

#14 Barron Trail 37 Bridge 12417

State of Wisconsin  
Department of Natural Resources  
dnr.wi.gov

Motorized Recreation Grant Application

For: (choose all that apply)

Form 8700-159 (R 02/2024)

Page 1 of 5

Due Date: April 15

ATV/UTV Trail Aid

Snowmobile Trail Aid

Notice: Completion of this form is required under Wisconsin Statutes 23.09(26) and 23.33. Failure to complete this form will result in denial of financial assistance. Personally identifiable information found on this form is not intended to be used for any other purpose. The Department of Natural Resources (DNR) may provide this information to requesters as required by Wisconsin's Public Records law (ss. 19.31 – 19.39, Wis. Stats.).

Instructions: Applications may combine more than one source of funds. They may be submitted for consideration of traditional ATV, UTV, Snowmobile and Motorized Stewardship funding. Submit one copy of all forms and attachments. See Page 2 for necessary attachments. Send applications to your [Community Services Specialist](#).

DNR Use Only	
Category	Number

Section 1: Applicant Information

Applicant / Organization Name			Check Recipient: Individual other than authorized individual to act on behalf of the applicant. <input type="checkbox"/> Select if the same as applicant.		
Jeff Wolfe/Barron County					
Individual Authorized to Act on Behalf of Applicant per Resolution			Check Recipient Name (Name to Appear on Check)		
Jeff Wolfe			Jodi Busch		
Title			Title		
Deputy Sheriff			Finance Director		
Address			Address		
1420 Highway 25 N.			335 E. Monroe Avenue		
City	State	ZIP Code	City	State	ZIP Code
Barron	WI	54812	Barron	WI	54812
Telephone Number		Email Address			
(715) 637-6710		jeff.wolfe@co.barron.wi.us			

Section 2: Project Information Required for all Projects

Project Title					Current Funded Miles	New Miles (if applicable)
Trail 37 Bridge Rehab					337.60	
County	Township	Range	Section	¼ ¼	¼	GPS Coordinates:
Barron	33 N	12 <input type="radio"/> E <input checked="" type="radio"/> W	17	SE	SE	Lat. 45.340013 Long. -91.87327

Project Description Summary

In March of 2024, Barron County had this bridge inspected by CORRE Inc. The inspection stated that the support pilings had failed and needed to be replaced. The inspector also recommended replacing the bridge decking and railings as they were nearing the end of life. Barron County proposes replacing the support pilings, decking and railings. The current and future load ratings are being calculated by CORRE Inc. and the inspection report will be provided when received.

I certify that all maintenance land use agreements are on file.

Estimated Cost

Maintenance	Acquisition	Insurance	Development	Bridge Rehab.	Trail Rehab.	Total Estimated Cost
				\$122,600.00		\$122,600.00

Leave Blank – DNR Use Only

Applicant Certification

Printed Name of Authorized Official	Official's Title
Jeff Wolfe	Deputy Sheriff

As the applicant's authorized official, I certify that, to the best of my knowledge, the information in this application is true and correct.

  
Signature of Authorized Official

4/9/2024  
Date Prepared

**Appendix A – Required for Bridge Rehab/Replace, New, or Reroute with New Bridge**

Bridge Rehab/Replace     New Bridge     Reroute with new bridge

County Barron	Township 33 N	Range 12	Section 17	1/4 1/4 SE	1/4 SE	GPS Coordinates: Lat. 45.340014 Long. -91.87327
Water Body Name Fourmile Creek			Bridge Name		County Inventory Number 12417	
Funded Trail Name or Number (SNARS if applicable) 37			Has this bridge site ever received development or rehabilitation funds in the past? <input checked="" type="radio"/> Yes <input type="radio"/> No    Year: 2015 \$ 6,816.00			
Bridge is located on: <input checked="" type="radio"/> Private property <input type="radio"/> Public property			Old Bridge/Culvert Size 62.5'x12.5'		New Bridge/Culvert Size 62.5'x12.5'	
Landowner Where Bridge is Located Charles G. Carr/Brian R. Carr			Telephone Number (715) 651-4649		Length of Trail Use Agreement (5 year minimum) 10	
Current maximum load 48,000 lbs.		Age of Bridge Unknown		Bridge Material Steel		
Proposed maximum load 48,000 lbs.						
Sponsoring Club Name Barron Bears Snowmobile Club			Club Contact Jeff Vergin		Telephone Number (715) 837-1600	
Do you have your trail bridges posted as to maximum load? <input checked="" type="radio"/> Yes <input type="radio"/> No			What is the maximum load of the other bridges on the system if groomed with this bridge? 10,000 lbs-60,000 lbs			
What is the weight of your puller & drag/grading equipment? 24,251						
What other recreational trail uses are planned for this bridge? ATV/Snowmobiling						
If there are other Recreational uses planned, how much of the bridge cost will be paid for by non-snowmobile or non-ATV users? N/A						
<input checked="" type="radio"/> Yes <input type="radio"/> No    Have you contacted your local <a href="#">DNR Water Management Specialist (WMS)</a> regarding a permit? <input checked="" type="radio"/> Yes <input type="radio"/> No    Is a permit needed? (Please provide any written correspondence from WMS.) <input checked="" type="radio"/> Yes <input type="radio"/> No    Have you contacted your County Zoning Dept. regarding a floodplain determination? <input type="radio"/> Yes <input checked="" type="radio"/> No    Will an H & H (hydrologic and hydraulic) study be required?						

