elm creek
Watershed Management Commission

ADMINISTRATIVE OFFICE
3235 Fernbrook Lane ● Plymouth, MN 55447
PH: 763.553.1144 ● email: judie@jass.biz
www.elmcreekwatershed.org

May 11, 2022

Members
Technical Advisory Committee
Elm Creek Watershed Management
Commission Hennepin County, MN

Dear Members:

A meeting of the Technical Advisory Committee of the Elm Creek Watershed Management Commission will be held on **Wednesday, May 18, 2022, at 9:30 a.m.** This will be a virtual meeting.

To join the meeting, click https://zoom.us/j/990970201 or go to www.zoom.us and click **Join A Meeting**. The meeting ID is **990-970-201**. The password is **water.**

If your computer is not equipped with audio capability, you need to dial into one of these numbers:

+1 929 205 6099 US (New York)
+1 669 900 6833 US (San Jose)
+1 253 215 8782 US
+1 312 626 6799 US (Chicago)
+1 346 248 7799 US (Houston)
+1 301 715 8592 US

Meeting ID: 990 970 201. Passcode: 579973

The meeting is open to the public via the instructions above.

Thank you.

Judie A. Anderson
Administrator
JAA:tim
Encls:

Z:\Elm Creek\TAC\2022\May 18, 2022 TAC Notice.docx

elm creek
Watershed Management Commission

ADMINISTRATIVE OFFICE
3235 Fernbrook Lane ● Plymouth, MN 55447
PH: 763.553.1144 ● email: judie@jass.biz
www.elmcreekwatershed.org

AGENDA
Technical Advisory Committee
May 18, 2022 | 9:30 a.m.

To join the meeting, click https://zoom.us/j/990970201 or go to www.zoom.us and click Join A Meeting. The meeting ID is 990-970-201. The password is water.

If your computer is not equipped with audio capability, you need to dial into one of these numbers:

+1 929 205 6099 US (New York)
+1 669 900 6833 US (San Jose)
+1 253 215 8782 US
+1 312 626 6799 US (Chicago)
+1 346 248 7799 US (Houston)
+1 301 715 8592 US

Meeting ID: 990 970 201. Passcode: 579973

---

1. Call to Order.
   a. Approve agenda.*
   b. Approve Minutes of April 13, 2022, meeting.*
2. HUC 8 Model.
   a. Draft 5-10-2022.*
   b. Cover email Draft 5_10_2022.*
   c. Draft 5-12-2022.*
3. Other Business.
4. Next TAC meeting – _____.
5. Adjournment.

Z:\Elm Creek\TAC\2022\May 18, 2022 agenda .docx

*in meeting packet
**available at meeting

elm creek
Watershed Management Commission

ADMINISTRATIVE OFFICE
3235 Fernbrook Lane ● Plymouth, MN 55447
PH: 763.553.1144 ● email: judie@jass.biz
www.elmcreekwatershed.org

Technical Advisory Committee Meeting
Minutes - April 13, 2022

I. A virtual meeting of the **Technical Advisory Committee (TAC)** of the Elm Creek Watershed Management Commission was convened at 10:01 a.m., Wednesday, April 13, 2022.

In attendance: Heather Nelson, Champlin; Nico Cantarero, Stantec, Dayton; Derek Asche, Maple Grove; Matt Danzl, Hakanson-Anderson, Medina; Ben Scharenbroich, Plymouth; Andrew Simmons, Rogers; Diane Spector and Erik Megow, Stantec; James Kujawa, Surface Water Solutions; Rebecca Carlson, Resilience Resources; Kris Guentzel and Kevin Ellis, Hennepin County Dept. of Environment and Energy (HCEE); Brian Vlach, Three Rivers Park District; and Amy Juntunen and Judie Anderson, JASS.

Not represented: Corcoran.

Also in attendance: Ken Guenthner, Corcoran; Doug Baines, Dayton; Jeff Weiss, Minnesota Department of Natural Resources (MNDNR); and RSB.

II. Motion by Scharenbroich, second by Danzl to approve the **revised agenda.*** *Motion carried unanimously.*

III. Motion by Scharenbroich, second by Danzl to approve the **minutes*** of the March 9, 2022, meeting. *Motion carried unanimously.*

[Simmons arrived 10:03 a.m.]

IV. HUC 8 Watershed Floodplain Modeling and Mapping Project.

A. Background.

Asche's April 11, 2022, memo* to the Commission recapped the history of this project, which spans 49 months. In his memo, Asche states:

> [At the request of the DNR, on April 7, 2022, a Teams Meeting was held] to discuss the responses/comments provided by the DNR regarding the Third Party Review. (Present at that meeting were Derek Asche, Erik Megow, Jeff Weiss, and Judie Anderson.) Jeff Weiss reiterated that Comment "5", subdivision of watersheds in the MNDNR Response to the Third Party Review should be included in the Commission's work to revise the model as the DNR expects this to only take one-half day. After discussion with Ross Mullen, Stantec, at the time the DNR comments were initially submitted, this comment was not included in the RFP out of concern for cost. In fact, the comment refers to 9 example watersheds recommended for subdivision as examples but is open ended and is not necessarily limited to 9. In addition, the DNR made a similar request of Barr regarding subdivision of watersheds. According to Barr's calculations they spent 95 hours and $9,500 on this similar request. The DNR subsequently funded $5,000 of the requested $9,500 for this work. While

likely not apples to apples, there was enough cause for concern to leave sub-division of watersheds out of the RFP. Also of note, all TAC requests for the RFP could not be included, again, out of concern for cost.

DNR's letter dated April 11, 2022,* in response to Asche's memo, was included in the TAC's supplemental meeting packet. Asche continued, "The Commission is trying to get a model that works for the member communities. The DNR is already satisfied with the product submitted by Barr Engineering. The Commission has met its obligation. The subdivision process could be never-ending. That effort should have been done before." Asche stated that his recommendation is that we have to stop at some point.

B. Discussion.

Weiss: I don't have to review anything if [what is being done by Stantec] is not replacing the DNR/Barr model. The Commission has to decide if the Stantec model is replacing the DNR/Barr model.

Guenthner: Are you comfortable with the [Barr] data so we are not undertaking excessive costs?

Asche: In Maple Grove I would not use data from the DNR/Barr model.

The Flood Risk Review meeting is still to come. Had we known the problems we would have addressed them.

The stakeholder meeting as part of Stantec's work is intended [to be held] in May, when cities can comment on how they see the model in their communities.

Third party review – these nine [subdivisions] are being addressed differently, left [out] due to concern for cost.

Vlach: If subdivided, would you be changing calibration points?

Megow: No.

Asche noted that the DNR has already accepted a model without the requested subdivisions.

Asche: Let's stay the course. If we find problems we address them. Or describe how flows are split up. Recommend to the Commission that we continue with the RFP and address any problems as they arise and be flexible in the timeline to complete the review.

The members agreed by consensus.

Other documents related to this item included in the meeting packet: RFP, DNR February 14, 2022 memo,* January 22, 2022, Third Party Review,* Consider Third Party Review,* and Barr December 7, 2021 memo.**

V. Revisions to Commission Rules.*

A. Background. In 2021, the Minnesota Pollution Control Agency (MPCA) issued a new Municipal Separate Storm Sewer System (MS4) Phase II general permit to Minnesota cities. An individual MS4 Phase II permit requires a city to develop and implement a stormwater pollution prevention program to reduce the discharge of pollutants from their storm sewer systems. All member communities in the Elm Creek Watershed Management Commission are MS4 Phase II permit holders.

The revised MS4 Phase II permit requires:

1. For non-linear projects, treatment of the amount of 1.0-inches of runoff from new and fully reconstructed impervious surfaces.

2. For linear projects, treatment of (a) 1.0-inches of runoff from the new impervious surface or (b) 0.50-inches of runoff from new and fully reconstructed impervious surfaces, whichever is greater.

The 2015 Third Generation Elm Creek Watershed Management Commission Plan rules require applicants to provide treatment in the amount of 1.1-inches of runoff from the net, new impervious areas for projects with construction disturbance of more than one acre.

The revisions to the MS4 Phase II permit create inconsistencies between the Commission's Third Generation Plan rules and the rules of its member cities as required by the newest MS4 Phase II permit. Staff propose to revise the Commission's rules to align with the MS4 Phase II permit requirements. These proposed revisions will have the greatest impact to redevelopment, including public works projects (i.e., road projects) and will have negligible impact to new construction projects on greenfield sites. It is important to the Commission's member cities that its rules be aligned with their MS4 Phase II permit requirements so as to be at least as stringent as those of its member cities and to create consistency in the project review process.

B. Timeline. The MPCA updated MS4 discharge permits to the Commission's member cities in October and November 2021. The member cities have one year to come into compliance with the new MS4 Phase II permit requirements. Project reviews submitted to the Commission after November 30, 2022, shall be required to follow the revised requirements. This rule shall go into effect as soon as a member city fully implements its new MS4 Phase II permit and a Minor Plan Amendment is approved by the Minnesota Board of Water and Soil Resources, no later than November 30, 2022.

C. Proposed Revisions.

1. Revise Rule A to include the definition of fully reconstructed impervious surfaces: *Areas where impervious surfaces have been removed down to the underlying soils. Activities such as structure renovation, mill and overlay projects, and other pavement rehabilitation projects that do not expose the underlying soils beneath the structure, pavement, or activity are not considered fully reconstructed. Maintenance activities such as catch basin repair/replacement, utility repair/replacement, pipe repair/replacement, lighting, and pedestrian ramp improvements are not considered fully reconstructed"*

2. Revise Rule A to include the definition of linear projects: *Linear projects are projects with construction of new or fully reconstructed roads, trails, sidewalks, or rail lines that are not part of a common plan of development or sale."*

3. Revise Rule D.2.b. a.

a. Existing: "*Linear projects that create one acre or more of new impervious surface must meet all Commission requirements for the net new impervious surface. Sidewalks and trails that do not exceed twelve feet (12'0") in width, are not constructed with other improvements, and have a minimum of five feet (5'0") of vegetated buffer on both sides are exempt from Commission requirements."*

b. Proposed: "*Linear projects that create one acre or more of new or fully reconstructed impervious surfaces must meet all Commission requirements for 1.1-inches of runoff from the new impervious surface or 0.55-inches from the combination of new and fully reconstructed impervious surfaces, whichever is greater. When this volume cannot be treated within the existing right-of-way, a reasonable attempt to obtain additional right-of-way, easement, or other permission to treat the stormwater during the project planning process must be made. Volume reduction practices must be considered first. Volume reduction practices are not required if the practices cannot be provided cost effectively. If additional right-of-way, easements, or other permission cannot be obtained, owners of construction activity must maximize the treatment of the water quality volume.*"

4. Revise Rule D.3.c

a. Existing: *"Stormwater runoff volume must be infiltrated/abstracted onsite in the amount equivalent to one point one inch (1.1") of runoff generated from new impervious surface."*

b. Proposed: *"For non-linear projects, stormwater runoff volume must be infiltrated/abstracted onsite in the amount equivalent to one point one inch (1.1") of runoff from the new impervious surface or 0.55-inches from the combination of new and fully reconstructed impervious surfaces, whichever is greater."*

D. Minor Plan Amendment to Revise Rules.*

The proposed amendment would revise Appendix C of the Third Generation Plan, Rules and Standards, to (1) make the rules consistent with the most recent Minnesota General Stormwater Permit and (2) clarify the Commission's standards regarding the required freeboard between the high-water elevation of a constructed or natural water and the low floor or opening of a proposed adjacent structure.

Motion by Scharenbroich, second by Danzl to approve the rules as revised, (revising what was proposed ~~*"one point one inch (1.1") of runoff from the new impervious surface or 0.55-inches from the combination of new and fully reconstructed impervious surfaces, whichever is greater"*~~ *to read:* *"one point one inch of runoff from the sum of new and fully reconstructed impervious surfaces."*) and recommend to the Commission that it proceed with a Minor Plan Amendment and set May 11, 2022, as the date of the public meeting at which the proposed revised rules will be discussed. *Motion carried unanimously.* If approved, the revised Rules would go into effect June 1, 2022, for the revisions to the low floor rules (Rule D.3.b.i.7 and Rule F.3.b) and November 30, 2022, for the linear project rules (Rule D.2.b and Rule D.3.c)

A copy of the proposed notice* was included in the meeting packet.

VI. 2022 CIP Minor Plan Amendment.*

A. The Third Generation Watershed Management Plan and Capital Improvement Program (CIP) is proposed for a Minor Plan Amendment (MPA). The members reviewed the proposed revisions at its March meeting and agreed to revise the Plan to add three new projects to the Capital Improvement Program (CIP):

1. Line 50: Maple Grove South Fork Rush Creek Steam Restoration project, $406,252 each in 2022 and 2023.

2. Line 57: City Cost Share Program, a new project to the CIP – to share in the cost of small Best Management Practices (BMPs) on city projects, in accordance with the Commission's Cost Share Policy, approved in August 2021, $100,000 annually.

3. Line 58: Partnership Cost Chare Program , a new project to the CIP – to share in the cost of voluntary load-reduction BMPs on private property, in accordance with the Commission's Cost Share Policy, also approved in August 2021, $50,000 annually.

B. Some smaller projects (under $100,000) have been submitted to the CIP by the cities, as well as one since the March meeting from Three Rivers Park District for the proposed Oxbow Trail-Rush Creek Channel Stabilization that is likely to be under $100,000. It is recommended that those projects be handled administratively through the city cost share program rather than as small (<$50,000) line items on the CIP.

C. Ongoing discussions regarding the Watershed Based Implementation Funding (WBIF) may result in additional projects being added to the CIP, and the TAC may need to suggest a revision to the proposed Minor Plan Amendment. One option would be simply to allocate some of the WBIF grant funding to the city Cost Share program to accommodate the several small projects that are currently being contemplated. That would not require a Plan Amendment.

D. Motion by Scharenbroich, second by Cantarero to recommend to the Commission that it proceed with the Minor Plan Amendment and set May 11, 2022, as the date of the public meeting at which the revisions to the CIP will be discussed. *Motion carried unanimously.* A copy of the proposed notice* was included in the meeting packet. Public meetings are noticed twice, at least seven and 14 days prior to the meeting, in the Commission's official newspaper, the *Osseo-Maple Grove Press.*

VII. 2022-2023 Watershed-Based Implementation Funding (WBIF) Convene Meeting.

Due to time constraints, this meeting will be rescheduled to a separate time later in the month.

VIII. The **next Technical Advisory Committee meeting** will be rescheduled to a time NOT prior to the regular meeting.

There being no further business, the meeting was adjourned at 11:27 a.m.

Respectfully submitted,

Judie A. Anderson
Recording Secretary
JAA:tim

Z:\Elm Creek\TAC\2022\April 13 2022 TAC meeting minutes.docx

**included in meeting packet*

To: Elm Creek Watershed Management Commission Commissioners and Technical Advisory Committee

From: Erik Megow, PE
Lori Schrader
Danielle Johnson
Kiley Gafner

Date: May 10, 2022

Subject: Revisions to the Elm Creek Watershed HUC-8 Model - DRAFT

1.0 INTRODUCTION AND PURPOSE

The Minnesota Department of Natural Resources (MNDNR) is partnering with the Federal Emergency Management Agency to update the base flood elevation across the watershed for a future Flood Insurance Study (FIS). Member cities of the Elm Creek Watershed Management Commission (ECWMC) have noted significant differences between the flood elevations in the 2016 FIS and the preliminary Elm Creek Floodplain Modeling and Mapping HUC-8 Study (HUC-8 Study).

In some locations, the HUC-8 results show a base flood ("100-year" or 1%-annual-exceedance-probability) elevation that is up to 8' higher than the reported 2016 FIS elevations. Based on historic flooding reports and historic knowledge in the watershed, these results are outside of expected flooding conditions.

The base flood elevation published in the FIS sets the floodplain inundation extents and is particularly important as there are local, state, and federal regulations governing development. For example, existing single-family homes with a federally backed mortgage (approximately 95% of all mortgages) are required to buy subsidized flood insurance that may cost between a few hundred to tens of thousands of dollars per year. The floodplain also substantially increases costs for new construction due to the increased cost associated with bringing in fill (i.e. raising ground level) to reduce flood risk.

The purpose of this memorandum is to summarize the work completed to revise and update the HUC-8 Study based on the findings of the Third-Party Review (Stantec, January 2022) through the Tasks outlined in Stantec's Response to Request for Proposal for Revisions to HUC-8 Model (March 2022). The following sections provide an overview of the revisions made to the hydrologic (HEC-HMS) and hydraulic (HEC-RAS) models, along with a discussion of the calibration analysis.

2.0 HYDROLOGIC MODEL (HEC-HMS) UPDATES AND HYDROLOGIC CALIBRATION

Stantec updated the HEC-HMS (US Army Corps of Engineers **H**ydrologic **E**ngineering **C**enter – **H**ydrologic **M**odeling **S**ystem) model (received from the DNR January 24, 2022) to provide better estimates of peak streamflows for input into the hydraulic (HEC-RAS) model. After the updates were completed, the model was assessed through the same calibration methodology, and for the same calibration events, that were included in "*Elm Creek Narrative and QAQC Documentation*" (Barr Engineering Co., 2021).

2.1 HEC-HMS Updates

Three major updates were made to the HEC-HMS model to improve hydrology and estimate new streamflows:

1. The model was updated from HEC-HMS Version 4.3 to Version 4.7, the latest version.
2. Natural storage and cross-sections were updated to replace areas where a Muskingham-Cunge shortened simplified trapezoidal bank-width cross section was modeled.
3. Watershed areas and hydrologic connections between the watersheds and reach segments were updated and a methodology was produced to input the calculated flows into the HEC-RAS Model.

The following sections provide an overview of these updates, while Appendices A and B provide additional details.

2.1.1 HEC-HMS Version Update

The original HEC-HMS model was transitioned from Version 4.3 to Version 4.7 for storage, cross-section, and routing updates. Using Version 4.7 made it possible to easily integrate the required updates, but this update required defining an Index Method (Celerity). According to the HEC-HMS User's Manual, the Index Method (Celerity) is used in conjunction with the physical properties of the channel to discretize the routing reach in both space and time. A celerity, or reference flow, equal to 5 ft/s was assumed uniformly across the model as recommended by the HEC-HMS User's Manual. Assuming a celerity of 5 ft/s, no negligible change in the 100-year flows was seen between the runs in Version 4.3 and 4.7.

2.1.2 Natural Storage and Sub-basin Cross-section Updates

The 55 sub-basins highlighted in the Third-Party Review (Stantec, January 2022) were examined to determine whether storage or updated cross-section definitions would be beneficial to updating flow calculations. Storage considerations included depressions in the Digital Elevation Model (DEM), imagery, and how/if the storage could then be accounted for in the HMS routing. Storage was calculated by first creating polygons around the depression areas seen in imagery and LiDAR. These polygons were then used along with the DEM to create storage capacity curves (elevation-area). The calculated curves were then applied to an existing or added associated reservoir. Added reservoirs were assumed to have outlets estimated by measuring culvert or bridge openings and inlet and outlet elevations. Rise was calculated using engineering judgement based on the size of the structure to subtract 2.5-4 feet from the differential of the structure deck and inlet elevations.

Cross-section updates were made by pulling terrain data for the whole cross section in HEC-RAS and then filtering them to 8 point cross sections. The left and right Manning's coefficient settings were applied by reviewing common overbank channel along the reach.

Overall, 47 sub-basins were updated by adding natural storage areas or updating storage reservoir curves within 37 sub-basin and updating cross-section within the other 10 sub-basins. A summary of the updates is included as Appendix A.

With the added natural storages and updated cross-sections, junctions were added as needed to properly join and route flows within the model. For example, if more than one component (i.e. reach, basin, reservoir, etc.) were joining together and we deemed a potential need to collect flows in that location, a junction was added. Junction components do not contribute to the program calculations. They served a

dual purpose of more accurately modeling the routing of the watershed and making it easier to import flows into HEC-RAS.

2.1.3 Watershed Area and Hydrologic Routing Updates

The subbasin (watershed) areas were calculated in GIS and compared to the drainage areas represented in the HMS model. Eight subbasins had areas that differed by greater than 2 % and were updated. These basins were DC1, DC4, DC5, EC11, EC12, EC17, and EC8.

Every attempt was made to mimic the methodology used previously to route flows from the HMS results to the HEC-RAS cross-sections. The routing method used in the January 24, 2022 HEC-HMS Model, was not replicable and had inconsistencies on where the flows were applied. Without further sub-delineations, Stantec was required to compute ratios for some reaches based on the percentage of drainage area and reach length routed within each sub-basin. A spreadsheet was used to calculate the routed flows and an example (for the 100-year flows) of the methodology used is shown in Appendix B.

2.2 Hydrologic Model Calibration Analysis

Following the HEC-HMS updates outlined in Section 2.1, the model was assessed through the same calibration methodology, and for the same calibration events, that were included in "*Elm Creek Narrative and QAQC Documentation*" (Barr Engineering Co., 2021).

The updated model was evaluated using the historical flow record at the gage co-operated with the U.S. Geological Survey (USGS) on Elm Creek in Elm Creek Park Preserve, and two Three Rivers Park District-operated flow monitoring gages:

- *ECER (Elm Creek at Elm Road* near the Plymouth-Maple Grove municipal border), and
- *RT* (Rush Creek at Territorial Road).

The precipitation events that were used to assess the calibration of the updated model are:

- June 23 – July 5, 2003 (rainfall)
  - Data for RT was not available before 2006.
- September 22 – October 1, 2016 (rainfall)
- March 6 – April 3, 2010 (snowmelt)
  - Data for RT and ECER was not available for winter months
- March 18 – March 28, 2011 (snowmelt)
  - Data for RT and ECER was not available for winter months

As outlined in "*Elm Creek Narrative and QAQC Documentation*" (Barr Engineering Co., 2021), the calibration targets for the June 2003 and September 2016 rainfall events were to achieve a Nash-Sutcliffe Efficiency (NSE) index of 0.6, which is a measure of model fit compared to observed data. With an NSE of 0.6, a model is deemed satisfactorily accurate and with an index >0.75, the model is considered excellent. Figures 1 through 7 show the calibrated HEC-HMS Model results compared to the data from the three stations, when available. A summary of the calibration results is as follows:

- For Figures 1, 2, and 5 the calculated NSE Index was > 0.8 showing that our updated HEC-HMS model matched these storm events very well.
- For Figure 3, we did not have enough data points to calculate an NSE Index, but the modeled peak flow (159 cfs) was within 12.5% of the observed flow (181.5 cfs).

- For the September 16 RT comparison (Figure 4), the HEC-HMS modeled flows were higher than the observed, but after further conversation with Brian Vlach at Three Rivers Park District, it was determined that the rating curve at this location was not accurate for high flows (56.7 cfs, or water levels above 3.13 ft).
- For the snowmelt events, shown in Figures 6 and 7, where the orange line is the model-predicted results and the blue dots are the actual observed flows, the modeled (HMS) peak flows continue to occur close to the measured peak flow for both events, so no further lag time adjustments were made.

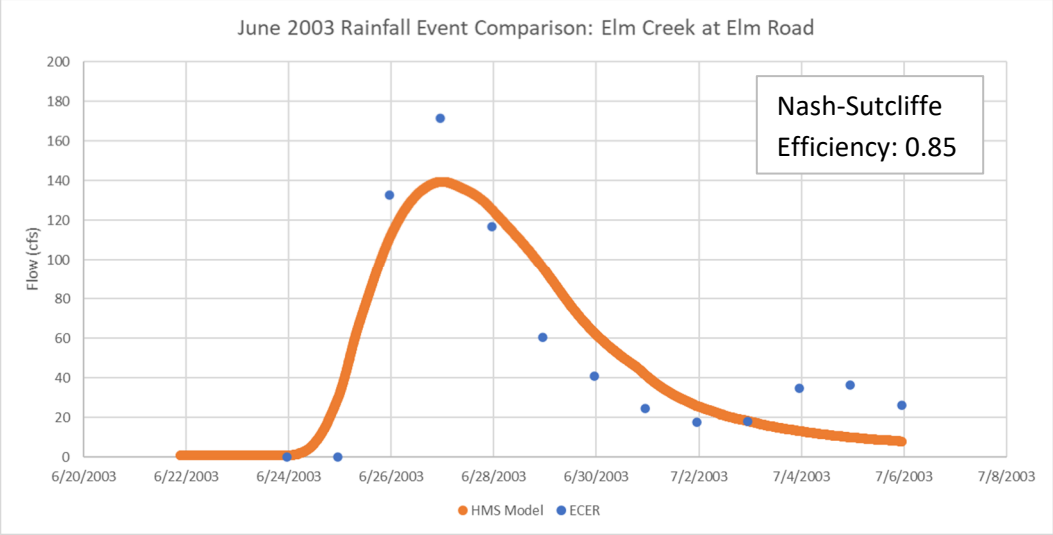


Figure 1. June 2003 rainfall event comparison at ECER.

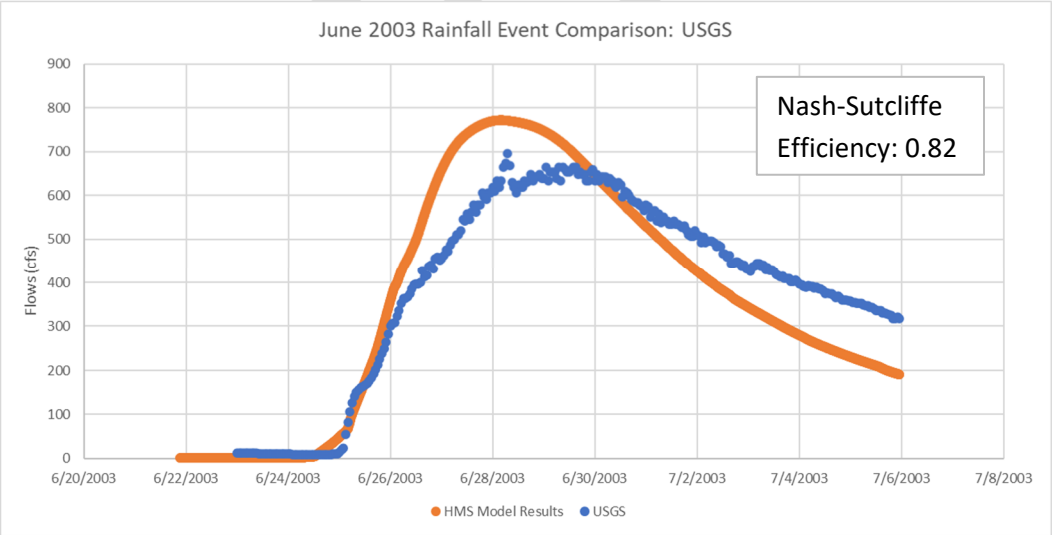


Figure 2. June 2003 rainfall event comparison at USGS.

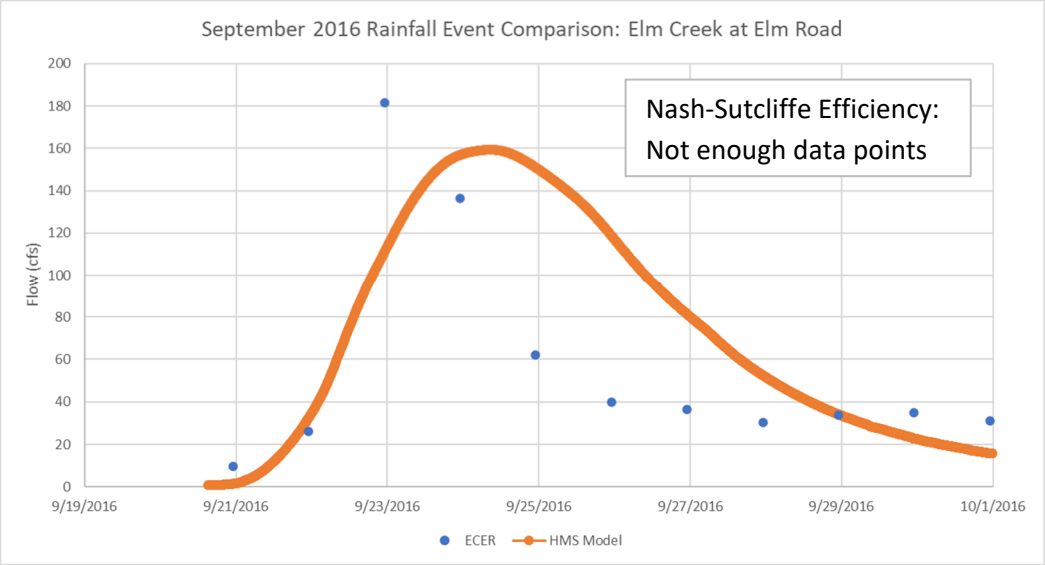


Figure 3. June 2016 rainfall event comparison at ECER.

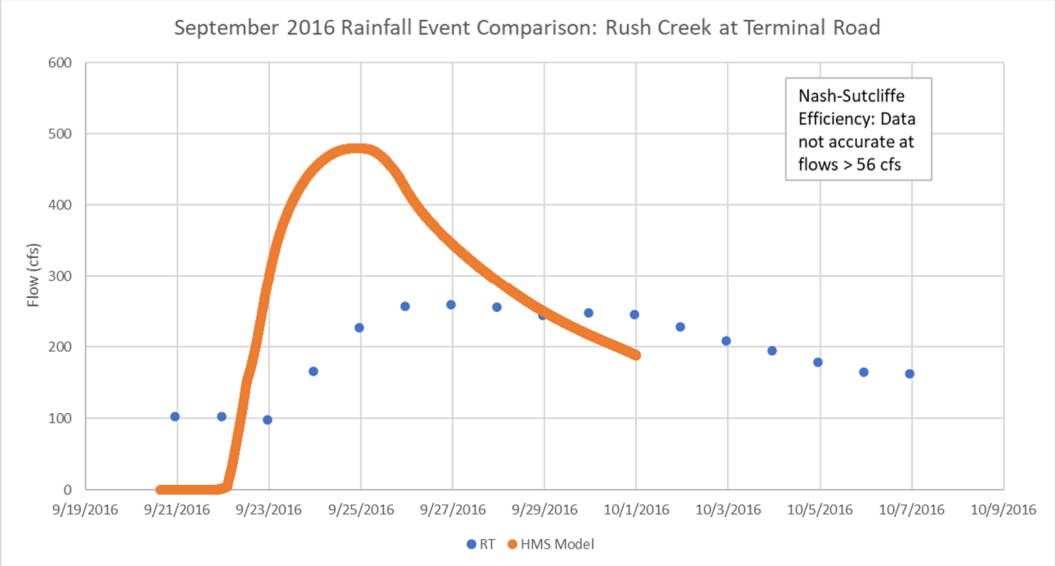


Figure 4. June 2016 rainfall event comparison at RT.

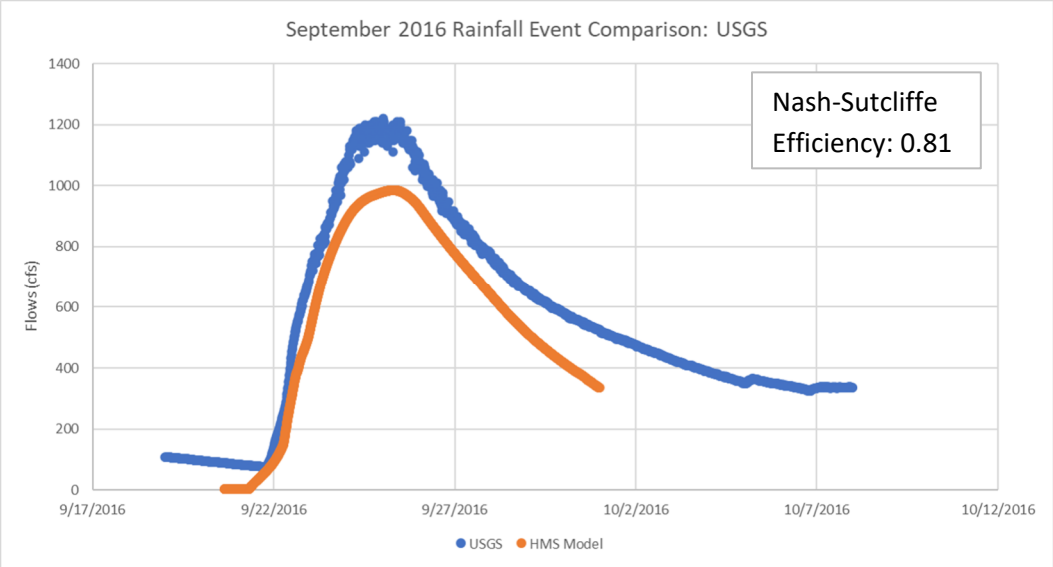


Figure 5. June 2016 rainfall event comparison at USGS.

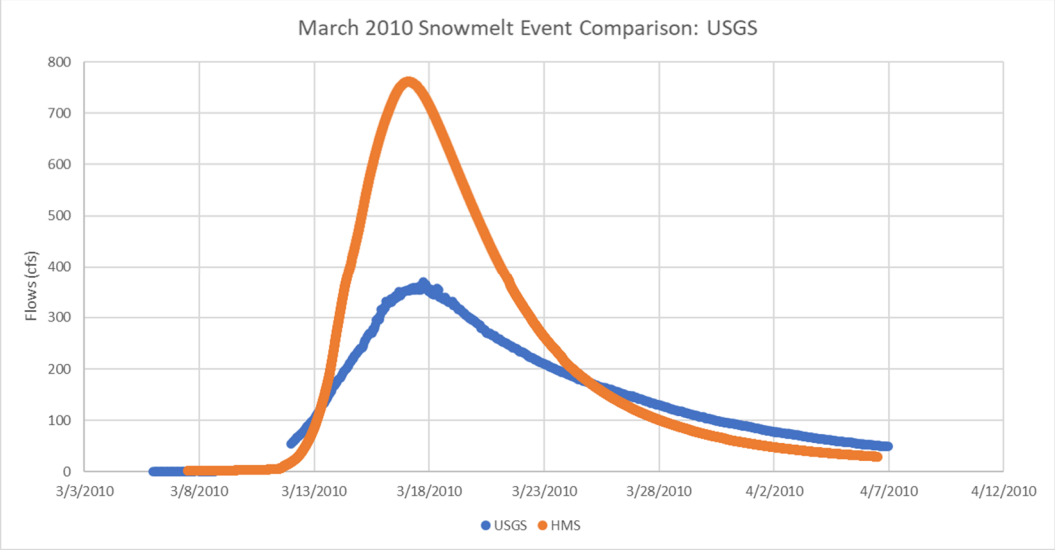


Figure 6. March 2010 snowmelt event comparison at USGS.

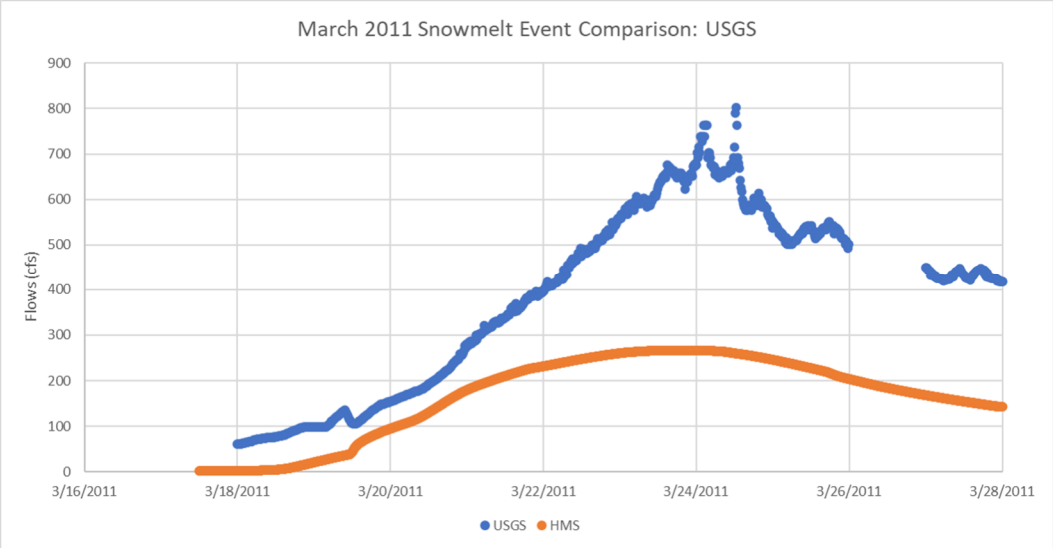


Figure 7. March 2011 snowmelt event comparison at USGS.

Based on the acceptable NSE Indexes (> 0.75) shown in Figures 1, 2, and 5 and the accurate timing of the peak flows shown in Figures 6 and 7, no further changes were made to curve numbers or lag times of the HEC-HMS Model. After calibration, flows for the 10%, 2%, 1%, and 0.2% rain events were calculated in the HEC-HMS model and inported into the HEC-RAS model to calculate elevations and hydraulics for the floodplain mapping task.

3.0 HYDRAULIC MODEL (HEC-RAS) UPDATES

Stantec updated hydraulic connections and downstream boundary conditions within the HEC-RAS model to calculate better estimates of peak water surface elevations. Three groups of updates were made to the HEC-RAS Model:

- Hydraulic crossings (bridges, culverts, weirs, and dams),
- Stream alignments, and
- Downstream boundary conditions.

The following sections provide an overview of these updates, while Appendix C provides additional details.

3.1 Hydraulic Crossing Updates

Fifty-three (53) hydraulic crossings, including Elm Creek Dam, were updated in the HEC-RAS model based on construction drawings, surveys, photos, and as-built information. These 53 structures were highlighted in the Third-Party Review (Stantec, January 2022). The updates included upstream/downstream inverts, road overflow elevation, pipe size, pipe material, and ground elevation (based on LiDAR). The details and any assumptions for these updates are listed in Appendix C

3.2 Stream Alignment Updates

Two major stream alignments were updated in the HEC-RAS Model, as follows:

1) *County Ditch 16* east of Brockton Lane (County Road 101).

   The alignment of County Ditch 16 was updated to match the record plans from Maple Grove. The ditch is routed through a series of storm sewer pipes beneath Vagabond Lane N and Bass Lake Road. The outlet is on the north side of Bass Lake Road where the ditch line then continues north. The storm sewer was modeled as a culvert without any bends for simplicity. The upstream invert elevation is where the ditch enters the storm sewer, and the downstream invert is where it leaves the storm sewer.

2) *Unnamed Tributary* to Elm Creek (HEC-RAS Reach *ElmCreek_BR4*) just southeast of the intersection of Hackamore Road (County Road 47) and Brockton Lane (County Road 101) in Plymouth.

   The modeled stream alignment appeared to show a temporary construction alignment of the creek. The alignment was updated to follow the permanent alignment of the watercourse, per record drawings from the City of Plymouth. The watercourse is routed through a culvert crossing County Road 47, and then through a storm sewer pipe, modeled as a culvert, under a new residential development. The storm sewer outlets to a wetland where the watercourse realigns with the natural flow path of the stream.

3.3 Downstream Boundary Condition Updates

As directed by the MNDNR, the downstream boundary conditions were modeled using a 'normal depth' in HEC-RAS. Each of the normal depth boundary conditions were reviewed and the upstream/downstream slopes were changed when necessary. In addition, the most downstream cross section of each tributary and the nearest downstream cross section of the main stem were reviewed to confirm that the tributary cross section had a lower water surface elevation than the main stem cross section. By verifying each tributary had a lower water surface elevation than the main stem, an appropriate tie-in could be made. The elevations along each flooding source could be evaluated independently and the water surface elevation at the confluences would be dictated by the main flooding source elevations.

4.0 RESULTS AND FLOODPLAIN MAPPING

After the hydrologic (HEC-HMS) and hydraulic (HEC-RAS) models were updated, the updated flows for the 10%, 2%, 1%, 0.2%-annual-exceedance-events were exported from the hydrologic model (HEC-HMS) and imported into the HEC-RAS Model. Results from the 1% and 0.2%-annual-exceedance-events are shown in Appendix D, along with a comparison to the effective 2016 FIS flood elevations at road crossings, lettered FEMA cross sections, and other pertinent locations across the watershed.

In addition to the updated models and results, floodplain inundation maps were created at a scale of 1:10,000 for Elm Creek, Diamond Creek, North Fork Rush Creek, and South Fork Rush Creek. The HEC-RAS RASMapper routine was used to automatically generate output and create maps. The maps were then reviewed to correct any issues the initial mapping had at bridge and culvert crossing, sharp turns in the watercourse, and other common automated mapping output issues to display accurate maps. During the mapping iterations, updates needed to be made to the HEC-RAS model. The inundation maps are shown in Appendix E. Appendix F provides a summary of the HEC-RAS model updates that were required for mapping.

APPENDIX A

HEC-HMS Sub-basin Updates

HMS Basin	Changes made
DC1	Storage Added, Outlet assumed from imagery and LiDAR
EC1	Storage Added, Outlet assumed from imagery and LiDAR
EC3	Updated Cross Sections with 8 Point
EC5	Storage Added and updated Cross Section with 8 Point
EC7	Updated Cross Sections with 8 Point
EC8	Storage Curves Updated
EC10	Storage Added, 3 reaches removed to model storage
EC11	Storage Curves Updated
EC12	Storage Curves Updated
EC13	Storage Added, Outlet assumed from imagery and LiDAR
EC16	Updated Cross Sections with 8 Point
EC17	Storage Added, Outlet assumed from imagery and LiDAR
EC19	Updated Cross Sections with 8 Point
EC20	Storage Curves Updated
EC22	Storage Curves Updated
EC24	Updated Cross Sections with 8 Point
EC26	Storage Added, Outlet assumed from imagery and LiDAR
EC27	Storage Added, Outlet assumed from imagery and LiDAR
EC29	Storage Added, Outlet assumed from imagery and LiDAR
EC30	Storage Curves Updated
EC34	Storage Curves Updated
RC1	Updated Cross Sections with 8 Point
RC2	Storage Added, Outlet assumed from imagery and LiDAR
RC4	Storage Curves Updated
RC5	Updated Cross Sections with 8 Point
RC6	Updated Cross Sections with 8 Point
RC7	Storage Curves Updated
RC8	Storage Added, Outlet assumed from imagery and LiDAR
RC9	Storage Added, Outlet assumed from imagery and LiDAR
RC10	Storage Curves Updated
RC11	Updated Cross Sections with 8 Point
RC12	Storage Added, Outlet assumed from imagery and LiDAR
RC13	Storage Added, Outlet assumed from imagery and LiDAR
RC15	Storage Added, Outlet assumed from imagery and LiDAR
SFRC1	Storage Added, Outlet assumed from imagery and LiDAR
SFRC2	Storage Added, 1 reach removed to model storage
SFRC3	Storage Curves Updated
SFRC4	Storage Added, Outlet assumed from imagery and LiDAR
SFRC7	Storage Added, Outlet assumed from imagery and LiDAR
SFRC8	Storage Curves Updated
SFRC10	Storage Curves Updated
SFRC13	Storage Added, Outlet assumed from imagery and LiDAR
SFRC14	Storage Curves Updated
SFRC17	Storage Curves Updated
SFRC19	Storage Curves Updated
SFRC21	Storage Added, Outlet assumed from imagery and LiDAR

APPENDIX B

Hydrologic Routing Example

HEC-RAS Cross-section	Location ID	StreamName	HMSElement	OrigBasin	OrigReach	HMS_Comm	Original Subasin Area	Subasin Component for Ratio	Original Subbasin Discharge	Subbasin Flow Contribution	Original Reach Length	Reach Component for Ratio	Original Reach Flow	Reach Flow Contribution	HMS Flows	Adjusted Flows
5257	RCBR7_01	RushCreek_BR7	RC3P												49.5	49.5
4477	RCBR6_01	RushCreek_BR6	RC4P												30.5	30.5
33016	RCBR5_03	RushCreek_BR5	SFRC10P												33.3	33.3
10301	RCBR5_02	RushCreek_BR5	SFRC8P												49.8	49.8
1471	RCBR5_01	RushCreek_BR5	SFRC4P												142.5	142.5
10876	RCBR4_01	RushCreek_BR4	SFRC11P												19.3	19.3
10604	RCBR3_02	RushCreek_BR3	SFRC15P												26.2	26.2
4942	RCBR3_01	RushCreek_BR3	SFRC14P												62.5	62.5
6631	RCBR2_01	RushCreek_BR2	SFRC19P												25	25
14652	RCBR1_01	RushCreek_BR1	SFRC17P												50.5	50.5
105486	RC_09	RushCreek	Jubert Lake												76.5	76.5
99522	RC_08	RushCreek	JSFRC13_1	SFRC13		plus SR	1.525122	0.437085	65.1	18.65702121					124.2	142.9
97079	RC_07	RushCreek	SFRC7P												184.2	184.2
86434	RC_06	RushCreek	JSFRC4_1												265.8	265.8
77175	RC_05	RushCreek	SFRC2P												357	357
62766	RC_04	RushCreek	SFRC1P												396.1	396.1
53717	RC_03	RushCreek	RC2P												878	878
37740	RC_02	RushCreek	JRC1_2												914.3	914.3
12615	RC_01	RushCreek	EC3R2	EC3		plus SR	1.904015	0.451326	69.8	16.54532911					986.9	1003.4
17919	NFRCBR2_01	NFRushCreek_BR2	RC7P												33.8	33.8
8127	NFRCBR_01	NFRushCreek_BR1	RC9P												49.9	49.9
73290	NFRC_07	NorthForkRushCrk	RC15P												43	43
60120	NFRC_06	NorthForkRushCrk	RC13P												91.9	91.9
41705	NFRC_05	NorthForkRushCrk	RC12P												117	117
30100	NFRC_04	NorthForkRushCrk	RC12R												157.1	157.1
24861	NFRC_03	NorthForkRushCrk	JRC8												311.5	311.5
18282	NFRC_02	NorthForkRushCrk	JRC5												359	359
11411	NFRC_01	NorthForkRushCrk	JRC5_2		RC5R	minus RR					10414.20174	1315.207985	458.3	57.87863868	458.3	400.4
16051	ECBR5_01	ElmCreek_BR5	EC22P												113.6	113.6
12125	ECBR4_02	ElmCreek_BR4	EC19R3												5.6	5.6
6036	ECBR4_01	ElmCreek_BR4	EC19R3	EC19		plus SR	3.436849	1.116634	122.5	39.80031273					5.6	45.4
1766	ECBR3_01	ElmCreek_BR3	EC27P												34.9	34.9
13614	ECBR2_02	ElmCreek_BR2	EC26R2	EC26		Assumed = split	2.430516	1.215258	344.3	172.15					17.7	189.9
4652	ECBR2_01	ElmCreek_BR2	JEC26												344.3	344.3
10253	ECBR1_01	ElmCreek_BR1	SR26	EC26		Assumed = split	2.430516	1.215258	344.3	172.15					0	172.2
132106	EC_09	ElmCreek	EC30P												38.1	38.1
122487	EC_08	ElmCreek	EC29P												72.1	72.1
117239	EC_07	ElmCreek	JEC26_1												235.3	235.3
93233	EC_06	ElmCreek	JEC16												488.4	488.4
71366	EC_05	ElmCreek	EC10P												527.3	527.3
63137	EC_04	ElmCreek	Rice Lake												688.6	688.6
54439	EC_03	ElmCreek	JEC5												749.4	749.4
34765	EC_02	ElmCreek	JEC3_2												1779.6	1779.6
9268	EC_01	ElmCreek	EC1P												1950	1950
33492	DC_02	DiamondCreek	French Lake												17.3	17.3
25449	DC_01	DiamondCreek	JDC1	DC1		plus SR	3.854982	1.122419	89.5	26.05887667					46.4	72.5

APPENDIX C

Hydraulic Crossing Updates

			Preliminary HUC-8 HEC-RAS Model									Data Review and Stantec Updates					
Municipality	Name	FEMA ZONE	River	Reach	HEC-RAS XS	HEC-RAS XS Structure Size and Shape	Bridge Opening Area (sq ft)	U/S Invert (feet)	D/S Invert (feet)	Road Overflow (feet)	Structure Data Source	Structure Size and Shape	U/S Invert (feet)	D/S Invert (feet)	Road Overflow (feet)	Structure Data Source	Internal Review
Maple Grove	Rice Lake Dam	AE	Elm Creek	ElmCreek	53103	60ft wide spillway Dam		N/A	N/A	N/A	DNR 2020 Survey	60 ft wide spillway at 891.0'				As-Built	EN0_(RICE_Lake_DAM)_D0
Maple Grove	Regional Trail	AE	Elm Creek	ElmCreek	49922	Bridge	7083	873.0	872.7	908.5	Assumed from aerial imagery	80' Span Length				MNDOT-BridgeInfo3 App. ID R1024	
Champlin	Osseo Road	AE	Elm Creek	ElmCreek	650	Dam		N/A	N/A	N/A	Dam is Not Modeled	Dam- see as-builts	N/A	N/A	N/A	Record Plans	1684-74 Elm Creek Dam Roadway - RECORD PLAN.pdf
Plymouth	CP RR	AE	Elm Creek	ElmCreek_BR3	741	4' Circular		966.2	963.4	992.8	Assumed from aerial imagery	3' (Material Not Listed)	Not Listed	962.9		Record Plans	STS1888.pdf
Plymouth	Trojan Trail/ Wayzata High	A	Elm Creek	ElmCreek_BR3	226	6' Circular		960.5	955.4	975.2	Assumed from aerial imagery	5' RCP	962.15	957.05		Record Plans	STS1887.pdf
Corcoran/ Medina	Hackamore Road	A	Elm Creek	ElmCreek_BR4	10363	3' Circular		971.7	970.6	977.6	Assumed from aerial imagery	2' Circular RCP	970.96	970.11	977.48	City of Corcoran Survey 2021	Ok- Consistent
Corcoran/ Medina	Hackamore Road	A	Elm Creek	ElmCreek_BR4	9555	3' Circular		964.6	964.0	974.1	Assumed from aerial imagery	2' Circular RCP	964.05	963.37	973.76	City of Corcoran Survey 2021	Ok- Consistent
Maple Grove/ Corcoran	Brockton Ln	A	Elm Creek	ElmCreek_BR4	9394	3' Circular		964.0	961.4	974.4	Assumed from aerial imagery	OCS draining to Pond to the SE	956.00	Not Listed		Record Plans	STS1972 and STS19733.pdf has limited info
Maple Grove/ Plymouth	Hackamore Road	A	Elm Creek	ElmCreek_BR4	8966	3' Circular		959.6	958.3	965.7	Assumed from aerial imagery	3' RCP	Not Listd	Not Listed		Record Plans	STS1972.pdf top right corner
Plymouth	Troy Ln	A	Elm Creek	ElmCreek_BR4	4858	Double 3' x 6' Box		940.7	938.3	944.4	Assumed from aerial imagery	Double 3' x 6' Box Culvert	940.37	939.79		Record Drawing	STS1901.pdf
Plymouth	58th Circle	A	Elm Creek	ElmCreek_BR4	3392	Double 5' Circular		934.9	934.1	942.5	Assumed from aerial imagery	Twin 54x88" Arch Pipes	934.45	933.61		City of Plymouth GIS	N/A
Plymouth	Peony Ln	AE	Elm Creek	ElmCreek_BR4	1891	6' x 6' Box		926.0	927.3	938.1	Assumed from aerial imagery	6' x 5' Box Culvert	926.96	925.69		Record Drawing	STS1846.pdf, STS1855.pdf
Maple Grove/ Corcoran	Co. Rd. 101	A	Elm Creek	ElmCreek_BR5	11191	4' Circular		958.9	957.9	968.1	Assumed from aerial imagery	4.5' Circular CSP	957.84	957.84		Construction Drawings	ENA_20_07_17-A0.pdf (construction drawing) PD
Maple Grove	Private Road	A	Elm Creek	ElmCreek_BR5	10648	7' Circular		957.2	957.2	972.0	Assumed from aerial imagery	5' Circular RCP	957.7	957.4		Record Drawing	. Maple Grove ENA_20_17-11_A0.pdf, sheet 14
Maple Grove	Vagabond Court	A	Elm Creek	ElmCreek_BR5	9049	6' Circular		955.5	955.5	967.4	Assumed from aerial imagery	5' Diameter RCP . The routing of this is under the Vagabond Court not through the pond	954.93	954.67		Construction Drawings	ENA_20_01-17_A0.pdf (see PDF page 100 and 10
Maple Grove	Co. Rd. 10	A	Elm Creek	ElmCreek_BR5	8529	5' Circular		960.0	956.0	966.3	Assumed from aerial imagery	Does not exist, the creek is not routed in this direction.	N/A	N/A		Maple Grove GIS	
Maple Grove	Private Road	A	Elm Creek	ElmCreek_BR5	8223	5' Circular		953.4	951.6	966.8	Assumed from aerial imagery	6' Circular RCP	951.83	950.48		Construction Drawings	ENA_20_12-15_A0.pdf
Maple Grove	Trail Crossing	A	Elm Creek	ElmCreek_BR5	6707	5' Circular		941.5	941.1	947.2	Assumed from aerial imagery	1.25' RCP beneath recreational trail	Not Listd	Not Listed		Maple Grove GIS	
Maple Grove	74th Ave N	A	Elm Creek	ElmCreek_BR5	5192	6' Circular		929.6	927.4	942.0	Assumed from aerial imagery	10x6' Precast Concrete Box	929.41	927.93		Construction Drawings	ENA_20_07-10_A0
Maple Grove	Lawndale Ln	A	Elm Creek	ElmCreek_BR5	3072	6' Circular		919.6	918.1	927.4	Assumed from aerial imagery	10x6' Precast Concrete Box	Approx 917.5	Approx 917.5		As-Built	MNDOT-BridgeInfo3 App. ID 97986 and ENA_19
Maple Grove	Inland Ln	A	Elm Creek	ElmCreek_BR5	2092	6' Circular		911.6	911.4	920.9	Assumed from aerial imagery	10' x 6' Box Culvert	909.64	909.01	Approx. 921.5'	As-Built	ENA_19_97-42_A0.pdf
Corcoran	Co. Rd. 116	A	NFRushCreek	NFRushCreek_BR1	5112	5' Circular		914.7	914.7	920.8	Assumed from aerial imagery	3' Circular CMP	913.04	912.96	921.15	City of Corcoran Survey 2021	
Corcoran	Co. Rd. 50	AE	NFRushCreek	NorthFrkRushCrk	73093	2.5' Circular		1001.9	1001.2	1009.0	Assumed from aerial imagery	2.5' Circular CMP	1000.53	1000.18	1009.29	City of Corcoran Survey 2021	
Rogers	Fletcher Lane	A	NFRushCreek	NorthFrkRushCrk	10707	15' x 6' Box		905.1	905.1	915.0	Assumed from aerial imagery	8x14' Precast Concrete Box				MNDOT- BridgeInfo3. App ID 27J52	
Dayton/ Rogers	Brockton Lane	A	NFRushCreek	NorthFrkRushCrk	5258	Bridge	189	903.8	903.9	910.7	Assumed from aerial imagery	41.7' Span Bridge (207sq ft conveance)				MNDOT- BridgeInfo3. App ID 27B87	
Maple Grove	105th Ave N	AE	RushCreek	RushCreek	36346	Bridge	787	899.2	899.0	919.0	Assumed from aerial imagery	379.3' Span Bridge over I-94 and Rush Creek				MNDOT- BridgeInfo3. App ID 27251	
Corcoran	Horseshoe Trail	A	RushCreek	RushCreek_BR1	13676	3' Circular		974.3	973.1	975.1	Assumed from aerial imagery	Size Unspecified, CMP	972.63	972.62		City of Corcoran Survey 2021	
Corcoran	Willow Drive	A	RushCreek	RushCreek_BR1	8595	3' Circular		966.4	966.7	973.2	Assumed from aerial imagery	2.5' Circular PVC	965.65	965.24		City of Corcoran Survey 2021	
Corcoran	Horseshoe Trail	A	RushCreek	RushCreek_BR1	6626	2' Circular		965.5	965.4	966.9	Assumed from aerial imagery	1.25' Circular PVC	965.64	965.05		City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR1	4157	1.5' Circular		965.1	965.0	967.0	Assumed from aerial imagery	Two, 2.5' Circular RCP's	963.74, 963.46	963.37, 963.42	967.9	City of Corcoran Survey 2021	
Corcoran	Homestead Trail	A	RushCreek	RushCreek_BR1	2142	4' x 3' Box		963.9	963.7	968.2	Assumed from aerial imagery	4.5' Circular CIP	963.63	963.56		City of Corcoran Survey 2021	
Corcoran	Co. Rd. 50	A	RushCreek	RushCreek_BR2	4251	5' Circular		980.2	974.7	987.7	Assumed from aerial imagery	2' Circular CPP	986.89	986.46	993.79	City of Corcoran Survey 2021	This seems off but matches the survey
Corcoran	Rolling Hills Road	A	RushCreek	RushCreek_BR2	3066	4' Circular		964.2	964.2	966.4	Assumed from aerial imagery	2' Circular RCP	963.01	962.66	967.31	City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR2	1717	4' Circular		961.6	961.5	968.3	Assumed from aerial imagery	5' Circular CRP	961.35	961.05		City of Corcoran Survey 2021	
Corcoran	Trail Haven Road	A	RushCreek	RushCreek_BR3	5809	6' Circular		969.3	970.5	979.9	Assumed from aerial imagery	24" Circular CMP	969.68	967.98	980.43	City of Corcoran Survey 2021	
Corcoran	Settlers Road	A	RushCreek	RushCreek_BR4	9019	2' Circular		975.4	974.0	981.0	Assumed from aerial imagery	1.5' Circular PVC	974.21	973.83	981.59	City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR4	8256	2' Circular		973.1	972.9	978.7	Assumed from aerial imagery	3.5' Circular PVC	972.24	971.51	977.55	City of Corcoran Survey 2021	
Corcoran	Larkin Road	A	RushCreek	RushCreek_BR4	6938	3' Circular		970.3	970.3	984.1	Assumed from aerial imagery	3.5' Circular RCP	969.83	968.56	984.49	City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR4	4999	1.5' Circular		962.5	961.9	964.4	Assumed from aerial imagery	1.5' Circular PVC	961.86	961.34	964.68	City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR4	4523	2' Circular		962.1	962.0	964.7	Assumed from aerial imagery	2' Circular CMP	959.23	959.16	961.5	City of Corcoran Survey 2021	
Corcoran	Co. Rd. 50	A	RushCreek	RushCreek_BR4	1774	5' Circular		946.0	946.0	952.7	Assumed from aerial imagery	4' Circular CMP	944.74	944.49	953.12	City of Corcoran Survey 2021	
Corcoran	Settlers Road	A	RushCreek	RushCreek_BR5	16293	5' Circular		973.7	974.1	981.4	Assumed from aerial imagery	3' Circular PVC	974.39	973.73		City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR5	13795	5' Circular		972.1	972.0	978.2	Assumed from aerial imagery	Two, 3' Circular PVC Pipes	974.33, 972.78	972.28, 972.72	978.31	City of Corcoran Survey 2021	

			Preliminary HUC-8 HEC-RAS Model									Data Review and Stantec Updates					
Municipality	Name	FEMA ZONE	River	Reach	HEC-RAS XS	HEC-RAS XS Structure Size and Shape	Bridge Opening Area (sq ft)	U/S Invert (feet)	D/S Invert (feet)	Road Overflow (feet)	Structure Data Source	Structure Size and Shape	U/S Invert (feet)	D/S Invert (feet)	Road Overflow (feet)	Structure Data Source	Internal Review
Corcoran	Blue Bonnet Drive	A	RushCreek	RushCreek_BR5	12050	2' Circular		968.5	968.5	972.6	Assumed from aerial imagery	4' Circular CMP	968.55	967.52	973.45	City of Corcoran Survey 2021	
Corcoran	Abilene Lane	A	RushCreek	RushCreek_BR5	9192	5' Circular		961.0	961.0	967.0	Assumed from aerial imagery	2.25' Circular PVC	961.74	961.55	967.48	City of Corcoran Survey 2021	
Corcoran	Buckskin Trail	A	RushCreek	RushCreek_BR5	8494	5' Circular		959.8	959.7	966.1	Assumed from aerial imagery	3' Circular PVC	960.39, 960.45	960.07, 960.34	966.6	City of Corcoran Survey 2021	
Corcoran	Larkin Road	A	RushCreek	RushCreek_BR5	8110	5' Circular		959.6	959.3	966.4	Assumed from aerial imagery	5' Circular CMP	959.25	958.72		City of Corcoran Survey 2021	
Corcoran	Co. Rd. 50	A	RushCreek	RushCreek_BR5	5079	6' Circular		951.9	950.0	959.8	Assumed from aerial imagery	5' Circular CMP	951.58	950.26	960.11	City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR5	3967	3.5' Circular		948.2	947.9	953.6	Assumed from aerial imagery	5' Circular CPP	947.81	947.53	954.16	City of Corcoran Survey 2021	
Corcoran	Co. Rd. 10	A	RushCreek	RushCreek_BR5	654	Bridge	101	938.4	938.6	947.8	Assumed from aerial imagery	10x6' Precast Concrete Box	938.98	938.79	947.98	City of Corcoran Survey 2021 & MNDOT- BridgeInfo3. App ID 90462	
Dayton	Holly Ln	A	RushCreek	RushCreek_BR6	1787	3' Circular		918.0	913.3	919.7	Assumed from aerial imagery	3' Culvert	917.75	911.65		Dayton Municiapl GIS	
Dayton	Holly Ln	AE	RushCreek	RushCreek_BR6	768	3' Circular		909.6	907.5	914.4	Assumed from aerial imagery	3' Circular RCP	908.72	907.49		Dayton Municiapl GIS	
Dayton	Territorial Road	A	RushCreek	RushCreek_BR7	355	6' Circular		898.1	898.0	911.2	Assumed from aerial imagery	2' Circular RCP	908.18	907.78		Dayton Municiapl GIS	

