



Newfolden / Middle River
Subwatershed Flood Reduction
Project Team Meeting
April 24, 2017





**JD 15 Along 150th Ave NW & North
of 310th St. NW**



03.30.2017 12:40

**CD 15 At 130th Ave NW & North of
300th St. NW**



03.30.2017 12:32

PROJECT OBJECTIVES TO DEVELOP PURPOSE & NEED

- Remove Newfolden from floodplain and eliminate flood damages
- Minimize flood insurance
- Enhance future development
- Minimize upstream / downstream flooding / impacts
- Improve water quality & natural resources



PURPOSE

- Remove Newfolden from 1% Annual (100 year) Floodplain

NEED

- ~43 Residences, multiple elevator structures, a church, park, and apartment building in floodplain
- 10 out of 14 properties surveyed are within ½ foot of the Preliminary BFE of 1098.1'
- Structures within floodplain with federally secured mortgage require flood insurance
- City of Newfolden required to adopt a floodplain ordinance
- Economic & residential expansion will be difficult
- Structures in the floodplain will have less value
- New structures must be built 1.5' above BFE
- Home additions may not exceed 50% of home value
- Eliminate unsafe dam hazard
- Rehabilitate deteriorating RR culverts
- Provide safer passage for trains carrying HAZMAT



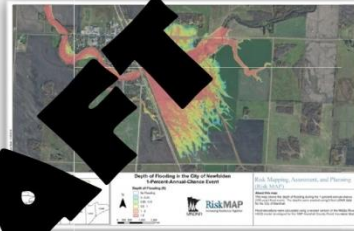
Purpose and Need Statement

The purpose of this project is to remove the City of Newfolden from the 1% Annual (100 Year) Floodplain while maintaining or reducing downstream flood levels.

Problem Statement

The City of Newfolden is located in northwestern Minnesota in Marshall County. In 2015, the Department of Homeland Security's Federal Emergency Management Agency (FEMA) performed a Flood Insurance Study (FIS) and developed a draft Flood Insurance Rate Map (FIRM) for Newfolden. As a result of that study, FEMA has mapped the majority of the eastern half of Newfolden in the 1% Annual (100 Year) Floodplain.

The eastern half of Newfolden is currently occupied by approximately 45 residences, the local grain elevator, a church, a park, and an apartment complex. All structures within the 1% Annual (100 Year) Floodplain with a federally secured mortgage will be required to obtain flood insurance. The required flood insurance will cost tens of thousands of dollars annually within the community that could otherwise be spent on the local economy. In addition to the costs of flood insurance, property owners will see a decrease in property values due to the floodplain designation.



The City of Newfolden will be required to adopt a floodplain ordinance which will make economical, residential, and recreational expansion difficult. Residents and business owners looking to construct an addition will be required to obtain a floodplain permit and construct first floor levels at a minimum of 1.0 foot above the Base Flood Elevation, which is not at the first floor elevation of existing structures. All structural improvements will be limited to 50 percent of the market value of the existing structure.

The Red River Basin Flood Damage Reduction Work Group Mediation Agreement specifies that one of the flood damage reduction goals in the Red River Basin is to prevent damage to communities, homes, and farm structures by providing flood protection from the 1% annual flood (100 year). The City of Newfolden will be in direct conflict with this goal based on the recent Floodplain mapping mandated by FEMA.

The existing railroad embankment is functioning as a high hazard dam during significant flood events. The railroad culvert structures in the Middle River do not have sufficient capacity, and thus are creating 10 feet of impounded water to the east of the embankment during a 1% chance event. This hydraulic head creates a hazard for residents and structures downstream. The culvert structures are currently in poor condition and nearing the end of their life expectancy. Multiple trains containing crude oil cars pass along this rail line on a regular basis. These circumstances create the potential for a public health, public safety, or environmental emergency.

Comment [CLJ1]: This currently has the potential to cause problems so there are a couple ways to deal with the statement of reducing ds flows.

1. If there truly is a need to reduce ds flows we will need much more information regarding the ds problems. Information such as what is flooding, how often and at what events, duration, and what are the impacts/losses of the flooding. This detailed information essentially needs to justify the need of reducing ds levels.

2. If the project is to solely focus on newfolden, we should remove this statement and leave it at removing the city from the 100 floodplain. I understand the potential of a project to increase the ds levels so, we can either handle that issue through the alternative analysis or insert language stating, "remove newfolden...while not increasing levels downstream."

My recommendation is to keep the P&N statement clean and account for the potential of increase levels ds in the alternatives analysis. During the Alt analysis, we would look the ds impacts of a particular alternative and possibly dismiss an alternative based on increased ds impacts.

Comment [CLJ2]: This paragraph is a good addition

Definition of Early, Middle, and Late Areas Relative to the Red River Main Stem

Figure 24 identifies early, middle, and late runoff areas within the Red River basin relative to the main stem at the Canadian border. This generalized map was based on the evaluations of historical flood hydrographs, knowledge of more recent floods, and computed runoff travel times. This map can be used to help define which types of FDR measures to use in different areas of the basin to help reduce peak flows on the Red River main stem, while also achieving local and watershed FDR goals. The lines between early, middle, and late areas are not exact. For example, smaller late areas may exist within the identified middle area. Therefore, this map should be used in conjunction with local knowledge of runoff timing.

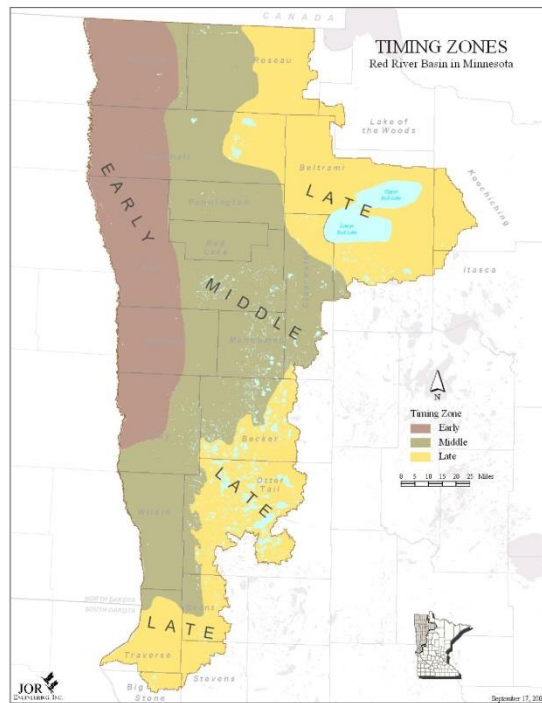
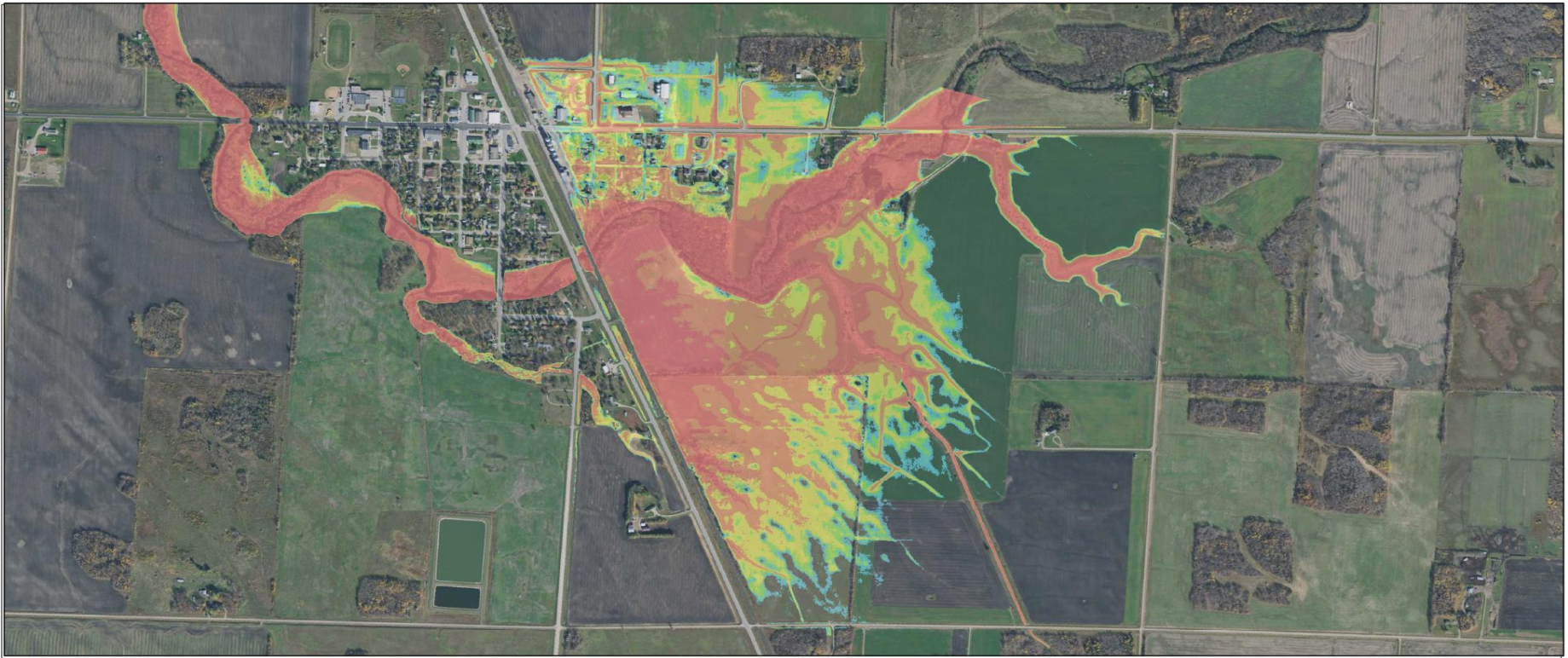