**Bridge Project Detailed Description**

In March of 2024, Barron County had this bridge inspected by CORRE Inc. The inspection stated that the support pilings had failed and needed to be replaced. The inspector also recommended replacing the bridge decking and railings as they were nearing the end of life. Barron County proposes remove the existing deck and railings, temporarily relocate the bridge structure, install new timber piles and timber piers, reinstall bridge structure, and then install a new panelized timber deck and railings.

Project Name: Bridge 12417 Rehab		Prepared By: Jeff Wolfe	Date: 04/09/2024
County: Barron	Project Applicant: Barron County	Landowner Name: Charles & Brian Carr	<input type="radio"/> Public <input checked="" type="radio"/> Private

Indicate - (C) Contract , (F) Force Acct., (D) Donated

	DEVELOPMENT PROJECT ITEMS <i>List by individual item or break down by Use Areas (See Item List On Back Of This Form)</i>	Quantity	Unit of Measure	Component Costs	Estimated Total Item Cost
C	Crane Mobilization Fee	1	LS	\$22,500.00	22,500.00
C	Removal of existing bridge deck, railings, and moving bridge	1	LS	\$8,400.00	8,400.00
C	Removal of piers	4	Each	\$2,200.00	8,800.00
C	New open bent timber pier installation	2	Each	\$18,000.00	36,000.00
C	Installation of new panelized timber deck with railings	1	LS	\$145,000.00	145,000.00
C	Site grading	1	LS	\$9,500.00	9,500.00
C	Erosion control	1	LS	\$10,000.00	10,000.00
C	Engineering	1	LS	\$5,000.00	5,000.00
<b>TOTAL \$</b>					<b>\$245,200.00</b>

- NOTE:**
- For development projects, contingency and indirect costs are not eligible expenses.
  - For acquisition projects, complete the Acquisition Project Cost Estimate Section of this form.



**Larson Construction Co Inc**

19681 - 55th Avenue  
 Chippewa Falls WI 54729  
 PH 715.723.9708  
 FX 715.723.4515

**Barron County Trail System  
 Trail 136  
 Bridge Rehabilitation**

BASE BID						
Line No	Item No	Description	Quantity	Unit	Unit Price	Total
1		Mobilization	1.00	LS	22,500.00	\$ 22,500.00
2		Removal of Existing deck	1.00	LS	8,400.00	\$ 8,400.00
3		removal of piers	4.00	EA	2,200.00	\$ 8,800.00
4		New open bent timber pier installation	2.00	EA	18,000.00	\$ 36,000.00
5		Installation of new panelized timber deck with railing	1.00	LS	145,000.00	\$ 145,000.00
6		Site grading	1.00	LS	9,500.00	\$ 9,500.00
7		Erosion control	1.00	LS	10,000.00	\$ 10,000.00
						\$ 240,200.00

**Notes:**

- 1 Larson Construction is a Union Contractor.
- 2 Utility conflicts to be resolved with help from the Prime Contractor
- 3 All items in Base Bid are tied unless discussed prior to bid

Signed:

*Tim MacLaughlin-Barok, Vice President, Operations*

Date: 3/20/2024

Accepted:

Date: \_\_\_\_\_

Guidelines for Applicant

Complete this form for each bridge structure you are submitting a grant application for. Provide any additional documents not requested on application checklist to substantiate your points, including actual deeded easements.

Category		Possible Points	Actual Points
1	<b>Condition of the Structure</b> (max of 10 points)		
	Has a certified bridge inspection report that supports the project & demonstrates need (see example, must provide copy of report by August 1 for 2024 only)	10	10
2	<b>Permits</b> (maximum points 4)		
	Consultation with DNR Water Mgmt Specialist has occurred & permit is likely, if needed	1	1
	Permit in hand / Bridge already permitted	3	
3	<b>Funding</b> (maximum points 2) Are other funds already committed?		
	50% or greater from other funding source(s)?	2	
	11% - 49% from other funding source(s)?	1	
4	<b>Length of Written Easements or Land Use Agreement</b> (max points 5)(ch. 23.09(26)(am)1 WI Stats)		
	On public land (County, State, Federal)	5	
	10 or more year <b>deeded easement</b> on private land or other public land, for <u>all portions of that trail to the nearest road on each side of the bridge</u>	5	<del>5</del>
	3-9 year <b>deeded easement</b> on private land or other public land, for <u>all portions of that trail to the nearest road on each side of the bridge</u>	4	Not Deeded
	10 or more year <b>deeded easement</b> on private land or other public land, for <u>just the bridge site</u>	3	
	3-9 year <b>deeded easement</b> on private land or other public land, for <u>just the bridge site</u>	2	
	10 or more year land use agreement (LUA, not deeded) on private land or other public land	1	1
	3-9 year land use agreement (LUA, not deeded) on private land or other public land	0	
5	<b>Miles Impacted</b> – How many miles will need to rerouted if the structure is not replaced? Measured from nearest intersection on both sides of the bridge. (max 4 points)		
	Less than 20 miles	1	
	20 miles or more	3	3
	No other snowmobile trails connect. Explain:	4	
<b>DEDUCTIONS</b>			
6	<b>County Active Project Deduction</b> (maximum deduction 1 point) A snowmobile active project is one that has exceeded it's initial grant period.		
	Two or more active projects - deduct 1 point	-1	N/A
<b>GRAND TOTAL</b>			<del>19</del> 15

Comments/Notes:





