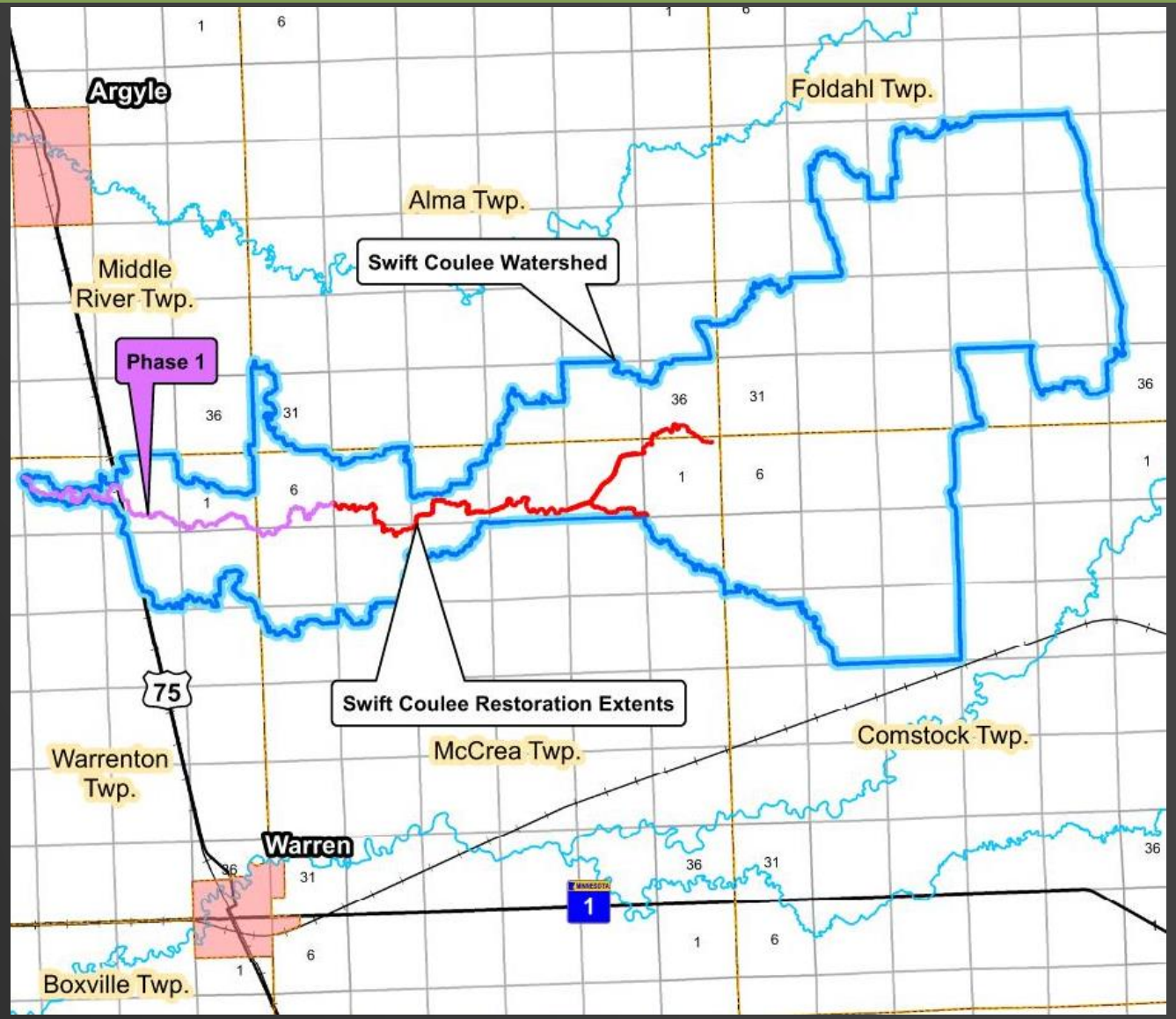
SWIFT COULEE CHANNEL RESTORATION PROJECT

FINAL HEARING

FEBRUARY 3, 2025

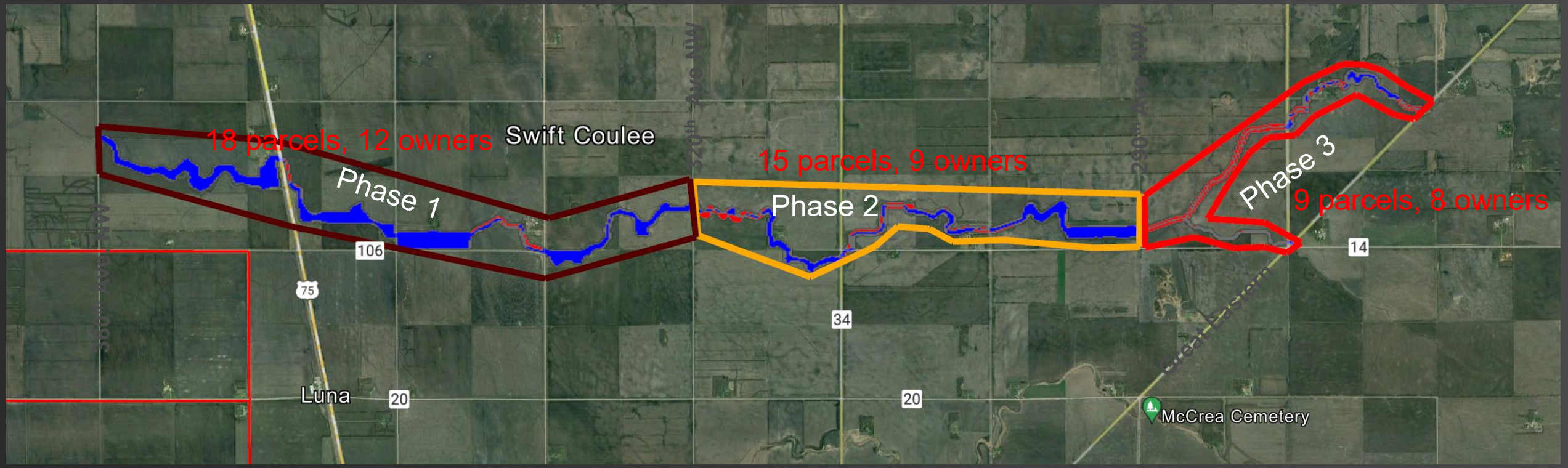
CHANNEL RESTORATION/SETBACK LEVEE EXTENT



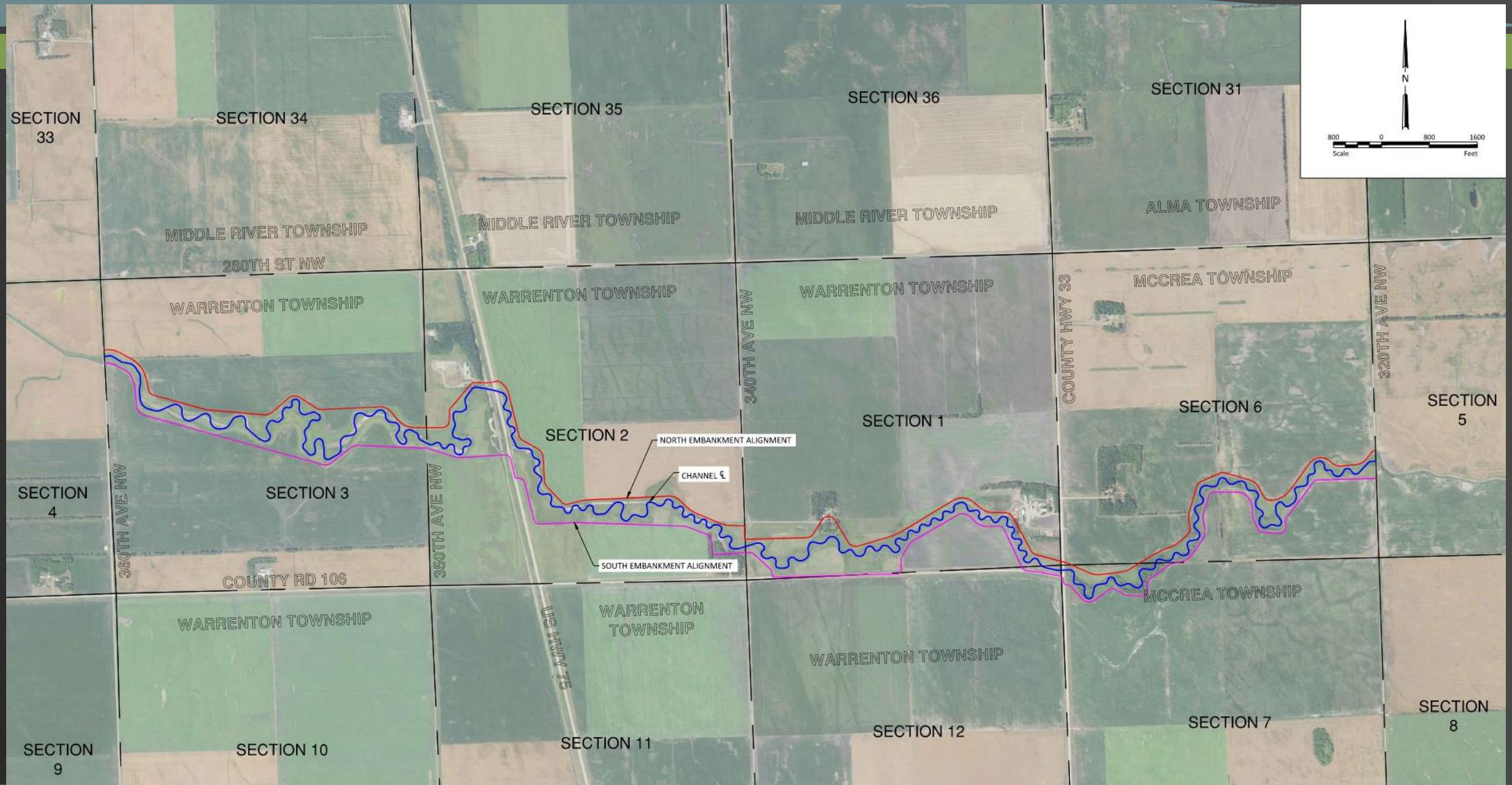
PROJECT TEAM PROCESS

- Tasks completed
  - Purpose and Need of Project – Concurrence Point #1 – Dec. 2018
  - Potential Alternatives and Alternatives to Carry Forward – Concurrence Point #2 – June 2019
  - Individual Meetings with Majority Landowners where Alternatives were Identified
  - Identification of the Selected Alternative – Concurrence Point #3 – April 2021
    - 13 Alternatives screened through the Concurrence Point process
    - Alt.11 – Restoration with Impoundment showed the most benefit meeting the purpose and need
    - Landowner Unwillingness – Alt. 11 – August 19, 2020 Project Team Meeting – Landowners Suggest Share Flooding Burden
    - Alt. 13 – Channel Restoration w/Setback Levees – Share Flooding Burden
  - Alt. 13 – Selected as Preferred Alternative on February 11, 2021 Project Team Meeting
  - Project Establishment Hearing June 20, 2023

PROJECT PHASING

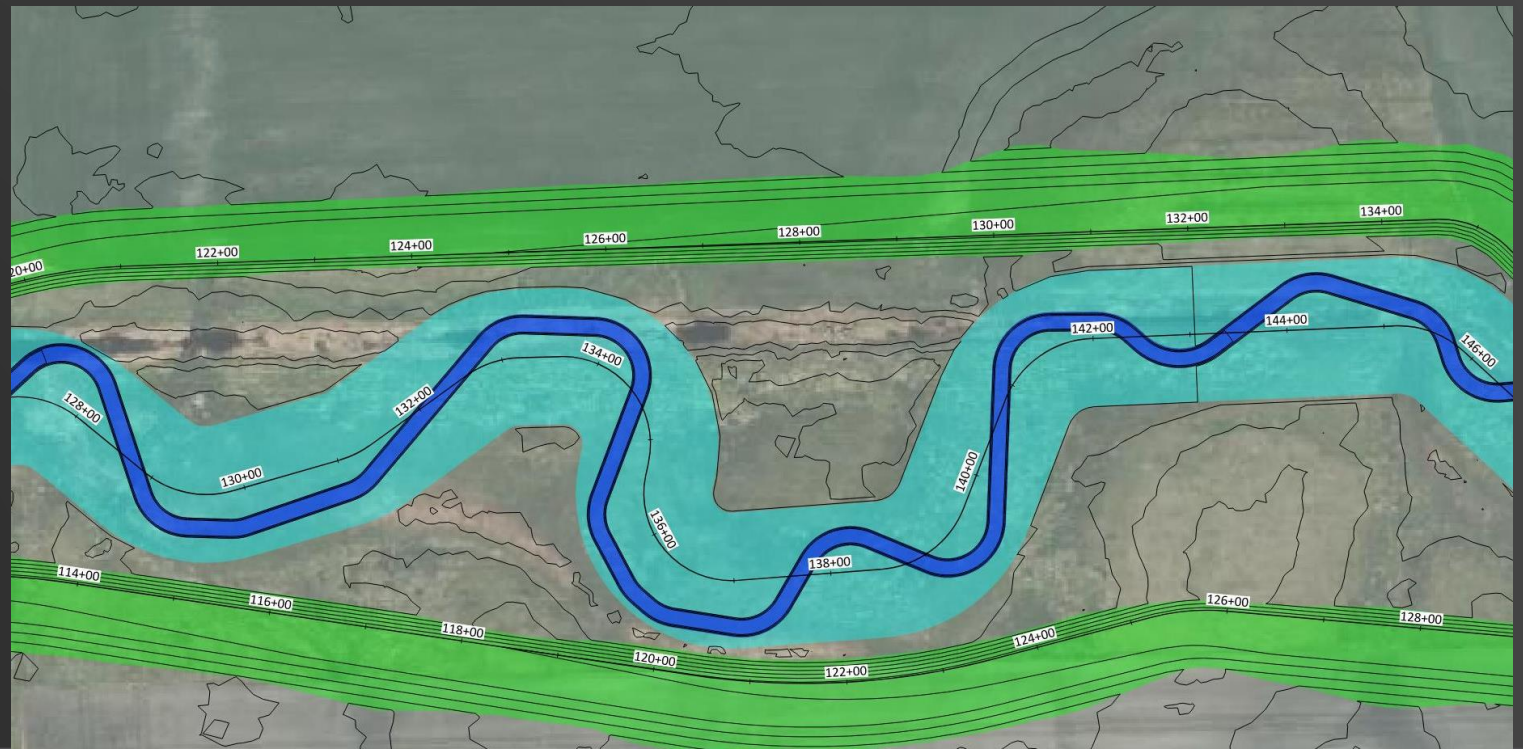


PHASE 1 EXTENT



PHASE 1 DESIGN

- Review Hydraulic & Hydrologic Modeling Results
  - E- Channel Restoration
    - Culvert to Culvert Profile
    - Historic Aerial Photography/DNR Input – Add Meander Back into Channel Alignment with Set Back Levees
    - Approx. 1-yr Meandering Channel with 10-yr Floodplain/Valley and Set Back Levees



