Final Engineering Report
Judicial Ditch No. 414 Branch A40
Martin County and Faribault County, Minnesota

Date: January 26, 2022

ISG Project No.: 19-23608

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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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Judicial Ditch No. 414 Branch A40 Improvement

Martin County and Faribault County, Minnesota

Engineer's Project Number: 19-23608

Dated this 26th day of January, 2022

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EXECUTIVE SUMMARY

A petition was submitted to the Martin – Faribault Joint County Drainage Authority requesting an improvement to a portion of the Joint Judicial Ditch No. 414 (JD 414) public drainage system. The petitioners request was to improve Branch A40 and its associated branches other than Branch A41.This includes Branch A43, A45, A46, and A47 along with the mainline A40. Judicial Ditch No. 414 has a watershed of 10,893 acres consisting of gently rolling agricultural land while Branch A40 and its branches have a watershed serving 453 acres. The entire system was constructed in 1910 with major repair completed in 2018, which included cleaning entire mainline open ditch and addressing maintenance items specifically to the JD 414 mainline open ditch. There are no records of maintenance to the Branch A40 system other than minor spot repairs to fix tile washouts.

ISG prepared a feasibility report for landowners within the drainage system which then progressed into meeting with all landowners within the Branch A40 drainage system and county staff. At the conclusion of the meeting, there was a general concern with the system's ability to drain portions of the watershed due to issues with tile capacity and tile failures.

Currently, Branch A40 tile outlets into the JD 414 open ditch with a 14-inch tile and has a drainage coefficient of 0.13 inches per day. Throughout the remaining portions of Branch A40 and its branches, drainage coefficients are consistently under the recommended drainage capacities.

The proposed project includes upsizing and deepening Branch A40 and its petitioned improvement branches. The project includes installing approximately 10,500 linear feet of tile ranging from 24- to 8-inch tile generally following the existing tile alignments. The proposed tiles are improved to achieve the recommended 0.50 in/day drainage coefficient. The JD 414 Branch A38 open ditch outlet of the system has sufficient capacity to handle the slight increase in peak flow rates from the Branch A40 tile improvement.

There are 2 alternatives for the proposed project aimed to improve the drainage capacity of the system. Option 1 includes the above tile improvements as outlined in the petition. Option 2 includes the above tile improvements with a 2.5-acre storage pond along the mainline tile in the NW ¼ of the SW ¼ of Section 19 of Pilot Grove Township. This option was sized for no net increase in peak flow rates into the Branch A 38 open ditch.

The total preliminary cost estimates for the Martin-Faribault County Judicial Ditch No. 414 Branch A40 are $681,998 for Option 1 and $951,458 for Option 2.

PETITION + ORDER

Petition Summary

A Petition was received by the Martin – Faribault Joint Drainage Authority on August 2, 2019 to improve a portion of Judicial Ditch No. 414. The petitioners requested that the Drainage Authority improve Branch A40 and its branches, which include tile branches A40, A43, A45, A46, and A47. A copy of the signed Petition has been placed in Appendix B.

Order Summary

On September 17th, 2019 the Martin – Faribault Joint Drainage Authority, in regular session, made an Order related to the Petition in which it appointed ISG as the engineer. A copy of the signed Order has been placed in Appendix B.

Order to Proceed

On July 21st, 2020, the Martin – Faribault Joint Drainage Authority in regular session made an order to proceed in which it directed the engineer, ISG, to prepare a Final Engineer's Report (FER) and associated construction plans. It further directed that the engineer addresses the issues raised at the preliminary hearing and preliminary advisory letter, including by not limited to retention within the system. A copy of the order has been placed in Appendix B.

SYSTEM WATERSHED

Location

Judicial Ditch 414 is located in Sections 3, 4, 7-10, 15-20, 29, and 30 of Pilot Grove Township in Faribault County and Sections 13-29 of East Chain Township in Martin County. The mainline open ditch runs generally northeast from its end in Section 17 of East Chain Township in Martin County to Section 3 of Pilot Grove Township in Faribault County to its outlet, County Ditch No. 514.

Branch A40 is located in Section 19 and 30 of Pilot Grove Township in Faribault County and Section 24 and 25 of East Chain Township in Martin County. Branch A40 flows generally northwest to its outlet into the Branch A38 open ditch. Branch A40 contains 5 branches: Branch A41, Branch A43, Branch A45, Branch A46, and Branch A47.

Watershed Description

Judicial Ditch No. 414 drains 10,893 acres and serves as an outlet to Judicial Ditch 314 draining 3,443 acres. Its watershed is characterized as gently rolling with an elevation difference of approximately 45-feet. Branch A40 and its branches drain 453 acres.

The predominant hydrologic soil type in the system's watershed is Type "C/D" according to the Web Soil Survey (WSS). This classification "C" represents the drained condition with Type "D" represents the undrained condition. The soils consist of silty clay loam soils that, when adequately drained, are prime for farmland. A level 1 wetland delineation was completed, and Branch A40 has potential wetlands located along County Road 2.

See Appendix C for maps depicting the watershed's location, elevation, hydrologic soils, unified soil classification, and Level 1 Wetland Delineation.

HISTORY

According to material supplied by Martin County and Faribault County, Judicial Ditch 414 was first constructed as part of Judicial Ditch No. 14 in 1910. During a re-determination of benefits in 2012-2013, the Judicial Ditch No. 14 system was divided into the current systems which include Judicial Ditch No. 214, Judicial Ditch No. 314, Judicial Ditch, 414, and County Ditch No. 514. The JD 414 system currently consisting of 92,015-feet of open ditch including the mainline and branches and 210,370-feet of tile including the mainline and branches.

Maintenance records indicate that JD 414 underwent repairs in 1950 consisting of open ditch cleaning. In the mid 1970's improvements were completed on the mainline open ditch, Branch A1, A2, A6, A7, and A20. A major repair was completed in 2018, which included cleaning the entire JD 414 open ditch and addressed maintenance items such as slough repairs, tile outlet repairs, buffer seeding, and alternative side inlet installation.

No known major repairs or improvements have been completed on Branch A40, A43, A45, A6 or A47.

Early Coordination

Prior to the Petition for this drainage project, a landowner meeting was held which was attended by the Engineer, county drainage staff, ISG staff, and watershed landowners. In response, the Engineer prepared a Feasibility Report, which included options for repair and improvement of Branch A40 and is branches. The feasibility report formed the basis for both the petition and present report.

Investigation of External Sources of Funding and Technical Assistance

Section 103E.015, Subd. 1a of the Drainage Code requires that an investigation of external sources of funding and technical assistance be conducted prior to the appointment of an engineer for a drainage project or a petitioned 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.

A multipurpose drainage management (MDM) map is included in Appendix D. The MDM map shows potential locations for additional best management practices (BMPs) and will be proposed to landowners.

Due to limited BMPs that can be implemented in coordination with tile installation, additional BMPs may be implemented independently by individual landowners. These practices include nutrient management, conservation tillage, cover crops, blind rock inlets, and controlled drainage. The respective county's Soil and Water Conservation District (SWCD) representatives can assist landowners with implementation and available funding.

Through the improvement project, potential storage ponds have been investigated and proposed in Option 2 of the improvement. Storage ponds can provide water-holding capacity within the watershed to reduce peak flow rates discharges from the system as well as providing ability for sedimentation and denitrification. However given the small-scale storage pond for the watershed, it's impacts and improvements to water quality are limited when compared to other upland BMPs such as cover crops, reduced tillage, and controlled drainage. For the Branch A40 watershed, off system and upland BMPs are encouraged to landowners to implement to help reduce erosion and nutrient delivery.

While typically it is recommended to implement storage on improvement projects, because of the small size of the Branch A40 watershed it is not necessary on this project to achieve an adequate outlet. Additionally, reducing peak flow rates would require a pond size large enough that the cost would exceed the benefits in the system and would require outside funding. Although there are many grants available in the state of Minnesota that support water quality, storage ponds are not considered an eligible practice for many of these grants. The investigation of sources of external funds included BWSR MDM grants, the Greater Blue Earth River Basin Alliance, Coronavirus State and Local Recovery Fund, and other MDM grants.

PRESENT CONDITION

System Capacity

The following tables summarize the hydraulic analysis of Branch 40A and its branches in the As Constructed or Subsequently Improved Condition (ACSIC). The capacities listed in the tables reference the capacity of agricultural drainage which is expressed as a drainage coefficient and 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)). For a system like JD 414 Branch A40, a drainage coefficient of 0.50 in/day for tile is recommended for today's drainage needs. The existing tile capacities are shown below in Table 1, the values in red represent a drainage coefficient that is below the industry standard of 0.50 in/day.

TABLE 1. ACSIC TILE CAPACITIES

Branch	ACSIC Size (in)	ACSIC Slope (%)	Drainage Area (Acres)	ACSIC Drainage Coefficient (in/day)
A40	15	0.20%	427.4	0.16
	12	0.20%	329.4	0.12
	12	0.10%	315.2	0.09
	10	0.05%	268.2	0.04
	8	0.50%	156.8	0.13
	8	0.40%	83.6	0.22
	8	0.20%	83.2	0.15
	8	0.40%	72.6	0.25
	8	0.30%	33.2	0.48
	8	1.00%	25.4	1.14
	8	2.00%	25.1	1.63
A41	10	0.20%	79.8	0.29
	10	0.80%	78.6	0.59
	10	1.00%	72.9	0.72
	10	0.20%	70.8	0.33
	8	0.20%	47.3	0.27
	8	2.00%	41.9	0.97
	8	1.40%	40.7	0.84
	8	0.40%	39.8	0.46
A43	8	0.05%	48.0	0.13
A45	8	0.20%	17.4	0.74
	8	1.60%	16.5	2.22
	8	4.40%	15.9	3.80
	8	2.00%	6.4	6.33
A46	10	0.05%	73.2	0.16
	8	0.05%	66.6	0.10
	8	0.10%	54.7	0.17
	8	0.30%	50.3	0.31
	8	0.80%	22.4	1.15
	8	1.00%	18.0	1.60
A47	6	0.05%	12.4	0.24

Nature and Capacity of the Outlet

The outlet for Branch A40 and its branches is JD 414 Branch A38 open ditch with their junction located in SW ¼ of the NW ¼ of Section 19 of Pilot Grove Township in Faribault County. JD 414 open ditch is a 103E public drainage system and it is not anticipated that a permit will be required for this project as it is not classified as a public watercourse.

STATUTE REQUIRED + SUGGESTED EFFORTS

Project Necessity

After due consideration of the present condition of Branch A40 and its branches, both observationally and by analysis; Branch A40 is deemed necessary to improve drainage efficiencies to meet current farming practices and standards. The tiles throughout the watershed are over 100-years old and are deteriorating because of their age and shallow depth.

Environmental, Land Use, and Multipurpose Water Management Considerations

(Section 103E.015, Subd. 1)

The Drainage Code 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 law 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 drainage project will decrease the amount and duration of standing water of farm fields, thereby reducing the potential for crop loss and increasing the farmability of land within the watershed. The improvements to the drainage system will replace failing infrastructure to meet today's farming need for drainage.

Since the present project is on a public drainage system, the financial cost will be borne by the benefitted landowners. The only costs that might be paid by the public would be those that are provided through grants or loans.

A storage option is included in Option 2 of the improvement. While storage is not required for this improvement; storage practices can be utilized as a water quality practice.

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

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

Faribault County Local Water Management Plan 2018-2027

Martin County Local Water Plan 2017-2026

- *(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;*

Both Faribault and Martin County water plans have goals to reduce the impacts of altered hydrology and outline strategies which include implementation of wetland restorations, controlled drainage, storage basins, and other multipurpose drainage management practices. Through this project, a storage basin is being presented for potential implementation to minimize impacts to downstream waters. The storage basins will reduce peak flows, provide additional water holding capacity within the drainage system, and allow for storage and treatment of tile drainage water. A wetland restoration option was also pursued as recommended by the Department of Natural Resources (DNR) in the PER; however, the landowner in Section 30 was not interested and the concept was dismissed. A concept map of the potential wetland restoration is included in Appendix I. Given the nature of the project, preventative measures offline from the drainage system are encouraged to landowners to implement as they will have the most impact of soil erosion and water quality.

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

The watershed area for this drainage system is zoned as agricultural in both the Faribault and Martin County Zoning Maps. No land use change is expected. It is possible that a section of farmland located in the NE ¼ of the NW ¼ of Section 19 of Pilot Grove Township will be converted for use as a storage pond, which is consistent with agricultural land use. The storage pond would be seeded with native seed-mix conducive to withstand the expected hydric conditions of the pond providing wildlife habitat to the watershed aligning with the county water plans.

(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 As Constructed or Subsequently Improved Condition (ACSIC) and proposed improvement conditions were modeled with XP SWMM. XP SWMM is a fully dynamic modeling software that combines 1-dimensional flow calculations (e.g., open channel, pipe flow, etc.) with 2-dimensional flow calculations (e.g., floodplain, overland flow, etc.) to better analyze hydrologic and hydraulic conditions. The model incorporates land use, soil type, topography, and the associated 2D components to simulate overland and floodplain flow associate with the triggered runoff from a watershed.

Design storms and rainfall data used to generate Type II rainfall distributions for the project area were obtained from the National Oceanic and Atmospheric Administration (NOAA's) Atlas 14 precipitation frequency estimates. Runoff calculations in the model were performed using the TR-55 method. Curve numbers for the project area were determined using GIS derived soil and land use data. The model was used to simulate the 2, 5, 10, 25, 50, and 100-year rainfall events for a 24-hour storm duration.

The XP SWMM model compares the ACSIC condition to the proposed improvement for Branch A40 and its branches. Two improvement options are being considered during the final phase of this project. While both options aim to improve the tile to a 0.50 in/day drainage coefficient, each option has different components. Option 1 does not incorporate additional storage on the system while Option 2 will incorporate a 2.5-acre pond

on the system. The options will be compared to show the difference in cost, benefit, and peak flows to downstream waters. Table 2 below summarizes the peak flow rates at the Branch A40 outlet into JD 414 and at the overall outlet of JD 414.

TABLE 2. PEAK FLOW RATE COMPARISONS

		5-Year		10-Year		25-Year		50-Year	
		Flow (cfs)	% Change	Flow (cfs)	% Change	Flow (cfs)	% Change	Flow (cfs)	% Change
Existing	Branch A40 Outlet	12.9	NA	20.0	NA	32.7	NA	43.7	NA
	JCD 414 Outlet	528	NA	760	NA	1110	NA	1410	NA
Option 1: *No Storage*	Branch A40 Outlet	20.2	56%	28.9	44%	42.2	29%	55.3	26%
	JCD 414 Outlet	535	1%	769	1%	1120	1%	1422	1%
Option 2: *2.5ac Pond*	Branch A40 Outlet	8.75	-32%	13.0	-35%	27.9	-15%	41.8	-4%
	JCD 414 Outlet	524	-1%	753	-1%	1105	0%	1408	0%

The increases in peak flowrates from the Branch A40 outlet indicate large increases in peak flow rate percentages. However, the percentage is skewed because the Branch A40 watershed is small in nature and low peak flowrates exit the system. As a result, even small numerical differences in peak flowrates reflect as a large percentage increase. Therefore, the outlet peak flowrate from the overall JD 414 open ditch, which includes the Branch A40 flows, are a more accurate depiction on the impacts to the outlet of the system and when reviewing the adequacy of the outlet.

Option 1 implements the improvement to the tiles with no additional storage incorporated into the system. When comparing the peak flowrates to the ACSIC system, there is an increase in peak flow rates on the storm events with increases at the outlet of JD 414 open ditch of 1%. The peak flow increase of 1% can be considered negligible at the JD 414 open ditch outlet and the system can provide adequate capacity for the improvement.

Option 2 implements a 2.5-acre storage pond to offset an increase in peak flows. The goal of the storage pond was to target reducing the 5-year storm event as it produces increases due to the improvement. When comparing the peak flowrates to the legal system, the peak flow rates for this option reduced or had no increase in flowrates at the JD 414 open ditch outlet for all of the storm events simulations. This option nearly matches the outlet peak flowrates into JD 414 for the 5- through 50-year events. A pond of this size for this size of watershed will most likely not be cost effective. Therefore, outside funding would be necessary to implement this pond. However, storage ponds in drainage improvement projects are not applicable for funding as was noted by BWSR and the DNR in comments submitted for other recent improvement projects.

An in-depth analysis of the XPSWMM model results is placed in Appendix E.

(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. A Level 1 wetland delineation was completed in areas where improvements are slated to take place. Three Level 1 potential wetlands are present in proximity to tile. These appear to be Type 1 wetlands that would qualify for agricultural exemptions if impacts cannot be avoided. Where tile improvements encroach identified wetland areas, non-perforated tile and watertight connections will be installed. Connections of existing private tiles will not be enlarged with the improvement in these areas. Therefore, there are no anticipated effects on wetlands with this improvement.

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

Water quality issues pertinent to drainage projects can include erosion and sediment transport potential, and non-point pollution. According to the MPCA Impaired Waters listing, JD 414 east of the county boundary, is impaired for macroinvertebrate bioassessments. The utilization of drainage will not decrease the water quality of existing conditions to macroinvertebrates. Reduced overland flow also will reduce sediment transport to surface water. The proposed storage option will provide some detention thereby potentially reducing bank erosion and increasing base flow. The sediment trap in the proposed storage ponds will retain sediment, keeping it from going downstream with proper maintenance.

Additional water quality and best management practices can be found in the multipurpose drainage management (MDM) plan map in Appendix D. The MDM plan was shared with landowners for implementation of preventative, control, and treatment measures. The respective county Soil and Water Conservation Districts can provide assistance landowners with implementation and funding because many of the practice are beyond the jurisdiction of the drainage authority. Option 2 includes a storage pond that may slightly increase water quality at the outlet of the Branch A40 tile watershed by reducing peak flow rates and reducing the amount of sediment that enters the ditch. Other preventative practices can be incorporated throughout the watershed on a private landowner basis off the drainage system to further improve water quality and soil health. These practices are recommended over a storage pond as preventative measure in an all tile drainage system with isolated basins will have more impacts on water quality than a storage pond alone.

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

The proposed drainage project will not have any negative impacts on fish and wildlife resources as no landscapes changes of this nature will occur. The implementation of the potential storage pond could provide additional wildlife habitat within the watershed if incorporated.

Natural Heritage Information System (NHIS) data for Faribault and Martin Counties has been obtained by ISG via a license agreement with the Minnesota DNR. A review of this database was conducted by ISG staff to identify any rare features that could potentially be located within the Judicial Ditch No. 414 Branch A40 watershed. The Element Occurrence of one rare feature was identified within the watershed; Hooded Arrowhead, a state listed threatened species. This occurrence was located along the western extent of the watershed where some existing and proposed tile are located. It should be noted however that the representation accuracy of the element occurrence is listed as very low.

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

There is no anticipated effect of the proposed project shallow groundwater; the project will only impact the soil saturation levels. There is no Groundwater Restoration and Protection Strategy (GRAPS) or Geologic Atlas available for this watershed area. There are no wells listed within the watershed in the County Well Index. The watershed is not located within a Wellhead Protection Area.

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

The project will have negligible environmental impacts, as there are no land use changes, wetland impacts, fish and wildlife habitat changes or any adverse effects to water quality. A small portion of crop land may be converted to use as a storage and treatment pond, which is consistent with agricultural land use. The implementation of storage with the improvement will provide storage and treatment to the watershed and additional wildlife habitat. The project as recommended will have negligible effects to downstream waters and downstream water quality.

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

After assessing the necessity and feasibility of this drainage project on behalf of the Martin – Faribault Joint Drainage Authority in relation to the environmental, land use, and multipurpose water management criteria of Section 103E.015, Subd. 1, the engineer deems the proposed project to be both necessary and feasible.

Substantial Effect on Public Waters

Upon filing of the Preliminary Engineers Report (PER) to the respective county auditors, the Engineer mailed a physical copy of the PER to the Director of the Division of Ecological and Water Resources of the DNR and an electronic copy to the respective DNR regional office for preparation of the Commissioner Preliminary Advisory Report.

If the project moves forward, it is expected that no permit will be needed as the improvement outlets into a 103E public drainage ditch that is not listed as a public watercourse.

Potential Wetland Restorations

During the preliminary phase of the improvement project, the DNR suggested restoring a wetland restoration along County Road 2 in Section 30. Following this comment, ISG researched the feasibility of a wetland restoration in the southern portion of the watershed along County Road 2. The 30-acres of partially drained wetland north and south of County Road 2 would be eligible for MDM grant funds. The project was presented to landowners to receive feedback on the potential restoration. After discussions with landowners, it was determined the proposed wetland restoration was not in the interest of the landowners and the idea was abandoned. Certain parameters also add obstacles to make a wetland restoration not feasible in this location. The ground elevations in the basin along County Road 2 do not provide enough grade for tile to daylight into the basin. Additionally, the process to design and construct a wetland on the system would add additional cost to the project including design and permitting that could place the net costs over the total benefits received from the improvement. A concept of this wetland in is included in Appendix I, however this option was dismissed due to lack of landowner support and outside funding.

Response to DNR's PER Advisory Review and PER Hearing Questions and Comments

RESPONSE TO DNR'S PER ADVISORY REVIEW

Mr. Todd Kolander, District Manager for the Ecological and Water Resources Division of the DNR, submitted a letter of Advisory Review of the Martin – Faribault Judicial Ditch 414 – Branch A40 Improvement Preliminary Engineers Report to the Faribault County Auditor on February 25, 2020.

The review included a lengthy discussion on effects on drainage improvements to downstream water resources, natural resources, and property owners regarding flooding and water quality. Several BMPs and resources for the area were mentioned and recommended to be included in the proposed improvement. Multiple BMPs including storage retention and water quality inlets were recommend being included in the improvement. Particularly, the letter identified off system, upland practices of cover crops and controlled drainage, both which aid to retention of water in the soil profile. Other off system, or upland BMPs can be identified throughout the improvement watershed and interested landowners should contact the Faribault or Martin County Soil and Water Conservation District (SWCD) for assistance.

The letter comments on the proposed drainage coefficients that exceed the design parameter of 0.50 in/day drainage coefficient. The letter suggests the justification for drainage coefficients exceeding the 0.50 in/day drainage coefficient is the availability of dual wall pipe, however that is not the case. There are many design factors that contribute to the final design that may affect the designed drainage coefficient listed below are some of the additional factors that affect the improvement design that may also affects the drainage coefficient.

1. The smallest available size for dual wall pipe is 8-inches. ISG specifies the use of dual wall pipe for structural stability and durability to extend the lifetime of the tile. Dual wall tile as compared to single wall or perforated tile will have extended lifetime and therefore will be replaced and repaired less frequently. The overall lifetime cost of dual wall tile may be less than alternatives.
2. Dual wall pipe is only made available in standard sizing. Therefore, an existing pipe may be 14-inch pipe and will be replaced with readily available 15-inch pipe.
3. ISG standard is to install public tile to a depth of at least 5-feet. Public tile is used as a header for private tile for access to a free outlet. Private tile standards place tile at depths of 3 to 4-feet. To allow for gravity drainage, the public tile header must be below the private tile. Maintaining at least 5-feet of depth on private tiles effects the slope of tile and therefore may also affects the drainage coefficient.
4. The minimum slope recommended by ISG for open trench tile installation is 0.05%. At a 0.05% slope there is 0.05-feet of vertical difference over 100-feet of tile. This is very flat, and slopes less than this would be very difficult to install in the field. Proposing a slope smaller than 0.05% would create a smaller drainage coefficient but would not be feasible to construct properly and would have extensive long-term maintenance.
5. Continuity throughout the system is desired where there is not breaks in tile sizes. For example, the upstream portions of the watershed will have the smallest size tile and the outlet size will have the largest tile. This will be consistent throughout the entire system, avoiding having larger tiles entering smaller tiles.

Due to reasons noted above, the drainage coefficient may exceed 0.50 in/day and follows good engineering practices proven to be successful. As noted by the DNR, the control will be outlet of the system where a drainage coefficient is 0.49 in/day following the design parameters outlined for the Branch A40 improvement.

A suggestion of a wetland restoration along County Road 2. A wetland restoration would be preferred water retention strategy by the DNR to reduce total annual discharge, increase infiltration, habitat, and benefit water quality. The 30-acres of partially drained wetland north and south of County Road 2 would be eligible for MDM grant funds. Upon further investigation, a wetland restoration at this location is not feasible. Several sheets of the preliminary construction plans display the ground elevations the basin along County Road 2. There is not enough grade to daylight a tile outlet and properly cover the pipe. Furthermore, there was no landowner interest in restoring the wetland and the project was dismissed.

Lastly, the letter comments on the analysis of the peak flow comparison at the outlet JD 414 system stating that the flow comparisons are misleading. The flowrates for both the outlet of Branch A40 and JD 414 outlet were presented in Table 2 in the Preliminary Engineer's Report and compared to the ACSIC flowrates.

RESPONSE TO PER HEARING QUESTIONS AND COMMENTS

At the Preliminary Hearing, the landowner at the outlet of the Branch A40 drainage system was opposed to a storage pond on the property. This comment has been incorporated into the FER as the pond options are shifted south onto the adjacent property.

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)). For Branch A40 and its branches, a drainage coefficient of 0.50 in/day for tile is recommended with timing further influencing design.

SYSTEM DEPTH

The depth of Branch A40 and its branches are controlled by three criteria: 1. Provide a minimum of five feet of cover in low spots along public tile alignments, 2. Increase tile grades to improve capacity, and 3. Provide deeper outlets for private tile.

EROSION CONTROL

Required temporary erosion control will consist of silt fence or bio-roll around all drop intakes, ponds and ditches 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 all tile outlets into ditches and ponds as necessary. 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.

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 non-perforated dual wall high density polyethylene HDPE or reinforced concrete pipe (RCP) pipe. Per ISG construction specifications, watertight connections and fittings are required for all drainage tile installation.

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 replaced tile will be the responsibility of the landowner into the future. See connection details in the Preliminary Plans for a visual explanation.

Project Components

Systems can be all ditch, all tile, or a combination of the two. Each project will, therefore, have its own list of components. The improvement to Branch A40 and its branches will have the following components:

TILE

This drainage project proposes to improve Branch A40 and its branches by enlarging and deepening tile. The proposed tile sizes and its corresponding drainage coefficient are noted below in Table 3. Branches included in the improvement include Branch A40 and its branches A43, A45, A46, and A47. All tiles were sized to provide a drainage coefficient of 0.50 in/day. In some locations, the improvement may cause the proposed drainage coefficient to exceed 0.50 in/day. The most common reasons for this is the limited availability of dual wall pipe sizes and the necessity for the county tile to act as a header for private tile. Another reason is where steep slopes exist and the pipe installation generally follows this grade to avoid extremely deep tile. Due to this some of the smaller branches the drainage coefficient often exceeds the 0.50 in/day recommendation values. However, during high flows the outlet of each branch will control the flow.

TABLE 3. PROPOSED TILE CAPACITIES

Branch	ACSIC Size (in)	Proposed Size (in)	ACSIC Slope (%)	Proposed Slope (%)	Drainage Area (Acres)	ACSIC Drainage Coefficient (in/day)	Proposed Drainage Coefficient (in/day)
A40	15	24	0.20%	0.15%	427.4	0.16	0.49
	12	24	0.20%	0.10%	329.4	0.12	0.52
	12	24	0.10%	0.10%	315.2	0.09	0.54
	10	24	0.05%	0.10%	268.2	0.04	0.64
	8	18	0.50%	0.10%	156.8	0.13	0.51
	8	15	0.40%	0.10%	83.6	0.22	0.58
	8	15	0.20%	0.10%	83.2	0.15	0.59
	8	12	0.40%	0.20%	72.6	0.25	0.52
	8	12	0.30%	0.45%	33.2	0.48	1.72
	8	8	1.00%	0.45%	25.4	1.14	0.76
	8	8	2.00%	1.75%	25.1	1.63	1.52
A43	8	15	0.05%	0.05%	48.0	0.13	0.72
A45	8	8	0.20%	0.20%	17.4	0.74	0.74
	8	8	1.60%	1.00%	16.5	2.22	1.75
	8	8	4.40%	2.50%	15.9	3.80	2.86
	8	8	2.00%	2.50%	6.4	6.33	7.08
A46	10	18	0.05%	0.05%	73.2	0.16	0.77
	8	15	0.05%	0.05%	66.6	0.10	0.52
	8	15	0.10%	0.05%	54.7	0.17	0.63
	8	10	0.30%	0.30%	50.3	0.31	0.57
	8	8	0.80%	0.75%	22.4	1.15	1.12
	8	8	1.00%	0.75%	18.0	1.60	1.39
A47	6	8	0.05%	0.05%	12.4	0.24	0.52

DROP INLET

A drop inlet is a structure used along a tile to aid in televising tile, accessing the tile to check for sediment accumulation, and draining surface water. Drop inlets are also utilized for connection to the existing public tile or for private tile connection. 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 inlets 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 in order to promote sedimentation and infiltration). During high flow events, a standard surface inlet trash rack provides an overflow in order to prevent extensive flooding.

When located in a road ditch, water quality inlets may be provided in lieu of a standard drop inlet. Water quality inlets are designed to provide surface drainage infiltration through a washed rock filter during low flow events. This allows for increased settling of sediment and provides an opportunity for nutrient uptake prior to surface runoff entering the tile system. An integrated slotted (or perforated) intake provides an overflow during high flow events, preventing extensive flooding similar to a standard drop intake. With the existing mainline and branch tile lines remaining

in place, the new mainlines and branch tiles 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.

STORAGE

Drainage improvements can increase flows, change timing of flows, and increase flooding downstream depending on the magnitude of the improvement. Storage is proposed in Option 2 as an option to add storage to the system. There are three types of storage that can be used on a public drainage system: 1. On-ditch storage where the ditch is expanded (widened) and the resulting pond is controlled by a reduced size culvert or control structure. 2. On-tile storage where the tile is removed within the pond. This pond type is controlled by a structure as well. 3. Off-ditch storage where the pond is constructed to one side of the ditch. The storage pond designed for the JD 414 Branch A40 drainage system utilized on tile storage where the upstream tile will outlet into the pond for temporary storage. The pond will then outlet into the proposed tile which leads into the open ditch.

Option 2 incorporates a 2.5-acre pond located at the property line of the Cone and Peterson property. The pond is 10-feet deep with a storage capacity of 15.3 acre-feet. The pond outlet will be controlled by a 15-inch concrete pipe located at the bottom of the pond, allowing the pond to completely drain during dry periods. The 15-inch outlet pipe matches the size of pipe that can legally be repaired at the outlet of Branch A40 given it is the next available pipe size on the market. The pond inlets and outlets will be armored with riprap to protect from erosion. The 2.5-acre pond will have negligible changes or reductions on all storm events. Option 2 maintains or reduces the peak flow rates for all storm events although costs approximately $291,132. It is anticipated that the net costs will not out-weight the benefits for the improvement when implementing a 2.5-arce pond without the contribution of outside funding.

Preliminary Cost Estimates

The preliminary estimated construction cost for improvement to Branch A40 and its branches is approximately $681,998 for Option 1 and $951,458 for Option 2. Per Minnesota state statue, the road authority is charged with the duty of maintaining the crossing of drainage systems. Therefore, costs are included as such in the preliminary cost estimates to the county and township road authorities for tile crossings at County Road 2 and 310th Street. Cost estimates assume boring tile under paved county roads and open cutting gravel township roads.

Detailed cost estimates of the improvement and separable maintenance are included in Appendix G and are summarized below in Table 4 and

Table 5. Unit prices were estimated based on recent projects with similar scale and scope of work. Unit prices for standard tile installation were assumed to use High Density Polyethylene (HPDE) pipe and fused plastic or steel pipe for all borings under paved roadways. Damages for construction of the project have also been included in the cost estimates and are included in Appendix H.

Separable Maintenance

When proposing to do an improvement and a separable portion of a larger system is in need of 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.

Table 4. Option 1 Preliminary Cost Estimate

Area	Separable Maintenance	Improvement Cost	Net Cost
Branch A40 - Opt 1	$ 331,977	$ 447,961	$ 115,984
Branch A43	$ 42,991	$ 46,980	$ 3,989
Branch A45	$ 42,714	$ 44,826	$ 2,112
Branch A46	$ 87,479	$ 99,233	$ 11,754
Branch A47	$ 27,349	$ 28,716	$ 1,367
Road Crossing Costs	$ -	$ 14,282	$ 14,282
Subtotal	**$ 532,509**	**$ 681,998**	**$ 149,488**
Road Authority Repair Costs	$ 66,423	$ 66,423	$ -
Total Project Costs	**$ 598,933**	**$ 748,421**	**$ 149,488**
		Subtotal Separable Maintenance Costs	$ 532,509
		Net Costs	$ 149,488
		Total Project Costs for Landowners	**$ 681,998**
		Benefits (Per Ditch Viewer Report)	$ 190,000
		Net Benefit	**$ 40,512**

Table 5. Option 2 Preliminary Cost Estimate

Area	Separable Maintenance	Improvement Cost	Net Cost
Branch A40 - Opt 2	$ 331,977	$ 426,288	$ 94,312
Branch A43	$ 42,991	$ 46,980	$ 3,989
Branch A45	$ 42,714	$ 44,826	$ 2,112
Branch A46	$ 87,479	$ 99,233	$ 11,754
Branch A47	$ 27,349	$ 28,716	$ 1,367
Storage Pond (2.5 AC)	$ -	$ 291,132	$ 291,132
Road Crossing Costs	$ -	$ 14,282	$ 14,282
Subtotal without Road Crossings	**$ 532,509**	**$ 951,458**	**$ 418,948**
Road Authority Repair Costs	$ 66,423	$ 66,423	$ -
Total	$ 598,933	$ 1,017,881	$ 418,948
		Subtotal Separable Maintenance Costs	$ 532,509
		Net Costs	$ 418,948
		Total Project Costs for Landowners	**$ 951,458**
		Benefits (Per Ditch Viewer Report)	$ 190,000
		Net Benefit	**$ (228,948)**

The preliminary costs estimate for Options 1 and 2 are considered practicable and feasible for an improvement of this size. Option 2 may not be cost effective without outside funding given the cost of the storage pond compared to the watershed size.