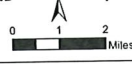
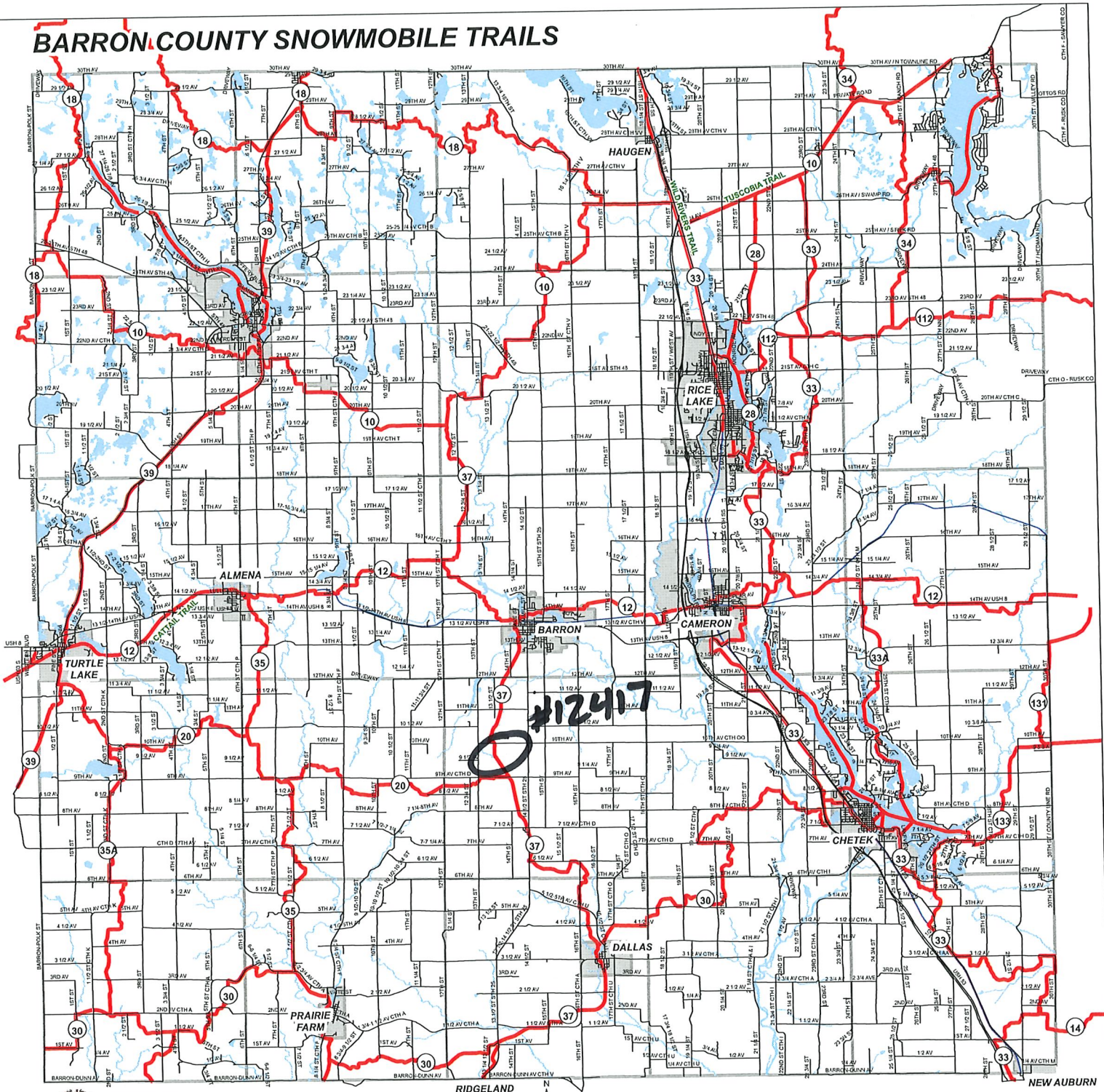








# BARRON COUNTY SNOWMOBILE TRAILS

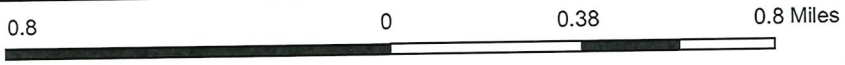




# Bridge #12417 Rehab Location

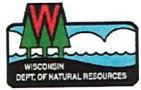


- Legend**
- Municipality
  - State Boundaries
  - County Boundaries
  - Major Roads**
  - Interstate Highway
  - State Highway
  - US Highway
  - County and Local Roads**
  - County HWY
  - Local Road
  - Railroads
  - Tribal Lands
  - Rivers and Streams
  - Intermittent Streams
  - Lakes and Open water



DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

**Notes**

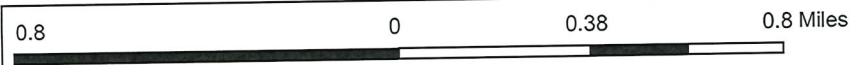
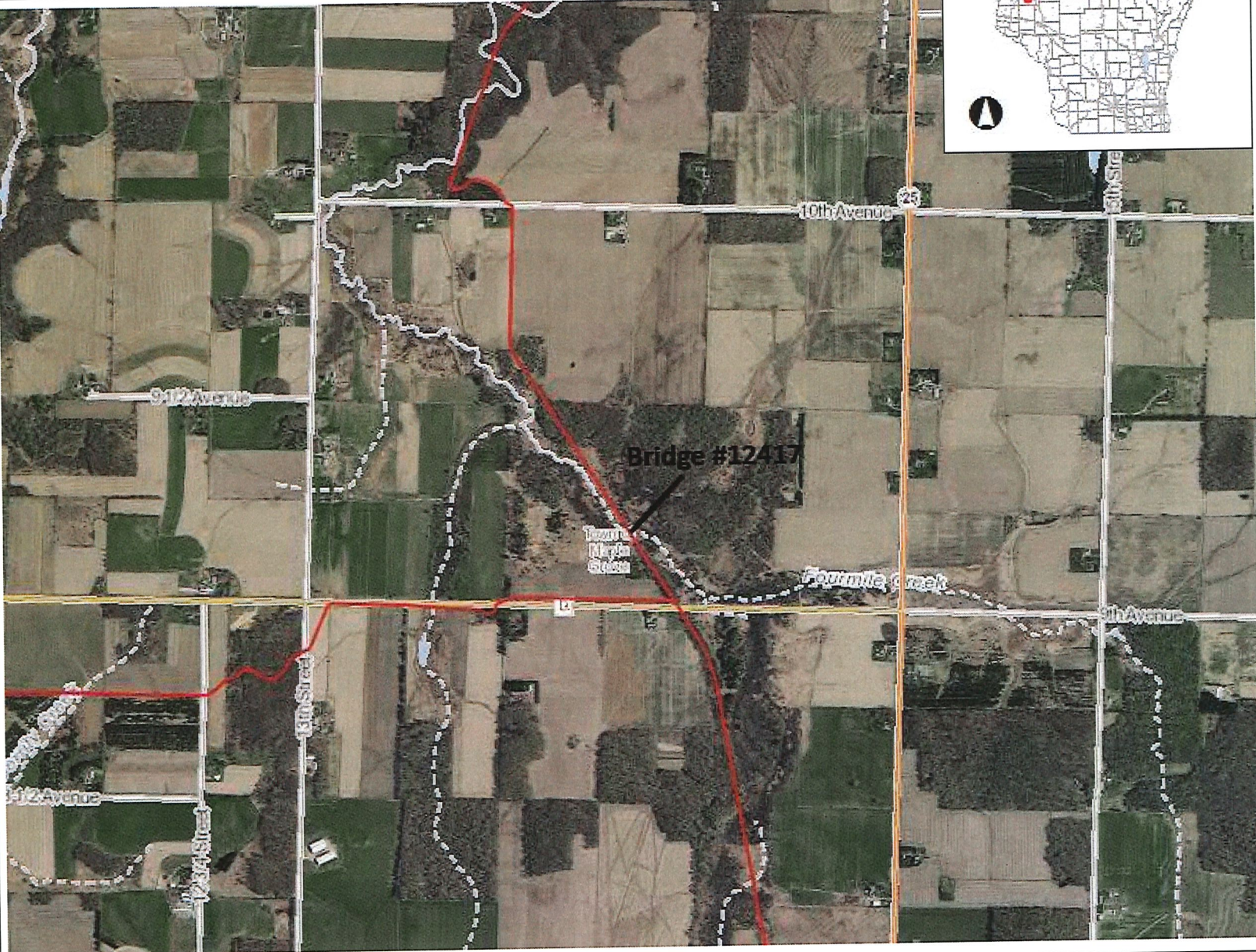


# Bridge #12417 Aerial Map



### Legend

- Municipality
- State Boundaries
- County Boundaries
- Major Roads**
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads**
  - County HWY
  - Local Road
- Railroads
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NAD\_1983\_HARN\_Wisconsin\_TM