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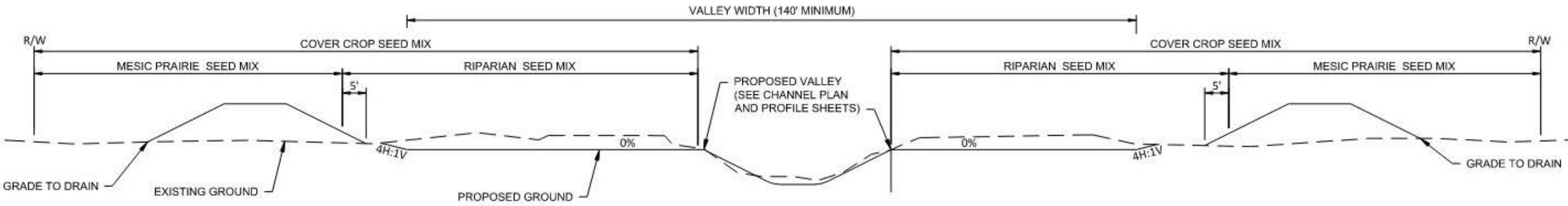
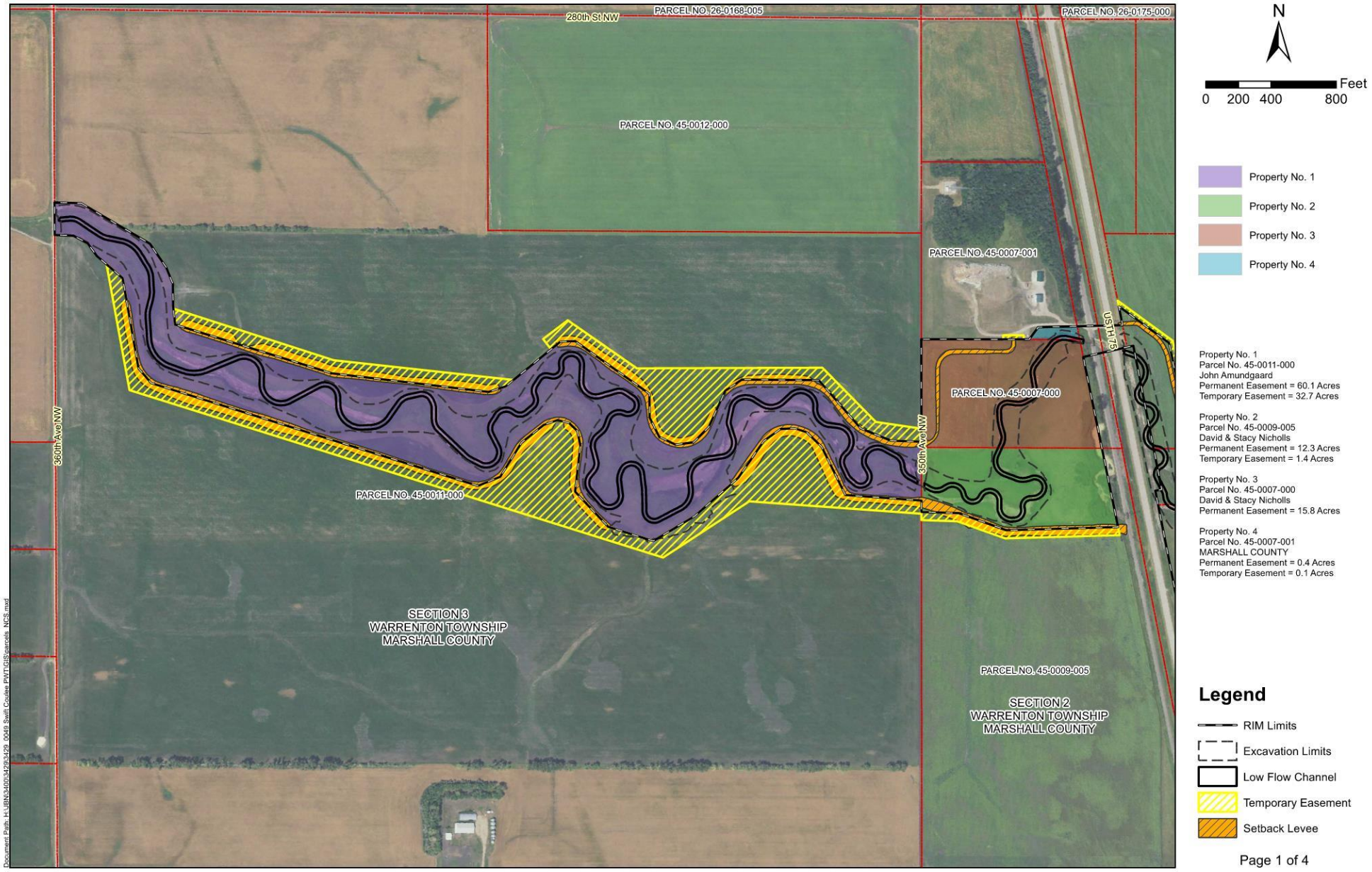


STA. 1000+83 TO 1287+00
TYPICAL CHANNEL SECTION
NOT TO SCALE

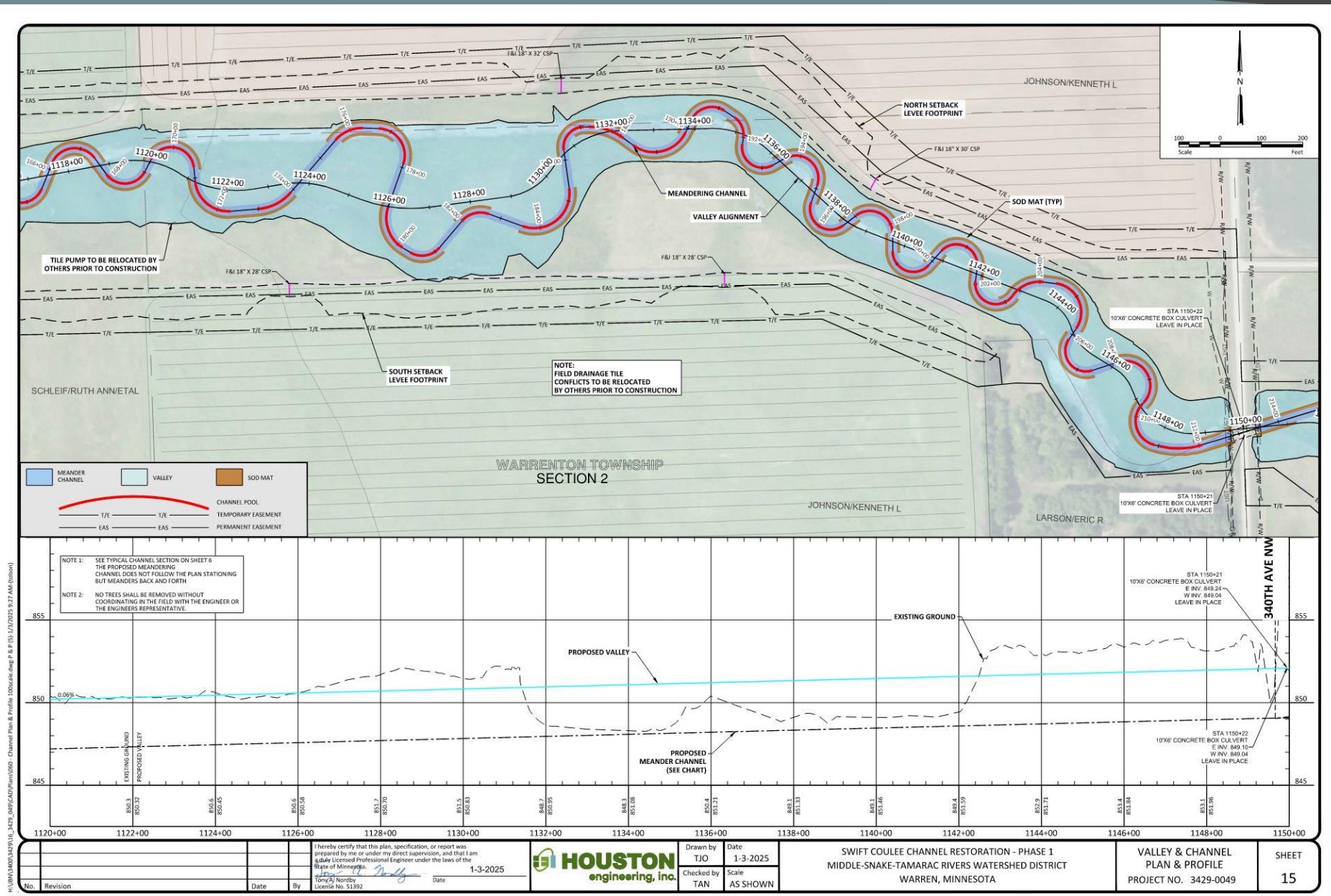
PHASE 1 DESIGN

- Design
  - Centerline culverts
    - Additional 48” added and altered roadway profile in current design at low water crossing west of Hwy 75 Sect 2/3 Warrenton for public waters requirements
    - All other centerline openings left as existing conditions – change from preliminary concept design
  - Side water inlet pipes with traps through setback levees for adjacent agricultural drainage
  - Rock riffles at downstream end of project – minimize channel grade & reduce excavation
  - Utilities – private & public

