ENGINEER'S PRELIMINARY REPORT

REPAIR & IMPROVEMENT OF
COUNTY DITCH NO. 32
FREEBORN COUNTY, MN

PREPARED FOR:
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Engineers + Surveyors

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.

STEVEN J. PENKAVA

LIC. NO. 43895

DATE: September 30, 2024

PREPARED BY:

JONES, HAUGH & SMITH INC.

515 S WASHINGTON AVE

ALBERT LEA, MN 56007

REPAIR & IMPROVEMENT TO FREEBORN COUNTY DITCH NO. 32

PROJECT NUMBER: 17-426

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FREEBORN COUNTY, MINNESOTA

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COUNTY DITCH NO. 32
FREEBORN COUNTY, MINNESOTA

SUMMARY

1. HISTORY
    a. County Ditch No. 32 (CD 32) was established in 1918 and provides drainage for a watershed that includes the City of Hayward and County Ditch No. J22 (CD J22).
    b. The original construction of CD 32 consisted of 1.1 miles of open ditch and 21.8 miles of subsurface tile ranging in size from 6 to 30 inches.
    c. Tile Improvements were completed on the Lateral 7 tile in 1983, Branch 9 and Lateral 9-2 tiles in 1987 and the Main tile in 2019.
    d. The established outlet of CD 32 is in the NE ¼ NW ¼ Section 17, Hayward Township at a point 455 feet west and 655 feet south of the center of the north line of Section 17 of said Township into Peter Lund Creek.

2. INVESTIGATION AND FINDINGS
    a. The project watershed is 896 acres and the total area draining to CD 32 is approximately 6,700 acres.
    b. Approximately 13,477 feet of the Branch 4, Lateral 4-13 and Lateral 4-25 tiles were televised and located in the field. Televising revealed cracked tiles, misaligned joints, sags in the pipe, poorly installed tile connections and debris in the pipe. Pipe blockages have been repaired by the Ditch Inspector. Organic soils in low areas along the tile alignment have subsided resulting in shallow tile.
    c. The drainage coefficient is defined as the depth of water drained from the contributing watershed over a 24-hour period. The Natural Resource Conservation Service (NRCS) design guidelines recommend a drainage coefficient of 0.50 inches per day for subsurface tile systems.
    d. The CD 32 tiles are undersized and lack sufficient capacity to provide adequate drainage for the watershed. The drainage coefficients of the tiles range between 0.19 to 0.52 inches per day.

3. PROPOSED SOLUTION
    a. The proposed improvements consist of constructing approximately 19,360 feet of subsurface tile ranging in size from 10 inches to 30 inches in diameter.
    b. The proposed tile will replace the existing project tile and serve as the single outlet for the project watershed.
    c. The proposed tile will be non-perforated dual wall polyethylene tile (DWPE) with watertight joints. A tile will be jack and bored under the railroad.
    d. The project replaces all existing open tile inlets with alternative tile inlets. No open inlets are planned as part of this project.

e. Private tiles encountered during construction will be connected to the proposed tile if clean and in good condition.
f. Tile inspection inlets will be installed at property boundaries and will be constructed approximately 4 feet above the natural grade and capped to prevent surface water from entering the system

4. ABANDONMENT OT EXISTING TILE
    a. The proposed tile will replace the existing CD 32 Branch 4, Lateral 4-13 and Lateral 4-25 Tiles. We recommend the existing tile be abandoned and no longer maintained by the Drainage Authority.

5. APPORTIONMENT OF REPAIR COSTS
    a. In accordance with Minnesota Statute 103E.215 Subdivision 6, the repair cost allocation for the project is 67.0%. Engineering, legal, administrative, bonding and interest cost could be allocated similarly.

6. OPINION OF PROBABLE COST

SUMMARY	
Branch 4 Tile Construction	$653,680
Lateral 4-13 Tile Construction	188,589
Lateral 4-25 Tile Construction	41,280
Contingencies	132,600
Engineering, Legal, Viewing and Administrative	172,800
TOTAL ESTIMATED COST	**$1,188,949**

7. OUTLET ANALYSIS
    a. An existing and proposed watershed model was developed for the project.
    b. Model results show peak flows at the project outlet increase for the 2-year to 25-year storm events and remain unchanged for the 50 and 100-year storm events. Peak water surface elevations at crossings downstream from the project are estimated to rise 0.2 feet or 2.4 inches or less with most crossings experiencing less than a 0.1 foot increase. Peak velocities downstream from the project outlet are estimated to increase by 0.4 feet per second or less.
    c. Model results indicate adding storage provides minimal changes to the peak flows and water surface elevations downstream of the project outlet due to the large watershed contributing flow into CD 32.
    d. The proposed improvements have minimal impact on peak flows, velocities and water surface elevations and modeling has shown limited downstream benefits with the addition of surface storage. It is the opinion of the Engineer that the outlet is adequate for the proposed improvements without new storage being created.

8. ENVIRONMENTAL CRITERIA
    a. The Shell Rock River and Winnebago River Comprehensive Watershed Plan and the Shell Rock River Watershed Restoration and Protection Strategy (WRAPS) Report, the Freeborn County Comprehensive Water Plan Amendment to Implementation 2016-2021 and the Agricultural BMP Handbook for Minnesota were reviewed as part of this report.
    b. Adverse effects of the proposed project will be temporary in nature and include temporary disruption of normal cropping practices and potential for reduced yields within the project construction limits. After construction, the trench area will be restored and salvaged topsoil re-spread, however said area may lack in productivity for the first few years.
    c. Temporary noise and dust will be generated during construction. The impacts will be similar to that experienced during the normal course of farming activities and are not viewed as significant.
    d. Project benefits include more manageable fields, timely cropping procedures, reduced compaction, and improved crop yields. Additional benefits will be derived from increased farm revenue and improved tax base within the watershed.
    e. Cover crops are currently planted on over 100 acres of the project watershed and are estimated to provide approximately 0.7 acre-feet of water storage, in addition to removing 1,430 pounds of Total Nitrogen, 4.5 tons of sediment and 22 pounds of Total Phosphorus per year. We anticipate the number of cover crop acres to increase after construction.
    f. The project will replace all existing open tile inlets with alternative tile inlets. No open tile inlets are planned as part of this project. Various studies have estimated the pollutant removal efficiencies of alternative tile inlets to be 27 percent for nitrogen and phosphorus and 45 percent for sediment.

9. RIGHT-OF-WAY REQUIRED
    a. No permanent right-of-way is required for construction of the proposed tile.

10. RECOMMENDATIONS
    a. The plans, profiles and narrative outlined herein provide sufficient details for the landowners and the Ditch Authority to evaluate the project. Hearings should be held to determine whether any additions to or deletions from the construction proposed herein and shown in the attached plans to this report should be made. Subject to discussion at hearings, the Engineer should be authorized to prepare and file the Final Report.
    b. Viewers should be appointed and commence their duties to determine benefits, damages and/or outlet fees.
    c. It is believed that the benefits derived from construction will exceed the costs and that the project is practical, necessary, and feasible.

STATE OF MINNESOTA
COUNTY OF FREEBORN

IN THE MATTER OF REPAIR AND IMPROVEMENT OF A SEPARABLE PART
OF COUNTY DITCH NO. 32
FREEBORN COUNTY, MINNESOTA

ENGINEER'S PRELIMINARY REPORT

TO THE HONORABLE BOARD OF COUNTY COMMISSIONERS:

The undersigned Professional Engineer, Steven J. Penkava, representing Jones, Haugh & Smith Inc., Consulting Engineers, duly appointed by Order of said Board of County Commissioners, dated September 5, 2017, having qualified as provided by law and assumed the duties of the office of Engineer, would now respectfully report on the investigation and examination of said drainage system as follows:

PETITION

The Petition filed in the above referenced matter requests that Branch 4, Lateral 4-13 and Lateral 4-25 of County Ditch No. 32 be repaired and improved.

HISTORY

County Ditch No. 32 (CD 32) was established in 1918 and provides drainage for a 6,700 acre watershed that includes the City of Hayward and County Ditch No. J22 (CD J22). The original construction of CD 32 consisted of 1.1 miles of open ditch and 21.8 miles of subsurface tile ranging in size from 6 to 30 inches.

An improvement of the Lateral 7 tile was completed in 1983. Construction was coordinated with the re-grading of County State Aid Highway No. 46 (CSAH 46) and involved installation of 1,730 feet of 24" tile in the south right-of-way of CSAH 46.

In 1987, approximately 2,800 feet of Branch 9 and Lateral 9-2 tiles in the NE ¼ Section 5 Hayward Township were repaired.

In 1996, approximately 2,995 feet of tile was installed in the north right-of-way of County Road No. 102. Construction of the tile began at a point on the east line of the west half of the SW ¼ NE ¼ Section 4, Hayward Township and traveled westerly to outlet into the main tile. The State of Minnesota, Freeborn County, and four landowners paid for said tile. As part of the agreement no additional private tile line shall be connected to and outlet into the tile so as to drain lands lying more than 350 feet north of CR 102 right-of-way beginning at the east line of the west half of SW ¼ of NE ¼ Section 4, Hayward Township. After construction of said tile line, all future repair, replacement and maintenance shall be completed at the expense and obligation of CD 32.

In 2019, the Main Tile was repaired from the open ditch upstream to CSAH 46 in the NW ¼ NW ¼ Section 9, Hayward Township. Construction consisted of approximately 1,100 feet of 36-inch tile.

The established outlet of CD 32 is in the NE ¼ NW ¼ Section 17, Hayward Township at a point 455 feet west and 655 feet south of the center of the north line of Section 17 of said Township into Peter Lund Creek.

INVESTIGATION AND FINDINGS

A topographic survey of the watershed area described in the Petition was made using aerial photography, light detection and ranging (LIDAR) data, U.S. Geological Survey contour maps, as-built plans, and soils surveys. The project watershed is 896 acres and the total area draining to CD 32 is approximately 6,700 acres. The topography of the watershed is rolling with numerous landlocked depressional areas. Due to the random location of these areas, the original design used tile to provide surface and subsurface drainage outlets for the watershed. Maps and profiles of the established CD 32 system were reviewed and used in the investigation. Benchmark elevations are listed on the plans.

The Branch 4 tile investigation began at the junction with the Main Open Ditch in the NW ¼ Section 9, Hayward Township and coursed in a southeasterly direction terminating on the west side of 820th Avenue in the NE ¼ SE ¼ Section 16, Hayward Township.

The Lateral 4-13 tile investigation began at the junction with the Branch 4 tile in the NE ¼ SE ¼ Section 9, Hayward Township and coursed in a southerly direction terminating in the NE ¼ NW ¼ Section 16, Hayward Township.

The Lateral 4-25 tile investigation began at the junction with the Branch 4 tile in the SW ¼ SW ¼ Section 10, Hayward Township and coursed in a southerly direction terminating on the south side of 200th Street in the NW ¼ NW ¼ Section 15, Hayward Township.

Approximately 13,477 feet of the Branch 4, Lateral 4-13 and Lateral 4-25 tiles were televised and located in the field. Televising revealed cracked tile, misaligned joints, sags in the pipe, poorly installed tile connections and debris in the pipe as shown in the attached televising report. Pipe blockages have been repaired by the Ditch Inspector. Organic soils in low areas along the tile alignment have subsided resulting in shallow tile.

The Natural Resource Conservation Service (NRCS) design guidelines recommend a drainage coefficient of 0.50 inches per day for subsurface tile systems. The drainage coefficient is defined as the depth of water drained from the contributing watershed over a 24-hour period.

The approximate drainage coefficient of the existing tile is shown in Table 1. Tile segments with less than the NRCS recommended drainage coefficient are highlighted. Existing tile capacities discussed in this report assume the tile is functioning as originally designed and in its original condition. Actual tile capacities will vary and depend on the condition of the tile system. Based on televising evidence the tile is likely providing less than the calculated flow.

Tile	Location	Length (ft)	Size (in)	Grade (%)	Existing Drainage Coefficient (in/day)
Branch 4	0+00 to 15+55	1,555	22	0.56	0.36
Branch 4	15+55 to 27+55	1,200	30	0.12	0.39
Branch 4	27+55 to 34+00	645	28	0.12	0.30
Branch 4	34+00 to 53+55	1,955	28	0.12	0.39
Branch 4	53+55 to 63+55	1,000	20	0.14	0.36
Branch 4	63+55 to 78+55	1,500	18	0.10	0.30
Branch 4	78+55 to 80+55	200	16	0.10	0.33
Branch 4	80+55 to 81+55	100	14	0.10	0.23
Branch 4	81+55 to 90+55	900	10	0.40	0.19
Branch 4	90+55 to 98+55	800	8	1.50	0.20
Branch 4	98+55 to 113+55	1,500	10	0.20	0.52
Lateral 4-13	0+00 to 4+65	465	14	0.50	0.40
Lateral 4-13	4+65 to 22+00	1,735	14	0.32	0.32
Lateral 4-13	22+00 to 34+65	1,265	12	0.32	0.31
Lateral 4-13	34+65 to 38+00	335	14	0.12	0.32
Lateral 4-13	38+00 to 45+00	700	12	0.12	0.27
Lateral 4-13	45+00 to 55+00	1,000	10	0.12	0.30
Lateral 4-13	55+00 to 62+65	765	9	0.12	0.41
Lateral 4-13	62+65 to 64+33	168	8	0.12	0.30
Lateral 4-25	0+00 to 4+79	479	12	0.20	0.46
Lateral 4-25	4+79 to 5+79	100	10	0.40	0.40
Lateral 4-25	5+79 to 9+79	400	9	0.40	0.30
Lateral 4-25	9+79 to 12+79	300	8	0.40	0.27
Lateral 4-25	12+79 to 19+79	700	7	0.98	0.30
Lateral 4-25	19+79 to 27+79	800	6	0.98	0.29
Lateral 4-25	27+79 to 39+79	1,200	7	0.20	0.20

Table 1: Existing CD 32 Tile Summary.

PROPOSED SOLUTION

The construction proposed is believed the most practical to accomplish the results envisioned by the Petitioners. Factors considered and/or evaluated include; design requirements for the contributing watershed, minimizing disruption of wildlife areas, downstream impacts and general economics.

A runoff coefficient of 0.50 inches per day was used for the project watershed. The proposed improvements consist of constructing approximately 19,360 feet of subsurface tile ranging in size from 10 inches to 30 inches in diameter. General project design requirements are listed below, and a detailed description of the project tile follows.

- The proposed tile will replace the existing tile and serve as the single outlet for the project watershed.

- The proposed tile will be non-perforated dual wall polyethylene tile (DWPE) with watertight joints. Township road crossings would be made by open trench methods and the roadway surface restored with 6 inches of gravel. A tile will be jack and bored under the railroad located near the center of Section 9, Hayward Township.

- Private tiles encountered during construction will be connected to the proposed tile if clean and in good condition. Landowners are encouraged to furnish the Engineer with private tile maps and provide input when staking for construction. Preservation, utilization and or improvements of private drainage systems will be the responsibility of the landowner thereof.

- The project replaces all existing open tile inlets with alternative tile inlets. No open inlets are planned as part of this project.

- Tile inspection inlets will be installed at property boundaries and will be constructed approximately 4 feet above the natural grade and capped to prevent surface water from entering the system.

- An MPCA Storm Water Construction Permit, a Freeborn County Highway Department Utility Permit and a Hayward Township permit are required to construct the project.

Branch 4 tile construction will begin at the junction with the Main Open Ditch in the NW ¼ Section 9, Hayward Township and course in a southeasterly direction terminating on the west side of 820th Avenue in the NE ¼ SE ¼ Section 16, Hayward Township. The proposed tile consists of approximately 5,600 linear feet of 30-inch tile, 2,300 linear feet of 24-inch tile, 300 linear feet of 18-inch tile, 1,100 linear feet of 15-inch tile, 1,300 linear feet of 12-inch tile and 1,067 linear feet of 10-inch tile.

Lateral 4-13 tile construction will begin at the junction with the Branch 4 tile in the NE ¼ SE ¼ Section 9, Hayward Township and course in a southerly direction terminating in the NE ¼ NW ¼ Section 16, Hayward Township. The proposed tile consists of approximately 4,500 linear feet of 15-inch tile and 1,943 linear feet of 12-inch tile.

Lateral 4-25 tile construction will begin at the junction with the Branch 4 tile in the SW ¼ SW ¼ Section 10, Hayward Township and course in a southerly direction terminating on the south side of 200th Street in the NW ¼ NW ¼ Section 15, Hayward Township. The proposed tile consists of approximately 1,250 linear feet of 12-inch tile.

The drainage coefficient of the proposed tile is shown in Table 2. The proposed drainage coefficient exceeds NRCS design guidelines in some locations. The increase in capacity is due to limited manufactured sizes of dual wall pipe. The capacity of each branch or lateral is controlled by the outlet during high flows.

Tile	Location	Length (ft)	Size (in)	Grade (%)	Proposed Drainage Coefficient (in/day)
Branch 4	0+00 to 9+00	900	24	0.60	0.50
Branch 4	9+00 to 30+00	2,100	30	0.18	0.51
Branch 4	30+00 to 55+00	2,500	30	0.15	0.53
Branch 4	55+00 to 65+00	1,000	30	0.10	0.68
Branch 4	65+00 to 79+00	1,400	24	0.10	0.70
Branch 4	79+00 to 82+00	300	18	0.10	0.50
Branch 4	82+00 to 93+00	1,100	15	0.45	0.65
Branch 4	93+00 to 101+00	800	12	1.50	0.65
Branch 4	101+00 to 106+00	500	12	0.17	0.76
Branch 4	106+00 to 116+67	1,067	10	0.17	0.52
Lateral 4-13	0+00 to 22+50	2,250	15	0.50	0.53
Lateral 4-13	22+50 to 39+00	1,650	15	0.25	0.53
Lateral 4-13	39+00 to 45+00	600	15	0.15	0.59
Lateral 4-13	45+00 to 56+00	1,100	12	0.18	0.64
Lateral 4-13	56+00 to 64+43	843	12	0.10	0.54
Lateral 4-25	0+00 to 12+50	1,250	12	0.40	0.70

Table 2: Proposed CD 32 Tile Summary.

ABANDONMENT OF EXISTING TILE

The proposed tile will replace the existing CD 32 Branch 4, Lateral 4-13 and Lateral 4-25 Tiles. We recommend the existing tile be abandoned and no longer maintained by the Drainage Authority.

APPORTIONMENT OF REPAIR COSTS

In accordance with Minnesota Statute 103E.215 Subdivision 6, the Project Repair cost allocation is 67.0%. A detailed account of the proposed repair costs are shown in Appendix 2. Engineering, legal, administrative, bonding and interest cost could be allocated similarly.

OUTLET ANALYSIS

An existing and proposed conditions XPSWMM model was developed to determine the effects of the proposed construction and model results are discussed in detail in Appendix 3. Peak flows at the Branch 4 tile outlet into CD 32 increase for the 2-year to 25-year storm events and remain unchanged for the 50 and 100-year storm events. Peak water surface elevations at crossings downstream from the project are estimated to rise 0.2 feet or 2.4 inches or less with most crossings experiencing less than a 0.1 foot increase. Peak velocities downstream from the project outlet are estimated to increase by 0.4 feet per second or less. Peak flows from the Branch 4 watershed enter CD 32 prior to upstream flows from the 6,800 acre watershed reaching the ditch. This is illustrated by the hydrographs shown in Appendix 3. The existing and proposed Branch 4 peak flows enter CD 32 on the rising limb of the hydrograph which results in minimal changes to the peak flows and water surface elevations.

The Shell Rock River and Winnebago River Comprehensive Watershed Plan and the Shell Rock River Watershed Restoration and Protection Strategy (WRAPS) Report set a goal of reducing peak flows by 15%. The outlet analysis investigated several concept level storage options including modification of road crossings, daylighting segments of the tile system into a wetland restoration or storage basin and constructing berms on the landscape to create temporary water holding areas. Due to the flat topography and structures near road crossings constructing the temporary water holding areas appeared to be the most viable option.

The analysis considered construction of the temporary water holding areas near the project outlet in the NW ¼ Section 9 Hayward Township at the approximate locations shown in Map 3 attached to this report. The berms would be approximately two feet in height and provide approximately 22-acre feet of storage. An outlet structure into the proposed Branch 4 tile would be constructed at each location.

The proposed temporary water holding areas reduce the Branch 4 tile 100-year storm peak flow by 34% at the outlet into CD 32. However, reduced peak flow benefits are minimal further downstream due to the large watershed (6,800 acres) flowing into CD 32. For example, peak flows at the outlet of CD 32 into Peter Lund Creek increase with construction of the temporary water holding areas. The small peak flow increase is due to flood waters being retained on the landscape and released closer to the peak of the CD 32 hydrograph thus increasing peak flows to a level greater than before the project.

The proposed improvements have minimal impact on peak flows, velocities and water surface elevations at the project outlet and the downstream CD 32 channel. Modeling has shown limited downstream benefits with the addition of surface storage. It is the opinion of the Engineer that the outlet is adequate for the proposed improvements without new storage being created.

ENVIRONMENTAL CRITERIA

Pursuant to the requirements of Minnesota Statutes 103E.015, Subdivision 1 with respect to environmental land use and multipurpose water management criteria, the following information is herewith submitted relative to the above referenced project:

Subd. 1a. Investigating potential use of external sources of funding and technical assistance.

A potential source of external funding is provided by the Board of Water and Soil Resources Clean Water Fund through the Multipurpose Drainage Management Grant. The program funds practices which have been shown to reduce erosion and sedimentation, reduce peak flows and flooding and improve water quality. Eligible practices include grade stabilization structures, grass waterways, water and sediment control basins, open tile inlet replacement, controlled drainage, saturated buffers and denitrifying bioreactors.

The Environmental Quality Incentives Program (EQIP) provided by the Natural Resources Conservation Service is a voluntary conservation program that helps agricultural producers in a manner that promotes agricultural production and environmental quality. Numerous areas within the project watershed are suitable for Best Management Practices (BMP's) which would qualify for funding through EQIP. Typical practices include those mentioned above in addition to cover crops. The EQIP program can fund practices throughout the watershed and landowners are encouraged to contact the local NRCS office for more details. .

Funding may also be available through the Shell Rock River and Winnebago River Comprehensive Watershed Plan as part of the One Watershed, One Plan program.

If the Engineer's Preliminary Report is approved, the Petitioners plan to work with local agencies to determine if portions of the project are eligible for funding.

MINNESOTA STATUTE 103E.015, SUBD 1: Environmental land use and multipurpose water management criteria:

1. Private and public benefits and costs of the proposed drainage project:

Many conservation practices are inplace within the project watershed. Practices already implemented include cover crops, grassed waterways, conservation tillage, no till, nutrient management, buffer strips and alternative tile inlets. The proposed construction will enhance the existing practices and provide landowners with a suitable outlet for additional conservation practices. Project benefits include more manageable fields, timely cropping procedures, reduced compaction and improved crop yields. Additional benefits will be derived from increased farm revenue and improved tax base within the watershed. Public and Private benefits for the project will be established by the Viewers.

2. Alternative measures, including measures identified in applicable state-approved and locally adopted water management plans, to: (i) conserve, allocate, and use drainage waters for agriculture, stream flow augmentation, or other beneficial uses; (ii) reduce downstream peak flows and flooding; (iii) provide adequate drainage system capacity; (iv) reduce erosion and sedimentation; and (v) protect or improve water quality;

The Shell Rock River and Winnebago River Comprehensive Watershed Plan and the Shell Rock River Watershed Restoration and Protection Strategy (WRAPS) Report, the Freeborn County Comprehensive Water Plan Amendment to Implementation 2016-2021 and the Agricultural BMP Handbook for Minnesota were reviewed as part of this report.

Implementation of conservation practices such as wetland restorations and water storage sites, water and sediment control basins (WASCOB's), saturated buffers, woodchip bioreactors, controlled drainage, grassed waterways, Two-stage ditch, In-channel sediment basin and cover crops were discussed with the landowners in the project watershed and are shown on the map attached to this report in Appendix 4. In addition to the conservation practices, several alternatives to the proposed project were evaluated and discussed with the Petitioners as part of this investigation.

The Do Nothing alternate has been discussed but the Petitioners experience poor drainage in the project watershed and crop loss occurs on a frequent basis. The frequent crop loss results in lower property values for wet acres and landowners do not receive a reasonable return on their investment.

Replacing the entire tile system with an open ditch was considered but due to increased right-of-way costs and the general course of said ditch it was not preferred.

Another alternative is to restore typically flooded areas of the watershed to wetlands. This practice provides storage in depressional areas to temporarily hold runoff until the existing drainage system can convey the flows. Two potential wetland restorations were investigated as part of this project and are shown on Maps 2 and 3 in Appendix 4.

A potential wetland restoration basin, shown on Map 2, is located in the SW ¼ SW ¼ Section 10, Hayward Township on the Hinrichs, Broulik and Thompson properties. It appears a 29-acre basin with an approximate depth of two feet could be restored. The Branch 4 and lower end of the Lateral 4-25 tiles would be below the permanent water level of the basin and require re-routing. Fill would need to be placed on adjacent property to avoid off-site impacts. We estimate a total easement area of approximately 67 acres located on four separate properties would be required for the restoration. The estimated cost of land acquisition, re-routing existing private tile and restoration costs is estimated at $15,000 per acre, bringing the total estimated restoration cost to approximately $1,005,000 plus the upstream and downstream tile improvements.

Two temporary water holding areas, shown on Map 3, could be developed near the outlet of the Branch 4 tile in the NW ¼ Section 9, Hayward Township. The first site would require raising the CD 32 ditch bank approximately 2 feet and installing a water control structure to control discharge into the open ditch. The basin would be 2 feet in depth and directly impact approximately 1.5 acres of cropland. We anticipate additional crop damage and yield loss outside of the area immediately flooded and estimate the total area impacted to be approximately 3 acres. The cost of a flowage easement and outlet construction is estimated at $28,000 plus the upstream and downstream tile improvements.

The second temporary water holding area could be constructed upstream of the private road located on the Wangen property. Construction requires raising the private road 2 feet and construction of an outlet structure into the proposed Branch 4 tile. The basin would be 2 feet in depth and directly impact approximately 12 acres of cropland. We anticipate additional crop damage and yield loss outside of the area immediately flooded and estimate the total area impacted to be approximately 20 acres. The cost of a flowage easement and outlet construction is estimated at $130,000 plus the upstream and downstream tile improvements.

The alternative practices identified in this report involve voluntary participation by the landowners. Landowners understand that there are outside funding resources which may fund the conservation practices discussed in this report. Due to the limited benefit of adding storage, lack of landowner interest and the estimated high construction and land acquisition costs the projects were not viewed as feasible at this time.

3. The present and anticipated land use within the drainage project or system, including compatibility of the project with local land use plans:

Land use within the watershed varies and is comprised of prime farmland, pasture, building sites, roads, and natural areas. All the agricultural lands in the project watershed are used for growing diversified crops or are pastured. It is not anticipated that lands will be used for purposes other than agricultural production.

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:

See the Outlet Analysis section of the report and Appendix 3 for more detailed information regarding outlet adequacy.

5. The effects of the proposed drainage project on wetlands:

National Wetland Inventory Maps of the project area were reviewed and the location of mapped but not delineated wetlands are shown in Figure 1.

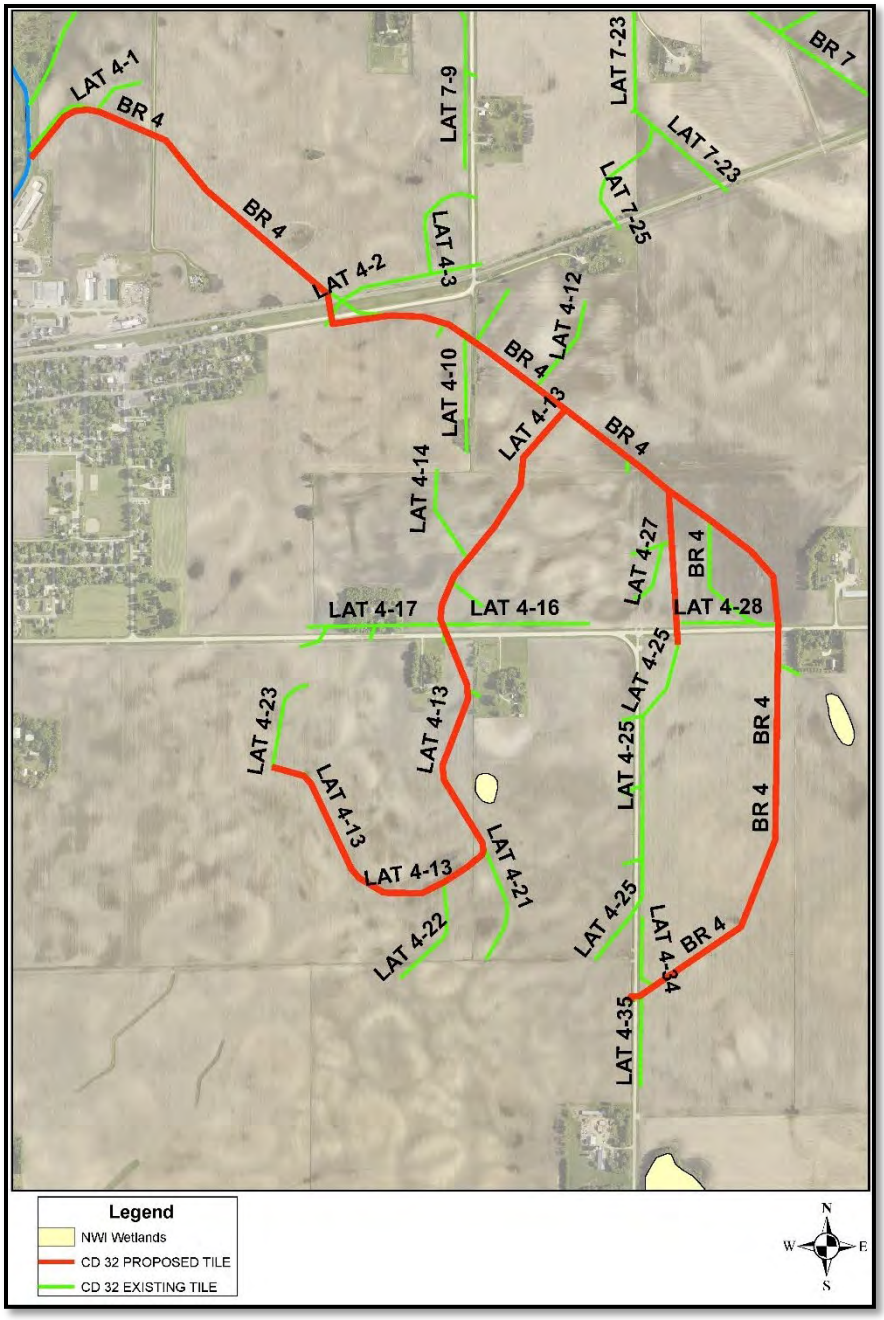


Figure 1: NWI Wetland Inventory Map.

No wetlands were noted along the proposed project alignments. Landowners are encouraged to contact the Natural Resource Conservation Service (NRCS) to complete Form AD 1026. Said Form allows the NRCS to review each parcel to identify wetlands and measures required to avoid wetland impacts. Due to federal data privacy regulations, the obligation for completing the Form rests with the individual landowners and not the project.

Freeborn County is a strong supporters of wetland restoration projects. Restoration of wetlands will continue to be encouraged after establishment of this project. The project is not anticipated to negatively affect wetlands.

6. The effects of the proposed drainage project on water quality:

Cover crops are currently planted on approximately 100 acres of the project watershed. The Shell Rock River and Winnebago River Comprehensive Watershed Plan estimates cover crops provide approximately 0.7 acre-feet of water storage. In addition to removing 1,430 pounds of Total Nitrogen, 4.5 tons of sediment and 22 pounds of Total Phosphorus per year. We anticipate the number of cover crop acres to increase after construction of the proposed tile.

The project will replace all existing open tile inlets (9 total) with alternative tile inlets each having an average watershed size of 10 acres. No open tile inlets are planned as part of this project. Various studies have estimated the pollutant removal efficiencies of alternative tile inlets to be 27 percent for nitrogen and phosphorus and 45 percent for sediment. Replacing open tile inlets with the proposed alternative tile inlets will improve water quality.

Additional water quality practices within the watershed are shown on Maps 1, 2 and 3. The potential conservation practices were shared and discussed with landowners during project meetings. The local Soil and Water Conservation District and the Shell Rock River Watershed can provide assistance to landowners to implement and fund the practices which are beyond the jurisdiction of the Drainage Authority. Implementation of the proposed construction will maintain or improve the quality of water leaving the project watershed.

7. The effects of the proposed drainage project on fish and wildlife resources:

Aerial photographs were reviewed, and a cursory visual inspection of the watershed conducted. Wildlife habitat areas within the watershed typically consist of CRP, farm groves, fence lines and road ditches. Wildlife habitat will not be substantially reduced by the proposed construction. No fish were observed during the field investigation.

There may be some temporary disruption of upland wildlife habitat during construction. The extent and duration of habitat disturbance will be similar to that experienced during normal agricultural cropping practices. During the field survey for this project, the wildlife observed was common to that of other similar drainage systems in the general area, which have been properly repaired and maintained in the past.

8. Effects of the proposed drainage project on shallow groundwater availability, distribution, and use:

Shallow ground water is widely distributed over the entire watershed. Agricultural subsurface drainage systems are installed to maintain the water table elevation sufficiently below the surface of the ground to provide for efficient crop production. The elevation of private tile will continue to determine the shallow groundwater elevation, which is typically at a depth of 3 to 4 feet. No change in availability, distribution or use of the ground water is anticipated as a result of this project.

9. The overall environmental impact of all the above criteria:

Adverse effects of the proposed project will be temporary in nature and include temporary disruption of normal cropping practices and potential for reduced yields within the project construction limits. After construction, the trench area will be restored and salvaged topsoil re-spread, however, said area may lack in productivity for the first few years. Over time we anticipate crop production to return to pre-construction conditions. Temporary noise and dust will be generated during construction. The impacts will be similar to that experienced during the normal course of farming activities and are not viewed as significant. Temporary soil erosion within the construction limits may occur until permanent stabilization is achieved. Potential soil erosion will be addressed as required by the MPCA erosion control permit.

The proposed project will improve the drainage capabilities of saturated lands in the project watershed and provide property owners with the availability of normal agricultural cropping programs. Project benefits include more manageable fields, timely cropping procedures, reduced compaction, and improved crop yields. Additional benefits will be derived from increased farm revenue and improved tax base within the watershed.

Cover crops are currently planted on over 100 acres of the project watershed and are estimated to provide approximately 0.7 acre-feet of water storage. In addition to removing 1,430 pounds of Total Nitrogen, 4.5 tons of sediment and 22 pounds of Total Phosphorus per year. We anticipate the number of cover crop acres to increase after construction.

The project will replace all existing open tile inlets with alternative tile inlets. No open tile inlets are planned as part of this project. Various studies have estimated the pollutant removal efficiencies of alternative tile inlets to be 27 percent for nitrogen and phosphorus and 45 percent for sediment.

Additional voluntary water quality practices are shown on the maps attached to this report. The conservation practices were shared and discussed with landowners during the project. Landowners understand that outside funding resources are available which may fund the conservation practices. Additional conservation practices can be implemented with this project if requested.

RIGHT-OF-WAY REQUIRED

No permanent right-of-way is required for construction of the proposed tile. We recommend the Drainage Authority consider recording the CD 32 right-of-way easement to protect future drainage rights.

EXHIBITS AND APPENDICES

Estimates of the cost of the project are appended at the end of this report in Appendix 1, under the heading "Opinion of Probable Cost".

Apportionment of Repair Cost Estimates of the project are appended at the end of this report in Appendix 2, under the heading "Apportionment of Repair Cost Estimate ".

A Technical Memorandum regarding the outlet analysis for the project is appended at the end of this report in Appendix 3, under the heading "Outlet Analysis".

Potential Conservation Practices in the project watershed are appended at the end of this report in Appendix 4.

The project tile televising report is attached at the end of this report in Appendix 5.

The location, sizes, grades and depths of the proposed drains are shown on the plan-profile sheets attached to this report.

RECOMMENDATIONS

The plans, profiles and narrative outlined herein provide sufficient details for the landowners and the Ditch Authority to evaluate the project. It is the opinion of the Engineer that for the best type of construction and a system that will function adequately for the longest period, the design as shown on the plans attached to this report should be followed.

Hearings should be held to determine whether any additions to or deletions from the construction proposed herein and shown in the attached plans to this report should be made. Landowners should be cognizant of the proposal and understand that only the construction outlined in the Engineer's Report, as amended during the proceedings and included in the Final Order of the Ditch Authority may be done as part of the project. The Engineer has no authority to make changes from the Final Engineer's Report as ordered by the Ditch Authority. Subject to discussion at hearings, the Engineer should be authorized to prepare and file the Final Report. Viewers should be appointed and commence their duties to determine benefits, damages and/or outlet fees.

It is believed that the benefits derived from construction will exceed the costs and that the project is practical, necessary and feasible.

