

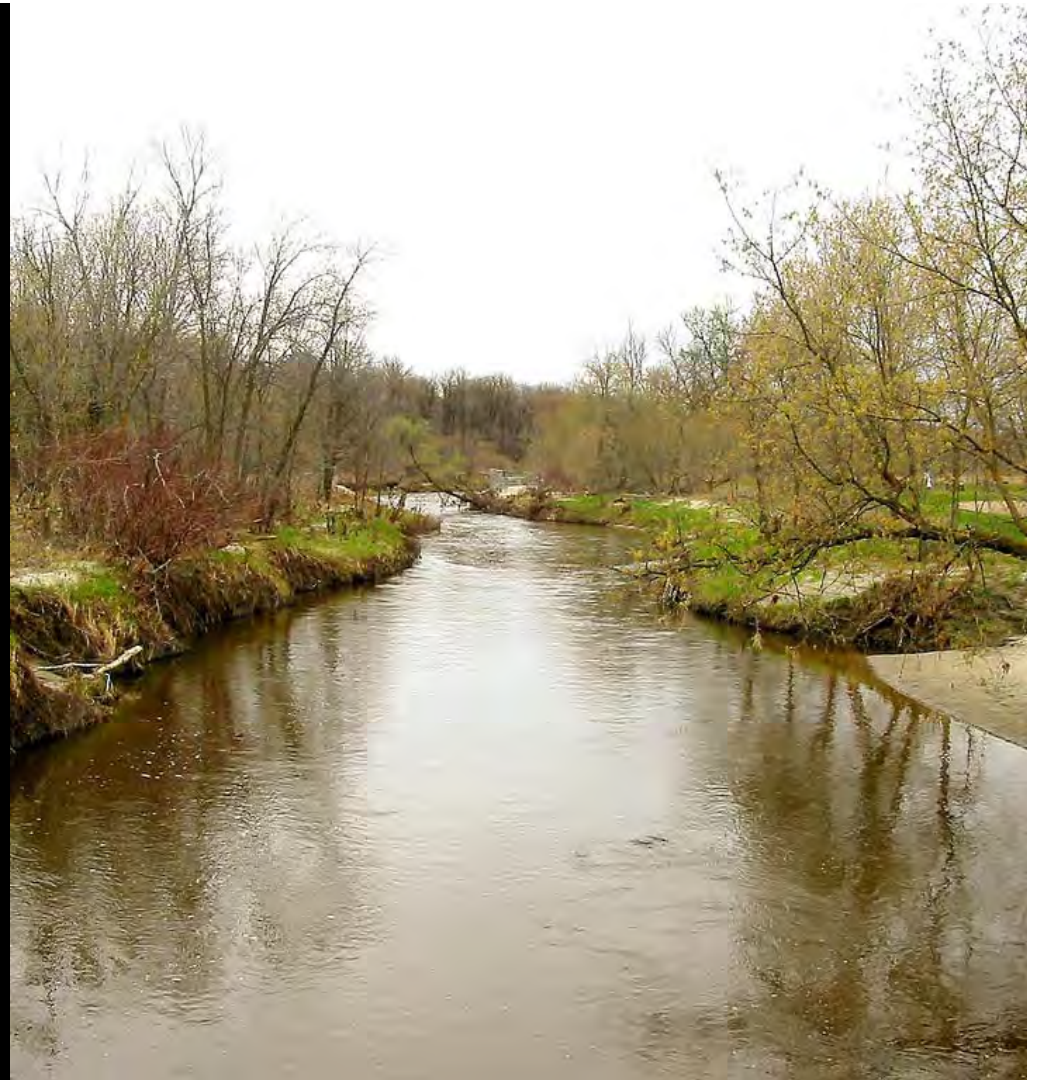


Middle River PWT Meeting 5/16/2016



MIDDLE RIVER SUBWATERSHED

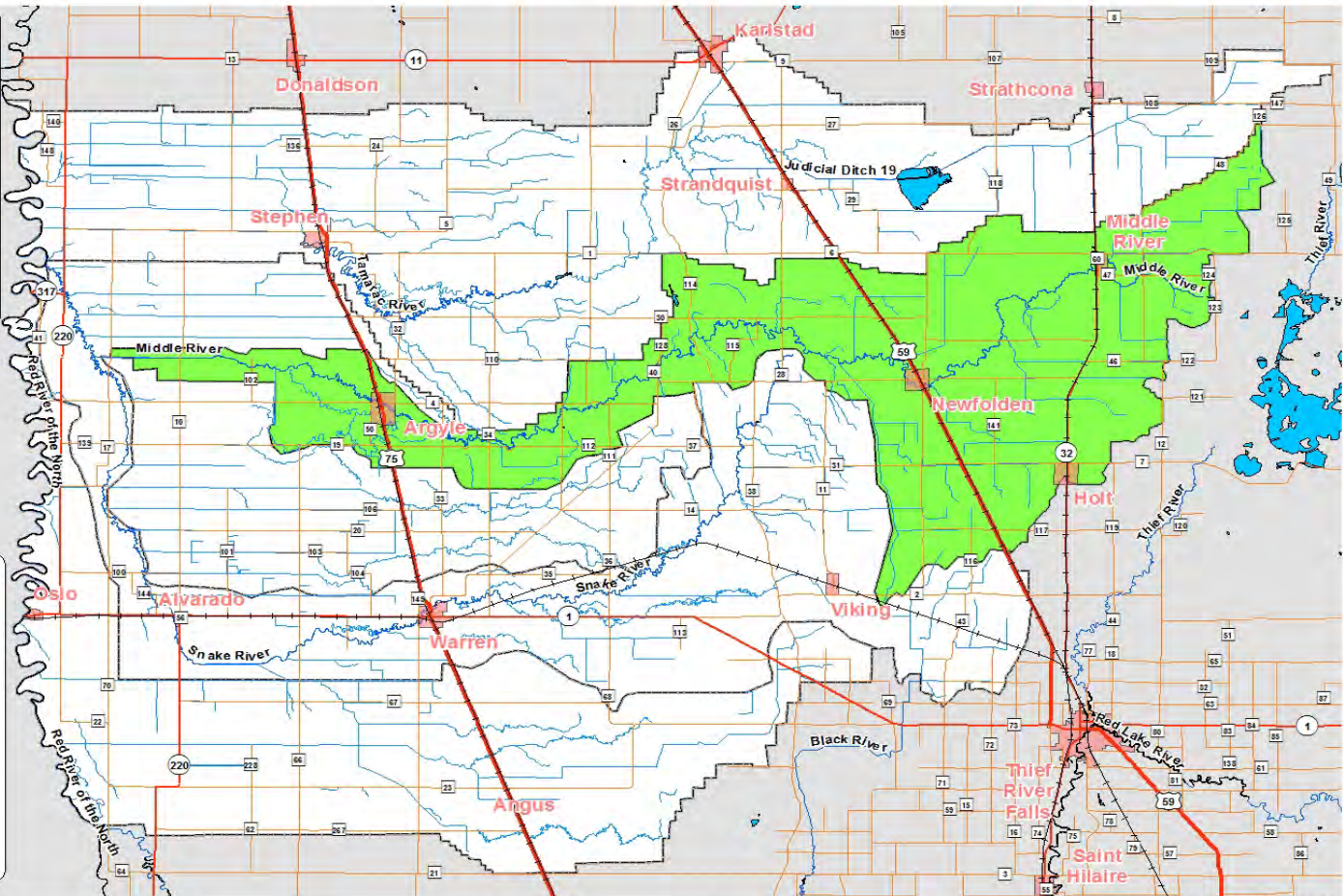
- Middle River drainage area is approximately 295 square miles
- River is approximately 98 miles long
- Is a tributary to the Snake River
- Passes through Middle River, Newfolden, Old Mill State Park, and Argyle





Legend

- MSTRWD
- Middle River Subwatershed
- Municipal Boundary
- Highway
- County Road
- Railroad
- Lake
- River
- Stream