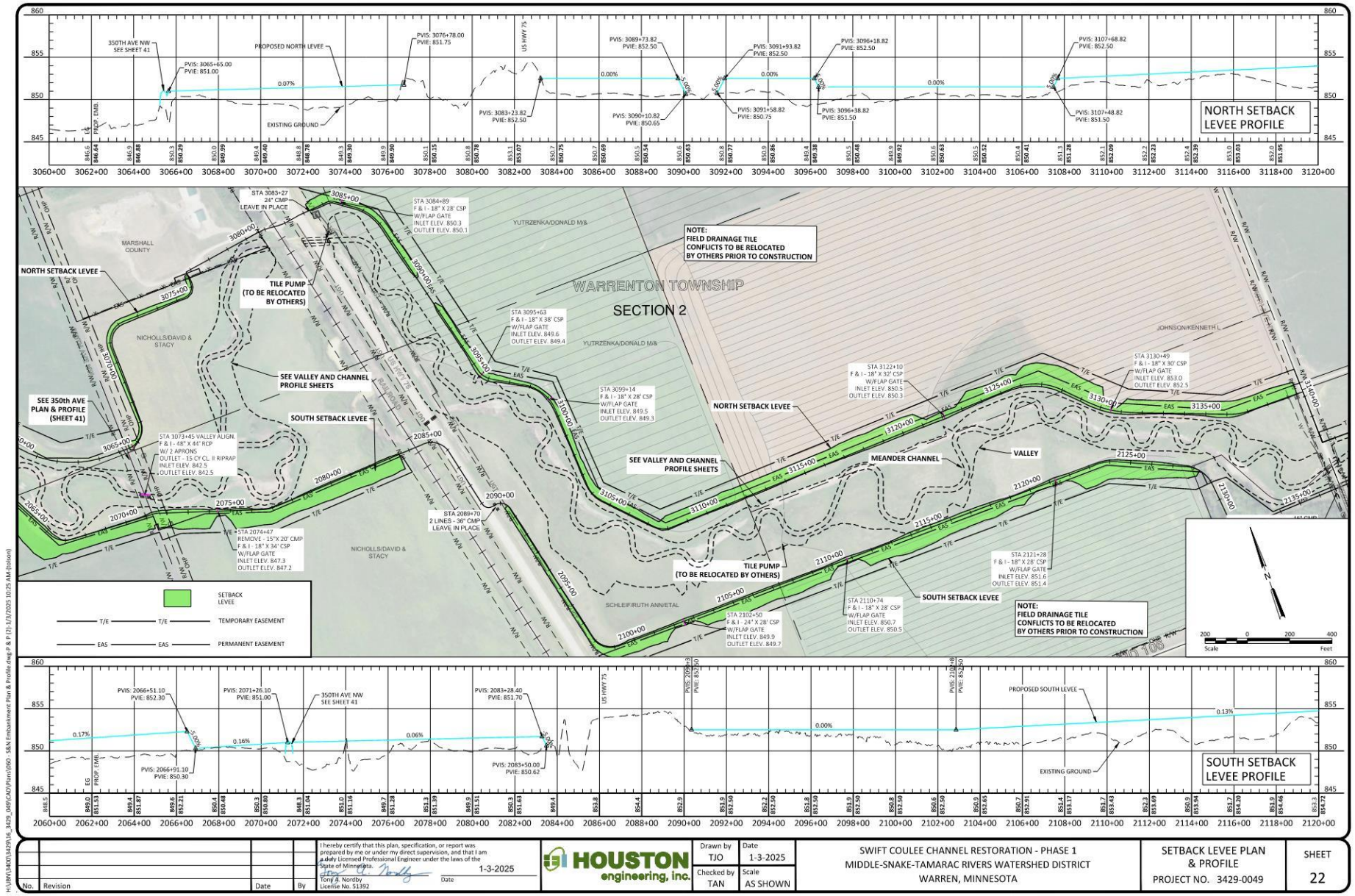
PROJECT PLAN



PROJECT PLAN



PROJECT PLAN

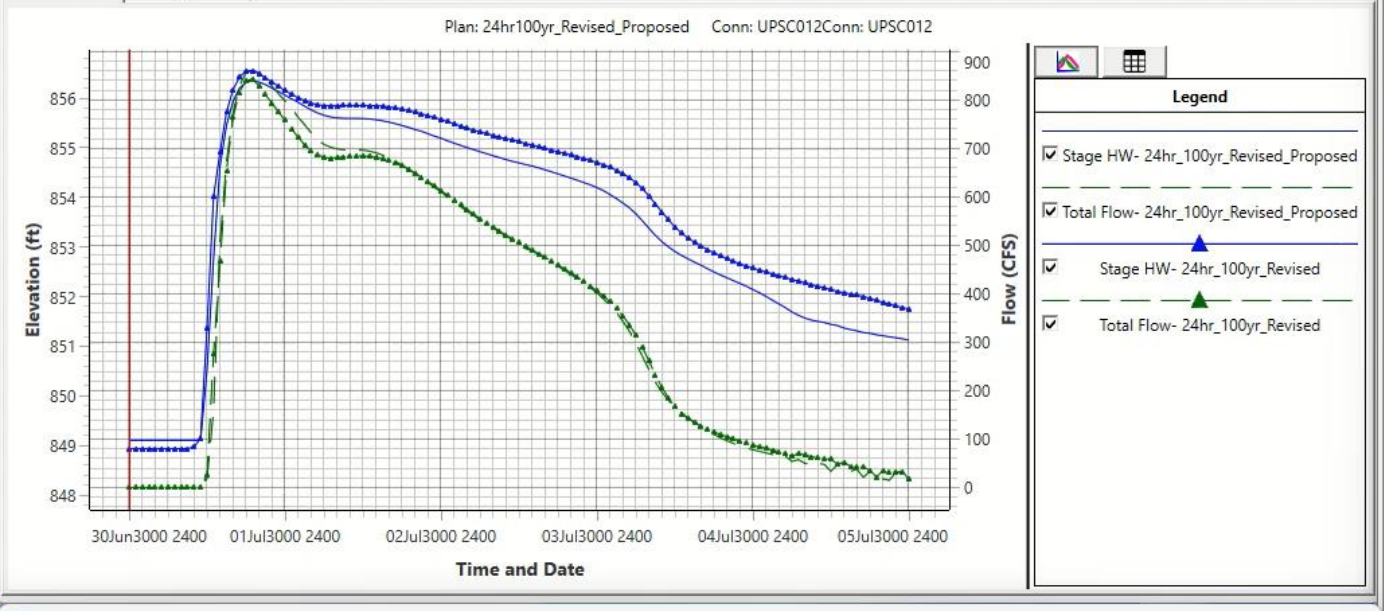


Conn: UPSC012

☑ Plot Stage ☑ Plot Flow ☑ Obs Stage ☑ Obs Flow ☐ Use Ref Stage

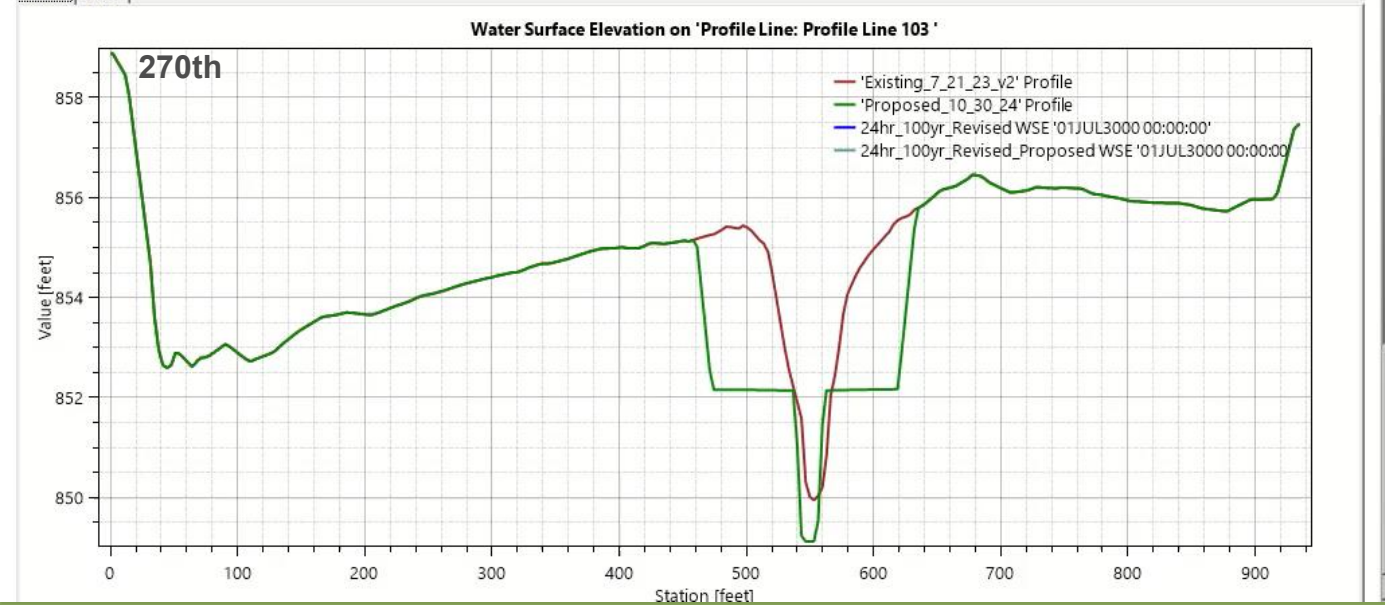
Time Series	Maximum	Time at Max	Volume ac-ft
24hr_100yr_Revised_Proposed:Stage HW	856.35	01Jul3000 1900	
24hr_100yr_Revised_Proposed:Total Flow	860.36	01Jul3000 1900	3557.62
24hr_100yr_Revised:Stage HW	856.56	01Jul3000 1900	

Time Series | Rating Curve



RASMapper Plot

Plot | Table



CHANNEL RESTORATION 5-YEAR DURATION RESULTS

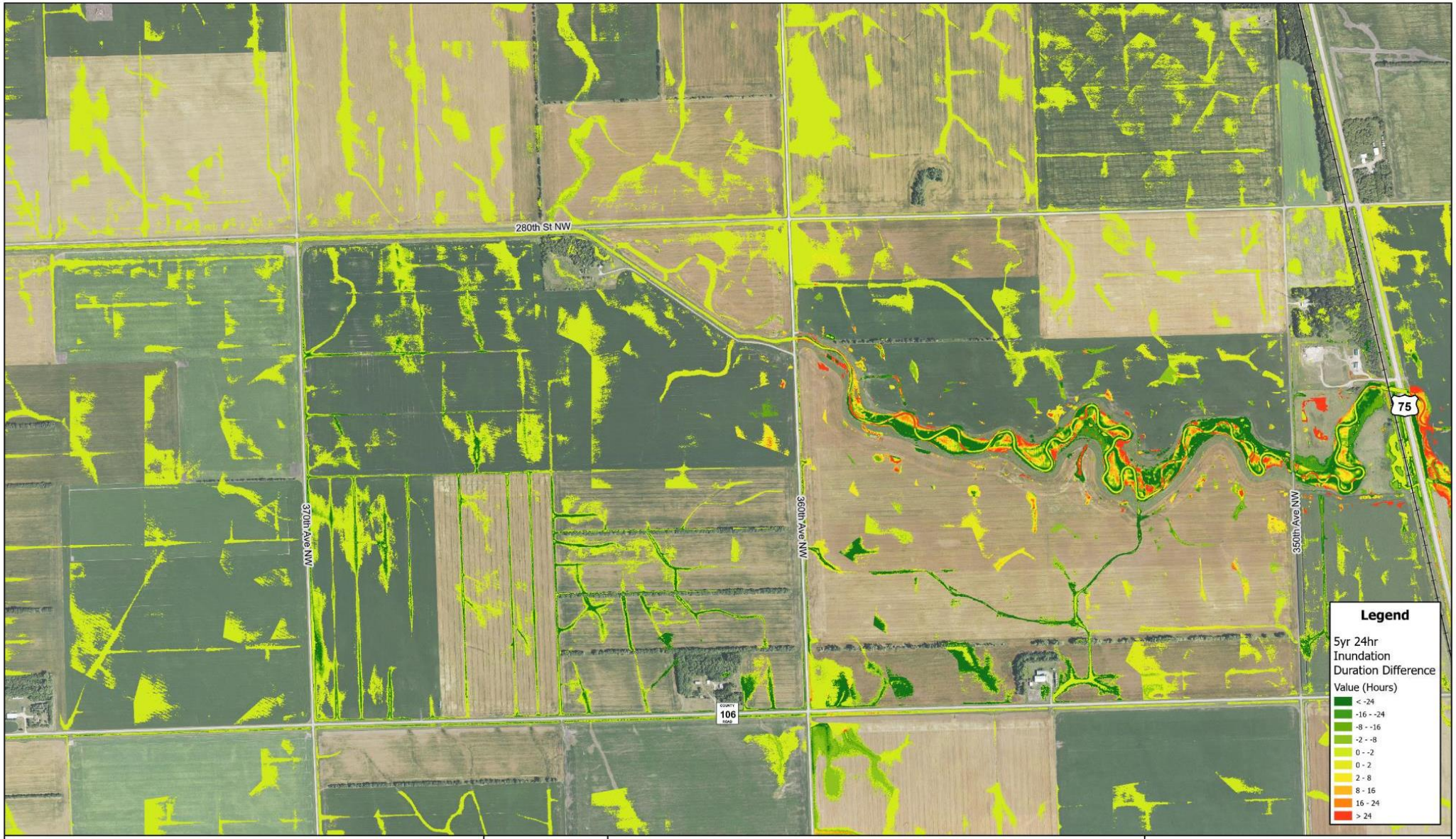


Exhibit 4 - 5yr 24hr Inundation Duration Difference

Engineer's Report
Swift Coulee Channel Restoration Project
Middle-Snake-Tamarac Rivers Watershed District

N W E S

0 0.07 0.15 0.3 0.45 0.6 Miles

HOUSTON engineering, inc.

CHANNEL RESTORATION 5-YEAR DURATION RESULTS

Exhibit 4 - 5yr 24hr Inundation Duration Difference

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HOUSTON engineering, inc.

CHANNEL RESTORATION 10-YEAR DURATION RESULTS

Exhibit 5 - 10yr 24hr Inundation Duration Difference

Engineer's Report
Swift Coulee Channel Restoration Project
Middle-Snake-Tamarac Rivers Watershed District

N
W E
S

0 0.07 0.15 0.3 0.45 0.6 Miles

HOUSTON engineering, inc.

CHANNEL RESTORATION 10-YEAR DURATION RESULTS

Exhibit 5 - 10yr 24hr Inundation Duration Difference

Engineer's Report
Swift Coulee Channel Restoration Project
Middle-Snake-Tamarac Rivers Watershed District

N W E S

0 0.07 0.15 0.3 0.45 0.6 Miles

HOUSTON engineering, inc.

CHANNEL RESTORATION 100-YEAR DURATION RESULTS

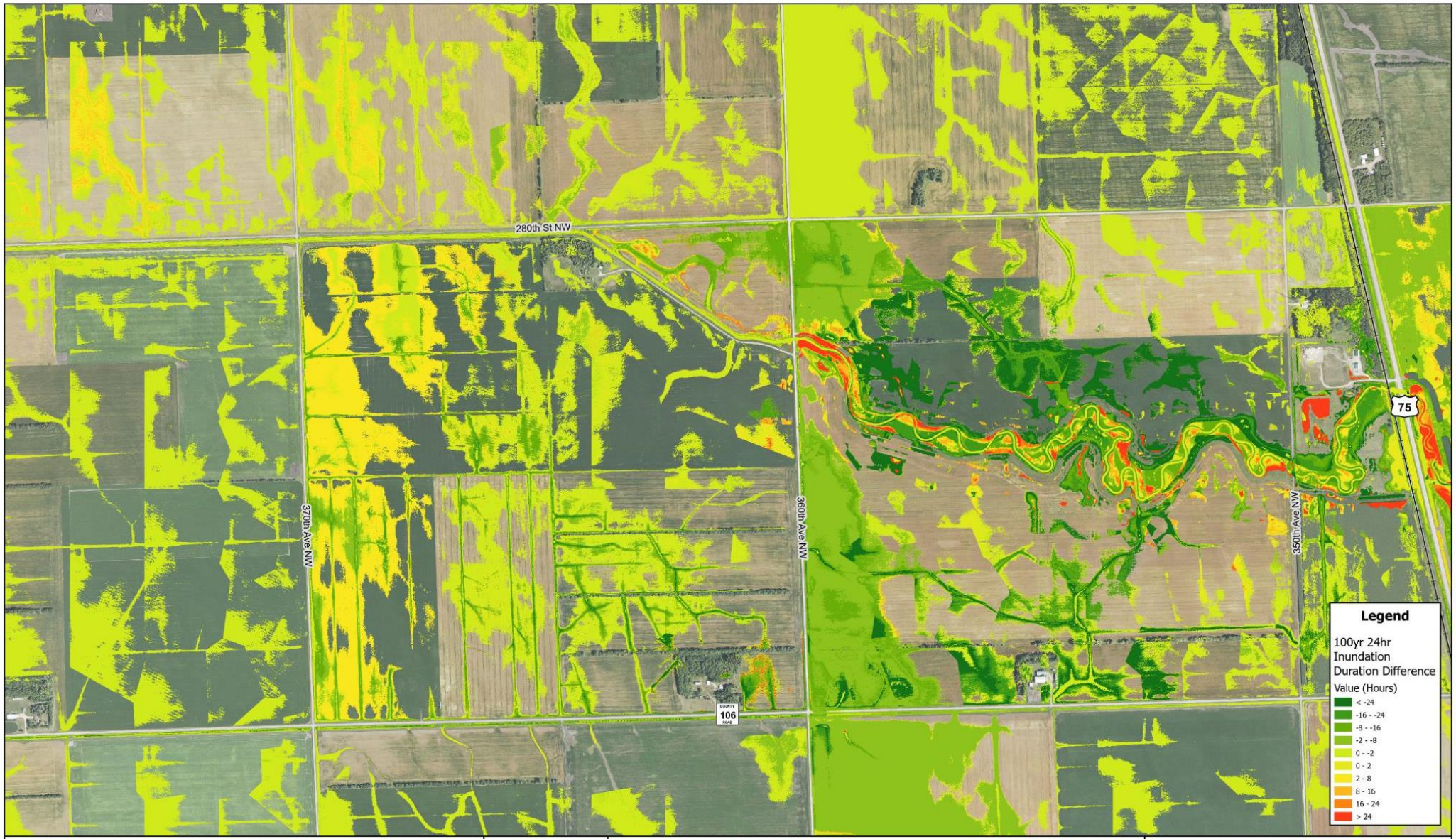

Exhibit 6 - 100yr 24hr Inundation Duration Difference

Engineer's Report
Swift Coulee Channel Restoration Project
Middle-Snake-Tamarac Rivers Watershed District

N W E S

0 0.07 0.15 0.3 0.45 0.6 Miles

HOUSTON engineering, inc.

