

Motorized Recreation Grant Application

For: (choose all that apply)

Form 8700-159 (R 02/2024)

ATV/UTV Trail Aid

Snowmobile Trail Aid

Due Date: April 15

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			Oconto County			Check Recipient: Individual other than authorized individual to act on behalf of the applicant. <input type="checkbox"/> Select if the same as applicant.		
Individual Authorized to Act on Behalf of Applicant per Resolution			Chris Firgens			Check Recipient Name (Name to Appear on Check)		
Title			Forest, Parks, and Recreation Administrator			Oconto County Treasure		
Address			4921 Cty NN			301 Washington St		
City	State	ZIP Code	City	State	ZIP Code			
Oconto	WI	54153	Oconto	WI	54153			
Telephone Number			Email Address					
(920) 834-6995			chris.firgens@ocontocountywi.gov					

Section 2: Project Information Required for all Projects

Project Title					Current Funded Miles		New Miles (if applicable)	
Hay Creek Bridge					111.43			
County	Township	Range	Section	¼ ¼	¼	GPS Coordinates:		
Oconto	32 N	17	10	UN	UN	Lat.	45.274	
						Long.	-88.365	

Project Description Summary

Oconto County is looking to replace the bridge crossing Hay Creek. Inspections in 2024 indicated several cracks in the vertical members of the truss integrated railings. A load rating inspection was performed in June 2025 and placed a weight restriction on the bridge which prevents clubs to be able to cross the bridge with groomers.

Total project cost estimate: \$275,000

RTP application: \$100,000

ATV 50%: \$87,500

Snow 50%: \$87,500

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

Estimated Cost

Maintenance	Acquisition	Insurance	Development	Bridge Rehab.	Trail Rehab.	Total Estimated Cost
				\$275,000.00		\$275,000.00
Leave Blank – DNR Use Only						

Applicant Certification

Printed Name of Authorized Official	Official's Title
Chris Firgens	Forest, Parks, and Recreation Administrator

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

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 Oconto	Township 32 N	Range 17	<input checked="" type="radio"/> E <input type="radio"/> W	Section 10	¼ ¼ UN	¼ UN	GPS Coordinates: Lat. 45.274 Long. -88.365
Water Body Name Hay Creek				Bridge Name Hay Creek Bridge			County Inventory Number
Funded Trail Name or Number (SNARS if applicable) USFS 55555				Has this bridge site ever received development or rehabilitation funds in the past? <input type="radio"/> Yes <input checked="" type="radio"/> No Year: _____ \$ _____			
Bridge is located on: <input type="radio"/> Private property <input checked="" type="radio"/> Public property				Old Bridge/Culvert Size 30'x12'			
				New Bridge/Culvert Size 35'x12'			
Landowner Where Bridge is Located United States Forest Service				Telephone Number (715) 674-4481		Length of Trail Use Agreement (5 year minimum) perpetual	
Current maximum load 12,000 lbs.		Age of Bridge unknown		Bridge Material Steel, Timber			
Proposed maximum load 25,000 lbs.							
Sponsoring Club Name Crooked Trails				Club Contact Chad Roskopf		Telephone Number (414) 745-8519	
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? unknown			
What is the weight of your puller & drag/grading equipment? 23,030							
What other recreational trail uses are planned for this bridge? ATV, Snowmobile, Non-Motorized - hiking, biking, horseback riding							
If there are other Recreational uses planned, how much of the bridge cost will be paid for by non-snowmobile or non-ATV users? RTP- \$100,000							
<input checked="" type="radio"/> Yes <input type="radio"/> No Have you contacted your local DNR Water Management Specialist (WMS) regarding a permit? <input checked="" type="radio"/> Yes <input type="radio"/> No Is a permit needed? (Please provide any written correspondence from WMS.) <input type="radio"/> Yes <input checked="" type="radio"/> No Have you contacted your County Zoning Dept. regarding a floodplain determination? <input checked="" type="radio"/> Yes <input type="radio"/> No Will an H & H (hydrologic and hydraulic) study be required?							

Bridge Project Detailed Description

Oconto County is proposing to hire engineering to design a new bridge, construct a replacement, remove the existing bridge, and install the new bridge at the location for Summer ATV and Winter Snow use.

Appendix A (continued)

Summarize Costs in Appropriate Categories:

Bridge Structure

Quote 1

Quote 2

Steel Wooden

Steel Wooden

Bridge Dimensions: 35'x12'

Bridge Manufacturer:

Design Weight Load 25,000 lbs.

lbs.

Cost of Structure: 1. Engineering \$ 50,000

\$

2. Structure \$ 200,000

\$

Subtotal \$ 250,000

\$

Quote 1

Quote 2

Contractor or Sponsor Estimate

Contractor or Sponsor Estimate

Installation Costs:

1. Engineering \$

\$

2. Site Preparation \$ 12,000

\$

3. Abutments \$ 6,000

\$

4. Pilings/Piers \$

\$

5. Approaches \$ 2,500

\$

6. Riprap \$ 3,000

\$

7. Labor \$

\$

8. Equipment Rental \$

\$

9. Culverts \$

\$

10. H & H Study \$ 1,500

\$

11. Wetland Delineation \$

\$

12. Other \$

\$

Subtotal \$ 25,000

\$

Total Cost \$ 275,000

\$

For the application grant, you must take the lowest of the two quotes.