1: 23,760

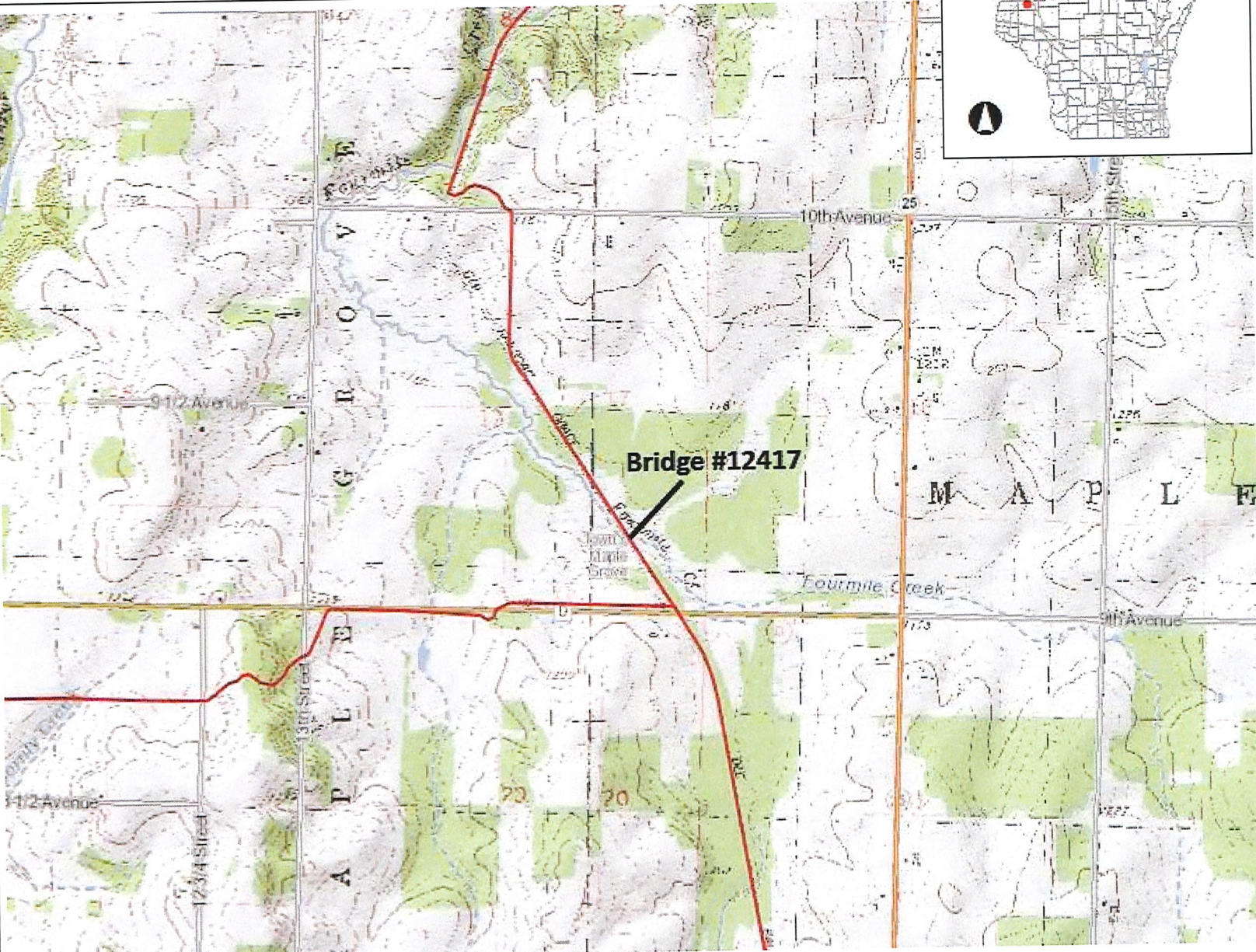
### Notes



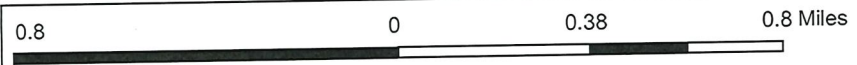
# Bridge #12417 Topo Map



- Legend**
- Municipality
  - State Boundaries
  - County Boundaries
  - Major Roads**
  - Interstate Highway
  - State Highway
  - US Highway
  - County and Local Roads**
  - County HWY
  - Local Road
  - Railroads
  - Tribal Lands
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**Bridge #12417**



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1: 23,760

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**Notes**

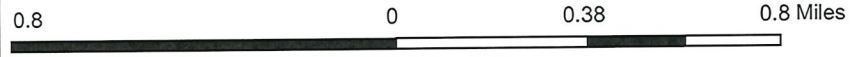
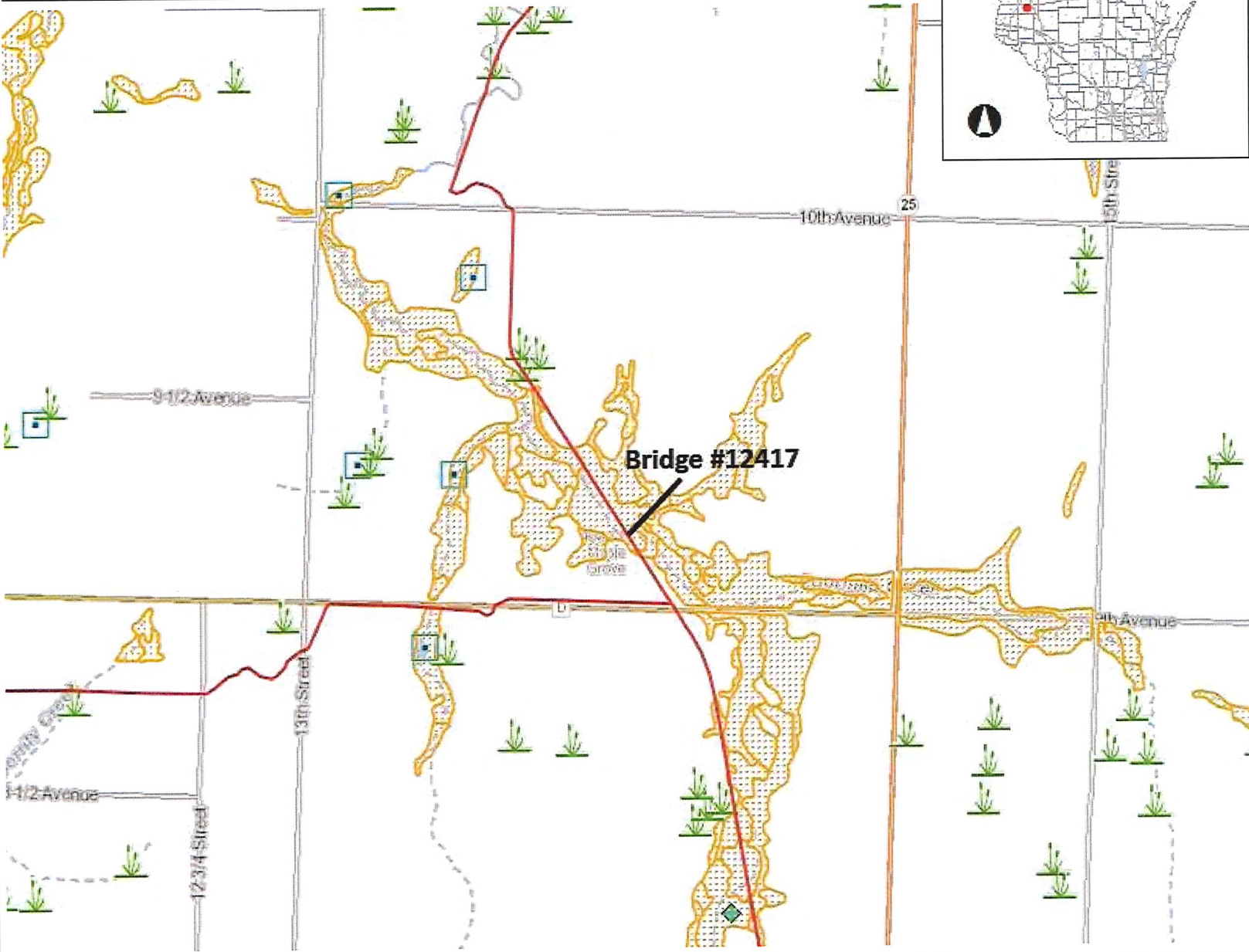