CHANNEL RESTORATION 100-YEAR DURATION RESULTS

Exhibit 6 - 100yr 24hr Inundation Duration Difference

Engineer's Report
Swift Coulee Channel Restoration Project
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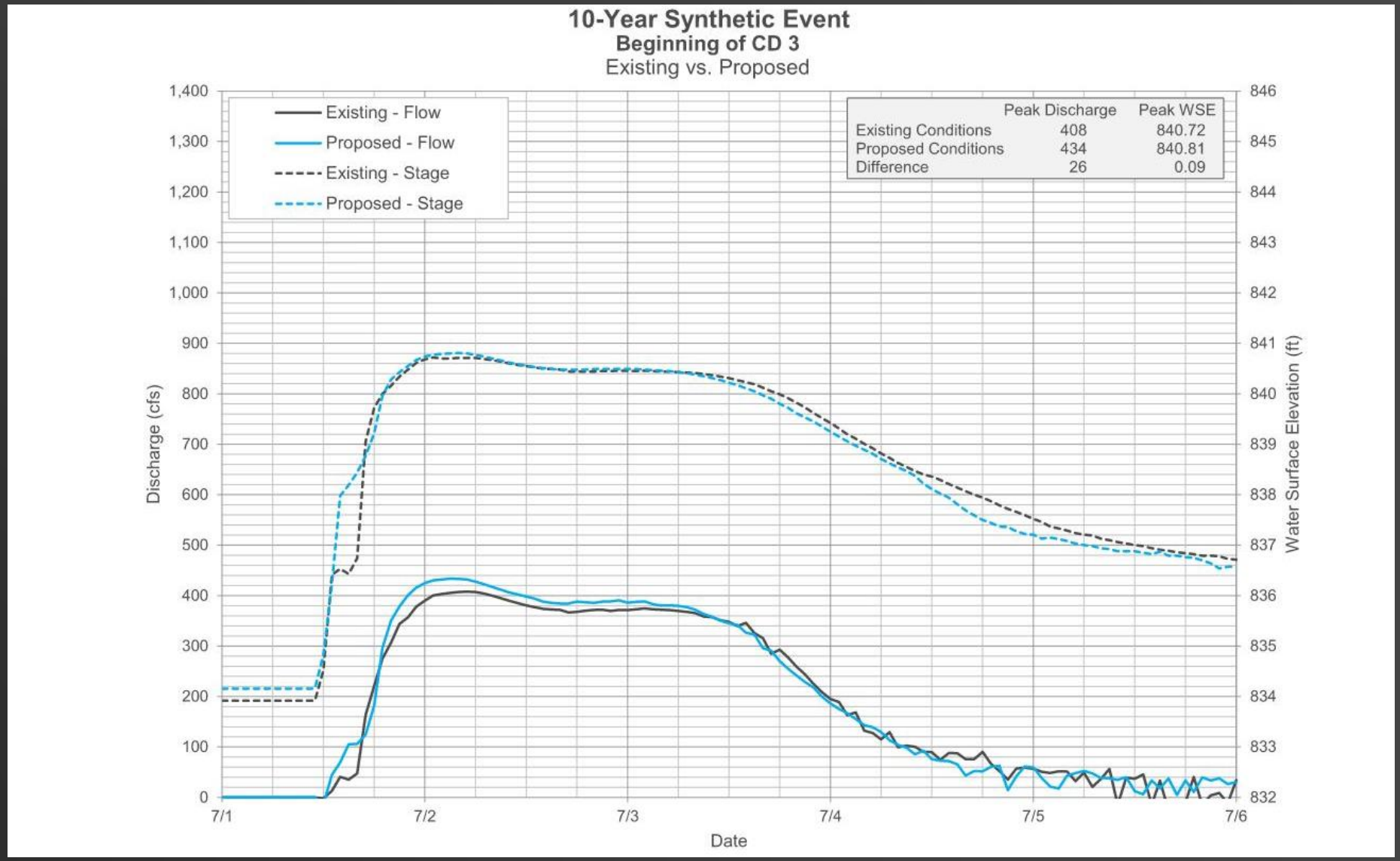
N W E S

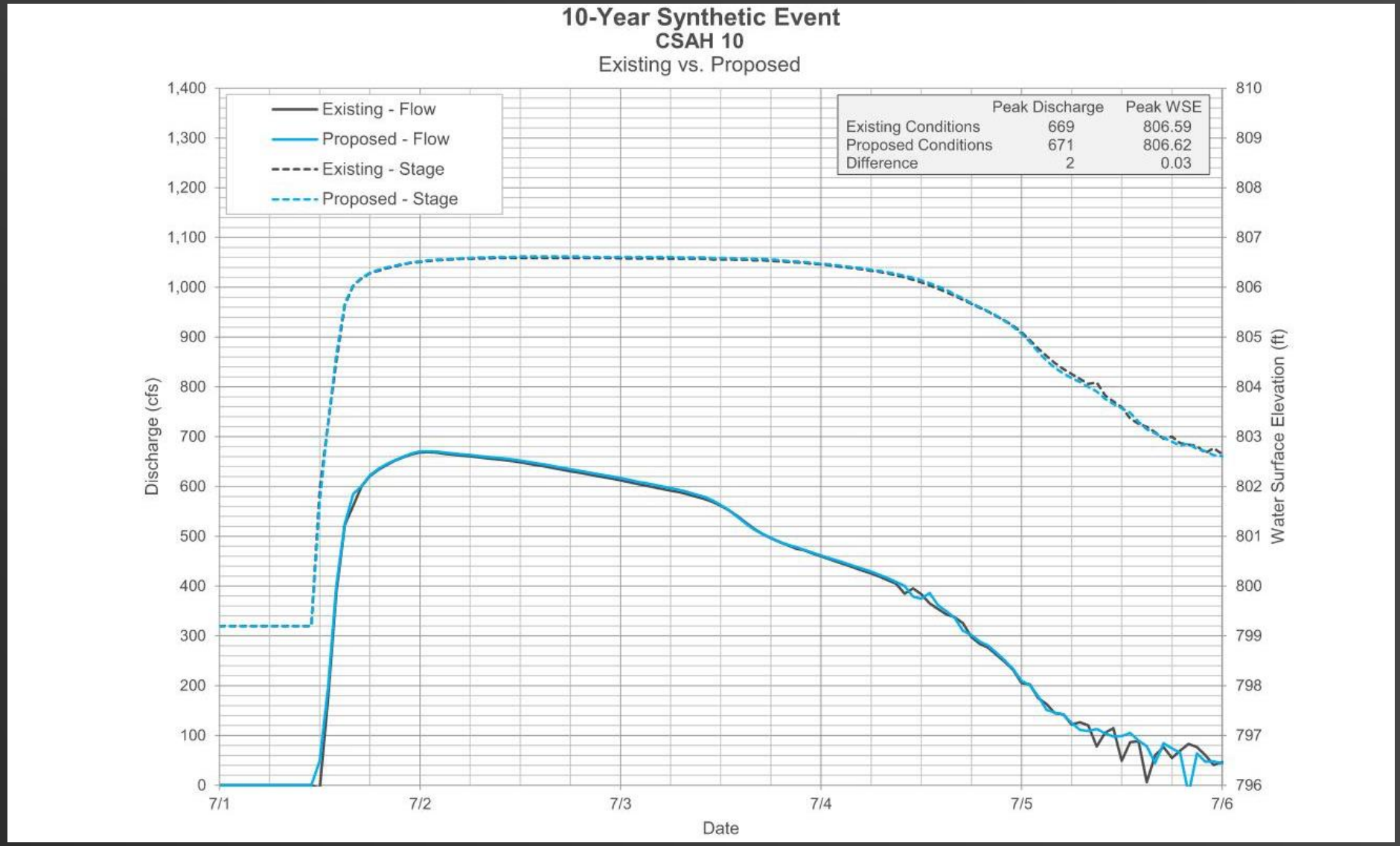
0 0.07 0.15 0.3 0.45 0.6 Miles

HOUSTON engineering, inc.