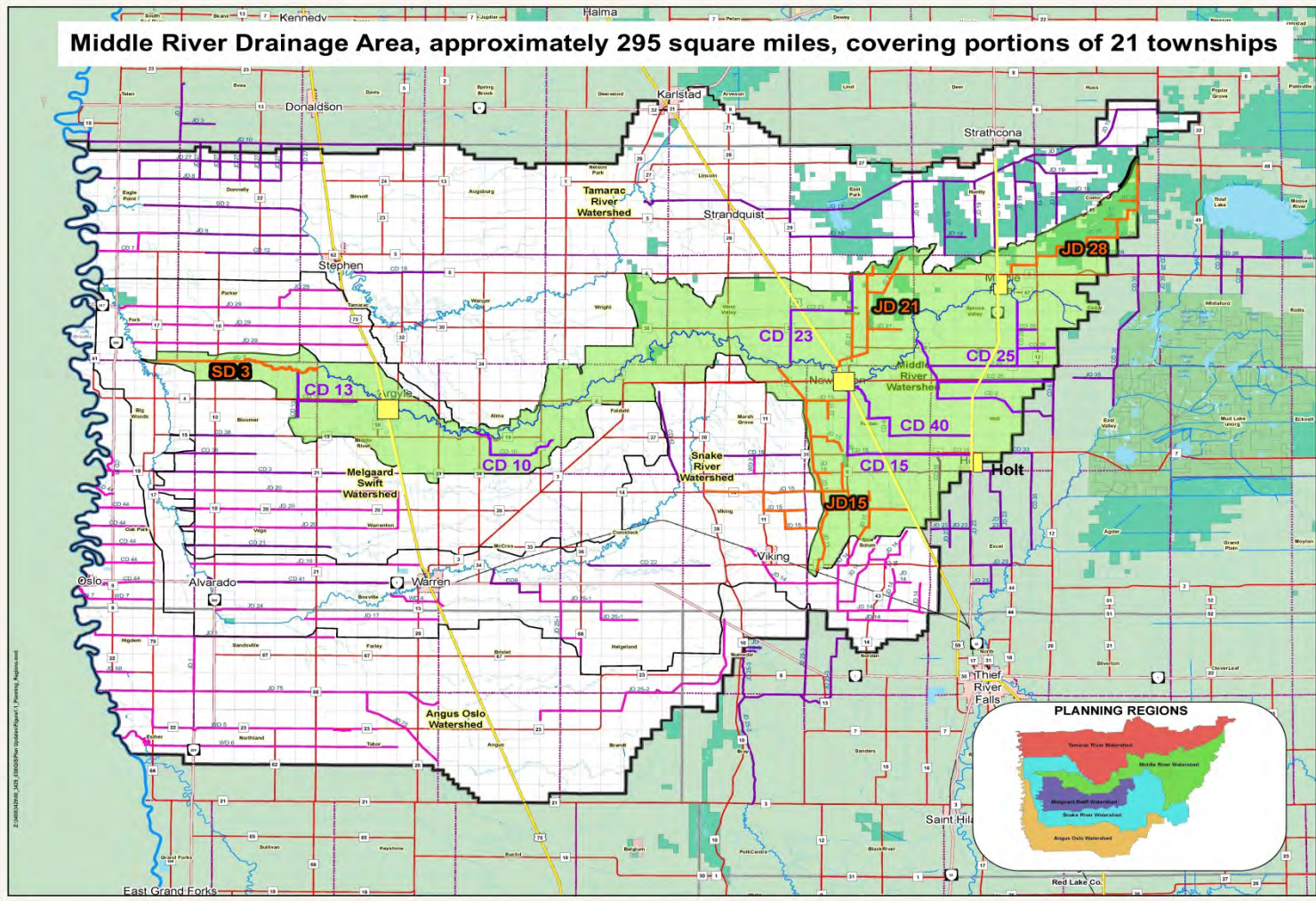


\\011-178\LANE\INFO\PROJECTS\WATER\GIS\MAPS\MIDDLE_SNAKE_TAMARAC_WATER_SHELD_DISTRICT_MAP.MXD - USER: SARACLOAN - DATE: 3/1/2016



MIDDLE RIVER FEASIBILITY STUDY
MIDDLE SNAKE TAMARAC WATERSHED DISTRICT MAP

Middle River Drainage Area, approximately 295 square miles, covering portions of 21 townships



- Legend**
- County Boundary
 - Legal Boundary
 - Cities
 - Sections_Watershed
 - Townships
- Transportation**
- US Highway
 - State Highway
 - County Highway
 - County Road
 - Legal Drainage Ditch
 - Railroads
- Water Features**
- Centerline (River)
 - Stream (Perennial)
 - Drainage Ditch (Perennial)
 - Stream (Intermittent)
 - Drainage Ditch (Intermittent)
 - Waterbody
- State and Federal Land**
- National Wildlife Refuge
 - Waterfowl Production Areas
 - Wildlife Management Areas
 - Scientific and Natural Areas
- Ditch Jurisdiction**
- MSTRWD
 - Marshall County

Data source: MN DNR Data Del. USFW site

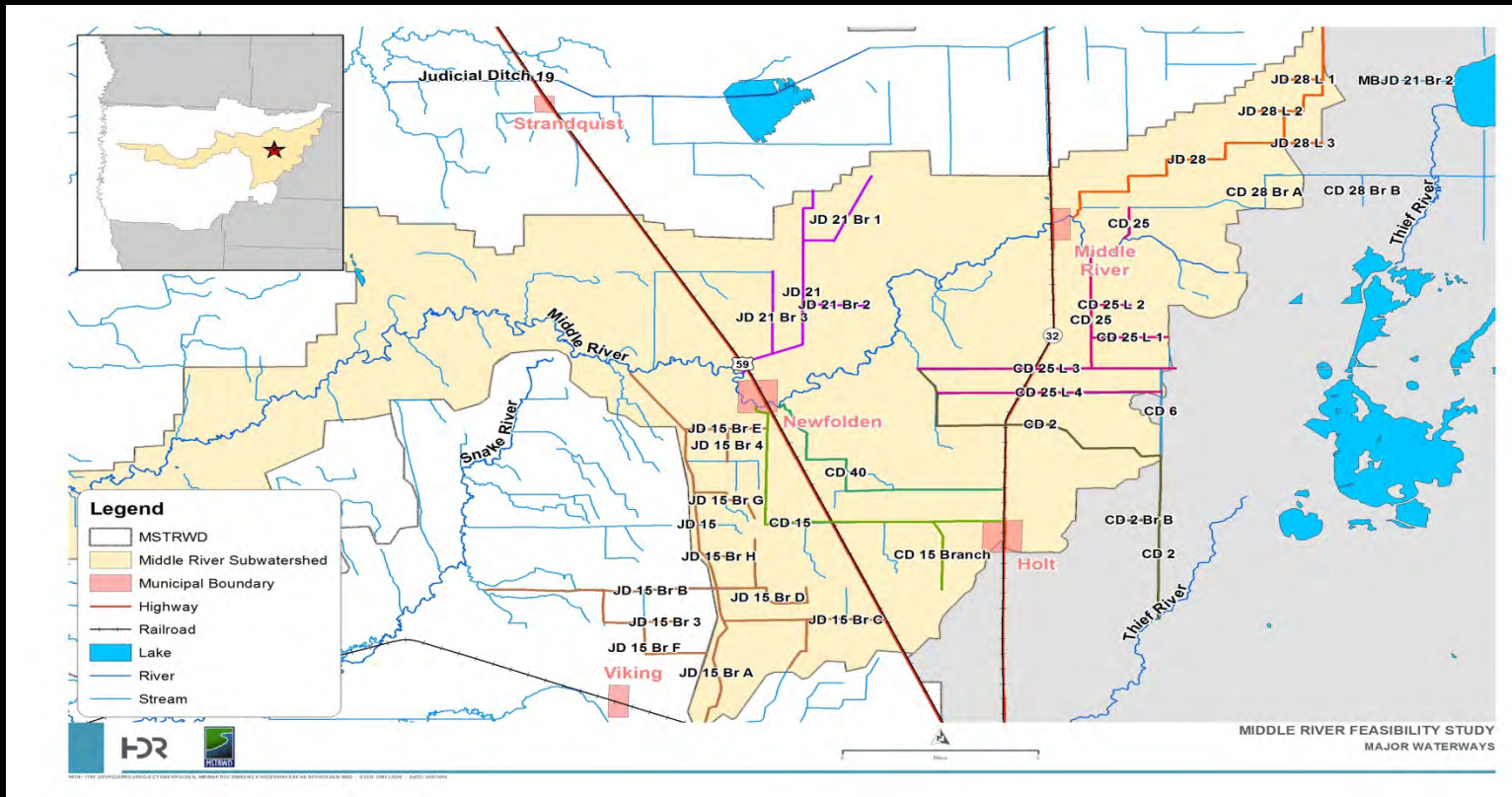


Location Map



Middle Snake Tamarac River Watershed District				
Scale	Drawn by	Checked by	Project No.	Date
AS SHOWN	ESB		701.237.5065	4/15/20
				Sheet
				701.237.5065

