



PRELIMINARY ENGINEERS REPORT

Goodhue County Ditch 1 Branch B Tile Improvement

PRELIMINARY ENGINEERS REPORT

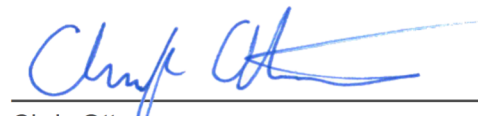
Goodhue County Ditch 1 Branch B Tile Improvement

May 3, 2021



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 Engineer under the laws of the State of Minnesota

Houston Engineering, Inc.
7550 Meridian Court, Suite 120
Maple Grove, MN 55369
Phone # 763.493.4522

A handwritten signature in blue ink, appearing to read "Chris Ottenness", is written over a horizontal line.

Chris Ottenness
License No. 41961

May 3, 2021

Date

TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	OVERVIEW OF EXISTING DRAINAGE SYSTEM	1
1.2	PROJECT DESIGN AND SITE SURVEY	3
2	COMPATIBILITY WITH EXISTING PLANS AND STATE LAW.....	4
2.1	DRAINAGE LAW – MINN. STAT. CHAPTER 103E	4
2.1.1	<i>PRELIMINARY SURVEY REPORT REQUIRED CONTENTS.....</i>	<i>4</i>
2.2	PERMITTING REQUIREMENTS	4
2.2.1	<i>LOCAL</i>	<i>4</i>
2.2.2	<i>STATE</i>	<i>4</i>
2.2.3	<i>FEDERAL</i>	<i>5</i>
2.3	EXISTING WATER MANAGEMENT PLANS.....	5
2.3.1	<i>GOODHUE COUNTY WATER PLAN.....</i>	<i>5</i>
2.3.2	<i>TMDL & WRAPS.....</i>	<i>5</i>
2.3.3	<i>CONSISTENCY WITH WATER PLANS.....</i>	<i>6</i>
2.3.4	<i>COUNTY ZONING AND LAND USE PLAN.....</i>	<i>6</i>
3	CONSIDERATIONS.....	6
3.1	PROJECT COSTS AND PUBLIC AND PRIVATE BENEFITS	6
3.1.1	<i>PRIVATE BENEFIT</i>	<i>6</i>
3.1.2	<i>PUBLIC BENEFIT.....</i>	<i>6</i>
3.1.3	<i>COSTS.....</i>	<i>7</i>
3.2	ALTERNATIVE MEASURES	7
3.3	LAND USE	7
3.4	CURRENT AND POTENTIAL FLOODING	8
3.4.1	<i>HYDROLOGIC AND HYDRAULIC CONDITIONS IN SYSTEM.....</i>	<i>8</i>
3.4.2	<i>HYDROLOGIC AND HYDRAULIC CONDITIONS AT CR-59</i>	<i>9</i>
3.5	WETLANDS	10
3.6	WATER QUALITY	10
3.7	FISH AND WILDLIFE RESOURCES.....	11
3.8	GROUNDWATER	11
3.9	ENVIRONMENTAL IMPACT	11
3.10	EXTERNAL FUNDING.....	11
4	PUBLIC UTILITY, BENEFIT OR WELFARE.....	12
5	OPINION OF PROBABLE CONSTRUCTION COST	13
6	SEPERABLE MAINTENANCE	13
7	RECOMMENDATIONS	13
	EXHIBIT A – IMPROVEMENT PETITION.....	14
	EXHIBIT B – SITE SURVEY	19
	EXHIBIT C – DESIGN PLAN / PROFILE.....	21
	EXHIBIT D – OPINION OF PROBABLE COST	27
	EXHIBIT E – SUBCATCHMENT BOUNDARIES.....	29

TABLES

Table 1 – Branch B Drainage Coefficients.....	8
Table 2 – Branch B-1 Drainage Coefficients.....	8
Table 3 – Branch B-2 Drainage Coefficients.....	8
Table 4 – County Road 59 36” Culvert Hydraulic Calculations.....	9
Table 5 – CD 1 Open Channel Hydraulic Calculations.....	9
Table 6 – Opinion of Probable Construction Cost Summary.....	13

FIGURES

Figure 1 – Site Area	2
-----------------------------------	----------

1 INTRODUCTION

The petitioned project consists of an improvement of the Branch B drain tile of Goodhue County Ditch 1 (CD 1). The improvement will increase the capacity of the Branch B drain tile to meet current drainage needs. The CD 1 Branch B tile alignment is shown in **Figure 1**. The entire length of drain tile Branch B (including two sub-branches) is proposed for improvement. The project is a result of a petition from several landowners received by Goodhue County requesting the improvement of Branch B. A copy of the petition for improvement is included in **Exhibit A**.

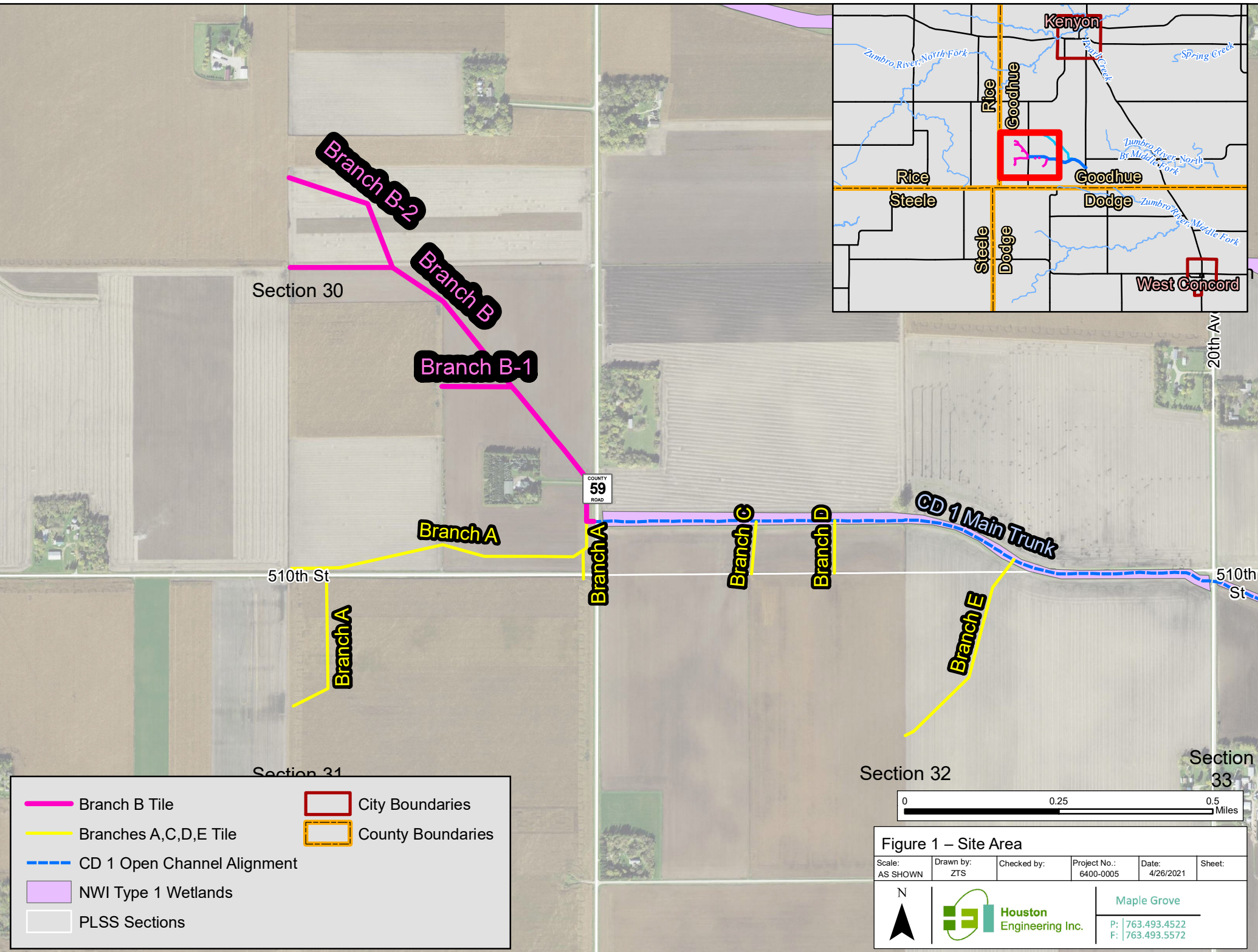
The petition for improvement of CD 1 Branch B states that Branch B has insufficient capacity and the installation of a larger tile is required to provide sufficient drainage capacity and fulfill its originally intended purpose under current farming and drainage practices. It also states that portions of the drainage system have deteriorated, thus impairing its effectiveness and the proposed improvement will be of public utility and promote the public health.

The petition for improvement of CD 1 Branch B was filed with the Goodhue County Board of Commissioners in accordance with Minnesota Statutes (Minn. Stat.) section 103E.215. The Board of Commissioners appointed Houston Engineering, Inc. (HEI) as project engineer and ordered the preparation of the Engineer's Preliminary Survey Report in accordance with Minn. Stat. § 103E.241, Subd. 1.

1.1 OVERVIEW OF EXISTING DRAINAGE SYSTEM

The Goodhue CD 1 public drainage system consists of an open channel and five branches of drain tile located in Sections 28, 29, 30, 31, 32, and 33 of Kenyon Township (T109N, R18W). The portion of the system being analyzed for this report is the Branch B drain tile. Branch B begins in the Southeast Quarter of the Southeast Quarter of Section 30 in a drop structure located on the west side of County Road 59; thence northwesterly through the Northeast Quarter of the Southeast Quarter and Northwest Quarter of the Southeast Quarter; then terminating in the Southeast Quarter of the Northeast Quarter at the boundary between the Northeast Quarter and Northwest Quarter of Section 30. Branch B-1 originates in the Northeast Quarter of the Southeast Quarter of Section 30 and terminates due west at the boundary with the Northwest Quarter of the Southeast Quarter. Branch B-2 originates in the Northwest Quarter of the Southeast Quarter of Section 30 and terminates due west at the center of Section 30.

The full length of Branch B and its two sub-branches are being analyzed as part of this improvement.











	Branch B Tile		City Boundaries
	Branches A,C,D,E Tile		County Boundaries
	CD 1 Open Channel Alignment		
	NWI Type 1 Wetlands		
	PLSS Sections		

Figure 1 – Site Area

Scale: AS SHOWN	Drawn by: ZTS	Checked by:	Project No.: 6400-0005	Date: 4/26/2021	Sheet:
--------------------	------------------	-------------	---------------------------	--------------------	--------

0 0.25 0.5 Miles

N

 Houston Engineering Inc.	Maple Grove
	P: 763.493.4522 F: 763.493.5572

1.2 PROJECT DESIGN AND SITE SURVEY

The landowners in the Branch B tile watershed have observed prolonged flooding of agricultural lands drained by Branch B of CD 1. A tile inspection report¹ of the CD 1 drain tile networks indicates the drainage issues are due to both insufficient capacity and disrepair of the tile system. Branch B was established in 1954 and has undergone no significant repairs during its service life. Televising survey of Branch B found a concrete pipe in disrepair near the outlet, and although the televising equipment was unable to move farther upstream, tile displacement and deterioration are likely present elsewhere in the system due to its age and similar characteristics found in the other branches.