APPENDIX D

2016 FIS Comparison Tables

1% AEP Comparison of ECWMC 2016 FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	1767	U.S. Route 169 (US)	* (Data not applicable)	A	851.5	2,780	853.48	1950	2.0	(830)	At confluence with Mississippi
Elm Creek	2505	U.S. Route 169 (US), US of A	* (Data not applicable)	B	851.7		853.67	1950	2.0		
Elm Creek	4251	U.S. Route 169 (US), US of B	* (Data not applicable)	C	851.7		853.66	1950	2.0		
Elm Creek	4604	Cartway Road (DS)	* (Data not applicable)	D	851.8		853.71	1950	1.9		
Elm Creek	4750	Cartway Road (US)	0.85	E	856.3		857.04	1950	0.7		
Elm Creek	5731	US of confluence with Elm Creek. DS of Fernbrook Lane	0.98	F	856.4		857.58	1950	1.2		
Elm Creek	6876	DS of Fernbrook Lane, US of F	1.20	G	856.6		857.68	1950	1.1		
Elm Creek	7643	DS of Fernbrook Lane, US of G	1.40	H	856.7		857.78	1950	1.1		
Elm Creek	8448	Fernbrook Lane (County and State Aide Highway 121)	1.56	I	856.7		857.78	1950	1.1		
Elm Creek	8719	US of Fernbrook Lane	1.62	J	856.7		857.79	1950	1.1		
Elm Creek	9684	US of Fernbrook Lane, US of J	1.76	K	857.4		858	1950	0.6		
Elm Creek	9883	US of Fernbrook Lane, US of K	2.19	L	857.5		858.01	1950	0.5		
Elm Creek	10985	US of Fernbrook Lane, US of L	2.30	M	857.8		858.03	1779.6	0.2		
Elm Creek	11340	US of Fernbrook Lane, US of M	2.34	N	857.8		858.04	1779.6	0.2		
Elm Creek	19957	DS of Elm Creek Road, DS of P	3.98	O	858.3		858.31	1779.6	0.0		
Elm Creek	22253	DS of Elm Creek Road, DS of Q	4.34	P	858.3		858.69	1779.6	0.4		
Elm Creek	24546	Elm Creek Road (DS), DS of R	4.62	Q	858.5		859.89	1779.6	1.4		
Elm Creek	25060	DS of Elm Creek Road, DS of S	4.71	R	860.5		860.47	1779.6	0.0		
Elm Creek	25541	Elm Creek Road (DS)	4.80	S	861.4		861.03	1779.6	-0.4		
Elm Creek	26148	Elm Creek Road (US)	4.90	T	861.8		861.24	1779.6	-0.6		
Elm Creek	26220	DS of Pineview Lane, US of Elm Creek Road, DS of V	4.95	U	863.1		861.78	1779.6	-1.3		
Elm Creek	28303	DS of Pineview Lane, US of Elm Creek Road, DS of W	5.21	V	863.1		862.86	1779.6	-0.2		
Elm Creek	29590	DS of Pineview Lane, US of Elm Creek Road, DS of Y	5.39	W	864.2		863.73	1779.6	-0.5		
Elm Creek	32034	DS of Pine View Lane	5.75	X	865.8		865.04	1779.6	-0.8		
Elm Creek	32439	DS of Pineview Lane, US of Elm Creek Road, DS of Z	5.84	Y	866.3		865.35	1779.6	-0.9		
Elm Creek	33241	DS of Pineview Lane, US of Elm Creek Road, DS of AA	5.99	Z	867.8		866.18	1779.6	-1.6		
Elm Creek	34180	Pine View Lane (DS)	6.10	AA	869.2		866.82	1779.6	-2.4		
Elm Creek	34246	Pine View Lane (US)	6.14	AB	869.3		866.99	1779.6	-2.3		
Elm Creek	34783	DS of Confluence of Bush Creek, US of Pine View Lane	6.21	AC	869.3		867.09	1779.6	-2.2		
Elm Creek	35380	Confluence of Bush Creek (DS)	6.31	AD	869.4	945	867.29	1779.6	-2.1	835	FIS location: Above junction of Rush Creek, just inside corporate limits of City of Dayton. Looked at Cross sections on Arcmap and this aligns with the described location
Elm Creek	36616	DS of Pine View Lake, DS of AI	6.63	AE	869.6		868	749.4	-1.6		
Elm Creek	37254	Pine View Lake (DS), downstream of AG	6.77	AF	869.6		868.16	749.4	-1.4		
Elm Creek	39639	Pine View Lake (DS)	7.36	AG	870.1		868.99	749.4	-1.1		
Elm Creek	41126	DS of Pine View Lake, DS of AI	7.70	AH	870.9		870.18	749.4	-0.7		
Elm Creek	42433	DS of Pine View Lake, DS of AJ	7.99	AI	871.3		870.88	749.4	-0.4		
Elm Creek	43181	Pine View Lake (DS)	8.20	AJ	871.6		871.36	749.4	-0.2		
Elm Creek	43585	Pine View Lake (US)	8.37	AK	873.8		872.06	749.4	-1.7		
Elm Creek	44250	DS of Territorial Road, US of Pine View Lake, DS of AM	8.46	AL	874.2		873.36	749.4	-0.8		
Elm Creek	46044	DS of Territorial Road, US of Pine View Lake, DS of AN	8.75	AM	874.6		874.9	749.4	0.3		
Elm Creek	47970	Territorial Road (DS)	9.20	AN	875.2		876.03	749.4	0.8		
Elm Creek	48986	Minnesota Trunk Highway 52 (DS)	9.44	AO	876.2		878.34	749.4	2.1		
Elm Creek	49361	Minnesota Trunk Highway 52 (US), DS of Railroad	9.52	AP	877.1		878.61	749.4	1.5		
Elm Creek	49968	US of Railroad that is US of Minnesota Trunk Highway 152	9.63	AQ	879.8		879.05	749.4	-0.8		
Elm Creek	50514	US of Railroad, DS of Rice Lake Dam, DS of AS	9.72	AR	880.0		879.6	749.4	-0.4		

1% AEP Comparison of ECWMC 2016 FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	51433	Rice Lake Dam (DS)	9.91	AS	881.8		880.01	749.4	-1.8		
Elm Creek	52499	DS of Rice Lake Dam, DS of AU	10.12	AT	882.9		880.99	749.4	-1.9		
Elm Creek	53197	Rice Lake Dam (DS)	10.26	AU	884.1		882.26	749.4	-1.8		
Mill Pond (Elm Creek)	53796		Not listed in FIS	AV	893.9	860	893.89	749.4	0.0	(111)	FIS Location: 10.33 mi above Mill Pond Spillway. Looked on Arcmap and this cross section is on Elm Creek but near Mill pond and Rice Lake. The cross section on FIS prfile is 10.35 mi above the Mill Pond Spillway. I think all the Mill Pond cross sectins are actually part of Elm Creek and then would in turn have a creek distance. The missing Cross sections from the Elm Creek correspond to the cross section in the Mill Pond main stem.
Mill Pond (Elm Creek)	65333		Not listed in FIS	AW	893.9	750	894.16	527.3	0.3	(223)	FIS Location: 12.52 mi above Mill Pond Spillway. Looked on Arcmap and this cross section is on Elm Creek but near Mill pond and Rice Lake. The cross section on FIS prfile is 12.52 mi above the Mill Pond Spillway
Mill Pond (Elm Creek)	65946		Not listed in FIS	AX	894.1		894.18	527.3	0.1		
Elm Creek	66592	West Rice Lake Road	12.76	AY	894.6		894.24	527.3	-0.4		
Elm Creek	66781	West Rice Lake Road (US)	12.78	AZ	895.3		894.26	527.3	-1.0		
Elm Creek	67119	DS of Weaver Lake Road, US of West Rice Lake Road	12.84	BA	895.6		894.39	527.3	-1.2		
Elm Creek	68058	DS of Weaver Lake Road, US of West Rice Lake Road	13.05	BB	897.3		894.61	527.3	-2.7		
Elm Creek	68853	Weaver Lake Road	13.17	BC	898.4		895.98	527.3	-2.4		
Elm Creek	69167	Weaver Lake Road (US)	13.25	BD	898.4		896.09	527.3	-2.3		
Elm Creek	69875	US of Weaver Lake Road, DS of BF	13.37	BE	898.4		896.11	527.3	-2.3		
Elm Creek	70093	US of Weaver Lake Road, DS of BG	13.44	BF	898.4		896.14	527.3	-2.3		
Elm Creek	70462	US of Weaver Lake Road, DS of BH	13.48	BG	898.5		896.22	527.3	-2.3		
Elm Creek	71981	Weaver Lake Road (US)	13.77	BH	898.5		896.27	527.3	-2.2		
Elm Creek	73933	DS of Farm Driveway	14.10	BI	898.5	690	898.19	488.4	-0.3	(202)	FIS Location: 14.08 miles above Mill pond spillway
Elm Creek	74436	DS of Farm Driveway, DS of BK	14.30	BJ	901.5		898.84	488.4	-2.7		
Elm Creek	74718	Dunkirk Lane	14.41	BK	903.7		899.28	488.4	-4.4		
Elm Creek	74971	Dunkirk Lane (US)	14.44	BL	903.9		901.23	488.4	-2.7		
Elm Creek	75680	US of Dunkirk Lane, DS of Bass Lake Road, DS of BN	14.55	BM	905.1		902.39	488.4	-2.7		
Elm Creek	76495	US of Dunkirk Lane, DS of Bass Lake Road, DS of BO	14.72	BN	906.0		903.78	488.4	-2.2		
Elm Creek	77331	DS of Bass Lake Road, US Dunkirk Lane, DS of BP	14.86	BO	906.2		904.97	488.4	-1.2		
Elm Creek	79194	DS of Bass Lake Road, US Dunkirk Lane, DS of BQ	15.18	BP	906.4		906.08	488.4	-0.3		
Elm Creek	80843	DS of Bass Lake Road, US Dunkirk Lane, DS of BR	15.48	BQ	908.1		906.83	488.4	-1.3		
Elm Creek	82336	DS of Bass Lake Road	15.75	BR	909.8		908.7	488.4	-1.1		
Elm Creek	82996	Bass Lake Road	15.90	BS	910.4		909.19	488.4	-1.2		
Elm Creek	83398	DS of Elm Road, US of Bass Lake Road, DS of BU	15.95	BT	910.7		909.48	488.4	-1.2		
Elm Creek	83890	DS of Elm Road, US of Bass Lake Road, DS of BV	16.05	BU	910.9		909.83	488.4	-1.1		
Elm Creek	84476	DS of Elm Road, US of Bass Lake Road, DS of BW	16.16	BV	911.0		909.88	488.4	-1.1		
Elm Creek	85470	DS of Elm Road, US of Bass Lake Road, DS of BX	16.35	BW	911.0		910.12	488.4	-0.9		
Elm Creek	86861	DS of Elm Road, US of Bass Lake Road	16.52	BX	911.0		911.35	488.4	0.4		
Elm Creek	88288	DS of Elm Road, US of Bass Lake Road, DS of BZ	16.74	BY	915.4	520	914.44	488.4	-1.0	(32)	On FIS the creek distance for the 100-yr peak flow rate is 16.73, used this peak flow rate
Elm Creek	88898	DS of Elm Road, US of Bass Lake Road, DS of CA	16.82	BZ	916.7		915.3	488.4	-1.4		
Elm Creek	90652	Elm Road (DS)	17.04	CA	918.9		918.09	488.4	-0.8		
Elm Creek	#N/A	Elm Road (US)	17.11	CB	920.6		#N/A	#N/A	#N/A		
Elm Creek	91739	US of Elm Road, US of CB	17.24	CC	921.0		919.96	488.4	-1.0		
Elm Creek	92290	US of Elm Road, US of CC	17.34	CD	921.6		920.71	488.4	-0.9		
Elm Creek	93102	US of Elm Road, DS of CF	17.50	CE	922.2		921.2	488.4	-1.0		
Elm Creek	93848	US of Elm Road, US of CE	17.63	CF	922.3		921.36	235.3	-0.9		
Elm Creek	111598	US of State Highway 55, DS of State Highway 101 and CH	20.66	CG	959.6	245	960.5	235.3	0.9	(10)	FIS Location: At Medina-Plymouth corporate boundary limits. This Cross section is the closest to the city boundaries

1% AEP Comparison of ECWMC 2016 FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	112306	State Highway 101 (DS)	20.73	CH	962.1		961.57	235.3	-0.5		
Elm Creek	112413	State Highway 101 (US)	20.75	CI	963.9		963.66	235.3	-0.2		
Elm Creek	113170	DS of Access Road, US of State Highway 101	20.87	CJ	966.0		965.78	235.3	-0.2		
Elm Creek	113302	US and DS of two Access Road, US of State Highway 101	20.91	CK	972.4		972.4	235.3	0.0		
Elm Creek	113654	US and DS of two Access Road, US of State Highway 101, US of CK	20.96	CL	972.5		972.6	235.3	0.1		
Elm Creek	113752	US of Access Road, DS of Railroad	21.00	CM	972.7		972.62	235.3	-0.1		
Elm Creek	114334	US Access road, DS railroad and Hamel Road	21.11	CN	972.7	210	972.65	235.3	-0.1	25	FIS Location: Below Soo Line Bridge, near Hamel Road. I think this is the correct cross section location but not positive. Double check
Elm Creek	114472	Railroad, DS of Hamel Road	21.14	CO	974.6		975.33	235.3	0.7		
Elm Creek	114953	DS of Hamel Road, US of Railroad	21.21	CP	974.6	65	975.33	235.3	0.7	170	FIS Location: downstream of Hamel Road, near Pinto Drive. I picked the cross section that is farthest DS of Hamel Road (Creek meanders around it), and is still near Pinto Road.
Elm Creek	115445	Elm Creek Drive (DS)	21.29	CQ	975.7		976.29	235.3	0.6		
Elm Creek	115587	Elm Creek Drive (US)	21.32	CR	976.9		976.36	235.3	-0.5		
Elm Creek	116667	Sewage Lagoon Road (DS)	21.50	CS	976.9		976.55	235.3	-0.4		
Elm Creek	116797	Sewage Lagoon Road (US)	21.53	CT	977.0		976.67	235.3	-0.3		
Elm Creek	117854	DS of Confluence of Tributary to Elm Creek	21.73	CU	977.0		976.68	235.3	-0.3		
Elm Creek	118767	DS of Hamel Road, DS of CW	21.90	CV	977.1		976.76	72.1	-0.3		
Elm Creek	119019	DS of Hamel Road	21.94	CW	977.5		977.34	72.1	-0.2		
Elm Creek	119205	US of Hamel Road DS of SOO Line Railroad	21.97	CX	977.7		977.67	72.1	0.0		
Elm Creek	119439	US of Hamel Road DS of SOO Line Railroad	22.02	CY	977.9		977.7	72.1	-0.2		
Elm Creek	120084	DS of SOO Line Railroad	22.15	CZ	978.0		977.74	72.1	-0.3		

1% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations arnd Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	1361	US of confluence with Elm Creek	0.26	A	869.60	1,330	868.44	1003.4	-1.16	(327)	
Rush Creek	4230	US of confluence with Elm Creek, DS of C	0.76	B	869.90		871.25	1003.4	1.35		
Rush Creek	5541	US of confluence with Elm Creek, DS of D	1.00	C	871.60		872.64	1003.4	1.04		
Rush Creek	7368	US of confluence with Elm Creek, DS of E	1.39	D	874.30		874.79	1003.4	0.49		
Rush Creek	8015	US of confluence with Elm Creek, DS of F	1.52	E	875.70		875.47	1003.4	-0.23		
Rush Creek	9884	US of confluence with Elm Creek, DS of G	1.87	F	880.00		878.1	1003.4	-1.90		
Rush Creek	11375	US of confluence with Elm Creek, DS of H	2.14	G	882.60		881.29	1003.4	-1.31		
Rush Creek	12615	Fernbrook Lane (DS)	2.36	H	885.00		882.91	1003.4	-2.09		
Rush Creek	12977	At Fernbrook Lane	2.42	I	886.80		883.92	914.3	-2.88		
Rush Creek	13940	Fernbrook Lane (US)	2.60	J	887.30		885.24	914.3	-2.06		
Rush Creek	14425	US of Fernbrook Lane, DS of L	2.68	K	887.80		885.45	914.3	-2.35		
Rush Creek	15894	US of Fernbrook Lane, DS of M	2.94	L	890.10		886.57	914.3	-3.53		
Rush Creek	16252	US of Fernbrook Lane, DS of N	3.01	M	890.60		886.81	914.3	-3.79		
Rush Creek	16584	US of Fernbrook Lane, DS of O	3.05	N	890.80		887.19	914.3	-3.61		
Rush Creek	17911	US of Fernbrook Lane, DS of P	3.33	O	892.90		888.85	914.3	-4.05		
Rush Creek	18529	US of Fernbrook Lane, DS of Q	3.43	P	894.00		889.86	914.3	-4.14		
Rush Creek	19800	US of Fernbrook Lane, DS of R	3.64	Q	895.70		893	914.3	-2.70		
Rush Creek	20567	US of Fernbrook Lane, DS of S	3.75	R	896.90		893.94	914.3	-2.96		
Rush Creek	21118	US of Fernbrook Lane, DS of T	3.89	S	898.90		894.95	914.3	-3.95		
Rush Creek	25333	Territorial Road (DS)	4.66	T	905.50		902.91	914.3	-2.59		
Rush Creek	25518	At Territorial Road	4.70	U	905.90		903.09	914.3	-2.81		
Rush Creek	26324	Territorial Road (US)	4.84	V	906.10		903.63	914.3	-2.47		
Rush Creek	27258	US of Territorial Road, DS of Minnesota Trunk Highway 152	5.00	W	906.10	1,280	903.68	914.3	-2.42	(366)	Location from FIS: 5 miles above confluence with Elm Creek
Rush Creek	28541	Minnesota Trunk Highway 152 (DS)	5.22	X	906.20		903.89	914.3	-2.31		
Rush Creek	29002	At Minnesota Trunk Highway 152	5.30	Y	906.30		904.05	914.3	-2.25		
Rush Creek	30564	Minnesota Trunk Highway 152 (US), near Burling and Nor. RR	5.61	Z	907.50		905.66	914.3	-1.84		
Rush Creek	31018	US of Burling and Nor. RR, DS of Dunkirk Lane	5.67	AA	907.60		905.78	914.3	-1.82		
Rush Creek	31134	Dunkirk Lane (DS)	5.71	AB	907.70		905.78	914.3	-1.92		
Rush Creek	31323	Dunkirk Lane (US)	5.74	AC	907.80		905.85	914.3	-1.95		
Rush Creek	31489	US of Dunkirk Lane, DS of AE	5.78	AD	909.40		906.28	914.3	-3.12		
Rush Creek	32287	US of Dunkirk Lane, DS of 105th Avenue N, DS of AF	5.92	AE	909.70		907.45	914.3	-2.25		
Rush Creek	33461	105th Avenue N (DS)	6.09	AF	909.70		907.53	914.3	-2.17		
Rush Creek	33852	At 105th Avenue N	6.18	AG	909.70		907.53	914.3	-2.17		
Rush Creek	34127	105th Avenue N (US)	6.24	AH	911.70		908.14	914.3	-3.56		
Rush Creek	34752	US of 105th Avenue N, DS of State Route 92/Interstate 94, DS of AH	6.35	AI	911.80		908.49	914.3	-3.31		
Rush Creek	36410	State Route 92/Interstate 94 (DS)	6.66	AJ	911.90		908.88	914.3	-3.02		
Rush Creek	36817	State Route 92/Interstate 94 (US)	6.76	AK	913.00		909.25	914.3	-3.75		
Rush Creek	37740	US of the confluence with North Fork Rush Creek	7.52	AL	913.00	680	909.81	914.3	-3.19	234	Location from FIS: 7.52 mi above confluence with Elm Creek
Rush Creek	40468	US of the confluence with North Fork Rush Creek, DS of 101st Avenue North, US of AL	7.85	AM	913.00		910.49	878	-2.51		
Rush Creek	42214	US of the confluence with North Fork Rush Creek, DS of 101st Avenue North, US of AM	8.05	AN	913.00		912.14	878	-0.86		
Rush Creek	43810	101st Avenue North (DS)	8.28	AO	913.20		912.8	878	-0.40		
Rush Creek	44964	101st Avenue North (US)	8.33	AP	914.50		915.37	878	0.87		
Rush Creek	46234	US of 101st Avenue North, DS of 97th Avenue North, US of AP	8.48	AQ	917.60		916.47	878	-1.13		
Rush Creek	49423	US of 101st Avenue North, DS of 97th Avenue North, US of AQ	8.67	AR	921.30		922.15	878	0.85		
Rush Creek	50185	US of 101st Avenue North, DS of 97th Avenue North, US of AR	8.84	AS	922.60		922.84	878	0.24		
Rush Creek	51388	US of 101st Avenue North, DS of 97th Avenue North, US of AS	9.08	AT	924.50		923.63	878	-0.87		
Rush Creek	53011	US of 101st Avenue North, DS of 97th Avenue North, US of AT	9.37	AU	926.60		926.48	878	-0.12		
Rush Creek	53717	US of 101st Avenue North, DS of 97th Avenue North, US of AU	9.48	AV	927.40		926.88	878	-0.52		

1% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations arnd Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	54121	97th Avenue N (DS)	9.55	AW	927.70		927.07	396.1	-0.63		
Rush Creek	54333	At 97th Avenue N	9.59	AX	928.50		927.26	396.1	-1.24		
Rush Creek	54953	97th Avenue N (US)	9.69	AY	928.50		927.37	396.1	-1.13		
Rush Creek	56367	US of 97th Avenue N, DS of BA	9.92	AZ	928.50		927.39	396.1	-1.11		
Rush Creek	57461	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of AZ	10.12	BA	928.60		927.46	396.1	-1.14		
Rush Creek	58182	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of BA	10.22	BB	928.60		927.65	396.1	-0.95		
Rush Creek	60047	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of BB	10.51	BC	929.70		929.12	396.1	-0.58		
Rush Creek	60695	DS of Minnesota Highway 101, US of 97th Avenue North, DS of BE	10.64	BD	930.30		929.77	396.1	-0.53		
Rush Creek	62766	DS of Minnesota Highway 101, US of BD	10.96	BE	932.10		930.9	396.1	-1.20		
Rush Creek	63179	State Highway 101 (just DS)	11.03	BF	932.40	570	931.18	357	-1.22	(213)	FIS Location: At State Highway 101
Rush Creek	64415	DS of Private Road that is DS of Schute Road	11.28	BG	934.00		932.19	357	-1.81		
Rush Creek	64580	US of Private Road that is DS of Schute Road	11.36	BH	935.00		932.92	357	-2.08		
Rush Creek	65350	US of Private Road near State Highway 10, DS of Schute Road, US of BH	11.42	BI	935.10		933.27	357	-1.83		
Rush Creek	65819	DS of Schute Road, US of BI	11.52	BJ	935.20		933.38	357	-1.82		
Rush Creek	66475	Schute Road (DS)	11.64	BK	935.20		933.42	357	-1.78		
Rush Creek	66776	Schute Road (US)	11.72	BL	935.20		933.73	357	-1.47		
Rush Creek	67465	US of Schute Road, DS of BN	11.84	BM	935.30		933.78	357	-1.52		
Rush Creek	69314	US of Schute Road, DS of BO	12.16	BN	935.40		933.97	357	-1.43		
Rush Creek	70421	US of Schute Road, DS of BP	12.38	BO	935.70		934.64	357	-1.06		
Rush Creek	76315	US of Schute Road, DS of County Highway 116, DS of BQ	13.50	BP	936.10		935.12	357	-0.98		
Rush Creek	76731	County Highway 116 (DS)	13.60	BQ	936.10	470	935.63	357	-0.47	(113)	FIS location: Just downstream of County Road 116
Rush Creek	77175	County Highway 116 (US)	13.66	BR	937.20		938.1	357	0.90		
Rush Creek	78725	US of County Highway 116, DS of County Highway 10, DS of BT	13.94	BS	937.50		938.35	265.8	0.85		
Rush Creek	80181	US of County Highway 116, DS of County Highway 10, DS of BU	14.12	BT	937.90		938.39	265.8	0.49		
Rush Creek	81438	US of County Highway 116, DS of County Highway 10, DS of BV	14.44	BU	940.70		939.33	265.8	-1.37		
Rush Creek	82895	US of County Highway 116, DS of County Highway 10, DS of BW	14.64	BV	942.40	315	941.92	265.8	-0.48	(49)	FIS location: Just aboved Unnamed Tributary approximately 0.3 miles downstream of County Highway 10. Cross section BV is ~0.39 mi downstream of Highway 10 and downstream of a trib
Rush Creek	84156	County Highway 10 (DS)	14.78	BW	945.10		944.56	265.8	-0.54		
Rush Creek	84403	County Highway 10 (US)	14.86	BX	945.90		945.17	265.8	-0.73		
Rush Creek	85510	US of County Highway 10, DS of County Highway 50, DS of BZ	15.06	BY	946.30		946.27	265.8	-0.03		
Rush Creek	86165	US of County Highway 10, DS of County Highway 50, DS of CA	15.14	BZ	947.30		946.84	265.8	-0.46		
Rush Creek	86434	US of County Highway 10, DS of County Highway 50, DS of CB	15.34	CA	949.50		947.98	265.8	-1.52		
Rush Creek	88133	US of County Highway 10, DS of County Highway 50, DS of CC	15.42	CB	951.10	230	951.04	184.2	-0.06	(46)	FIS Location: Just above Unnamed Tributary approximately 0.6 miles upstream of County Highway 10. Cross section CB is 0.6 mi upstream of County Highway 10
Rush Creek	89836	US of County Highway 10, DS of County Highway 50, DS of CD	15.72	CC	955.20		954.56	184.2	-0.64		
Rush Creek	90820	US of County Highway 10, DS of County Highway 50, DS of CE	15.92	CD	957.30		956.32	184.2	-0.98		
Rush Creek	91832	County Highway 50 (DS)	16.02	CE	958.60		958.7	184.2	0.10		
Rush Creek	92192	County Highway 50 (US)	16.12	CF	959.20		959.2	184.2	0.00		
Rush Creek	93097	US of County Highway 50, DS of Kalk Road, DS of CH	16.33	CG	960.50		960.92	184.2	0.42		

1% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations arnd Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	93948	US of County Highway 50, DS of Kalk Road, DS of CI	16.45	CH	962.80		961.84	184.2	-0.96		
Rush Creek	94424	Kalk Road (DS)	16.53	CI	963.00		962.16	184.2	-0.84		
Rush Creek	94564	Kalk Road (US)	16.57	CJ	964.90		966.38	184.2	1.48		
Rush Creek	95356	US of Kalk Road, DS of Rolling Hills Road, US of CJ	16.73	CK	964.90		966.4	184.2	1.50		
Rush Creek	100957	DS of Rolling Hills Road, US of CK	17.76	CL	964.90		966.43	76.5	1.53		
Rush Creek	101677	Rolling Hills Road (DS)	17.86	CM	964.90		966.45	76.5	1.55		
Rush Creek	101771	Rolling Hills Road (US)	17.92	CN	965.60		966.58	76.5	0.98		
Rush Creek	104294	US of Rolling Hills Road, DS of CP	18.36	CO	966.20		967.33	76.5	1.13		
Rush Creek	104810	US of Rolling Hills Road, DS of CQ	18.44	CP	969.40		968.66	76.5	-0.74		
Rush Creek	105486	US of Rolling Hills Road, At the "limit of detailed of study"	18.58	CQ	970.60	150	969.36	76.5	-1.24		(74) FIS Location: At Jubert Lake outlet. Looked on Arcmap and CQ is at this location

1% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations arnd Peak Discharges										
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates	
					100-yr		100-yr		100-yr	
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Rush Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)
North Fork Rush Creek	14593	County Road 117 (US)	2.66	A	914.8		912.12	359	-2.7	
North Fork Rush Creek	15174	109th Avenue North (US)	2.76	B	914.8		912.27	359	-2.5	
North Fork Rush Creek	16367	US of 109th Avenue N, DS of Access Road near Cain Road, DS of D	2.98	C	914.8		912.28	359	-2.5	
North Fork Rush Creek	17914	US of 109th Avenue N, DS of Access Road near Cain Road, DS of E	3.26	D	914.8		912.29	359	-2.5	
North Fork Rush Creek	18117	Access Road near Cain Road (DS)	3.30	E	914.8		912.29	359	-2.5	
North Fork Rush Creek	18282	Access Road near Cain Road (US)	3.32	F	914.8		913.58	359	-1.2	
North Fork Rush Creek	19664	Cain Road	3.55	G	914.8	530	913.9	311.5	-0.9	(219)
North Fork Rush Creek	19750	Cain Road (US)	3.58	H	915.0		914.03	311.5	-1.0	
North Fork Rush Creek	20321	US of Cain Road, DS of Trail Haven Road, DS of J	3.70	I	915.0		914.04	311.5	-1.0	
North Fork Rush Creek	20321	US of Cain Road, DS of Trail Haven Road, DS of J	3.70	I	915.0		914.04	311.5	-1.0	
North Fork Rush Creek	20321	US of Cain Road, DS of Trail Haven Road, DS of J	3.84	I	915.0		914.04	311.5	-1.0	
North Fork Rush Creek	21320	US of Cain Road, DS of Trail Haven Road, DS of K	3.84	J	915.4		914.47	311.5	-0.9	
North Fork Rush Creek	22487	US of Cain Road, DS of Trail Haven Road, DS of L	4.06	K	917.7		917.49	311.5	-0.2	
North Fork Rush Creek	23477	US of Cain Road, DS of Trail Haven Road, DS of M	4.24	L	918.4		917.79	311.5	-0.6	
North Fork Rush Creek	23984	US of Cain Road, DS of Trail Haven Road, DS of N	4.34	M	918.7		917.83	311.5	-0.9	
North Fork Rush Creek	24861	US of Cain Road, DS of Trail Haven Road, DS of O	4.50	N	919.9		918.73	311.5	-1.2	
North Fork Rush Creek	26026	US of Cain Road, DS of Trail Haven Road, DS of P	4.72	O	921.1		919.4	157.1	-1.7	
North Fork Rush Creek	26892	US of Cain Road, DS of Trail Haven Road, DS of Q	4.87	P	921.9		920.49	157.1	-1.4	
North Fork Rush Creek	27431	US of Cain Road, DS of Trail Haven Road, DS of R	4.98	Q	923.2		920.99	157.1	-2.2	
North Fork Rush Creek	27581	Trail Haven Road (DS)	4.99	R	923.3	495	921.22	157.1	-2.1	(338)
North Fork Rush Creek	27759	Trail Haven Road (US)	5.03	S	924.6		921.76	157.1	-2.8	
North Fork Rush Creek	28660	US of Trail Haven Road, DS of County Road 117, US of S	5.19	T	924.7		921.97	157.1	-2.7	
North Fork Rush Creek	30100	US of Trail Haven Road, DS of County Road 117, US of T	5.44	U	924.7		922.31	157.1	-2.4	
North Fork Rush Creek	31286	County Road 117/109th Avenue North (DS)	5.65	V	924.7		922.6	117	-2.1	
North Fork Rush Creek	31384	At County Road 117/109th Avenue N	5.67	W	924.7		922.65	117	-2.1	
North Fork Rush Creek	31460	County Road 117/109th Avenue North (US)	5.68	X	924.7		923.06	117	-1.6	
North Fork Rush Creek	31580	US and DS of County Road 117/109th Avenue N, DS of Z	5.70	Y	925.8		923.21	117	-2.6	
North Fork Rush Creek	35165	DS of County Road 117/109th Ave N, DS of AA	6.47	Z	926.6		924.95	117	-1.6	
North Fork Rush Creek	35265	US of County Road 117/109th Avenue N	6.50	AA	930.0		925.29	117	-4.7	
North Fork Rush Creek	35391	US of County Road 117/109th Ave N, DS of AC	6.52	AB	930.2		925.99	117	-4.2	
North Fork Rush Creek	35871	US of County Road 117/109th Ave N, DS of AD	6.60	AC	930.3		928.5	117	-1.8	
North Fork Rush Creek	36391	US of County Road 117/109th Ave N, DS of AE	6.70	AD	931.1		929.29	117	-1.8	
North Fork Rush Creek	38053	DS of Access Road, US of AD	6.99	AE	935.6		932.27	117	-3.3	
North Fork Rush Creek	38209	DS of Bechtold Road, US of Access Road	7.03	AF	937.1		932.52	117	-4.6	
North Fork Rush Creek	38758	DS of Bechtold Road	7.15	AG	937.6		934.68	117	-2.9	
North Fork Rush Creek	38930	US of Bechtold Road	7.16	AH	937.6		935.05	117	-2.6	
North Fork Rush Creek	39380	US of Bechtold Road,DS of AJ	7.25	AI	940.4		936.07	117	-4.3	
North Fork Rush Creek	40511	DS of County Road 30/Oak Bole Drive, DS of AK	7.47	AJ	941.8		937.84	117	-4.0	

1% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations arnd Peak Discharges										
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates	
					100-yr		100-yr		100-yr	
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Rush Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)
North Fork Rush Creek	41705	DS of County Road 30/Oak Bole Drive	7.67	AK	943.3		941.67	117	-1.6	
North Fork Rush Creek	41986	US of County Road 30/Oak Bole Drive	7.72	AL	947.6		943.17	91.9	-4.4	
North Fork Rush Creek	43630	US of County Road 30/Oak Bole Drive, DS of AN	7.96	AM	947.8		945.17	91.9	-2.6	
North Fork Rush Creek	44291	US of County Road 30/Oak Bole Drive, DS of AO	8.07	AN	947.9		946.15	91.9	-1.8	
North Fork Rush Creek	46377	DS of Sundance Road, DS of AP	8.37	AO	951.0		949.96	91.9	-1.0	
North Fork Rush Creek	47362	DS of Sundance Road, DS of AQ	8.53	AP	954.8		951.06	91.9	-3.7	
North Fork Rush Creek	48342	DS of Sundance Road, DS of AR	8.69	AQ	957.4		954.88	91.9	-2.5	
North Fork Rush Creek	49363	DS of Sundance Road	8.86	AR	959.9		957.21	91.9	-2.7	
North Fork Rush Creek	49436	US of Sundance Road	8.88	AS	963.2		959.11	91.9	-4.1	
North Fork Rush Creek	49901	US of Sundance Road, US of AS	8.94	AT	963.3		960.8	91.9	-2.5	
North Fork Rush Creek	50577	US of Sundance Road, US of AT	9.08	AU	963.5		961	91.9	-2.5	
North Fork Rush Creek	52176	DS of 97th Avenue N, DS of AW	9.29	AV	965.8		965.42	91.9	-0.4	
North Fork Rush Creek	52972	DS of 97th Avenue N, DS of AX	9.42	AW	968.4		966.9	91.9	-1.5	
North Fork Rush Creek	54987	DS of 97th Avenue N	9.75	AX	973.4		971.08	91.9	-2.3	
North Fork Rush Creek	55226	US of 97th Avenue N	9.78	AY	977.1		971.37	91.9	-5.7	
North Fork Rush Creek	55966	US of 97th Avenue N, US of AY	9.91	AZ	977.5		974.13	91.9	-3.4	
North Fork Rush Creek	57273	US of 97th Avenue N, US of AZ	10.13	BA	981.4		978.91	91.9	-2.5	
North Fork Rush Creek	58518	US of 97th Avenue N, DS of BC	10.32	BB	984.4		982.37	91.9	-2.0	
North Fork Rush Creek	59887	DS of Access Road and County Road 10, DS of BD	10.52	BC	988.9		988.04	91.9	-0.9	
North Fork Rush Creek	59987	DS of Access Road, DS of BE	10.55	BD	990.9		988.53	91.9	-2.4	
North Fork Rush Creek	60064	US of Access Road near County Road 10, DS of BF	10.59	BE	991.1		988.58	91.9	-2.5	
North Fork Rush Creek	60120	DS of County Road 10	10.61	BF	991.9	310	988.86	91.9	-3.0	(218)
North Fork Rush Creek	60352	US of County Road 10	10.63	BG	992.0		989.36	43	-2.6	
North Fork Rush Creek	60606	US of County Road 10, DS of Access Road	10.69	BH	992.0		989.37	43	-2.6	
North Fork Rush Creek	60948	US of Access Road, DS of BJ	10.73	BI	992.1		989.64	43	-2.5	
North Fork Rush Creek	61315	US of County Road 10 and Access road, US of BI	10.81	BJ	992.2		989.66	43	-2.5	
North Fork Rush Creek	63385	US of County Road 10, US of BJ	11.20	BK	993.5		990.53	43	-3.0	
North Fork Rush Creek	63749	US of County Road 10, US of BK	11.27	BL	994.0		990.79	43	-3.2	
North Fork Rush Creek	64763	DS of County Road 19/Crow Hassan Park Road	11.45	BM	995.0		993.02	43	-2.0	
North Fork Rush Creek	64955	US of County Road 19/Crow-Hassan Park Road	11.49	BN	1001.2		994.07	43	-7.1	
North Fork Rush Creek	65429	DS of Strehler Road, DS of BP	11.58	BO	1001.2		994.84	43	-6.4	
North Fork Rush Creek	65983	DS of Strehler Road, DS of BQ	11.68	BP	1001.2		994.85	43	-6.4	
North Fork Rush Creek	66739	DS of Strehler Road, DS of BR	11.80	BQ	1001.2		998.53	43	-2.7	
North Fork Rush Creek	67226	DS of Strehler Road	11.92	BR	1001.9	215	999.47	43	-2.4	(172)
North Fork Rush Creek	67429	US of Strehler Road	11.96	BS	1004.1		1001.78	43	-2.3	
North Fork Rush Creek	68345	US of Strehler Road, US of BS	12.12	BT	1004.1		1001.84	43	-2.3	
North Fork Rush Creek	69031	US of Strehler Road, US of BT	12.24	BU	1004.1		1001.84	43	-2.3	
North Fork Rush Creek	69474	US of Strehler Road, US of BU	12.33	BV	1004.1		1001.84	43	-2.3	
North Fork Rush Creek	71089	US of Strehler Road, DS of BX	12.64	BW	1004.2		1001.87	43	-2.3	
North Fork Rush Creek	72186	US of Strehler Road, US of BW	12.85	BX	1004.3		1001.91	43	-2.4	
North Fork Rush Creek	72915	US of Strehler Road, US of BX	12.99	BY	1004.3		1001.9	43	-2.4	

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					500-yr		500-yr		500-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	1767	U.S. Route 169 (US)	* (Data not applicable)	A	854.6	4,350	854.88	2685.6	0.3	(1,664)	At confluence with Mississippi
Elm Creek	2505	U.S. Route 169 (US), US of A	* (Data not applicable)	B	854.6		855.16	2685.6	0.6		
Elm Creek	4251	U.S. Route 169 (US), US of B	* (Data not applicable)	C	854.6		855.14	2685.6	0.5		
Elm Creek	4604	Cartway Road (DS)	* (Data not applicable)	D	854.8		855.21	2685.6	0.4		
Elm Creek	4750	Cartway Road (US)	0.85	E	858.5		857.61	2685.6	-0.9		
Elm Creek	5731	US of confluence with Elm Creek. DS of Fernbrook Lane	0.98	F	858.6		858.48	2685.6	-0.2		
Elm Creek	6876	DS of Fernbrook Lane, US of F	1.20	G	858.8		858.6	2685.6	-0.2		
Elm Creek	7643	DS of Fernbrook Lane, US of G	1.40	H	859.0		858.73	2685.6	-0.3		
Elm Creek	8448	Fernbrook Lane (County and State Aide Highway 121)	1.56	I	859.2		858.74	2685.6	-0.5		
Elm Creek	8719	US of Fernbrook Lane	1.62	J	859.3		858.74	2685.6	-0.5		
Elm Creek	9684	US of Fernbrook Lane, US of J	1.76	K	859.5		859.01	2685.6	-0.5		
Elm Creek	9883	US of Fernbrook Lane, US of K	2.19	L	859.8		859.02	2685.6	-0.8		
Elm Creek	10985	US of Fernbrook Lane, US of L	2.30	M	859.9		859.04	2423.8	-0.9		
Elm Creek	11340	US of Fernbrook Lane, US of M	2.34	N	859.8		859.03	2423.8	-0.8		
Elm Creek	19957	DS of Elm Creek Road, DS of P	3.98	O	859.8		859.35	2423.8	-0.5		
Elm Creek	22253	DS of Elm Creek Road, DS of Q	4.34	P	859.9		859.61	2423.8	-0.3		
Elm Creek	24546	Elm Creek Road (DS), DS of R	4.62	Q	860.0		860.53	2423.8	0.5		
Elm Creek	25060	DS of Elm Creek Road, DS of S	4.71	R	861.3		860.92	2423.8	-0.4		
Elm Creek	25541	Elm Creek Road (DS)	4.80	S	862.4		861.71	2423.8	-0.7		
Elm Creek	26148	Elm Creek Road (US)	4.90	T	863.0		861.91	2423.8	-1.1		
Elm Creek	26220	DS of Pineview Lane, US of Elm Creek Road, DS of V	4.95	U	863.2		862.52	2423.8	-0.7		
Elm Creek	28303	DS of Pineview Lane, US of Elm Creek Road, DS of W	5.21	V	864.1		863.89	2423.8	-0.3		
Elm Creek	29590	DS of Pineview Lane, US of Elm Creek Road, DS of Y	5.39	W	865.5		864.67	2423.8	-0.8		
Elm Creek	32034	DS of Pine View Lane	5.75	X	867.5		866.01	2423.8	-1.5		
Elm Creek	32439	DS of Pineview Lane, US of Elm Creek Road, DS of Z	5.84	Y	867.8		866.14	2423.8	-1.6		
Elm Creek	33241	DS of Pineview Lane, US of Elm Creek Road, DS of AA	5.99	Z	869.4		867.17	2423.8	-2.2		
Elm Creek	34180	Pine View Lane (DS)	6.10	AA	870.2		867.89	2423.8	-2.3		
Elm Creek	34246	Pine View Lane (US)	6.14	AB	870.7		868.25	2423.8	-2.4		
Elm Creek	34783	DS of Confluence of Bush Creek, US of Pine View Lane	6.21	AC	870.9		868.35	2423.8	-2.5		
Elm Creek	35380	Confluence of Bush Creek (DS)	6.31	AD	871.0	1,480	868.53	2423.8	-2.4	944	FIS location: Above junction of Rush Creek, just inside corporate limits of City of Dayton. Looked at Cross sections on Arcmap and this aligns with the described location
Elm Creek	36616	DS of Pine View Lake, DS of AI	6.63	AE	871.0		869.05	1034.6	-1.9		
Elm Creek	37254	Pine View Lake (DS), downstream of AG	6.77	AF	871.0		869.15	1034.6	-1.8		
Elm Creek	39639	Pine View Lake (DS)	7.36	AG	871.2		869.53	1034.6	-1.7		
Elm Creek	41126	DS of Pine View Lake, DS of AI	7.70	AH	871.7		870.65	1034.6	-1.1		
Elm Creek	42433	DS of Pine View Lake, DS of AJ	7.99	AI	872.3		871.28	1034.6	-1.0		
Elm Creek	43181	Pine View Lake (DS)	8.20	AJ	872.6		871.74	1034.6	-0.9		
Elm Creek	43585	Pine View Lake (US)	8.37	AK	875.0		872.86	1034.6	-2.2		
Elm Creek	44250	DS of Territorial Road, US of Pine View Lake, DS of AM	8.46	AL	876.1		874.02	1034.6	-2.1		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					500-yr		500-yr		500-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	46044	DS of Territorial Road, US of Pine View Lake, DS of AN	8.75	AM	876.3		875.27	1034.6	-1.0		
Elm Creek	47970	Territorial Road (DS)	9.20	AN	876.6		876.39	1034.6	-0.2		
Elm Creek	48986	Minnesota Trunk Highway 52 (DS)	9.44	AO	877.0		879.32	1034.6	2.3		
Elm Creek	49361	Minnesota Trunk Highway 52 (US), DS of Railroad	9.52	AP	877.9		879.63	1034.6	1.8		
Elm Creek	49968	US of Railroad that is US of Minnesota Trunk Highway 152	9.63	AQ	881.8		880.16	1034.6	-1.7		
Elm Creek	50514	US of Railroad, DS of Rice Lake Dam, DS of AS	9.72	AR	882.0		880.7	1034.6	-1.3		
Elm Creek	51433	Rice Lake Dam (DS)	9.91	AS	883.0		881.07	1034.6	-1.9		
Elm Creek	52499	DS of Rice Lake Dam, DS of AU	10.12	AT	884.2		881.85	1034.6	-2.4		
Elm Creek	53197	Rice Lake Dam (DS)	10.26	AU	887.2		883.14	1034.6	-4.1		
Mill Pond (Elm Creek)	53796		Not listed in FIS	AV	894.8	1,345	894.49	1034.6	-0.3	(310)	FIS Location: 10.33 mi above Mill Pond Spillway. Looked on Arcmap and this cross section is on Elm Creek but near Mill pond and Rice Lake. The cross section on FIS prfile is 10.35 mi above the Mill Pond Spillway. I think all the Mill Pond cross sectins are actually part of Elm Creek and then would in turn have a creek distance. The missing Cross sections from the Elm Creek correspond to the cross section in the Mill Pond main stem.
Mill Pond (Elm Creek)	65333		Not listed in FIS	AW	895.2	1,130	894.87	729.5	-0.3	(401)	FIS Location: 12.52 mi above Mill Pond Spillway. Looked on Arcmap and this cross section is on Elm Creek but near Mill pond and Rice Lake. The cross section on FIS prfile is 12.52 mi above the Mill Pond Spillway
Mill Pond (Elm Creek)	65946		Not listed in FIS	AX	895.4		894.91	729.5	-0.5		
Elm Creek	66592	West Rice Lake Road	12.76	AY	895.8		894.99	729.5	-0.8		
Elm Creek	66781	West Rice Lake Road (US)	12.78	AZ	896.1		895.01	729.5	-1.0		
Elm Creek	67119	DS of Weaver Lake Road, US of West Rice Lake Road	12.84	BA	897.5		895.18	729.5	-2.3		
Elm Creek	68058	DS of Weaver Lake Road, US of West Rice Lake Road	13.05	BB	898.6		895.3	729.5	-3.3		
Elm Creek	68853	Weaver Lake Road	13.17	BC	898.4		897.27	729.5	-1.1		
Elm Creek	69167	Weaver Lake Road (US)	13.25	BD	900.0		897.42	729.5	-2.6		
Elm Creek	69875	US of Weaver Lake Road, DS of BF	13.37	BE	900.0		897.43	729.5	-2.6		
Elm Creek	70093	US of Weaver Lake Road, DS of BG	13.44	BF	900.0		897.43	729.5	-2.6		
Elm Creek	70462	US of Weaver Lake Road, DS of BH	13.48	BG	900.0		897.51	729.5	-2.5		
Elm Creek	71981	Weaver Lake Road (US)	13.77	BH	900.0		897.55	729.5	-2.5		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					500-yr		500-yr		500-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	73933	DS of Farm Driveway	14.10	BI	900.0	1,020	898.86	672.2	-1.2	(348)	FIS Location: 14.08 miles above Mill pond spillway
Elm Creek	74436	DS of Farm Driveway, DS of BK	14.30	BJ	902.0		899.56	672.2	-2.4		
Elm Creek	74718	Dunkirk Lane	14.41	BK	904.0		899.97	672.2	-4.1		
Elm Creek	74971	Dunkirk Lane (US)	14.44	BL	905.1		901.89	672.2	-3.2		
Elm Creek	75680	US of Dunkirk Lane, DS of Bass Lake Road, DS of BN	14.55	BM	905.9		903.13	672.2	-2.7		
Elm Creek	76495	US of Dunkirk Lane, DS of Bass Lake Road, DS of BO	14.72	BN	906.6		904.13	672.2	-2.5		
Elm Creek	77331	DS of Bass Lake Road, US Dunkirk Lane, DS of BP	14.86	BO	907.2		905.55	672.2	-1.6		
Elm Creek	79194	DS of Bass Lake Road, US Dunkirk Lane, DS of BQ	15.18	BP	907.6		906.67	672.2	-0.9		
Elm Creek	80843	DS of Bass Lake Road, US Dunkirk Lane, DS of BR	15.48	BQ	908.9		907.5	672.2	-1.4		
Elm Creek	82336	DS of Bass Lake Road	15.75	BR	910.4		909.34	672.2	-1.0		
Elm Creek	82996	Bass Lake Road	15.90	BS	911.3		909.95	672.2	-1.3		
Elm Creek	83398	DS of Elm Road, US of Bass Lake Road, DS of BU	15.95	BT	911.8		910.3	672.2	-1.5		
Elm Creek	83890	DS of Elm Road, US of Bass Lake Road, DS of BV	16.05	BU	911.9		910.75	672.2	-1.1		
Elm Creek	84476	DS of Elm Road, US of Bass Lake Road, DS of BW	16.16	BV	912.0		910.79	672.2	-1.2		
Elm Creek	85470	DS of Elm Road, US of Bass Lake Road, DS of BX	16.35	BW	912.0		910.96	672.2	-1.1		
Elm Creek	86861	DS of Elm Road, US of Bass Lake Road	16.52	BX	912.4		911.86	672.2	-0.5		
Elm Creek	88288	DS of Elm Road, US of Bass Lake Road, DS of BZ	16.74	BY	916.1	740	915.07	672.2	-1.0	(68)	On FIS the creek distance for the 100-yr peak flow rate is 16.73, used this peak flow rate
Elm Creek	88898	DS of Elm Road, US of Bass Lake Road, DS of CA	16.82	BZ	917.3		915.99	672.2	-1.3		
Elm Creek	90652	Elm Road (DS)	17.04	CA	920.1		918.75	672.2	-1.4		
Elm Creek	#N/A	Elm Road (US)	17.11	CB	921.0		#N/A	#N/A	#N/A		
Elm Creek	91739	US of Elm Road, US of CB	17.24	CC	921.7		921	672.2	-0.7		
Elm Creek	92290	US of Elm Road, US of CC	17.34	CD	922.3		921.82	672.2	-0.5		
Elm Creek	93102	US of Elm Road, DS of CF	17.50	CE	923.5		922.22	672.2	-1.3		
Elm Creek	93848	US of Elm Road, US of CE	17.63	CF	922.3		922.42	460.5	0.1		
Elm Creek	111598	US of State Highway 55, DS of State Highway 101 and CH	20.66	CG	960.8	330	962.82	460.5	2.1	131	FIS Location: At Medina-Plymouth corporate boundary limits. This Cross section is the closest to the city boundaries
Elm Creek	112306	State Highway 101 (DS)	20.73	CH	963.9		963.56	460.5	-0.3		
Elm Creek	112413	State Highway 101 (US)	20.75	CI	965.3		966.76	460.5	1.5		
Elm Creek	113170	DS of Access Road, US of State Highway 101	20.87	CJ	966.2		967.72	460.5	1.5		
Elm Creek	113302	US and DS of two Access Road, US of State Highway 101	20.91	CK	973.1		974.04	460.5	0.9		
Elm Creek	113654	US and DS of two Access Road, US of State Highway 101, US of CK	20.96	CL	973.2		974.57	460.5	1.4		
Elm Creek	113752	US of Access Road, DS of Railroad	21.00	CM	973.3		974.57	460.5	1.3		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					500-yr		500-yr		500-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	114334	US Access road, DS railroad and Hamel Road	21.11	CN	973.4	305	974.59	460.5	1.2	156	FIS Location: Below Soo Line Bridge, near Hamel Road. I think this is the correct cross section location but not positive. Double check
Elm Creek	114472	Railroad, DS of Hamel Road	21.14	CO	976.6		983.4	460.5	6.8		
Elm Creek	114953	DS of Hamel Road, US of Railroad	21.21	CP	977.4	72	983.4	460.5	6.0	389	FIS Location: downstream of Hamel Road, near Pinto Drive. I picked the cross section that is farthest DS of Hamel Road (Creek meanders around it), and is still near Pinto Road.
Elm Creek	115445	Elm Creek Drive (DS)	21.29	CQ	977.8		983.4	460.5	5.6		
Elm Creek	115587	Elm Creek Drive (US)	21.32	CR	977.8		983.4	460.5	5.6		
Elm Creek	116667	Sewage Lagoon Road (DS)	21.50	CS	977.9		983.41	460.5	5.5		
Elm Creek	116797	Sewage Lagoon Road (US)	21.53	CT	977.9		983.41	460.5	5.5		
Elm Creek	117854	DS of Confluence of Tributary to Elm Creek	21.73	CU	977.8		983.41	460.5	5.6		
Elm Creek	118767	DS of Hamel Road, DS of CW	21.90	CV	978.0		983.41	102	5.4		
Elm Creek	119019	DS of Hamel Road	21.94	CW	978.0		983.41	102	5.4		
Elm Creek	119205	US of Hamel Road DS of SOO Line Railroad	21.97	CX	978.2		983.65	102	5.4		
Elm Creek	119439	US of Hamel Road DS of SOO Line Railroad	22.02	CY	978.4		983.65	102	5.3		
Elm Creek	120084	DS of SOO Line Railroad	22.15	CZ	978.5		983.65	102	5.1		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	1361	US of confluence with Elm Creek	0.26	A	971.0	2,000	860.1	1345.8	-110.9	-654.2	
Rush Creek	4230	US of confluence with Elm Creek, DS of C	0.76	B	971.0		862.3	1345.8	-108.7		
Rush Creek	5541	US of confluence with Elm Creek, DS of D	1.00	C	872.2		864.3	1345.8	-7.9		
Rush Creek	7368	US of confluence with Elm Creek, DS of E	1.39	D	875.3		867	1345.8	-8.3		
Rush Creek	8015	US of confluence with Elm Creek, DS of F	1.52	E	876.4		868.3	1345.8	-8.1		
Rush Creek	9884	US of confluence with Elm Creek, DS of G	1.87	F	880.7		869	1345.8	-11.7		
Rush Creek	11375	US of confluence with Elm Creek, DS of H	2.14	G	884.0		871.1	1345.8	-12.9		
Rush Creek	12615	Fernbrook Lane (DS)	2.36	H	886.6		874.3	1345.8	-12.3		
Rush Creek	12977	At Fernbrook Lane	2.42	I	888.8		875.5	1227.5	-13.3		
Rush Creek	13940	Fernbrook Lane (US)	2.60	J	889.4		876.7	1227.5	-12.7		
Rush Creek	14425	US of Fernbrook Lane, DS of L	2.68	K	889.6		879	1227.5	-10.6		
Rush Creek	15894	US of Fernbrook Lane, DS of M	2.94	L	891.2		878.7	1227.5	-12.5		
Rush Creek	16252	US of Fernbrook Lane, DS of N	3.01	M	891.8		880.2	1227.5	-11.6		
Rush Creek	16584	US of Fernbrook Lane, DS of O	3.05	N	892.0		880.2	1227.5	-11.8		
Rush Creek	17911	US of Fernbrook Lane, DS of P	3.33	O	893.9		882.88	1227.5	-11.0		
Rush Creek	18529	US of Fernbrook Lane, DS of Q	3.43	P	894.8		883.6	1227.5	-11.2		
Rush Creek	19800	US of Fernbrook Lane, DS of R	3.64	Q	896.6		886.9	1227.5	-9.7		
Rush Creek	20567	US of Fernbrook Lane, DS of S	3.75	R	897.9		888.51	1227.5	-9.4		
Rush Creek	21118	US of Fernbrook Lane, DS of T	3.89	S	900.4		888.7	1227.5	-11.7		
Rush Creek	25333	Territorial Road (DS)	4.66	T	907.1		894.7	1227.5	-12.4		
Rush Creek	25518	At Territorial Road	4.70	U	907.9		895.2	1227.5	-12.7		
Rush Creek	26324	Territorial Road (US)	4.84	V	907.9		895.3	1227.5	-12.6		
Rush Creek	27258	US of Territorial Road, DS of Minnesota Trunk Highway 152	5.00	W	907.9	1,860	894.1	1227.5	-13.8	-632.5	Location from FIS: 5 miles above confluence with Elm Creek
Rush Creek	28541	Minnesota Trunk Highway 152 (DS)	5.22	X	907.9		895.6	1227.5	-12.3		
Rush Creek	29002	At Minnesota Trunk Highway 152	5.30	Y	907.9		895.6	1227.5	-12.3		
Rush Creek	30564	Minnesota Trunk Highway 152 (US), near Burling and Nor. RR	5.61	Z	909.7		898.24	1227.5	-11.5		
Rush Creek	31018	US of Burling and Nor. RR, DS of Dunkirk Lane	5.67	AA	910.0		898.24	1227.5	-11.8		
Rush Creek	31134	Dunkirk Lane (DS)	5.71	AB	910.0		898.14	1227.5	-11.9		
Rush Creek	31323	Dunkirk Lane (US)	5.74	AC	912.6		898.14	1227.5	-14.5		
Rush Creek	31489	US of Dunkirk Lane, DS of AE	5.78	AD	912.9		899.7	1227.5	-13.2		
Rush Creek	32287	US of Dunkirk Lane, DS of 105th Avenue N, DS of AF	5.92	AE	912.9		898.1	1227.5	-14.8		
Rush Creek	33461	105th Avenue N (DS)	6.09	AF	912.9		897.5	1227.5	-15.4		
Rush Creek	33852	At 105th Avenue N	6.18	AG	912.9		896.2	1227.5	-16.7		
Rush Creek	34127	105th Avenue N (US)	6.24	AH	912.9		896.2	1227.5	-16.7		
Rush Creek	34752	US of 105th Avenue N, DS of State Route 92/Interstate 94, DS of AH	6.35	AI	912.9		898.8	1227.5	-14.1		
Rush Creek	36410	State Route 92/Interstate 94 (DS)	6.66	AJ	912.9		899.2	1227.5	-13.7		
Rush Creek	36817	State Route 92/Interstate 94 (US)	6.76	AK	913.5		899.5	1227.5	-14.0		
Rush Creek	37740	US of the confluence with North Fork Rush Creek	7.52	AL	913.9	960	901.6	1227.5	-12.3	267.5	Location from FIS: 7.52 mi above confluence with Elm Creek
Rush Creek	40468	US of the confluence with North Fork Rush Creek, DS of 101st Avenue North, US of AL	7.85	AM	914.7		903.29	1178.8	-11.4		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	42214	US of the confluence with North Fork Rush Creek, DS of 101st Avenue North, US of AM	8.05	AN	916.2		904.94	1178.8	-11.2		
Rush Creek	43810	101st Avenue North (DS)	8.28	AO	918.2		906	1178.8	-12.2		
Rush Creek	44964	101st Avenue North (US)	8.33	AP	920.2		907.9	1178.8	-12.3		
Rush Creek	46234	US of 101st Avenue North, DS of 97th Avenue North, US of AP	8.48	AQ	920.3		910.3	1178.8	-10.0		
Rush Creek	49423	US of 101st Avenue North, DS of 97th Avenue North, US of AQ	8.67	AR	921.9		913.4	1178.8	-8.5		
Rush Creek	50185	US of 101st Avenue North, DS of 97th Avenue North, US of AR	8.84	AS	923.3		915.1	1178.8	-8.2		
Rush Creek	51388	US of 101st Avenue North, DS of 97th Avenue North, US of AS	9.08	AT	925.1		916.8	1178.8	-8.3		
Rush Creek	53011	US of 101st Avenue North, DS of 97th Avenue North, US of AT	9.37	AU	927.1		918	1178.8	-9.1		
Rush Creek	53717	US of 101st Avenue North, DS of 97th Avenue North, US of AU	9.48	AV	928.2		918.6	1178.8	-9.5		
Rush Creek	54121	97th Avenue N (DS)	9.55	AW	928.8		919.1	521.9	-9.7		
Rush Creek	54333	At 97th Avenue N	9.59	AX	929.0		919.4	521.9	-9.6		
Rush Creek	54953	97th Avenue N (US)	9.69	AY	929.0		919.4	521.9	-9.6		
Rush Creek	56367	US of 97th Avenue N, DS of BA	9.92	AZ	929.1		920.2	521.9	-8.9		
Rush Creek	57461	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of AZ	10.12	BA	929.2		920.6	521.9	-8.6		
Rush Creek	58182	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of BA	10.22	BB	929.2		920.7	521.9	-8.5		
Rush Creek	60047	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of BB	10.51	BC	930.0		922.1	521.9	-7.9		
Rush Creek	60695	DS of Minnesota Highway 101, US of 97th Avenue North, DS of BE	10.64	BD	930.6		923	521.9	-7.6		
Rush Creek	62766	DS of Minnesota Highway 101, US of BD	10.96	BE	932.8		925.5	521.9	-7.3		
Rush Creek	63179	State Highway 101 (just DS)	11.03	BF	933.4	810	925.7	464.5	-7.7	-345.5	FIS Location: At State Highway 101
Rush Creek	64415	DS of Private Road that is DS of Schute Road	11.28	BG	934.6		925.9	464.5	-8.7		
Rush Creek	64580	US of Private Road that is DS of Schute Road	11.36	BH	936.2		926.6	464.5	-9.5		
Rush Creek	65350	US of Private Road near State Highway 10, DS of Schute Road, US of BH	11.42	BI	936.3		926.6	464.5	-9.7		
Rush Creek	65819	DS of Schute Road, US of BI	11.52	BJ	936.3		926	464.5	-10.3		
Rush Creek	66475	Schute Road (DS)	11.64	BK	936.4		926	464.5	-10.4		
Rush Creek	66776	Schute Road (US)	11.72	BL	936.5		926.54	464.5	-9.9		
Rush Creek	67465	US of Schute Road, DS of BN	11.84	BM	936.6		927.1	464.5	-9.4		
Rush Creek	69314	US of Schute Road, DS of BO	12.16	BN	936.8		928.4	464.5	-8.4		
Rush Creek	70421	US of Schute Road, DS of BP	12.38	BO	937.0		928.5	464.5	-8.5		
Rush Creek	76315	US of Schute Road, DS of County Highway 116, DS of BQ	13.50	BP	937.1		928.8	464.5	-8.3		
Rush Creek	76731	County Highway 116 (DS)	13.60	BQ	937.1	680	929.72	464.5	-7.4	-215.5	FIS location: Just downstream of County Road 116
Rush Creek	77175	County Highway 116 (US)	13.66	BR	939.2		930.5	464.5	-8.7		
Rush Creek	78725	US of County Highway 116, DS of County Highway 10, DS of BT	13.94	BS	939.3		931.9	365.5	-7.4		
Rush Creek	80181	US of County Highway 116, DS of County Highway 10, DS of BU	14.12	BT	939.4		932.3	365.5	-7.1		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	81438	US of County Highway 116, DS of County Highway 10, DS of BV	14.44	BU	941.2		935.8	365.5	-5.4		
Rush Creek	82895	US of County Highway 116, DS of County Highway 10, DS of BW	14.64	BV	942.5	485	938.63	365.5	-3.9	-119.5	FIS location: Just aboved Unnamed Tributary approximately 0.3 miles downstream of County Highway 10. Cross section BV is ~0.39 mi downstream of Highway 10 and downstream of a trib
Rush Creek	84156	County Highway 10 (DS)	14.78	BW	945.9		939.7	365.5	-6.2		
Rush Creek	84403	County Highway 10 (US)	14.86	BX	947.0		939	365.5	-8.0		
Rush Creek	85510	US of County Highway 10, DS of County Highway 50, DS of BZ	15.06	BY	947.3		941	365.5	-6.3		
Rush Creek	86165	US of County Highway 10, DS of County Highway 50, DS of CA	15.14	BZ	947.6		943.62	365.5	-4.0		
Rush Creek	86434	US of County Highway 10, DS of County Highway 50, DS of CB	15.34	CA	950.5		944.26	365.5	-6.3		
Rush Creek	88133	US of County Highway 10, DS of County Highway 50, DS of CC	15.42	CB	952.0	375	946.8	251.1	-5.2	-123.9	FIS Location: Just above Unnamed Tributary approximately 0.6 miles upstream of County Highway 10. Cross section CB is 0.6 mi upstream of County Highway 10
Rush Creek	89836	US of County Highway 10, DS of County Highway 50, DS of CD	15.72	CC	956.1		951.6	251.1	-4.5		
Rush Creek	90820	US of County Highway 10, DS of County Highway 50, DS of CE	15.92	CD	957.9		952.5	251.1	-5.4		
Rush Creek	91832	County Highway 50 (DS)	16.02	CE	960.0		953.9	251.1	-6.1		
Rush Creek	92192	County Highway 50 (US)	16.12	CF	960.0		955.7	251.1	-4.3		
Rush Creek	93097	US of County Highway 50, DS of Kalk Road, DS of CH	16.33	CG	961.1		957.73	251.1	-3.4		
Rush Creek	93948	US of County Highway 50, DS of Kalk Road, DS of CI	16.45	CH	963.2		958.1	251.1	-5.1		
Rush Creek	94424	Kalk Road (DS)	16.53	CI	963.8		958.5	251.1	-5.3		
Rush Creek	94564	Kalk Road (US)	16.57	CJ	966.1		957.5	251.1	-8.6		
Rush Creek	95356	US of Kalk Road, DS of Rolling Hills Road, US of CJ	16.73	CK	966.1		956.8	251.1	-9.3		
Rush Creek	100957	DS of Rolling Hills Road, US of CK	17.76	CL	966.3		962	117.7	-4.3		
Rush Creek	101677	Rolling Hills Road (DS)	17.86	CM	966.3		960.5	117.7	-5.8		
Rush Creek	101771	Rolling Hills Road (US)	17.92	CN	968.0		960.5	117.7	-7.5		
Rush Creek	104294	US of Rolling Hills Road, DS of CP	18.36	CO	967.6		965.84	117.7	-1.8		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	104810	US of Rolling Hills Road, DS of CQ	18.44	CP	969.8		966.66	117.7	-3.2		
Rush Creek	105486	US of Rolling Hills Road, At the "limit of detailed of study"	18.58	CQ	971.1	300	967.7	117.7	-3.4	-182.3	FIS Location: At Jubert Lake outlet. Looked on Arcmap and CQ is at this location