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IMPORTANT WATERWAYS












- Middle River
- CD 40
- CD 25
- CD 15
- CD 2
- JD 28
- JD 21
- JD 15

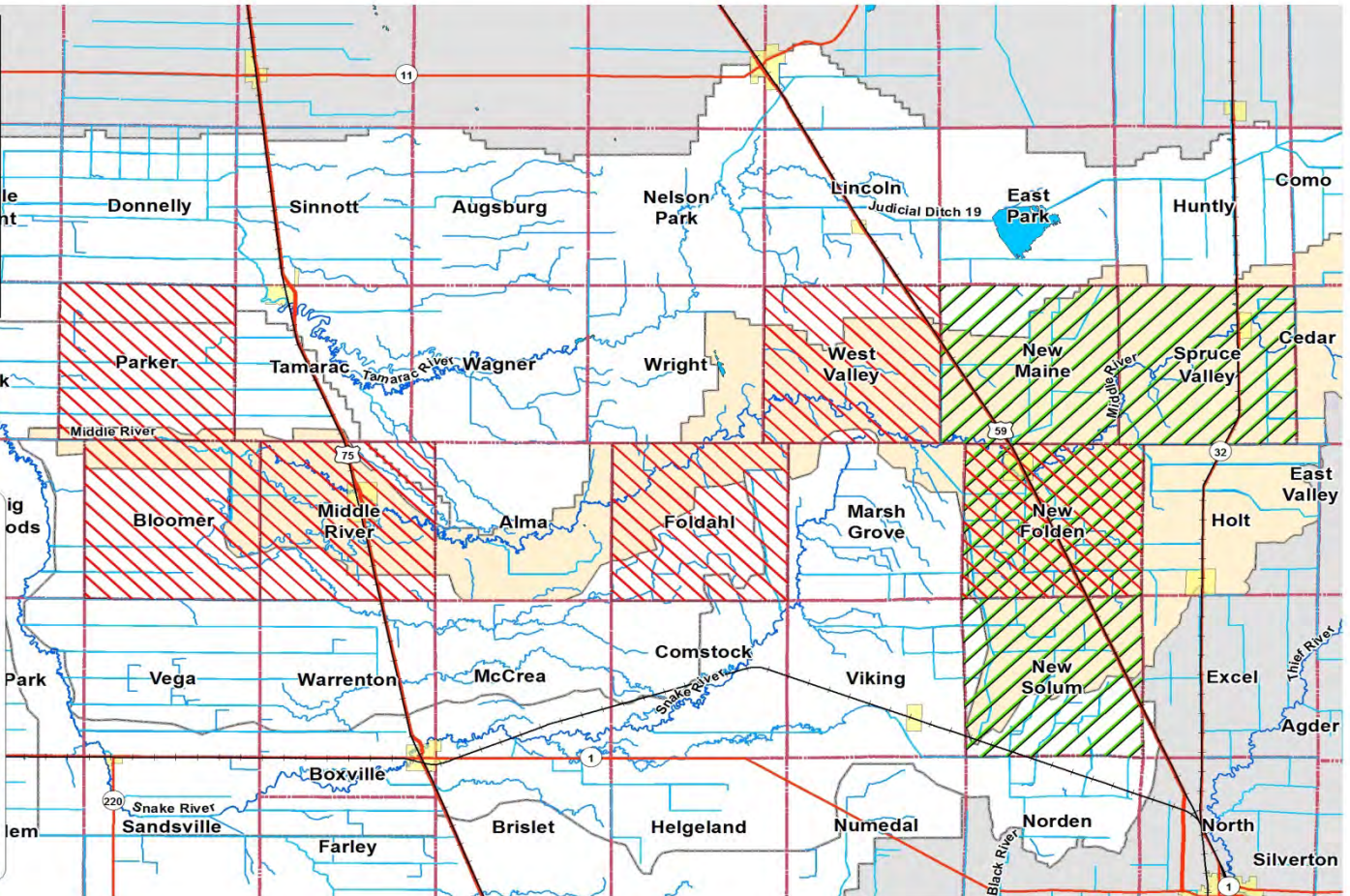
Problems Identified within the Middle River Subwatershed

- Runoff contribution and timing is excessive from Eastern portion
- Need to remove or prevent structures in the floodplain (Newfolden)
- Flooding problems throughout the watershed
- Impairment of the Middle River for turbidity & dissolved oxygen
- Banks of Middle River are sloughing
- Base flows too small for fish passage & other habitat needs



Legend

-  Potential Problem Area
-  Potential Retention Area
-  Municipal Boundary
-  Railroad
-  Highway
-  Lake
-  River
-  Stream
-  Ditch
-  MSTRWD
-  Middle River Subwatershed



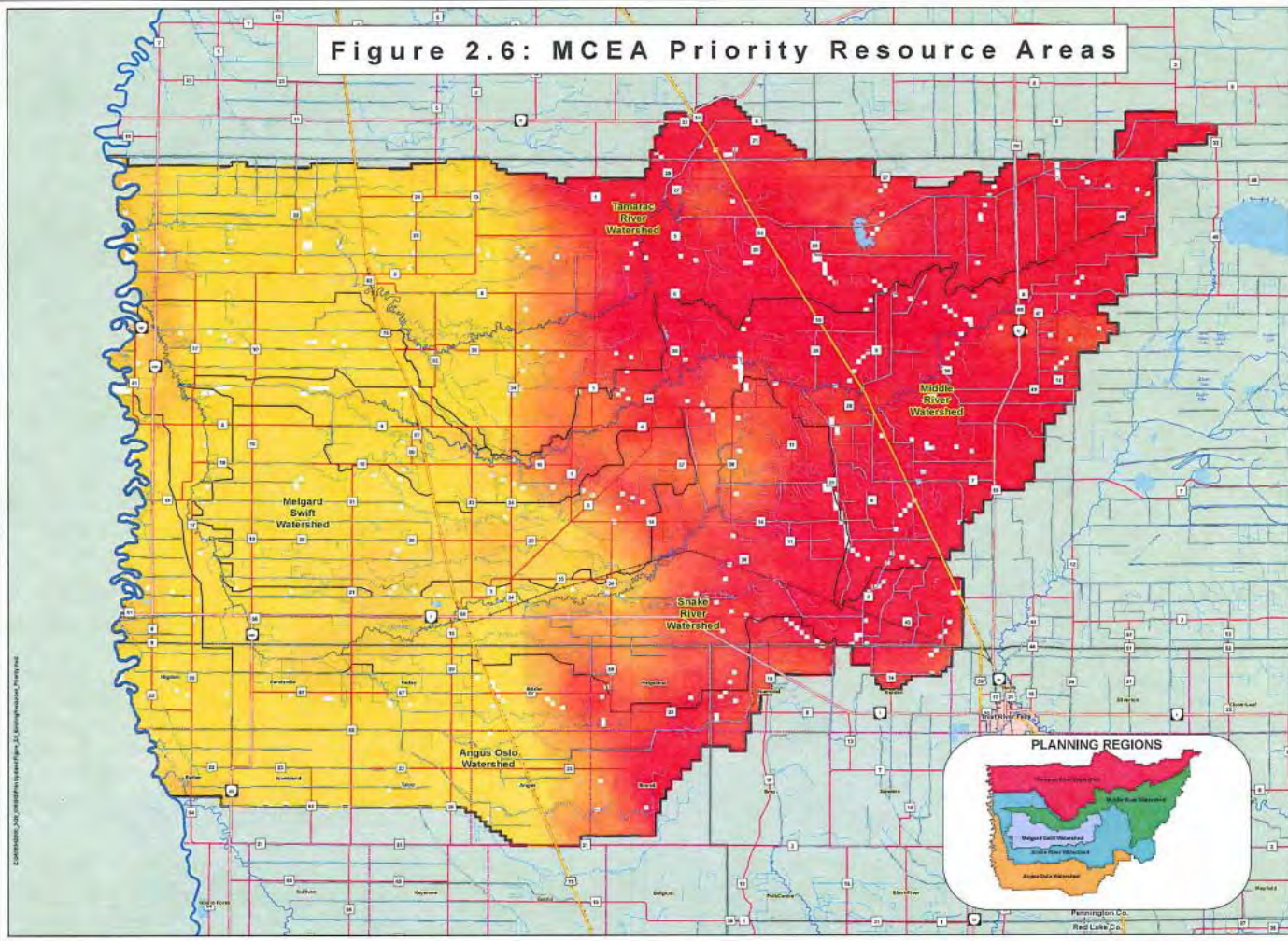
MIDDLE RIVER FEASIBILITY STUDY
POTENTIAL RETENTION/PROBLEM AREAS



Minnesota Center for Environmental Advocacy (MCEA) Assessment

- East portion identified as high priority area for wildlife and game species
- Middle River classified as a Class III warm water stream
- Key habitats such as surrogate grasslands and native plant communities
- Contains conservation regions & wetlands throughout

Figure 2.6: MCEA Priority Resource Areas



- Legend**
- County Boundary
 - Legal Boundary
 - Cities
 - Sections_Watershed
 - Townships
- Transportation**
- US Highway
 - State Highway
 - County Highway
 - County Road
 - Legal Drainage Ditch
 - Railroads
- Water Features**
- Centerline (River)
 - Stream (Perennial)
 - Drainage Ditch (Perennial)
 - Stream (Intermittent)
 - Drainage Ditch (Intermittent)
 - Waterbody
- Priority**
- High: 65
 - Low: 2