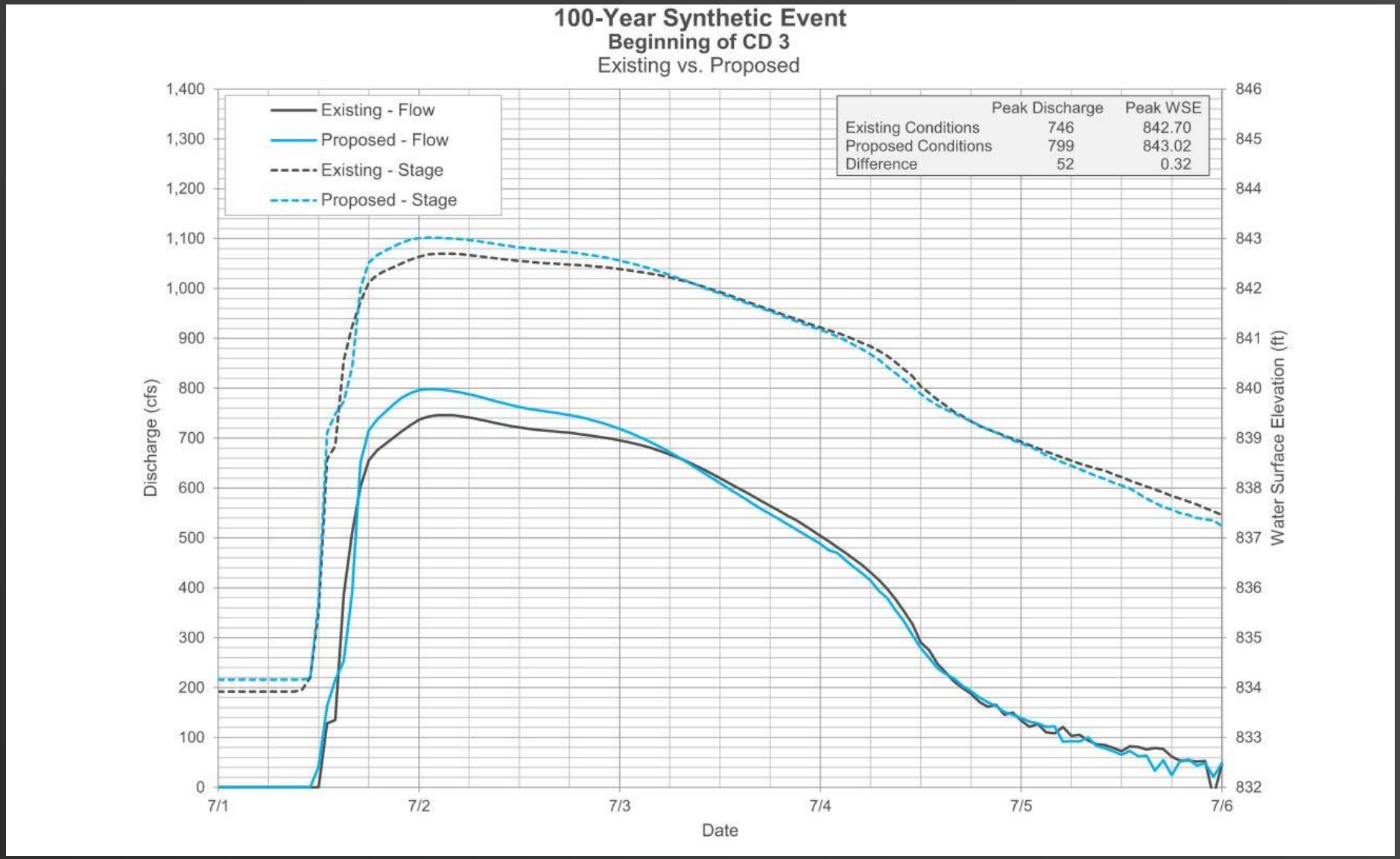
CHANNEL RESTORATION 10-YEAR PEAK FLOW COMPARISON



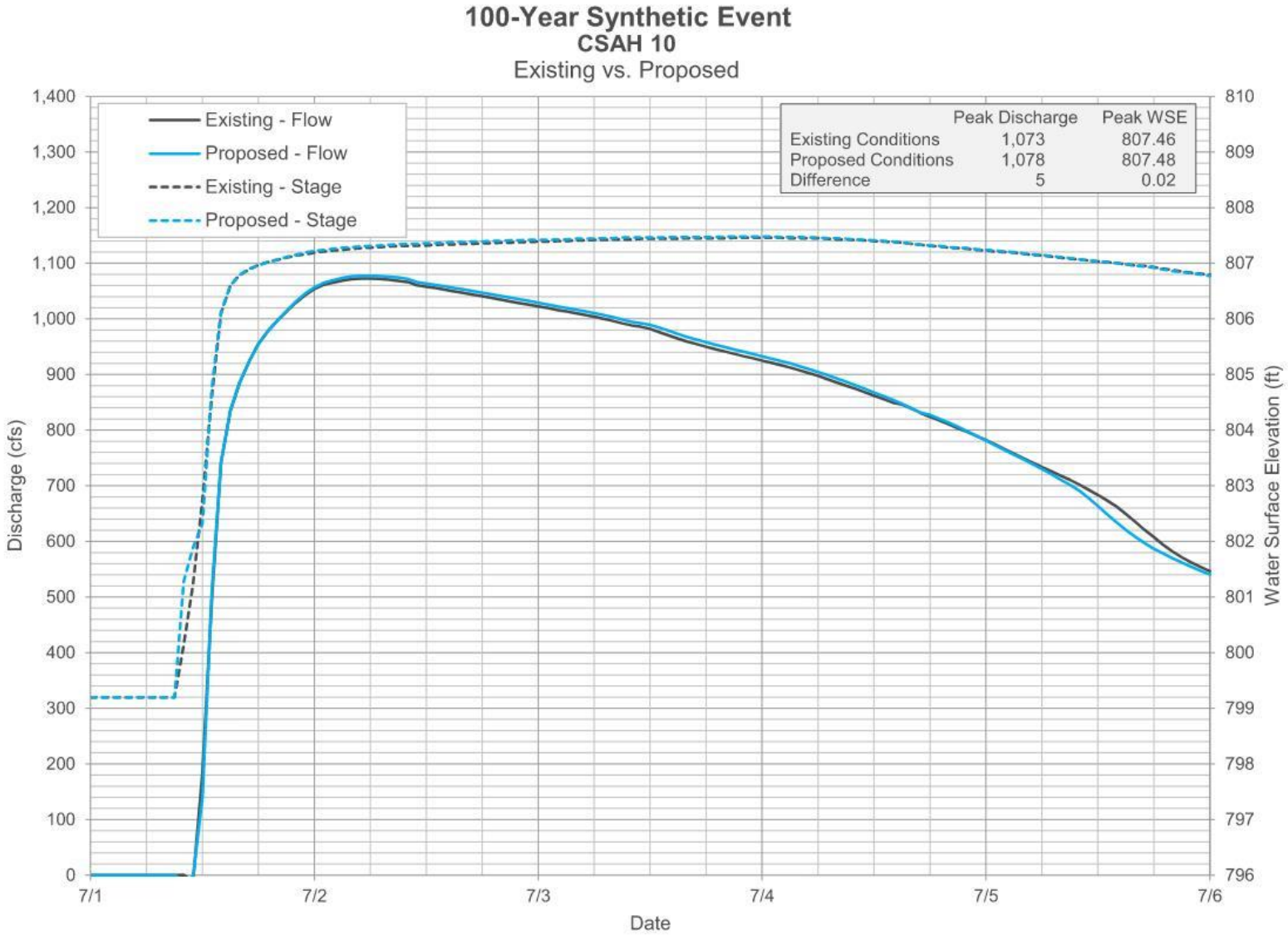
CHANNEL RESTORATION 10-YEAR PEAK FLOW COMPARISON



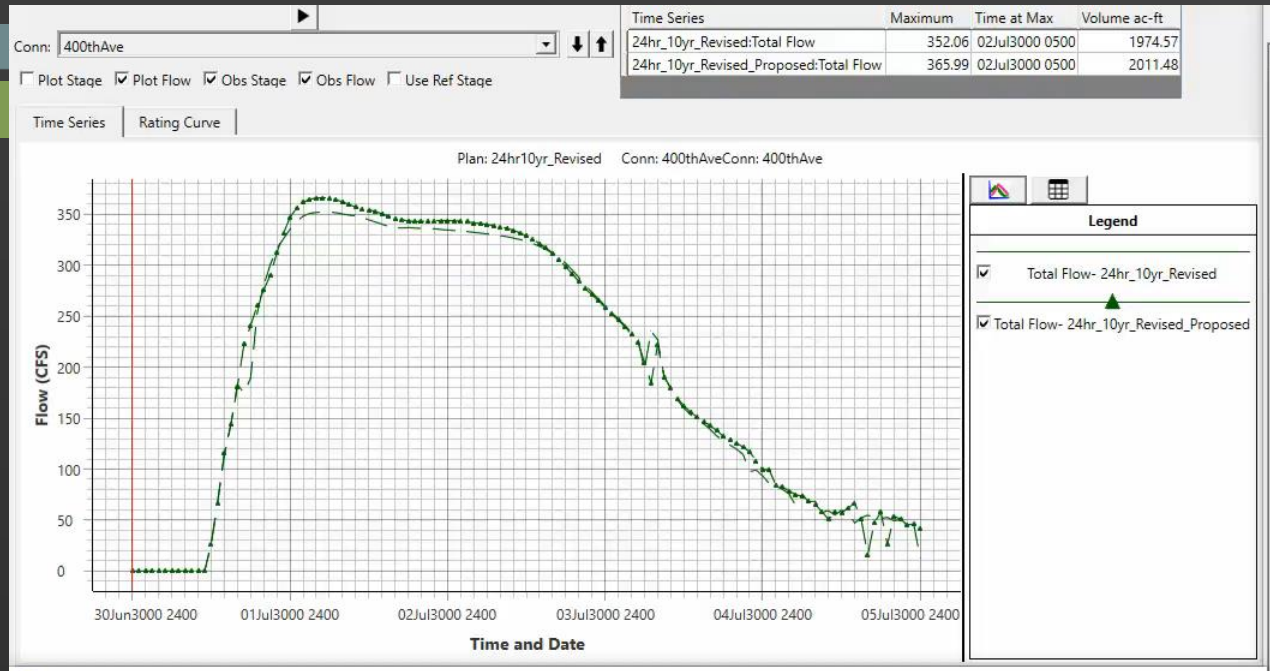
CHANNEL RESTORATION 100-YEAR PEAK FLOW COMPARISON



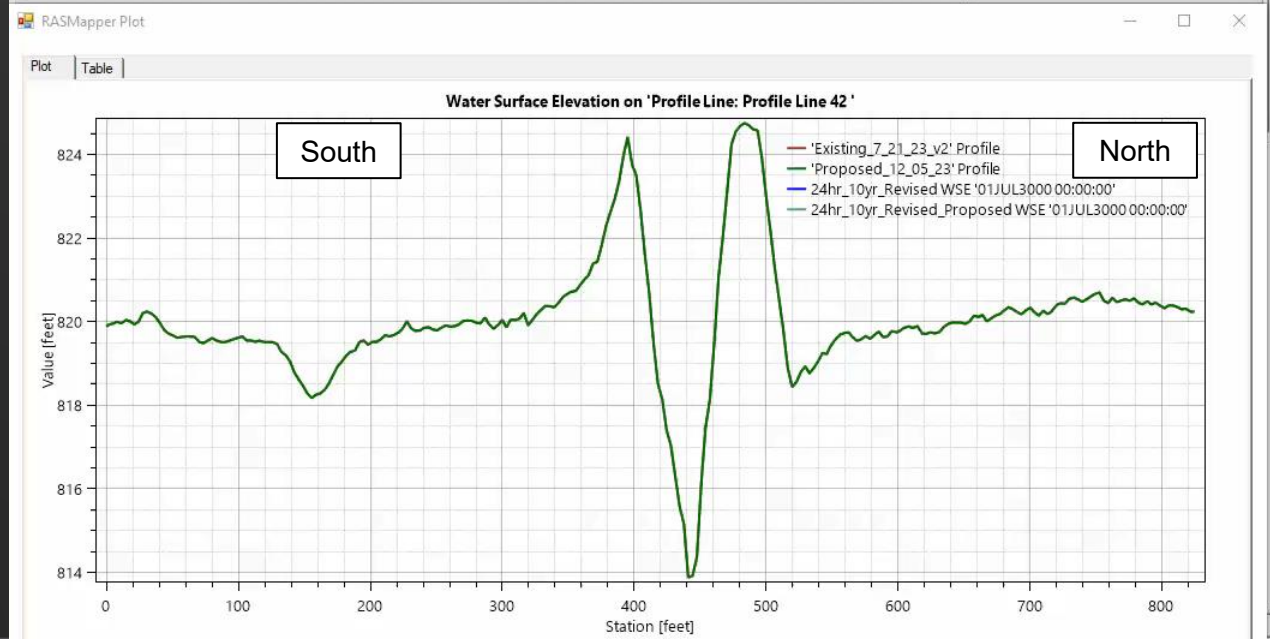
CHANNEL RESTORATION 100-YEAR PEAK FLOW COMPARISON

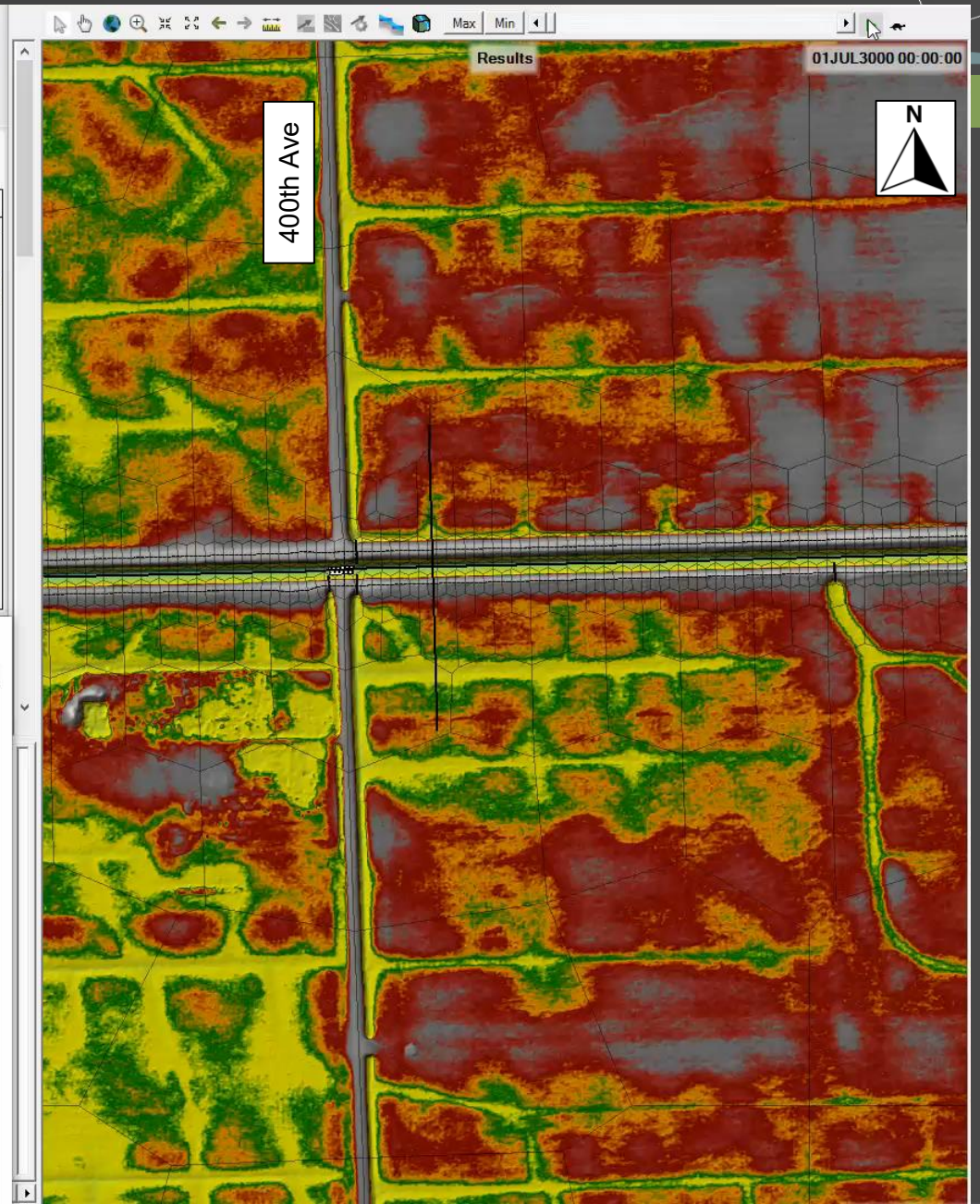


10-YEAR WATER SURFACE/DURATION COMPARISON CD #3

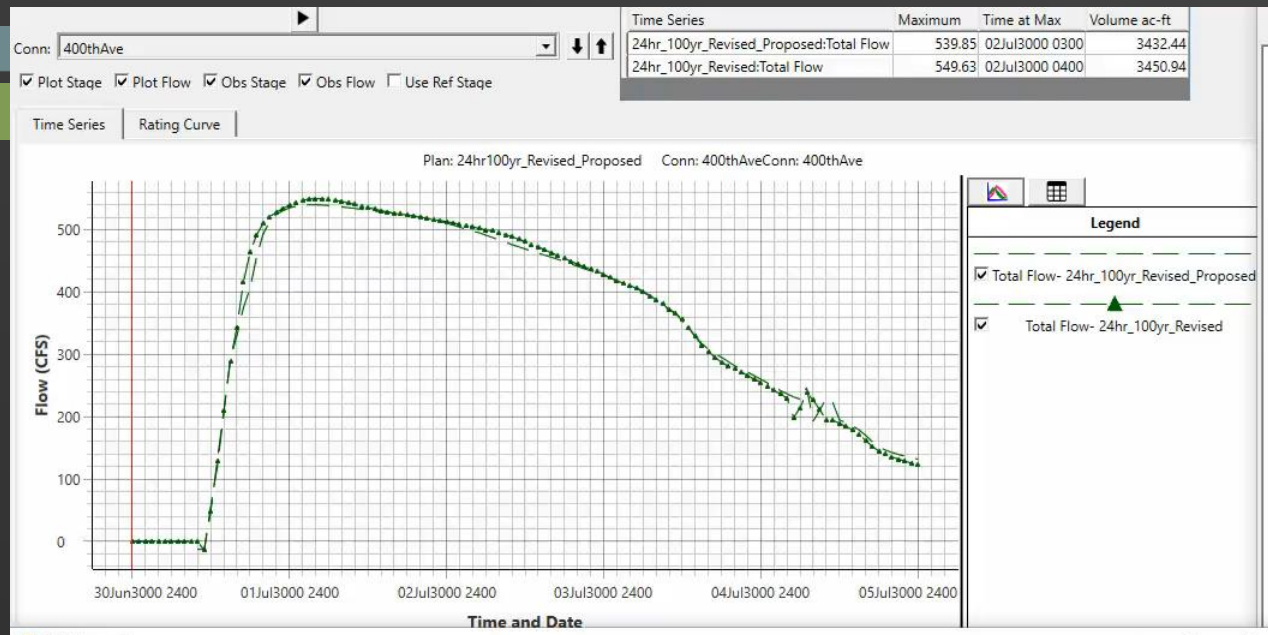


Time Series	Maximum	Time at Max	Volume ac-ft
24hr_10yr_Revised:Total Flow	352.06	02Jul3000 0500	1974.57
24hr_10yr_Revised_Proposed:Total Flow	365.99	02Jul3000 0500	2011.48