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Rush Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
North Fork Rush Creek	14593	County Road 117 (US)	2.66	A	916.0		902.8	509.5	-13.2		
North Fork Rush Creek	15174	109th Avenue North (US)	2.76	B	916.0		904.8	509.5	-11.2		
North Fork Rush Creek	16367	US of 109th Avenue N, DS of Access Road near Cain Road, DS of D	2.98	C	916.0		905	509.5	-11.0		
North Fork Rush Creek	17914	US of 109th Avenue N, DS of Access Road near Cain Road, DS of E	3.26	D	916.0		906	509.5	-10.0		
North Fork Rush Creek	18117	Access Road near Cain Road (DS)	3.30	E	916.0		905.6	509.5	-10.4		
North Fork Rush Creek	18282	Access Road near Cain Road (US)	3.32	F	916.0		905.5	509.5	-10.5		
North Fork Rush Creek	19664	Cain Road	3.55	G	916.0	700	905.2	444.6	-10.8	-255.4	
North Fork Rush Creek	19750	Cain Road (US)	3.58	H	916.0		904.9	444.6	-11.1		
North Fork Rush Creek	20321	US of Cain Road, DS of Trail Haven Road, DS of J	3.70	I	916.0		909.1	444.6	-6.9		
North Fork Rush Creek	21320	US of Cain Road, DS of Trail Haven Road, DS of K	3.84	J	916.6		911.5	444.6	-5.1		
North Fork Rush Creek	22487	US of Cain Road, DS of Trail Haven Road, DS of L	4.06	K	918.2		913.4	444.6	-4.8		
North Fork Rush Creek	23477	US of Cain Road, DS of Trail Haven Road, DS of M	4.24	L	919.0		913	444.6	-6.0		
North Fork Rush Creek	23984	US of Cain Road, DS of Trail Haven Road, DS of N	4.34	M	919.3		913.1	444.6	-6.2		
North Fork Rush Creek	24861	US of Cain Road, DS of Trail Haven Road, DS of O	4.50	N	920.2		915.8	444.6	-4.4		
North Fork Rush Creek	26026	US of Cain Road, DS of Trail Haven Road, DS of P	4.72	O	921.4		916.3	213.3	-5.1		
North Fork Rush Creek	26892	US of Cain Road, DS of Trail Haven Road, DS of Q	4.87	P	922.6		915.2	213.3	-7.4		
North Fork Rush Creek	27431	US of Cain Road, DS of Trail Haven Road, DS of R	4.98	Q	924.7		917.64	213.3	-7.1		
North Fork Rush Creek	27581	Trail Haven Road (DS)	4.99	R	926.2	700	918.2	213.3	-7.9	-486.7	
North Fork Rush Creek	27759	Trail Haven Road (US)	5.03	S	926.7		917.2	213.3	-9.5		
North Fork Rush Creek	28660	US of Trail Haven Road, DS of County Road 117, US of S	5.19	T	926.8		917.5	213.3	-9.3		
North Fork Rush Creek	30100	US of Trail Haven Road, DS of County Road 117, US of T	5.44	U	926.9		918.1	213.3	-8.8		
North Fork Rush Creek	31286	County Road 117/109th Avenue North (DS)	5.65	V	927.0		918.6	158.6	-8.4		
North Fork Rush Creek	31384	At County Road 117/109th Avenue N	5.67	W	924.7		918.4	158.6	-6.3		
North Fork Rush Creek	31460	County Road 117/109th Avenue North (US)	5.68	X	927.6		918.4	158.6	-9.2		
North Fork Rush Creek	31580	US and DS of County Road 117/109th Avenue N, DS of Z	5.70	Y	928.5		920.4	158.6	-8.1		
North Fork Rush Creek	35165	DS of County Road 117/109th Ave N, DS of AA	6.47	Z	928.9		921.2	158.6	-7.7		
North Fork Rush Creek	35265	US of County Road 117/109th Avenue N	6.50	AA	932.1		921.3	158.6	-10.8		
North Fork Rush Creek	35391	US of County Road 117/109th Ave N, DS of AC	6.52	AB	932.1		923.8	158.6	-8.3		
North Fork Rush Creek	35871	US of County Road 117/109th Ave N, DS of AD	6.60	AC	932.1		925.62	158.6	-6.5		
North Fork Rush Creek	36391	US of County Road 117/109th Ave N, DS of AE	6.70	AD	936.5		926.05	158.6	-10.5		
North Fork Rush Creek	38053	DS of Access Road, US of AD	6.99	AE	935.6		929	158.6	-6.6		
North Fork Rush Creek	38209	DS of Bechtold Road, US of Access Road	7.03	AF	937.9		930.5	158.6	-7.4		
North Fork Rush Creek	38758	DS of Bechtold Road	7.15	AG	938.4		931.6	158.6	-6.8		
North Fork Rush Creek	38930	US of Bechtold Road	7.16	AH	940.3		931.7	158.6	-8.6		
North Fork Rush Creek	39380	US of Bechtold Road,DS of AJ	7.25	AI	941.2		932.2	158.6	-8.9		
North Fork Rush Creek	40511	DS of County Road 30/Oak Bole Drive, DS of AK	7.47	AJ	942.8		934.69	158.6	-8.1		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Rush Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
North Fork Rush Creek	41705	DS of County Road 30/Oak Bole Drive	7.67	AK	944.7		938.32	158.6	-6.4		
North Fork Rush Creek	41986	US of County Road 30/Oak Bole Drive	7.72	AL	948.2		939	126.4	-9.2		
North Fork Rush Creek	43630	US of County Road 30/Oak Bole Drive, DS of AN	7.96	AM	948.5		941.6	126.4	-6.9		
North Fork Rush Creek	44291	US of County Road 30/Oak Bole Drive, DS of AO	8.07	AN	949.1		943.7	126.4	-5.4		
North Fork Rush Creek	46377	DS of Sundance Road, DS of AP	8.37	AO	952.2		946.9	126.4	-5.3		
North Fork Rush Creek	47362	DS of Sundance Road, DS of AQ	8.53	AP	955.9		949.21	126.4	-6.7		
North Fork Rush Creek	48342	DS of Sundance Road, DS of AR	8.69	AQ	959.3		952.7	126.4	-6.6		
North Fork Rush Creek	49363	DS of Sundance Road	8.86	AR	961.8		953.8	126.4	-8.0		
North Fork Rush Creek	49436	US of Sundance Road	8.88	AS	964.1		955	126.4	-9.1		
North Fork Rush Creek	49901	US of Sundance Road, US of AS	8.94	AT	964.1		956.62	126.4	-7.4		
North Fork Rush Creek	50577	US of Sundance Road, US of AT	9.08	AU	964.1		957.59	126.4	-6.5		
North Fork Rush Creek	52176	DS of 97th Avenue N, DS of AW	9.29	AV	966.3		962	126.4	-4.3		
North Fork Rush Creek	52972	DS of 97th Avenue N, DS of AX	9.42	AW	969.0		962.48	126.4	-6.5		
North Fork Rush Creek	54987	DS of 97th Avenue N	9.75	AX	974.4		968.3	126.4	-6.1		
North Fork Rush Creek	55226	US of 97th Avenue N	9.78	AY	977.5		968.5	126.4	-9.0		
North Fork Rush Creek	55966	US of 97th Avenue N, US of AY	9.91	AZ	978.1		971.24	126.4	-6.9		
North Fork Rush Creek	57273	US of 97th Avenue N, US of AZ	10.13	BA	981.9		976.18	126.4	-5.7		
North Fork Rush Creek	58518	US of 97th Avenue N, DS of BC	10.32	BB	985.4		978.8	126.4	-6.6		
North Fork Rush Creek	59887	DS of Access Road and County Road 10, DS of BD	10.52	BC	989.6		984	126.4	-5.6		
North Fork Rush Creek	59987	DS of Access Road, DS of BE	10.55	BD	991.5		984.2	126.4	-7.3		
North Fork Rush Creek	60064	US of Access Road near County Road 10, DS of BF	10.59	BE	991.7		984.3	126.4	-7.4		
North Fork Rush Creek	60120	DS of County Road 10	10.61	BF	992.1	420	985.2	126.4	-6.9	-293.6	
North Fork Rush Creek	60352	US of County Road 10	10.63	BG	992.4		984.5	58.1	-7.9		
North Fork Rush Creek	60606	US of County Road 10, DS of Access Road	10.69	BH	993.1		985.3	58.1	-7.8		
North Fork Rush Creek	60948	US of Access Road, DS of BJ	10.73	BI	993.1		985.3	58.1	-7.8		
North Fork Rush Creek	61315	US of County Road 10 and Access road, US of BI	10.81	BJ	993.3		986.1	58.1	-7.2		
North Fork Rush Creek	63385	US of County Road 10, US of BJ	11.20	BK	994.5		988.74	58.1	-5.7		
North Fork Rush Creek	63749	US of County Road 10, US of BK	11.27	BL	995.1		988.6	58.1	-6.5		
North Fork Rush Creek	64763	DS of County Road 19/Crow Hassan Park Road	11.45	BM	999.8		991.33	58.1	-8.4		
North Fork Rush Creek	64955	US of County Road 19/Crow-Hassan Park Road	11.49	BN	1005.2		992.68	58.1	-12.5		
North Fork Rush Creek	65429	DS of Strehler Road, DS of BP	11.58	BO	1005.2		991.01	58.1	-14.2		
North Fork Rush Creek	65983	DS of Strehler Road, DS of BQ	11.68	BP	1005.2		993.09	58.1	-12.1		
North Fork Rush Creek	66739	DS of Strehler Road, DS of BR	11.80	BQ	1005.2		995.8	58.1	-9.4		
North Fork Rush Creek	67226	DS of Strehler Road	11.92	BR	1005.3	300	995.9	58.1	-9.4	-241.9	
North Fork Rush Creek	67429	US of Strehler Road	11.96	BS	1005.3		996	58.1	-9.3		
North Fork Rush Creek	68345	US of Strehler Road, US of BS	12.12	BT	1005.3		997.4	58.1	-7.9		
North Fork Rush Creek	69031	US of Strehler Road, US of BT	12.24	BU	1005.3		998	58.1	-7.3		
North Fork Rush Creek	69474	US of Strehler Road, US of BU	12.33	BV	1005.3		998.5	58.1	-6.8		
North Fork Rush Creek	71089	US of Strehler Road, DS of BX	12.64	BW	1005.4		998.7	58.1	-6.7		
North Fork Rush Creek	72186	US of Strehler Road, US of BW	12.85	BX	1005.4		999.5	58.1	-5.9		
North Fork Rush Creek	72915	US of Strehler Road, US of BX	12.99	BY	1005.4		1000.2	58.1	-5.2		

APPENDIX E

1% and 0.2% AEP Inundation Maps

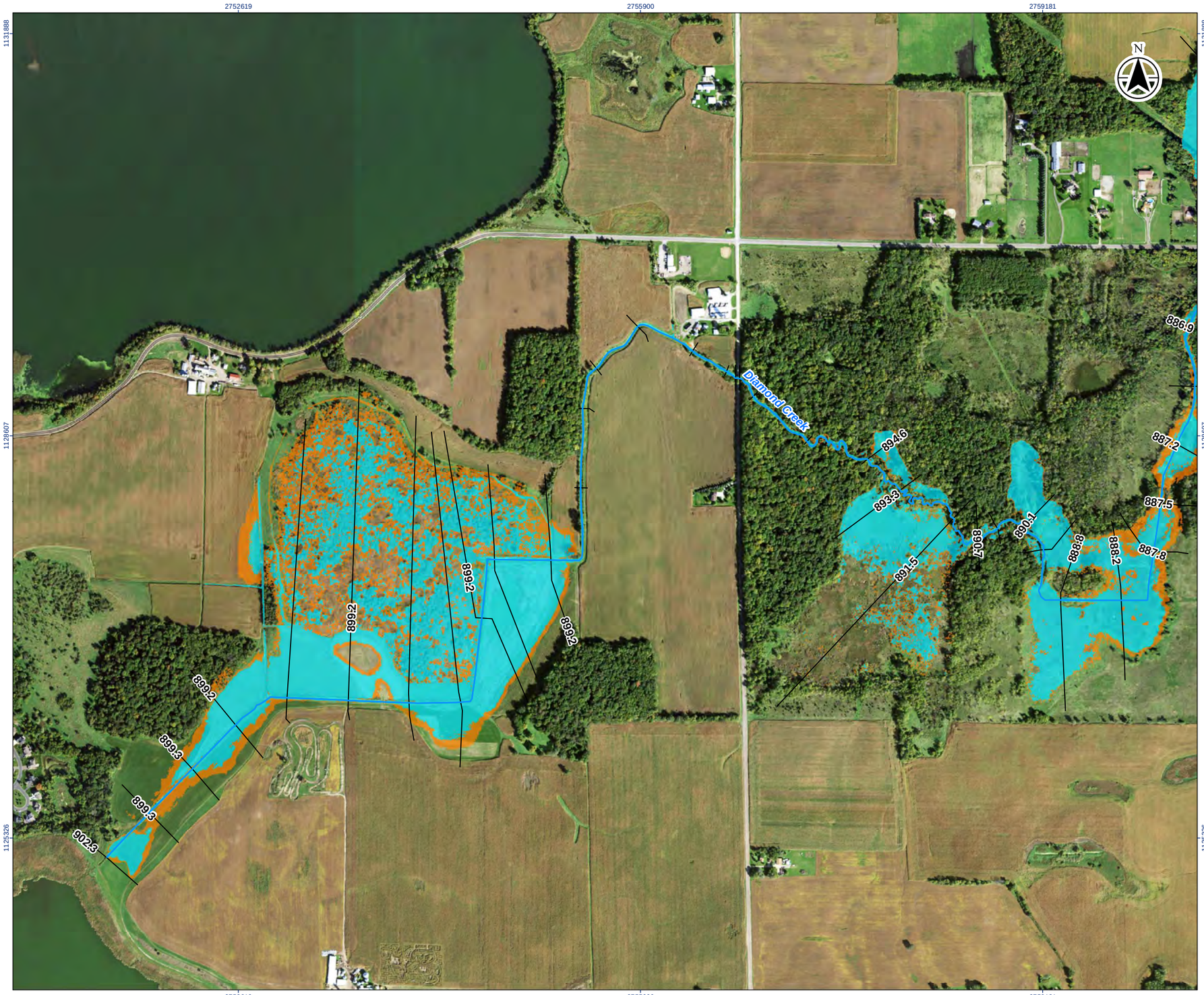


Figure No.
1 of 27

Title
Elm Creek Watershed Revision Proposed Results

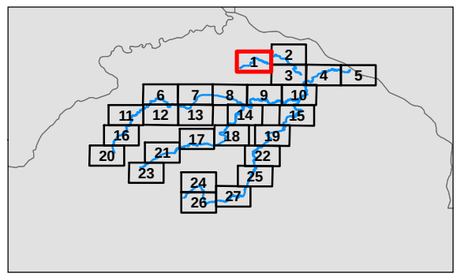
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain

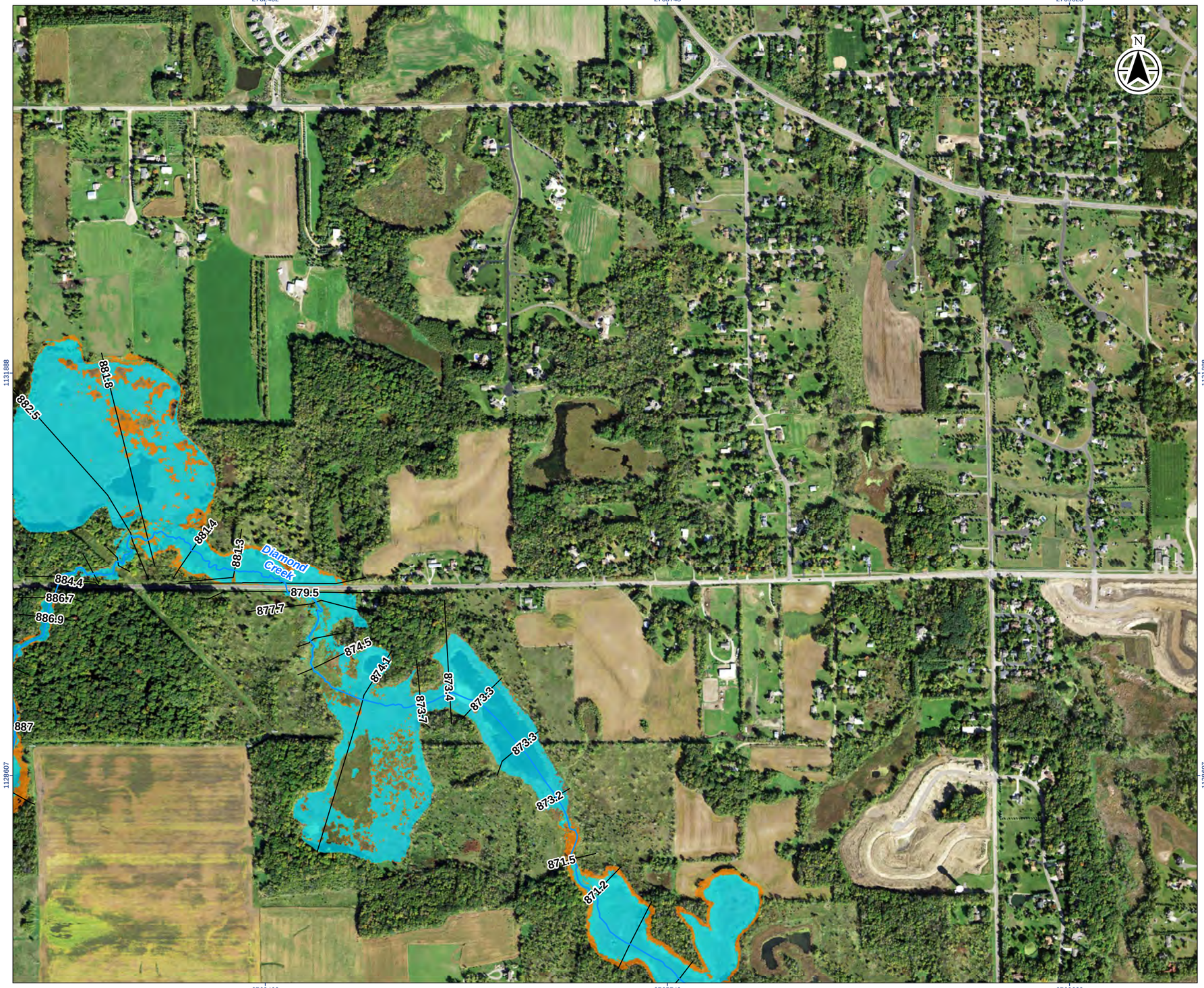


Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

V:\1897\temporary\22704963_ElmCreek\Maps\Final_Maps\BmCreek_Maps.mxd Revised: 2022-05-06 By: lschrader

2762462 2765743 2769023

1131888



1128607

Figure No.
2 of 27

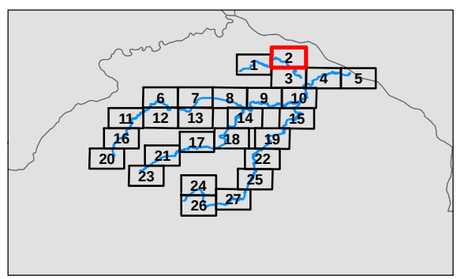
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\19371\temporary\227004983_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 By: lschrader

2762462 2765743 2769023

1125326 1122045

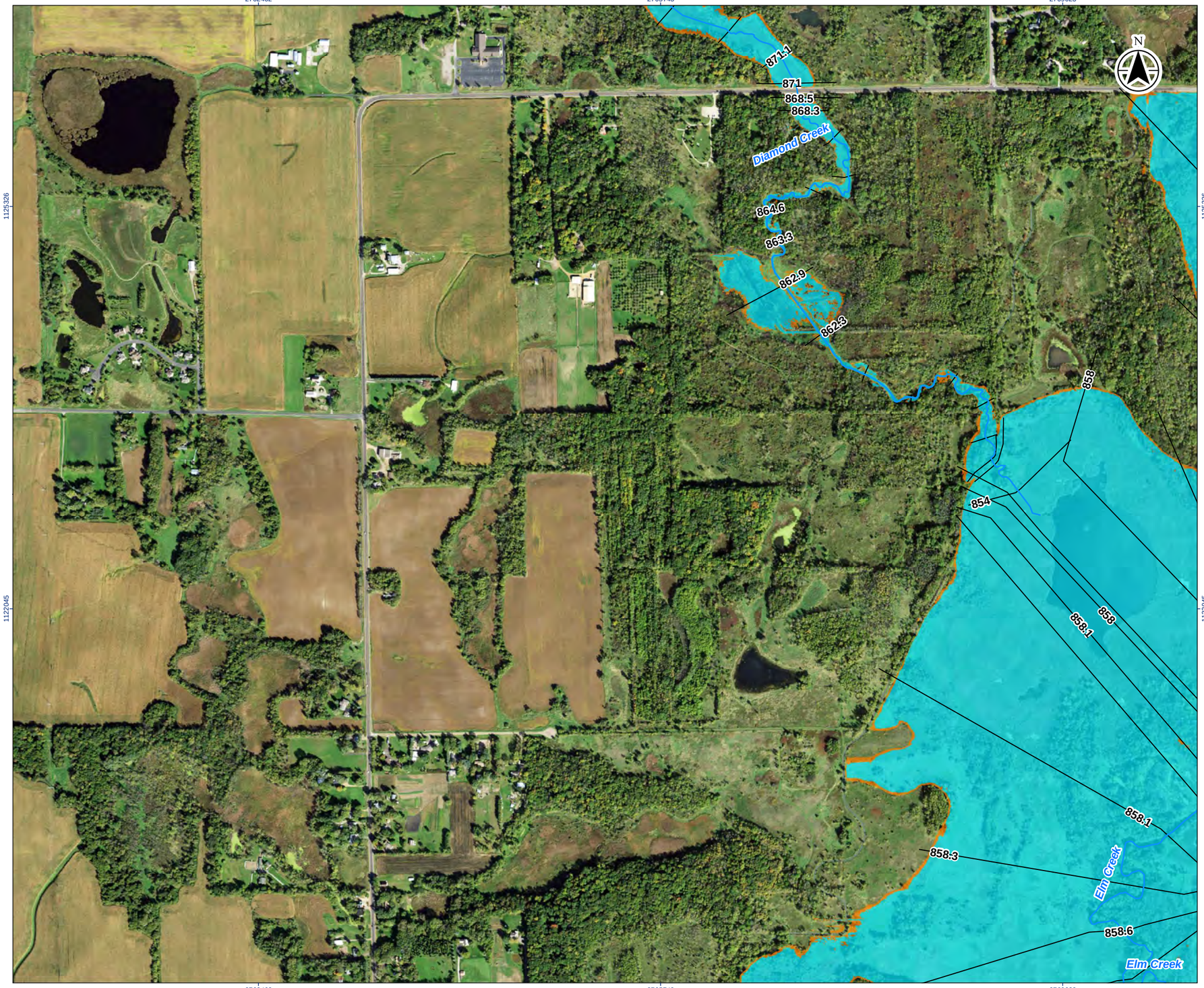


Figure No.
3 of 27

Title
Elm Creek Watershed Revision
Proposed Results

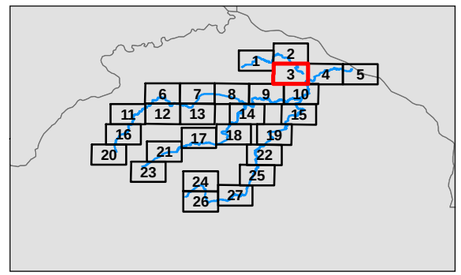
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 By: kschrader

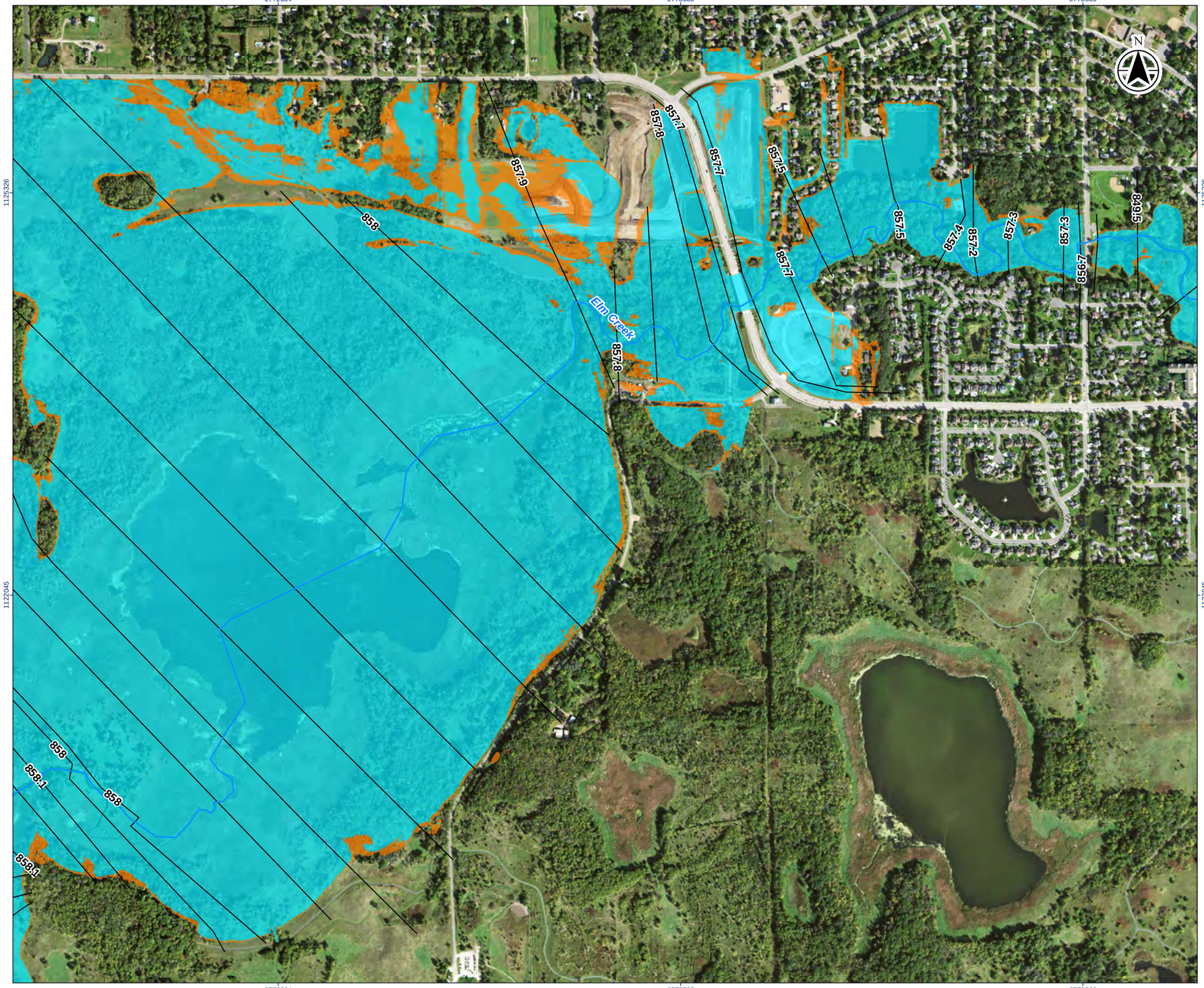


Figure No.
4 of 27

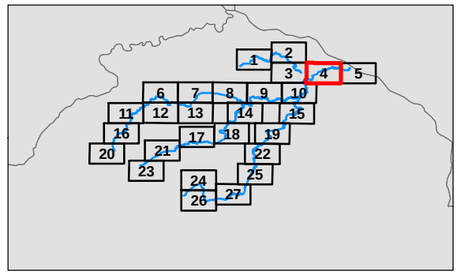
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1937\temporary\227704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 By: lschrader

Figure No.
5 of 27

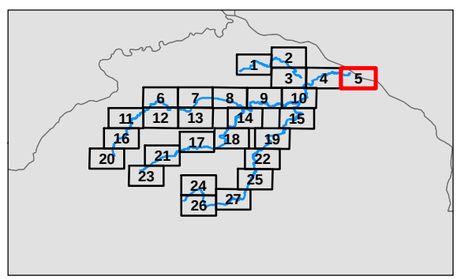
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

2726373 2729653 2732934

1118764 1115483 1112203

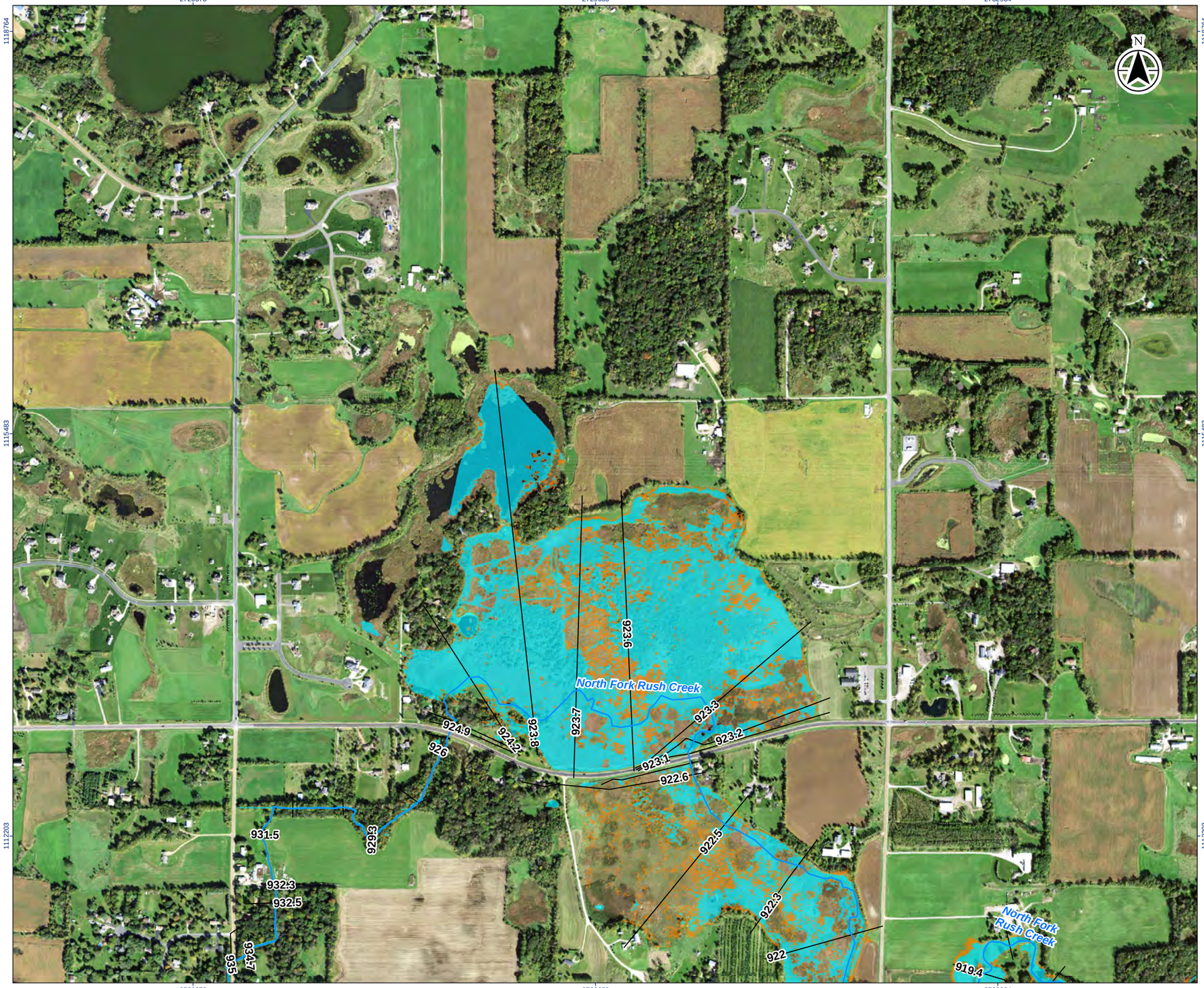


Figure No.
6 of 27

Title
Elm Creek Watershed Revision
Proposed Results

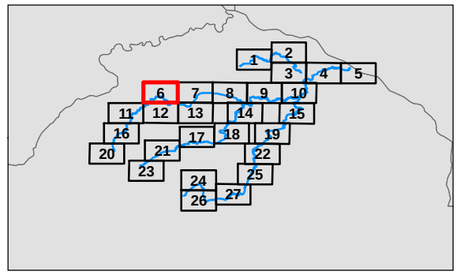
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

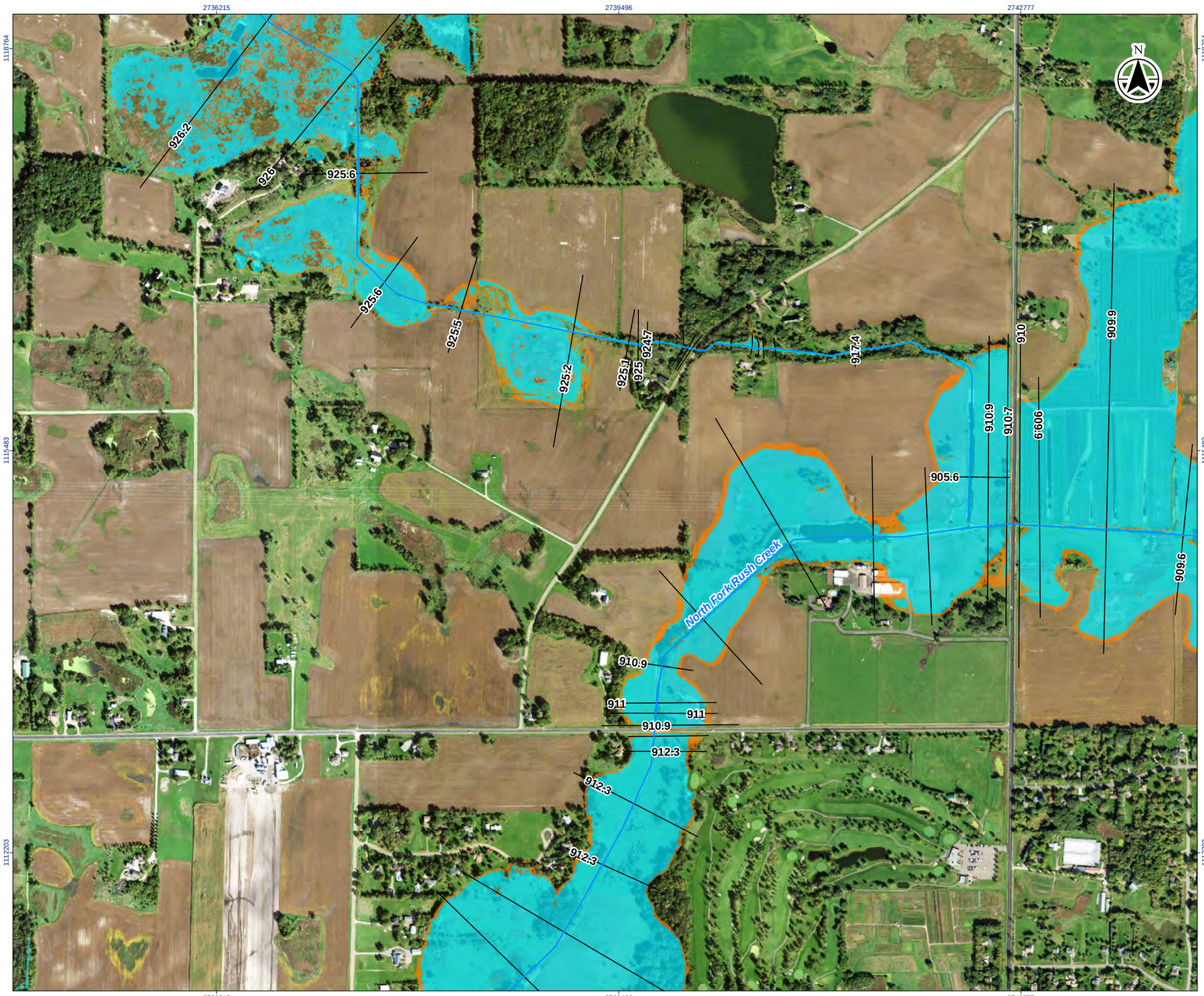


Figure No.
7 of 27

Title
Elm Creek Watershed Revision
Proposed Results

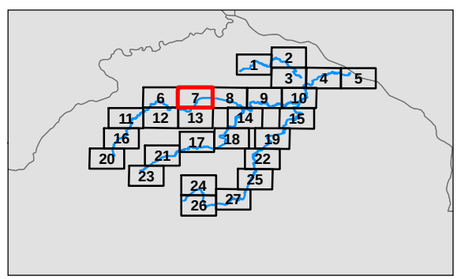
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\193711\temporary\22704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 By: kschrader

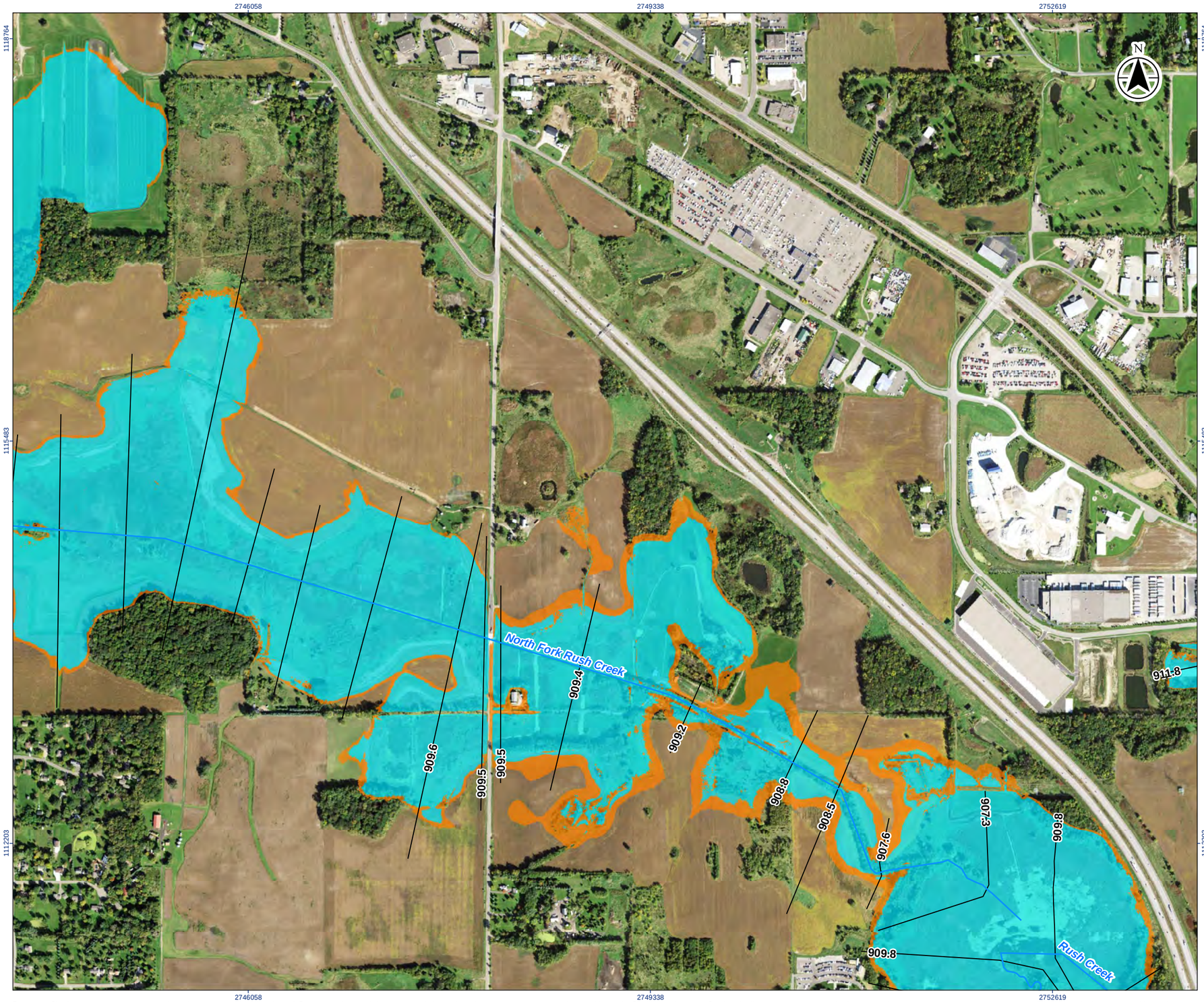


Figure No.
8 of 27

Title
Elm Creek Watershed Revision
Proposed Results

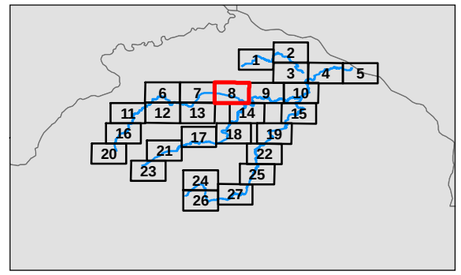
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

v:\193711temporary\227104963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 By: lschrader

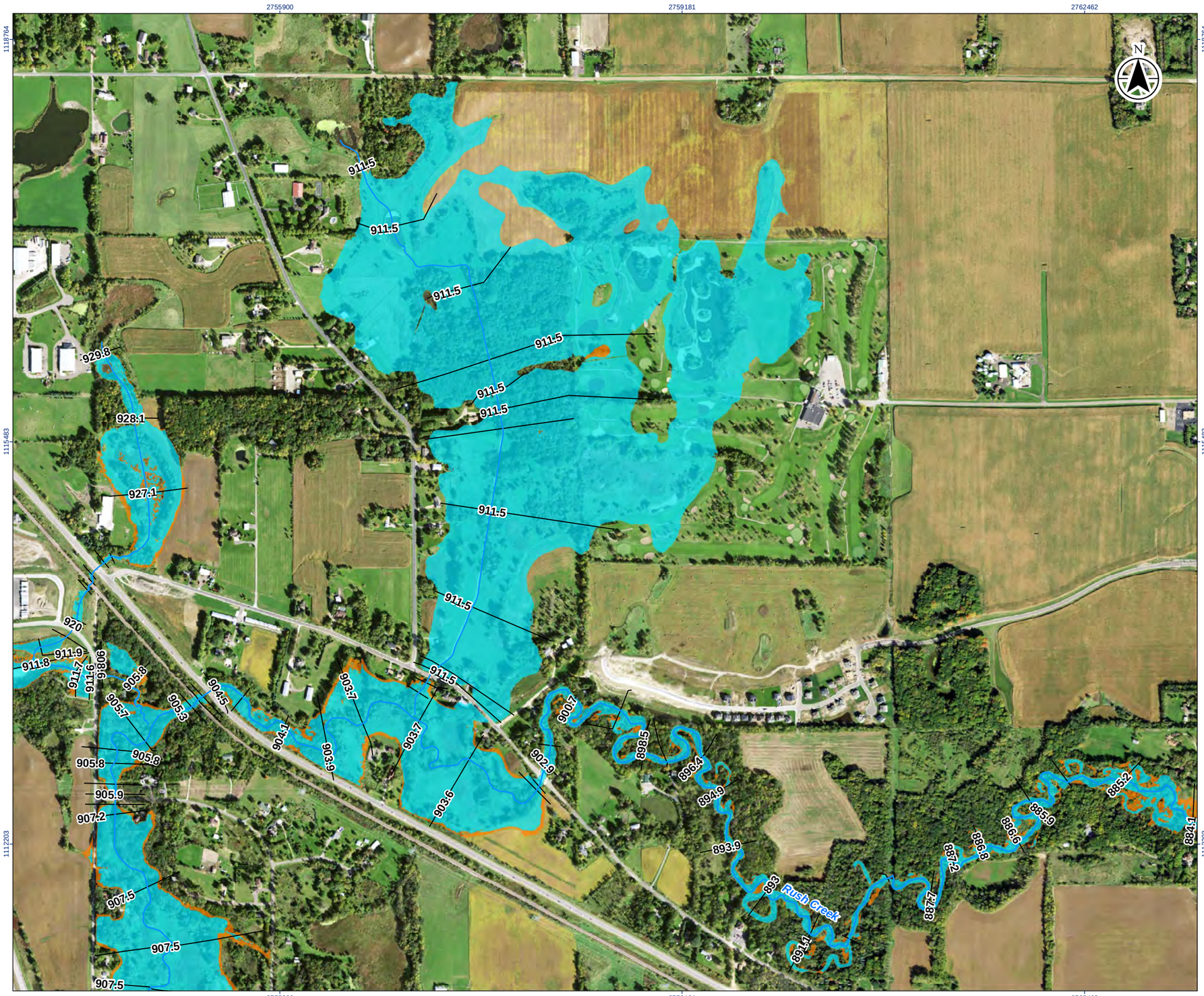


Figure No.
9 of 27

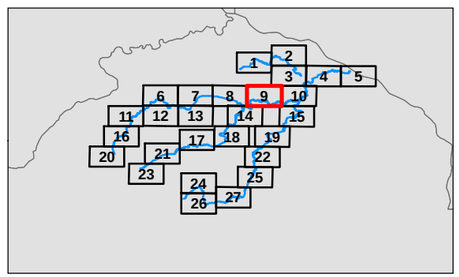
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1937\Temporary\227049\83_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 by:tschrader

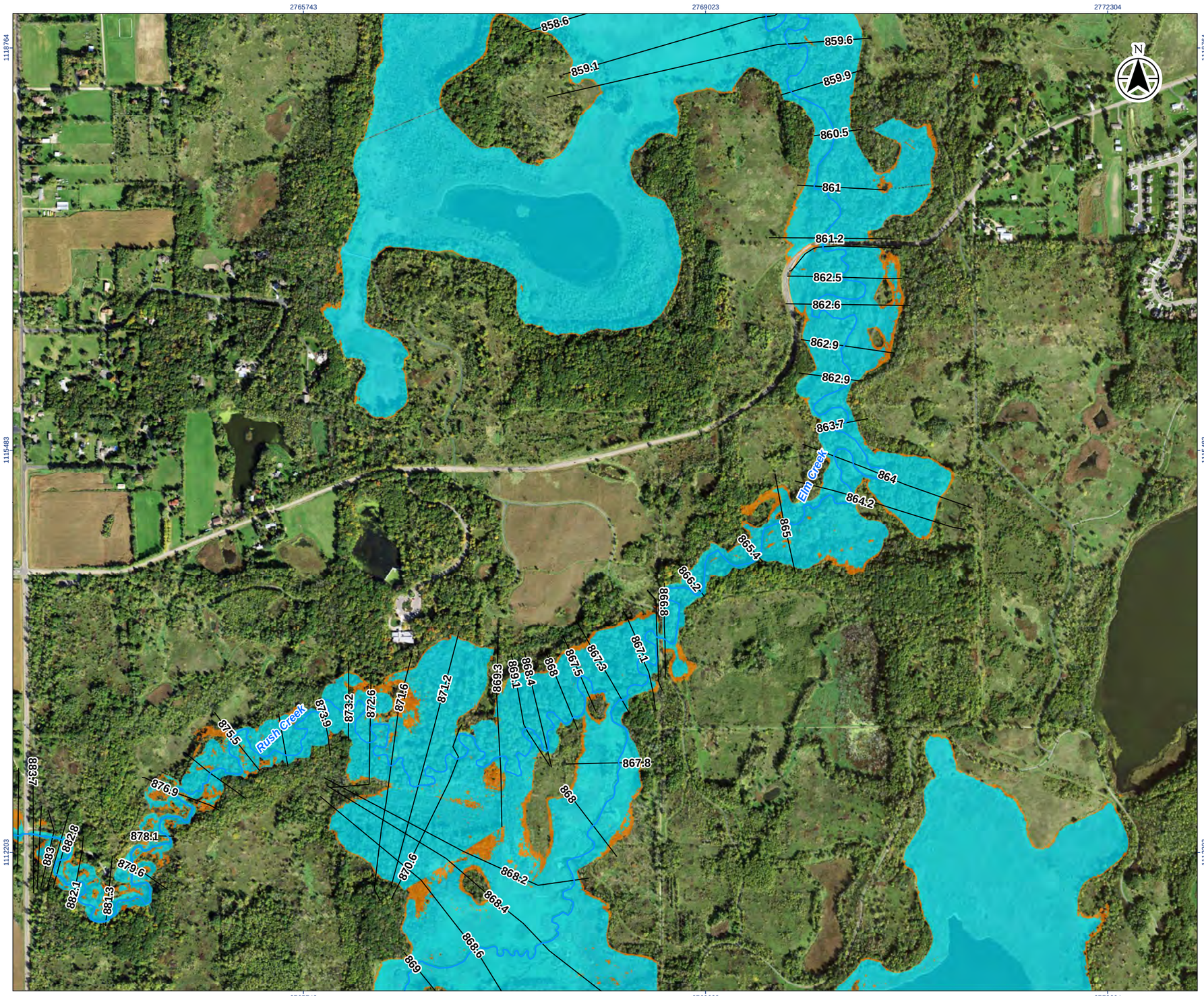


Figure No.
10 of 27

Title
Elm Creek Watershed Revision
Proposed Results

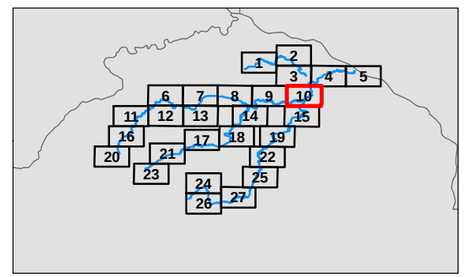
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1937\temporary\22.7704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 By: tschrader

2716530 2719811 2723092

1108922 1105641

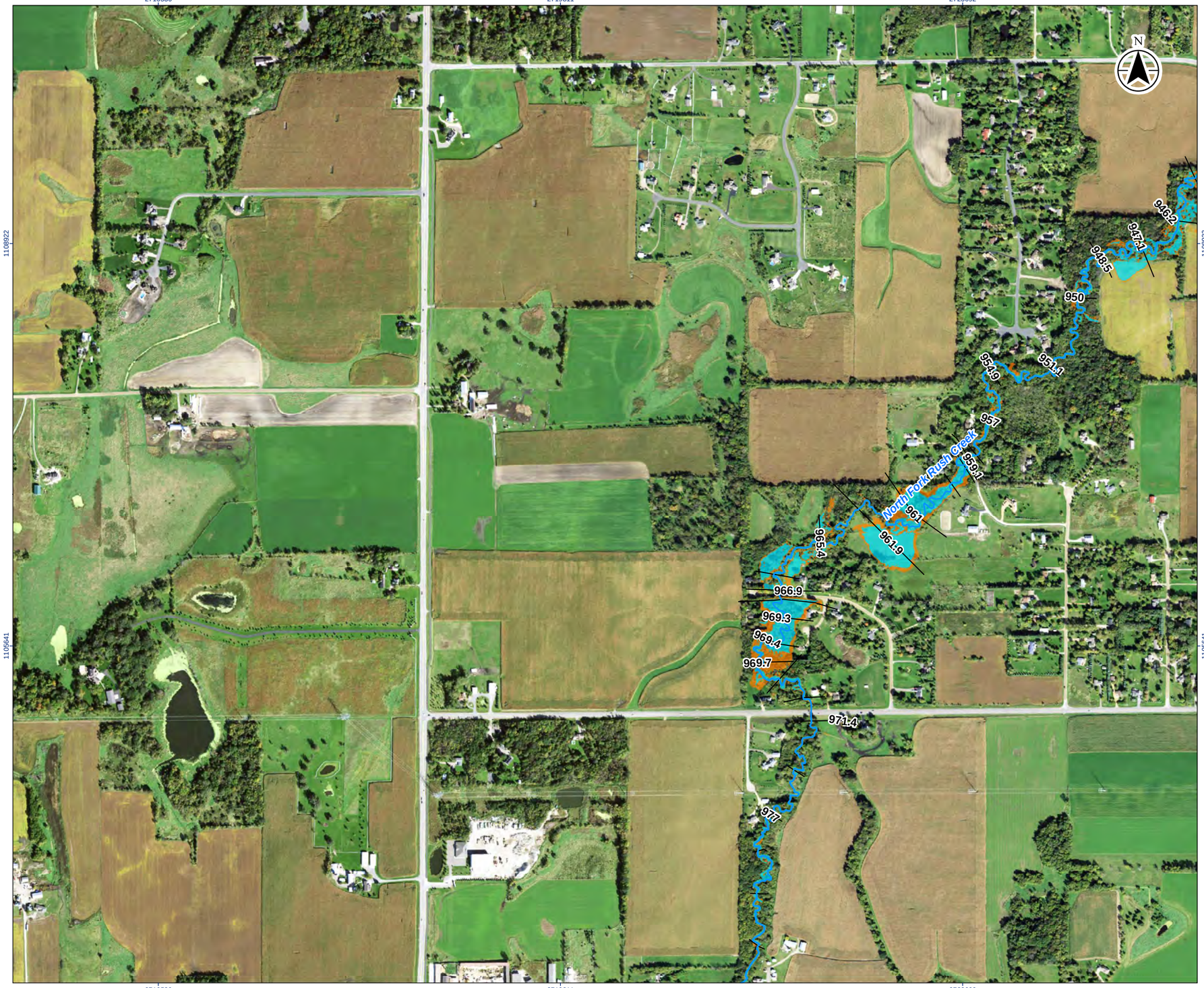


Figure No.
11 of 27

Title
Elm Creek Watershed Revision
Proposed Results

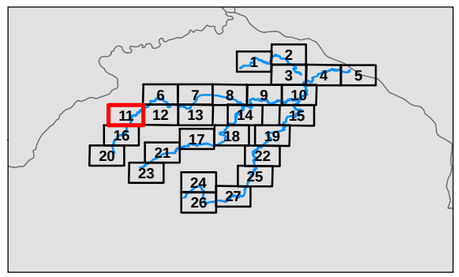
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\193711\temporary\22703963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 By: kschrader