On-site televising of Branch B was completed by Empire Pipe Services in September 2020, and on-site survey was obtained by Goodhue County in April 2021. The on-site survey determined the locations and elevations of the tile outlet near County Road 59 and all inlets and tile access locations for the public drainage system. LiDAR elevation data from the State of Minnesota was used in lieu of on-site survey to assess drainage patterns and map catchment boundaries. The project site survey is shown in **Exhibit B**.

Plan and profile drawings included as **Exhibit C** of this report provide a graphical representation of the current system and a recommended solution to correct existing flooding and drainage problems in the Branch B tile watershed. The proposed solution includes the replacement of existing tile with new tile sized to provide a drainage coefficient of approximately 1/2-inch to remove excess water from the surface and the root zone of the soil profile within a 24-hour period. The Natural Resource Conservation Service (NRCS) recommends a 1/2-inch drainage coefficient to support modern row crop production.

Existing tile diameters for the Branch B system range in size from 10-inches at the outlet to 6-inches at the upstream ends of Branch B and Branch B-2. Proposed pipe diameters have been selected based on drainage coefficients calculated for critical sections identified by pipe diameter. The project has been designed assuming proposed improvement tiles will be placed parallel to existing tiles, and the existing tiles will be abandoned in-place. Branches B, B-1, and B-2 each have several private tile connections, so no change in the system alignment or length is recommended.

Branch B outlets into a concrete outlet structure located west of County Road 59. Due to the age of the concrete structure, the new Branch B tile likely cannot be connected into the existing structure without replacement of the structure. This structure is planned to be replaced with the order repairs to Branch A (which are to be completed concurrently with the Branch B improvement if it is ordered). The cost of replacing the outlet structure is not included in the Opinion of Probable Cost for Branch B improvement.

¹ Goodhue County Ditch 1 Tile Inspection and Ditch Repair reported, dated January 15, 2021, prepared by Houston Engineering, Inc.

2 COMPATIBILITY WITH EXISTING PLANS AND STATE LAW

2.1 DRAINAGE LAW – MINN. STAT. CHAPTER 103E

Goodhue County is exercising authority over the petitioned action pursuant to Minn. Stat chapter 103E. Under Minn. Stat. chapter 103E, the County and its Board of Commissioners must give special attention to both the procedural requirements for establishment and construction of a drainage project as well as the policy requirements for establishment as specifically outlined in Minn. Stat. §§ 103E.015 and 103E.341.

2.1.1 PRELIMINARY SURVEY REPORT REQUIRED CONTENTS

Minn. Stat. § 103E.245, Subd. 4, requires the designated Engineer, if they find the improvement feasible and compliant with the environmental and land use criteria in Minn. Stat. § 103E.015, Subd. 1, to include in the Preliminary Survey Report a preliminary plan of the drainage project showing the proposed ditches, tile, laterals, and other improvements, the outlet of the project, the watershed of the drainage project or system, and the property likely to be affected and its known users. The plan must show:

- The elevation of the outlet and the controlling elevations of the property likely to be affected referenced to standard sea level datum, if practical;
- The probable size and character of the ditch necessary to make the plan practicable and feasible;
- The character of the outlet and whether it is sufficient;
- The probable cost of the drains and improvements shown on the plan;
- All other information and data necessary to disclose the practicability, necessity, and feasibility of the proposed drainage project;
- Consideration of the drainage project under the environmental and land use, and multipurpose water management criteria in Section 103E.015, Subd. 1; and
- Other information as ordered by the drainage authority.

2.2 PERMITTING REQUIREMENTS

2.2.1 LOCAL

The project must comply with the Wetland Conservation Act (WCA) as administered by Goodhue County as the local government unit (LGU). The National Wetland Inventory (NWI) and Public Waters Inventory (PWI) was reviewed to determine the presence of wetland resources within the drainage system and is displayed on **Figure 1**.

There are no NWI-mapped wetlands within the Branch B tile watershed. The construction of the new tile will not result in any drainage or fill wetland impacts.

2.2.2 STATE

The Minnesota state Public Waters Inventory (PWI) shows no public waterbodies or watercourses near the proposed project. A permit will not be required from the Minnesota Department of Natural Resources (DNR) since the proposed project does not involve working in any state-listed Public Waters.

A Stormwater Pollution Prevention Plan will be developed and a permit will be required from the Minnesota Pollution Control Agency (MPCA) since construction will disturb more than one acre of land as part of the project.

2.2.3 FEDERAL

Impacts to wetlands are regulated at the Federal level by the US Army Corps of Engineers implementing Section 404 of the federal Clean Water Act (CWA). The proposed work may be authorized under Nationwide Permit 40 (NWP 40), as issued by the U.S. Army Corps of Engineers in 2017. This permit authorizes the construction of drainage tile for agricultural activities. The construction of the tile is authorized under NWP 40, and the project will be designed such that no wetland drainage will result from the project. Therefore, no mitigation will be required for the project.

The Swampbuster provision of the 1985 Farm Bill was aimed at reducing the conversion of wetlands for agricultural purposes. Farmers who drain, fill, level, clear stumps or otherwise alter a wetland may lose eligibility for U.S. Department of Agriculture (USDA) program benefits. As a result of the proposed improvement to CD 1 Branch B, farmers wishing to receive, or continue to receive, USDA program benefits or payments may need to complete Form AD-1026, which is available at the local Farm Service Agency (FSA) office.

2.3 EXISTING WATER MANAGEMENT PLANS

Several local water management plans address water quantity and quality concerns at the county and watershed level which are inclusive of this project area. The following sections summarize water management issues, goals, and activities identified in each of the relevant water plans.

2.3.1 GOODHUE COUNTY WATER PLAN

The 2010-2020 Goodhue County Comprehensive Local Water Management Plan contains a number of priority areas and implementation plans to address water issues that are relevant to the proposed improvement of CD 1. Relevant priority areas include erosion and sediment control and management of impaired waters for improvement of rural and agricultural water quality.

Implementation actions for erosion control and reducing turbidity in impaired waters overlap, and both recommend pursuing the implementation of drainage BMPs to reduce the runoff and the quantity of sediment leaving agricultural fields. Implementing such BMPs often relies heavily on external funding and voluntary landowner participation, though some design considerations (such as alternative intakes) can be accomplished with little or no added cost.

2.3.2 TMDL & WRAPS

The Zumbro River, Middle Fork is the receiving waterbody downstream of the outlet of CD 1. It is listed on the MPCA's Impaired Waters List for aquatic recreation and aquatic life. The Zumbro River, Middle Fork is part of the Zumbro River watershed that has a completed and approved TMDL for TSS. The Zumbro River, Middle Fork was added to the Clean Water Act Section 303(d) impaired waters list in 2008. MPCA prepared a Restoration and Protection Strategies (WRAPS) report for the Zumbro River Watershed. Watershed-wide priorities related to the agricultural drainage proposed in this report included reducing nitrogen and phosphorous loadings to streams and increasing soil infiltration and water holding capacity.

The proposed project will increase soil infiltration and will help decrease sediment and phosphorus delivery downstream via installation of alternative (Hickenbottom) intakes.

2.3.3 CONSISTENCY WITH WATER PLANS

Under current conditions, the condition of the Branch B tile watershed contributes to the impairment of the Zumbro River, Middle Fork receiving water. Poor field drainage produces excess surface runoff that delivers sediment and nutrients downstream, and the poor condition of the existing drain tile allows sediment to enter the tile system.

The proposed tile improvement will improve sediment and nutrient runoff conditions in two ways: 1) Improving subsurface drainage will increase the infiltration capacity of the soil, which will increase surface abstraction and thus reduce surface runoff during smaller, more frequent rainfall events, thus reducing total phosphorus and total sediment delivery downstream; and 2) Replacing the old, deteriorated sectioned drain tile with plastic pipe will decrease the amount of sediment that enters the tile and thus decrease the amount of sediment delivered downstream. Based on the impairments (aquatic life, aquatic recreation), the improvement is a reasonable TMDL implementation strategy and therefore consistent with the Goodhue County Comprehensive Local Water Management Plan.

2.3.4 COUNTY ZONING AND LAND USE PLAN

Land within the project area is primarily zoned as “Agricultural” according to the current Kenyon Township Zoning Map. The Goodhue County Zoning Ordinance has stated purposes that include encouraging farmers, residents, and businesses to protect the land from erosion, loss of wetlands, loss of water quality, and loss of woodlands; and protecting and preserving prime agricultural land by limiting the density of residential development in those areas. The proposed project falls within the purpose of protecting the land from erosion and loss of water quality.

3 CONSIDERATIONS

3.1 PROJECT COSTS AND PUBLIC AND PRIVATE BENEFITS

Minn. Stat. § 103E.015, Subd 1(1) requires the drainage authority to consider private and public benefits and costs of proposed drainage projects.

3.1.1 PRIVATE BENEFIT

The private benefits expected from the project accrue mainly to agricultural lands that lie adjacent to the proposed improvement. These private benefits would be experienced through reduced overland flooding, reduced seepage, and erosion prevention. A secondary benefit would be reduced maintenance cost, as the project will replace a substantial amount of aging tile.

3.1.2 PUBLIC BENEFIT

Benefits to public transportation systems include Goodhue County Road 59. The proposed project will reduce the duration of standing water and the volume of surface runoff adjacent to the road by improving

the drainage capacity of the Branch B watershed. Additional public benefits include protection and preservation of the tax base and a reduction in impairments to public waters.

3.1.3 COSTS

A detailed breakdown of the project cost is included in **Exhibit D** to this report. In addition to economic costs, there are other non-quantifiable costs to be considered, including environmental, social, and cultural costs. Adverse impacts due to construction activities include inconveniences due to traffic impairment and rerouting and nuisances due to increased noise pollution and dust creation. The proposed project is located in a rural area and all construction activities are proposed to take place on private agricultural fields, so minimal additional impacts are anticipated.

3.2 ALTERNATIVE MEASURES

Alternative measures must be considered before establishing a drainage project per Minn. Stat. § 103E.015, Subd 1(2). The alternative measures considered must include elements to (i) conserve, allocate, and use drainage waters for agriculture, stream flow augmentation, or other beneficial uses (ii) reduce downstream peak flows and flooding (iii) provide adequate drainage system capacity (iv) reduce erosion and sedimentation and (v) protect or improve water quality. Listed below are the feasible alternatives and followed by the consideration given to each:

- Do Nothing – This alternative will maintain the status quo in terms of insufficient agricultural drainage which limits the economic viability of agriculture in the watershed. Due to the age of the system, it will continue to rapidly deteriorate, requiring significant cost to maintain until it is improved or repaired. Additionally, as described above in Section 2.3, the current drainage system contributes excessive sediment and nutrients to downstream impaired stream reach due to open water intakes and sectional tile. For these reasons, the Do Nothing alternative is not preferred.
- Repair– Repair of the drainage system would resolve the excessive contributions of sediment and nutrients to downstream impairments as well as bring the system back to the ACSIC but would not enhance the economic viability of agriculture due to standing water caused by poor drainage. Therefore, it is not a preferred alternative.
- Improvement– Improvement of the drainage system would resolve both the excessive contributions of sediment and nutrients to downstream impairments and enhance the agricultural economics on the drainage system by bringing system drainage in line with modern standards.

