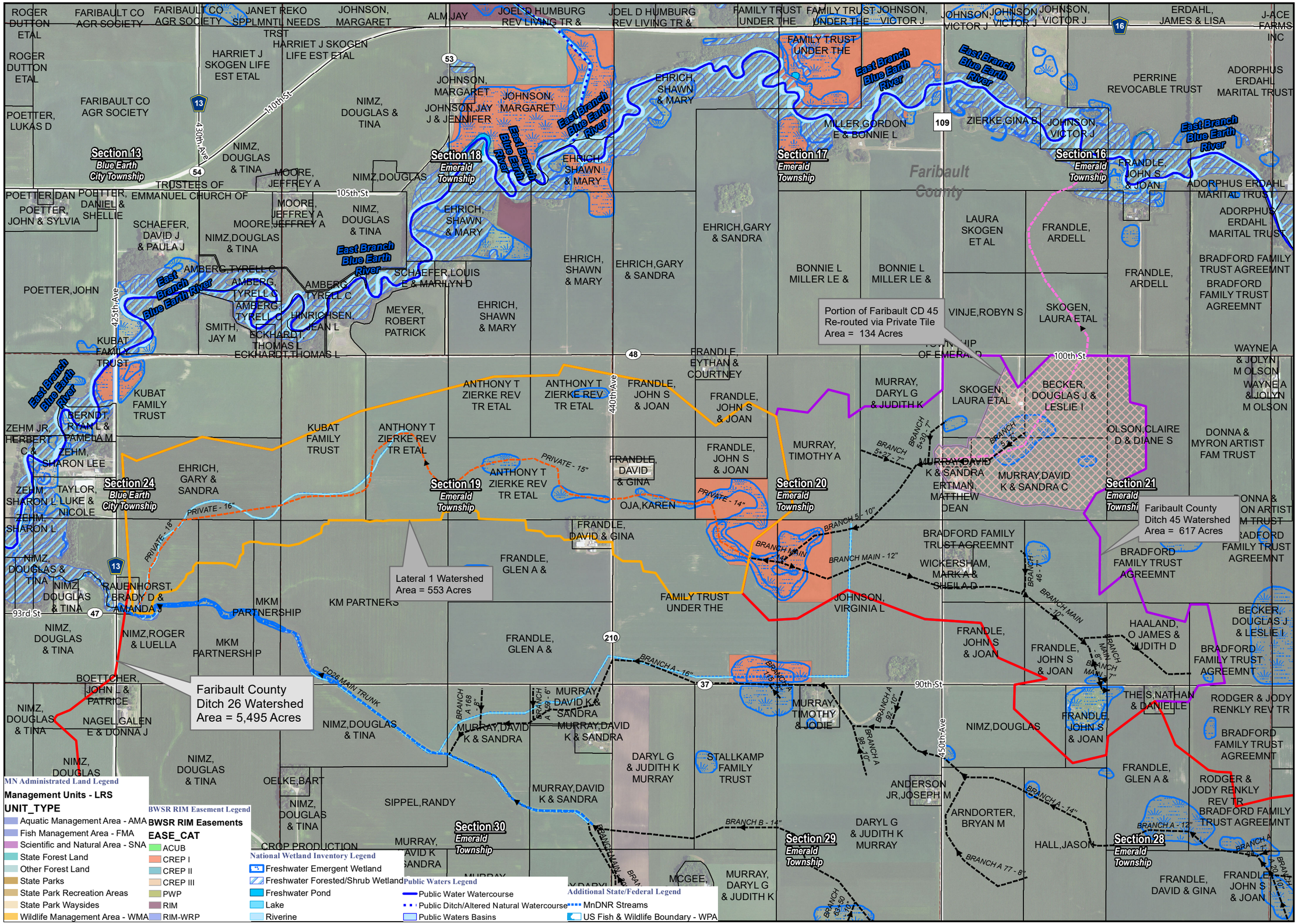
**Source:**

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N

0 750 1,500 Feet






MN Administrated Land Legend

**Management Units - LRS**

**UNIT_TYPE**

- Aquatic Management Area - AMA
- Fish Management Area - FMA
- Scientific and Natural Area - SNA
- State Forest Land
- Other Forest Land
- State Parks
- State Park Recreation Areas
- State Park Waysides
- Wildlife Management Area - WMA

BWSR RIM Easement Legend

**BWSR RIM Easements**

**EASE_CAT**

- ACUB
- CREP I
- CREP II
- CREP III
- PWP
- RIM
- RIM-WRP

National Wetland Inventory Legend

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

Public Waters Legend

- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse
- Public Waters Basins

Additional State/Federal Legend

- MnDNR Streams
- US Fish & Wildlife Boundary - WPA

ISG

# Public Waters, Public Lands, and Conservation Lands Map

County Ditch No 26/45

Faribault County, Minnesota

Thursday, August 25, 2022

**Legend**

- Existing Tile
- Open Ditch
- Existing Private Main
- Parcels
- CD 26 Watershed
- CD 45 Watershed
- CD 26 Subwatershed

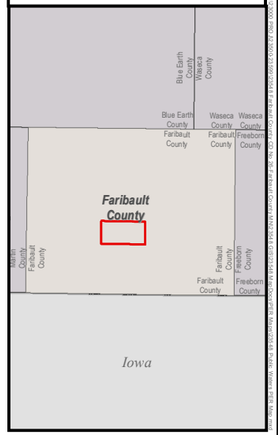
PN: 19-23548

**Source:**

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N

0 750 1,500 Feet



# Appendix D: Multipurpose Drainage Management

# Multi-Purpose Drainage Management Plan

Multi-purpose drainage management incorporates Best Management Practices (BMPs) which utilize effective measures aimed at reducing sediment, nutrient loading, and improving water quality. These BMPs are divided into the following three areas.

## Preventative Measures

Preventative measures that can be applied throughout the watershed include crop rotation, cover crops, residue management, and nutrient management. These measures are aimed at controlling sediment, minimizing erosion and nutrient loss, and sustaining the soils health, all without dramatically changing the current land use of the landscape.

## Control Measures

Control measures are practices aimed at improving water quality directly associated with the flow of water by reducing peak flow and providing in-stream storage, sedimentation, and nutrient uptake. Examples of control measures include alternative tile intakes, grassed waterways, two stage ditches, water control structures, and controlled subsurface drainage. These practices are directly linked to the conveyance of subsurface tile water or open channel ditch flow.

## Treatment Measures

The function of treatment measures is to improve water quality by directly removing sediment and nutrients from the subsurface or surface water flow throughout a watershed. Examples of treatment measures include surge basins (storage ponds), filter/buffer strips, wetland restorations, woodchip bioreactors, and water and sediment control basins (WASCOBs). These practices may be incorporated to either the public or private drainage systems.

## Conservative Drainage Practices

Conservative drainage practices, such as construction of controlled drainage systems, provide an option for improving the water quality within a drainage system. Through utilization of control structures, these systems are designed to allow agricultural producers to regulate water levels in their fields. The water level in the ground can be lowered during planting and harvest seasons and allowed to rise during the growing season. Water and nutrients stored in the soil during the growing season can then be used by the crops during drier periods, potentially increasing yields.

## Funding

There are several outside sources of funding to potentially help pay for water quality improvements implemented in an improvement project such as this. A main source of funding for this type of project is through the Minnesota Board of Water and Soil Resources (BWSR) Clean Water Fund (CWF). The primary purpose of activities funded with grants associated with the CWF is to restore, protect and enhance water quality. One CWF grant program is the Multipurpose Drainage Management Grant. This grant is geared towards implementing practices that will reduce the transport of sediment and nutrient loads. Some practices that have been funded in the past include grade stabilization, grassed waterways, water and sediment control basins, alternative side inlets, saturated buffers, storage wetlands, denitrifying bioreactors, etc.

Another potential source is the Legislative-Citizen Commission on Minnesota Resources (LCCMR) Environment and Natural Resources Trust Fund (ENRTF) which was established to provide funding for activities that protect, conserve, preserve, and enhance Minnesota's "air, water, land, fish, wildlife, and other natural resources." The LCCMR prioritizes innovative ideas that provide multiple benefits.

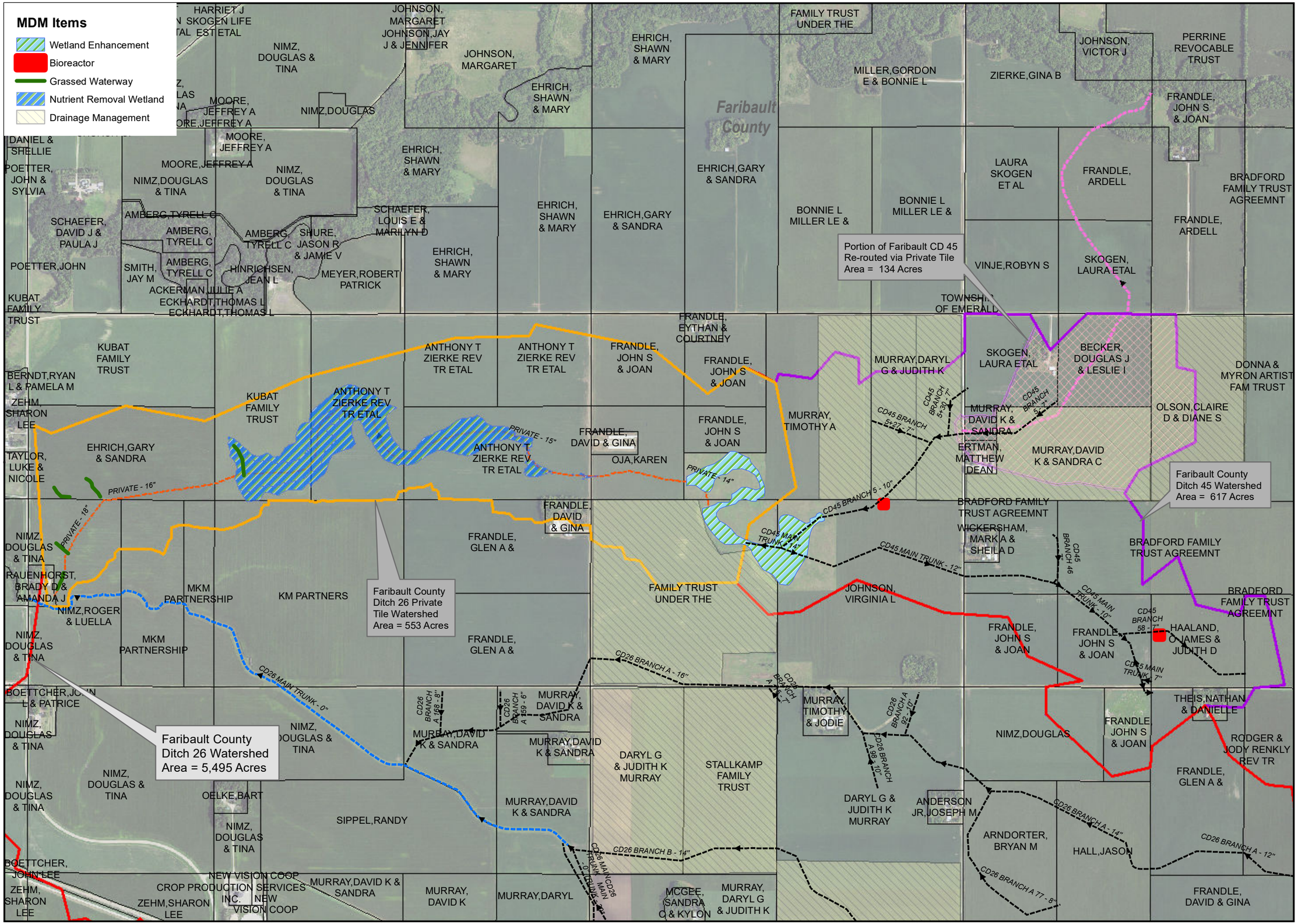
Potential locations for additional BMPs are shown on the Multi-Purpose Drainage Management map below. If landowners are interested in pursuing practices that go beyond this project scope, a few programs may be a source for funding. The Agriculture Best Management Practices (BMP) Loan Program provides loans to rural landowners to encourage BMPs that help counteract pollution problems.

Another option for individual landowners that are interested in pursuing additional practices is the Environmental Quality Incentives Program (EQIP) is a voluntary program through the NRCS that provides financial assistance to individual landowners for various conservative practices as identified above.

In addition, the BWSR Community Partners Grant may be an option. This grant leverages the interest of non-governmental partners such as lake and river associations, boy/girl scout troops and other civic groups to install on-the ground projects that reduce runoff and keep water on the land. It also allows for multiple local government units to work together on a project that involves the Community Partners Grant. Projects installed with the Community Partners Grant are intended to be structural or vegetative practices designed to reduce runoff and/or keep water on the land.

Additionally, County Soil and Water Conservation District (SWCD) representatives can assist landowners with implementation and available funding.

Currently, this project includes water quality inlets in all public road ditches, as well as a wetland enhancement The location for additional potential BMPs are shown on the *Multi-Purpose Drainage Management Map* below and will be proposed to landowners. Following the Multi-Purpose Drainage Management Map, the preliminary plans for wetland enhancement and subsequent tile reroute are attached below, which are currently proposed within the project. Furthermore; additional water quality measures can be implemented with this project if requested.




ISG

# MDM Map

County Ditch No 26/45
Faribault County, Minnesota
Friday, September 16, 2022

**Legend**

- Wetland Enhancement
- CD 26 Watershed
- CD 45 Watershed
- CD 26 Subwatershed
- CD 45 Reroute Removal
- Existing Tile
- Open Ditch
- Existing Private Main
- CD45_Private_Reroute
- Parcels

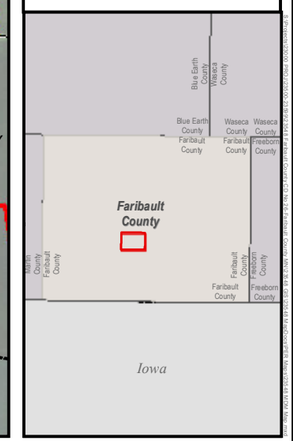
PN: 19-23548

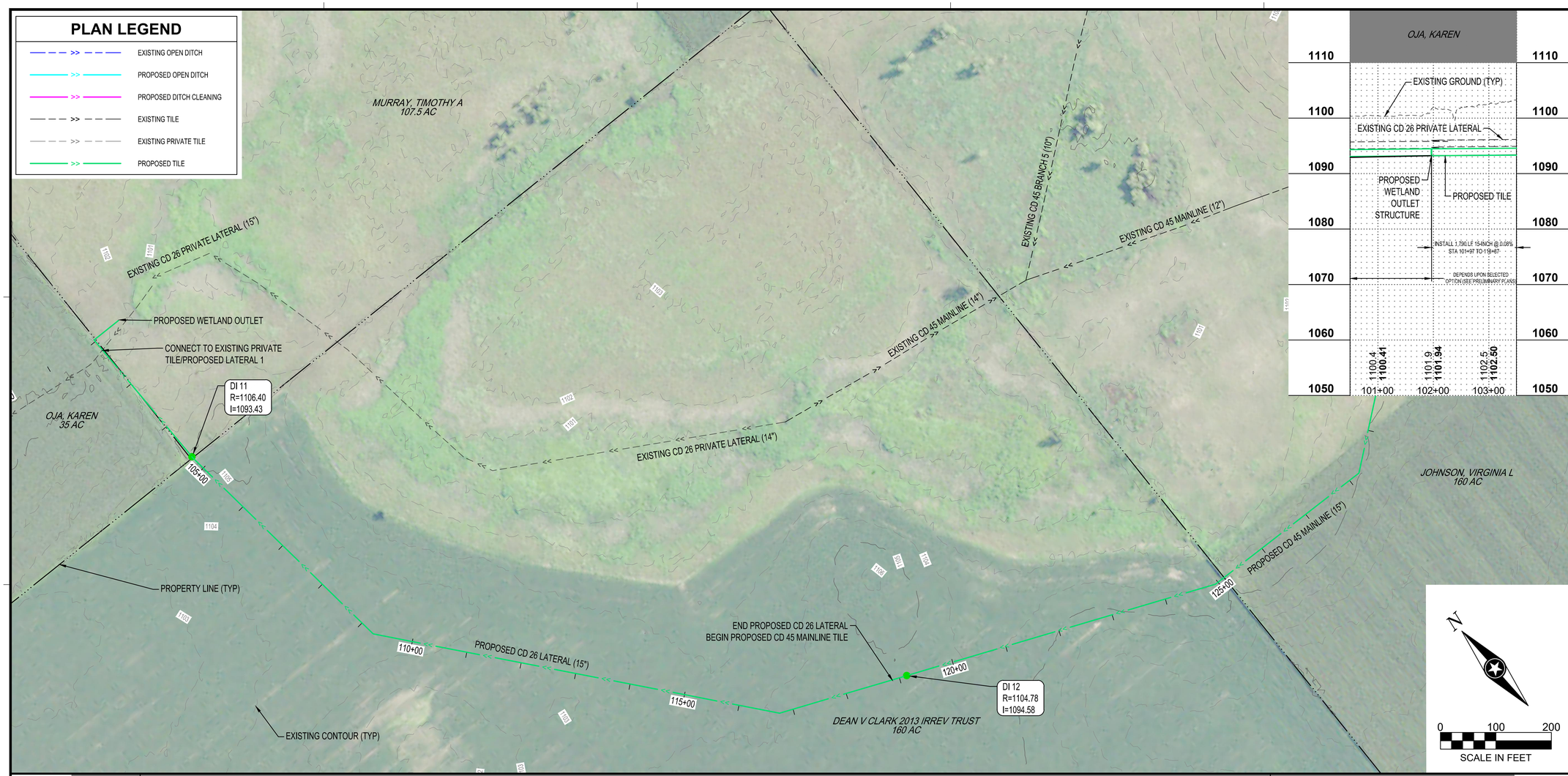
**Source:**

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (Faribault County, 12/16/2016)
Parcels (Faribault County, 2022)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N