Data source: MN DNR Data Dell



Location Map



Middle-Snake-Tamarac Rivers Watershed District

Scale:	Drawn by:	Checked by:	Project No.:	Date:	Sheet:
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Figure 2.8: Key Habitats

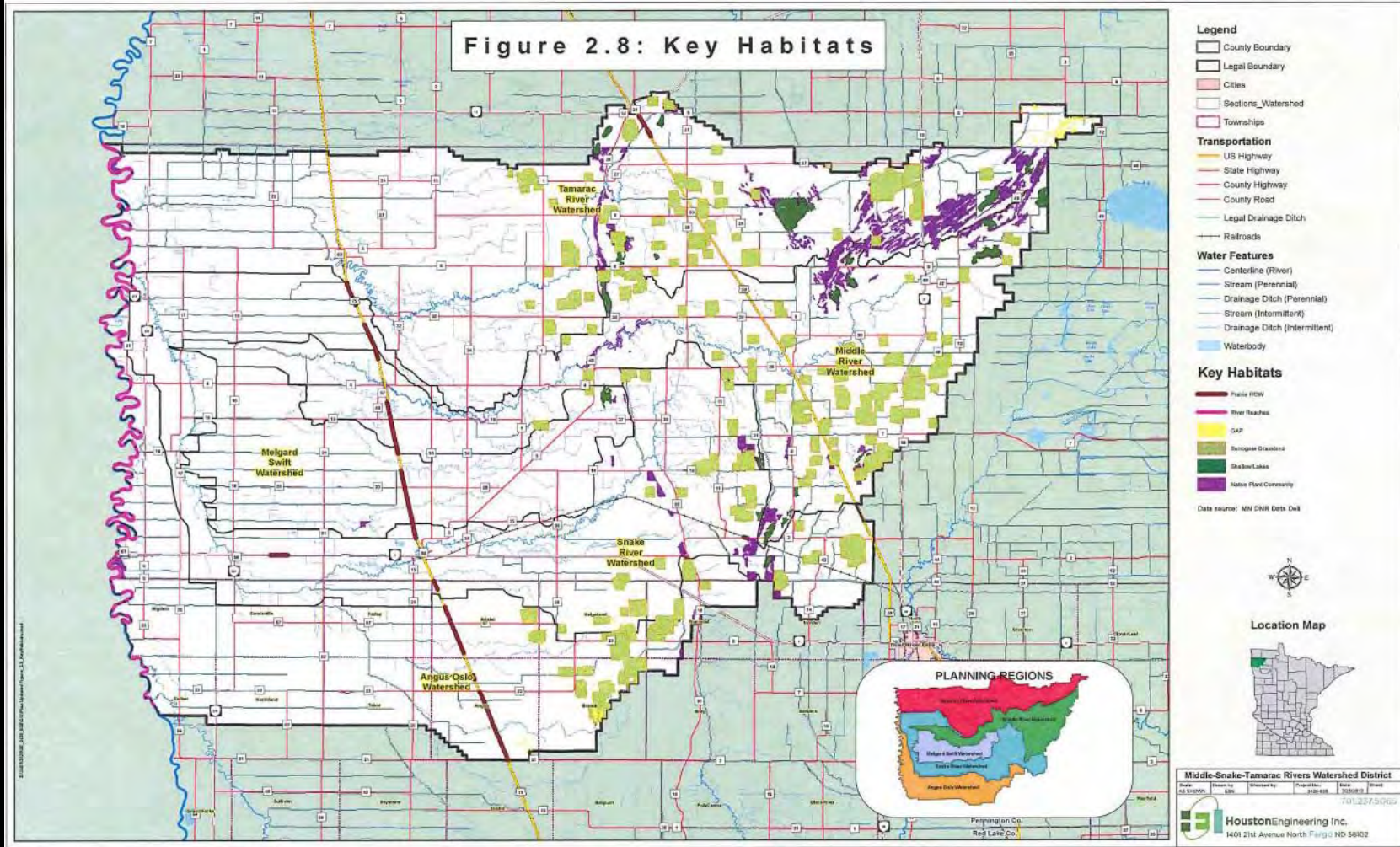
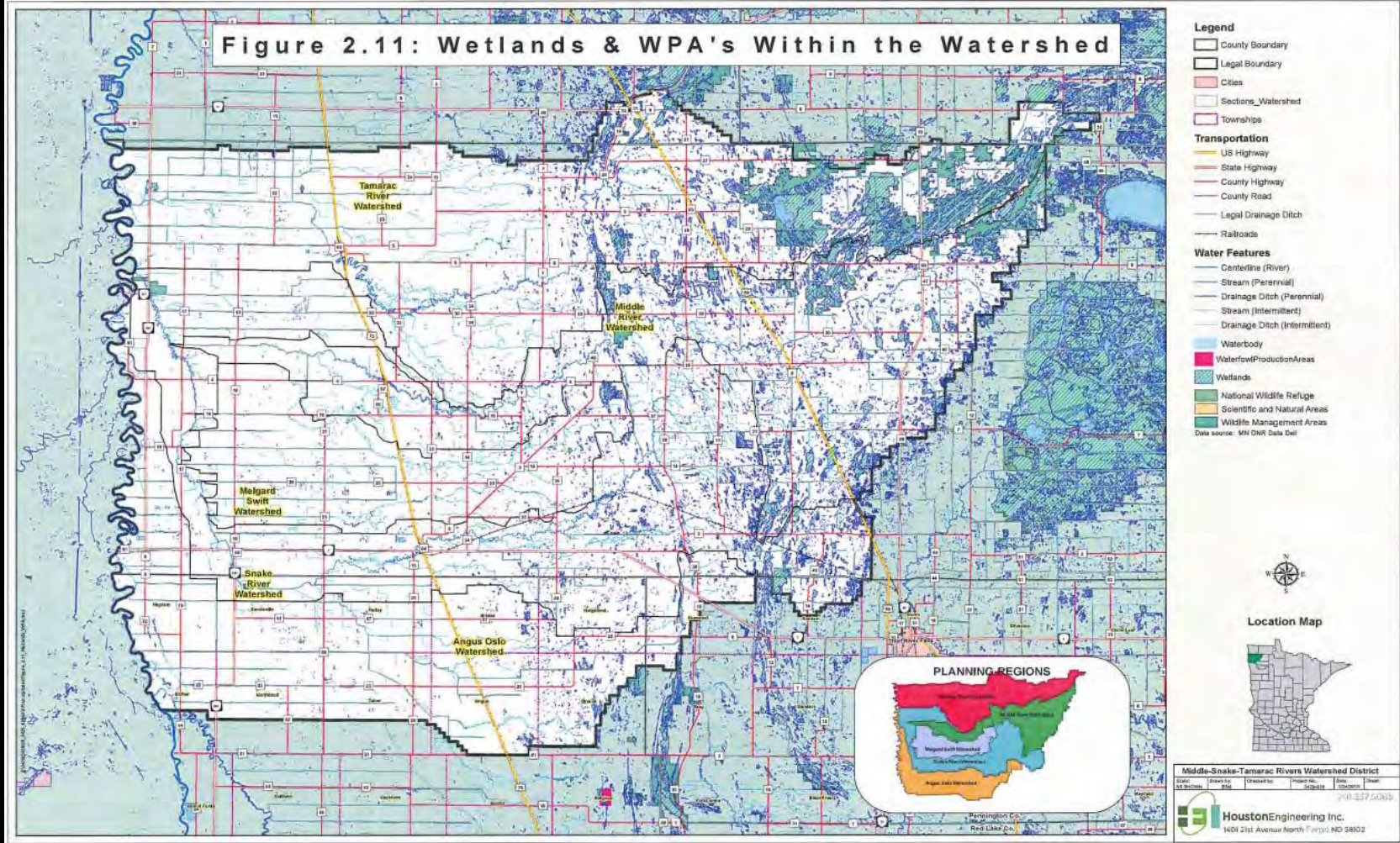


Figure 2.11: Wetlands & WPA's Within the Watershed



CITY OF NEWFOLDEN FLOODPLAIN MITIGATION





Newfalden
1975

Arlene, Donna & Nancy
Big rain in Newfolden







Traffic was slowed Wednesday on highway 59 four miles south of Newfolden as water was flowing over county road seven as well as highway 59. The Soo Line tracks near this intersection were under water as gravel under the rails washed away.