Figure 24. Early, Middle, and Late Runoff Timing Zones in the Red River Basin

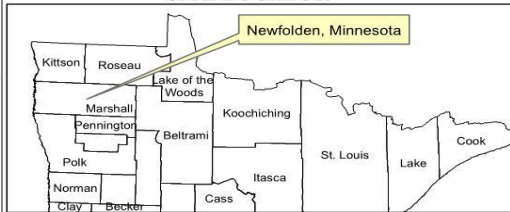
Table 1. Expected Peak Flow Reduction Effects on the Red River Main Stem of FDR Measures Applied in Early, Middle, and Late Areas Upstream

Flood Damage Reduction Measure	Early* Upstream Area	Middle* Upstream Area	Late* Upstream Area
1) Reduce Flood Volume	+	++	++
a) Wetlands	+	+	++
b) Cropland BMPs	+	++	++
c) Conversion to grassland	+	++	++
d) Conversion to forest	+	++	++
e) Other beneficial uses of stored water	+	++	++
2) Increase Conveyance Capacity	+	-	--
a) Channelization	+	-	--
b) Drainage	+	-	--
c) Diversion	+	Variable	-
d) Setting back existing levees (to increase conveyance capacity)	+	-	--
e) Increasing bridge capacity	+	-	-
3) Increase Temporary Flood Storage	Variable	++	+
a) Gated impoundments	+	++	++
b) Ungated impoundments	-	+	+
c) Restored or created wetlands	-	+	+
d) Drainage	-	+	++
e) Culvert sizing	-	+	+
f) Setting back existing levees (to increase floodplain storage)	+	++	+
g) Overtopping levees	++	+	Variable
4) Protection/Avoidance	Variable	Variable	Variable
a) Urban levees	-	-	-
b) Farmstead levees	-	-	-
c) Agricultural levees	-	-	-
d) Evacuation of the floodplain	0	0	0
e) Floodproofing	0	0	0
f) Warning and emergency response	0	0	0

* Location of FDR measure relative to the Red River main stem at the international border.

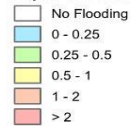


SITE LOCATOR



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

Depth of Flooding (ft)



RiskMAP
Increasing Resilience Together

Risk Mapping, Assesment, and Planning (Risk MAP)

About this map:

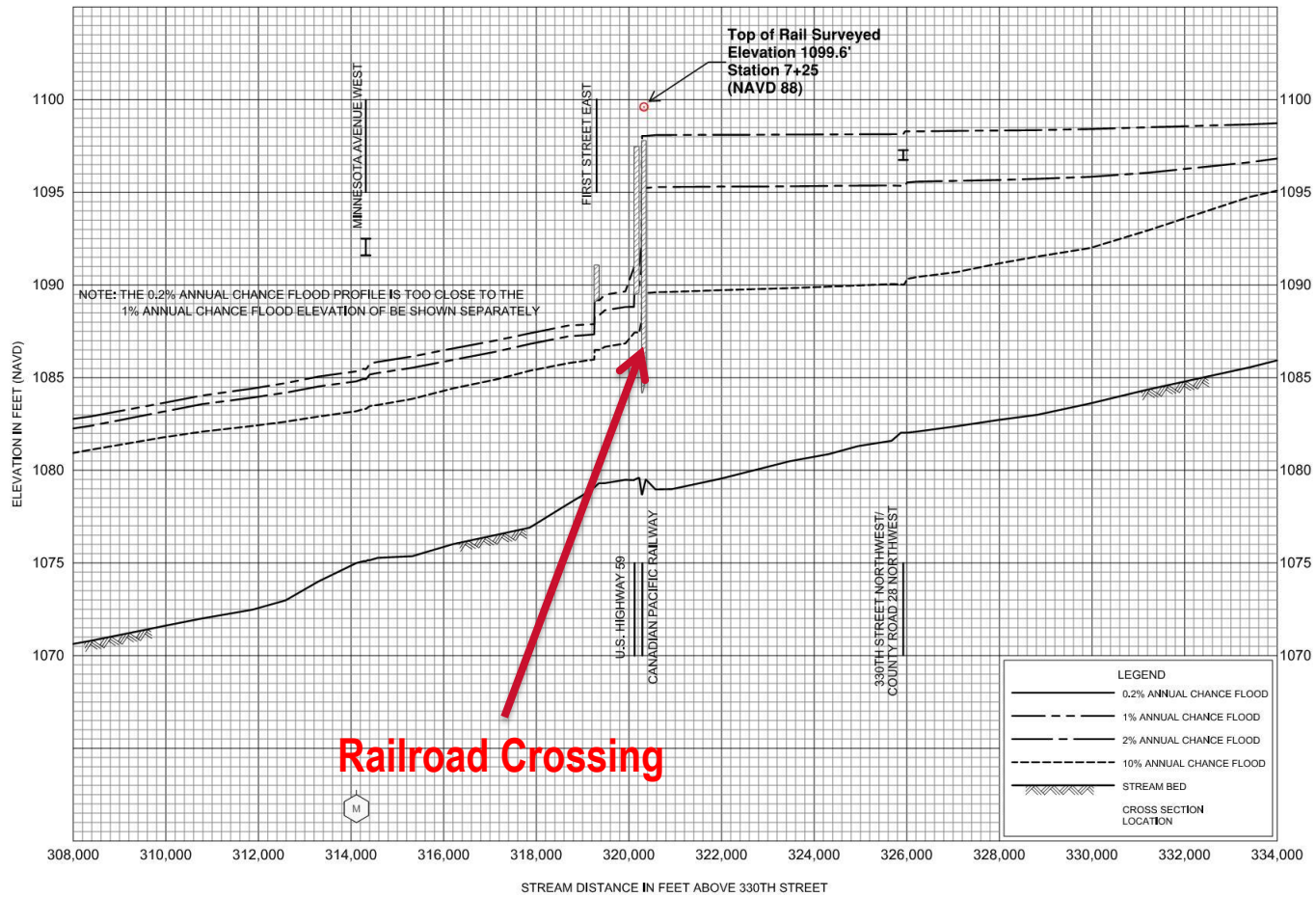
This map shows the depth of flooding during the 1-percent-annual-chance (100-year) flood event. The depths were created using 2-foot LiDAR data for the City of Marshall.