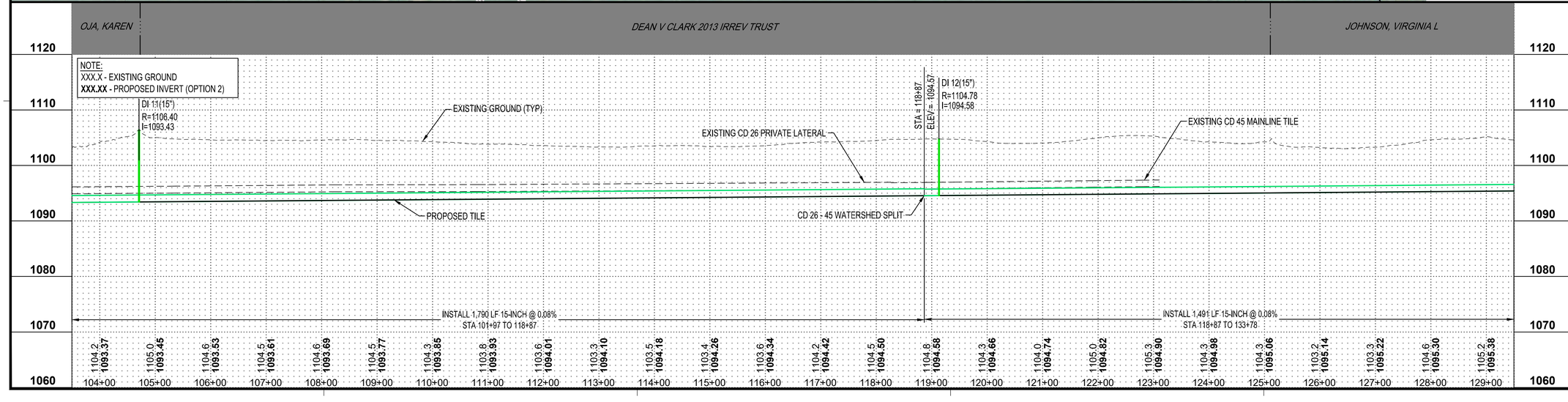
0 750 1,500 Feet









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PROJECT

# FARIBAULT COUNTY DITCH No. 26/45 IMPROVEMENT

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

| DATE | DESCRIPTION | BY |
|---|---|---|
| | | |

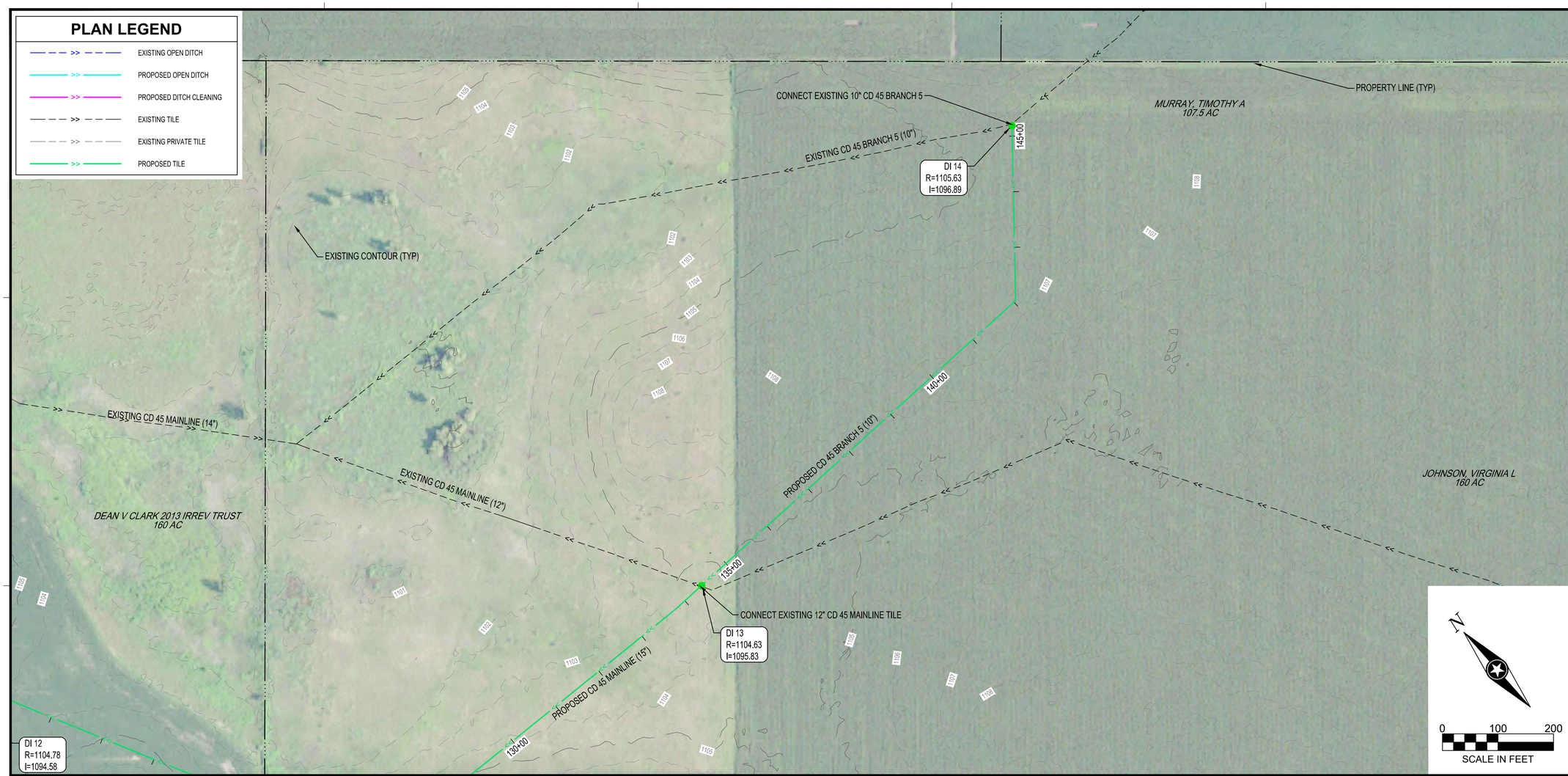
| | |
|---|---|
| PROJECT NO. | 21-23548 |
| FILE NAME | 23548 CD26 PLAN-PROF WETLANDREROUTE |
| DRAWN BY | # |
| DESIGNED BY | # |
| REVIEWED BY | # |
| ORIGINAL ISSUE DATE | --/--/-- |
| CLIENT PROJECT NO. | - |

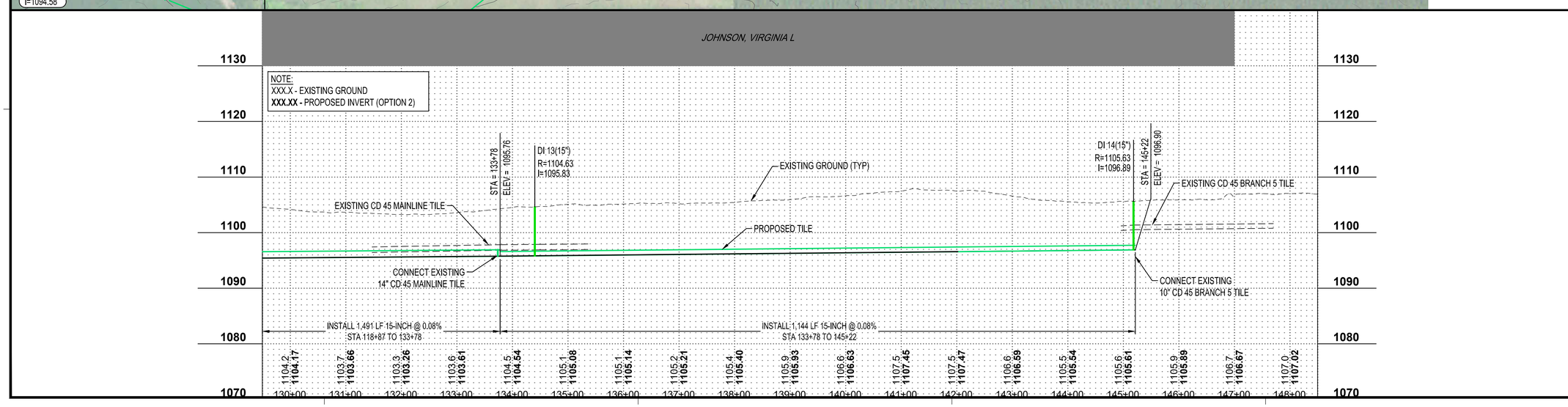
TITLE

# WETLAND REROUTE PLAN PROFILE

SHEET

13 OF 15

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PROJECT

**FARIBAULT COUNTY DITCH No. 26/45 IMPROVEMENT**

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

| DATE | DESCRIPTION | BY |
|---|---|---|
| | | |

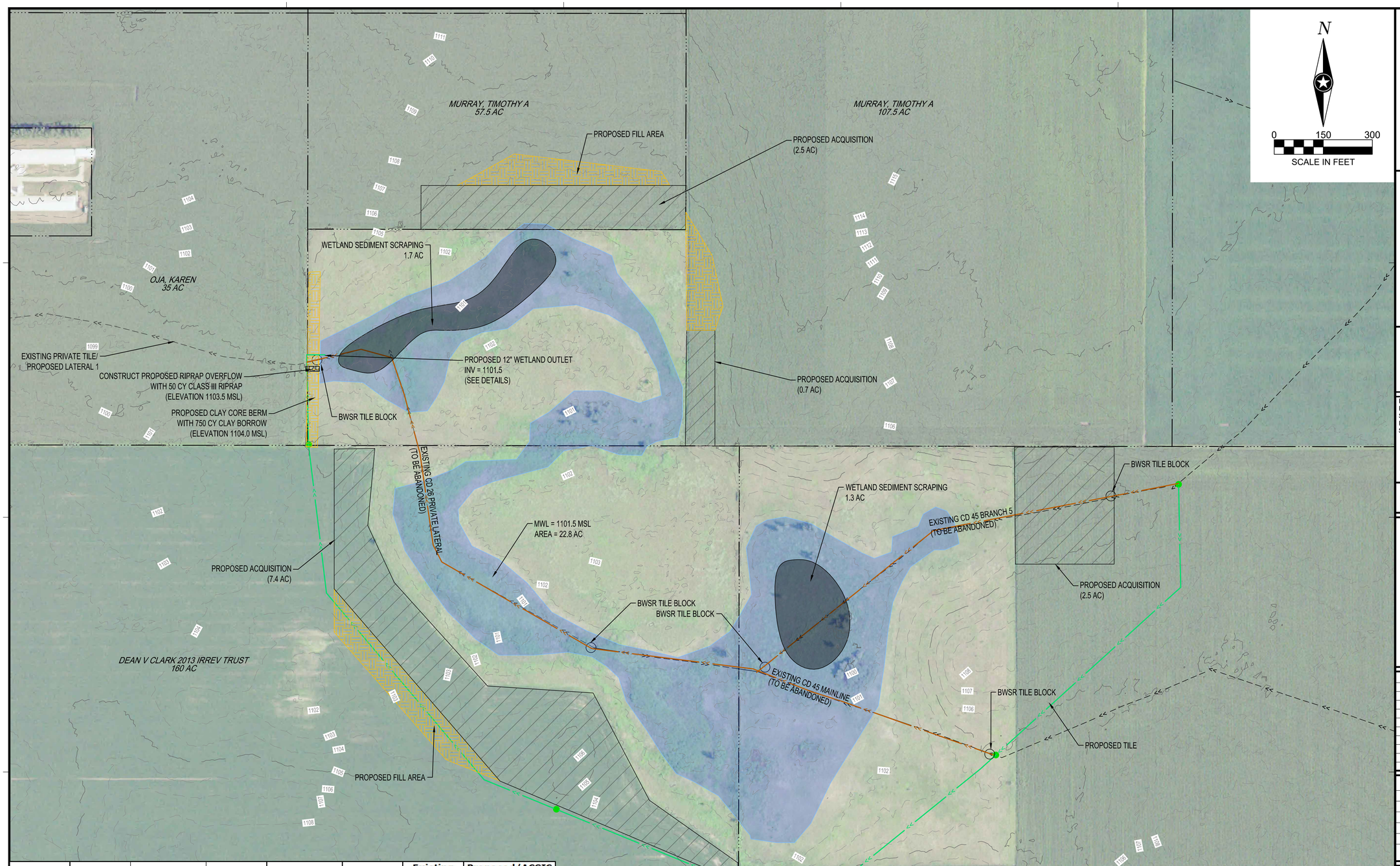
| | |
|---|---|
| PROJECT NO. | 21-23548 |
| FILE NAME | 23548 CD26 PLAN-PROF WETLANDREROUTE |
| DRAWN BY | # |
| DESIGNED BY | # |
| REVIEWED BY | # |
| ORIGINAL ISSUE DATE | --/--/-- |
| CLIENT PROJECT NO. | - |

TITLE

**WETLAND REROUTE PLAN PROFILE**

SHEET

**14** OF 15




| Area | Existing Size (in) | Proposed/ACSIC Size (in) | Existing Slope (%) | Proposed/ACSIC Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed/ACSIC Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|
| CD 26 Lateral Reroute Potion | 14 | 15 | 0.08% | 0.08% | 491.00 | 0.09 | 0.09 |
| CD 45 Mainline Reroute Portion | 14 | 15 | 0.10% | 0.08% | 483.30 | 0.08 | 0.09 |
| Branch 5 Reroute Portion | 10 | 10 | 0.10% | 0.10% | 147.90 | 0.11 | 0.11 |

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PROJECT

**FARIBAULT COUNTY DITCH No. 26/45 IMPROVEMENT**

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

| DATE | DESCRIPTION | BY |
|---|---|---|
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| PROJECT NO. | 21-23548 |
| FILE NAME | 23548 WETLAND PLAN |
| DRAWN BY | - |
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| REVIEWED BY | - |
| ORIGINAL ISSUE DATE | --/--/-- |
| CLIENT PROJECT NO. | - |

TITLE

**WETLAND OVERALL PLAN**

SHEET

**15** OF 15

# Appendix E: Drainage Calculations

**Faribault County**
**County Ditch No. 26**

ISG

## EXISTING TILE SUMMARY

| Area | Existing Size (in) | Existing Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) |
|---|---|---|---|---|
| Private Tile | 18 | 0.37% | 1036 | 0.15 |
| | 16 | 0.37% | 1014 | 0.11 |
| | 16 | 0.37% | 953 | 0.12 |
| | 16 | 0.37% | 891 | 0.13 |
| | 16 | 0.15% | 891 | 0.08 |
| | 16 | 0.15% | 843 | 0.08 |
| | 16 | 0.15% | 769 | 0.09 |
| | 15 | 0.08% | 769 | 0.06 |
| | 15 | 0.08% | 636 | 0.07 |
| | 15 | 0.08% | 491 | 0.09 |
| | 15 | 0.08% | 459 | 0.10 |
| | 14 | 0.08% | 459 | 0.08 |
| | 14 | 1.34% | 459 | 0.32 |

**Faribault County**
**County Ditch No. 45**

ISG

## EXISTING TILE SUMMARY

| Area | Existing Size (in) | Existing Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) |
|---|---|---|---|---|
| Mainline Tile | 14 | 0.10% | 483.3 | 0.08 |
| | 12 | 0.08% | 322.9 | 0.07 |
| | 12 | 0.08% | 255.9 | 0.09 |
| | 10 | 0.08% | 149.9 | 0.10 |
| | 8 | 0.08% | 60.8 | 0.13 |
| | 7 | 0.08% | 44.1 | 0.13 |
| Branch 5 | 10 | 0.10% | 147.9 | 0.11 |
| | 10 | 0.66% | 124.0 | 0.34 |
| | 10 | 0.10% | 110.8 | 0.15 |
| Branch 46 | 7 | 0.25% | 51.3 | 0.20 |
| Branch 58 | 7 | 0.53% | 54.0 | 0.27 |
| | 7 | 0.11% | 33.4 | 0.20 |