SUMMARY OF FINDINGS, CONCLUSIONS + RECOMMENDATIONS

After review, the existing Branch A40, A43, A45, A46, and A47 were determined to have lower capacities than the recommended 0.50 in/day drainage coefficient to meet today's standard of farming and agricultural drainage. The system is approximately 110-years old, which is over the life expectancy of tile systems like that of Branch A40 and its branches. This improvement would be a public benefit and contribute to the public welfare of this area.

Branch A40 tile and its branches will be increased in size to increase drainage capacity to reduce flooding extends and duration of standing water within the watershed. The improvement modeled the hydrology and hydraulics of the watershed and compared it to the ACSIC of the system.

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 (or alternative) to the Drainage Authority for approval.

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.

PRELIMINARY PLANS

The Preliminary Plans are provided in Appendix A in keeping with Section 103E.245, Subd. 4. They are preliminary plans and are therefore unsigned as signed construction plans are not required at this phase of the project.

Appendix A: Preliminary Plans

MARTIN-FARIBAULT COUNTY
JUDICIAL DITCH No. 414 BRANCH A40 IMPROVEMENT

MARTIN-FARIBAULT COUNTY, MINNESOTA — **FINAL ENGINEERING REPORT** — **ISG PROJECT # 19-23608**

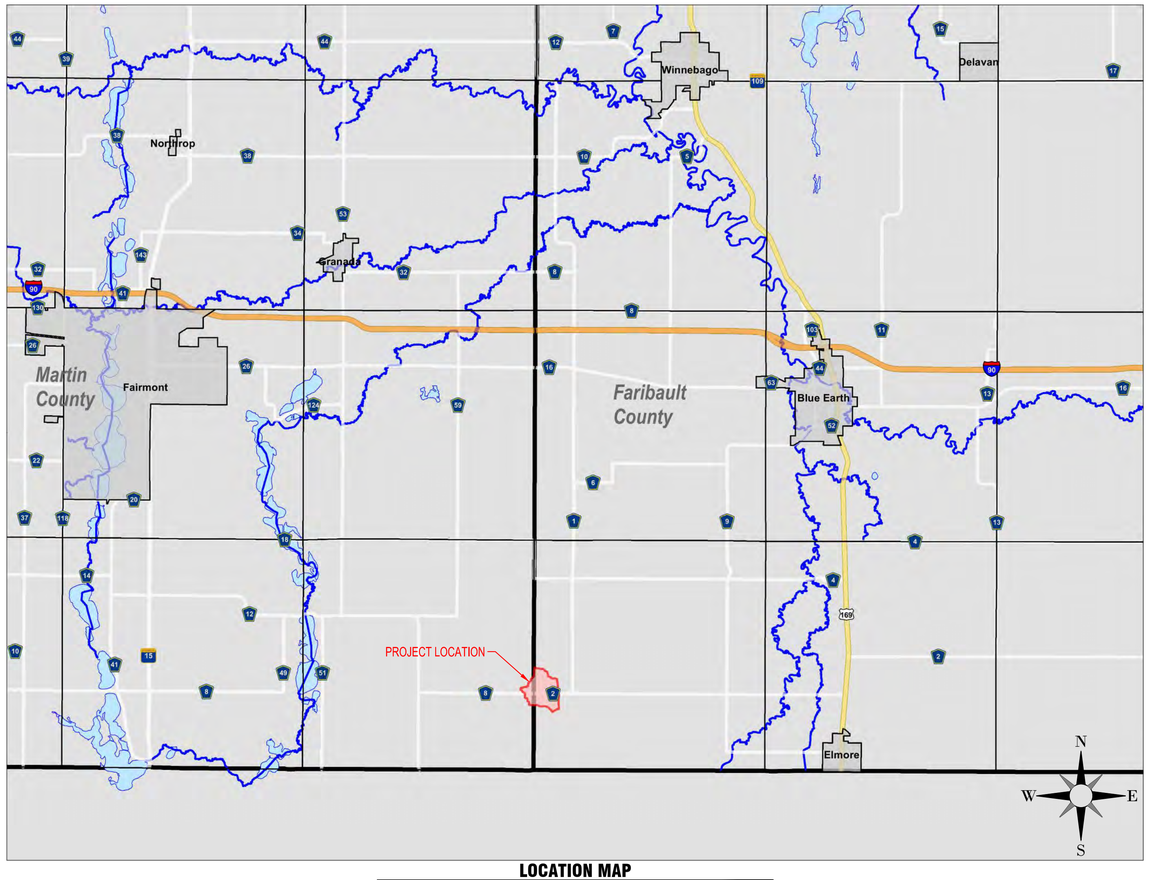
LEGEND

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
- DITCH 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)
- TILE
- TILE (PIPE WIDTH)
- 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

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4 DETAILS
5 DETAILS
6 DETAILS
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8 PROPOSED OVERALL
9 BRANCH A40 PLAN & PROFILE
10 BRANCH A40 PLAN & PROFILE
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14 BRANCH A46 PLAN & PROFILE
15 BRANCH A47 PLAN & PROFILE

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: MARTIN-FARIBAULT JOINT DRAINAGE AUTHORITY

OWNER NAME: MIKE FORSTNER

OWNER ADDRESS: 201 LAKE AVENUE, SUITE 201, FAIRMONT, MN 56081

PH: 507-238-3130

PROJECT ADDRESS / LOCATION:

SEC: 25
EAST CHAIN TWP

SEC: 19 & 30
PILOT GROVE TWP

MANAGING OFFICE:

MANKATO OFFICE
115 EAST HICKORY STREET
SUITE 300
MANKATO, MN 56001
PHONE: 507.387.6651
FAX: 507.387.3583

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

SPECIFICATIONS REFERENCE

ALL CONSTRUCTION SHALL COMPLY WITH THE MARTIN COUNTY 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 2013, UNLESS DIRECTED OTHERWISE.

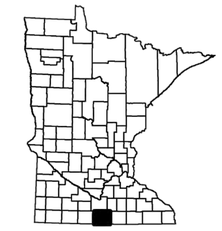
PROJECT DATUM

HORIZONTAL COORDINATES HAVE BEEN REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), 1996 ADJUSTMENT (NAD83(1996)) ON THE MARTIN 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=1161.22
48.78 FEET WEST OF CR 53
24.04 FEET S/SW OF N END OF CULVERT
1.5 FEET EAST OF WITNESS POST

TOPOGRAPHIC SURVEY

THIS PROJECT'S TOPOGRAPHIC SURVEY CONSISTS OF DATA COLLECTED IN SEPTEMBER-OCTOBER, 2019 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 THE STATE OF MINNESOTA.

PRELIMINARY NOT FOR CONSTRUCTION

DATE_____ LIC. NO._____

THIS DOCUMENT IS THE PROPERTY OF I & S GROUP, INC. AND MAY NOT BE USED, COPIED OR DUPLICATED WITHOUT PRIOR WRITTEN CONSENT.

PROJECT

MARTIN-FARIBAULT COUNTY

JUDICIAL DITCH No. 414 BRANCH A40 IMPROVEMENT

MARTIN-FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	19-23608
FILE NAME	23608 TITLE
DRAWN BY	DMP
DESIGNED BY	BPG
REVIEWED BY	MAO
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

TITLE

TITLE

SHEET

1 OF 15

GENERAL PROJECT NOTES:

1. DURING CONSTRUCTION, CONTRACTOR SHALL MAINTAIN A DRAINAGE OUTLET FOR THE ENTIRE JD 414 BRANCH A40 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.
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.
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

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 10 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)

TOTAL ESTIMATED QUANTITIES

Item Code	Item	Unit	Estimated Quantity
2021.501	MOBILIZATION	LS	1
2021.601	TILE INVESTIGATION	HR	23
2106.501	COMMON EXCAVATION (P) (EV)	CY	65340
2451.509	GRANULAR PIPE FOUNDATION	CY	781
2501.511	24-INCH CLASS III RCP PIPE	LF	108
2501.511	15-INCH CLASS III RCP PIPE	LF	72
2501.515	24-INCH RCP APRON	EA	6
2502.541	INSTALL 12-INCH PERFORATED TILE (WATER QUALITY INLET)	LF	158
2503.603	24-INCH AGRICULTURAL TILE	LF	4245
2503.603	18-INCH AGRICULTURAL TILE	LF	700
2503.603	15-INCH AGRICULTURAL TILE	LF	1758
2503.603	12-INCH AGRICULTURAL TILE	LF	1220
2503.603	10-INCH AGRICULTURAL TILE	LF	200
2503.603	8-INCH AGRICULTURAL TILE	LF	2399
2506.502	FURNISH & INSTALL WATER QUALITY INLET	EA	4
2506.502	INSTALL DROP INTAKE (18-INCH)	EA	15
2506.502	CAP DROP INTAKE (18-INCH)	EA	6
2506.516	INSTALL STRUCTURE S-1 WITH GALVINIZED GRATE	LS	3
2506.602	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	45
2506.602	CONNECT EXISTING 18-INCH TILE	EA	1
2506.602	CONNECT EXISTING 15-INCH TILE	EA	1
2506.602	CONNECT EXISTING 10-INCH TILE	EA	2
2506.602	CONNECT EXISTING 8-INCH TILE	EA	9
2506.602	CONNECT EXISTING 6-INCH TILE	EA	1
2506.602	15-INCH CROSS-CONNECT W/30 LF OF SPECIFIED PIPE	EA	1
2506.602	12-INCH CROSS-CONNECT W/30 LF OF SPECIFIED PIPE	EA	2
2506.602	8-INCH CROSS-CONNECT W/30 LF OF SPECIFIED PIPE	EA	1
2506.603	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1
2511.501	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	150
2575.501	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	1.19
2575.501	STANDARD SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH)	AC	1.29
2575.541	BUFFER STRIP MOWING	AC	2.37
2575.545	WEED SPRAYING	AC	3.66

ISG

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MARTIN-FARIBAULT COUNTY

JUDICIAL DITCH No. 414 BRANCH A40 IMPROVEMENT

MARTIN-FARIBAULT COUNTY MINNESOTA

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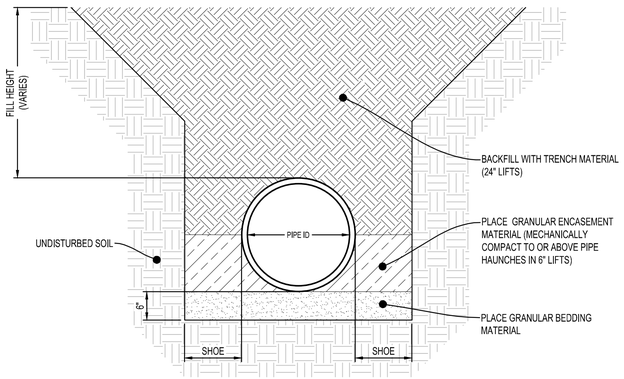
TITLE

NOTES AND QUANTITIES

SHEET

2 OF 15



NOTES:

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

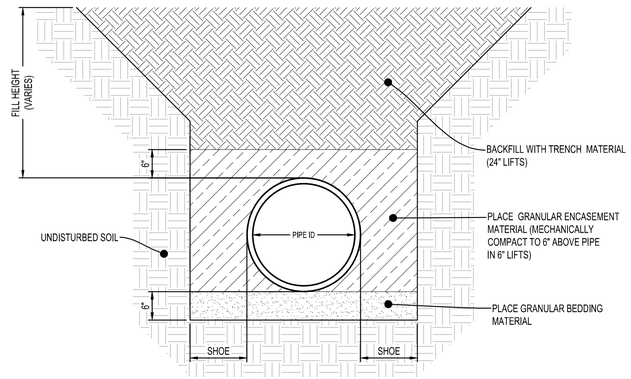
ALL PIPE WITH A FILL HEIGHT GREATER THAN 15-FEET SHALL BE FULLY ENCASED IN ASTM CLASS I MATERIAL.

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 AG100



NOTE:

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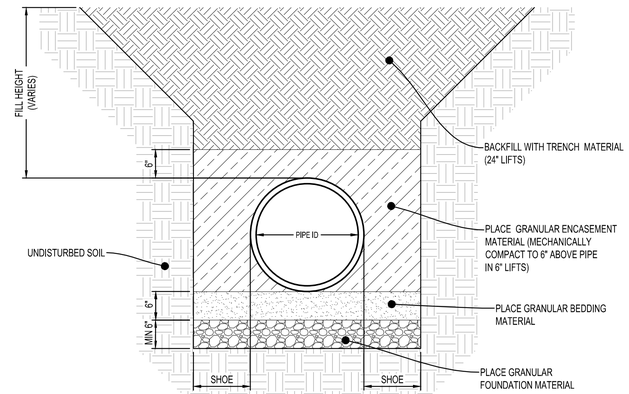
ALL PIPE WITH A FILL HEIGHT GREATER THAN 15-FEET SHALL BE FULLY ENCASED IN ASTM CLASS I MATERIAL.

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 AG110



NOTES:

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

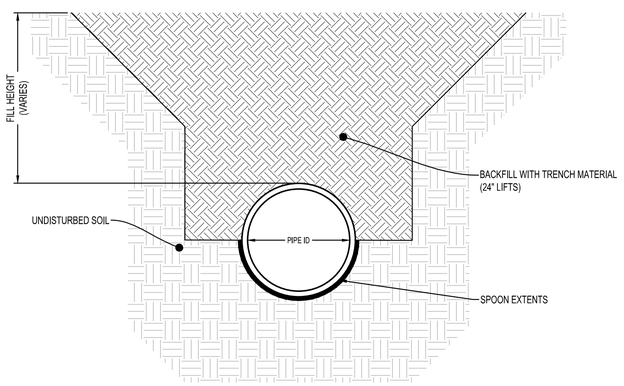
GRANULAR FOUNDATION BELOW THE PIPE SHALL BE PAID FOR BY THE CUBIC YARD, ONLY WHERE APPROVED BY THE FIELD ENGINEER.

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 AG120



NOTES:

BACKFILL SHALL BE INCIDENTAL TO CONSTRUCTION.

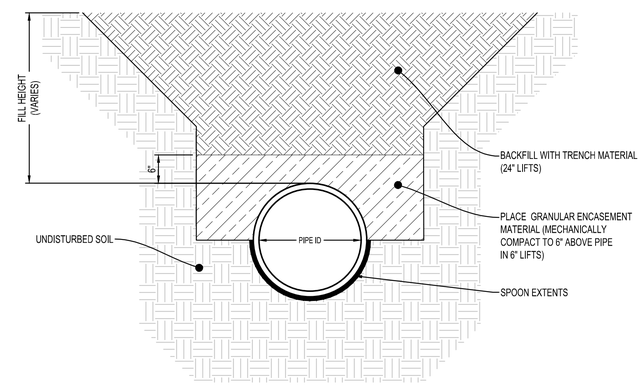
SPOON DIMENSIONS SHALL COMPLY WITH PIPE MANUFACTURER'S SPECIFICATIONS.

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 AG130



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 AG140

ISG

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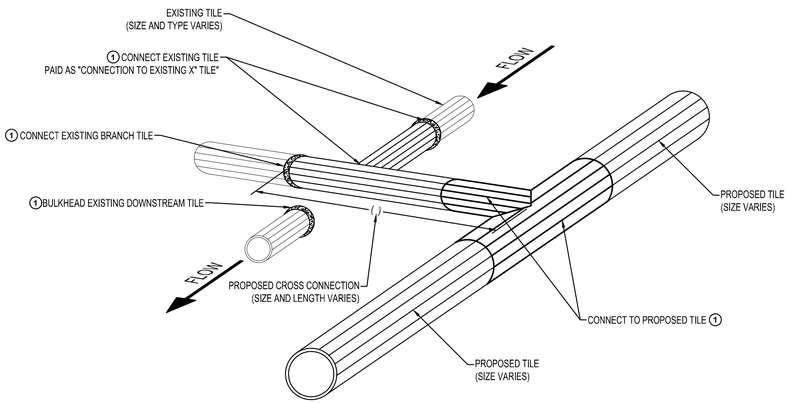
3

OF 15



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

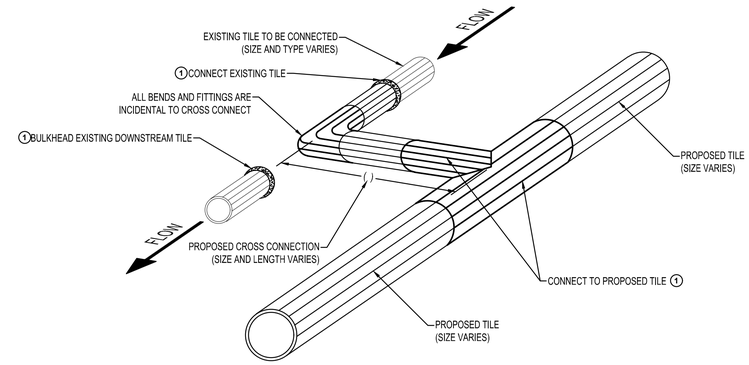
   CROSS CONNECTION SHALL BE CONSTRUCTED WITH HDPE TILE.

   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 AG220



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'

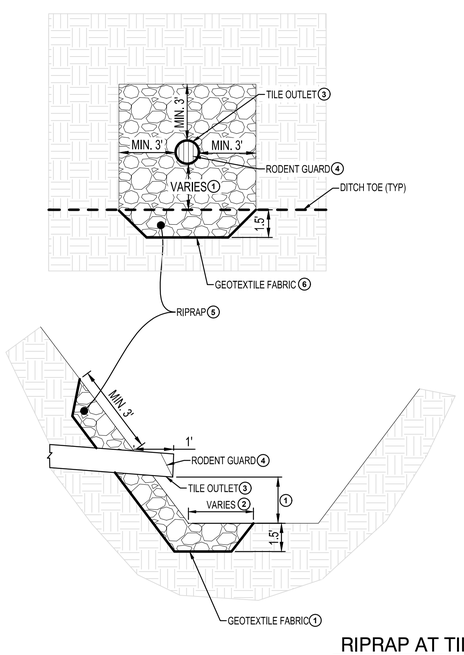
   CROSS CONNECTION SHALL BE CONSTRUCTED WITH HDPE TILE.

   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 AG225



DIMENSIONS	
NOMINAL PIPE DIA	RIPRAP 5
UNDER 12"	8 CY
12"-15"	8.5 CY
18" TO 36"	9 CY
42" TO 60"	10 CY
ABOVE 60"	12 CY

NOTES:

1. DISTANCE VARIES. REFER TO PLANS AND DETAILS.
2. DISTACE VARIES. 4' OR 1/2 OF DITCH BOTTOM, WHICHEVER IS GREATER.
3. SIZE AND TYPE VARIES. REFER TO PLANS AND SCHEDULES.
4. RODENT GUARDS SHALL BE INSTALLED ON ALL OUTLETS 18" AND SMALLER. (INCIDENTAL TO RESPECTIVE BID ITEMS).
5. RIPRAP SHALL BE MnDOT CLASS III, UNLESS OTHERWISE SPECIFIED. THE CUBIC YARD LISTED IN THE TABLE SHALL BE INCIDENTAL TO THE RESPECTIVE BID ITEM. ADDITIONAL RIPRAP SHALL BE PAID FOR BY THE CUBIC YARD INSTALLED.
6. GEOTEXTILE FABRIC SHALL BE MnDOT TYPE IV, (INCIDENTAL TO RESPECTIVE BID ITEM)

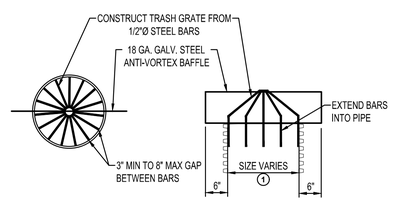
   RIPRAP DIMENSIONS SHOWN ARE TYPICAL AND MAY BE MODIFIED ON A SITUATIONAL BASIS, IF APPROVED BY THE ENGINEER.

   RIPRAP SHALL NOT IMPEDE FLOW FROM THE TILE OUTLET OR THE RECEIVING BODY.

   RIPRAP OF THE OPPOSITE BANK MAY BE REQUIRED BY THE ENGINEER IN THE FIELD OR AS CALLED OUT IN THE PLANS. PAID FOR BY THE CUBIC YARD INSTALLED.

RIPRAP AT TILE OUTLET

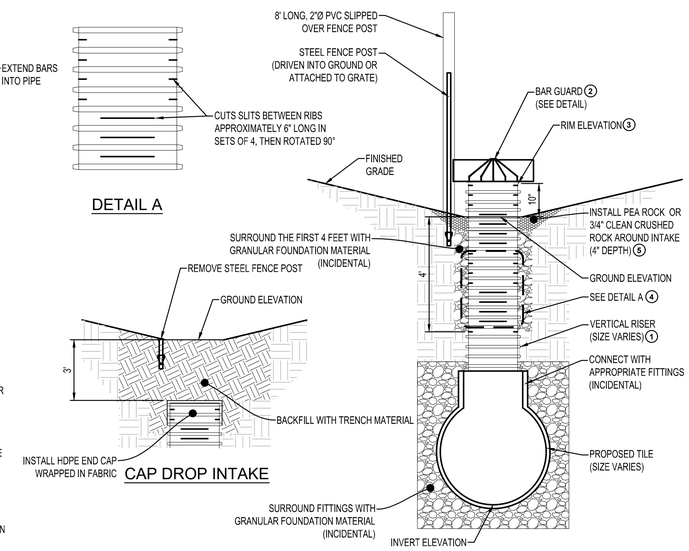
NTS AG640



HEAVY DUTY BAR GUARD

(INCIDENTAL)

DETAIL A



SECTION

CAP DROP INTAKE

NOTES:

1. INTAKES SHALL BE 18" FOR PROPOSED TILE LESS THAN 30" IN DIAMETER AND 24" FOR 30" DIAMETER AND LARGER.
2. INTAKE CAPS SHALL BE SUBSTITUTED FOR TRASH GRATES IN AREAS THAT WILL NOT TAKE SURFACE FLOW, AS APPROVED BY THE ENGINEER.
3. RIM ELEVATIONS SHALL BE ADJUSTED TO MATCH ACTUAL GROUND ELEVATION AT LOCATION OF INTAKE.
4. DETAIL A MAY BE INTERCHANGED WITH NARROW SLOTTED OR PERFORATED TILE.
5. GRANULAR FOUNDATION MATERIAL MAY BE SUBSTITUTED, IF APPROVED BY THE ENGINEER.

   ALL VERTICAL RISERS SHALL BE WRAPPED WITH MnDOT TYPE 1 GEOTEXTILE FABRIC. (INCIDENTAL TO EACH INTAKE)

   IF THE PROPOSED TILE SIZE IS LESS THAN 18" IN DIAMETER, REDUCERS SHALL BE USED ON BOTH SIDES OF AN 18" TEE FOR THE RISER. (TELEVISING ACCESS)

   ALL APPROPRIATE FITTINGS, FABRIC, GRANULAR FOUNDATION MATERIAL, BAR GUARD, ANTI-VORTEX BAFFLE, FENSE POST, AND PVC SHALL BE INCIDENTAL.

   VERTICAL RISERS MAY BE CUT DOWN AND BURIED AT 3' BELOW GRADE AFTER FINAL TELEVISING, PER LANDOWNER REQUEST. PAID FOR BY "CAP DROP INTAKE."

   INTAKES SHALL NOT BE BURIED AND CAPPED UNTIL FINAL TELEVISING HAS BEEN APPROVED BY THE ENGINEER.

DROP INTAKE

NTS AG240

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4

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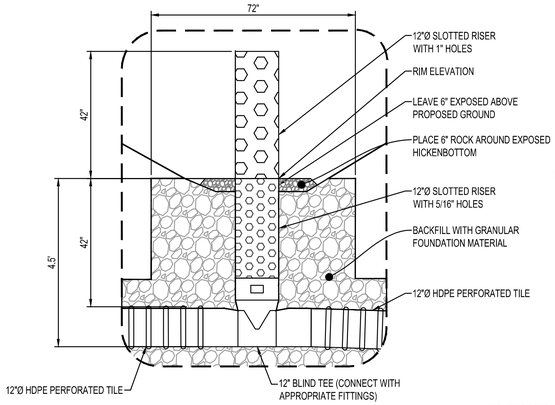
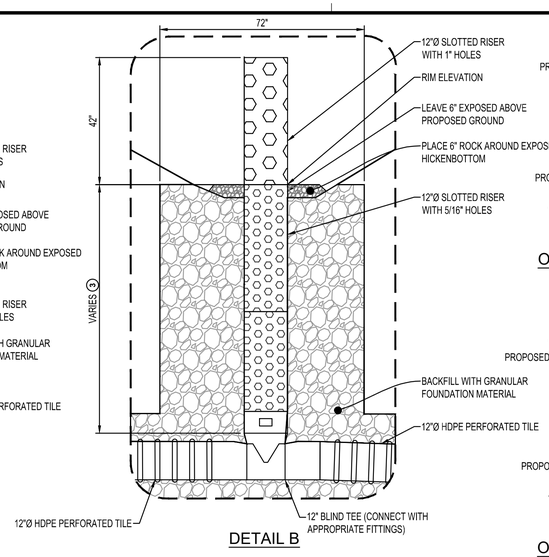


DETAIL A



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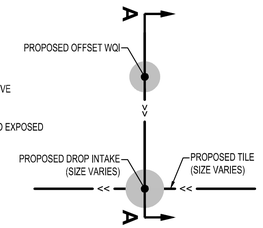
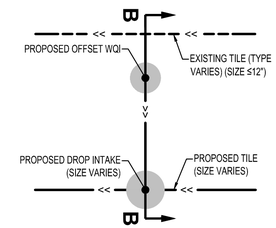
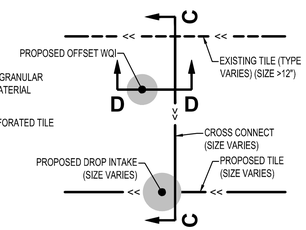


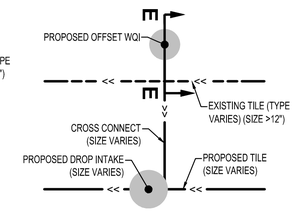
OFFSET WATER QUALITY INLET
WITH NO TILE CONNECTION



OFFSET WATER QUALITY INLET
WITH TILE CONNECTION (≤12")



OFFSET WATER QUALITY INLET
MID CROSS CONNECTION



OFFSET WATER QUALITY INLET
END OF CROSS CONNECTION

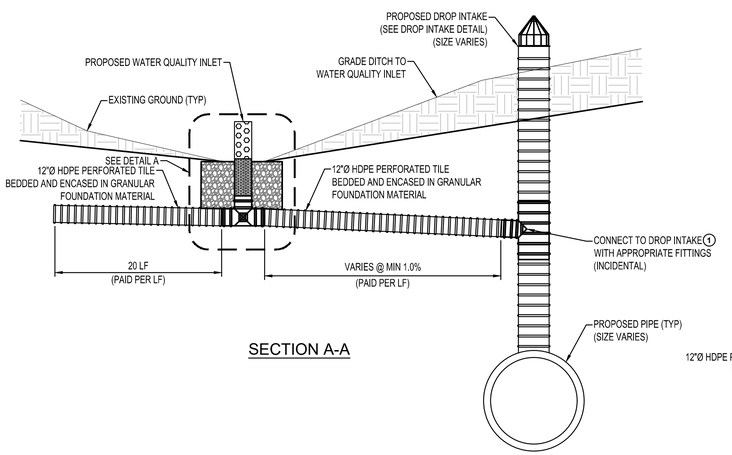
PLAN VIEWS

TYPICAL BID ITEM BREAKDOWN:

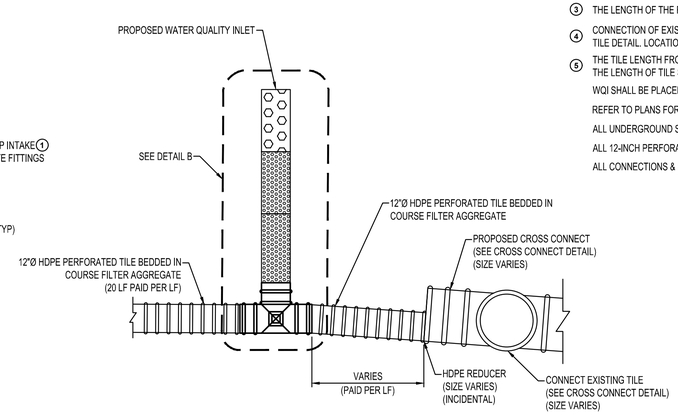
SITUATION	BID ITEMS
OFFSET WATER QUALITY INLET WITH NO TILE CONNECTION	1. FURNISH & INSTALL WATER QUALITY INLET (EA) 2. INSTALL 12-INCH PERFORATED TILE (WATER QUALITY INLET) (LF)
OFFSET WATER QUALITY INLET WITH TILE CONNECTION (≤12")	1. FURNISH & INSTALL WATER QUALITY INLET (EA) 2. INSTALL 12-INCH PERFORATED TILE (WATER QUALITY INLET) (LF) 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) 2. FURNISH & INSTALL WATER QUALITY INLET (EA) 3. INSTALL 12-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) 2. FURNISH & INSTALL WATER QUALITY INLET (EA) 3. INSTALL 12-INCH PERFORATED TILE (WATER QUALITY INLET) (LF)

BID ITEM INCIDENTALS:

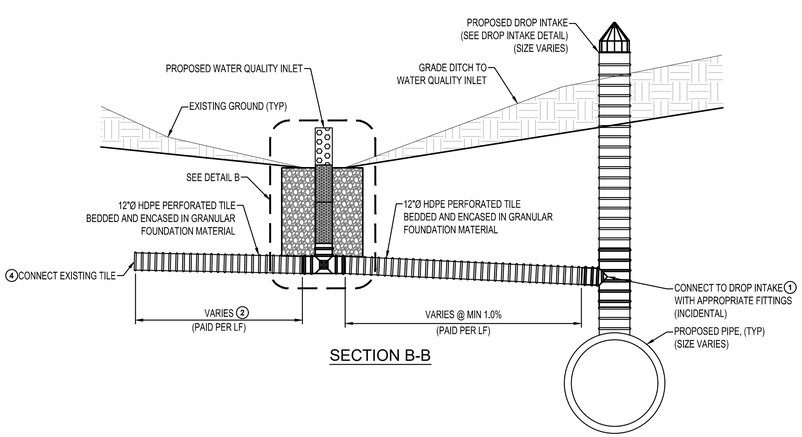
BID ITEM	UNIT	INCIDENTALS
FURNISH & INSTALL WATER QUALITY INLET	EA	ROCK, GEOTEXTILE FABRIC, RISER PIECES, BLIND TEE, FITTINGS, ALL CONNECTIONS
INSTALL 12-INCH PERFORATED TILE (WATER QUALITY INLET)	LF	PIPE, BEDDING AND ENCASEMENT MATERIAL
CONNECT EXISTING X-INCH TILE	EA	REFER TO CONNECT TO EXISTING TILE DETAIL
XX-INCH CROSS CONNECT W/ 40 LF OF SPECIFIED TILE	EA	REFER TO CROSS CONNECT TO EXISTING TILE DETAIL



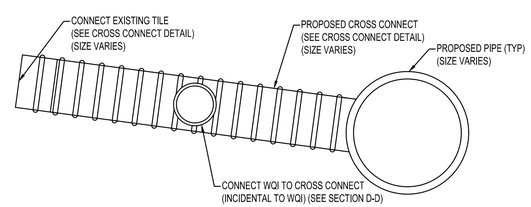
SECTION A-A



SECTION E-E



SECTION B-B



SECTION C-C

TYPICAL OFFSET WATER QUALITY INLET

NTS AG230

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.

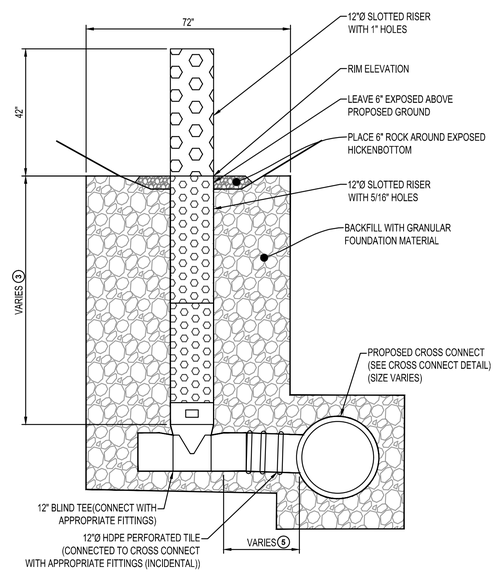
WQI SHALL BE PLACED IN THE LOW SPOT OF THE ROAD DITCH.

REFER TO PLANS FOR SIZES.

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

ALL 12-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

MARTIN-FARIBAULT COUNTY

JUDICIAL DITCH No. 414 BRANCH A40 IMPROVEMENT

MARTIN-FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	19-23608
FILE NAME	23608 NOTES & DETAILS
DRAWN BY	DMP
DESIGNED BY	BPG
REVIEWED BY	MAO
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

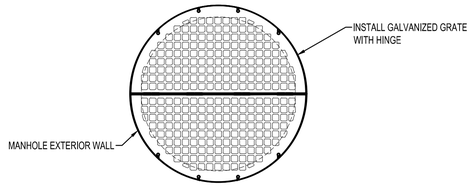
TITLE

DETAILS

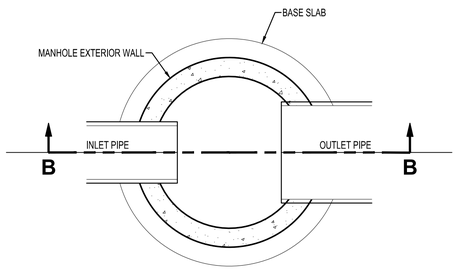
SHEET

5

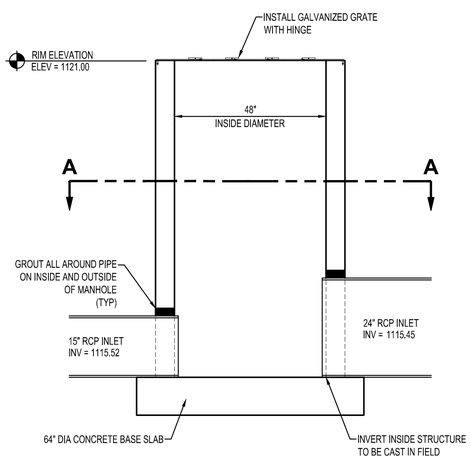
OF 15



PLAN
NTS

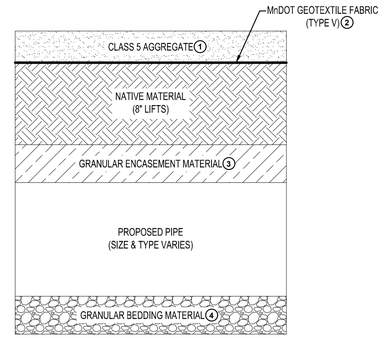


SECTION A-A



SECTION B-B

S-1
RCP OUTLET STRUCTURE
NTS AG600



NOTES:

1. SALVAGE AND REPLACE EXISTING CROSSING SURFACE MATERIAL.THE ROAD SLOPE AND WIDTH SHALL MATCH EXISTING CONDITIONS, UNLESS OTHERWISE SPECIFIED. ADDITIONAL CLASS 5 AGGREGATE MAY BE NEEDED TO MATCH EXISTING SECTION OR 10" MINIMUM FOR ROADWAYS, WHICHEVER IS GREATER. (INCIDENTAL TO OPEN CUT AND RESTORE GRAVEL ROADWAY)
2. GEOTEXTILE FABRIC SHALL BE INCIDENTAL TO OPEN CUT AND RESTORE GRAVEL ROADWAY.
3. REFER TO PIPE BEDDING DETAILS.
4. REFER TO PIPE BEDDING DETAILS, MAY BE EXISTING GROUND DEPENDING ON INSTALLATION METHOD.