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





Railroad Crossing

FLOOD PROFILES
MIDDLE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARSHALL COUNTY, MN
AND INCORPORATED AREAS

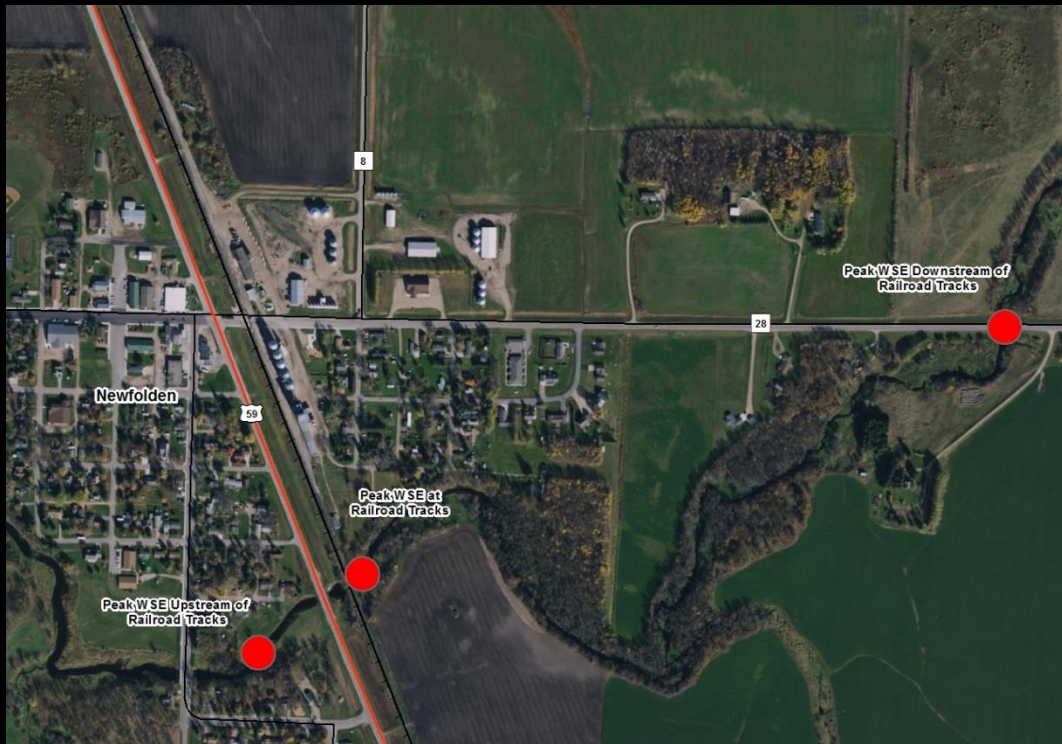
ALTERNATIVES

1. Do nothing – residents may raise lots, obtain LOMAs, etc.
2. Bore 1 or 2 – 48” to 54” steel pipes
3. Install 3 to 5 – 9’ x 9’ reinforced concrete boxes
4. Construct certifiable dike on north side of river, upstream of crossing
5. Construct dikes downstream of crossing or buyout affected properties
6. Construct a bypass channel
7. Retention area upstream or downstream
8. Some combination of the above measures

BENEFITS

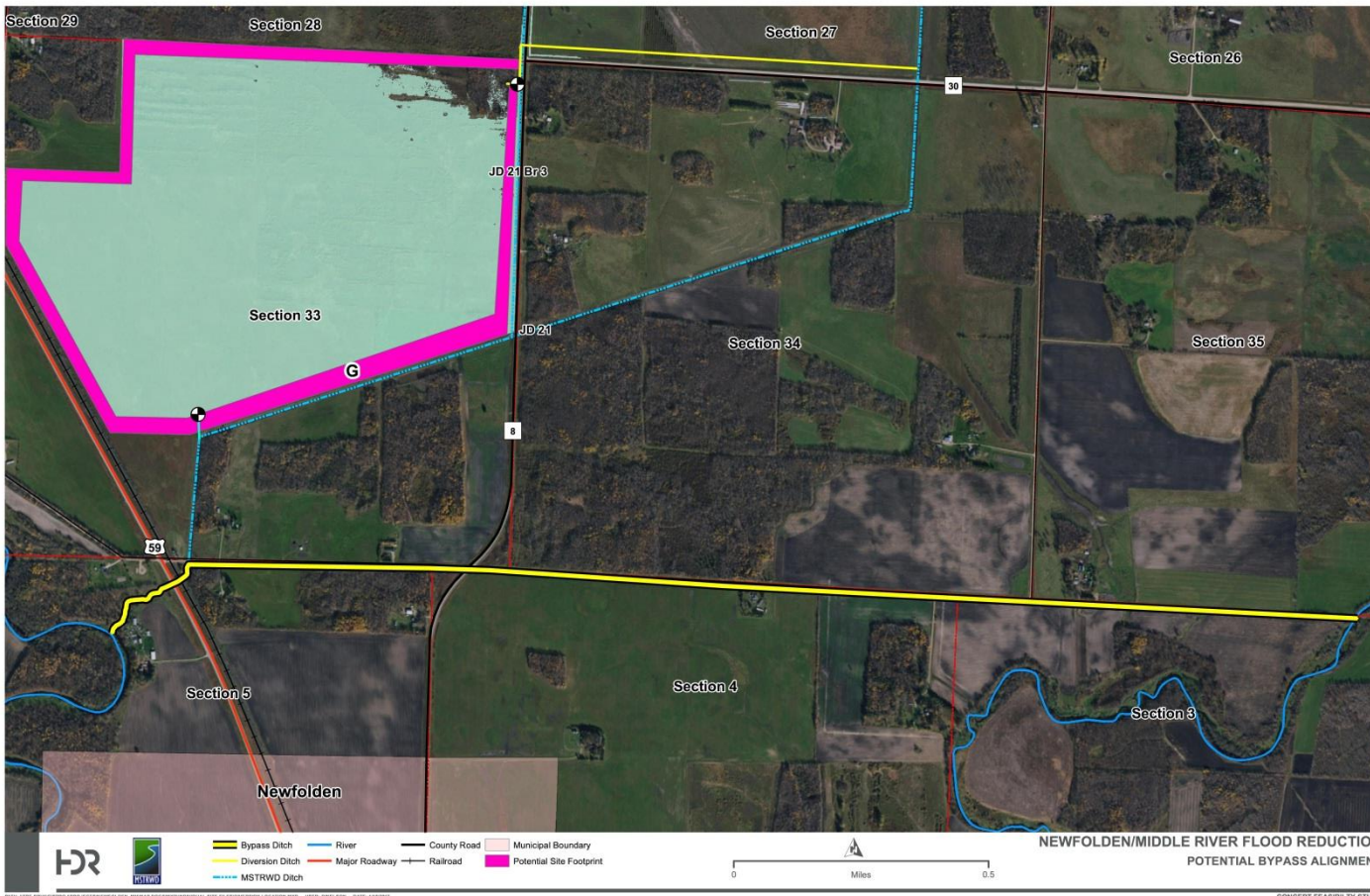
- New crossing with extended lifespan
- Lower headwater
- Removal of high-head embankment dam
- 40 homes removed from 100-year floodplain
- Flood risk reduced
- Dam hazard reduced
- Improve downstream/upstream flood impacts