ATTENTION PROPERTY OWNERS! FLOOD INSURANCE RATE MAPPING

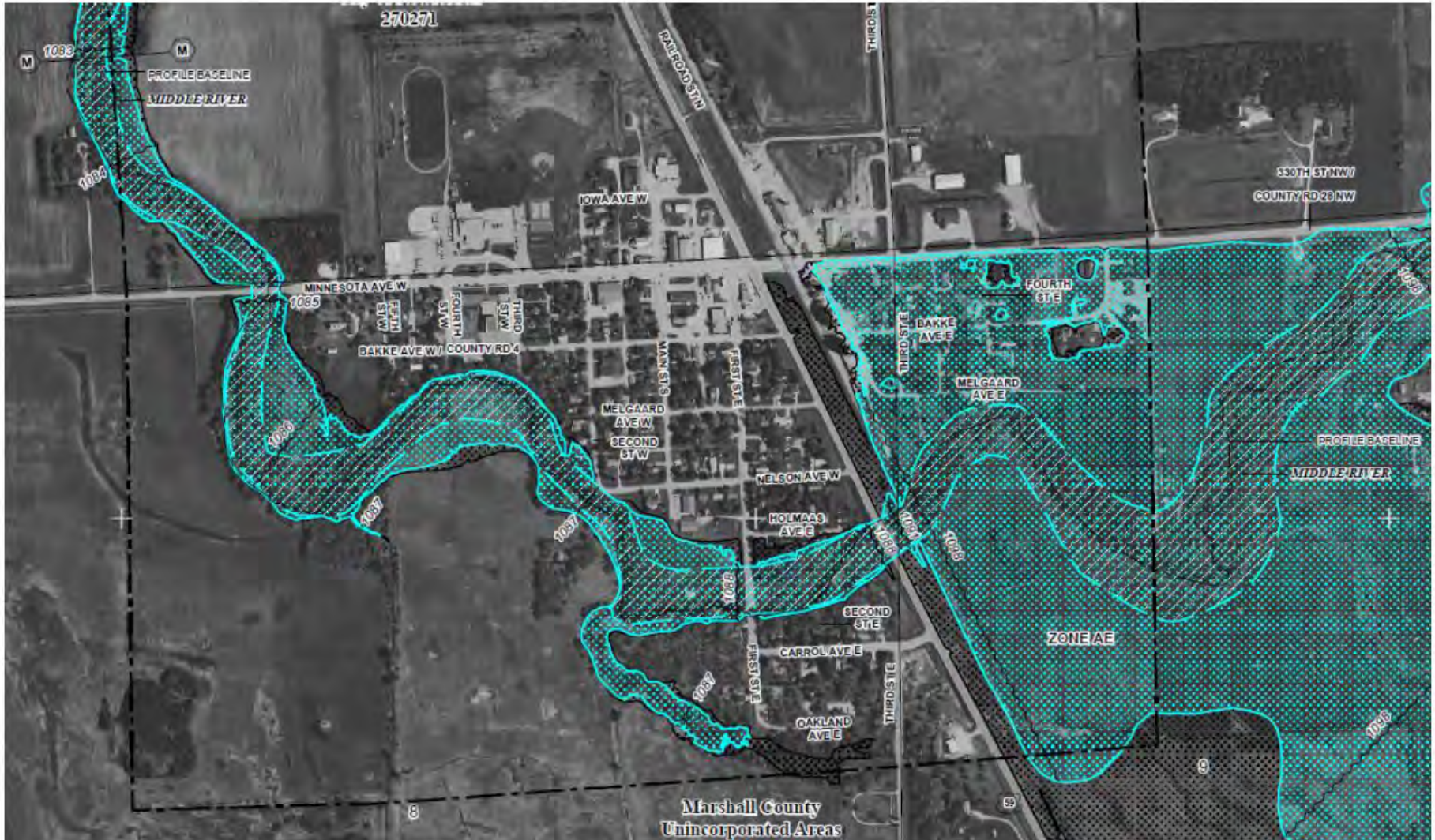


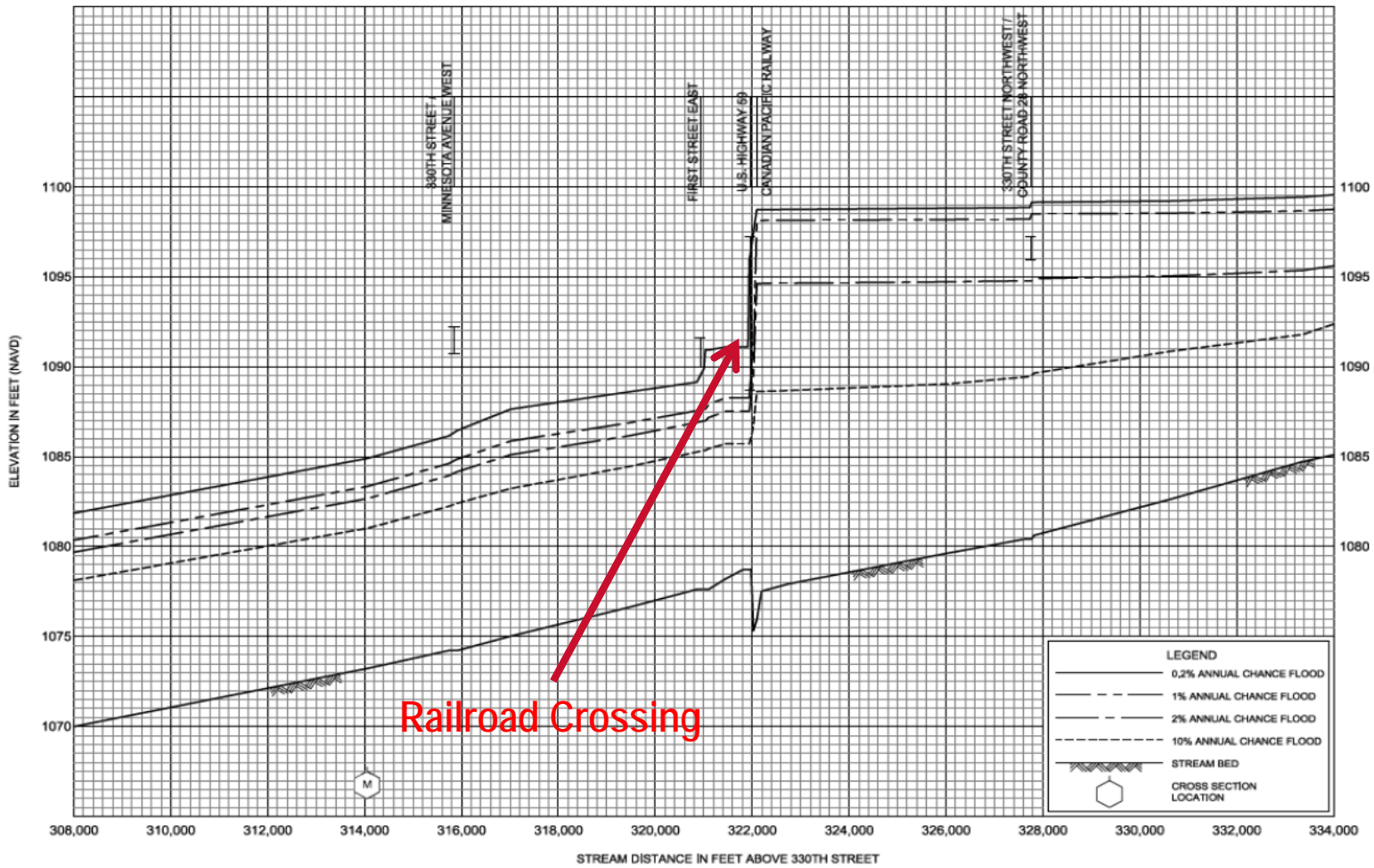
Newfolden's East Side - proposed 100 year flood plain

The Department of Homeland Security's Emergency Management Agency (FEMA) has completed a Preliminary Flood Insurance Rate Map (FIRM) and a Flood Insurance Study (FIS) for the City of Newfolden. Up until now, Newfolden did not have flood plain elevation data or floodplain maps. For this reason, Newfolden was not required to adopt a flood-plain ordinance; nor were residents in Newfolden required to carry flood insurance.

The next step in the process has begun. FEMA has published a notice of flood hazard determination and a public notification concerning the appeal process. The end result will be a final Federal Flood Insurance Rate Map, in which base flood elevations are determined and 100 and 500 flood hazard areas are identified. Once this is final, residents with structures in these flood plains, and who have a federally secured mortgage, will be required to obtain flood insurance.

Click [HERE](#) to for more QUESTIONS AND ANSWERS for property owners in FEMA's proposed 100 year flood plain.