**Faribault County**
**County Ditch No. 45**

ISG

## ACSIC TILE SUMMARY

| Area | ACSIC Size (in) | ACSIC Slope (%) | Drainage Area (Acres) | ACSIC Drainage Coefficient (in/day) |
|---|---|---|---|---|
| Mainline Tile | 15 | 0.10% | 483.3 | 0.10 |
| | 12 | 0.08% | 322.9 | 0.07 |
| | 12 | 0.08% | 255.9 | 0.09 |
| | 10 | 0.08% | 149.9 | 0.10 |
| | 8 | 0.08% | 60.8 | 0.13 |
| | 8 | 0.08% | 44.1 | 0.18 |
| Branch 5 | 10 | 0.10% | 147.9 | 0.11 |
| | 10 | 0.66% | 124.0 | 0.34 |
| | 10 | 0.10% | 110.8 | 0.15 |
| Branch 46 | 8 | 0.25% | 51.3 | 0.28 |
| Branch 58 | 8 | 0.53% | 54.0 | 0.39 |
| | 8 | 0.11% | 33.4 | 0.29 |
| Branch 64 | 8 | 1.00% | 4.1 | 7.03 |
| Branh 5+27 | 8 | 0.19% | 46.6 | 0.27 |
| Branch 5+30 | 8 | 0.20% | 39.8 | 0.32 |
| | 8 | 0.18% | 28.0 | 0.44 |

**Faribault County**
**County Ditch No. 26**

ISG

## PROPOSED OPTION 1 TILE SUMMARY

| Area | Start Location | End Location | Existing Size (in) | Proposed Size (in) | Existing Slope (%) | Proposed Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|---|---|
| Lateral 1 | 0+00 | 5+30 | 18 | 24 | 0.37% | 0.12% | 378.0 | 0.15 | 0.49 |
| | 5+30 | 10+65 | 16 | 24 | 0.37% | 0.11% | 356.0 | 0.11 | 0.50 |
| | 10+65 | 26+50 | 16 | 18 | 0.37% | 0.32% | 295.0 | 0.12 | 0.48 |
| | 26+50 | 30+20 | 16 | 18 | 0.37% | 0.20% | 233.0 | 0.13 | 0.48 |
| | 30+20 | 39+50 | 16 | 15 | 0.15% | 0.55% | 233.0 | 0.08 | 0.49 |
| | 39+50 | 46+00 | 16 | 18 | 0.15% | 0.13% | 185.0 | 0.08 | 0.49 |
| | 46+00 | 63+00 | 16 | 15 | 0.15% | 0.35% | 185.0 | 0.08 | 0.49 |
| | 63+00 | 73+70 | 16 | 15 | 0.15% | 0.12% | 111.0 | 0.09 | 0.48 |
| | 73+70 | 93+84 | 15 | 15 | 0.08% | 0.12% | 111.0 | 0.06 | 0.48 |
| | 93+84 | 100+00 | 15 | 15 | 0.08% | 0.10% | 42.0 | 0.07 | 1.16 |

**Faribault County**
**County Ditch No. 26**

## PROPOSED OPTION 2 TILE SUMMARY

| Area | Start Location | End Location | Existing Size (in) | Proposed Size (in) | Existing Slope (%) | Proposed Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|---|---|
| Lateral 1 | 0+00 | 5+30 | 18 | 30 | 0.37% | 0.15% | 1036.0 | 0.15 | 0.37 |
| | 5+30 | 10+65 | 16 | 30 | 0.37% | 0.15% | 1014.0 | 0.11 | 0.37 |
| | 10+65 | 17+00 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 17+00 | 23+50 | 16 | 24 | 0.37% | 0.45% | 953.0 | 0.12 | 0.38 |
| | 23+50 | 26+50 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 26+50 | 30+20 | 16 | 24 | 0.37% | 0.40% | 891.0 | 0.13 | 0.38 |
| | 30+20 | 39+50 | 16 | 24 | 0.15% | 0.40% | 891.0 | 0.08 | 0.38 |
| | 39+50 | 46+50 | 16 | 30 | 0.15% | 0.10% | 843.0 | 0.08 | 0.37 |
| | 46+50 | 63+00 | 16 | 24 | 0.15% | 0.36% | 843.0 | 0.08 | 0.38 |
| | 63+00 | 73+70 | 16 | 30 | 0.15% | 0.10% | 769.0 | 0.09 | 0.40 |
| | 73+70 | 93+84 | 15 | 30 | 0.08% | 0.08% | 769.0 | 0.06 | 0.36 |
| | 93+84 | 112+75 | 15 | 24 | 0.08% | 0.20% | 636.0 | 0.07 | 0.38 |
| | 112+75 | 122+45 | 15 | 24 | 0.08% | 0.11% | 491.0 | 0.09 | 0.36 |
| | 122+45 | 131+19 | 15 | 24 | 0.08% | 0.10% | 459.0 | 0.10 | 0.37 |

**Faribault County**
**County Ditch No. 26**

## PROPOSED OPTION 3 TILE SUMMARY

| Area | Start Location | End Location | Existing Size (in) | Proposed Size (in) | Existing Slope (%) | Proposed Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|---|---|
| Lateral 1 | 0+00 | 5+30 | 18 | 30 | 0.37% | 0.15% | 1036.0 | 0.15 | 0.37 |
| | 5+30 | 10+65 | 16 | 30 | 0.37% | 0.15% | 1014.0 | 0.11 | 0.37 |
| | 10+65 | 17+00 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 17+00 | 23+50 | 16 | 24 | 0.37% | 0.45% | 953.0 | 0.12 | 0.38 |
| | 23+50 | 26+50 | 16 | 30 | 0.37% | 0.15% | 953.0 | 0.12 | 0.40 |
| | 26+50 | 30+20 | 16 | 24 | 0.37% | 0.40% | 891.0 | 0.13 | 0.38 |
| | 30+20 | 39+50 | 16 | 24 | 0.15% | 0.40% | 891.0 | 0.08 | 0.38 |
| | 39+50 | 46+50 | 16 | 30 | 0.15% | 0.10% | 843.0 | 0.08 | 0.37 |
| | 46+50 | 63+00 | 16 | 24 | 0.15% | 0.36% | 843.0 | 0.08 | 0.38 |
| | 63+00 | 73+70 | 16 | 30 | 0.15% | 0.10% | 769.0 | 0.09 | 0.40 |
| | 73+70 | 93+84 | 15 | 30 | 0.08% | 0.08% | 769.0 | 0.06 | 0.36 |
| | 93+84 | 112+75 | 15 | 24 | 0.08% | 0.20% | 636.0 | 0.07 | 0.38 |

**Faribault County**
**County Ditch No. 26**

## PROPOSED WETLAND REROUTE TILE SUMMARY

| Area | Existing Size (in) | Proposed/ ACSIC Size (in) | Existing Slope (%) | Proposed/ACSIC Slope (%) | Drainage Area (Acres) | Existing Drainage Coefficient (in/day) | Proposed/ACSIC Drainage Coefficient (in/day) |
|---|---|---|---|---|---|---|---|
| CD 26 Lateral Reroute Potion | 14 | 15 | 0.08% | 0.08% | 491.0 | 0.09 | 0.09 |
| CD 45 Mainline Reroute Portion | 14 | 15 | 0.10% | 0.08% | 483.3 | 0.08 | 0.09 |
| Branch 5 Reroute Portion | 10 | 10 | 0.10% | 0.10% | 147.9 | 0.11 | 0.11 |

# Appendix F: Hydraulic/Hydrologic Modeling

# Faribault CD 26/CD 45 PER Hydrology Report

## PROJECT OVERVIEW

Faribault County Ditch No. 26 (CD 26) & County Ditch No. 45 (CD 45) public drainage system improvement was modeled in InfoWorks ICM. The Preliminary Engineer's Report presents three Improvement options. Option 1 involves increasing the drainage capacity to 0.50 in/day for the existing private lateral while not considering the drainage area of anywhere upstream, or west of, 440th Avenue including CD 45, it also includes the implementation of a 22.8-acre wetland and subsequent tile reroutes which exhibit no increase in capacity from the ACSIC condition. Option 2 is to increase the drainage capacity to 3/8 in/day for the existing private lateral when considering the entire upstream watershed, including CD 45, without the wetland enhancement described in Option 1. Option 3 is to increase the drainage capacity to 3/8 in/day for the same watershed as Option 2, and the implementation of a wetland enhancement, similar to Option 1. Model calibration was done through site visits, drone flights, and landowner testimony.

## MODEL PARAMETERS

### HYDRAULIC PARAMETERS

The routing method for the models used the SCS Hydrology method. Two parameters were calculated in GIS: the runoff sub-catchment area and the time of concentration. This information was calculated for points located strategically along the CD 26 & CD 45 drainage tile and overland flow paths. A GIS tool utilizing the area draining to each node, surface cover, and land use will calculate the time of concentration using the SCS Method. The values used for this tool conservatively assumes that the entire watershed is tile drained. The curve number was found to range between 73 and 81 throughout the watershed through review of the land use and soil parameters within the watershed.

The SCS depth, or storage depth, was calculated as a range between 0.195 and 0.308 ft for the predominant soils based on the curve number and is applied the appropriate subcatchments. The storage depth is the maximum potential storage depth in feet, for this surface. The initial abstraction factor is the proportion of the storage depth that is retained on the surface before runoff occurs (i.e. through infiltration, evaporation, and surface depression storage).

One assumption made to model the existing system is that it is functioning as it was originally constructed. So, it does not take into consideration the blockages and restrictions found while televising the system. Both the existing and proposed tile systems are modeled using a Manning's n value of 0.013.

Another factor within the model is that the flow is routed directly into the pipes, which assumes 100% privately tiled ground. The landowners may or may not have their land completely privately tiled at this time, but the Engineer believes this is a necessary conservative factor. The Engineer understands that additional flooding may occur on the landscape that is not representative in the model and is taking a conservative approach to the model.

### INFILTRATION

2D hydraulic infiltration was used in the model to allow surface water to infiltrate into the soil. The model was categorized by a single agricultural land use class. In ICM, infiltration is applied using the Green-Ampt and initial/continuing loss methodologies. The soil parameters were defined based on the hydrologic soil conditions identified by the USDA Web Soil survey. The soil boundaries allow the model to accurately calculate infiltration based on each unique site condition.

### STORM EVENTS

The design storm events were chosen to comply with Minnesota Drainage Statute 103E.015(subd. 4), "Current and potential flooding characteristics of property in the drainage project or system and downstream for 5-, 10-, 25-, and 50-year flood events, including adequacy of the outlet for the drainage project." The 100-year event was added to review potential roadway overtopping of County Road 13 at the Outlet.

Modeled rainfall depths were determined using NOAA Atlas 14 Point Precipitation Frequency Estimates: MN as provided for Blue Earth, MN (43.6342, -93.9823) and the obtained values can be seen in Table 1 below. The 24-hour duration was used as it is the standard design storm duration and is the necessary duration to use the NRCS MSE3 rainfall distribution. This distribution was selected as it is the recommended rainfall distribution by MnDOT.

*Table 1. Modeled 24-hr precipitation values*

| Return Period | Rainfall Depth (inches) |
|---|---|
| 5-Year | 3.89 |
| 10-Year | 4.66 |
| 25-Year | 5.87 |
| 50-Year | 6.92 |
| 100-Year | 8.07 |

## MODEL REVIEW

A hydraulic/hydrologic (H/H) model was created for both the existing and proposed conditions to model the 5-, 10-, 25-, 50-, and 100-year storm events in ICM. The existing model was first built then modified by increasing tile size and implementing storage to create the proposed models. Tables 2-4 show a comparison of the peak flows out of Lateral 1 into the CD 26 Main Open Ditch for the existing and proposed conditions for Option 1, 2, & 3.

*Table 2. Option 1 System Outlet Flow Comparison*

| Event | Existing (cfs) | Proposed (cfs) | % Change |
|---|---|---|---|
| 5-Yr | 133 | 127 | -5% |
| 10-Yr | 179 | 174 | -3% |
| 25-Yr | 256 | 252 | -2% |
| 50-Yr | 330 | 326 | -1% |
| 100-Yr | 416 | 411 | -1% |

Denotes peak flows less than or equal to existing.

*Table 3. Option 2 System Outlet Flow Comparison*

| Event | Existing (cfs) | Proposed (cfs) | % Change |
|---|---|---|---|
| 5-Yr | 133 | 152 | 14% |
| 10-Yr | 179 | 205 | 15% |
| 25-Yr | 256 | 295 | 15% |
| 50-Yr | 330 | 377 | 14% |
| 100-Yr | 416 | 471 | 13% |

*Table 4. Option 3 System Outlet Flow Comparison*

| Event | Existing (cfs) | Proposed (cfs) | % Change |
|---|---|---|---|
| 5-Yr | 133 | 145 | 9% |
| 10-Yr | 179 | 189 | 6% |
| 25-Yr | 256 | 264 | 3% |
| 50-Yr | 330 | 334 | 1% |
| 100-Yr | 416 | 416 | 0% |

Additional figures to show max water depth and flood inundation are shown in the attached figures. The inundation maps shown in the attachments below show the time that water deeper than 0.1-foot sits on the landscape. Generally, crop stress from excess water occurs if they remain flooded for longer than 48-hours. These maps illustrate the faster drainage times across the system and where the project will impact the landscape.

Where only Option 1 saw reductions in peak outlet flows, all options are accompanied by a large reduction in peak overland flows which travel through the relatively linear low ground in CD 26. A location along this relatively low path was selected to compare the existing and proposed conditions and can be seen below in Figure 1. Table 5 below illustrates this reduction for both proposed Improvement options.

*Figure 1. Overland Comparison Location*

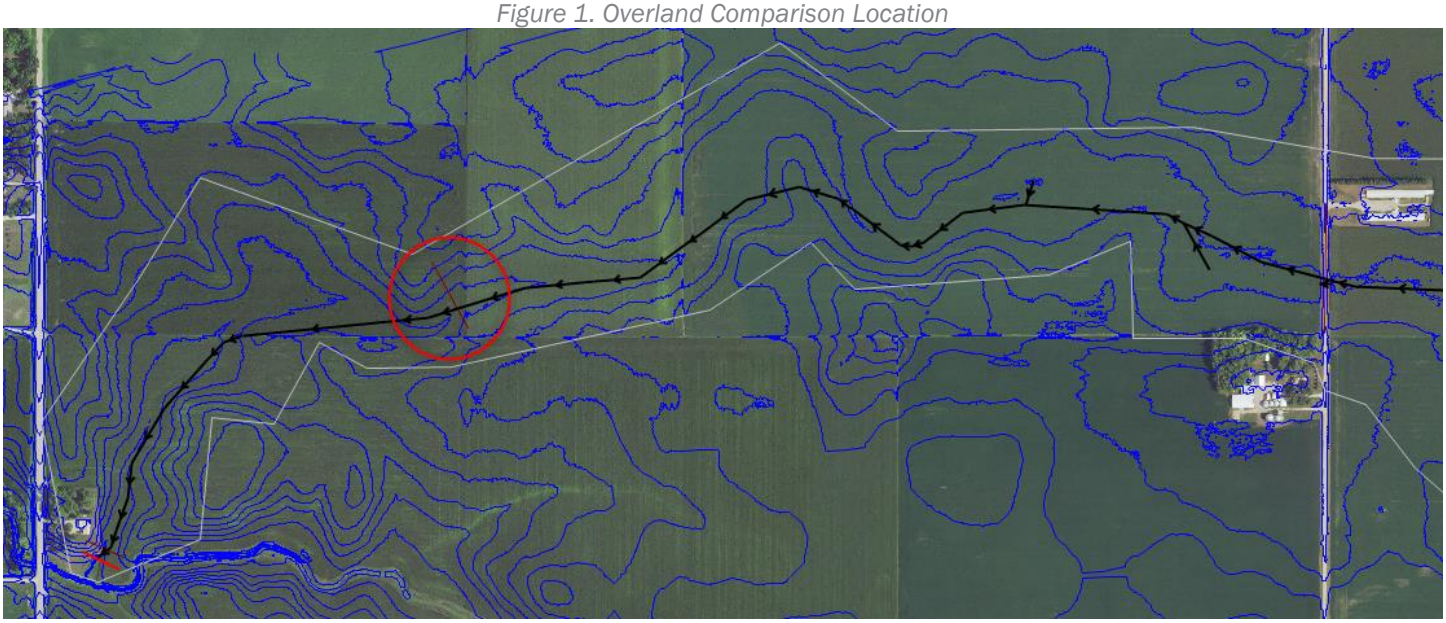

*Table 5. Improvement CD 26 Overland Flow Comparison*

| Location | Conveyence | 5-yr | | | 10-yr | | |
|---|---|---|---|---|---|---|---|
| | | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change |
| CD 26 Overland Flow | Option 1 | 51.56 | 44.71 | -13% | 80.04 | 71.93 | -10% |
| | Option 2 | 51.56 | 42.66 | -17% | 80.04 | 64.76 | -19% |
| | Option 3 | 51.56 | 34.06 | -34% | 80.04 | 63.77 | -20% |

| Location | Conveyence | 25-yr | | | 50-yr | | | 100-yr | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change |
| CD 26 Overland Flow | Option 1 | 132.50 | 122.25 | -8% | 182.38 | 170.92 | -6% | 242.21 | 229.54 | -5% |
| | Option 2 | 132.50 | 119.79 | -10% | 182.38 | 172.60 | -5% | 242.21 | 236.24 | -2% |
| | Option 3 | 132.50 | 118.36 | -11% | 182.38 | 170.05 | -7% | 242.21 | 232.01 | -4% |

Denotes peak flows less than or equal to existing

Additionally, it was shown within the model that 440th Avenue overtops for the 100-year event in the existing condition, whereas it doesn't overtop for either proposed Option 1 or 3, where Option 2 still overtops given the same storm events.