EXISTING CONDITIONS VS. PROPOSED RAILROAD STRUCTURE ALTERNATIVES FOR A 100-YEAR, 10-DAY EVENT

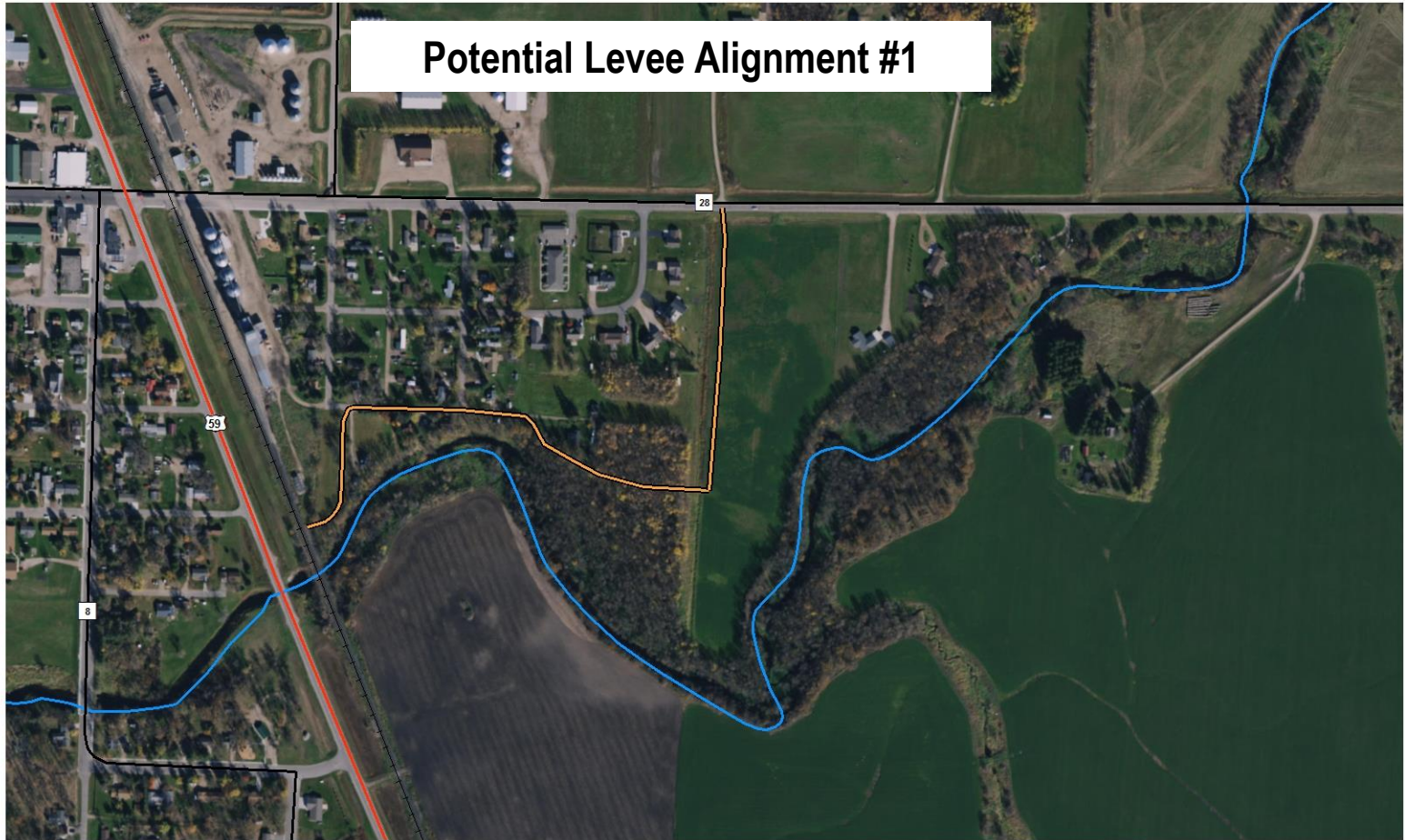


Alternative	Peak WSE Upstream of Railroad Tracks (Ft)	Peak WSE at Railroad Tracks (FT)	Peak WSE Downstream of Railroad Tracks (Ft)
Existing	1098.31	1098.13	1089.66
48" CSP	1097.95 (-0.36')	1097.69 (-0.44')	1089.72 (0.06')
54" CSP	1097.86 (-0.45')	1097.57 (-0.56')	1089.74 (0.08')
(2) 48" CSP	1097.62 (-0.69')	1097.28 (-0.85')	1089.79 (0.13')
(2) 54" CSP	1097.42 (-0.89')	1097.06 (-1.07')	1089.82 (0.16')
(3) 9' x 9' Box Culverts	1096.43 (-1.88')	1096.11 (-2.02')	1089.95 (0.29')
(5) 9' x 9' Box Culverts	1094.88 (-3.43')	1094.50 (-3.63')	1090.09 (0.43')