FLOOD PROFILES
MIDDLE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARSHALL COUNTY, MN
AND INCORPORATED AREAS

04P



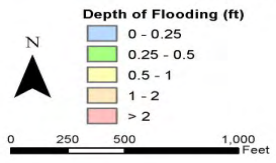
Existing CP Rail Crossing

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroX, Geomatics, AeroGRID, IGN, ICF, swisstopo, and the GIS User Community

SITE LOCATOR



**Depth of Flooding in the City of Newfolden
1-Percent-Annual-Chance Event**



**Risk Mapping, Assesment, and Planning
(Risk MAP)**

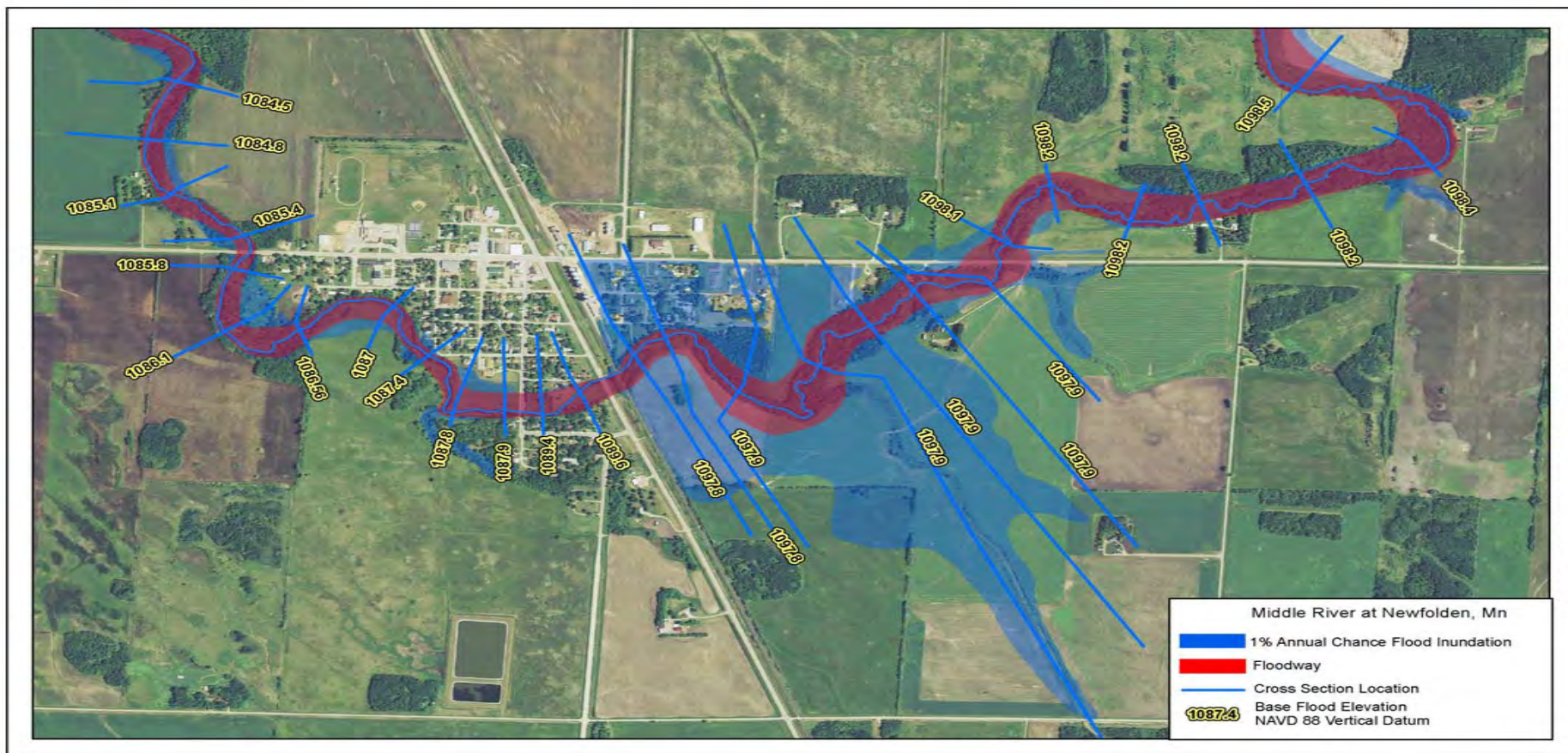
About this map:
This map shows the depth of flooding during the 1-percent-annual-chance (100-year) flood event. The depths were created using 2-foot LIDAR data for the City of Marshall.
Flood elevations were calculated using a revised version of the Middle River HEC2 model developed for the 1987 Marshall County Flood Insurance Study.

2 – 96” CSP

3 – 66” CSP



CURRENT MAPPING FROM DNR HEC-RAS MODEL



One 48" culvert will reduce 100-year water surface elevation

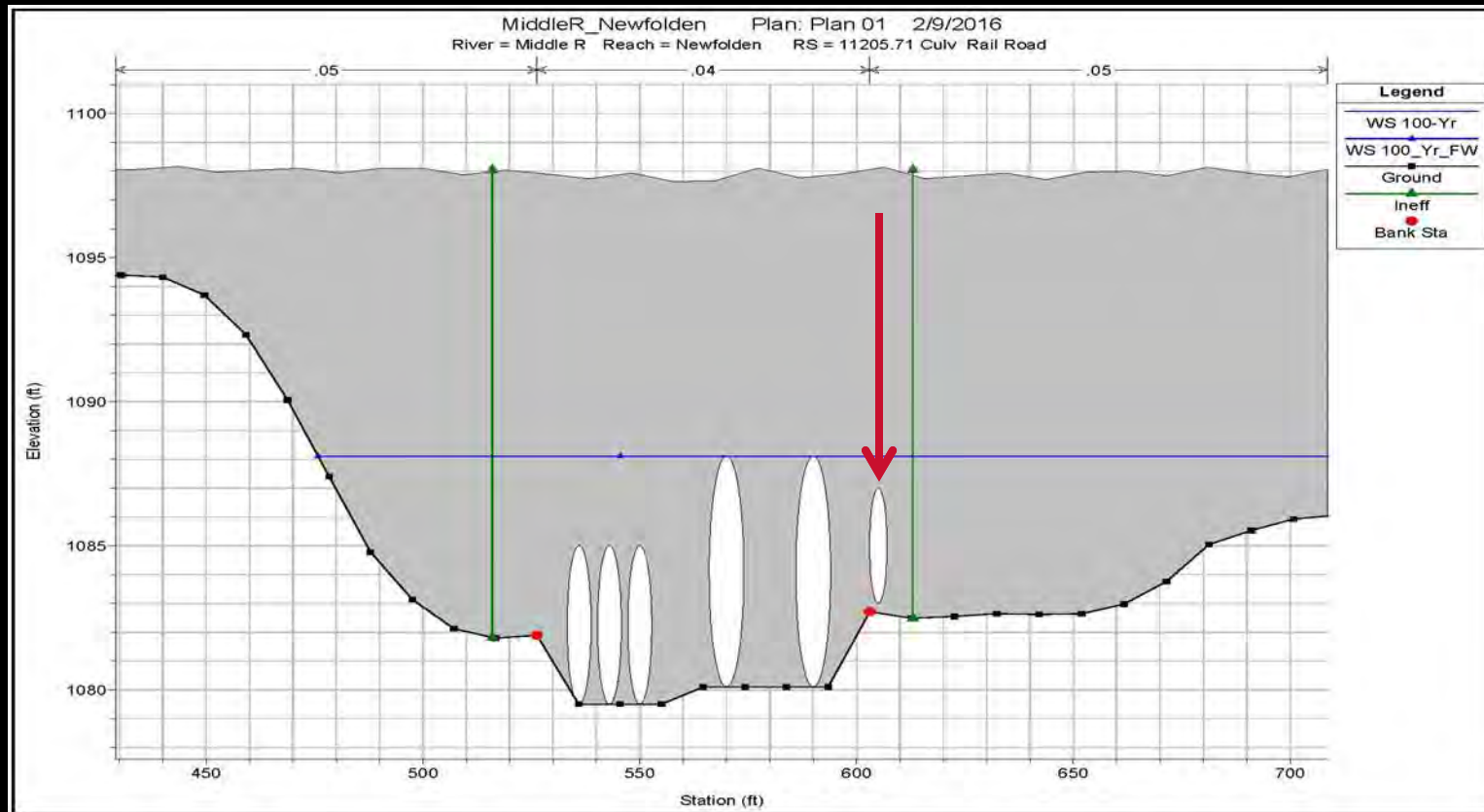


TABLE OF EXISTING VS. PROPOSED

	WSEs (ft)		
River Station	Existing	Proposed	Change
11283	1098.09	1097.55	-0.54
11220	1098.05	1097.5	-0.55
RR			
11193	1092.34	1092.34	0
11176	1091.04	1091.04	0
Hwy 59			
11141	1089.02	1089.02	0