APPENDIX 1
OPINION OF PROBABLE COST

ENGINEER'S PRELIMINARY REPORT PETITION FOR IMPROVEMENT

TO BRANCH 4, LATERAL 4-13 & LATERAL 4-25 TO FREEBORN COUNTY DITCH NO. 32

OPINION OF PROBABLE COST

BRANCH 4 TILE					
Item	Description	Est. Qty.		Unit Price	Amount
1.	30" CMP Tile Outlet	20	LF	$ 140.00	$ 2,800.00
2.	30" Tile	5,400	LF	52.00	280,800.00
3.	24" Tile	2,280	LF	40.00	91,200.00
4.	18" Tile	260	LF	29.00	7,540.00
5.	15" Tile	1,100	LF	25.00	27,500.00
6.	12" Tile	1,300	LF	23.00	29,900.00
7.	10" Tile	1,027	LF	20.00	20,540.00
8.	30" HP Storm Tile @ Pvt Road	40	LF	200.00	8,000.00
9.	30" HP Storm Tile @ CR 102	60	LF	200.00	12,000.00
10.	18" HP Storm Tile @ 200th St	40	LF	180.00	7,200.00
11.	12" HP Storm Tile @ 820th Ave	40	LF	110.00	4,400.00
12.	Jack & Bore 30" casing @ RR	100	LF	650.00	65,000.00
13.	Alternative Tile Inlets	6	EA	1,750.00	10,500.00
14.	Tile Inspection Inlets	4	EA	1,300.00	5,200.00
15.	Connect existing tile	60	EA	500.00	30,000.00
16.	Drain Tile Cross Connection	1	EA	2,500.00	2,500.00
17.	Riprap	20	TON	55.00	1,100.00
18.	Erosion Control	1	LS	10,000.00	10,000.00
19.	Crushed rock for pipe foundation	1,500	TON	25.00	37,500.00
				BRANCH 4 TILE SUBTOTAL:	**$653,680.00**

LATERAL 4-25 TILE					
Item	Description	Est. Qty.		Unit Price	Amount
1.	12" Tile	1,210	LF	$ 23.00	$ 27,830.00
2.	12" HP Storm Tile @ 200th St	40	LF	110.00	4,400.00
3.	Connect existing tile	5	EA	500.00	2,500.00
4.	Alternative Tile Inlets	1	EA	1,750.00	1,750.00
5.	Tile Inspection Inlets	1	EA	1,300.00	1,300.00
6.	Erosion Control	1	LS	1,000.00	1,000.00
7.	Crushed rock for pipe foundation	100	TON	25.00	2,500.00
				LATERAL 4-25 TILE SUBTOTAL:	**$ 41,280.00**

ENGINEER'S PRELIMINARY REPORT

PETITION FOR IMPROVEMENT TO BRANCH 4, LATERAL 4-13 & LATERAL 4-25

TO FREEBORN COUNTY DITCH NO. 32

OPINION OF PROBABLE COST

LATERAL 4-13 TILE					
Item	Description	Est. Qty.		Unit Price	Amount
1.	15" Tile	4,460	LF	$ 25.00	$ 111,500.00
2.	12" Tile	1,943	LF	23.00	44,689.00
3.	15" HP Storm Tile @ 200 St	40	LF	150.00	6,000.00
4.	Connect existing tile	20	EA	500.00	10,000.00
5.	Tile Inspection Inlets	3	EA	1,300.00	3,900.00
6.	Alternative Tile Inlets	2	EA	1,750.00	3,500.00
7.	Erosion Control	1	LS	1,500.00	1,500.00
8.	Crushed rock for pipe foundation	300	TON	25.00	7,500.00
				LATERAL 4-13 TILE SUBTOTAL:	**$188,589.00**

SUMMARY		
BRANCH 4 TILE	$	653,680.00
LATERAL 4-25 TILE	$	41,280.00
LATERAL 4-13 TILE	$	188,589.00
SUBTOTAL:	**$**	**883,549.00**
+ Contingencies (±15%)	$	132,600.00
Total Estimated Construction Costs:	$	1,016,149.00
+ Eng, Legal, Viewing & Admin:	$	172,800.00
TOTAL ESTIMATED TILE COST:	**$**	**1,188,949.00**

APPENDIX 2:
APPORTIONMENT OF REPAIR COST ESTIMATE

ENGINEER'S PRELIMINARY REPORT

PETITION FOR IMPROVEMENT TO BRANCH 4, LATERAL 4-13 & LATERAL 4-25

TO FREEBORN COUNTY DITCH NO. 32

APPORTIONMENT OF REPAIR COST ESTIMATE

BRANCH 4 TILE					
Item	Description	Est. Qty.		Unit Price	Amount
1.	30" CMP Tile Outlet	20	LF	$ 140.00	$ 2,800.00
2.	30" Tile	3,685	LF	52.00	191,620.00
3.	24" Tile	2,595	LF	40.00	103,800.00
4.	18" Tile	358	LF	29.00	10,382.00
5.	10" Tile	2,822	LF	20.00	56,440.00
6.	8" Tile	600	LF	16.00	9,600.00
7.	24" Tile @ Pvt Road	40	LF	190.00	7,600.00
8.	30" Tile @ CR 102	60	LF	200.00	12,000.00
9.	18" Tile @ 200th St	40	LF	180.00	7,200.00
10.	12" Tile @ 820th Ave	40	LF	110.00	4,400.00
11.	Alternative Tile Inlets	3	EA	1,750.00	5,250.00
12.	Connect existing tile	60	EA	500.00	30,000.00
13.	Riprap	20	TON	55.00	1,100.00
14.	Erosion Control	1	LS	10,000.00	10,000.00
15.	Crushed rock for pipe foundation	600	TON	25.00	15,000.00
		BRANCH 4 TILE SUBTOTAL:			**$467,192.00**

LATERAL 4-25 TILE					
Item	Description	Est. Qty.		Unit Price	Amount
1.	12" Tile	479	LF	23.00	11,017.00
2.	10" Tile	500	LF	20.00	10,000.00
3.	8" Tile	231	LF	16.00	3,696.00
4.	12" Tile @ 200th St	40	LF	110.00	4,400.00
5.	Connect existing tile	5	EA	500.00	2,500.00
6.	Erosion Control	1	LS	1,000.00	1,000.00
7.	Crushed rock for pipe foundation	50	TON	25.00	1,250.00
		LATERAL 4-25 TILE SUBTOTAL:			**$ 33,863.00**

ENGINEER'S PRELIMINARY REPORT

PETITION FOR IMPROVEMENT TO BRANCH 4, LATERAL 4-13 & LATERAL 4-25

TO FREEBORN COUNTY DITCH NO. 32

APPORTIONMENT OF REPAIR COST ESTIMATE

LATERAL 4-13 TILE						
Item	Description	Est. Qty.		Unit Price		Amount
1.	15" Tile	2,495	LF	$ 25.00	$	62,375.00
2.	12" Tile	1,965	LF	23.00		45,195.00
3.	10" Tile	1,765	LF	20.00		35,300.00
4.	8" Tile	178	LF	16.00		2,848.00
5.	15" Tile @ 200 St	40	LF	150.00		6,000.00
6.	Connect existing tile	20	EA	500.00		10,000.00
7.	Alternative Tile Inlets	2	EA	1,750.00		3,500.00
8.	Erosion Control	1	LS	1,500.00		1,500.00
9.	Crushed rock for pipe foundation	250	TON	25.00		6,250.00
		LATERAL 4-13 TILE SUBTOTAL:				**$172,968.00**

SUMMARY		
	Tile	Amount
BRANCH 4 TILE	$	467,192.00
LATERAL 4-25 TILE	$	33,863.00
LATERAL 4-13 TILE	$	172,968.00
SUBTOTAL:	**$**	**674,023.00**
+ Contingencies	$	50,600.00
Total Estimated Construction Costs:	$	724,623.00
+ Eng, Legal, Viewing & Admin:	$	72,500.00
TOTAL ESTIMATED TILE COST:	**$**	**797,123.00**
REPAIR COST ALLOCATION:		**67.0%**

APPENDIX 3:
OUTLET ANALYSIS

Technical Memorandum

To: Steve Penkava
Jones Haugh Smith, Inc.

From: Adam N. Nies PE, CFM
Houston Engineering, Inc.

Subject: Freeborn County Ditch 32 Branch 4

Date: March 13, 2024

Project: 9875-0003

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

Adam N. Nies 03/13/2024
Reg. No. 53358

INTRODUCTION

Freeborn County Ditch 32 Branch 4 (CD 32 Br 4) has been petitioned for an improvement of the existing drain tile, to a 0.5-inch drainage coefficient. The CD 32 system was established in 1926 and is in need of repair. Under MS.103E.015 Subd. 1(4), before establishing a drainage project, the drainage authority must consider 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 adequacy of the outlet for the drainage project. Additionally, under MS.103E.245 Subd. 4(3), the plan must show the character of the outlet and whether it is sufficient. The purpose of this technical memorandum is to evaluate changes in hydrologic and hydraulic loading resulting from the project to demonstrate whether the outlet is adequate for the project and determine the sizing of the necessary practices to ensure the outlet's adequacy.

MODEL DEVELOPMENT

Approach

The analysis was performed using XPSWMM (v. 2021.1) hydrologic modeling software. Both existing and proposed models were created using Curve-Number (CN) hydrologic theory, which estimates runoff volumes based on the combination of rainfall input, soil type, and land use at any given location (NRCS TR55). The input parameters remain identical between existing and improved conditions to represent only that change that is directly related to the tile size and grade according to the improvement plan. The model does not account for potential change to the infiltrability of the soil following the improvement project. This analysis is short-duration based according to the 24-hour storm. It does not account for the long-term changes to the system related to soil moisture content, groundwater table, evapotranspiration, or nutrient loading.

Using the National Oceanic and Atmospheric Administration's (NOAA) Atlas 14, in combination with the Hydrology Guide for Minnesota, a basic rainfall frequency was established, and corresponding rainfall to runoff correlation was determined. Rainfall amounts over the CD 32 drainage area were obtained from the Atlas-14 Point Precipitation Frequency database. The rainfall inputs and corresponding return periods are displayed in

Table 1. Rainfall depths were applied in the model using MSE3 rainfall distribution for a 24 hour storm event.

Table 1 – Rainfall depths over CD 32

Return Period (Years)	Rainfall (inches)
2	2.99
5	3.80
10	4.55
25	5.72
50	6.72
100	7.81

The CN was assigned by comparing the 2016 NLCD Land Use data with SSURGO soils data. For both existing and proposed models, the hydrologic soil groups were assumed to be “drained” conditions, meaning that soils are assumed to not be saturated and therefore have a higher infiltrability. This assumption is conservative, given that available capacity in the soils will be greater with the tile improvement than under existing conditions.The watershed for CD 32 Br 4 exhibits relatively uniform land use and soils classification and an average CN value was assigned to each catchment delineated within the study area. The CN value assigned is identical between existing and proposed conditions.

CD 32 Br 4 is approximately 15 miles of agricultural drainage tile including lateral connections, with 3.6 miles of tile scheduled for improvement. The contributing drainage area for CD 32 Br 4 is approximately 896 acres. CD 32 Br 4 outlets into the CD 32 main open channel, which drains to Peter Lund Creek approximately 1.1 miles downstream. The CD 32 main open channel is maintained and is stable. Tailwater conditions for County Ditch 32 main open channel have been established at Peter Lund Creek, employing USGS Regression Equations and an HY-8 model of a crossing adjacent to the confluence in order to establish an outlet rating curve as the downstream boundary conditions for CD 32 in the modeling. The drainage area of Peter Lund Creek to this location is approximately 11,600 acres comprised of natural channel as well as open ditch. For reference, the overall drainage area of CD 32 (including CD 32 Br 4) is roughly 6,800 acres. Timing of the peaks from the tile outflow of Branch 4, and the CD 32 open channel, and Peter Lund Creek may not be coincident due to times of concentration over the drainage areas. Therefore, the simulations completed likely overestimate the affects of the proposed tile improvement.

Existing Conditions

The current conditions of CD 32 Br 4 are known to be in disrepair relative to the originally constructed conditions in 1926. Drainage improvements must be measured against the As Constructed and Subsequently Improved Condition (ACSIC) of the tile. This analysis and report focus on the ACSIC for modeling existing conditions, without attempting to account for current degraded tile conditions. This means that any tile blowouts, joint separation, cracking, or deteriorated pipes are not represented in the modeling. The existing CD 32 Br 4 tile sizes range from 6 to 30 inches. The model is setup with sufficient detail to model the relative change between existing and improved conditions. It is assumed that any existing tile that is to remain in place will continue to

function the same for the proposed improvement. Only the segments of tile that are part of the improvement project are included in the modeling. The subbasins are generalized accordingly and are displayed in **Exhibit A**. The model is allowed to account for ponded areas within the system for excess water that the system must retain until such time as the tile capacity can drain the water out. Storage curves for these ponded areas have been set with available LiDAR. Surface flow is allowed for excess water once ponded areas are full. Significant conveyance occurs overland as overflow weirs representing high ground transfer water from one ponded area to the next.

Proposed Improvement

The proposed improvement model was based on the construction plans titled Freeborn County, MN Petition for Improvement to County Ditch No. 32 dated 12/29/2023, produced by Jones Haugh Smith (JHS). The proposed replacement drain tile of CD 32 Br 4 and Laterals 4-13 and 4-25 range in size from 10 inches to 30 inches. The tile improvement includes both changes in tile size and grade. Minnesota Statutes. 103E.015 and 103E.245 requires the Engineer to evaluate the adequacy of the outlet for drainage projects, which for this project includes consideration of increased peak flows at the tile outlet. The modeling extends from the outlet of CD 32 Br 4 and the open channel CD 32 main ditch to the confluence with Peter Lund Creek. **Table 2** and **Table 3** compare the peak flow rates and water surface elevations and velocities of the CD 32 Br 4 tile outlet and open ditch outlet of CD 32, respectively, between existing and proposed conditions. Output hydrographs are displayed in **Figure 1** corresponding to the CD 32 Br 4 tile outlet location. These hydrographs show an increase in peak flow of the tile and a shorter duration of residence time in the ponded areas, though the total volume is unchanged. The modeling indicates that the improvement generally exchanges a portion of the surface conveyance for subsurface tile flow, though it still results in a significant surface flow overland on larger events, since the ½ inch drainage coefficient is much smaller than the modeled rainfall volumes. The combined surface conveyance and tile flow are displayed on **Figure 2**, and the CD 32 Br 4 hydrograph is displayed on the overall CD 32 open channel hydrograph as **Figure 3**. The non-coincident timing of the peaks is clearly shown as the CD 32 Br 4 peak occurs along the rising limb of the CD 32 open channel hydrograph. Only the 2-year and 50-year events are shown for simplicity and clarity, however this trend is consistent across all modeled events. Due to the offset peaks, the increased flow from the tile outlet has minimal effect on the peak flow of the CD 32 open channel. Peak water surface elevations have been evaluated at the crossings along CD 32 downstream of the Branch 4 tile and show a maximum of 0.2 feet of increase at the upstream end of all crossings, with most showing less than 0.1 feet for all events analyzed and none of the crossings being overtopped for the 50-year event. This increase is not sufficient to result in damage to landowners downstream of the system. The peak velocity at the outlet of the Branch 4 tile increased by approximately 2 fps for all events modeled, resulting in an increase in open channel velocities in CD 32 of 0.1 to 0.4 fps immediately downstream of Branch 4. As displayed in **Table 4**, the peak velocity at the CD 32 outlet to Peter Lund Creek increased by less than 0.1 fps for all events modeled, less than the anticipated modeling error. These minor increases will not adversely impact the channel or structures.

Storage Alternatives

The Shell Rock River Watershed WRAPS includes a goal of reducing peak stream flows by 15%. Additionally, while the increases in peak flow at the outlet of CD 32 Br 4 will not result in substantive impacts downstream, there are locations along the landscape of the tile system that potentially provide the opportunity for additional storage to incrementally address the storage goals of the WRAPS. The petitioners are not aware of any willing

landowners with which to implement storage on the landscape. However, an analysis of the effects of additional storage is included within this report to document the analysis that was completed, if a willing landowner opportunity should present itself in the future.

Several concept level storage locations were considered in order to decrease peak flows from the improvement project. The open channel portion of CD 32, downstream from the outlet of the Branch 4 tile, has several road crossings. Consideration was given to reducing structure sizes through these crossings to attenuate the peak flow of the hydrograph. Each of the crossings has residential and/or commercial structures adjacent to them. Any storage alternative that would restrict flow through these crossings would potentially put additional risk of adverse impact to the structures and are not viable.

Storage alternatives that capture surface flow on the lands drained by Branch 4 are able to capture the peak more directly and mitigate the increase in flow entering CD 32. The orientation of the tile system does not allow opportunity for daylighting any segment of the tile onto the landscape. Instead, this approach focused on capturing the surface flow portion of the watershed (that which bypasses the tile during larger rainfall events). With the tile system designed for a ½ inch drainage coefficient, larger rain events cause excess runoff to be conveyed overland between low lying areas, and towards the CD 32 open channel. Temporarily retaining a portion of this surface conveyance could aid in the mitigation of the increased combined peak flows at the outlet of CD 32 Br 4. Several locations were investigated to capture this surface runoff. Storage may be accomplished through the addition of 2-foot-high berms in both of the low-lying areas located near the outlet of the tile system in the northwest corner of Section 9. Varying the heights of these berms between 1 – 3 feet was modeled, with 2 feet showing the best balance of benefit at the outlet and shortest duration of temporary retainage of the water. This mitigates the increased peak of the improvement's combined tile and surface flow at the outlet of the tile system and has minimal effect on the peak or timing of the CD 32 open channel hydrograph, which is governed by the large contributing drainage area north of the tile system. **Table 2** and **Table 3** and **Table 4** compare the peak flow rates and water surface elevations and velocities, respectively of the CD 32 Br 4 tile outlet and system outlet of CD 32 between existing, proposed and proposed with storage conditions. **Figure 4** displays the visual comparison of the potential peak reduction with storage. The benefit of this storage is greatest at the outlet of the CD 32 Br. 4 tile and is reduced further downstream.

RESULTS / CONCLUSION

The model results show that the proposed improvement to CD 3 Br 4 produces minimal impact at the CD 32 outlet to Peter Lund Creek and thus the outlet is adequate for the proposed improvement project. In order to incrementally address WRAPS goals and eliminate the effect of the improvement on the CD 32 open ditch, surface storage could be incorporated into the project or via a separate project by increasing the elevation of the overflow berms. The storage would minimally increase residence time on the fields by approximately 6 hours compared to the improvement condition with no storage, and will still drain faster than existing conditions, while significantly reducing the peak outflow from the Branch 4 tile system into the CD 32 Main channel. However, any storage added to Branch 4 is going to have minimal benefits to peak flows downstream of the CD 32 outlet into Peter Lund Creek, due to the significant CD 32 drainage area outside of Branch 4. At this time, the petitioners are not aware of any willing landowners with which to implement storage on the landscape.

Table 2 – Peak Flow at CD 32 Br 4 Tile Outlet and CD 32 Open Channel Outlet to Peter Lund Creek (cfs)

Location	Scenario	2-year	5-year	10-year	25-year	50-year	100-year
Br 4 Tile Outlet Combined Flow	Existing	49	71	93	161	232	311
	Proposed	62	84	106	163	232	310
	Proposed with Storage	56	79	101	138	169	204
CD 32 Open Channel Outlet to Peter Lund Creek	Existing	159	302	462	744	997	1231
	Proposed	167	308	471	758	1021	1270
	Proposed with Storage	165	304	466	754	1017	1267

Table 3 – Peak Water Level at CD 32 Br 4 Tile Outlet and CD 32 Open Channel Outlet to Peter Lund Creek (feet)[1]

Location	Scenario	2-year	5-year	10-year	25-year	50-year	100-year
CD 32 at Confluence with Br 4 Tile Outlet	Existing	1226.1	1227.2	1228.2	1229.7	1231.0	1232.1
	Proposed	1226.1	1227.2	1228.2	1229.6	1230.7	1231.6
	Proposed with Storage	1226.1	1227.2	1228.2	1229.6	1230.7	1231.6
CD 32 Open Channel Outlet to Peter Lund Creek	Existing	1211.0	1211.2	1211.4	1211.7	1212.0	1212.2
	Proposed	1211.0	1211.2	1211.4	1211.8	1212.0	1212.2
	Proposed with Storage	1211.0	1211.2	1211.4	1211.8	1212.0	1212.2

[1] All elevations provide herein are based on NAVD 88 datum.

Table 4 – Velocity at CD 32 confluence with Br 4 Tile Outlet and CD 32 Open Channel Outlet to Peter Lund Creek (fps)

Location	Scenario	2-year	5-year	10-year	25-year	50-year	100-year
CD 32 at Confluence with Br 4 Tile Outlet	Existing	3.0	3.49	3.76	3.96	4.0	4.03
	Proposed	3.0	3.45	3.76	4.10	4.27	4.41
	Proposed with Storage	2.99	3.44	3.75	4.09	4.27	4.40
CD 32 Open Channel Outlet to Peter Lund Creek	Existing	2.02	2.46	2.46	2.57	2.86	3.08
	Proposed	2.07	2.46	2.46	2.59	2.88	3.12
	Proposed with Storage	2.06	2.46	2.46	2.59	2.88	3.11

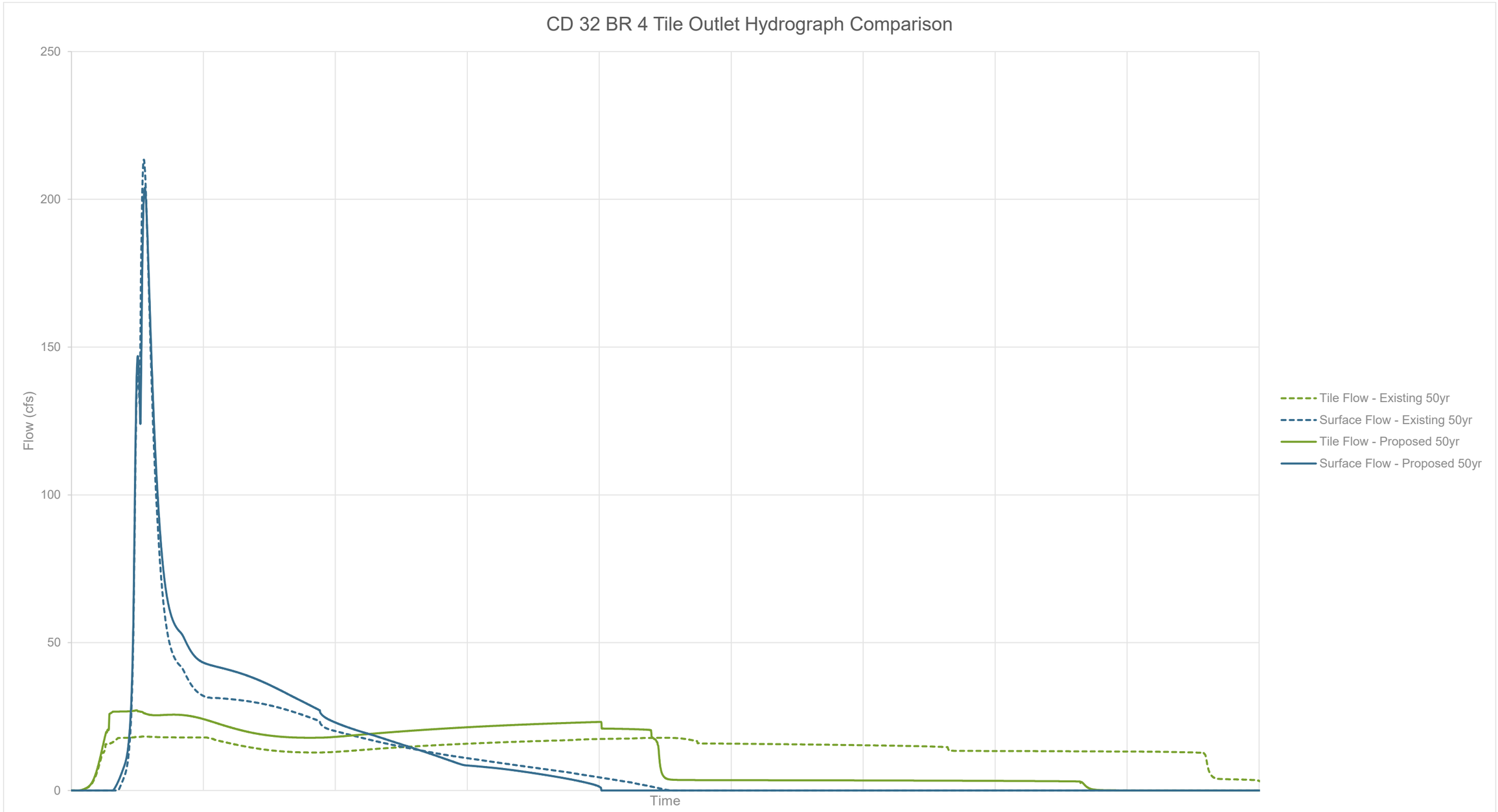


Figure 1 – Separated Tile and Surface Flow at the Outlet of the Tile System

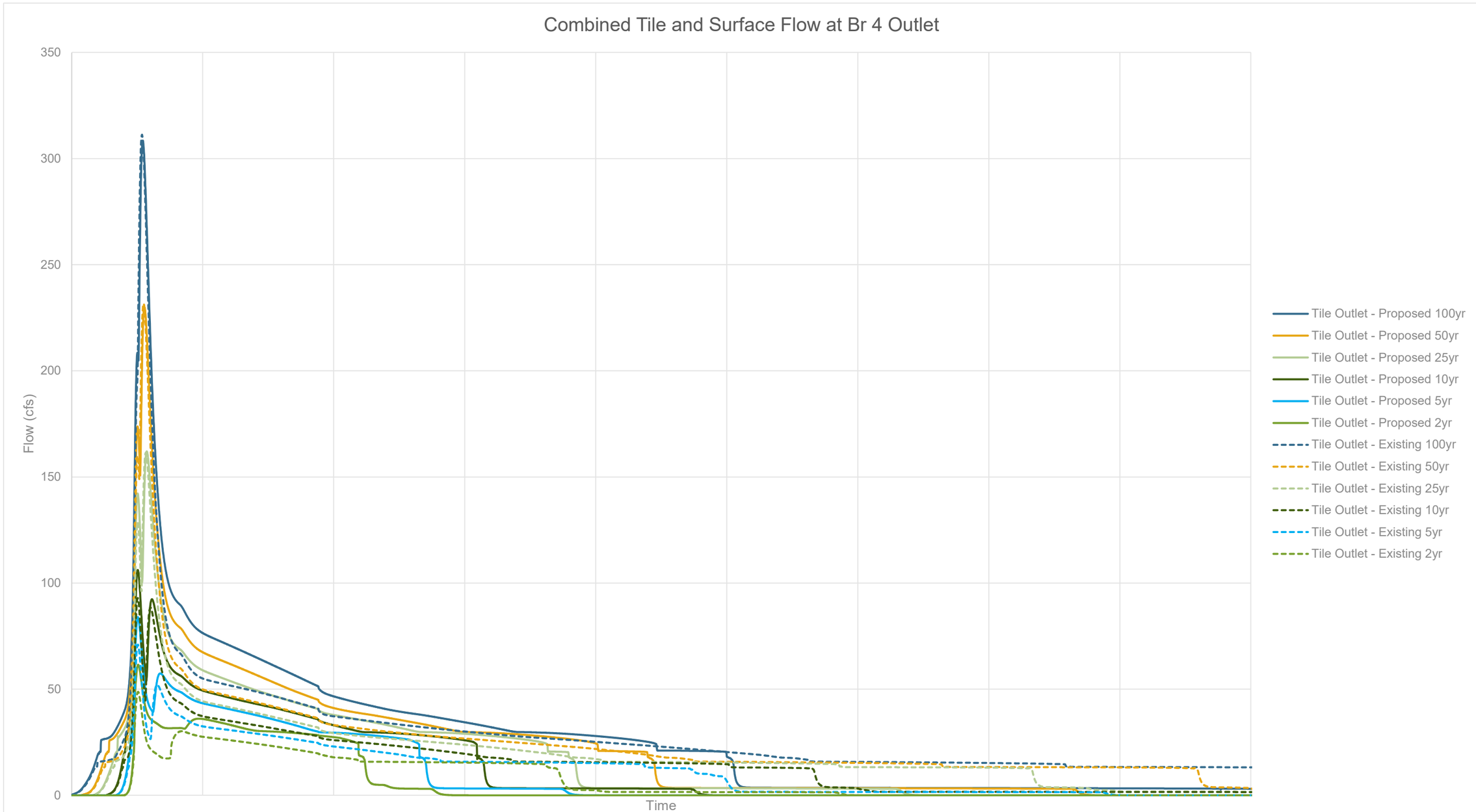


Figure 2. Combined Tile and Surface Flow at Tile System Outlet

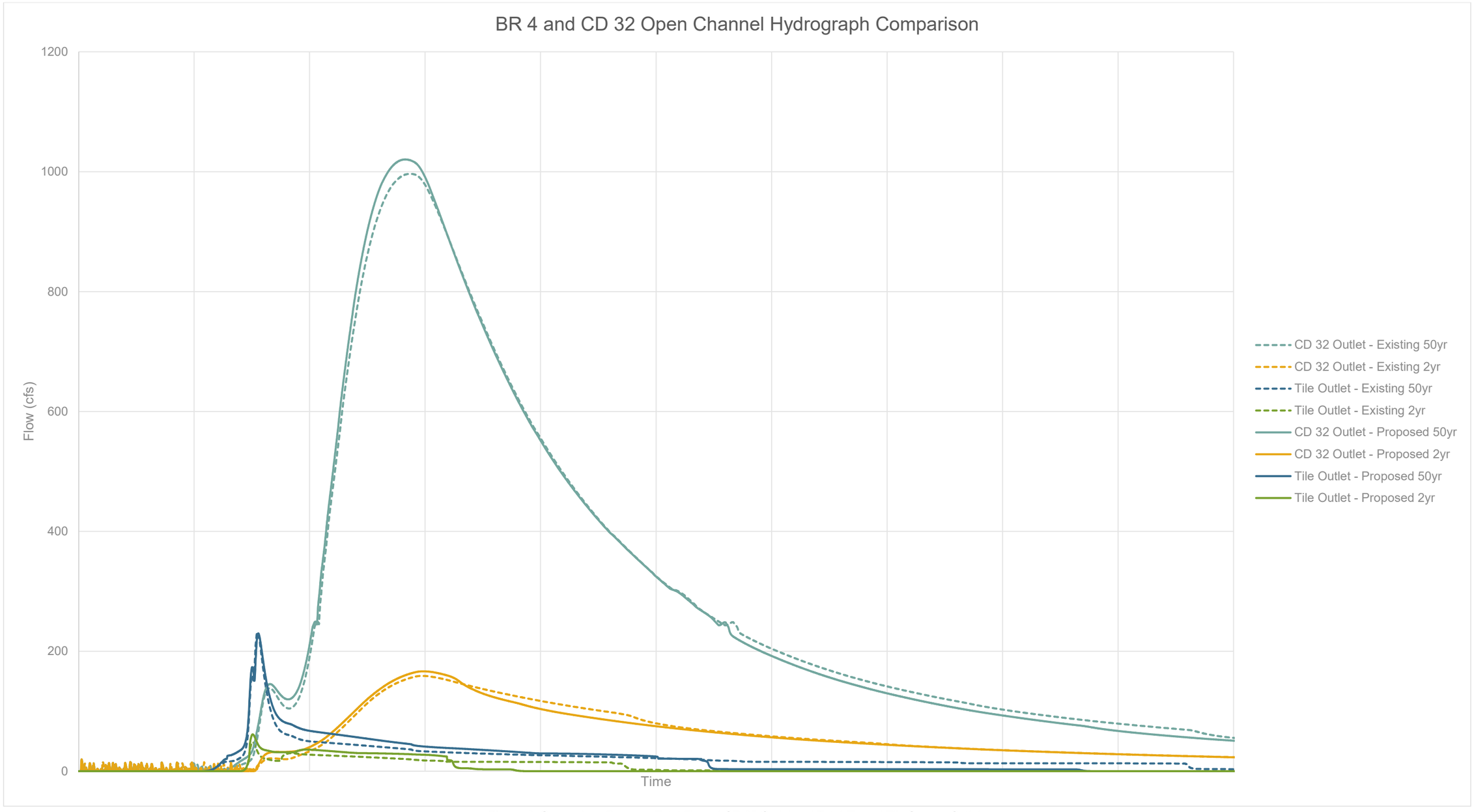


Figure 3. Comparison Between Total Flow at CD 32 Outlet and Total Flow at Tile System Outlet

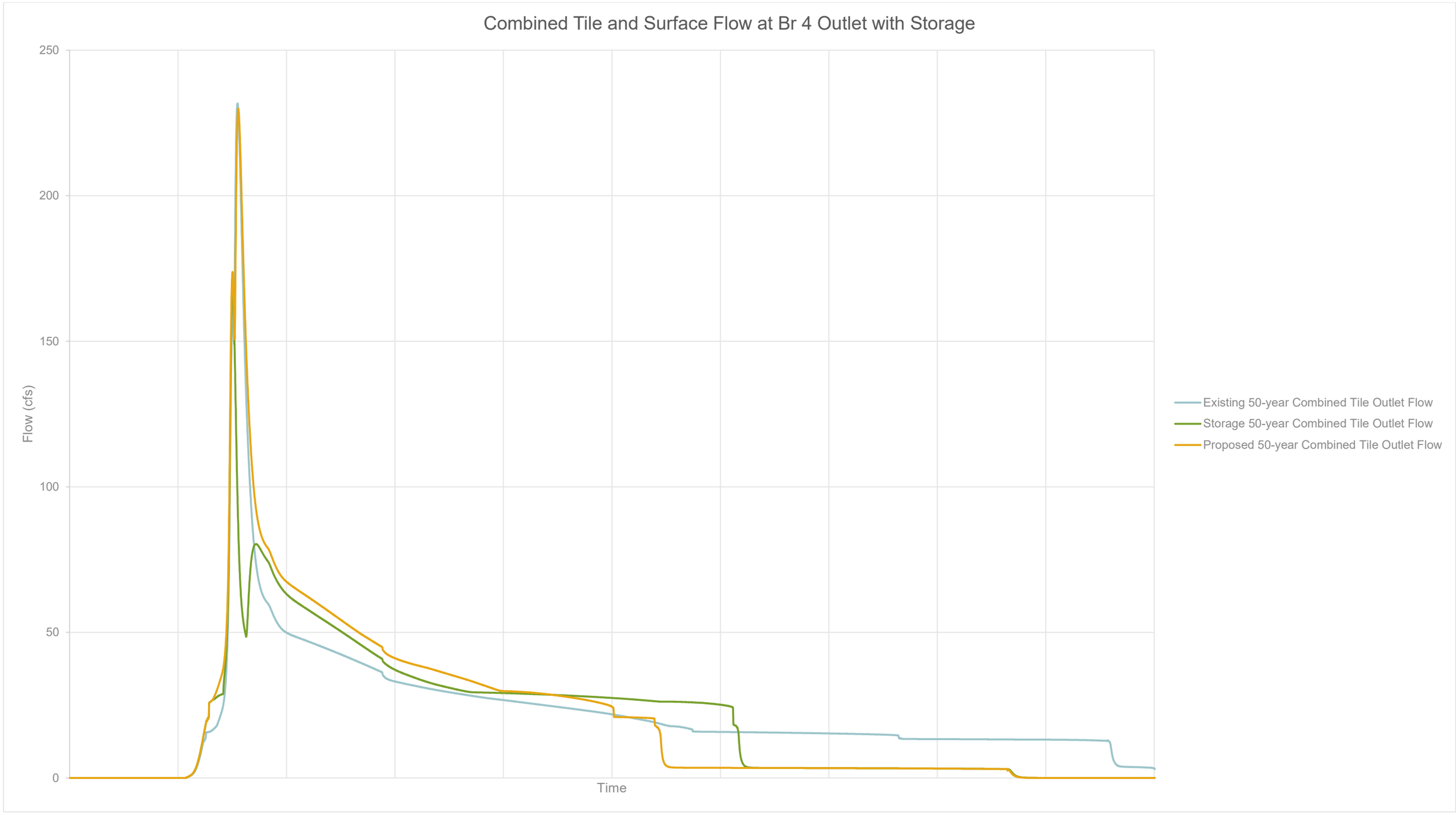


Figure 4. Combined Tile and Overland Flow at Tile Outlet, Including Storage Concept