Technical analysis presented in subsequent sections of this report describes the effectiveness of alternatives and achieving drainage function and evaluating downstream flood and water quality impacts.

3.3 LAND USE

Per Minn. Stat. § 103E.015, Subd 1(3), the drainage authority must consider the present and anticipated land use including the compatibility of the project with local land use plans. The present land use within the project area is mostly agricultural. In general, land use will remain agricultural for the foreseeable

future. The project is compatible with the Goodhue County Zoning Ordinance which aims to maintain and enhance agricultural land in the County as described in Section 3(A.1).

3.4 CURRENT AND POTENTIAL FLOODING

Per Minn. Stat. § 103E.015, Subd 1(4), the drainage authority must consider the current and potential flooding characteristics of property in the drainage project or system and downstream for the 5-, 10-, 25- and 50-year flood events, including the adequacy of the outlet for the drainage project.

3.4.1 HYDROLOGIC AND HYDRAULIC CONDITIONS IN SYSTEM

The proposed drain tile improvements were chosen to provide a minimum 1/2-inch drainage coefficient for each critical portion of Branches B, B-1, and B-2. Increases in flow due to the tile improvements were added to the existing conditions peak flows to determine the post-project flows in CD 1. Existing and proposed drainage coefficients for critical locations in the tile network are shown in Tables 1 through 3.

Table 1 – Drainage Coefficient – Main Trunk

Location	Cumulative Area	Tile Diameter		Drainage Coefficient (in/day)		Maximum Flow Capacity
		Existing	Proposed	Existing	Proposed	
Outlet (STA 0+00 to 14+44)	246.5 ac	10"	18"	0.11	0.52	5.4 cfs
Branch B-1 Junction (STA 14+44 to 20+00)	128.2 ac	8"	15"	0.15	0.84	4.5 cfs
STA (20+00 to 29+07)	128.2 ac	8"	15"	0.15	0.58	3.1 cfs
Branch B-2 Junction (STA 29+07 to 37+85)	45.1 ac	6"	10"	0.07	0.56	1.1 cfs

Table 2 – Drainage Coefficient – Branch B-1

Location	Cumulative Area	Tile Diameter		Drainage Coefficient (in/day)		Maximum Flow Capacity
		Existing	Proposed	Existing	Proposed	
B-1 - (STA 0+00 to 5+97)	61.1 ac	8"	10"	0.37	0.72	1.8 cfs

Table 3 – Drainage Coefficient – Branch B-2

Location	Cumulative Area	Tile Diameter		Drainage Coefficient (in/day)		Maximum Flow Capacity
		Existing	Proposed	Existing	Proposed	
B-2 - STA 0+00 to 13+05	17.3 ac	6"	8"	0.24	0.81	0.6 cfs

3.4.2 HYDROLOGIC AND HYDRAULIC CONDITIONS AT CR-59

Branches A and B of the CD 1 public tile system outlet into a drop structure located adjacent to County Road 59 and then flow to a 36-inch culvert that discharges at the upstream end of the open channel portion of CD 1. Flow from the tile discharges under County Road 59 through 36-inch reinforced concrete culvert with a headwall and into the upstream end of the CD 1 open channel. The open channel portion of CD 1 ultimately discharges to the Zumbro River, Middle Fork. Per the original Engineer's Report for the CD 1 system, the typical section of the upstream reach of CD 1 has a 4-foot bottom, 2:1 horizontal to vertical side slopes, and a depth of approximately 5 feet.

The USGS regression equation obtained from the StreamStats program was used to model peak stormflows through the 36-inch culvert and at upstream end of the CD 1 open channel. Peak flows were modeled for the 2-, 5-, 10-, 25-, 50-, and 100-year stormflow events.

Increases in flow to the culvert and ditch due to increased capacity in the drain tile were calculated based on the proposed pipe sizes, slopes, and Manning's roughness values.

For this analysis, the impacts on both the County Road 59 culvert and the open channel of CD 1 were assessed. The modeling shows the proposed improvements will increase the flow rate to both the culvert and the CD 1 open channel, as the increased capacity of the tile will decrease flooding durations on the field surface but increase the total flow to the culvert and channel. **Table 4** shows the existing and post-improvement elevations and flows for the 36-inch culvert, and **Table 5** shows the existing and post-improvement conditions for the CD 1 open channel.

Table 4 – County Road 59 36-Inch Culvert Hydraulic Calculations

Flood Frequency	Flow (cfs)		Water Surface Elevation (ft)		
	Existing	Post-Improvement	Existing	Post-Improvement	Change in WSEL
2-Year	34	38.1	1237.5	1237.7	0.2
5-Year	64	68.1	1239.6	1240.0	0.4
10-Year	89	93.1	1242.7	1243.3	0.6
25-Year	126	130.1	1243.6	1243.6	0.0
50-Year	158	162.1	1243.6	1243.6	0.0
100-Year	195	199.1	1243.7	1243.7	0.0

Table 5 – CD 1 Open Channel Hydraulic Calculations

Flood Frequency	Flow (cfs)		Channel Velocity (ft/s)		
	Existing	Post-Improvement	Existing	Post-Improvement	Change in Velocity
2-Year	34	38.4	2.2	2.3	0.1
5-Year	64	68.4	2.7	2.8	0.1
10-Year	89	93.4	3.0	3.0	0.0
25-Year	126	130.4	3.3	3.4	0.1
50-Year	158	162.4	3.6	3.6	0.0
100-Year	195	199.4	3.8	3.8	0.0

The hydraulic model for the 36-inch culvert shows increases in upstream elevations of 0.2 to 0.6 feet for the 2-, 5-, and 10-year flood events. The existing conditions model shows the road overtops at a discharge of approximately 95 cfs, and thus the proposed improvements will not cause the road to overtop where it did not in the existing conditions.

The model of the CD 1 open channel shows the proposed improvements are projected to increase the peak flow to CD 1 by 4.4 cfs for the design events, which correlates to a maximum channel velocity increase of 0.1 feet per second for the design events. This increase is not projected to cause any adverse impacts to the public drainage system or its ability to serve its designed function.

Given the small potential impact on overtopping of County Road 59 and downstream peak flood elevations in the CD 1 open channel, the proposed improvement of CD 1 is considered to have an adequate outlet.

3.5 WETLANDS

Minn. Stat. § 103E.015, Subd 1(5) requires the drainage authority to consider the effects on wetlands. The National Wetland Inventory (NWI) database shows a Type 1 wetland in the CD 1 open channel east of County Road 59 (see **Figure 1**). The proposed project does not discharge directly to the wetland, and no work is being proposed within the mapped wetland boundaries. The modeling done for Section 3.4 shows minimal elevation increases for design events that are not expected to significantly affect the hydroperiod of the wetland.

3.6 WATER QUALITY

Minn. Stat. § 103E.015, Subd 1(6) requires that the drainage authority consider the effects of the proposed drainage project on water quality. The occurrence of an extreme runoff condition during project construction could cause an increased sediment load into the downstream channel system. However, a Stormwater Pollution Prevention Plan will be prepared for the project, which will minimize the likelihood of a substantial sediment discharge following rainfall events. The downstream water quality following completion of the project will change little from the current condition. The improved tile will be clean and free of sediment blockages. Cleaning and inspection ports will be incorporated into the project design. The project will not drain new lands downstream, and thus the discharge of nutrients will remain similar or

decrease in volume from an increase of infiltration potential but will arrive in downstream watercourses earlier in the hydrograph following a rainfall event.

3.7 FISH AND WILDLIFE RESOURCES

Minn. Stat. § 103E.015, Subd 1(7) requires the drainage authority to consider the effects of the proposed project on fish and wildlife resources. The proposed improvement project does not contemplate any major excavation in any existing natural watercourse or lakes, and as a result will have insignificant effects on fish resources. The proposed work will occur on fields currently used for agricultural practices, so there is no proposed destruction of prairie or wooded wildlife habitat. The project incorporates replacement of deteriorating drain tile, new tile intakes, and other project components that are consistent with current BMPs. Therefore, the quality of the water exiting Branch B into CD 1 will be improved and have a net positive affect on fish and wildlife resources.

3.8 GROUNDWATER

Minn. Stat. § 103E.015, Subd 1(8) requires the drainage authority to consider the effects of the proposed drainage project on shallow groundwater availability, distribution and use. Review of the SSURGO soil database indicates the presence of soils susceptible to poorly drained conditions. The existing drain tile was installed to draw down saturated soils following rainfall events and thus allow the soil to function in a “drained” condition for cultivation. The proposed improvement will install perforated tile at a depth similar to existing conditions, and thus the improvement will not substantively affect the seasonal groundwater table or shallow groundwater resources in the project area.

3.9 ENVIRONMENTAL IMPACT

Minn. Stat. § 103E.015, Subd 1(9) requires the drainage authority to consider the effects on the overall environmental impact of the proposed drainage project. The project engineer and project sponsors for this project envision that the overall impact of the project will contain no long-term adverse effects on the environment beyond the potential for wetland drainage. While construction operations have an inherent adverse effect on the environment, these effects are temporary in comparison to the long-term benefits anticipated from the project operation.

3.10 EXTERNAL FUNDING

In accordance with Minn. Stat. § 103E.015, Subd. 1a., the Engineer on behalf of Goodhue County investigated the potential use of external sources of funding to facilitate the purposes of Minn. Stat. § 103E.011, Subd. 5., which are for wetland preservation or restoration or creation of water quality improvements or flood control. The Goodhue County SWCD was not aware of any available external sources of funding for the project and thought it unlikely that the project would apply for grant funding from the Clean Water Fund grant program administered by the MN Board of Water and Soil Resources. The types of projects that meet the Minn. Stat. § 103E.011, Subd. 5, purposes of wetland, water quality or flood control improvements include wetland restoration, grass waterways, water and sediment control basins, alternative tile intakes, denitrifying bioreactors, drainage water management, and several other types.

4 PUBLIC UTILITY, BENEFIT OR WELFARE

In accordance with Minn. Stat. § 103E.015, Subd 2, consideration was given to the conservation of soil, water, forests, wild animals, and related natural resources, and to other public interests affected, together with other material matters as provided by law in determining whether the project will be of public utility, benefit, or welfare, the project engineers provide the following observations.

- The area drained by Branch B consists of private property, and none of the land is used for public purposes. Significant changes in land use are not anticipated in the foreseeable future, with or without the proposed improvements.
- Recreational activities are currently limited within the project area. There is no anticipated adverse effect on recreation in this area.
- Since the drainage system improvement project consists entirely of drain tile, there is no anticipated public navigation potential.
- The project elements as proposed in this report include no drainage opportunities of existing lakes, wetlands, or other protected water environments. Therefore, the proposed project will have little or no effect on fish resources. All new tiles will be solid with no perforations.
- There do not appear to be any cultural or archaeological resources which would be affected by the proposed project.
- Regarding the federally listed threatened Northern Long-Eared Bat, there are no known roost trees or hibernacula located within the project area. Additionally, no tree removals are proposed, therefore the project will not result in a taking of this federally listed species.