It is the engineer's determination that none of the proposed options will have any negative impact and the watercourse has sufficient capacity to handle the minor increases in flow from this portion of the CD 26 system.

With the relatively large proposed wetland enhancement increasing modeled residency time, Option 1 saw decreases in total runoff volume reaching the outlet across all storm events and Option 3 saw decreases for larger events. This can be seen detailed below in Table 5.

*Table 5. Outlet Volume Comparison*

| Location | Volume | 5-yr | | | 10-yr | | |
|---|---|---|---|---|---|---|---|
| | | Existing (Ac-ft) | Proposed (Ac-ft) | % Change | Existing (Ac-ft) | Proposed (Ac-ft) | % Change |
| Overall Outlet Swale | Option 1 | 118 | 104 | -11% | 161 | 142 | -12% |
| | Option 2 | 118 | 125 | 6% | 161 | 170 | 5% |
| | Option 3 | 118 | 120 | 2% | 161 | 162 | 1% |

| Location | Volume | 25-yr | | | 50-yr | | | 100-yr | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Existing (Ac-ft) | Proposed (Ac-ft) | % Change | Existing (Ac-ft) | Proposed (Ac-ft) | % Change | Existing (Ac-ft) | Proposed (Ac-ft) | % Change |
| Overall Outlet Swale | Option 1 | 234 | 199 | -15% | 298 | 255 | -15% | 377 | 333 | -12% |
| | Option 2 | 234 | 244 | 4% | 298 | 311 | 4% | 377 | 390 | 3% |
| | Option 3 | 234 | 231 | -1% | 298 | 288 | -3% | 377 | 368 | -2% |

Denotes peak flows less than or equal to existing

## ERRORS

The volume balance error is calculated by comparing the initial water volume in the 2D model and conduits to infiltration, system outflows, and final water volume in the 2D system and conduits. Table 6 shows the volume balance error for each modeled storm event. The maximum absolute volume balance error was -2.25%, which was for the 100-year event for the existing model. This is well within the ICM's allowable percent error of 5%.

*Table 6. Volume Balance Errors*

| Event | Existing Error (%) | Proposed Option 1 Corrected Error (%) | Proposed Option 2 Corrected Error (%) | Proposed Option 3 Corrected Error (%) |
|---|---|---|---|---|
| 5-Yr | 0.85 | 0.20 | 0.86 | 0.29 |
| 10-Yr | 0.88 | 2.13 | 0.17 | 0.20 |
| 25-Yr | 0.30 | 1.50 | 0.36 | 1.05 |
| 50-Yr | 0.95 | 0.09 | 1.72 | 0.77 |
| 100-Yr | 2.25 | 0.15 | 2.06 | 0.84 |

## SYSTEM OUTLET

The CD 45 tile system outlets into the CD 26 Private Lateral which subsequently outlets into the CD 26 Main Open Ditch. The open ditch becomes an unnamed stream shortly thereafter where it immediately outlets the East Branch Blue Earth River in the NE ¼ of the SW ¼ of Section 24 of Blue Earth City Township, which is a public water. To mitigate potential downstream impacts with increased flows from the Improvement, the wetland enhancement is recommended to reduce downstream impacts, increase storage, and create an overall more efficient drainage system.

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## ICM VOLUME TABLE

| Location | Volume | 5-yr | | | 10-yr | | |
|---|---|---|---|---|---|---|---|
| | | Existing (Ac-ft) | Proposed (Ac-ft) | % Change | Existing (Ac-ft) | Proposed (Ac-ft) | % Change |
| Overall Outlet Swale | Option 1 | 118 | 104 | -11% | 161 | 142 | -12% |
| | Option 2 | 118 | 125 | 6% | 161 | 170 | 5% |
| | Option 3 | 118 | 120 | 2% | 161 | 162 | 1% |

| Location | Volume | 25-yr | | | 50-yr | | | 100-yr | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Existing (Ac-ft) | Proposed (Ac-ft) | % Change | Existing (Ac-ft) | Proposed (Ac-ft) | % Change | Existing (Ac-ft) | Proposed (Ac-ft) | % Change |
| Overall Outlet Swale | Option 1 | 234 | 199 | -15% | 298 | 255 | -15% | 377 | 333 | -12% |
| | Option 2 | 234 | 244 | 4% | 298 | 311 | 4% | 377 | 390 | 3% |
| | Option 3 | 234 | 231 | -1% | 298 | 288 | -3% | 377 | 368 | -2% |

Denotes peak flows less than or equal to existing

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## ICM FLOWRATE TABLE (OPTION 1)

| Location | Conveyence | 5-yr | | | 10-yr | | | 25-yr | | | 50-yr | | | 100-yr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change |
| System Outlet | Culvert / Tile | 22.32 | 24.17 | 8% | 22.50 | 24.40 | 8% | 22.56 | 24.14 | 7% | 22.49 | 24.47 | 9% | 22.78 | 24.34 | 7% |
| | Overland Flow | 111.00 | 102.57 | -8% | 156.25 | 149.10 | -5% | 233.60 | 228.11 | -2% | 307.03 | 301.64 | -2% | 392.78 | 386.25 | -2% |
| | Total | 133.32 | 126.74 | -5% | 178.75 | 173.50 | -3% | 256.16 | 252.25 | -2% | 329.52 | 326.11 | -1% | 415.56 | 410.59 | -1% |
| Wetland Outlet | Culvert / Tile | 6.05 | 6.03 | 0% | 4.80 | 6.22 | 30% | 8.28 | 8.42 | 2% | 9.73 | 10.00 | 3% | 10.23 | 10.42 | 2% |
| | Overland Flow | 26.03 | 0.00 | -100% | 51.45 | 0.00 | -100% | 102.25 | 0.00 | -100% | 141.77 | 0.65 | -100% | 181.95 | 12.92 | -93% |
| | Total | 32.08 | 6.03 | -81% | 56.25 | 6.22 | -89% | 110.53 | 8.42 | -92% | 151.50 | 10.65 | -93% | 192.18 | 23.34 | -88% |
| 440th Avenue | Culvert / Tile | 7.07 | 4.84 | -32% | 8.53 | 6.28 | -26% | 14.89 | 8.05 | -46% | 19.56 | 8.80 | -55% | 21.28 | 11.32 | -47% |
| | Overland Flow | 11.58 | 9.74 | -16% | 12.90 | 11.64 | -10% | 14.36 | 12.05 | -16% | 15.38 | 13.04 | -15% | 40.69 | 14.06 | -65% |
| | Total | 18.65 | 14.58 | -22% | 21.43 | 17.92 | -16% | 29.25 | 20.10 | -31% | 34.94 | 21.84 | -37% | 61.97 | 25.38 | -59% |
| Mid CD 26 Overland Swale | Culvert / Tile | 5.89 | 8.36 | 42% | 5.31 | 8.70 | 64% | 5.27 | 9.19 | 74% | 5.28 | 9.58 | 81% | 5.42 | 9.96 | 84% |
| | Overland Flow | 51.56 | 44.71 | -13% | 80.04 | 71.93 | -10% | 132.50 | 122.25 | -8% | 182.38 | 170.92 | -6% | 242.21 | 229.54 | -5% |
| | Total | 57.45 | 53.07 | -8% | 85.35 | 80.63 | -6% | 137.77 | 131.44 | -5% | 187.66 | 180.50 | -4% | 247.63 | 239.50 | -3% |

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## ICM FLOWRATE TABLE (OPTION 2)

| Location | Conveyence | 5-yr | | | 10-yr | | | 25-yr | | | 50-yr | | | 100-yr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change |
| System Outlet | Culvert / Tile | 22.32 | 42.43 | 90% | 22.50 | 44.68 | 99% | 22.56 | 46.78 | 107% | 22.49 | 46.13 | 105% | 22.78 | 45.83 | 101% |
| | Overland Flow | 111.00 | 109.26 | -2% | 156.25 | 160.36 | 3% | 233.60 | 248.14 | 6% | 307.03 | 330.53 | 8% | 392.78 | 425.24 | 8% |
| | Total | 133.32 | 151.69 | 14% | 178.75 | 205.04 | 15% | 256.16 | 294.92 | 15% | 329.52 | 376.66 | 14% | 415.56 | 471.07 | 13% |
| Wetland Outlet | Culvert / Tile | 6.05 | 8.07 | 33% | 4.80 | 8.78 | 83% | 8.28 | 9.42 | 14% | 9.73 | 9.74 | 0% | 10.23 | 9.29 | -9% |
| | Overland Flow | 26.03 | 19.25 | -26% | 51.45 | 40.71 | -21% | 102.25 | 81.84 | -20% | 141.77 | 108.99 | -23% | 181.95 | 133.85 | -26% |
| | Total | 32.08 | 27.32 | -15% | 56.25 | 49.49 | -12% | 110.53 | 91.26 | -17% | 151.50 | 118.73 | -22% | 192.18 | 143.14 | -26% |
| 440th Avenue | Culvert / Tile | 7.07 | 15.07 | 113% | 8.53 | 21.95 | 157% | 14.89 | 28.74 | 93% | 19.56 | 32.04 | 64% | 21.28 | 35.49 | 67% |
| | Overland Flow | 11.58 | 9.62 | -17% | 12.90 | 11.75 | -9% | 14.36 | 13.60 | -5% | 15.38 | 14.16 | -8% | 40.69 | 20.30 | -50% |
| | Total | 18.65 | 24.69 | 32% | 21.43 | 33.70 | 57% | 29.25 | 42.34 | 45% | 34.94 | 46.20 | 32% | 61.97 | 55.79 | -10% |
| Mid CD 26 Overland Swale | Culvert / Tile | 5.89 | 26.14 | 344% | 5.31 | 26.37 | 397% | 5.27 | 26.88 | 410% | 5.28 | 27.03 | 412% | 5.42 | 27.16 | 401% |
| | Overland Flow | 51.56 | 42.66 | -17% | 80.04 | 64.76 | -19% | 132.50 | 119.79 | -10% | 182.38 | 172.60 | -5% | 242.21 | 236.24 | -2% |
| | Total | 57.45 | 68.80 | 20% | 85.35 | 91.13 | 7% | 137.77 | 146.67 | 6% | 187.66 | 199.63 | 6% | 247.63 | 263.40 | 6% |

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## ICM FLOWRATE TABLE (OPTION 3)

| Location | Conveyence | 5-yr | | | 10-yr | | | 25-yr | | | 50-yr | | | 100-yr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change | Existing (cfs) | Proposed (cfs) | % Change |
| System Outlet | Culvert / Tile | 22.32 | 44.83 | 101% | 22.50 | 45.00 | 100% | 22.56 | 43.82 | 94% | 22.49 | 44.18 | 96% | 22.78 | 43.91 | 93% |
| | Overland Flow | 111.00 | 100.38 | -10% | 156.25 | 144.45 | -8% | 233.60 | 219.74 | -6% | 307.03 | 290.00 | -6% | 392.78 | 371.60 | -5% |
| | Total | 133.32 | 145.21 | 9% | 178.75 | 189.45 | 6% | 256.16 | 263.56 | 3% | 329.52 | 334.18 | 1% | 415.56 | 415.51 | 0% |
| Wetland Outlet | Culvert / Tile | 6.05 | 9.06 | 50% | 4.80 | 9.08 | 89% | 8.28 | 9.30 | 12% | 9.73 | 12.90 | 33% | 10.23 | 11.16 | 9% |
| | Overland Flow | 26.03 | 0.00 | -100% | 51.45 | 0.00 | -100% | 102.25 | 0.00 | -100% | 141.77 | 0.39 | -100% | 181.95 | 13.01 | -93% |
| | Total | 32.08 | 9.06 | -72% | 56.25 | 9.08 | -84% | 110.53 | 9.30 | -92% | 151.50 | 13.29 | -91% | 192.18 | 24.17 | -87% |
| 440th Avenue | Culvert / Tile | 7.07 | 15.24 | 116% | 8.53 | 18.32 | 115% | 14.89 | 24.10 | 62% | 19.56 | 27.33 | 40% | 21.28 | 31.48 | 48% |
| | Overland Flow | 11.58 | 8.24 | -29% | 12.90 | 9.97 | -23% | 14.36 | 11.56 | -19% | 15.38 | 11.73 | -24% | 40.69 | 12.50 | -69% |
| | Total | 18.65 | 23.48 | 26% | 21.43 | 28.29 | 32% | 29.25 | 35.66 | 22% | 34.94 | 39.06 | 12% | 61.97 | 43.98 | -29% |
| Mid CD 26 Overland Swale | Culvert / Tile | 5.89 | 28.50 | 384% | 5.31 | 29.26 | 451% | 5.27 | 29.84 | 466% | 5.28 | 30.17 | 471% | 5.42 | 30.43 | 461% |
| | Overland Flow | 51.56 | 34.06 | -34% | 80.04 | 63.77 | -20% | 132.50 | 118.36 | -11% | 182.38 | 170.05 | -7% | 242.21 | 232.01 | -4% |
| | Total | 57.45 | 62.56 | 9% | 85.35 | 93.03 | 9% | 137.77 | 148.20 | 8% | 187.66 | 200.22 | 7% | 247.63 | 262.44 | 6% |

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## ICM ELEVATION TABLE (OPTION 1)

| Location | 5-yr | | | 10-yr | | | 25-yr | | | 50-yr | | | 100-yr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference |
| Outlet Swale | 1077.61 | 1077.59 | -0.02 | 1077.74 | 1077.73 | -0.01 | 1077.91 | 1077.91 | 0.00 | 1078.06 | 1078.06 | 0.00 | 1078.22 | 1078.21 | -0.01 |
| 440th Avenue (Upstream) | 1101.20 | 1100.79 | -0.41 | 1101.92 | 1101.13 | -0.79 | 1102.49 | 1101.62 | -0.87 | 1102.90 | 1102.01 | -0.89 | 1103.28 | 1102.40 | -0.88 |
| Wetland | 1101.86 | 1102.55 | 0.69 | 1102.00 | 1102.87 | 0.87 | 1102.53 | 1103.29 | 0.76 | 1102.94 | 1103.69 | 0.75 | 1103.35 | 1104.13 | 0.78 |

Denotes peak elevation less than or equal to existing

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## ICM ELEVATION TABLE (OPTION 2)

| Location | 5-yr | | | 10-yr | | | 25-yr | | | 50-yr | | | 100-yr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference |
| Outlet Swale | 1077.61 | 1077.25 | -0.36 | 1077.74 | 1077.57 | -0.17 | 1077.91 | 1077.91 | 0.00 | 1078.06 | 1078.12 | 0.06 | 1078.22 | 1078.33 | 0.11 |
| 440th Avenue (Upstream) | 1101.20 | 1100.74 | -0.46 | 1101.92 | 1101.47 | -0.45 | 1102.49 | 1102.25 | -0.24 | 1102.90 | 1102.66 | -0.24 | 1103.28 | 1103.09 | -0.19 |
| Wetland | 1101.86 | 1101.60 | -0.26 | 1102.00 | 1101.86 | -0.14 | 1102.53 | 1102.33 | -0.20 | 1102.94 | 1102.75 | -0.19 | 1103.35 | 1103.16 | -0.19 |

Denotes peak elevation less than or equal to existing

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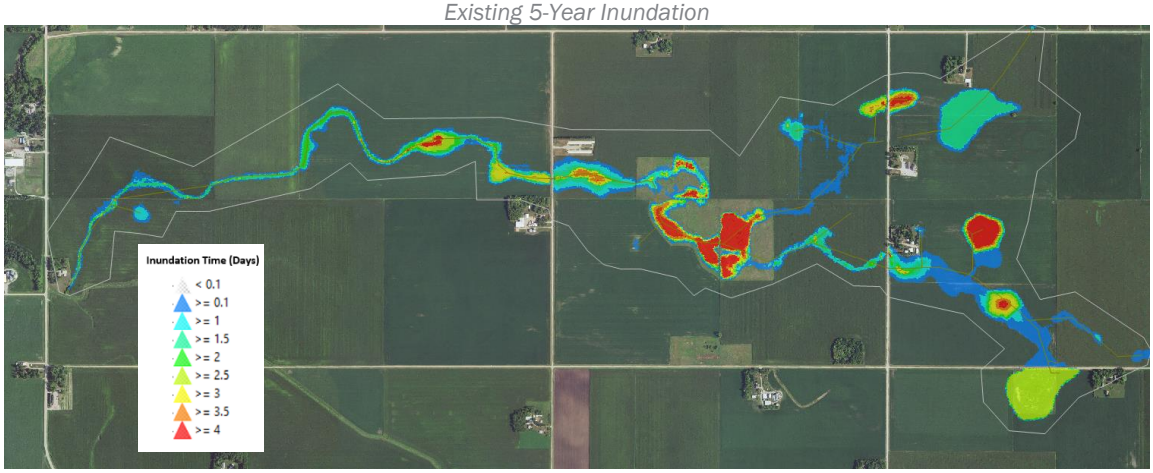
## ICM ELEVATION TABLE (OPTION 3)