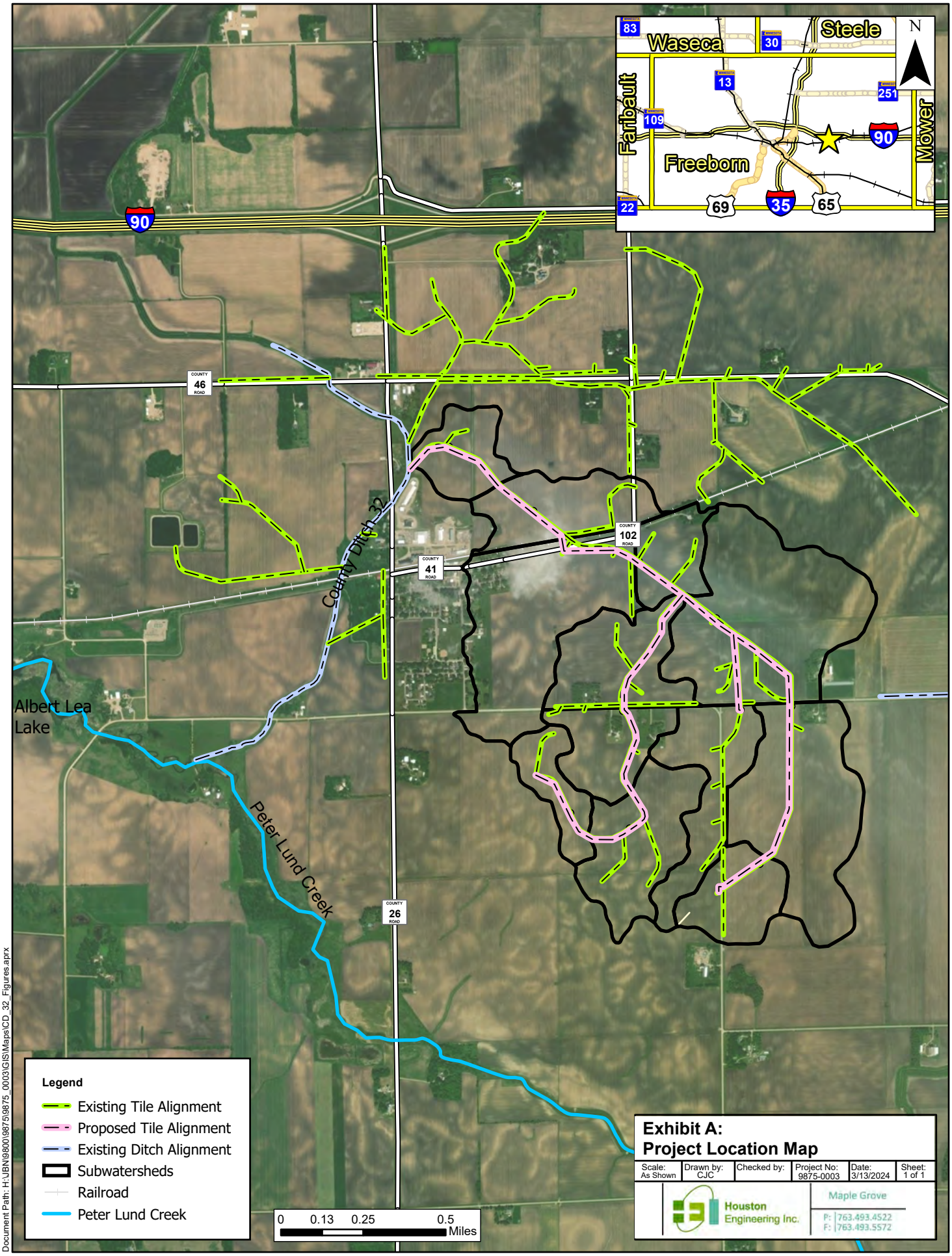


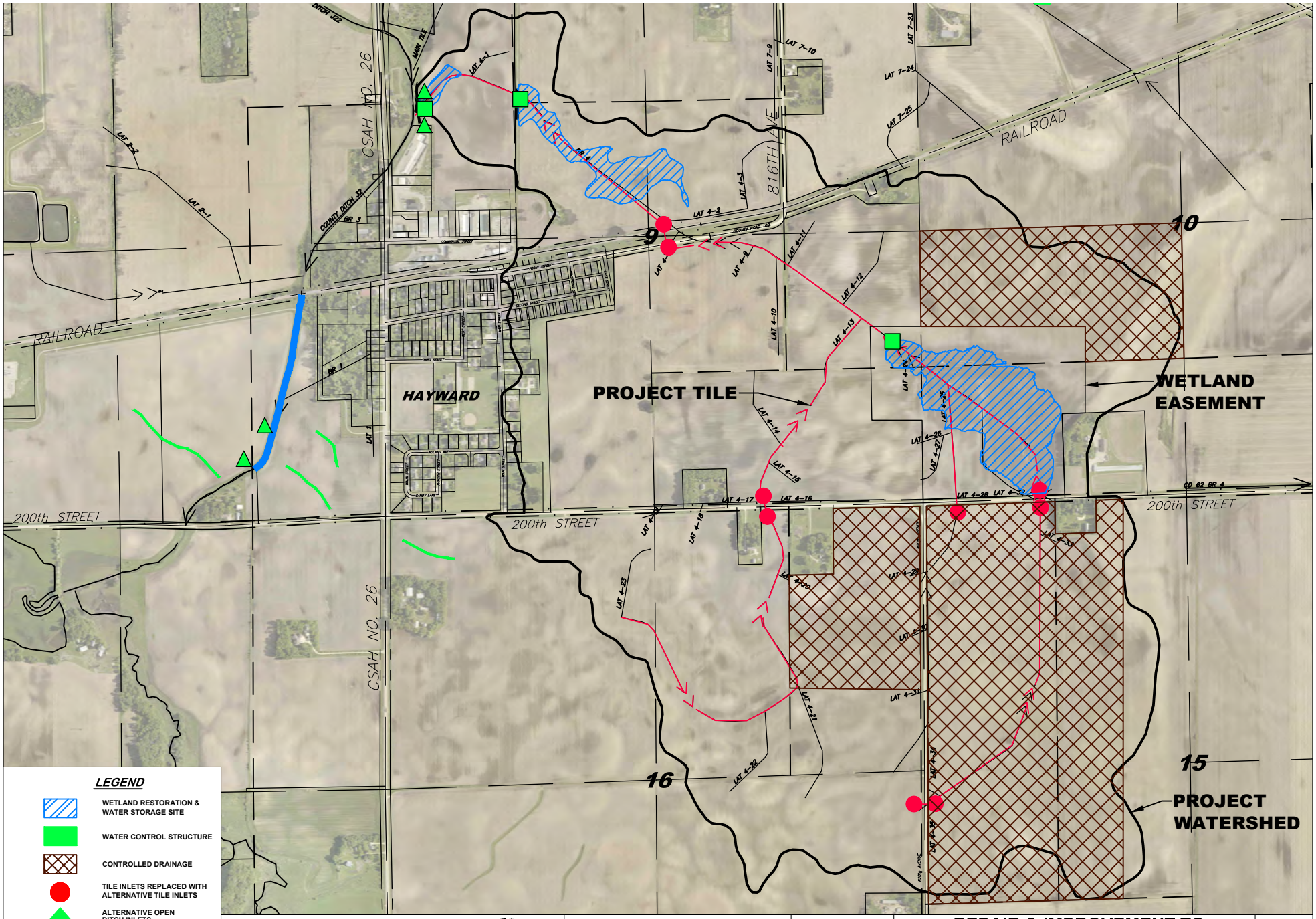
Exhibit A:
Project Location Map

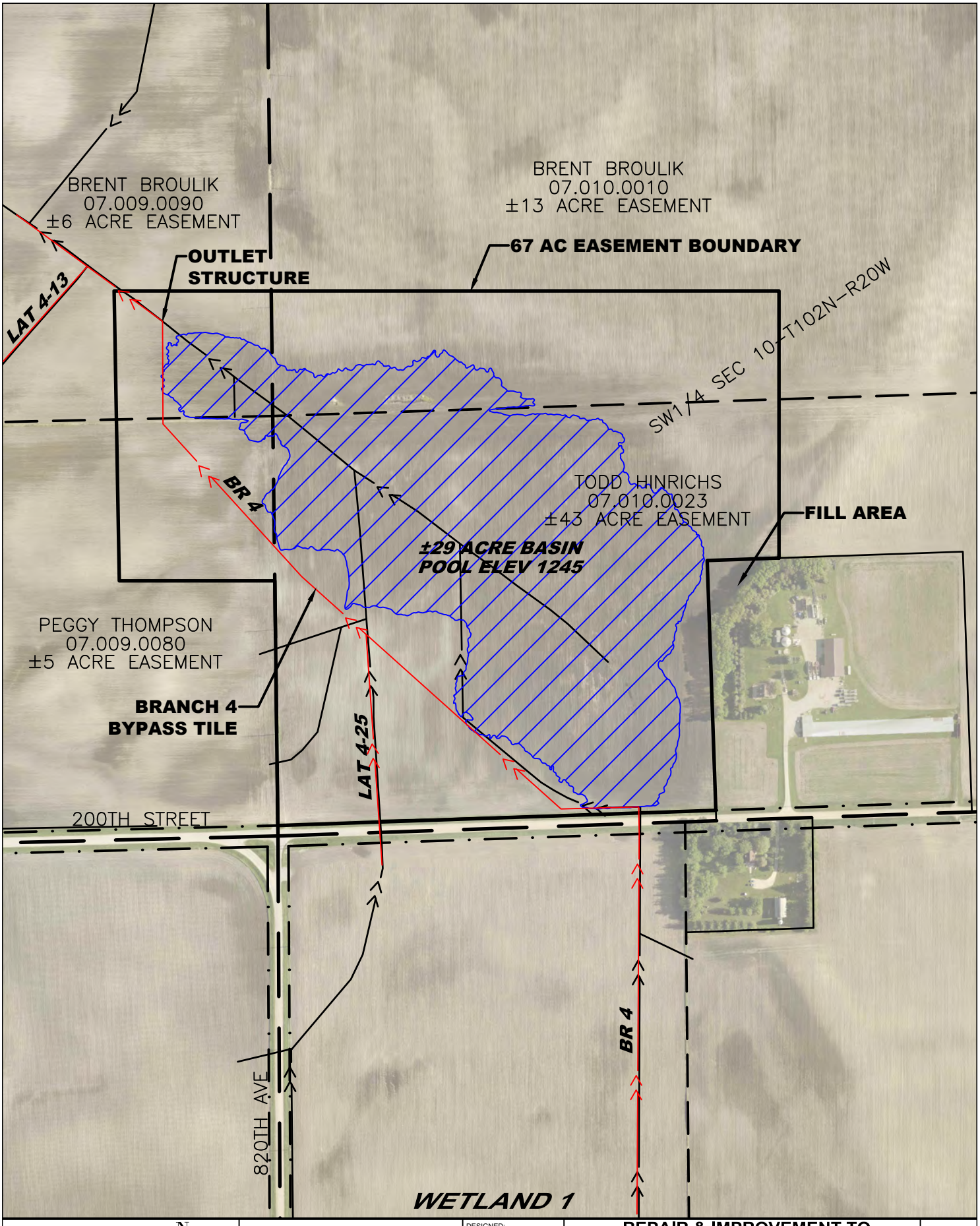
Scale:	Drawn by:	Checked by:	Project No:	Date:	Sheet:
As Shown	CJC		9875-0003	3/13/2024	1 of 1

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

Document Path: H:\JBN\9800\9875\9875_0003\GIS\Maps\CD_32_Figures.aprx

APPENDIX 4:
POTENTIAL CONSERVATION PRACTICES


HAYWARD
PROJECT TILE
WETLAND EASEMENT
PROJECT WATERSHED
RAILROAD
200th STREET
CSAH NO. 26
816TH AVE
COUNTY ROAD 102
COUNTY DITCH 32
9
10
15
16
LEGEND
WETLAND RESTORATION & WATER STORAGE SITE
WATER CONTROL STRUCTURE
CONTROLLED DRAINAGE
TILE INLETS REPLACED WITH ALTERNATIVE TILE INLETS
ALTERNATIVE OPEN DITCH INLETS
TWO-STAGE DITCH & IN-CHANNEL SEDIMENT BASIN
GRASSED WATERWAY
NOT TO SCALE
N
JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave, Albert Lea, MN 56007
507-373-4876
415 West North Street Owatonna, MN 55060
507-451-4598
DESIGNED:
DRAWN: SJP
CHECKED:
DATE: 9-9-24
FILE NO: 17-426.DWG
REPAIR & IMPROVEMENT TO FREEBORN COUNTY DITCH NO. 32 POTENTIAL CONSERVATION PRACTICES MAP
MAP 1



NOT TO SCALE

N

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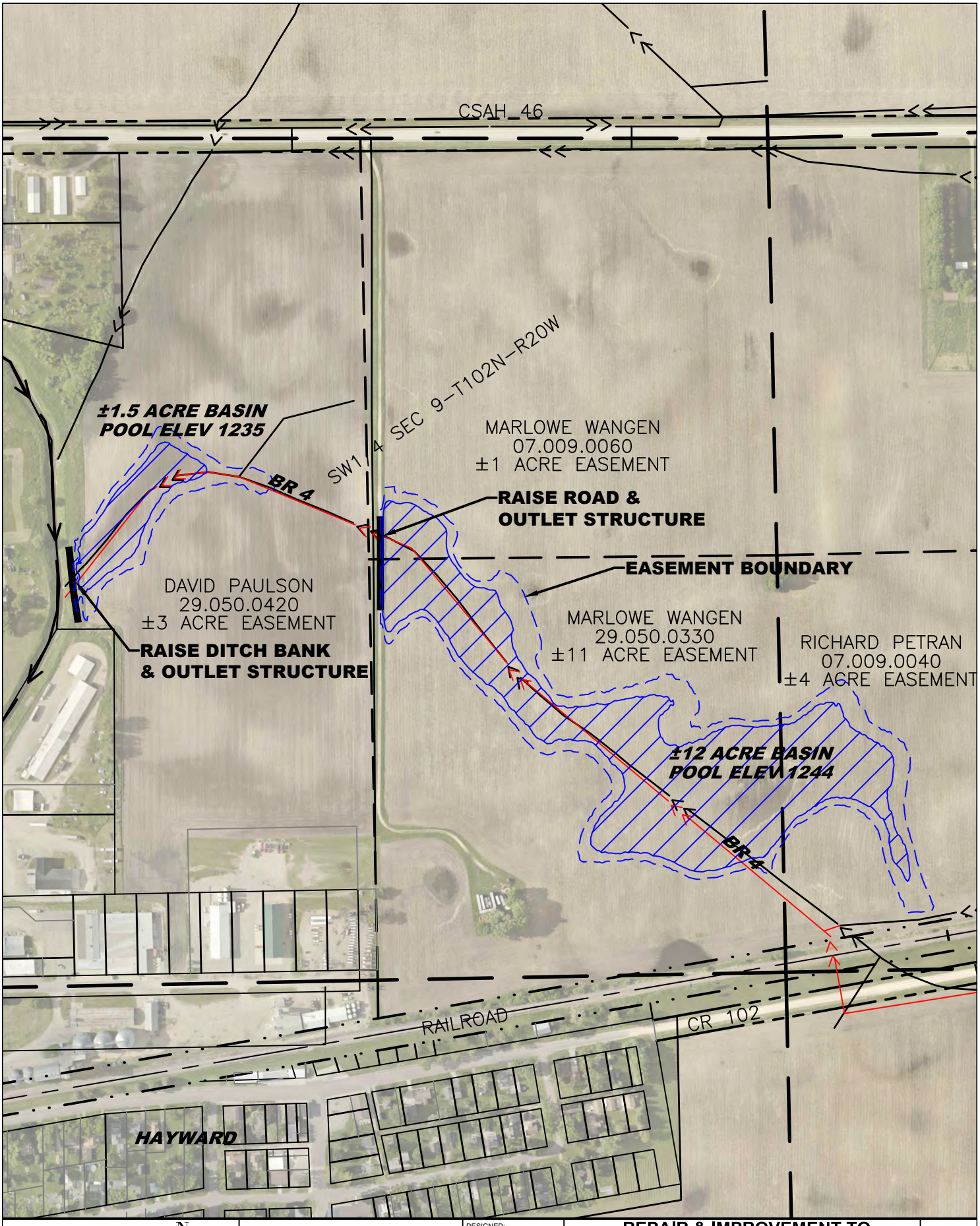
Albert Lea, MN 56007
507-373-4876
415 West North Street
Owatonna, MN 55060
507-451-4598

DESIGNED:	
DRAWN:	SJP
CHECKED:	
DATE:	9-5-24
FILE NO:	17-426.DWG

REPAIR & IMPROVEMENT TO FREEBORN COUNTY DITCH NO. 32 POTENTIAL WETLAND RESTORATION SITE

MAP 2



NOT TO SCALE

N

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507-451-4598

DESIGNED:	
DRAWN:	SJP
CHECKED:	
DATE:	9-5-24
FILE NO:	17-426.DWG

REPAIR & IMPROVEMENT TO FREEBORN COUNTY DITCH NO. 32 TEMPORARY WATER HOLDING AREA

MAP 3

APPENDIX 5:
TELEVISING REPORT

Empire Pipe Services
415 Truman Street, North Mankato, MN
Tel. 507-388-2895
swenner@empire-pipe.com

Table of Contents

Project		
FREEBORN CD 32 BR 4 INSPEC. 11-15-17		**11/15/2017**

Empire Pipe Services
415 Truman Street, North Mankato, MN
Tel. 507-388-2895
swenner@empire-pipe.com

Legend of Classification (Section)

Project	
FREEBORN CD 32 BR 4 INSPEC. 11-15-17	**11/15/2017**

1:	Excellent Condition Minor Defects - Failure unlikely in the foreseeable future.
2:	Good Condition Defects that have not begun to deteriorate - Pipe unlikely to fail for at least 20 years.
3:	Fair Condition Moderate defects that will continue to deteriorate - Pipe may fail in 10-20 years.
4:	Poor Condition Severe defects that will become Grade 5 defects within the foreseeable future - Pipe will probably fail in 5-10 years.
5:	Immediate Attention Defects require immediate attention - Pipe has failed or will likely fail within the next 5 years.

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Section Profile

Project	
FREEBORN CD 32 BR 4 INSPEC. 11-15-17	**11/15/2017**

Nr.	Upstream MH	Downstream MH	Date	Street	Media Label	Material	Total Length	Length Surveyed
8	EAP-END 2	EAP-6905	11/20/2017	200TH ST		Concrete Pipe (non-reinforced)	181.00	181.00

1 x Circular 10 = 181.00 Total Length (181.00 Length Surveyed)

Nr.	Upstream MH	Downstream MH	Date	Street	Media Label	Material	Total Length	Length Surveyed
7	EAP-6293	EAP 6905	11/20/2017	20OTH ST		Concrete Pipe (non-reinforced)	512.60	512.60
13	EAP-9000	EAP-END 4	11/22/2017	200TH ST		Concrete Pipe (non-reinforced)	20.00	**19.90**

2 x Circular 12 = 532.60 Total Length (532.50 Length Surveyed)

Nr.	Upstream MH	Downstream MH	Date	Street	Media Label	Material	Total Length	Length Surveyed
9	EAP-7443	EAP-7000	11/20/2017	LAT4-13		Concrete Pipe (non-reinforced)	443.10	443.10
10	EAP-7675	EAP-7443	11/20/2017	LAT-4-13		Concrete Pipe (non-reinforced)	232.10	232.10
11	EAP-7875	EAP-7675	11/22/2017	200TH ST		Concrete Pipe (non-reinforced)	200.00	200.00
12	EAP-7875	EAP-END 3	11/22/2017	200TH ST		Concrete Pipe (non-reinforced)	130.50	130.50
14	EAP-9125	EAP-8000	11/22/2017	200TH ST		Concrete Pipe (non-reinforced)	1,125.30	1,125.30
15	EAP-9443	EAP-9125	11/27/2017	200TH ST		Concrete Pipe (non-reinforced)	318.30	318.30
16	EAP-9898	EAP-9443	11/27/2017	200TH ST		Concrete Pipe (non-reinforced)	455.90	455.90
17	EAP-10616	EAP-9898	11/27/2017	200TH ST		Concrete Pipe (non-reinforced)	716.40	716.40

8 x Circular 14 = 3621.60 Total Length (3621.60 Length Surveyed)

Nr.	Upstream MH	Downstream MH	Date	Street	Media Label	Material	Total Length	Length Surveyed
5	EAP-6031	EAP-5438	11/17/2017	200TH ST		Concrete Pipe (non-reinforced)	593.40	593.40
6	EAP-6031	EAP-END 1	11/17/2017	200TH		Concrete Pipe (non-reinforced)	1,103.00	**1,102.40**

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Section Profile

Project	
FREEBORN CD 32 BR 4 INSPEC. 11-15-17	**11/15/2017**

2 x Circular 20 = 1696.40 Total Length (1695.80 Length Surveyed)

Nr.	Upstream MH	Downstream MH	Date	Street	Media Label	Material	Total Length	Length Surveyed
2	EAP-2261	EAP-1100	11/16/2017	SOUTH OF CSAH 46		Concrete Pipe (non-reinforced)	1,161.80	1,161.80

1 x Circular 24 = 1161.80 Total Length (1161.80 Length Surveyed)

Nr.	Upstream MH	Downstream MH	Date	Street	Media Label	Material	Total Length	Length Surveyed
1	EAP-1100	TILE OUTLET	11/15/2017	EAST OF CSAH 26		Corrugated Metal Pipe	1,100.30	1,100.30
3	EAP-4268	EAP-2261	11/16/2017	SOUTH OF CSAH 46		Concrete Pipe (non-reinforced)	2,007.00	**1,170.00**
3	EAP-4268	EAP-2261	11/16/2017	SOUTH OF CSAH 46		Concrete Pipe (non-reinforced)	2,007.00	**837.00**
3	EAP-4268	EAP-2261	11/16/2017	SOUTH OF CSAH 46		Concrete Pipe (non-reinforced)	2,007.00	2,007.00
4	EAP-5438	EAP-4268	11/16/2017	FRONT ST EAST		Concrete Pipe (non-reinforced)	1,170.40	1,170.40

5 x Circular 30 = 8291.70 Total Length (6284.70 Length Surveyed)

Total: 19 = 15485.10 Total Length (13477.40 Length Surveyed)

Empire Pipe Services
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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/15/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-1100-TILE OUTLET**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1100.3**	**1100.3**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-1100**
Street :	**EAST OF CSAH 26**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**TILE OUTLET**
Location Details :	**EAST OF OPEN DITCH**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**30**	Sewer Category :	**SEC**
Pipe material:	**Corrugated Metal Pipe**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:4640 Distance		Code	Observation	Counter	Photo	Grade
0.00		AMH	Manhole / TILE OUTLET START RUN	00:00:00		
0.00		MWL	Water Level, 20% of cross sectional area	00:00:25		
18.90		MSC	Shape or Size Change, 26inch dim	00:01:13		
18.90		MMC	Material Change, Concrete pipe (non reinforced)	00:01:20		
23.70	S01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:02:24		
62.20		JSL	Joint Separated Large	00:04:52		S2
68.30		TB	Tap Break-In at 12 o'clock, 8inch dim / FIELD TOP INLET & APPROX 6" FIELD INLET	00:05:23		
97.50		MGO	General Observation / DEPTH 7' 7"	00:07:23		
200.40		MGO	General Observation / DEPTH 6FT2IN	00:10:09		
300.50	F01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:12:47		S5
300.60		MGO	General Observation / DEPTH 5FT 9IN	00:12:53		
400.80		MGO	General Observation / DEPTH 5 FT 3IN	00:15:48		
401.50		MGO	General Observation / LOCATER WAS NOT CALIBRATED RIGHT SO WE WILL RESHOOT BEGINING DEPTHS AT END OF VIDEO	00:00:28		
500.40		MGO	General Observation / DEPTH 5FT 1IN	00:18:28		

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/15/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-1100-TILE OUTLET**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1100.3**	**1100.3**

1:4640 Distance		Code	Observation	Counter	Photo	Grade
562.10	S02	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, Start	00:20:24		
600.70		MGO	General Observation / WE ARE RESUMING THE VIDEO	00:00:00		
601.10		MGO	General Observation / DEPTH 5 FT 5IN	00:05:39		
700.00		TB	Tap Break-In at 11 o'clock, 8inch dim, within 8 inch / NORTH EAST INLET	00:08:57		
700.00		MGO	General Observation / DEPTH 5FT 8IN	00:09:17		
800.60		MGO	General Observation / DEPTH 5FT 1IN	00:12:09		
900.80		MGO	General Observation / DEPTH 5FT 3IN	00:15:03		
1000.90		MGO	General Observation / DEPTH 6FT 1IN	00:18:03		
1099.70		MGO	General Observation / WILL PAUSE VIDEO AND VERIFY DEPTHS IN THE FIRST PART OF RUN 300 FT AND DOWN	00:22:33		
1100.30		MGO	General Observation / DEPTH 6FT 5IN	00:21:38		
1100.30	F02	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, Finish	00:21:46		S5
1100.30		AEP	End of Pipe / WE ARE OUT OF CABLE WE OPEN PIPE AT THIS POINT EAP-1100	00:21:56		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5021	0000	817.0	0.0	817.0	5.0	0.0	5.0

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-2261-EAP-1100**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1161.8**	**1161.8**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-2261**
Street :	**SOUTH OF CSAH 46**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-1100**
Location Details :	**EAST OF OPEN DITCH**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**24**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:3599 Distance		Code	Observation	Counter	Photo	Grade
0.00		AEP	End of Pipe / EAP-1100, START RUN	00:00:38		
0.00		MWL	Water Level, 20% of cross sectional area	00:00:49		
5.70	S01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:01:59		
40.30		TBD	Tap Break-In Defective at 1 o'clock, 6inch dim, within 8 inch / SOUTHWEST INLET BROKEN	00:03:40		M3
100.20		MGO	General Observation / DEPTH 7FT 3IN	00:06:00		
108.70		B	Broken from 9 o'clock to 3 o'clock, within 8 inch	00:06:53		S5
120.10		TB	Tap Break-In at 2 o'clock, 6inch dim, within 8 inch / SOUTH INLET DEPTH 6FT 10 IN	00:08:00		
162.90		D	Deformed, 15% changed	00:09:25		S5
170.90	F01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:09:50		S5
171.40	S02	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start / FRACTURES ARE SHOWING SEPERATION	00:09:58		
201.60		MGO	General Observation / DEPTH 6FT 0IN	00:11:19		
229.50		D	Deformed, 15% changed	00:12:26		S5
300.50		MGO	General Observation / DEPTH 6FT 7IN	00:14:04		

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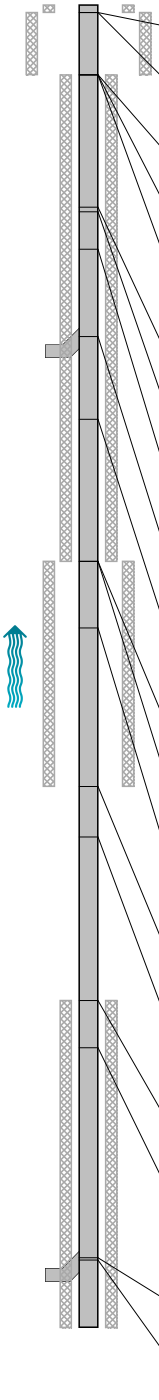
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-2261-EAP-1100**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1161.8**	**1161.8**



1:3599 Distance		Code	Observation	Counter	Photo	Grade
307.60	F02	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish / FRACTURES ARE SHOWING SEPERATION	00:14:20		S5
307.60	S03	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:14:25		
337.20	F03	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:15:05		S5
337.30	S04	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start / SHOWING SEPERATION	00:15:11		
337.30		D	Deformed, 15% changed	00:15:18		S5
400.30		MGO	General Observation / DEPTH 6FT 6IN	00:16:45		
402.50		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:17:24		S5
420.30		MSC	Shape or Size Change, 28inch dim	00:18:39		
461.90		TB	Tap Break-In at 2 o'clock, 6inch dim, within 8 inch / SOUTH INLET DEPTH 6FT 5IN	00:19:43		
501.30		MGO	General Observation / DEPTH 6 FT 8IN	00:20:37		
569.00	F04	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish / SHOWING SEPERATION	00:22:06		S5
569.00	S05	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:22:12		
600.70		MGO	General Observation / DEPTH 7FT 2IN	00:23:07		
676.20	F05	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:24:49		S5
700.20		MGO	General Observation / DEPTH 7FT 9IN	00:25:21		
778.10	S06	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:27:11		
800.60		MGO	General Observation / DEPTH 7 FT 6IN	00:27:48		
900.60		MGO	General Observation / DEPTH 7FT 11IN	00:30:12		
901.70		TB	Tap Break-In at 2 o'clock, 6inch dim, within 8 inch / SOUTH INLET	00:30:44		

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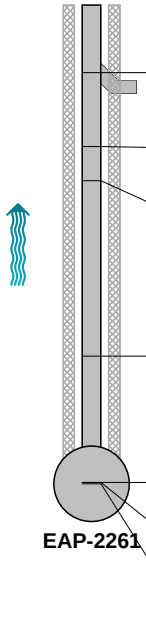
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-2261-EAP-1100**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1161.8**	**1161.8**



Distance		Code	Observation	Counter	Photo	Grade
966.00		TB	Tap Break-In at 10 o'clock, 6inch dim, within 8 inch / DEPTH 7 FT 1IN	00:32:37		
1001.20		MGO	General Observation / DEPTH 7FT 4IN	00:33:40		
1017.50		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:34:15		S5
1101.00		MGO	General Observation / DEPTH 7 FT 4 IN	00:36:40		
1161.20		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:38:35		S5
1161.20	F06	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:39:43		S5
1161.80		AEP	End of Pipe / WE ARE OUT OF CABLE WILL DIG UP AT THIS POINT EAP-2261, END RUN	00:40:08		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5000	3100	1085.0	3.0	1088.0	5.0	3.0	5.0

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Section Pictures - 11/16/2017 - EAP-2261-EAP-1100

City	Street	Date	Pipe Segment Reference	Nr.
HAYWARD TWP	**SOUTH OF CSAH 46**	**11/16/2017**	**EAP-2261-EAP-1100**	**2**

EAP-_-EAP-1100_0bb8e445-7a35-4e44-997b-63ac3dd3131b_20171116_121051_407.jpg, 00:06:53, 108.70
Broken from 9 o'clock to 3 o'clock, within 8 inch

EAP-_-EAP-1100_fa14c345-be12-455d-9cb3-916d54ecf6cb_20171116_122656_887.jpg, 00:17:24, 402.50
Broken from 12 o'clock to 12 o'clock, within 8 inch

EAP-_-EAP-1100_653228b4-8fec-41af-96e6-69157d875f2d_20171116_125237_840.jpg, 00:34:15, 1017.50
Broken from 12 o'clock to 12 o'clock, within 8 inch

EAP-_-EAP-1100_e2ff947f-0aec-43c7-b5af-45fd0bdf3e21_20171116_125248_243.jpg, 00:34:15, 1017.50
Broken from 12 o'clock to 12 o'clock, within 8 inch

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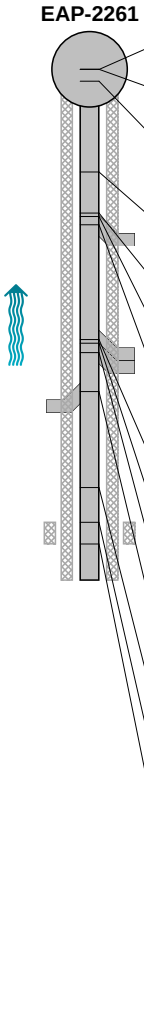
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-4268-EAP-2261**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**2007.0**	**1170.0**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-4268**
Street :	**SOUTH OF CSAH 46**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-2261**
Location Details :	**NORTH EAST OF TOWN**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**30**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :



1:5533 Distance		Code	Observation	Counter	Photo	Grade
0.00		AEP	End of Pipe / EAP-2261, START RUN	00:00:17		
0.00		MWL	Water Level, 20% of cross sectional area	00:00:24		
8.70	S01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:01:43		
75.20		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:03:27		S5
105.30		MGO	General Observation / DEPTH 5FT 4"	00:04:27		
107.80		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:04:45		S5
113.90		TB	Tap Break-In at 10 o'clock, 6inch dim / NORTH INLET DEPTH 5FT 8IN	00:05:03		
197.90		TB	Tap Break-In at 9 o'clock, 6inch dim, within 8 inch / NORTH INLET	00:07:01		
200.60		MGO	General Observation / DEPTH 4FT 10 IN	00:07:33		
207.50		TB	Tap Break-In at 10 o'clock, 6inch dim, within 8 inch / NORTH INLET	00:08:04		
236.00		TB	Tap Break-In at 2 o'clock, 8inch dim / SOUTH INLET	00:09:26		
306.20		MGO	General Observation / DEPTH 4FT 7IN	00:12:20		
331.70	S02	DSGV	Deposits Settled Gravel, 10% of cross sectional area from 5 o'clock to 7 o'clock, within 8 inch, Start	00:13:21		
347.60	F02	DSGV	Deposits Settled Gravel, 10% of cross sectional area from 5 o'clock to 7 o'clock, within 8 inch, Finish	00:13:53		M2

Empire Pipe Services
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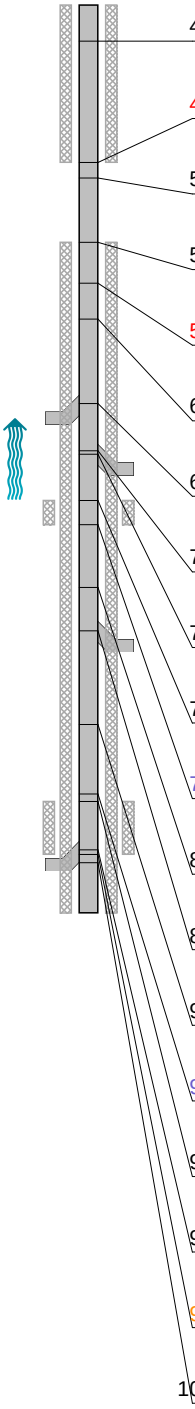
swenner@empire-pipe.com

Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-4268-EAP-2261**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**2007.0**	**1170.0**



1:5533 Distance		Code	Observation	Counter	Photo	Grade
400.50		MGO	General Observation / DEPTH 5FT 4 IN	00:15:11		
489.30	F01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:18:13		S5
500.70		MGO	General Observation / DEPTH 7FT 4IN	00:19:47		
547.70	S03	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, Start	00:21:53		
577.70		D	Deformed, 15% changed	00:22:33		S5
604.00		MGO	General Observation / DEPTH 8FT 0 IN	00:23:10		
665.80		TB	Tap Break-In at 2 o'clock, 6inch dim, within 8 inch / SOUTH INLET	00:24:39		
700.30		MGO	General Observation / DEPTH 6FT 8IN	00:25:40		
702.90		TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch / NORTH INLET	00:26:00		
736.70	S04	DSGV	Deposits Settled Gravel, 10% of cross sectional area from 5 o'clock to 7 o'clock, within 8 inch, Start	00:27:08		
754.50	F04	DSGV	Deposits Settled Gravel, 10% of cross sectional area from 5 o'clock to 7 o'clock, within 8 inch, Finish	00:27:59		M2
800.40		MGO	General Observation / DEPTH 6FT 11IN	00:29:10		
832.20		TB	Tap Break-In at 10 o'clock, 10inch dim, within 8 inch / NORTH INLET	00:30:05		
900.70		MGO	General Observation / DEPTH 8FT 8IN	00:32:19		
951.70		JOL	Joint Offset Large, 2Inch	00:34:18		S2
957.10	S05	DSGV	Deposits Settled Gravel, 20% of cross sectional area from 4 o'clock to 8 o'clock, Start	00:35:07		
992.50		TB	Tap Break-In at 3 o'clock, 8inch dim, within 8 inch / SOUTH INLET	00:39:06		
995.90	F05	DSGV	Deposits Settled Gravel, 20% of cross sectional area from 4 o'clock to 8 o'clock, Finish	00:39:29		M3
1001.90		MGO	General Observation / DEPTH 8FT 2IN	00:39:58		

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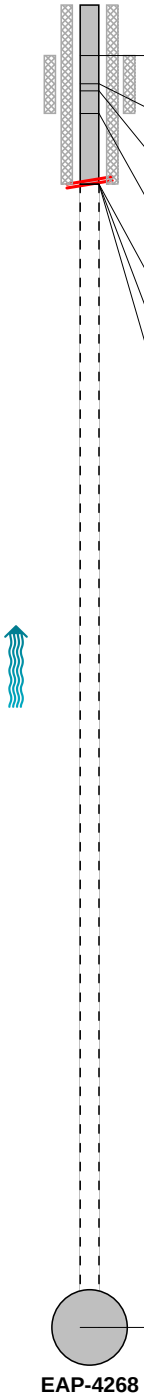
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-4268-EAP-2261**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**2007.0**	**1170.0**



Distance		Code	Observation	Counter	Photo	Grade
1075.80	S06	B	Broken from 12 o'clock to 12 o'clock, within 8 inch, Start	00:42:57		
1096.50		D	Deformed, 30% changed	00:44:02		S5
1101.60		MGO	General Observation / DEPTH 8FT 3IN	00:44:23		
1118.20	F06	B	Broken from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:45:04		S5
1170.00	F03	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, Finish	00:46:41		S5
1170.00		MGO	General Observation / DEPTH 9FT 8IN	00:46:51		
1170.00		MSA	Survey Abandoned / WE ARE OUT OF CABLE WILL SET UP IN UPSTREAM EXCAVATED HOLE	00:47:15		
2007.00			End of pipe			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5021	3827	1162.0	38.0	1200.0	5.0	2.5	4.8

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Section Pictures - 11/16/2017 - EAP-4268-EAP-2261

City	Street	Date	Pipe Segment Reference	Nr.
HAYWARD TWP	**SOUTH OF CSAH 46**	**11/16/2017**	**EAP-4268-EAP-2261**	**3**

EAP-_-EAP-2261_1b7570a4-12c8-4be5-8955-b5fe9338d657_20171116_141635_581.jpg, 00:03:27, 75.20
Broken from 12 o'clock to 12 o'clock, within 8 inch

EAP-_-EAP-2261_953c8752-227a-4835-87fd-03ff7357be81_20171116_141653_804.jpg, 00:03:27, 75.20
Broken from 12 o'clock to 12 o'clock, within 8 inch

EAP-_-EAP-2261_6aa5335f-f9c1-4617-a247-e0769aaa5318_20171116_151157_918.jpg, 00:42:57, 1075.80
Broken from 12 o'clock to 12 o'clock, within 8 inch, Start

EAP-_-EAP-2261_4d1cef50-84bd-4634-a1dc-54e5cb962cb1_20171116_151227_937.jpg, 00:42:57, 1075.80
Broken from 12 o'clock to 12 o'clock, within 8 inch, Start

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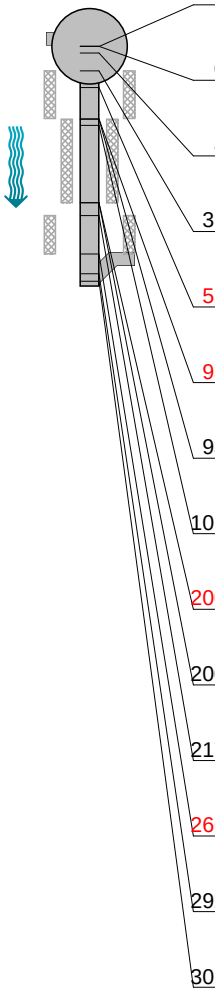
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-4268-EAP-2261**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Downstream**		**2007.0**	**837.0**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-4268**
Street :	**SOUTH OF CSAH 46**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-2261**
Location Details :	**NORTH EAST OF TOWN**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**30**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :



1:9708	Distance		Code	Observation	Counter	Photo	Grade
EAP-4268	0.00		AEP	End of Pipe / EAP-4268, START RUN HEADED TOWARDS EAP-2261 REVERSE INSPECTION	00:00:00		
	0.00		MWL	Water Level, 20% of cross sectional area	00:00:22		
	8.70		TB	Tap Break-In at 2 o'clock, 8inch dim, within 8 inch / NORTH EAST INLET	00:01:11		
	31.60	S01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:02:19		
	53.00		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:02:54		S5
	93.10	F01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:04:07		S5
	93.70	S02	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start / SHOWING SEPERATION	00:04:18		
	101.70		MGO	General Observation / DEPTH 5FT 5IN	00:04:41		
	200.90	F02	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish / SHOWING SEPERATION	00:07:20		S5
	200.90		MGO	General Observation / DEPTH 5FT 4IN	00:07:29		
	217.50	S03	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:07:53		
	266.90	F03	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:09:04		S5
	292.20		TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch / SOUTH WEST INLET	00:09:51		
	301.70		MGO	General Observation / DEPTH 5FT 5IN	00:10:18		