The proposed improvement will be of public utility and benefit and will promote the public health and welfare. Public utility and benefit are achieved by providing more efficient drainage to agricultural properties within the drainage area. The improvement will protect property values and improve the economy of agricultural production. Public health and welfare are achieved by reducing the frequency of wet and overflowed land which, will improve the general sanitary condition of the community, relieve low wet or stagnant and unhealthful conditions, and protect the overflowed property, all of which were goals of the original proceedings to establish the CD 1 public drainage system.

5 OPINION OF PROBABLE CONSTRUCTION COST

The estimated total project costs for the improvement described in this report are as follows:

Table 6 – Opinion of Probable Construction Cost Summary

Category	Cost
Construction Costs*	\$253,600
Engineering and Viewing**	\$42,900
Legal and Administrative	\$15,000
Total Improvement Project Cost	\$311,500

*Includes 20% construction contingency.

**Engineering based on 20% of construction cost and Viewing estimated at \$2.50/acre

A detailed breakdown of the project costs is included as **Exhibit D** of this report. These costs assume the improvement will generally follow the existing tile alignment and include costs for materials, labor, engineering, and project management.

6 SEPERABLE MAINTENANCE

In its order initiating proceedings and appointing the engineer to prepare a preliminary survey report, Goodhue County instructed the engineer to include in this preliminary survey report an investigation of the current condition of the portion of the drainage system proposed to be improved and provide a recommendation on the propriety of a separable maintenance allocation of project costs.

A repair report prepared by HEI dated January 15, 2021 found the existing tile is in poor condition and given the system has not undergone any major repairs since it was established in 1954, the report recommended the existing tile be repaired, independent of an improvement proceedings. The cost to repair the existing Branch B tile by replacement at its current sizing was estimated separately from the improvement cost, and the cost was found to be **\$272,060** (See **Exhibit D**). It is recommended the Viewers consider these as separable maintenance costs relative to the improvement in further ditch proceedings.

7 RECOMMENDATIONS

In the opinion of the Project Engineer, the proposed project outlined herein is necessary, feasible, and practical. It is recommended that the County Board continue with the proceedings for the Improvement of the Goodhue County Branch B drain tile, including ordering the Engineer to prepare a Final Engineer's Report and assigning viewers. This improvement sizing is feasible and will not result in substantive environmental impacts.



EXHIBIT A – IMPROVEMENT PETITION



STATE OF MINNESOTA
Before the
GOODHUE COUNTY BOARD
SITTING AS THE DRAINAGE AUTHORITY FOR
GOODHUE COUNTY DITCH 1

In the Matter of: The Petition for Improvement to Goodhue County Ditch 1 Branch B	PETITION FOR IMPROVEMENT TO Goodhue County Ditch 1 Branch B
--	--

Pursuant to Minn. Stat. § 103E.215, Petitioners seek an improvement of Goodhue County Ditch 1. For their Petition, the undersigned Petitioners state and allege the following:

1. Petitioners seek the improvement of Goodhue County Ditch 1 Branch B located in Kenyon Township – Goodhue County.
2. Goodhue County Ditch 1 Branch B provides beneficial drainage to agricultural properties, public roadways, and other lands located in Section(s) <28, 29, 30, 31, 32, & 33 Township 109N, Range 18W, Goodhue County, Minnesota.
3. County Ditch 1, including Branch B is in need of repair. Branch B has remained in service since its original construction. Other than minor repairs, no major repairs have been made to Branch B since it was constructed.
4. Even in a repaired state, Goodhue County Ditch 1 Branch B is inadequate to support beneficial drainage for current farming and drainage practices. Goodhue County Ditch 1 Branch B has insufficient capacity and needs enlarging to furnish sufficient capacity.
5. The proposed improvements include: enlarging the existing tile on Branch B of Goodhue County Ditch 1 to meet modern drainage requirements.
6. The following is a description of a starting point, general course, and terminus of the proposed improvement:

Main

Commencing at a point in the SE 1/4, Section 30, Township 109, Range 18W, Kenyon Township , Goodhue County , Minnesota; thence northwest to the border between the SE and NE ¼ of Section 30, thence west approximately 925 feet

before terminating at the center of Section 30, Township 109N, Range 18 W, Kenyon Township, Goodhue County, Minnesota.

Lateral B-1

Commencing at a point in the SE 1/4, Section 30, Township 109, Range 18W, Kenyon Township, Goodhue County, Minnesota; thence <northwest approximately 1300 feet; terminating at the border of the NE and NW 1/4, Section 30, Township 109N, Range 18W, Kenyon Township, Goodhue County, Minnesota.

Lateral B-2


Commencing at a point in the NE 1/4, Section 30, Township 109N, Range 18W, Kenyon Township, Goodhue County, Minnesota; thence west approximately 650 feet; terminating at a point located in the SE 1/4, Section 30, Township 109N, Range 18W, Kenyon Township, Goodhue County, Minnesota.

The 40-acre tracts or government lots and property where the proposed improvement passes over, including the names and addresses of the property owners from the records in the county assessor's office, is as follows:

Property Description	Property Owners	Address
1.NE 1/4 SE1/4 Section 30 T109N, R18W	Jeffrey Solberg	50851 County 59 Blvd. Kenyon, MN. 55946
2.SE 1/4 SE 1/4 Section 30 T109N, R18W	Jeffrey Solberg	50851 County 59 Blvd. Kenyon, MN. 55946
3.NW 1/4 SE 1/4 Section 30 T109N, R18W	Jon Houglum	50243 County 59 Blvd. Kenyon, MN. 55946
4. SW 1/4 NE 1/4 Section 30 T109N, R18W	Jon Houglum	50243 County 59 Blvd. Kenyon, MN. 55946

7. The proposed improvement will be of public utility and promote the public health.
8. Petitioners will pay all costs of the proceedings if the proceedings are dismissed or the contract for construction of the proposed drainage system is not awarded.
9. A bond in the amount of \$10,000 is attached hereto, payable to Goodhue County conditioned to pay the costs incurred if these proceedings are dismissed or a contract is not awarded to construct the improvement proposed in the petition. Petitioners acknowledge and agree that additional bonds may be required as additional costs are incurred in the proceedings.
10. Petitioners are the owners of 4 of the 4 40-acre tracts or government lots and property, at least twenty-six percent of the owners of property that the proposed improvement passes over.

11. Because Branch B of CD 1 is in need of repair, Petitioners request, to the extent practicable, that the drainage authority consider, under Minn. Stat. § 103E.215, subd. 6, the separable maintenance portion of the work when determining benefits and assessing costs of the improvement.
12. This Petition may be signed in counterparts.

Respectfully submitted this 16th day of February, 2021 by: 

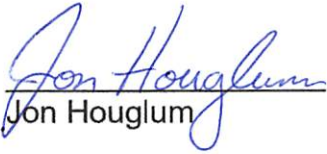
[Note: All signatories to the Petition must indicate the capacity in which they sign, i.e. owner, co-owner, corporate official, or government lot. In the case of a partnership, only one general partner needs sign. In the case of a corporation, only one corporate official need sign. In the case of co-ownership, all co-owners must sign. In the case of a trust, all trustees must sign. Be sure all signature blocks are fully completed. If you are unsure of whom must sign please contact the petitioner's attorney.]

OWNER SIGNATURE

PROPERTY OWNED

MAILING ADDRESS

DATE


Jon Hougum

Sect-30 Twp – 109
Range 018 NE ¼
SEC 30 109 18

50243 County 59 Blvd
Kenyon MN 55946

2-13-21

Sect-30 Twp 109
Range 018 W ½ of SE ¼
SEC 30 109 18


Larry Lurken

Sect-30 Twp 109
Range 018 NW ¼
SEC 30 109 18

420 500th St
Kenyon MN 55946

2-13-21

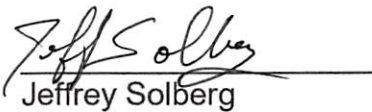

LyTana Derscheid

Sect-30 Twp 109
Range 018 S ½ of SW ¼
SEC 30 109 18

159 510th St
Kenyon MN 55946

2-13-21

Sect 30 Twp 109
Range 108 N ½ of SW ¼
SEC 30 109 18


Jeffrey Solberg

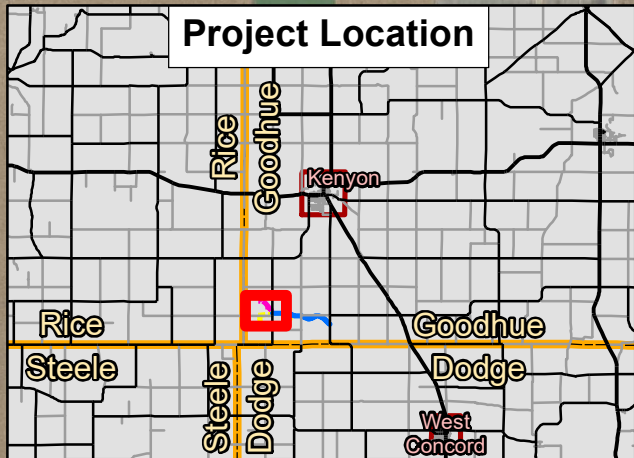
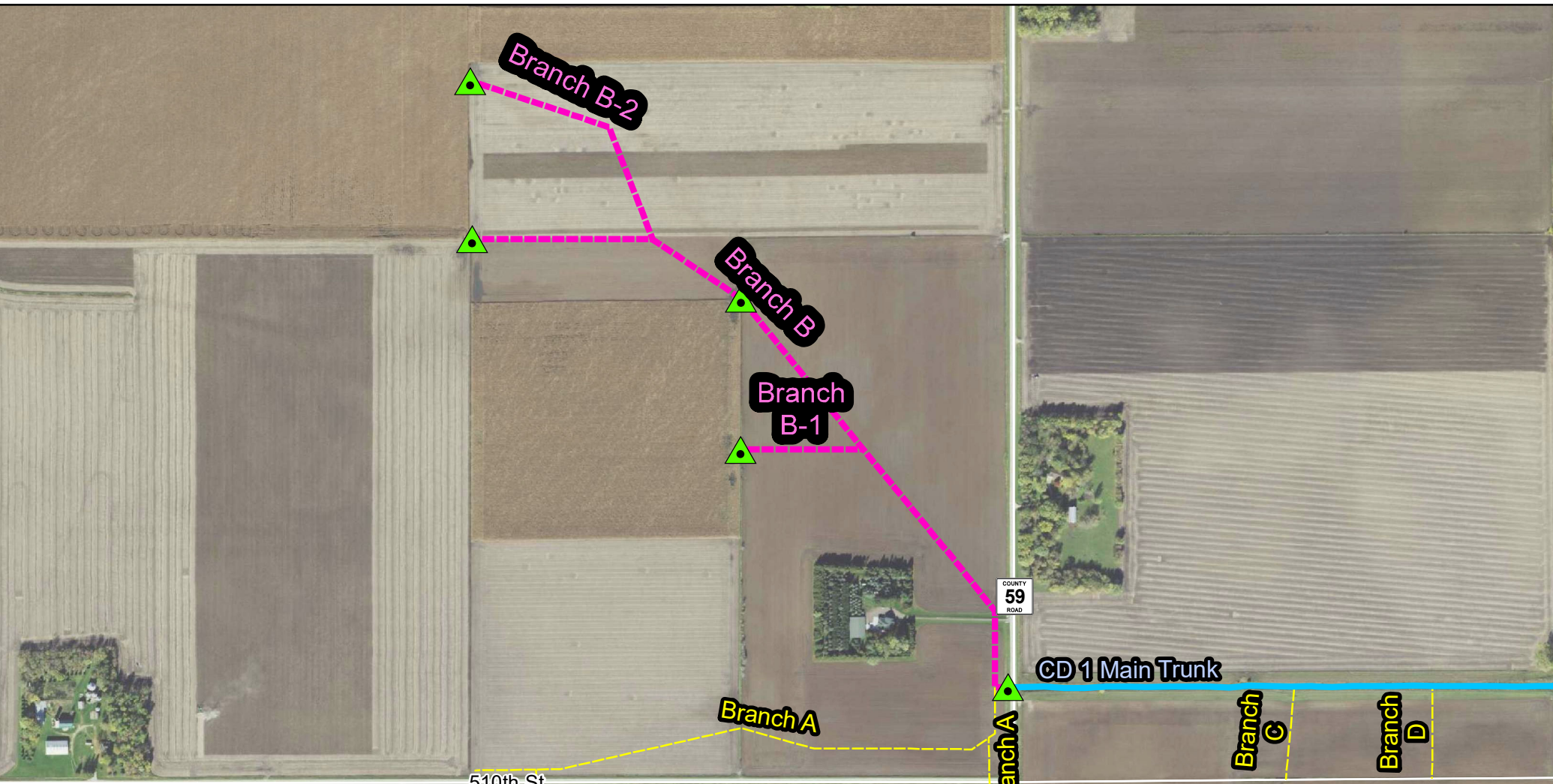
Sect-30 Twp 109
Range 108 NE ½ of SE
¼ SEC 30 109 18