Potential Bypass Alignment

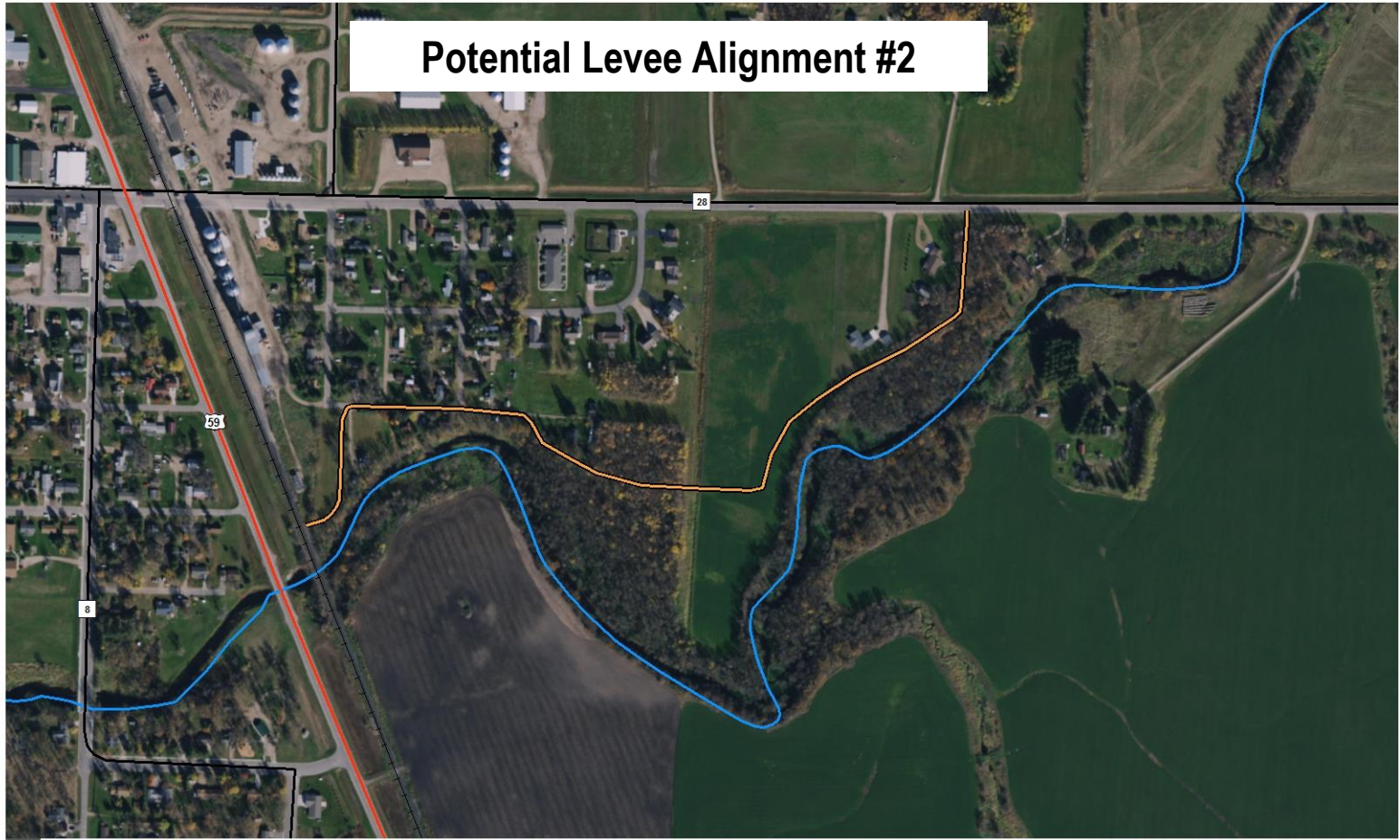


Potential Levee Alignment #1



MIDDLE RIVER SUBWATERSHED FEASIBILITY STUDY
POTENTIAL LEVEE ALIGNMENT

Potential Levee Alignment #2



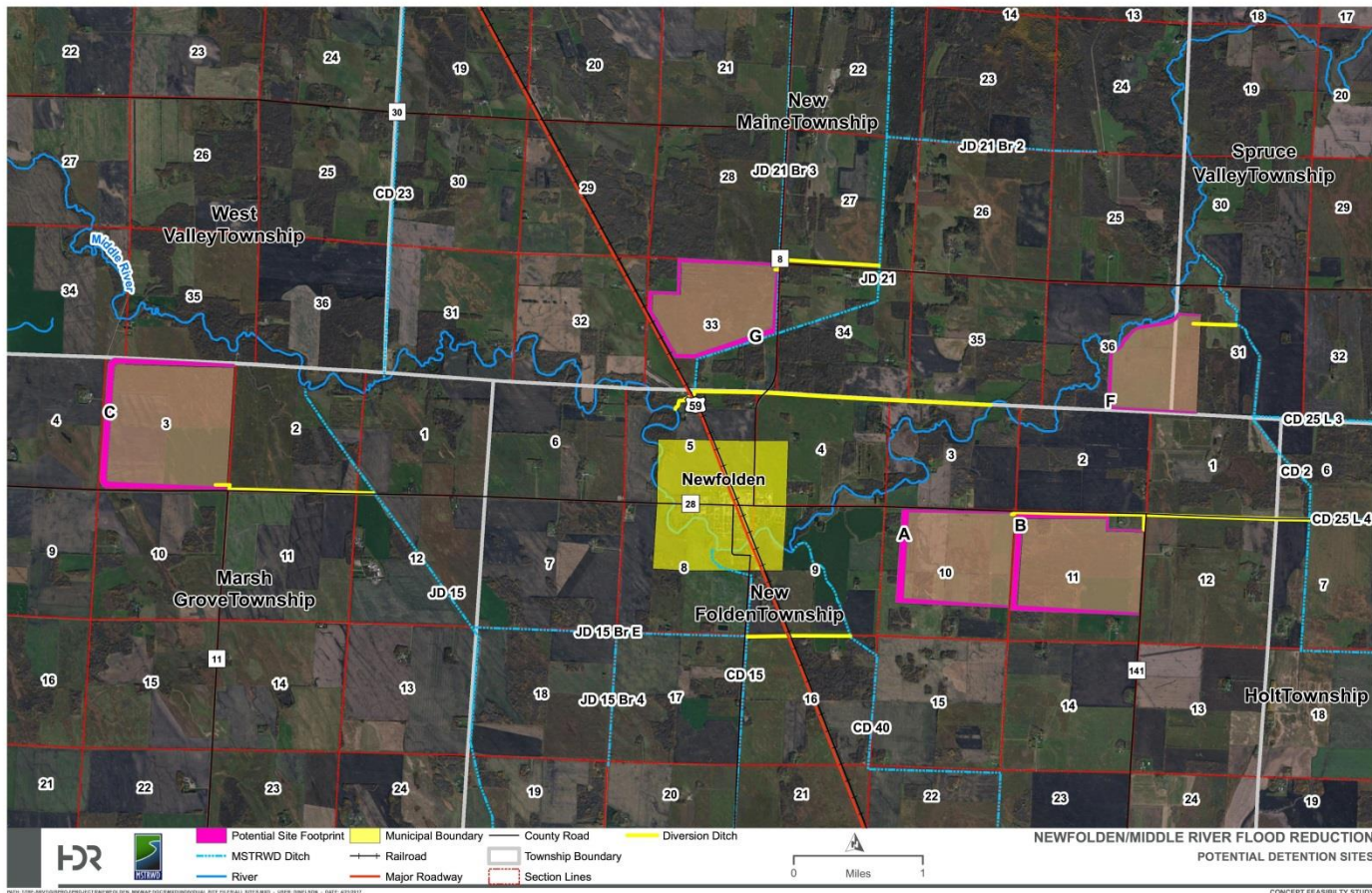
- Levee
- Major Roadway
- Railroad
- River
- County Road