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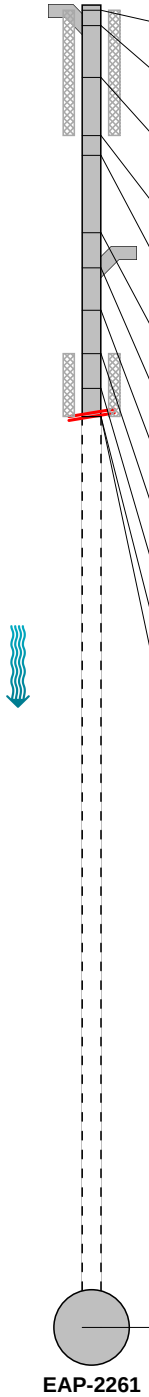
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-4268-EAP-2261**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Downstream**		**2007.0**	**837.0**



1:9708 Distance		Code	Observation	Counter	Photo	Grade
314.80	S04	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:10:45		
334.50		TB	Tap Break-In at 2 o'clock, 10inch dim, within 8 inch / NORTH EAST INLET	00:11:19		
401.30		MGO	General Observation / DEPTH 5FT 6IN	00:12:43		
475.90	F04	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:14:14		S5
501.40		MGO	General Observation / DEPTH 5FT 8IN	00:14:52		
600.60		MGO	General Observation / DEPTH 5FT 4IN	00:17:15		
645.70		TB	Tap Break-In at 10 o'clock, 6inch dim, within 8 inch / SOUTH WEST INLET	00:18:42		
700.40		MGO	General Observation / DEPTH 5FT 4IN	00:20:01		
756.00	S05	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:21:31		
800.70		MGO	General Observation / DEPTH 6FT 2IN	00:23:03		
837.00	F05	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:24:08		S5
837.00		MSA	Survey Abandoned / EAP-2261 THIS IS OUR STOPPING POINT RUN IS COMPLETE	00:24:25		
2007.00			End of pipe			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5U00	0000	460.0	0.0	460.0	5.0	0.0	5.0

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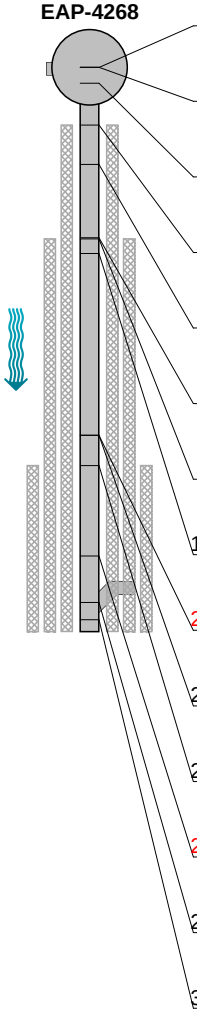
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-4268-EAP-2261**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Downstream**		**2007.0**	**2007.0**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-4268**
Street :	**SOUTH OF CSAH 46**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-2261**
Location Details :	**NORTH EAST OF TOWN**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**30**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :



1:4127 Distance		Code	Observation	Counter	Photo	Grade
0.00		AEP	End of Pipe / EAP-?, START RUN HEADED TOWARDS EAP-2261 REVERSE INSPECTION	00:00:00		
0.00		MWL	Water Level, 20% of cross sectional area	00:00:22		
8.70		TB	Tap Break-In at 2 o'clock, 8inch dim, within 8 inch / NORTH EAST INLET	00:01:11		
31.60	S01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:02:19		
53.00		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:02:54		S5
93.10	F01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:04:07		S5
93.70	S02	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start / SHOWING SEPERATION	00:04:18		
101.70		MGO	General Observation / DEPTH 5FT 5IN	00:04:41		
200.90	F02	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish / SHOWING SEPERATION	00:07:20		S5
200.90		MGO	General Observation / DEPTH 5FT 4IN	00:07:29		
217.50	S03	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:07:53		
266.90	F03	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:09:04		S5
292.20		TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch / SOUTH WEST INLET	00:09:51		
301.70		MGO	General Observation / DEPTH 5FT 5IN	00:10:18		

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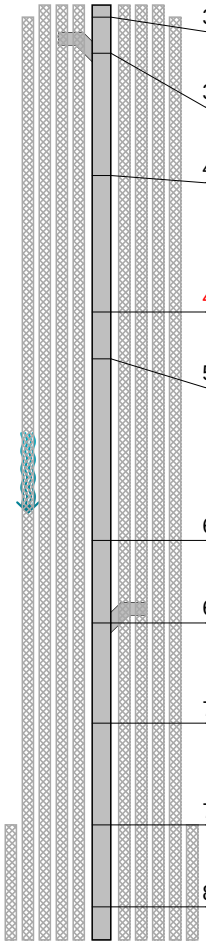
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-4268-EAP-2261**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Downstream**		**2007.0**	**2007.0**



1:4127 Distance		Code	Observation	Counter	Photo	Grade
314.80	S04	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:10:45		
334.50		TB	Tap Break-In at 2 o'clock, 10inch dim, within 8 inch / NORTH EAST INLET	00:11:19		
401.30		MGO	General Observation / DEPTH 5FT 6IN	00:12:43		
475.90	F04	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:14:14		S5
501.40		MGO	General Observation / DEPTH 5FT 8IN	00:14:52		
600.60		MGO	General Observation / DEPTH 5FT 4IN	00:17:15		
645.70		TB	Tap Break-In at 10 o'clock, 6inch dim, within 8 inch / SOUTH WEST INLET	00:18:42		
700.40		MGO	General Observation / DEPTH 5FT 4IN	00:20:01		
756.00	S05	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:21:31		
800.70		MGO	General Observation / DEPTH 6FT 2IN	00:23:03		

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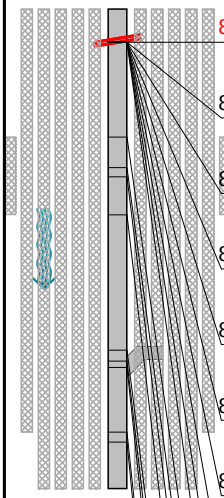
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-4268-EAP-2261**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Downstream**		**2007.0**	**2007.0**



1:4127 Distance		Code	Observation	Counter	Photo	Grade
837.00	F05	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:24:08		S5
837.00		MSA	Survey Abandoned / THIS IS OUR STOPPING POINT RUN IS COMPLETE	00:24:25		
837.00		C	Remark: ***** Combined *****			
837.00		C	Remark: Inspection from the other side			
837.00		C	Remark: Uninspected Length: 0.0			
837.00		C	Remark: Inspection from the other side			
837.00		C	Remark: ***** Combined *****			
837.00	F03	CH4	Crack Longitudinal Hinge, 4, from 12 to 12 o'clock, F03	00:46:41		S5
837.00		MGO	General Observation / DEPTH 9FT 8IN	00:46:51		
837.00		MSA	Survey Abandoned / WE ARE OUT OF CABLE WILL SET UP IN UPSTREAM EXCAVATED HOLE	00:47:15		
888.80	F06	B	Broken, from 12 to 12 o'clock, within 8 inch, F06	00:45:04		S5
905.40		MGO	General Observation / DEPTH 8FT 3IN	00:44:23		
910.50		D	Deformed	00:44:02		S5
931.20	S06	B	Broken, from 12 to 12 o'clock, within 8 inch, S06	00:42:57		
1005.10		MGO	General Observation / DEPTH 8FT 2IN	00:39:58		
1011.10	F05	DSGV	Deposits Settled Gravel, from 04 to 08 o'clock, F05	00:39:29		M3
1014.50		TB	Tap Break-In, at 09 o'clock, 8 inch dim, within 8 inch / SOUTH INLET	00:39:06		
1049.90	S05	DSGV	Deposits Settled Gravel, from 04 to 08 o'clock, S05	00:35:07		
1055.30		JOL	Joint Offset Large, 2.000 Inch	00:34:18		S2

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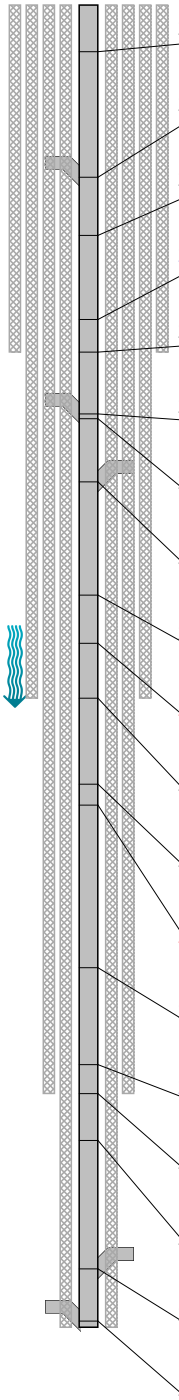
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-4268-EAP-2261**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Downstream**		**2007.0**	**2007.0**



1:4127 Distance		Code	Observation	Counter	Photo	Grade
1106.30		MGO	General Observation / DEPTH 8FT 8IN	00:32:19		
1174.80		TB	Tap Break-In, at 02 o'clock, 10 inch dim, within 8 inch / NORTH INLET	00:30:05		
1206.60		MGO	General Observation / DEPTH 6FT 11IN	00:29:10		
1252.50	F04	DSGV	Deposits Settled Gravel, from 05 to 07 o'clock, within 8 inch, F04	00:27:59		M2
1270.30	S04	DSGV	Deposits Settled Gravel, from 05 to 07 o'clock, within 8 inch, S04	00:27:08		
1304.10		TB	Tap Break-In, at 02 o'clock, 8 inch dim, within 8 inch / NORTH INLET	00:26:00		
1306.70		MGO	General Observation / DEPTH 6FT 8IN	00:25:40		
1341.20		TB	Tap Break-In, at 10 o'clock, 6 inch dim, within 8 inch / SOUTH INLET	00:24:39		
1403.00		MGO	General Observation / DEPTH 8FT 0 IN	00:23:10		
1429.30		D	Deformed	00:22:33		S5
1459.30	S03	CH4	Crack Longitudinal Hinge, 4, from 12 to 12 o'clock, S03	00:21:53		
1506.30		MGO	General Observation / DEPTH 7FT 4IN	00:19:47		
1517.70	F01	CH4	Crack Longitudinal Hinge, 4, from 12 to 12 o'clock, within 8 inch, F01	00:18:13		S5
1606.50		MGO	General Observation / DEPTH 5FT 4 IN	00:15:11		
1659.40	F02	DSGV	Deposits Settled Gravel, from 05 to 07 o'clock, within 8 inch, F02	00:13:53		M2
1675.30	S02	DSGV	Deposits Settled Gravel, from 05 to 07 o'clock, within 8 inch, S02	00:13:21		
1700.80		MGO	General Observation / DEPTH 4FT 7IN	00:12:20		
1771.00		TB	Tap Break-In, at 10 o'clock, 8 inch dim / SOUTH INLET	00:09:26		
1799.50		TB	Tap Break-In, at 02 o'clock, 6 inch dim, within 8 inch / NORTH INLET	00:08:04		

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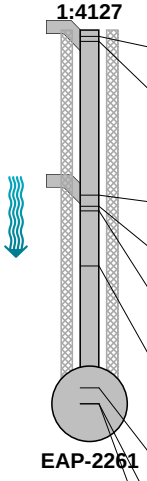
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-4268-EAP-2261**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Downstream**		**2007.0**	**2007.0**



1:4127 Distance		Code	Observation	Counter	Photo	Grade
1806.40		MGO	General Observation / DEPTH 4FT 10 IN	00:07:33		
1809.10		TB	Tap Break-In, at 03 o'clock, 6 inch dim, within 8 inch / NORTH INLET	00:07:01		
1893.10		TB	Tap Break-In, at 02 o'clock, 6 inch dim / NORTH INLET DEPTH 5FT 8IN	00:05:03		
1899.20		B	Broken, from 12 to 12 o'clock, within 8 inch	00:04:45		S5
1901.70		MGO	General Observation / DEPTH 5FT 4"	00:04:27		
1931.80		B	Broken, from 12 to 12 o'clock, within 8 inch	00:03:27		S5
1998.30	S01	CH4	Crack Longitudinal Hinge, 4, from 12 to 12 o'clock, within 8 inch, S01	00:01:43		
2007.00		AEP	End of Pipe / EAP-2261, START RUN	00:00:17		
2007.00		MWL	Water Level	00:00:24		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI

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Section Pictures - 11/16/2017 - EAP-4268-EAP-2261

City	Street	Date	Pipe Segment Reference	Nr.
HAYWARD TWP	**SOUTH OF CSAH 46**	**11/16/2017**	**EAP-4268-EAP-2261**	**3**

EAP-_-EAP-2261_6aa5335f-f9c1-4617-a247-e0769aaa5318_20171116_151157_918.jpg, 00:42:57, 931.20
Broken, from 12 to 12 o'clock, within 8 inch, S06

EAP-_-EAP-2261_4d1cef50-84bd-4634-a1dc-54e5cb962cb1_20171116_151227_937.jpg, 00:42:57, 931.20
Broken, from 12 to 12 o'clock, within 8 inch, S06

EAP-_-EAP-2261_1b7570a4-12c8-4be5-8955-b5fe9338d657_20171116_141635_581.jpg, 00:03:27, 1931.80
Broken, from 12 to 12 o'clock, within 8 inch

EAP-_-EAP-2261_953c8752-227a-4835-87fd-03ff7357be81_20171116_141653_804.jpg, 00:03:27, 1931.80
Broken, from 12 to 12 o'clock, within 8 inch

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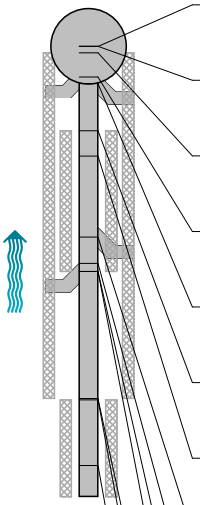
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-5438-EAP-4268**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1170.4**	**1170.4**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-5438**
Street :	**FRONT ST EAST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-4268**
Location Details :	**SOUTH OF FRONT ST EAS**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**30**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :



1:3628 Distance		Code	Observation	Counter	Photo	Grade
0.00		AEP	End of Pipe / EAP-4268, START RUN HEADED SOUTH EAST	00:00:20		
0.00		MWL	Water Level, 20% of cross sectional area	00:00:26		
3.10	S01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:01:01		
14.70		TB	Tap Break-In at 2 o'clock, 6inch dim, within 8 inch / SOUTH WEST INLET	00:01:24		
17.90		TB	Tap Break-In at 11 o'clock, 8inch dim, within 8 inch / NORTH EAST INLET	00:01:43		
40.50	S02	B	Broken from 12 o'clock to 12 o'clock, within 8 inch, Start / NEAR COLLAPSE	00:02:29		
52.70		D	Deformed, 35% changed	00:03:44		S5
91.60		TB	Tap Break-In at 10 o'clock, 6inch dim, within 8 inch / NORTH EAST INLET	00:04:50		
104.20		MGO	General Observation / DEPTH 6FT 10 IN	00:05:30		
108.10		TB	Tap Break-In at 2 o'clock, 8inch dim, within 8 inch / SOUTHWEST INLET	00:05:56		
108.10	F02	B	Broken from 12 o'clock to 12 o'clock, within 8 inch, Finish / NEAR COLLAPSE	00:06:05		S5
169.10	F01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:07:15		S5
169.70	S03	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start / SHOWING SEPERATION	00:07:23		
201.30		MGO	General Observation / DEPTH 7' 2"	00:08:05		

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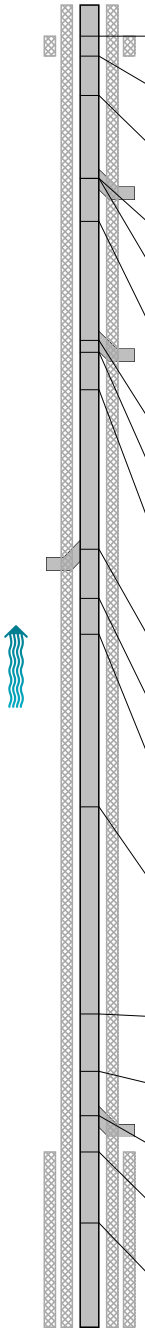
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-5438-EAP-4268**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1170.4**	**1170.4**



1:3628 Distance		Code	Observation	Counter	Photo	Grade
231.10	S04	B	Broken from 12 o'clock to 12 o'clock, within 8 inch, Start	00:08:51		
240.70	F04	B	Broken from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:09:09		S5
259.60		D	Deformed, 30% changed	00:09:45		S5
299.40		TB	Tap Break-In at 10 o'clock, 6inch dim, within 8 inch / NORTH INLET	00:11:00		
299.40		MGO	General Observation / DEPTH 7FT 10IN	00:11:12		
320.00		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:11:47		S5
377.20		TB	Tap Break-In at 10 o'clock, 6inch dim, within 8 inch / NORTH EAST INLET	00:13:22		
382.90		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:13:43		S5
400.90		MGO	General Observation / DEPTH 7FT 9IN	00:14:15		
477.40		TB	Tap Break-In at 1 o'clock, 6inch dim, within 8 inch / SOUTH WEST INLET	00:15:53		
501.00		MGO	General Observation / DEPTH 7FT 6IN	00:16:27		
518.30		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:16:53		S5
601.10		MGO	General Observation / DEPTH 8FT 4IN	00:18:25		
700.50		MGO	General Observation / DEPTH 7FT 10IN	00:20:25		
728.10		D	Deformed, 30% changed	00:21:08		S5
749.40		TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch / LAT 4-12 NORTH INLET	00:21:39		
766.80	S05	B	Broken from 12 o'clock to 12 o'clock, within 8 inch, Start	00:22:22		
800.90		MGO	General Observation / DEPTH 6FT 8IN	00:23:23		

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/16/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-5438-EAP-4268**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1170.4**	**1170.4**

1:3628 Distance		Code	Observation	Counter	Photo	Grade
901.10		MGO	General Observation / DEPTH 6FT 7IN	00:25:29		
901.10	F05	B	Broken from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:25:34		S5
929.80		TB	Tap Break-In at 9 o'clock, 10inch dim, within 8 inch / EAST INLET	00:26:38		
980.60		TB	Tap Break-In at 3 o'clock, 14inch dim, within 8 inch / SOUTH WEST LATERAL DEPTH 6FT 2IN	00:28:43		
1001.70		MSC	Shape or Size Change, 20inch dim	00:29:34		
1001.70		MGO	General Observation / DEPTH 6FT 2IN	00:29:39		
1090.50	F03	FH4	Fracture Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish / SHOWING SEPERATION	00:32:09		S5
1091.30	S06	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, Start	00:32:14		
1103.30		MGO	General Observation / DEPTH 6FT 11IN	00:32:41		
1170.40	F06	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, Finish	00:35:22		S5
1170.40		AEP	End of Pipe / EAP-5438 END RUN WILL EXCAVATE NEW HOLE AT THIS POINT	00:35:28		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5000	0000	1410.0	0.0	1410.0	5.0	0.0	5.0

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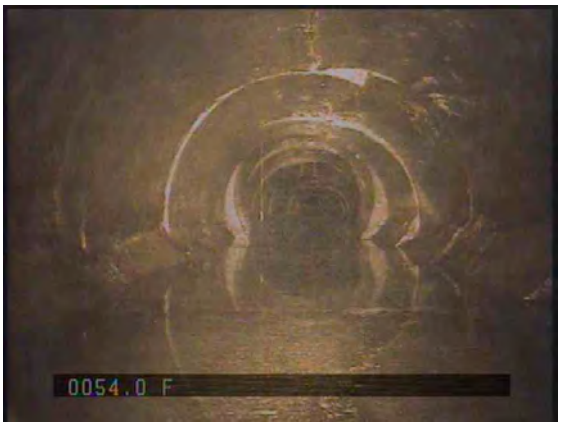
Section Pictures - 11/16/2017 - EAP-5438-EAP-4268

City	Street	Date	Pipe Segment Reference	Nr.
HAYWARD TWP	**FRONT ST EAST**	**11/16/2017**	**EAP-5438-EAP-4268**	**4**

EAP-_-EAP-4268_44671f5a-58e4-4dea-a1e0-e78bdb25f482_20171116_170403_617.jpg, 00:02:29, 40.50
Broken from 12 o'clock to 12 o'clock, within 8 inch, Start



EAP-_-EAP-4268_5e6da263-dd6f-4f77-a79b-e510566171a1_20171116_170502_616.jpg, 00:03:44, 52.70
Deformed, 35% changed

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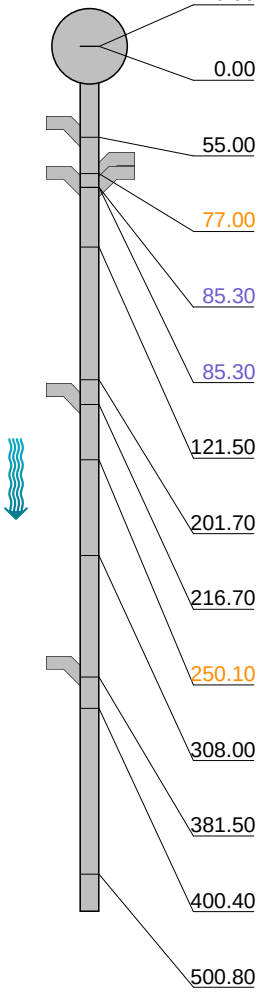
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/17/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-6031-EAP-5438**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Downstream**		**593.4**	**593.4**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-6031**
Street :	**200TH ST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-5438**
Location Details :	**NORTH 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**20**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :



1:4571 Distance	Code	Observation	Counter	Photo	Grade
0.00	AEP	End of Pipe / EAP-6031, START RUN	00:00:18		
0.00	MWL	Water Level, 10% of cross sectional area	00:00:24		
55.00	TB	Tap Break-In at 2 o'clock, 8inch dim, within 8 inch / EAST INLET	00:02:09		
77.00	TBD	Tap Break-In Defective at 10 o'clock, 8inch dim, within 8 inch / WEST INLET	00:04:06		M3
85.30	TBI	Tap Break-In Intruding at 3 o'clock, 8inch dim, 2inch intrusion, within 8 inch / EAST INLET	00:04:38		M2
85.30	TBI	Tap Break-In Intruding at 9 o'clock, 8inch dim, 3inch intrusion, within 8 inch	00:04:57		M2
121.50	MGO	General Observation / DEPTH 4FT	00:06:03		
201.70	MGO	General Observation / DEPTH 4FT 5IN	00:08:11		
216.70	TB	Tap Break-In at 2 o'clock, 8inch dim, within 8 inch / EAST INLET	00:08:39		
250.10	H	Hole at 9 o'clock, within 8 inch	00:09:45		S3
308.00	MGO	General Observation / DEPTH 4 FT	00:11:17		
381.50	TB	Tap Break-In at 1 o'clock, 8inch dim, within 8 inch / EAST INLET	00:13:12		
400.40	MGO	General Observation / DEPTH 4FT 6IN	00:13:48		
500.80	MGO	General Observation / DEPTH 5FT 7 IN	00:16:30		

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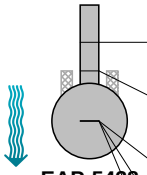
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/17/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-6031-EAP-5438**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Downstream**		**593.4**	**593.4**



1:4571 Distance		Code	Observation	Counter	Photo	Grade
545.80		H	Hole at 2 o'clock, within 8 inch	00:17:48		S3
563.10	S01	CL	Crack Longitudinal at 1 o'clock, within 8 inch, Start	00:18:20		
593.40	F01	CL	Crack Longitudinal at 1 o'clock, within 8 inch, Finish	00:19:16		S2
593.40		MGO	General Observation / DEPTH 6FT	00:19:17		
593.40		MSA	Survey Abandoned / EAP-6438 END OF RUN	00:19:23		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3226	3122	18.0	7.0	25.0	2.3	2.3	2.3

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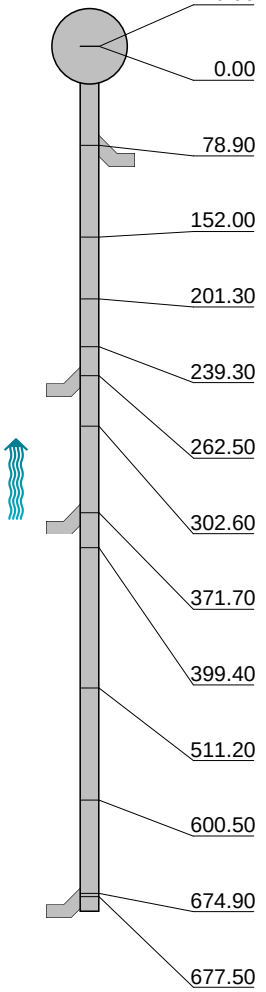
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/17/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-6031-EAP-END 1**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1103.0**	**1102.4**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-6031**
Street :	**200TH**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-END 1**
Location Details :	**NORTH 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**20**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :



1:6021 Distance	Code	Observation	Counter	Photo	Grade
0.00	AEP	End of Pipe / EAP-6031 START RUN	00:00:00		
0.00	MWL	Water Level, 15% of cross sectional area	00:00:29		
78.90	TB	Tap Break-In at 9 o'clock, 8inch dim, within 8 inch / NORTH INLET	00:02:19		
152.00	MGO	General Observation / DEPTH 4FT 11 IN	00:04:18		
201.30	MGO	General Observation / DEPTH 4FT IN	00:05:35		
239.30	MSC	Shape or Size Change, 18inch dim	00:06:36		
262.50	TB	Tap Break-In at 3 o'clock, 18inch dim, within 8 inch / SOUTH INLET	00:07:10		
302.60	MGO	General Observation / DEPTH 5FT 5 IN	00:08:34		
371.70	TB	Tap Break-In at 3 o'clock, 10inch dim, within 8 inch / SOUTH INLET	00:10:16		
399.40	MGO	General Observation / DEPTH 3FT 8IN	00:11:13		
511.20	MGO	General Observation / DEPTH 3FT 6 IN	00:14:08		
600.50	MGO	General Observation / DEPTH 5FT	00:16:25		
674.90	RPP	Repair Patch from 12 o'clock to 12 o'clock, within 8 inch / PLASTIC	00:18:25		
677.50	TF	Tap Factory Made at 3 o'clock, 18inch dim, within 8 inch	00:18:34		

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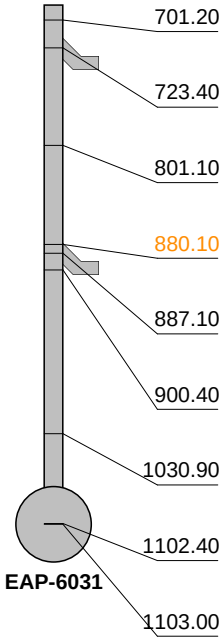
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/17/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-6031-EAP-END 1**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1103.0**	**1102.4**



1:6021 Distance	Code	Observation	Counter	Photo	Grade
701.20	MGO	General Observation / DEPTH 5FT 1IN	00:19:13		
723.40	TB	Tap Break-In at 10 o'clock, 10inch dim, within 8 inch / INLET NORTH	00:19:54		
801.10	MGO	General Observation / DEPTH 3FT 8 IN	00:21:53		
880.10	DSGV	Deposits Settled Gravel, 20% of cross sectional area from 4 o'clock to 8 o'clock	00:24:04		M3
887.10	TB	Tap Break-In at 9 o'clock, 8inch dim, within 8 inch / NORTH INLET	00:24:27		
900.40	MGO	General Observation / DEPTH 5FT 3 IN	00:24:50		
1030.90	MGO	General Observation / DEPTH3FT 5 IN	00:28:53		
1102.40	MSA	Survey Abandoned / END OF CABLE, DEPTH 3FT 2IN, END RUN	00:30:49		
1103.00		End of pipe			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	3100	0.0	3.0	3.0	0.0	3.0	3.0

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/20/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-6293-EAP 6905**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**512.6**	**512.6**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-6293**
Street :	**20OTH ST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP 6905**
Location Details :	**NORTH 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**12**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:4477 Distance	Code	Observation	Counter	Photo	Grade
0.00	AEP	End of Pipe / EAP-6293, START RUN	00:00:00		
0.00	MWL	Water Level, 20% of cross sectional area	00:00:23		
100.50	MGO	General Observation / DEPTH 4 FT	00:03:22		
201.20	MGO	General Observation / DEPTH 3FT 6IN.	00:06:13		
223.50	B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:18:53		S5
277.50	B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:20:07		S5
295.60	B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:20:51		S5
316.70	MGO	General Observation / DEPTH 4FT 2 IN	00:21:40		
402.50	MGO	General Observation / DEPTH 3FT 9 IN	00:24:36		
474.90	TB	Tap Break-In at 3 o'clock, 12inch dim, within 8 inch / WEST INLET	00:26:41		
482.80	MSC	Shape or Size Change, 10inch dim	00:27:06		
503.00	MGO	General Observation / DEPTH 5FT	00:28:13		
512.60	MSA	Survey Abandoned / EAP-6905 CAN NOT MAKE IT THROUGH GRAVEL END RUN.	00:30:57		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5300	0000	15.0	0.0	15.0	5.0	0.0	5.0

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Section Pictures - 11/20/2017 - EAP-6293-EAP 6905

City	Street	Date	Pipe Segment Reference	Nr.
HAYWARD TWP	**20OTH ST**	**11/20/2017**	**EAP-6293-EAP 6905**	**7**

EAP-6293-EAP
___bbab8bef-215f-443e-a9ad-a2a8908987b0_20171120_120234_143.jpg, 00:20:07, 277.50
Broken from 12 o'clock to 12 o'clock, within 8 inch

EAP-6293-EAP
___a6ae4599-99b7-4929-a8be-05706e6eb476_20171120_120329_453.jpg, 00:20:51, 295.60
Broken from 12 o'clock to 12 o'clock, within 8 inch

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/20/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-END 2-EAP-6905**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**181.0**	**181.0**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-END 2**
Street :	**200TH ST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-6905**
Location Details :	**NORTH 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**10**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:1581 Distance		Code	Observation	Counter	Photo	Grade
EAP-6905						
0.00		MWL	Water Level, 20% of cross sectional area	00:00:00		
0.00		AEP	End of Pipe / EAP-6905, START RUN	00:00:00		
0.00		MWL	Water Level, 15% of cross sectional area	00:00:13		
101.80		MGO	General Observation / DEPTH 9FT	00:03:33		
177.70	S01	DSGV	Deposits Settled Gravel, 20% of cross sectional area from 4 o'clock to 8 o'clock, within 8 inch, Start	00:06:13		
181.00	F01	DSGV	Deposits Settled Gravel, 20% of cross sectional area from 4 o'clock to 8 o'clock, within 8 inch, Finish	00:07:41		M3
EAP-END 2 181.00		MSA	Survey Abandoned / EAP- END 2 CAN NOT GET PAST GRAVEL, DEPTH 6FT 11 IN , END RUN	00:08:01		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	3100	0.0	3.0	3.0	0.0	3.0	3.0

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/20/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-7443-EAP-7000**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**443.1**	**443.1**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-7443**
Street :	**LAT4-13**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-7000**
Location Details :	**EAST OF OPEN DITCH**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**14**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:3003 Distance		Code	Observation	Counter	Photo	Grade
0.00				00:00:00		
0.00		AEP	End of Pipe / EAP-7000, START RUN	00:00:14		
0.00		MWL	Water Level, 55% of cross sectional area	00:00:24		
75.90	S01	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Start	00:02:17		
100.60	F01	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Finish	00:02:27		S2
100.60		MGO	General Observation / DEPTH 5 FT	00:02:35		
118.10	S02	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Start	00:02:58		
139.00	F02	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Finish	00:03:32		S2
201.20	S03	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Start	00:05:08		
224.00		MGO	General Observation / DEPTH 5FT 5 IN	00:05:46		
251.50		CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch	00:06:29		S5
300.50		MGO	General Observation / DEPTH 5FT 7 IN	00:06:39		
300.50	F03	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Finish	00:06:41		S2
332.80	S04	CL	Crack Longitudinal at 12 o'clock, Start	00:07:38		

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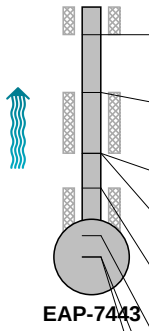
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/20/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-7443-EAP-7000**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**443.1**	**443.1**



1:3003 Distance		Code	Observation	Counter	Photo	Grade
354.80	F04	CL	Crack Longitudinal at 12 o'clock, Finish	00:08:11		S2
377.70	S05	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Start	00:08:44		
401.90		MGO	General Observation / DEPTH 5FT 8IN	00:08:55		
401.90	F05	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Finish	00:08:59		S2
415.70	S06	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Start	00:09:25		
434.60		OBM	Obstacles Pipe Material, 20% of cross sectional area from 12 o'clock to 12 o'clock	00:10:49		M3
443.10	F06	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Finish	00:11:12		S2
443.10		MSA	Survey Abandoned / EAP-7443 CAN NOT GET PAST PIPE, END RUN	00:11:16		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
512I	3100	91.0	3.0	94.0	2.1	3.0	2.1

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/20/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-7675-EAP-7443**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**232.1**	**232.1**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-7675**
Street :	**LAT-4-13**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-7443**
Location Details :	**EAST OF OPEN DITCH**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**14**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:2028 Distance		Code	Observation	Counter	Photo	Grade
0.00		AEP	End of Pipe / EAP-7443, START RUN	00:00:18		
0.00		MWL	Water Level, 15% of cross sectional area	00:00:26		
10.50	S01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:00:50		
31.00		TB	Tap Break-In at 3 o'clock, 6inch dim, within 8 inch / WEST INLET	00:01:51		
85.00		LL	Alignment Left, 20% changed	00:03:18		M1
100.50		MGO	General Observation / DEPTH 5FT 7 IN	00:03:39		
117.90		TBD	Tap Break-In Defective at 12 o'clock, 8inch dim, within 8 inch	00:04:22		M3
117.90		B	Broken from 12 o'clock to 12 o'clock, within 8 inch	00:04:33		S5
188.30	F01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:06:51		S5
200.30		MGO	General Observation / DEPTH 6FT 11 IN	00:07:10		
229.60		OBR	Obstacles Rocks, 25% of cross sectional area at 6 o'clock	00:07:54		M4
231.50		OBM	Obstacles Pipe Material, 25% of cross sectional area from 12 o'clock to 12 o'clock	00:08:20		M4
232.10		MSA	Survey Abandoned / EAP-7675 CAN NOT GET PAST ROCK IN PIPE, END RUN, DEPTH 6FT 7 IN	00:08:25		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5G00	4231	185.0	12.0	197.0	5.0	3.0	4.8

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Section Pictures - 11/20/2017 - EAP-7675-EAP-7443

City	Street	Date	Pipe Segment Reference	Nr.
HAYWARD TWP	**LAT-4-13**	**11/20/2017**	**EAP-7675-EAP-7443**	**10**

EAP-_-EAP-7443_788ae057-68c5-4a4c-9218-968031ecb0bb
_20171121_091549_544.jpg, 00:04:33, 117.90
Broken from 12 o'clock to 12 o'clock, within 8 inch

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/22/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-7875-EAP-7675**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Downstream**		**200.0**	**200.0**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-7875**
Street :	**200TH ST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-7675**
Location Details :	**NORTH OF 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**14**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:1747 Distance		Code	Observation	Counter	Photo	Grade
0.00		AEP	End of Pipe / EAP-7875, START RUN TO NORTH	00:00:16		
0.00		MWL	Water Level, 15% of cross sectional area	00:00:25		
76.70		OBR	Obstacles Rocks, 20% of cross sectional area at 6 o'clock	00:03:42		M3
81.90		TB	Tap Break-In at 9 o'clock, 8inch dim, within 8 inch / WEST INLET	00:04:15		
92.50		OBR	Obstacles Rocks, 30% of cross sectional area at 6 o'clock	00:04:36		M4
92.50		MGO	General Observation / DEPTH 6FT 11 IN	00:04:42		
102.20	S01	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Start	00:05:25		
166.30		LR	Alignment Right, 20% changed	00:07:09		M1
176.00		OBR	Obstacles Rocks, 20% of cross sectional area at 6 o'clock	00:08:04		M3
196.90		MGO	General Observation / WILL REMOVE ROCK ,DEPTH 4FT 5IN	00:11:05		
200.00	F01	CL	Crack Longitudinal at 12 o'clock, within 8 inch, Finish	00:14:00		S2
200.00		MSA	Survey Abandoned / EAP-7675 CAN NOT GET PAST ROCK END RUN	00:14:06		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2C00	4132	40.0	11.0	51.0	2.0	2.8	2.1

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/22/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-7875-EAP-END 3**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**130.5**	**130.5**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-7875**
Street :	**200TH ST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-END 3**
Location Details :	**NORTH OF 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**14**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:1140 Distance		Code	Observation	Counter	Photo	Grade
0.00		AEP	End of Pipe / EAP-END 3, START RUN	00:00:00		
0.00		MWL	Water Level, 10% of cross sectional area	00:00:19		
16.10		TB	Tap Break-In at 3 o'clock, 8inch dim, within 8 inch / WEST INLET	00:00:45		
19.10	S01	CL	Crack Longitudinal at 9 o'clock, within 8 inch, Start	00:01:07		
58.70		TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch / EAST INLET MID OF ROAD	00:02:40		
66.20		DSGV	Deposits Settled Gravel, 40% of cross sectional area from 4 o'clock to 8 o'clock, within 8 inch	00:03:04		M5
96.50		TBI	Tap Break-In Intruding at 3 o'clock, 8inch dim, 2inch intrusion, within 8 inch / WEST INLET	00:05:03		M2
96.70		MGO	General Observation / DEPTH 9 FT 7 IN	00:05:39		
121.30		TBI	Tap Break-In Intruding at 2 o'clock, 8inch dim, 2inch intrusion, within 8 inch / WEST INLET	00:06:26		M2
130.50	F01	CL	Crack Longitudinal at 9 o'clock, within 8 inch, Finish	00:08:47		S2
130.50		MSA	Survey Abandoned / EAP-7875 CAN NOT GET PAST ROCKS WILL SET UP 30 FT PAST, END RUN	00:08:59		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2C00	5122	44.0	9.0	53.0	2.0	3.0	2.1