# Bridge #12417 Wetlands Map



### Legend

- Lake Class Areas
- Riverine/ditch Class Areas
- Wetland Class Areas
- Wetland Class Points
- Dammed pond
- Excavated pond
- Filled/draind wetland
- Wetland too small to delineate
- Filled excavated pond
- Filled Points
- Wetland Class Areas
- Filled Areas
- Lake Class Areas
- Riverine/ditch Class Areas
- Wetland Class Areas
- Wetland Class Points
- Dammed pond
- Excavated pond
- Filled/draind wetland
- Wetland too small to delineate
- Filled excavated pond
- Filled Points
- Wetland Class Areas
- Filled Areas
- Wetland Identifications and Confirmations
- Municipality
- State Boundaries
- County Boundaries
- Major Roads**
- Interstate Highway
- State Highway
- US Highway
- County and Local Roads**
- County HWY



NAD\_1983\_HARN\_Wisconsin\_TM 1: 23,760

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**Notes**

July 23, 2024

**Barron County Sheriff's Department**  
Barron County Justice Center  
1420 State Hwy 25 North  
Room 1200  
Barron, WI 54812-3007

Eau Claire Office  
1802 Warden Street  
Eau Claire, WI 54703  
608.828.1011 P

## Trail Bridge #12417 Inspection and Load Rating

**CORRE, Inc. (CORRE) has completed the inspection and load rating of the trail bridge over Fourmile Creek at latitude and longitude of 45.340019 N, 91.873274 W.**

### INSPECTION

**Painted Steel Girders** All paint gone with some minor pitting / corrosion but no section loss. Both rows of girders are spliced at mid-span and no sign of defects. Fair condition

**Painted Steel Diaphragms** All paint is gone with pitting / corrosion but no section loss. Fair condition

**Timber Abutments:** Timber only visible at 6-inches each side of bearing locations. No sign of crushing at the girder bearing. Fair condition

**Abutment Slopes:** gravel / soil, no erosion or scour. Fair condition.

**Timber Deck:** 3" x 8" timber plank. Timbers are aged and have minor decay / white fungus on underside throughout. Some planks are spongy and should be replaced. Poor condition

**Timber pile:** Piles at all four piers have failed. Holes through entire section of most. All have decay and crushing. Poor condition / Replace

**Railing:** light steel tubing with welded wire fence between posts. Posts are rusty; connections are anchored to timber deck plank. Poor condition

### Recommendations:

Replace entire structure (salvage the existing steel girders).

### Inspection Frequency:

Pedestrian/trail bridges that do not carry highway traffic are not under the NBIS regulations. WisDOT does recommend inspections on a 48-month cycle for these structures.

CORRE recommends this structure be inspected on a 12-month inspection cycle.

### LOAD RATING

*Based on our review of the structure and discussions with the client, it is desirable to salvage the existing steel girders and place them on new timber piers. All existing piers would be removed, and 2 new piers are proposed to be installed, resulting in a 3-span configuration. The proposed span lengths would be 20.0', 22.5', 20.0'. New panel decking and timber railing would be installed.*

*Under the proposed conditions noted above, the existing steel girders will have the capacity to handle a truck load of 24 tons. It should be noted that prior to construction, analysis of the existing steel splice in both girders should be performed to confirm adequacy, which is outside the scope of effort for this load rating.*



**SUMMARY**

CORRE appreciates the opportunity to provide these services. If you have any questions or would like to discuss further, please feel free to contact me at 715.579.0325 or Mark Pilgrim at 715.726.9631.

**Sincerely,**  
CORRE, Inc.



Eric Price, PE  
Structural Services Director



Mark Pilgrim, 9501  
Bridge Inspector

Enc: Inspection Summary, Load Rating Calculations



South Approach Looking North



West Profile



Typical Girder condition



Typical Timber abutment (W)



Typical Timber abutment (E)



Typical Timber abutment (E)



Typical pile condition at pier



Typical bearing at pier



Typical timber pier cap



Timber and girder condition at contact.