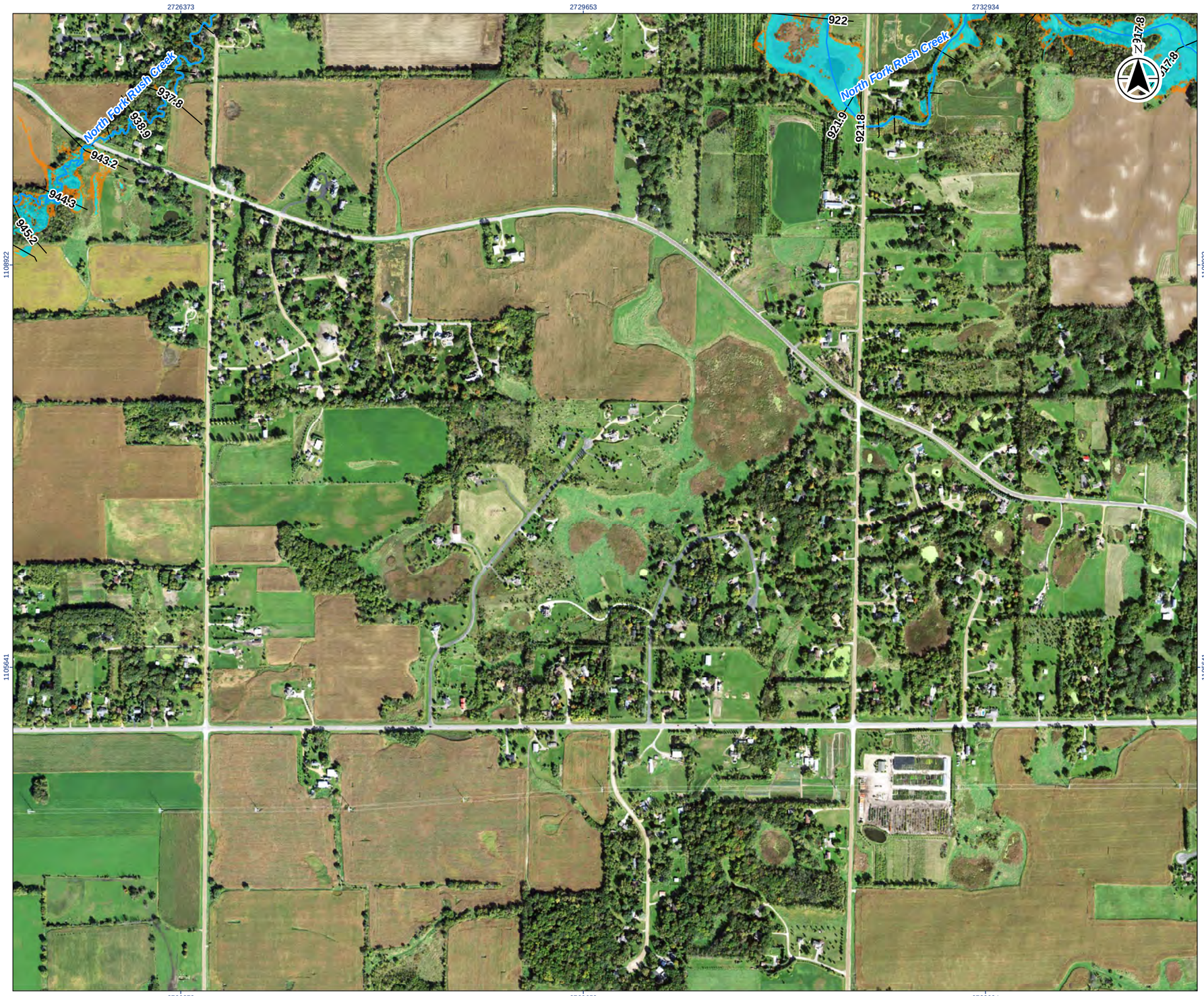


Figure No.
12 of 27

Title
Elm Creek Watershed Revision
Proposed Results

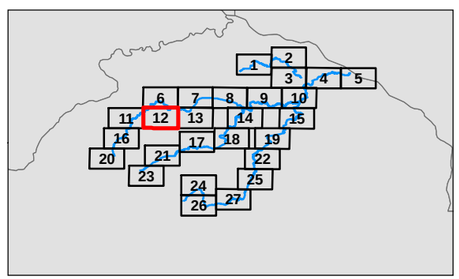
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

X:\19371\temporary\227004983_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 By: lschrader

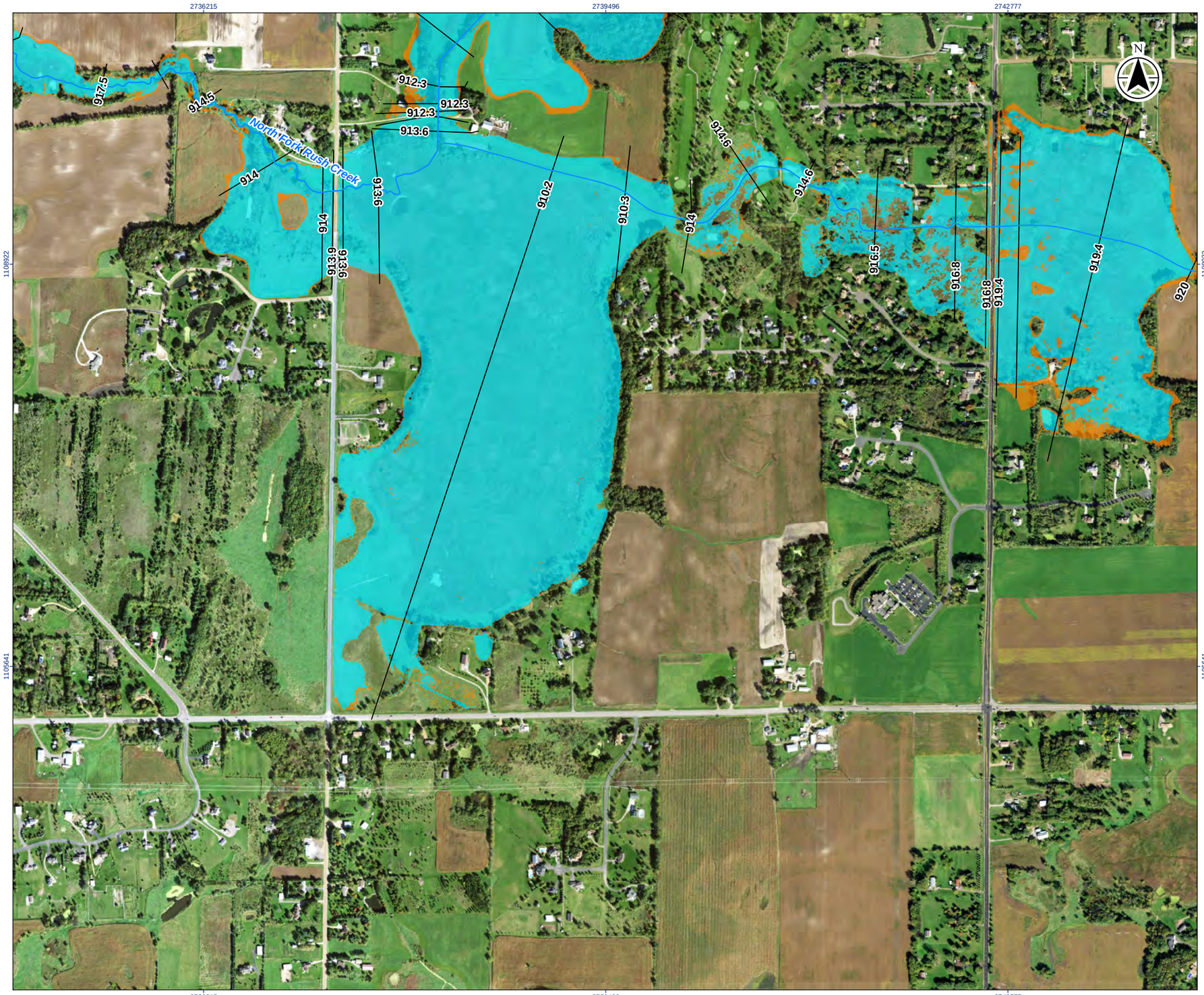


Figure No.
13 of 27

Title
Elm Creek Watershed Revision
Proposed Results

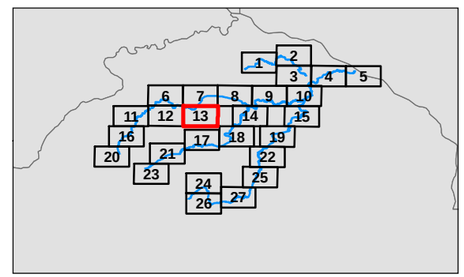
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

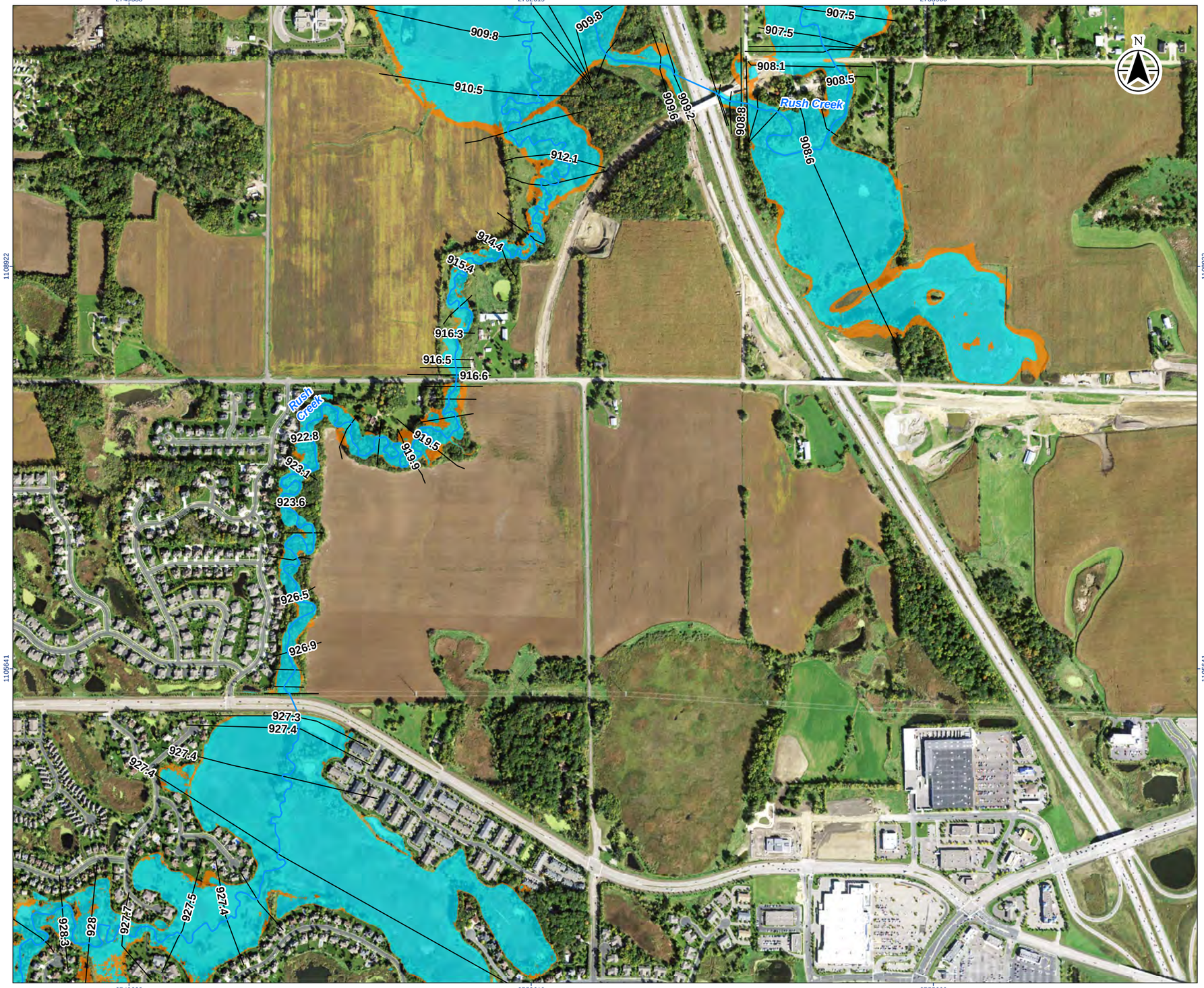


Figure No.
14 of 27

Title
Elm Creek Watershed Revision
Proposed Results

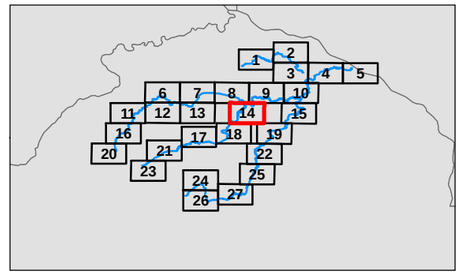
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

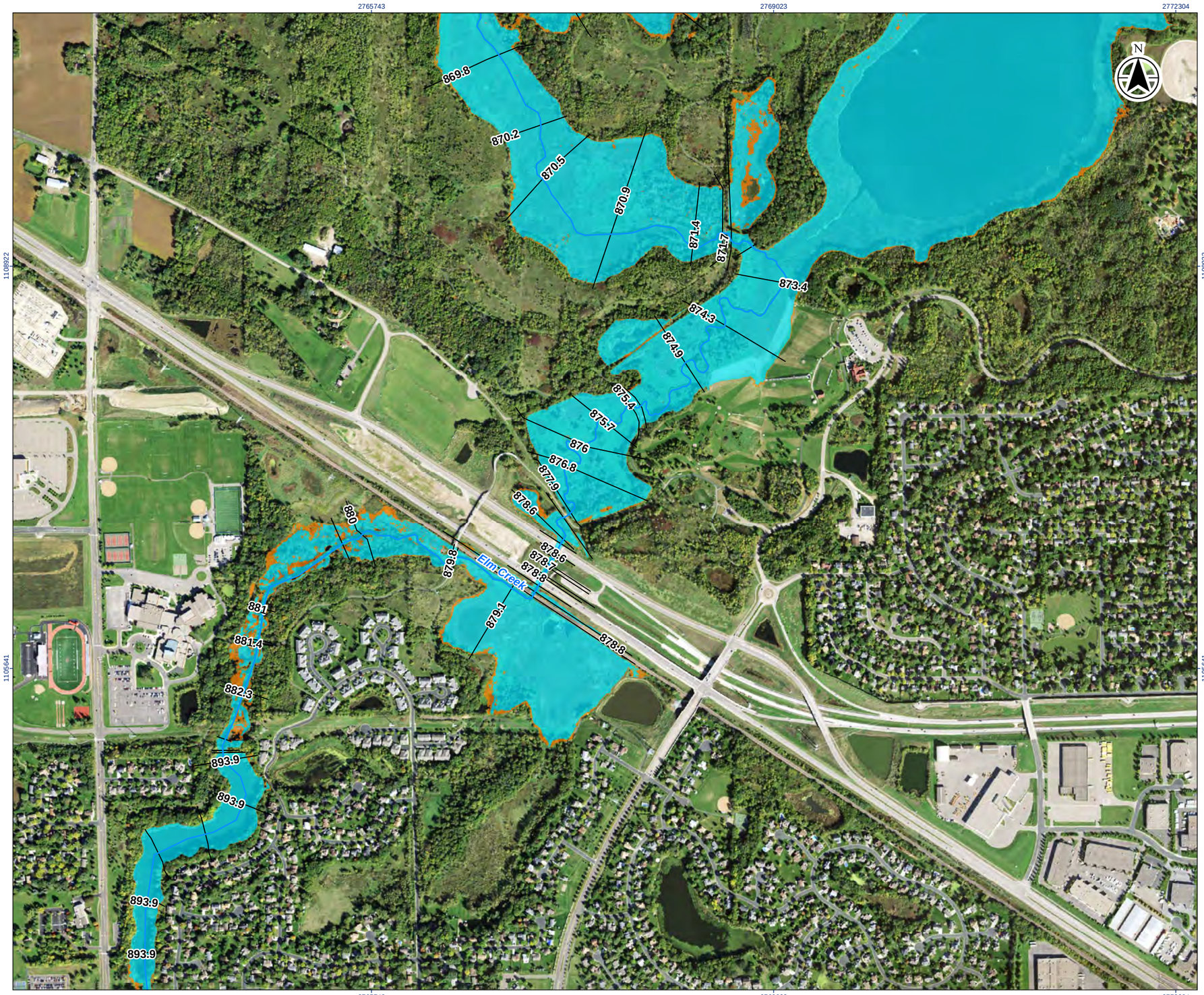


Figure No.
15 of 27

Title
Elm Creek Watershed Revision
Proposed Results

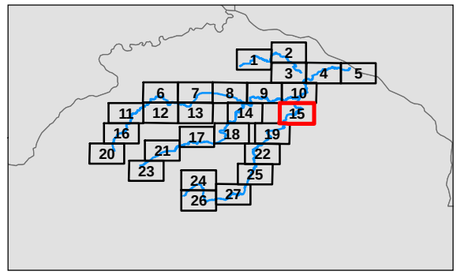
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

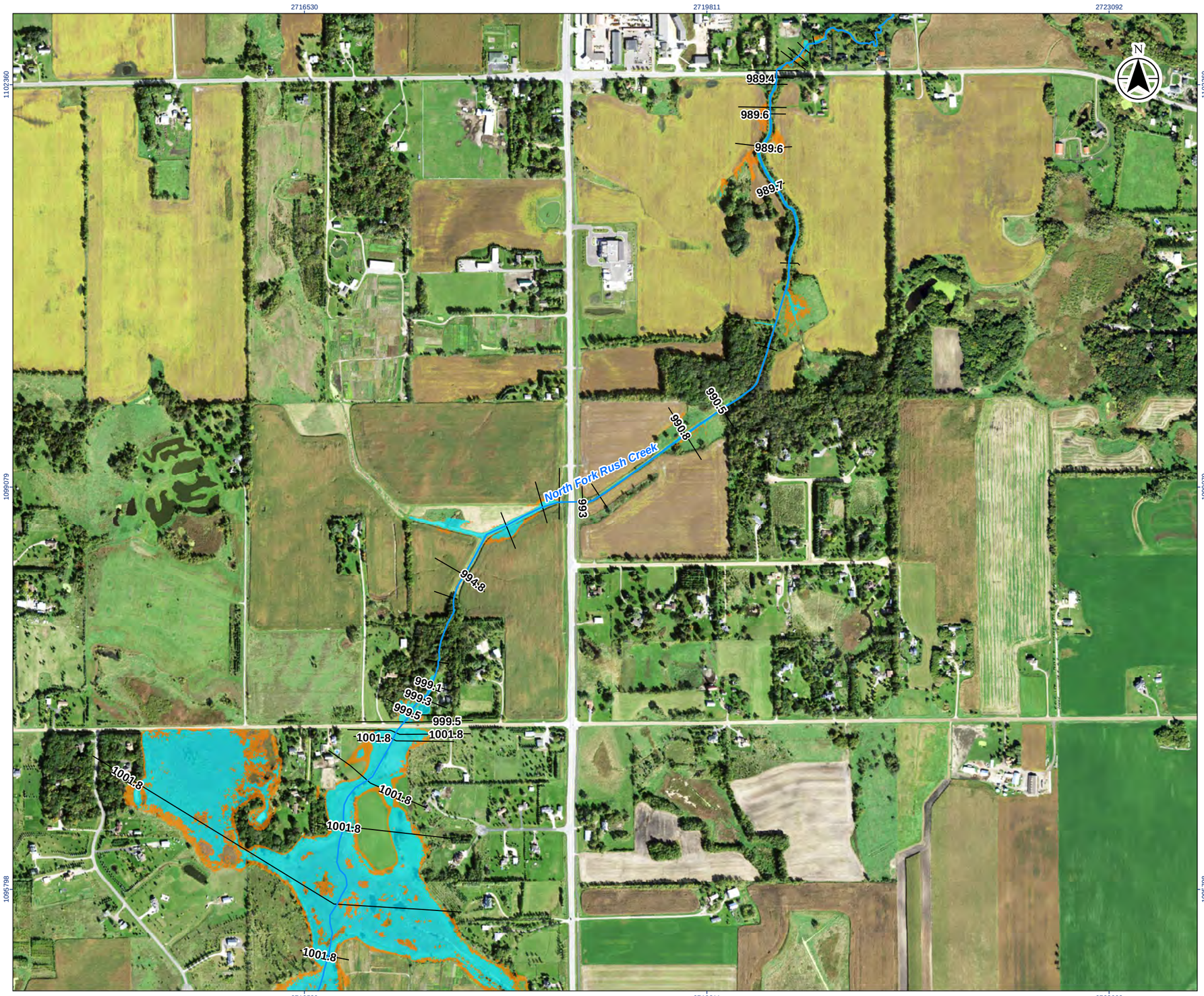


Figure No.
16 of 27

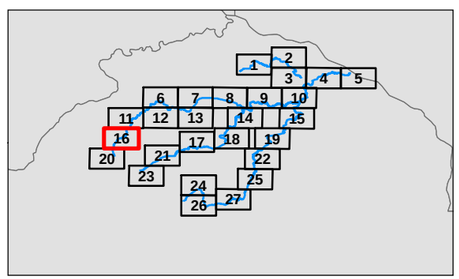
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1937\temporary\227704963 ElmCreek\Maps\Final Maps\ElmCreek Maps.mxd Revised: 2022-05-06 By: lschnaiter

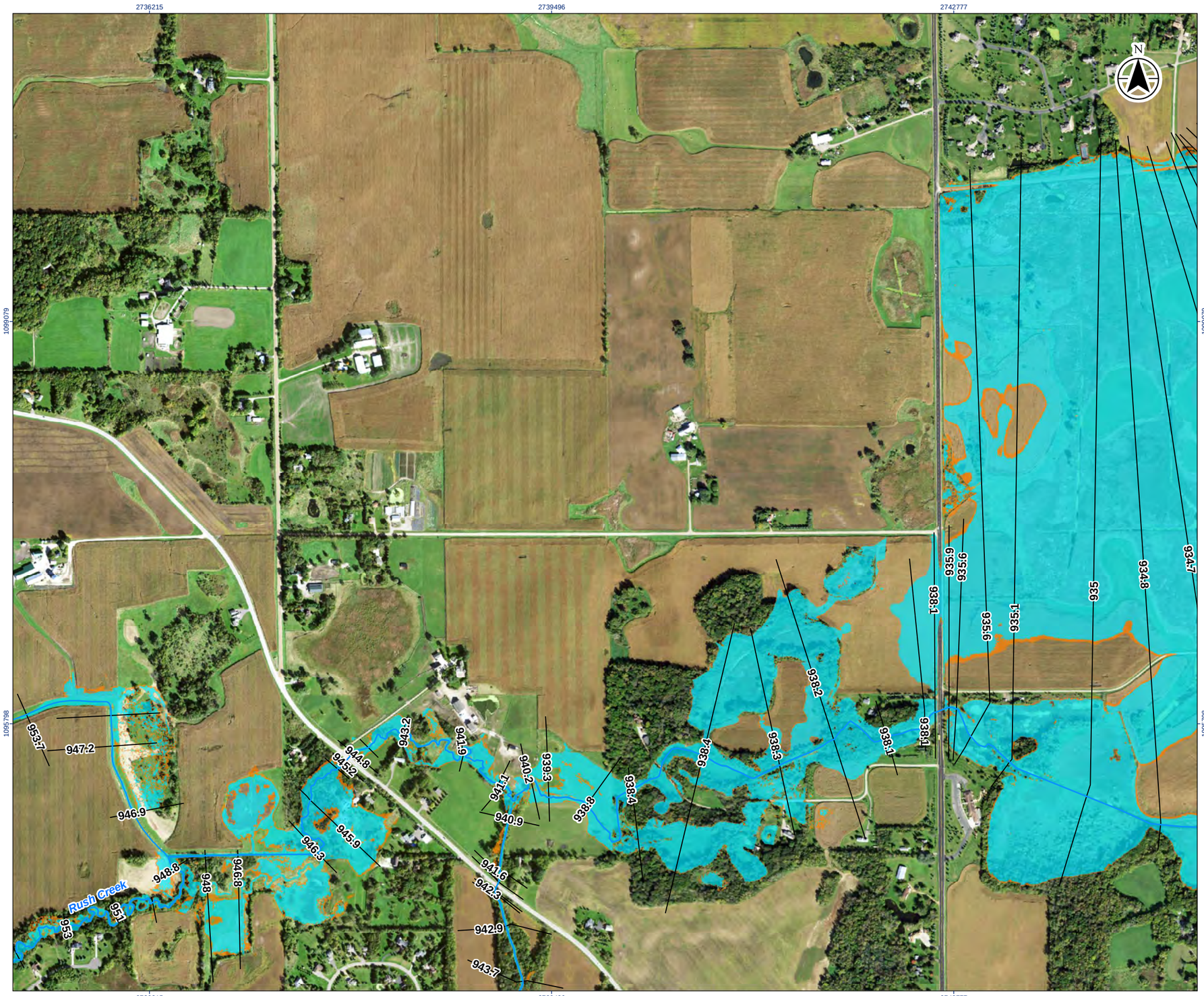


Figure No.
17 of 27

Title
Elm Creek Watershed Revision
Proposed Results

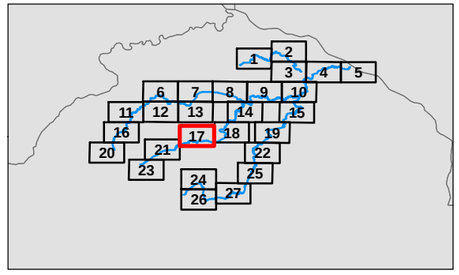
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

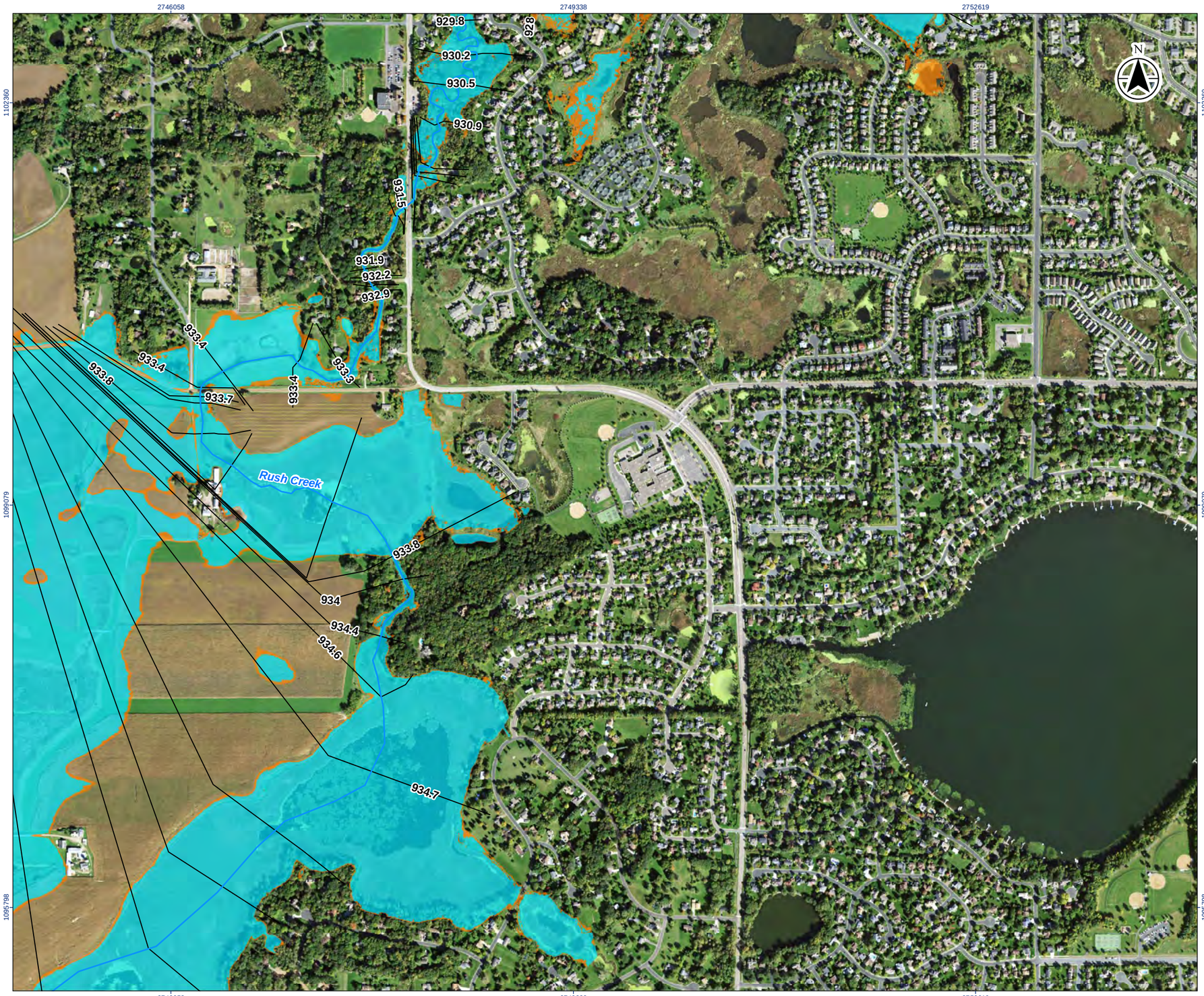


Figure No.
18 of 27

Title
Elm Creek Watershed Revision
Proposed Results

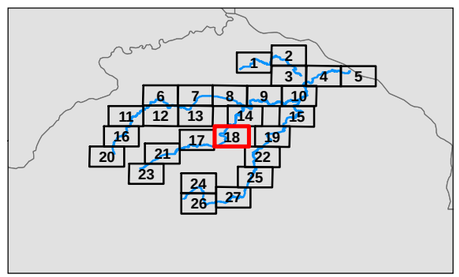
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1937\temporary\22.704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 By: tschrader

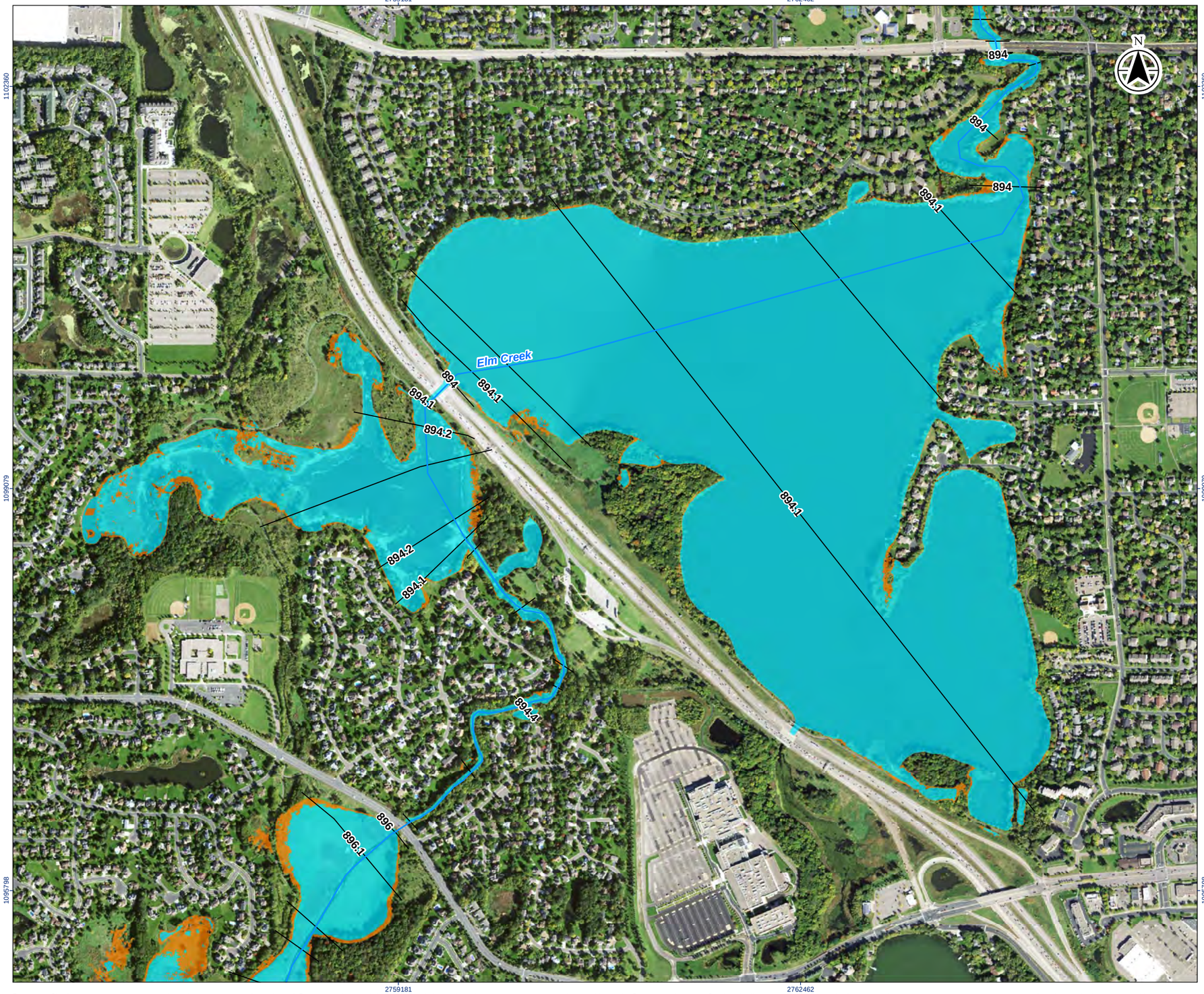


Figure No.
19 of 27

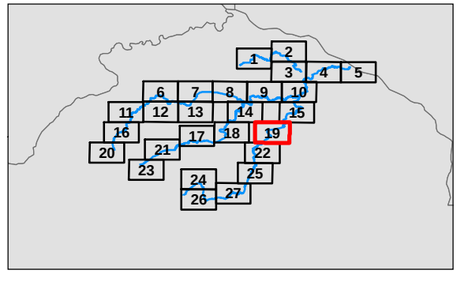
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

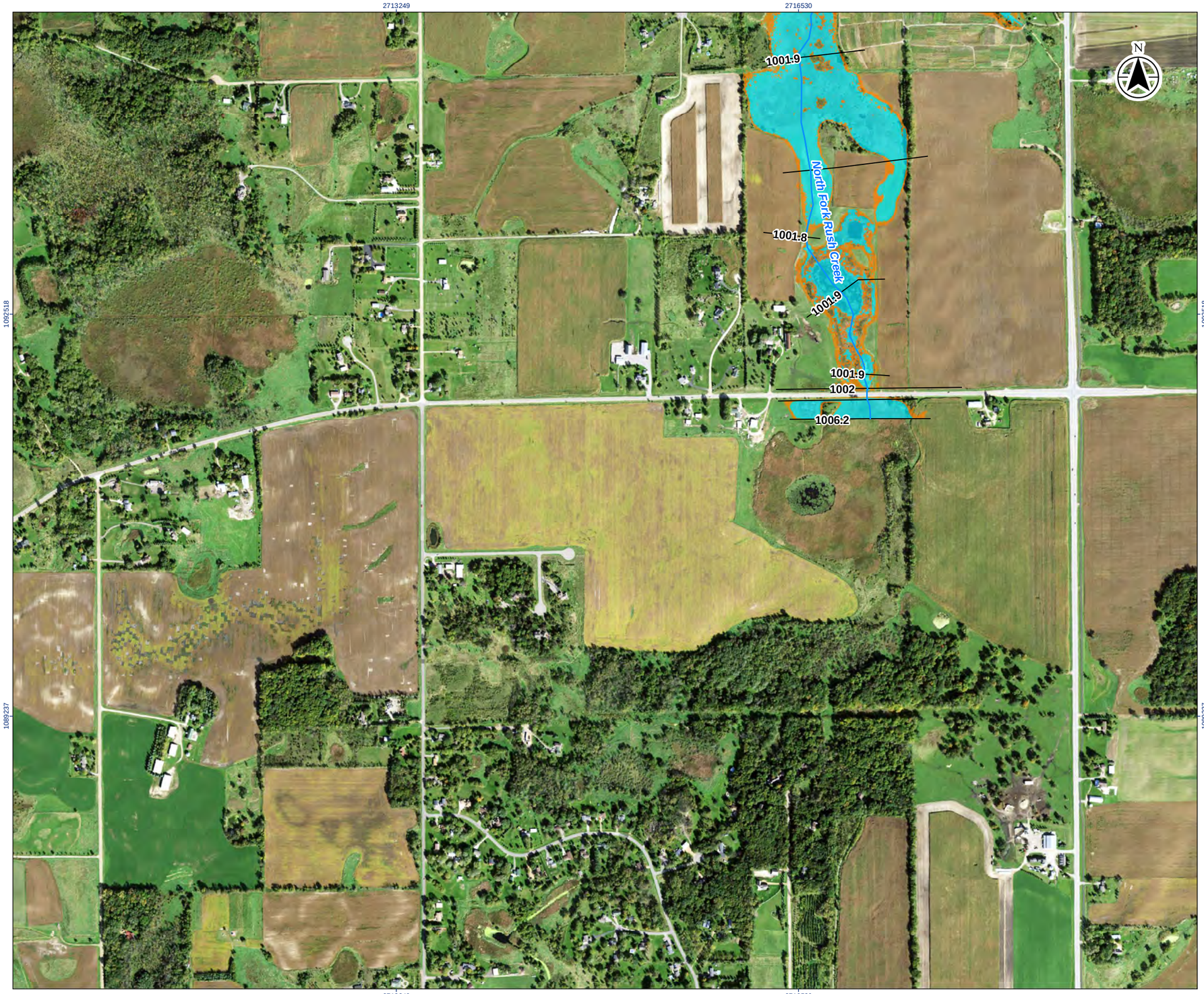


Figure No.
20 of 27

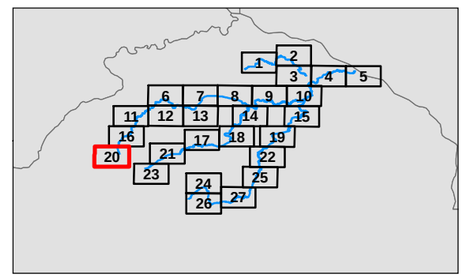
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1937\temp\ray\227704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-06 By: lschrader

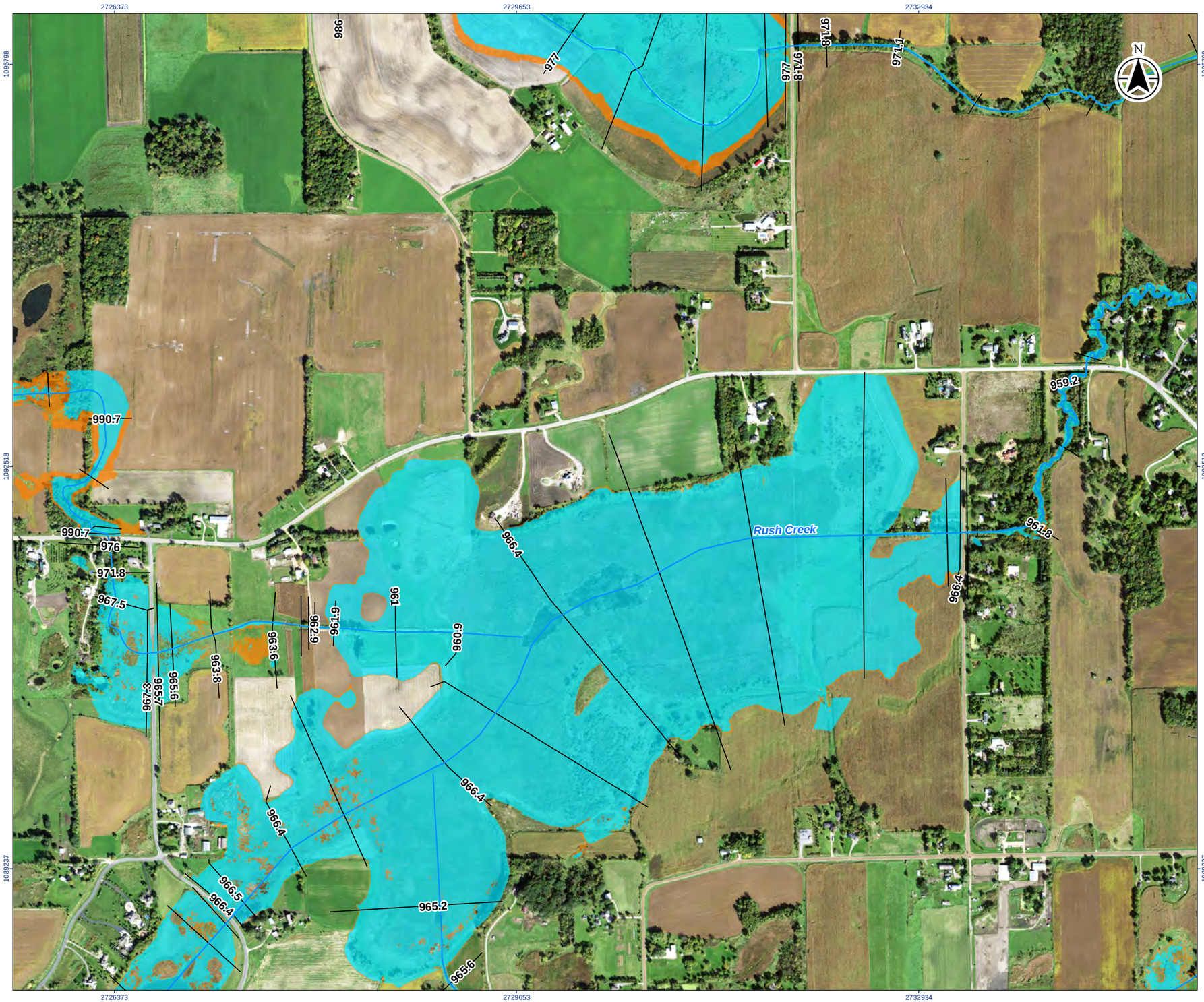


Figure No.
21 of 27

Title
Elm Creek Watershed Revision
Proposed Results

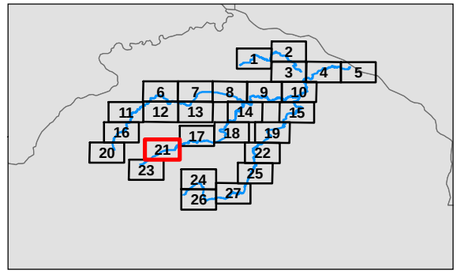
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\193711\temporary\22705963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-07 By:tschrader

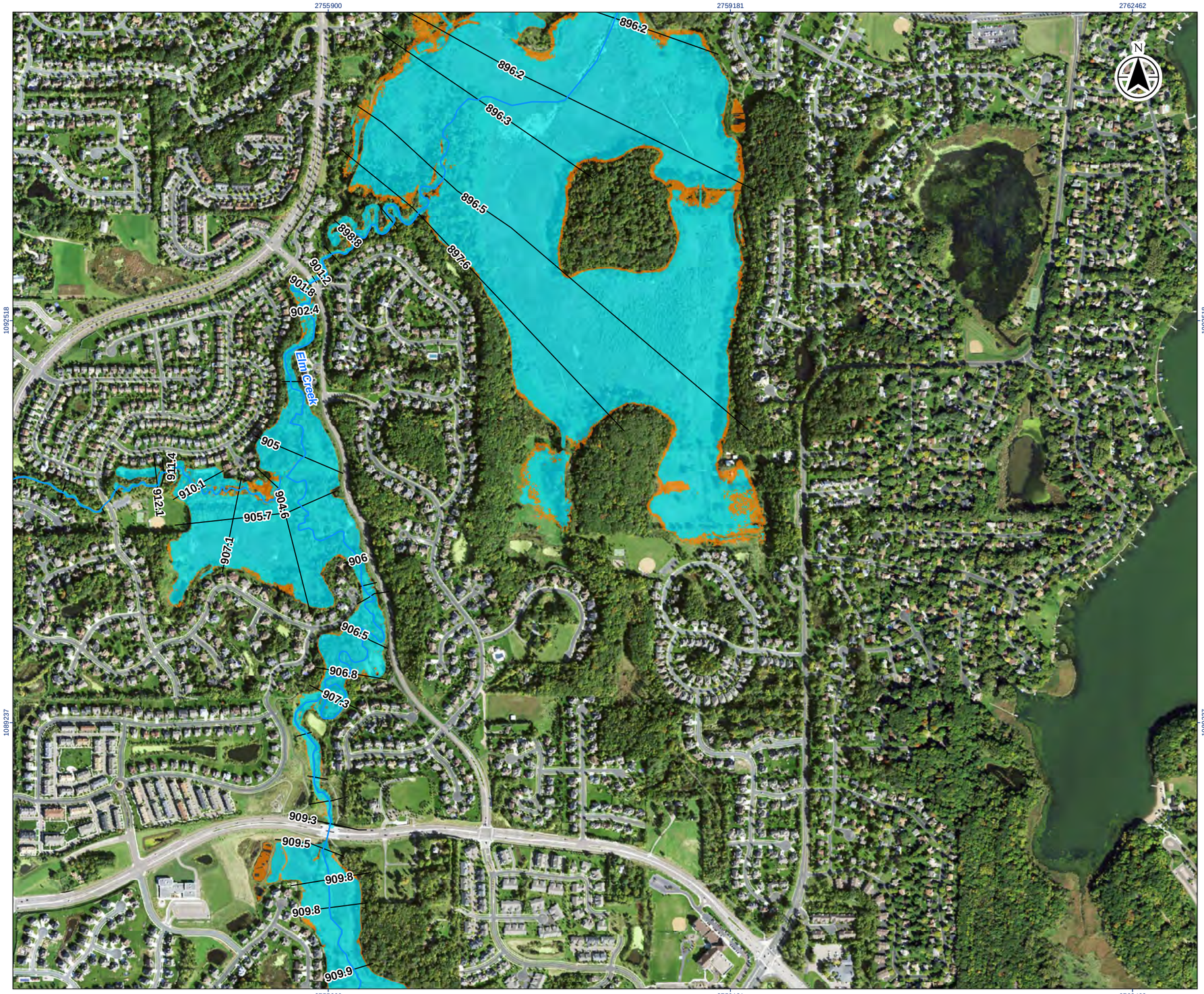


Figure No.
22 of 27

Title
Elm Creek Watershed Revision
Proposed Results

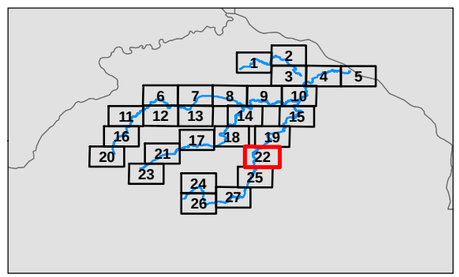
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

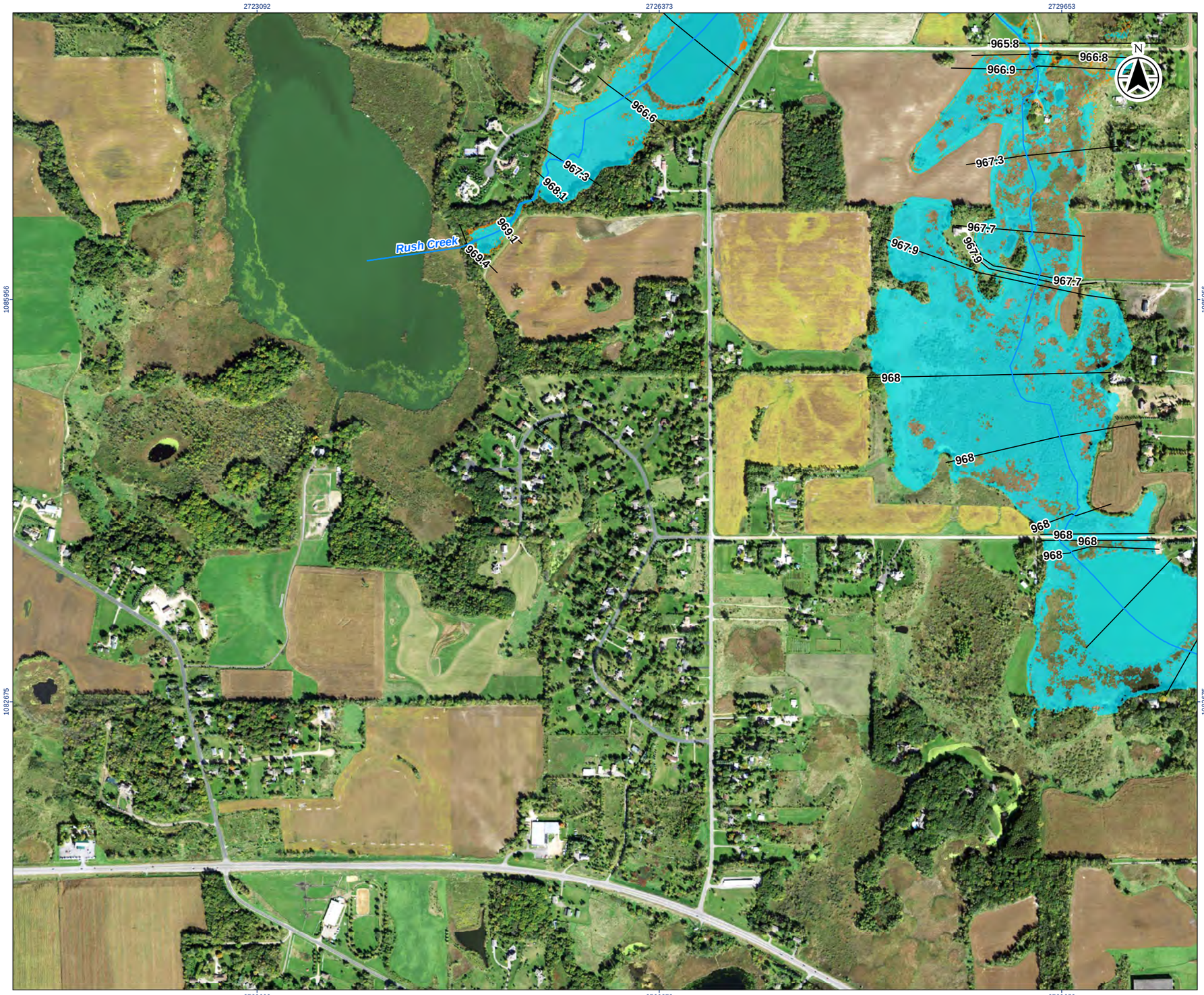


Figure No.
23 of 27

Title
Elm Creek Watershed Revision
Proposed Results

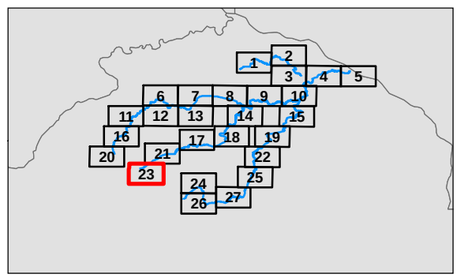
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\193711\temporary\22705963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-07 By: kschrader

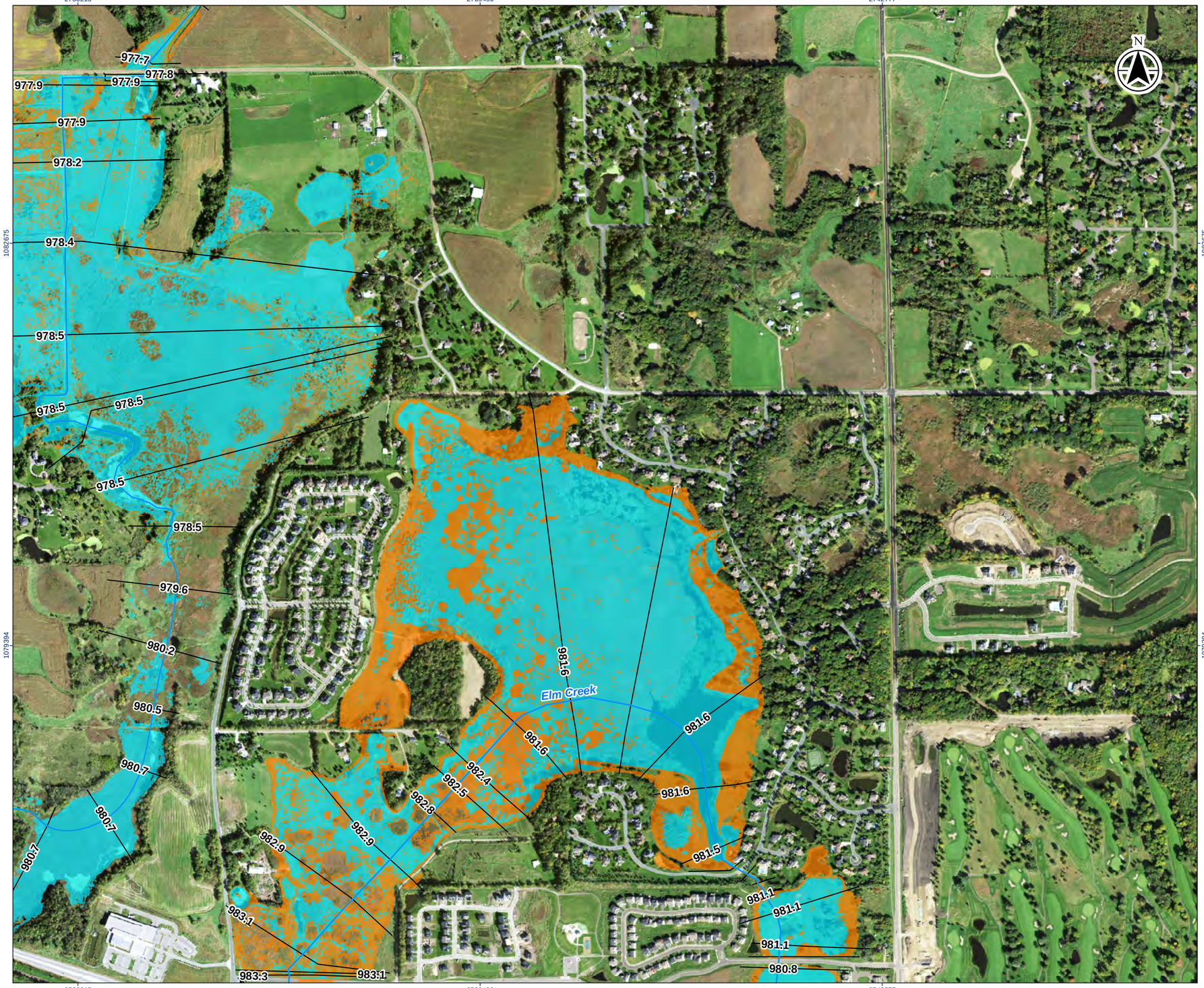


Figure No.
24 of 27

Title
Elm Creek Watershed Revision
Proposed Results

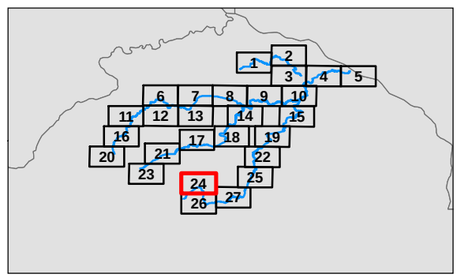
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1937\Customproject\227049\03_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-07 By:tschrader

2752619 2755900 2759181

1085956 1082675 1079394

910.1
910.7
912.6
916.5
Elm Creek
920
920.7
921.2
921.4
921.4
921.4
921.4
921.4
937.8

N

Figure No.
25 of 27

Title
Elm Creek Watershed Revision
Proposed Results

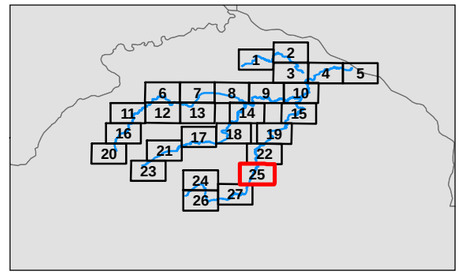
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\193711temporary\27704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-07 By: kschrader

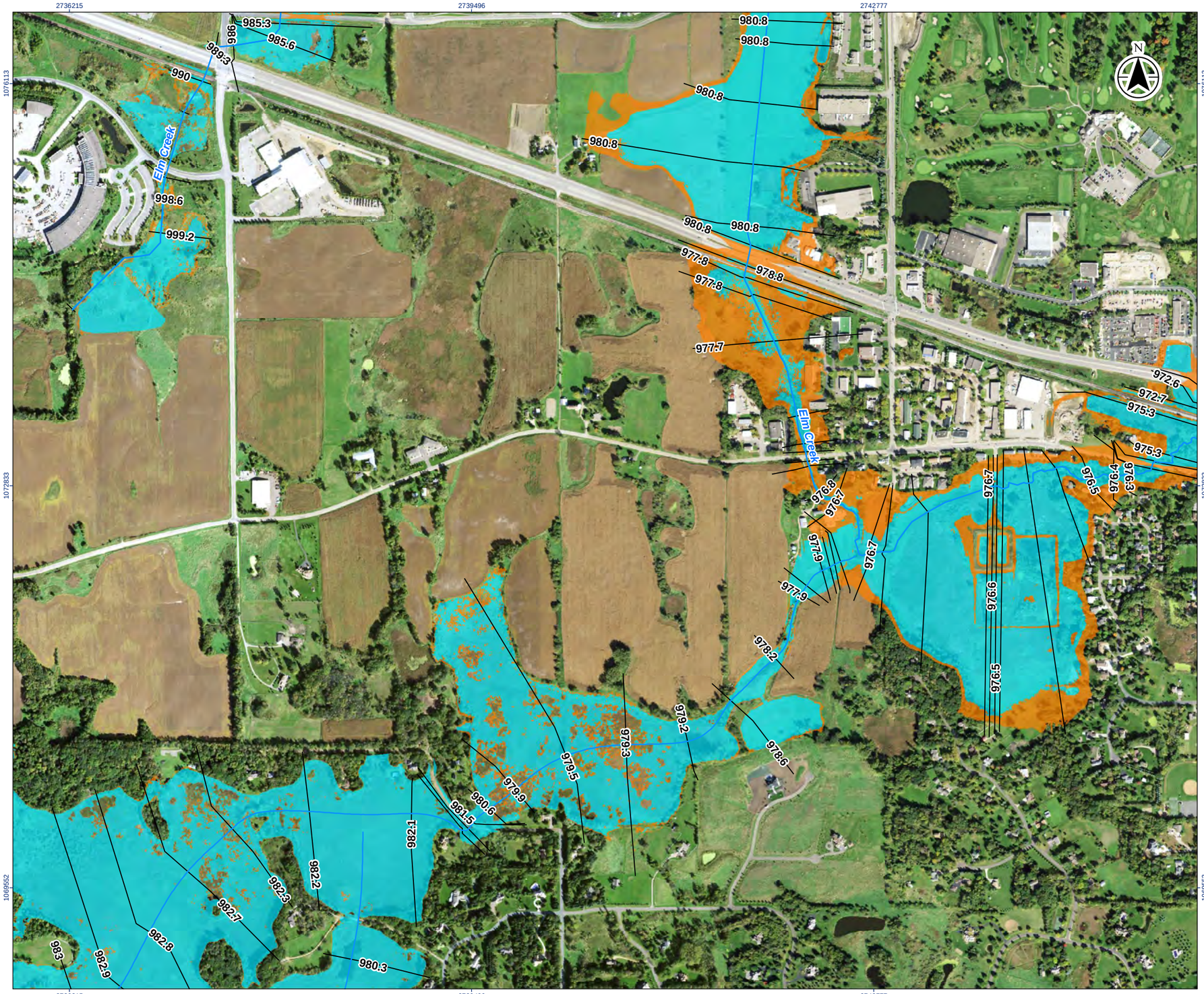


Figure No.
26 of 27

Title
Elm Creek Watershed Revision
Proposed Results

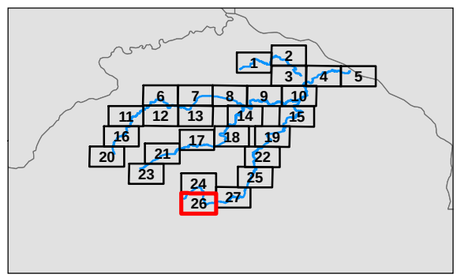
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1937\temporary\22704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-07 By: kchrader

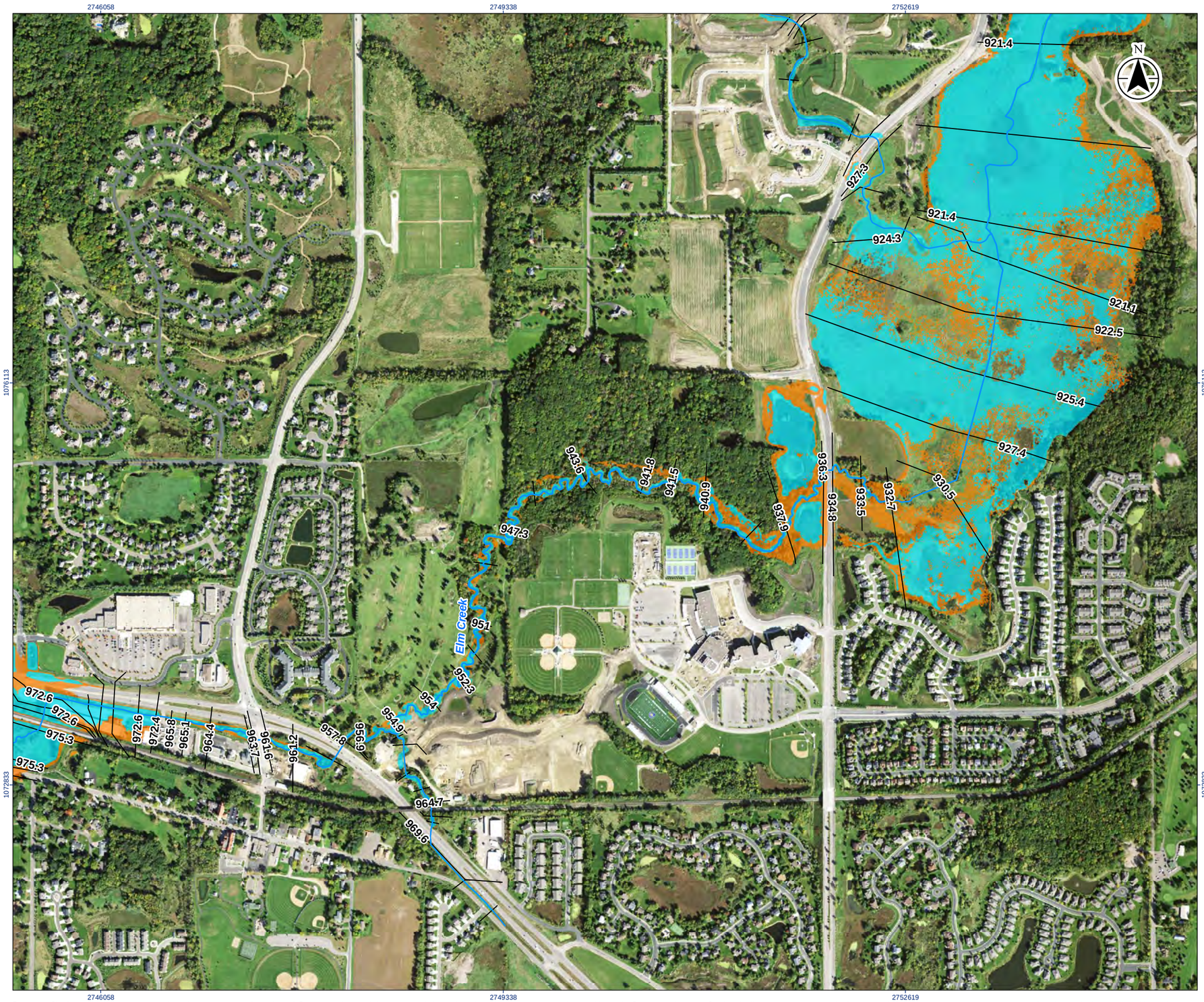


Figure No.
27 of 27

Title
Elm Creek Watershed Revision
Proposed Results

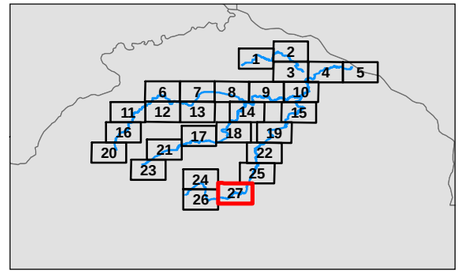
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

APPENDIX F

HEC-RAS Mapping Overview and Updates

Overall Model Updates

- Model was split into two separate geometries to allow for full extents of main stem streams and tributary streams to be mapped directly in HEC-RAS.