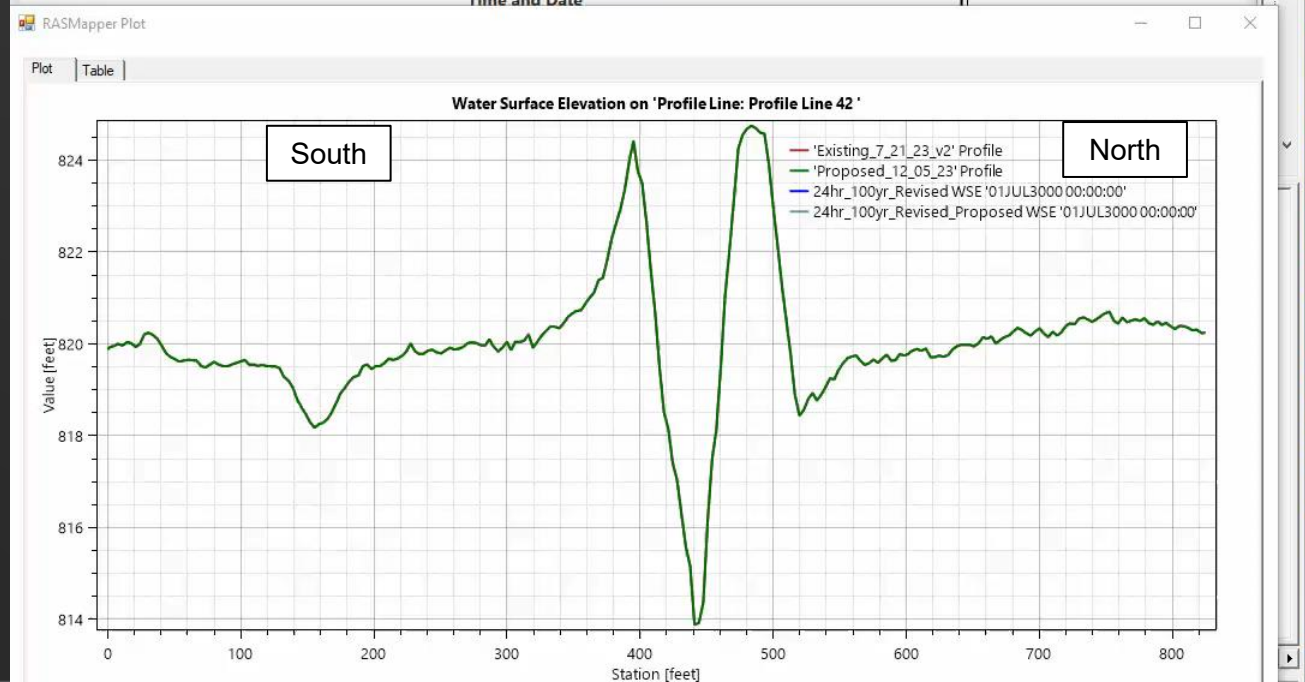


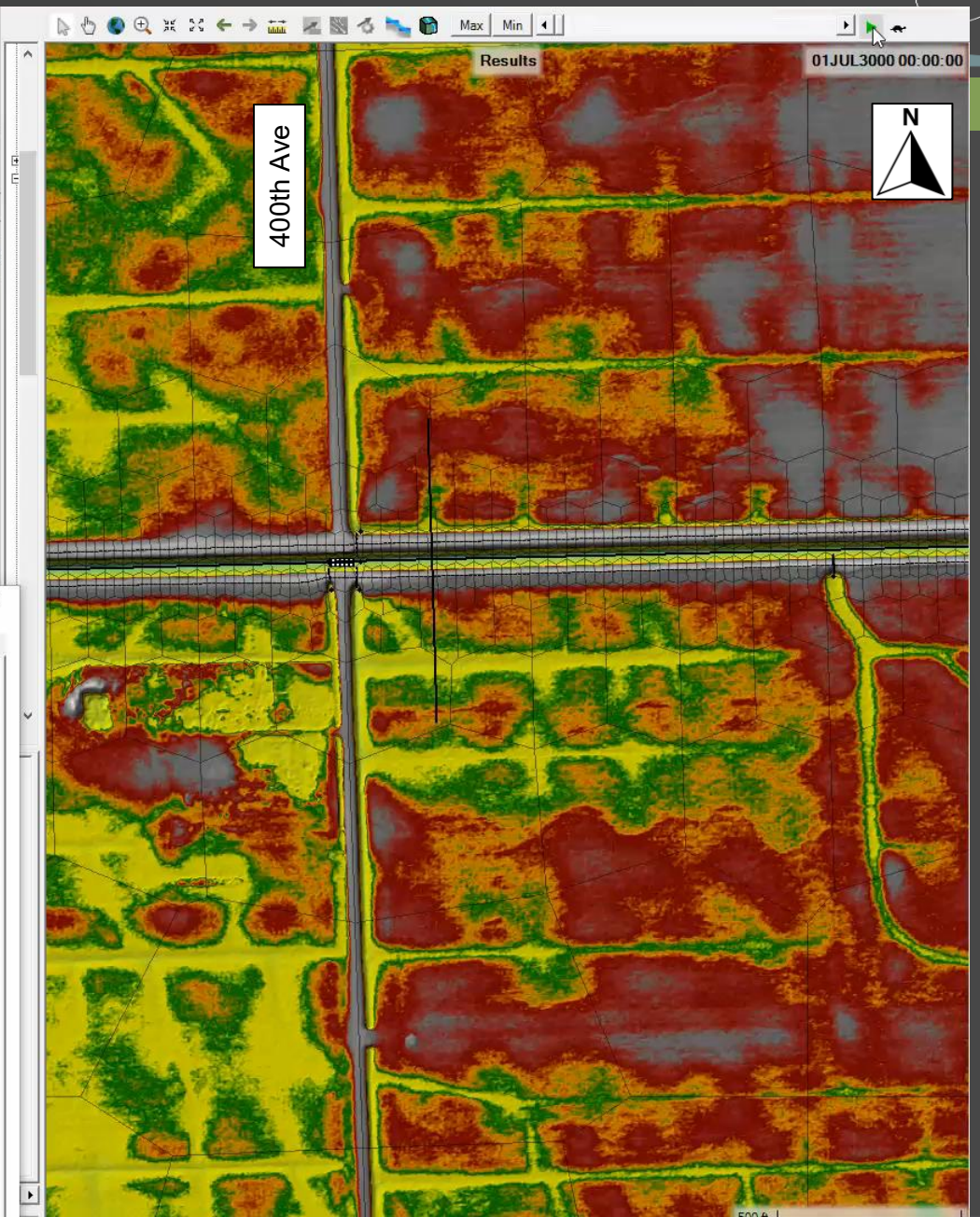


100-YEAR WATER SURFACE/DURATION COMPARISON CD #3



Time Series	Maximum	Time at Max	Volume ac-ft
24hr_100yr_Revised_Proposed:Total Flow	539.85	02Jul3000 0300	3432.44
24hr_100yr_Revised:Total Flow	549.63	02Jul3000 0400	3450.94





ENGINEER'S ESTIMATED PROJECT COST

- Construction Total = $3,033,937
  - Contingencies (10%) = $303,393
  - Engineering (Final Design, Permitting, Easements, Construction) = $350,000
  - Utilities = $150,000
  - Environmental Mitigation = $54,000
  - Permanent Easement (RIM & MSTRWD) = $1,129,752
  - Temporary Construction Easement = $18,480
  - 1st Year RIM Mowing Maintenance = $20,000

- Total Project Cost = $5,060,000

- Project funding all State and MSTRWD project funds
  - No local tax/special assessment for construction costs
  - Future Maintenance – Water Management District at some point down the road

PHASE 1 SCHEDULE

- MSTRWD/Landowner Agreements – permanent easement/temporary construction easement Completed
- Permitting – Completed
- Finalize Plans/Specifications - Completed
- Final Hearing
- Advertise for Bids in February – Open Bids in March
- Construction - 2025
- RIM Easement Completion – In process

Questions/Discussion

ADVISORY REPORT ANSWER

- Does the 6% increase in peak flow on CD for a 10-year event cause damage to the channel section.
  - The channel velocities were reviewed between 370th and 400th Avenue to compare existing/proposed velocities. For the 10-year the modeling shows an increase between 0.03 to 0.07 fps increase, which is negligible for damage to the ditch system.

CHANNEL RESTORATION RAINFALL

Table 1 – Inundated Lands Summary

Runoff Event	Rainfall Depth* Inches	Total Inundated Acres	Agriculture** Inundated Acres	% of Total Drainage Area
2-year, 24-hour	2.3	2,623	2,108	7
5-year, 24-hour	2..9	4,313	3,600	12
10-year, 24-hour	3.5	5,938	5,061	17
25-year, 24-hour	4.4	7,966	6,920	23
50-year, 24-hour	5.1	10,402	9,148	30
100-year, 24-hour	5.9	12,163	10,751	35

Swift Coulee/ MCD #3 Total Drainage Area = 30,494 Acres

**NOAA Atlas 14 Rainfall Depths*

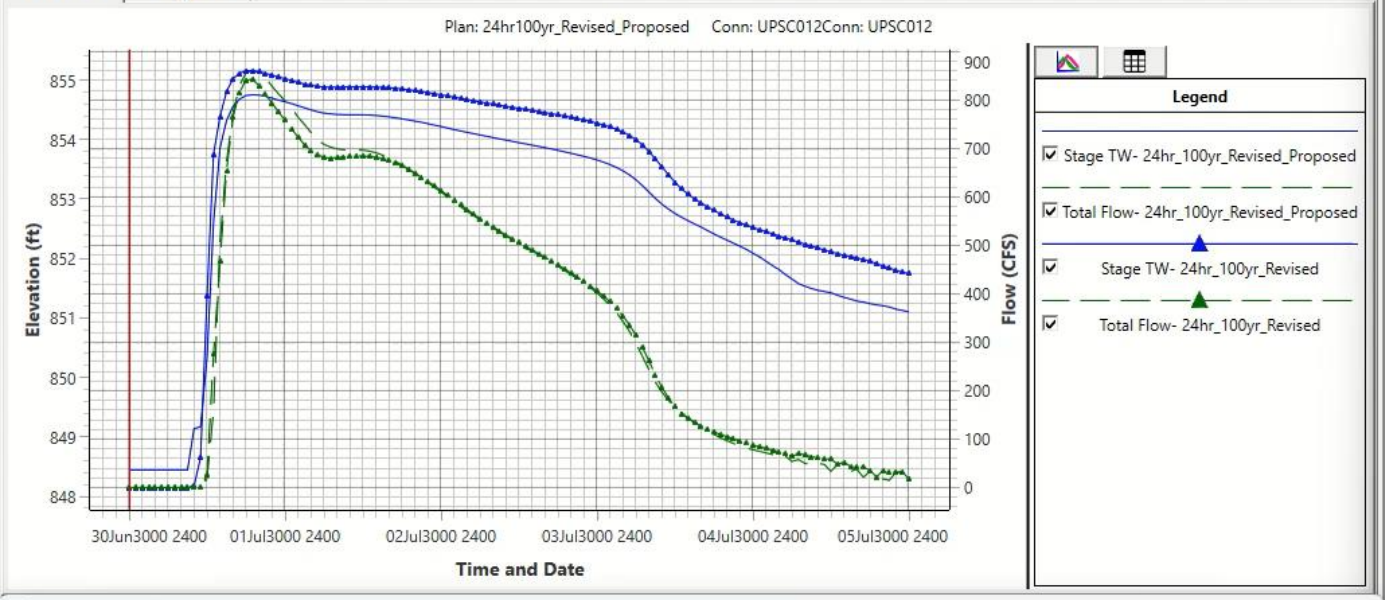
***Estimated from National Agricultural Statistics Service 2016 Class GIS data layer*

Conn: UPSC012

☑ Plot Stage ☑ Plot Flow ☑ Obs Stage ☑ Obs Flow ☐ Use Ref Stage

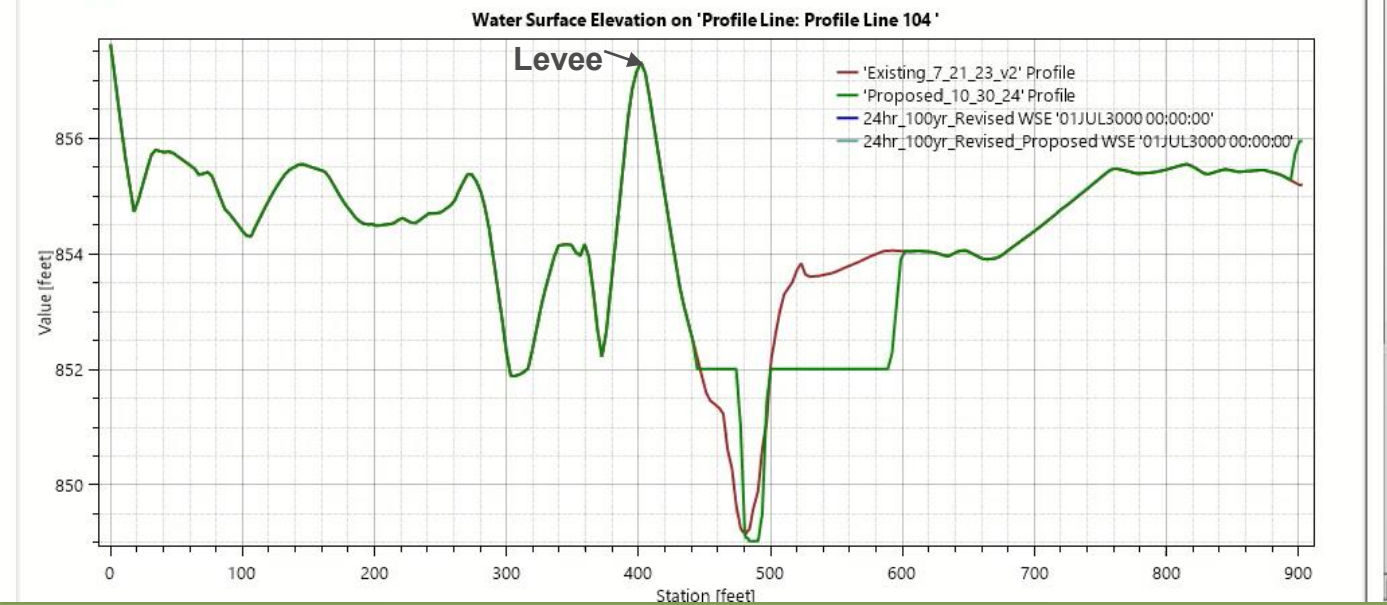
Time Series	Maximum	Time at Max	Volume ac-ft
24hr_100yr_Revised_Proposed:Stage TW	854.75	01Jul3000 1900	
24hr_100yr_Revised_Proposed:Total Flow	860.36	01Jul3000 1900	3557.62
24hr_100yr_Revised:Stage TW	855.16	01Jul3000 1900	