Entire Deck and Railing Projects Contractor Sponsor Club

Bridge Dimensions:

Design Weight Load lbs.

1. Materials \$

2. Labor \$

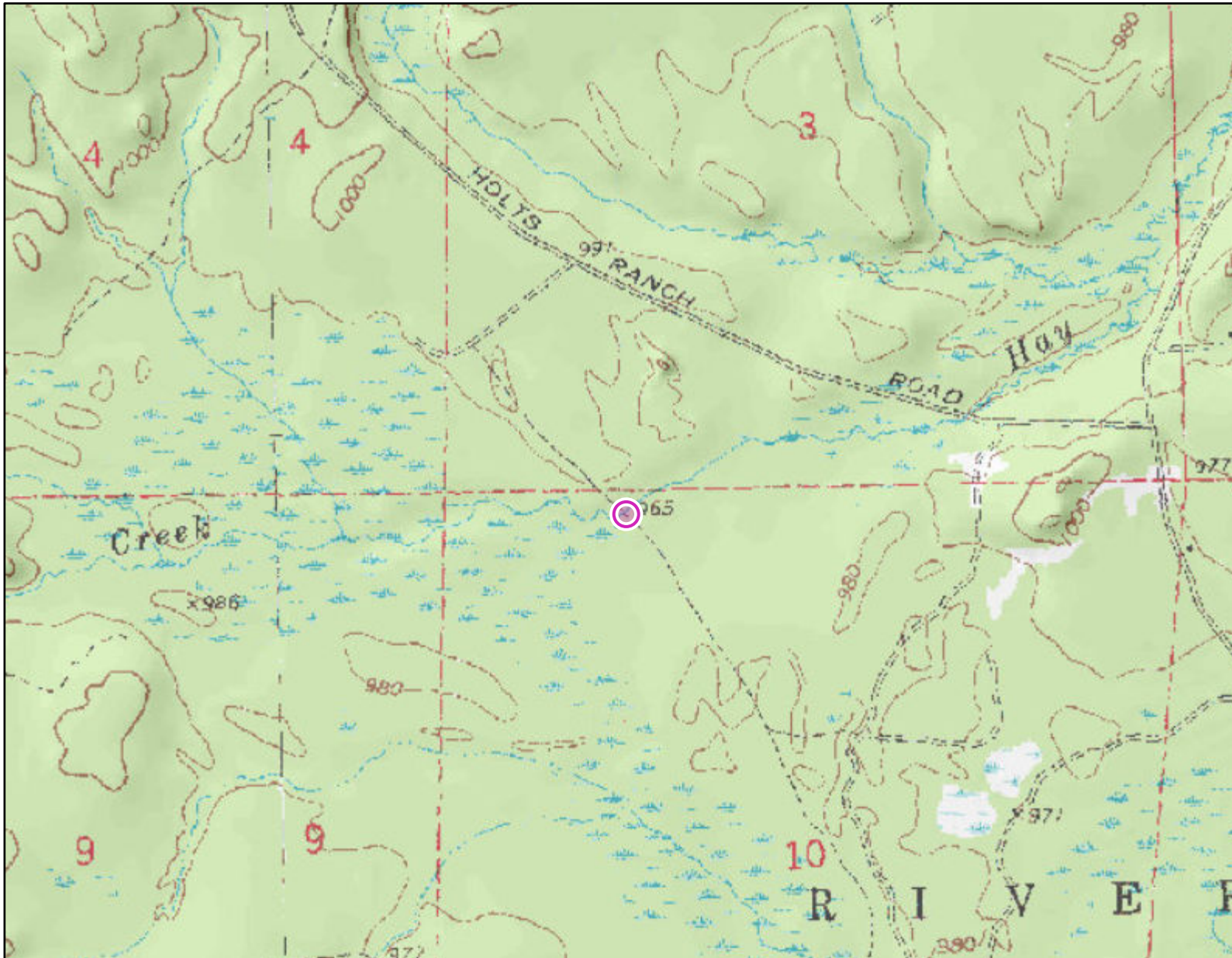
Total \$

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.

This ranking tool is used for both **Snowmobile** and **ATV/UTV** Trail Aids programs, though each program may score things differently. If you are seeking funding from BOTH programs for a dual use bridge, please score ALL questions

Category		Possible Points	Snow Points	ATV/UTV Points
1	Condition of the Structure (max of 10 points)			
	Has a certified bridge inspection report that supports the project & demonstrates need. Copy of report needed. Snowmobile Funded Projects	10		
	Calculation: 10 minus NBI Rating Score (0-9) ATV Funded Projects <i>Use overall NBI # if provided, or an average of the components. Redecking projects should just use the deck NBI #.</i>	10		6
2	Permits (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	Funding (maximum points 2) Has an application been submitted for other funding			
	50% or greater from other funding source(s)? (includes 50/50 Snow/ATV projects)	2		2
	11% - 49% from other funding source(s)?	1		
4	Length of Written Easements or Land Use Agreement (max points 5)(ch. 23.09(26)(am)1 WI Stats)			
	On public land (County, State, Federal)	5		5
	10 or more year deeded easement 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		
	3-9 year deeded easement 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		
	10 or more year deeded easement on private land or other public land, for <u>just the bridge site</u>	3		
	3-9 deeded easement 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		
	3-9 year land use agreement (LUA, not deeded) on private land or other public land	0		
5	Miles Impacted – 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 Snowmobile Funded Projects	1		
	20 miles or more Snowmobile Funded Projects	3		
	No other snowmobile trails connect. Snowmobile Funded Explain:	4		
	For ATV/UTV projects, describe the relocation (on routes? Trail?) Include sketch/map			
6	If ATV/UTV, Seasons of Use (max 3 points)			
	Year-Round or Summer Only ATV/UTV Trail	3		3
	Winter Only ATV/UTV Trail	1		
	DEDUCTIONS			
7	County Active Project Deduction (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		
GRAND TOTAL				17