SUMMARY – 48” BORE

- RR overtopping issue must be evaluated
- Length of pipe to install is ~80 feet
- Cost for pipe jacking < \$175,000
- Significant administrative costs for approvals from FEMA and other permitting authorities
- Likely mitigation measures required due to downstream impacts

PROJECT OBJECTIVES

- Remove ~40 structures from floodplain and eliminate flood damages
- Minimize flood insurance
- Future development
- Minimize upstream / downstream impacts
- Build efficient and economical system



FAILURE TO ADDRESS FLOODPLAIN ISSUES

- Hinder economic development
- Remove dollars from the local economy
- Flood risk will continue to compromise “peace of mind”
- Historical flood risks will remain



ALTERNATIVES

1. Do nothing – residents may raise lots, obtain LOMAs, etc.
2. Bore 1 or 2 – 48" to 54" corrugated steel pipes
3. Install 2 – 12' x 10' reinforced concrete boxes
4. Install bridge crossing
5. Construct certifiable dike on north side of river, upstream of crossing
6. Construct dikes downstream of crossing or buyout affected properties
7. Retention area upstream or downstream
8. Some combination of the above measures

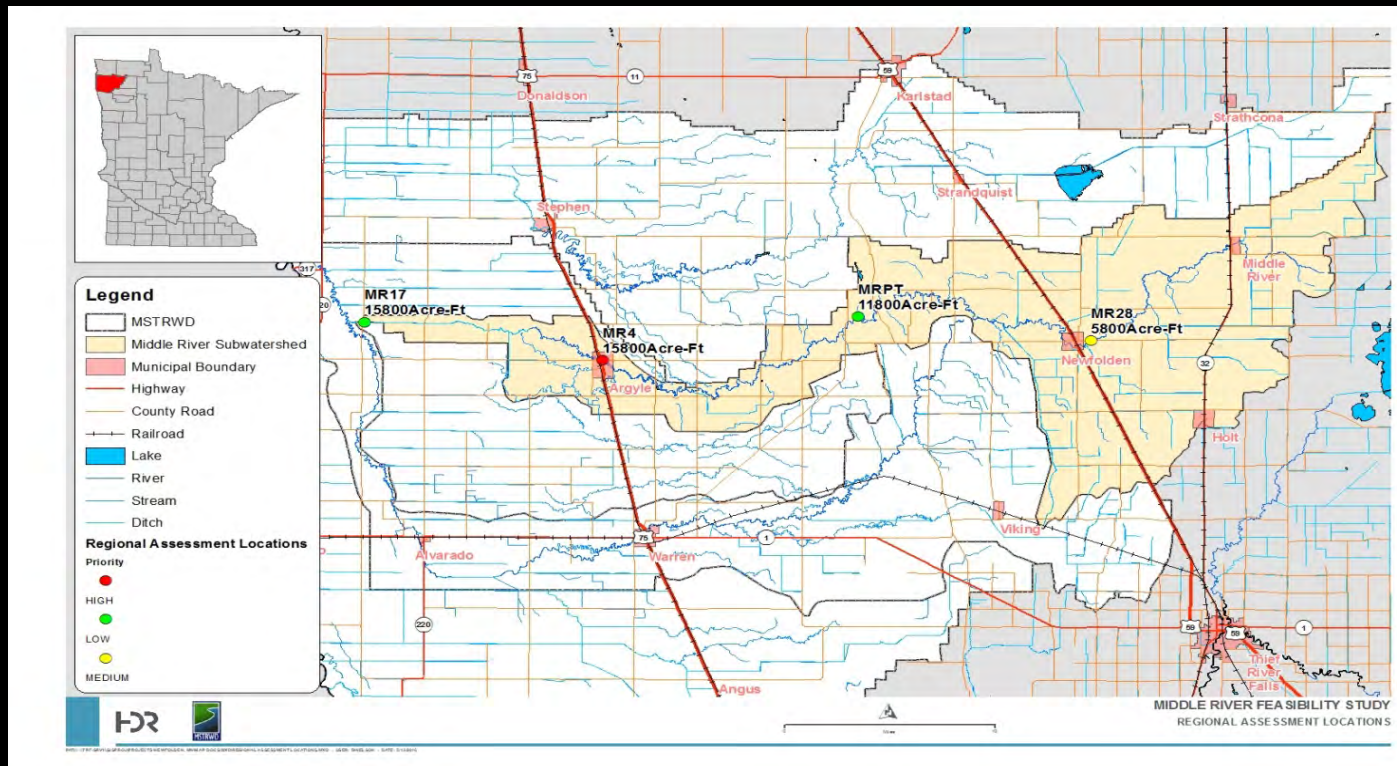
BENEFITS

- New crossing with extended lifespan
- Lower headwater
- Removal of high-head embankment dam
- 40 homes removed from 100-year floodplain
- Flood risk reduced
- Dam hazard reduced
- Improve downstream flood impacts

Multi-Purpose Solution?

BRANDT ANGUS IMPOUNDMENT



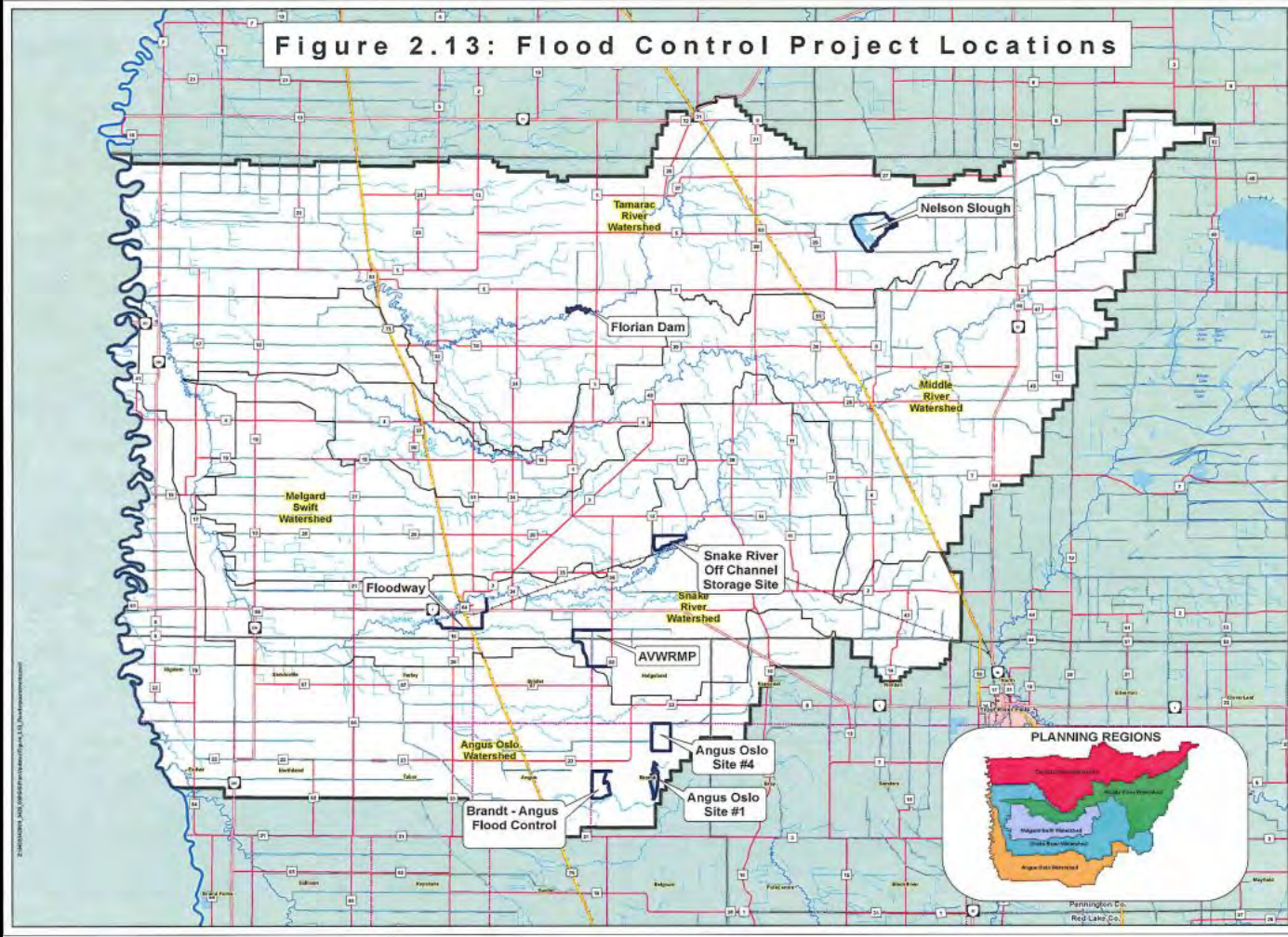


Red River Basin Commission goal of 20% reduction of peak flows to the Red River

Approximately 15,000 – 16,000 acre-feet of storage needed for the Middle River Subwatershed