50581 County 59 Blvd
Kenyon MN 55946

2-15-21

EXHIBIT B – SITE SURVEY





-  Surveyed Inlets / Outlets
-  Branch B Tile
-  CD 1 Open Channel Alignment
-  Branches A,C,D,E Tile

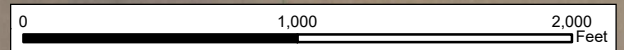


Exhibit B - Site Survey

Scale: AS SHOWN	Drawn by: ZTS	Checked by:	Project No.: 6400-0005	Date: 4/26/2021	Sheet:
--------------------	------------------	-------------	---------------------------	--------------------	--------

Maple Grove

Houston Engineering Inc.

P: 763.493.4522
F: 763.493.5572



EXHIBIT C – DESIGN PLAN / PROFILE



GOODHUE COUNTY DITCH 1 BRANCH B IMPROVEMENT

GOODHUE COUNTY KENYON TOWNSHIP APRIL 2021

DRAWING INDEX	
SHEET NUMBER	SHEET TITLE
1	TITLE SHEET
2	BRANCH B
3	BRANCH B
4	BRANCH B-1
5	BRANCH B-2

NOTES:

1. GEODETIC CONTROL

HORIZONTAL: NAD83 MINNESOTA DOT: GOODHUE COUNTY, US FOOT

VERTICAL: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

BENCH MARK: EPSOM MNDOT, NE QUARTER, SECTION 1, TOWNSHIP 109N, RANGE 19W

2.5 MILES WEST-NORTHWEST OF KENYON, 2.8 MILES WEST ALONG TRUNK HIGHWAY 60 FROM THE JUNCTION OF TRUNK HIGHWAY 60 AND TRUNK HIGHWAY 56 IN KENYON TO TRUNK HIGHWAY 60 MILEPOINT 160.90, THEN 0.7 MILE NORTH ON GOODHUE AVENUE, THEN 0.3 MILE WEST ON 210TH STREET, 27.5 FEET SOUTH OF 210TH STREET, 60.0 FEET SOUTH-SOUTHEAST OF A POWER POLE, 58.2 FEET SOUTH-SOUTHEAST OF A WITNESS POST, 59.19 FEET SOUTH-SOUTHEAST OF EPSOM MNDT 1, 39.98 FEET WEST-NORTHWEST OF EPSOM MNDT 2, 11.0 FEET EAST OF AN ENTRANCE, 2.4 FEET WEST OF A WITNESS POST.

2. UTILITY

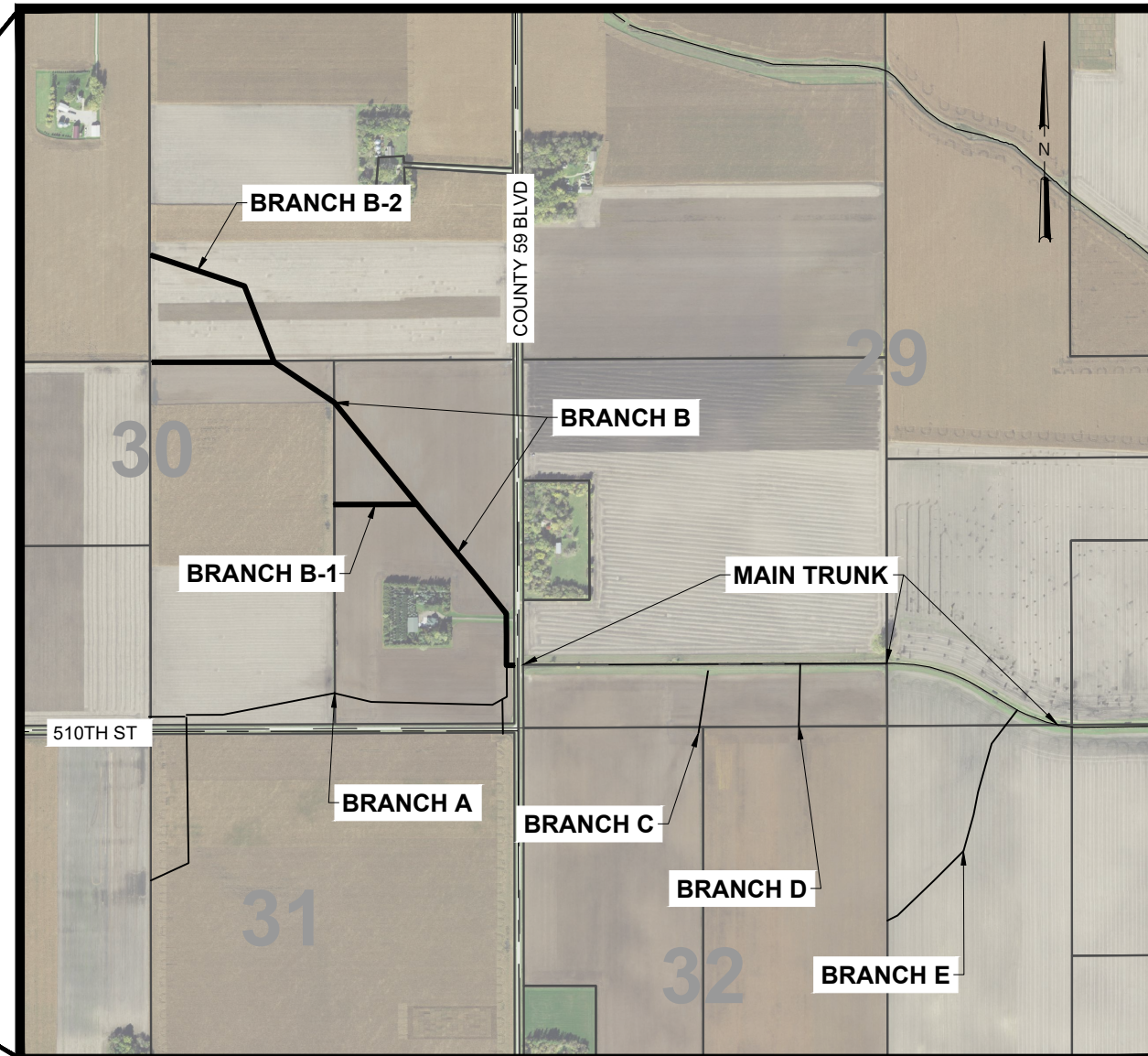
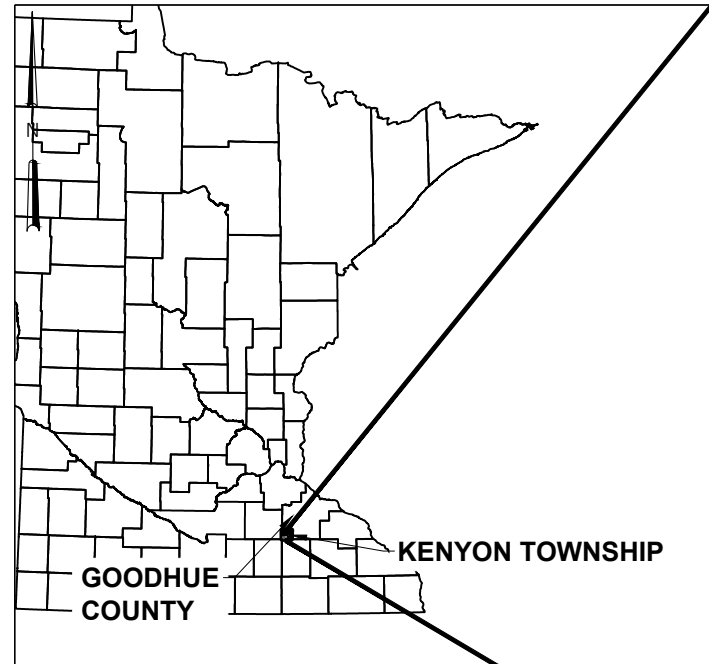
PRIOR TO ANY EXCAVATION WORK, THE CONTRACTOR IS RESPONSIBLE UNDER MINNESOTA STATE STATUTE 216D AND MINNESOTA RULES CHAPTER 7560 TO CONTACT GOPHER STATE ONE CALL FOR THE LOCATION OF UNDERGROUND UTILITY FACILITIES IN PROXIMITY TO THE EXCAVATION SITE.