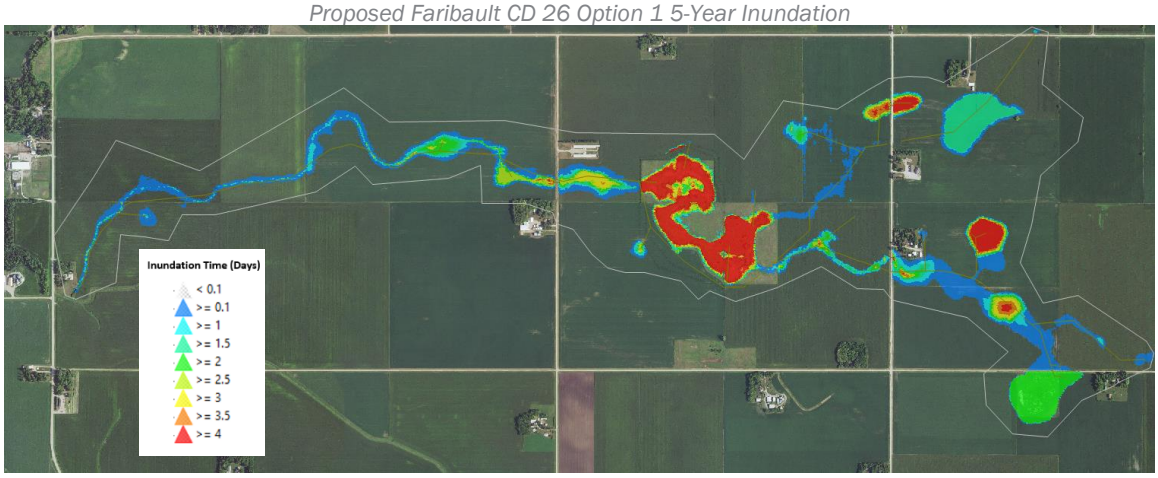
| Location | 5-yr | | | 10-yr | | | 25-yr | | | 50-yr | | | 100-yr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference | Existing (MSL) | Proposed (MSL) | Difference |
| Outlet Swale | 1077.61 | 1077.46 | -0.15 | 1077.74 | 1077.68 | -0.06 | 1077.91 | 1077.83 | -0.08 | 1078.06 | 1077.94 | -0.12 | 1078.22 | 1078.06 | -0.16 |
| 440th Avenue (Upstream) | 1101.20 | 1100.58 | -0.62 | 1101.92 | 1100.87 | -1.05 | 1102.49 | 1101.31 | -1.18 | 1102.90 | 1101.67 | -1.23 | 1103.28 | 1102.03 | -1.25 |
| Wetland | 1101.86 | 1102.71 | 0.85 | 1102.00 | 1102.99 | 0.99 | 1102.53 | 1103.35 | 0.82 | 1102.94 | 1103.70 | 0.76 | 1103.35 | 1104.15 | 0.80 |

Denotes peak elevation less than or equal to existing

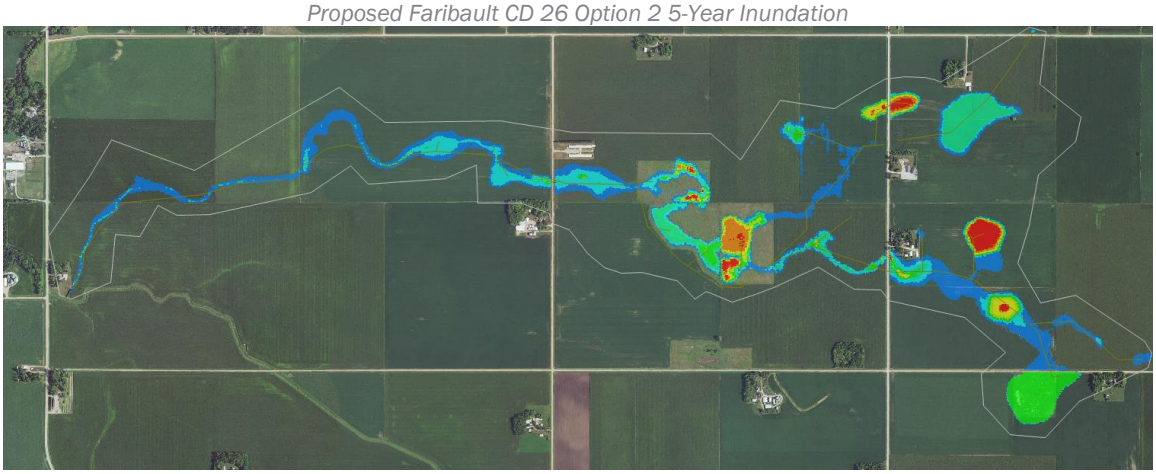
*Existing 5-Year Inundation*



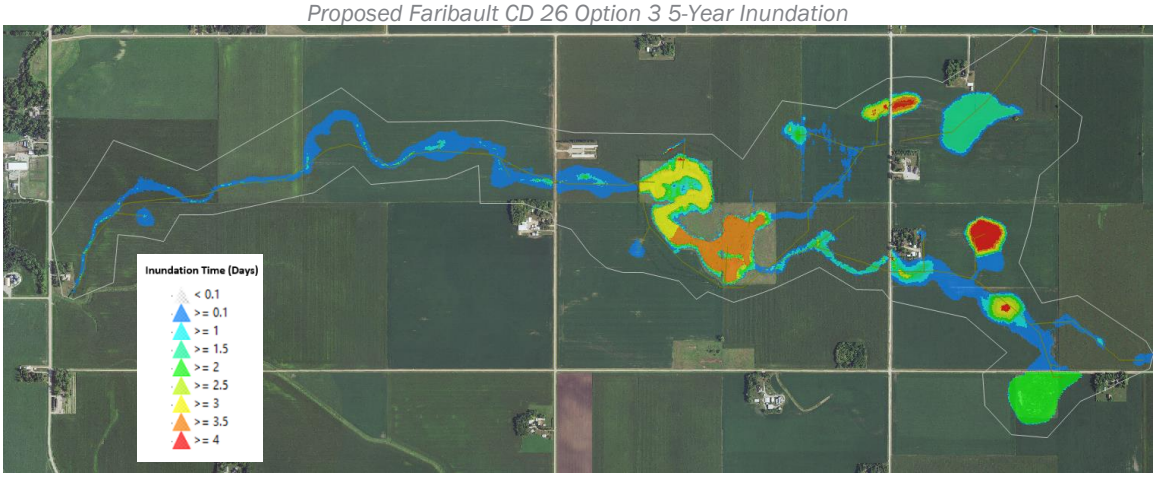

*Proposed Faribault CD 26 Option 1 5-Year Inundation*



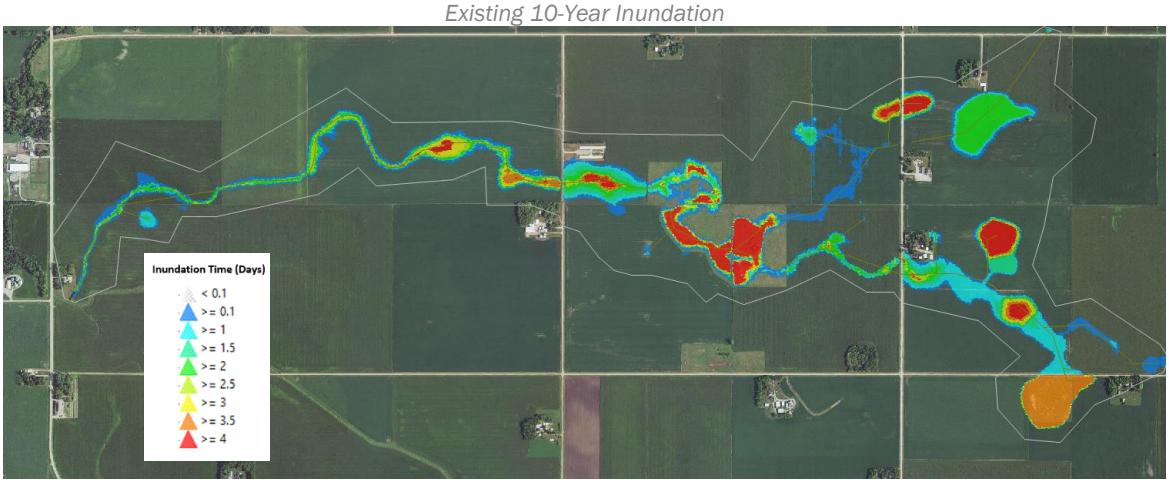
*Proposed Faribault CD 26 Option 2 5-Year Inundation*



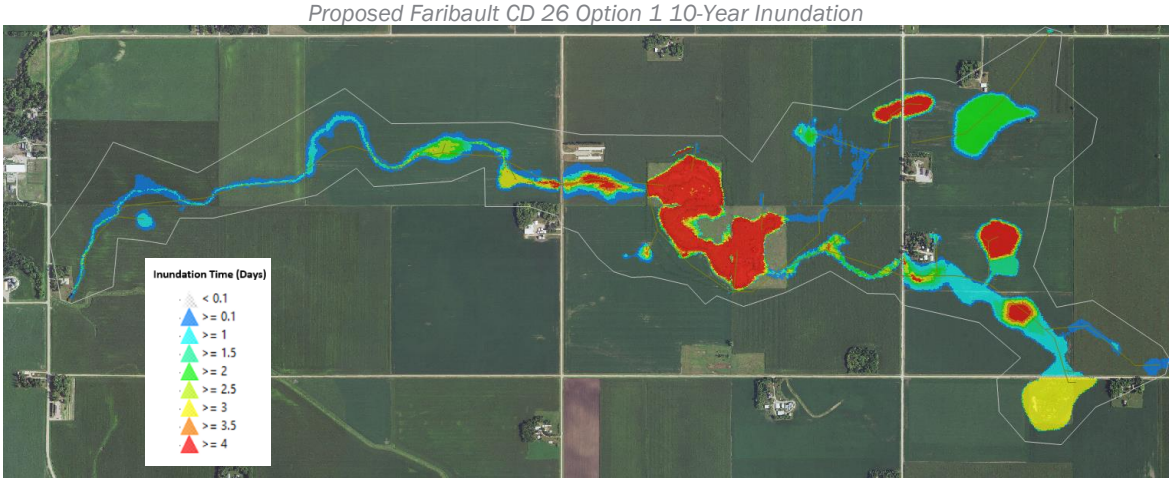
*Proposed Faribault CD 26 Option 3 5-Year Inundation*



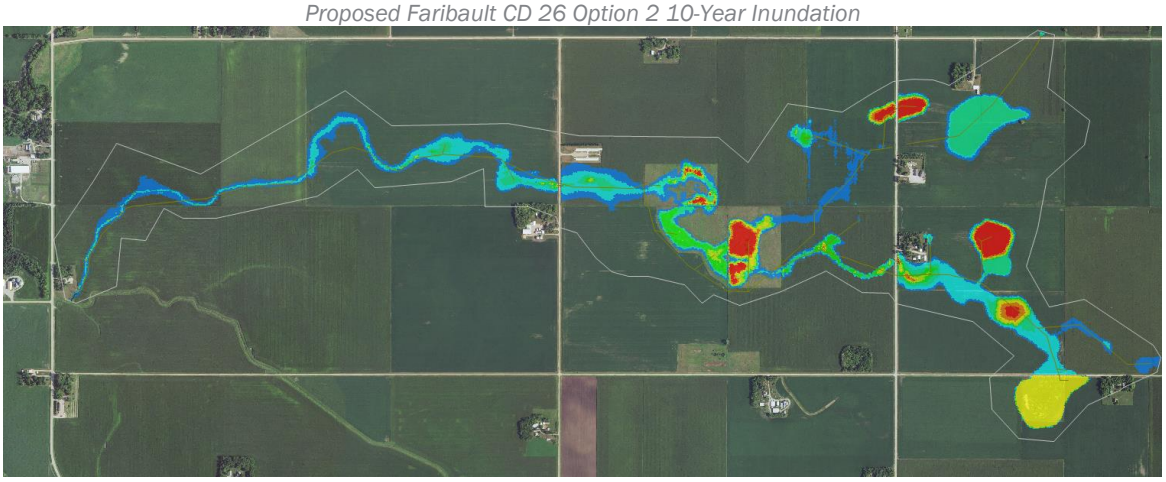
*Existing 10-Year Inundation*



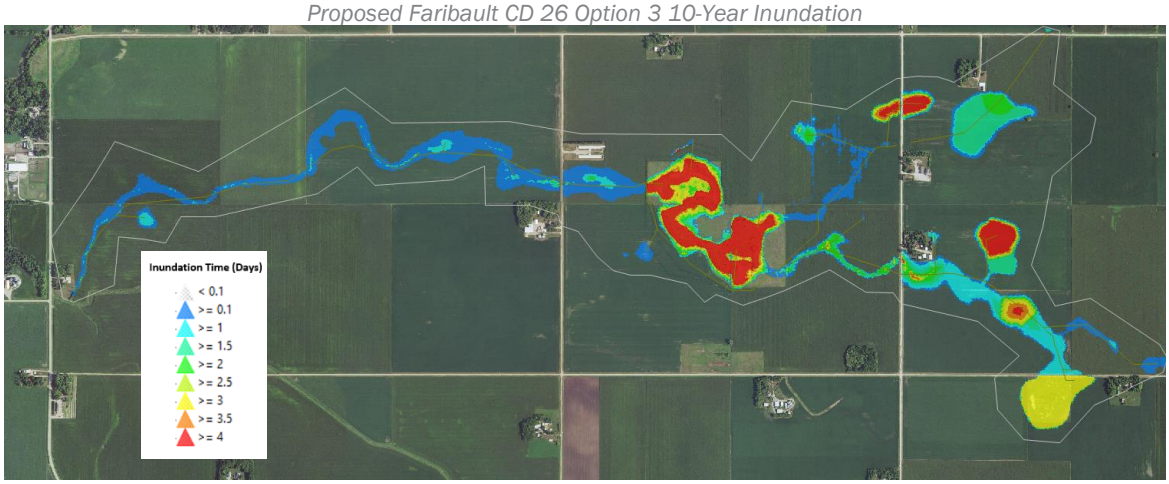

*Proposed Faribault CD 26 Option 1 10-Year Inundation*



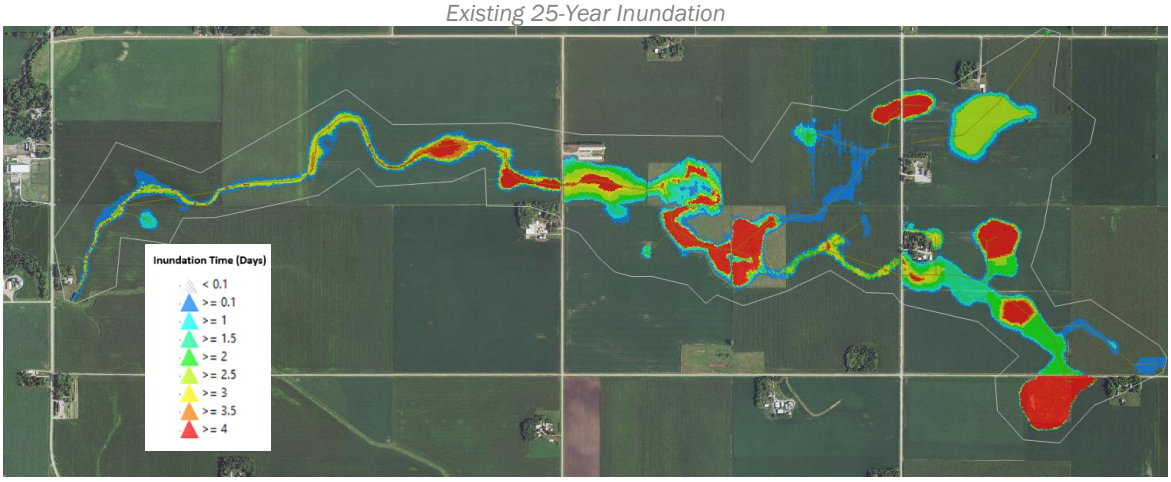
*Proposed Faribault CD 26 Option 2 10-Year Inundation*