Time Series | Rating Curve



RASMapper Plot

Plot | Table



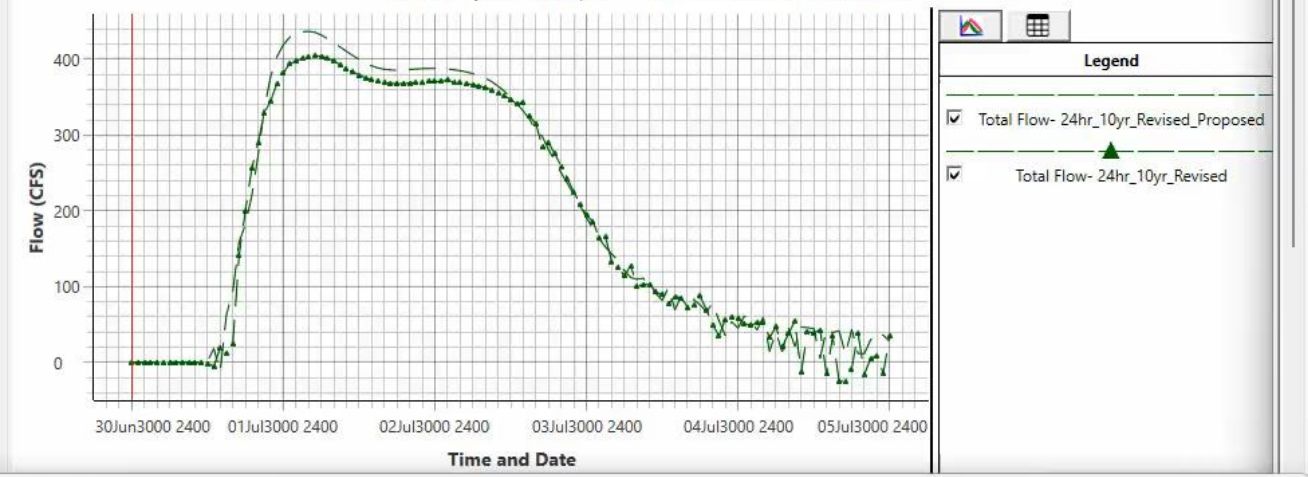
Conn: 360th Ave 2

☑ Plot Stage ☑ Plot Flow ☑ Obs Stage ☑ Obs Flow ☐ Use Ref Stage

Time Series	Maximum	Time at Max	Volume ac
24hr_10yr_Revised_Proposed:Total Flow	436.86	02Jul3000 0400	19
24hr_10yr_Revised:Total Flow	404.62	02Jul3000 0500	182

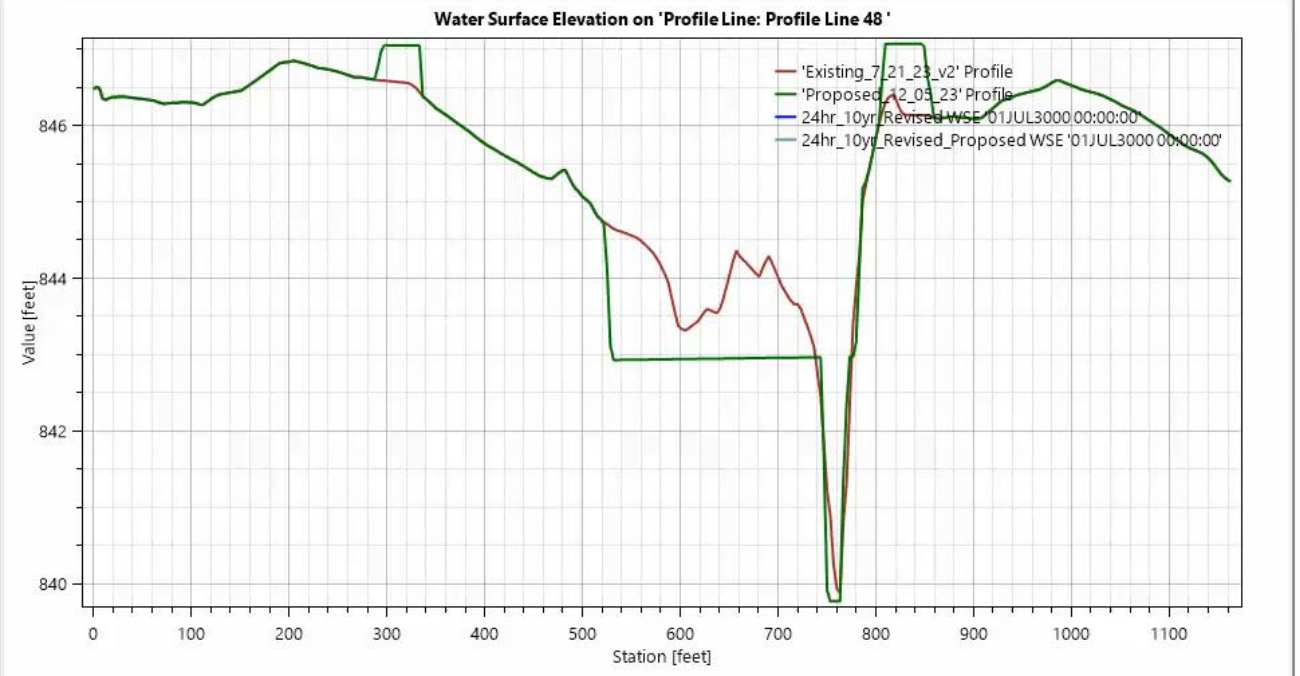
Time Series | Rating Curve

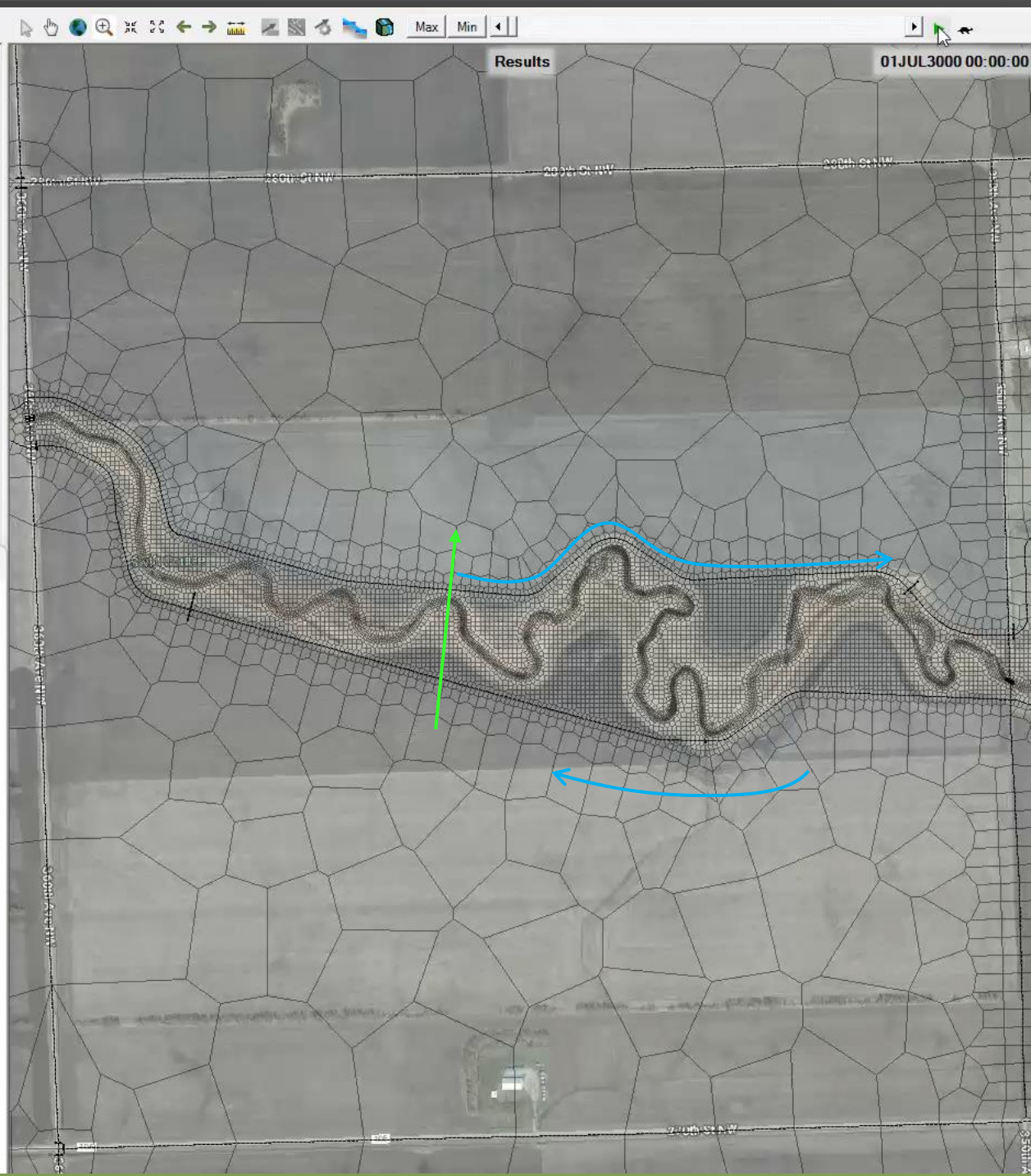
Plan: 24hr10yr_Revised_Proposed Conn: 360th_Ave_2Conn: 360th_Ave_2



RASMapper Plot

Plot | Table





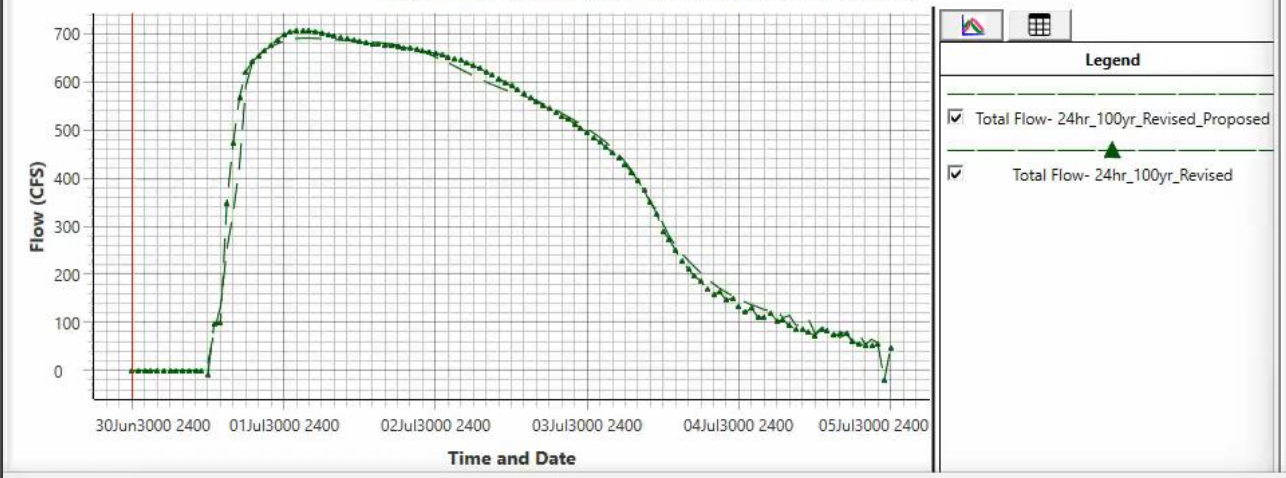
Conn: 360th Ave 2

Plot Stage | Plot Flow | Obs Stage | Obs Flow | Use Ref Stage

Time Series	Maximum	Time at Max	Volume a
24hr_100yr_Revised_Proposed:Total Flow	691.02	02Jul3000 0300	3
24hr_100yr_Revised:Total Flow	706.63	02Jul3000 0300	37