ROAD SLOPE AND WIDTH SHALL MATCH EXISTING CONDITIONS, UNLESS OTHERWISE SPECIFIED.

DISTURBED SHOULDER AND ROAD DITCH SHALL BE SEEDED WITH MnDOT 25-142 ON CATEGORY 3 EROSION CONTROL BLANKET, UNLESS OTHERWISE SPECIFIED.

THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN THE DISTURBED ROADS UNTIL THE PROJECT IS COMPLETED OR ROAD AUTHORITY HAS RESUMED CONTROL; WHICHEVER IS SOONER.

TYPICAL GRAVEL ROAD CROSSING
NTS AG810

ISG

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PROJECT

MARTIN-FARIBAULT COUNTY

JUDICIAL DITCH No. 414 BRANCH A40 IMPROVEMENT

MARTIN-FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	19-23608
FILE NAME	23608 NOTES & DETAILS
DRAWN BY	DMP
DESIGNED BY	BPG
REVIEWED BY	CJB
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

TITLE

DETAILS

SHEET

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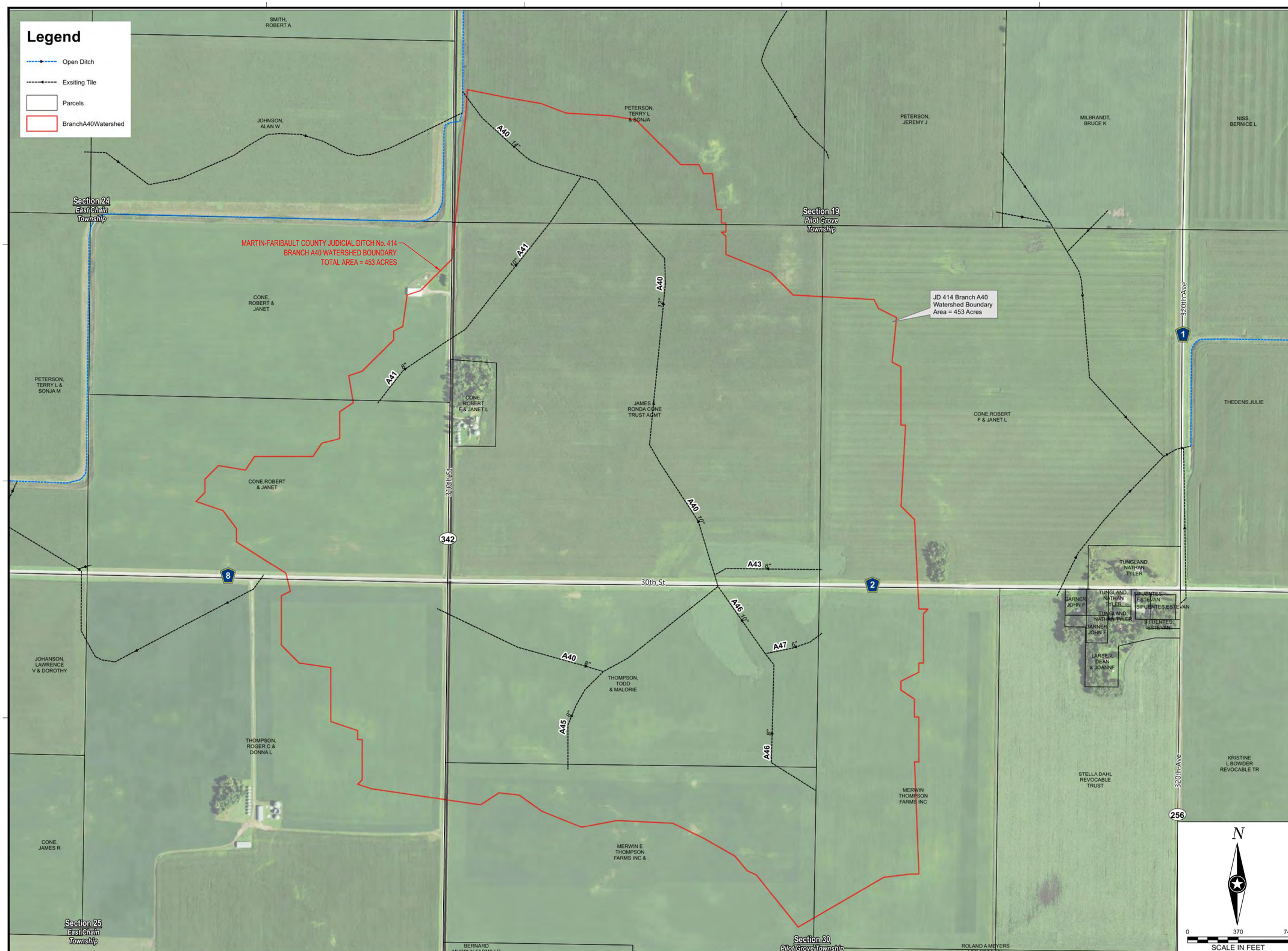

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TITLE

EXISTING OVERALL

SHEET

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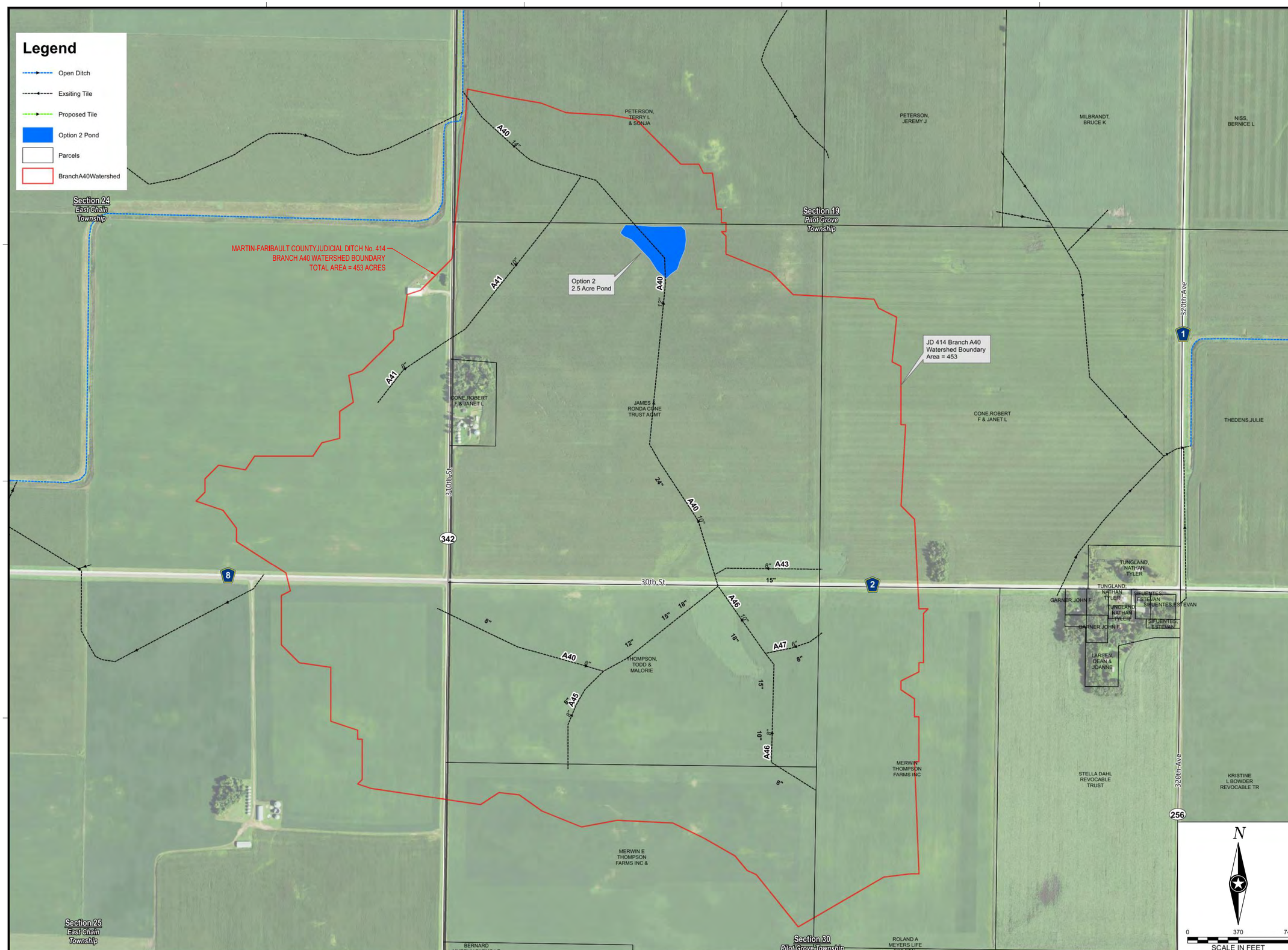

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CLIENT PROJECT NO.	-

TITLE

PROPOSED OVERALL

SHEET

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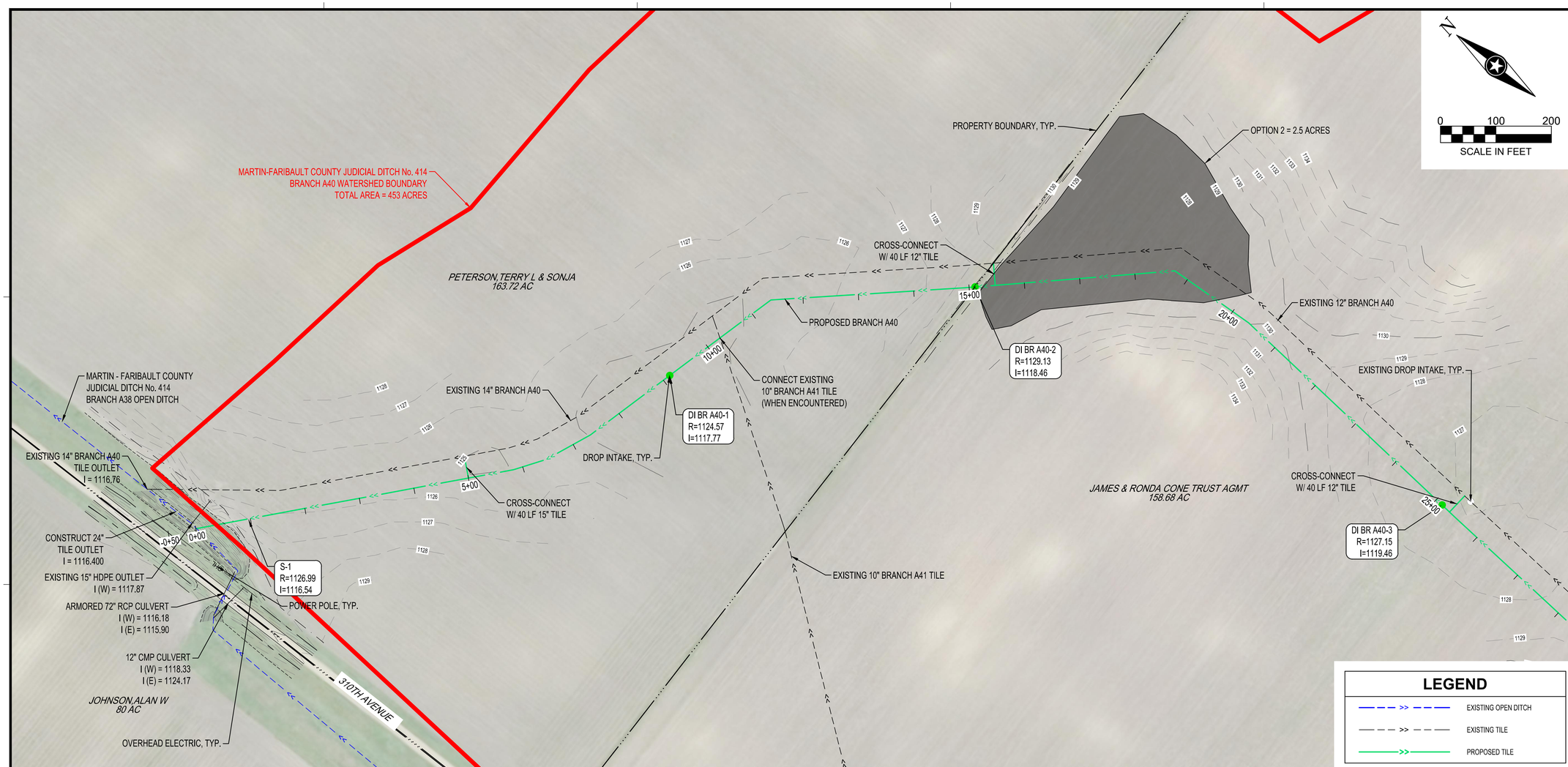
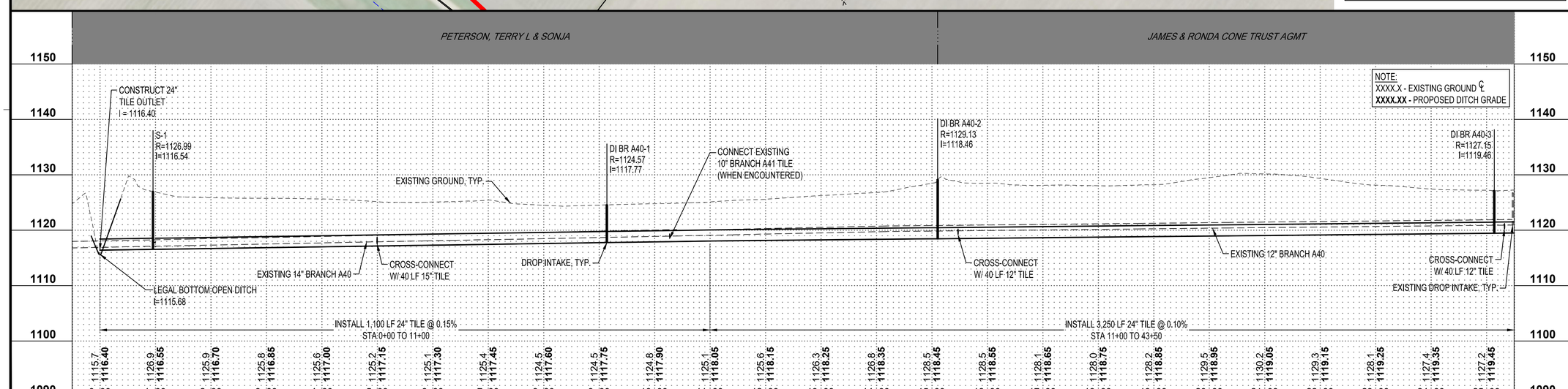
OF 15





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MARTIN-FARIBAULT COUNTY MINNESOTA

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CLIENT PROJECT NO.	-

TITLE

BRANCH A40 PLAN & PROFILE

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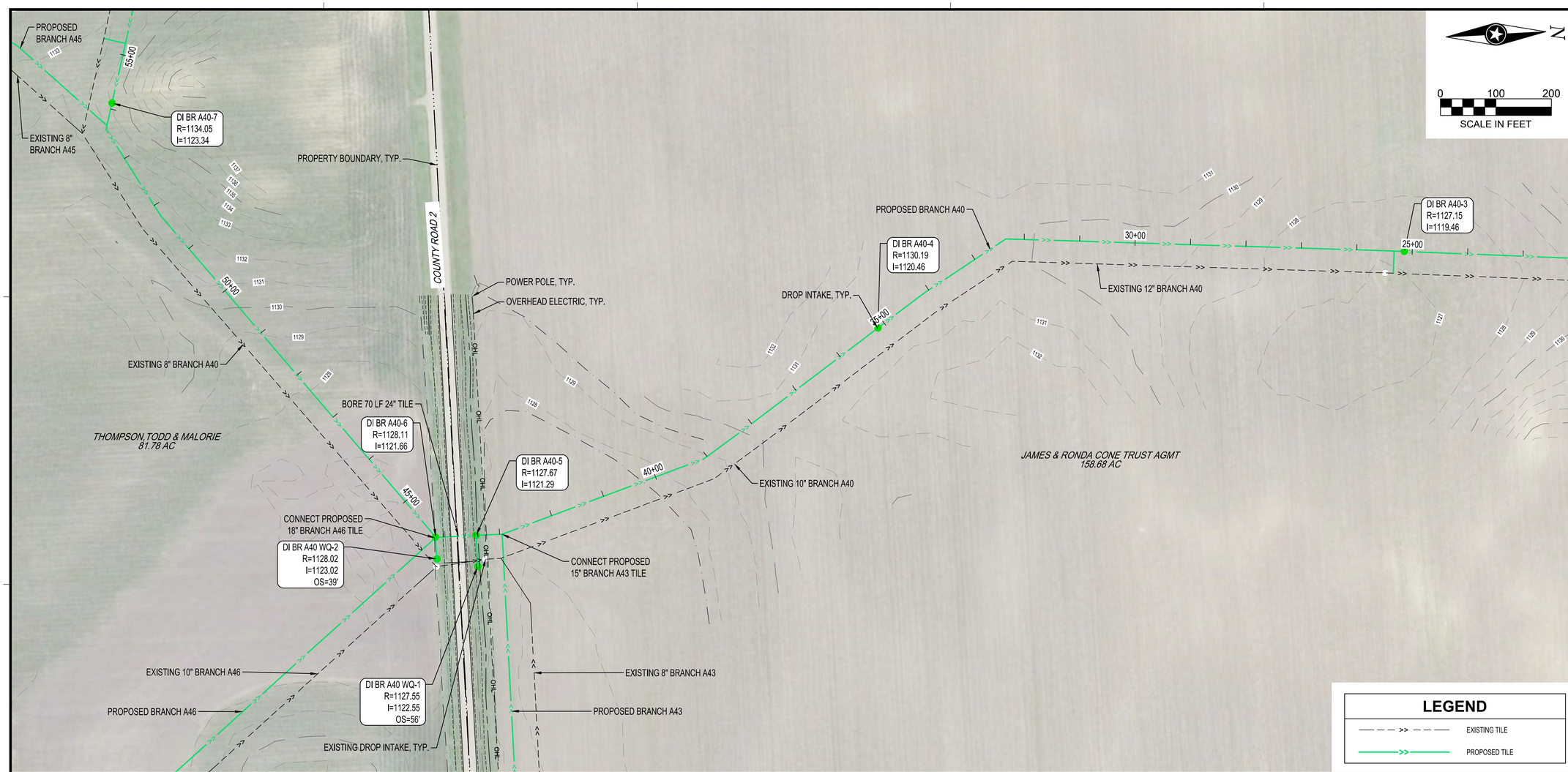
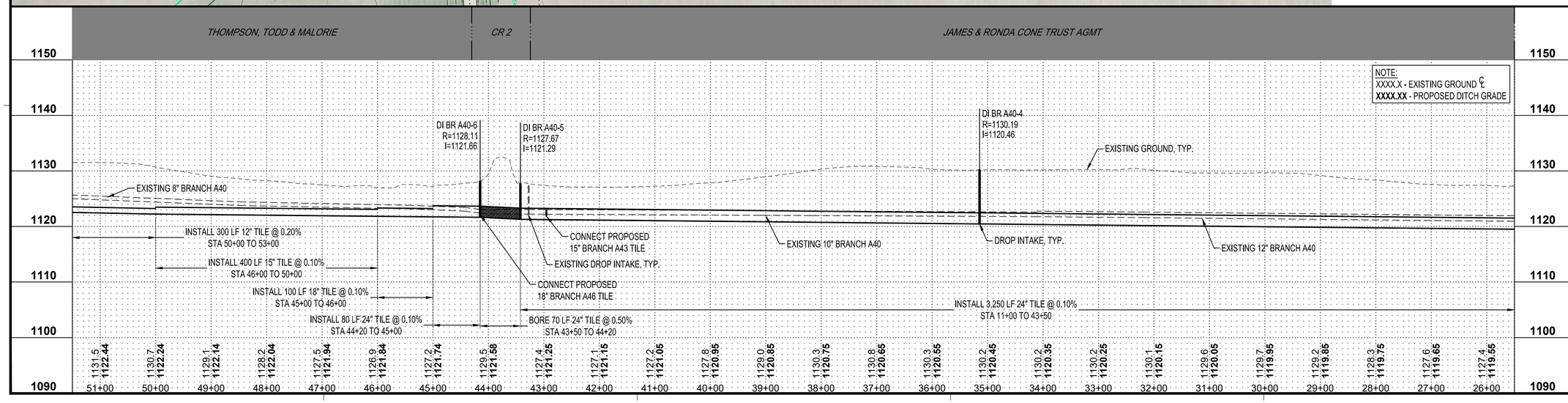


LEGEND

EXISTING TILE

PROPOSED TILE



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BRANCH A40 PLAN & PROFILE

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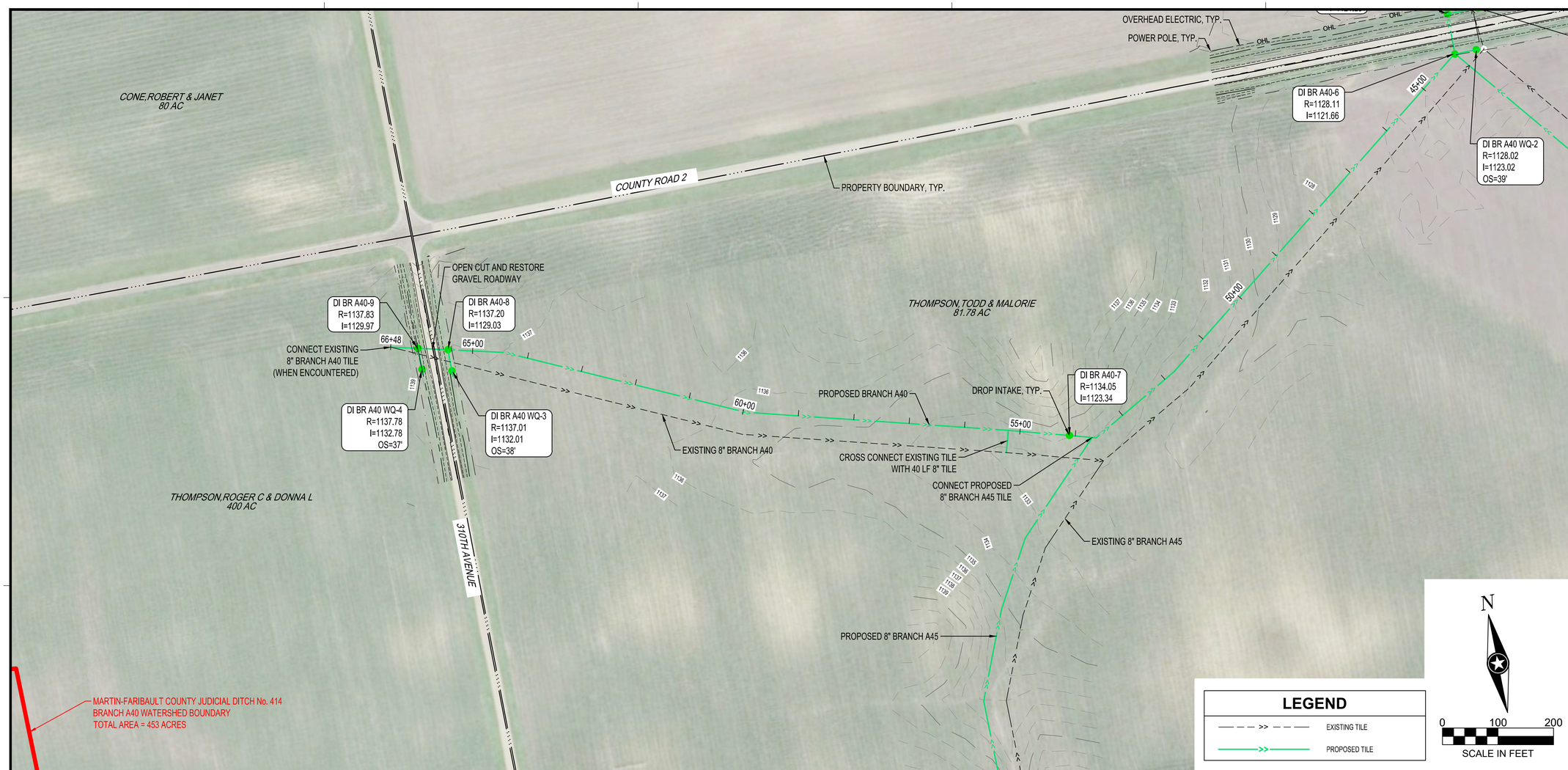

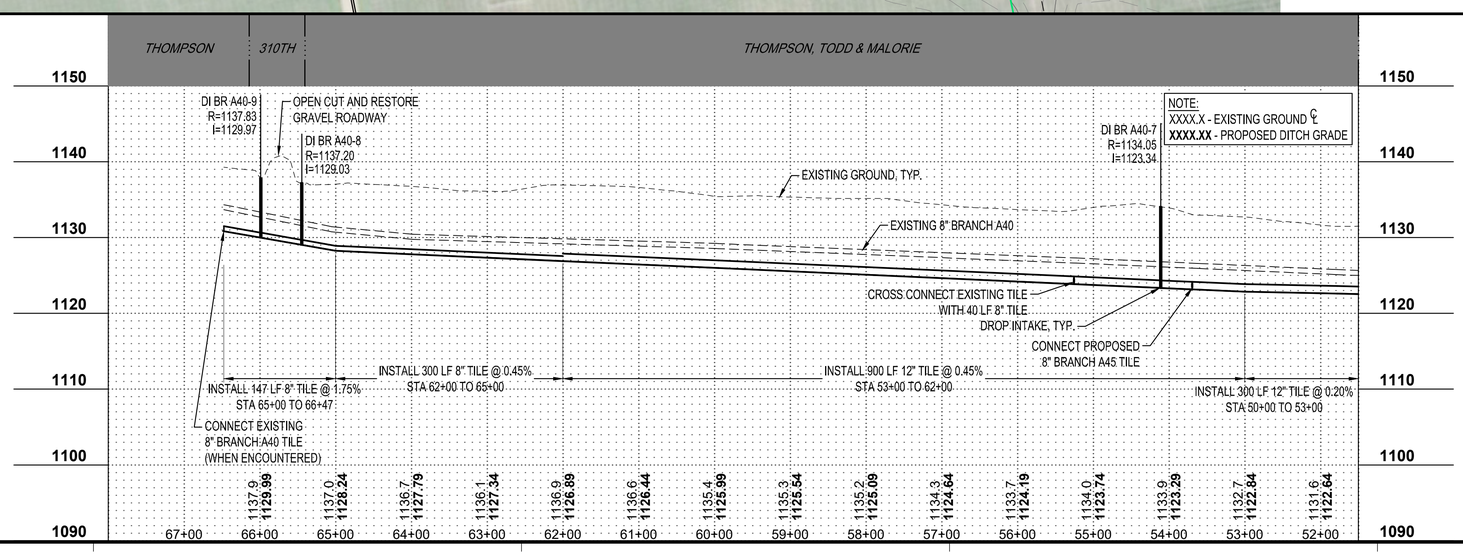

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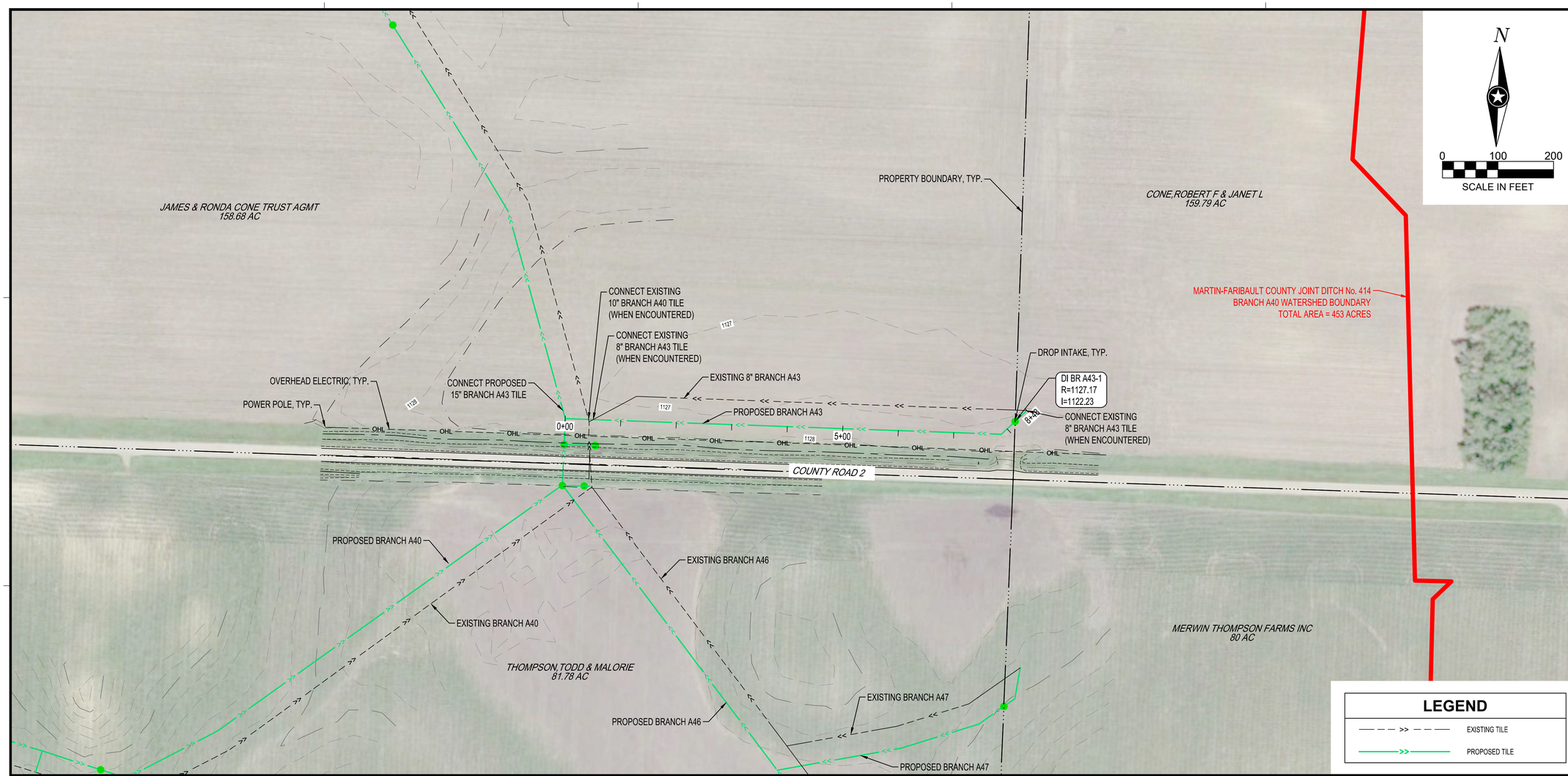