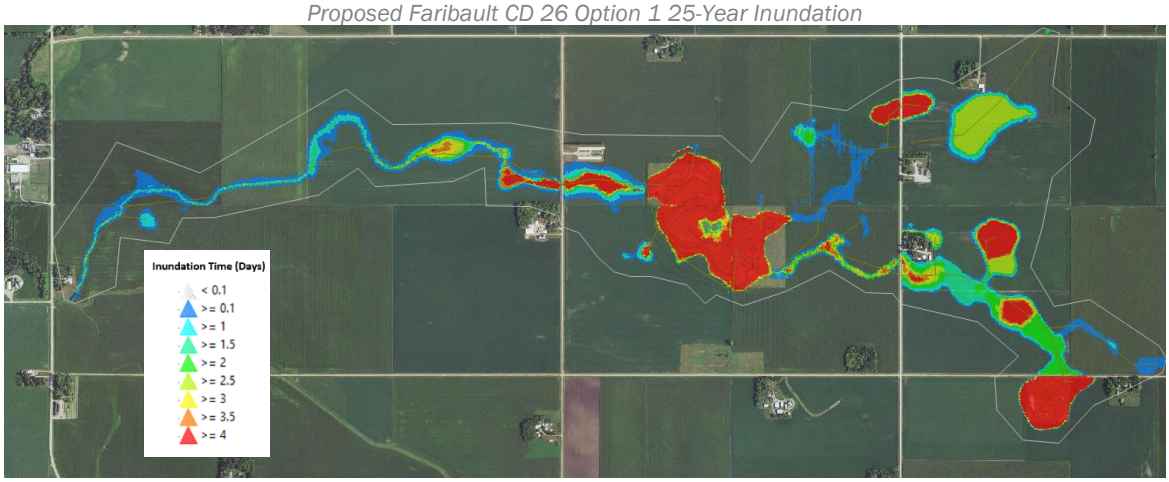
*Proposed Faribault CD 26 Option 3 10-Year Inundation*



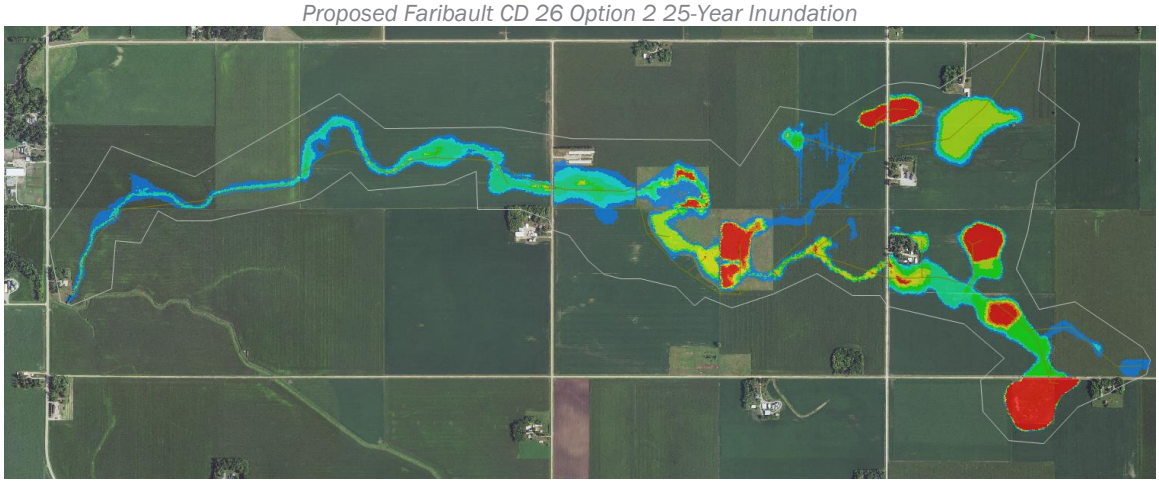
*Existing 25-Year Inundation*



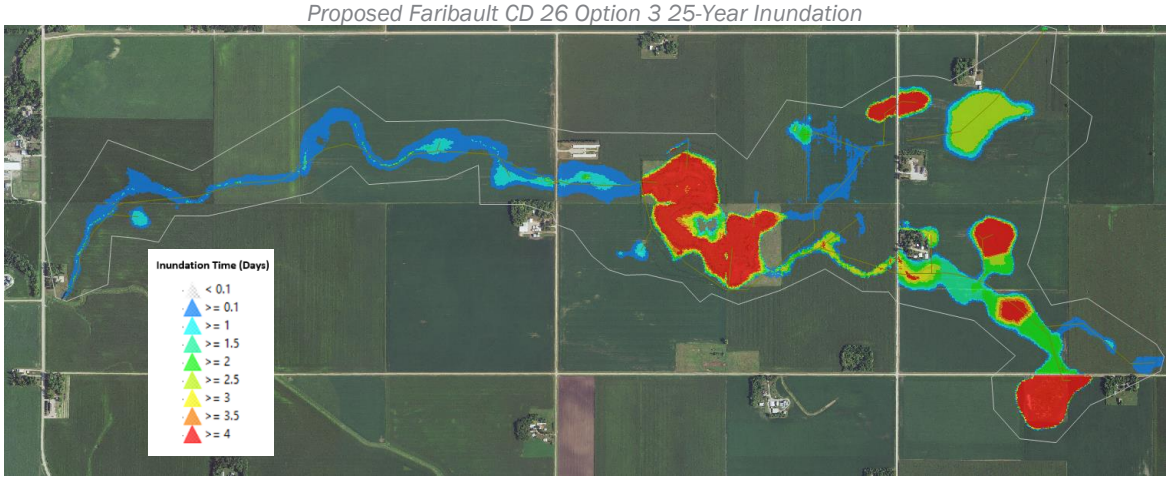

*Proposed Faribault CD 26 Option 1 25-Year Inundation*



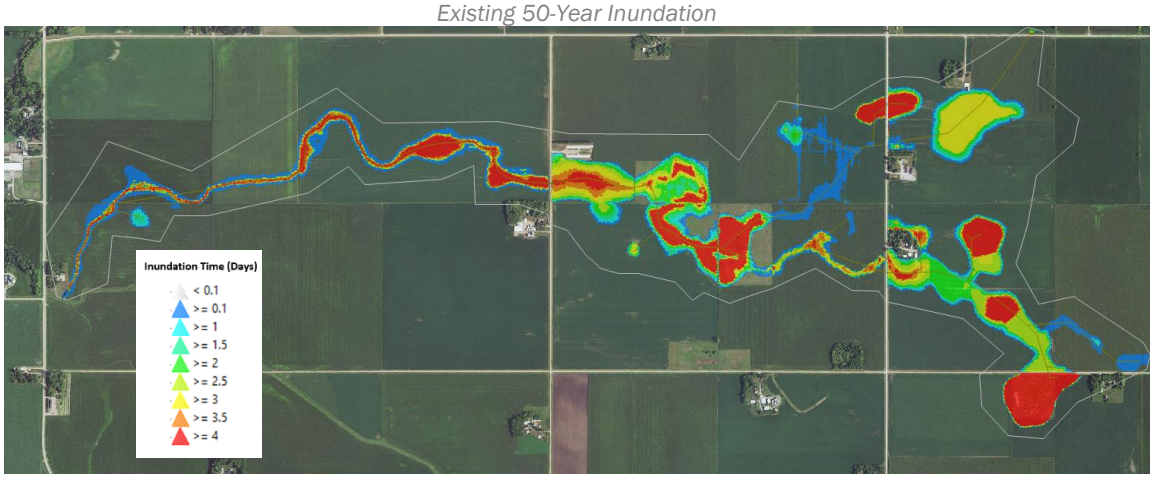
*Proposed Faribault CD 26 Option 2 25-Year Inundation*



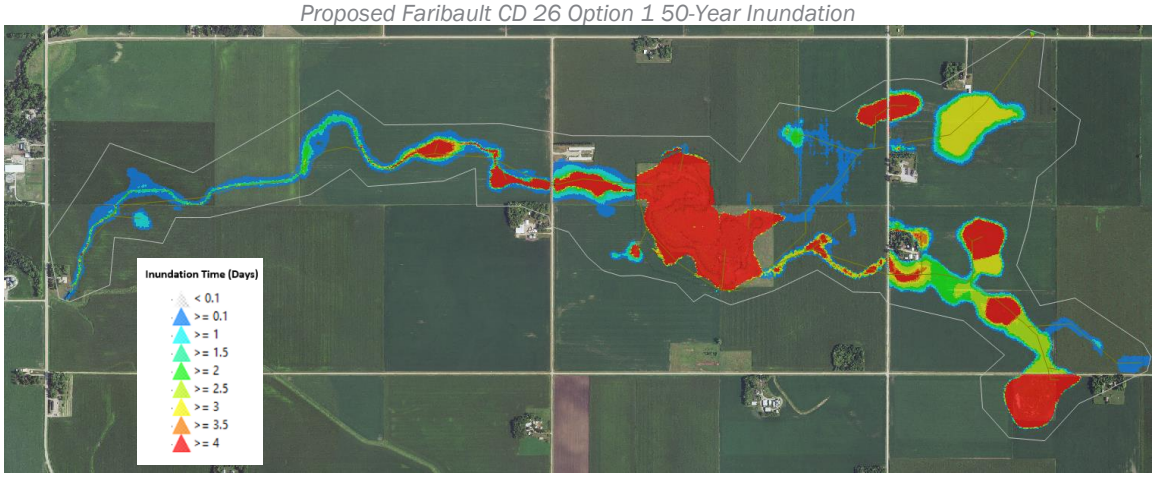
*Proposed Faribault CD 26 Option 3 25-Year Inundation*



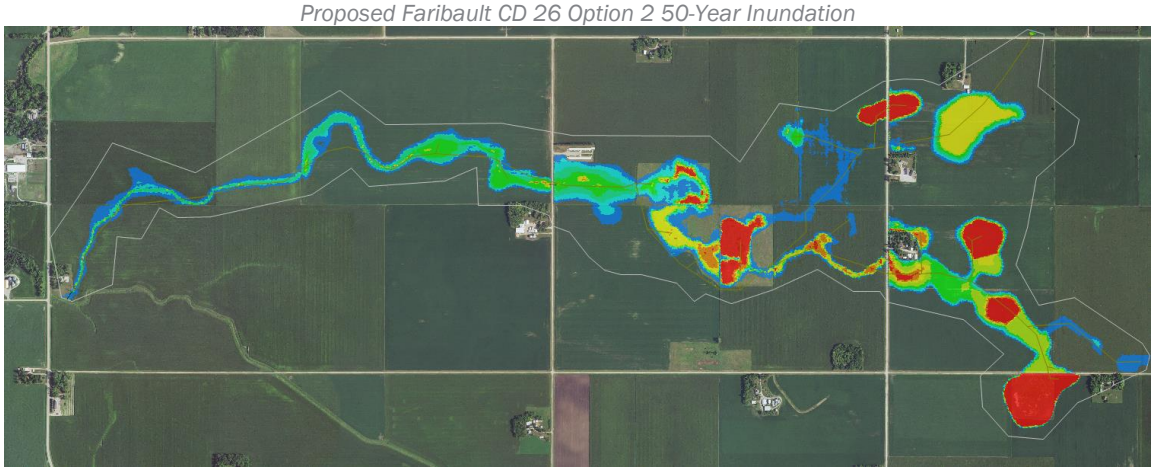
*Existing 50-Year Inundation*



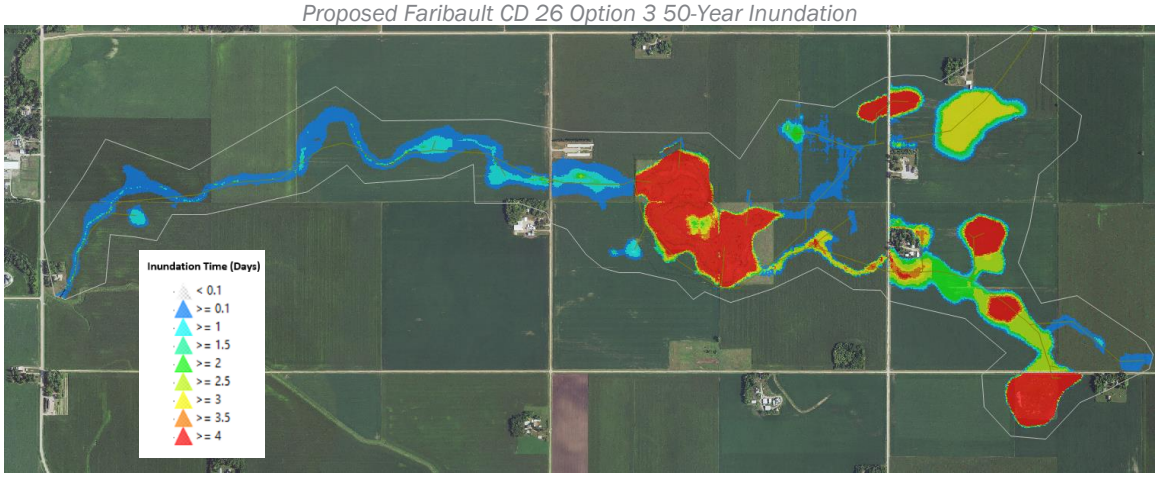

*Proposed Faribault CD 26 Option 1 50-Year Inundation*



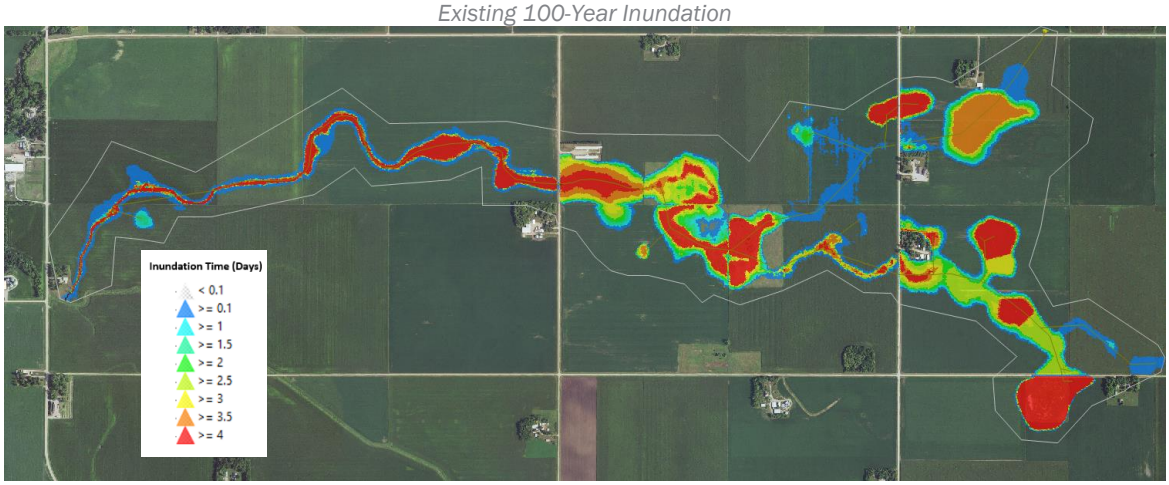
*Proposed Faribault CD 26 Option 2 50-Year Inundation*



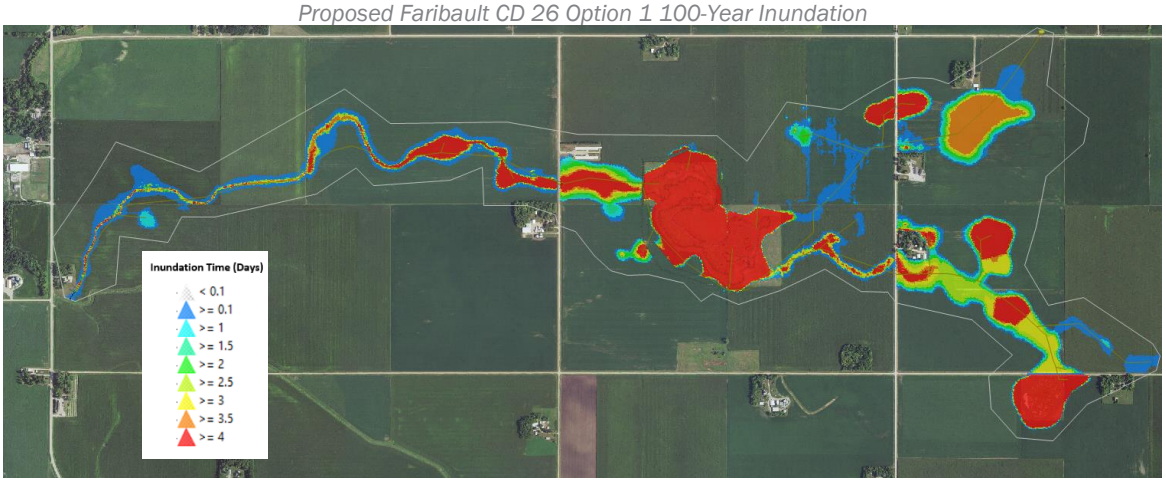
*Proposed Faribault CD 26 Option 3 50-Year Inundation*