Legend: (some map layers may not be displayed)

24K USGS DRGs

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 8
- 9
- 10
- 11
- 12
- 20
- 21
- 24
- 25

Notes:

Topo Map



Service Layer Credits:
DNR Basic Feature VTL (WTM): Wisconsin Department of Natural Resources, GIS Section, Latest Leaf Off: ,
Topographic Maps:

Map projection: NAD 1983 HARN Wisconsin TM

This map is a product generated by a DNR web mapping application.

This map is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. The user is solely responsible for verifying the accuracy of information before using for any purpose. By using this product for any purpose user agrees to be bound by all disclaimers found here: <https://dnr.wisconsin.gov/legal>

Date Printed: 2/5/2026 12:35 PM



Clarence Kilmer General Store
Oconto Falls, WI
1913

MATH. WAGNER, Jr., Pres.
ADOLPH WAGNER, Vice-Pres.
W.M. F. P. WAGNER, Treas.
OSCAR WAGNER, Sec'y.

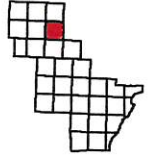
WAGNER
Mercantile & Manufacturing
COMPANY

Dealers in
General Merchandise, Grain,
Lumber, Lath and Shingles.

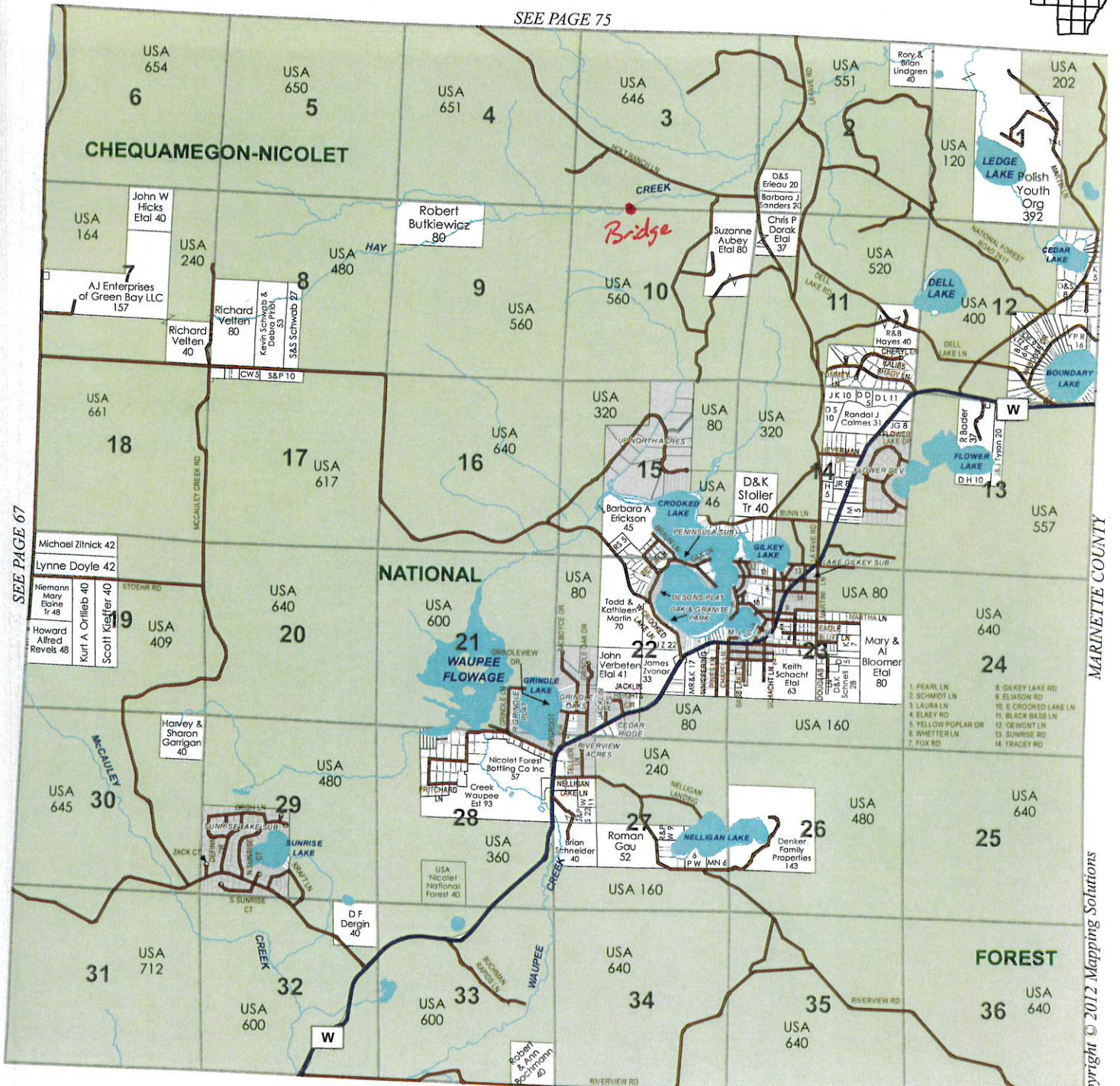
BOARD OF DIRECTORS:
Paul Traenbach, Math. Wagner Jr.,
Adolph Wagner, Wm. F. P. Wagner,
Oscar Wagner.