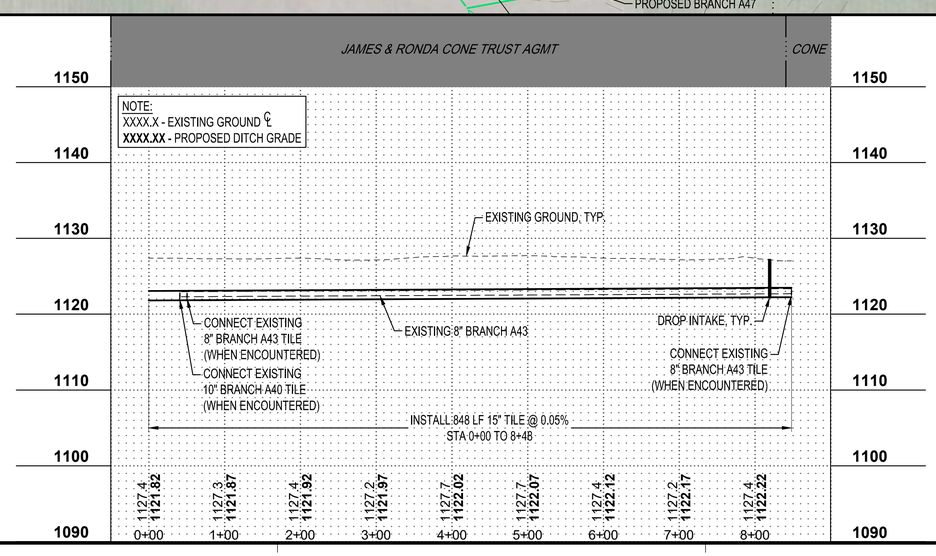

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BRANCH A43 PLAN & PROFILE

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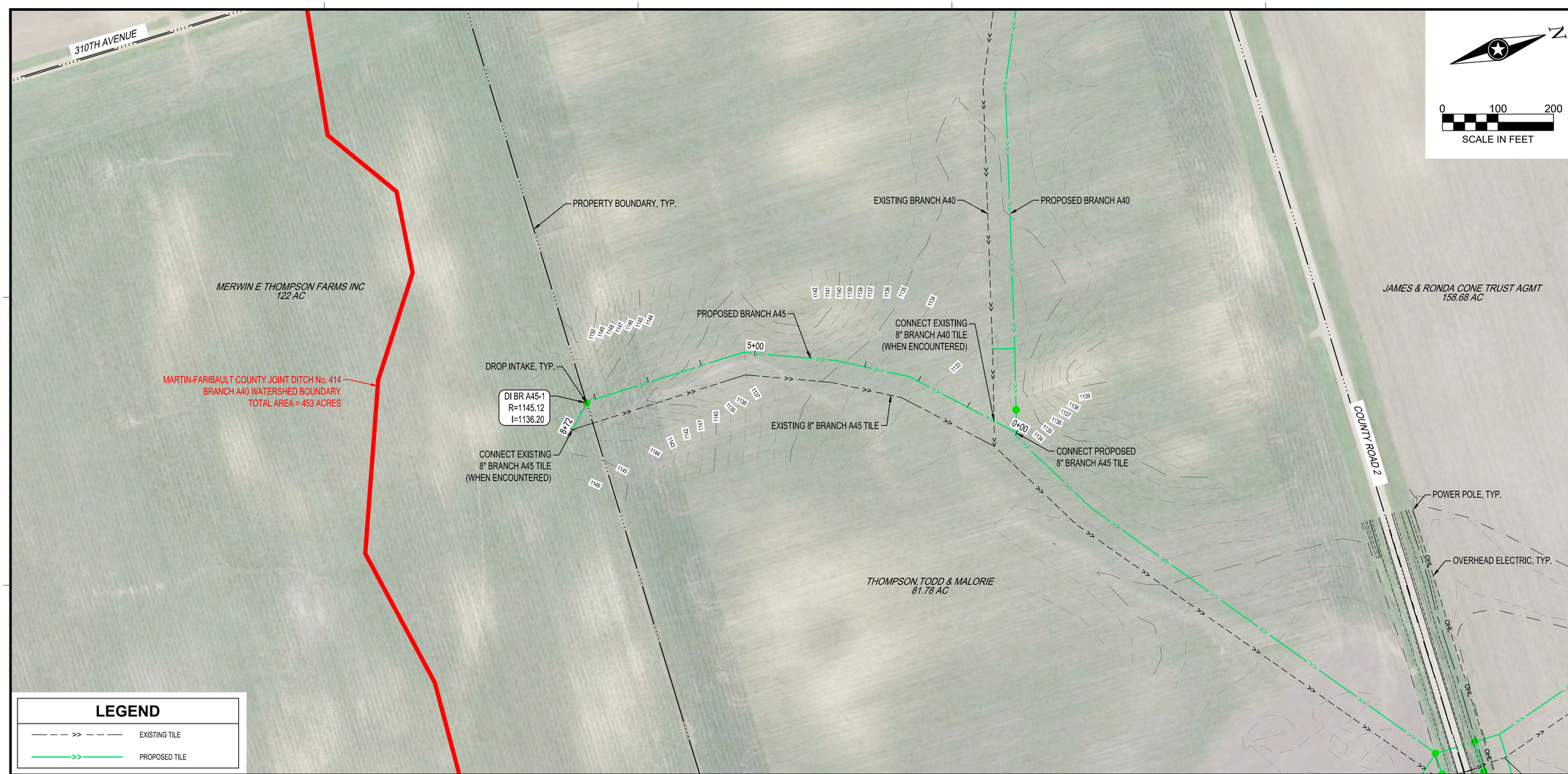

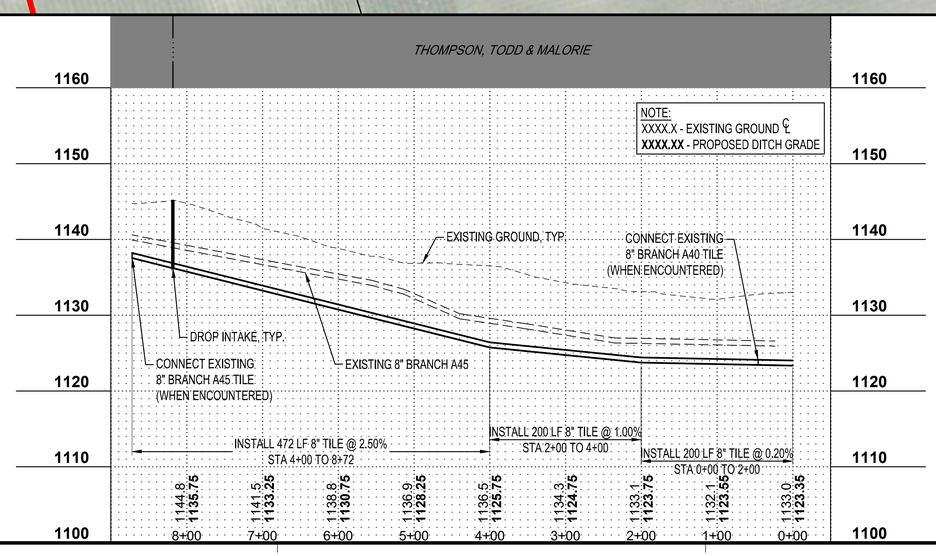

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MARTIN-FARIBAULT COUNTY MINNESOTA

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BRANCH A45 PLAN & PROFILE

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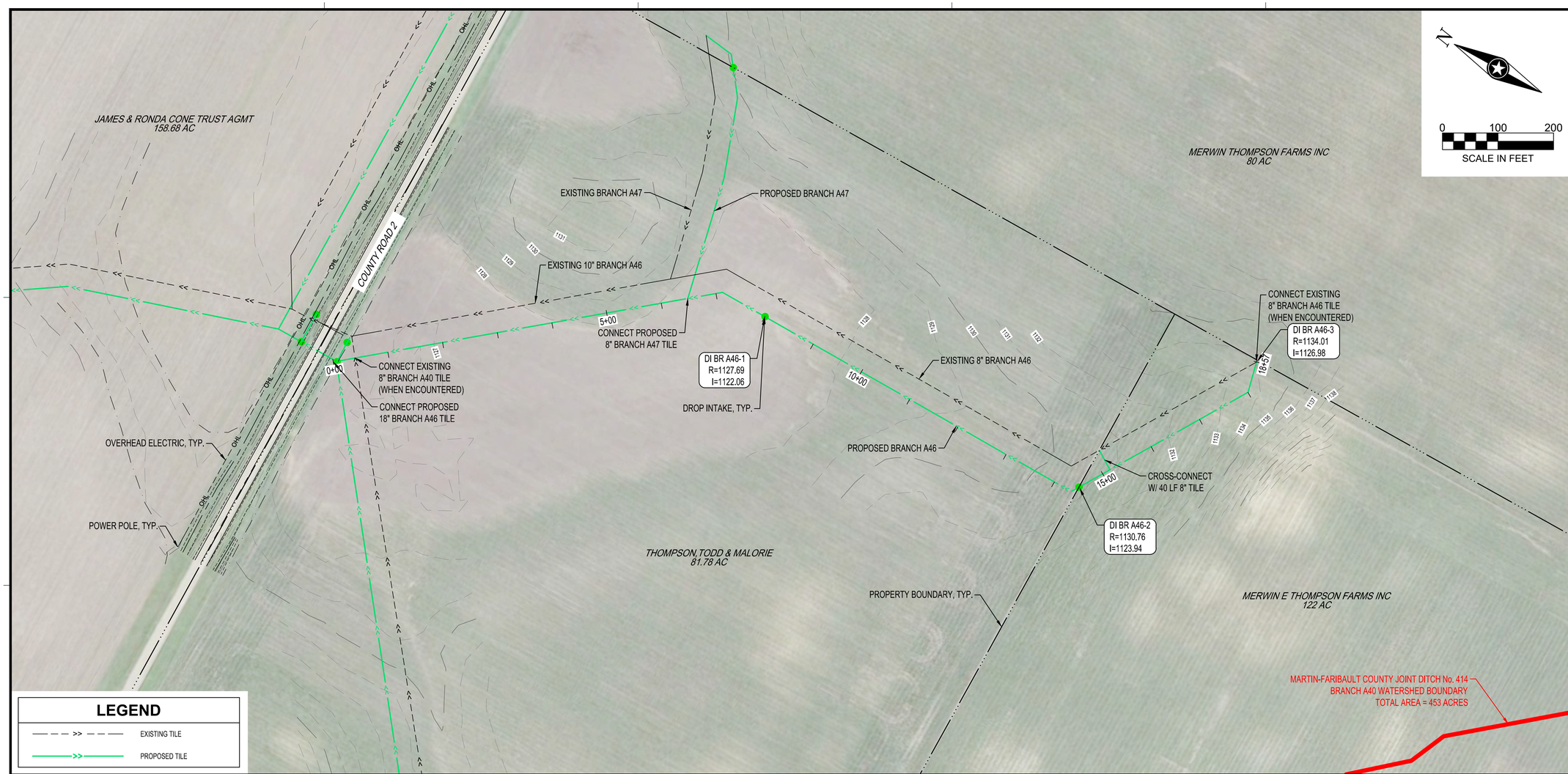

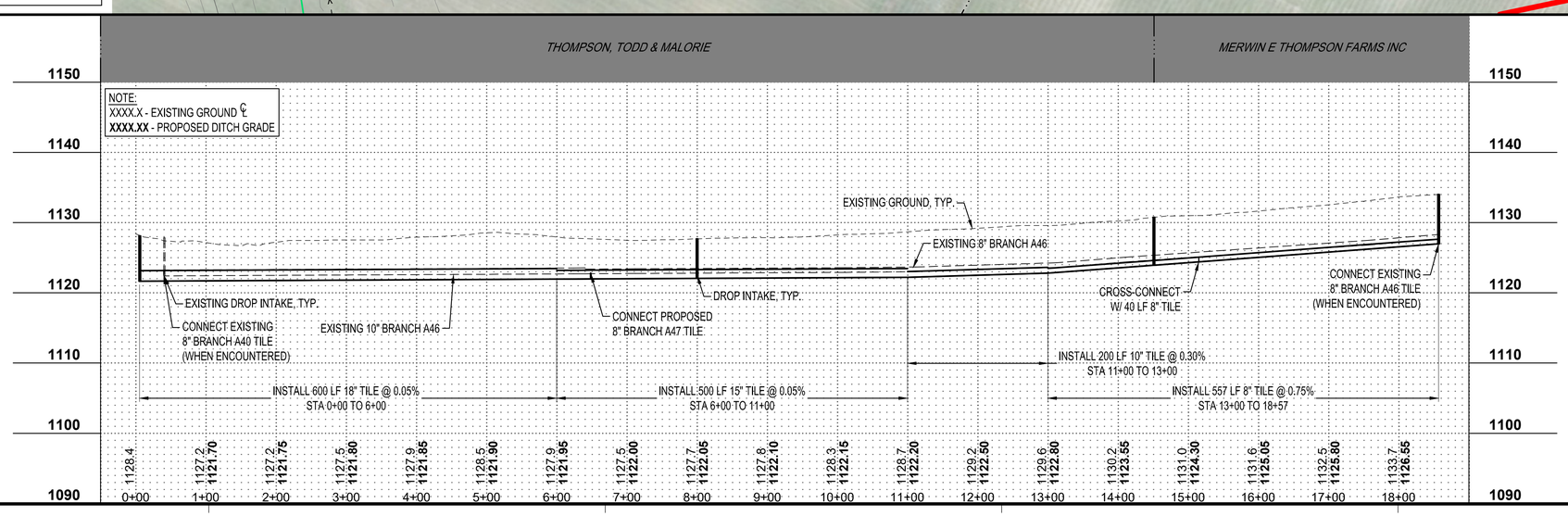

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FILE NAME	23608 PROF (BRANCH A46)-1
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BRANCH A46 PLAN & PROFILE

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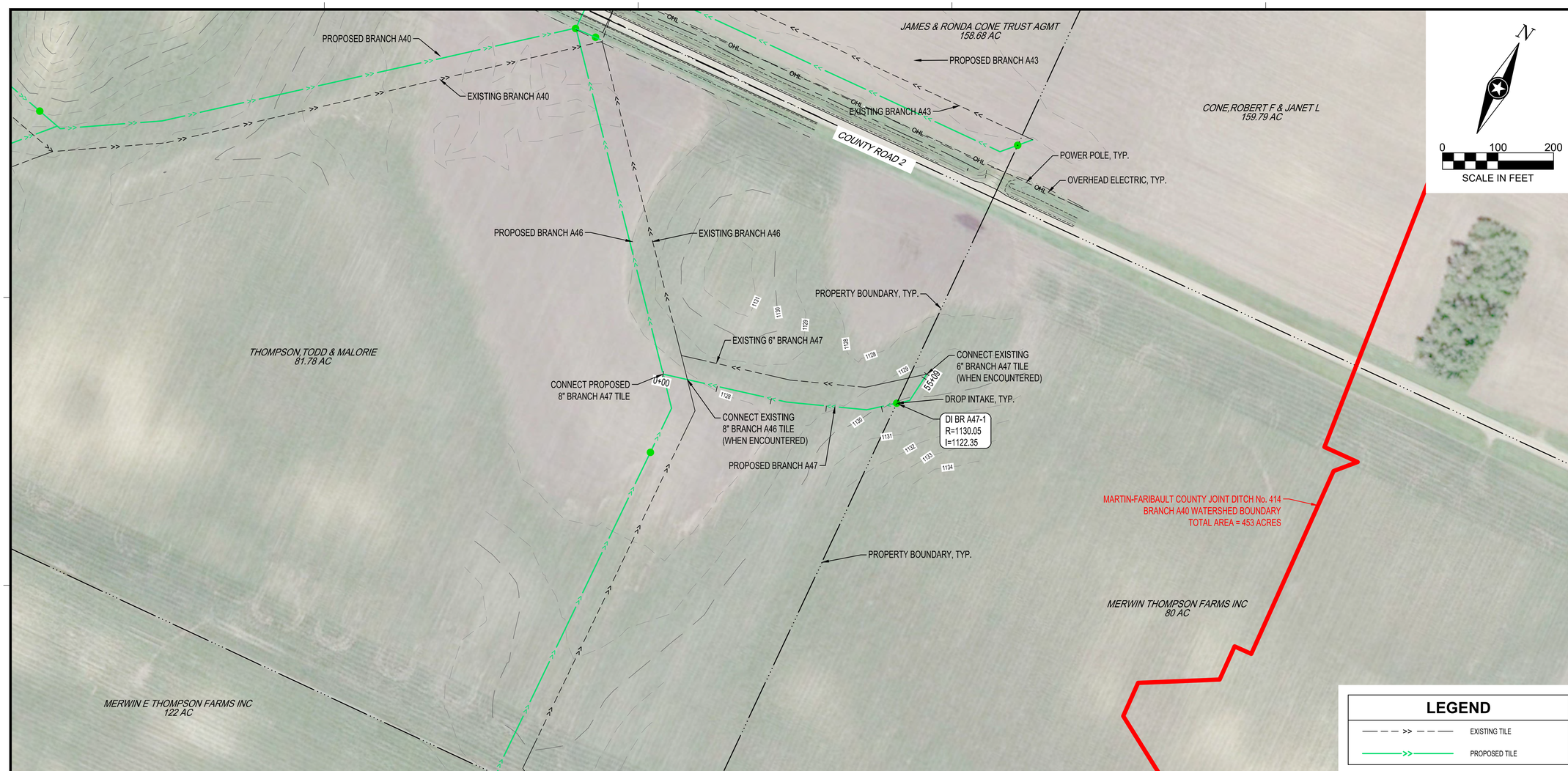

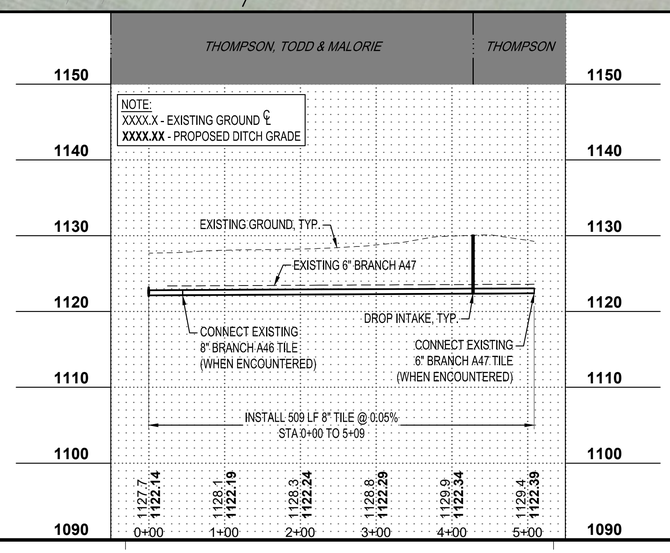

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FILE NAME	23608 PROF (BRANCH A47)-1
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REVIEWED BY	MAO
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

TITLE

BRANCH A47 PLAN & PROFILE

SHEET

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Appendix B: Order + Petition

Wendland
Sellers
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MAPLETON, MN 56065
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BRUCE E. SELLERS
SELLERS@WENDLANDLAW.COM

REPLY TO BLUE EARTH OFFICE

August 2, 2019

John Thompson
Faribault County Drainage Manager
PO Box 130
Blue Earth, MN 56013

RE: Improvement Petition for Faribault-Martin County Judicial Ditch No. 414
Our File No.: 3507.01

Dear Mr. Thompson:

Our office represents petitioners for the proposed improvement to Faribault-Martin County Judicial Ditch No. 414, Brach A40 ("J.D. 414" or "the system"). Pursuant to Minn. Stat. §103E.202, enclosed please find the following for filing:

1. Petition for Improvement of Faribault-Martin County Judicial Ditch No. 414 ("Petition"):
2. A Map referred to and incorporated as "Exhibit A" depicting the starting point and general course and terminus of the proposed improvement project which adequately satisfies the requirement under Minn. Stat. §103E.215, Subd. 4(c)(3): and
3. Corporate Surety Bond ("Bond") in the face amount of $50,000.00 payable to the Drainage Authority of Faribault-Martin County Judicial Ditch No. 414.

All information used to determine the delineation of the watershed boundary for J.D. 414, Branch A40 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 and Martin Counties 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 and Martin Counties, and, based on the section information (also provided by the

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

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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 with the information available through the Faribault and Martin Counties' GIS website and/or using the online Beacon software.

Pursuant to Minn. Stat. §103E.215, Subd. 4(a), a petition is considered to be adequate if it is signed by: (1) at least 26% of the owners of the property affected by the proposed improvements; OR (2) at least 26% of the owners of the property that the proposed improvement passes over; OR (3) the owners of at least 26% of the property area affected by the proposed improvement; OR (4) the owners of at least 26% of the property area that the proposed improvement passes over.

With respect to the adequacy of this Petition as it relates to satisfying the requirements of Minn. Stat. §103E.215, Subd. 4(a), I will address each sub-section of this particular statute.

(1) at least 26 percent of the owners of the property affected by the proposed improvement;

There are a total of 7 owners affected by the proposed improvement benefited or damaged by the project. I have submitted a petition which includes a total of 4 owners (57.14%) of property affected by the proposed improvement.

(2) at least 26 percent of the owners of property that the proposed improvement passes over;

There are a total of 7 owners of property that is bordered by, touched by, or is underneath the path of the proposed drainage project. I have submitted a petition which includes a total of 4 owners (57.14%) of property the proposed improvement "passes over".

(3) the owners of at least 26 percent of the property area affected by the proposed improvement; or

The Faribault-Martin County Judicial Ditch No. 414, Branch A40 watershed benefits a total property area consisting of approximately 445.19 acres. I have submitted a petition which includes a total of 4 owners owning a total of approximately 342.14 acres (76.85%) of the property area affected by the proposed improvement.

(4) the owners of at least 26 percent of the property area that the proposed improvement passes over.

The proposed improvement drainage project borders, touches, or is underneath the path of a total property area consisting of approximately 374.25 acres. I have submitted a petition which includes a total of 4 owners owning a total of approximately 289.23 acres (77.28%) of the property area that the proposed improvement passes over.

Therefore, I believe the petition satisfies the requirements of Minn. Stat. §103E.215, Subd. 4 by containing signatures the owners of (1) at least 26 percent of the owners of the property affected by the proposed improvement; (2) at least 26 percent of the owners of property that the proposed improvement passes over; (3) the owners of at least 26 percent of the property area affected by the proposed improvement; and (4) the owners of at least 26 percent of the property area that the proposed improvement passes over.

I have also enclosed a spreadsheet which details the information provided above. 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-Martin County Joint Board of Commissioners acting as Drainage Authority for Judicial Ditch No. 414.

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

Enc.

PETITION FOR AN IMPROVEMENT OF
FARIBAULT-MARTIN COUNTY JUDICIAL DITCH NO. 414

TO THE FARIBAULT AND MARTIN COUNTY JOINT BOARD OF COMMISSIONERS AS DRAINAGE AUTHORITY IN RELATION TO FARIBAULT-MARTIN COUNTY JUDICIAL DITCH NO. 414 ("DRAINAGE AUTHORITY")

The Petitioners herein respectfully represent:

WHEREAS, this Petition specifically relates to Branch A40 and its subsurface tile laterals, specifically, A41, A43, A45, A46, and A47 (together, "Branches"), of Faribault-Martin County Judicial Ditch No. 414 subsurface tile ("the system") located in Sections 19 and 30 of Pilot Grove Township, Faribault County, and Sections 24 and 25 of East Chain Township, Martin County, with the intention of improving the system by increasing the drainage capacity; and

WHEREAS, the Branches have insufficient capacity or requires enlarging in order to furnish sufficient capacity. Petitioners propose enlarging said Branches and laterals to furnish sufficient capacity thereof ("proposed Improvement Project"); and

WHEREAS, the starting point, general course and terminus of the proposed Improvement Project is depicted on Exhibit A which is attached hereto for reference; and

WHEREAS, Petitioners further 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 improvement of the drain capacity of the system that the engineer deems feasible, if any, including repairs to the current mainline open ditch and alternative outlets, if any; and

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

WHEREAS, Petitioners recognize that water storage benefits the entire system and requests that the engineer appointed by the Drainage Authority consider water storage designs into the proposed Improvement Project. Petitioners further request and will support actively seeking outside funding for said water storage; and

WHEREAS, a separable part of the drainage system may need repair. Petitioners requests, pursuant to Minn. Stat. §103E.215, subd. 6, that separable maintenance be used for those locations where existing tiles are being replaced with new tile. Petitioner requests that the appointed project engineer be ordered to determine a proportionate share of life span based on the existing condition versus the tiles original designed capacity. It is recommended by Petitioners that the separable maintenance to be paid by the entire system is that percentage of the in-place tile whose life span capacity has been used and that the improvement pay for that percentage of the tile, life span or capacity that still is in repair; and

WHEREAS, Petitioners request the engineer appointed by the Drainage Authority is asked to include in its detailed survey report a statement showing the proportionate estimated cost of the proposed improvement required to repair the separable part of the existing system and the estimated proportionate share of the cost of the added work required for the improvement. The Petitioners, as landowners, request that a percentage be paid as separable maintenance by the entire system and a percentage be paid for by the improvement benefits as determined by the appointed project engineer and viewers; and

WHEREAS, the names and addresses of owners of the property area that the Improvement passes over is depicted on the attached Exhibit A are as follows:

Tract 1*	
Owner/Address:	Terry L. & Sonja Peterson 2927 50th St. Blue Earth, MN 56013

Tract 2	
Owner/Address:	Terry L. & Sonja Peterson 2927 50th St. Blue Earth, MN 56013

Tract 3	
Owner/Address:	Robert F. & Janet L. Cone 389 Lake Aires Rd. Fairmont, MN 56031

Tract 4*	
Owner/Address:	James & Ronda Cone Trust Agreement James & Ronda Cone, Trustees 640 W Interlaken Rd. Fairmont, MN 56031

Tract 5*	
Owner/Address:	James & Ronda Cone Trust Agreement James & Ronda Cone, Trustees 640 W Interlaken Rd. Fairmont, MN 56031

Tract 5	
Owner/Address:	Robert F. & Janet L. Cone 389 Lake Aires Rd. Fairmont, MN 56031

Tract 6 Owner/Address:	Robert F. & Janet L. Cone 389 Lake Aires Rd. Fairmont, MN 56031

Tract 7 Owner/Address:	Robert F. & Janet L. Cone 389 Lake Aires Rd. Fairmont, MN 56031

Tract 8 Owner/Address:	Robert F. & Janet L. Cone 389 Lake Aires Rd. Fairmont, MN 56031

Tract 9* Owner/Address:	James & Ronda Cone Trust Agreement James & Ronda Cone, Trustees 640 W Interlaken Rd. Fairmont, MN 56031

Tract 9 Owner/Address:	Robert F. & Janet L. Cone 389 Lake Aires Rd. Fairmont, MN 56031

Tract 10* Owner/Address:	James & Ronda Cone Trust Agreement James & Ronda Cone, Trustees 640 W Interlaken Rd. Fairmont, MN 56031

Tract 11* Owner/Address:	Robert F. & Janet L. Cone 389 Lake Aires Rd. Fairmont, MN 56031

Tract 12* Owner/Address:	Merwin Thompson Farms, Inc. c/o Roger Thompson 190 280th Ave. Elmore, MN 56027

Tract 13* Owner/Address:	Todd & Malorie Thompson 268 280th Ave. Elmore, MN 56027

Tract 14* Owner/Address:	Todd & Malorie Thompson 268 280th Ave. Elmore, MN 56027

Tract 15* Owner/Address:	Roger Thompson & Donna Bosek Revocable Trust, et al. 10695 Kingsfield Lane Woodbury, MN 55139

Tract 16 Owner/Address:	Roger Thompson & Donna Bosek Revocable Trust, et al. 10695 Kingsfield Lane Woodbury, MN 55139

Tract 17* Owner/Address:	Merwin E. Thompson Farms, Inc. & Roger C. Thompson, et al. 190 280th Ave. Elmore, MN 56027

Tract 18* Owner/Address:	Merwin E. Thompson Farms, Inc. & Roger C. Thompson, et al. 190 280th Ave. Elmore, MN 56027

Tract 19* Owner/Address:	Merwin Thompson Farms, Inc. c/o Roger Thompson 190 280th Ave. Elmore, MN 56027

WHEREAS, this Petition is signed by at least 26% of the owners of the property area affected by the proposed improvement project; and WHEREAS, this Petition is signed by: (1) at least 26% of the owners of the property affected by the proposed improvements; (2) at least 26% of the owners of the property that the proposed improvement passes over; (3) the owners of at least 26% of the property area affected by the proposed improvement; or (4) the owners of at least 26% of the property area that the proposed improvement passes over; and

WHEREAS, Petitioner provides herewith a surety bond in the face amount of $50,000 payable to the Drainage Authority of Faribault-Martin County Judicial Ditch No. 414, said bond conditioned to pay the costs incurred if the proceeding are dismissed or a contract is not awarded to allow the costs incurred to exceed the amount of the bond and that they will cause additional bond to be filed if it appears that the costs exceed the amount of the bond; and

WHEREAS, Petitioner has been informed and understands that they may not withdraw as a Petitioner at any time after this Petition is accepted by the Drainage Authority. Petitioner further acknowledges that if the proposed drainage project is not constructed, they 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, this Petition may be signed in counterparts.

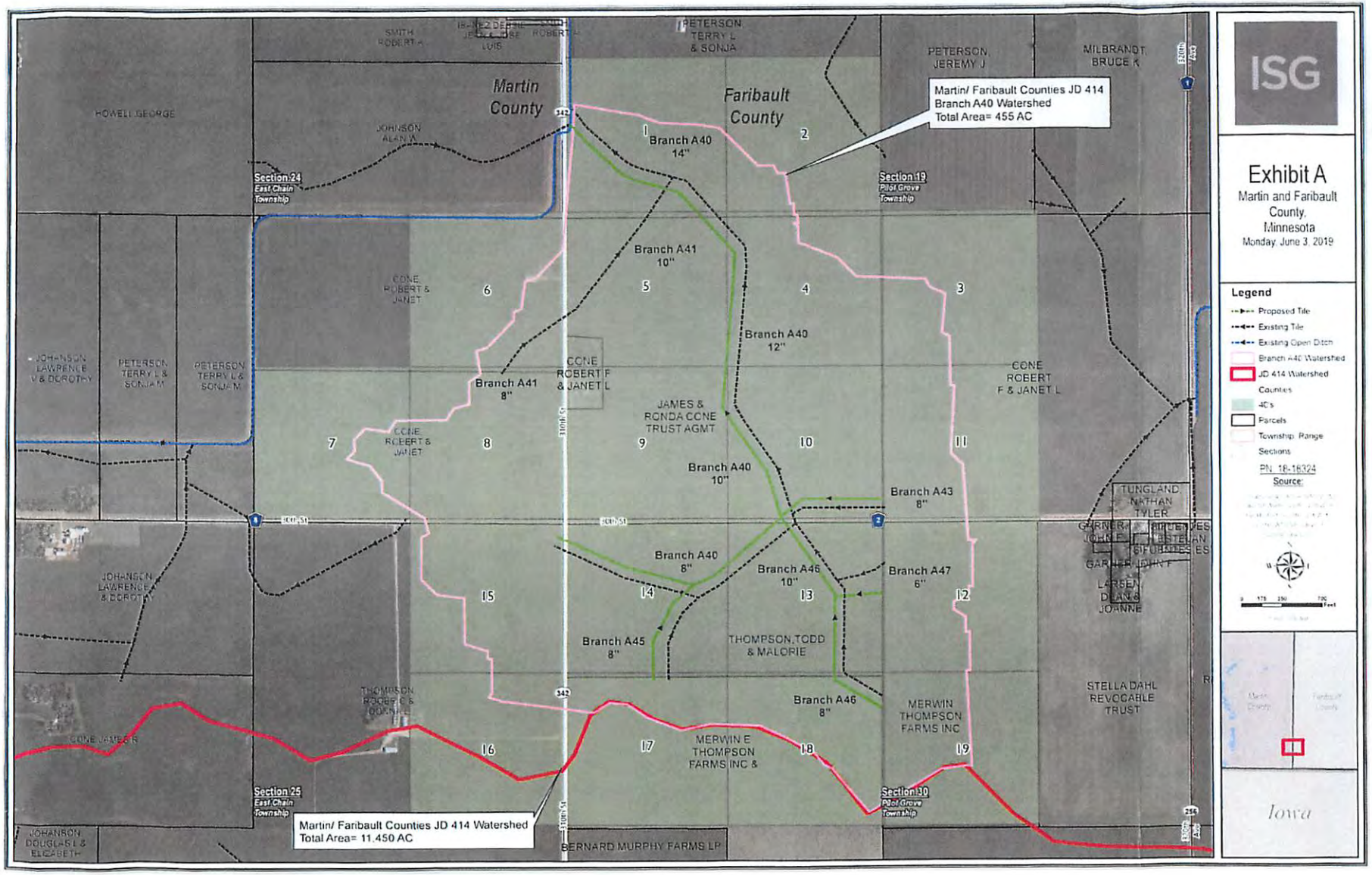
NOW THEREFORE, Petitioners request the Faribault County Auditor present this Petition to the Faribault County Board of Commissioners (after examination by legal counsel), and for the formation and appointment of members of the Faribault and Martin County Joint County Board of Commissioners, to act together as the drainage authority to oversee the proposed Improvement Project proceeding, and, after formation, further request the acceptance of the Petition and for the appointment of Chuck Brandel, I+S Group, or, in the alternative, another engineer skilled in public drainage matters, to examine the proposed work.

Owner Signature	Property Owned	Affected Acres
Robert F Cone Robert F. Cone	Parcel ID: 14.019.0100 Parcel ID: 03.024.0200 Parcel ID: 03.024.0600	33.50 9.22 39.13
Janet L Cone Janet L. Cone		

Owner Signature	Property Owned	Affected Acres
Trustee, James & Ronda Cone James & Ronda Cone Trust Agreement Trustee, James & Ronda Cone James & Ronda Cone Trust Agreement	Parcel ID: 14.010.0400	151.74
By: Todd Thompson Merwin E. Thompson Farms, Inc By: Its: Treasurer P.O.A	Parcel ID: 14.030.0100	36.56
Todd Thompson Malorie Thompson	Parcel ID: 14.030.0600	80.93

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 Bromeland, P.A.
825 East Second Street, P.O. Box 247
Blue Earth, MN 56013
507-526-2196


ISG
Exhibit A
Martin and Faribault County, Minnesota
Monday, June 3, 2019
Legend
Proposed Tile
Existing Tile
Existing Open Ditch
Branch A40 Watershed
JD 414 Watershed
Counties
40's
Parcels
Township, Range
Sections
PN 18-16324
Source:
Iowa
Martin County
Faribault County
Martin/ Faribault Counties JD 414
Branch A40 Watershed
Total Area= 455 AC
Martin/ Faribault Counties JD 414 Watershed
Total Area= 11,450 AC
Branch A40 14"
Branch A41 10"
Branch A40 12"
Branch A41 8"
Branch A40 10"
Branch A43 8"
Branch A40 8"
Branch A46 10"
Branch A47 6"
Branch A45 8"
Branch A46 8"
Section 24 East Chain Township
Section 19 Pilot Grove Township
Section 25 East Chain Township
Section 30 Pilot Grove Township
HOWELL GEORGE
JOHNSON ALAN W
PETERSON TERRY L & SONJA
PETERSON JEREMY J
MILBRANDT BRUCE K
CONE ROBERT & JANET
CONE ROBERT F & JANET L
JAMES & RONDA CONE TRUST AGMT
THOMPSON, TODD & MALORIE
MERWIN THOMPSON FARMS INC
MERWIN E THOMPSON FARMS INC &
STELLA DAHL REVOCABLE TRUST
TUNGLAND NATHAN TYLER
LARSEN DUANE & JOANNE
JOHANSON LAWRENCE V & DOROTHY
JOHANSON DOUGLAS L & ELIZABETH
BERNARD MURPHY FARMS LP

Auto-Owners Insurance
Life Home Car Business
The No Problem Place

Bond No. 66329842

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

SURETY BOND

KNOW ALL MEN BY THESE PRESENTS

That we, Todd Thompson and Faribault-Martin County Judicial Ditch 414 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 for Faribault-Martin County J D 414 in the penal sum of ($ 50,000.00)

Fifty Thousand and 00/100---------- 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 1st day of July, 2019.