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

CONTACT "GOPHER STATE ONE CALL" FOR LOCATIONS OF BURIED UTILITIES. CALL (651) 454-0002 OR (800) 252-1166. ALSO CONTACT AT www.gopherstateonecall.org

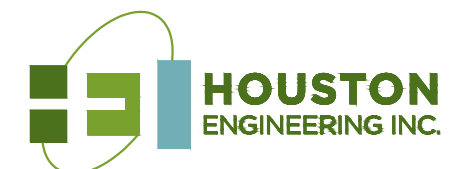
3. SOURCE OF SURVEY

GOODHUE COUNTY, SOIL AND WATER CONSERVATION DISTRICT, OBSERVED OCTOBER 2020, APRIL 2021

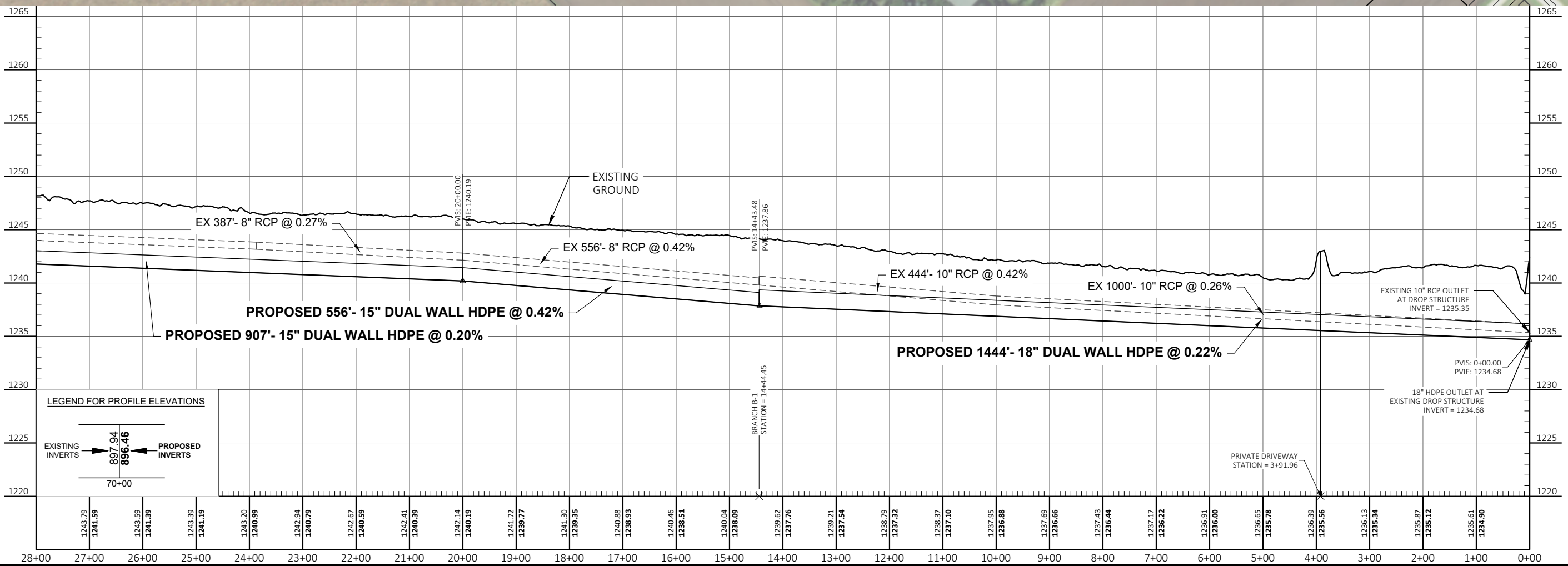
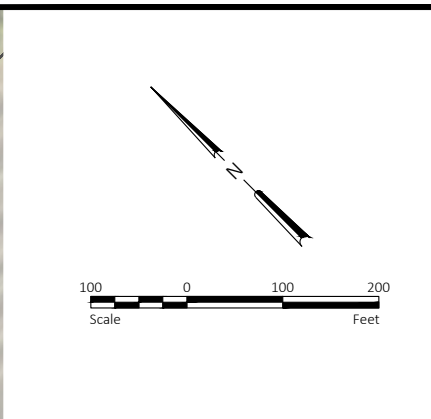
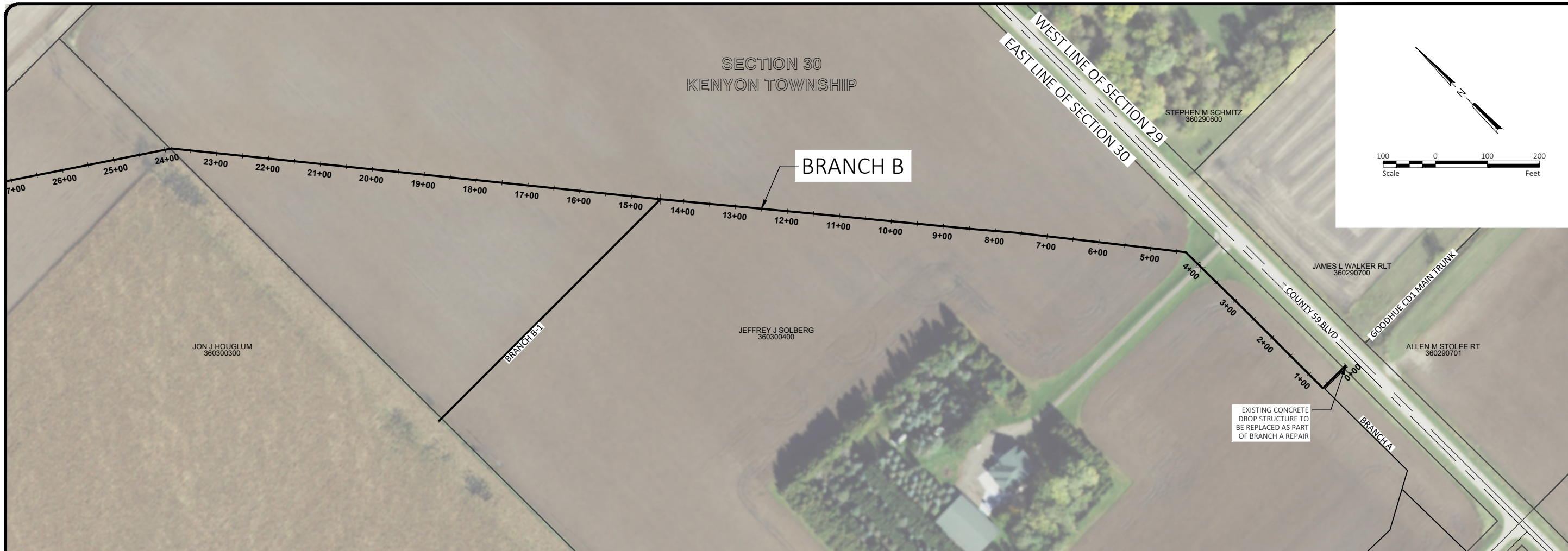


PRELIMINARY
Not for Construction


PREPARED BY:



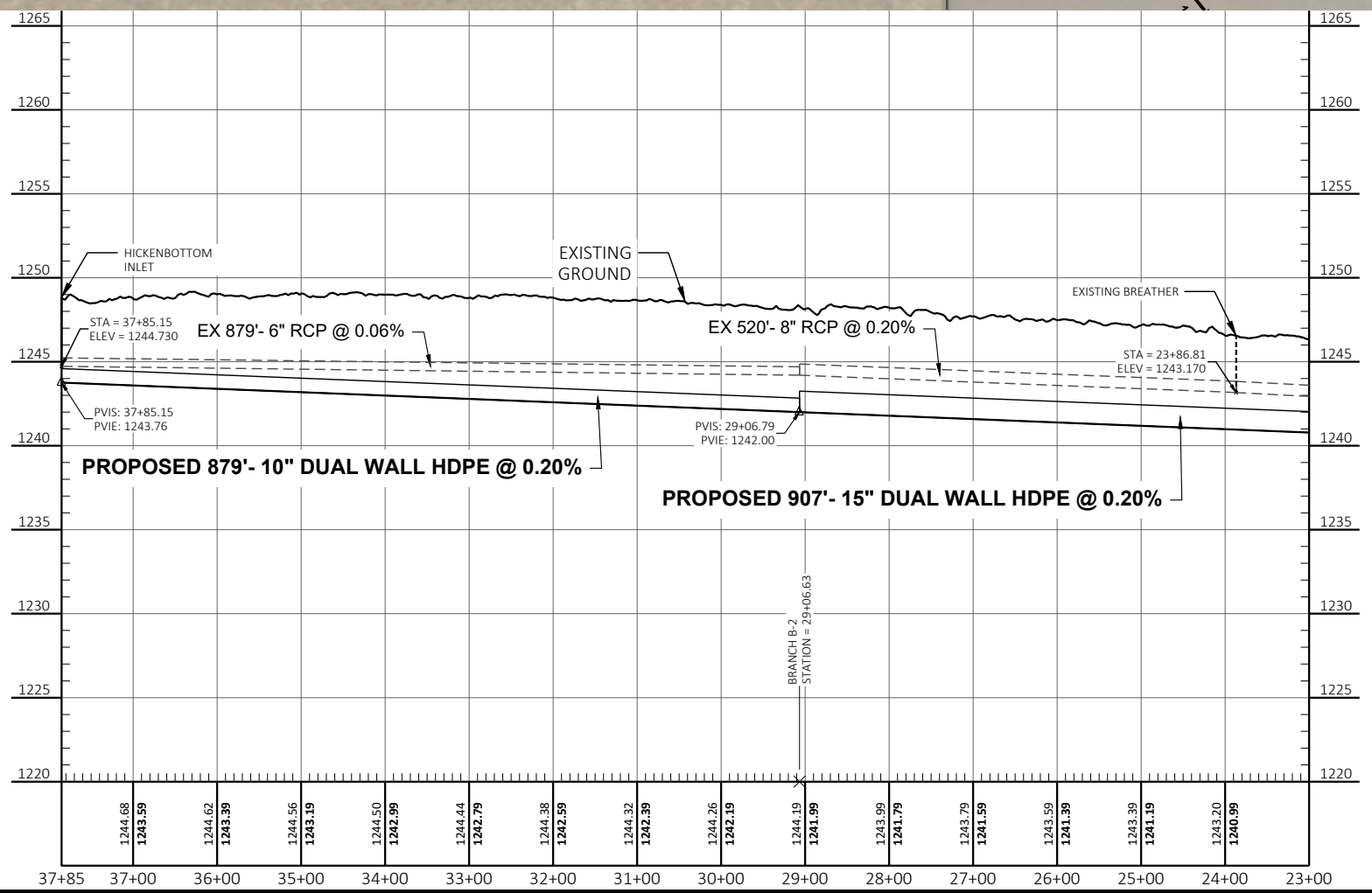
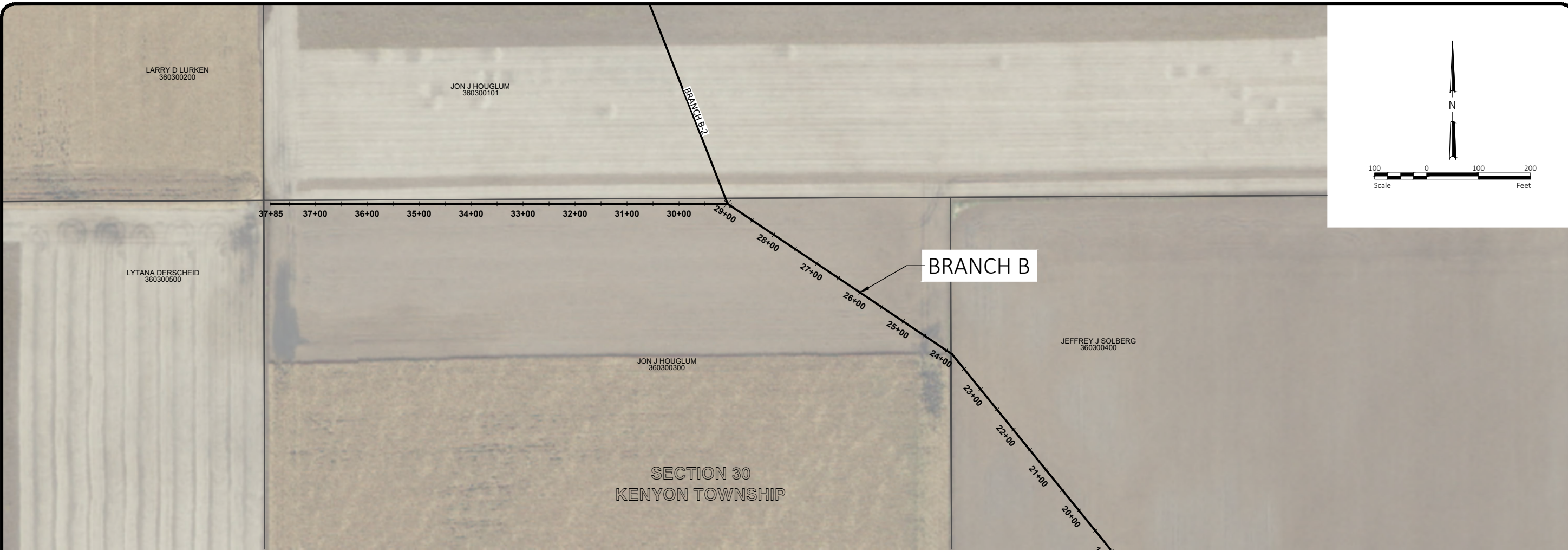
MAPLE GROVE, MINNESOTA