Client: **Barron County Sheriff**  
 Project Description: **Load Rating**  
 Structure No.: **12417**  
 Rated By: **SAE**  
 Date: **7/23/2024**  
 File Name: [https://correinc.sharepoint.com/sites/Projects/NW\\_Region/202403.025\\_2024\\_Ancillary\\_Bridge\\_Inspections/300\\_Design/309\\_Structures/Ratings/12417/\[Steel Girder-Multi Span - 3 SPAN - MIDDLE SPAN - Snowmobile-Rating \(LFR\)-12417.xlsx\]program](https://correinc.sharepoint.com/sites/Projects/NW_Region/202403.025_2024_Ancillary_Bridge_Inspections/300_Design/309_Structures/Ratings/12417/[Steel Girder-Multi Span - 3 SPAN - MIDDLE SPAN - Snowmobile-Rating (LFR)-12417.xlsx]program)



# AASHTO LFR STEEL GIRDER RATING

#VALUE!

## Structure Information:

Span Length =		<i>Span 2 controls</i>	22.50 feet
Clear Width =			12.50 feet
<b>Location of Beam (Interior or Exterior) =</b>			<b>Exterior</b> feet
Number of Girders =			2 total
Girder Spacing =			6.00 feet
Overhang Width =			3.00 feet
Rail Width =			0.25 feet
Deck Thickness =			6.00 inches
Depth of Wearing Surface =			0.00 inches
Average Haunch Depth =			0.00 inches
Deck Configuration =	Composite? <b>No</b>	<i>Plank (wide face bearing on support)</i>	
Overlay Thickness =	Type = <b>None</b>		0.00 inches
Overburden Thickness =	Type = <b>None</b>		0.00 inches
Weight of Rail =			27.0 lbs/foot
Location of M1 =	<i>Std Spec for Hwy Bridges 17th 10.48.1.1</i>		25.00 feet
LL Moment @ location of M1 =			77.30 ft-kips
DL Moment @ location of M1 =			1.34 ft-kips
Unbraced Length of Compression Flange of Girder =			15.00 feet
Compressive Strength of Concrete =			N/A psi
Area of Longitudinal Steel, at Top of Slab, at Location of Positive Moment =			N/A inches <sup>2</sup> /foot
Yield Strength of Reinforcing Steel =			N/A psi
Modular Ratio = $E_s/E_c$ =			N/A

## Girder/Beam Properties:

Yield Strength =		30 ksi
Shape =		LK 18X55
Bottom Flange:		
Width =		6.00 inches
Height =		0.44 inches
Bottom Flange Cover Plate:		
Width =		0.00 inches
Height =		0.00 inches
Web:		
Width =	<u>Assumed Section Loss</u>	0.46 inches
Height =	0%	17.13 inches
Top Flange:		
Width =		6.00 inches
Height =		0.44 inches
Top Flange Cover Plate:		
Width =		0.00 inches
Height =		0.00 inches
Transverse Stiffener Spacing =		N/A
Longitudinal Stiffener Used =		No

Total Depth, d =	18.00 inches
Web Thickness, $t_w$ =	0.46 inches
Compression Flange Thickness, $t_f$ =	0.44 inches
Compression Flange Width, $b_f$ =	6.00 inches
Weak Axis Radius of Gyration, $r_y$ =	1.15 inches
Area, A =	15.93 inches <sup>2</sup>
Strong Axis Section Modulus, $S_x$ =	88.40 inches <sup>3</sup>
Strong Axis Moment of Inertia, $I_x$ =	795.60 inches <sup>4</sup>

Live Load Distribution:

1.) Interior Girders	
a.) For Moment (AASHTO Table 3.23.1) Distribution Factor = $S/4.00$ =	1.500
b.) For End Reaction (AASHTO 3.23.1.2) Distribution Factor =	1.000
2.) Exterior Girders	
a.) For Moment	
(1) AASHTO 3.23.2.3.1.2 Distribution Factor =	1.125 (governs)
(2) AASHTO 3.23.2.3.1.5 Distribution Factor =	0.000
b.) For End Reaction (AASHTO 3.23.1.2) Distribution Factor =	1.125

<u>Non-Composite Dead Loads</u>		Max Moment (ft-kips)	Max Reaction (kips)
Deck =	0.135 klf =	8.54	1.52
Haunch =	0.000 klf =	0.00	0.00
Girders =	0.054 klf =	3.43	0.61
Secondary Members =	0.020 klf =	1.27	0.23
	<b>0.209 klf =</b>	<b>10.7</b>	<b>2.35</b>
<u>Composite Dead Loads</u>			
Overlay =	0.000 klf =	0.00	0.00
Rail Load =	0.027 klf =	1.71	0.30
Snow (12" Depth) =	0.123 klf =	7.78	1.38
	<b>0.150 klf =</b>	<b>7.70</b>	<b>1.69</b>
<u>Live Loads</u>			
H2O Loading =		<b>132.90</b>	<b>35.00</b>
Pedestrian Loading =	85 psf =	<b>49.50</b>	<b>11.95</b>
Impact, $I = 50/(\text{Span} + 125) \leq 1.30$ =			1.000
			<b>1.000</b>
Controlling Live Load (Distributed) =		74.8 ft-kips	19.7 kips
M1 =	<i>Std Spec for Hwy Bridges 17th 10.48.1.1</i>	44.2 ft-kips	

Design Load Factors:

Table 3.22.1A

Factor Applied to Dead Load, $LF_d$ =	1.3
Factor Applied to Composite Dead Load, $LF_c$ =	1.3
Factor Applied to Live Load, $LF_l$ =	2.17

## COMPUTATION OF SECTION PROPERTIES

### Properties of Noncomposite Section Resisting Dead Loads:

Moment of Inertia, I =	795.60 inches <sup>4</sup>
Distance from Bottom of Beam to N.A., Yb =	9.00 inches
Distance from Top of Beam to N.A., Yt =	9.00 inches
Section Modulus to Bottom of Beam, Sb =	88.40 inches <sup>3</sup>
Section Modulus to Top of Beam, St =	88.40 inches <sup>3</sup>