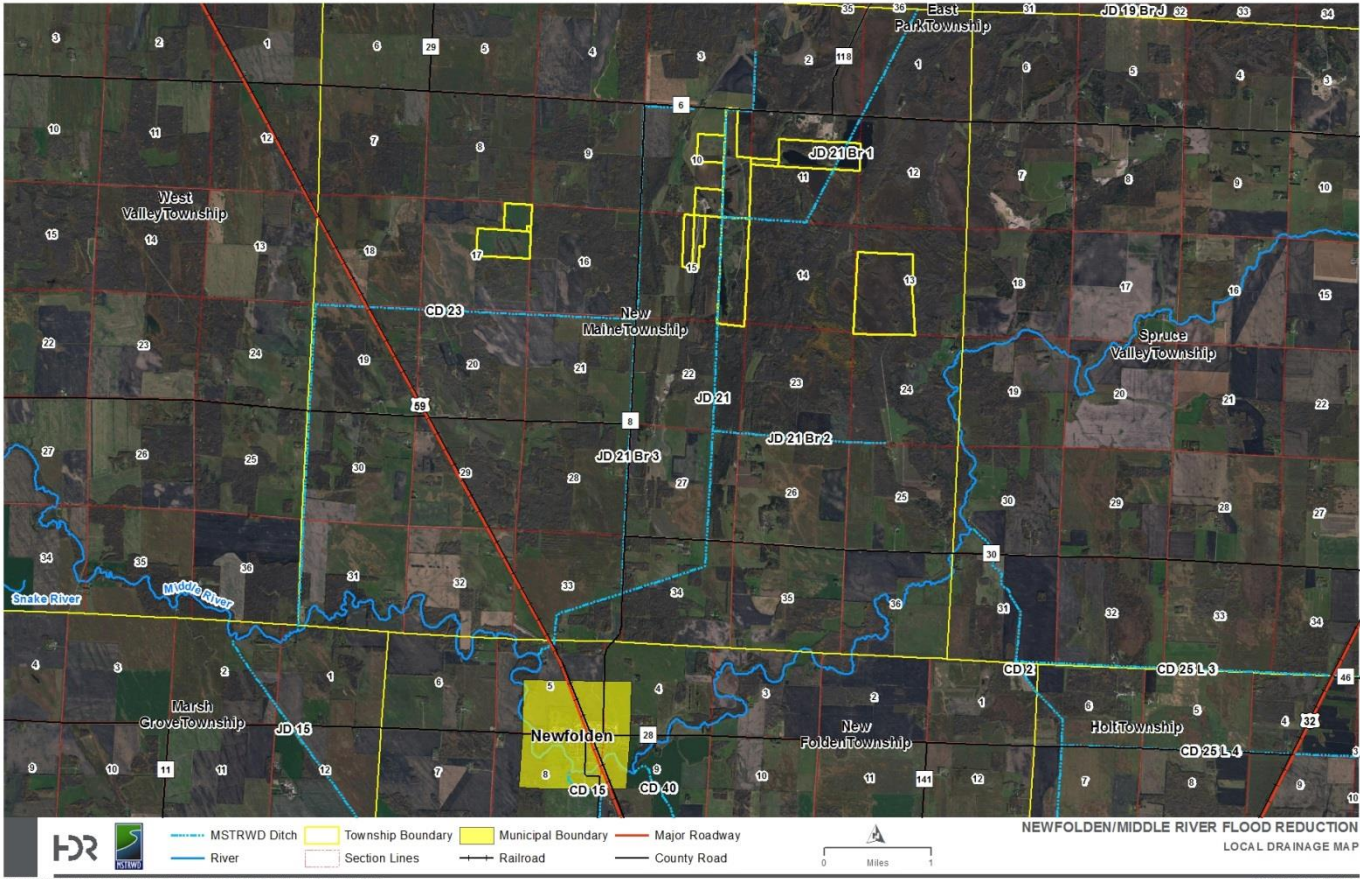
0 0.25 Miles

MIDDLE RIVER SUBWATERSHED FEASIBILITY STUDY
 POTENTIAL LEVEE ALIGNMENT WITH EXPANDED CITY LIMITS

Potential Retention Locations

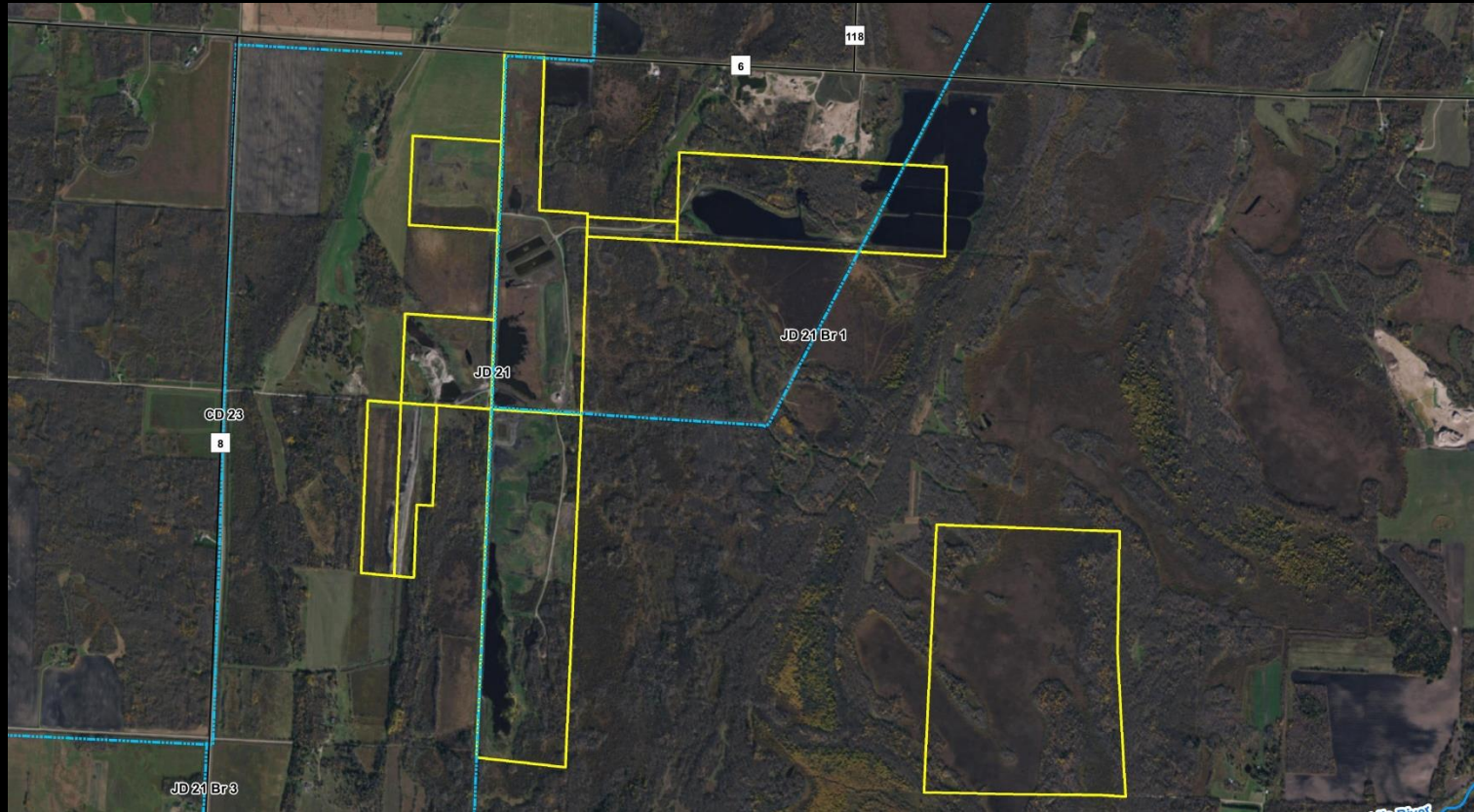


JD 21 Drainage Area

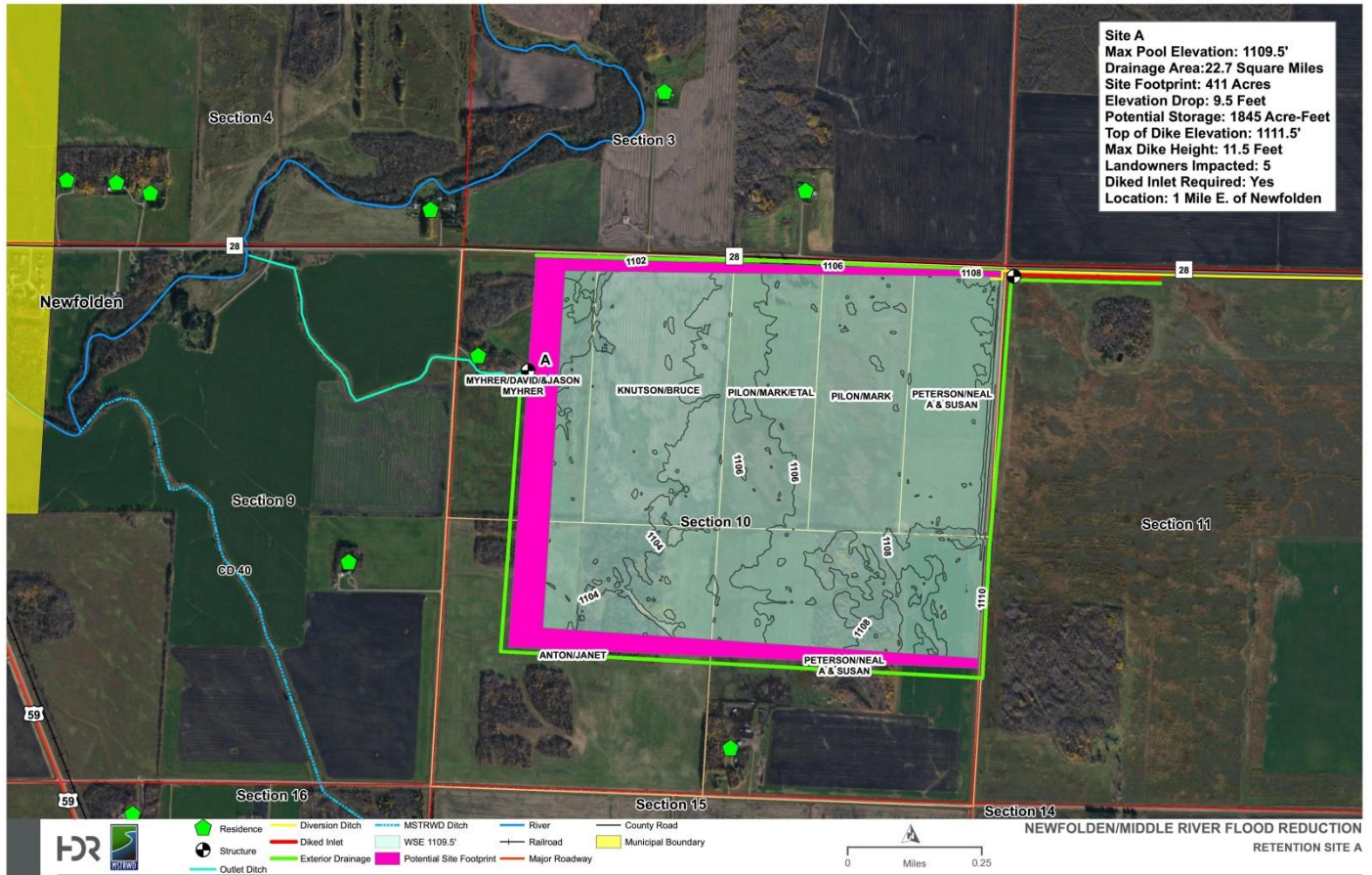


**NEWFOLDEN/MIDDLE RIVER FLOOD REDUCTION
LOCAL DRAINAGE MAP**

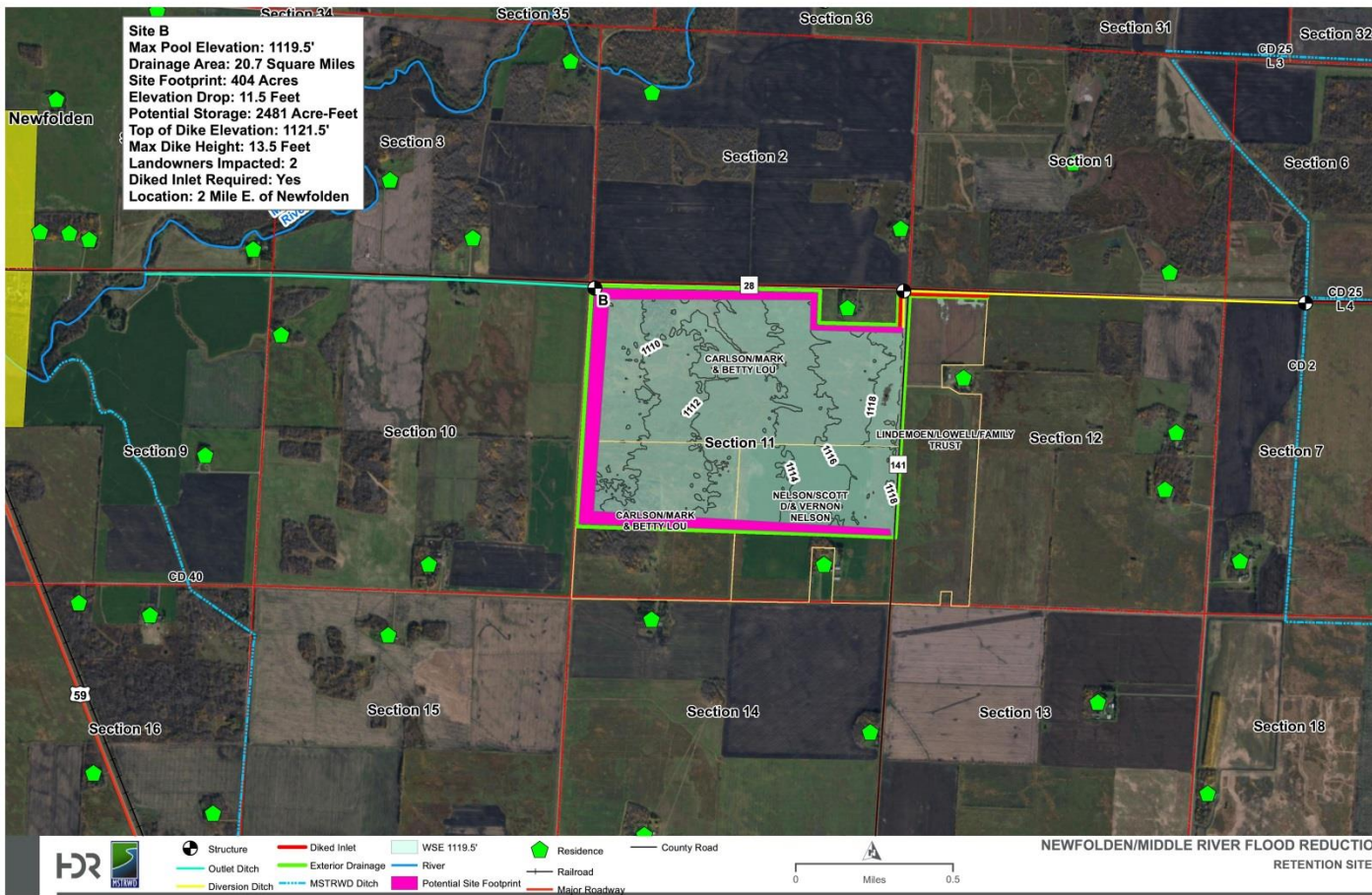
Kevin Pierce Parcels



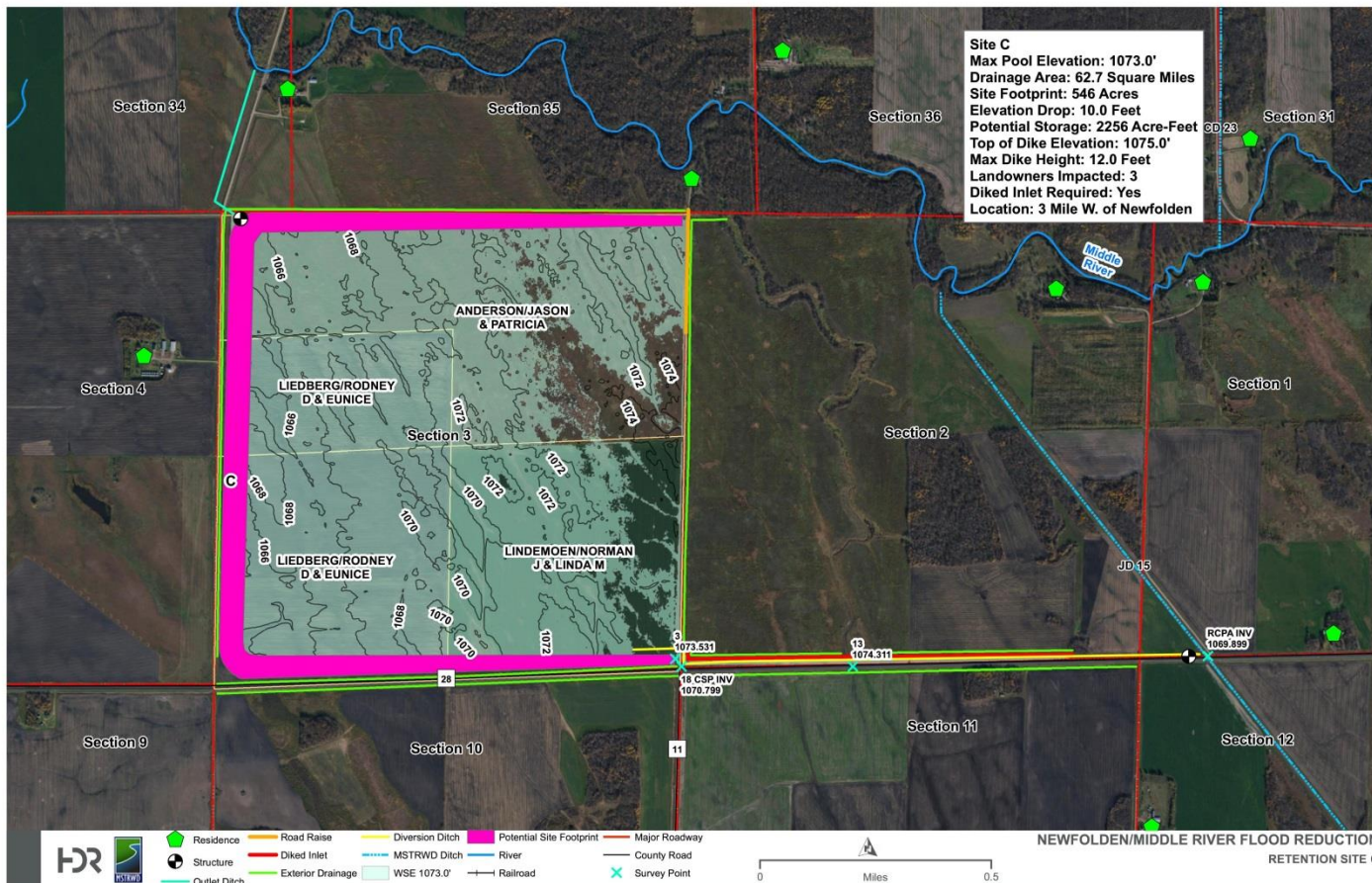
Site A



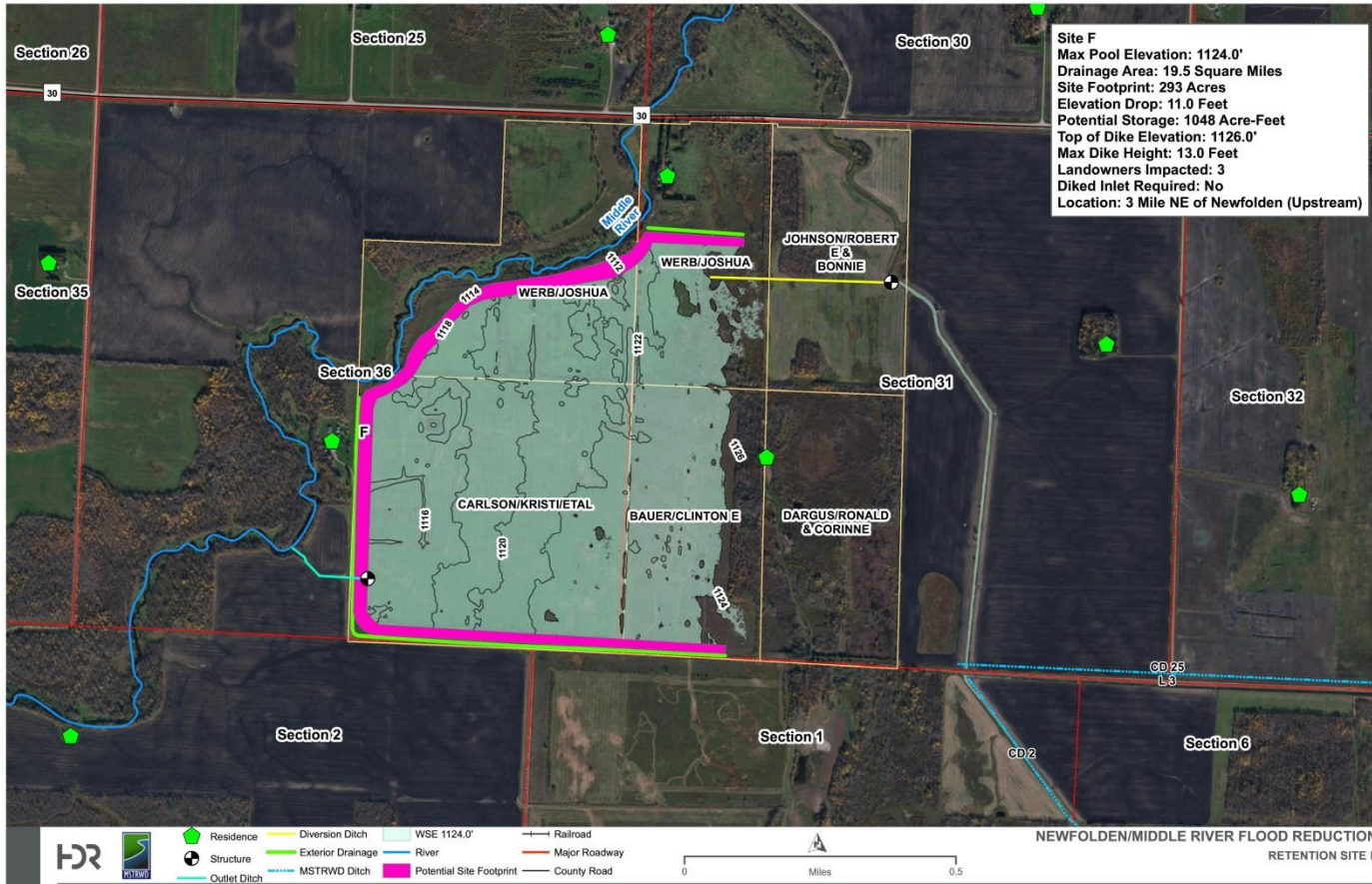
Site B



Site C



Site F



Alternative	Reduces Subwatershed Peak Flows	Reduces Subwatershed Runoff Volume	Decreases WSE at Newfolden	Improves Riparian Habitat	Enhances Water Quality	Benefits Highways	Benefits Railroad