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/22/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-9000-EAP-END 4**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**20.0**	**19.9**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-9000**
Street :	**200TH ST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-END 4**
Location Details :	**SOUTH OF 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**12**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:175	Distance		Code	Observation	Counter	Photo	Grade
EAP-END 4							
	0.00				00:00:00		
	0.00		AEP	End of Pipe / EAP-9000, START RUN TO SOUTH	00:00:15		
	0.00		MWL	Water Level, 20% of cross sectional area	00:00:29		
	14.60	S01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Start	00:00:49		
	16.70		OBR	Obstacles Rocks, 30% of cross sectional area from 4 o'clock to 8 o'clock	00:01:01		M4
	17.30		MGO	General Observation / ROCKS FOR AS FAR AS I CAN SEE	00:01:51		
	19.90	F01	CH4	Crack Longitudinal Hinge, 4 from 12 o'clock to 12 o'clock, within 8 inch, Finish	00:02:26		S5
	19.90		MSA	Survey Abandoned / EAP- END 4 CAN NOT PASS THROUGH ROCKS END RUN	00:02:29		
EAP-9000	20.00			End of pipe			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	4100	5.0	4.0	9.0	5.0	4.0	4.5

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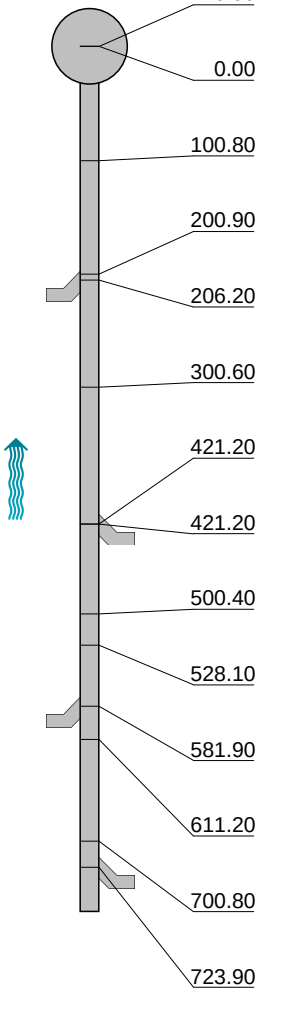
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/22/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-9125-EAP-8000**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1125.3**	**1125.3**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-9125**
Street :	**200TH ST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-8000**
Location Details :	**SOUTH OF 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**14**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :



1:6663 Distance	Code	Observation	Counter	Photo	Grade
0.00	AEP	End of Pipe / EAP-8000, START RUN TO SOUTH.	00:00:19		
0.00	MWL	Water Level, 20% of cross sectional area	00:00:26		
100.80	MGO	General Observation / DEPTH 7FT	00:02:45		
200.90	MGO	General Observation / 9FT 5 IN	00:06:16		
206.20	TB	Tap Break-In at 3 o'clock, 4inch dim, within 8 inch / WEST INLET	00:06:40		
300.60	MGO	General Observation / DEPTH8FT 5 IN	00:09:41		
421.20	TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch / EAST INLET	00:12:46		
421.20	MGO	General Observation / DEPTH5FT 11 IN	00:12:53		
500.40	MGO	General Observation / DEPTH 5FT 5 IN	00:17:13		
528.10	MGO	General Observation / DEPTH 8FT	00:15:39		
581.90	TB	Tap Break-In at 3 o'clock, 8inch dim, within 8 inch / WEST INLET	00:17:02		
611.20	MGO	General Observation / DEPTH 7FT 7 IN	00:20:28		
700.80	MGO	General Observation / DEPTH 8FT 3 IN	00:23:01		
723.90	TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch / EAST INLET	00:23:58		

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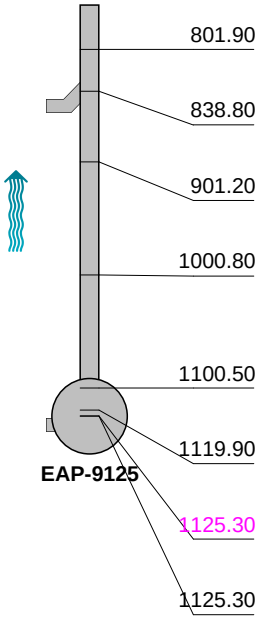
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/22/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-9125-EAP-8000**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**1125.3**	**1125.3**



1:6663 Distance	Code	Observation	Counter	Photo	Grade
801.90	MGO	General Observation / DEPTH10FT 1 IN	00:26:14		
838.80	TB	Tap Break-In at 2 o'clock, 8inch dim, within 8 inch / WEST INLET	00:27:32		
901.20	MGO	General Observation / DEPTH 9FT 4 IN	00:29:39		
1000.80	MGO	General Observation / DEPTH 7FT 4 IN	00:32:29		
1100.50	MGO	General Observation / DEPTH 5FT 8 IN	00:35:17		
1119.90	TB	Tap Break-In at 3 o'clock, 8inch dim, within 8 inch / WEST INLET	00:36:02		
1125.30	OBR	Obstacles Rocks, 25% of cross sectional area from 4 o'clock to 8 o'clock	00:36:46		M4
1125.30	MSA	Survey Abandoned / EAP-9125 CAN'T GET PAST ROCKS END RUN.	00:36:53		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	4100	0.0	4.0	4.0	0.0	4.0	4.0

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Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/27/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-9443-EAP-9125**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**318.3**	**318.3**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-9443**
Street :	**200TH ST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-9125**
Location Details :	**SOUTH OF 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**14**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:2780 Distance	Code	Observation	Counter	Photo	Grade
EAP-9125					
0.00	AEP	End of Pipe / EAP-9125, START RUN	00:00:18		
0.00	MWL	Water Level, 20% of cross sectional area	00:00:23		
100.70	MGO	General Observation / DEPTH 6FT 11 IN	00:03:25		
202.20	MGO	General Observation / DEPTH 8FT 4 IN +	00:05:56		
265.70	TB	Tap Break-In at 2 o'clock, 8inch dim, within 8 inch / WEST INLET	00:07:24		
300.80	MGO	General Observation / DEPTH 9FT 5 IN+	00:08:35		
318.30	DSGV	Deposits Settled Gravel, 25% of cross sectional area from 12 o'clock to 12 o'clock, within 8 inch	00:09:22		M4
EAP-9443 318.30	MSA	Survey Abandoned / EAP-9443 CAN NOT GET PAST ROCKS, END RUN	00:09:30		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	4100	0.0	4.0	4.0	0.0	4.0	4.0

Empire Pipe Services
415 Truman Street, North Mankato, MN
Tel. 507-388-2895
swenner@empire-pipe.com

Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/27/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-9898-EAP-9443**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**455.9**	**455.9**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-9898**
Street :	**200TH ST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-9443**
Location Details :	**SOUTH OF 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**14**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

1:3936 Distance	Code	Observation	Counter	Photo	Grade
EAP-9443					
0.00			00:00:00		
0.00	MWL	Water Level, 55% of cross sectional area / .	00:00:16		
0.00	AEP	End of Pipe / EAP-9443, START RUN	00:00:17		
68.80	MGO	General Observation / REMOVED ROCK	00:01:42		
87.90	MGO	General Observation / REMOVED ROCK	00:01:42		
101.40	MGO	General Observation / DEPTH 6FT 9 IN	00:01:57		
210.50	MGO	General Observation / DEPTH 6FT 4 IN	00:04:20		
275.40	TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch	00:06:06		
310.30	MGO	General Observation / DEPTH 5FT 11IN	00:06:09		
388.30	DSGV	Deposits Settled Gravel, 30% of cross sectional area from 4 o'clock to 8 o'clock, within 8 inch	00:12:41		M4
403.30	TB	Tap Break-In at 12 o'clock, 8inch dim, within 8 inch	00:29:34		
403.30	MGO	General Observation / DEPTH 7FT 7 IN	00:29:35		
447.70	TB	Tap Break-In at 2 o'clock, 8inch dim, within 8 inch / WEST INLET	00:31:00		

Empire Pipe Services
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Tel. 507-388-2895
swenner@empire-pipe.com

Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/27/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-9898-EAP-9443**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**455.9**	**455.9**

Distance	Code	Observation	Counter	Photo	Grade
453.50	RPP	Repair Patch from 12 o'clock to 12 o'clock, within 8 inch / SINGLEWALL	00:31:33		
453.50	D	Deformed, 55% changed	00:31:34		S5
455.70	TF	Tap Factory Made at 3 o'clock, 8inch dim, within 8 inch	00:31:35		
455.70	TF	Tap Factory Made at 9 o'clock, 8inch dim, within 8 inch	00:31:36		
455.90	MSA	Survey Abandoned / EAP-9898 CAN NOT GET PAST DEFORMED PIPE END RUN	00:32:37		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	4100	5.0	4.0	9.0	5.0	4.0	4.5

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Section Pictures - 11/27/2017 - EAP-9898-EAP-9443

City	Street	Date	Pipe Segment Reference	Nr.
HAYWARD TWP	**200TH ST**	**11/27/2017**	**EAP-9898-EAP-9443**	**16**

EAP-_-EAP-9443_6af12e61-92f6-4bb8-b739-25ca3074e127_20171127_115840_966.jpg, 00:31:34, 453.50
Deformed, 55% changed

Empire Pipe Services
415 Truman Street, North Mankato, MN
Tel. 507-388-2895
swenner@empire-pipe.com

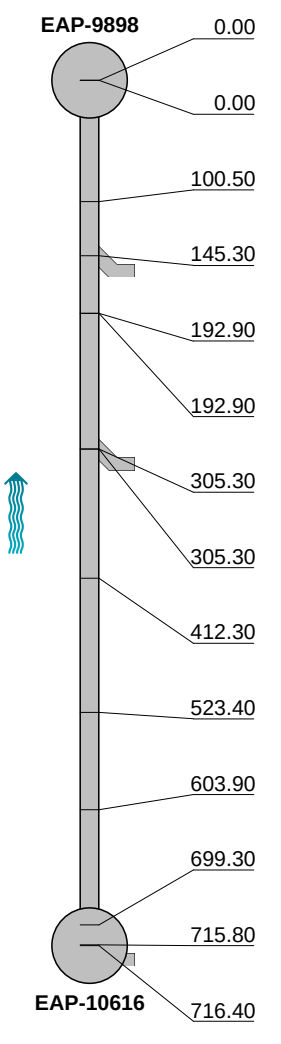
Inspection report

Date :	Work Order :	Weather :	Surveyed By :	Certificate Number :	Pipe Segment Ref. :
11/27/2017	**2422**	**Dry**	**Shawn W**	**U-213-17314**	**EAP-10616-EAP-9898**
Year laid :	Pre-cleaning :	Direction :	Pipe Joint Length :	Total Length :	Length Surveyed :
	No Pre-Cleaning	**Upstream**		**716.4**	**716.4**

City :	**HAYWARD TWP**	Drainage Area :		Upstream MH :	**EAP-10616**
Street :	**200TH ST**	Media Label :		Up Rim to Invert :	**0.0**
Location Code :		Flow Control :	**Not Controlled**	Downstream MH :	**EAP-9898**
Location Details :	**SOUTH OF 200TH ST**	Sheet Number :		Down Rim to Invert :	**0.0**

Pipe shape:	**Circular**	Sewer Use:	**Stormwater**
Pipe size:	**14**	Sewer Category :	**SEC**
Pipe material:	**Concrete Pipe (non-reinforced)**	Purpose:	**Capital Improvement Program Assessment**
Lining Method :		Owner :	**FREEBORN COUNTY**

Additional Info :

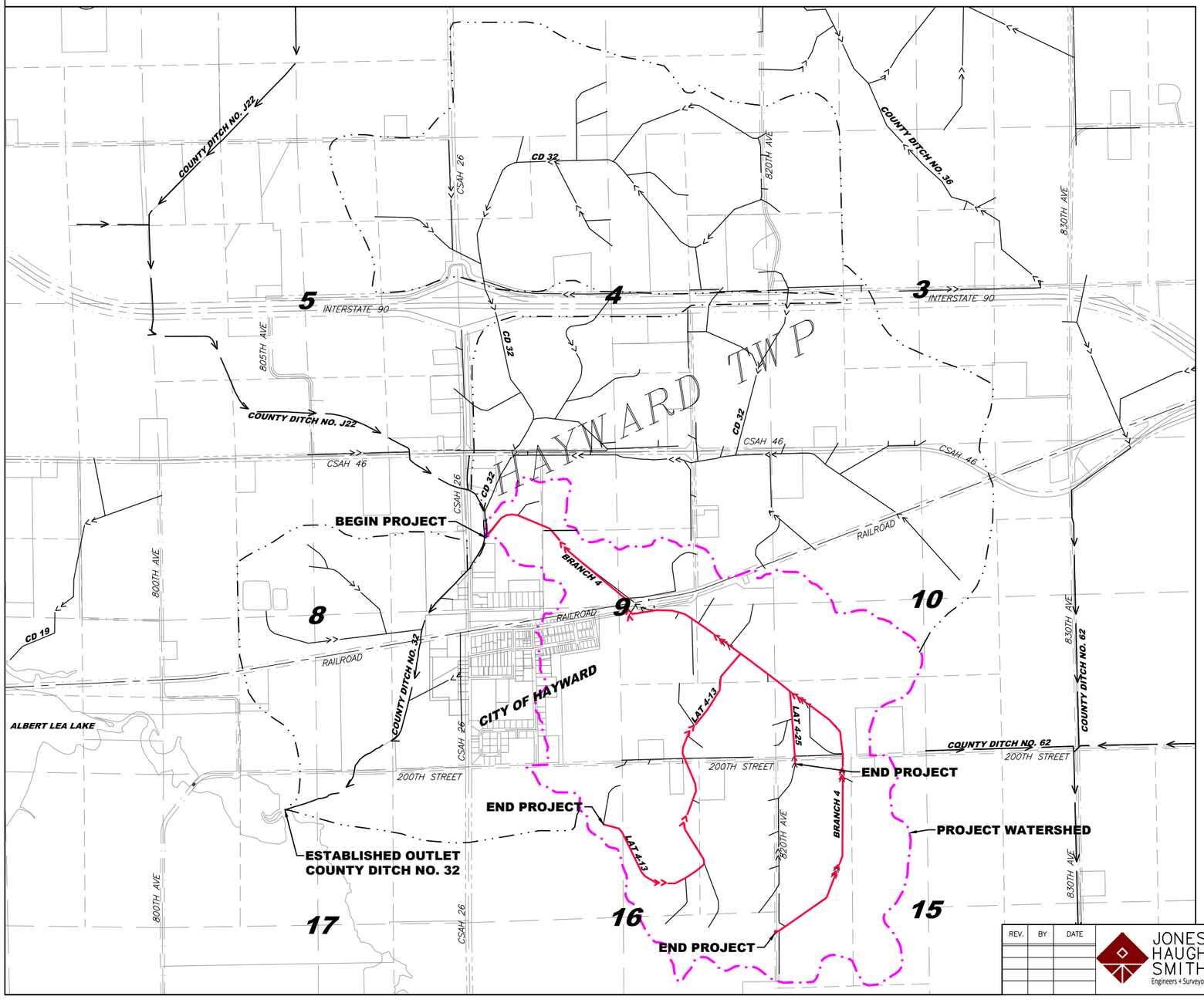


1:6257 Distance	Code	Observation	Counter	Photo	Grade
0.00	AEP	End of Pipe / EAP-9898, START RUN	00:00:19		
0.00	MWL	Water Level, 20% of cross sectional area	00:00:25		
100.50	MGO	General Observation / DEPTH 5FT 2 IN	00:03:27		
145.30	TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch / SOUTH INLET	00:05:25		
192.90	MSC	Shape or Size Change, 12inch dim	00:06:47		
192.90	MGO	General Observation / DEPTH 5FT 1 IN	00:06:50		
305.30	TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch / SOUTH INLET	00:10:37		
305.30	MGO	General Observation / DEPTH 4FT 5 IN	00:10:42		
412.30	MGO	General Observation / DEPTH 6FT 10 IN	00:13:58		
523.40	MGO	General Observation / DEPTH 4FT 10IN	00:17:09		
603.90	MGO	General Observation / DEPTH 5FT 5 IN	00:19:50		
699.30	MGO	General Observation / DEPTH 6FT 5 IN	00:23:53		
715.80	TB	Tap Break-In at 10 o'clock, 8inch dim, within 8 inch / SOUTH INLET	00:24:27		
716.40	MSA	Survey Abandoned / EAP-10616 CAN NOT GET PAST TAP END RUN	00:25:07		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

FREEBORN COUNTY, MN

PETITION FOR IMPROVEMENT TO BRANCH 4, LATERAL 4-13 AND LATERAL 4-25 TO COUNTY DITCH NO. 32



INDEX TO SHEETS

N

1000 0 1000

SCALE IN FEET

SCALE
11X17 HORIZ: 1"=2000'
22X34 HORIZ: 1"=1000'

LEGEND

- APPROXIMATE PROJECT WATERSHED
- APPROXIMATE INTERIOR WATERSHED
- APPROXIMATE EXTERIOR WATERSHED
- OPEN DITCH (Project)
- LEGAL OPEN DITCH (Not Project)
- PRIVATE OPEN DITCH
- TILE DITCH (Project)
- LEGAL TILE DITCH (Not Project)
- PRIVATE TILE
- PRIVATE WATERWAY
- NATURAL STREAM
- GAS LINE — GAS
- OVERHEAD ELECTRIC — OHD ELEC
- UNDERGROUND TELEPHONE — TEL BUR
- CITY LIMITS
- FENCE LINE — X — X
- ALTERNATIVE TILE INLET
- TILE INSPECTION INLET
- OVERHEAD TELEPHONE — OT
- FIBER-OPTICS — FO
- UNDERGROUND ELECTRIC — UE
- LIGHT POLE
- POWER POLE

ABBREVIATIONS

JD = JUDICIAL DITCH
CD = COUNTY DITCH
JCD = JOINT COUNTY DITCH
MOD = MAIN OPEN DITCH
LAT = LATERAL
BR = BRANCH
PVT = PRIVATE
POD = PRIVATE OPEN DITCH
L/W = LOW-WATER
XG = CROSSING
O/L = OUTLET

BENCHMARK ELEVATION = 1271.66

MNDOT GEODETIC CONTROL STATION #9106, 2482 F. LOCATED 1.0 MILE NORTH OF HAYWARD, AT THE JUNCTION OF INTERSTATE HIGHWAY 90 AND COUNTY ROAD 26 (THE JUNCTION IS 1.0 MILE NORTH OF HAYWARD) IN THE SOUTHEAST CORNER OF COUNTY ROAD 26 BRIDGE NUMBER 24806 OVER INTERSTATE HIGHWAY 90, 6.9 FEET NORTHWEST OF THE SOUTHEAST END OF THE SOUTH CONCRETE ABUTMENT, 60.4 FEET SOUTH OF EASTBOUND INTERSTATE HIGHWAY 90, 17.4 FEET EAST OF COUNTY ROAD 26.

BENCHMARK ELEVATION = 1270.75

MNDOT GEODETIC CONTROL STATION #36446, HAYWARD MNDT. LOCATED 1.0 MILE NORTH OF HAYWARD, AT THE JUNCTION OF INTERSTATE HIGHWAY 90 AND COUNTY ROAD 26, (THE JUNCTION IS 1.9 MILE NORTH OF HAYWARD), AT INTERSTATE HIGHWAY 90 MILEPOINT 163.6, 21.4 FEET WEST OF COUNTY ROAD 26, 22.8 FEET NORTH-NORTHWEST OF COUNTY ROAD 26 BRIDGE NUMBER 24806 OVER INTERSTATE HIGHWAY 90, 5.5 FEET WEST OF A GUARD RAIL, 2.0 FEET WEST OF A WITNESS POST.

NOTE: THIS IS A COLOR PLAN SET. IF THIS TEXT DOES NOT APPEAR IN COLOR, THIS IS NOT AN ORIGINAL PLAN SET AND MAY RESULT IN MISINTERPRETATION.

NO RESPONSIBILITY IS ACCEPTED FOR THE LOCATIONS OF UTILITIES SHOWN HEREON. VERIFICATION OF ACTUAL LOCATIONS SHOULD BE REQUESTED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION OR THE TAKING OF ANY OTHER ACTION RELYING ON THE ACTUAL LOCATIONS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR VARIATION FROM PLAN.

LOCATIONS OF ALL UTILITIES SHOWN ARE APPROXIMATE.
GOPHER STATE ONE-CALL: 1-800-252-1166

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 GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. NOTIFY ENGINEER OF ANY DISCREPANCIES OR CONDITIONS REQUIRING INFORMATION OR CLARIFICATION BEFORE PROCEEDING WITH WORK.

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.

Steven J. Penkava
Lic. No. 43895 Date: 9-30-24

PRELIMINARY REPORT

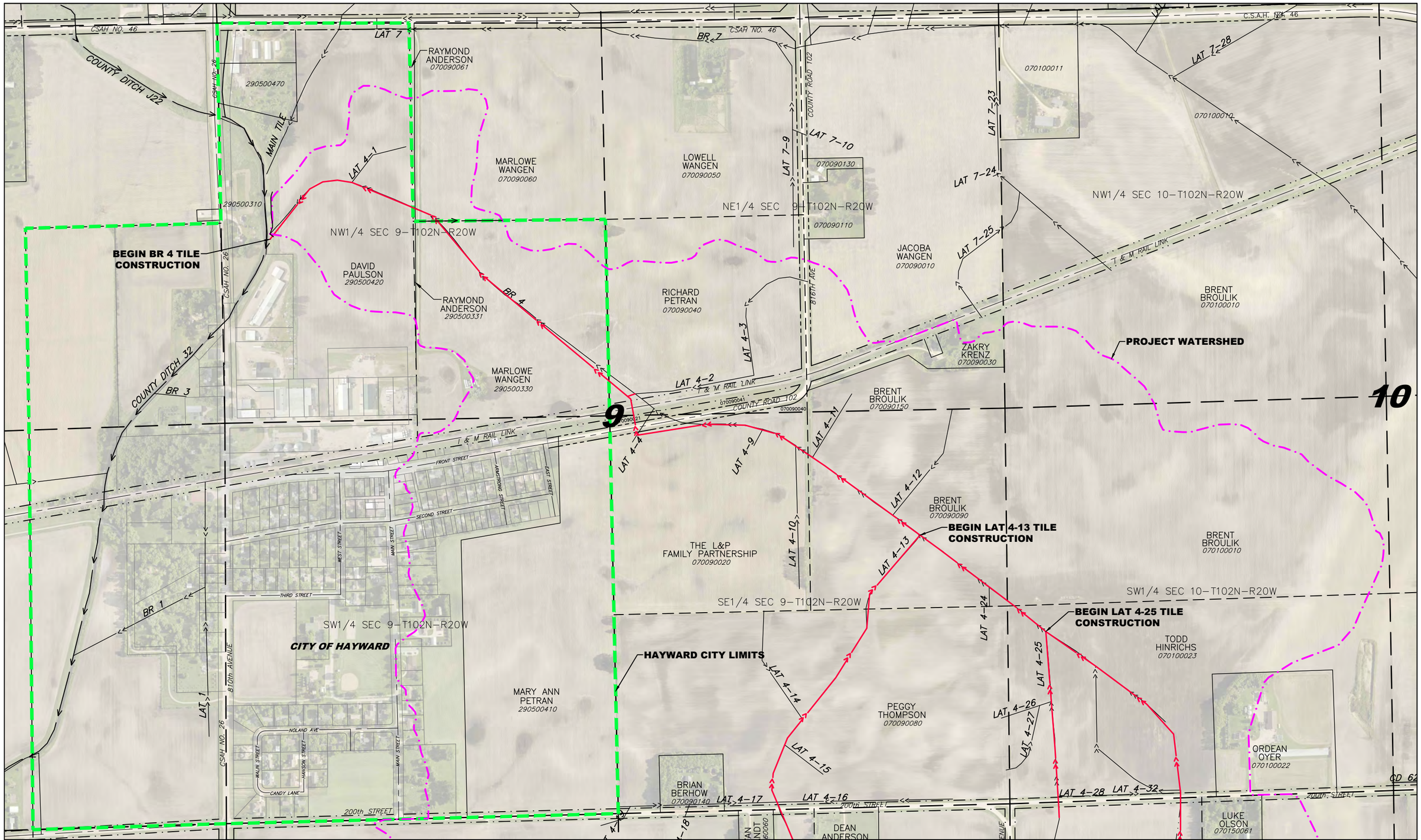
REV.	BY	DATE

JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave.
Albert Lea, MN 56007
507-373-4876
415 West North Street
Owatonna, MN 55060
507-451-4598

DESIGNED:	SJP
DRAWN:	SJP
CHECKED:	SJP
DATE:	9-30-24
FILE NO:	17-426.DWG

FREEBORN COUNTY, MN
PETITION FOR IMPROVEMENT TO COUNTY DITCH NO. 32
TITLE SHEET

SHEET 1 OF 18



300 0 300
HORIZ. SCALE FEET

SCALE
11X17 HORIZ: 1"=600'
22X34 HORIZ: 1"=300'

N

No responsibility is accepted for the locations of utilities shown hereon. Verification of actual locations should be requested prior to the commencement of construction or the taking of any other action relying on the actual locations.

GOPHER STATE ONE-CALL: 1-800-252-1166

REV.	BY	DATE

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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.

Steven J. Penkava
Lic. No. 43895 Date: 9-30-24

FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
WATERSHED MAP

SHEET 2 OF 18

CITY OF HAYWARD
NOLAND AVE
WALN STREET
HANSON STREET
MAIN STREET
CANDY LANE
MARY ANN PETRAN
290500410
CSAH NO. 26
810th AVENUE
200th STREET
LAT 1
LAT 4-14
LAT 4-15
LAT 4-16
LAT 4-17
LAT 4-18
LAT 4-20
LAT 4-21
LAT 4-22
LAT 4-23
LAT 4-26
LAT 4-27
LAT 4-28
LAT 4-29
LAT 4-30
LAT 4-31
LAT 4-32
LAT 4-33
LAT 4-34
LAT 4-35
PEGGY THOMPSON
070090080
BRIAN BERHOW
070090140
RYAN BRANDT
070160060
DEAN ANDERSON
070160070
ORDEAN OYER
070100022
CD 62
LUKE OLSON
070150061
820th AVENUE
END LAT 4-25 TILE CONSTRUCTION
END LAT 4-13 TILE CONSTRUCTION
CHARLES KERMES
070160030
NW1/4 SEC 16-T102N-R20W
CHARLES KERMES
070160020
NE1/4 SEC 16-T102N-R20W
DOUG THOMPSON
070160010
NW1/4 SEC 15-T102N-R20W
KIM OTTEN
070150040
KIMBERLY VON
070150060
070170010
16
15
END BR 4 TILE CONSTRUCTION
PROJECT WATERSHED
070160041
SW1/4 SEC 16-T102N-R20W
HAROLD KERMES
070160051
SE1/4 SEC 16-T102N-R20W
SW1/4 SEC 15-T102N-R20W
070170020
070160040
TRACY SKAAR
070160050
KEITH IVERSON
070150030

300 0 300
HORIZ. SCALE FEET

SCALE
11X17 HORIZ: 1"=600'
22X34 HORIZ: 1"=300'

N

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GOPHER STATE ONE-CALL: 1-800-252-1166

REV.	BY	DATE

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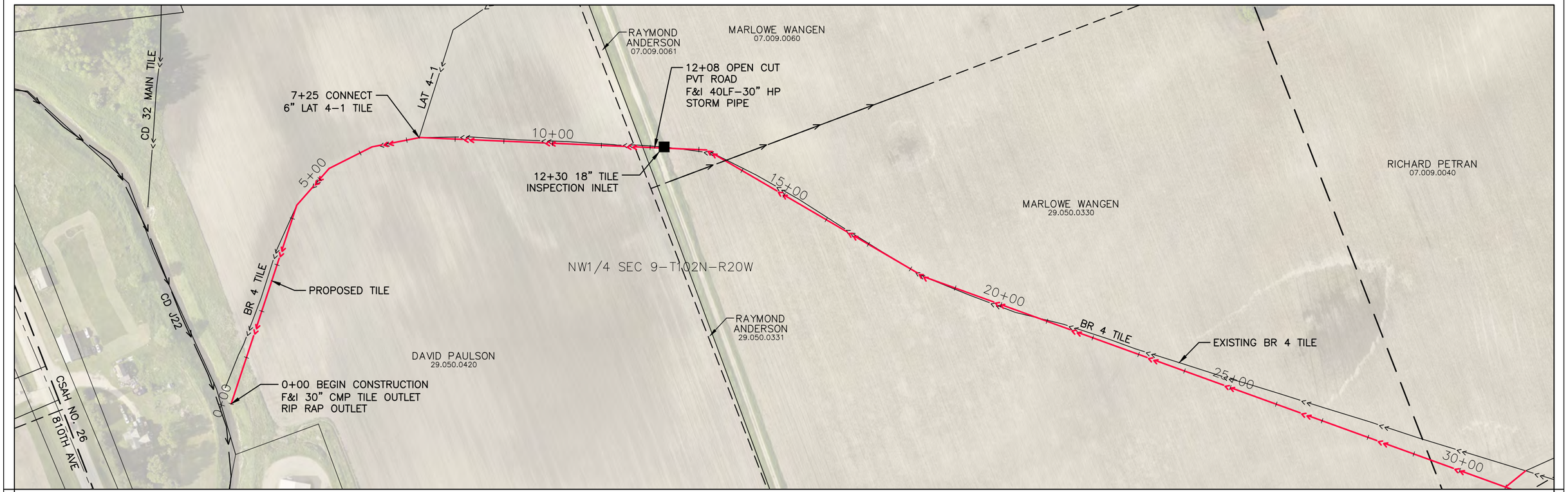
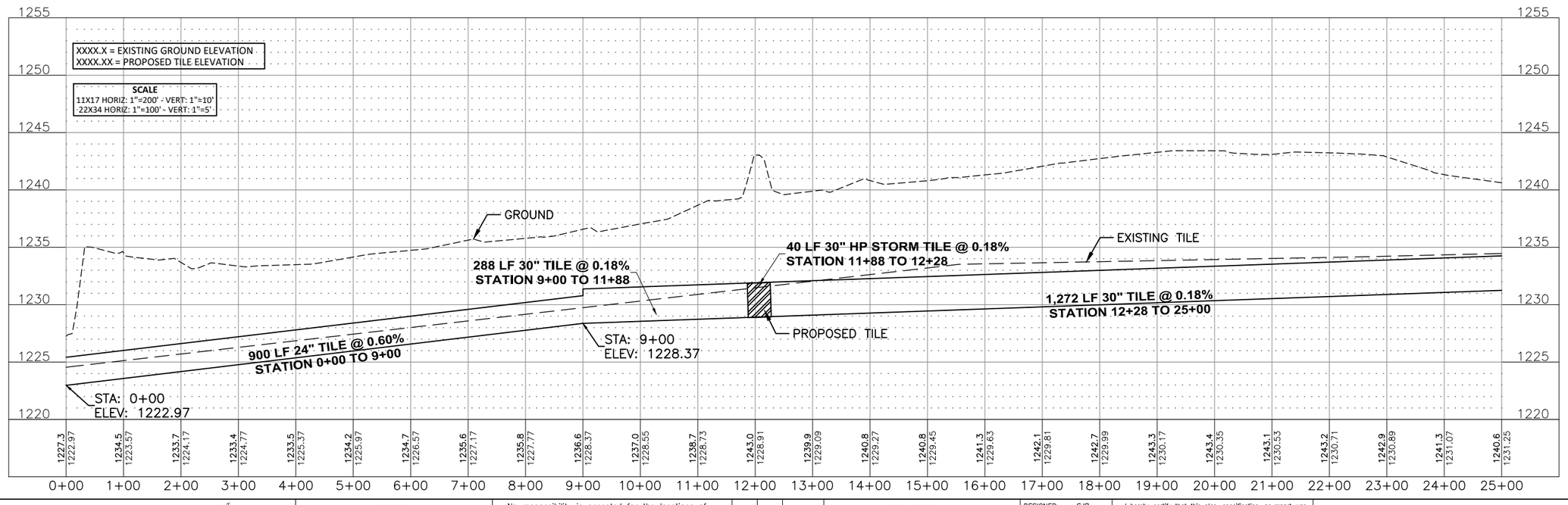
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Steven J. Penkava
Lic. No. 43895 Date: 9-30-24

FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
WATERSHED MAP

SHEET 3 OF 18





200 0 200
HORIZ. SCALE FEET

10 0 10
VERT. SCALE FEET

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GOPHER STATE ONE-CALL: 1-800-252-1166

REV.	BY	DATE

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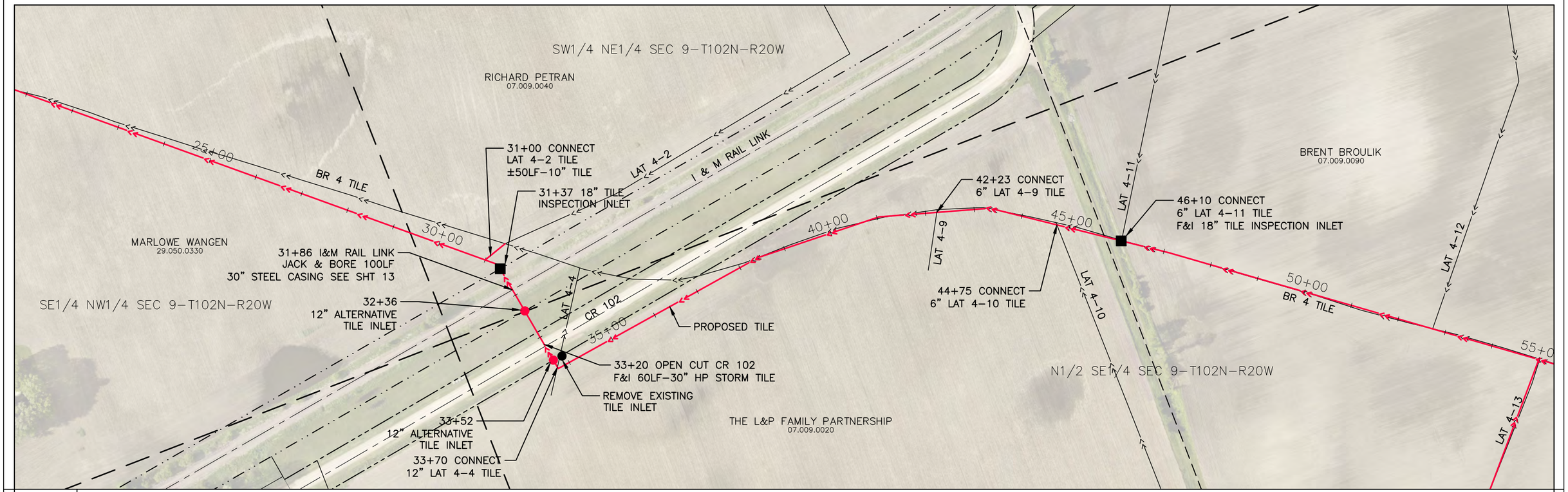
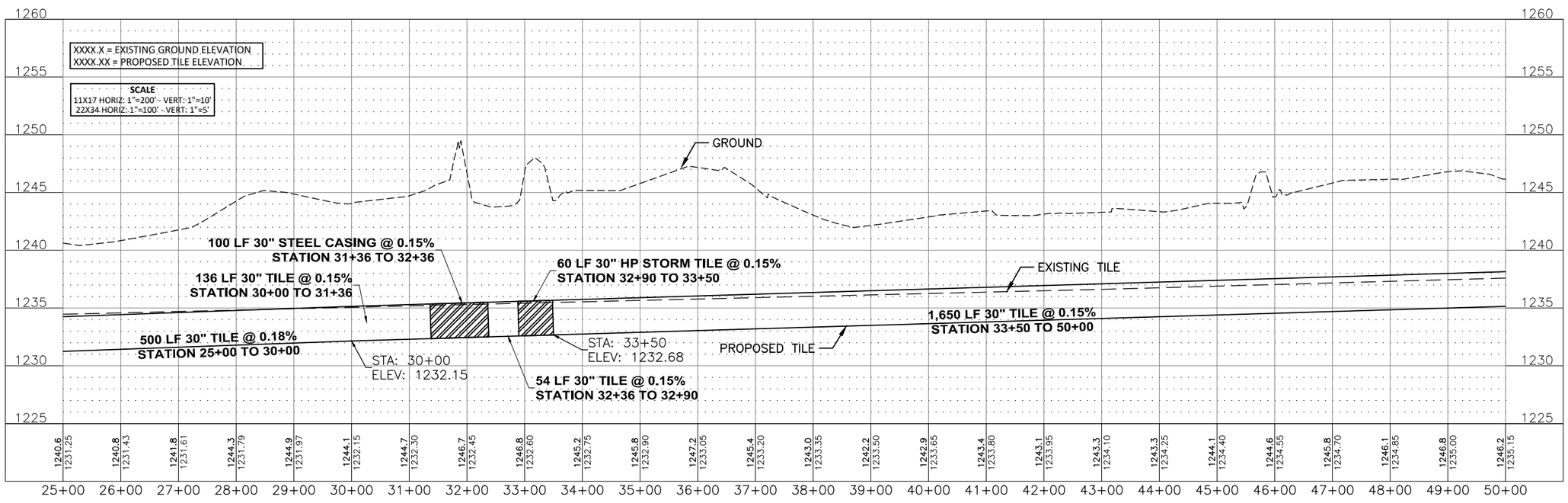
FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
BRANCH 4 TILE
STATION 0+00-25+00

SHEET 4 OF 18





200 0 200
HORIZ. SCALE FEET

10 0 10
VERT. SCALE FEET

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GOPHER STATE ONE–CALL: 1–800–252–1166