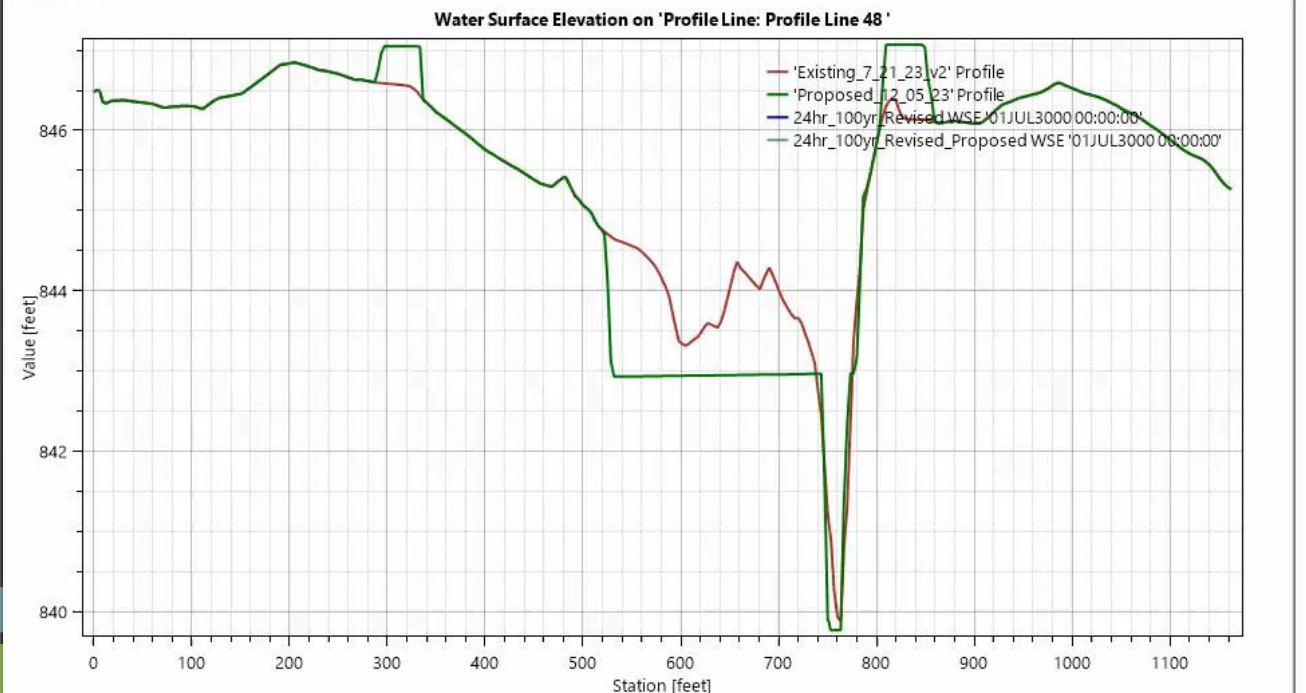
Time Series | Rating Curve

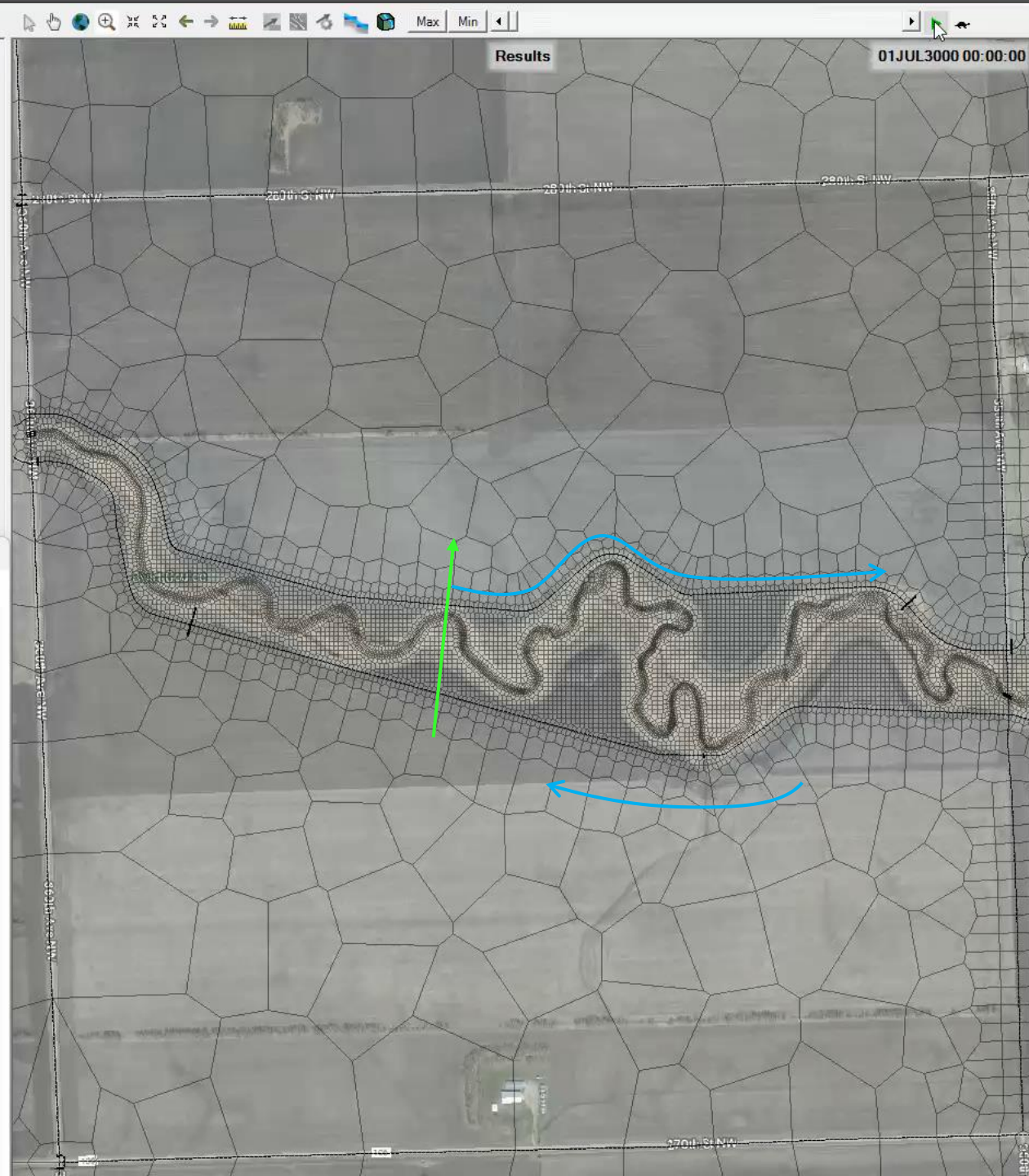
Plan: 24hr100yr_Revised_Proposed Conn: 360th_Ave_2Conn: 360th_Ave_2



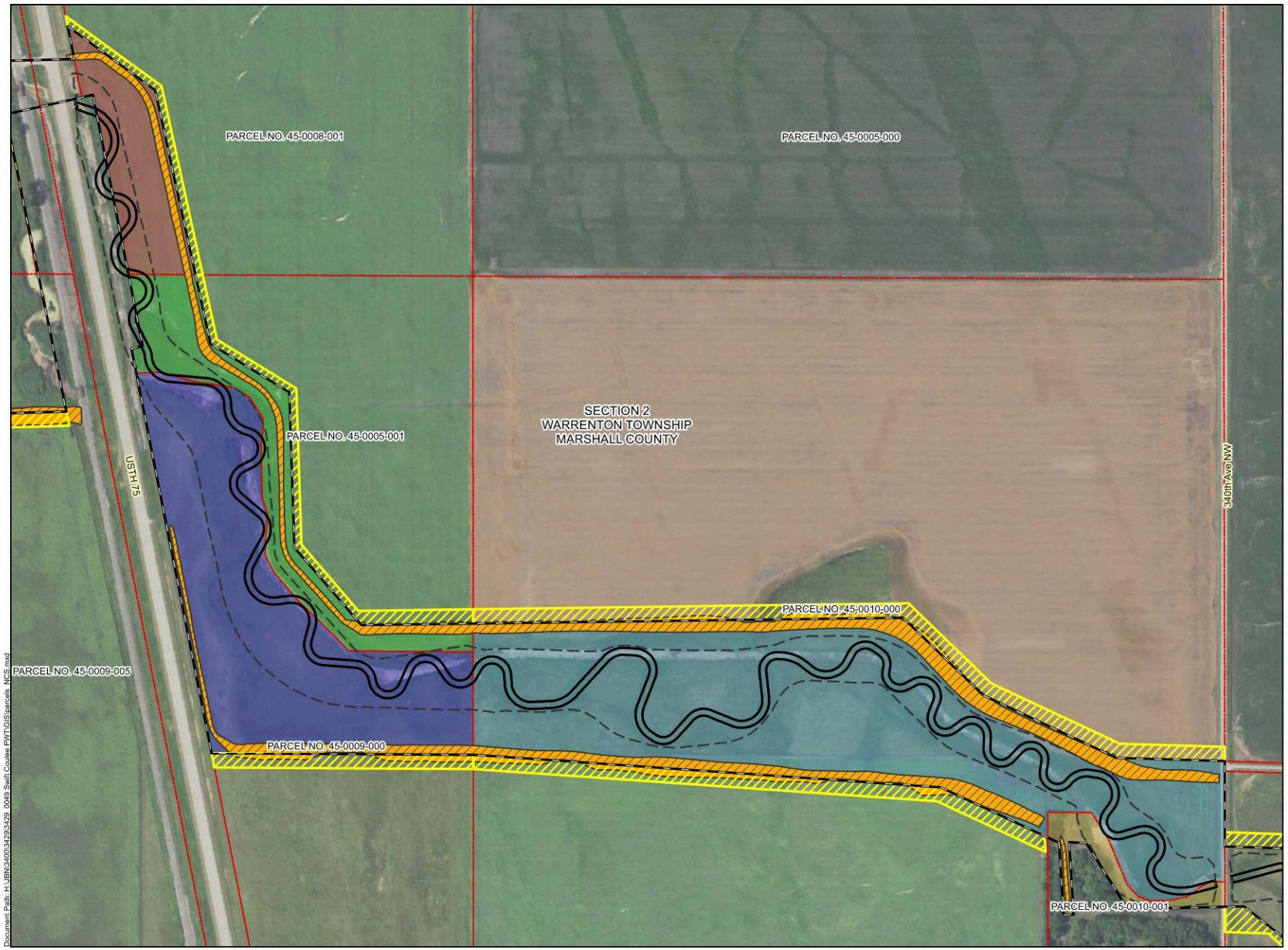
RASMapper Plot

Plot | Table





PROJECT PLAN



N

0 125 250 500 Feet

Property No. 5
Property No. 6
Property No. 7
Property No. 8
Property No. 9

Property No. 5
Parcel No. 45-0008-001
Donald & Mark Yutrezenka
Permanent Easement = 4.1 Acres
Temporary Easement = 0.6 Acres

Property No. 6
Parcel No. 45-0005-001
Donald & Mark Yutrezenka
Permanent Easement = 5.7 Acres
Temporary Easement = 1.3 Acres

Property No. 7
Parcel No. 45-0009-000
Ruth Ann Shlief ETAL
Permanent Easement = 16.4 Acres
Temporary Easement = 1 Acre

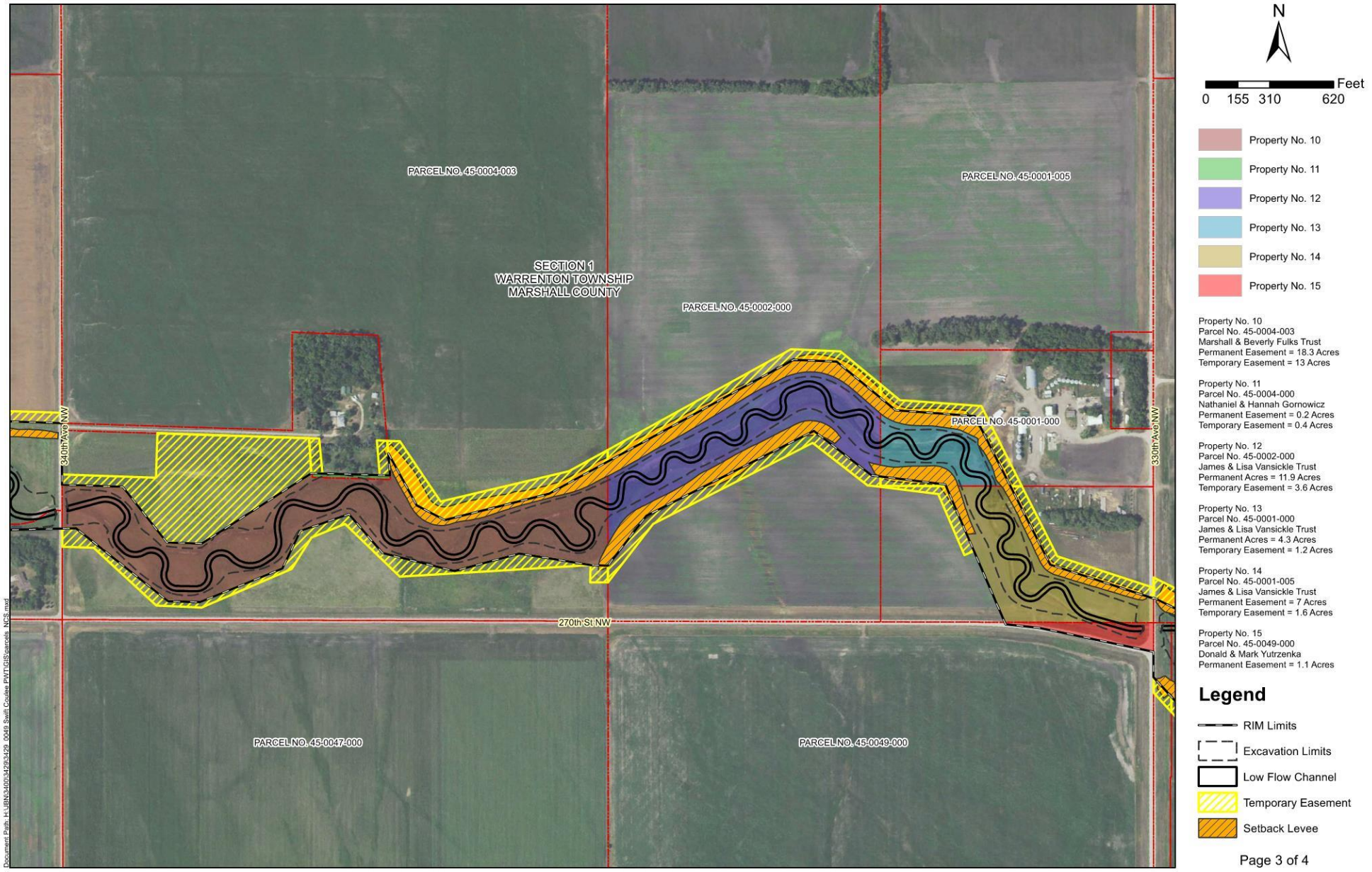
Property No. 8
Parcel No. 45-0010-000
Kenneth Johnson
Permanent Easement = 28.9 Acres
Temporary Easement = 3.9 Acres

Property No. 9
Parcel No. 45-0010-001
Eric Larson
Permanent Easement = 1.3 Acres

Legend

- RIM Limits
- Excavation Limits
- Low Flow Channel
- Temporary Easement
- Setback Levee

PROJECT PLAN



N

0 155 310 620 Feet

Property No. 10
Property No. 11
Property No. 12
Property No. 13
Property No. 14
Property No. 15

Property No. 10
Parcel No. 45-0004-003
Marshall & Beverly Fulks Trust
Permanent Easement = 18.3 Acres
Temporary Easement = 13 Acres

Property No. 11
Parcel No. 45-0004-000
Nathaniel & Hannah Gornowicz
Permanent Easement = 0.2 Acres
Temporary Easement = 0.4 Acres

Property No. 12
Parcel No. 45-0002-000
James & Lisa Vansickle Trust
Permanent Acres = 11.9 Acres
Temporary Easement = 3.6 Acres

Property No. 13
Parcel No. 45-0001-000
James & Lisa Vansickle Trust
Permanent Acres = 4.3 Acres
Temporary Easement = 1.2 Acres

Property No. 14
Parcel No. 45-0001-005
James & Lisa Vansickle Trust
Permanent Easement = 7 Acres
Temporary Easement = 1.6 Acres

Property No. 15
Parcel No. 45-0049-000
Donald & Mark Yutrzenka
Permanent Easement = 1.1 Acres

Legend

RIM Limits
Excavation Limits
Low Flow Channel
Temporary Easement
Setback Levee

PROJECT PLAN