H:\Maple Grove\JBN\6400\6400\CAD\Plans\6400-0005_Plan&Profile.dwg-Branch B_STA 0+25-4/15/2021 11:25 AM-(earpin)

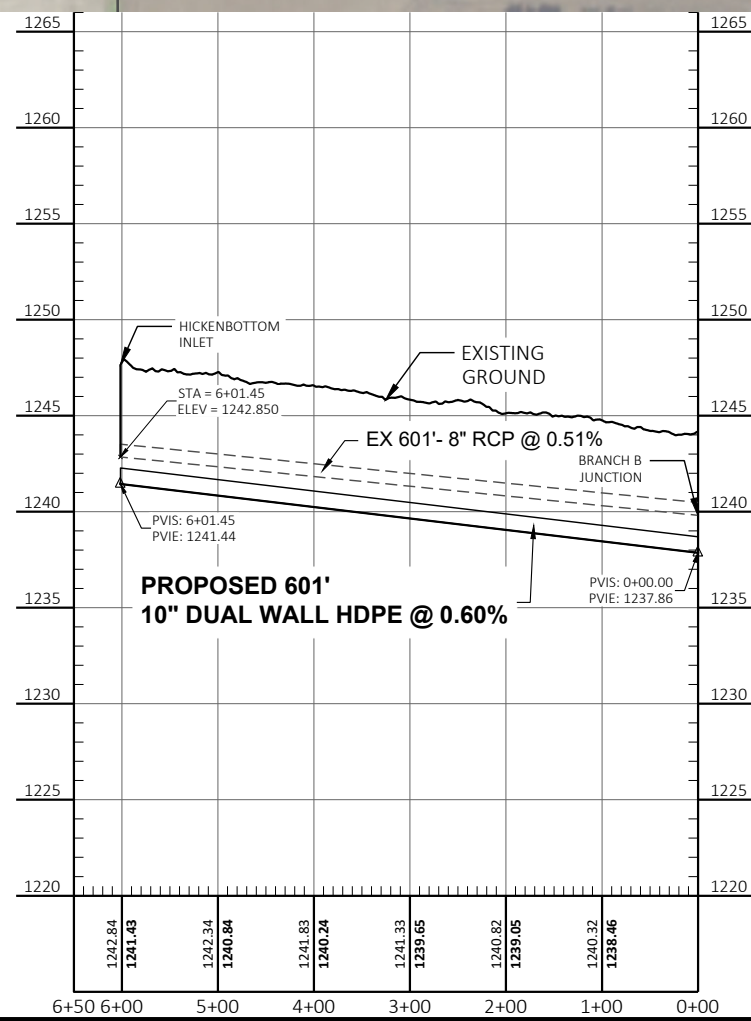
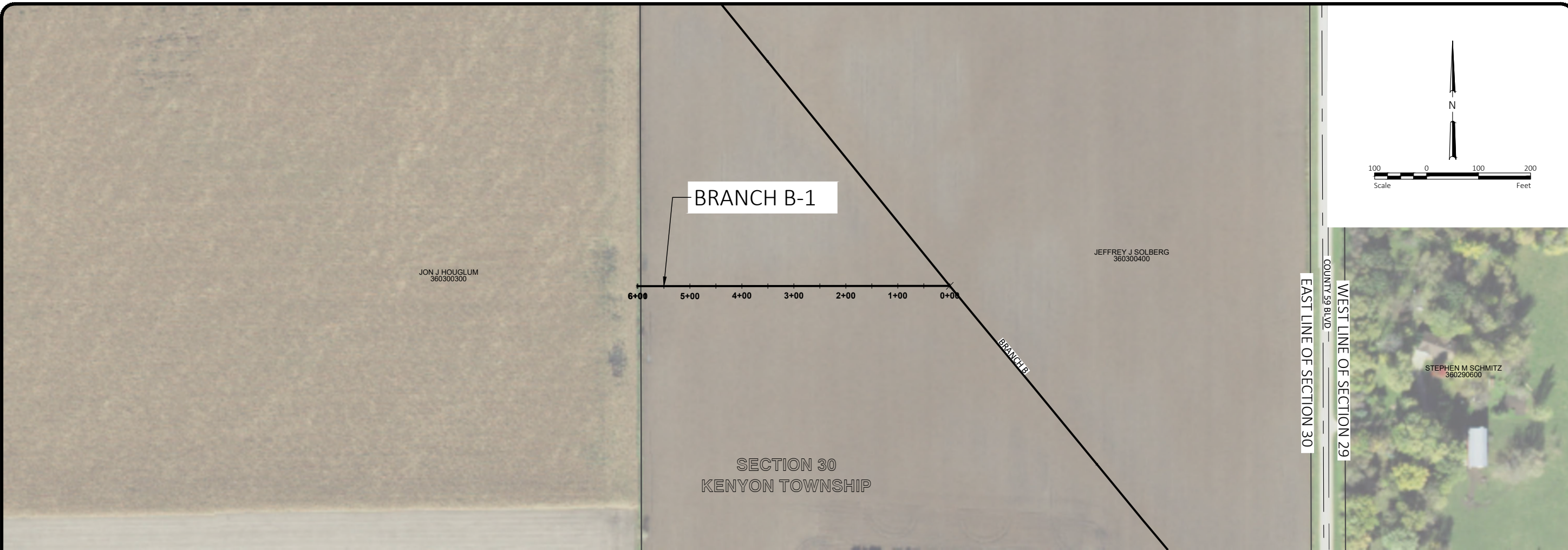
	By
	Date
	Revision
	No.
PRELIMINARY NOT FOR CONSTRUCTION	
GOODHUE CD1 BRANCH B IMPROVEMENT GOODHUE COUNTY KENYON TOWNSHIP BRANCH B STA 0+00 TO 25+00	
 HOUSTON engineering, inc.	
Drawn By EJA	
Checked By CO	
Date 04-15-2021	
Scale As Shown	
Project No. 6400-0005	
SHEET 2 OF 5	


H:\Maple Grove\IBN\6400\6400_0005\CAD\Plans\6400-0005_Plan&Profile.dwg-Branch B_STA 25-ENR-4/15/2021 11:25 AM-(earpin)

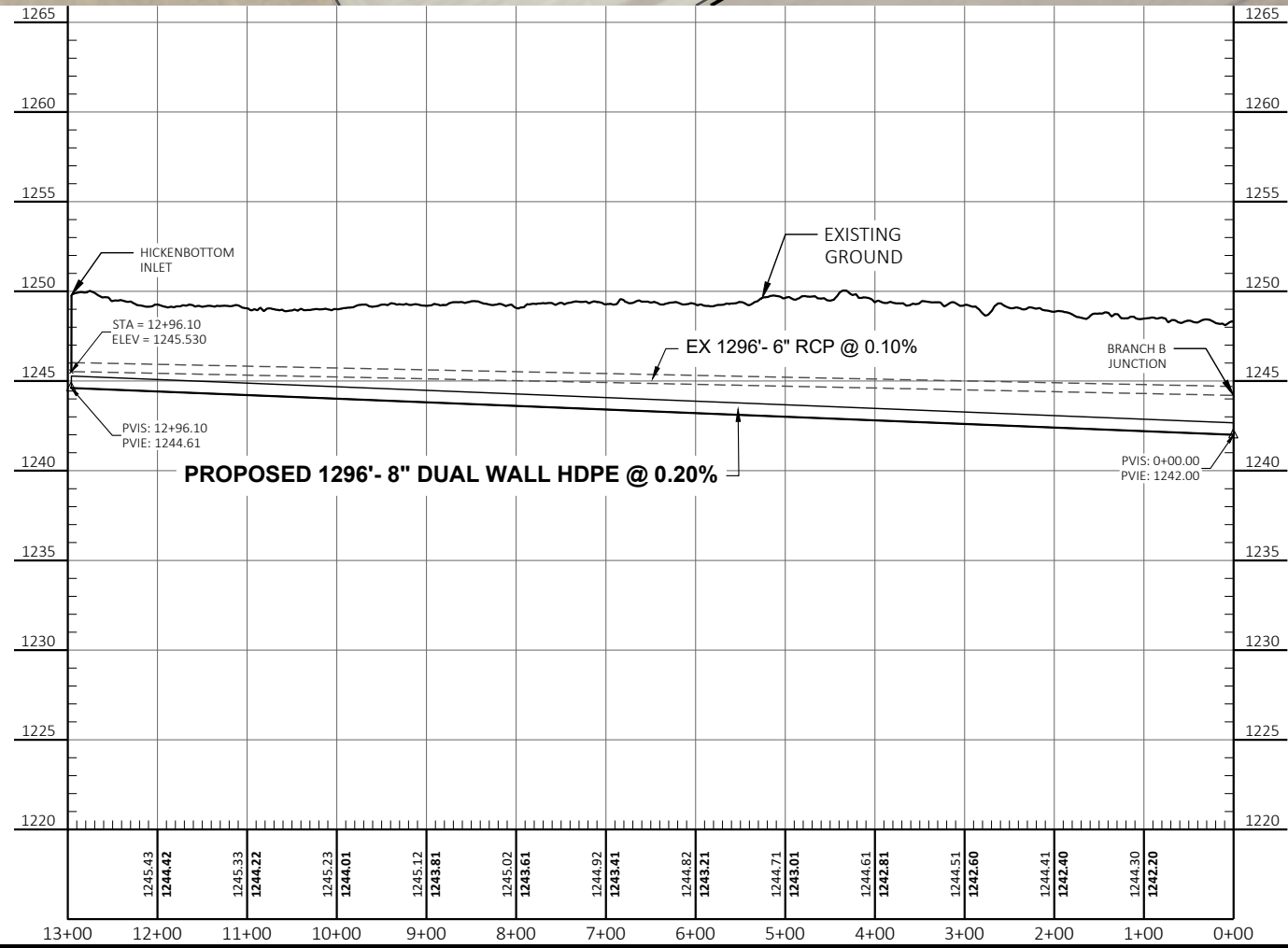
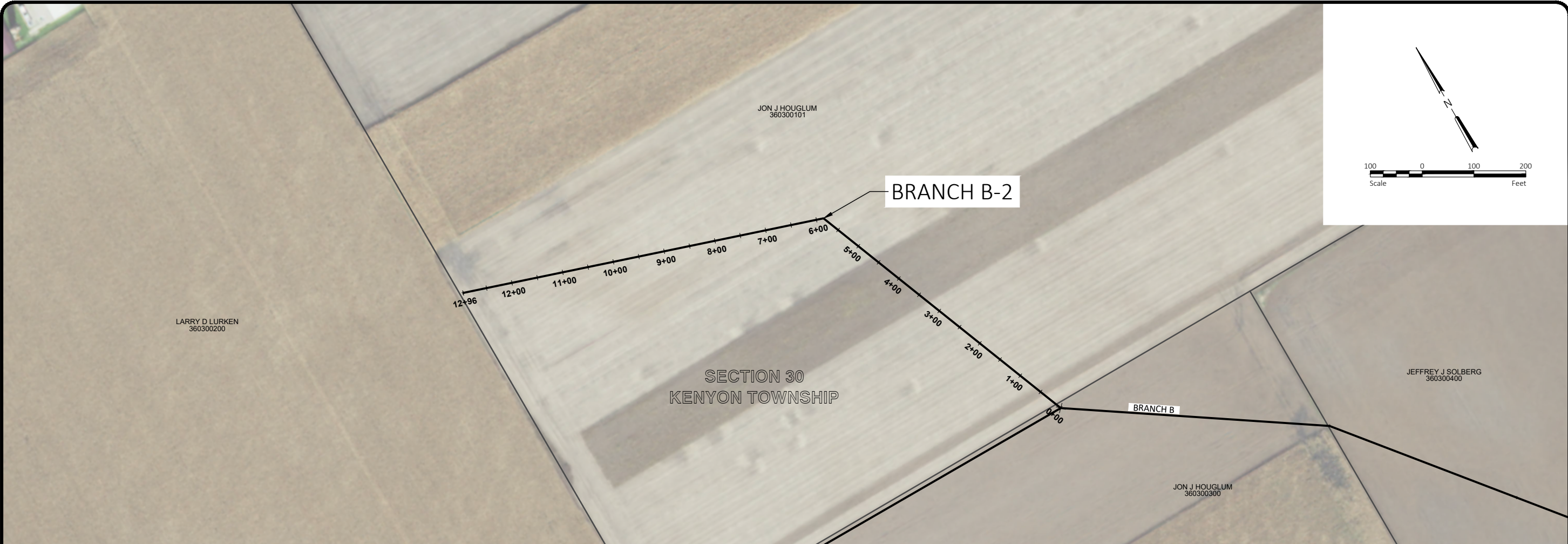