### Properties of Composite Section Resisting Dead Loads:

Moment of Inertia, I =	795.60 inches <sup>4</sup>
Distance from Bottom of Beam to N.A., Yb =	9.00 inches
Distance from Top of Beam to N.A., Yt =	9.00 inches
Section Modulus to Bottom of Beam, Sb =	88.40 inches <sup>3</sup>
Section Modulus to Top of Beam, St =	88.40 inches <sup>3</sup>

### Properties of Section Resisting Composite Dead Loads (3n):

Moment of Inertia, I =	#VALUE! inches <sup>4</sup>
Distance from Bottom of Beam to N.A., Yb =	#VALUE! inches
Distance from Top of Beam to N.A., Yt =	#VALUE! inches
Distance from Top of Deck to N.A., Ydeck =	#VALUE! inches
Section Modulus to Bottom of Beam, Sb =	#VALUE! inches <sup>3</sup>
Section Modulus to Top of Beam, St =	#VALUE! inches <sup>3</sup>
Section Modulus to Top of Deck, Sdeck =	#VALUE! inches <sup>3</sup>

### Properties of Section Resisting Live Loads (n):

Moment of Inertia, I =	795.60 inches <sup>4</sup>
Distance from Bottom of Beam to N.A., Yb =	9.00 inches
Distance from Top of Beam to N.A., Yt =	9.00 inches
Distance from Top of Deck to N.A., Ydeck =	15.00 inches
Section Modulus to Bottom of Beam, Sb =	88.40 inches <sup>3</sup>
Section Modulus to Top of Beam, St =	88.40 inches <sup>3</sup>
Section Modulus to Top of Deck, Sdeck =	0.00 inches <sup>3</sup>

## ANALYSIS OF NONCOMPOSITE SECTION

### Determine Section Designation:

	10.48.1	10.48.2	10.48.4
	Compact Section Requirements	Braced Noncompact Section Requirements	Unbraced Section Requirements
b'/t =	6.86	11.86	12.70
D/t <sub>w</sub> =	37.23	111.02	88.91
D/t <sub>w</sub> + 9.35(b'/t) =	101.34	N/A	N/A
L <sub>b</sub> =	180.00	119.65	97.22
I <sub>yc</sub> /I <sub>y</sub> =	0.37	N/A	N/A
Classification of Section =			Noncompact
Bracing Classification of Section =			Unbraced

Moment Capacity of Section

$M_p = F_y Z =$  (10-92) 199.6 ft-kips  
 $M_y = F_y S =$  (10-98) 221.0 ft-kips

Determine  $M_r$ :

$L_p =$  95.00 inches  
 $L_r =$  (10-103f) 174.85 inches  
 $L_b =$  180.00 inches  
 $D_o/t_w =$  18.61  
 $\lambda/F_y^{0.5} =$  88.91  
 $18,250/F_y =$  105.37

For  $D_o/t_w \leq \lambda/F_y^{0.5}$  or with Longitudinally Stiffened Webs:

$M_r =$  (10-103c) 143.1 ft-kips

For  $\lambda/F_y^{0.5} < D_o/t_w \leq 18,250/F_y^{0.5}$ :

For  $L_b \leq L_p$ :  
 $M_r = M_y =$  (10-103d) N/A ft-kips

For  $L_r \geq L_b > L_p$ :  
 $M_r =$  (10-103e) N/A ft-kips

For  $L_b \geq L_r$ :  
 $M_r =$  (10-103g) 104.27 ft-kips

Governing  $M_r =$  143.1 ft-kips

Determine  $R_b$ :

Depth of Web = 17.13 inches  
Depth of Web in Compression,  $D_c =$  8.56 inches  
Area of Compression Flange,  $A_{fc} =$  2.63 inches<sup>2</sup>  
Lateral Torsional Buckling Moment or Yield Moment,  $M_r =$  1,717,049 inch-lbs.  
Section Modulus for Noncomposite Section = 88.40 inches<sup>3</sup>  
 $\lambda =$  15,400.00  
  
 $R_b =$  (10-103b) 1.00

**Governing Moment Capacity of Section,  $M_u =$  143.1 ft-kips**

Shear Capacity of Section:

$F_y$  of Web = 30 ksi  
 $V_u = CV_p$  (10-113)  
 $C =$  1.00  
 $V_p = 0.58F_y * d * t_w =$  (10-115) 5,102.8 kips

Shear Capacity of Section,  $V_u =$  5,102.8 kips



## STRUCTURE RATINGS

### Ratings Based on Moment for Noncomposite Section:

Available  $M_{ll+i} = M_n/1.3 - M_{dl} =$  91.7 ft-kips  
Inventory Rating Factor = 0.74  
  
Inventory Rating = H 14.7  
Operational Rating = H 24.5

<u>Vehicle</u>	<u>Weight (tons)</u>	<u>Operating RF</u>	<u>Capacity</u>	<u>Recommended</u>
H20	20	1.23	24.5 Tons	24 Tons

### Ratings Based on Shear:

Available  $V_{ll+i} = V_n/1.3 - V_{dl} =$  3,921.2 kips  
Inventory Rating Factor = 119.50  
  
Inventory Rating = H 2390.1  
Operational Rating = H 3983.4

## GOVERNING RATINGS

Structure shall be limited to a maximum vehicle load of = **24 Tons**