48" CSP	N	N	Y	N	N	N	Y
54" CSP	N	N	Y	N	N	N	Y
(2) 48" CSP	N	N	Y	N	N	N	Y
(2) 54" CSP	N	N	Y	N	N	N	Y
(3) 9' x 9' Box Culverts	N	N	Y	N	N	N	Y
(5) 9' x 9' Box Culverts	N	N	Y	N	N	N	Y
Certified Levee	N	N	N	N	N	N	N
Certified Levee Expanded	N	N	N	N	N	N	N
Diversion Channel	N	N	Y	N	N	Y	Y
Detention Site B	Y	Y	Y	Y	Y	Y	Y
Detention Site C	Y	Y	Y	Y	Y	Y	Y
Detention Site D	Y	Y	Y	Y	Y	Y	Y
Detention Site F	Y	Y	Y	Y	Y	Y	Y
Detention Site G	Y	Y	Y	Y	Y	Y	Y
Detention Site B w/ Culvert Alt.	Y	Y	Y	Y	Y	Y	Y
Detention Site C w/ Culvert Alt.	Y	Y	Y	Y	Y	Y	Y
Detention Site D w/ Culvert Alt.	Y	Y	Y	Y	Y	Y	Y
Detention Site F w/ Culvert Alt.	Y	Y	Y	Y	Y	Y	Y