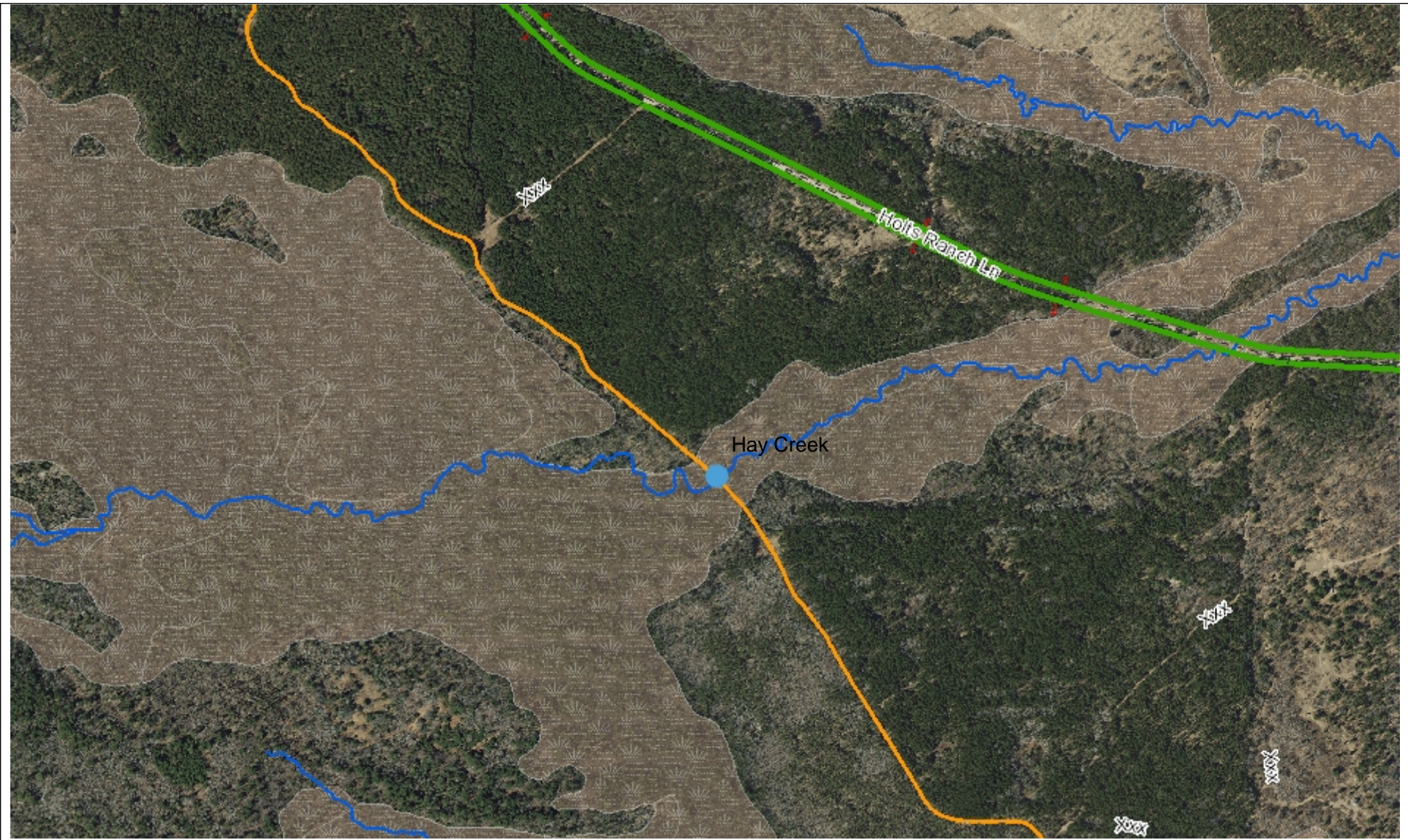
SURING : : : **WIS**

RIVERVIEW (E) T32N • R17E



SEE PAGE 75





Oconto County Land Information Systems makes every effort to produce the most current and accurate information possible. No warranties, expressed or implied, are provided for the data provided, its use, or its interpretation. Oconto County does not guarantee the accuracy of the material contained herein and is not responsible for any misuse or misrepresentation of this information or its derivatives. Oconto County parcel maps are for tax and real property listing purposes only and do NOT represent a survey. The tax parcel maps are compiled from official records, including survey plats and deeds, but only contain the information required for Oconto County business. You should always use the original recorded documents for legal or survey information

Oconto County
Aerial & Wetland



SCALE: 1" = 702'



Print Date: 2/5/2026

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS



Hay Creek Bridge - looking north



Closer view looking north

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Downstream side. Sand windrow at edges



Upstream Truss

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



DS Channel



US channel

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Looking south



Toward crack at L1 panel point (Left truss looking north (upstream truss), 1st panel pt)

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Closeup of L1 crack



SW corner, typical of all

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Typical at edge



South abut looking DS

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



South riprap slope looking DS



Channel under bridge

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Toward north abut



Bot chord butt weld

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Typical floorbeam connection



Typical FB condition

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Toward north abut



Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Toward crack at L6



L6 panel point crack in vert

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Another view of crack width at L6



Toward R6 crack from NE quad

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



R6 vert crack



R6 width

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Toward upstream



Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Signs looking south. Log trucks should not use this bridge

Insert photo here.