Table 1 Split Geometry Stream Groups

Group 1 Streams	Group 2 Streams
Elm Creek	Rush Creek
Rush Creek Branch 1	Elm Creek Branch 2
Rush Creek Branch 2	Elm Creek Branch 3
Rush Creek Branch 3	Elm Creek Branch 4
Rush Creek Branch 5	Elm Creek Branch 5
Rush Creek Branch 6	North Fork Rush Creek Branch 1
Rush Creek Branch 7	North Fork Rush Creek Branch 2
North Fork Rush Creek	Diamond Creek
Elm Creek Branch 1	Rush Creek Branch 4

Group 1 Model Updates

Elm Creek

- Flow change locations were adjusted according to the river station updates.
- Left portion of XS extended at locations: 17159, 17870, 18774, 19466, 11839, 37254, 38150, 39051, and 65215.
- Right portion of XS extended at locations: 19466, 15477, and 13893.
- Left portion of XS adjusted at: 77973
- Areas of centerline not in floodplain: 101622 to 100653
- IFA adjustment at XS: 90982, 63561, 90939
- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

Elm Creek Branch 1

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

North Fork Rush Creek

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 18117 and 72915
- Moved XS 73061 slightly downstream outside of structure embankments. Now station 73038.

Rush Creek Branch 1

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 8442 and 13645

Rush Creek Branch 2

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

Rush Creek Branch 3

- No adjustments made to model geometry.

Rush Creek Branch 5

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- XS 18625 adjusted station elevation point inside channel that appeared to be incorrectly pulled to a higher elevation.

Rush Creek Branch 6

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

Rush Creek Branch 7

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 6961

Group 2 Model Updates

Diamond Creek

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 10367

North Fork Rush Creek Branch 1

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

Rush Creek Branch 4

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 5320, 5792, 5525, 5113
- Right portion of XS shortened at locations: 9126 and 9250
- Con/Exp coefficients increased to 0.3 and 0.5 respectively for XS's 9552 and 9632 to account for significant changes in floodplain extents (widening)

Rush Creek Branch 5

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 15055

Rush Creek

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- 2 Additional Cross sections added at downstream end for tie in: 724 & 298
- IFA adjustment at drawdowns along structures mainly.

Elm Creek Branch 2

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

Elm Creek Branch 3

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- Additional Cross section added at downstream end for tie in: 15

Elm Creek Branch 4

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- 2 Additional Cross sections added at downstream end for tie in: 810 & 236
- River station adjusted and centerline adjusted at downstream end to appropriately tie into the main stem stream

Judie Anderson

From: Megow, Erik <erik.megow@stantec.com>
Sent: Thursday, May 12, 2022 8:56 AM
To: Judie Anderson
Cc: dasche@maplegrovemn.gov; Spector, Diane
Subject: RE: ECWMC MAY 2022 TAC Meeting Materials - HUC-8 Modeling Updates Memo and Mapping
Attachments: Elm Creek HUC-8 model Updates_DRAFT_5_12_22.pdf

Judie,

Please disperse the attached, updated memo with updated inundation maps in Appendix E. As I discussed with you yesterday, I received some early feedback from TAC Members that the Results Table (Appendix D) was difficult to cross-reference with the Maps in Appendix E.

The only update that was made to these maps (Appendix E) was the inclusion of the HEC-RAS cross-section (XS) ID. This update will allow the Cities to easily compare the mapped elevations and cross-sections with the elevations listed in Appendix D.

Here is an example of the XS IDs added to the maps:

These new IDs will match the HEC-RAS XS IDs in the results tabled of Appendix D:

1% AEP Comparison of ECWMC 2016 FIS F				
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lett
Elm Creek	112306	State Highway 101 (DS)	20.73	CH
Elm Creek	112413	State Highway 101 (US)	20.75	CI
Elm Creek	113170	DS of Access Road, US of State Highway 101	20.87	CJ
Elm Creek	113302	US and DS of two Access Road, US of State Highway 101	20.91	CK
Elm Creek	113654	US and DS of two Access Road, US of State Highway 101, US of CK	20.96	CL
Elm Creek	113752	US of Access Road, DS of Railroad	21.00	CM
Elm Creek	114334	US Access road, DS railroad and Hamel Road	21.11	CN
Elm Creek	114472	Railroad, DS of Hamel Road	21.14	CO

The mapped inundation areas did not change from the 5_10_22 Draft that was sent out on Tuesday. The only change is the addition of the XS IDs to make the review easier for the TAC.

Thanks,

Erik Megow, PE (MN)
Associate, Water Resources Engineer

Direct: 763 252-6857
erik.megow@stantec.com

Stantec
7500 Olson Memorial Highway Suite 300
Golden Valley MN 55427-4886

From: Judie Anderson <Judie@jass.biz>
Sent: Tuesday, May 10, 2022 1:02 PM
To: Amy Juntunen <Amy@jass.biz>; Amy Riegel (ariegel@plymouthmn.gov) <ariegel@plymouthmn.gov>; asimmons@ci.rogers.mn.us; Ben Scharenbroich (bscharenbroich@plymouthmn.gov) <bscharenbroich@plymouthmn.gov>; Brian Vlach (BVlach@threeriversparkdistrict.org) <BVlach@threeriversparkdistrict.org>; Derek Asche <dasche@maplegrovemn.gov>; Spector, Diane <diane.spector@stantec.com>; Matthiesen, Edward <edward.matthiesen@stantec.com>; Ellis, Kevin (Kevin.Ellis@hennepin.us) <Kevin.Ellis@hennepin.us>; Megow, Erik <erik.megow@stantec.com>; Heather Nelson <hnelson@ci.champlin.mn.us>; James C Kujawa <Surfacewatersolutions@outlook.com>; Quisberg, Jason <jason.quisberg@stantec.com>; Judie Anderson <Judie@jass.biz>; Kevin Mattson (kmattson@ci.corcoran.mn.us) <kmattson@ci.corcoran.mn.us>; Kris Guentzel (kristopher.guentzel@hennepin.us) <Kristopher.Guentzel@hennepin.us>; Mark Lahtinen (mlahtinen@ci.maple-grove.mn.us) <mlahtinen@ci.maple-grove.mn.us>; Matt Danzl (MattD@HAA-inc.com) <MattD@HAA-inc.com>; Cantarero, Nicolas <nicolas.cantarero@stantec.com>; Paul Stewart (Paul.Stewart@hennepin.us) <Paul.Stewart@hennepin.us>; Rebecca Carlson <rebecca@resilience-resources.com>; Ross Mullen (ross.mullen@stantec.com) <ross.mullen@stantec.com>; Shane Nelson (shanen@haa-inc.com) <shanen@haa-inc.com>; Shibani Bisson (sbisson@wsbeng.com) <sbisson@wsbeng.com>; Steve Christopher

(steve.christopher@state.mn.us) <steve.christopher@state.mn.us>
Cc: Bill Walraven (traderstec@aol.com) <traderstec@aol.com>; Catherine Cesnik (cesnik@gmail.com) <cesnik@gmail.com>; Dan Riggs (driggs@carlsonmccain.com) <driggs@carlsonmccain.com>; David Katzner (dkatzner@carlsonmccain.com) <dkatzner@carlsonmccain.com>; Doug Baines (dougbaines@yahoo.com) <dougbaines@yahoo.com>; Joe Trainor (joe.trainor@meritain.com) <joe.trainor@meritain.com>; Ken Guenthner (kenguenthner@gmail.com) <kenguenthner@gmail.com>; Kevin Jullie (kjullie@srfconsulting.com) <kjullie@srfconsulting.com>; Scott Mahar <scott.mahar@trueit.com>; Terry Sharp <tsharp2972@aol.com>; Tom Anderson (tompand@yahoo.com) <tompand@yahoo.com>; Travis Henderson <thenderson@cityofdaytonmn.com>
Subject: FW: ECWMC MAY 2022 TAC Meeting Materials - HUC-8 Modeling Updates Memo and Mapping

Members of the Technical Advisory Committee:

Attached are the HUC-8 updates for your review. Remember, we will be meeting via Zoom on Wednesday, May 18, 2022, at 9:30 a.m. to discuss these updates. An agenda with additional meeting items will be emailed to you later this week.

If you have comments or concerns regarding this document, please email them to Erik Megow erik.megow@stantec.com> by end of day, Monday, May 16.

Thank you.

- Judie

Judie A. Anderson
WATERSHED ADMINISTRATOR | JASS | 3235 FERNBROOK LANE PLYMOUTH MN 55447
judie@jass.biz | D 763.553.1144 | F 763.553.9326
Representing Elm Creek, Shingle Creek, West Mississippi, and Pioneer-Sarah Creek WMOs and Clearwater River WD

From: Megow, Erik <erik.megow@stantec.com>
Sent: Tuesday, May 10, 2022 12:44 PM
To: Judie Anderson <Judie@jass.biz>
Cc: Spector, Diane <diane.spector@stantec.com>; dasche@maplegrovemn.gov
Subject: ECWMC MAY 2022 TAC Meeting Materials - HUC-8 Modeling Updates Memo and Mapping

Judie,

Attached is our Memo for the HUC-8 Updates for the 5/18/2022 Tac Meeting.

Please confirm that you received this e-mail. The file, with maps is quite large. I would like this to get out to the TAC as soon as we are able so they have a longer time to review the report, updates, results, and mapping.

Thanks,
Erik Megow, PE (MN)
Associate, Water Resources Engineer

Direct: 763 252-6857
erik.megow@stantec.com

Stantec
7500 Olson Memorial Highway Suite 300
Golden Valley MN 55427-4886

To: Elm Creek Watershed Management Commission Commissioners and Technical Advisory Committee

From: Erik Megow, PE
Lori Schrader
Danielle Johnson
Kiley Gafner

Date: May 10, 2022

Subject: Revisions to the Elm Creek Watershed HUC-8 Model - DRAFT

1.0 INTRODUCTION AND PURPOSE

The Minnesota Department of Natural Resources (MNDNR) is partnering with the Federal Emergency Management Agency to update the base flood elevation across the watershed for a future Flood Insurance Study (FIS). Member cities of the Elm Creek Watershed Management Commission (ECWMC) have noted significant differences between the flood elevations in the 2016 FIS and the preliminary Elm Creek Floodplain Modeling and Mapping HUC-8 Study (HUC-8 Study).

In some locations, the HUC-8 results show a base flood ("100-year" or 1%-annual-exceedance-probability) elevation that is up to 8' higher than the reported 2016 FIS elevations. Based on historic flooding reports and historic knowledge in the watershed, these results are outside of expected flooding conditions.

The base flood elevation published in the FIS sets the floodplain inundation extents and is particularly important as there are local, state, and federal regulations governing development. For example, existing single-family homes with a federally backed mortgage (approximately 95% of all mortgages) are required to buy subsidized flood insurance that may cost between a few hundred to tens of thousands of dollars per year. The floodplain also substantially increases costs for new construction due to the increased cost associated with bringing in fill (i.e. raising ground level) to reduce flood risk.

The purpose of this memorandum is to summarize the work completed to revise and update the HUC-8 Study based on the findings of the Third-Party Review (Stantec, January 2022) through the Tasks outlined in Stantec's Response to Request for Proposal for Revisions to HUC-8 Model (March 2022). The following sections provide an overview of the revisions made to the hydrologic (HEC-HMS) and hydraulic (HEC-RAS) models, along with a discussion of the calibration analysis.

2.0 HYDROLOGIC MODEL (HEC-HMS) UPDATES AND HYDROLOGIC CALIBRATION

Stantec updated the HEC-HMS (US Army Corps of Engineers **H**ydrologic **E**ngineering **C**enter – **H**ydrologic **M**odeling **S**ystem) model (received from the DNR January 24, 2022) to provide better estimates of peak streamflows for input into the hydraulic (HEC-RAS) model. After the updates were completed, the model was assessed through the same calibration methodology, and for the same calibration events, that were included in "*Elm Creek Narrative and QAQC Documentation*" (Barr Engineering Co., 2021).

2.1 HEC-HMS Updates

Three major updates were made to the HEC-HMS model to improve hydrology and estimate new streamflows:

1. The model was updated from HEC-HMS Version 4.3 to Version 4.7, the latest version.
2. Natural storage and cross-sections were updated to replace areas where a Muskingham-Cunge shortened simplified trapezoidal bank-width cross section was modeled.
3. Watershed areas and hydrologic connections between the watersheds and reach segments were updated and a methodology was produced to input the calculated flows into the HEC-RAS Model.

The following sections provide an overview of these updates, while Appendices A and B provide additional details.

2.1.1 HEC-HMS Version Update

The original HEC-HMS model was transitioned from Version 4.3 to Version 4.7 for storage, cross-section, and routing updates. Using Version 4.7 made it possible to easily integrate the required updates, but this update required defining an Index Method (Celerity). According to the HEC-HMS User's Manual, the Index Method (Celerity) is used in conjunction with the physical properties of the channel to discretize the routing reach in both space and time. A celerity, or reference flow, equal to 5 ft/s was assumed uniformly across the model as recommended by the HEC-HMS User's Manual. Assuming a celerity of 5 ft/s, no negligible change in the 100-year flows was seen between the runs in Version 4.3 and 4.7.

2.1.2 Natural Storage and Sub-basin Cross-section Updates

The 55 sub-basins highlighted in the Third-Party Review (Stantec, January 2022) were examined to determine whether storage or updated cross-section definitions would be beneficial to updating flow calculations. Storage considerations included depressions in the Digital Elevation Model (DEM), imagery, and how/if the storage could then be accounted for in the HMS routing. Storage was calculated by first creating polygons around the depression areas seen in imagery and LiDAR. These polygons were then used along with the DEM to create storage capacity curves (elevation-area). The calculated curves were then applied to an existing or added associated reservoir. Added reservoirs were assumed to have outlets estimated by measuring culvert or bridge openings and inlet and outlet elevations. Rise was calculated using engineering judgement based on the size of the structure to subtract 2.5-4 feet from the differential of the structure deck and inlet elevations.

Cross-section updates were made by pulling terrain data for the whole cross section in HEC-RAS and then filtering them to 8 point cross sections. The left and right Manning's coefficient settings were applied by reviewing common overbank channel along the reach.

Overall, 47 sub-basins were updated by adding natural storage areas or updating storage reservoir curves within 37 sub-basin and updating cross-section within the other 10 sub-basins. A summary of the updates is included as Appendix A.

With the added natural storages and updated cross-sections, junctions were added as needed to properly join and route flows within the model. For example, if more than one component (i.e. reach, basin, reservoir, etc.) were joining together and we deemed a potential need to collect flows in that location, a junction was added. Junction components do not contribute to the program calculations. They served a

dual purpose of more accurately modeling the routing of the watershed and making it easier to import flows into HEC-RAS.

2.1.3 Watershed Area and Hydrologic Routing Updates

The subbasin (watershed) areas were calculated in GIS and compared to the drainage areas represented in the HMS model. Eight subbasins had areas that differed by greater than 2 % and were updated. These basins were DC1, DC4, DC5, EC11, EC12, EC17, and EC8.

Every attempt was made to mimic the methodology used previously to route flows from the HMS results to the HEC-RAS cross-sections. The routing method used in the January 24, 2022 HEC-HMS Model, was not replicable and had inconsistencies on where the flows were applied. Without further sub-delineations, Stantec was required to compute ratios for some reaches based on the percentage of drainage area and reach length routed within each sub-basin. A spreadsheet was used to calculate the routed flows and an example (for the 100-year flows) of the methodology used is shown in Appendix B.

2.2 Hydrologic Model Calibration Analysis

Following the HEC-HMS updates outlined in Section 2.1, the model was assessed through the same calibration methodology, and for the same calibration events, that were included in "*Elm Creek Narrative and QAQC Documentation*" (Barr Engineering Co., 2021).

The updated model was evaluated using the historical flow record at the gage co-operated with the U.S. Geological Survey (USGS) on Elm Creek in Elm Creek Park Preserve, and two Three Rivers Park District-operated flow monitoring gages:

- *ECER (Elm Creek at Elm Road* near the Plymouth-Maple Grove municipal border), and
- *RT* (Rush Creek at Territorial Road).

The precipitation events that were used to assess the calibration of the updated model are:

- June 23 – July 5, 2003 (rainfall)
  - Data for RT was not available before 2006.
- September 22 – October 1, 2016 (rainfall)
- March 6 – April 3, 2010 (snowmelt)
  - Data for RT and ECER was not available for winter months
- March 18 – March 28, 2011 (snowmelt)
  - Data for RT and ECER was not available for winter months

As outlined in "*Elm Creek Narrative and QAQC Documentation*" (Barr Engineering Co., 2021), the calibration targets for the June 2003 and September 2016 rainfall events were to achieve a Nash-Sutcliffe Efficiency (NSE) index of 0.6, which is a measure of model fit compared to observed data. With an NSE of 0.6, a model is deemed satisfactorily accurate and with an index >0.75, the model is considered excellent. Figures 1 through 7 show the calibrated HEC-HMS Model results compared to the data from the three stations, when available. A summary of the calibration results is as follows:

- For Figures 1, 2, and 5 the calculated NSE Index was > 0.8 showing that our updated HEC-HMS model matched these storm events very well.
- For Figure 3, we did not have enough data points to calculate an NSE Index, but the modeled peak flow (159 cfs) was within 12.5% of the observed flow (181.5 cfs).

- For the September 16 RT comparison (Figure 4), the HEC-HMS modeled flows were higher than the observed, but after further conversation with Brian Vlach at Three Rivers Park District, it was determined that the rating curve at this location was not accurate for high flows (56.7 cfs, or water levels above 3.13 ft).
- For the snowmelt events, shown in Figures 6 and 7, where the orange line is the model-predicted results and the blue dots are the actual observed flows, the modeled (HMS) peak flows continue to occur close to the measured peak flow for both events, so no further lag time adjustments were made.

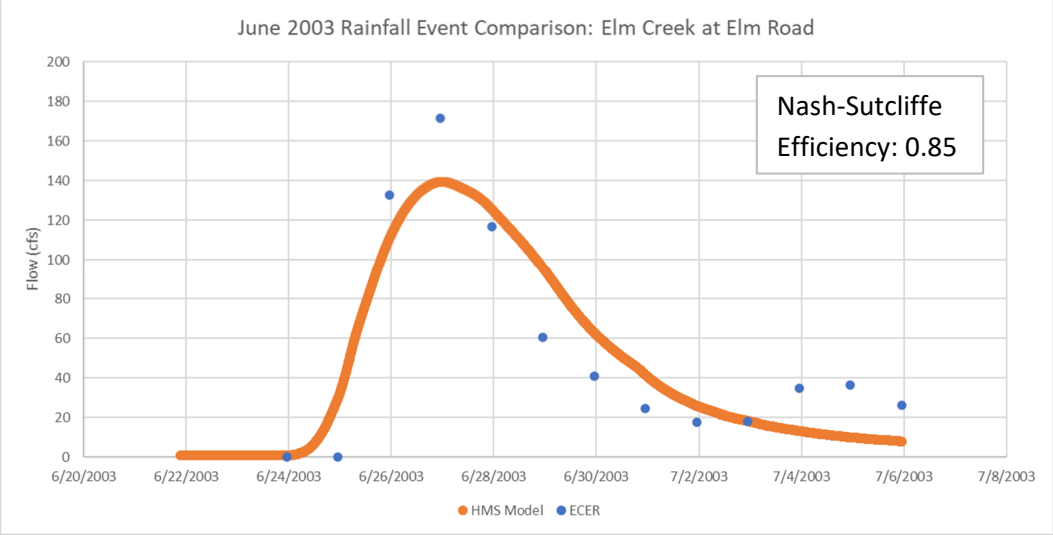


Figure 1. June 2003 rainfall event comparison at ECER.

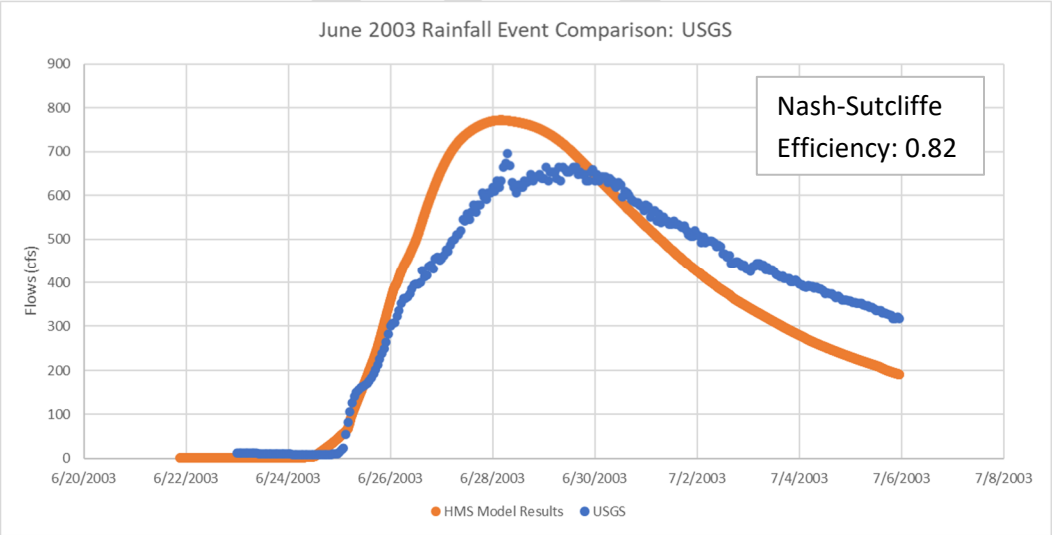


Figure 2. June 2003 rainfall event comparison at USGS.

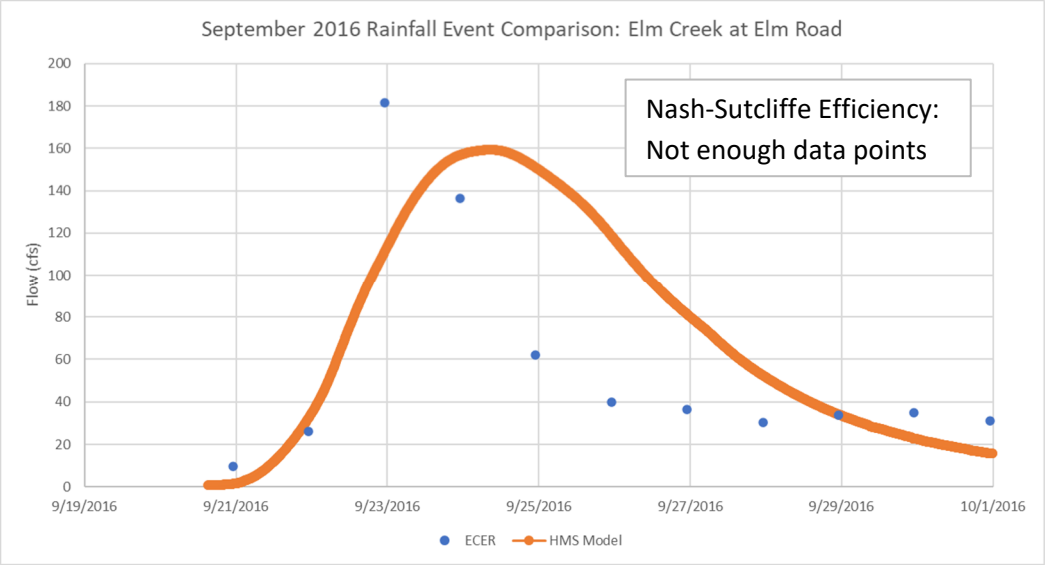


Figure 3. June 2016 rainfall event comparison at ECER.

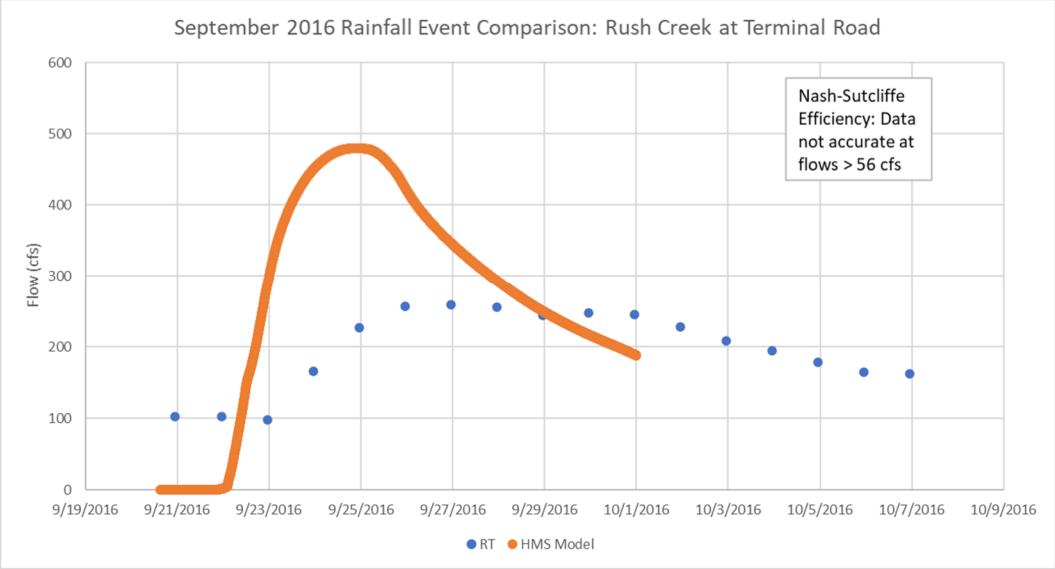


Figure 4. June 2016 rainfall event comparison at RT.

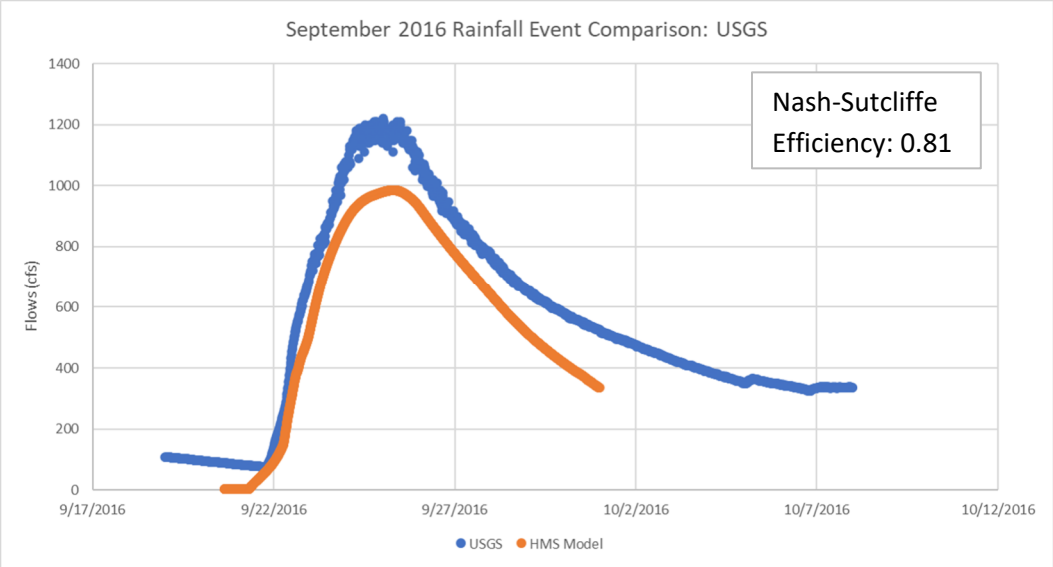


Figure 5. June 2016 rainfall event comparison at USGS.

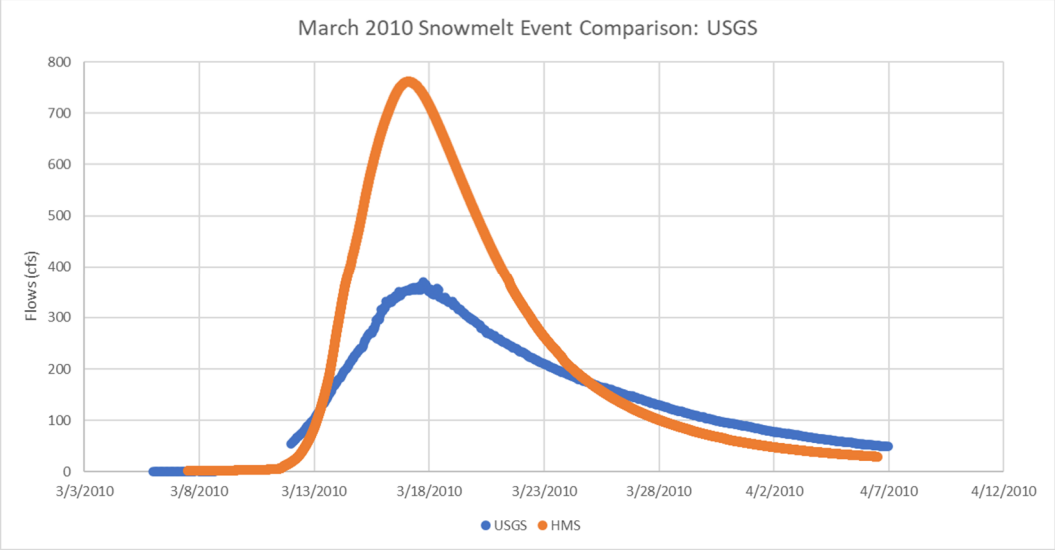


Figure 6. March 2010 snowmelt event comparison at USGS.

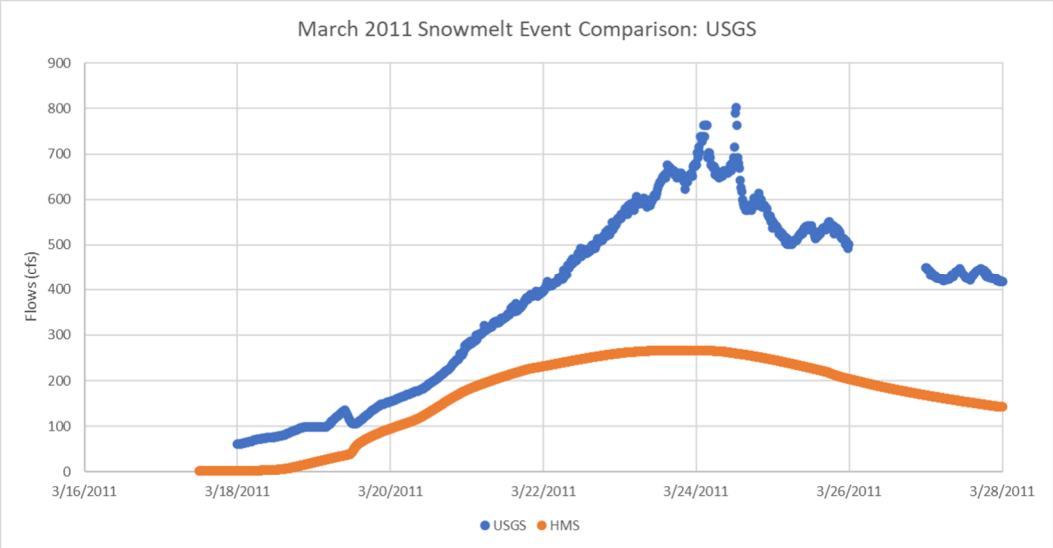


Figure 7. March 2011 snowmelt event comparison at USGS.

Based on the acceptable NSE Indexes (> 0.75) shown in Figures 1, 2, and 5 and the accurate timing of the peak flows shown in Figures 6 and 7, no further changes were made to curve numbers or lag times of the HEC-HMS Model. After calibration, flows for the 10%, 2%, 1%, and 0.2% rain events were calculated in the HEC-HMS model and inported into the HEC-RAS model to calculate elevations and hydraulics for the floodplain mapping task.

3.0 HYDRAULIC MODEL (HEC-RAS) UPDATES

Stantec updated hydraulic connections and downstream boundary conditions within the HEC-RAS model to calculate better estimates of peak water surface elevations. Three groups of updates were made to the HEC-RAS Model:

- Hydraulic crossings (bridges, culverts, weirs, and dams),
- Stream alignments, and
- Downstream boundary conditions.

The following sections provide an overview of these updates, while Appendix C provides additional details.

3.1 Hydraulic Crossing Updates

Fifty-three (53) hydraulic crossings, including Elm Creek Dam, were updated in the HEC-RAS model based on construction drawings, surveys, photos, and as-built information. These 53 structures were highlighted in the Third-Party Review (Stantec, January 2022). The updates included upstream/downstream inverts, road overflow elevation, pipe size, pipe material, and ground elevation (based on LiDAR). The details and any assumptions for these updates are listed in Appendix C

3.2 Stream Alignment Updates

Two major stream alignments were updated in the HEC-RAS Model, as follows:

1) *County Ditch 16* east of Brockton Lane (County Road 101).

   The alignment of County Ditch 16 was updated to match the record plans from Maple Grove. The ditch is routed through a series of storm sewer pipes beneath Vagabond Lane N and Bass Lake Road. The outlet is on the north side of Bass Lake Road where the ditch line then continues north. The storm sewer was modeled as a culvert without any bends for simplicity. The upstream invert elevation is where the ditch enters the storm sewer, and the downstream invert is where it leaves the storm sewer.

2) *Unnamed Tributary* to Elm Creek (HEC-RAS Reach *ElmCreek_BR4*) just southeast of the intersection of Hackamore Road (County Road 47) and Brockton Lane (County Road 101) in Plymouth.

   The modeled stream alignment appeared to show a temporary construction alignment of the creek. The alignment was updated to follow the permanent alignment of the watercourse, per record drawings from the City of Plymouth. The watercourse is routed through a culvert crossing County Road 47, and then through a storm sewer pipe, modeled as a culvert, under a new residential development. The storm sewer outlets to a wetland where the watercourse realigns with the natural flow path of the stream.

3.3 Downstream Boundary Condition Updates

As directed by the MNDNR, the downstream boundary conditions were modeled using a 'normal depth' in HEC-RAS. Each of the normal depth boundary conditions were reviewed and the upstream/downstream slopes were changed when necessary. In addition, the most downstream cross section of each tributary and the nearest downstream cross section of the main stem were reviewed to confirm that the tributary cross section had a lower water surface elevation than the main stem cross section. By verifying each tributary had a lower water surface elevation than the main stem, an appropriate tie-in could be made. The elevations along each flooding source could be evaluated independently and the water surface elevation at the confluences would be dictated by the main flooding source elevations.

4.0 RESULTS AND FLOODPLAIN MAPPING

After the hydrologic (HEC-HMS) and hydraulic (HEC-RAS) models were updated, the updated flows for the 10%, 2%, 1%, 0.2%-annual-exceedance-events were exported from the hydrologic model (HEC-HMS) and imported into the HEC-RAS Model. Results from the 1% and 0.2%-annual-exceedance-events are shown in Appendix D, along with a comparison to the effective 2016 FIS flood elevations at road crossings, lettered FEMA cross sections, and other pertinent locations across the watershed.

In addition to the updated models and results, floodplain inundation maps were created at a scale of 1:10,000 for Elm Creek, Diamond Creek, North Fork Rush Creek, and South Fork Rush Creek. The HEC-RAS RASMapper routine was used to automatically generate output and create maps. The maps were then reviewed to correct any issues the initial mapping had at bridge and culvert crossing, sharp turns in the watercourse, and other common automated mapping output issues to display accurate maps. During the mapping iterations, updates needed to be made to the HEC-RAS model. The inundation maps are shown in Appendix E. Appendix F provides a summary of the HEC-RAS model updates that were required for mapping.

APPENDIX A

HEC-HMS Sub-basin Updates

HMS Basin	Changes made
DC1	Storage Added, Outlet assumed from imagery and LiDAR
EC1	Storage Added, Outlet assumed from imagery and LiDAR
EC3	Updated Cross Sections with 8 Point
EC5	Storage Added and updated Cross Section with 8 Point
EC7	Updated Cross Sections with 8 Point
EC8	Storage Curves Updated
EC10	Storage Added, 3 reaches removed to model storage
EC11	Storage Curves Updated
EC12	Storage Curves Updated
EC13	Storage Added, Outlet assumed from imagery and LiDAR
EC16	Updated Cross Sections with 8 Point
EC17	Storage Added, Outlet assumed from imagery and LiDAR
EC19	Updated Cross Sections with 8 Point
EC20	Storage Curves Updated
EC22	Storage Curves Updated
EC24	Updated Cross Sections with 8 Point
EC26	Storage Added, Outlet assumed from imagery and LiDAR
EC27	Storage Added, Outlet assumed from imagery and LiDAR
EC29	Storage Added, Outlet assumed from imagery and LiDAR
EC30	Storage Curves Updated
EC34	Storage Curves Updated
RC1	Updated Cross Sections with 8 Point
RC2	Storage Added, Outlet assumed from imagery and LiDAR
RC4	Storage Curves Updated
RC5	Updated Cross Sections with 8 Point
RC6	Updated Cross Sections with 8 Point
RC7	Storage Curves Updated
RC8	Storage Added, Outlet assumed from imagery and LiDAR
RC9	Storage Added, Outlet assumed from imagery and LiDAR
RC10	Storage Curves Updated
RC11	Updated Cross Sections with 8 Point
RC12	Storage Added, Outlet assumed from imagery and LiDAR
RC13	Storage Added, Outlet assumed from imagery and LiDAR
RC15	Storage Added, Outlet assumed from imagery and LiDAR
SFRC1	Storage Added, Outlet assumed from imagery and LiDAR
SFRC2	Storage Added, 1 reach removed to model storage
SFRC3	Storage Curves Updated
SFRC4	Storage Added, Outlet assumed from imagery and LiDAR
SFRC7	Storage Added, Outlet assumed from imagery and LiDAR
SFRC8	Storage Curves Updated
SFRC10	Storage Curves Updated
SFRC13	Storage Added, Outlet assumed from imagery and LiDAR
SFRC14	Storage Curves Updated
SFRC17	Storage Curves Updated
SFRC19	Storage Curves Updated
SFRC21	Storage Added, Outlet assumed from imagery and LiDAR

APPENDIX B

Hydrologic Routing Example

HEC-RAS Cross-section	Location ID	StreamName	HMSElement	OrigBasin	OrigReach	HMS_Comm	Original Subasin Area	Subasin Component for Ratio	Original Subbasin Discharge	Subbasin Flow Contribution	Original Reach Length	Reach Component for Ratio	Original Reach Flow	Reach Flow Contribution	HMS Flows	Adjusted Flows
5257	RCBR7_01	RushCreek_BR7	RC3P												49.5	49.5
4477	RCBR6_01	RushCreek_BR6	RC4P												30.5	30.5
33016	RCBR5_03	RushCreek_BR5	SFRC10P												33.3	33.3
10301	RCBR5_02	RushCreek_BR5	SFRC8P												49.8	49.8
1471	RCBR5_01	RushCreek_BR5	SFRC4P												142.5	142.5
10876	RCBR4_01	RushCreek_BR4	SFRC11P												19.3	19.3
10604	RCBR3_02	RushCreek_BR3	SFRC15P												26.2	26.2
4942	RCBR3_01	RushCreek_BR3	SFRC14P												62.5	62.5
6631	RCBR2_01	RushCreek_BR2	SFRC19P												25	25
14652	RCBR1_01	RushCreek_BR1	SFRC17P												50.5	50.5
105486	RC_09	RushCreek	Jubert Lake												76.5	76.5
99522	RC_08	RushCreek	JSFRC13_1	SFRC13		plus SR	1.525122	0.437085	65.1	18.65702121					124.2	142.9
97079	RC_07	RushCreek	SFRC7P												184.2	184.2
86434	RC_06	RushCreek	JSFRC4_1												265.8	265.8
77175	RC_05	RushCreek	SFRC2P												357	357
62766	RC_04	RushCreek	SFRC1P												396.1	396.1
53717	RC_03	RushCreek	RC2P												878	878
37740	RC_02	RushCreek	JRC1_2												914.3	914.3
12615	RC_01	RushCreek	EC3R2	EC3		plus SR	1.904015	0.451326	69.8	16.54532911					986.9	1003.4
17919	NFRCBR2_01	NFRushCreek_BR2	RC7P												33.8	33.8
8127	NFRCBR_01	NFRushCreek_BR1	RC9P												49.9	49.9
73290	NFRC_07	NorthForkRushCrk	RC15P												43	43
60120	NFRC_06	NorthForkRushCrk	RC13P												91.9	91.9
41705	NFRC_05	NorthForkRushCrk	RC12P												117	117
30100	NFRC_04	NorthForkRushCrk	RC12R												157.1	157.1
24861	NFRC_03	NorthForkRushCrk	JRC8												311.5	311.5
18282	NFRC_02	NorthForkRushCrk	JRC5												359	359
11411	NFRC_01	NorthForkRushCrk	JRC5_2		RC5R	minus RR					10414.20174	1315.207985	458.3	57.87863868	458.3	400.4
16051	ECBR5_01	ElmCreek_BR5	EC22P												113.6	113.6
12125	ECBR4_02	ElmCreek_BR4	EC19R3												5.6	5.6
6036	ECBR4_01	ElmCreek_BR4	EC19R3	EC19		plus SR	3.436849	1.116634	122.5	39.80031273					5.6	45.4
1766	ECBR3_01	ElmCreek_BR3	EC27P												34.9	34.9
13614	ECBR2_02	ElmCreek_BR2	EC26R2	EC26		Assumed = split	2.430516	1.215258	344.3	172.15					17.7	189.9
4652	ECBR2_01	ElmCreek_BR2	JEC26												344.3	344.3
10253	ECBR1_01	ElmCreek_BR1	SR26	EC26		Assumed = split	2.430516	1.215258	344.3	172.15					0	172.2
132106	EC_09	ElmCreek	EC30P												38.1	38.1
122487	EC_08	ElmCreek	EC29P												72.1	72.1
117239	EC_07	ElmCreek	JEC26_1												235.3	235.3
93233	EC_06	ElmCreek	JEC16												488.4	488.4
71366	EC_05	ElmCreek	EC10P												527.3	527.3
63137	EC_04	ElmCreek	Rice Lake												688.6	688.6
54439	EC_03	ElmCreek	JEC5												749.4	749.4
34765	EC_02	ElmCreek	JEC3_2												1779.6	1779.6
9268	EC_01	ElmCreek	EC1P												1950	1950
33492	DC_02	DiamondCreek	French Lake												17.3	17.3
25449	DC_01	DiamondCreek	JDC1	DC1		plus SR	3.854982	1.122419	89.5	26.05887667					46.4	72.5

APPENDIX C

Hydraulic Crossing Updates

			Preliminary HUC-8 HEC-RAS Model									Data Review and Stantec Updates					
Municipality	Name	FEMA ZONE	River	Reach	HEC-RAS XS	HEC-RAS XS Structure Size and Shape	Bridge Opening Area (sq ft)	U/S Invert (feet)	D/S Invert (feet)	Road Overflow (feet)	Structure Data Source	Structure Size and Shape	U/S Invert (feet)	D/S Invert (feet)	Road Overflow (feet)	Structure Data Source	Internal Review
Maple Grove	Rice Lake Dam	AE	Elm Creek	ElmCreek	53103	60ft wide spillway Dam		N/A	N/A	N/A	DNR 2020 Survey	60 ft wide spillway at 891.0'				As-Built	EN0_(RICE_Lake_DAM)_D0
Maple Grove	Regional Trail	AE	Elm Creek	ElmCreek	49922	Bridge	7083	873.0	872.7	908.5	Assumed from aerial imagery	80' Span Length				MNDOT-BridgeInfo3 App. ID R1024	
Champlin	Osseo Road	AE	Elm Creek	ElmCreek	650	Dam		N/A	N/A	N/A	Dam is Not Modeled	Dam- see as-builts	N/A	N/A	N/A	Record Plans	1684-74 Elm Creek Dam Roadway - RECORD PLAN.pdf
Plymouth	CP RR	AE	Elm Creek	ElmCreek_BR3	741	4' Circular		966.2	963.4	992.8	Assumed from aerial imagery	3' (Material Not Listed)	Not Listed	962.9		Record Plans	STS1888.pdf
Plymouth	Trojan Trail/ Wayzata High	A	Elm Creek	ElmCreek_BR3	226	6' Circular		960.5	955.4	975.2	Assumed from aerial imagery	5' RCP	962.15	957.05		Record Plans	STS1887.pdf
Corcoran/ Medina	Hackamore Road	A	Elm Creek	ElmCreek_BR4	10363	3' Circular		971.7	970.6	977.6	Assumed from aerial imagery	2' Circular RCP	970.96	970.11	977.48	City of Corcoran Survey 2021	Ok- Consistent
Corcoran/ Medina	Hackamore Road	A	Elm Creek	ElmCreek_BR4	9555	3' Circular		964.6	964.0	974.1	Assumed from aerial imagery	2' Circular RCP	964.05	963.37	973.76	City of Corcoran Survey 2021	Ok- Consistent
Maple Grove/ Corcoran	Brockton Ln	A	Elm Creek	ElmCreek_BR4	9394	3' Circular		964.0	961.4	974.4	Assumed from aerial imagery	OCS draining to Pond to the SE	956.00	Not Listed		Record Plans	STS1972 and STS19733.pdf has limited info
Maple Grove/ Plymouth	Hackamore Road	A	Elm Creek	ElmCreek_BR4	8966	3' Circular		959.6	958.3	965.7	Assumed from aerial imagery	3' RCP	Not Listd	Not Listed		Record Plans	STS1972.pdf top right corner
Plymouth	Troy Ln	A	Elm Creek	ElmCreek_BR4	4858	Double 3' x 6' Box		940.7	938.3	944.4	Assumed from aerial imagery	Double 3' x 6' Box Culvert	940.37	939.79		Record Drawing	STS1901.pdf
Plymouth	58th Circle	A	Elm Creek	ElmCreek_BR4	3392	Double 5' Circular		934.9	934.1	942.5	Assumed from aerial imagery	Twin 54x88" Arch Pipes	934.45	933.61		City of Plymouth GIS	N/A
Plymouth	Peony Ln	AE	Elm Creek	ElmCreek_BR4	1891	6' x 6' Box		926.0	927.3	938.1	Assumed from aerial imagery	6' x 5' Box Culvert	926.96	925.69		Record Drawing	STS1846.pdf, STS1855.pdf
Maple Grove/ Corcoran	Co. Rd. 101	A	Elm Creek	ElmCreek_BR5	11191	4' Circular		958.9	957.9	968.1	Assumed from aerial imagery	4.5' Circular CSP	957.84	957.84		Construction Drawings	ENA_20_07_17-A0.pdf (construction drawing) PD
Maple Grove	Private Road	A	Elm Creek	ElmCreek_BR5	10648	7' Circular		957.2	957.2	972.0	Assumed from aerial imagery	5' Circular RCP	957.7	957.4		Record Drawing	. Maple Grove ENA_20_17-11_A0.pdf, sheet 14
Maple Grove	Vagabond Court	A	Elm Creek	ElmCreek_BR5	9049	6' Circular		955.5	955.5	967.4	Assumed from aerial imagery	5' Diameter RCP . The routing of this is under the Vagabond Court not through the pond	954.93	954.67		Construction Drawings	ENA_20_01-17_A0.pdf (see PDF page 100 and 10
Maple Grove	Co. Rd. 10	A	Elm Creek	ElmCreek_BR5	8529	5' Circular		960.0	956.0	966.3	Assumed from aerial imagery	Does not exist, the creek is not routed in this direction.	N/A	N/A		Maple Grove GIS	
Maple Grove	Private Road	A	Elm Creek	ElmCreek_BR5	8223	5' Circular		953.4	951.6	966.8	Assumed from aerial imagery	6' Circular RCP	951.83	950.48		Construction Drawings	ENA_20_12-15_A0.pdf
Maple Grove	Trail Crossing	A	Elm Creek	ElmCreek_BR5	6707	5' Circular		941.5	941.1	947.2	Assumed from aerial imagery	1.25' RCP beneath recreational trail	Not Listd	Not Listed		Maple Grove GIS	
Maple Grove	74th Ave N	A	Elm Creek	ElmCreek_BR5	5192	6' Circular		929.6	927.4	942.0	Assumed from aerial imagery	10x6' Precast Concrete Box	929.41	927.93		Construction Drawings	ENA_20_07-10_A0
Maple Grove	Lawndale Ln	A	Elm Creek	ElmCreek_BR5	3072	6' Circular		919.6	918.1	927.4	Assumed from aerial imagery	10x6' Precast Concrete Box	Approx 917.5	Approx 917.5		As-Built	MNDOT-BridgeInfo3 App. ID 97986 and ENA_19
Maple Grove	Inland Ln	A	Elm Creek	ElmCreek_BR5	2092	6' Circular		911.6	911.4	920.9	Assumed from aerial imagery	10' x 6' Box Culvert	909.64	909.01	Approx. 921.5'	As-Built	ENA_19_97-42_A0.pdf
Corcoran	Co. Rd. 116	A	NFRushCreek	NFRushCreek_BR1	5112	5' Circular		914.7	914.7	920.8	Assumed from aerial imagery	3' Circular CMP	913.04	912.96	921.15	City of Corcoran Survey 2021	
Corcoran	Co. Rd. 50	AE	NFRushCreek	NorthFrkRushCrk	73093	2.5' Circular		1001.9	1001.2	1009.0	Assumed from aerial imagery	2.5' Circular CMP	1000.53	1000.18	1009.29	City of Corcoran Survey 2021	
Rogers	Fletcher Lane	A	NFRushCreek	NorthFrkRushCrk	10707	15' x 6' Box		905.1	905.1	915.0	Assumed from aerial imagery	8x14' Precast Concrete Box				MNDOT- BridgeInfo3. App ID 27J52	
Dayton/ Rogers	Brockton Lane	A	NFRushCreek	NorthFrkRushCrk	5258	Bridge	189	903.8	903.9	910.7	Assumed from aerial imagery	41.7' Span Bridge (207sq ft conveance)				MNDOT- BridgeInfo3. App ID 27B87	
Maple Grove	105th Ave N	AE	RushCreek	RushCreek	36346	Bridge	787	899.2	899.0	919.0	Assumed from aerial imagery	379.3' Span Bridge over I-94 and Rush Creek				MNDOT- BridgeInfo3. App ID 27251	
Corcoran	Horseshoe Trail	A	RushCreek	RushCreek_BR1	13676	3' Circular		974.3	973.1	975.1	Assumed from aerial imagery	Size Unspecified, CMP	972.63	972.62		City of Corcoran Survey 2021	
Corcoran	Willow Drive	A	RushCreek	RushCreek_BR1	8595	3' Circular		966.4	966.7	973.2	Assumed from aerial imagery	2.5' Circular PVC	965.65	965.24		City of Corcoran Survey 2021	
Corcoran	Horseshoe Trail	A	RushCreek	RushCreek_BR1	6626	2' Circular		965.5	965.4	966.9	Assumed from aerial imagery	1.25' Circular PVC	965.64	965.05		City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR1	4157	1.5' Circular		965.1	965.0	967.0	Assumed from aerial imagery	Two, 2.5' Circular RCP's	963.74, 963.46	963.37, 963.42	967.9	City of Corcoran Survey 2021	
Corcoran	Homestead Trail	A	RushCreek	RushCreek_BR1	2142	4' x 3' Box		963.9	963.7	968.2	Assumed from aerial imagery	4.5' Circular CIP	963.63	963.56		City of Corcoran Survey 2021	
Corcoran	Co. Rd. 50	A	RushCreek	RushCreek_BR2	4251	5' Circular		980.2	974.7	987.7	Assumed from aerial imagery	2' Circular CPP	986.89	986.46	993.79	City of Corcoran Survey 2021	This seems off but matches the survey
Corcoran	Rolling Hills Road	A	RushCreek	RushCreek_BR2	3066	4' Circular		964.2	964.2	966.4	Assumed from aerial imagery	2' Circular RCP	963.01	962.66	967.31	City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR2	1717	4' Circular		961.6	961.5	968.3	Assumed from aerial imagery	5' Circular CRP	961.35	961.05		City of Corcoran Survey 2021	
Corcoran	Trail Haven Road	A	RushCreek	RushCreek_BR3	5809	6' Circular		969.3	970.5	979.9	Assumed from aerial imagery	24" Circular CMP	969.68	967.98	980.43	City of Corcoran Survey 2021	
Corcoran	Settlers Road	A	RushCreek	RushCreek_BR4	9019	2' Circular		975.4	974.0	981.0	Assumed from aerial imagery	1.5' Circular PVC	974.21	973.83	981.59	City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR4	8256	2' Circular		973.1	972.9	978.7	Assumed from aerial imagery	3.5' Circular PVC	972.24	971.51	977.55	City of Corcoran Survey 2021	
Corcoran	Larkin Road	A	RushCreek	RushCreek_BR4	6938	3' Circular		970.3	970.3	984.1	Assumed from aerial imagery	3.5' Circular RCP	969.83	968.56	984.49	City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR4	4999	1.5' Circular		962.5	961.9	964.4	Assumed from aerial imagery	1.5' Circular PVC	961.86	961.34	964.68	City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR4	4523	2' Circular		962.1	962.0	964.7	Assumed from aerial imagery	2' Circular CMP	959.23	959.16	961.5	City of Corcoran Survey 2021	
Corcoran	Co. Rd. 50	A	RushCreek	RushCreek_BR4	1774	5' Circular		946.0	946.0	952.7	Assumed from aerial imagery	4' Circular CMP	944.74	944.49	953.12	City of Corcoran Survey 2021	
Corcoran	Settlers Road	A	RushCreek	RushCreek_BR5	16293	5' Circular		973.7	974.1	981.4	Assumed from aerial imagery	3' Circular PVC	974.39	973.73		City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR5	13795	5' Circular		972.1	972.0	978.2	Assumed from aerial imagery	Two, 3' Circular PVC Pipes	974.33, 972.78	972.28, 972.72	978.31	City of Corcoran Survey 2021	