Detention Site G w/ Culvert Alt.	Y	Y	Y	Y	Y	Y	Y

POTENTIAL PARTNERS

- FEMA – MN HSEM
- RRWMB
- NWRDC (Northwest Regional Development Commission)
- CP Railway
- State of MN – DNR & FDR
- MnDOT
- Marshall County
- Middle-Snake-Tamarac Rivers WD
- City of Newfolds

Funding Partners		Potential Funding Partners
FDR	50%	NWRDC
RRWMB	15%	MnDOT
FEMA	10%	Marshall County
MSTRWD	10%	
CP	10%	
City of Newfolden	5%	

Timeline

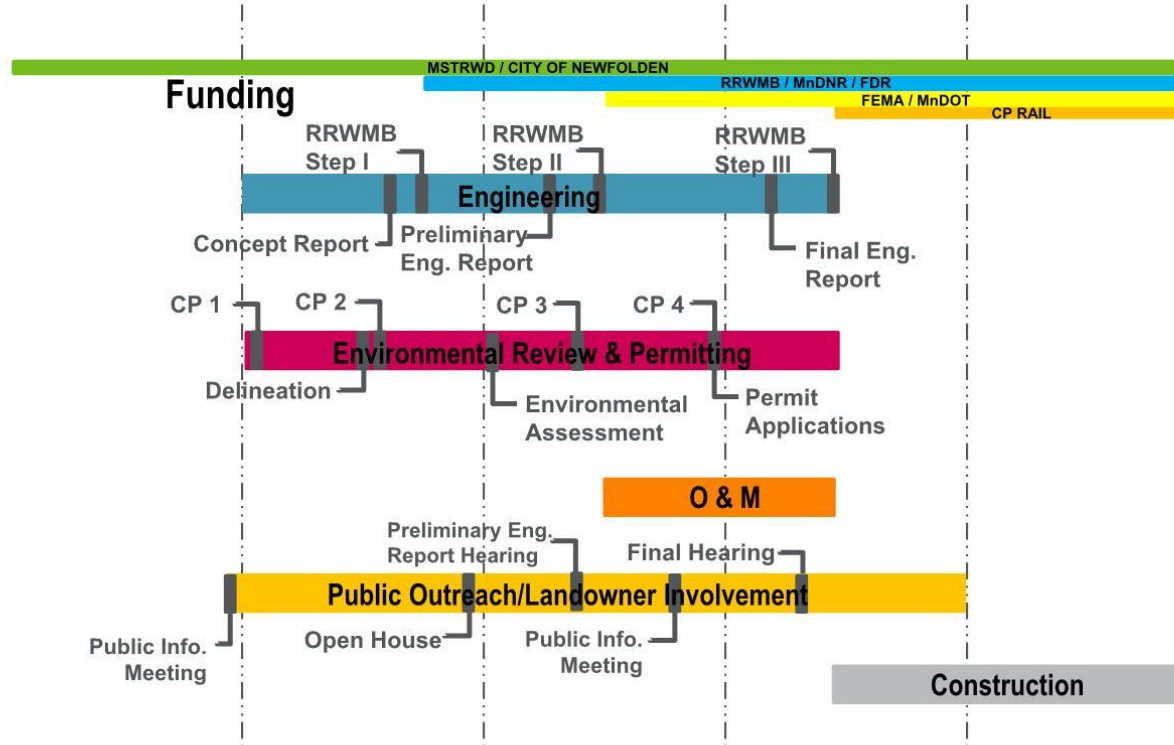
2016

2017

2018

2019

2020



PROJECT DEVELOPMENT AND NEXT STEPS

- Analyze & screen alternatives
- Continue landowner discussions
- Reach out to potential project partners & discuss project with the railroad



HDR