Load Rating

for

Hay Creek Trail Bridge, 091304-55555-0.0

Steel Truss/Steel Floorbeam/Timber Plank Deck, Trail Bridge

USDA Forest Service – Region 9

**Chequamegon-Nicolet National Forest – Lakewood-Laona
Ranger District**

Oconto County, Wisconsin



Prepared by:

U.P. Engineers & Architects, Inc.

100 Portage Street

Houghton, MI 49931



June 16, 2025

UPEA Project Number: U28-04461

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I. Summary

BRIDGE RATING SUMMARY USFS REGION 9 LOAD RATING REPORT

Forest: <u>CHEQUAMEGON-NICOLET NATIONAL FOREST</u>	Ranger District: <u>LAKEWOOD-LAONA</u>
Rated By: <u>CHASE SMITH, E.I.T.</u>	Bridge Name: <u>HAY CREEK</u>
Reviewed By: <u>GUST JUNTTILA, P.E.</u>	Bridge Number: <u>091304-55555-0.0</u>
Firm: <u>UPEA</u>	Bridge SN: <u>091304-55555-0.0</u>
Rating Date: <u>6/14/2025</u>	

=====

SUMMARY OF CONTROLLING RATING (Rating Factors)

	RF	Safe Load Capacity (tons)	Posting Load (tons)	Controlling Member	Location (span ratio)	Controlling Effect* (M, V, or A)
H5	0.89	4	---	Deck	0.5	STR I, M
H5	1.22	6	---	F.B.	0.5	SER II, Ac
H10	0.45	4	---	Deck	0.5	STR I, M
H10	0.61	6	---	F.B.	0.5	SER II, Ac
H15	0.30	4	---	Deck	0.5	STR I, M
H15	0.41	6	---	F.B.	0.5	SER II, Ac
Pedestrian	2.77	---	---	T.C.	0.5	STR I, Ac
U-Frame*	0.99*	9	---	T.C.	0.5	STR I, Ac/M

T.C. = Top Chord, B.C. = Bottom Chord, INT = Interior, EXT = Exterior, Ac = Axial Compression,

M = Bending Moment, D.M. = Diagonal Member, At = Axial Tension, F.B. = Floor Beam

NOTES or COMMENTS:

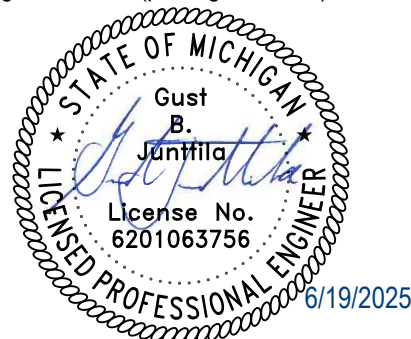
Existing trail bridge load rating, no previous load rating. A snow load of 51 psf was used with a load factor of 1.0(unmodified ground snow load, risk category I). The bridge was modeled with 0% reduction to the steel trusses, 0% reduction to the steel floor beams, and 0% reduction to the timber deck. However, the cracked members of the trusses were modeled as detailed in section IV. methodology.

*The U-Frame stiffness check is a combined stress index (CSI) check not a rating factor check (passing is <= 1.00).

Load Rating Engineer: Chase Smith, E.I.T. *Chase Smith* 6/19/2025

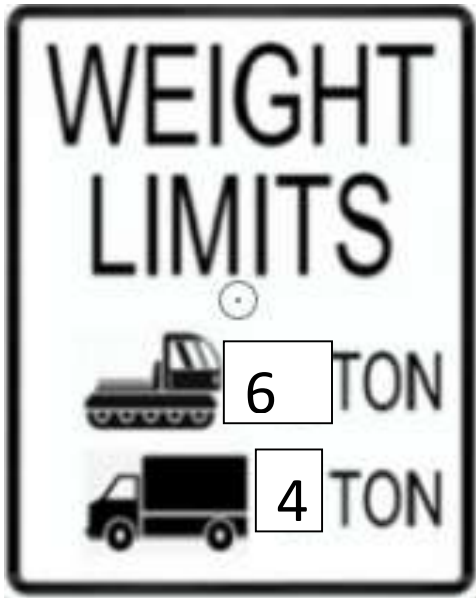
Checked By Engineer: Gust Junntila, P.E. *Gust Junntila* 6/19/2025

Regional Bridge Program Manager: Jeff Dulka, P.E.



Recommended Posting

The bridge is recommended to be posted as shown below as controlled by the safe load capacity of the plank deck for H trucks, strength limit state and the Floorbeam Service II limit state for groomers. A posting of 9 tons for groomers is possible, as controlled by the U-Frame stiffness check, as the floorbeam spacing (2'-0" O.C.) is close enough that the groomer loading will be distributed over several floorbeams, but this would require a groomer specific analysis.