			Preliminary HUC-8 HEC-RAS Model									Data Review and Stantec Updates					
Municipality	Name	FEMA ZONE	River	Reach	HEC-RAS XS	HEC-RAS XS Structure Size and Shape	Bridge Opening Area (sq ft)	U/S Invert (feet)	D/S Invert (feet)	Road Overflow (feet)	Structure Data Source	Structure Size and Shape	U/S Invert (feet)	D/S Invert (feet)	Road Overflow (feet)	Structure Data Source	Internal Review
Corcoran	Blue Bonnet Drive	A	RushCreek	RushCreek_BR5	12050	2' Circular		968.5	968.5	972.6	Assumed from aerial imagery	4' Circular CMP	968.55	967.52	973.45	City of Corcoran Survey 2021	
Corcoran	Abilene Lane	A	RushCreek	RushCreek_BR5	9192	5' Circular		961.0	961.0	967.0	Assumed from aerial imagery	2.25' Circular PVC	961.74	961.55	967.48	City of Corcoran Survey 2021	
Corcoran	Buckskin Trail	A	RushCreek	RushCreek_BR5	8494	5' Circular		959.8	959.7	966.1	Assumed from aerial imagery	3' Circular PVC	960.39, 960.45	960.07, 960.34	966.6	City of Corcoran Survey 2021	
Corcoran	Larkin Road	A	RushCreek	RushCreek_BR5	8110	5' Circular		959.6	959.3	966.4	Assumed from aerial imagery	5' Circular CMP	959.25	958.72		City of Corcoran Survey 2021	
Corcoran	Co. Rd. 50	A	RushCreek	RushCreek_BR5	5079	6' Circular		951.9	950.0	959.8	Assumed from aerial imagery	5' Circular CMP	951.58	950.26	960.11	City of Corcoran Survey 2021	
Corcoran	Private Road	A	RushCreek	RushCreek_BR5	3967	3.5' Circular		948.2	947.9	953.6	Assumed from aerial imagery	5' Circular CPP	947.81	947.53	954.16	City of Corcoran Survey 2021	
Corcoran	Co. Rd. 10	A	RushCreek	RushCreek_BR5	654	Bridge	101	938.4	938.6	947.8	Assumed from aerial imagery	10x6' Precast Concrete Box	938.98	938.79	947.98	City of Corcoran Survey 2021 & MNDOT- BridgeInfo3. App ID 90462	
Dayton	Holly Ln	A	RushCreek	RushCreek_BR6	1787	3' Circular		918.0	913.3	919.7	Assumed from aerial imagery	3' Culvert	917.75	911.65		Dayton Municiapl GIS	
Dayton	Holly Ln	AE	RushCreek	RushCreek_BR6	768	3' Circular		909.6	907.5	914.4	Assumed from aerial imagery	3' Circular RCP	908.72	907.49		Dayton Municiapl GIS	
Dayton	Territorial Road	A	RushCreek	RushCreek_BR7	355	6' Circular		898.1	898.0	911.2	Assumed from aerial imagery	2' Circular RCP	908.18	907.78		Dayton Municiapl GIS	

APPENDIX D

2016 FIS Comparison Tables

1% AEP Comparison of ECWMC 2016 FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	1767	U.S. Route 169 (US)	* (Data not applicable)	A	851.5	2,780	853.48	1950	2.0	(830)	At confluence with Mississippi
Elm Creek	2505	U.S. Route 169 (US), US of A	* (Data not applicable)	B	851.7		853.67	1950	2.0		
Elm Creek	4251	U.S. Route 169 (US), US of B	* (Data not applicable)	C	851.7		853.66	1950	2.0		
Elm Creek	4604	Cartway Road (DS)	* (Data not applicable)	D	851.8		853.71	1950	1.9		
Elm Creek	4750	Cartway Road (US)	0.85	E	856.3		857.04	1950	0.7		
Elm Creek	5731	US of confluence with Elm Creek. DS of Fernbrook Lane	0.98	F	856.4		857.58	1950	1.2		
Elm Creek	6876	DS of Fernbrook Lane, US of F	1.20	G	856.6		857.68	1950	1.1		
Elm Creek	7643	DS of Fernbrook Lane, US of G	1.40	H	856.7		857.78	1950	1.1		
Elm Creek	8448	Fernbrook Lane (County and State Aide Highway 121)	1.56	I	856.7		857.78	1950	1.1		
Elm Creek	8719	US of Fernbrook Lane	1.62	J	856.7		857.79	1950	1.1		
Elm Creek	9684	US of Fernbrook Lane, US of J	1.76	K	857.4		858	1950	0.6		
Elm Creek	9883	US of Fernbrook Lane, US of K	2.19	L	857.5		858.01	1950	0.5		
Elm Creek	10985	US of Fernbrook Lane, US of L	2.30	M	857.8		858.03	1779.6	0.2		
Elm Creek	11340	US of Fernbrook Lane, US of M	2.34	N	857.8		858.04	1779.6	0.2		
Elm Creek	19957	DS of Elm Creek Road, DS of P	3.98	O	858.3		858.31	1779.6	0.0		
Elm Creek	22253	DS of Elm Creek Road, DS of Q	4.34	P	858.3		858.69	1779.6	0.4		
Elm Creek	24546	Elm Creek Road (DS), DS of R	4.62	Q	858.5		859.89	1779.6	1.4		
Elm Creek	25060	DS of Elm Creek Road, DS of S	4.71	R	860.5		860.47	1779.6	0.0		
Elm Creek	25541	Elm Creek Road (DS)	4.80	S	861.4		861.03	1779.6	-0.4		
Elm Creek	26148	Elm Creek Road (US)	4.90	T	861.8		861.24	1779.6	-0.6		
Elm Creek	26220	DS of Pineview Lane, US of Elm Creek Road, DS of V	4.95	U	863.1		861.78	1779.6	-1.3		
Elm Creek	28303	DS of Pineview Lane, US of Elm Creek Road, DS of W	5.21	V	863.1		862.86	1779.6	-0.2		
Elm Creek	29590	DS of Pineview Lane, US of Elm Creek Road, DS of Y	5.39	W	864.2		863.73	1779.6	-0.5		
Elm Creek	32034	DS of Pine View Lane	5.75	X	865.8		865.04	1779.6	-0.8		
Elm Creek	32439	DS of Pineview Lane, US of Elm Creek Road, DS of Z	5.84	Y	866.3		865.35	1779.6	-0.9		
Elm Creek	33241	DS of Pineview Lane, US of Elm Creek Road, DS of AA	5.99	Z	867.8		866.18	1779.6	-1.6		
Elm Creek	34180	Pine View Lane (DS)	6.10	AA	869.2		866.82	1779.6	-2.4		
Elm Creek	34246	Pine View Lane (US)	6.14	AB	869.3		866.99	1779.6	-2.3		
Elm Creek	34783	DS of Confluence of Bush Creek, US of Pine View Lane	6.21	AC	869.3		867.09	1779.6	-2.2		
Elm Creek	35380	Confluence of Bush Creek (DS)	6.31	AD	869.4	945	867.29	1779.6	-2.1	835	FIS location: Above junction of Rush Creek, just inside corporate limits of City of Dayton. Looked at Cross sections on Arcmap and this aligns with the described location
Elm Creek	36616	DS of Pine View Lake, DS of AI	6.63	AE	869.6		868	749.4	-1.6		
Elm Creek	37254	Pine View Lake (DS), downstream of AG	6.77	AF	869.6		868.16	749.4	-1.4		
Elm Creek	39639	Pine View Lake (DS)	7.36	AG	870.1		868.99	749.4	-1.1		
Elm Creek	41126	DS of Pine View Lake, DS of AI	7.70	AH	870.9		870.18	749.4	-0.7		
Elm Creek	42433	DS of Pine View Lake, DS of AJ	7.99	AI	871.3		870.88	749.4	-0.4		
Elm Creek	43181	Pine View Lake (DS)	8.20	AJ	871.6		871.36	749.4	-0.2		
Elm Creek	43585	Pine View Lake (US)	8.37	AK	873.8		872.06	749.4	-1.7		
Elm Creek	44250	DS of Territorial Road, US of Pine View Lake, DS of AM	8.46	AL	874.2		873.36	749.4	-0.8		
Elm Creek	46044	DS of Territorial Road, US of Pine View Lake, DS of AN	8.75	AM	874.6		874.9	749.4	0.3		
Elm Creek	47970	Territorial Road (DS)	9.20	AN	875.2		876.03	749.4	0.8		
Elm Creek	48986	Minnesota Trunk Highway 52 (DS)	9.44	AO	876.2		878.34	749.4	2.1		
Elm Creek	49361	Minnesota Trunk Highway 52 (US), DS of Railroad	9.52	AP	877.1		878.61	749.4	1.5		
Elm Creek	49968	US of Railroad that is US of Minnesota Trunk Highway 152	9.63	AQ	879.8		879.05	749.4	-0.8		
Elm Creek	50514	US of Railroad, DS of Rice Lake Dam, DS of AS	9.72	AR	880.0		879.6	749.4	-0.4		

1% AEP Comparison of ECWMC 2016 FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	51433	Rice Lake Dam (DS)	9.91	AS	881.8		880.01	749.4	-1.8		
Elm Creek	52499	DS of Rice Lake Dam, DS of AU	10.12	AT	882.9		880.99	749.4	-1.9		
Elm Creek	53197	Rice Lake Dam (DS)	10.26	AU	884.1		882.26	749.4	-1.8		
Mill Pond (Elm Creek)	53796		Not listed in FIS	AV	893.9	860	893.89	749.4	0.0	(111)	FIS Location: 10.33 mi above Mill Pond Spillway. Looked on Arcmap and this cross section is on Elm Creek but near Mill pond and Rice Lake. The cross section on FIS prfile is 10.35 mi above the Mill Pond Spillway. I think all the Mill Pond cross sectins are actually part of Elm Creek and then would in turn have a creek distance. The missing Cross sections from the Elm Creek correspond to the cross section in the Mill Pond main stem.
Mill Pond (Elm Creek)	65333		Not listed in FIS	AW	893.9	750	894.16	527.3	0.3	(223)	FIS Location: 12.52 mi above Mill Pond Spillway. Looked on Arcmap and this cross section is on Elm Creek but near Mill pond and Rice Lake. The cross section on FIS prfile is 12.52 mi above the Mill Pond Spillway
Mill Pond (Elm Creek)	65946		Not listed in FIS	AX	894.1		894.18	527.3	0.1		
Elm Creek	66592	West Rice Lake Road	12.76	AY	894.6		894.24	527.3	-0.4		
Elm Creek	66781	West Rice Lake Road (US)	12.78	AZ	895.3		894.26	527.3	-1.0		
Elm Creek	67119	DS of Weaver Lake Road, US of West Rice Lake Road	12.84	BA	895.6		894.39	527.3	-1.2		
Elm Creek	68058	DS of Weaver Lake Road, US of West Rice Lake Road	13.05	BB	897.3		894.61	527.3	-2.7		
Elm Creek	68853	Weaver Lake Road	13.17	BC	898.4		895.98	527.3	-2.4		
Elm Creek	69167	Weaver Lake Road (US)	13.25	BD	898.4		896.09	527.3	-2.3		
Elm Creek	69875	US of Weaver Lake Road, DS of BF	13.37	BE	898.4		896.11	527.3	-2.3		
Elm Creek	70093	US of Weaver Lake Road, DS of BG	13.44	BF	898.4		896.14	527.3	-2.3		
Elm Creek	70462	US of Weaver Lake Road, DS of BH	13.48	BG	898.5		896.22	527.3	-2.3		
Elm Creek	71981	Weaver Lake Road (US)	13.77	BH	898.5		896.27	527.3	-2.2		
Elm Creek	73933	DS of Farm Driveway	14.10	BI	898.5	690	898.19	488.4	-0.3	(202)	FIS Location: 14.08 miles above Mill pond spillway
Elm Creek	74436	DS of Farm Driveway, DS of BK	14.30	BJ	901.5		898.84	488.4	-2.7		
Elm Creek	74718	Dunkirk Lane	14.41	BK	903.7		899.28	488.4	-4.4		
Elm Creek	74971	Dunkirk Lane (US)	14.44	BL	903.9		901.23	488.4	-2.7		
Elm Creek	75680	US of Dunkirk Lane, DS of Bass Lake Road, DS of BN	14.55	BM	905.1		902.39	488.4	-2.7		
Elm Creek	76495	US of Dunkirk Lane, DS of Bass Lake Road, DS of BO	14.72	BN	906.0		903.78	488.4	-2.2		
Elm Creek	77331	DS of Bass Lake Road, US Dunkirk Lane, DS of BP	14.86	BO	906.2		904.97	488.4	-1.2		
Elm Creek	79194	DS of Bass Lake Road, US Dunkirk Lane, DS of BQ	15.18	BP	906.4		906.08	488.4	-0.3		
Elm Creek	80843	DS of Bass Lake Road, US Dunkirk Lane, DS of BR	15.48	BQ	908.1		906.83	488.4	-1.3		
Elm Creek	82336	DS of Bass Lake Road	15.75	BR	909.8		908.7	488.4	-1.1		
Elm Creek	82996	Bass Lake Road	15.90	BS	910.4		909.19	488.4	-1.2		
Elm Creek	83398	DS of Elm Road, US of Bass Lake Road, DS of BU	15.95	BT	910.7		909.48	488.4	-1.2		
Elm Creek	83890	DS of Elm Road, US of Bass Lake Road, DS of BV	16.05	BU	910.9		909.83	488.4	-1.1		
Elm Creek	84476	DS of Elm Road, US of Bass Lake Road, DS of BW	16.16	BV	911.0		909.88	488.4	-1.1		
Elm Creek	85470	DS of Elm Road, US of Bass Lake Road, DS of BX	16.35	BW	911.0		910.12	488.4	-0.9		
Elm Creek	86861	DS of Elm Road, US of Bass Lake Road	16.52	BX	911.0		911.35	488.4	0.4		
Elm Creek	88288	DS of Elm Road, US of Bass Lake Road, DS of BZ	16.74	BY	915.4	520	914.44	488.4	-1.0	(32)	On FIS the creek distance for the 100-yr peak flow rate is 16.73, used this peak flow rate
Elm Creek	88898	DS of Elm Road, US of Bass Lake Road, DS of CA	16.82	BZ	916.7		915.3	488.4	-1.4		
Elm Creek	90652	Elm Road (DS)	17.04	CA	918.9		918.09	488.4	-0.8		
Elm Creek	#N/A	Elm Road (US)	17.11	CB	920.6		#N/A	#N/A	#N/A		
Elm Creek	91739	US of Elm Road, US of CB	17.24	CC	921.0		919.96	488.4	-1.0		
Elm Creek	92290	US of Elm Road, US of CC	17.34	CD	921.6		920.71	488.4	-0.9		
Elm Creek	93102	US of Elm Road, DS of CF	17.50	CE	922.2		921.2	488.4	-1.0		
Elm Creek	93848	US of Elm Road, US of CE	17.63	CF	922.3		921.36	235.3	-0.9		
Elm Creek	111598	US of State Highway 55, DS of State Highway 101 and CH	20.66	CG	959.6	245	960.5	235.3	0.9	(10)	FIS Location: At Medina-Plymouth corporate boundary limits. This Cross section is the closest to the city boundaries

1% AEP Comparison of ECWMC 2016 FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	112306	State Highway 101 (DS)	20.73	CH	962.1		961.57	235.3	-0.5		
Elm Creek	112413	State Highway 101 (US)	20.75	CI	963.9		963.66	235.3	-0.2		
Elm Creek	113170	DS of Access Road, US of State Highway 101	20.87	CJ	966.0		965.78	235.3	-0.2		
Elm Creek	113302	US and DS of two Access Road, US of State Highway 101	20.91	CK	972.4		972.4	235.3	0.0		
Elm Creek	113654	US and DS of two Access Road, US of State Highway 101, US of CK	20.96	CL	972.5		972.6	235.3	0.1		
Elm Creek	113752	US of Access Road, DS of Railroad	21.00	CM	972.7		972.62	235.3	-0.1		
Elm Creek	114334	US Access road, DS railroad and Hamel Road	21.11	CN	972.7	210	972.65	235.3	-0.1	25	FIS Location: Below Soo Line Bridge, near Hamel Road. I think this is the correct cross section location but not positive. Double check
Elm Creek	114472	Railroad, DS of Hamel Road	21.14	CO	974.6		975.33	235.3	0.7		
Elm Creek	114953	DS of Hamel Road, US of Railroad	21.21	CP	974.6	65	975.33	235.3	0.7	170	FIS Location: downstream of Hamel Road, near Pinto Drive. I picked the cross section that is farthest DS of Hamel Road (Creek meanders around it), and is still near Pinto Road.
Elm Creek	115445	Elm Creek Drive (DS)	21.29	CQ	975.7		976.29	235.3	0.6		
Elm Creek	115587	Elm Creek Drive (US)	21.32	CR	976.9		976.36	235.3	-0.5		
Elm Creek	116667	Sewage Lagoon Road (DS)	21.50	CS	976.9		976.55	235.3	-0.4		
Elm Creek	116797	Sewage Lagoon Road (US)	21.53	CT	977.0		976.67	235.3	-0.3		
Elm Creek	117854	DS of Confluence of Tributary to Elm Creek	21.73	CU	977.0		976.68	235.3	-0.3		
Elm Creek	118767	DS of Hamel Road, DS of CW	21.90	CV	977.1		976.76	72.1	-0.3		
Elm Creek	119019	DS of Hamel Road	21.94	CW	977.5		977.34	72.1	-0.2		
Elm Creek	119205	US of Hamel Road DS of SOO Line Railroad	21.97	CX	977.7		977.67	72.1	0.0		
Elm Creek	119439	US of Hamel Road DS of SOO Line Railroad	22.02	CY	977.9		977.7	72.1	-0.2		
Elm Creek	120084	DS of SOO Line Railroad	22.15	CZ	978.0		977.74	72.1	-0.3		

1% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations arnd Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	1361	US of confluence with Elm Creek	0.26	A	869.60	1,330	868.44	1003.4	-1.16	(327)	
Rush Creek	4230	US of confluence with Elm Creek, DS of C	0.76	B	869.90		871.25	1003.4	1.35		
Rush Creek	5541	US of confluence with Elm Creek, DS of D	1.00	C	871.60		872.64	1003.4	1.04		
Rush Creek	7368	US of confluence with Elm Creek, DS of E	1.39	D	874.30		874.79	1003.4	0.49		
Rush Creek	8015	US of confluence with Elm Creek, DS of F	1.52	E	875.70		875.47	1003.4	-0.23		
Rush Creek	9884	US of confluence with Elm Creek, DS of G	1.87	F	880.00		878.1	1003.4	-1.90		
Rush Creek	11375	US of confluence with Elm Creek, DS of H	2.14	G	882.60		881.29	1003.4	-1.31		
Rush Creek	12615	Fernbrook Lane (DS)	2.36	H	885.00		882.91	1003.4	-2.09		
Rush Creek	12977	At Fernbrook Lane	2.42	I	886.80		883.92	914.3	-2.88		
Rush Creek	13940	Fernbrook Lane (US)	2.60	J	887.30		885.24	914.3	-2.06		
Rush Creek	14425	US of Fernbrook Lane, DS of L	2.68	K	887.80		885.45	914.3	-2.35		
Rush Creek	15894	US of Fernbrook Lane, DS of M	2.94	L	890.10		886.57	914.3	-3.53		
Rush Creek	16252	US of Fernbrook Lane, DS of N	3.01	M	890.60		886.81	914.3	-3.79		
Rush Creek	16584	US of Fernbrook Lane, DS of O	3.05	N	890.80		887.19	914.3	-3.61		
Rush Creek	17911	US of Fernbrook Lane, DS of P	3.33	O	892.90		888.85	914.3	-4.05		
Rush Creek	18529	US of Fernbrook Lane, DS of Q	3.43	P	894.00		889.86	914.3	-4.14		
Rush Creek	19800	US of Fernbrook Lane, DS of R	3.64	Q	895.70		893	914.3	-2.70		
Rush Creek	20567	US of Fernbrook Lane, DS of S	3.75	R	896.90		893.94	914.3	-2.96		
Rush Creek	21118	US of Fernbrook Lane, DS of T	3.89	S	898.90		894.95	914.3	-3.95		
Rush Creek	25333	Territorial Road (DS)	4.66	T	905.50		902.91	914.3	-2.59		
Rush Creek	25518	At Territorial Road	4.70	U	905.90		903.09	914.3	-2.81		
Rush Creek	26324	Territorial Road (US)	4.84	V	906.10		903.63	914.3	-2.47		
Rush Creek	27258	US of Territorial Road, DS of Minnesota Trunk Highway 152	5.00	W	906.10	1,280	903.68	914.3	-2.42	(366)	Location from FIS: 5 miles above confluence with Elm Creek
Rush Creek	28541	Minnesota Trunk Highway 152 (DS)	5.22	X	906.20		903.89	914.3	-2.31		
Rush Creek	29002	At Minnesota Trunk Highway 152	5.30	Y	906.30		904.05	914.3	-2.25		
Rush Creek	30564	Minnesota Trunk Highway 152 (US), near Burling and Nor. RR	5.61	Z	907.50		905.66	914.3	-1.84		
Rush Creek	31018	US of Burling and Nor. RR, DS of Dunkirk Lane	5.67	AA	907.60		905.78	914.3	-1.82		
Rush Creek	31134	Dunkirk Lane (DS)	5.71	AB	907.70		905.78	914.3	-1.92		
Rush Creek	31323	Dunkirk Lane (US)	5.74	AC	907.80		905.85	914.3	-1.95		
Rush Creek	31489	US of Dunkirk Lane, DS of AE	5.78	AD	909.40		906.28	914.3	-3.12		
Rush Creek	32287	US of Dunkirk Lane, DS of 105th Avenue N, DS of AF	5.92	AE	909.70		907.45	914.3	-2.25		
Rush Creek	33461	105th Avenue N (DS)	6.09	AF	909.70		907.53	914.3	-2.17		
Rush Creek	33852	At 105th Avenue N	6.18	AG	909.70		907.53	914.3	-2.17		
Rush Creek	34127	105th Avenue N (US)	6.24	AH	911.70		908.14	914.3	-3.56		
Rush Creek	34752	US of 105th Avenue N, DS of State Route 92/Interstate 94, DS of AH	6.35	AI	911.80		908.49	914.3	-3.31		
Rush Creek	36410	State Route 92/Interstate 94 (DS)	6.66	AJ	911.90		908.88	914.3	-3.02		
Rush Creek	36817	State Route 92/Interstate 94 (US)	6.76	AK	913.00		909.25	914.3	-3.75		
Rush Creek	37740	US of the confluence with North Fork Rush Creek	7.52	AL	913.00	680	909.81	914.3	-3.19	234	Location from FIS: 7.52 mi above confluence with Elm Creek
Rush Creek	40468	US of the confluence with North Fork Rush Creek, DS of 101st Avenue North, US of AL	7.85	AM	913.00		910.49	878	-2.51		
Rush Creek	42214	US of the confluence with North Fork Rush Creek, DS of 101st Avenue North, US of AM	8.05	AN	913.00		912.14	878	-0.86		
Rush Creek	43810	101st Avenue North (DS)	8.28	AO	913.20		912.8	878	-0.40		
Rush Creek	44964	101st Avenue North (US)	8.33	AP	914.50		915.37	878	0.87		
Rush Creek	46234	US of 101st Avenue North, DS of 97th Avenue North, US of AP	8.48	AQ	917.60		916.47	878	-1.13		
Rush Creek	49423	US of 101st Avenue North, DS of 97th Avenue North, US of AQ	8.67	AR	921.30		922.15	878	0.85		
Rush Creek	50185	US of 101st Avenue North, DS of 97th Avenue North, US of AR	8.84	AS	922.60		922.84	878	0.24		
Rush Creek	51388	US of 101st Avenue North, DS of 97th Avenue North, US of AS	9.08	AT	924.50		923.63	878	-0.87		
Rush Creek	53011	US of 101st Avenue North, DS of 97th Avenue North, US of AT	9.37	AU	926.60		926.48	878	-0.12		
Rush Creek	53717	US of 101st Avenue North, DS of 97th Avenue North, US of AU	9.48	AV	927.40		926.88	878	-0.52		

1% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations arnd Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	54121	97th Avenue N (DS)	9.55	AW	927.70		927.07	396.1	-0.63		
Rush Creek	54333	At 97th Avenue N	9.59	AX	928.50		927.26	396.1	-1.24		
Rush Creek	54953	97th Avenue N (US)	9.69	AY	928.50		927.37	396.1	-1.13		
Rush Creek	56367	US of 97th Avenue N, DS of BA	9.92	AZ	928.50		927.39	396.1	-1.11		
Rush Creek	57461	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of AZ	10.12	BA	928.60		927.46	396.1	-1.14		
Rush Creek	58182	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of BA	10.22	BB	928.60		927.65	396.1	-0.95		
Rush Creek	60047	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of BB	10.51	BC	929.70		929.12	396.1	-0.58		
Rush Creek	60695	DS of Minnesota Highway 101, US of 97th Avenue North, DS of BE	10.64	BD	930.30		929.77	396.1	-0.53		
Rush Creek	62766	DS of Minnesota Highway 101, US of BD	10.96	BE	932.10		930.9	396.1	-1.20		
Rush Creek	63179	State Highway 101 (just DS)	11.03	BF	932.40	570	931.18	357	-1.22	(213)	FIS Location: At State Highway 101
Rush Creek	64415	DS of Private Road that is DS of Schute Road	11.28	BG	934.00		932.19	357	-1.81		
Rush Creek	64580	US of Private Road that is DS of Schute Road	11.36	BH	935.00		932.92	357	-2.08		
Rush Creek	65350	US of Private Road near State Highway 10, DS of Schute Road, US of BH	11.42	BI	935.10		933.27	357	-1.83		
Rush Creek	65819	DS of Schute Road, US of BI	11.52	BJ	935.20		933.38	357	-1.82		
Rush Creek	66475	Schute Road (DS)	11.64	BK	935.20		933.42	357	-1.78		
Rush Creek	66776	Schute Road (US)	11.72	BL	935.20		933.73	357	-1.47		
Rush Creek	67465	US of Schute Road, DS of BN	11.84	BM	935.30		933.78	357	-1.52		
Rush Creek	69314	US of Schute Road, DS of BO	12.16	BN	935.40		933.97	357	-1.43		
Rush Creek	70421	US of Schute Road, DS of BP	12.38	BO	935.70		934.64	357	-1.06		
Rush Creek	76315	US of Schute Road, DS of County Highway 116, DS of BQ	13.50	BP	936.10		935.12	357	-0.98		
Rush Creek	76731	County Highway 116 (DS)	13.60	BQ	936.10	470	935.63	357	-0.47	(113)	FIS location: Just downstream of County Road 116
Rush Creek	77175	County Highway 116 (US)	13.66	BR	937.20		938.1	357	0.90		
Rush Creek	78725	US of County Highway 116, DS of County Highway 10, DS of BT	13.94	BS	937.50		938.35	265.8	0.85		
Rush Creek	80181	US of County Highway 116, DS of County Highway 10, DS of BU	14.12	BT	937.90		938.39	265.8	0.49		
Rush Creek	81438	US of County Highway 116, DS of County Highway 10, DS of BV	14.44	BU	940.70		939.33	265.8	-1.37		
Rush Creek	82895	US of County Highway 116, DS of County Highway 10, DS of BW	14.64	BV	942.40	315	941.92	265.8	-0.48	(49)	FIS location: Just aboved Unnamed Tributary approximately 0.3 miles downstream of County Highway 10. Cross section BV is ~0.39 mi downstream of Highway 10 and downstream of a trib
Rush Creek	84156	County Highway 10 (DS)	14.78	BW	945.10		944.56	265.8	-0.54		
Rush Creek	84403	County Highway 10 (US)	14.86	BX	945.90		945.17	265.8	-0.73		
Rush Creek	85510	US of County Highway 10, DS of County Highway 50, DS of BZ	15.06	BY	946.30		946.27	265.8	-0.03		
Rush Creek	86165	US of County Highway 10, DS of County Highway 50, DS of CA	15.14	BZ	947.30		946.84	265.8	-0.46		
Rush Creek	86434	US of County Highway 10, DS of County Highway 50, DS of CB	15.34	CA	949.50		947.98	265.8	-1.52		
Rush Creek	88133	US of County Highway 10, DS of County Highway 50, DS of CC	15.42	CB	951.10	230	951.04	184.2	-0.06	(46)	FIS Location: Just above Unnamed Tributary approximately 0.6 miles upstream of County Highway 10. Cross section CB is 0.6 mi upstream of County Highway 10
Rush Creek	89836	US of County Highway 10, DS of County Highway 50, DS of CD	15.72	CC	955.20		954.56	184.2	-0.64		
Rush Creek	90820	US of County Highway 10, DS of County Highway 50, DS of CE	15.92	CD	957.30		956.32	184.2	-0.98		
Rush Creek	91832	County Highway 50 (DS)	16.02	CE	958.60		958.7	184.2	0.10		
Rush Creek	92192	County Highway 50 (US)	16.12	CF	959.20		959.2	184.2	0.00		
Rush Creek	93097	US of County Highway 50, DS of Kalk Road, DS of CH	16.33	CG	960.50		960.92	184.2	0.42		

1% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations arnd Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	93948	US of County Highway 50, DS of Kalk Road, DS of CI	16.45	CH	962.80		961.84	184.2	-0.96		
Rush Creek	94424	Kalk Road (DS)	16.53	CI	963.00		962.16	184.2	-0.84		
Rush Creek	94564	Kalk Road (US)	16.57	CJ	964.90		966.38	184.2	1.48		
Rush Creek	95356	US of Kalk Road, DS of Rolling Hills Road, US of CJ	16.73	CK	964.90		966.4	184.2	1.50		
Rush Creek	100957	DS of Rolling Hills Road, US of CK	17.76	CL	964.90		966.43	76.5	1.53		
Rush Creek	101677	Rolling Hills Road (DS)	17.86	CM	964.90		966.45	76.5	1.55		
Rush Creek	101771	Rolling Hills Road (US)	17.92	CN	965.60		966.58	76.5	0.98		
Rush Creek	104294	US of Rolling Hills Road, DS of CP	18.36	CO	966.20		967.33	76.5	1.13		
Rush Creek	104810	US of Rolling Hills Road, DS of CQ	18.44	CP	969.40		968.66	76.5	-0.74		
Rush Creek	105486	US of Rolling Hills Road, At the "limit of detailed of study"	18.58	CQ	970.60	150	969.36	76.5	-1.24		(74) FIS Location: At Jubert Lake outlet. Looked on Arcmap and CQ is at this location

1% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations arnd Peak Discharges										
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates	
					100-yr		100-yr		100-yr	
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Rush Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)
North Fork Rush Creek	14593	County Road 117 (US)	2.66	A	914.8		912.12	359	-2.7	
North Fork Rush Creek	15174	109th Avenue North (US)	2.76	B	914.8		912.27	359	-2.5	
North Fork Rush Creek	16367	US of 109th Avenue N, DS of Access Road near Cain Road, DS of D	2.98	C	914.8		912.28	359	-2.5	
North Fork Rush Creek	17914	US of 109th Avenue N, DS of Access Road near Cain Road, DS of E	3.26	D	914.8		912.29	359	-2.5	
North Fork Rush Creek	18117	Access Road near Cain Road (DS)	3.30	E	914.8		912.29	359	-2.5	
North Fork Rush Creek	18282	Access Road near Cain Road (US)	3.32	F	914.8		913.58	359	-1.2	
North Fork Rush Creek	19664	Cain Road	3.55	G	914.8	530	913.9	311.5	-0.9	(219)
North Fork Rush Creek	19750	Cain Road (US)	3.58	H	915.0		914.03	311.5	-1.0	
North Fork Rush Creek	20321	US of Cain Road, DS of Trail Haven Road, DS of J	3.70	I	915.0		914.04	311.5	-1.0	
North Fork Rush Creek	20321	US of Cain Road, DS of Trail Haven Road, DS of J	3.70	I	915.0		914.04	311.5	-1.0	
North Fork Rush Creek	20321	US of Cain Road, DS of Trail Haven Road, DS of J	3.84	I	915.0		914.04	311.5	-1.0	
North Fork Rush Creek	21320	US of Cain Road, DS of Trail Haven Road, DS of K	3.84	J	915.4		914.47	311.5	-0.9	
North Fork Rush Creek	22487	US of Cain Road, DS of Trail Haven Road, DS of L	4.06	K	917.7		917.49	311.5	-0.2	
North Fork Rush Creek	23477	US of Cain Road, DS of Trail Haven Road, DS of M	4.24	L	918.4		917.79	311.5	-0.6	
North Fork Rush Creek	23984	US of Cain Road, DS of Trail Haven Road, DS of N	4.34	M	918.7		917.83	311.5	-0.9	
North Fork Rush Creek	24861	US of Cain Road, DS of Trail Haven Road, DS of O	4.50	N	919.9		918.73	311.5	-1.2	
North Fork Rush Creek	26026	US of Cain Road, DS of Trail Haven Road, DS of P	4.72	O	921.1		919.4	157.1	-1.7	
North Fork Rush Creek	26892	US of Cain Road, DS of Trail Haven Road, DS of Q	4.87	P	921.9		920.49	157.1	-1.4	
North Fork Rush Creek	27431	US of Cain Road, DS of Trail Haven Road, DS of R	4.98	Q	923.2		920.99	157.1	-2.2	
North Fork Rush Creek	27581	Trail Haven Road (DS)	4.99	R	923.3	495	921.22	157.1	-2.1	(338)
North Fork Rush Creek	27759	Trail Haven Road (US)	5.03	S	924.6		921.76	157.1	-2.8	
North Fork Rush Creek	28660	US of Trail Haven Road, DS of County Road 117, US of S	5.19	T	924.7		921.97	157.1	-2.7	
North Fork Rush Creek	30100	US of Trail Haven Road, DS of County Road 117, US of T	5.44	U	924.7		922.31	157.1	-2.4	
North Fork Rush Creek	31286	County Road 117/109th Avenue North (DS)	5.65	V	924.7		922.6	117	-2.1	
North Fork Rush Creek	31384	At County Road 117/109th Avenue N	5.67	W	924.7		922.65	117	-2.1	
North Fork Rush Creek	31460	County Road 117/109th Avenue North (US)	5.68	X	924.7		923.06	117	-1.6	
North Fork Rush Creek	31580	US and DS of County Road 117/109th Avenue N, DS of Z	5.70	Y	925.8		923.21	117	-2.6	
North Fork Rush Creek	35165	DS of County Road 117/109th Ave N, DS of AA	6.47	Z	926.6		924.95	117	-1.6	
North Fork Rush Creek	35265	US of County Road 117/109th Avenue N	6.50	AA	930.0		925.29	117	-4.7	
North Fork Rush Creek	35391	US of County Road 117/109th Ave N, DS of AC	6.52	AB	930.2		925.99	117	-4.2	
North Fork Rush Creek	35871	US of County Road 117/109th Ave N, DS of AD	6.60	AC	930.3		928.5	117	-1.8	
North Fork Rush Creek	36391	US of County Road 117/109th Ave N, DS of AE	6.70	AD	931.1		929.29	117	-1.8	
North Fork Rush Creek	38053	DS of Access Road, US of AD	6.99	AE	935.6		932.27	117	-3.3	
North Fork Rush Creek	38209	DS of Bechtold Road, US of Access Road	7.03	AF	937.1		932.52	117	-4.6	
North Fork Rush Creek	38758	DS of Bechtold Road	7.15	AG	937.6		934.68	117	-2.9	
North Fork Rush Creek	38930	US of Bechtold Road	7.16	AH	937.6		935.05	117	-2.6	
North Fork Rush Creek	39380	US of Bechtold Road,DS of AJ	7.25	AI	940.4		936.07	117	-4.3	
North Fork Rush Creek	40511	DS of County Road 30/Oak Bole Drive, DS of AK	7.47	AJ	941.8		937.84	117	-4.0	

1% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations arnd Peak Discharges										
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates	
					100-yr		100-yr		100-yr	
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Rush Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)
North Fork Rush Creek	41705	DS of County Road 30/Oak Bole Drive	7.67	AK	943.3		941.67	117	-1.6	
North Fork Rush Creek	41986	US of County Road 30/Oak Bole Drive	7.72	AL	947.6		943.17	91.9	-4.4	
North Fork Rush Creek	43630	US of County Road 30/Oak Bole Drive, DS of AN	7.96	AM	947.8		945.17	91.9	-2.6	
North Fork Rush Creek	44291	US of County Road 30/Oak Bole Drive, DS of AO	8.07	AN	947.9		946.15	91.9	-1.8	
North Fork Rush Creek	46377	DS of Sundance Road, DS of AP	8.37	AO	951.0		949.96	91.9	-1.0	
North Fork Rush Creek	47362	DS of Sundance Road, DS of AQ	8.53	AP	954.8		951.06	91.9	-3.7	
North Fork Rush Creek	48342	DS of Sundance Road, DS of AR	8.69	AQ	957.4		954.88	91.9	-2.5	
North Fork Rush Creek	49363	DS of Sundance Road	8.86	AR	959.9		957.21	91.9	-2.7	
North Fork Rush Creek	49436	US of Sundance Road	8.88	AS	963.2		959.11	91.9	-4.1	
North Fork Rush Creek	49901	US of Sundance Road, US of AS	8.94	AT	963.3		960.8	91.9	-2.5	
North Fork Rush Creek	50577	US of Sundance Road, US of AT	9.08	AU	963.5		961	91.9	-2.5	
North Fork Rush Creek	52176	DS of 97th Avenue N, DS of AW	9.29	AV	965.8		965.42	91.9	-0.4	
North Fork Rush Creek	52972	DS of 97th Avenue N, DS of AX	9.42	AW	968.4		966.9	91.9	-1.5	
North Fork Rush Creek	54987	DS of 97th Avenue N	9.75	AX	973.4		971.08	91.9	-2.3	
North Fork Rush Creek	55226	US of 97th Avenue N	9.78	AY	977.1		971.37	91.9	-5.7	
North Fork Rush Creek	55966	US of 97th Avenue N, US of AY	9.91	AZ	977.5		974.13	91.9	-3.4	
North Fork Rush Creek	57273	US of 97th Avenue N, US of AZ	10.13	BA	981.4		978.91	91.9	-2.5	
North Fork Rush Creek	58518	US of 97th Avenue N, DS of BC	10.32	BB	984.4		982.37	91.9	-2.0	
North Fork Rush Creek	59887	DS of Access Road and County Road 10, DS of BD	10.52	BC	988.9		988.04	91.9	-0.9	
North Fork Rush Creek	59987	DS of Access Road, DS of BE	10.55	BD	990.9		988.53	91.9	-2.4	
North Fork Rush Creek	60064	US of Access Road near County Road 10, DS of BF	10.59	BE	991.1		988.58	91.9	-2.5	
North Fork Rush Creek	60120	DS of County Road 10	10.61	BF	991.9	310	988.86	91.9	-3.0	(218)
North Fork Rush Creek	60352	US of County Road 10	10.63	BG	992.0		989.36	43	-2.6	
North Fork Rush Creek	60606	US of County Road 10, DS of Access Road	10.69	BH	992.0		989.37	43	-2.6	
North Fork Rush Creek	60948	US of Access Road, DS of BJ	10.73	BI	992.1		989.64	43	-2.5	
North Fork Rush Creek	61315	US of County Road 10 and Access road, US of BI	10.81	BJ	992.2		989.66	43	-2.5	
North Fork Rush Creek	63385	US of County Road 10, US of BJ	11.20	BK	993.5		990.53	43	-3.0	
North Fork Rush Creek	63749	US of County Road 10, US of BK	11.27	BL	994.0		990.79	43	-3.2	
North Fork Rush Creek	64763	DS of County Road 19/Crow Hassan Park Road	11.45	BM	995.0		993.02	43	-2.0	
North Fork Rush Creek	64955	US of County Road 19/Crow-Hassan Park Road	11.49	BN	1001.2		994.07	43	-7.1	
North Fork Rush Creek	65429	DS of Strehler Road, DS of BP	11.58	BO	1001.2		994.84	43	-6.4	
North Fork Rush Creek	65983	DS of Strehler Road, DS of BQ	11.68	BP	1001.2		994.85	43	-6.4	
North Fork Rush Creek	66739	DS of Strehler Road, DS of BR	11.80	BQ	1001.2		998.53	43	-2.7	
North Fork Rush Creek	67226	DS of Strehler Road	11.92	BR	1001.9	215	999.47	43	-2.4	(172)
North Fork Rush Creek	67429	US of Strehler Road	11.96	BS	1004.1		1001.78	43	-2.3	
North Fork Rush Creek	68345	US of Strehler Road, US of BS	12.12	BT	1004.1		1001.84	43	-2.3	
North Fork Rush Creek	69031	US of Strehler Road, US of BT	12.24	BU	1004.1		1001.84	43	-2.3	
North Fork Rush Creek	69474	US of Strehler Road, US of BU	12.33	BV	1004.1		1001.84	43	-2.3	
North Fork Rush Creek	71089	US of Strehler Road, DS of BX	12.64	BW	1004.2		1001.87	43	-2.3	
North Fork Rush Creek	72186	US of Strehler Road, US of BW	12.85	BX	1004.3		1001.91	43	-2.4	
North Fork Rush Creek	72915	US of Strehler Road, US of BX	12.99	BY	1004.3		1001.9	43	-2.4	

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					500-yr		500-yr		500-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	1767	U.S. Route 169 (US)	* (Data not applicable)	A	854.6	4,350	854.88	2685.6	0.3	(1,664)	At confluence with Mississippi
Elm Creek	2505	U.S. Route 169 (US), US of A	* (Data not applicable)	B	854.6		855.16	2685.6	0.6		
Elm Creek	4251	U.S. Route 169 (US), US of B	* (Data not applicable)	C	854.6		855.14	2685.6	0.5		
Elm Creek	4604	Cartway Road (DS)	* (Data not applicable)	D	854.8		855.21	2685.6	0.4		
Elm Creek	4750	Cartway Road (US)	0.85	E	858.5		857.61	2685.6	-0.9		
Elm Creek	5731	US of confluence with Elm Creek. DS of Fernbrook Lane	0.98	F	858.6		858.48	2685.6	-0.2		
Elm Creek	6876	DS of Fernbrook Lane, US of F	1.20	G	858.8		858.6	2685.6	-0.2		
Elm Creek	7643	DS of Fernbrook Lane, US of G	1.40	H	859.0		858.73	2685.6	-0.3		
Elm Creek	8448	Fernbrook Lane (County and State Aide Highway 121)	1.56	I	859.2		858.74	2685.6	-0.5		
Elm Creek	8719	US of Fernbrook Lane	1.62	J	859.3		858.74	2685.6	-0.5		
Elm Creek	9684	US of Fernbrook Lane, US of J	1.76	K	859.5		859.01	2685.6	-0.5		
Elm Creek	9883	US of Fernbrook Lane, US of K	2.19	L	859.8		859.02	2685.6	-0.8		
Elm Creek	10985	US of Fernbrook Lane, US of L	2.30	M	859.9		859.04	2423.8	-0.9		
Elm Creek	11340	US of Fernbrook Lane, US of M	2.34	N	859.8		859.03	2423.8	-0.8		
Elm Creek	19957	DS of Elm Creek Road, DS of P	3.98	O	859.8		859.35	2423.8	-0.5		
Elm Creek	22253	DS of Elm Creek Road, DS of Q	4.34	P	859.9		859.61	2423.8	-0.3		
Elm Creek	24546	Elm Creek Road (DS), DS of R	4.62	Q	860.0		860.53	2423.8	0.5		
Elm Creek	25060	DS of Elm Creek Road, DS of S	4.71	R	861.3		860.92	2423.8	-0.4		
Elm Creek	25541	Elm Creek Road (DS)	4.80	S	862.4		861.71	2423.8	-0.7		
Elm Creek	26148	Elm Creek Road (US)	4.90	T	863.0		861.91	2423.8	-1.1		
Elm Creek	26220	DS of Pineview Lane, US of Elm Creek Road, DS of V	4.95	U	863.2		862.52	2423.8	-0.7		
Elm Creek	28303	DS of Pineview Lane, US of Elm Creek Road, DS of W	5.21	V	864.1		863.89	2423.8	-0.3		
Elm Creek	29590	DS of Pineview Lane, US of Elm Creek Road, DS of Y	5.39	W	865.5		864.67	2423.8	-0.8		
Elm Creek	32034	DS of Pine View Lane	5.75	X	867.5		866.01	2423.8	-1.5		
Elm Creek	32439	DS of Pineview Lane, US of Elm Creek Road, DS of Z	5.84	Y	867.8		866.14	2423.8	-1.6		
Elm Creek	33241	DS of Pineview Lane, US of Elm Creek Road, DS of AA	5.99	Z	869.4		867.17	2423.8	-2.2		
Elm Creek	34180	Pine View Lane (DS)	6.10	AA	870.2		867.89	2423.8	-2.3		
Elm Creek	34246	Pine View Lane (US)	6.14	AB	870.7		868.25	2423.8	-2.4		
Elm Creek	34783	DS of Confluence of Bush Creek, US of Pine View Lane	6.21	AC	870.9		868.35	2423.8	-2.5		
Elm Creek	35380	Confluence of Bush Creek (DS)	6.31	AD	871.0	1,480	868.53	2423.8	-2.4	944	FIS location: Above junction of Rush Creek, just inside corporate limits of City of Dayton. Looked at Cross sections on Arcmap and this aligns with the described location
Elm Creek	36616	DS of Pine View Lake, DS of AI	6.63	AE	871.0		869.05	1034.6	-1.9		
Elm Creek	37254	Pine View Lake (DS), downstream of AG	6.77	AF	871.0		869.15	1034.6	-1.8		
Elm Creek	39639	Pine View Lake (DS)	7.36	AG	871.2		869.53	1034.6	-1.7		
Elm Creek	41126	DS of Pine View Lake, DS of AI	7.70	AH	871.7		870.65	1034.6	-1.1		
Elm Creek	42433	DS of Pine View Lake, DS of AJ	7.99	AI	872.3		871.28	1034.6	-1.0		
Elm Creek	43181	Pine View Lake (DS)	8.20	AJ	872.6		871.74	1034.6	-0.9		
Elm Creek	43585	Pine View Lake (US)	8.37	AK	875.0		872.86	1034.6	-2.2		
Elm Creek	44250	DS of Territorial Road, US of Pine View Lake, DS of AM	8.46	AL	876.1		874.02	1034.6	-2.1		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					500-yr		500-yr		500-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	46044	DS of Territorial Road, US of Pine View Lake, DS of AN	8.75	AM	876.3		875.27	1034.6	-1.0		
Elm Creek	47970	Territorial Road (DS)	9.20	AN	876.6		876.39	1034.6	-0.2		
Elm Creek	48986	Minnesota Trunk Highway 52 (DS)	9.44	AO	877.0		879.32	1034.6	2.3		
Elm Creek	49361	Minnesota Trunk Highway 52 (US), DS of Railroad	9.52	AP	877.9		879.63	1034.6	1.8		
Elm Creek	49968	US of Railroad that is US of Minnesota Trunk Highway 152	9.63	AQ	881.8		880.16	1034.6	-1.7		
Elm Creek	50514	US of Railroad, DS of Rice Lake Dam, DS of AS	9.72	AR	882.0		880.7	1034.6	-1.3		
Elm Creek	51433	Rice Lake Dam (DS)	9.91	AS	883.0		881.07	1034.6	-1.9		
Elm Creek	52499	DS of Rice Lake Dam, DS of AU	10.12	AT	884.2		881.85	1034.6	-2.4		
Elm Creek	53197	Rice Lake Dam (DS)	10.26	AU	887.2		883.14	1034.6	-4.1		
Mill Pond (Elm Creek)	53796		Not listed in FIS	AV	894.8	1,345	894.49	1034.6	-0.3	(310)	FIS Location: 10.33 mi above Mill Pond Spillway. Looked on Arcmap and this cross section is on Elm Creek but near Mill pond and Rice Lake. The cross section on FIS prfile is 10.35 mi above the Mill Pond Spillway. I think all the Mill Pond cross sectins are actually part of Elm Creek and then would in turn have a creek distance. The missing Cross sections from the Elm Creek correspond to the cross section in the Mill Pond main stem.
Mill Pond (Elm Creek)	65333		Not listed in FIS	AW	895.2	1,130	894.87	729.5	-0.3	(401)	FIS Location: 12.52 mi above Mill Pond Spillway. Looked on Arcmap and this cross section is on Elm Creek but near Mill pond and Rice Lake. The cross section on FIS prfile is 12.52 mi above the Mill Pond Spillway
Mill Pond (Elm Creek)	65946		Not listed in FIS	AX	895.4		894.91	729.5	-0.5		
Elm Creek	66592	West Rice Lake Road	12.76	AY	895.8		894.99	729.5	-0.8		
Elm Creek	66781	West Rice Lake Road (US)	12.78	AZ	896.1		895.01	729.5	-1.0		
Elm Creek	67119	DS of Weaver Lake Road, US of West Rice Lake Road	12.84	BA	897.5		895.18	729.5	-2.3		
Elm Creek	68058	DS of Weaver Lake Road, US of West Rice Lake Road	13.05	BB	898.6		895.3	729.5	-3.3		
Elm Creek	68853	Weaver Lake Road	13.17	BC	898.4		897.27	729.5	-1.1		
Elm Creek	69167	Weaver Lake Road (US)	13.25	BD	900.0		897.42	729.5	-2.6		
Elm Creek	69875	US of Weaver Lake Road, DS of BF	13.37	BE	900.0		897.43	729.5	-2.6		
Elm Creek	70093	US of Weaver Lake Road, DS of BG	13.44	BF	900.0		897.43	729.5	-2.6		
Elm Creek	70462	US of Weaver Lake Road, DS of BH	13.48	BG	900.0		897.51	729.5	-2.5		
Elm Creek	71981	Weaver Lake Road (US)	13.77	BH	900.0		897.55	729.5	-2.5		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					500-yr		500-yr		500-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	73933	DS of Farm Driveway	14.10	BI	900.0	1,020	898.86	672.2	-1.2	(348)	FIS Location: 14.08 miles above Mill pond spillway
Elm Creek	74436	DS of Farm Driveway, DS of BK	14.30	BJ	902.0		899.56	672.2	-2.4		
Elm Creek	74718	Dunkirk Lane	14.41	BK	904.0		899.97	672.2	-4.1		
Elm Creek	74971	Dunkirk Lane (US)	14.44	BL	905.1		901.89	672.2	-3.2		
Elm Creek	75680	US of Dunkirk Lane, DS of Bass Lake Road, DS of BN	14.55	BM	905.9		903.13	672.2	-2.7		
Elm Creek	76495	US of Dunkirk Lane, DS of Bass Lake Road, DS of BO	14.72	BN	906.6		904.13	672.2	-2.5		
Elm Creek	77331	DS of Bass Lake Road, US Dunkirk Lane, DS of BP	14.86	BO	907.2		905.55	672.2	-1.6		
Elm Creek	79194	DS of Bass Lake Road, US Dunkirk Lane, DS of BQ	15.18	BP	907.6		906.67	672.2	-0.9		
Elm Creek	80843	DS of Bass Lake Road, US Dunkirk Lane, DS of BR	15.48	BQ	908.9		907.5	672.2	-1.4		
Elm Creek	82336	DS of Bass Lake Road	15.75	BR	910.4		909.34	672.2	-1.0		
Elm Creek	82996	Bass Lake Road	15.90	BS	911.3		909.95	672.2	-1.3		
Elm Creek	83398	DS of Elm Road, US of Bass Lake Road, DS of BU	15.95	BT	911.8		910.3	672.2	-1.5		
Elm Creek	83890	DS of Elm Road, US of Bass Lake Road, DS of BV	16.05	BU	911.9		910.75	672.2	-1.1		
Elm Creek	84476	DS of Elm Road, US of Bass Lake Road, DS of BW	16.16	BV	912.0		910.79	672.2	-1.2		
Elm Creek	85470	DS of Elm Road, US of Bass Lake Road, DS of BX	16.35	BW	912.0		910.96	672.2	-1.1		
Elm Creek	86861	DS of Elm Road, US of Bass Lake Road	16.52	BX	912.4		911.86	672.2	-0.5		
Elm Creek	88288	DS of Elm Road, US of Bass Lake Road, DS of BZ	16.74	BY	916.1	740	915.07	672.2	-1.0	(68)	On FIS the creek distance for the 100-yr peak flow rate is 16.73, used this peak flow rate
Elm Creek	88898	DS of Elm Road, US of Bass Lake Road, DS of CA	16.82	BZ	917.3		915.99	672.2	-1.3		
Elm Creek	90652	Elm Road (DS)	17.04	CA	920.1		918.75	672.2	-1.4		
Elm Creek	#N/A	Elm Road (US)	17.11	CB	921.0		#N/A	#N/A	#N/A		
Elm Creek	91739	US of Elm Road, US of CB	17.24	CC	921.7		921	672.2	-0.7		
Elm Creek	92290	US of Elm Road, US of CC	17.34	CD	922.3		921.82	672.2	-0.5		
Elm Creek	93102	US of Elm Road, DS of CF	17.50	CE	923.5		922.22	672.2	-1.3		
Elm Creek	93848	US of Elm Road, US of CE	17.63	CF	922.3		922.42	460.5	0.1		
Elm Creek	111598	US of State Highway 55, DS of State Highway 101 and CH	20.66	CG	960.8	330	962.82	460.5	2.1	131	FIS Location: At Medina-Plymouth corporate boundary limits. This Cross section is the closest to the city boundaries
Elm Creek	112306	State Highway 101 (DS)	20.73	CH	963.9		963.56	460.5	-0.3		
Elm Creek	112413	State Highway 101 (US)	20.75	CI	965.3		966.76	460.5	1.5		
Elm Creek	113170	DS of Access Road, US of State Highway 101	20.87	CJ	966.2		967.72	460.5	1.5		
Elm Creek	113302	US and DS of two Access Road, US of State Highway 101	20.91	CK	973.1		974.04	460.5	0.9		
Elm Creek	113654	US and DS of two Access Road, US of State Highway 101, US of CK	20.96	CL	973.2		974.57	460.5	1.4		
Elm Creek	113752	US of Access Road, DS of Railroad	21.00	CM	973.3		974.57	460.5	1.3		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					500-yr		500-yr		500-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above State Route 12 (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Elm Creek	114334	US Access road, DS railroad and Hamel Road	21.11	CN	973.4	305	974.59	460.5	1.2	156	FIS Location: Below Soo Line Bridge, near Hamel Road. I think this is the correct cross section location but not positive. Double check
Elm Creek	114472	Railroad, DS of Hamel Road	21.14	CO	976.6		983.4	460.5	6.8		
Elm Creek	114953	DS of Hamel Road, US of Railroad	21.21	CP	977.4	72	983.4	460.5	6.0	389	FIS Location: downstream of Hamel Road, near Pinto Drive. I picked the cross section that is farthest DS of Hamel Road (Creek meanders around it), and is still near Pinto Road.
Elm Creek	115445	Elm Creek Drive (DS)	21.29	CQ	977.8		983.4	460.5	5.6		
Elm Creek	115587	Elm Creek Drive (US)	21.32	CR	977.8		983.4	460.5	5.6		
Elm Creek	116667	Sewage Lagoon Road (DS)	21.50	CS	977.9		983.41	460.5	5.5		
Elm Creek	116797	Sewage Lagoon Road (US)	21.53	CT	977.9		983.41	460.5	5.5		
Elm Creek	117854	DS of Confluence of Tributary to Elm Creek	21.73	CU	977.8		983.41	460.5	5.6		
Elm Creek	118767	DS of Hamel Road, DS of CW	21.90	CV	978.0		983.41	102	5.4		
Elm Creek	119019	DS of Hamel Road	21.94	CW	978.0		983.41	102	5.4		
Elm Creek	119205	US of Hamel Road DS of SOO Line Railroad	21.97	CX	978.2		983.65	102	5.4		
Elm Creek	119439	US of Hamel Road DS of SOO Line Railroad	22.02	CY	978.4		983.65	102	5.3		
Elm Creek	120084	DS of SOO Line Railroad	22.15	CZ	978.5		983.65	102	5.1		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	1361	US of confluence with Elm Creek	0.26	A	971.0	2,000	860.1	1345.8	-110.9	-654.2	
Rush Creek	4230	US of confluence with Elm Creek, DS of C	0.76	B	971.0		862.3	1345.8	-108.7		
Rush Creek	5541	US of confluence with Elm Creek, DS of D	1.00	C	872.2		864.3	1345.8	-7.9		
Rush Creek	7368	US of confluence with Elm Creek, DS of E	1.39	D	875.3		867	1345.8	-8.3		
Rush Creek	8015	US of confluence with Elm Creek, DS of F	1.52	E	876.4		868.3	1345.8	-8.1		
Rush Creek	9884	US of confluence with Elm Creek, DS of G	1.87	F	880.7		869	1345.8	-11.7		
Rush Creek	11375	US of confluence with Elm Creek, DS of H	2.14	G	884.0		871.1	1345.8	-12.9		
Rush Creek	12615	Fernbrook Lane (DS)	2.36	H	886.6		874.3	1345.8	-12.3		
Rush Creek	12977	At Fernbrook Lane	2.42	I	888.8		875.5	1227.5	-13.3		
Rush Creek	13940	Fernbrook Lane (US)	2.60	J	889.4		876.7	1227.5	-12.7		
Rush Creek	14425	US of Fernbrook Lane, DS of L	2.68	K	889.6		879	1227.5	-10.6		
Rush Creek	15894	US of Fernbrook Lane, DS of M	2.94	L	891.2		878.7	1227.5	-12.5		
Rush Creek	16252	US of Fernbrook Lane, DS of N	3.01	M	891.8		880.2	1227.5	-11.6		
Rush Creek	16584	US of Fernbrook Lane, DS of O	3.05	N	892.0		880.2	1227.5	-11.8		
Rush Creek	17911	US of Fernbrook Lane, DS of P	3.33	O	893.9		882.88	1227.5	-11.0		
Rush Creek	18529	US of Fernbrook Lane, DS of Q	3.43	P	894.8		883.6	1227.5	-11.2		
Rush Creek	19800	US of Fernbrook Lane, DS of R	3.64	Q	896.6		886.9	1227.5	-9.7		
Rush Creek	20567	US of Fernbrook Lane, DS of S	3.75	R	897.9		888.51	1227.5	-9.4		
Rush Creek	21118	US of Fernbrook Lane, DS of T	3.89	S	900.4		888.7	1227.5	-11.7		
Rush Creek	25333	Territorial Road (DS)	4.66	T	907.1		894.7	1227.5	-12.4		
Rush Creek	25518	At Territorial Road	4.70	U	907.9		895.2	1227.5	-12.7		
Rush Creek	26324	Territorial Road (US)	4.84	V	907.9		895.3	1227.5	-12.6		
Rush Creek	27258	US of Territorial Road, DS of Minnesota Trunk Highway 152	5.00	W	907.9	1,860	894.1	1227.5	-13.8	-632.5	Location from FIS: 5 miles above confluence with Elm Creek
Rush Creek	28541	Minnesota Trunk Highway 152 (DS)	5.22	X	907.9		895.6	1227.5	-12.3		
Rush Creek	29002	At Minnesota Trunk Highway 152	5.30	Y	907.9		895.6	1227.5	-12.3		
Rush Creek	30564	Minnesota Trunk Highway 152 (US), near Burling and Nor. RR	5.61	Z	909.7		898.24	1227.5	-11.5		
Rush Creek	31018	US of Burling and Nor. RR, DS of Dunkirk Lane	5.67	AA	910.0		898.24	1227.5	-11.8		
Rush Creek	31134	Dunkirk Lane (DS)	5.71	AB	910.0		898.14	1227.5	-11.9		
Rush Creek	31323	Dunkirk Lane (US)	5.74	AC	912.6		898.14	1227.5	-14.5		
Rush Creek	31489	US of Dunkirk Lane, DS of AE	5.78	AD	912.9		899.7	1227.5	-13.2		
Rush Creek	32287	US of Dunkirk Lane, DS of 105th Avenue N, DS of AF	5.92	AE	912.9		898.1	1227.5	-14.8		
Rush Creek	33461	105th Avenue N (DS)	6.09	AF	912.9		897.5	1227.5	-15.4		
Rush Creek	33852	At 105th Avenue N	6.18	AG	912.9		896.2	1227.5	-16.7		
Rush Creek	34127	105th Avenue N (US)	6.24	AH	912.9		896.2	1227.5	-16.7		
Rush Creek	34752	US of 105th Avenue N, DS of State Route 92/Interstate 94, DS of AH	6.35	AI	912.9		898.8	1227.5	-14.1		
Rush Creek	36410	State Route 92/Interstate 94 (DS)	6.66	AJ	912.9		899.2	1227.5	-13.7		
Rush Creek	36817	State Route 92/Interstate 94 (US)	6.76	AK	913.5		899.5	1227.5	-14.0		
Rush Creek	37740	US of the confluence with North Fork Rush Creek	7.52	AL	913.9	960	901.6	1227.5	-12.3	267.5	Location from FIS: 7.52 mi above confluence with Elm Creek
Rush Creek	40468	US of the confluence with North Fork Rush Creek, DS of 101st Avenue North, US of AL	7.85	AM	914.7		903.29	1178.8	-11.4		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	42214	US of the confluence with North Fork Rush Creek, DS of 101st Avenue North, US of AM	8.05	AN	916.2		904.94	1178.8	-11.2		
Rush Creek	43810	101st Avenue North (DS)	8.28	AO	918.2		906	1178.8	-12.2		
Rush Creek	44964	101st Avenue North (US)	8.33	AP	920.2		907.9	1178.8	-12.3		
Rush Creek	46234	US of 101st Avenue North, DS of 97th Avenue North, US of AP	8.48	AQ	920.3		910.3	1178.8	-10.0		
Rush Creek	49423	US of 101st Avenue North, DS of 97th Avenue North, US of AQ	8.67	AR	921.9		913.4	1178.8	-8.5		
Rush Creek	50185	US of 101st Avenue North, DS of 97th Avenue North, US of AR	8.84	AS	923.3		915.1	1178.8	-8.2		
Rush Creek	51388	US of 101st Avenue North, DS of 97th Avenue North, US of AS	9.08	AT	925.1		916.8	1178.8	-8.3		
Rush Creek	53011	US of 101st Avenue North, DS of 97th Avenue North, US of AT	9.37	AU	927.1		918	1178.8	-9.1		
Rush Creek	53717	US of 101st Avenue North, DS of 97th Avenue North, US of AU	9.48	AV	928.2		918.6	1178.8	-9.5		
Rush Creek	54121	97th Avenue N (DS)	9.55	AW	928.8		919.1	521.9	-9.7		
Rush Creek	54333	At 97th Avenue N	9.59	AX	929.0		919.4	521.9	-9.6		
Rush Creek	54953	97th Avenue N (US)	9.69	AY	929.0		919.4	521.9	-9.6		
Rush Creek	56367	US of 97th Avenue N, DS of BA	9.92	AZ	929.1		920.2	521.9	-8.9		
Rush Creek	57461	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of AZ	10.12	BA	929.2		920.6	521.9	-8.6		
Rush Creek	58182	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of BA	10.22	BB	929.2		920.7	521.9	-8.5		
Rush Creek	60047	US of 97th Avenue N, DS of Minnnnesota Highway 10, US of BB	10.51	BC	930.0		922.1	521.9	-7.9		
Rush Creek	60695	DS of Minnesota Highway 101, US of 97th Avenue North, DS of BE	10.64	BD	930.6		923	521.9	-7.6		
Rush Creek	62766	DS of Minnesota Highway 101, US of BD	10.96	BE	932.8		925.5	521.9	-7.3		
Rush Creek	63179	State Highway 101 (just DS)	11.03	BF	933.4	810	925.7	464.5	-7.7	-345.5	FIS Location: At State Highway 101
Rush Creek	64415	DS of Private Road that is DS of Schute Road	11.28	BG	934.6		925.9	464.5	-8.7		
Rush Creek	64580	US of Private Road that is DS of Schute Road	11.36	BH	936.2		926.6	464.5	-9.5		
Rush Creek	65350	US of Private Road near State Highway 10, DS of Schute Road, US of BH	11.42	BI	936.3		926.6	464.5	-9.7		
Rush Creek	65819	DS of Schute Road, US of BI	11.52	BJ	936.3		926	464.5	-10.3		
Rush Creek	66475	Schute Road (DS)	11.64	BK	936.4		926	464.5	-10.4		
Rush Creek	66776	Schute Road (US)	11.72	BL	936.5		926.54	464.5	-9.9		
Rush Creek	67465	US of Schute Road, DS of BN	11.84	BM	936.6		927.1	464.5	-9.4		
Rush Creek	69314	US of Schute Road, DS of BO	12.16	BN	936.8		928.4	464.5	-8.4		
Rush Creek	70421	US of Schute Road, DS of BP	12.38	BO	937.0		928.5	464.5	-8.5		
Rush Creek	76315	US of Schute Road, DS of County Highway 116, DS of BQ	13.50	BP	937.1		928.8	464.5	-8.3		
Rush Creek	76731	County Highway 116 (DS)	13.60	BQ	937.1	680	929.72	464.5	-7.4	-215.5	FIS location: Just downstream of County Road 116
Rush Creek	77175	County Highway 116 (US)	13.66	BR	939.2		930.5	464.5	-8.7		
Rush Creek	78725	US of County Highway 116, DS of County Highway 10, DS of BT	13.94	BS	939.3		931.9	365.5	-7.4		
Rush Creek	80181	US of County Highway 116, DS of County Highway 10, DS of BU	14.12	BT	939.4		932.3	365.5	-7.1		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	81438	US of County Highway 116, DS of County Highway 10, DS of BV	14.44	BU	941.2		935.8	365.5	-5.4		
Rush Creek	82895	US of County Highway 116, DS of County Highway 10, DS of BW	14.64	BV	942.5	485	938.63	365.5	-3.9	-119.5	FIS location: Just aboved Unnamed Tributary approximately 0.3 miles downstream of County Highway 10. Cross section BV is ~0.39 mi downstream of Highway 10 and downstream of a trib
Rush Creek	84156	County Highway 10 (DS)	14.78	BW	945.9		939.7	365.5	-6.2		
Rush Creek	84403	County Highway 10 (US)	14.86	BX	947.0		939	365.5	-8.0		
Rush Creek	85510	US of County Highway 10, DS of County Highway 50, DS of BZ	15.06	BY	947.3		941	365.5	-6.3		
Rush Creek	86165	US of County Highway 10, DS of County Highway 50, DS of CA	15.14	BZ	947.6		943.62	365.5	-4.0		
Rush Creek	86434	US of County Highway 10, DS of County Highway 50, DS of CB	15.34	CA	950.5		944.26	365.5	-6.3		
Rush Creek	88133	US of County Highway 10, DS of County Highway 50, DS of CC	15.42	CB	952.0	375	946.8	251.1	-5.2	-123.9	FIS Location: Just above Unnamed Tributary approximately 0.6 miles upstream of County Highway 10. Cross section CB is 0.6 mi upstream of County Highway 10
Rush Creek	89836	US of County Highway 10, DS of County Highway 50, DS of CD	15.72	CC	956.1		951.6	251.1	-4.5		
Rush Creek	90820	US of County Highway 10, DS of County Highway 50, DS of CE	15.92	CD	957.9		952.5	251.1	-5.4		
Rush Creek	91832	County Highway 50 (DS)	16.02	CE	960.0		953.9	251.1	-6.1		
Rush Creek	92192	County Highway 50 (US)	16.12	CF	960.0		955.7	251.1	-4.3		
Rush Creek	93097	US of County Highway 50, DS of Kalk Road, DS of CH	16.33	CG	961.1		957.73	251.1	-3.4		
Rush Creek	93948	US of County Highway 50, DS of Kalk Road, DS of CI	16.45	CH	963.2		958.1	251.1	-5.1		
Rush Creek	94424	Kalk Road (DS)	16.53	CI	963.8		958.5	251.1	-5.3		
Rush Creek	94564	Kalk Road (US)	16.57	CJ	966.1		957.5	251.1	-8.6		
Rush Creek	95356	US of Kalk Road, DS of Rolling Hills Road, US of CJ	16.73	CK	966.1		956.8	251.1	-9.3		
Rush Creek	100957	DS of Rolling Hills Road, US of CK	17.76	CL	966.3		962	117.7	-4.3		
Rush Creek	101677	Rolling Hills Road (DS)	17.86	CM	966.3		960.5	117.7	-5.8		
Rush Creek	101771	Rolling Hills Road (US)	17.92	CN	968.0		960.5	117.7	-7.5		
Rush Creek	104294	US of Rolling Hills Road, DS of CP	18.36	CO	967.6		965.84	117.7	-1.8		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Elm Creek (miles)	Lettered Cross Section from FIS	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
Rush Creek	104810	US of Rolling Hills Road, DS of CQ	18.44	CP	969.8		966.66	117.7	-3.2		
Rush Creek	105486	US of Rolling Hills Road, At the "limit of detailed of study"	18.58	CQ	971.1	300	967.7	117.7	-3.4	-182.3	FIS Location: At Jubert Lake outlet. Looked on Arcmap and CQ is at this location