WHEREAS the aforesaid Principal has petitioned to proceed in the matter of the improvements of multiple Branches of A40
(If a Public Official Bond insert "been elected or appointed (name) for the terms beginning (date) and ending (date)")

of Faribault-Martin County Judicial Ditch 414. Said petition is being addressed before the Board of Commissioners Drainage Authority
(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)")

of Faribault-Martin County pursuant to Minnesota Statutes 103E 215 with respect to a petition for improvement. (#1)
(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 contract is
(If a Public Official Bond insert "faithfully perform the duties of said office")

entered into for the construction of such improvement as proposed in the petition. Petitioners covenant they will not allow the costs
(If a License or Permit Bond insert "comply with the laws of the aforesaid Obligee governing said License or Permit")

incurred to exceed the amount of the bond submitted herewith. Being part of a County Ditch the improvement will be a public (#2)
Principal as (Guardian, Administrator, Conservator, Executor, etc.) will faithfully discharge the duties of their trust as Fiduciary of the person and/or estate in this matter according to law

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

PROVIDED: That the liability of the Surety shall in no event exceed the penalty of this Bond.

the petitioners acknowledge that they have been informed and understand that they may not withdraw as a petitioner at any time
(If no further conditions insert "no further conditions")

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.

Todd Thompson and Faribault-Martin County Judicial Ditch 414 landowners/petitioners
X
Principal

Auto-Owners
Surety

By
Attorney-in-Fact

AUTO-OWNERS INSURANCE SEAL

2948 (11-14)

BOND NUMBER_____
Todd Thompson and Faribault-Martin County Judicial Ditch 414

#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. 66329842

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 1st day of July, 2019.

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.)

NO. 66329842

Agency Name M & M INSURANCE AGENCY LLC Agency Code 06-0636-00

Name of Principal TODD THOMPSON AND FARIBAULT-MARTIN COUNTY JUDICIAL DIT Effective Date 07/01/2019

Mailing Address 268 280TH AVE, ELMORE, MN 56027-504 Premium Charge $1,080.00

Name of Obligee DRAINAGE AUTHORITY FOR FARIBAULT-MARTIN COUNTY JUDICIA 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	Affected Property Owners	Affected Property Owners Received	Passed Over Property Owners	Passed Over Property Owners Received	Total Affected Property Area	Affected Property Area Received	Total Passed Over Property Area	Passed Over Property Area Received
14.019.0300	1	TERRY L & SONJA PETERSON	1		1		24.67		24.67	0.00
14.019.0300	2	TERRY L & SONJA PETERSON					5.35			
14.019.0100	3	ROBERT F & JANET L CONE	1	1			8.92			
14.019.0400	4	JAMES & RONDA CONE TRUST AGREEMENT	1	1	1	1	32.19	32.19	32.19	32.19
14.019.0100	5	ROBERT F & JANET L CONE					1.89	1.89		
14.019.0400	5	JAMES & RONDA CONE TRUST AGREEMENT					38.65	38.65	38.65	38.65
03.024.0200	6	ROBERT F & JANET L CONE					9.22	9.22		
03.024.0600	7	ROBERT F & JANET L CONE					5.46	5.46		
03.024.0600	8	ROBERT F & JANET L CONE					33.67	33.67		
14.019.0100	9	ROBERT F & JANET L CONE					2.69	2.69		
14.019.0400	9	JAMES & RONDA CONE TRUST AGREEMENT					41.07	41.07	41.07	41.07
14.019.0400	10	JAMES & RONDA CONE TRUST AGREEMENT					39.83	39.83	39.83	39.83
14.019.0100	11	ROBERT F & JANET L CONE			1	1	20.00	20.00	20.00	20.00
14.030.0100	12	MERWIN THOMPSON FARMS INC	1	1	1	1	21.19	21.19	21.19	21.19
14.030.0600	13	TODD & MALORIE THOMPSON	1	1	1	1	38.70	38.70	38.70	38.70
14.030.0600	14	TODD & MALORIE THOMPSON					42.23	42.23	42.23	42.23
03.025.0100	15	ROGER THOMPSON & DONNA BOSEK REVOCABLE TRUST ET AL	1		1		28.55		28.55	0.00
03.025.0100	16	ROGER THOMPSON & DONNA BOSEK REVOCABLE TRUST ET AL					3.75			
14.030.1200	17	MERWIN E THOMPSON FARMS INC & ROGER C THOMPSON ET AL	1		1		10.89		10.89	0.00
14.030.1200	18	MERWIN E THOMPSON FARMS INC & ROGER C THOMPSON ET AL					20.91		20.91	0.00
14.030.0100	19	MERWIN THOMPSON FARMS INC					15.37	15.37	15.37	15.37
			7	4	7	4	445.19	342.14	374.25	289.23
				57.14%		57.14%		76.85%		77.28%

Parcels, Tracts, and Owners considered "passed over" are marked in red

BEFORE THE JOINT BOARD OF
MARTIN & FARIBAULTCOUNTY COMMISSIONERS,
ACTING AS DRAINAGE AUTHORITY
FOR MARTIN & FARIBAULT COUNTY JD #414

Findings of Fact and Order Regarding Acceptance of Petition and Appointment of Engineer

WHEREAS, a Petition was submitted to the Joint Board of Martin & Faribault County Board of Commissioners, acting as Drainage Authority for Martin & Faribault County JD #414, requesting the Improvement of Branch A40 of Martin & Faribault County JD #414; and

WHEREAS, the Petition was referred to Kurt Deter to review to establish that it meets the requirements of the a Petition, under Minnesota Statutes 103E.215; and

WHEREAS, the Petition does meet the requirements under Minnesota Statutes 103E.215.

NOW, THEREFORE, the Joint Board of Martin & Faribault County Board of Commissioners, acting as Drainage Authority for Martin & Faribault County JD #414, makes the following Findings of Fact and Order:

FINDINGS OF FACT

1. That the Petition is accepted as meeting the requirements of Minnesota Statutes 103E.215.

2. That I&S Group has been recommended to be the engineers for the proposed Improvement project.

ORDER

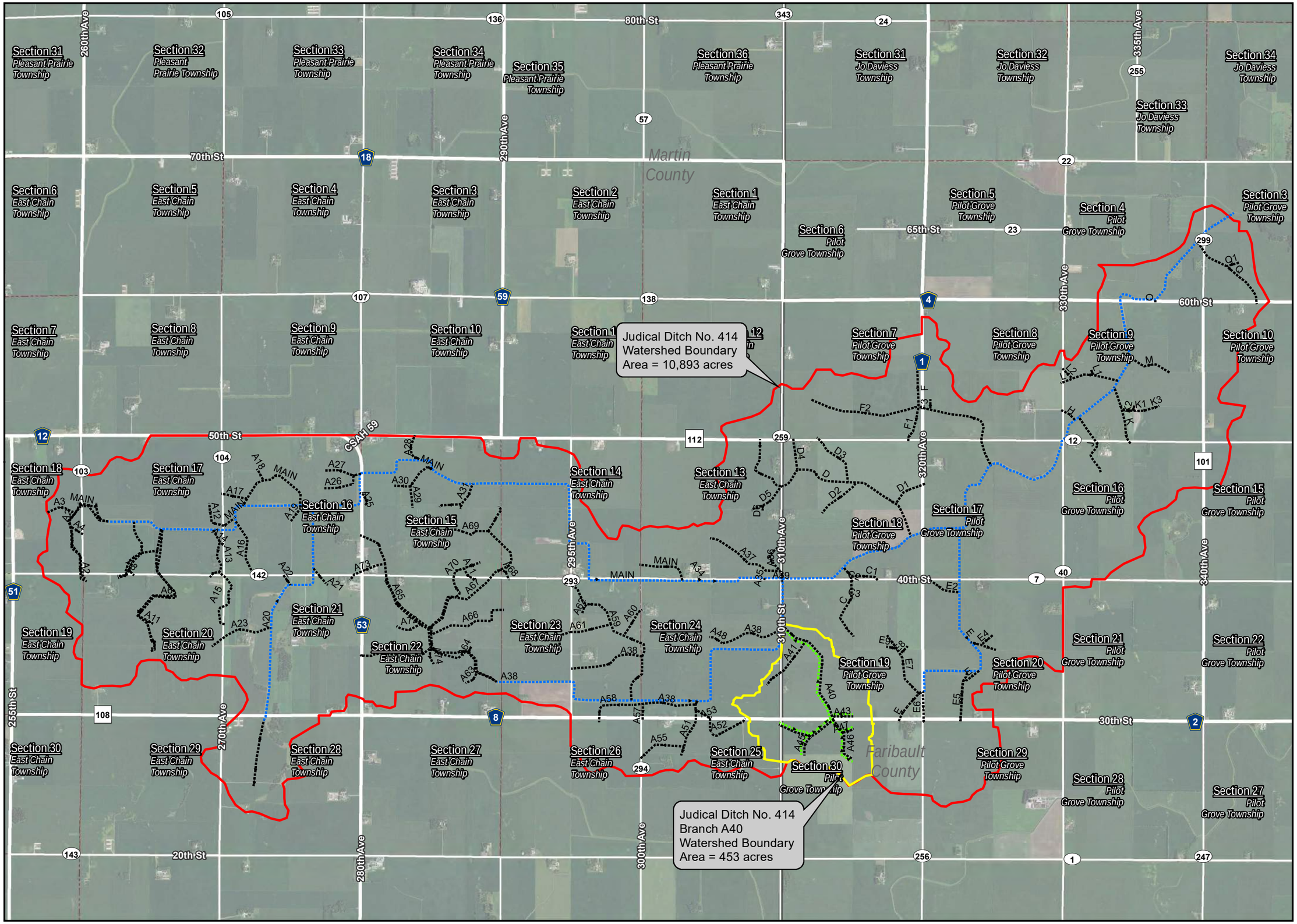
NOW, THEREFORE, it is hereby ordered that the Petition is accepted for the Improvement of Branch A40 of Martin & Faribault County JD #414 and I&S Group is appointed the engineer and is to proceed in the preparation of a Preliminary Engineer's Report.

Dated this 17th day of September, 2019.

JOINT BOARD OF
MARTIN & FARIBAULTCOUNTY COMMISSIONERS,
ACTING AS DRAINAGE AUTHORITY
FOR MARTIN & FARIBAULT COUNTY JD #414

By Elliot Belgard
Its Chairperson

Appendix C: Maps



ISG

Watershed Map

Judical Ditch No. 414

Martin - Faribault County, Minnesota

Tuesday, June 1, 2021

Legend

- OPEN CHANNEL
- TILE
- Proposed Tile
- BranchA40Watershed
- JD414 Watershed
- Counties

PN: 19-23608

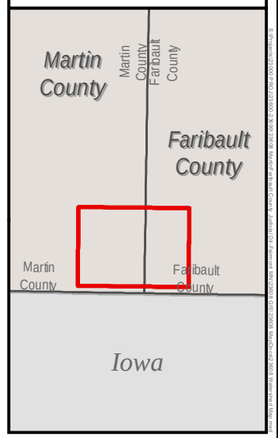
Source:

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

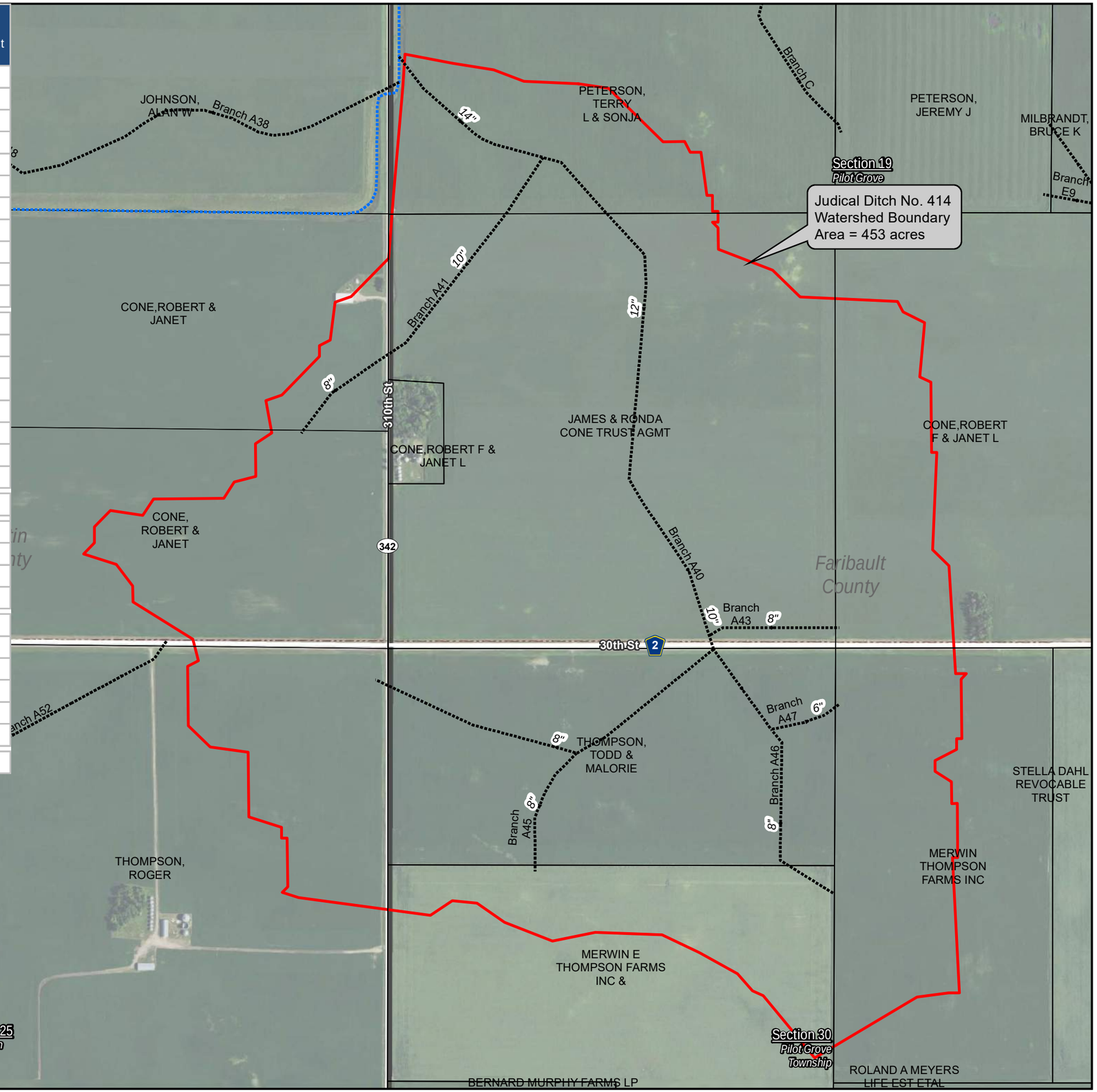
N W E S

0 750 1,500 3,000 Feet

1 inch = 3,333 feet



Branch	ACSIC Size (in)	ACSIC Slope (%)	Drainage Area (Acres)	ACSIC Drainage Coefficient (in/day)
A40	15	0.20%	427.4	0.16
	12	0.20%	329.4	0.12
	12	0.10%	315.2	0.09
	10	0.05%	268.2	0.04
	8	0.50%	156.8	0.13
	8	0.40%	83.6	0.22
	8	0.20%	83.2	0.15
	8	0.40%	72.6	0.25
	8	0.30%	33.2	0.48
	8	1.00%	25.4	1.14
	8	2.00%	25.1	1.63
A41	10	0.20%	79.8	0.29
	10	0.80%	78.6	0.59
	10	1.00%	72.9	0.72
	10	0.20%	70.8	0.33
	8	0.20%	47.3	0.27
	8	2.00%	41.9	0.97
	8	1.40%	40.7	0.84
	8	0.40%	39.8	0.46
A43	8	0.05%	48.0	0.13
A45	8	0.20%	17.4	0.74
	8	1.60%	16.5	2.22
	8	4.40%	15.9	3.80
	8	2.00%	6.4	6.33
A46	10	0.05%	73.2	0.16
	8	0.05%	66.6	0.10
	8	0.10%	54.7	0.17
	8	0.30%	50.3	0.31
	8	0.80%	22.4	1.15
	8	1.00%	18.0	1.60
A47	6	0.05%	12.4	0.24



ISG

Existing Map

Judical Ditch No. 414

Martin - Faribault County, Minnesota

Monday, June 21, 2021

Legend

- Open Ditch
- Existing Tile
- Parcels
- BranchA40Watershed
- Counties

PN: 19-23608

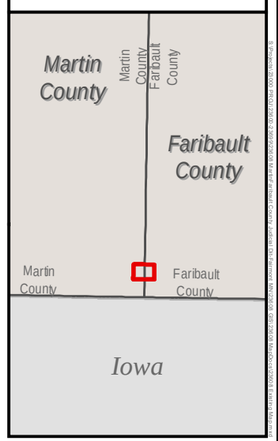
Source:

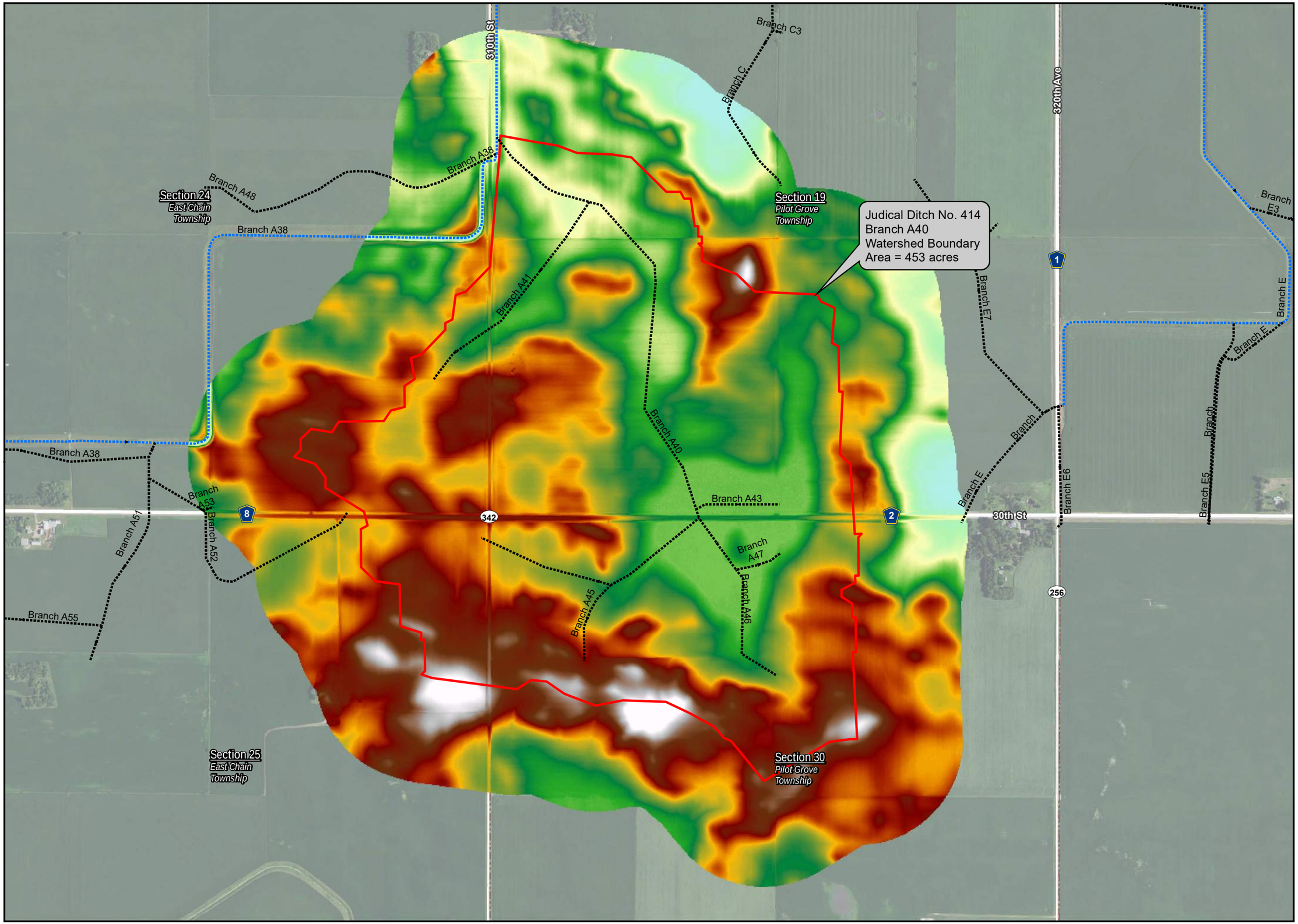
Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (XX County, 12/16/2016)
Parcels (XX County, 12/16/2016)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N W E S

0 150 300 600 Feet

1 inch = 633 feet





ISG

Digital Elevation Map

Judical Ditch No. 414

Martin - Faribault County, Minnesota

Tuesday, June 1, 2021

Legend

- OPEN CHANNEL
- TILE
- BranchA40Watershed

Value

High : 1170.2

Low : 1116.82

PN: 19-23608

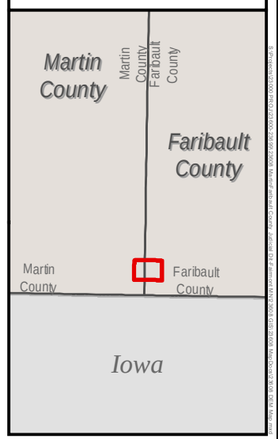
Source:

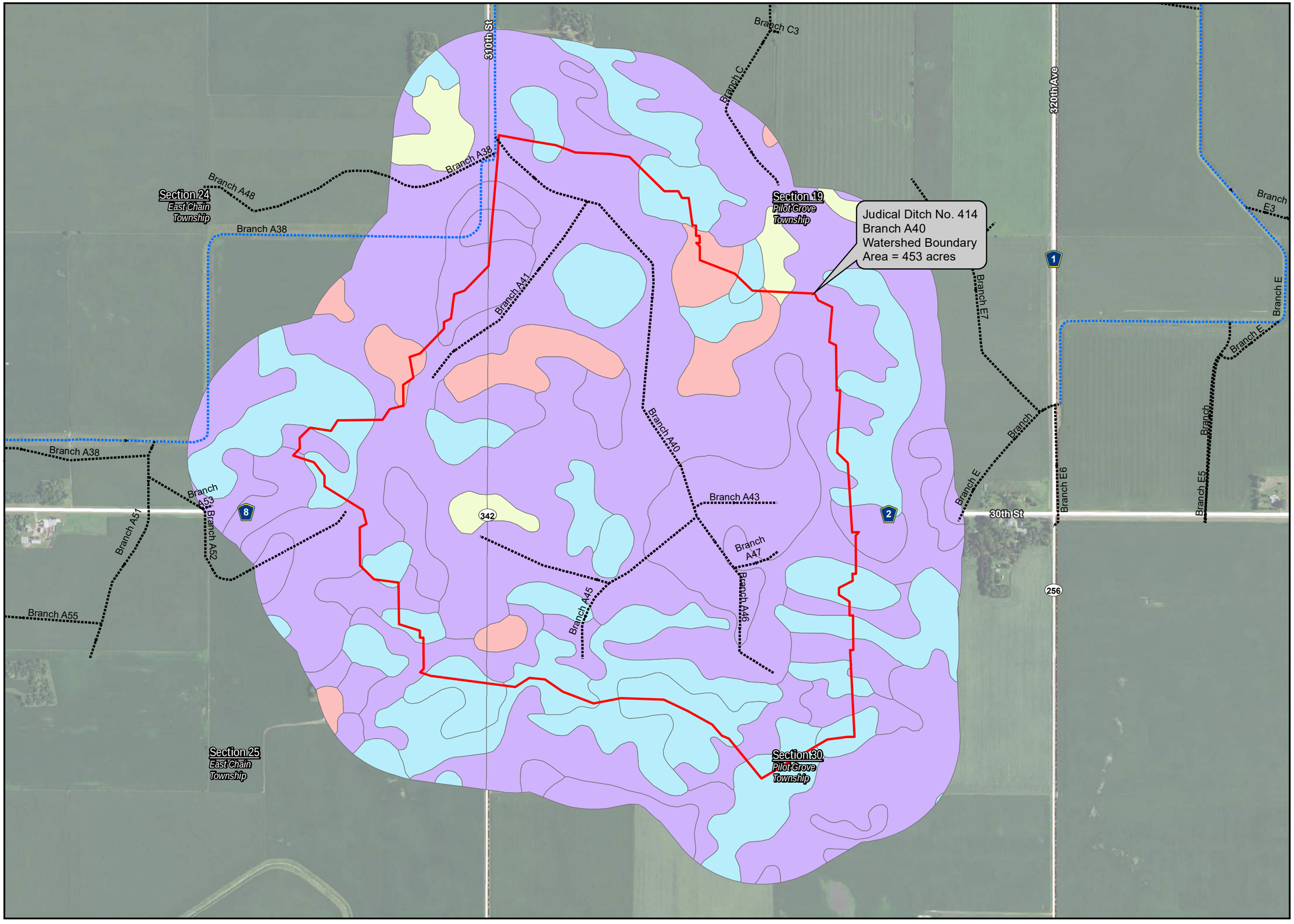
Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (XX County, 12/16/2016)
Parcels (XX County, 12/16/2016)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N W E S

0 200 400 800 Feet

1 inch = 833 feet





ISG

Hydrologic Soil Group Map

Judical Ditch No. 414

Martin - Faribault County, Minnesota

Tuesday, June 1, 2021

Legend

- OPEN CHANNEL
- TILE
- BranchA40Watershed

HSG

- B
- B/D
- C
- C/D

PN: 19-23608

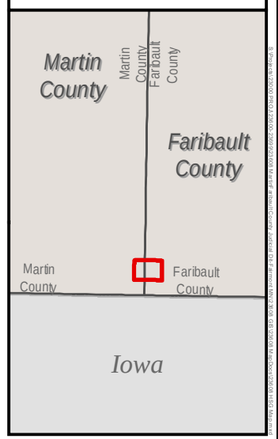
Source:

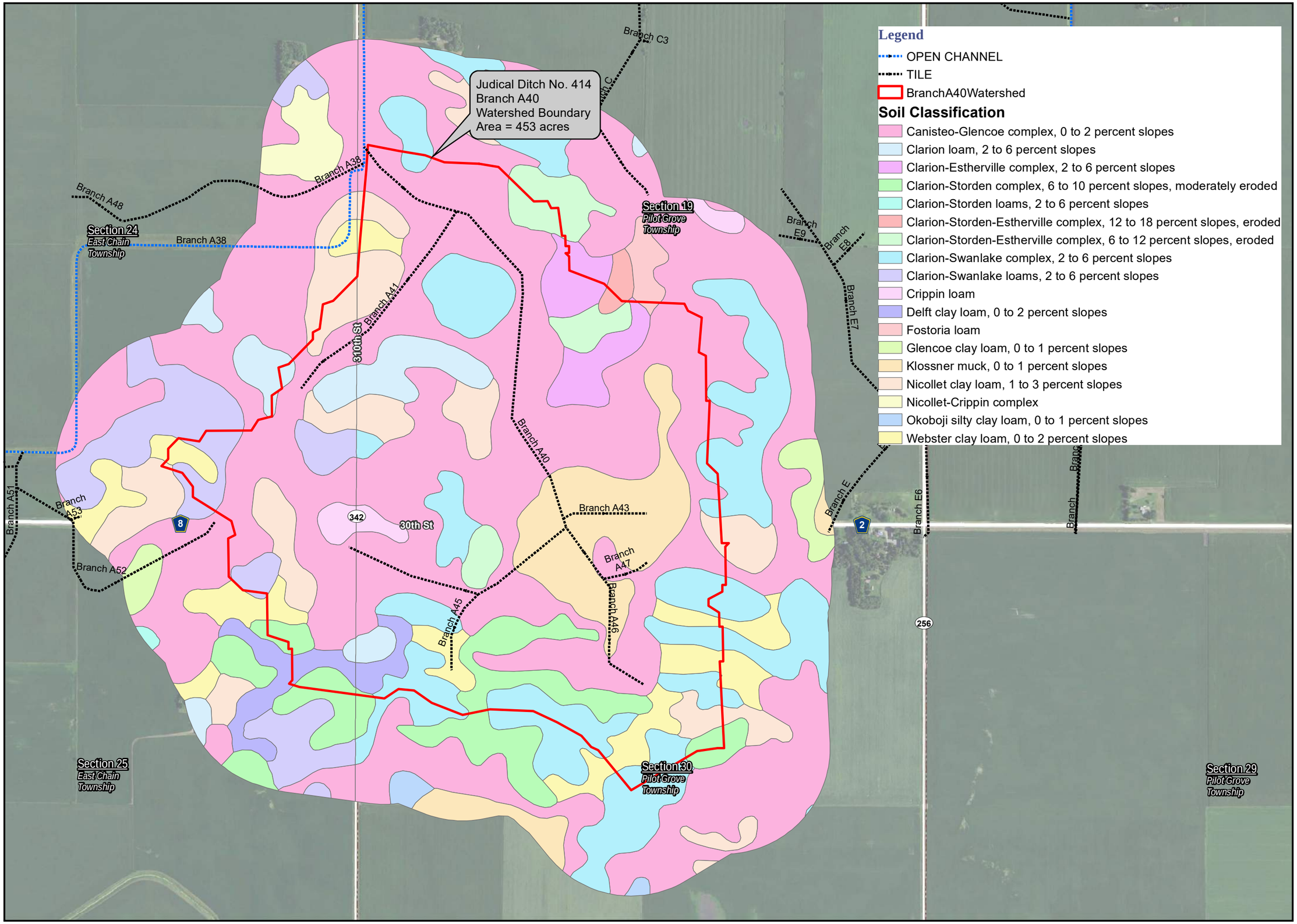
Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (XX County, 12/16/2016)
Parcels (XX County, 12/16/2016)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N W E S

0 195 390 780 Feet

1 inch = 833 feet





ISG

Soil Classification Map

Judical Ditch No. 414

Martin - Faribault County, Minnesota

Tuesday, June 1, 2021

PN: 19-23608

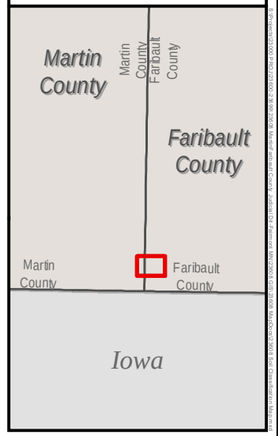
Source:

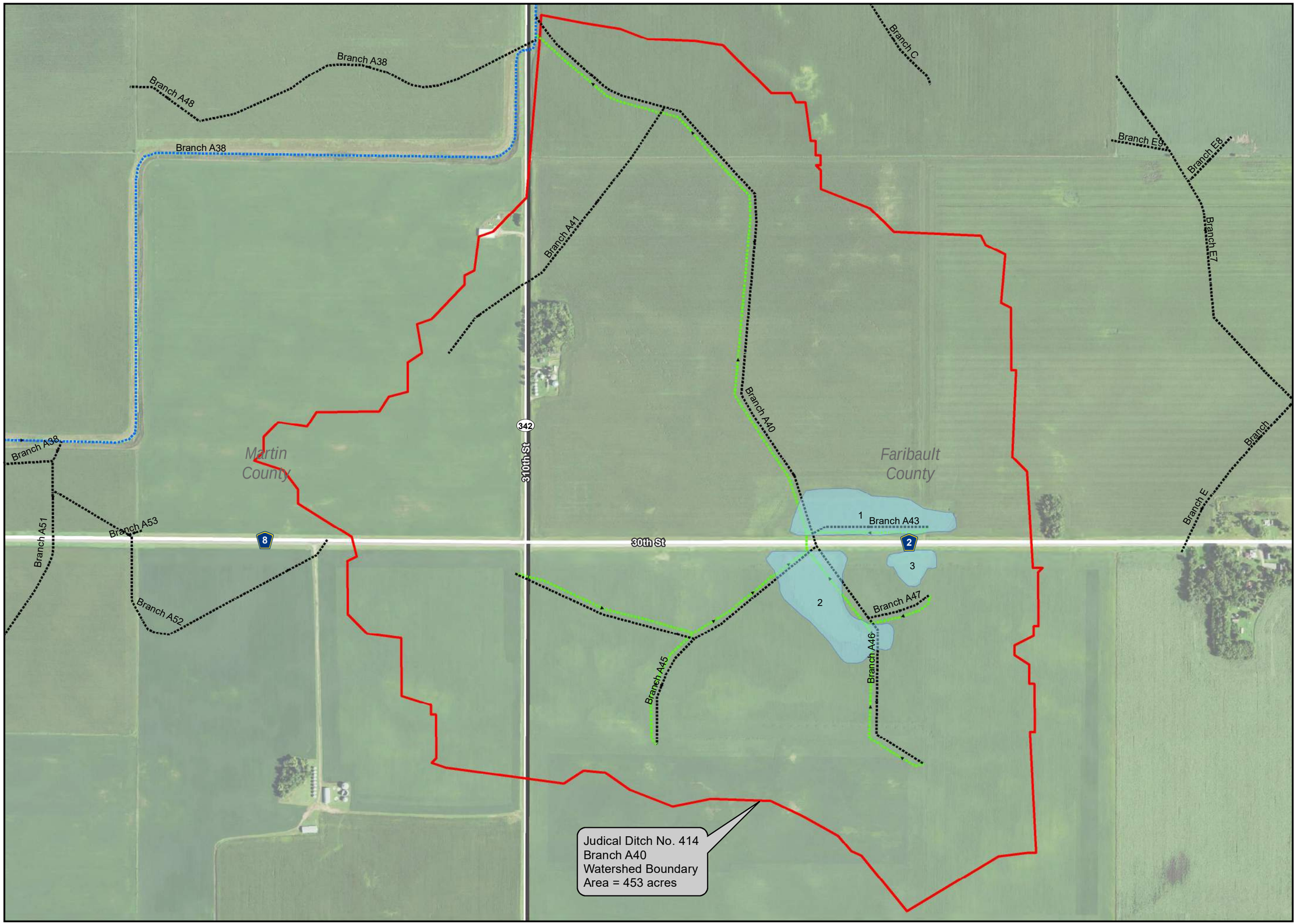
Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (XX County, 12/16/2016)
Parcels (XX County, 12/16/2016)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