REV.	BY	DATE

JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave.
Albert Lea, MN 56007
507-373-4876
415 West North Street
Owatonna, MN 55060
507-451-4598

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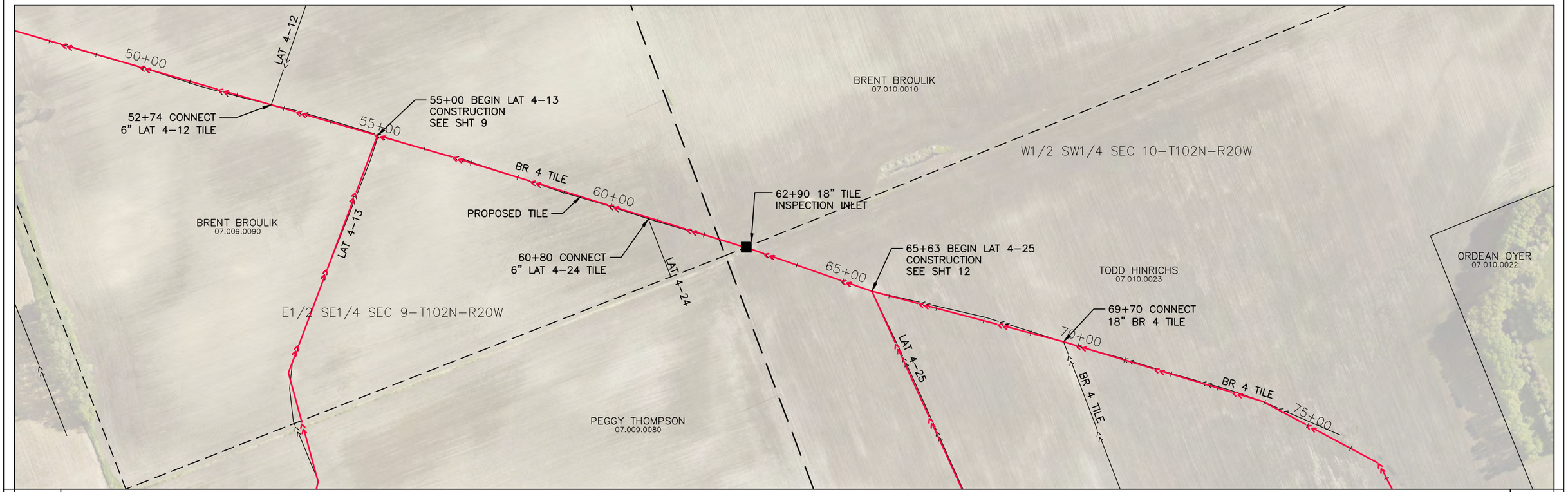
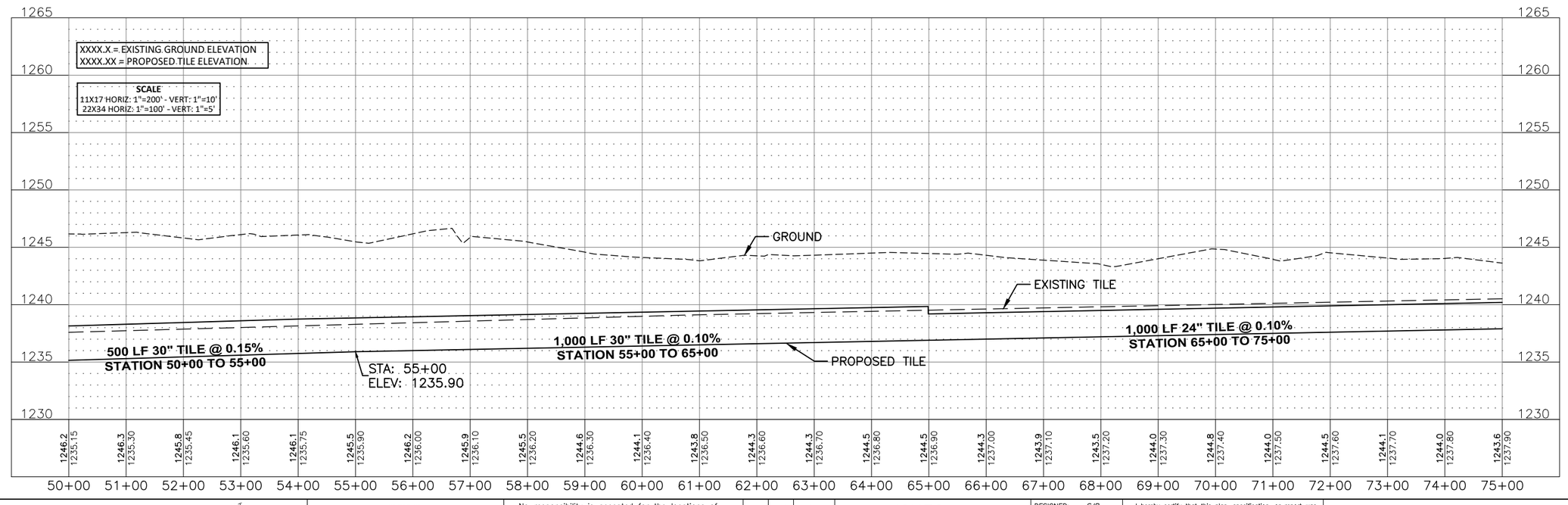
Steven J. Penkava
Lic. No. 43895 Date: 9–30–24

FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
BRANCH 4 TILE
STATION 25+00-50+00

SHEET 5 OF 18





200 0 200
HORIZ. SCALE FEET

10 0 10
VERT. SCALE FEET

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GOPHER STATE ONE-CALL: 1-800-252-1166

REV.	BY	DATE

JONES HAUGH SMITH
Engineers + Surveyors
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Albert Lea, MN 56007
507-373-4876
415 West North Street
Owatonna, MN 55060
507-451-4598

DESIGNED:	SJP
DRAWN:	SJP
CHECKED:	SJP
DATE:	9-30-24
FILE NO:	17-426.DWG

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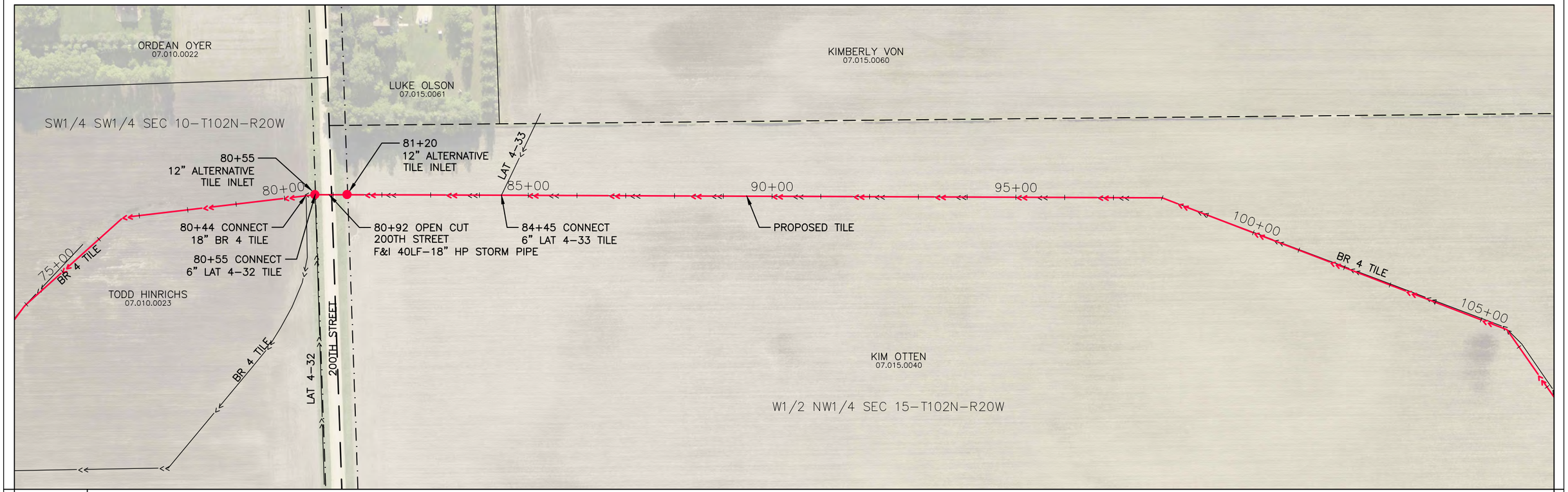
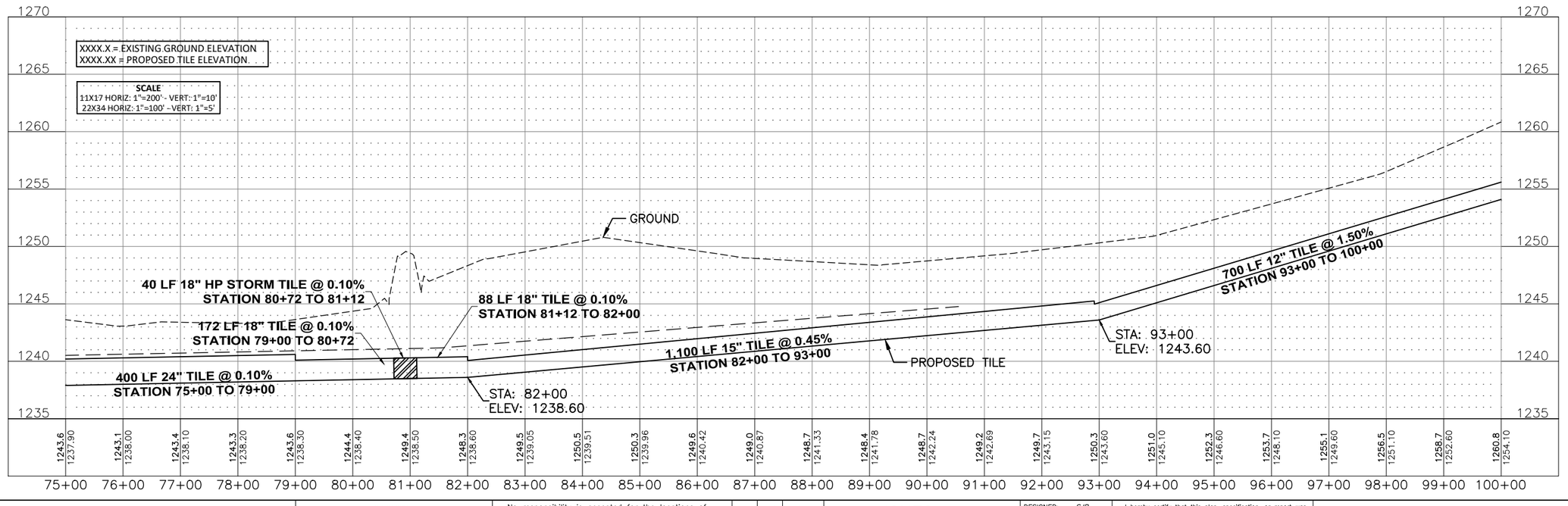
Steven J. Penkava
Lic. No. 43895 Date: 9-30-24

FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
BRANCH 4 TILE
STATION 50+00-75+00

SHEET 6 OF 18





200 0 200
HORIZ. SCALE FEET

10 0 10
VERT. SCALE FEET

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GOPHER STATE ONE-CALL: 1-800-252-1166

REV.	BY	DATE

JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave.
Albert Lea, MN 56007
507-373-4876
415 West North Street
Owatonna, MN 55060
507-451-4598

DESIGNED:	SJP
DRAWN:	SJP
CHECKED:	SJP
DATE:	9-30-24
FILE NO:	17-426.DWG

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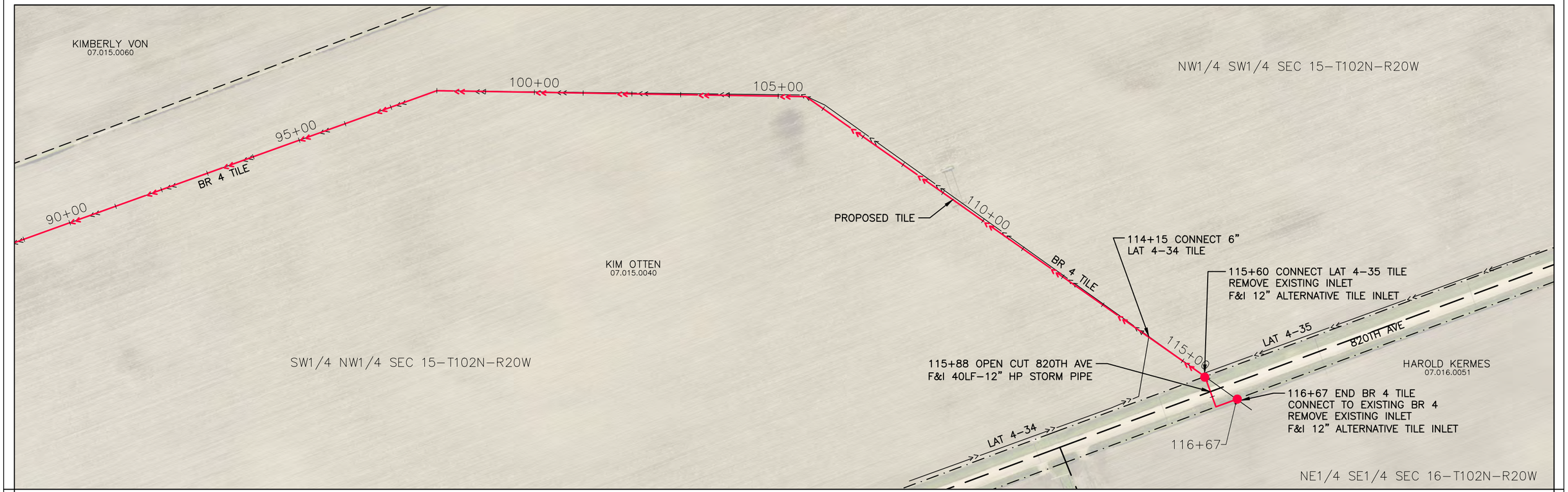
Steven J. Penkava
Lic. No. 43895 Date: 9-30-24

FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
BRANCH 4 TILE
STATION 75+00-100+00

SHEET 7 OF 18



XXXX.X = EXISTING GROUND ELEVATION
XXXX.XX = PROPOSED TILE ELEVATION

SCALE
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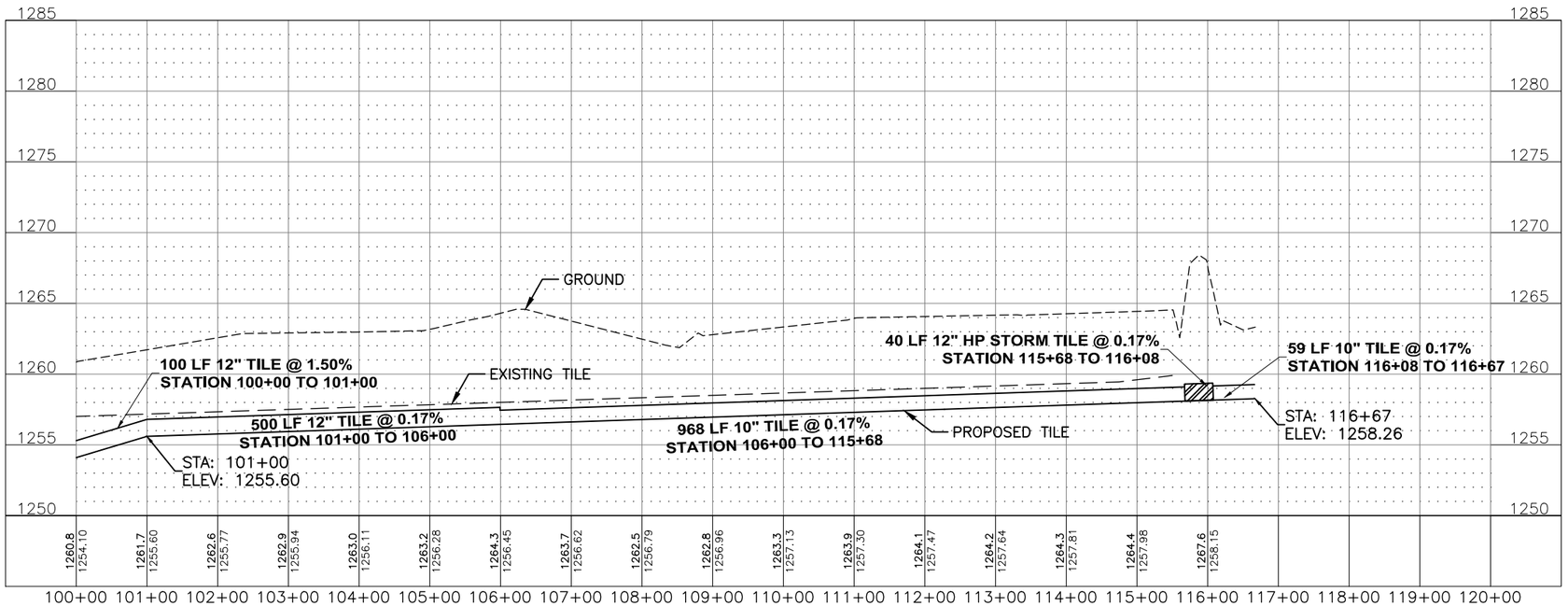
22X34 HORIZ: 1"=100' - VERT: 1"=5'



200 0 200
HORIZ. SCALE FEET

10 0 10
VERT. SCALE FEET

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GOPHER STATE ONE–CALL: 1–800–252–1166

REV.	BY	DATE

JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave.
Albert Lea, MN 56007
507-373-4876
415 West North Street
Owatonna, MN 55060
507-451-4598

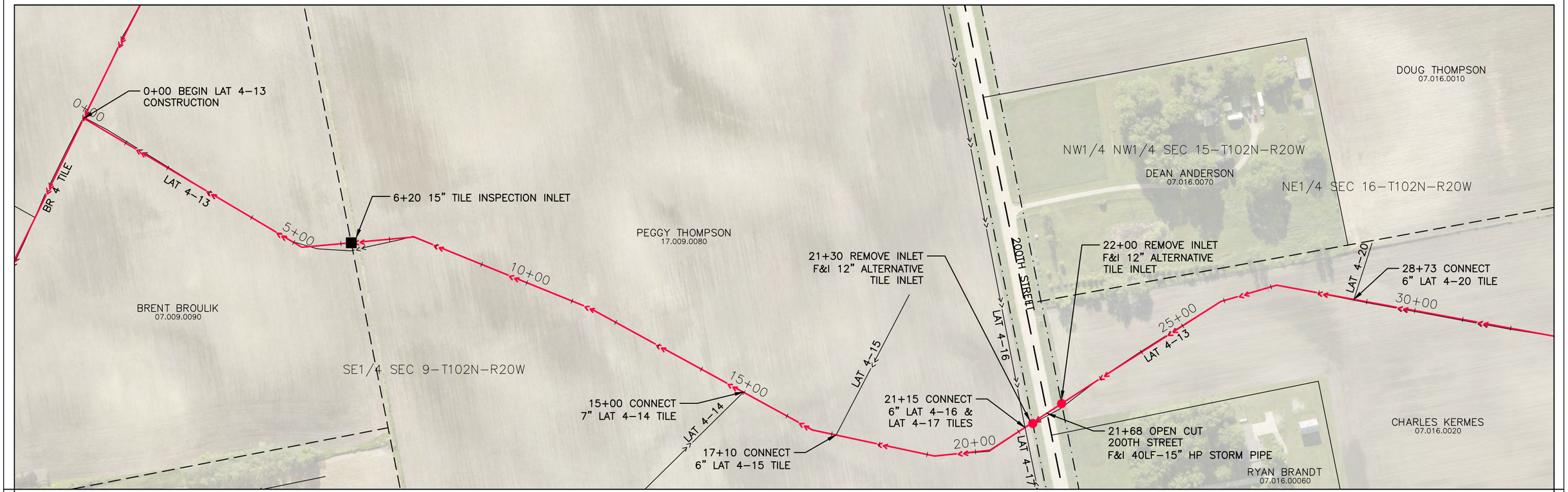
DESIGNED:	SJP
DRAWN:	SJP
CHECKED:	SJP
DATE:	9–30–24
FILE NO:	17–426.DWG

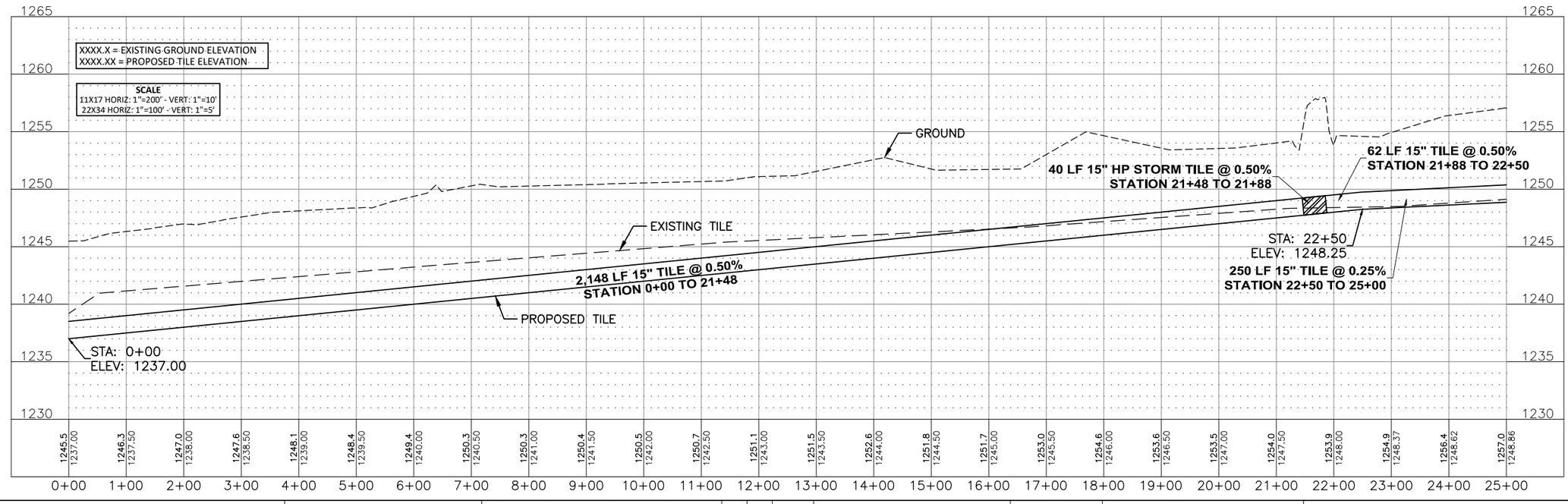
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Steven J. Penkava
Lic. No. 43895 Date: 9–30–24

FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
BRANCH 4 TILE
STATION 100+00-116+67

SHEET 8 OF 18





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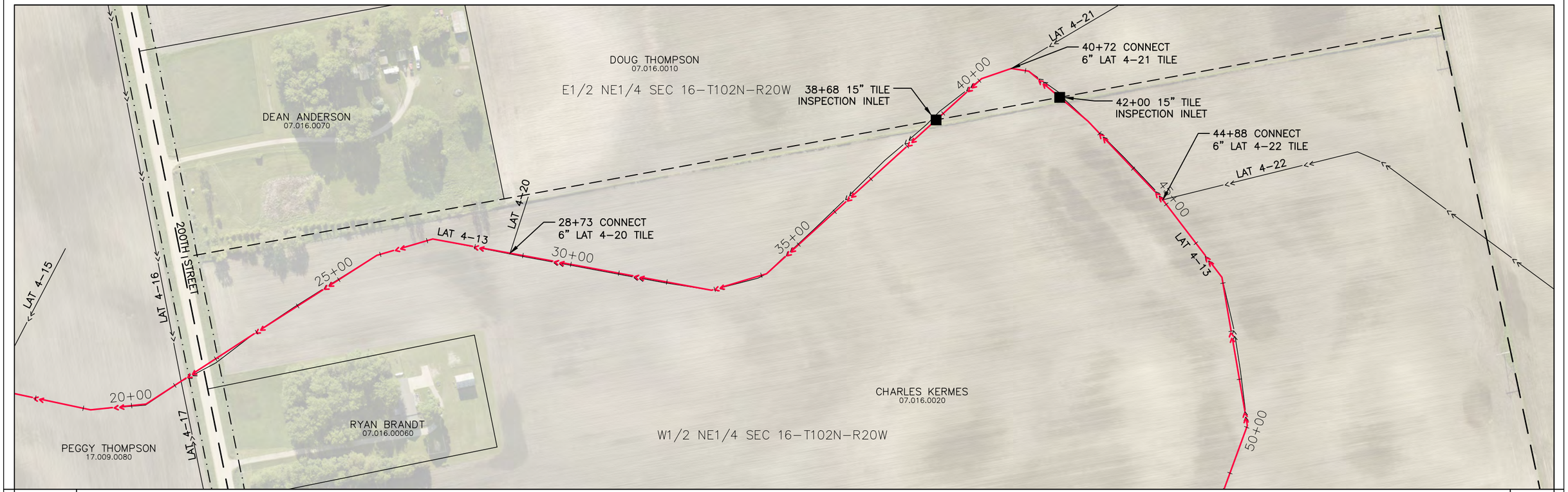
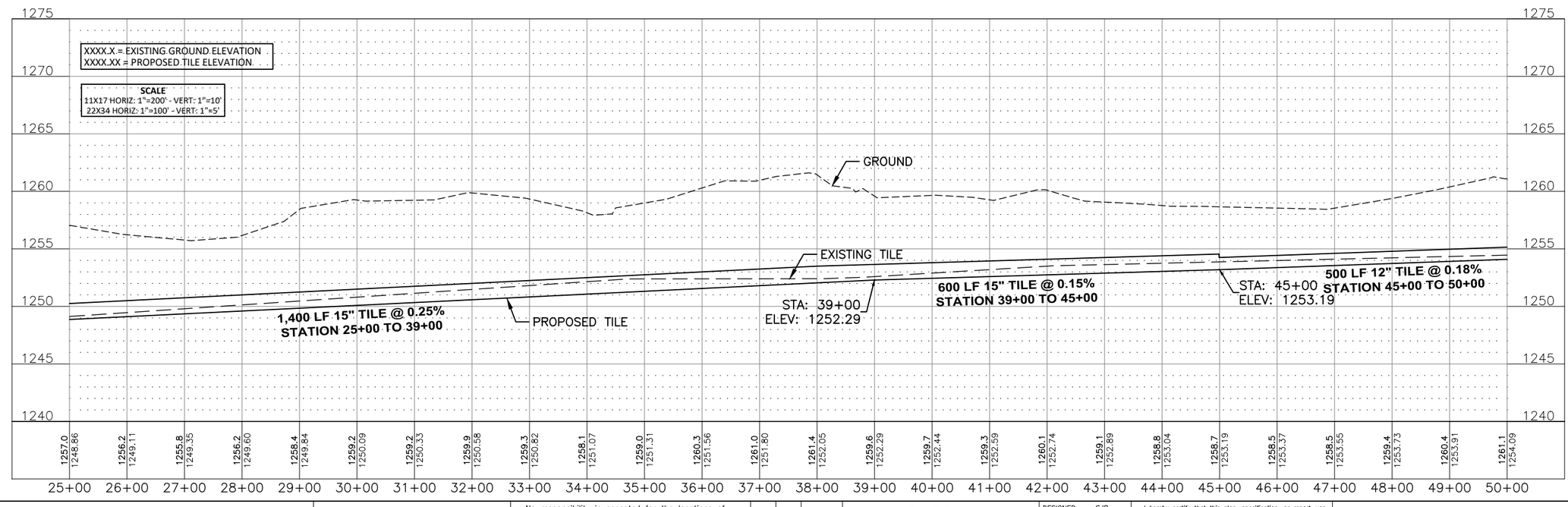
FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
LATERAL 4-13 TILE
STATION 0+00-25+00

SHEET 9 OF 18





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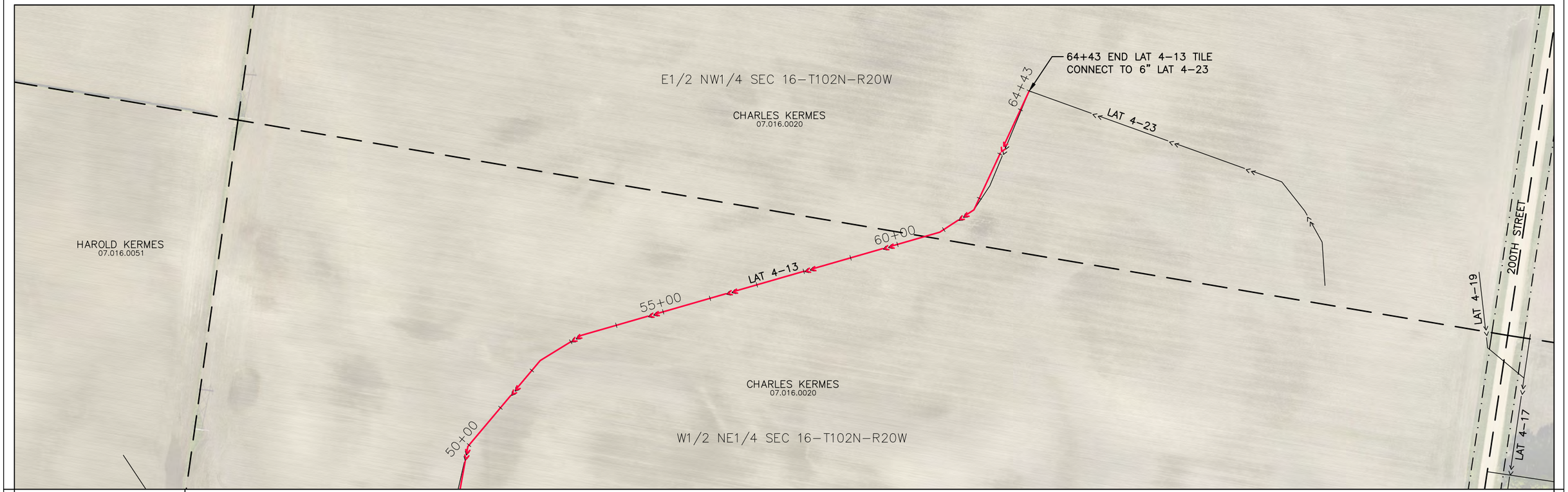
FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
LATERAL 4-13 TILE
STATION 25+00-50+00

SHEET 10 OF 18



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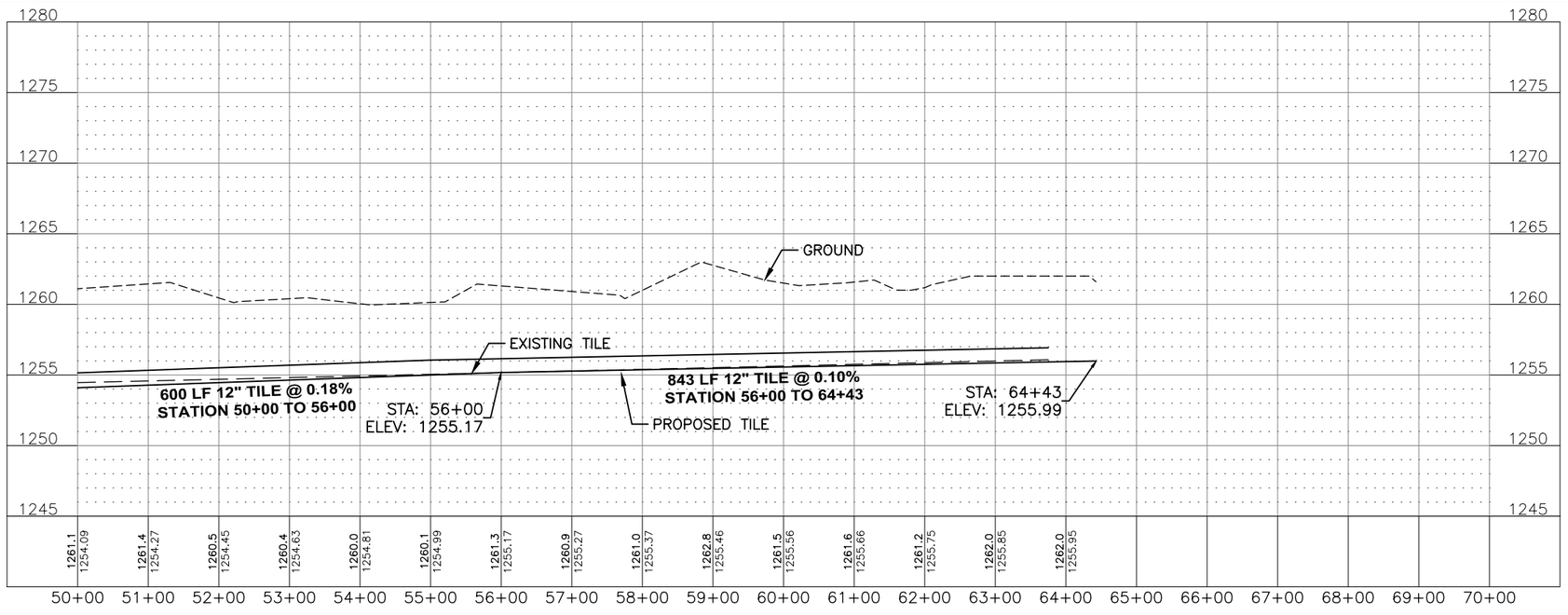

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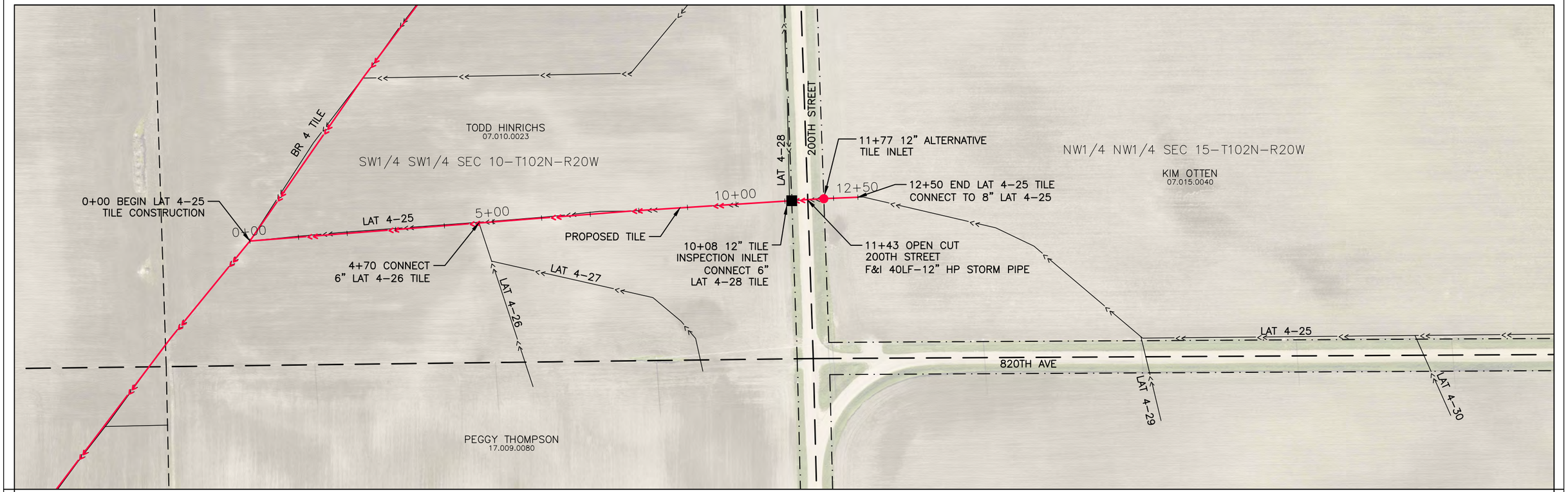
FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
LATERAL 4-13 TILE
STATION 50+00-64+43

SHEET 11 OF 18



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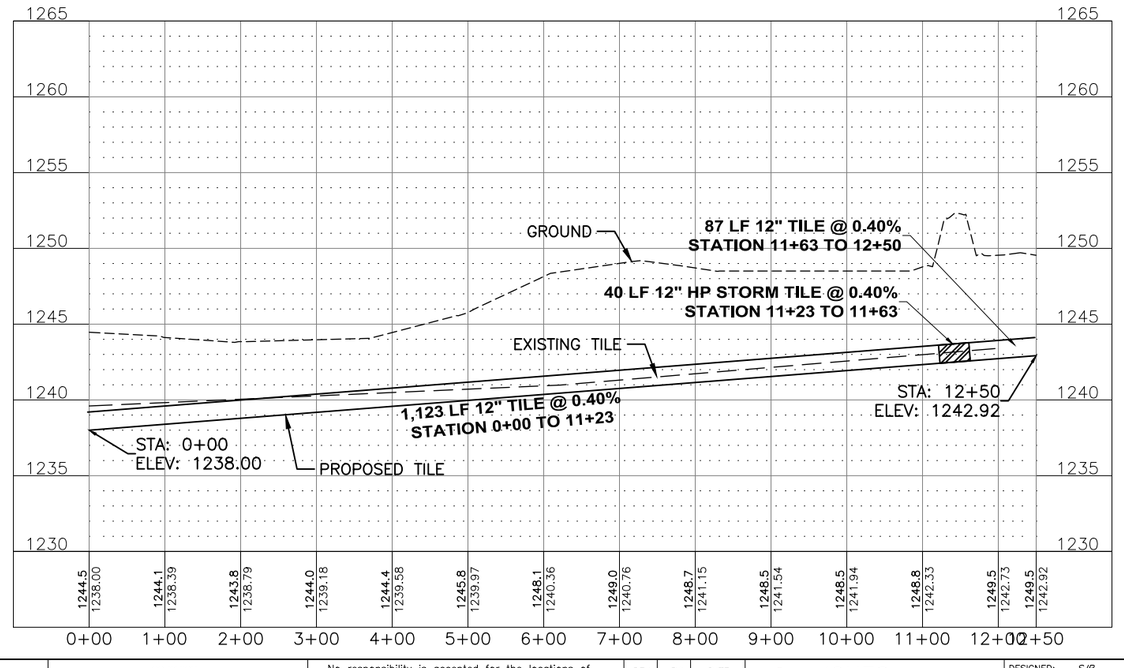

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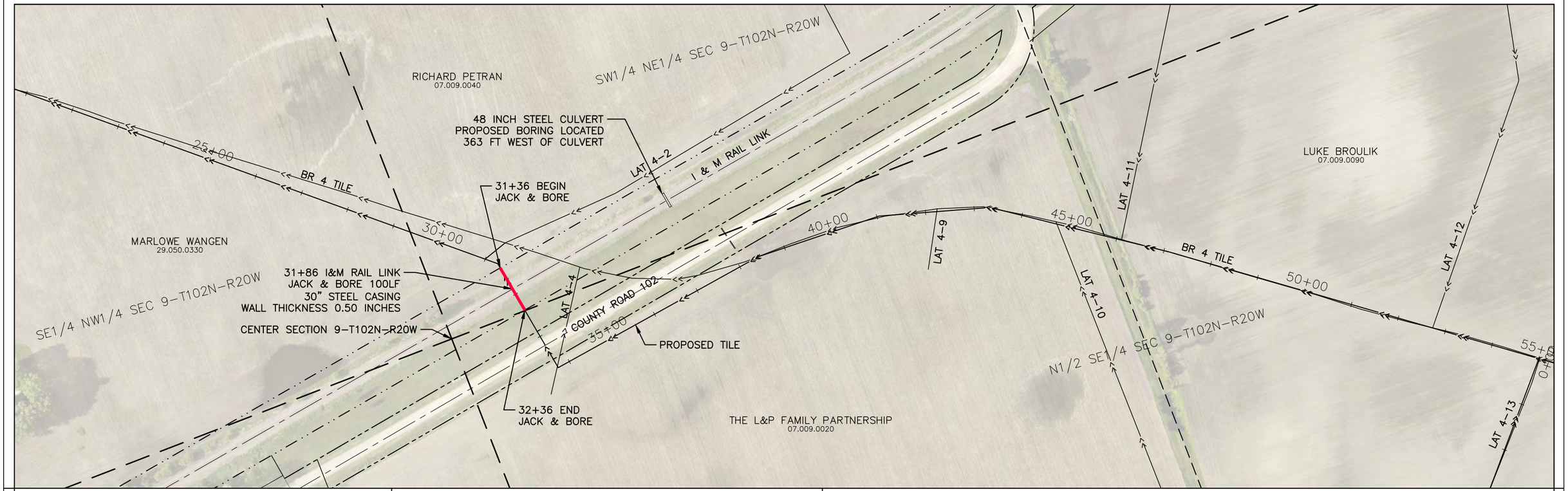
FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
LATERAL 4-25 TILE
STATION 0+00-12+30

SHEET 12 OF 18



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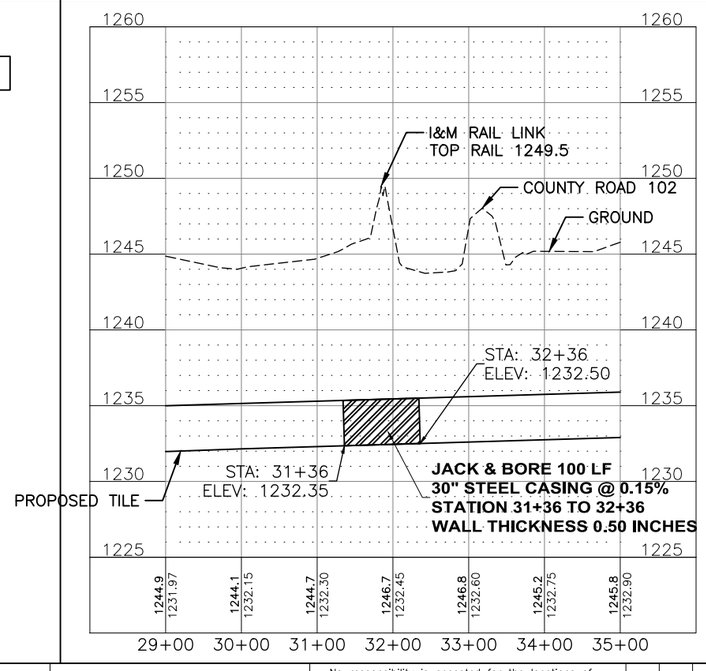

NOTES:

1. THE CONTRACTOR SHALL DRILL OR JACK AND BORE OR AUGER THE STEEL CASING PIPE OF THE SPECIFIED CLASS, DIAMETER AND THICKNESS AND PROPER LINE AND GRADE AS SHOWN ON THE PLANS. THE METHOD OF TUNNELING USED SHALL BE SUCH AS WILL INSURE PROPER ALIGNMENT AND GRADE OF THE PIPE IN FINAL POSITION WITHIN THE TOLERANCES SPECIFIED.