By	
Date	
Revision	
No.	
PRELIMINARY NOT FOR CONSTRUCTION	
GOODHUE CD1 BRANCH B IMPROVEMENT GOODHUE COUNTY KENYON TOWNSHIP BRANCH B STA 25+00 TO 37+85	
 HOUSTON engineering, inc.	
Drawn By	EJA
Checked By	CO
Date	04-15-2021
Scale	As Shown
Project No.	6400-0005
SHEET 3 OF 5	

H:\Maple Grove\IBN\6400\6400\6400\0005\CAD\Plans\6400-0005_Plan&Profile.dwg-Branch B-1-4/15/2021 11:25 AM-(earpin)



By	
Date	
Revision	
No.	
PRELIMINARY NOT FOR CONSTRUCTION	
GOODHUE CD1 BRANCH B IMPROVEMENT GOODHUE COUNTY KENYON TOWNSHIP BRANCH B-1	
 HOUSTON engineering, inc.	
Drawn By	EJA
Checked By	CO
Date	04-15-2021
Scale	As Shown
Project No.	6400-0005
SHEET 4 OF 5	



H:\Maple Grove\IBN\6400\6400\6400_0005\CAD\Plans\6400-0005_Plan&Profile.dwg-Branch B-2-4/15/2021 11:25 AM-(earpin)


By	
Date	
Revision	
No.	
PRELIMINARY NOT FOR CONSTRUCTION	
GOODHUE CD1 BRANCH B IMPROVEMENT GOODHUE COUNTY KENYON TOWNSHIP BRANCH B-2	
 HOUSTON engineering, inc.	
Drawn By	EJA
Checked By	CO
Date	04-15-2021
Scale	As Shown
Project No.	6400-0005
SHEET 5 OF 5	

EXHIBIT D – OPINION OF PROBABLE COST

IMPROVEMENT COST – BRANCH B

Item	Item Description	Unit	Quantity	Unit Cost	Extension
1	Mobilization	LUMP SUM	1	\$25,000	\$25,000
2	Traffic Control	LUMP SUM	1	\$5,000	\$5,000
3	Crush Tile and Leave in Place	LIN FT	400	\$2	\$800
4	Water Control	LUMP SUM	1	\$10,000	\$10,000
5	Connect to Existing Lateral	EACH	10	\$1,200	\$12,000
6	Remove Existing Breather	EACH	1	\$500	\$500
7	8" Hickenbottom Inlet	EACH	4	\$1,200	\$4,800
8	8" Perforated HDPE Tile	LIN FT	1296	\$22	\$28,512
9	10" Perforated HDPE Tile	LIN FT	601	\$24	\$14,424
10	12" Perforated HPDE Tile	LIN FT	879	\$26	\$22,854
11	15" Perforated HDPE Tile	LIN FT	1463	\$28	\$40,964
12	18" Perforated HDPE Tile	LIN FT	1444	\$32	\$46,208
13	Gravel Driveway Repair	EACH	1	\$2,000	\$2,000
				Construction Total	\$213,062
				Contingency	20%
				Engineering + Viewing	20%
				Legal	\$15,000
				Total	\$313,862



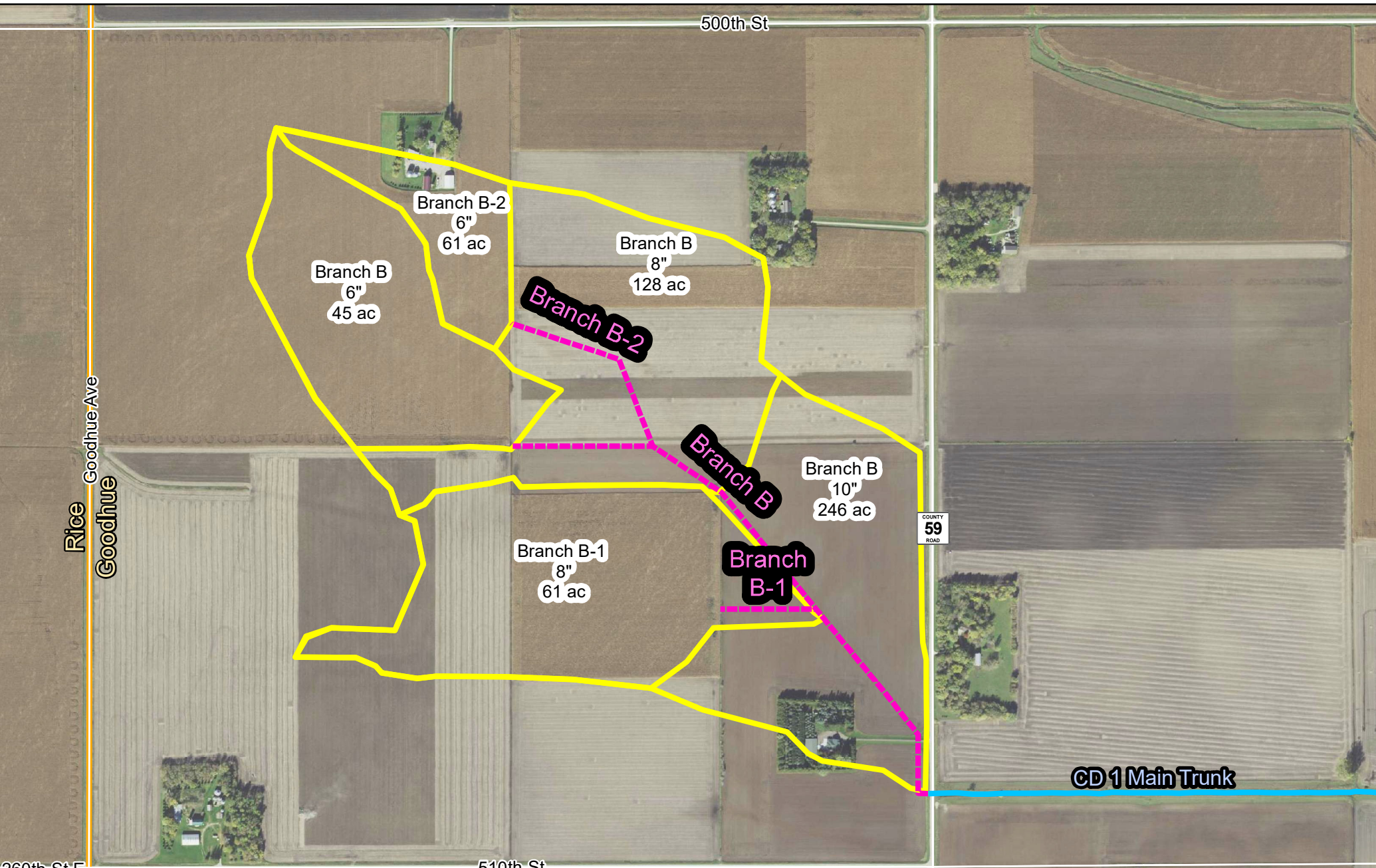
REPAIR COST – BRANCH B

Item	Item Description	Unit	Quantity	Unit Cost	Extension	
1	Mobilization	LUMP SUM	1	\$25,000	\$25,000	
2	Traffic Control	LUMP SUM	1	\$5,000	\$5,000	
3	Crush Tile and Leave in Place	LIN FT	400	\$2	\$800	
4	Water Control	LUMP SUM	1	\$10,000	\$10,000	
5	Connect to Existing Lateral	EACH	10	\$1,200	\$12,000	
6	Remove Existing Breather	EACH	1	\$500	\$500	
7	8" Hickenbottom Inlet	EACH	4	\$1,200	\$4,800	
8	6" Perforated HDPE Tile	LIN FT	2175	\$20	\$43,500	
9	8" Perforated HDPE Tile	LIN FT	2064	\$22	\$45,408	
10	10" Perforated HDPE Tile	LIN FT	1444	\$24	\$34,656	
11	Gravel Driveway Repair	EACH	1	\$2,000	\$2,000	
				Construction Total	\$183,664	
				Contingency	20%	\$36,700
				Engineering	20%	\$36,700
				Legal		\$15,000
				Total		\$272,064



EXHIBIT E – SUBCATCHMENT BOUNDARIES





- Branch B Tile
- CD 1 Open Channel Alignment
- Tile Subwatersheds

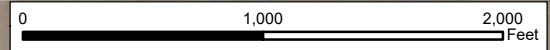


Exhibit E - Tile Subcatchments

Scale: AS SHOWN	Drawn by: ZTS	Checked by:	Project No.: 6400-0005	Date: 5/3/2021	Sheet:
--------------------	------------------	-------------	---------------------------	-------------------	--------



Maple Grove
 P: 763.493.4522
 F: 763.493.5572