Four regional assessment locations within the sub-watershed

Figure 2.13: Flood Control Project Locations



- Legend**
- County Boundary
 - Legal Boundary
 - Cities
 - Sections_Watershed
 - Townships
- Transportation**
- US Highway
 - State Highway
 - County Highway
 - County Road
 - Legal Drainage Ditch
 - Railroads
- Water Features**
- Centerline (River)
 - Stream (Perennial)
 - Drainage Ditch (Perennial)
 - Stream (Intermittent)
 - Drainage Ditch (Intermittent)
 - Waterbody
- Project Locations**
- Flood Control Structures

Data source: MN DNR Data Set



Location Map



Middle-Snake-Tamarac Rivers Watershed District












Date	Drawn by	Checked by	Project No.	Date
04/20/2010	WSE	WSE	09-0004	04/20/2010

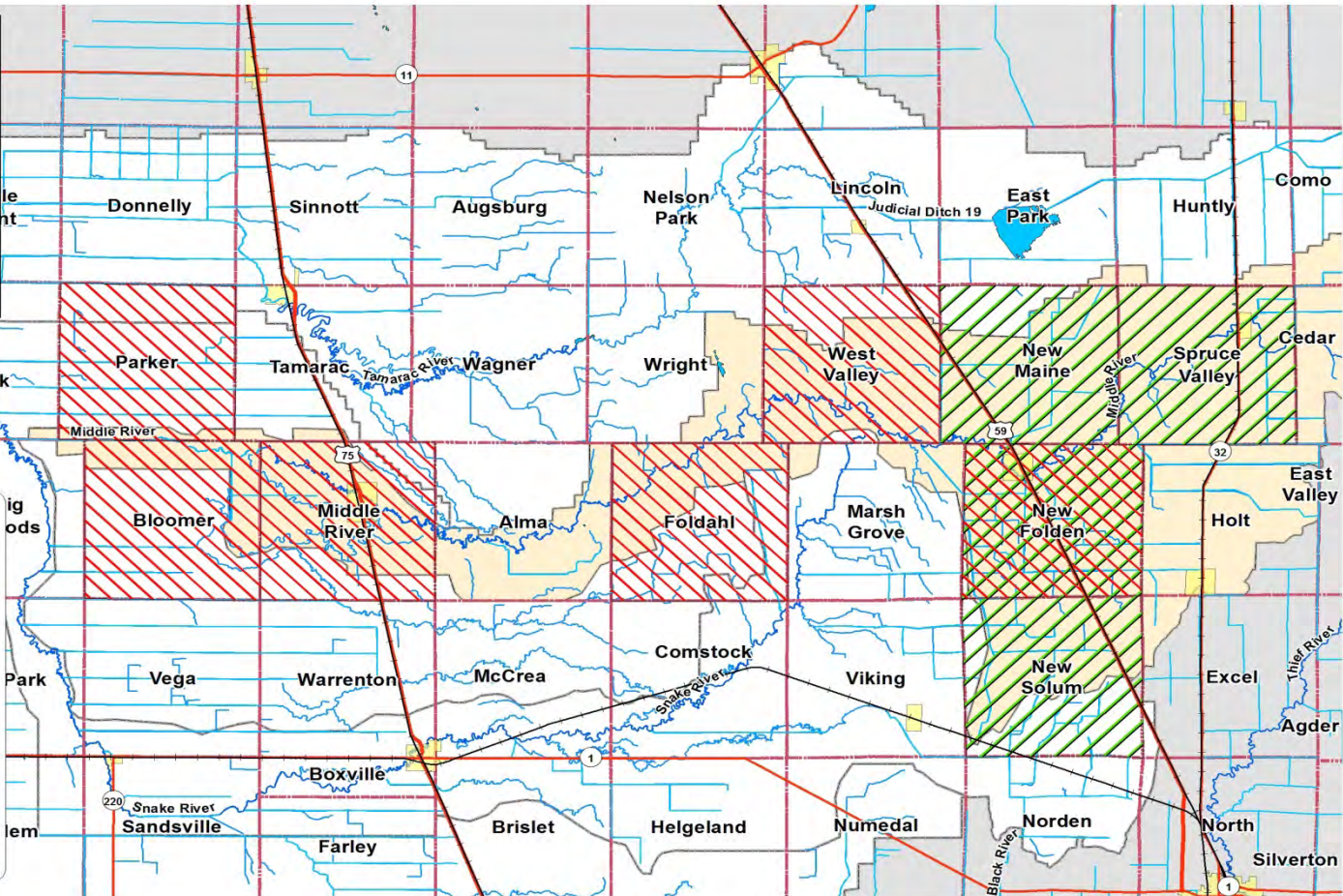
701.337.5065

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 1604 21st Avenue North Fargo, ND 58102



Legend

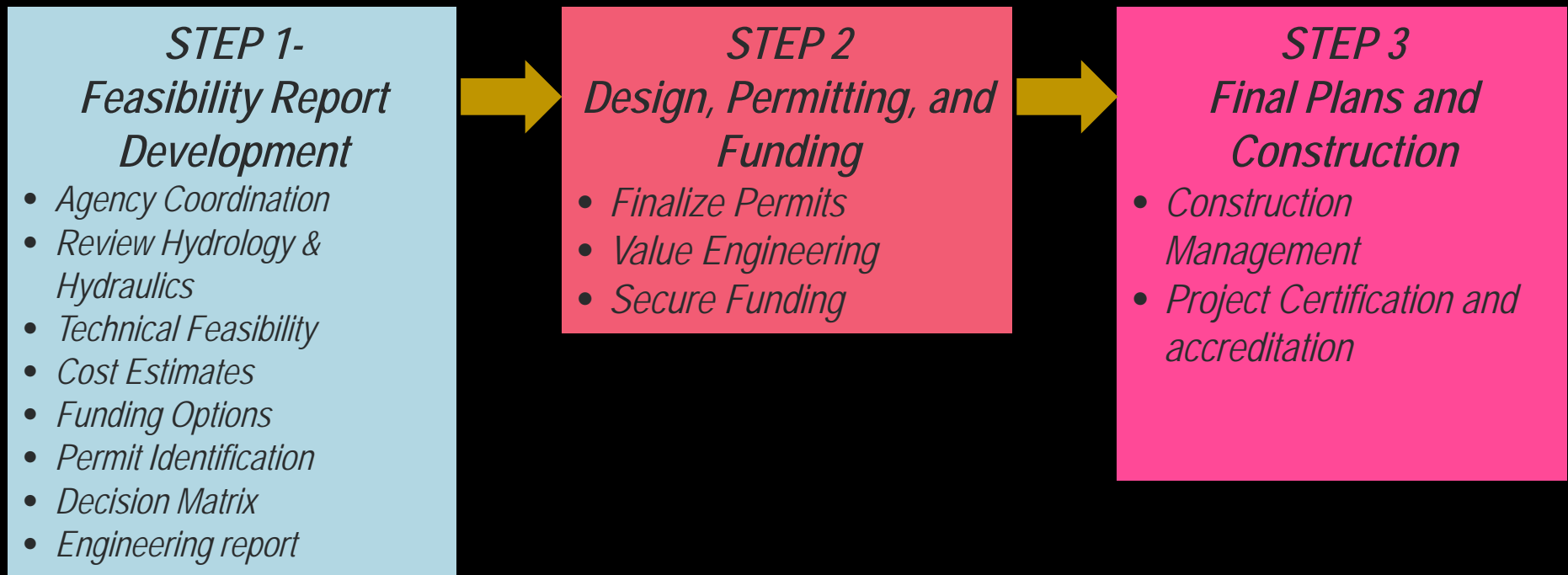
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-  Potential Retention Area
-  Municipal Boundary
-  Railroad
-  Highway
-  Lake
-  River
-  Stream
-  Ditch
-  MSTRWD
-  Middle River Subwatershed



MIDDLE RIVER FEASIBILITY STUDY
POTENTIAL RETENTION/PROBLEM AREAS

PATH: \\SRF\SERVERS\PROJECTS\STWY\WORLDWIDE\MAPS\GIS\COMBO\MSR\MSR\WATERSHED\PROBLEM AREAS.MXD - 5/26/2010 10:26:00 - DATE: 5/10/2010

THREE STEPS LEAD TO A SOLUTION



POTENTIAL PARTNERS

- FEMA – MN HSEM
- RRWMB
- NWRDC
- CP Railway
- State of MN – DNR & FDR
- Marshall County
- Middle-Snake-Tamarac Rivers WD
- City of Newfolden

PROJECT DEVELOPMENT AND NEXT STEPS

- Multi-purpose project (s)
- Purpose and Need



<http://mstrwd.com/maps/>

HDR