N W E S

0 195 390 780 Feet

1 inch = 833 feet





ISG

Level 1 Wetland Delineation Map

Judical Ditch No. 414

Martin - Faribault County, Minnesota

Friday, January 14, 2022

Legend

- Potential Wetlands
- Open Ditch
- Existing Tile
- Proposed Tile
- Watershed

PN: 19-23608

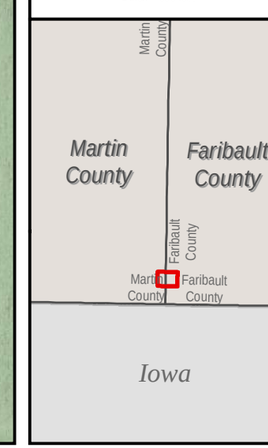
Source:

Orthophotograph (MnGeo WMS, 2017)
Tile/Ditch (Faribault County, 2012)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

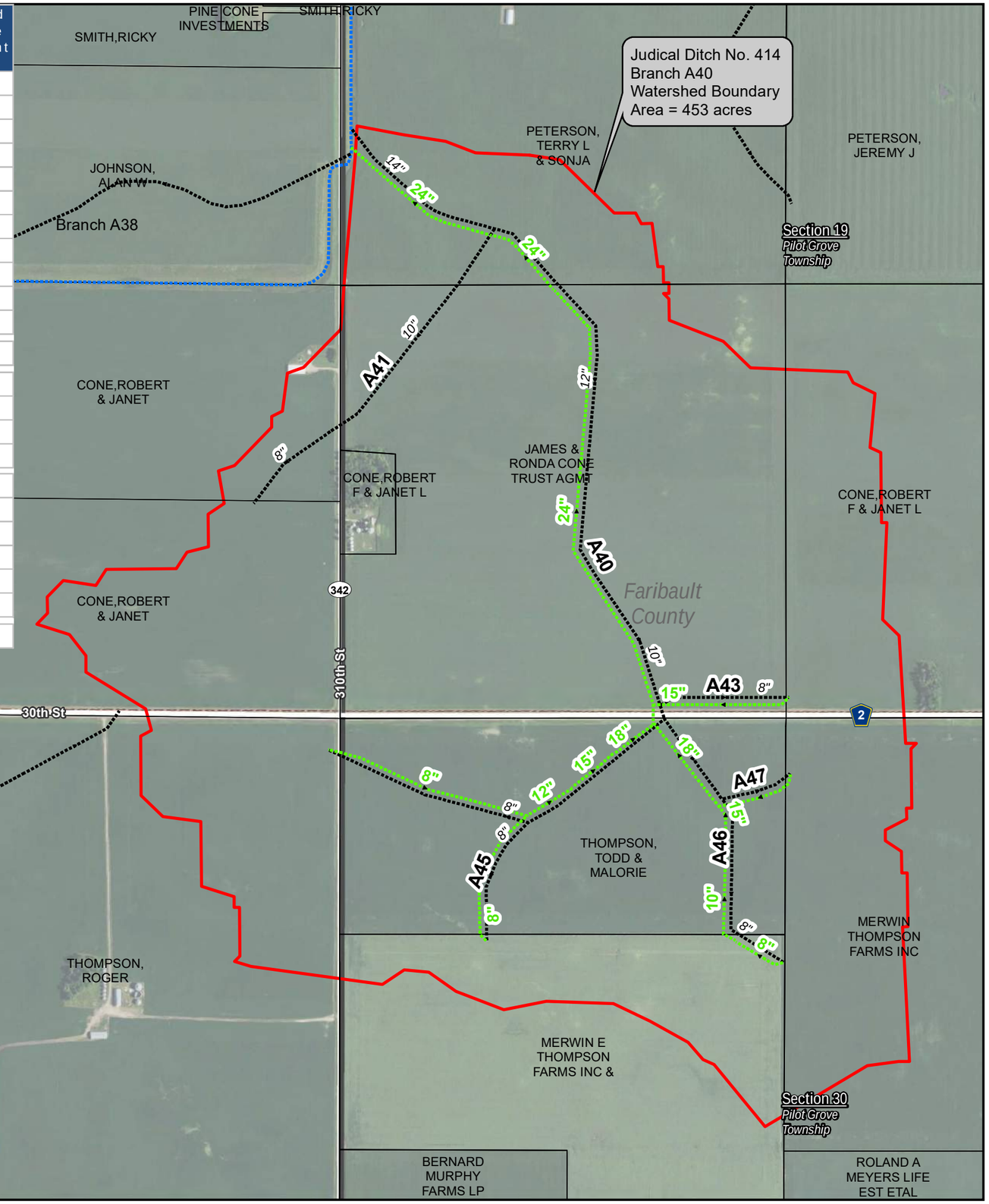
N W E S

0 150 300 600 Feet

1 inch = 600 feet



Branch	ACSIC Size (in)	Proposed Size (in)	ACSIC Slope (%)	Proposed Slope (%)	Drainage Area (Acres)	ACSIC Drainage Coefficient (in/day)	Proposed Drainage Coefficient (in/day)
A40	15	24	0.20%	0.15%	427.4	0.16	0.49
	12	24	0.20%	0.10%	329.4	0.12	0.52
	12	24	0.10%	0.10%	315.2	0.09	0.54
	10	24	0.05%	0.10%	268.2	0.04	0.64
	8	18	0.50%	0.10%	156.8	0.13	0.51
	8	15	0.40%	0.10%	83.6	0.22	0.58
	8	15	0.20%	0.10%	83.2	0.15	0.59
	8	12	0.40%	0.20%	72.6	0.25	0.52
	8	12	0.30%	0.45%	33.2	0.48	1.72
	8	8	1.00%	0.45%	25.4	1.14	0.76
	8	8	2.00%	1.75%	25.1	1.63	1.52
A43	8	15	0.05%	0.05%	48.0	0.13	0.72
A45	8	8	0.20%	0.20%	17.4	0.74	0.74
	8	8	1.60%	1.00%	16.5	2.22	1.75
	8	8	4.40%	2.50%	15.9	3.80	2.86
	8	8	2.00%	2.50%	6.4	6.33	7.08
A46	10	18	0.05%	0.05%	73.2	0.16	0.77
	8	15	0.05%	0.05%	66.6	0.10	0.52
	8	15	0.10%	0.05%	54.7	0.17	0.63
	8	10	0.30%	0.30%	50.3	0.31	0.57
	8	8	0.80%	0.75%	22.4	1.15	1.12
	8	8	1.00%	0.75%	18.0	1.60	1.39
A47	6	8	0.05%	0.05%	12.4	0.24	0.52



Improvement Opt 1 Map

Judical Ditch No. 414

Martin - Faribault County, Minnesota

Friday, January 14, 2022

Legend

- Proposed Tile
- Open Ditch
- Existing Tile
- Parcels
- BranchA40Watershed
- Counties

PN: 19-23608

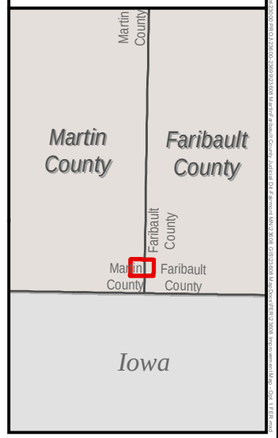
Source:

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

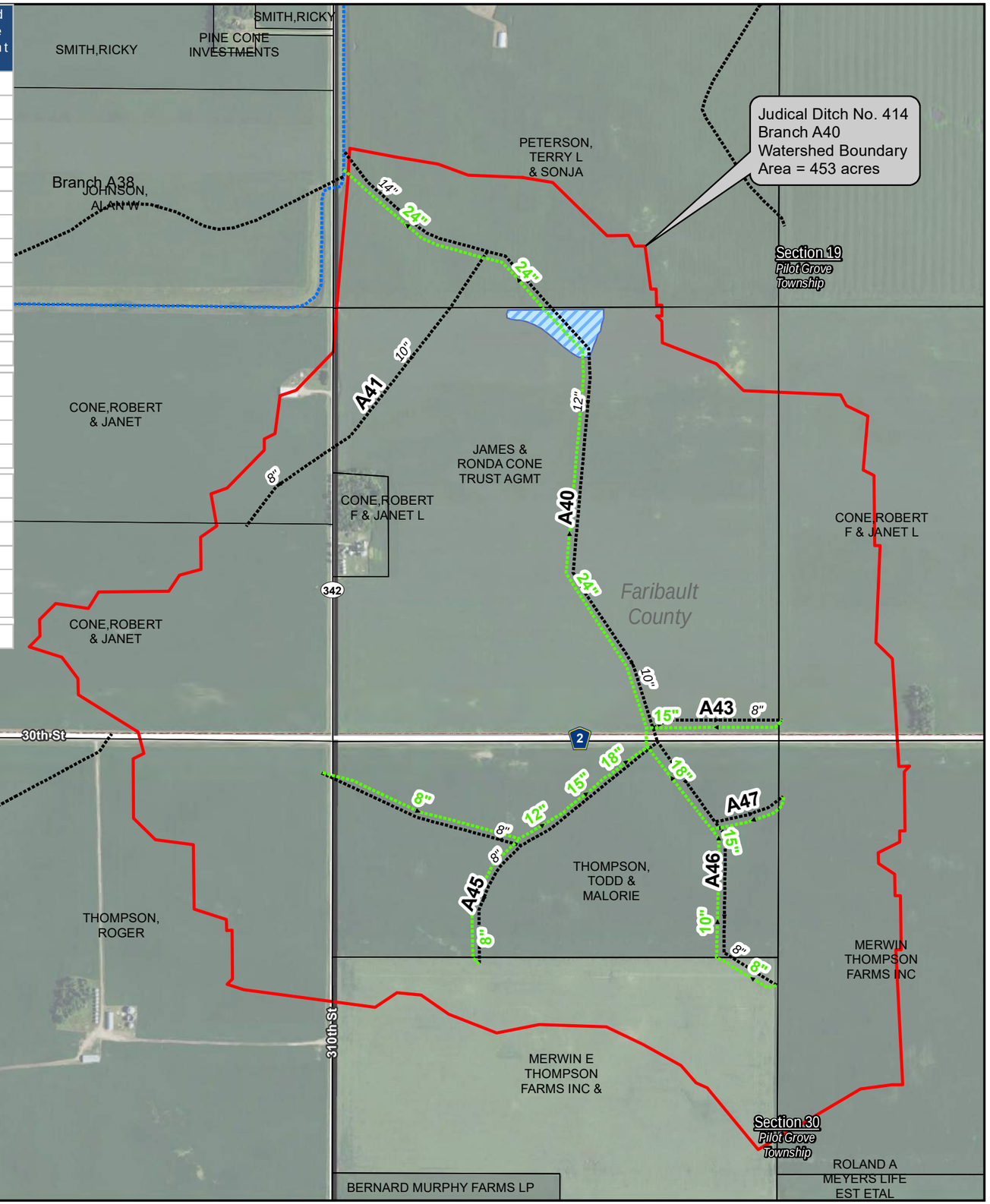
N W E S

0 165 330 660 Feet

1 inch = 700 feet



Branch	ACSIC Size (in)	Proposed Size (in)	ACSIC Slope (%)	Proposed Slope (%)	Drainage Area (Acres)	ACSIC Drainage Coefficient (in/day)	Proposed Drainage Coefficient (in/day)
A40	15	24	0.20%	0.15%	427.4	0.16	0.49
	12	24	0.20%	0.10%	329.4	0.12	0.52
	12	24	0.10%	0.10%	315.2	0.09	0.54
	10	24	0.05%	0.10%	268.2	0.04	0.64
	8	18	0.50%	0.10%	156.8	0.13	0.51
	8	15	0.40%	0.10%	83.6	0.22	0.58
	8	15	0.20%	0.10%	83.2	0.15	0.59
	8	12	0.40%	0.20%	72.6	0.25	0.52
	8	12	0.30%	0.45%	33.2	0.48	1.72
	8	8	1.00%	0.45%	25.4	1.14	0.76
	8	8	2.00%	1.75%	25.1	1.63	1.52
A43	8	15	0.05%	0.05%	48.0	0.13	0.72
A45	8	8	0.20%	0.20%	17.4	0.74	0.74
	8	8	1.60%	1.00%	16.5	2.22	1.75
	8	8	4.40%	2.50%	15.9	3.80	2.86
	8	8	2.00%	2.50%	6.4	6.33	7.08
A46	10	18	0.05%	0.05%	73.2	0.16	0.77
	8	15	0.05%	0.05%	66.6	0.10	0.52
	8	15	0.10%	0.05%	54.7	0.17	0.63
	8	10	0.30%	0.30%	50.3	0.31	0.57
	8	8	0.80%	0.75%	22.4	1.15	1.12
	8	8	1.00%	0.75%	18.0	1.60	1.39
A47	6	8	0.05%	0.05%	12.4	0.24	0.52



ISG

Improvement Map - Option #2

Judical Ditch No. 414

Martin - Faribault County, Minnesota

Friday, January 14, 2022

Legend

- Proposed Tile
- Open Ditch
- Existing Tile
- 2.5ac Storage Pond
- Parcels
- BranchA40Watershed
- Counties

PN: 19-23608

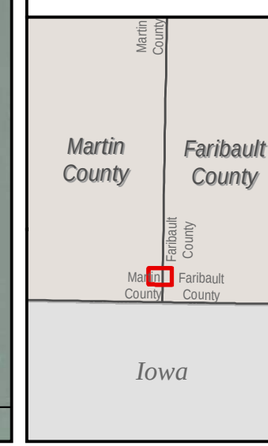
Source:

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

N W E S

0 175 350 700 Feet

1 inch = 700 feet



Appendix D: Multipurpose Drainage Management Plan

Multi-Purpose Drainage Management Plan

Multi-purpose drainage management incorporates Best Management Practices (BMPs) which utilize effective measures aimed at reducing sediment and 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. For the JD 414 Branch A40 watershed, these practices are recommended to landowners as they have the most impact on soil health and water quality for this type of watershed.

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. For the JD 414 Branch A40 watershed, there are several areas where controlled drainage can be incorporated on a private tiling basin.

Funding

There are several outside sources of funding to potentially help pay for water quality improvements implemented in a ditch 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.

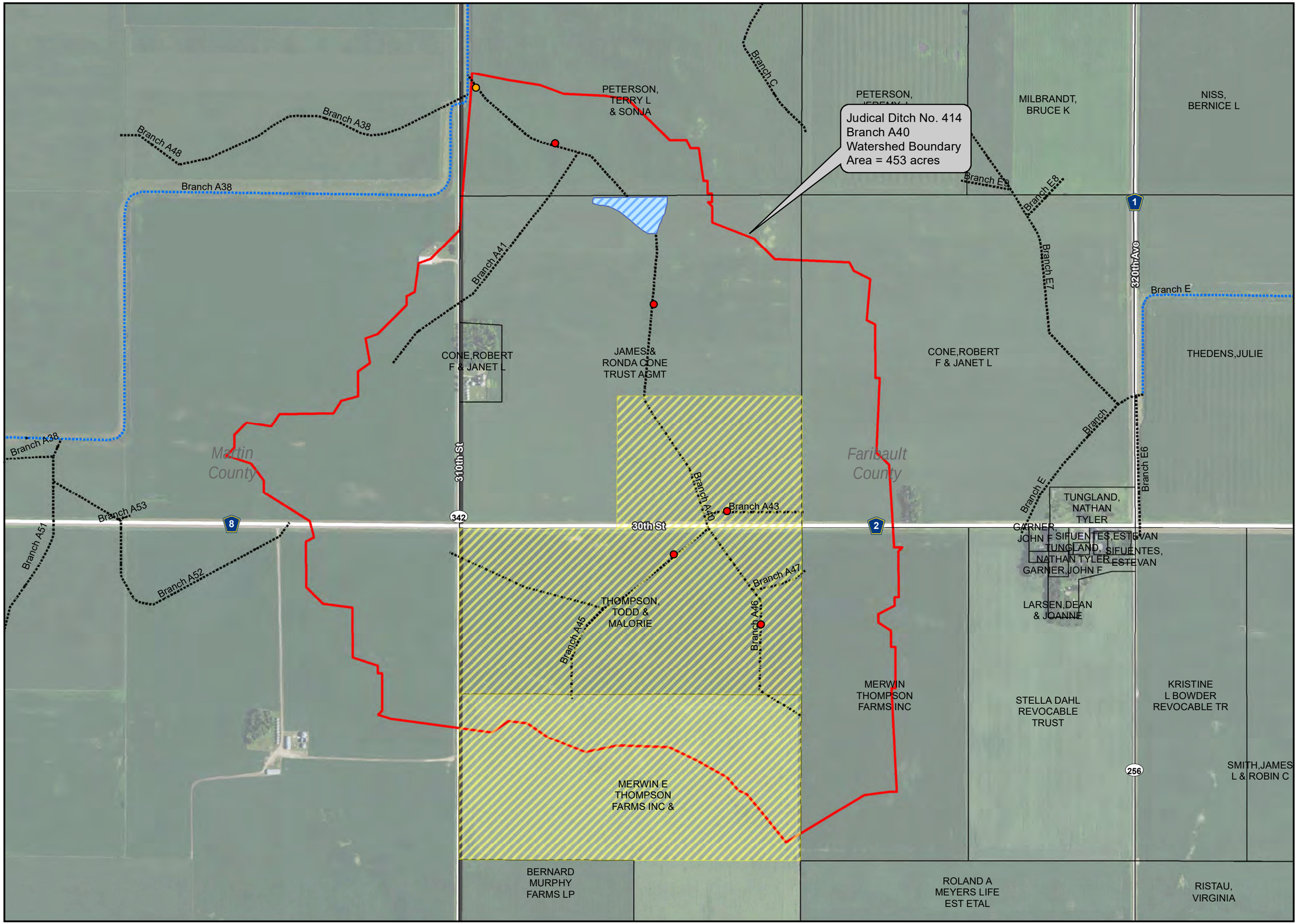
Potential locations for additional BMPs are shown on the Multi-Purpose Drainage Management map in this Appendix. If landowners are interested in pursuing practices that go beyond this project scope, a few programs may be a source for funding. The Agriculture Best Management Practices (BMP) Loan Program 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). EQUIP 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.

All of the water quality measures proposed with this project are applicable for some source of outside funding. The sources listed above are grants that could be a good fit for this project and if the timing of the project works in conjunction with the grant schedule. These grants can be applied for, if there is support from the drainage authority and/or interest from landowners.

Currently, this project proposes to use Alternative Tile Inlets which we call Water Quality Inlets in all public road ditches. In addition, storage ponds are shown to be implemented as part of the improvement project in Option 2. Potential locations for these and additional BMPs are shown on the *Multi-Purpose Drainage Management Map* and will be proposed to landowners. Furthermore; additional water quality measures can be implemented with this project if requested.



ISG

MDM Map

Judical Ditch No. 414

Martin - Faribault County, Minnesota

Friday, January 14, 2022

Legend

- Blind Rock Inlet
- ASI
- Storage
- Controlled Drainage
- Open Ditch
- Existing Tile
- Parcels
- BranchA40Watershed
- Counties

PN: 19-23608

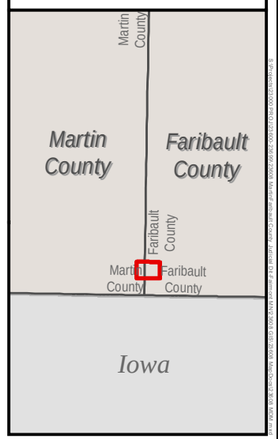
Source:

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

N W E S

0 175 350 700 Feet

1 inch = 700 feet



Appendix E: Drainage Calculations

Martin/Faribaul County
Judicial Ditch No. 414
Branch A40

EXISTING TILE SUMMARY

Branch	ACSIC Size (in)	ACSIC Slope (%)	Drainage Area (Acres)	ACSIC Drainage Coefficient (in/day)
A40	15	0.20%	427.4	0.16
	12	0.20%	329.4	0.12
	12	0.10%	315.2	0.09
	10	0.05%	268.2	0.04
	8	0.50%	156.8	0.13
	8	0.40%	83.6	0.22
	8	0.20%	83.2	0.15
	8	0.40%	72.6	0.25
	8	0.30%	33.2	0.48
	8	1.00%	25.4	1.14
	8	2.00%	25.1	1.63
A41	10	0.20%	79.8	0.29
	10	0.80%	78.6	0.59
	10	1.00%	72.9	0.72
	10	0.20%	70.8	0.33
	8	0.20%	47.3	0.27
	8	2.00%	41.9	0.97
	8	1.40%	40.7	0.84
	8	0.40%	39.8	0.46
A43	8	0.05%	48.0	0.13
A45	8	0.20%	17.4	0.74
	8	1.60%	16.5	2.22
	8	4.40%	15.9	3.80
	8	2.00%	6.4	6.33
A46	10	0.05%	73.2	0.16
	8	0.05%	66.6	0.10
	8	0.10%	54.7	0.17
	8	0.30%	50.3	0.31
	8	0.80%	22.4	1.15
	8	1.00%	18.0	1.60
A47	6	0.05%	12.4	0.24

Martin/Faribaul County
Judicial Ditch No. 414
Branch A40

PROPOSED TILE SUMMARY

Branch	ACSIC Size (in)	Proposed Size (in)	ACSIC Slope (%)	Proposed Slope (%)	Drainage Area (Acres)	ACSIC Drainage Coefficient (in/day)	Proposed Drainage Coefficient (in/day)
A40	15	24	0.20%	0.15%	427.4	0.16	0.49
	12	24	0.20%	0.10%	329.4	0.12	0.52
	12	24	0.10%	0.10%	315.2	0.09	0.54
	10	24	0.05%	0.10%	268.2	0.04	0.64
	8	18	0.50%	0.10%	156.8	0.13	0.51
	8	15	0.40%	0.10%	83.6	0.22	0.58
	8	15	0.20%	0.10%	83.2	0.15	0.59
	8	12	0.40%	0.20%	72.6	0.25	0.52
	8	12	0.30%	0.45%	33.2	0.48	1.72
	8	8	1.00%	0.45%	25.4	1.14	0.76
	8	8	2.00%	1.75%	25.1	1.63	1.52
A43	8	15	0.05%	0.05%	48.0	0.13	0.72
A45	8	8	0.20%	0.20%	17.4	0.74	0.74
	8	8	1.60%	1.00%	16.5	2.22	1.75
	8	8	4.40%	2.50%	15.9	3.80	2.86
	8	8	2.00%	2.50%	6.4	6.33	7.08
A46	10	18	0.05%	0.05%	73.2	0.16	0.77
	8	15	0.05%	0.05%	66.6	0.10	0.52
	8	15	0.10%	0.05%	54.7	0.17	0.63
	8	10	0.30%	0.30%	50.3	0.31	0.57
	8	8	0.80%	0.75%	22.4	1.15	1.12
	8	8	1.00%	0.75%	18.0	1.60	1.39
A47	6	8	0.05%	0.05%	12.4	0.24	0.52

Appendix F: Modeling With Maps

MARTIN AND FARIBAULT COUNTIES
JUDICIAL DITCH No. 414

Option 1 - No Storage

XP SWMM ELEVATION TABLE

Location	5-yr			10-yr			25-yr			50-yr		
	Existing (MSL)	Proposed (MSL)	Difference	Existing (MSL)	Proposed (MSL)	Difference	Existing (MSL)	Proposed (MSL)	Difference	Existing (MSL)	Proposed (MSL)	Difference
Branch A41 Connection to Branch A40	1126.28	1126.35	0.07	1126.51	1126.57	0.06	1126.88	1126.95	0.06	1127.24	1127.31	0.07
North CSAH 2	1128.45	1128.53	0.08	1128.88	1128.90	0.01	1129.49	1129.51	0.01	1129.98	1130.00	0.02
South CSAH 2	1128.67	1128.55	-0.12	1129.01	1129.14	0.13	1129.60	1129.57	-0.03	1130.08	1130.01	-0.07
West 310th Street	1140.34	1140.33	-0.01	1140.44	1140.43	-0.01	1140.55	1140.55	0.00	1140.64	1140.63	0.00
Branch A47 Connection to Branch A46	1128.67	1128.55	-0.12	1129.01	1128.91	-0.10	1129.60	1129.52	-0.08	1130.08	1130.01	-0.07

Denotes peak elevation less than or equal to existing

MARTIN AND FARIBAULT COUNTIES
JUDICIAL DITCH No. 414

Option 1 - No Storage

XP SWMM FLOWRATE TABLE

Location	Conveyence	5-yr			10-yr			25-yr			50-yr		
		Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change
JD 414 Open Ditch - System Outlet	Open Ditch	528.00	535.27	1%	760.00	768.84	1%	1110.00	1119.59	1%	1410.00	1421.57	1%
	Overflow	0.00	0.00	N/A	0.00	0.00	N/A	0.00	0.00	N/A	0.00	0.00	N/A
	Total	528.00	535.27	1%	760.00	768.84	1%	1110.00	1119.59	1%	1410.00	1421.57	1%
Branch A38 Open Ditch	Open Ditch	271.00	278.27	3%	389.00	397.84	2%	567.00	576.59	2%	722.00	733.57	2%
	Overflow	0.00	0.00	N/A	0.00	0.00	N/A	0.00	0.00	N/A	0.00	0.00	N/A
	Total	271.00	278.27	3%	389.00	397.84	2%	567.00	576.59	2%	722.00	733.57	2%
Branch A40 Outlet	Tile	3.10	9.40	203%	3.10	9.39	203%	3.10	9.40	203%	3.10	9.39	203%
	Overflow	9.78	10.75	10%	16.93	19.47	15%	29.56	32.85	11%	40.62	45.90	13%
	Total	12.88	20.15	56%	20.03	28.87	44%	32.66	42.24	29%	43.72	55.29	26%
Branch A43 Outlet	Tile	1.28	1.36	6%	1.28	1.41	10%	1.28	1.42	11%	1.28	1.43	12%
	Overflow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	1.28	1.36	6%	1.28	1.41	10%	1.28	1.42	11%	1.28	1.43	12%
Branch A45 Outlet	Tile	0.85	1.48	73%	0.85	1.48	73%	0.84	1.48	76%	0.83	1.48	79%
	Overflow	2.80	2.86	2%	4.63	4.71	2%	7.30	7.50	3%	9.81	9.95	1%
	Total	3.66	4.34	19%	5.48	6.18	13%	8.14	8.98	10%	10.64	11.43	7%
Branch A46 Outlet	Tile	0.63	2.90	364%	0.63	2.56	307%	0.63	2.55	304%	0.63	2.34	269%
	Overflow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	0.63	2.90	364%	0.63	2.56	307%	0.63	2.55	304%	0.63	2.34	269%
Branch A47 Outlet	Tile	0.28	0.67	143%	0.28	0.67	142%	0.28	0.67	142%	0.28	0.67	141%
	Overflow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	0.28	0.67	143%	0.28	0.67	142%	0.28	0.67	142%	0.28	0.67	141%
30th Street Culvert	Total	2.65	1.41	-47%	4.40	3.22	-27%	6.18	5.27	-15%	7.05	6.10	-14%

Denotes peak flows less than or equal to existing

MARTIN AND FARIBAULT COUNTIES
JUDICIAL DITCH No. 414

Option 2 - 2.5 ac Storage Pond

XP SWMM ELEVATION TABLE

Location	5-yr			10-yr			25-yr			50-yr		
	Existing (MSL)	Proposed (MSL)	Difference	Existing (MSL)	Proposed (MSL)	Difference	Existing (MSL)	Proposed (MSL)	Difference	Existing (MSL)	Proposed (MSL)	Difference
Branch A41 Connection to Branch A40	1126.28	1125.37	-0.92	1126.51	1125.86	-0.66	1126.88	1126.46	-0.42	1127.24	1126.80	-0.44
North CSAH 2	1128.45	1128.42	-0.03	1128.88	1128.83	-0.06	1129.49	1129.42	-0.08	1129.98	1129.92	-0.06
South CSAH 2	1128.67	1128.47	-0.19	1129.01	1128.91	-0.10	1129.60	1129.48	-0.11	1130.08	1129.93	-0.14
West 310th Street	1140.34	1140.33	-0.01	1140.44	1140.43	-0.01	1140.55	1140.55	0.00	1140.64	1140.63	0.00
Branch A47 Connection to Branch A46	1128.67	1128.47	-0.19	1129.01	1128.85	-0.16	1129.60	1129.45	-0.15	1130.08	1129.93	-0.15

Denotes peak elevation less than or equal to existing

MARTIN AND FARIBAULT COUNTIES
JUDICIAL DITCH No. 414

Option 2 - 2.5 ac Storage Pond

XP SWMM FLOWRATE TABLE

Location	Conveyence	5-yr			10-yr			25-yr			50-yr		
		Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change
JD 414 Open Ditch - System Outlet	Open Ditch	528.00	523.87	-1%	760.00	752.98	-1%	1110.00	1105.23	0%	1410.00	1408.07	0%
	Overflow	0.00	0.00	N/A	0.00	0.00	N/A	0.00	0.00	N/A	0.00	0.00	N/A
	Total	528.00	523.87	-1%	760.00	752.98	-1%	1110.00	1105.23	0%	1410.00	1408.07	0%
Branch A38 Open Ditch	Open Ditch	271.00	266.87	-2%	389.00	381.98	-2%	567.00	562.23	-1%	722.00	720.07	0%
	Overflow	0.00	0.00	N/A	0.00	0.00	N/A	0.00	0.00	N/A	0.00	0.00	N/A
	Total	271.00	266.87	-2%	389.00	381.98	-2%	567.00	562.23	-1%	722.00	720.07	0%
Branch A40 Outlet	Tile	3.10	8.75	182%	3.10	8.75	182%	3.10	8.75	182%	3.10	8.75	182%
	Overflow	9.78	0.00	-100%	16.93	4.25	-75%	29.56	19.14	-35%	40.62	33.04	-19%
	Total	12.88	8.75	-32%	20.03	13.00	-35%	32.66	27.89	-15%	43.72	41.79	-4%
Branch A43 Outlet	Tile	1.28	1.84	44%	1.28	1.97	54%	1.28	2.08	63%	1.28	2.08	63%
	Overflow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	1.28	1.84	44%	1.28	1.97	54%	1.28	2.08	63%	1.28	2.08	63%
Branch A45 Outlet	Tile	0.85	1.46	71%	0.85	1.46	71%	0.84	1.46	74%	0.83	1.46	76%
	Overflow	2.80	2.88	3%	4.63	4.73	2%	7.30	7.52	3%	9.81	9.97	2%
	Total	3.66	4.34	19%	5.48	6.19	13%	8.14	8.98	10%	10.64	11.43	7%
Branch A46 Outlet	Tile	0.63	3.76	501%	0.63	3.77	499%	0.63	3.72	490%	0.63	3.70	484%
	Overflow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	0.63	3.76	501%	0.63	3.77	499%	0.63	3.72	490%	0.63	3.70	484%
Branch A47 Outlet	Tile	0.28	0.70	152%	0.28	0.70	150%	0.28	0.70	150%	0.28	0.70	148%
	Overflow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	0.28	0.70	152%	0.28	0.70	150%	0.28	0.70	150%	0.28	0.70	148%
30th Street Culvert	Culvert	2.65	1.37	-48%	4.40	3.09	-30%	6.18	5.22	-15%	7.05	6.13	-13%
	Overflow	0.00	0.00	N/A	0.00	0.00	N/A	0.00	0.00	N/A	0.00	0.00	N/A
	Total	2.65	1.37	-48%	4.40	3.09	-30%	6.18	5.22	-15%	7.05	6.13	-13%