Note:

The groomer posting shall not be controlled by the deck, only the other superstructure components, due to the actual size of groomer tracks. For this bridge, the groomer weight is considered to be that of the H trucks (no other specified groomer).

II. Plan Information

This structure consists of two (2) steel thru trusses with six (6) four foot panels and two (2) three-foot sloped end panels for a span of 30 feet from centerline of bearing to centerline of bearing. The top chord is HSS 3x3x0.17 and bottom chord is HSS 3x4x0.17, vertical members are HSS 3x3x0.17, the diagonals are HSS 2x2x0.17, and the floor beams are HSS 6x2x1/4 members spaced at two feet on center. The longitudinal 2x8 decking is supported on the floorbeams and has a 2x8 timber wearing surface. The bridge dimensions and members were field measured (there are no existing plans on file). The thicknesses of steel tube elements were obtained with a D-meter. The deck has a 11.916-foot clear width.

III. Inspection Information

The most recent inspection was performed on October 3rd, 2024. The existing decking was rated as a 7 as viewed from below. The wearing surface was rated as 6 but only the edges were visible as the structure is covered in sand.

The superstructure was rated a 4 due to several vertical cracks in the vertical members. Three (3) vertical cracks were observed in the vertical members, The cracks are located at the verticals L1, L6, and R6, these are the verticals located at the corners. The largest of these cracks is 1/16th inch wide and 8 inches long.

This inspection was performed by UPEA. See **Appendix D: Inspection Report**.

IV. Methodology

The structure was load rated using LRFR in accordance with AASHTO MBE, 3rd Edition, 2018 and was performed using Visual Analysis 23 for the trusses and floor beams. Hand calculations were performed for the timber deck with a 1.00 condition factor.

Timber grades used for construction are unknown, therefore timber grades were assumed to be SYP no 1 for calculations. Steel grades were assumed to be 46 ksi steel based on the apparent age of the structure.

The steel vertical truss members that have cracks in them were modeled in Visual Analysis using shape builder to place a 1/16" wide crack in the tube steel as noted in the inspection report. The members that have these cracks, L1, R6, and L6 were then split into three sections. The first section is 2 inches long, undamaged HSS 3x3x0.188, the next 8 inches are the modeled cracked HSS3x3x0.188, and the remainder of the member is undamaged. But since the end vertical members are tension members and not compression members, the CSI checks on these members are significantly lower than all the other members and do not control the rating.

Per the Statement of Work, the bridge was checked for light vehicles (H5, H10, H15) plus snow, and pedestrian plus snow, and equestrian patch load on the deck (no snow).

For modeling purposes in the Visual Analysis software, vehicle load were applied to a weightless imaginary stringer added to the center of the model. The loads then distribute to each of the two trusses.

The frame was also checked for U-frame stiffness per the methodology in Chapter 7 of the AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges (Dec 2009), and the 6th Edition of "Guide to Stability Design Criteria for Metal Structures", chapter 15, titled "Members with Elastic Lateral Restraints", as edited by Theodore V. Galambos. The maximum axial compression force in the top chord at the middle of the bridge span, resulting from the controlling load combination, was retrieved from the Visual Analysis model and applied to the U-frame stiffness equations to determine an effective length factor, K for the top chord, as well as the resulting lateral load to be applied to the top of each thru truss. Once applied to the model, the combined stress index was checked for the top chord and the vertical members to verify adequate stiffness. Since the floorbeams are mounted to the side of the bottom chord and not into the side of the verticals, the frame doesn't adhere to the typical requirements of a U-frame structure. The calculations reduce the frame stiffness accordingly based on the difference in stiffness between a fixed end column and one that can rotate. (see **Appendix C: U-Frame Analysis**).