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Rush Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
North Fork Rush Creek	14593	County Road 117 (US)	2.66	A	916.0		902.8	509.5	-13.2		
North Fork Rush Creek	15174	109th Avenue North (US)	2.76	B	916.0		904.8	509.5	-11.2		
North Fork Rush Creek	16367	US of 109th Avenue N, DS of Access Road near Cain Road, DS of D	2.98	C	916.0		905	509.5	-11.0		
North Fork Rush Creek	17914	US of 109th Avenue N, DS of Access Road near Cain Road, DS of E	3.26	D	916.0		906	509.5	-10.0		
North Fork Rush Creek	18117	Access Road near Cain Road (DS)	3.30	E	916.0		905.6	509.5	-10.4		
North Fork Rush Creek	18282	Access Road near Cain Road (US)	3.32	F	916.0		905.5	509.5	-10.5		
North Fork Rush Creek	19664	Cain Road	3.55	G	916.0	700	905.2	444.6	-10.8	-255.4	
North Fork Rush Creek	19750	Cain Road (US)	3.58	H	916.0		904.9	444.6	-11.1		
North Fork Rush Creek	20321	US of Cain Road, DS of Trail Haven Road, DS of J	3.70	I	916.0		909.1	444.6	-6.9		
North Fork Rush Creek	21320	US of Cain Road, DS of Trail Haven Road, DS of K	3.84	J	916.6		911.5	444.6	-5.1		
North Fork Rush Creek	22487	US of Cain Road, DS of Trail Haven Road, DS of L	4.06	K	918.2		913.4	444.6	-4.8		
North Fork Rush Creek	23477	US of Cain Road, DS of Trail Haven Road, DS of M	4.24	L	919.0		913	444.6	-6.0		
North Fork Rush Creek	23984	US of Cain Road, DS of Trail Haven Road, DS of N	4.34	M	919.3		913.1	444.6	-6.2		
North Fork Rush Creek	24861	US of Cain Road, DS of Trail Haven Road, DS of O	4.50	N	920.2		915.8	444.6	-4.4		
North Fork Rush Creek	26026	US of Cain Road, DS of Trail Haven Road, DS of P	4.72	O	921.4		916.3	213.3	-5.1		
North Fork Rush Creek	26892	US of Cain Road, DS of Trail Haven Road, DS of Q	4.87	P	922.6		915.2	213.3	-7.4		
North Fork Rush Creek	27431	US of Cain Road, DS of Trail Haven Road, DS of R	4.98	Q	924.7		917.64	213.3	-7.1		
North Fork Rush Creek	27581	Trail Haven Road (DS)	4.99	R	926.2	700	918.2	213.3	-7.9	-486.7	
North Fork Rush Creek	27759	Trail Haven Road (US)	5.03	S	926.7		917.2	213.3	-9.5		
North Fork Rush Creek	28660	US of Trail Haven Road, DS of County Road 117, US of S	5.19	T	926.8		917.5	213.3	-9.3		
North Fork Rush Creek	30100	US of Trail Haven Road, DS of County Road 117, US of T	5.44	U	926.9		918.1	213.3	-8.8		
North Fork Rush Creek	31286	County Road 117/109th Avenue North (DS)	5.65	V	927.0		918.6	158.6	-8.4		
North Fork Rush Creek	31384	At County Road 117/109th Avenue N	5.67	W	924.7		918.4	158.6	-6.3		
North Fork Rush Creek	31460	County Road 117/109th Avenue North (US)	5.68	X	927.6		918.4	158.6	-9.2		
North Fork Rush Creek	31580	US and DS of County Road 117/109th Avenue N, DS of Z	5.70	Y	928.5		920.4	158.6	-8.1		
North Fork Rush Creek	35165	DS of County Road 117/109th Ave N, DS of AA	6.47	Z	928.9		921.2	158.6	-7.7		
North Fork Rush Creek	35265	US of County Road 117/109th Avenue N	6.50	AA	932.1		921.3	158.6	-10.8		
North Fork Rush Creek	35391	US of County Road 117/109th Ave N, DS of AC	6.52	AB	932.1		923.8	158.6	-8.3		
North Fork Rush Creek	35871	US of County Road 117/109th Ave N, DS of AD	6.60	AC	932.1		925.62	158.6	-6.5		
North Fork Rush Creek	36391	US of County Road 117/109th Ave N, DS of AE	6.70	AD	936.5		926.05	158.6	-10.5		
North Fork Rush Creek	38053	DS of Access Road, US of AD	6.99	AE	935.6		929	158.6	-6.6		
North Fork Rush Creek	38209	DS of Bechtold Road, US of Access Road	7.03	AF	937.9		930.5	158.6	-7.4		
North Fork Rush Creek	38758	DS of Bechtold Road	7.15	AG	938.4		931.6	158.6	-6.8		
North Fork Rush Creek	38930	US of Bechtold Road	7.16	AH	940.3		931.7	158.6	-8.6		
North Fork Rush Creek	39380	US of Bechtold Road,DS of AJ	7.25	AI	941.2		932.2	158.6	-8.9		
North Fork Rush Creek	40511	DS of County Road 30/Oak Bole Drive, DS of AK	7.47	AJ	942.8		934.69	158.6	-8.1		

0.2% AEP Comparison of ECWMC FIS Flood Profiles to Stantec HUC-8 Revised Model Results - Flood Elevations and Peak Discharges											
					ECWMC FIS Flood Profiles		ECWMC HUC-8 Revised Model Flood Profiles		Change in Flood Elevations and Flow Rates		
					100-yr		100-yr		100-yr		
Main Stem Creek	HEC-RAS XS	Location	Creek Distance above the Rush Creek (miles)	Lettered Cross Section from FI	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (NGVD29 feet)	Flow Rate (CFS)	Flood Elevation (feet)	Flow Rate (CFS)	Notes
North Fork Rush Creek	41705	DS of County Road 30/Oak Bole Drive	7.67	AK	944.7		938.32	158.6	-6.4		
North Fork Rush Creek	41986	US of County Road 30/Oak Bole Drive	7.72	AL	948.2		939	126.4	-9.2		
North Fork Rush Creek	43630	US of County Road 30/Oak Bole Drive, DS of AN	7.96	AM	948.5		941.6	126.4	-6.9		
North Fork Rush Creek	44291	US of County Road 30/Oak Bole Drive, DS of AO	8.07	AN	949.1		943.7	126.4	-5.4		
North Fork Rush Creek	46377	DS of Sundance Road, DS of AP	8.37	AO	952.2		946.9	126.4	-5.3		
North Fork Rush Creek	47362	DS of Sundance Road, DS of AQ	8.53	AP	955.9		949.21	126.4	-6.7		
North Fork Rush Creek	48342	DS of Sundance Road, DS of AR	8.69	AQ	959.3		952.7	126.4	-6.6		
North Fork Rush Creek	49363	DS of Sundance Road	8.86	AR	961.8		953.8	126.4	-8.0		
North Fork Rush Creek	49436	US of Sundance Road	8.88	AS	964.1		955	126.4	-9.1		
North Fork Rush Creek	49901	US of Sundance Road, US of AS	8.94	AT	964.1		956.62	126.4	-7.4		
North Fork Rush Creek	50577	US of Sundance Road, US of AT	9.08	AU	964.1		957.59	126.4	-6.5		
North Fork Rush Creek	52176	DS of 97th Avenue N, DS of AW	9.29	AV	966.3		962	126.4	-4.3		
North Fork Rush Creek	52972	DS of 97th Avenue N, DS of AX	9.42	AW	969.0		962.48	126.4	-6.5		
North Fork Rush Creek	54987	DS of 97th Avenue N	9.75	AX	974.4		968.3	126.4	-6.1		
North Fork Rush Creek	55226	US of 97th Avenue N	9.78	AY	977.5		968.5	126.4	-9.0		
North Fork Rush Creek	55966	US of 97th Avenue N, US of AY	9.91	AZ	978.1		971.24	126.4	-6.9		
North Fork Rush Creek	57273	US of 97th Avenue N, US of AZ	10.13	BA	981.9		976.18	126.4	-5.7		
North Fork Rush Creek	58518	US of 97th Avenue N, DS of BC	10.32	BB	985.4		978.8	126.4	-6.6		
North Fork Rush Creek	59887	DS of Access Road and County Road 10, DS of BD	10.52	BC	989.6		984	126.4	-5.6		
North Fork Rush Creek	59987	DS of Access Road, DS of BE	10.55	BD	991.5		984.2	126.4	-7.3		
North Fork Rush Creek	60064	US of Access Road near County Road 10, DS of BF	10.59	BE	991.7		984.3	126.4	-7.4		
North Fork Rush Creek	60120	DS of County Road 10	10.61	BF	992.1	420	985.2	126.4	-6.9	-293.6	
North Fork Rush Creek	60352	US of County Road 10	10.63	BG	992.4		984.5	58.1	-7.9		
North Fork Rush Creek	60606	US of County Road 10, DS of Access Road	10.69	BH	993.1		985.3	58.1	-7.8		
North Fork Rush Creek	60948	US of Access Road, DS of BJ	10.73	BI	993.1		985.3	58.1	-7.8		
North Fork Rush Creek	61315	US of County Road 10 and Access road, US of BI	10.81	BJ	993.3		986.1	58.1	-7.2		
North Fork Rush Creek	63385	US of County Road 10, US of BJ	11.20	BK	994.5		988.74	58.1	-5.7		
North Fork Rush Creek	63749	US of County Road 10, US of BK	11.27	BL	995.1		988.6	58.1	-6.5		
North Fork Rush Creek	64763	DS of County Road 19/Crow Hassan Park Road	11.45	BM	999.8		991.33	58.1	-8.4		
North Fork Rush Creek	64955	US of County Road 19/Crow-Hassan Park Road	11.49	BN	1005.2		992.68	58.1	-12.5		
North Fork Rush Creek	65429	DS of Strehler Road, DS of BP	11.58	BO	1005.2		991.01	58.1	-14.2		
North Fork Rush Creek	65983	DS of Strehler Road, DS of BQ	11.68	BP	1005.2		993.09	58.1	-12.1		
North Fork Rush Creek	66739	DS of Strehler Road, DS of BR	11.80	BQ	1005.2		995.8	58.1	-9.4		
North Fork Rush Creek	67226	DS of Strehler Road	11.92	BR	1005.3	300	995.9	58.1	-9.4	-241.9	
North Fork Rush Creek	67429	US of Strehler Road	11.96	BS	1005.3		996	58.1	-9.3		
North Fork Rush Creek	68345	US of Strehler Road, US of BS	12.12	BT	1005.3		997.4	58.1	-7.9		
North Fork Rush Creek	69031	US of Strehler Road, US of BT	12.24	BU	1005.3		998	58.1	-7.3		
North Fork Rush Creek	69474	US of Strehler Road, US of BU	12.33	BV	1005.3		998.5	58.1	-6.8		
North Fork Rush Creek	71089	US of Strehler Road, DS of BX	12.64	BW	1005.4		998.7	58.1	-6.7		
North Fork Rush Creek	72186	US of Strehler Road, US of BW	12.85	BX	1005.4		999.5	58.1	-5.9		
North Fork Rush Creek	72915	US of Strehler Road, US of BX	12.99	BY	1005.4		1000.2	58.1	-5.2		

APPENDIX E

1% and 0.2% AEP Inundation Maps

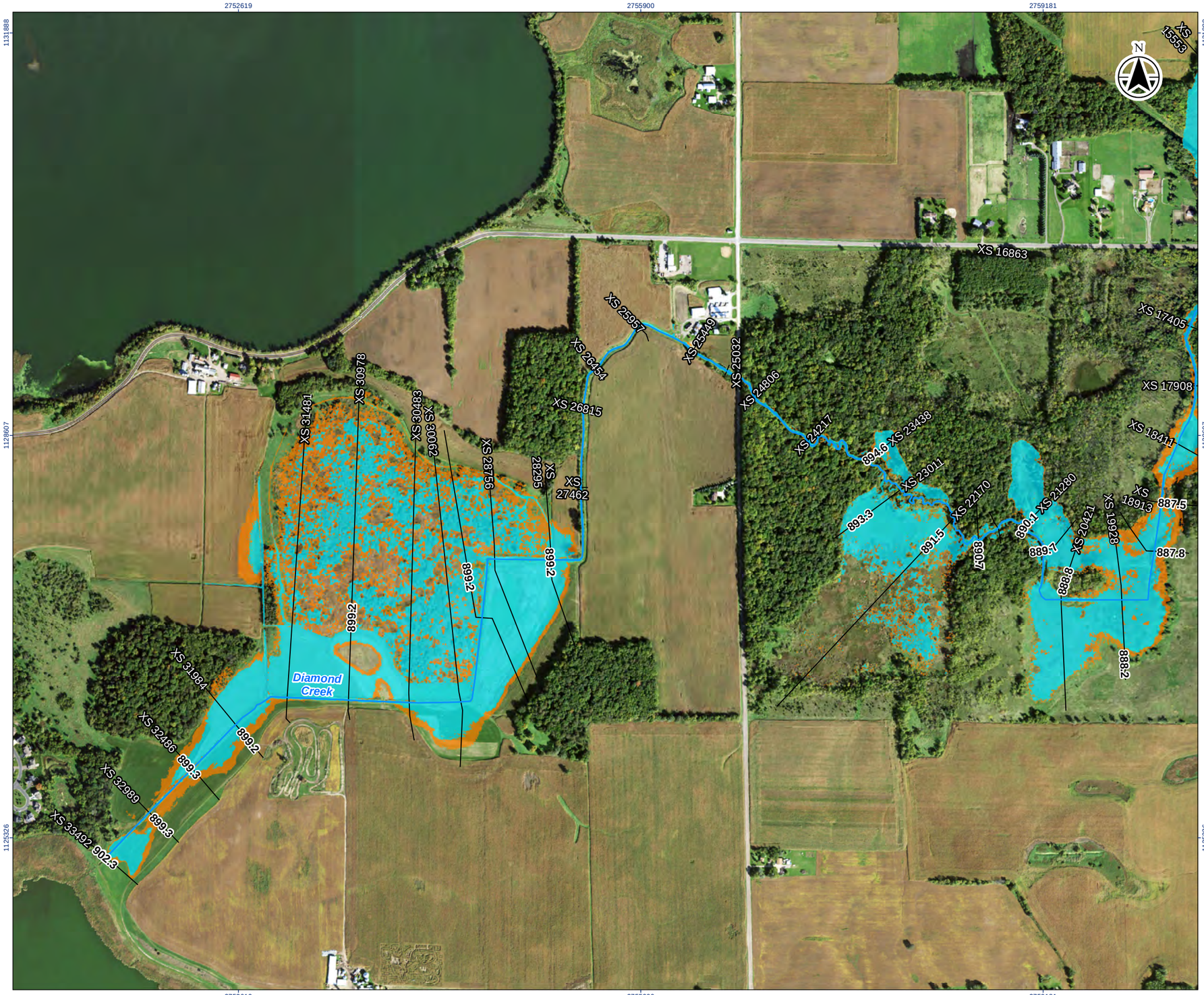


Figure No.
1 of 27

Title
Elm Creek Watershed Revision
Proposed Results

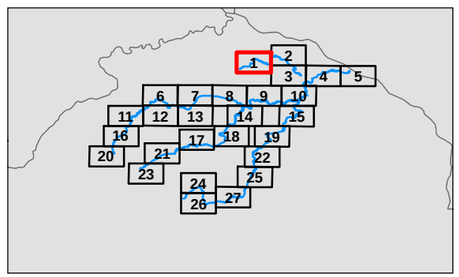
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

Y:\1821\temporary\227704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DNHiS

2762462 2765743 2769023

1131888

1128607

XS 15994
XS 16175
XS 15902
XS 14892
XS 14589
XS 13896
XS 13814
XS 13537
XS 13125
XS 12378
XS 11622
XS 11373
XS 10870
XS 10367
XS 9784
XS 9402
XS 8959
XS 8356

882.5
881.8
884.4
886.7
886.9
881.2
879.5
877.7
874.5
873.7
873.3
873.3

Diamond Creek
Diamond Creek

N

Figure No.
2 of 27

Title
Elm Creek Watershed Revision
Proposed Results

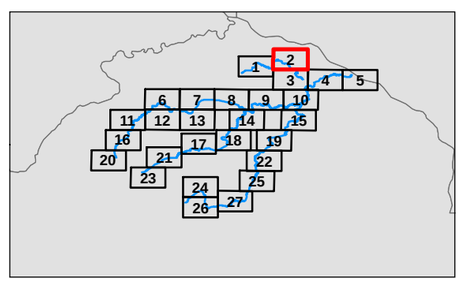
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1187\temporary\227704983_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DHINES

2762462 2765743 2769023

11125326 11122045

XS 7351
871 XS 7080
868.5 XS 6961
XS 6817
Diamond Creek
XS 5902
XS 5340
XS 4723
XS 4321
862.9 XS 3836
XS 3329
XS 2827
XS 2342
XS 1821
XS 1299
XS 696
858
XS 17870
XS 15477
XS 17159
857.2
XS 288
854
XS 1871A
XS 19466
XS 19957
XS 20949
858.1
859
858.1
XS 21309
858.3
Elm Creek
858.6
859.1
Elm Creek
N

Figure No.
3 of 27

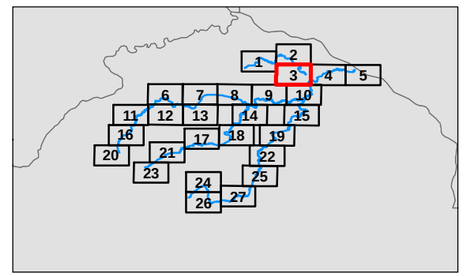
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1187\temporary\227704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DMNES

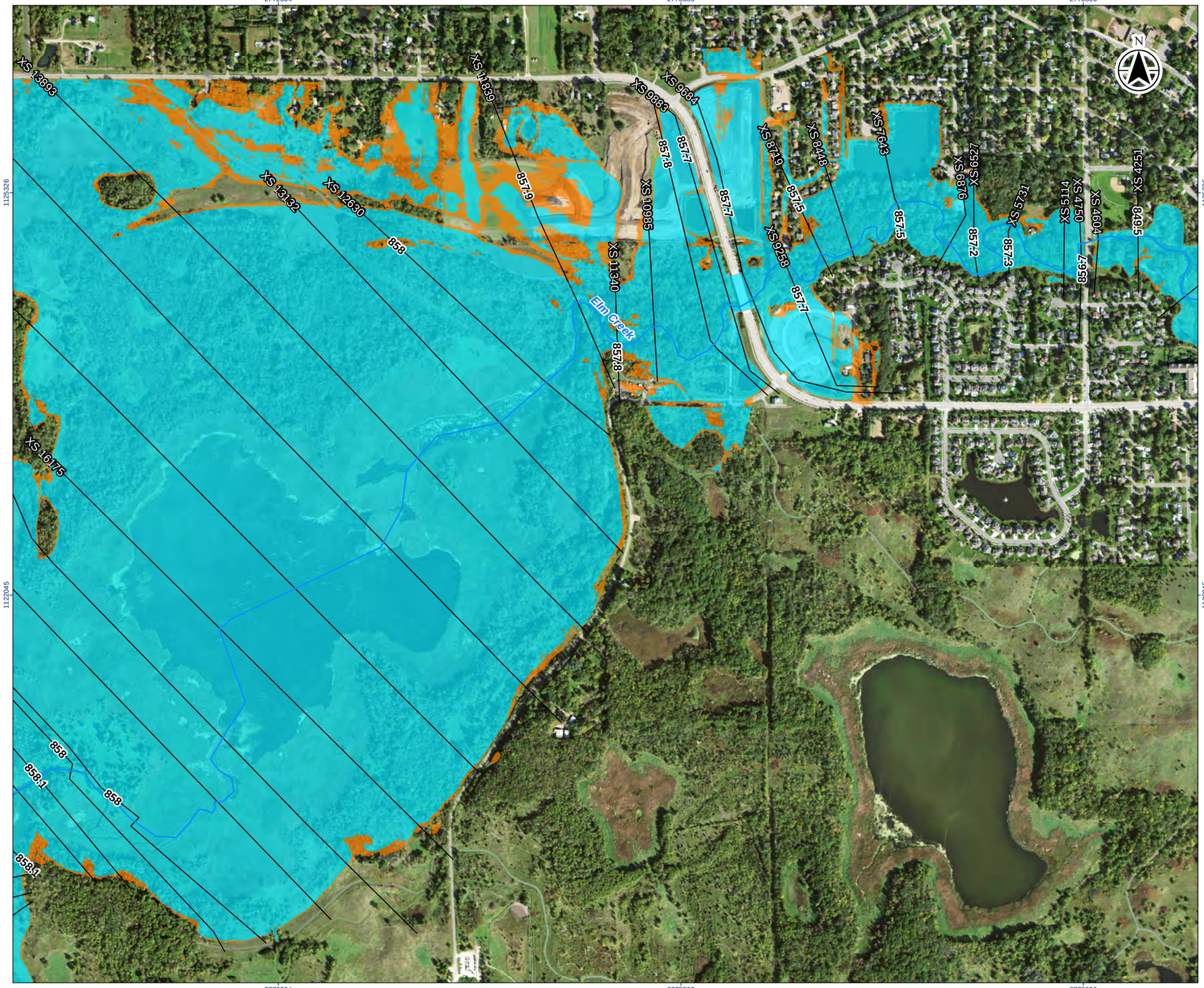


Figure No.
4 of 27

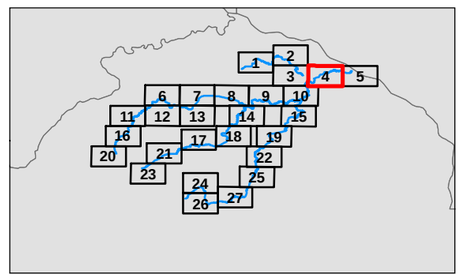
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227042903_ElmCreek\Maps\Final Maps\ElmCreek_Maps.mxd Revised: 2022-06-11 By: DHINES

Figure No.
5 of 27

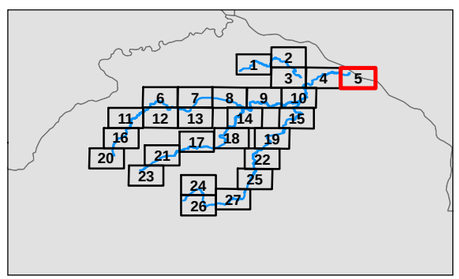
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227045\63_ElmCreek\Map\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DHINES

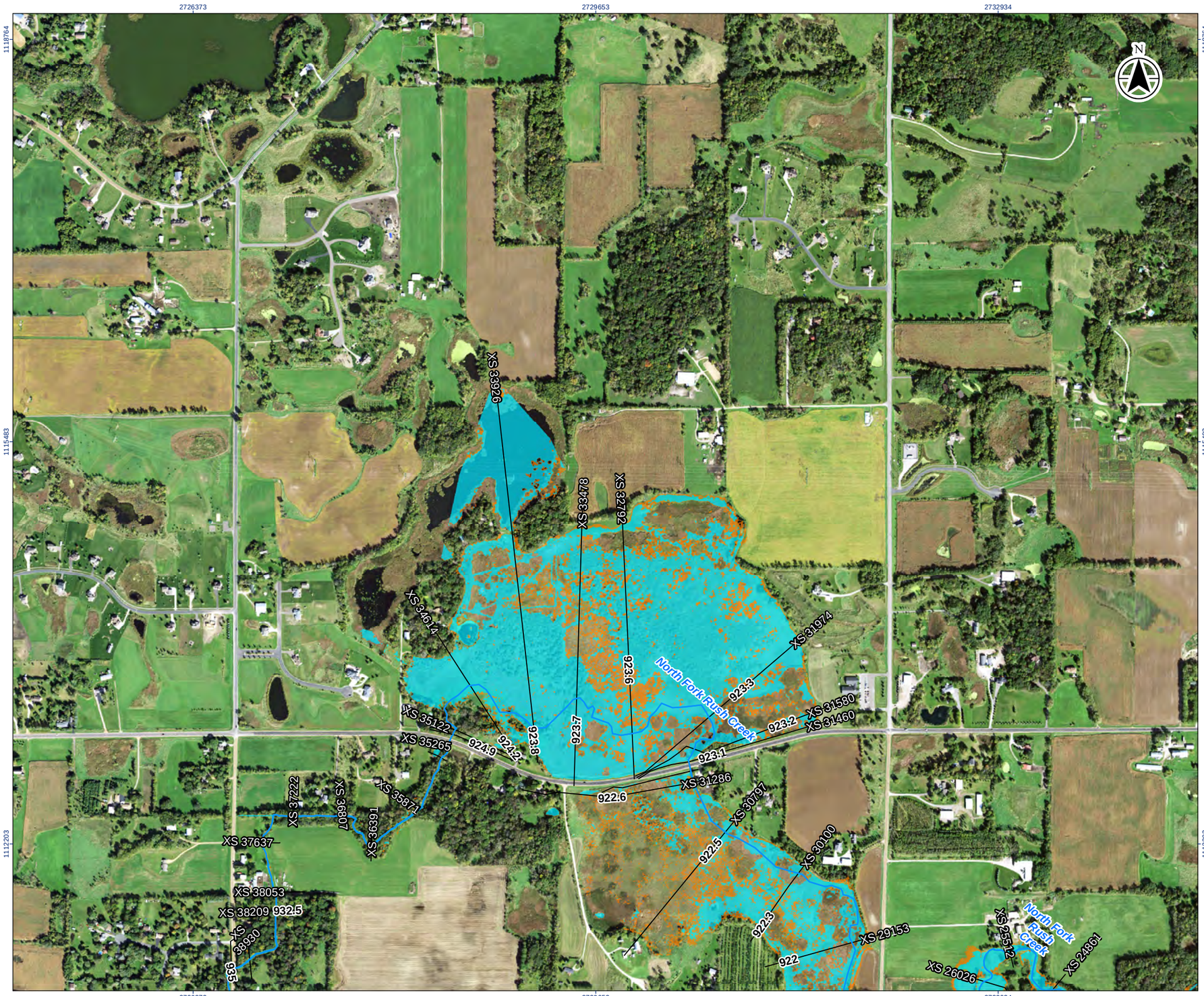


Figure No.
6 of 27

Title
Elm Creek Watershed Revision
Proposed Results

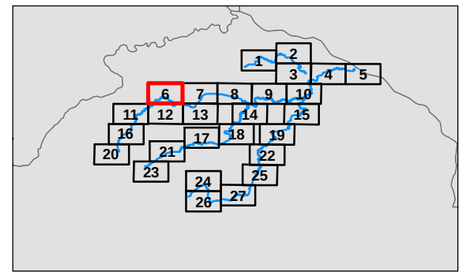
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

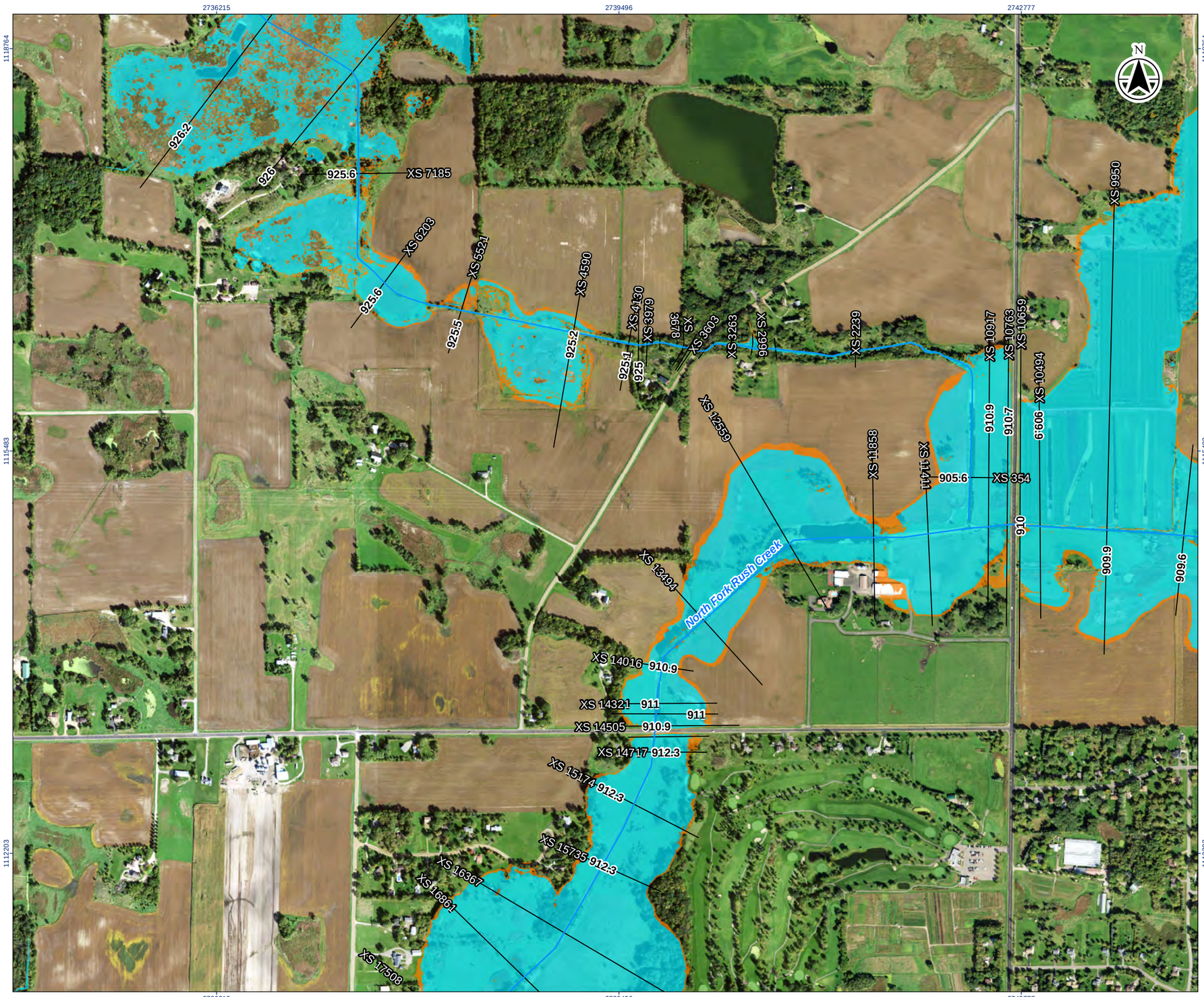


Figure No.
7 of 27

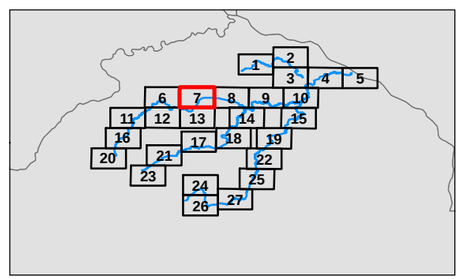
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227504963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DHINES

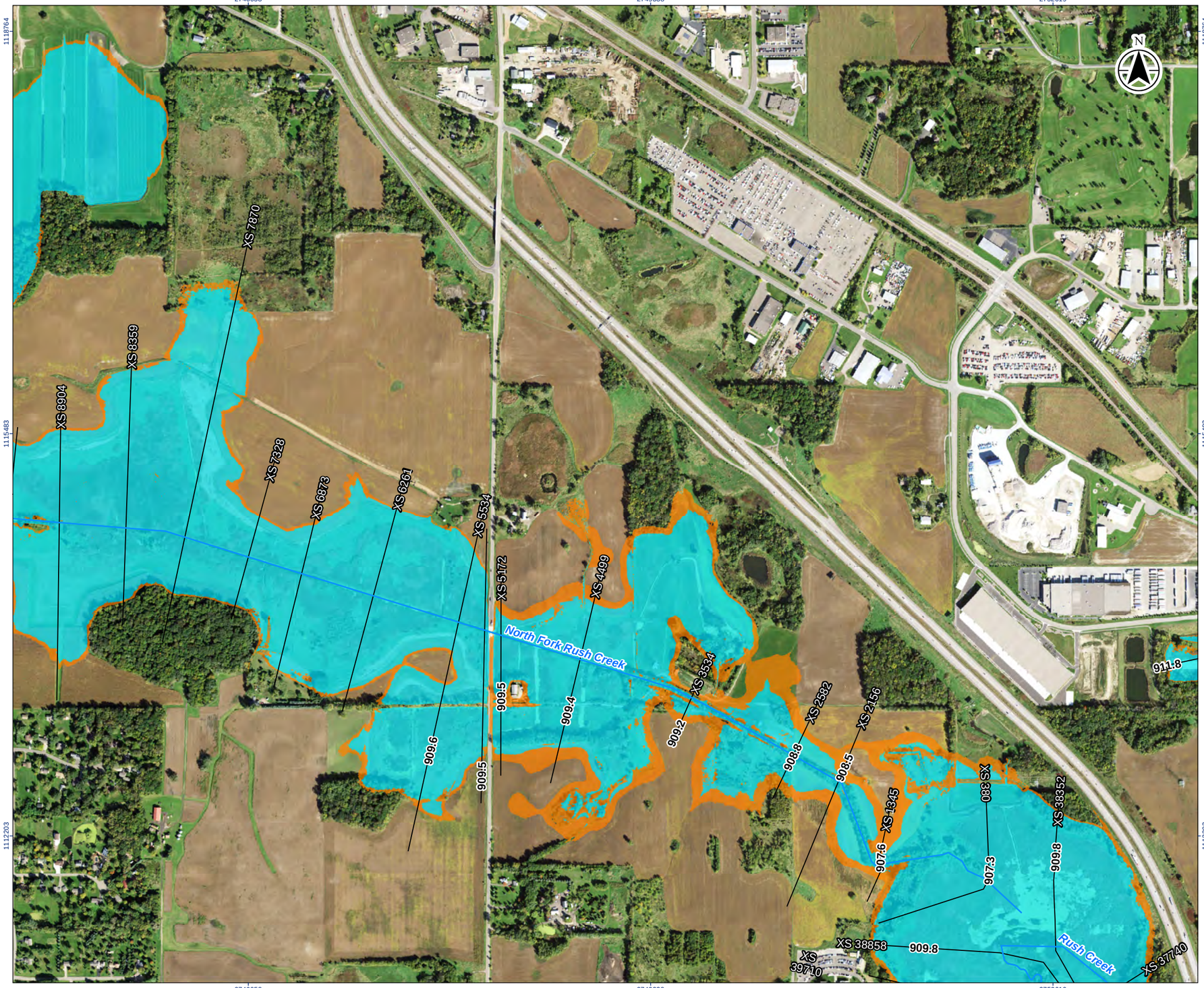


Figure No.
8 of 27

Title
Elm Creek Watershed Revision
Proposed Results

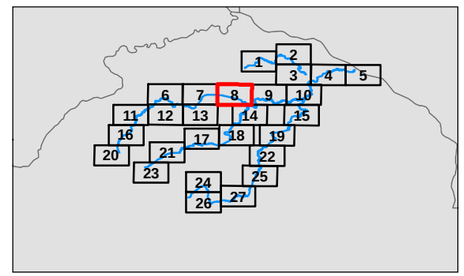
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DNHS

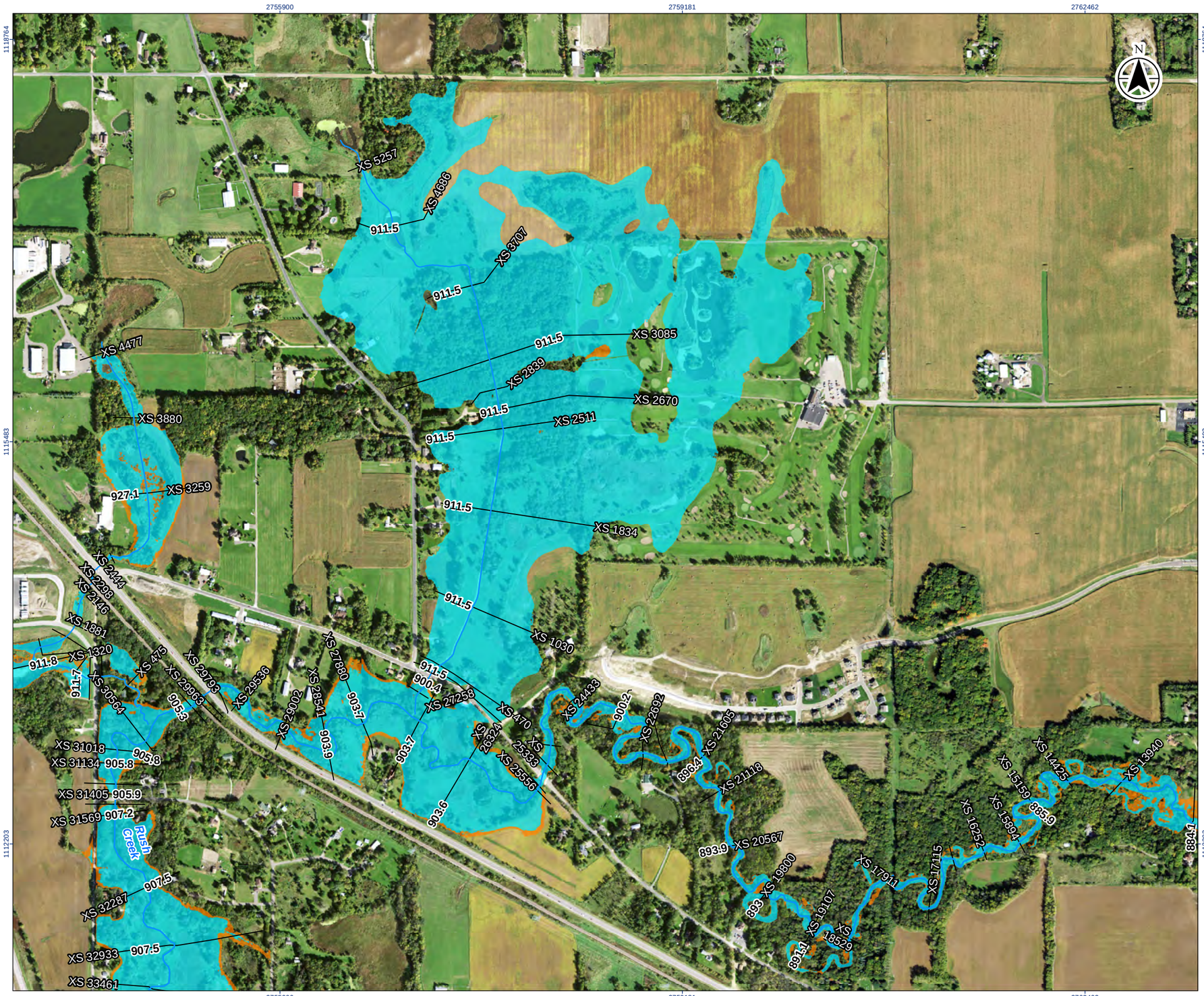


Figure No.
9 of 27

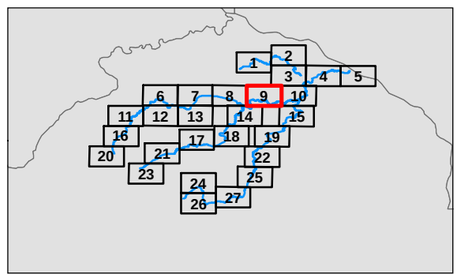
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227704963_ElmCreekWatershedFinal_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DWNES

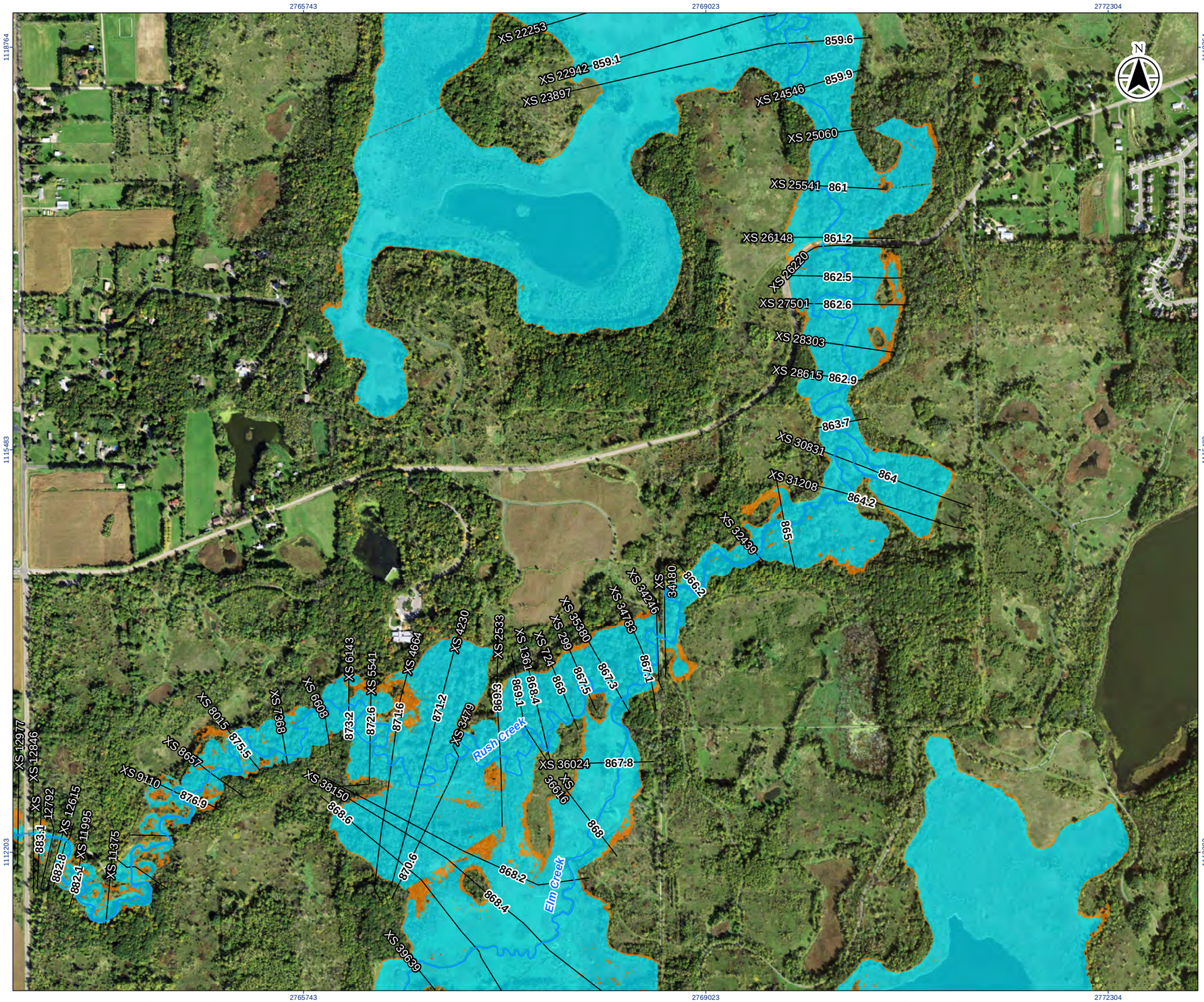


Figure No.
10 of 27

Title
Elm Creek Watershed Revision
Proposed Results

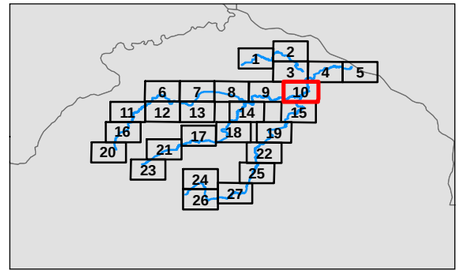
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1187\temporary\227704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DWHES

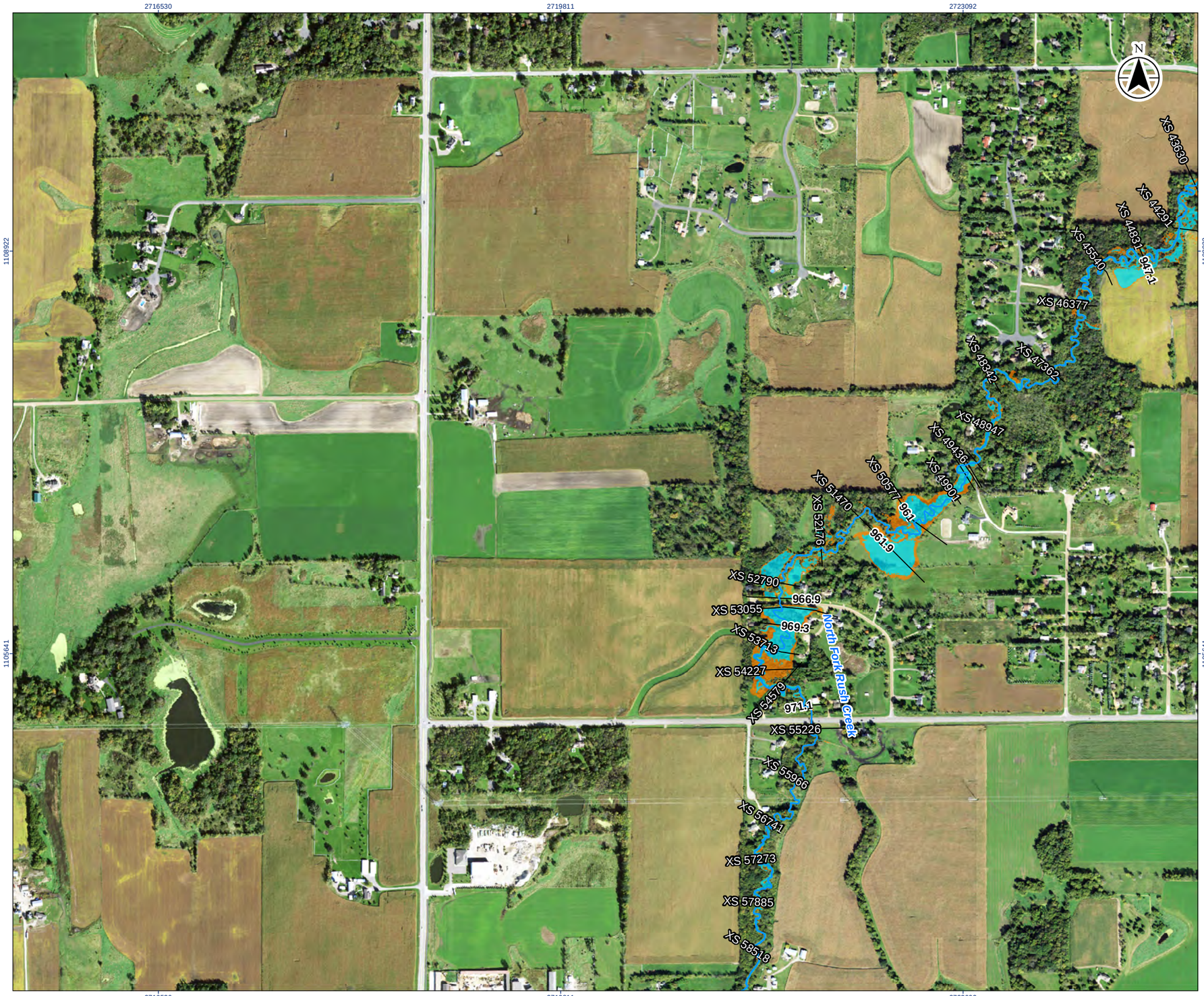


Figure No.
11 of 27

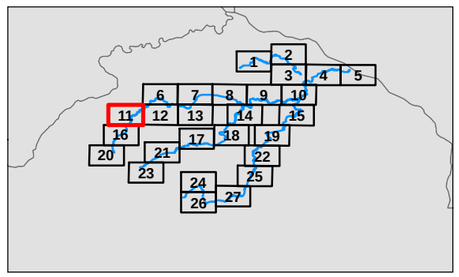
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227004963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DHINES

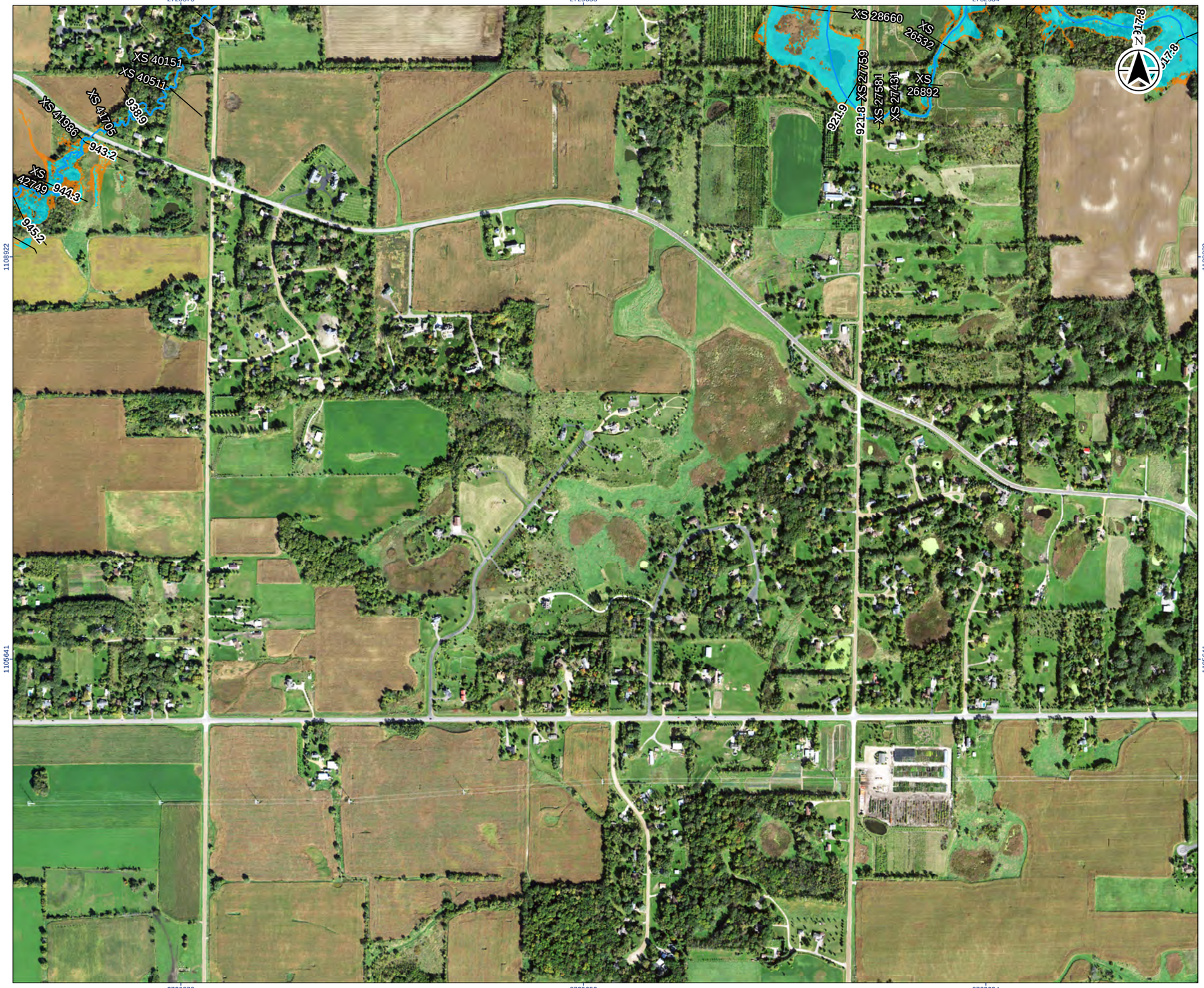


Figure No.
12 of 27

Title
Elm Creek Watershed Revision
Proposed Results

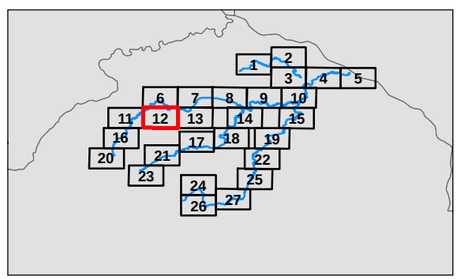
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