Denotes peak flows less than or equal to existing

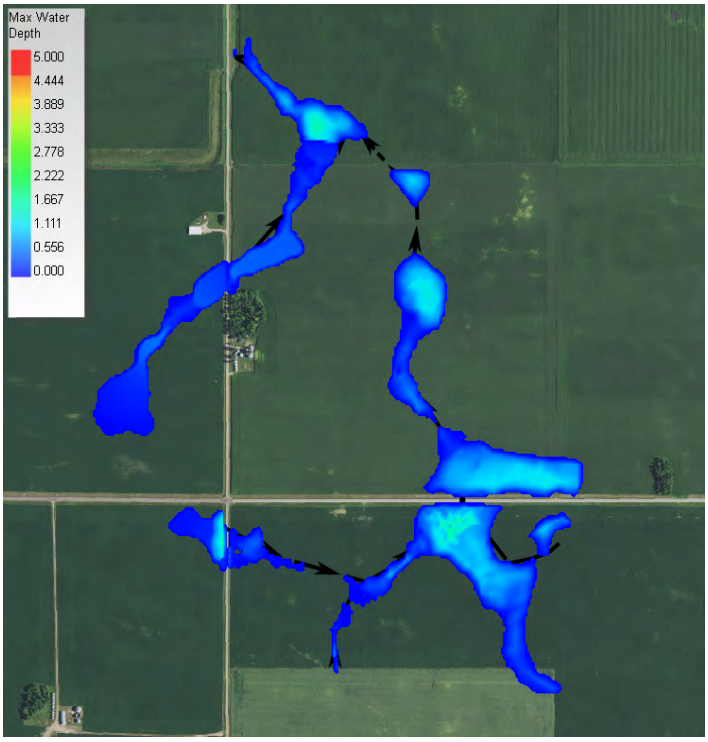


Figure 1: 5-year Rainfall Event Existing Flood Extents

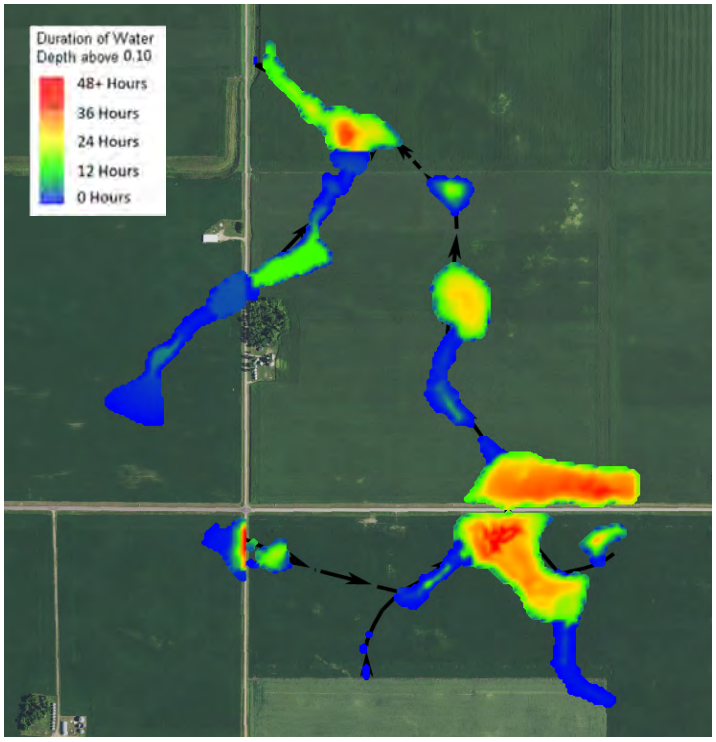


Figure 2: 5-year Rainfall Event Existing Flood Inundation Times

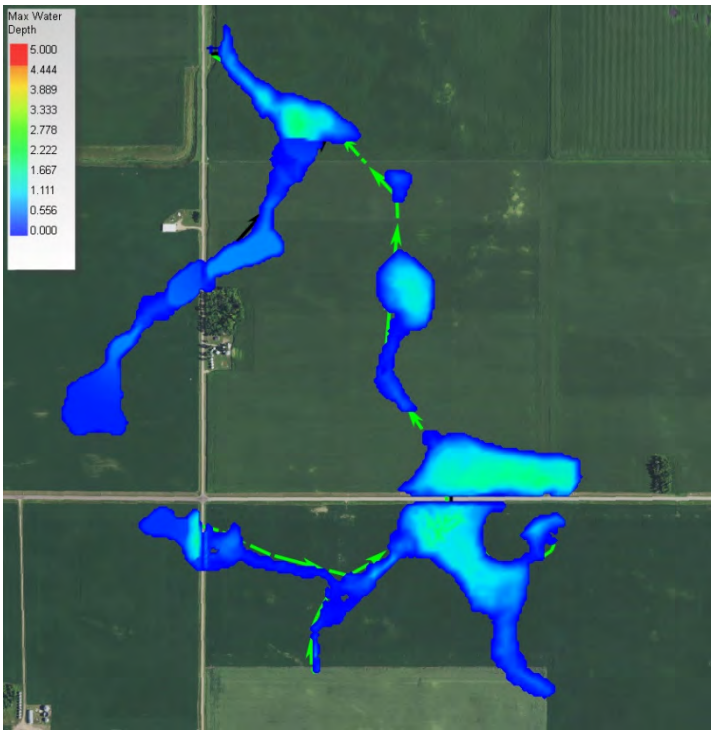


Figure 3: 5-year Rainfall Event Option 1 Flood Extents

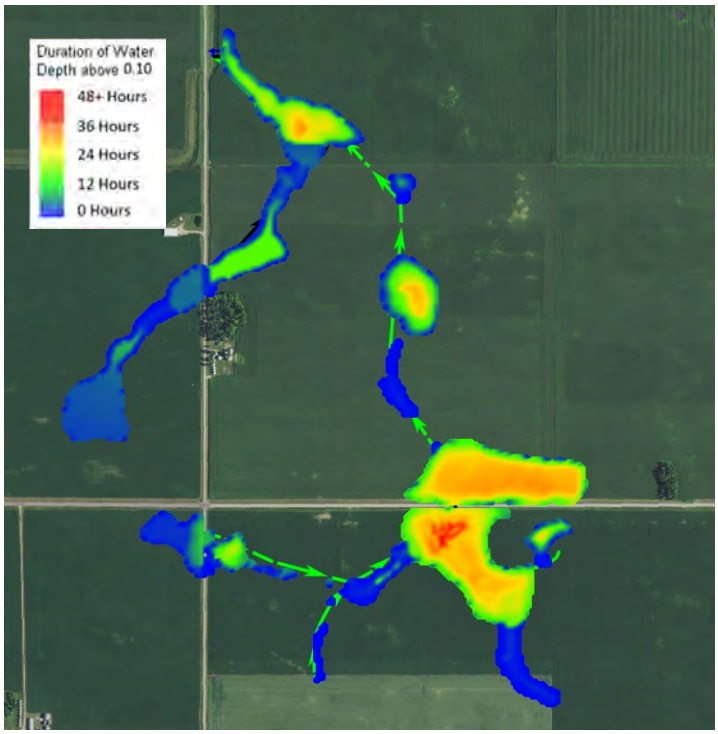


Figure 4: 5-year Rainfall Event Option 1 Inundation Times

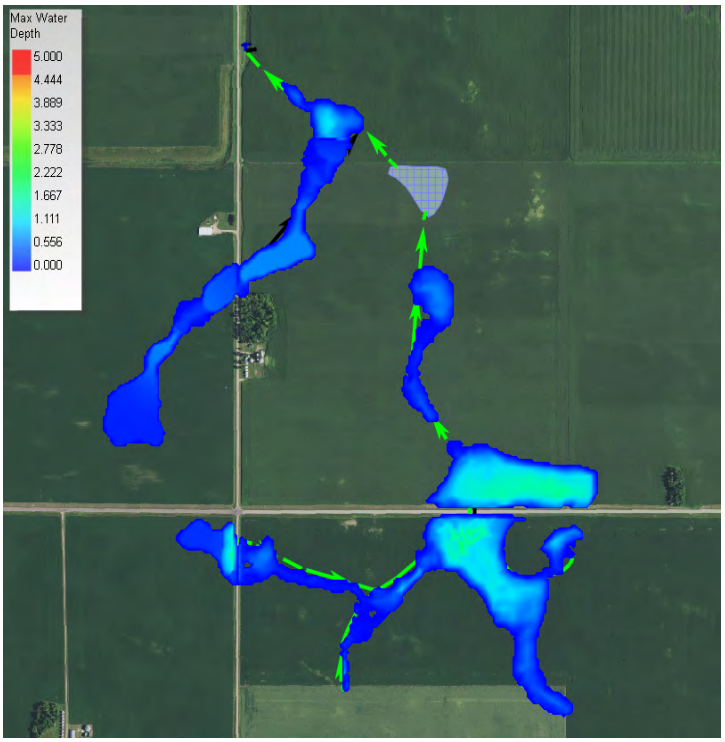


Figure 5: 5-year Rainfall Event Option 2 Flood Extents

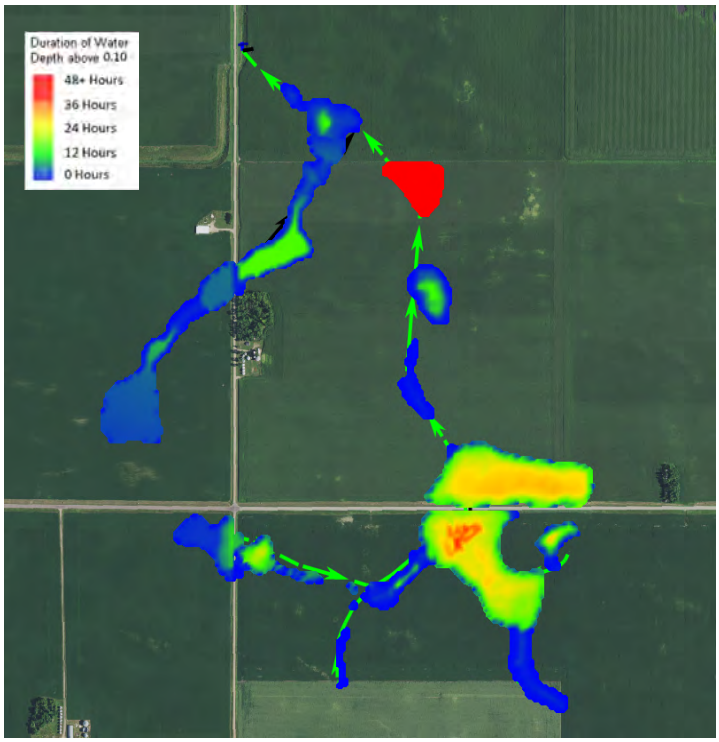


Figure 6: 5-year Rainfall Event Option 2 Inundation Times

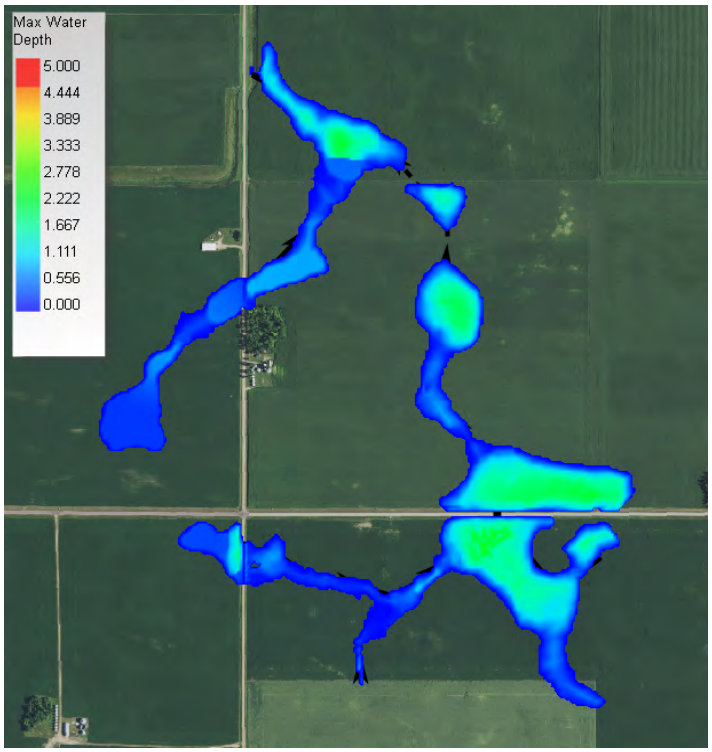


Figure 7: 10-year Rainfall Event Existing Flood Extents

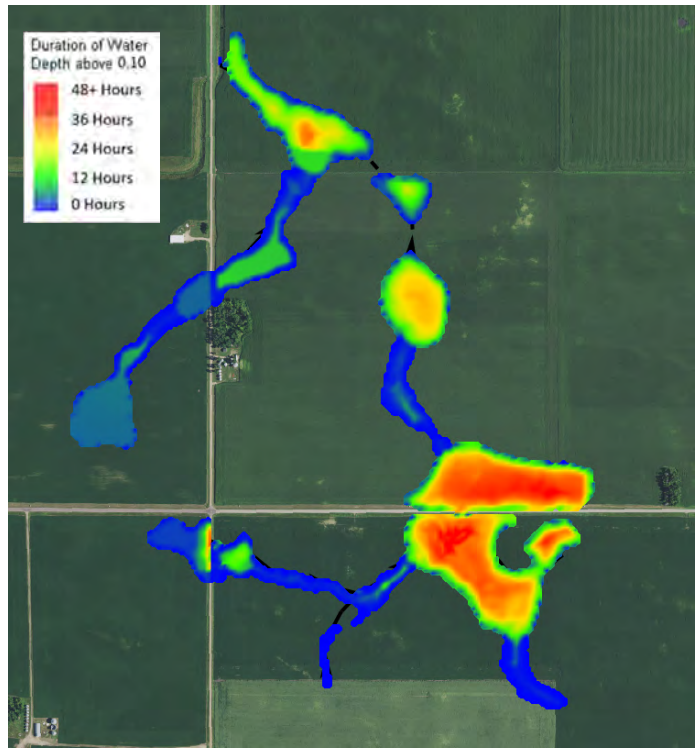


Figure 8: 10-year Rainfall Event Existing Indunation Times

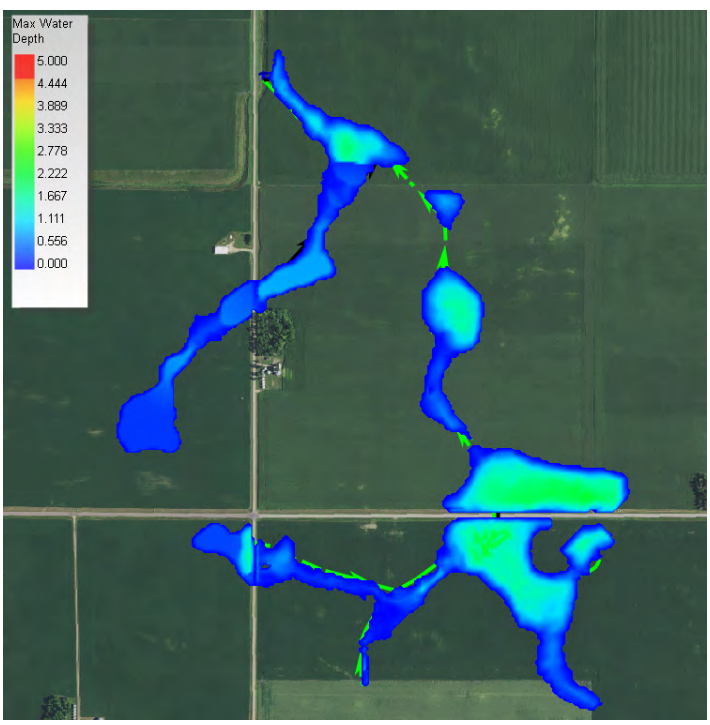


Figure 9: 10-year Rainfall Event Option 1 Flood Extents

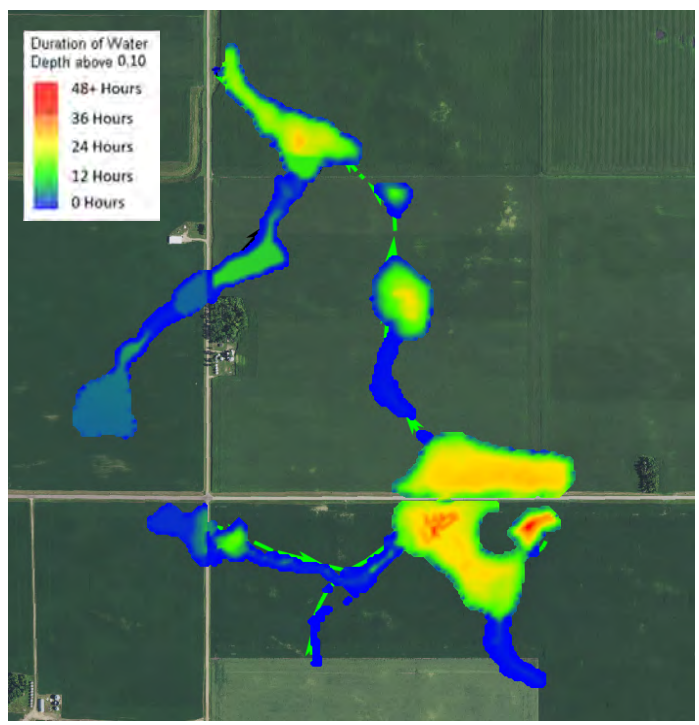


Figure 10: 10-year Rainfall Event Option 1 Inundation Times

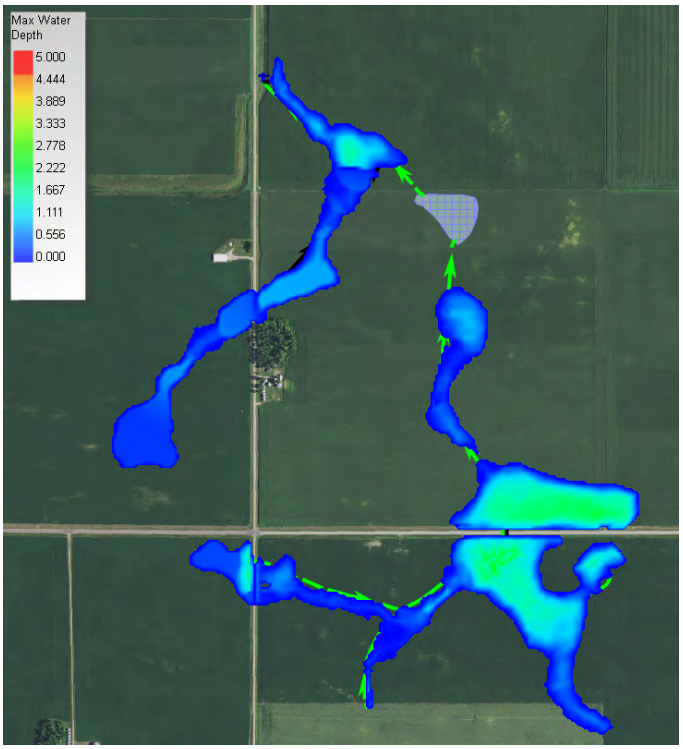


Figure 11: 10-year Rainfall Event Option 2 Flood Extents

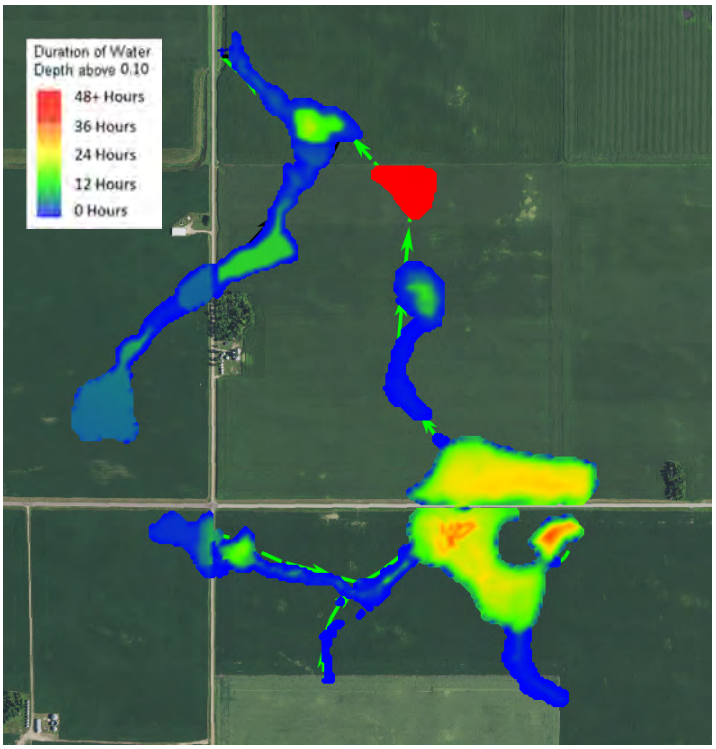


Figure 12: 10-year Rainfall Event Option 2 Inundation Times

Appendix G: Preliminary Cost Estimates

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

ISG

PROPOSED IMPROVEMENT COST SUMMARY OPTION #1

Area	Separable Maintenance	Improvement Cost	Net Cost
Branch A40 - Opt 1	$ 331,977	$ 447,961	$ 115,984
Branch A43	$ 42,991	$ 46,980	$ 3,989
Branch A45	$ 42,714	$ 44,826	$ 2,112
Branch A46	$ 87,479	$ 99,233	$ 11,754
Branch A47	$ 27,349	$ 28,716	$ 1,367
Road Crossing Costs	$ -	$ 14,282	$ 14,282
Subtotal	**$ 532,509**	**$ 681,998**	**$ 149,488**
Road Authority Repair Costs	$ 66,423	$ 66,423	$ -
Total Project Costs	**$ 598,933**	**$ 748,421**	**$ 149,488**
		Subtotal Separable Maintenance Costs	$ 532,509
		Net Costs	$ 149,488
		Total Project Costs for Landowners	**$ 681,998**
		Benefits (Per Ditch Viewer Report)	$ 190,000
		Net Benefit	**$ 40,512**

PROPOSED IMPROVEMENT COST SUMMARY OPTION #2

Area	Separable Maintenance	Improvement Cost	Net Cost
Branch A40 - Opt 2	$ 331,977	$ 426,288	$ 94,312
Branch A43	$ 42,991	$ 46,980	$ 3,989
Branch A45	$ 42,714	$ 44,826	$ 2,112
Branch A46	$ 87,479	$ 99,233	$ 11,754
Branch A47	$ 27,349	$ 28,716	$ 1,367
Storage Pond (2.5 AC)	$ -	$ 291,132	$ 291,132
Road Crossing Costs	$ -	$ 14,282	$ 14,282
Subtotal without Road Crossings	**$ 532,509**	**$ 951,458**	**$ 418,948**
Road Authority Repair Costs	$ 66,423	$ 66,423	$ -
Total	$ 598,933	$ 1,017,881	$ 418,948
		Subtotal Separable Maintenance Costs	$ 532,509
		Net Costs	$ 418,948
		Total Project Costs for Landowners	**$ 951,458**
		Benefits (Per Ditch Viewer Report)	$ 190,000
		Net Benefit	**$ (228,948)**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

SEPARABLE MAINTANENCE (REPAIR)

Branch A40

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 10,750.00	$ 10,750
102	TILE INVESTIGATION	HR	14	$ 218.00	$ 3,052
103	15-INCH AGRICULTURAL TILE	LF	1100	$ 23.00	$ 25,300
104	12-INCH AGRICULTURAL TILE	LF	2400	$ 21.70	$ 52,080
105	10-INCH AGRICULTURAL TILE	LF	927	$ 20.30	$ 18,818
106	8-INCH AGRICULTURAL TILE	LF	2295	$ 21.20	$ 48,654
107	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	27	$ 1,230.00	$ 33,210
108	CONNECT EXISTING 18-INCH TILE	EA	1	$ 1,503.50	$ 1,504
109	CONNECT EXISTING 15-INCH TILE	EA	1	$ 1,096.10	$ 1,096
110	CONNECT EXISTING 10-INCH TILE	EA	1	$ 804.30	$ 804
111	CONNECT EXISTING 8-INCH TILE	EA	2	$ 627.00	$ 1,254
112	15-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	1	$ 1,669.90	$ 1,670
113	12-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	2	$ 1,619.00	$ 3,238
114	GRANULAR PIPE FOUNDATION	CY	382	$ 27.60	$ 10,537
115	INSTALL DROP INTAKE (18-INCH)	EA	7	$ 1,430.00	$ 10,010
116	CAP DROP INTAKE (18-INCH)	EA	2	$ 407.00	$ 814
117	15-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	$ 1,225.20	$ 1,225
				TOTAL	**$ 224,100**
				10% UNFORSEEN	$ 22,410
				SUBTOTAL	**$ 246,510**
	TEMPORARY DAMAGES	AC	15.43	$ 650.00	$ 10,031
	TELEVISING (POST CONSTRUCTION)	LF	6722	$ 1.00	$ 6,722
				COUNTY ADMINISTRATION COSTS	$ 10,326
				TOPOGRAPHIC SURVEY	$ 2,503
				REPORTS, PLANS AND SPECIFICATIONS	$ 26,303
				CONSTRUCTION STAKING & ADMINISTRATION	$ 29,582
				TOTAL BRANCH A40 REPAIR COST	**$ 331,977**

Branch A43

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 2,000.00	$ 2,000
102	TILE INVESTIGATION	HR	2	$ 218.00	$ 436
103	8-INCH AGRICULTURAL TILE	LF	800	$ 21.20	$ 16,960
104	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	4	$ 1,230.00	$ 4,920
105	CONNECT EXISTING 10-INCH TILE	EA	1	$ 804.30	$ 804
106	CONNECT EXISTING 8-INCH TILE	EA	1	$ 627.00	$ 627
107	GRANULAR PIPE FOUNDATION	CY	41	$ 27.60	$ 1,128
108	INSTALL DROP INTAKE (18-INCH)	EA	1	$ 1,430.00	$ 1,430
109	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 28,800**
				10% UNFORSEEN	$ 2,880
				SUBTOTAL	**$ 31,680**
	TEMPORARY DAMAGES	AC	1.84	$ 650.00	$ 1,194
	TELEVISING (POST CONSTRUCTION)	LF	800	$ 1.00	$ 800
				COUNTY ADMINISTRATION COSTS	$ 1,584
				TOPOGRAPHIC SURVEY	$ 1,000
				REPORTS, PLANS AND SPECIFICATIONS	$ 2,931
				CONSTRUCTION STAKING & ADMINISTRATION	$ 3,802
				TOTAL BRANCH A43 REPAIR COST	**$ 42,991**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

SEPARABLE MAINTANENCE (REPAIR)

Branch A45

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 2,000.00	$ 2,000
102	TILE INVESTIGATION	HR	2	$ 218.00	$ 436
103	8-INCH AGRICULTURAL TILE	LF	800	$ 21.20	$ 16,960
104	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	4	$ 1,230.00	$ 4,920
105	CONNECT EXISTING 8-INCH TILE	EA	2	$ 627.00	$ 1,254
106	GRANULAR PIPE FOUNDATION	CY	40.86	$ 27.60	$ 1,128
107	INSTALL DROP INTAKE (18-INCH)	EA	1	$ 1,430.00	$ 1,430
108	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 28,600**
				10% UNFORSEEN	$ 2,860
				SUBTOTAL	**$ 31,460**
	TEMPORARY DAMAGES	AC	1.84	$ 650.00	$ 1,194
	TELEVISING (POST CONSTRUCTION)	LF	800	$ 1.00	$ 800
				COUNTY ADMINISTRATION COSTS	$ 1,573
				TOPOGRAPHIC SURVEY	$ 1,000
				REPORTS, PLANS AND SPECIFICATIONS	$ 2,911
				CONSTRUCTION STAKING & ADMINISTRATION	$ 3,776
				TOTAL BRANCH A45 REPAIR COST	**$ 42,714**

Branch A46

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 2,890.00	$ 2,890
102	TILE INVESTIGATION	HR	4	$ 218.00	$ 872
103	10-INCH AGRICULTURAL TILE	LF	600	$ 20.30	$ 12,180
104	8-INCH AGRICULTURAL TILE	LF	1200	$ 21.20	$ 25,440
105	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	8	$ 1,230.00	$ 9,840
106	CONNECT EXISTING 8-INCH TILE	EA	3	$ 627.00	$ 1,881
107	8-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	1	$ 1,246.40	$ 1,246
108	GRANULAR PIPE FOUNDATION	CY	94.07	$ 27.60	$ 2,596
109	INSTALL DROP INTAKE (18-INCH)	EA	2	$ 1,430.00	$ 2,860
110	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 60,300**
				10% UNFORSEEN	$ 6,030
				SUBTOTAL	**$ 66,330**
	TEMPORARY DAMAGES	AC	4.13	$ 650.00	$ 2,686
	TELEVISING (POST CONSTRUCTION)	LF	1800	$ 1.00	$ 1,800
				COUNTY ADMINISTRATION COSTS	$ 1,817
				TOPOGRAPHIC SURVEY	$ 750
				REPORTS, PLANS AND SPECIFICATIONS	$ 6,136
				CONSTRUCTION STAKING & ADMINISTRATION	$ 7,960
				TOTAL BRANCH A46 REPAIR COST	**$ 87,479**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

SEPARABLE MAINTANENCE (REPAIR)

Branch A47

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 1,000.00	$ 1,000
102	TILE INVESTIGATION	HR	1	$ 218.00	$ 218
103	6-INCH AGRICULTURAL TILE	LF	450	$ 22.40	$ 10,080
104	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	2	$ 1,230.00	$ 2,460
105	CONNECT EXISTING 8-INCH TILE	EA	1	$ 627.00	$ 627
106	CONNECT EXISTING 6-INCH TILE	EA	1	$ 532.30	$ 532
107	GRANULAR PIPE FOUNDATION	CY	21	$ 27.60	$ 592
108	INSTALL DROP INTAKE (18-INCH)	EA	1	$ 1,430.00	$ 1,430
109	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 17,400**
				10% UNFORSEEN	$ 1,740
				SUBTOTAL	**$ 19,140**
	TEMPORARY DAMAGES	AC	1.03	$ 650.00	$ 671
	TELEVISING (POST CONSTRUCTION)	LF	450	$ 1.00	$ 450
				COUNTY ADMINISTRATION COSTS	$ 957
				TOPOGRAPHIC SURVEY	$ 563
				REPORTS, PLANS AND SPECIFICATIONS	$ 3,271
				CONSTRUCTION STAKING & ADMINISTRATION	$ 2,297
				TOTAL BRANCH A47 REPAIR COST	**$ 27,349**

TOTAL REPAIR COST

Branch A40	**$ 331,977**
Branch A43	**$ 42,991**
Branch A45	**$ 42,714**
Branch A46	**$ 87,479**
Branch A47	**$ 27,349**

COMPLETE REPAIR COST	**$ 532,509**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

ISG

PROPOSED IMPROVEMENT OPTION #1

Branch A40 - Opt 1

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 14,370.00	$ 14,370
102	TILE INVESTIGATION	HR	14	$ 218.00	$ 3,052
103	24-INCH AGRICULTURAL TILE	LF	4430	$ 37.90	$ 167,897
104	18-INCH AGRICULTURAL TILE	LF	100	$ 29.00	$ 2,900
105	15-INCH AGRICULTURAL TILE	LF	400	$ 23.00	$ 9,200
106	12-INCH AGRICULTURAL TILE	LF	1200	$ 21.70	$ 26,040
107	8-INCH AGRICULTURAL TILE	LF	392	$ 21.20	$ 8,310
108	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	27	$ 1,230.00	$ 33,210
109	CONNECT EXISTING 18-INCH TILE	EA	1	$ 1,503.50	$ 1,504
110	CONNECT EXISTING 15-INCH TILE	EA	1	$ 1,096.10	$ 1,096
111	CONNECT EXISTING 10-INCH TILE	EA	1	$ 804.30	$ 804
112	CONNECT EXISTING 8-INCH TILE	EA	2	$ 627.00	$ 1,254
113	15-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	1	$ 1,669.90	$ 1,670
114	12-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	2	$ 1,619.00	$ 3,238
115	8-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	1	$ 1,246.40	$ 1,246
116	GRANULAR PIPE FOUNDATION	CY	480	$ 27.60	$ 13,244
117	INSTALL DROP INTAKE (18-INCH)	EA	6	$ 1,430.00	$ 8,580
118	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
119	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	$ 1,609.20	$ 1,609
				TOTAL	**$ 299,631**
				10% UNFORSEEN	$ 29,963
				SUBTOTAL	**$ 329,595**
	TEMPORARY DAMAGES	AC	14.97	$ 650.00	$ 9,732
	TELEVISING (POST CONSTRUCTION)	LF	6522	$ 1.00	$ 6,522
				COUNTY ADMINISTRATION COSTS	$ 16,480
				TOPOGRAPHIC SURVEY	$ 2,500
				REPORTS, PLANS AND SPECIFICATIONS	$ 41,080
				CONSTRUCTION STAKING & ADMINISTRATION	$ 42,052
				TOTAL BRANCH A40 - OPT 1 IMPROVEMENT COST	**$ 447,961**

Branch A43

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 1,530.00	$ 1,530
102	TILE INVESTIGATION	HR	2	$ 218.00	$ 436
103	15-INCH AGRICULTURAL TILE	LF	848	$ 23.00	$ 19,504
104	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	4	$ 1,230.00	$ 4,920
105	CONNECT EXISTING 10-INCH TILE	EA	1	$ 804.30	$ 804
106	CONNECT EXISTING 8-INCH TILE	EA	2	$ 627.00	$ 1,254
107	GRANULAR PIPE FOUNDATION	CY	55	$ 27.60	$ 1,517
108	INSTALL DROP INTAKE (18-INCH)	EA	1	$ 1,430.00	$ 1,430
109	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 31,802**
				10% UNFORSEEN	$ 3,180
				SUBTOTAL	**$ 34,982**
	TEMPORARY DAMAGES	AC	1.95	$ 650.00	$ 1,265
	TELEVISING (POST CONSTRUCTION)	LF	848	$ 1.00	$ 848
				COUNTY ADMINISTRATION COSTS	$ 1,750
				TOPOGRAPHIC SURVEY	$ 1,000
				REPORTS, PLANS AND SPECIFICATIONS	$ 3,936
				CONSTRUCTION STAKING & ADMINISTRATION	$ 3,198
				TOTAL BRANCH A43 IMPROVEMENT COST	**$ 46,980**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

PROPOSED IMPROVEMENT OPTION #1

Branch A45

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 2,000.00	$ 2,000
102	TILE INVESTIGATION	HR	2	$ 218.00	$ 436
103	8-INCH AGRICULTURAL TILE	LF	872	$ 21.20	$ 18,486
104	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	4	$ 1,230.00	$ 4,920
105	CONNECT EXISTING 8-INCH TILE	EA	2	$ 627.00	$ 1,254
106	GRANULAR PIPE FOUNDATION	CY	45	$ 27.60	$ 1,229
107	INSTALL DROP INTAKE (18-INCH)	EA	1	$ 1,430.00	$ 1,430
108	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 30,163**
				10% UNFORSEEN	$ 3,016
				SUBTOTAL	**$ 33,179**
	TEMPORARY DAMAGES	AC	2.00	$ 650.00	$ 1,301
	TELEVISING (POST CONSTRUCTION)	LF	872	$ 1.00	$ 872
				COUNTY ADMINISTRATION COSTS	$ 1,659
				TOPOGRAPHIC SURVEY	$ 1,000
				REPORTS, PLANS AND SPECIFICATIONS	$ 3,733
				CONSTRUCTION STAKING & ADMINISTRATION	$ 3,082
				TOTAL BRANCH A45 IMPROVEMENT COST	**$ 44,826**

Branch A46

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 3,420.00	$ 3,420
102	TILE INVESTIGATION	HR	4	$ 218.00	$ 872
103	18-INCH AGRICULTURAL TILE	LF	600	$ 29.00	$ 17,400
104	15-INCH AGRICULTURAL TILE	LF	500	$ 23.00	$ 11,500
105	10-INCH AGRICULTURAL TILE	LF	200	$ 20.30	$ 4,060
106	8-INCH AGRICULTURAL TILE	LF	557	$ 21.20	$ 11,808
107	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	8	$ 1,230.00	$ 9,840
108	CONNECT EXISTING 8-INCH TILE	EA	3	$ 627.00	$ 1,881
109	8-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	1	$ 1,246.40	$ 1,246
110	GRANULAR PIPE FOUNDATION	CY	114	$ 27.60	$ 3,157
111	INSTALL DROP INTAKE (18-INCH)	EA	4	$ 1,430.00	$ 5,720
112	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 71,312**
				10% UNFORSEEN	$ 7,131
				SUBTOTAL	**$ 78,443**
	TEMPORARY DAMAGES	AC	4.26	$ 650.00	$ 2,771
	TELEVISING (POST CONSTRUCTION)	LF	1857	$ 1.00	$ 1,857
				COUNTY ADMINISTRATION COSTS	$ 3,923
				TOPOGRAPHIC SURVEY	$ 1,000
				REPORTS, PLANS AND SPECIFICATIONS	$ 5,825
				CONSTRUCTION STAKING & ADMINISTRATION	$ 5,414
				TOTAL BRANCH A46 IMPROVEMENT COST	**$ 99,233**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