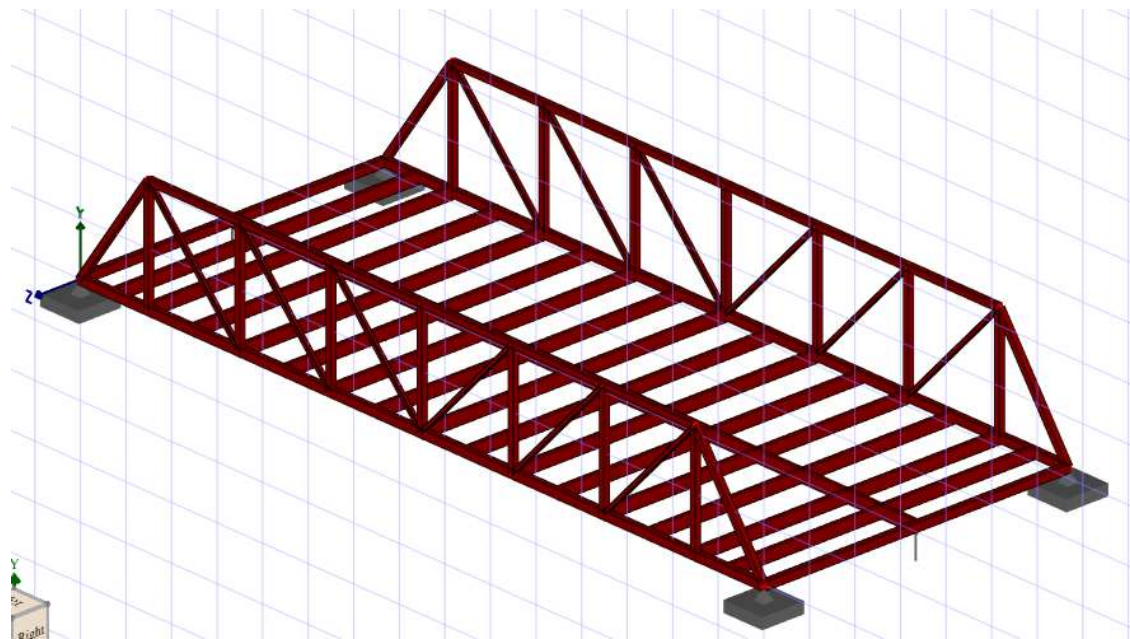


Figure 1: Visual Analysis 3D Truss View

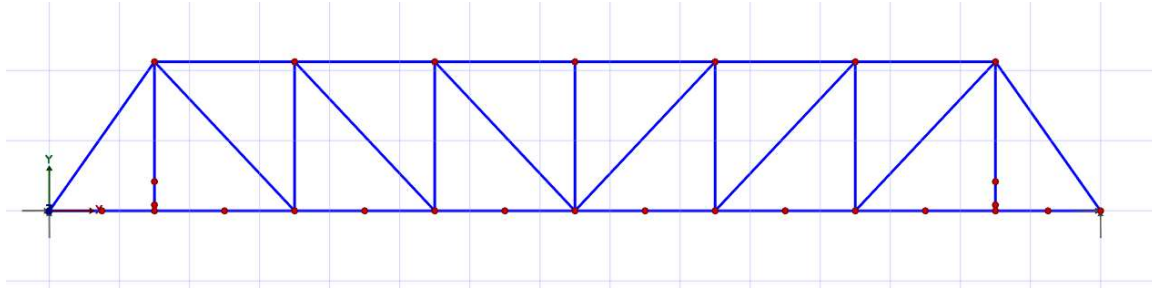


Figure 2: Visual Analysis Truss Profile

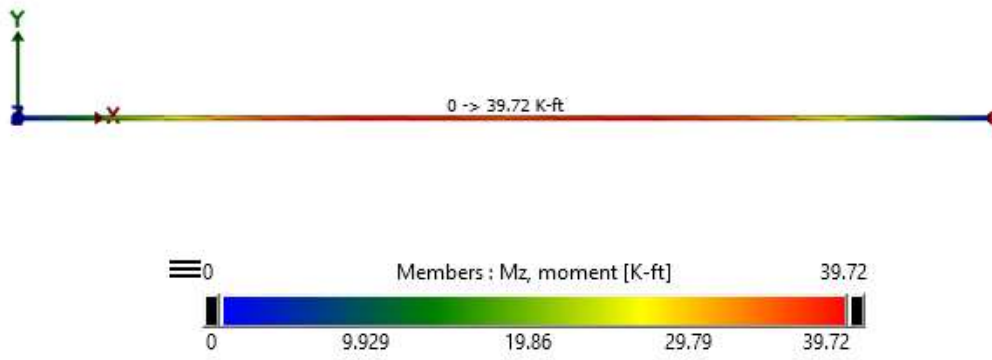


Figure 3: Floor Beam with H15 Loading

***Appendix A: Visual Analysis
Superstructure Modeling/Rating***

H5 Loading

Table of Contents

Bill of Materials: Members Member Loads, Uniform Moving Loads Custom Combination Cases Section Properties Member Design Results Service Load Cases
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Bill of Materials: Members

Material	Section	Count	Total Length ft	Total Volume in^3	Total Weight K
ASTM A500 Grade B (Fy = 46ksi)	3x3x.188 with crack	3	1.998	45.034	0.013
ASTM A500 Grade C (Fy = 46ksi)	HSS2X2X.188	12	70.036	1000.110	0.284
ASTM A500 Grade C (Fy = 46ksi)	HSS3X3X.188	33	126.311	2864.726	0.814
ASTM A500 Grade C (Fy = 46ksi)	HSS4X3X.188	34	84.833	2280.322	0.648
ASTM A500 Grade C (Fy = 46ksi)	HSS6X2X.250	16	216.251	8745.170	2.484

Total Member Weight = 3.897 K

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft
BmZ020	D	Force Y	-0.036 K/ft	No	6.208	12.417
BmZ020	D	Force Y	-0.011 K/ft	No	0.000	6.208
BmZ020	Di	Force Y	-0.011 K/ft	No	0.000	6.208
BmZ020	Di	Force Y	-0.009 K/ft	No	6.208	12.417
BmZ020	S	Force Y	-0.077 K/ft	No	0.000	6.208
BmZ020	S	Force Y	-0.077 K/ft	No	6.208	12.417
BmZ016	D	Force Y	-0.036 K/ft	No	6.208	12.417
BmZ016	D	Force Y	-0.011 K/ft	No	0.000	6.208
BmZ016	Di	Force Y	-0.011 K/ft	No	0.000	6.208
BmZ016	Di	Force Y	-0.009 K/ft	No	6.208	12.417
BmZ016	S	Force Y	-0.077 K/ft	No	0.000	6.208
BmZ016	S	Force Y	-0.077 K/ft	No	6.208	12.417
BmZ015	D	Force Y	-0.042 K/ft	Yes	0.000	12.417
BmZ015	Di	Force Y	-0.011 K/ft	Yes	0.000	12.417
BmZ015	S	Force Y	-0.089 K/ft	Yes	0.000	12.417
BmZ014	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ014	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ014	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ013	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ013	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ013	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ012	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ012	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417