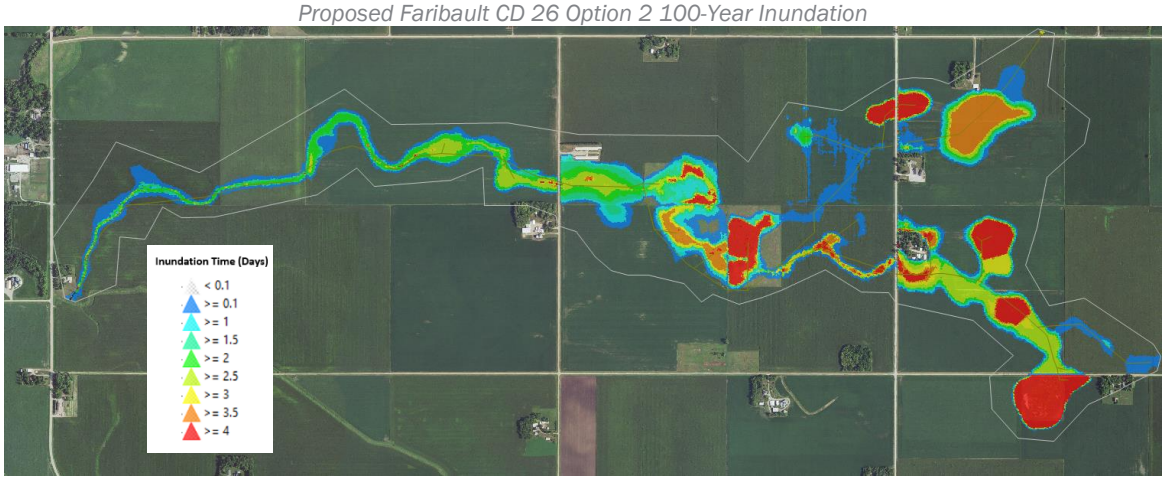
*Existing 100-Year Inundation*



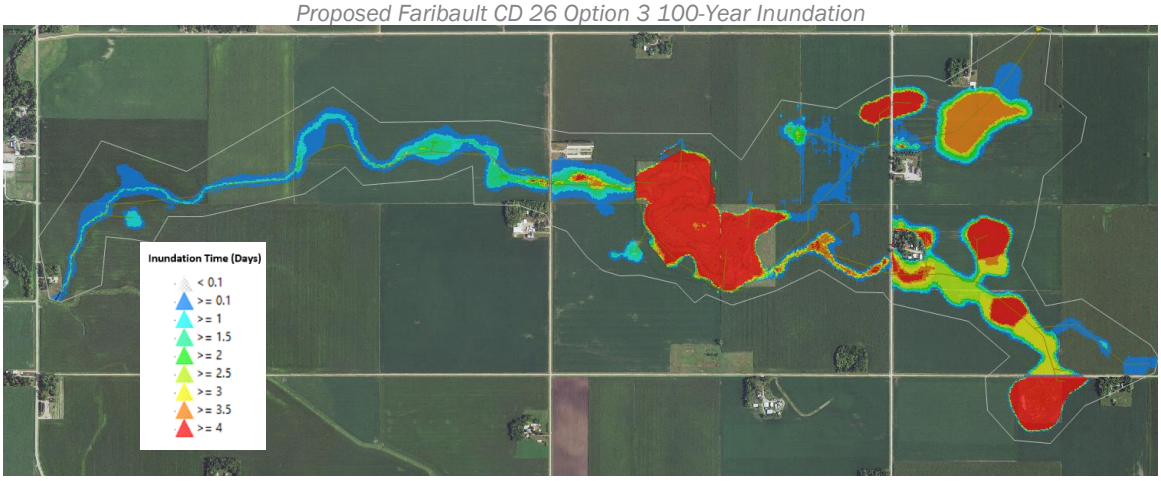

*Proposed Faribault CD 26 Option 1 100-Year Inundation*

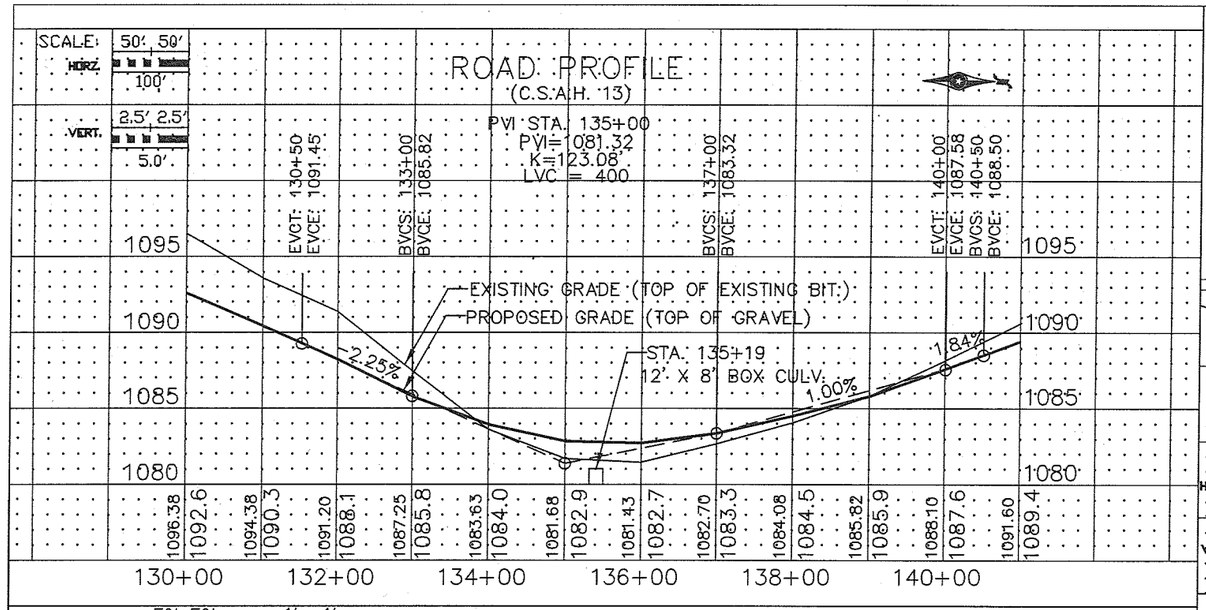


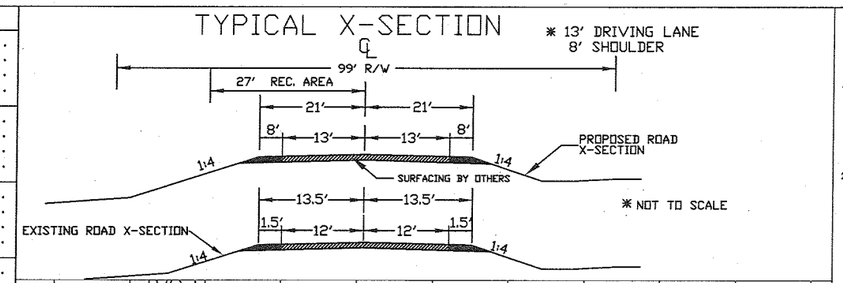
*Proposed Faribault CD 26 Option 2 100-Year Inundation*

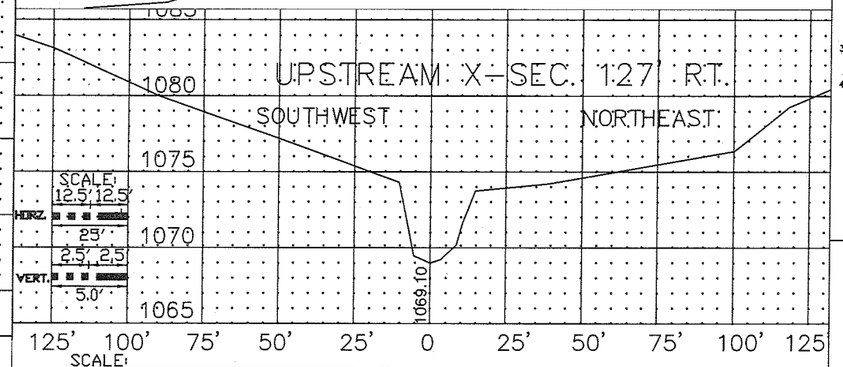


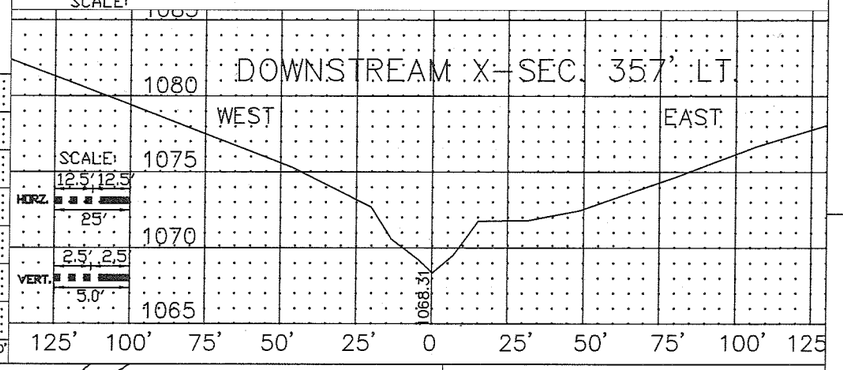

*Proposed Faribault CD 26 Option 3 100-Year Inundation*

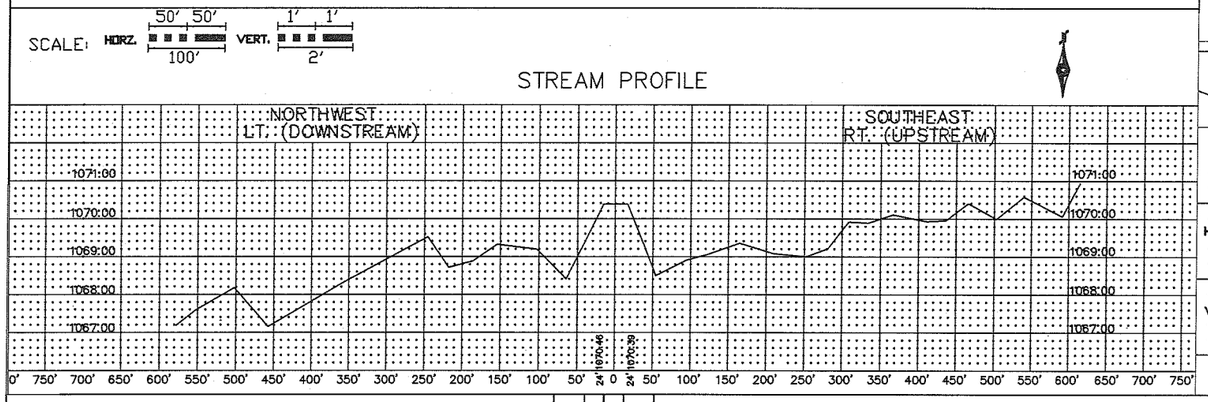





LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

1. Special Features: Waterfalls, dams, floods, ice, debris, sliding banks, recreational boating.
NONE

2. Other bridges or culverts over the same stream (particularly structures which carry high water without overflow of roadway) : Given location, type, length, height above high water, cross-sectional area etc.
DOWNSTREAM STRUCTURE – EAST FORK BLUE EARTH RIVER APPROX. 1/8 MILE DOWNSTREAM.

UPSTREAM STRUCTURE – A 66" C.S.P. WITH A WATERWAY OPENING OF 24 SQ. FT. LOCATED APPROX. 0.85 MILES UPSTREAM.

3. Apparent highwater elevation UNKNOWN Obtained from

4. Other data: Approx. velocity of water at time of survey UNKNOWN

HYDRAULIC ENGINEER'S RECOMMENDATION

Date DEC. 28, 2012

Stream or ditch designation CD 26
Drainage area 9.39 sq. mi.
Max. discharge on record UNKNOWN Design discharge ( 50 yr. freq.) 724 FT³/S
Max observed highwater elevation UNKNOWN Design highwater elevation 1077.76
Design mean velocity through structure 12.48 F/S
Low superstructure at or above elevation 1077.4
Flowline elev. OUTLET=1069.3 INLET 1069.4 Skew angle 0°
Waterway area rec'd below elevation _____ = _____ FT² at Rt. angles to channel

In the interest of flood plain zoning the regional flood(100. yr. freq.) 900 FT³/S at stage 1074.40 and mean velocity of 13.42 FT/S with 4.67 FT swellhead. The above recommendation will provide a structure of adequate waterway to pass the regional flood within criteria established by the Dept. of Natural Resources.

FOUNDATION ENGINEER'S RECOMMENDATION

Date _____

Bridge survey sheets made from:
FARIBAULT CO. DATA COLLECTION NOTES

Bench mark elevation 1081.43 (M.S.L. 1929 Adj.)
Location STA. 136+00 CL SPIKE (GPS)

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

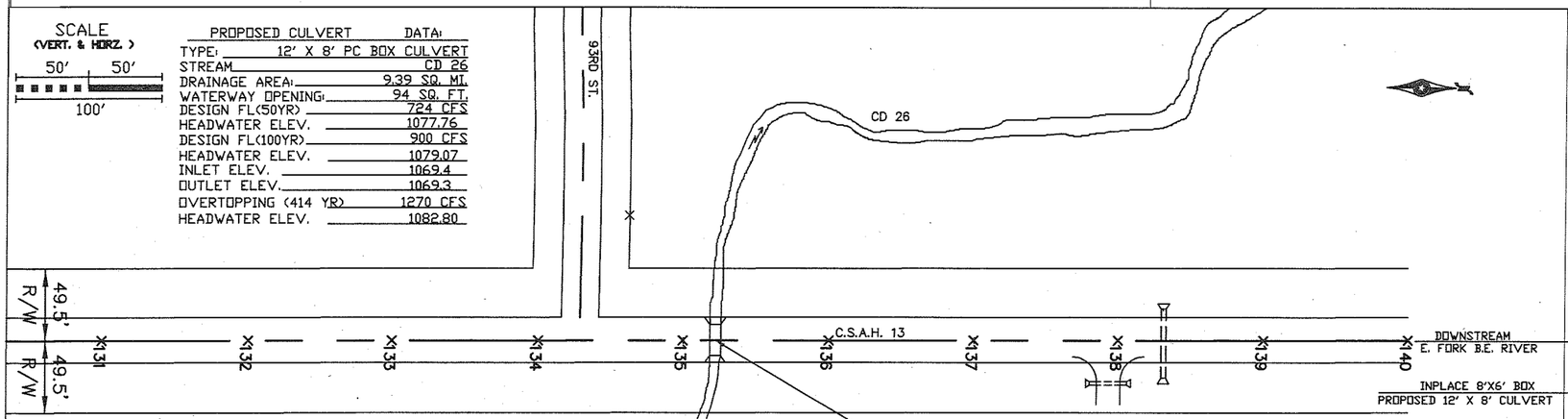
# BRIDGE SURVEY

PROPOSED BRIDGE LOCATED 1.27 MILES SOUTH OF
JCT C.S.A.H. 16 ON C.S.A.H. 13
SEC. 24 TWP. 102N R. 27W
TOWNSHIP BLUE EARTH COUNTY FARIBAULT

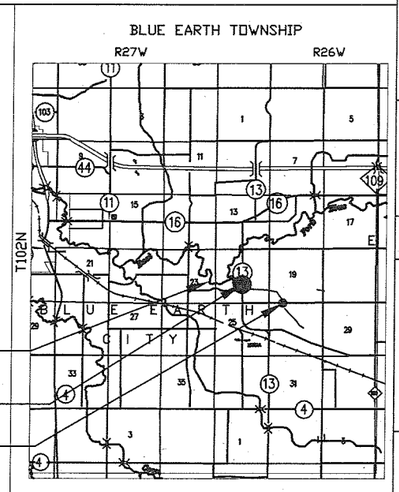
SCALE (VERT. & HORZ.) 50' 50' 100'

PROPOSED CULVERT DATA:

| | |
|---|---|
| TYPE: | 12' X 8' PC BOX CULVERT |
| STREAM | CD 26 |
| DRAINAGE AREA: | 9.39 SQ. MI. |
| WATERWAY OPENING: | 94 SQ. FT. |
| DESIGN FL(50YR) | 724 CFS |
| HEADWATER ELEV. | 1077.76 |
| DESIGN FL(100YR) | 900 CFS |
| HEADWATER ELEV. | 1079.07 |
| INLET ELEV. | 1069.4 |
| OUTLET ELEV. | 1069.3 |
| OVERTOPPING (414 YR) | 1270 CFS |
| HEADWATER ELEV. | 1082.80 |




EXISTING CULVERT DATA:
TYPE: 8'X6' CONC. BOX CULV.
WATERWAY OPENING 48 SQ. FT.