3. THE STEEL CASING PIPE SHALL CONFORM TO THE STANDARDS OF ASTM A53, GRADE B WITH A YIELD STRENGTH OF 36,000 PSI. WALL THICKNESS SHALL BE A MINIMUM OF 0.50 INCHES.

4. THE PLANS AND CONTRACT DOCUMENTS DO NOT WARRANT THE NATURE OR CONDITION OF THE SOILS. THE CONTRACTOR SHALL NOT BE ENTITLED TO ADDITIONAL COMPENSATION FOR ANY OBSTRUCTIONS ENCOUNTERED DURING TRENCHLESS CONSTRUCTION.

5. IF THE PIPE IS FOUND TO BE WITHIN A HORIZONTAL DISTANCE OF THREE FEET OF PLANNED ALIGNMENT AND WITHIN A VERTICAL DISTANCE OF 0.2 FEET OF THE PLANNED ALIGNMENT, THE INSTALLATION SHALL BE APPROVED BY THE ENGINEER. IF VERIFICATION OF LINE AND GRADE REVEALS THAT THESE ALLOWABLE DIMENSIONS ARE EXCEEDED, THE CONTRACTOR AGREES THAT THE PORTION(S) OF THE PIPE OUTSIDE OF THE SPECIFICATION TOLERANCE SHALL BE REALIGNED, AT HIS OWN EXPENSE, UNTIL THEY ARE WITHIN THESE TOLERANCES. THE ENGINEER RESERVES THE RIGHT TO REQUIRE ADDITIONAL EXCAVATIONS FOR VERIFICATION OF THE LINE AND GRADE IF ANY INITIAL EXCAVATIONS REVEAL THE PIPE ALIGNMENT TO EXCEED ALLOWABLE TOLERANCES. SUCH ADDITIONAL EXCAVATIONS SHALL BE PERFORMED AT THE CONTRACTOR'S EXPENSE AND SHALL INCLUDE, BUT NOT BE LIMITED TO, THE COSTS OF EXCAVATION, BACKFILLING, TIME DELAYS, REALIGNMENT, TAMPING AND TURF RESTORATION.

6. ANY FAILED ATTEMPTS AT DRILLING OR JACKING AND BORING OR AUGERING, REGARDLESS OF REASON OR CAUSE OF FAILURE, SHALL BE PAID FOR BY THE CONTRACTOR AT HIS OWN EXPENSE. PAYMENT FOR TUNNELING OR JACKING AND BORING OR AUGERING SHALL BE MADE ONLY FOR PIPE INSTALLED TO THE LINE AND GRADE AND LENGTH AS SHOWN ON THE PLANS AND WITHIN THE AFOREMENTIONED ALLOWABLE TOLERANCES.

7. THE CONTRACTOR SHALL ASSUME ALL RISKS FROM FLOODS, WASHOUTS, CAVING OF TRENCHES AND ALL OTHER DAMAGE THAT MAY OCCUR DURING CONSTRUCTION. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS TO PROTECT HIS WORK.

200 0 200 HORIZ. SCALE FEET

10 0 10 VERT. SCALE FEET

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FREEBORN COUNTY, MN
IMPROVEMENT TO COUNTY DITCH NO. 32
BRANCH 4 TILE
I&M RAIL LINK CROSSING @ 31+86

SHEET 13 OF 18

CONSTRUCTION ACTIVITY INFORMATION

CONSTRUCTION ACTIVITY INFORMATION

PROJECT NARRATIVE: THE PROJECT CONSISTS OF THE CONSTRUCTION TO COUNTY DITCH NO. 32. THE PROJECT IS LOCATED APPROXIMATELY 0.5 MILES EAST OF THE CITY OF HAYWARD, MN; IN SECTIONS 9, 10, 15 AND 16, HAYWARD TOWNSHIP, FREEBORN COUNTY, MN. THE PROJECT INCLUDES INSTALLATION OF 19,147 FEET OF TILE, BORINGS, SEEDING AND ASSOCIATED EROSION CONTROL.

PROJECT NAME: REPAIR & IMPROVEMENT TO COUNTY DITCH NO. 32

PROJECT LOCATION: SECTIONS 9, 10, 15 AND 16, HAYWARD TOWNSHIP, FREEBORN COUNTY, MN

PROJECT AREAS:
- TOTAL ESTIMATED PROJECT SIZE: 30 ACRES DISTURBED
- EXISTING IMPERVIOUS SURFACE AREA = 0.00 ACRES
- POST CONSTRUCTION IMPERVIOUS SURFACE AREA = 0.00 ACRES
- TOTAL NEW IMPERVIOUS SURFACE AREA = 0.00 ACRES

PROJECT TYPE: AGRICULTURAL DRAINAGE

SOIL TYPES:

5B	DAKOTA LOAM, 2 TO 6 PERCENT SLOPES
27B	DICKINSON FINE SANDY LOAM, 2 TO 6 PERCENT SLOPES
27C	DICKINSON FINE SANDY LOAM, 6 TO 16 PERCENT SLOPES
41	ESTHERVILLE SANDY LOAM, 0 TO 2 PERCENT SLOPES
94B	TERRIL LOAM, 2 TO 6 PERCENT SLOPES
102B	CLARION LOAM, 2 TO 6 PERCENT SLOPES
102C	CLARION LOAM, 6 TO 10 PERCENT SLOPES
106B	LESTER LOAM, 2 TO 6 PERCENT SLOPES
140	SPICER SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES
156	FARIHAVEN LOAM, 0 TO 2 PERCENT SLOPES
247	LINDER SANDY LOAM, 0 TO 3 PERCENT SLOPES
253	MAXCREEK SILTY CLAY LOAM
255	MAYER LOAM, 0 TO 2 PERCENT SLOPES
350	CANISTEO CLAY LOAM, 0 TO 1 PERCENT SLOPES
377	MERTON SILT LOAM, 1 TO 3 PERCENT SLOPES
380	HAVANA SILT LOAM
400	WACOUSTA SILT LOAM
921C	CLARION-STORDEN COMPLEX, 6 TO 10 PERCENT SLOPES
L13A	KLOSSNER MUCK, 0 TO 1 PERCENT SLOPES
L78A	CANISTEO CLAY LOAM, 0 TO 2 PERCENTS SLOPES
L83A	WEBSTER CLAY LOAM, 0 TO 2 PERCENT SLOPES
L84A	GLENCOE CLAY LOAM, 0 TO 2 PERCENT SLOPES
L85A	NICOLLET CLAY LOAM, 1 TO 3 PERCENT SLOPES

RECEIVING WATERS:
- FREEBORN COUNTY DITCH 32
- IN NW ¼ SECTION 9, HAYWARD TOWNSHIP
- RECEIVING WATER IS NOT IDENTIFIED AS A "SPECIAL OR IMPAIRED" WATER
- NO ADDITIONAL BMP'S ARE REQUIRED

DATES OF CONSTRUCTION: 3-2024 TO 12-2024

A NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER CONSTRUCTION PERMIT MUST BE SECURED FROM THE MPCA AT LEAST 7 DAYS PRIOR TO BEGINNING CONSTRUCTION.

GENERAL SITE INFORMATION

IMMEDIATELY FOLLOWING GRADING OF SLOPES OF 3:1 OR GREATER WHICH DRAIN TO WATERS OF THE STATE, SLOPES WILL BE STABILIZED WITH EROSION BLANKET OR HYDROSEEDING OVER A MINIMUM OF 6" OF TOPSOIL.

ALL EROSION CONTROL MEASURES SHALL REMAIN IN PLACE AND BE MAINTAINED IN GOOD CONDITION UNTIL THE SITE HAS BEEN RE-VEGETATED. THE CONTRACTOR MAY REMOVE NECESSARY SILT FENCING TO CONSTRUCT ROADWAYS WHILE MAINTAINING ADEQUATE EROSION CONTROL IN ADJACENT AREAS.

SUFFICIENT TOPSOIL SHALL BE STOCKPILED TO ALLOW FOR THE REPLACEMENT OF A MINIMUM OF 6" OF TOPSOIL FOR DISTURBED AREAS TO BE RE-VEGETATED. STOCKPILES WILL BE STABILIZED WITH TARPS OR SEEDED WITH OATS OR WINTER WHEAT WITHIN 7 DAYS OF COMPLETION, WITH SILT FENCE RINGS IN PLACE PRIOR TO STOCKPILE CONSTRUCTION.

CONTRACTOR WILL SCHEDULE SITE GRADING, UTILITY INSTALLATION, AND GRAVEL SURFACE CONSTRUCTION SO THAT THE GENERAL SITE CAN BE MULCHED AND RE-SEEDED SOON AFTER DISTURBANCE.

DISTURBED AREAS SHALL BE STABILIZED WITHIN 7 DAYS OF CESSATION OF DISTURBANCE. STABILIZATION ACTIVITIES WILL BEGIN IMMEDIATELY AND BE COMPLETED WITHIN 7 DAYS. STABILIZATION WILL BE COMPLETED WITHIN 7 DAYS FOR SLOPES 3:1 AND STEEPER OR WHEN IDENTIFIED AS IMPAIRED.

SILT FENCES WILL BE CHECKED AFTER EACH RAIN EVENT AND DAILY DURING A PROLONGED RAINFALL. IMMEDIATELY REPAIR FAILED OR FAILING MEASURES AND REPORT IN LOG BOOK. REMOVE SEDIMENT DEPOSITS FROM SILT FENCE AND BALE CHECKS WHEN SEDIMENT REACHES APPROXIMATELY 1/2 THE HEIGHT OF THE BARRIER.

BARRIERS WILL BE REPLACED WHEN THEY DECOMPOSE OR BECOME INEFFECTIVE BEFORE THE BARRIERS ARE NO LONGER NECESSARY. ANY SEDIMENT REMAINING IN-PLACE AFTER THE BARRIERS ARE NO LONGER NECESSARY WILL BE DRESSED TO CONFORM TO EXISTING GRADE, AND PREPARED AND SEEDED WITH THE APPROPRIATE SEED MIX, AS DIRECTED BY THE ENGINEER.

IN THOSE AREAS WHERE WOOD FIBER BLANKET OR OTHER SLOPE STABILIZATION METHODS HAVE FAILED, THE SLOPE SHALL BE REESTABLISHED, SEED AND TOPSOIL REPLACED, AND ADDITIONAL SLOPE TREATMENT INSTALLED AS DIRECTED BY THE ENGINEER. BARRIERS WILL BE REMOVED WHEN FINAL STABILIZATION OF THE SLOPES HAS BEEN COMPLETED AS DETERMINED BY THE ENGINEER. NO STORMWATER MITIGATION MEASURES WERE REQUIRED AS A PART OF ENVIRONMENTAL, ARCHAEOLOGICAL OR OTHER REQUIRED LOCAL, STATE, OR FEDERAL REVIEW OF THIS PROJECT. THIS PROJECT IS NOT LOCATED IN A KARST AREA NECESSITATING MEASURES TO PROTECT DRINKING WATER SUPPLY.

EROSION PREVENTION PRACTICES

APPROPRIATE CONSTRUCTION PRACTICES WILL BE USED TO MINIMIZE EROSION. AREAS OF NON-DISTURBANCE WILL BE DELINEATED (FLAGGED, ETC.) ON THE SITE BEFORE WORK BEGINS.

CONTRACTOR SHALL PHASE CONSTRUCTION, MAINTAIN VEGETATIVE BUFFER STRIPS, AND PROVIDE HORIZONTAL SLOPE STAKING IN ORDER TO MINIMIZE EROSION. SUGGESTED CONSTRUCTION SEQUENCING TO MINIMIZE EXPOSED AREAS SUBJECT TO EROSION HAS BEEN SHOWN, BUT ULTIMATE SEQUENCING IS UP TO THE CONTRACTOR. THE SWPPP ON-SITE WILL BE RED-LINED BY THE CONTRACTOR TO INDICATE FINAL SEQUENCING.

DOWNSTREAM SILT FENCE AND INLET PROTECTION DEVICES WILL BE INSTALLED PRIOR TO EARTH MOVING ACTIVITIES.

SLOPES SHALL BE "CAT-TRACKED" WHEN COMPLETE SUCH THAT THE TRACK DEPRESSIONS ARE PERPENDICULAR TO DRAINAGE FLOW.

SILT FENCE SHALL BE INSTALLED BEFORE WORK BEGINS. SILT FENCE LIMITS SHALL COINCIDE WITH DOWNGRADE GRADING LIMITS UNLESS OTHERWISE NOTED.

SILT FENCE USED ON SLOPES SHALL BE PLACED SUCH THAT 100 LINEAL FEET OF SILT FENCE STABILIZES APPROXIMATELY 0.25 ACRES OF DRAINAGE.

THE WETTED PERIMETER OF DRAINAGE SWALES WILL BE STABILIZED WITH RAPID STABILIZATION MEASURES WITHIN 200' OF THE SITE BOUNDARY LINE WITHIN 24 HOURS.

PIPE OUTLETS WILL BE PROVIDED WITH ENERGY DISSIPATION (RIP RAP) WITHIN 24 HOURS OF CONNECTION TO WATERS OF THE STATE.

IF NOT SHOWN ON THE PLAN: ALL EXPOSED SOIL AREAS WITHIN 200' OF SURFACE WATER OR A STORMWATER CONVEYANCE WHICH HAVE CONTINUOUS POSITIVE SLOPES WILL HAVE TEMPORARY EROSION PROTECTION OR PERMANENT COVER FOR THE EXPOSED SOILS YEAR-ROUND, ACCORDING TO THE FOLLOWING TABLE OF SLOPES AND TIME FRAMES:

GRADE OF SLOPE	TIME (MAX.)	BMP
STEEPER THAN 3:1	7 DAYS	RAPID STABILIZATION METHOD 4
4:1 TO 3:1	7 DAYS	RAPID STABILIZATION METHOD 2
FLATTER THAN 4:1	7 DAYS	TYPE 1 DISC ANCHORED MULCH

STABILIZATION WILL COMMENCE IMMEDIATELY UPON COMPLETION OF GRADING AND BE COMPLETE WITHIN THE STATED TIMEFRAME UNLESS FURTHER GRADING ACTIVITIES WILL COMMENCE PRIOR TO COMPLETION DATE. FROZEN GROUND IS CONSIDERED STABILIZED.

CUT AREAS WHERE NO GRADING HAS OCCURRED WITHIN 7 DAYS WILL BE STABILIZED USING BIO-ROLLS A MINIMUM OF EVERY 20 LINEAL FEET IN ORDER TO PREVENT EROSION.

FILL SLOPES WHICH DRAIN TO WATERS OF THE STATE OR OFFSITE SHALL BE STABILIZED IMMEDIATELY UPON CESSATION OF GRADING ACTIVITIES. THUS, IF SLOPES ARE BROUGHT TO SUBGRADE ELEVATION AND WILL CEASE BEING WORKED ON UNTIL TOPSOIL RE-SPREADING, THEY WILL BE STABILIZED IN THE INTERIM. STABILIZE SLOPES WITH INTERIM LINES OF SILT FENCE OR BIO-ROLLS EVERY 20 LINEAL FEET.

SOIL STOCKPILES WHICH REMAIN UNWORKED FOR MORE THAN 7 DAYS WILL BE STABILIZED WITH SEED AND MULCH OR TARPS WITH SILT FENCE RINGS IN PLACE PRIOR TO STOCKPILE CONSTRUCTION. DO NOT LOCATE STOCKPILES IN BUFFERS OR SURFACE WATERS.

THE WETTED PERIMETER OF THE LAST 200' OF DRAINAGE SWALES WILL BE STABILIZED WITHIN 24 HOURS OF CONNECTING TO A SURFACE WATER OR PROPERTY LINE. DO NOT USE MULCH, TACKIFIER OR SIMILAR EROSION PREVENTION MEASURES IF THE SLOPES OF SWALES ARE GREATER THAN 2%.

SEDIMENT CONTROL PRACTICES

CONTRACTOR SHALL FURNISH, INSTALL, AND MAINTAIN:
SEDIMENT CONTROLS FOR TEMPORARY AND PERMANENT DRAINAGE BASINS AND DRAINAGE DITCHES THAT ARE A PART OF THIS DESIGN, AND UPGRADIENT OF ANY BUFFER ZONES, INCLUDING:

- CHECK DAMS AND/OR WOOD FIBER BLANKETS TO ENSURE SHEET FLOW AND PREVENT RILLS FOR SLOPE LENGTHS GREATER THAN 75' WITH A SLOPE OF 3:1 OR GREATER (SEE NOTES ON BIO-ROLLS SPACED EVERY 20' ABOVE)
- SILT FENCE AT ALL DOWN GRADIENT PERIMETERS INSTALLED PRIOR TO ALL LAND DISTURBING ACTIVITIES
- INLET PROTECTION AT ALL EXISTING AND PROPOSED INLETS.
- SILT FENCING AROUND TEMPORARY SOIL STOCKPILES
- ROCK OR WOOD CHIP CONSTRUCTION SITE ENTRANCES
- DAILY STREET SWEEPING OF TRACKED SEDIMENT ONTO ROADWAYS
- CONCRETE TRUCKS SHALL PERFORM WASHOUT ACTIVITIES OFFSITE

TYPICALLY, UTILIZE THE PERMANENT STORMWATER PONDS FOR TEMPORARY SEDIMENTATION. IF AN AREA GREATER THAN 5 ACRES IS DESIGNED TO EVENTUALLY DRAIN TO A FILTRATION OR INFILTRATION BASIN, CONSTRUCT A TEMPORARY SEDIMENTATION BASIN UPSTREAM OF ULTIMATE BASIN.
CLEAN OUT TEMPORARY BASINS WHEN SEDIMENT DEPTH REACHES ½ VOLUME WITHIN 72 HOURS OF DISCOVERY.

IF SURFACE WATER IS TO DISCHARGE OFFSITE BEFORE TREATMENT, DIRECT TO VEGETATED AREAS.

*ESTIMATED QTY'S**

DESCRIPTION	EST QTY
INLET PROTECTION	19 EA
ROCK CONSTRUCTION ENTRANCE	6 EA
SILT FENCE–HEAVY DUTY	400 LF
CULVERT END CONTROLS	4 EA
SEEDMIX 25–142 & CAT 3 BLANKET	600 SY
SEEDMIX 25–142 & TYPE 1 MULCH	0.30 ACRE
RIPRAP, CL 2 & 3	150 TON

*ESTIMATES NOT FOR BIDDING PURPOSES AND ARE TO BE USED AS A GUIDE ONLY. SEE SPECIAL PROVISION AND BID DOCUMENTS FOR MORE INFORMATION. BIDDERS ARE PRESUMED TO HAVE VIEWED THE PROJECT TO FAMILIARIZE THEMSELVES AS TO THE EXTENT OF THE BMP'S REQUIRED AND SHALL PERFORM THEIR OWN TAKEOFFS FOR BIDDING.

DEWATERING AND BASIN DRAINING

CONTRACTOR SHALL PROVIDE PERMITS FOR ALL DEWATERING ACTIVITIES. ALL DEWATERING ACTIVITIES SHALL DISCHARGE TO A TEMPORARY SEDIMENTATION BASIN OR DEWATERING BASIN CONSTRUCTED NEAR OR PART OF THE PERMANENT STORMWATER BASIN.

THE DEWATERING OR TEMPORARY SEDIMENT BASINS WILL BE PUMPED THROUGH A FILTRATION SYSTEM CONSTRUCTED BY THE CONTRACTOR PRIOR TO DISCHARGE. NO BACKWASHING OF FILTERS ON-SITE.

DEWATERING CHANNELS WHICH ARE OVER LAND SHALL BE PROTECTED FROM EROSION. PLACE END OF HOSE ON FABRIC OR PLASTIC TO PREVENT EROSION.

CLEAN OUT TEMPORARY SEDIMENT BASINS TO DESIGN VOLUME AFTER SEDIMENT REACHES 1/2 DESIGN VOLUME.

CONSTRUCT DEWATERING ACTIVITIES SUCH THAT THEY WILL NOT CAUSE NUISANCE CONDITIONS, EROSION IN RECEIVING CHANNELS OR ON DOWN SLOPE PROPERTIES OR ADVERSELY AFFECT WETLANDS.

ADDITIONAL BMP'S FOR SPECIAL WATERS

THIS PROJECT DOES NOT DISCHARGE TO SPECIAL WATERS OR HAVE SIGNIFICANT IMPACTS TO WETLANDS.

INSPECTIONS AND MAINTENANCE

CONTRACTOR SHALL INSPECT AND MAINTAIN MEASURES AT MINIMUM ONCE EVERY (7) DAYS DURING ACTIVE CONSTRUCTION, AND WITHIN 24 HOURS AFTER A RAINFALL EVENT OF 0.5" IN 24 HOURS. ALSO INSPECT AREAS ADJACENT TO THE SITE FOR ROGUE EROSION OR SEDIMENT.

DEWATERING DISCHARGE POINTS WILL BE PHOTOGRAPHED DAILY WITH RECORDS MAINTAINED IF DISCHARGE REACHES A SURFACE WATER.

INSPECTIONS WILL INCLUDE STABILIZED AREAS, EROSION PREVENTION AND SEDIMENT CONTROLS, AGGREGATE SURFACES, DISCHARGE CHANNELS AND DEVICES, PERMANENT STORMWATER BMP'S AND RECEIVING STORM SEWER FACILITIES.

STABILIZED AREAS WILL BE INSPECTED ONCE PER MONTH. WHERE WORK HAS BEEN SUSPENDED DUE TO FROZEN GROUND CONDITIONS, INSPECTIONS AND MAINTENANCE WILL TAKE PLACE AS SOON AS FIRST RUNOFF OCCURS AT THE SITE OR PRIOR TO RESUMING CONSTRUCTION, WHICHEVER COMES FIRST.

CONSTRUCTION SITE VEHICLE ENTRANCES WILL BE INSPECTED FOR EVIDENCE OF OFF-SITE SEDIMENT BEING TRACKED ONTO PAVED SURFACES DAILY. TRACKED SEDIMENT MUST BE REMOVED FROM ALL OFF-SITE PAVED SURFACES WITHIN 24 HOURS OF DISCOVERY.

THE INSPECTION LOG MUST INCLUDE THE: DATE AND TIME, NAME OF INSPECTOR, FINDINGS INCLUDING SPECIFIC LOCATIONS OF CORRECTIONS REQUIRED, CORRECTIVE ACTIONS TAKEN WITH DATE AND TIME, RAINFALL AMOUNTS AND DATES VIA RAIN GAUGE OR WEATHER STATION WITHIN 1 MILE, DOCUMENTATION OF SEDIMENT DISCHARGE FROM SITE WITH PHOTOGRAPHS.

REPAIR ALL NONFUNCTIONAL BMP'S BY THE END OF THE NEXT BUSINESS DAY OR AS SOON AS FIELD CONDITIONS ALLOW.

RECORDS RETENTION

CONTRACTOR SHALL MAINTAIN RECORDS OF THE SEDIMENT RETENTION PROCEDURES ON-SITE. RECORDS WILL INCLUDE:COPY OF THE SWPPP AND ANY CHANGES, INSPECTION AND MAINTENANCE RECORDS, PERMANENT OPERATION AND MAINTENANCE AGREEMENTS, CALCULATIONS FOR THE DESIGN OF TEMPORARY AND PERMANENT STORMWATER MANAGEMENT SYSTEMS.

POLLUTION PREVENTION MANAGEMENT MEASURES

SOLID WASTE:
COLLECTED SEDIMENT, ASPHALT AND CONCRETE MILLINGS, FLOATING DEBRIS, PAPER, PLASTIC, FABRIC, CONSTRUCTION AND DEMOLITION DEBRIS AND OTHER WASTES MUST BE DISPOSED OF PROPERLY AND MUST COMPLY WITH MPCA DISPOSAL REQUIREMENTS. SIGNED SEPARATE DISPOSAL BINS WITH A SIGN REQUIRING USE OF SAID BINS WILL BE INSTALLED AND UTILIZED.

CONCRETE AND OTHER WASHOUTS:
PERFORM ALL CONCRETE TRUCK WASHOUTS OFFSITE.

SOLID AND LIQUID WASHOUT WASTE FROM OTHER MATERIALS (STUCCO, PAINT, FORM RELEASE OILS CURING COMPOUNDS ETC.) WILL BE DISPOSED OF IN A PROPERLY DESIGNATED LANDFILL.

PERFORM ALL HANDTOOLS WASHOUTS IN A LEAKPROOF CONTAINMENT FACILITY OR IMPERMEABLE LINER THAT PREVENTS RUNOFF ONTO ADJACENT SOILS. DEBRIS/SEDIMENT WILL NOT CONTACT THE GROUND SURFACE. A SIGN REQUIRING USE OF PROPER WASHOUT FACILITIES WILL BE INSTALLED ADJACENT TO SAID FACILITIES.

HAZARDOUS MATERIALS:
OIL, GASOLINE, PAINT AND ANY HAZARDOUS SUBSTANCES WILL BEE PROPERLY STORED, INCLUDING SECONDARY CONTAINMENT TO PREVENT SPILLS, LEAKS, OR OTHER DISCHARGE. RESTRICTED ACCESS TO STORAGE AREAS WILL BE PROVIDED TO PREVENT VANDALISM. STORAGE AND DISPOSAL OF HAZARDOUS WASTE WILL BE IN COMPLIANCE WITH MPCA REGULATIONS.

PLASTIC SHEETING UNDER AN ABSORBENT MATERIAL WILL BE PLACED ON THE GROUND NEAR FUEL STORAGE TANKS TO PREVENT SPILLS WHEN LOADING OR UNLOADING THE TANKS. SPILL KITS WILL BE PROVIDED NEAR STORAGE.

EXTERNAL WASHING OF TRUCKS AND OTHER CONSTRUCTION VEHICLES IS NOT ALLOWED ON-SITE. NO ENGINE DEGREASING IS ALLOWED ON SITE.

NO FLOCCULENTS ARE BEING UTILIZED TO ENHANCE SEDIMENTATION IN RETENTION FACILITIES.

PORTABLE TOILETS WILL BE SECURED.

SWPPP IMPLEMENTATION CHAIN OF RESPONSIBILITY

THE GENERAL CONTRACTOR SHALL PROVIDE A TRAINED, CERTIFIED, KNOWLEDGEABLE PERSON WHO SHALL SERVE AS THE SITE'S EROSION CONTROL INSPECTOR. THIS PERSON SHALL BE RESPONSIBLE FOR INSTALLATION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL BMP'S, AND SHALL MAINTAIN THE INSPECTION LOG AT THE PROJECT SITE.

EACH SUBCONTRACTOR ON-SITE WILL DESIGNATE AN EMPLOYEE AS ITS PROJECT SWPPP OFFICER. A LIST OF THESE OFFICERS WITH CONTACT INFORMATION WILL BE AVAILABLE ON-SITE. IT WILL BE SOLELY THE SWPPP OFFICERS' RESPONSIBILITY TO ENSURE THAT ALL ON-SITE ACTIVITIES PERFORMED BY ITS COMPANY COMPLY WITH THE SWPPP. THE GENERAL CONTRACTOR'S SWPPP INSPECTOR WILL HAVE AUTHORITY OVER ALL SUBCONTRACTOR'S SWPPP OFFICERS FOR WORK PERTAINING TO COMPLIANCE.

NOTE THE PERSONS RESPONSIBLE FOR EACH CONTRACTOR IN THE SWPPP.

SHOULD A SWPPP OFFICER FAIL TO ENSURE COMPLIANCE, THAT OFFICER'S FOREMAN OR DIRECT SUPERVISOR WILL ASSUME ALL RESPONSIBILITY.

SHOULD A SUBCONTRACTOR FAIL TO COMPLY WITH THE SWPPP, THE GENERAL CONTRACTOR WILL ASSUME ALL RESPONSIBILITY FOR COMPLIANCE.

SHOULD THE GENERAL CONTRACTOR FAIL TO COMPLY WITH THE SWPPP, THE OWNER WILL ASSUME ALL RESPONSIBILITY FOR COMPLIANCE.

SWPPP AMENDMENTS

THE CONTRACTOR IS RESPONSIBLE FOR DOCUMENTING CHANGES TO THE SWPPP VIA MARKUPS ON THE ON-SITE SWPPP DOCUMENTS. SHOULD ADDITIONAL MEASURES BE NEEDED BEYOND THE CAPABILITY OF THE CONTRACTOR, THE CONTRACTOR WILL CONTACT THE SWPPP DESIGNER FOR ASSISTANCE.

PERMIT TERMINATION CONDITIONS

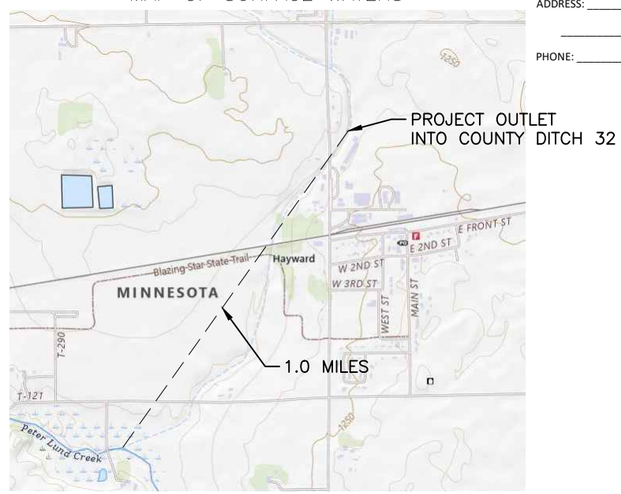
THE CONTRACTOR WILL BE A CO-PERMITEE DURING THE CONSTRUCTION OF THE PROJECT. AFTER DESIGNATED SURFACING OF THE PROJECT HAS BEEN COMPLETED, 70% PERMANENT VEGETATIVE COVER HAS BEEN ESTABLISHED OVER THE PERVIOUS AREAS OF THE SITE, THE PERMANENT STORMWATER TREATMENT FACILITIES ARE OPERATING AS DESIGNED AND HAVE BEEN RETURNED TO DESIGN CAPACITY, ANY SEDIMENT HAS BEEN REMOVED FROM STORMWATER CHANNELS, TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES HAVE BEEN REMOVED, DATED PHOTOGRAPHS OF THE SITE SHOWING FINAL STABILIZATION HAVE BEEN SUBMITTED TO THE OWNER, THE OWNER WILL, WITHIN 30 DAYS, SUBMIT THE NOTICE OF TERMINATION (NOT) AND DATED PHOTOGRAPHS TO THE MPCA.

NOTIFICATION OF THE MPCA IN CASE OF POLLUTION

IT IS THE DUTY OF THE CONTRACTOR TO NOTIFY THE MPCA IMMEDIATELY OF ANY DISCHARGE, ACCIDENTAL OR OTHERWISE, OF ANY SUBSTANCE OR MATERIAL UNDER HIS CONTROL WHICH, IF NOT RECOVERED, MAY CAUSE POLLUTION OF WATERS OF THE STATE, AND THE CONTRACTOR SHALL RECOVER AS RAPIDLY AND THOROUGHLY AS POSSIBLE SUCH SUBSTANCE OR MATERIAL AND TAKE IMMEDIATELY SUCH OTHER ACTION AS MAY BE REASONABLY POSSIBLE TO MINIMIZE OR ABATE POLLUTION OF WATERS OF THE STATE CAUSED THEREBY. SEDIMENT LEAVING THE CONSTRUCTION SITE AND ENTERING A PUBLIC WATER IS CAUSE FOR NOTIFICATION. PETROLEUM SPILLS LARGER THAN 5 GALLONS MUST BE REPORTED.