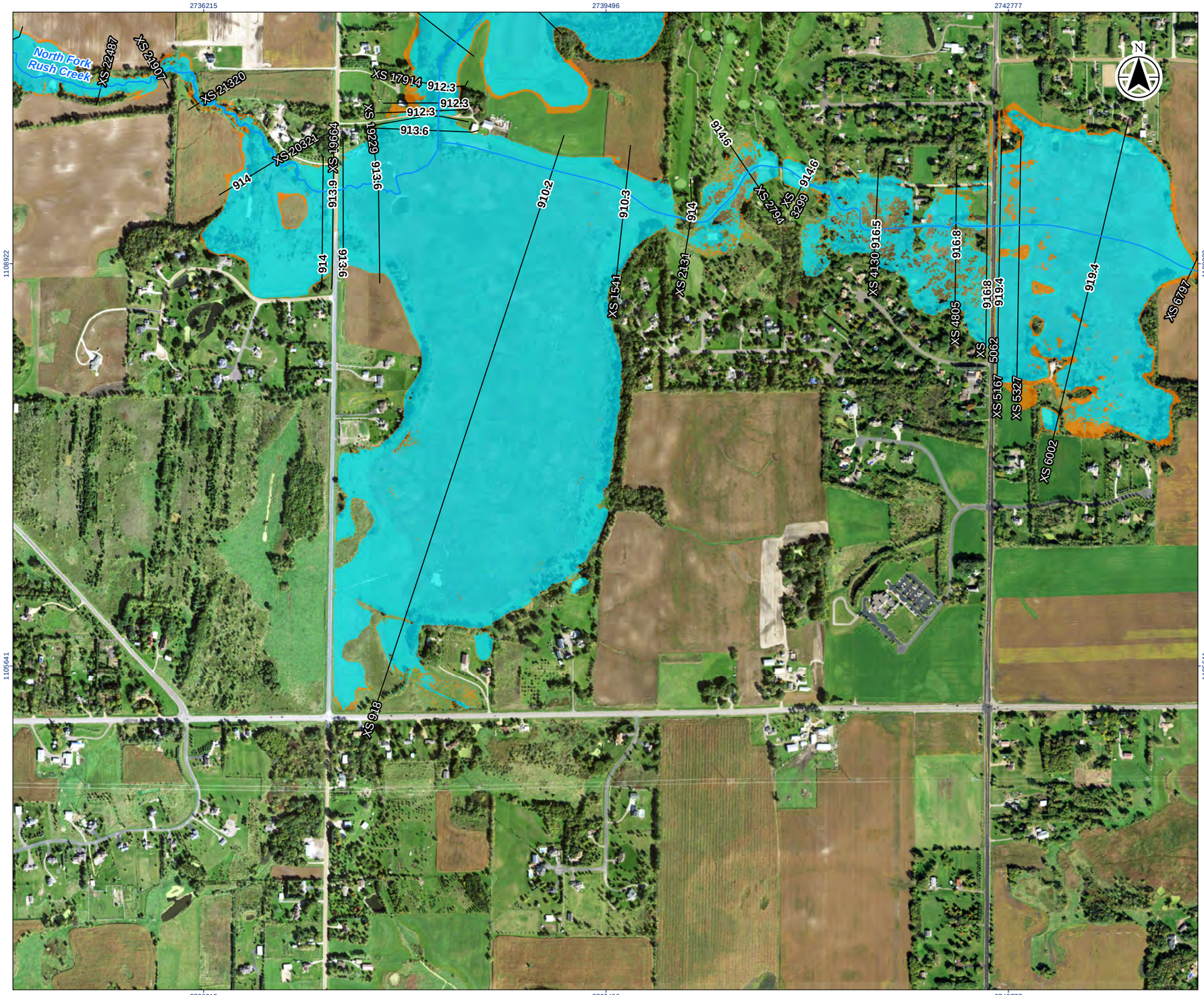


Figure No.
13 of 27

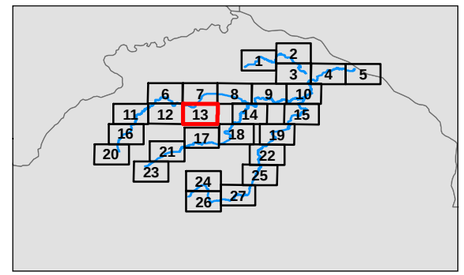
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

Y:\1807\temporary\227704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DNHS

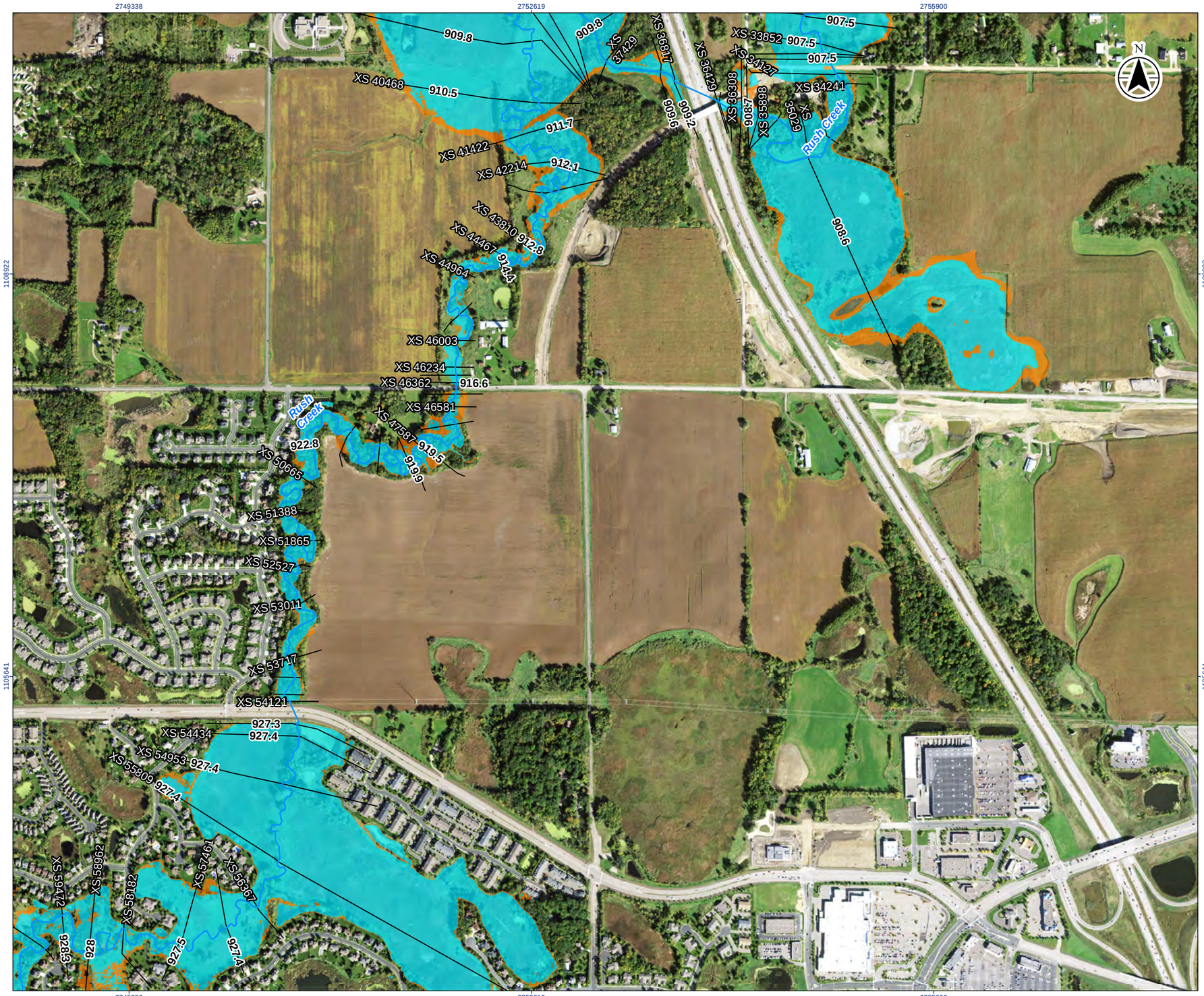


Figure No.
14 of 27

Title
Elm Creek Watershed Revision
Proposed Results

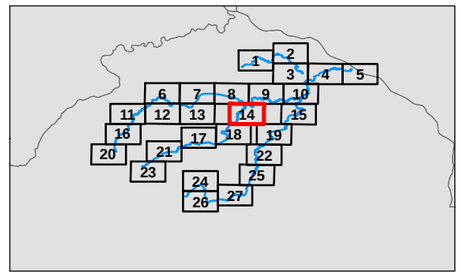
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

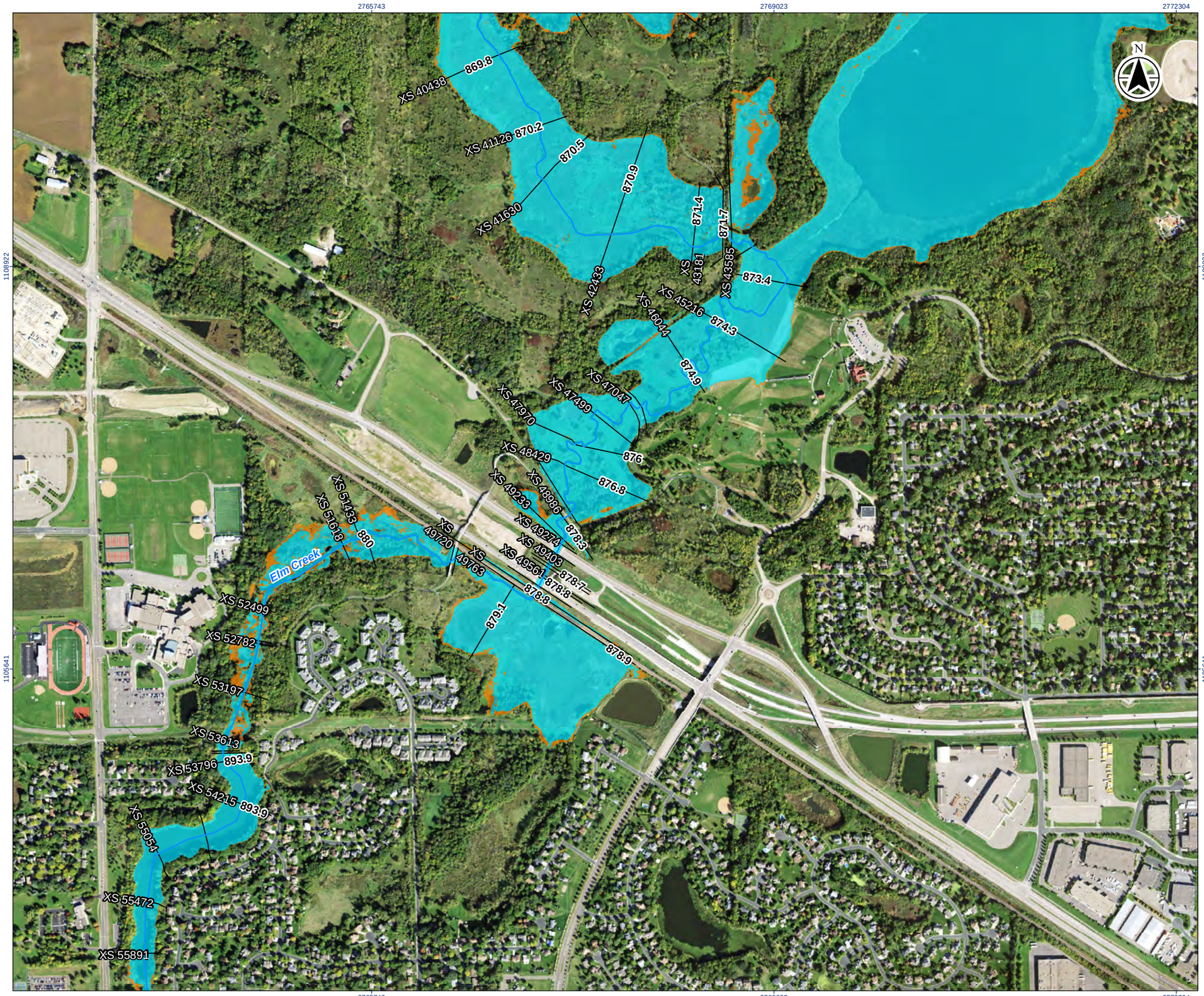


Figure No.
15 of 27

Title
Elm Creek Watershed Revision
Proposed Results

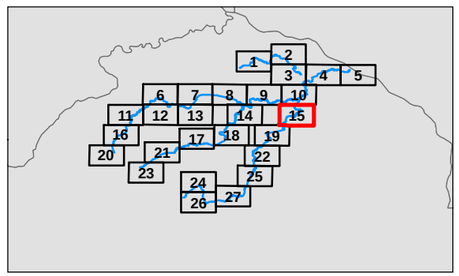
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

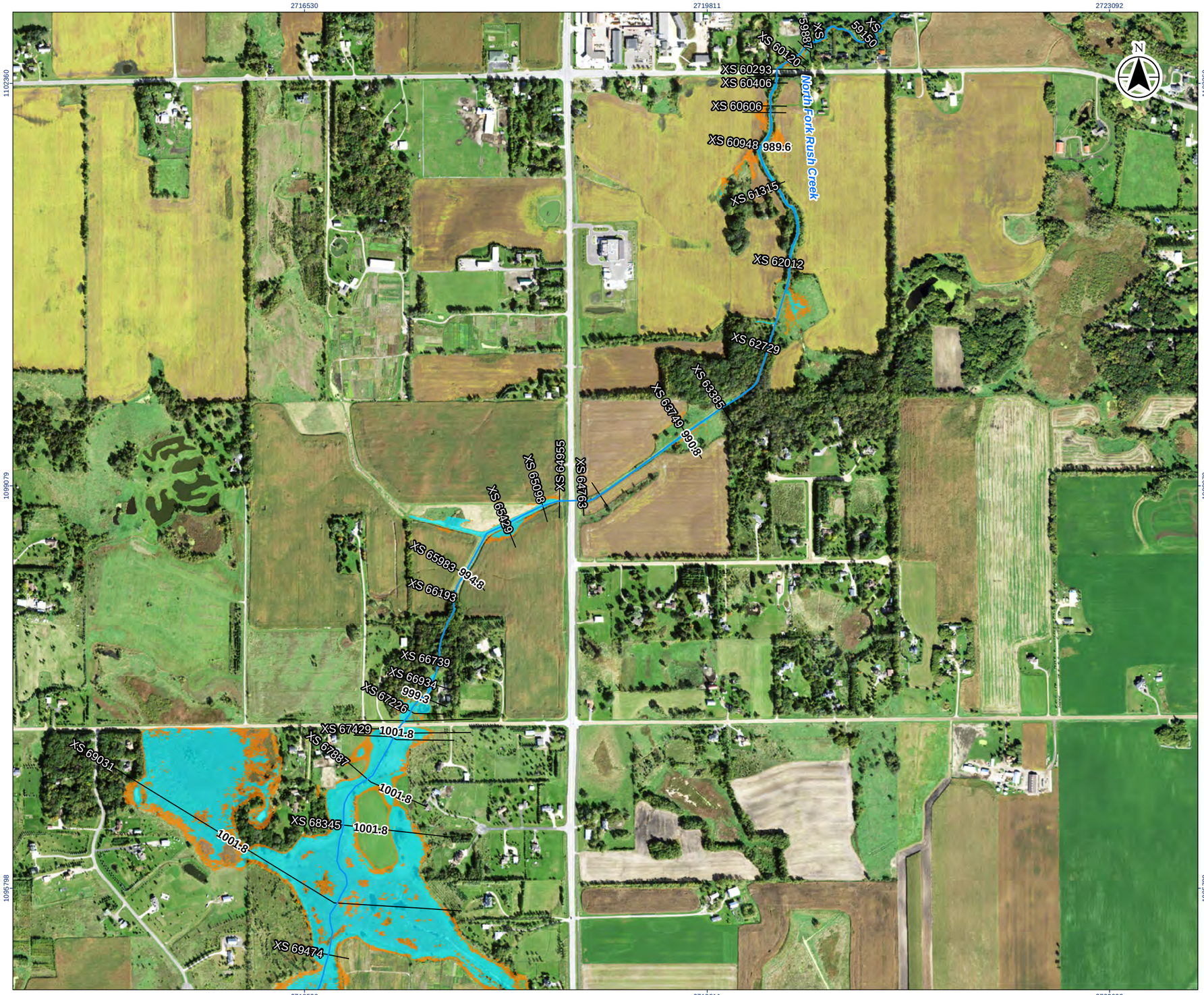


Figure No.
16 of 27

Title
Elm Creek Watershed Revision
Proposed Results

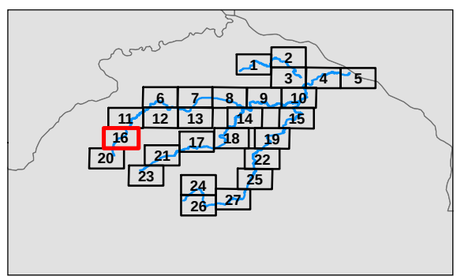
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

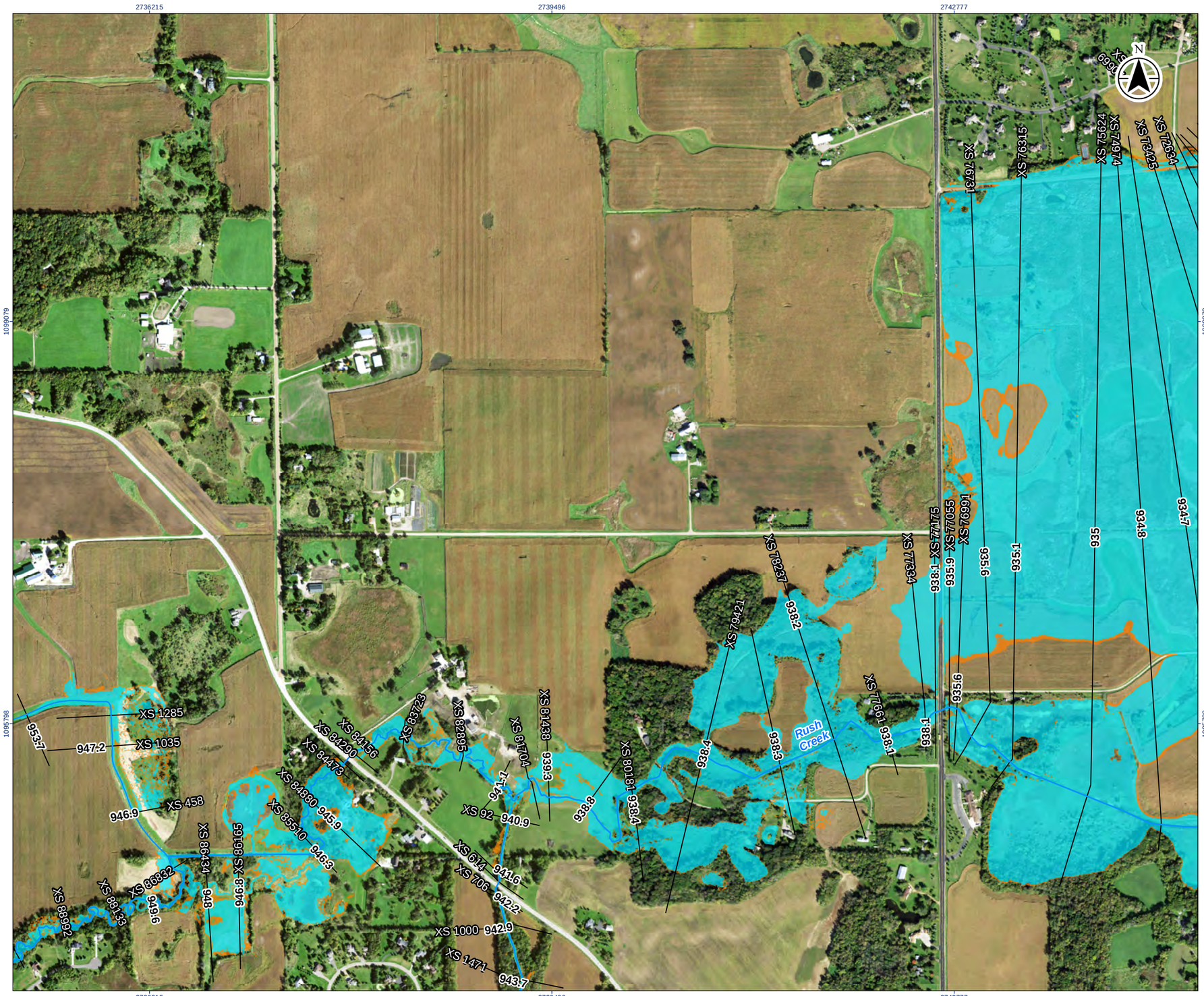


Figure No.
17 of 27

Title
Elm Creek Watershed Revision
Proposed Results

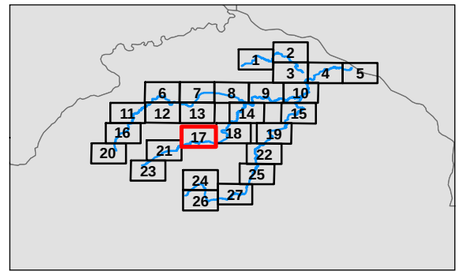
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

Figure No.
18 of 27

Title

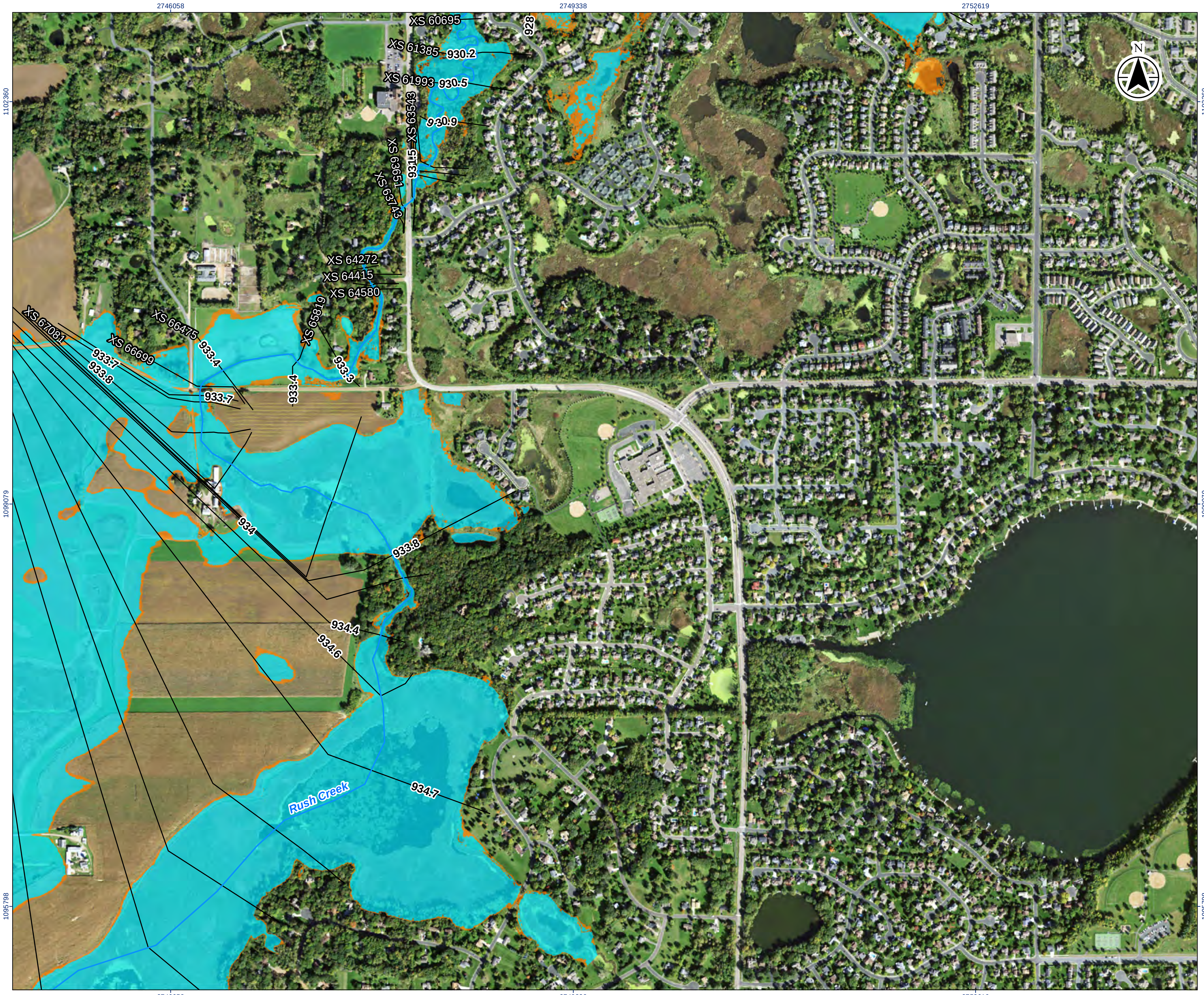
Elm Creek Watershed Revision Proposed Results

Client/Project

Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles



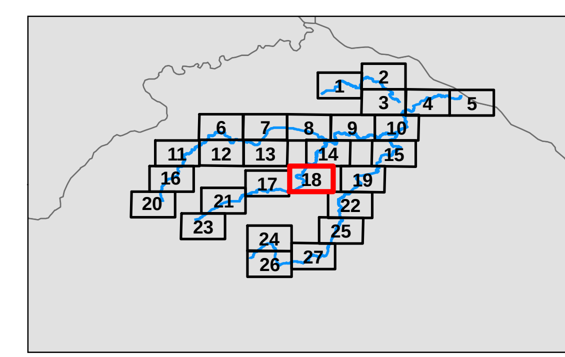
Legend

Stream Centerline

Cross-Section (1-pct BFE)

0.2-Pct Floodplain

1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1937\temporary\227704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DHINES

2759181 2762462

1102360 1099079 1095798

XS 56310
XS 56629
XS 56996
XS 57699
XS 58647
894
XS 59357
XS 60459
894.1
XS 62026
XS 63259
XS 63561
894.1
XS 63752
894
Elm Creek
XS 64007
XS 64219
894.2
894.2
XS 64531
XS 65033
894.2
894.1
XS 65333
XS 65215
XS 65946
XS 66592
XS 66781
XS 67119
XS 68058
XS 68701
XS 68853
XS 69167
896.1
XS 69875
XS 70093
XS 70462

N

Figure No.
19 of 27

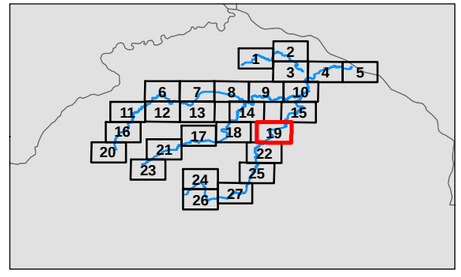
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227044963_ElmCreekMaps\Final_Maps\ElmCreek_Maps.mxd Revised: 2020-05-11 By: DHINES

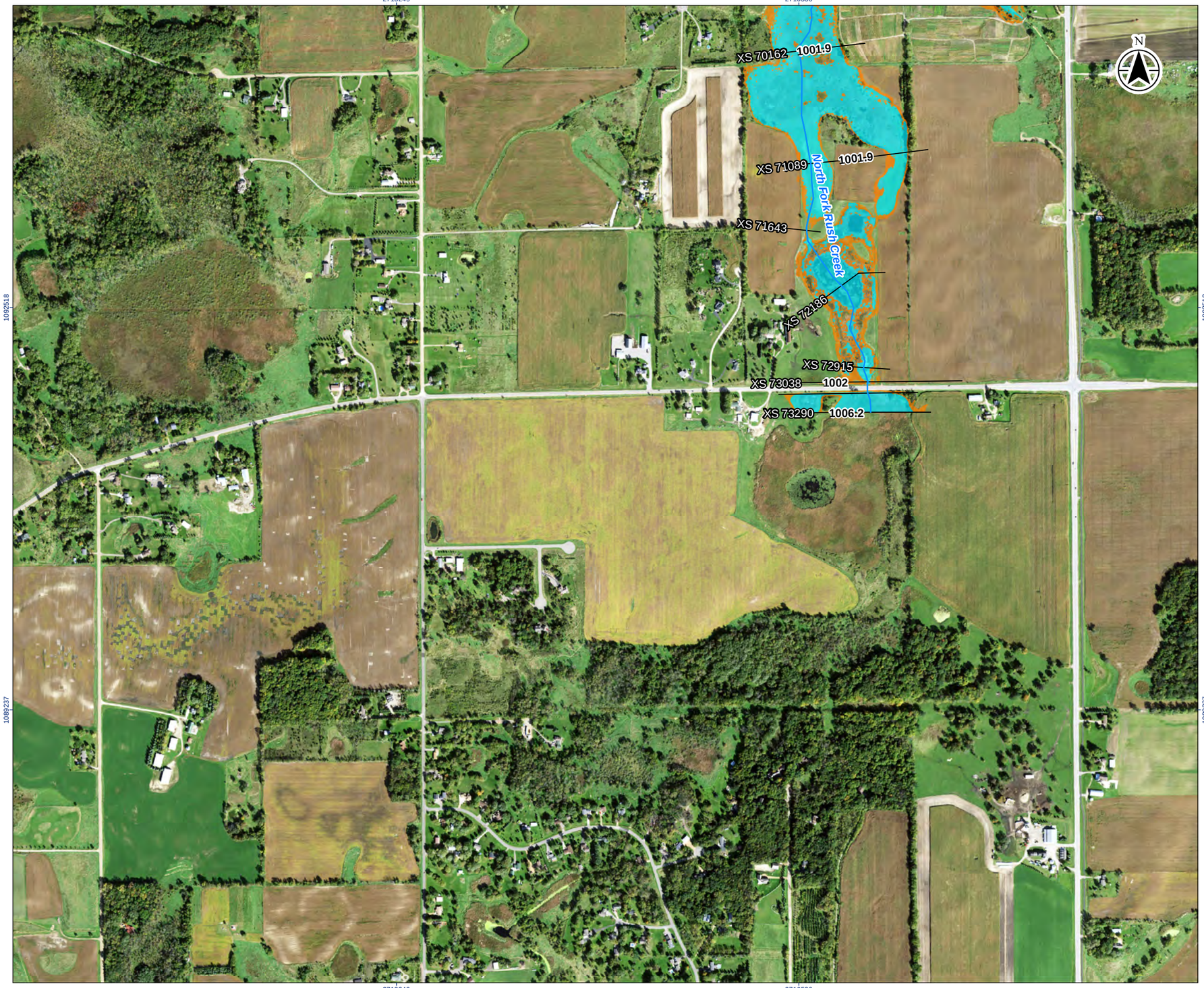


Figure No.
20 of 27

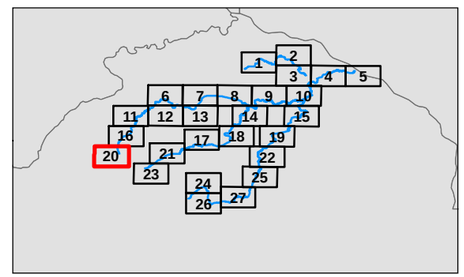
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227043903_ElmCreek\Maps\Final Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DHINES

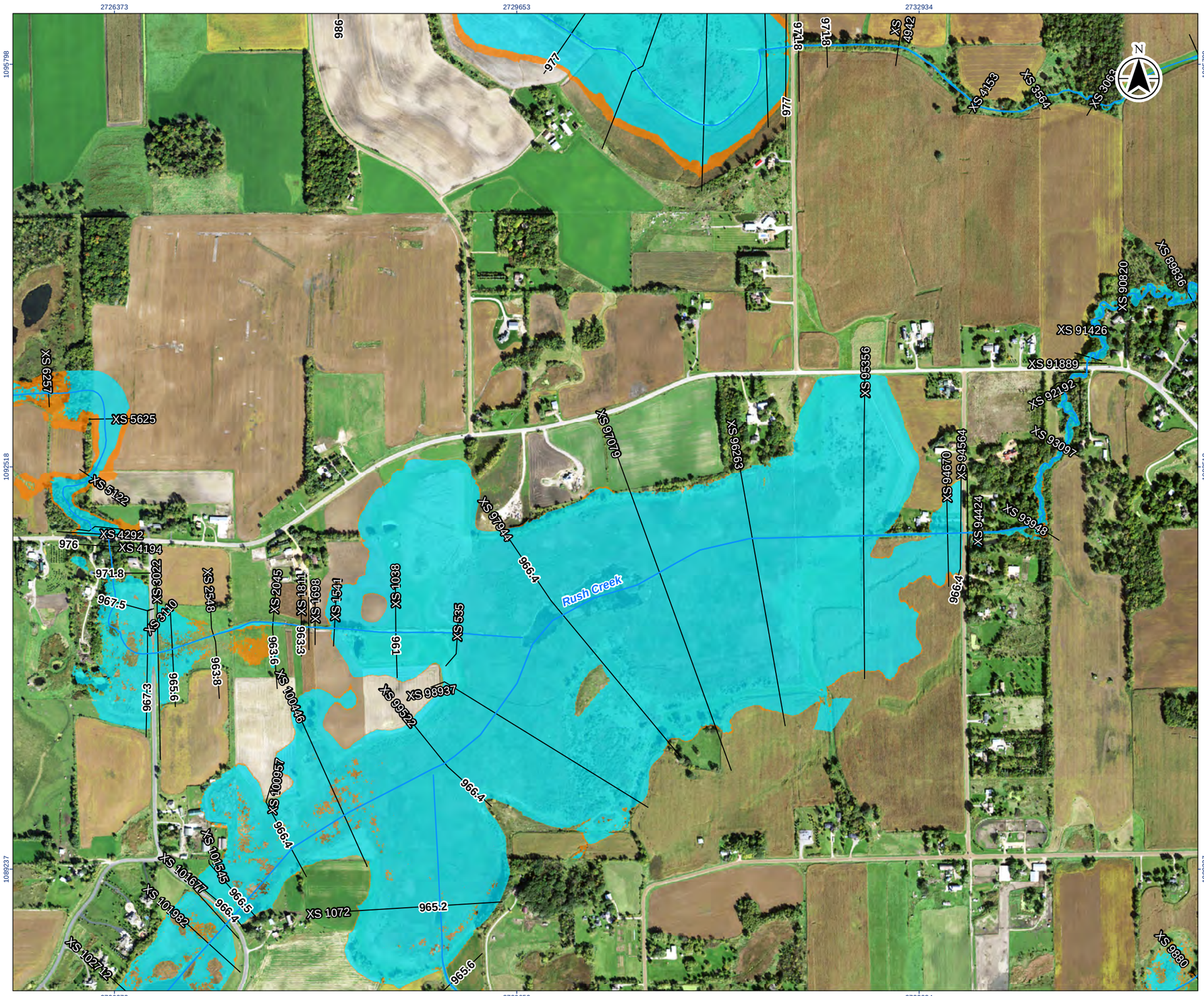


Figure No.
21 of 27

Title
Elm Creek Watershed Revision
Proposed Results

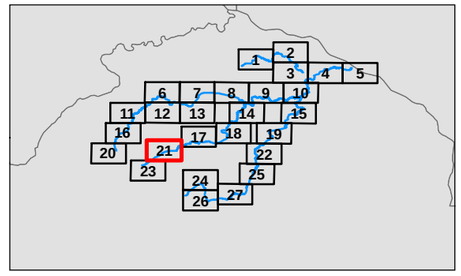
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\22704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DHINES

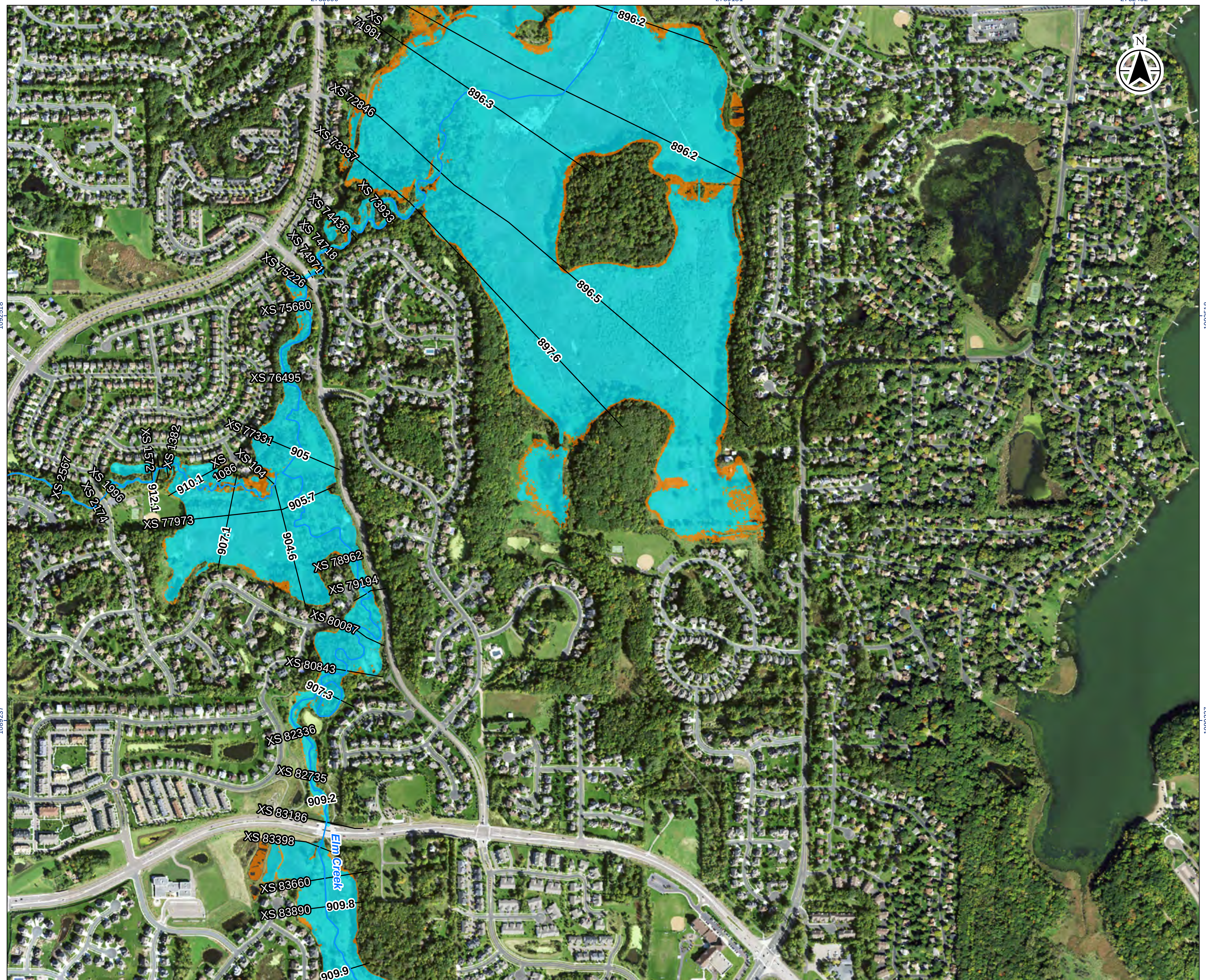


Figure No.
22 of 27

Title
Elm Creek Watershed Revision Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

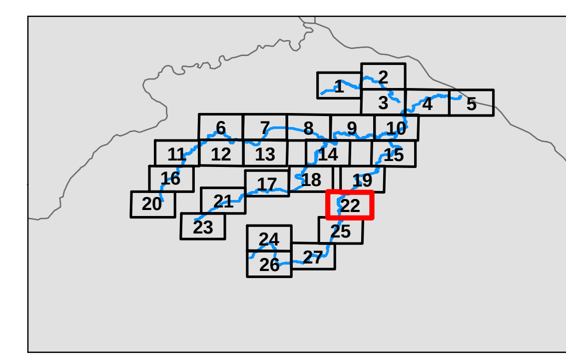
Legend

Stream Centerline

Cross-Section (1-pct BFE)

0.2-Pct Floodplain

1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1937\temporary\227704963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DHINES

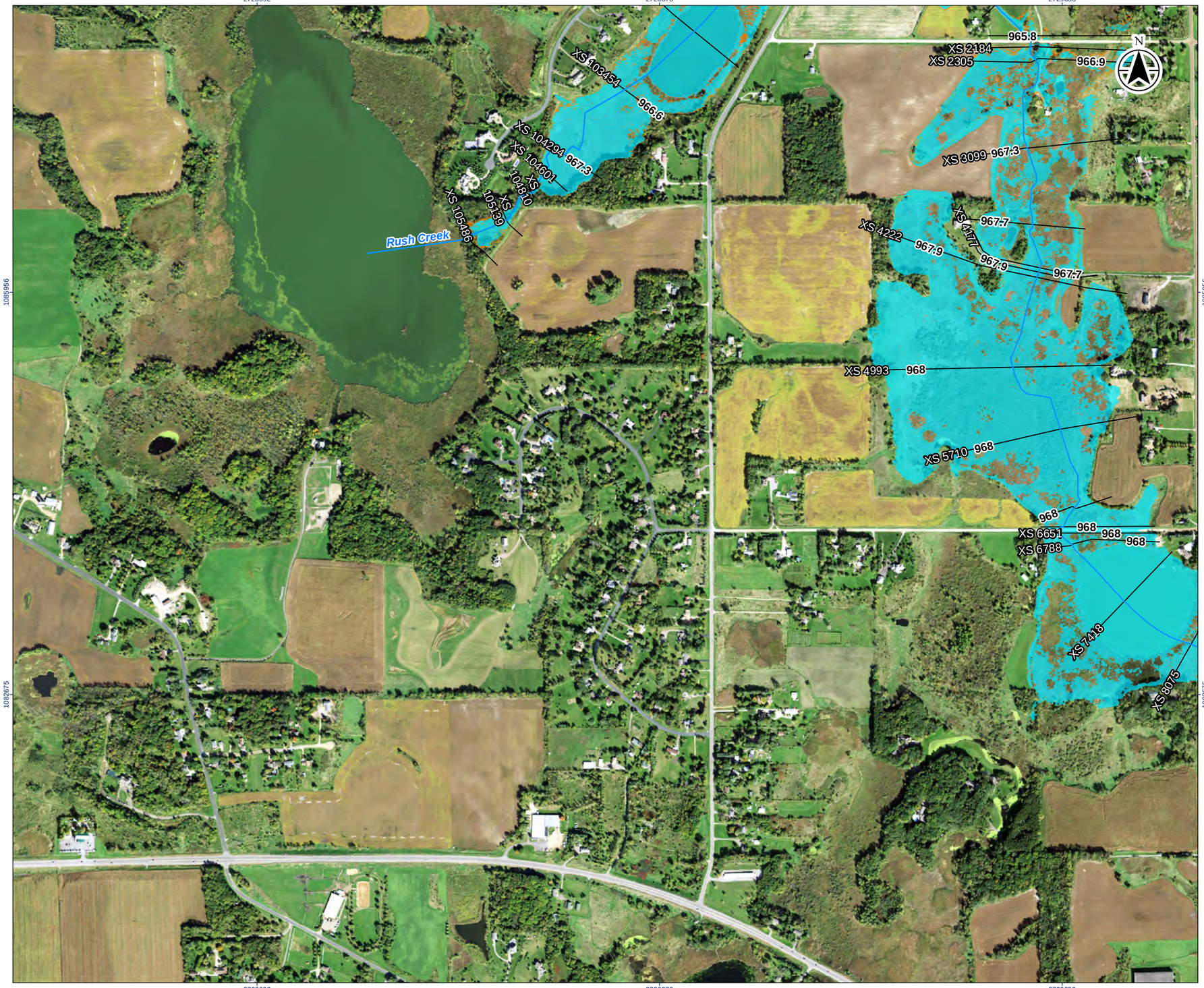


Figure No.
23 of 27

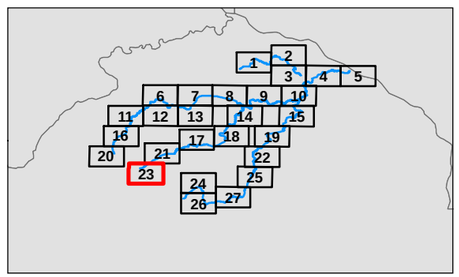
Title
Elm Creek Watershed Revision
Proposed Results

Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)
0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227504963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DHINES

Figure No.
24 of 27

Title
Elm Creek Watershed Revision
Proposed Results

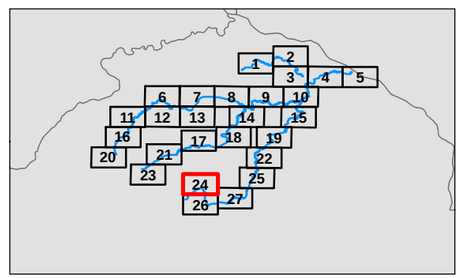
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

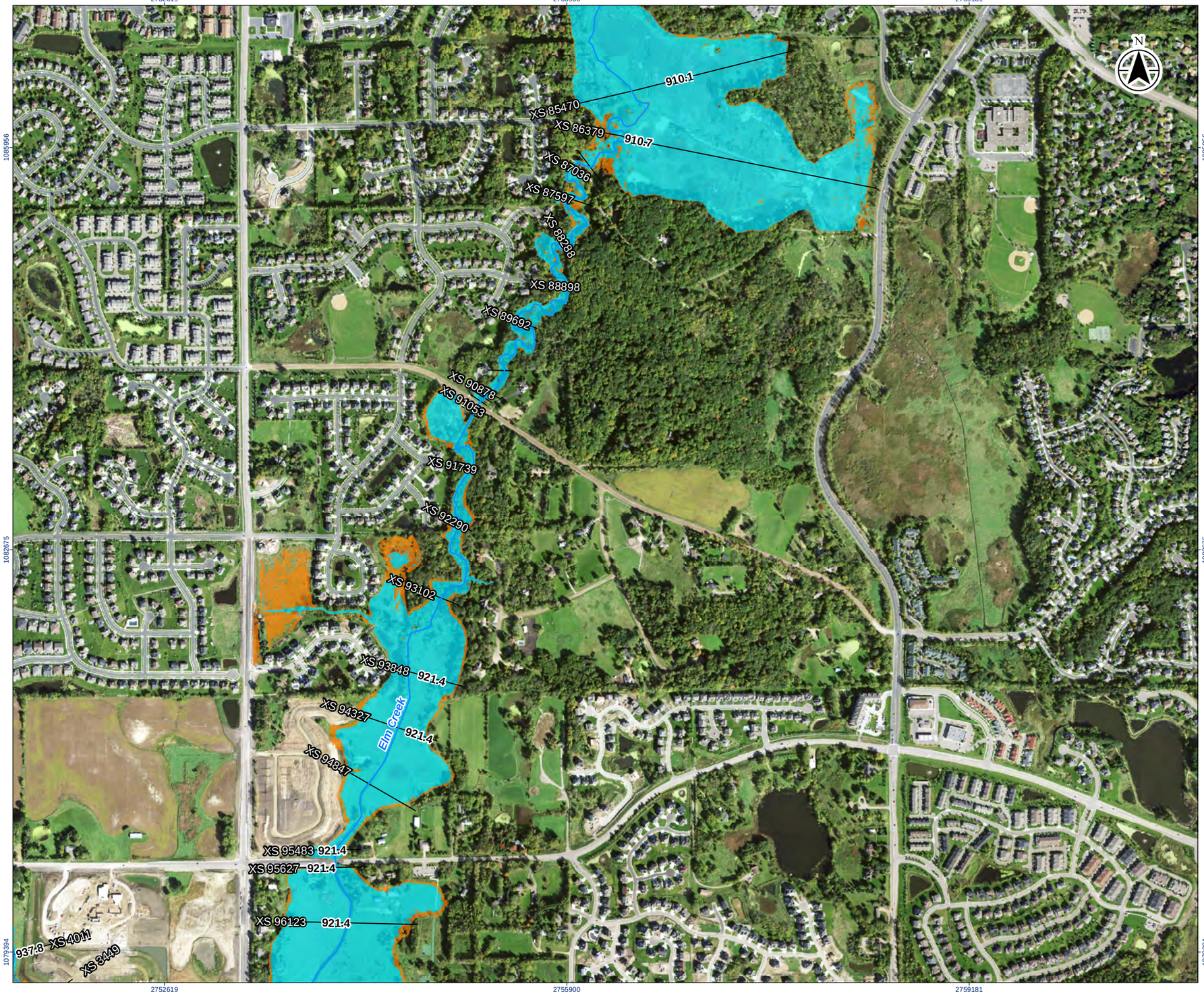


Figure No.
25 of 27

Title
Elm Creek Watershed Revision
Proposed Results

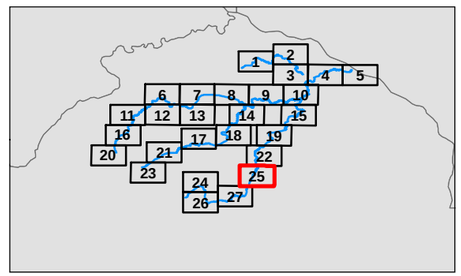
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

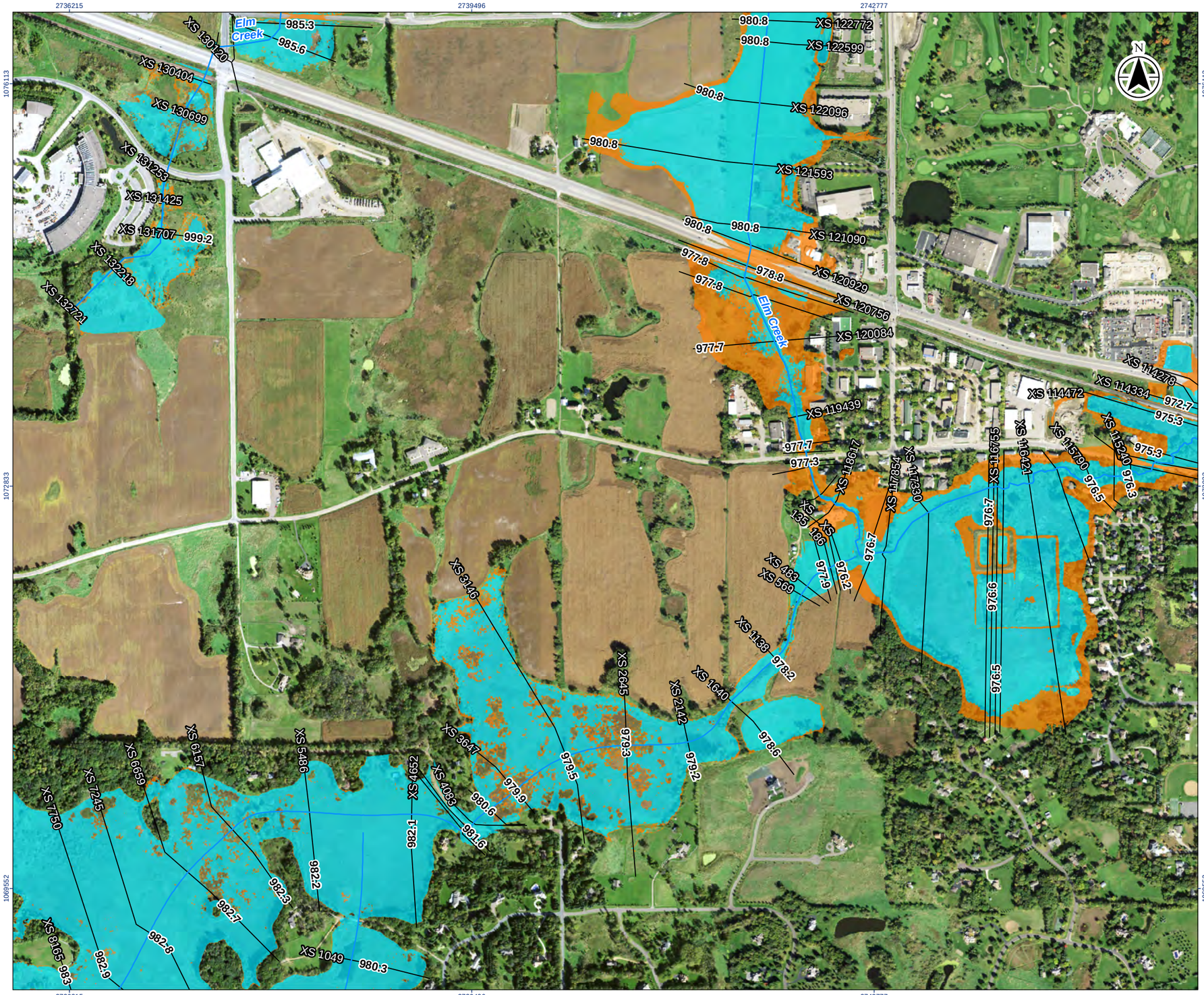


Figure No.
26 of 27

Title
Elm Creek Watershed Revision
Proposed Results

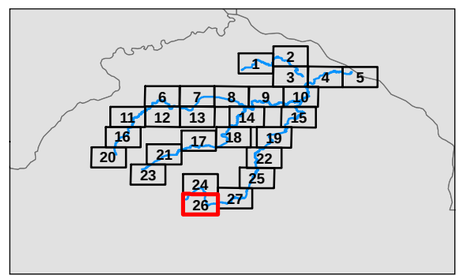
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec

elm creek Watershed Management Commission

V:\1897\temporary\227804963_ElmCreek\Maps\Final_Maps\ElmCreek_Maps.mxd Revised: 2022-05-11 By: DHINES

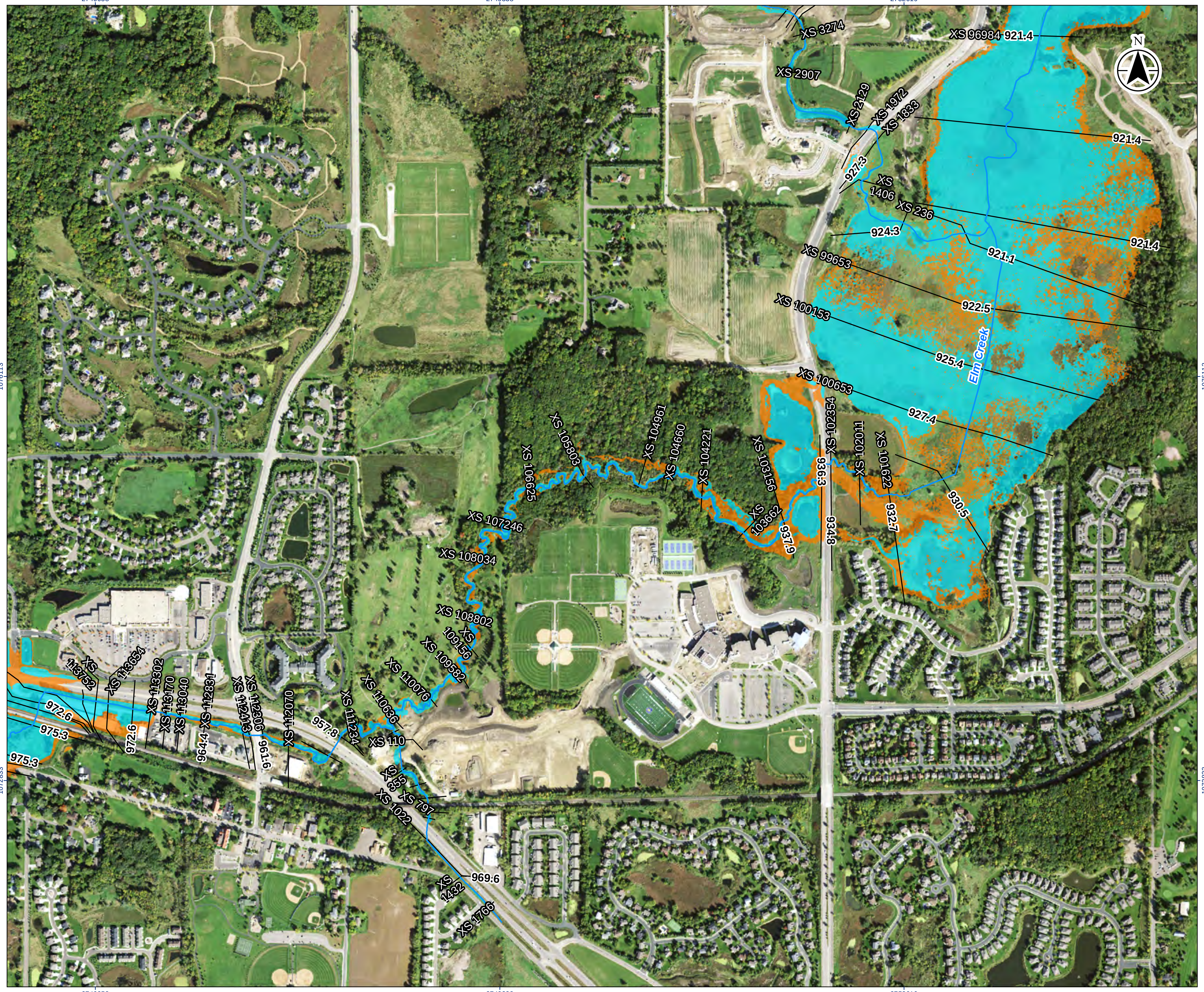


Figure No.
27 of 27

Title
Elm Creek Watershed Revision Proposed Results

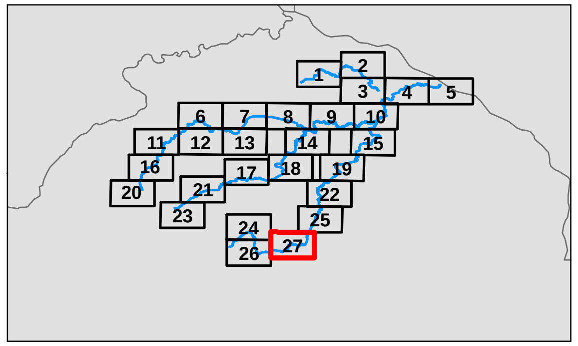
Client/Project
Elm Creek Watershed Managment Commission
Revisons to HUC-8 Model
Elm Creek Watershed

1:10,000 (At Original document size of 11x17)

0 0.2 0.4 Miles

Legend

- Stream Centerline
- Cross-Section (1-pct BFE)
- 0.2-Pct Floodplain
- 1-Pct Floodplain



Notes
1. Coordinate System: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet
2. Imagery is NAIP Plus published in 2016

Stantec
elm creek Watershed Management Commission

APPENDIX F

HEC-RAS Mapping Overview and Updates

Stantec

Overall Model Updates

- Model was split into two separate geometries to allow for full extents of main stem streams and tributary streams to be mapped directly in HEC-RAS.

Table 1 Split Geometry Stream Groups

Group 1 Streams	Group 2 Streams
Elm Creek	Rush Creek
Rush Creek Branch 1	Elm Creek Branch 2
Rush Creek Branch 2	Elm Creek Branch 3
Rush Creek Branch 3	Elm Creek Branch 4
Rush Creek Branch 5	Elm Creek Branch 5
Rush Creek Branch 6	North Fork Rush Creek Branch 1
Rush Creek Branch 7	North Fork Rush Creek Branch 2
North Fork Rush Creek	Diamond Creek
Elm Creek Branch 1	Rush Creek Branch 4

Group 1 Model Updates

Elm Creek

- Flow change locations were adjusted according to the river station updates.
- Left portion of XS extended at locations: 17159, 17870, 18774, 19466, 11839, 37254, 38150, 39051, and 65215.
- Right portion of XS extended at locations: 19466, 15477, and 13893.
- Left portion of XS adjusted at: 77973
- Areas of centerline not in floodplain: 101622 to 100653
- IFA adjustment at XS: 90982, 63561, 90939
- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

Elm Creek Branch 1

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

North Fork Rush Creek

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 18117 and 72915
- Moved XS 73061 slightly downstream outside of structure embankments. Now station 73038.

Rush Creek Branch 1

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 8442 and 13645

Rush Creek Branch 2

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

Rush Creek Branch 3

- No adjustments made to model geometry.

Rush Creek Branch 5

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- XS 18625 adjusted station elevation point inside channel that appeared to be incorrectly pulled to a higher elevation.

Rush Creek Branch 6

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

Rush Creek Branch 7

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 6961

Group 2 Model Updates

Diamond Creek

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 10367

North Fork Rush Creek Branch 1

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

Rush Creek Branch 4

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 5320, 5792, 5525, 5113
- Right portion of XS shortened at locations: 9126 and 9250
- Con/Exp coefficients increased to 0.3 and 0.5 respectively for XS's 9552 and 9632 to account for significant changes in floodplain extents (widening)

Rush Creek Branch 5

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- IFA adjustment at XS: 15055

Rush Creek

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- 2 Additional Cross sections added at downstream end for tie in: 724 & 298
- IFA adjustment at drawdowns along structures mainly.

Elm Creek Branch 2

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.

Elm Creek Branch 3

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- Additional Cross section added at downstream end for tie in: 15

Elm Creek Branch 4

- Bank station and n value adjustment done for cross sections with bank stations significantly higher than 100 yr WSEL after flow adjustment.
- 2 Additional Cross sections added at downstream end for tie in: 810 & 236
- River station adjusted and centerline adjusted at downstream end to appropriately tie into the main stem stream