PROPOSED IMPROVEMENT OPTION #1

Branch A47

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 940.00	$ 940
102	TILE INVESTIGATION	HR	2	$ 218.00	$ 436
103	8-INCH AGRICULTURAL TILE	LF	509	$ 21.20	$ 10,791
104	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	3	$ 1,230.00	$ 3,690
105	CONNECT EXISTING 8-INCH TILE	EA	1	$ 627.00	$ 627
106	CONNECT EXISTING 6-INCH TILE	EA	1	$ 532.30	$ 532
107	GRANULAR PIPE FOUNDATION	CY	26	$ 27.60	$ 718
108	INSTALL DROP INTAKE (18-INCH)	EA	1	$ 1,430.00	$ 1,430
109	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 19,571**
				10% UNFORSEEN	$ 1,957
				SUBTOTAL	**$ 21,528**
	TEMPORARY DAMAGES	AC	1.17	$ 650.00	$ 760
	TELEVISING (POST CONSTRUCTION)	LF	509	$ 1.00	$ 509
				COUNTY ADMINISTRATION COSTS	$ 1,077
				TOPOGRAPHIC SURVEY	$ 637
				REPORTS, PLANS AND SPECIFICATIONS	$ 2,422
				CONSTRUCTION STAKING & ADMINISTRATION	$ 1,784
				TOTAL BRANCH A47 IMPROVEMENT COST	**$ 28,716**

TOTAL IMPROVEMENT COST

Branch A40 - Opt 1	**$ 447,961**
Branch A43	**$ 46,980**
Branch A45	**$ 44,826**
Branch A46	**$ 99,233**
Branch A47	**$ 28,716**

COMPLETE IMPROVEMENT OPTION 1 COST	**$ 667,716**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

ISG

PROPOSED IMPROVEMENT OPTION #2

Branch A40 - Opt 2

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 13,670.00	$ 13,670
102	TILE INVESTIGATION	HR	13	$ 218.00	$ 2,834
103	24-INCH AGRICULTURAL TILE	LF	4100	$ 37.90	$ 155,390
104	18-INCH AGRICULTURAL TILE	LF	100	$ 29.00	$ 2,900
105	15-INCH AGRICULTURAL TILE	LF	400	$ 23.00	$ 9,200
106	12-INCH AGRICULTURAL TILE	LF	1200	$ 21.70	$ 26,040
107	8-INCH AGRICULTURAL TILE	LF	392	$ 21.20	$ 8,310
108	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	25	$ 1,230.00	$ 30,750
109	CONNECT EXISTING 18-INCH TILE	EA	1	$ 1,503.50	$ 1,504
110	CONNECT EXISTING 15-INCH TILE	EA	1	$ 1,096.10	$ 1,096
111	CONNECT EXISTING 10-INCH TILE	EA	1	$ 804.30	$ 804
112	CONNECT EXISTING 8-INCH TILE	EA	2	$ 627.00	$ 1,254
113	15-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	1	$ 1,669.90	$ 1,670
114	12-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	2	$ 1,619.00	$ 3,238
115	8-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	1	$ 1,246.40	$ 1,246
116	GRANULAR PIPE FOUNDATION	CY	453.36	$ 27.60	$ 12,513
117	INSTALL DROP INTAKE (18-INCH)	EA	7	$ 1,430.00	$ 10,010
118	CAP DROP INTAKE (18-INCH)	EA	2	$ 407.00	$ 814
119	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	$ 1,609.20	$ 1,609
				TOTAL	**$ 284,853**
				10% UNFORSEEN	$ 28,485
				SUBTOTAL	**$ 313,338**
	TEMPORARY DAMAGES	AC	14.21	$ 650.00	$ 9,240
	TELEVISING (POST CONSTRUCTION)	LF	6192	$ 1.00	$ 6,192
				COUNTY ADMINISTRATION COSTS	$ 15,667
				TOPOGRAPHIC SURVEY	$ 2,500
				REPORTS, PLANS AND SPECIFICATIONS	$ 39,251
				CONSTRUCTION STAKING & ADMINISTRATION	$ 40,101
				TOTAL BRANCH A40 - OPT 2 IMPROVEMENT COST	**$ 426,288**

Branch A43

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 1,530.00	$ 1,530
102	TILE INVESTIGATION	HR	2	$ 218.00	$ 436
103	15-INCH AGRICULTURAL TILE	LF	848	$ 23.00	$ 19,504
104	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	4	$ 1,230.00	$ 4,920
105	CONNECT EXISTING 10-INCH TILE	EA	1	$ 804.30	$ 804
106	CONNECT EXISTING 8-INCH TILE	EA	2	$ 627.00	$ 1,254
107	GRANULAR PIPE FOUNDATION	CY	55	$ 27.60	$ 1,517
108	INSTALL DROP INTAKE (18-INCH)	EA	1	$ 1,430.00	$ 1,430
109	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 31,802**
				10% UNFORSEEN	$ 3,180
				SUBTOTAL	**$ 34,982**
	TEMPORARY DAMAGES	AC	1.95	$ 650.00	$ 1,265
	TELEVISING (POST CONSTRUCTION)	LF	848	$ 1.00	$ 848
				COUNTY ADMINISTRATION COSTS	$ 1,750
				TOPOGRAPHIC SURVEY	$ 1,000
				REPORTS, PLANS AND SPECIFICATIONS	$ 3,936
				CONSTRUCTION STAKING & ADMINISTRATION	$ 3,198
				TOTAL BRANCH A43 IMPROVEMENT COST	**$ 46,980**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

PROPOSED IMPROVEMENT OPTION #2

Branch A45

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 2,000.00	$ 2,000
102	TILE INVESTIGATION	HR	2	$ 218.00	$ 436
103	8-INCH AGRICULTURAL TILE	LF	872	$ 21.20	$ 18,486
104	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	4	$ 1,230.00	$ 4,920
105	CONNECT EXISTING 8-INCH TILE	EA	2	$ 627.00	$ 1,254
106	GRANULAR PIPE FOUNDATION	CY	45	$ 27.60	$ 1,229
107	INSTALL DROP INTAKE (18-INCH)	EA	1	$ 1,430.00	$ 1,430
108	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 30,163**
				10% UNFORSEEN	$ 3,016
				SUBTOTAL	**$ 33,179**
	TEMPORARY DAMAGES	AC	2.00	$ 650.00	$ 1,301
	TELEVISING (POST CONSTRUCTION)	LF	872	$ 1.00	$ 872
				COUNTY ADMINISTRATION COSTS	$ 1,659
				TOPOGRAPHIC SURVEY	$ 1,000
				REPORTS, PLANS AND SPECIFICATIONS	$ 3,733
				CONSTRUCTION STAKING & ADMINISTRATION	$ 3,082
				TOTAL BRANCH A45 IMPROVEMENT COST	**$ 44,826**

Branch A46

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 3,420.00	$ 3,420
102	TILE INVESTIGATION	HR	4	$ 218.00	$ 872
103	18-INCH AGRICULTURAL TILE	LF	600	$ 29.00	$ 17,400
104	15-INCH AGRICULTURAL TILE	LF	500	$ 23.00	$ 11,500
105	10-INCH AGRICULTURAL TILE	LF	200	$ 20.30	$ 4,060
106	8-INCH AGRICULTURAL TILE	LF	557	$ 21.20	$ 11,808
107	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	8	$ 1,230.00	$ 9,840
108	CONNECT EXISTING 8-INCH TILE	EA	3	$ 627.00	$ 1,881
109	8-INCH CROSS-CONNECT W/40 LF OF SPECIFIED PIPE	EA	1	$ 1,246.40	$ 1,246
110	GRANULAR PIPE FOUNDATION	CY	114	$ 27.60	$ 3,157
111	INSTALL DROP INTAKE (18-INCH)	EA	4	$ 1,430.00	$ 5,720
112	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 71,312**
				10% UNFORSEEN	$ 7,131
				SUBTOTAL	**$ 78,443**
	TEMPORARY DAMAGES	AC	4.26	$ 650.00	$ 2,771
	TELEVISING (POST CONSTRUCTION)	LF	1857	$ 1.00	$ 1,857
				COUNTY ADMINISTRATION COSTS	$ 3,923
				TOPOGRAPHIC SURVEY	$ 1,000
				REPORTS, PLANS AND SPECIFICATIONS	$ 5,825
				CONSTRUCTION STAKING & ADMINISTRATION	$ 5,414
				TOTAL BRANCH A46 IMPROVEMENT COST	**$ 99,233**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

PROPOSED IMPROVEMENT OPTION #2
Branch A47

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 940.00	$ 940
102	TILE INVESTIGATION	HR	2	$ 218.00	$ 436
103	8-INCH AGRICULTURAL TILE	LF	509	$ 21.20	$ 10,791
104	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	3	$ 1,230.00	$ 3,690
105	CONNECT EXISTING 8-INCH TILE	EA	1	$ 627.00	$ 627
106	CONNECT EXISTING 6-INCH TILE	EA	1	$ 532.30	$ 532
107	GRANULAR PIPE FOUNDATION	CY	26	$ 27.60	$ 718
108	INSTALL DROP INTAKE (18-INCH)	EA	1	$ 1,430.00	$ 1,430
109	CAP DROP INTAKE (18-INCH)	EA	1	$ 407.00	$ 407
				TOTAL	**$ 19,571**
				10% UNFORSEEN	$ 1,957
				SUBTOTAL	**$ 21,528**
	TEMPORARY DAMAGES	AC	1.17	$ 650.00	$ 760
	TELEVISING (POST CONSTRUCTION)	LF	509	$ 1.00	$ 509
				COUNTY ADMINISTRATION COSTS	$ 1,077
				TOPOGRAPHIC SURVEY	$ 637
				REPORTS, PLANS AND SPECIFICATIONS	$ 2,422
				CONSTRUCTION STAKING & ADMINISTRATION	$ 1,784
				TOTAL BRANCH A47 IMPROVEMENT COST	**$ 28,716**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

PROPOSED IMPROVEMENT OPTION #2

Storage Pond (2.5 AC)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 9,910.00	$ 9,910
102	POND COMMON EXCAVATION (P) (EV)	CY	36157	$ 3.50	$ 126,550
103	TOP SOIL STRIP & PLACE SPOILS	AC	9	$ 4,212.60	$ 37,913
104	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	$ 1,609.20	$ 1,609
105	INSTALL STRUCTURE S-1 WITH GALVINIZED GRATE	EA	1	$ 19,632.20	$ 19,632
106	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	0.53	$ 1,388.40	$ 736
107	STANDARD SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH)	AC	0.8	$ 3,353.70	$ 2,683
108	STANDARD POND BOTTOM SEEDING (SEED MIX: 33-261 W/ TYPE 7 (BFM) MULCH)	AC	1.6	$ 3,450.00	$ 5,520
109	BUFFER STRIP MOWING	AC	1.05	$ 214.40	$ 225
110	WEED SPRAYING	AC	1.85	$ 307.80	$ 569
111	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	15	$ 75.80	$ 1,137
				TOTAL	**$ 206,485**
				10% UNFORSEEN	$ 20,648
				SUBTOTAL	**$ 227,133**
	TEMPORARY DAMAGES	AC	12.52	$ 650.00	$ 8,138
	LAND ACQUISTION/ PERMANENT DAMAGES	AC	3	$ 7,500.00	$ 22,725
				COUNTY ADMINISTRATION COSTS	$ 6,857
				TOPOGRAPHIC SURVEY	$ 3,470
				REPORTS, PLANS AND SPECIFICATIONS	$ 10,553
				CONSTRUCTION STAKING & ADMINISTRATION	$ 12,256
				TOTAL STORAGE POND (2.5 AC) IMPROVEMENT COST	**$ 291,132**

TOTAL IMPROVEMENT COST

Branch A40 - Opt 2	**$ 426,288**
Branch A43	**$ 46,980**
Branch A45	**$ 44,826**
Branch A46	**$ 99,233**
Branch A47	**$ 28,716**
Storage Pond (2.5 AC)	**$ 291,132**

COMPLETE IMPROVEMENT OPTION 2 COST	**$ 937,176**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

ISG

ROAD CROSSINGS

BRANCH A40 REPAIR COST WITH ROAD - COUNTY ROAD 2

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 1,500.00	$ 1,500
102	BORE 10-INCH TILE	LF	73	$ 260.62	$ 19,025
103	SAND OR CLSM FILL PIPE UNDER ROAD (10-INCH)	LF	70	$ 10.10	$ 707
104	FURNISH & INSTALL WATER QUALITY INLET	EA	2	$ 1,599.00	$ 3,198
105	INSTALL 12-INCH PERFORATED TILE (WATER QUALITY INLET)	LF	95	$ 22.90	$ 2,176
106	INSTALL DROP INTAKE (18-INCH)	EA	2	$ 1,430.00	$ 2,860
107	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 3	SY	950	$ 2.70	$ 2,565
				TOTAL	**$ 32,031**
				10% CONTINGENCY	$ 3,203
				SUBTOTAL	**$ 35,234**
				COUNTY ADMINISTRATION COSTS	$ 1,800
				REPORTS, PLANS AND SPECIFICATIONS	$ 4,000
				CONSTRUCTION STAKING & ADMINISTRATION	$ 4,300
				ESTIMATED BRANCH A40 REPAIR COST WITH ROAD - COUNTY ROAD 2	**$ 45,334**

BRANCH A40 IMPROVEMENT COST - COUNTY ROAD 2

Item No.	Item	Unit	Quantity	Unit Price	Amount
201	MOBILIZATION	LS	1	$ 1,900.00	$ 1,900
202	BORE 24-INCH TILE	LF	70	$ 410.00	$ 28,700
203	SAND OR CLSM FILL PIPE UNDER ROAD (10-INCH)	LF	70	$ 10.10	$ 707
204	FURNISH & INSTALL WATER QUALITY INLET	EA	2	$ 1,599.00	$ 3,198
205	INSTALL 12-INCH PERFORATED TILE (WATER QUALITY INLET)	LF	95	$ 22.90	$ 2,176
206	INSTALL DROP INTAKE (18-INCH)	EA	2	$ 1,430.00	$ 2,860
307	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 3	SY	950	$ 2.70	$ 2,565
				TOTAL	**$ 42,106**
				10% CONTINGENCY	$ 4,211
				SUBTOTAL	**$ 46,316**
				COUNTY ADMINISTRATION COSTS	$ 2,400
				REPORTS, PLANS AND SPECIFICATIONS	$ 5,300
				CONSTRUCTION STAKING & ADMINISTRATION	$ 5,600
				ESTIMATED BRANCH A40 IMPROVEMENT COST - COUNTY ROAD 2	**$ 59,616**

MARTIN/FARIBAULT COUNTY
JUDICIAL DITCH No. 414

ISG

ROAD CROSSINGS

BRANCH A40 REPAIR COST WITH ROAD - 310TH ST

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 1,000.00	$ 1,000
102	8-INCH AGRICULTURAL TILE	LF	55	$ 21.20	$ 1,166
103	SAND OR CLSM FILL PIPE UNDER ROAD (8-INCH)	LF	55	$ 8.90	$ 490
104	GRANULAR PIPE FOUNDATION	CY	3	$ 27.60	$ 78
105	FURNISH & INSTALL WATER QUALITY INLET	EA	2	$ 1,599.00	$ 3,198
106	NSTALL 12-INCH PERFORATED TILE(WATER QUALITY INLET)	LF	75	$ 22.90	$ 1,718
107	INSTALL DROP INTAKE (18-INCH)	EA	2	$ 1,430.00	$ 2,860
108	OPEN CUT & RESTORE GRAVEL ROAD OR DRIVEWAY	EA	1	$ 2,275.00	$ 2,275
109	MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEG	SY	750	$ 2.70	$ 2,025
				TOTAL	**$ 14,809**
				10% CONTINGENCY	$ 1,481
				SUBTOTAL	**$ 16,289**
				COUNTY ADMINISTRATION COSTS	$ 900
				REPORTS, PLANS AND SPECIFICATIONS	$ 1,900
				CONSTRUCTION STAKING & ADMINISTRATION	$ 2,000
				ESTIMATED BRANCH A40 REPAIR COST WITH ROAD - 310TH ST	**$ 21,089**

BRANCH A40 IMPROVEMENT COST - 310TH ST

Item No.	Item	Unit	Quantity	Unit Price	Amount
201	MOBILIZATION	LS	1	$ 1,000.00	$ 1,000
202	8-INCH AGRICULTURAL TILE	LF	55	$ 21.20	$ 1,166
203	SAND OR CLSM FILL PIPE UNDER ROAD (8-INCH)	LF	55	$ 8.90	$ 490
204	GRANULAR PIPE FOUNDATION	CY	3	$ 27.60	$ 78
205	FURNISH & INSTALL WATER QUALITY INLET	EA	2	$ 1,599.00	$ 3,198
206	NSTALL 12-INCH PERFORATED TILE(WATER QUALITY INLET)	LF	75	$ 22.90	$ 1,718
207	INSTALL DROP INTAKE (18-INCH)	EA	2	$ 1,430.00	$ 2,860
208	OPEN CUT & RESTORE GRAVEL ROAD OR DRIVEWAY	EA	1	$ 2,275.00	$ 2,275
209	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 3	SY	750	$ 2.70	$ 2,025
				TOTAL	**$ 14,809**
				10% CONTINGENCY	$ 1,481
				SUBTOTAL	**$ 16,289**
				COUNTY ADMINISTRATION COSTS	$ 900
				REPORTS, PLANS AND SPECIFICATIONS	$ 1,900
				CONSTRUCTION STAKING & ADMINISTRATION	$ 2,000
				ESTIMATED BRANCH A40 IMPROVEMENT COST - 310TH ST	**$ 21,089**

MARTIN/FARIBAULT COUNTY

JUDICIAL DITCH No. 414

ISG

ROAD CROSSING SUMMARY

Crossing	Road Authority	Repair Cost With Road (Repair Bore Tile)	Improvement Cost (Improvement Bore Tile)	Project Cost for Road Crossings (Difference of Improvement Cost and Road Authority Cost)
Branch A40				
County Road 2	Faribault County	$ 45,334	$ 59,616	$ 14,282
310th St	East Chain Township	$ 21,089	$ 21,089	$ -
TOTAL		**$ 66,423**	**$ 80,705**	**$ 14,282**

Faribault County Road Authority Total	**$ 45,334**	**$ 59,616**	**$ 14,282**
East Chain Township Road Authority Total	**$ 21,089**	**$ 21,089**	**$ -**

Appendix H: Approximate Damages

Martin/Faribault County Judicial Ditch No. 414 Branch A40
Approximate Damages Summary
Per Final Engineer's Report

Option 1

	40 Description	40 Owner	Parcel ID	Approximate Station Range	Improvement Description	Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch A40	SW 1/4 NW 1/4 Section 19 Pilot Grove Township	Peterson, Terry & Sonja	140190300.0	0+00 to 14+46	24-Inch Tile	0.00	1346	3.09
	NW 1/4 SW 1/4 Section 19 Pilot Grove Township	Peterson, Terry & Sonja	140190300.0	14+46 to 15+10	24-Inch Tile	0.00	64	0.15
	NW 1/4 SW 1/4 Section 19 Pilot Grove Township	James & Ronda Cone Trust AGMT	140190400.0	15+10 to 16+98	24-Inch Tile	0.00	188	0.43
	NE 1/4 SW 1/4 Section 19 Pilot Grove Township	James & Ronda Cone Trust AGMT	140190400.0	16+98 to 28+82	24-Inch Tile	0.00	1184	2.72
	SE 1/4 SW 1/4 Section 19 Pilot Grove Township	James & Ronda Cone Trust AGMT	140190400.0	28+82 to 43+33	24-Inch Tile	0.00	1451	3.33
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	James & Ronda Cone Trust AGMT	140190400.0	43+33 to 43+75	24-Inch Tile	0.00	42	0.10
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	43+75 to 44+95	24-Inch Tile	0.00	120	0.28
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	44+95 to 45+95	18-Inch Tile	0.00	100	0.23
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	45+95 to 49+95	15-Inch Tile	0.00	400	0.92
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	49+95 to 50+57	12-Inch Tile	0.00	62	0.14
	NW 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	50+57 to 61+92	12-Inch Tile	0.00	1110	2.55
	NW 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	61+92 to 65+58	8-Inch Tile	0.00	366	0.84
	NE 1/4 NE 1/4 Section 25 East Chain Township	Thompson, Todd & Malorie	140300600.0	65+58 to 65+73	8-Inch Tile	0.00	15	0.03
	NE 1/4 NE 1/4 Section 25 East Chain Township	Roger, Thompson	30250100.0	65+73 to 66+47	8-Inch Tile	0.00	74	0.17
					Branch A40 Total	**0.00**	**6522**	**14.97**

	40 Description	40 Owner	Parcel ID	Approximate Station Range	Improvement Description	Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch A43	SE 1/4 SW 1/4 Section 19 Pilot Gove Township	James & Ronda Cone Trust AGMT	140190400.0	0+00 to 8+19	15-Inch Tile	0.00	819	1.88
	SE 1/4 SW 1/4 Section 19 Pilot Gove Township	James & Ronda Cone Trust AGMT	140190400.0	8+19 to 8+35	15-Inch Tile	0.00	16	0.04
	SW 1/4 SE 1/4 Section 19 Pilot Gove Township	Cone, Robert & Janet	140190100.0	8+35 to 8+48	15-Inch Tile	0.00	13	0.03
					Branch A43 Total	**0.00**	**848**	**1.95**

	40 Description	40 Owner	Parcel ID	Approximate Station Range	Improvement Description	Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch A45	NW 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	0+00 to 7+78	8-Inch Tile	0.00	778	1.79
	SW 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	7+78 to 8+18	8-Inch Tile	0.00	40	0.09
	SW 1/4 NW 1/4 Section 30 Pilot Grove Township	Merwin Thompson Farms INC	140301200.0	8+18 to 8+72	8-Inch Tile	0.00	54	0.12
					Branch A45 Total	**0.00**	**872**	**2.00**

	40 Description	40 Owner	Parcel ID	Approximate Station Range	Improvement Description	Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch A46	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	0+00 to 6+00	18-Inch Tile	0.00	600	1.38
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	6+00 to 11+00	15-Inch Tile	0.00	500	1.15
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	11+00 to 13+00	10-Inch Tile	0.00	200	0.46
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	13+00 to 14+03	8-Inch Tile	0.00	103	0.24
	SE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	14+03 to 14+47	8-Inch Tile	0.00	44	0.10
	SE 1/4 NW 1/4 Section 31 Pilot Grove Township	Merwin Thompson Farms INC	140301200.0	14+47 to 18+57	8-Inch Tile	0.00	410	0.94
					Branch A46 Total	**0.00**	**1857**	**4.26**

	40 Description	40 Owner	Parcel ID	Approximate Station Range	Improvement Description	Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch A47	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	0+00 to 4+28	8-Inch Tile	0.00	428	0.98
	NE 1/4 NW 1/4 Section 31 Pilot Grove Township	Merwin Thompson Farms INC	140300100.0	4+28 to 4+42	8-Inch Tile	0.00	14	0.03
	NW 1/4 NE 1/4 Section 32 Pilot Grove Township	Merwin Thompson Farms INC	140300100.0	4+42 to 5+09	8-Inch Tile	0.00	67	0.15
					Branch A47 Total	**0.00**	**509**	**1.17**

Martin/Faribault County Judicial Ditch No. 414 Branch A40
Approximate Damages Summary
Per Final Engineer's Report

Option 2

	40 Description	40 Owner	Parcel ID	Approximate Station Range	Improvement Description	Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch A40	SW 1/4 NW 1/4 Section 19 Pilot Grove Township	Peterson, Terry & Sonja	140190300.0	0+00 to 14+46	24-Inch Tile	0.00	1420	3.26
	NW 1/4 SW 1/4 Section 19 Pilot Grove Township	Peterson, Terry & Sonja	140190300.0	14+46 to 15+10	24-Inch Tile	0.00	64	0.15
	NW 1/4 SW 1/4 Section 19 Pilot Grove Township	James & Ronda Cone Trust AGMT	140190400.0	15+10 to 16+98	Pond	0.93	188	4.00
	NE 1/4 SW 1/4 Section 19 Pilot Grove Township	James & Ronda Cone Trust AGMT	140190400.0	16+98 to 17+50	Pond	2.10	52	8.52
	NE 1/4 SW 1/4 Section 19 Pilot Grove Township	James & Ronda Cone Trust AGMT	140190400.0	17+50 to 28+82	24-Inch Tile	2.10	919	2.11
	SE 1/4 SW 1/4 Section 19 Pilot Grove Township	James & Ronda Cone Trust AGMT	140190400.0	28+82 to 43+33	24-Inch Tile	0.00	1451	3.33
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	James & Ronda Cone Trust AGMT	140190400.0	43+33 to 43+75	24-Inch Tile	0.00	42	0.14
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	43+75 to 44+95	24-Inch Tile	0.00	120	0.28
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	44+95 to 45+95	18-Inch Tile	0.00	100	0.23
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	45+95 to 49+95	15-Inch Tile	0.00	400	0.92
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	49+95 to 50+57	12-Inch Tile	0.00	62	0.14
	NW 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	50+57 to 61+92	12-Inch Tile	0.00	1135	2.61
	NW 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	61+92 to 65+58	8-Inch Tile	0.00	366	0.84
	NE 1/4 NE 1/4 Section 25 East Chain Township	Thompson, Todd & Malorie	140300600.0	65+58 to 65+73	8-Inch Tile	0.00	15	0.03
	NE 1/4 NE 1/4 Section 25 East Chain Township	Roger, Thompson	30250100.0	65+73 to 66+47	8-Inch Tile	0.00	74	0.17
					Branch A40 Total	**5.13**	**6168**	**26.73**

	40 Description	40 Owner	Parcel ID	Approximate Station Range	Improvement Description	Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch A43	SE 1/4 SW 1/4 Section 19 Pilot Gove Township	James & Ronda Cone Trust AGMT	140190400.0	0+00 to 8+19	15-Inch Tile	0.00	819	1.88
	SE 1/4 SW 1/4 Section 19 Pilot Gove Township	James & Ronda Cone Trust AGMT	140190400.0	8+19 to 8+35	15-Inch Tile	0.00	16	0.04
	SW 1/4 SE 1/4 Section 19 Pilot Gove Township	Cone, Robert & Janet	140190100.0	8+35 to 8+48	15-Inch Tile	0.00	13	0.03
					Branch A43 Total	**0.00**	**848**	**1.95**

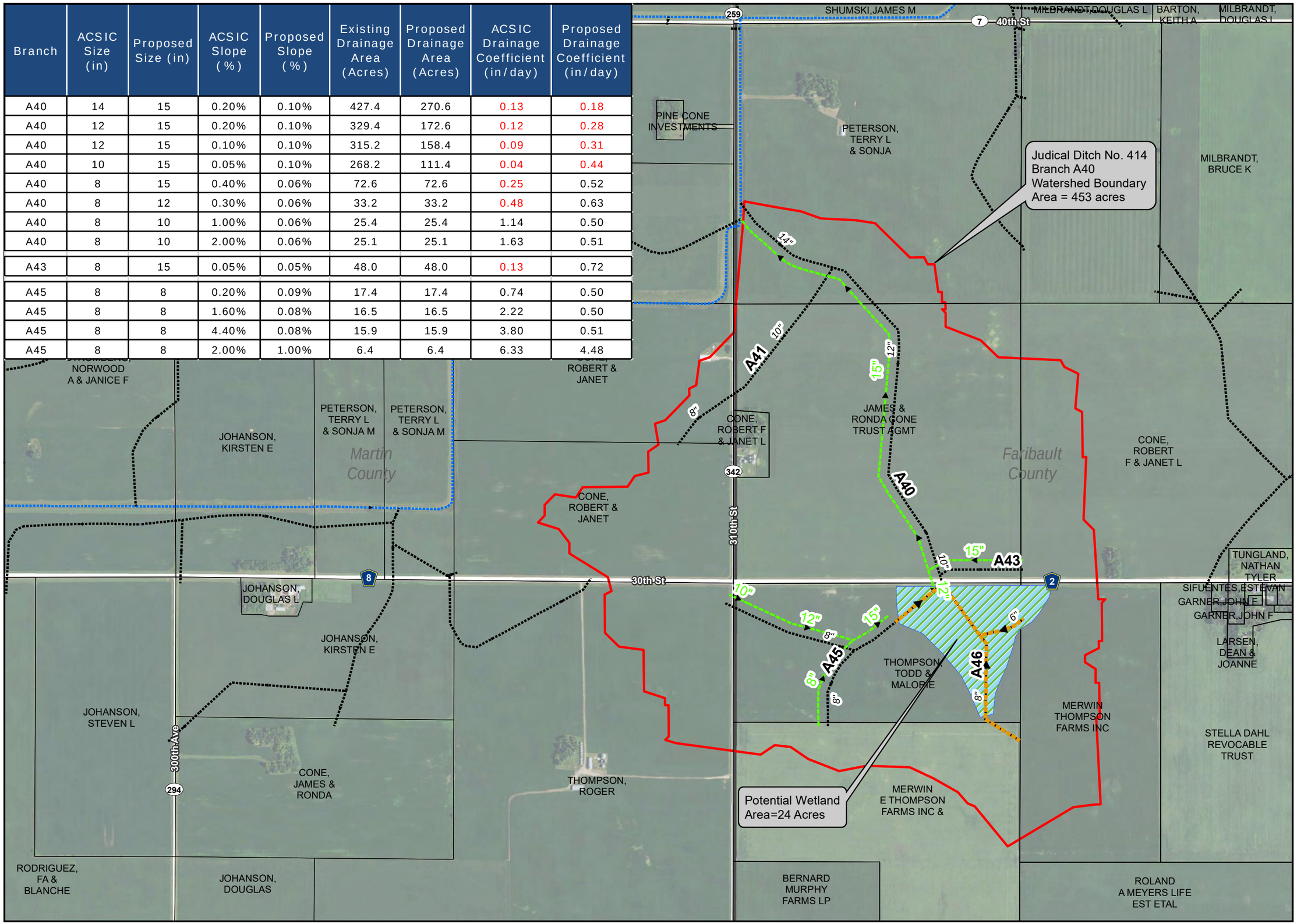
	40 Description	40 Owner	Parcel ID	Approximate Station Range	Improvement Description	Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch A45	NW 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	0+00 to 7+78	8-Inch Tile	0.00	778	1.79
	SW 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	7+78 to 8+18	8-Inch Tile	0.00	40	0.09
	SW 1/4 NW 1/4 Section 30 Pilot Grove Township	Merwin Thompson Farms INC	140301200.0	8+18 to 8+72	8-Inch Tile	0.00	54	0.12
					Branch A45 Total	**0.00**	**872**	**2.00**

	40 Description	40 Owner	Parcel ID	Approximate Station Range	Improvement Description	Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch A46	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	0+00 to 6+00	18-Inch Tile	0.00	600	1.38
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	6+00 to 11+00	15-Inch Tile	0.00	500	1.15
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	11+00 to 13+00	10-Inch Tile	0.00	200	0.46
	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	13+00 to 14+03	8-Inch Tile	0.00	103	0.24
	SE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	14+03 to 14+47	8-Inch Tile	0.00	44	0.10
	SE 1/4 NW 1/4 Section 31 Pilot Grove Township	Merwin Thompson Farms INC	140301200.0	14+47 to 18+57	8-Inch Tile	0.00	410	0.94
					Branch A46 Total	**0.00**	**1857**	**4.26**

	40 Description	40 Owner	Parcel ID	Approximate Station Range	Improvement Description	Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch A47	NE 1/4 NW 1/4 Section 30 Pilot Grove Township	Thompson, Todd & Malorie	140300600.0	0+00 to 4+28	8-Inch Tile	0.00	428	0.98
	NE 1/4 NW 1/4 Section 31 Pilot Grove Township	Merwin Thompson Farms INC	140300100.0	4+28 to 4+42	8-Inch Tile	0.00	14	0.03
	NW 1/4 NE 1/4 Section 32 Pilot Grove Township	Merwin Thompson Farms INC	140300100.0	4+42 to 5+09	8-Inch Tile	0.00	67	0.15
					Branch A47 Total	**0.00**	**509**	**1.17**

Appendix I: Wetland Concept

Branch	ACSIC Size (in)	Proposed Size (in)	ACSIC Slope (%)	Proposed Slope (%)	Existing Drainage Area (Acres)	Proposed Drainage Area (Acres)	ACSIC Drainage Coefficient (in/day)	Proposed Drainage Coefficient (in/day)
A40	14	15	0.20%	0.10%	427.4	270.6	0.13	0.18
A40	12	15	0.20%	0.10%	329.4	172.6	0.12	0.28
A40	12	15	0.10%	0.10%	315.2	158.4	0.09	0.31
A40	10	15	0.05%	0.10%	268.2	111.4	0.04	0.44
A40	8	15	0.40%	0.06%	72.6	72.6	0.25	0.52
A40	8	12	0.30%	0.06%	33.2	33.2	0.48	0.63
A40	8	10	1.00%	0.06%	25.4	25.4	1.14	0.50
A40	8	10	2.00%	0.06%	25.1	25.1	1.63	0.51
A43	8	15	0.05%	0.05%	48.0	48.0	0.13	0.72
A45	8	8	0.20%	0.09%	17.4	17.4	0.74	0.50
A45	8	8	1.60%	0.08%	16.5	16.5	2.22	0.50
A45	8	8	4.40%	0.08%	15.9	15.9	3.80	0.51
A45	8	8	2.00%	1.00%	6.4	6.4	6.33	4.48



ISG

Option #2a Map

Judical Ditch No. 414

Martin - Faribault County, Minnesota

Monday, February 22, 2021

Legend

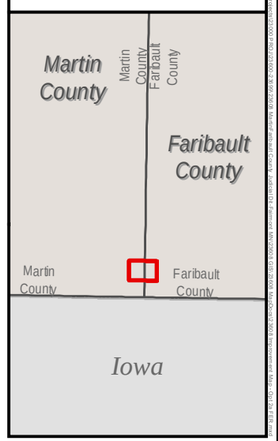
- Abandon Tile
- Proposed Tile Wetland
- Open Ditch
- Existing Tile
- Potential Wetland
- Parcels
- BranchA40Watershed
- Counties

PN: 19-23608

Source:

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

N W E S

0 195 390 780 Feet

1 inch = 833 feet