FARIBAULT COUNTY, MINNESOTA
SURVEY SHEET

# 12' X 8' PC BOX CULVERT

CERTIFIED BY _____ PROFESSIONAL ENGINEER REG. NO. 20357 4-11 2013

S.A.P. 022-613-021

SHEET NO. 15 OF 65 SHEETS

# Appendix G: Preliminary Cost Estimates

# FARIBAULT COUNTY
# COUNTY DITCH No. 26

ISG

## PROPOSED OPTION 1 SYSTEM COST SUMMARY

| Area | Separable Maintenance | Improvement Cost | Net Cost |
|---|---|---|---|
| Lateral 1 Option 1 | NA | $ 563,655 | $ 563,655 |
| Road Crossing Costs | $ - | $ 15,238 | $ 15,238 |
| **Total Project Costs** | **$ -** | **$ 578,893** | **$ 578,893** |

## PROPOSED OPTION 2 SYSTEM COST SUMMARY

| Area | Separable Maintenance | Improvement Cost | Net Cost |
|---|---|---|---|
| Lateral 1 Option 2 | NA | $ 910,606 | $ 910,606 |
| Road Crossing Costs | $ - | $ 16,733 | $ 16,733 |
| **Total Project Costs** | **$ -** | **$ 927,339** | **$ 927,339** |

## PROPOSED OPTION 3 SYSTEM COST SUMMARY

| Area | Separable Maintenance | Improvement Cost | Net Cost |
|---|---|---|---|
| Lateral 1 Option 3 | NA | $ 828,694 | $ 828,694 |
| Road Crossing Costs | $ - | $ 16,733 | $ 16,733 |
| **Total Project Costs** | **$ -** | **$ 845,428** | **$ 845,428** |

## PROPOSED WETLAND ENHANCEMENT COST SUMMARY

| Area | Estimated Cost | Potential Grant Funding |
|---|---|---|
| Wetland Enhancement & Reroute | $ 352,066 | $ 264,050 |

**FARIBAULT COUNTY**
**COUNTY DITCH No. 26**

ISG

## PROPOSED IMPROVEMENT - OPTION 1

### CD 26 Option 1

| Item No. | Item | Unit | Quantity | Unit Price | Amount |
|---|---|---|---|---|---|
| 101 | MOBILIZATION | LS | 1 | $ 15,950.00 | $ 15,950 |
| 102 | TILE INVESTIGATION | HR | 18 | $ 149.40 | $ 2,689 |
| 103 | 24-INCH AGRICULTURAL TILE | LF | 1070 | $ 36.87 | $ 39,451 |
| 104 | 18-INCH AGRICULTURAL TILE | LF | 2560 | $ 33.00 | $ 84,480 |
| 105 | 15-INCH AGRICULTURAL TILE | LF | 5167 | $ 26.91 | $ 139,044 |
| 106 | CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY) | EA | 36 | $ 500.00 | $ 18,000 |
| 107 | 18-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 2 | $ 2,476.26 | $ 4,953 |
| 108 | 15-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 3 | $ 1,812.85 | $ 5,439 |
| 109 | GRANULAR PIPE FOUNDATION | CY | 181 | $ 31.77 | $ 5,750 |
| 110 | INSTALL DROP INTAKE (18-INCH) | EA | 9 | $ 1,449.95 | $ 13,050 |
| 111 | CAP DROP INTAKE (18-INCH) | EA | 2 | $ 440.62 | $ 881 |
| 112 | DITCH CLEANING (4' WIDE DITCH BOTTOM) | LF | 160 | $ 3.55 | $ 568 |
| 113 | 24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC) | EA | 1 | $ 1,609.20 | $ 1,609 |
| 114 | 16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH) | AC | 0.13 | $ 1,388.40 | $ 180 |
| 115 | SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH) | AC | 0.08 | $ 3,353.70 | $ 268 |
| 116 | MOWING | AC | 0.26 | $ 214.40 | $ 56 |
| 117 | WEED SPRAYING | AC | 0.34 | $ 307.80 | $ 105 |
| | | | | **SUBTOTAL CONSTRUCTION COST** | **$ 332,473** |
| | | | | 10% UNFORSEEN | $ 33,247 |
| | | | | **TOTAL CONSTRUCTION COST** | **$ 365,720** |
| | TEMPORARY DAMAGES | AC | 21.54 | $ 650.00 | $ 14,004 |
| | TELEVISING (POST CONSTRUCTION) | LF | 8797 | $ 1.00 | $ 8,797 |
| | | | | COUNTY ADMINISTRATION COSTS (Legal, Staff, Bonding, Advertisement) | $ 18,286 |
| | | | | TOPOGRAPHIC SURVEY | $ 11,148 |
| | | | | REPORTS, PLANS AND SPECIFICATIONS | $ 70,550 |
| | | | | CONSTRUCTION STAKING & ADMINISTRATION | $ 75,150 |
| | | | | **TOTAL CD 26 OPTION 1 IMPROVEMENT COST** | **$ 563,655** |

### TOTAL IMPROVEMENT COST

| | |
|---|---|
| **CD 26 Option 1** | **$ 563,655** |

| | |
|---|---|
| **COMPLETE IMPROVEMENT COST** | **$ 563,655** |

**FARIBAULT COUNTY**
**COUNTY DITCH No. 26**

ISG

## PROPOSED IMPROVEMENT - OPTION 2

### CD 26 Option 2

| Item No. | Item | Unit | Quantity | Unit Price | Amount |
|---|---|---|---|---|---|
| 101 | MOBILIZATION | LS | 1 | $ 28,730.00 | $ 28,730 |
| 102 | TILE INVESTIGATION | HR | 23 | $ 149.40 | $ 3,436 |
| 103 | 30-INCH AGRICULTURAL TILE | LF | 5324 | $ 51.88 | $ 276,209 |
| 104 | 24-INCH AGRICULTURAL TILE | LF | 6173 | $ 36.87 | $ 227,599 |
| 105 | CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY) | EA | 46 | $ 500.00 | $ 23,000 |
| 106 | 18-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 2 | $ 2,476.26 | $ 4,953 |
| 107 | 15-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 3 | $ 1,812.85 | $ 5,439 |
| 108 | GRANULAR PIPE FOUNDATION | CY | 296 | $ 31.77 | $ 9,404 |
| 109 | INSTALL DROP INTAKE (18-INCH) | EA | 11 | $ 1,449.95 | $ 15,949 |
| 110 | CAP DROP INTAKE (18-INCH) | EA | 2 | $ 440.62 | $ 881 |
| 111 | DITCH CLEANING (4' WIDE DITCH BOTTOM) | LF | 160 | $ 3.55 | $ 568 |
| 112 | 30-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC) | EA | 1 | $ 2,161.70 | $ 2,162 |
| 113 | 16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH) | AC | 0.13 | $ 1,388.40 | $ 180 |
| 114 | SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH) | AC | 0.08 | $ 3,353.70 | $ 268 |
| 115 | MOWING | AC | 0.26 | $ 214.40 | $ 56 |
| 116 | WEED SPRAYING | AC | 0.34 | $ 307.80 | $ 105 |
| | | | | **SUBTOTAL CONSTRUCTION COST** | **$ 598,938** |
| | | | | 10% UNFORSEEN | $ 59,894 |
| | | | | **TOTAL CONSTRUCTION COST** | **$ 658,832** |
| | TEMPORARY DAMAGES | AC | 39.71 | $ 650.00 | $ 25,812 |
| | TELEVISING (POST CONSTRUCTION) | LF | 11497 | $ 1.00 | $ 11,497 |
| | | | | COUNTY ADMINISTRATION COSTS (Legal, Staff, Bonding, Advertisement) | $ 32,942 |
| | | | | TOPOGRAPHIC SURVEY | $ 14,523 |
| | | | | REPORTS, PLANS AND SPECIFICATIONS | $ 81,350 |
| | | | | CONSTRUCTION STAKING & ADMINISTRATION | $ 85,649 |
| | | | | **TOTAL CD 26 OPTION 2 IMPROVEMENT COST** | **$ 910,606** |

### TOTAL IMPROVEMENT COST

| | |
|---|---|
| **CD 26 Option 2** | **$ 910,606** |

| | |
|---|---|
| **COMPLETE IMPROVEMENT COST** | **$ 910,606** |

**FARIBAULT COUNTY**
**COUNTY DITCH No. 26**

ISG

## PROPOSED IMPROVEMENT - OPTION 3

### CD 26 Option 3

| Item No. | Item | Unit | Quantity | Unit Price | Amount |
|---|---|---|---|---|---|
| 101 | MOBILIZATION | LS | 1 | $ 25,930.00 | $ 25,930 |
| 102 | TILE INVESTIGATION | HR | 21 | $ 149.40 | $ 3,137 |
| 103 | 30-INCH AGRICULTURAL TILE | LF | 5324 | $ 51.88 | $ 276,209 |
| 104 | 24-INCH AGRICULTURAL TILE | LF | 4773 | $ 36.87 | $ 175,981 |
| 105 | CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY) | EA | 41 | $ 500.00 | $ 20,500 |
| 106 | 18-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 2 | $ 2,476.26 | $ 4,953 |
| 107 | 15-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE | EA | 3 | $ 1,812.85 | $ 5,439 |
| 108 | GRANULAR PIPE FOUNDATION | CY | 263 | $ 31.77 | $ 8,356 |
| 109 | INSTALL DROP INTAKE (18-INCH) | EA | 11 | $ 1,449.95 | $ 15,949 |
| 110 | CAP DROP INTAKE (18-INCH) | EA | 2 | $ 440.62 | $ 881 |
| 111 | DITCH CLEANING (4' WIDE DITCH BOTTOM) | LF | 160 | $ 3.55 | $ 568 |
| 112 | 30-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC) | EA | 1 | $ 2,161.70 | $ 2,162 |
| 113 | 16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH) | AC | 0.13 | $ 1,388.40 | $ 180 |
| 114 | SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH) | AC | 0.08 | $ 3,353.70 | $ 268 |
| 115 | MOWING | AC | 0.26 | $ 214.40 | $ 56 |
| 116 | WEED SPRAYING | AC | 0.34 | $ 307.80 | $ 105 |
| | | | | **SUBTOTAL CONSTRUCTION COST** | **$ 540,673** |
| | | | | 10% UNFORSEEN | $ 54,067 |
| | | | | **TOTAL CONSTRUCTION COST** | **$ 594,741** |
| | TEMPORARY DAMAGES | AC | 34.89 | $ 650.00 | $ 22,679 |
| | TELEVISING (POST CONSTRUCTION) | LF | 10097 | $ 1.00 | $ 10,097 |
| | | | | COUNTY ADMINISTRATION COSTS (Legal, Staff, Bonding, Advertisement) | $ 29,738 |
| | | | | TOPOGRAPHIC SURVEY | $ 12,773 |
| | | | | REPORTS, PLANS AND SPECIFICATIONS | $ 81,350 |
| | | | | CONSTRUCTION STAKING & ADMINISTRATION | $ 77,317 |
| | | | | **TOTAL CD 26 OPTION 3 IMPROVEMENT COST** | **$ 828,694** |

### TOTAL IMPROVEMENT COST

| | |
|---|---|
| **CD 26 Option 3** | **$ 828,694** |

| | |
|---|---|
| **COMPLETE IMPROVEMENT COST** | **$ 828,694** |

**FARIBAULT COUNTY**
**COUNTY DITCH No. 26**

ISG

## BWSR EASEMENT AREA

### Wetland Enhancement & Reroute

| Item No. | Item | Unit | Quantity | Unit Price | Amount |
|---|---|---|---|---|---|
| 101 | MOBILIZATION | LS | 1 | $ 8,310.00 | $ 8,310 |
| 102 | TILE INVESTIGATION | HR | 9 | $ 149.40 | $ 1,345 |
| 103 | 15-INCH AGRICULTURAL TILE | LF | 3155 | $ 26.91 | $ 84,901 |
| 104 | 12-INCH AGRICULTURAL TILE | LF | 30 | $ 24.69 | $ 741 |
| 105 | 10-INCH AGRICULTURAL TILE | LF | 1145 | $ 23.66 | $ 27,091 |
| 106 | CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY) | EA | 18 | $ 500.00 | $ 9,000 |
| 107 | GRANULAR PIPE FOUNDATION | CY | 81 | $ 31.77 | $ 2,573 |
| 108 | BWSR TILE BLOCK | EA | 5 | $ 483.33 | $ 2,417 |
| 109 | INSTALL DROP INTAKE (15-INCH) | EA | 1 | $ 1,350.00 | $ 1,350 |
| 110 | INSTALL DROP INTAKE (18-INCH) | EA | 3 | $ 1,449.95 | $ 4,350 |
| 111 | CAP DROP INTAKE (18-INCH) | EA | 2 | $ 440.62 | $ 881 |
| 112 | FURNISH & INSTALL 12-INCH WETLAND OUTLET | EA | 1 | $ 3,000.00 | $ 3,000 |
| 113 | WETLAND SCRAPING & SPOIL PLACEMENT | AC | 3 | $ 6,500.00 | $ 19,500 |
| 114 | CLAY BORROW (P) (CV) | CY | 750 | $ 10.20 | $ 7,650 |
| | | | | **SUBTOTAL CONSTRUCTION COST** | **$ 173,108** |
| | | | | 10% UNFORSEEN | $ 17,311 |
| | | | | **TOTAL CONSTRUCTION COST** | **$ 190,419** |
| | TEMPORARY DAMAGES | AC | 11.9 | $ 650.00 | $ 7,761 |
| | LAND ACQUISTION/ PERMANENT DAMAGES | AC | 13.5 | $ 6,500.00 | $ 87,750 |
| | | | | COUNTY ADMINISTRATION COSTS | $ 9,521 |
| | | | | TOPOGRAPHIC SURVEY | $ 5,413 |
| | | | | REPORTS, PLANS AND SPECIFICATIONS | $ 26,447 |
| | | | | CONSTRUCTION STAKING & ADMINISTRATION | $ 24,755 |
| | | | | **TOTAL WETLAND ENHANCEMENT & REROUTE COST** | **$ 352,066** |

**FARIBAULT COUNTY**
**COUNTY DITCH No. 26**

ISG

## ROAD CROSSINGS

**CD 26 OPTION 1 IMPROVEMENT COST - 440TH AVE**

| Item No. | Item | Unit | Quantity | Unit Price | Amount |
|---|---|---|---|---|---|
| 101 | MOBILIZATION | LS | 1 | $ 600.00 | $ 600 |
| 102 | TILE INVESTIGATION | HR | 1 | $ 149.40 | $ 149 |
| 103 | 15-INCH AGRICULTURAL TILE | LF | 100 | $ 26.91 | $ 2,691 |
| 104 | CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY) | EA | 1 | $ 500.00 | $ 500 |
| 105 | GRANULAR PIPE FOUNDATION | CY | 2 | $ 31.77 | $ 64 |
| 106 | FURNISH & INSTALL WATER QUALITY INLET | EA | 2 | $ 1,347.90 | $ 2,696 |
| 107 | NSTALL 8-INCH PERFORATED TILE(WATER QUALITY INLET) | LF | 80 | $ 22.90 | $ 1,832 |
| 108 | OPEN CUT & RESTORE GRAVEL ROAD OR DRIVEWAY | EA | 1 | $ 2,138.87 | $ 2,139 |
| | | | | **SUBTOTAL CONSTRUCTION COST** | **$ 10,671** |
| | | | | 10% UNFORSEEN | $ 1,067 |
| | | | | **TOTAL CONSTRUCTION COST** | **$ 11,738** |
| | | | | COUNTY ADMINISTRATION COSTS | $ 600 |
| | | | | REPORTS, PLANS AND SPECIFICATIONS | $ 1,300 |
| | | | | CONSTRUCTION STAKING & ADMINISTRATION | $ 1,600 |
| | | | | **ESTIMATED CD 26 OPTION 1 IMPROVEMENT COST - 440TH AVE** | **$ 15,238** |

**CD 26 OPTION 2 & 3 IMPROVEMENT COST - 440TH AVE**

| Item No. | Item | Unit | Quantity | Unit Price | Amount |
|---|---|---|---|---|---|
| 201 | MOBILIZATION | LS | 1 | $ 600.00 | $ 600 |
| 202 | TILE INVESTIGATION | HR | 1 | $ 149.40 | $ 149 |
| 203 | 24-INCH AGRICULTURAL TILE | LF | 100 | $ 36.87 | $ 3,687 |
| 204 | CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY) | EA | 1 | $ 500.00 | $ 500 |
| 205 | GRANULAR PIPE FOUNDATION | CY | 2 | $ 31.77 | $ 64 |
| 206 | FURNISH & INSTALL WATER QUALITY INLET | EA | 2 | $ 1,347.90 | $ 2,696 |
| 207 | NSTALL 8-INCH PERFORATED TILE(WATER QUALITY INLET) | LF | 80 | $ 22.90 | $ 1,832 |
| 208 | OPEN CUT & RESTORE GRAVEL ROAD OR DRIVEWAY | EA | 1 | $ 2,138.87 | $ 2,139 |
| | | | | **SUBTOTAL CONSTRUCTION COST** | **$ 11,667** |
| | | | | 10% UNFORSEEN | $ 1,167 |
| | | | | **TOTAL CONSTRUCTION COST** | **$ 12,833** |
| | | | | COUNTY ADMINISTRATION COSTS | $ 700 |
| | | | | REPORTS, PLANS AND SPECIFICATIONS | $ 1,500 |
| | | | | CONSTRUCTION STAKING & ADMINISTRATION | $ 1,700 |
| | | | | **ESTIMATED CD 26 OPTION 2 & 3 IMPROVEMENT COST - 440TH AVE** | **$ 16,733** |

**FARIBAULT COUNTY**

**COUNTY DITCH No. 26**

ISG

ROAD CROSSING SUMMARY

| Crossing | Road Authority | Improvement Cost | Project Cost for Road Crossings (Difference of Improvement Cost and Road Authority Cost) |
|---|---|---|---|
| **CD 26 Option 1** | | | |
| 440th Ave | EMERALD TOWNSHIP | $ 15,238 | $ 15,238 |
| **CD 26 Option 2 & 3** | | | |
| 440th Ave | EMERALD TOWNSHIP | $ 16,733 | $ 16,733 |

| | | |
|---|---|---|
| **TOTAL OPTION 1** | **$ 15,238** | **$ 15,238** |
| **TOTAL OPTION 2/3** | **$ 16,733** | **$ 16,733** |