MINNESOTA DUTY OFFICER: 800-422-0798

MAP OF SURFACE WATERS



QUALIFIED SWPPP PERSONNEL INFORMATION

CERTIFIED SWPPP DESIGNER:
JOHN H. SCHULTE V, PE
JONES HAUGH & SMITH, INC.
515 SOUTH WASHINGTON AVE
ALBERT LEA, MN 56007
(507) 451-4598

DATES OF LAST TRAINING: 1/15/24 Expires 2027
CONTENT: U of M DESIGN OF CONSTRUCTION SWPPP

CERTIFIED EROSION CONTROL SUPERVISOR:

NAME: _____
FIRM: _____
ADDRESS: _____
_____
PHONE: _____
DATES OF LAST TRAINING: _____
CONTENT: _____

CERTIFIED SWPPP INSTALLER:

NAME: _____
FIRM: _____
ADDRESS: _____
_____
PHONE: _____
DATES OF LAST TRAINING: _____
CONTENT: _____

CERTIFIED SWPPP INSPECTOR:

NAME: _____
FIRM: _____
ADDRESS: _____
_____
PHONE: _____
DATES OF LAST TRAINING: _____
CONTENT: _____

CONTRACTOR:

NAME: _____
FIRM: _____
ADDRESS: _____
_____
PHONE: _____

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GOPHER STATE ONE–CALL: 1–800–252–1166

REV.	BY	DATE

JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave.
Albert Lea, MN 56007
507-373-4876
415 West North Street
Owatonna, MN 55060
507-451-4598

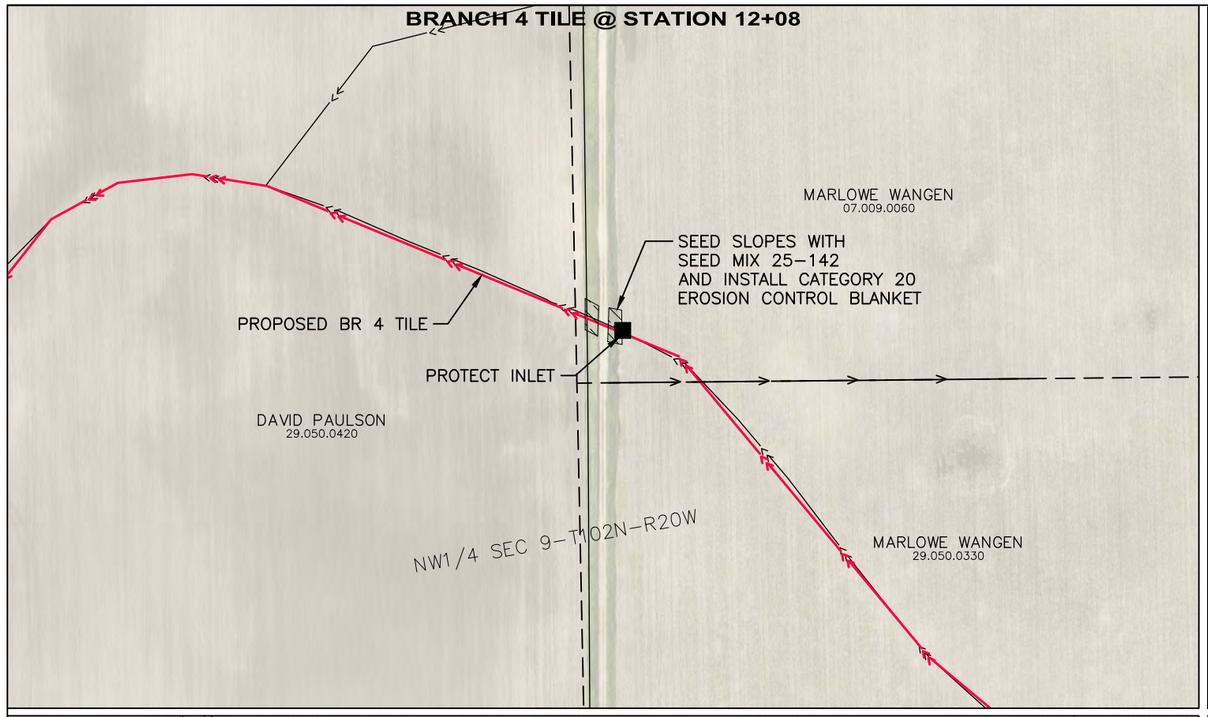
DESIGNED: SJP
DRAWN: SJP
CHECKED: SJP
DATE: 9-30-24
DWG: 17-426.DWG

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.
Steven J. Penkava
Lic. No. 43895 Date: 9-30-24

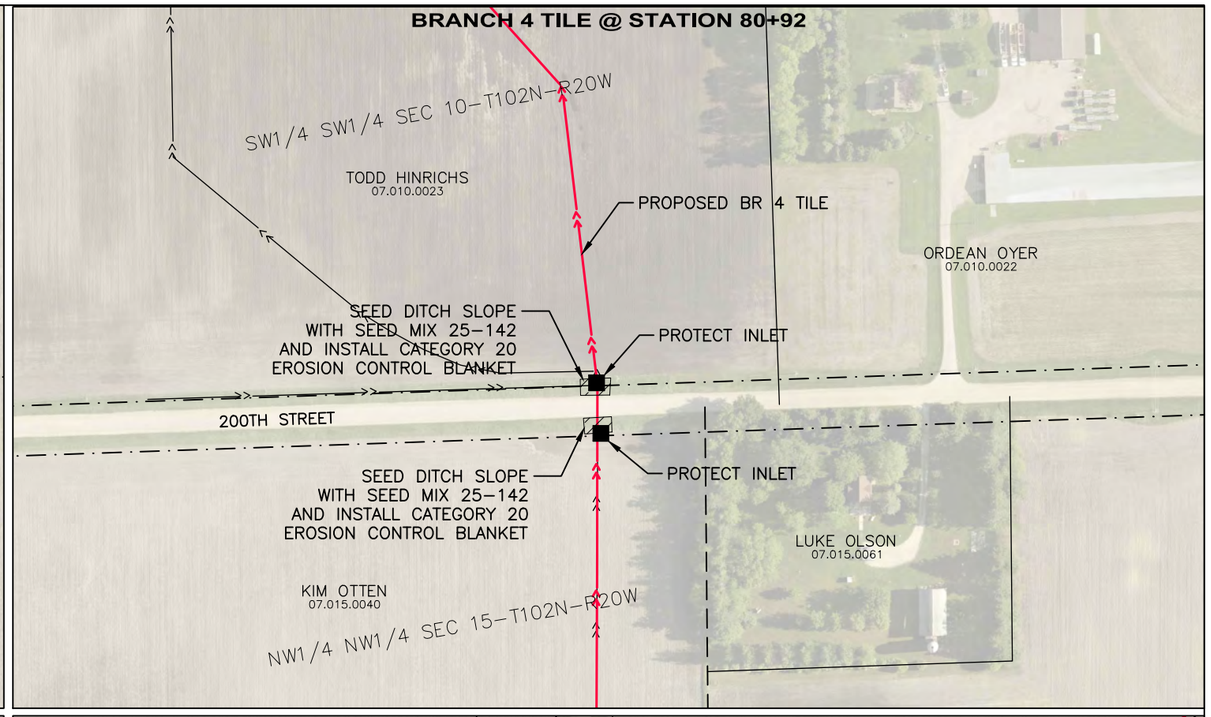
FREEBORN COUNTY. MN
IMPROVEMENT TO COUNTY DITCH NO. 32
SWPPP NARRATIVE

SHEET 14 OF 18

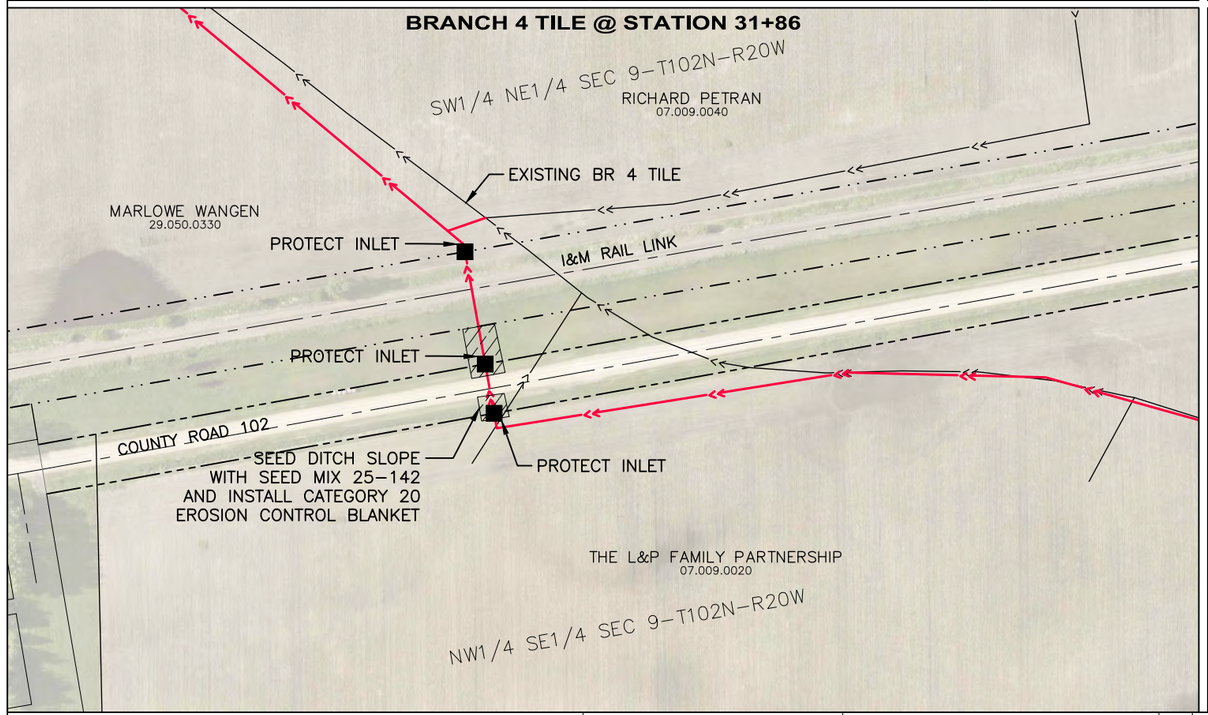
BRANCH 4 TILE @ STATION 12+08



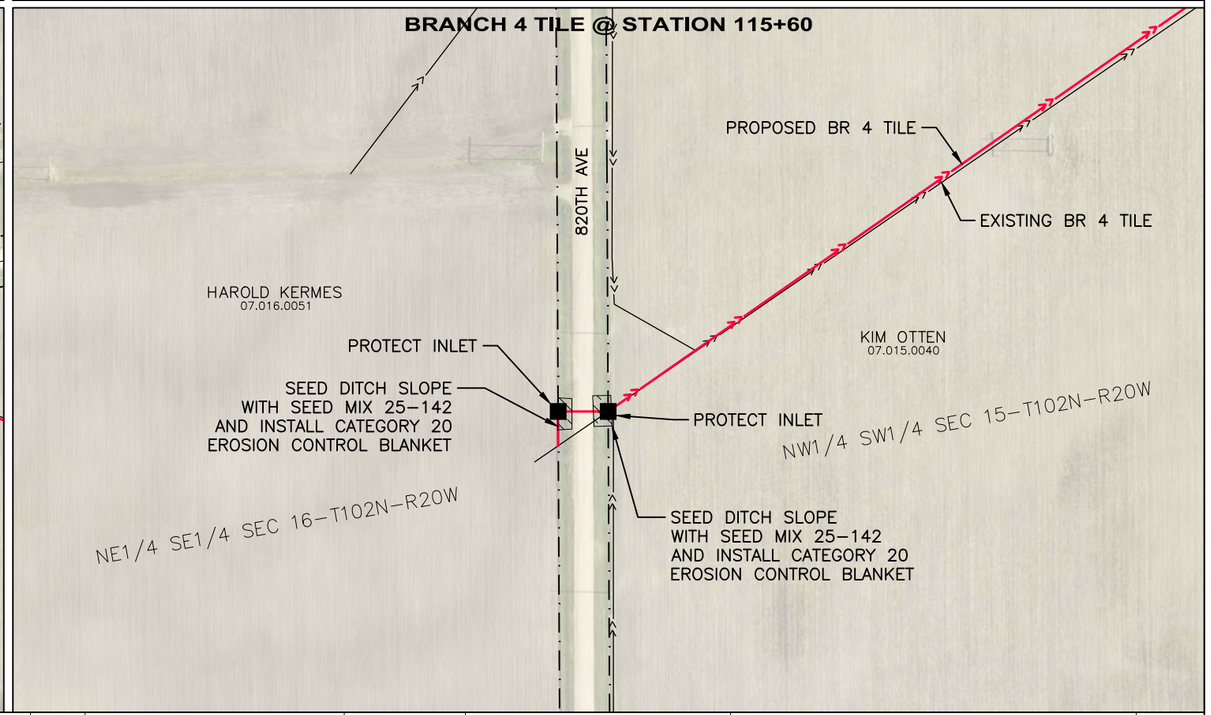
BRANCH 4 TILE @ STATION 80+92



BRANCH 4 TILE @ STATION 31+86



BRANCH 4 TILE @ STATION 115+60



NOT TO SCALE

N

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REV.	BY	DATE

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Owatonna, MN 55060
507-451-4598

DESIGNED:	SJP
DRAWN:	SJP
CHECKED:	SJP
DATE:	9-30-24
DWG:	17-426.DWG

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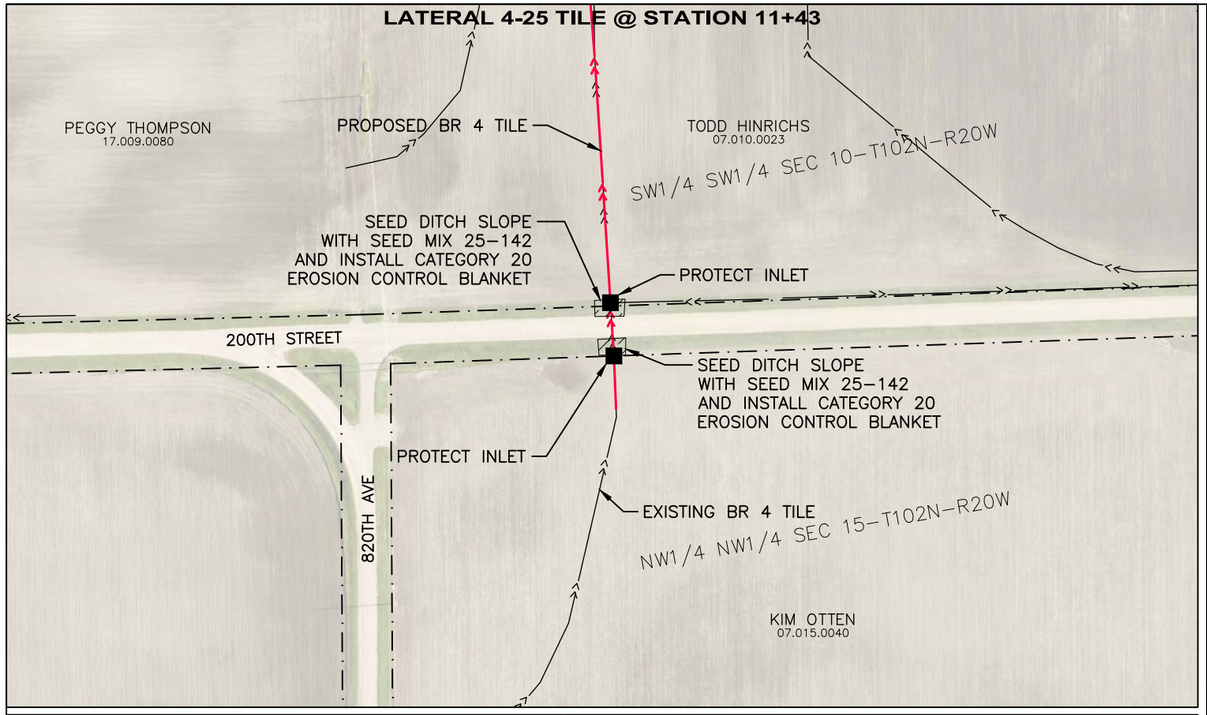
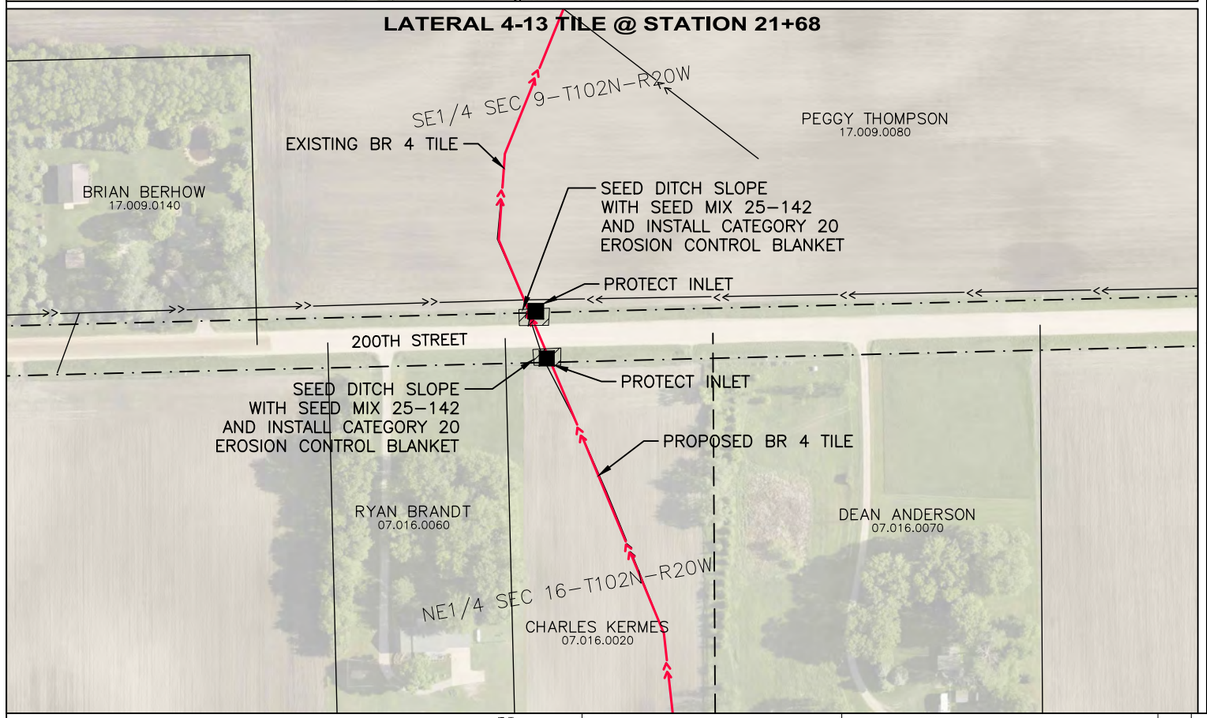
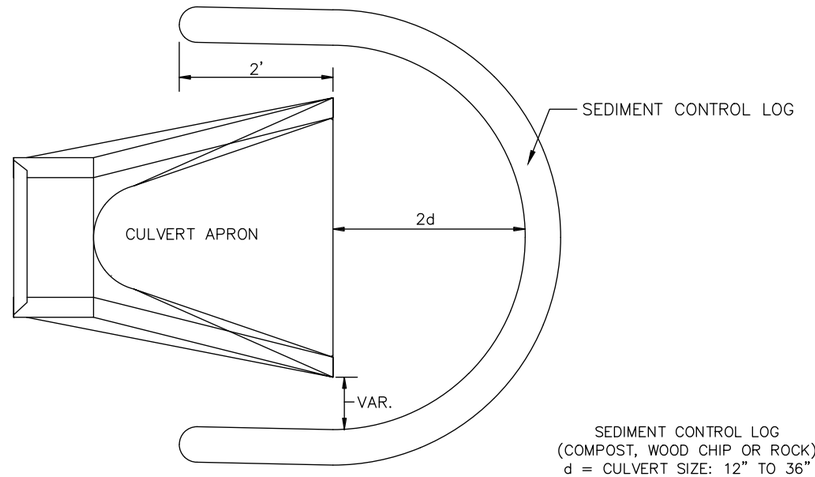
Steven J. Penkava
Lic. No. 43895 Date: 9-30-24

FREEBORN COUNTY, MN
IMPROVEMENT TO
COUNTY DITCH NO. 32
SWPPP DETAILS

SHEET 15 OF 18

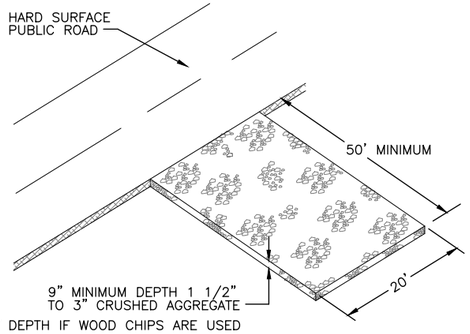






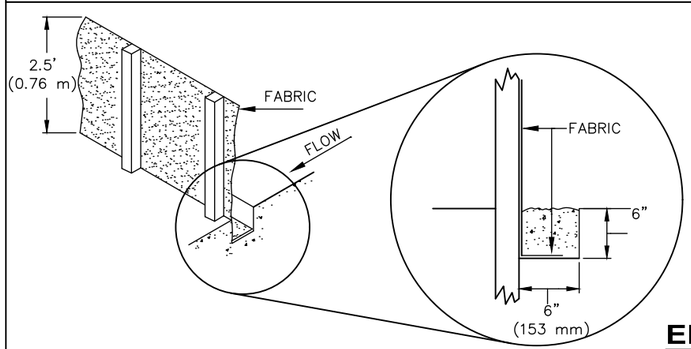
SEDIMENT CONTROL LOG
(COMPOST, WOOD CHIP OR ROCK)
d = CULVERT SIZE: 12" TO 36"

CULVERT END CONTROLS



NOTES:
1. FILTER FABRIC SHALL BE PLACED UNDER ROCK TO STOP MIGRATION OF MUD THROUGH ROCK.
2. WOOD CHIPS USED FOR CONSTRUCTION ENTRANCES MUST BE 80% NOT LESS THAN 2 INCHES AND NOT MORE THAN 5 INCHES. NO CHIPPED UP MANUFACTURED WOOD AND/OR CHEMICALLY TREATED WOOD IS ALLOWED.
3. ENTRANCE MUST BE REGULARLY MAINTAINED TO PREVENT SEDIMENTATION ON PUBLIC ROADWAYS. FUGITIVE ROCK OR WOOD CHIPS WILL BE REMOVED FROM ADJACENT ROADWAYS DAILY OR MORE FREQUENTLY AS NECESSARY.

CONSTRUCTION ACCESS



NOTES:
- PLACE BOTTOM EDGE OF FENCE INTO 6" (153 mm) DEEP
- POSTS SHALL BE:
  - 4' (1.22 m) ON CENTER
  - 2" (50.8 mm) X 2" (50.8 mm) HARDWOOD, PINE OR STANDARD STEEL FENCE POSTS
  - DRIVEN 2' (0.61 m) INTO THE GROUND.

EROSION CONTROL FENCE

NOT TO SCALE

N

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REV.	BY	DATE

JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave.
Albert Lea, MN 56007
507-373-4876
415 West North Street
Owatonna, MN 55060
507-451-4598

DESIGNED:	SJP
DRAWN:	SJP
CHECKED:	SJP
DATE:	9-30-24
DWG:	17-426.DWG

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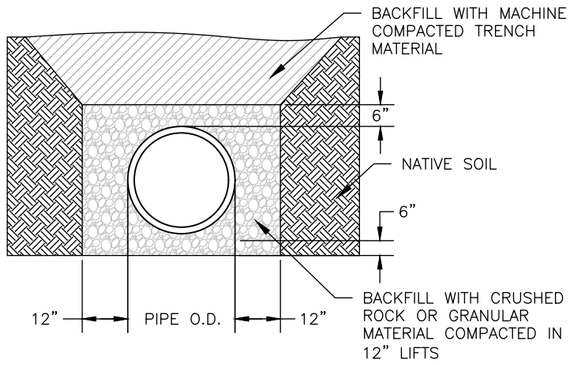
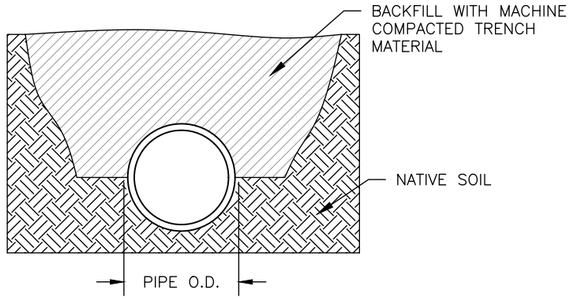
Steven J. Penkava
Lic. No. 43895 Date: 9-30-24

FREEBORN COUNTY. MN
IMPROVEMENT TO
COUNTY DITCH NO. 32
SWPPP DETAILS

SHEET 16 OF 18

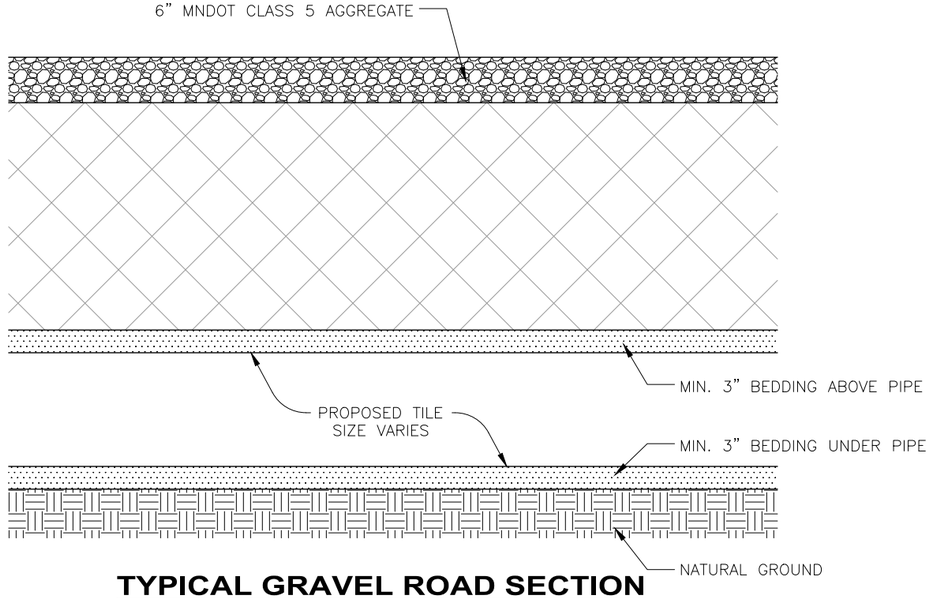


NOTES:
1. PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION.
2. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL.
3. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. MINIMUM BEDDING THICKNESS SHALL BE 6".
4. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

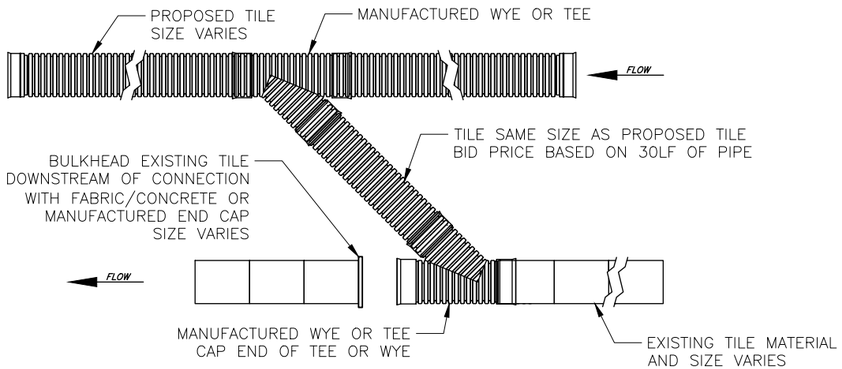


NOTES:
1. NATIVE SOIL: SUITABLE IN-SITU MATERIAL SHALL BE OF ADEQUATE STRENGTH TO WITHSTAND TRENCHING OPERATIONS AND MAINTAIN THE FINAL TRENCH SHAPE. IF ANY PART OF THE TRENCH SIDEWALL SLOUGHS OFF DURING EXCAVATION, REMOVE MATERIAL FROM TRENCH AND REPLACE WITH SUITABLE MATERIAL.
2. SHAPED TRENCH: THE TRENCH SHALL BE CUT TO A DEPTH SUCH THAT THE TOP OF THE SHAPED TRENCH BOTTOM EXTENDS TO PIPE SPRINGLINE, OR HIGHER.
3. FILL MATERIAL: AFTER PLACEMENT OF THE PIPE IN THE SHAPED TRENCH, FILL MATERIAL MEETING A CLASS I, II, III OR IV MAY BE PLACED AND COMPACTED AROUND THE PIPE.

DWPE INSTALLATION & BEDDING DETAIL

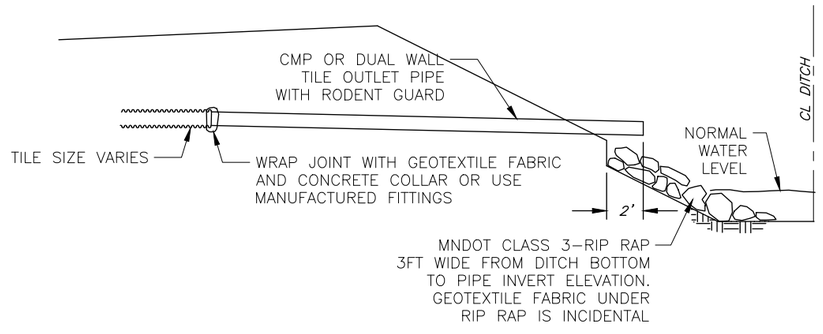


TYPICAL GRAVEL ROAD SECTION



DRAIN TILE CROSS CONNECTION

NOTES:
1. ALL FITTINGS ARE INCIDENTAL TO DRAIN TILE CROSS CONNECTION.
2. ALL CONNECTIONS SHALL BE MADE WITH MANUFACTURED FITTINGS WHENEVER POSSIBLE.
3. CONNECTIONS TO CONCRETE OR CLAY TILE SHALL BE MADE BY SLIDING DUAL WALL TILE OVER THE EXISTING TILE AND WRAPPING THE JOINT IN GEOTEXTILE FABRIC.
4. DRAIN TILE CROSS CONNECTIONS SHALL BE PAID FOR AS A LUMP SUM PER SPECIFICATIONS. PRICE IS BASED ON 30 LF OF PIPE. ADDITIONAL PIPE TO BE PAID FOR PER SPECIFICATIONS.



TYPICAL TILE OUTLET PIPE INSTALLATION

NOTES:
1. OUTLET PIPES SHALL BE ONE SIZE LARGER THAN TILE.
2. JOINT BETWEEN TILE AND OUTLET PIPE SHALL BE MANUFACTURED FITTING OR THE OUTLET PIPE SHALL BE SLIDE OVER THE EXISTING TILE AND THE JOINT WRAPPED IN GEOTEXTILE FABRIC.
3. OUTLET PIPES 12" IN DIAMETER ARE GREATER SHALL BE RIVETED CMP, PIPES SMALLER THAN 12" IN DIAMETER SHALL BE DUAL WALL TILE.
4. AT THE TIME OF CONSTRUCTION THE ENGINEER WILL DESIGNATE OUTLETS TO BE REPLACED. EXISTING OUTLETS IN GOOD CONDITION SHALL BE ARMORED WITH RIP RAP.
5. TILE OUTLET PIPES SHALL BE PAID FOR AS A LUMP SUM PER SPECIFICATIONS.
6. RODENT GUARDS SHALL BE INSTALLED ON ALL TILE OUTLET PIPES LESS THAN 15" IN DIAMTER AS PER SPECIFICATIONS.
7. SLOPE PIPE TO TERMINATE APPROXIMATELY 2 FT ABOVE NORMAL WATER LEVEL EXCEPT AS REQUIRED BY GRADE AND ELEVATION, OR AS OTHERWISE DIRECTED BY ENGINEER.

NOT TO SCALE

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REV.	BY	DATE

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Engineers + Surveyors
515 South Washington Ave.
Albert Lea, MN 56007
507-373-6876
415 West North Street
Owatonna, MN 55060
507-451-4598

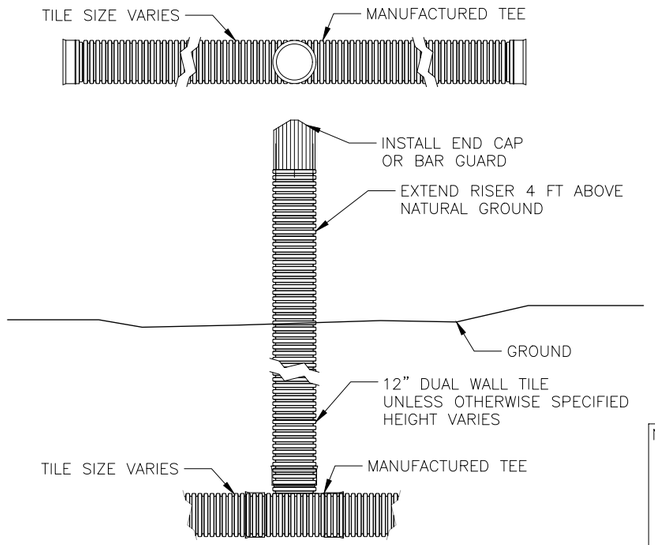
DESIGNED:
DRAWN: SJP
CHECKED:
DATE: 9-30-24
FILE NO: 17-426.DWG

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.

Steven J. Penkava
Lic. No. 43895 Date: 9-30-24

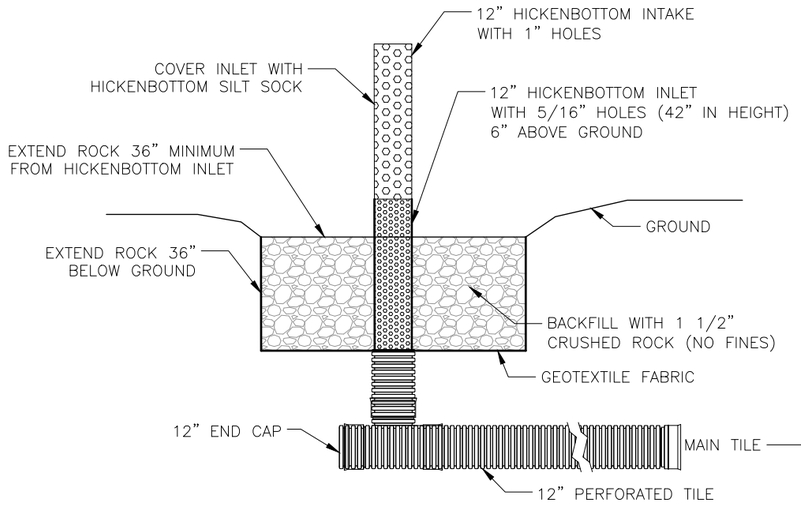
FREEBORN COUNTY. MN
PETITION FOR IMPROVEMENT TO COUNTY DITCH NO. 32
STANDARD DRAINAGE DETAILS

SHEET 17 OF 18



TILE INSPECTION INLET

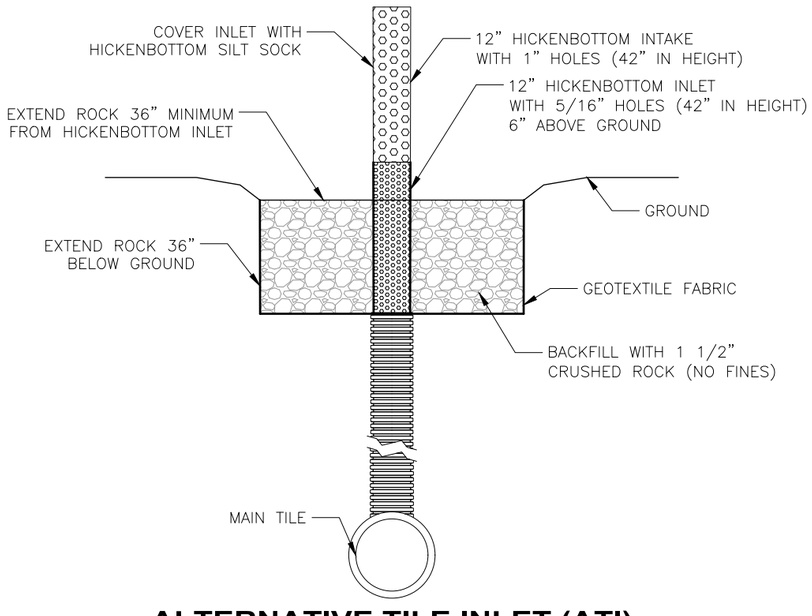
NOTES:
1. EXTEND VERTICAL RISER A MINIMUM OF 4 FT ABOVE NATURAL GROUND SURFACE AND INSTALL END CAP OR BAR GUARD.
2. ALL CONNECTIONS SHALL BE MADE WITH MANUFACTURED FITTINGS WHENEVER POSSIBLE.
3. TILE INSPECTION INLETS SHALL BE PAID FOR AS A LUMP SUM PER SPECIFICATIONS. ALL FITTINGS AND BAR GUARD ARE INCIDENTAL TO TILE INSPECTION INLET CONSTRUCTION.



OFFSET ALTERNATIVE TILE INLET (OATI)

NOTES:
1. ALL HICKENBOTTOM INLET SECTIONS SHALL BE 12" IN DIAMETER AND 42" IN HEIGHT.
2. ALL CRUSHED ROCK AGGREGATE BACKFILL SHALL BE CLEAN OF FINES AND DEBRIS.
3. CRUSHED ROCK AGGREGATE SHALL EXTEND A MINIMUM OF 36" FROM CENTER OF HICKENBOTTOM INLET.
4. CRUSHED ROCK AGGREGATE SHALL EXTEND A MINIMUM OF 36" BELOW GROUND.
5. ALL CONNECTIONS SHALL BE MADE WITH MANUFACTURED FITTINGS WHENEVER POSSIBLE.
6. ALTERNATIVE TILE INLETS SHALL BE PAID FOR AS A LUMP SUM PER SPECIFICATIONS AND INCLUDE ALL FITTINGS AND AGGREGATE MATERIAL.
7. OFFSET ALTERNATIVE TILE INLETS SHALL BE PAID FOR AS A LUMP SUM PER SPECIFICATIONS AND INCLUDE ALL FITTINGS AND AGGREGATE MATERIAL. BID QUANTITY BASED ON 20LF OF PIPE. ADDITIONAL PIPE TO BE PAID FOR PER SPECIFICATIONS.

NOTE: PROPOSED TILE TO BE TELEVISED AS PER SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ACCESS TO TILE FOR TELEVISING. INLETS MAY BE UPSIZED TO ACCOMMODATE TELEVISING EQUIPMENT AT NO COST TO OWNER. IF INLETS ARE UNDERSIZED FOR TELEVISING THE CONTRACTOR MUST EXCAVATE TILE TO PROVIDE ACCESS. NO EXTRA COMPENSATION WILL BE PROVIDED TO EXCAVATE AND REPAIR TILE.



ALTERNATIVE TILE INLET (ATI)

NOT TO SCALE

No responsibility is accepted for the locations of utilities shown hereon. Verification of actual locations should be requested prior to the commencement of construction or the taking of any other action relying on the actual locations.

GOPHER STATE ONE-CALL: 1-800-252-1166

REV.	BY	DATE

JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave.
Albert Lea, MN 56007
507-373-4876
415 West North Street
Owatonna, MN 55060
507-451-4598

DESIGNED:
DRAWN: SJP
CHECKED:
DATE: 9-30-24
FILE NO: 17-426.DWG

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.

Steven J. Penkava
Lic. No. 43895 Date: 9-30-24

FREEBORN COUNTY. MN
PETITION FOR IMPROVEMENT TO COUNTY DITCH NO. 32
STANDARD DRAINAGE DETAILS