Member Loads, Uniform (continued)

Member ↑	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft
BmZ012	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ011	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ011	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ011	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ010	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ010	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ010	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ009	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ009	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ009	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ008	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ008	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ008	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ007	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ007	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ007	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ006	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ006	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ006	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ005	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ005	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ005	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ004	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ004	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ004	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ003	D	Force Y	-0.042 K/ft	Yes	0.000	12.417
BmZ003	Di	Force Y	-0.011 K/ft	Yes	0.000	12.417
BmZ003	S	Force Y	-0.089 K/ft	Yes	0.000	12.417

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H5	H5	Yes	BmX048,	Axle Loads: 0 ft : -2 K 14 ft : -8 K

Custom Combination Cases

Name	Combination Type	Cases and Factors
Unfactored Component Dead Load	Strength	1 D.
Unfactored Snow Load	Strength	1 S.
Unfactored Wearing Surface Dead Load	Strength	1 Di.

Section Properties

Section	Source	Area in ²	Iz in ⁴	Iy in ⁴	J in ⁴	α deg
3x3x.188 with crack	Database Shape	1.878	2.446	2.438	3.066	0.000
HSS2X2X.188	Database Shape	1.190	0.641	0.641	1.090	0.000
HSS3X3X.188	Database Shape	1.890	2.460	2.460	4.030	0.000
HSS4X3X.188	Database Shape	2.240	4.930	3.160	6.260	0.000
HSS6X2X.250	Database Shape	3.370	13.100	2.210	6.550	0.000

Top Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Top Chord: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.198	24.840	H3-1	0.008	Tr = -0.0456 K-ft, Venant Shear = 0.1985 Ksi

Top Chord: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX012	HSS3X3X.188	0.000	Unfactored Snow Load	0.071	1.000	H1-1b	0.071	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Lb = 4 ft, Axial Unity = 0.1207, Mz Unity = 0.0088, My Unity = 0.0014, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 1.31

Top Chord: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	0.000	Unfactored Snow Load	8.383	69.462	E3-2	0.121	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1
BmX026	HSS3X3X.188	0.000	Unfactored Snow Load	8.383	69.462	E3-2	0.121	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Top Chord: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Unfactored Snow Load	-0.086	6.797	F7-1	0.013	Lb = 4 ft, Cb = 2.211

Top Chord: Weak Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX027	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	-0.019	6.797	F7-1	0.003	

Top Chord: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Unfactored Component Dead Load	-0.037	21.421	G4-1	0.002	Shear Area = 0.8623 in ² , Cv = 1

Diagonals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Diagonals: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V012	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	0.519	24.840	H3-1	0.021	Tr = 0.0493 K-ft, Venant Shear = 0.5186 Ksi

Diagonals: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
V001	HSS3X3X.188	5.202	Unfactored Snow Load	0.061	1.000	H1-1b	0.061	KLz = 5.202 ft, KLy = 4.648 ft, KL(torsion) = 5.202 ft, Lb = 5.202 ft, Axial Unity = 0.0807, Mz Unity = 0.0148, My Unity = 0.0056, Kz = 1, Ky = 0.8936, K(torsion) = 1, Cb = 2.242

Diagonals: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
V017	HSS2X2X.188	0.000	Unfactored Snow Load	4.324	49.266	D2-1	0.088	

Diagonals: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.139	6.797	F7-1	0.020	Lb = 5.202 ft, Cb = 1

Diagonals: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.056	6.797	F7-1	0.008	

Diagonals: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.037	21.421	G4-1	0.002	Shear Area = 0.8623 in ² , Cv = 1

Verticals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
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Verticals: Results (continued)

Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Verticals: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL010	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.052	24.840	H3-1	0.002	Tr = -0.0118 K-ft, Venant Shear = 0.0515 Ksi

Verticals: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL009	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	2.051	68.404	E3-2	0.030	KLz = 4.25 ft, KLy = 4.25 ft, KL(torsion) = 4.25 ft, Fn = 40.21 Ksi, Fe (E3-4) = 143.2 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Low Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): at Interior Crossings Lateral Bottom (-y): at Interior Crossings Strong (z): at Interior Crossings	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Low Chord: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	1.857	24.840	H3-1	0.075	Tr = 0.5791 K-ft, Venant Shear = 1.857 Ksi

Low Chord: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	0.086	1.000	H1-1b	0.086	KLz = 2 ft, KLy = 1.955 ft, KL(torsion) = 2 ft, Lb = 2 ft, Axial Unity = 0.0308, Mz Unity = 0.0699, My Unity = 0.0008, Kz = 1, Ky = 0.9775, K(torsion) = 1, Cb = 1

Low Chord: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX039	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	2.861	92.736	D2-1	0.031	

Low Chord: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	0.723	10.350	F7-1	0.070	Lb = 2 ft, Cb = 1

Low Chord: Weak Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX019	HSS4X3X.188	2.000	Result Superposition Case 1 Low Extreme	-0.017	8.487	F7-1	0.002	

Low Chord: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	1.500	Result Superposition Case 1 Low Extreme	-0.648	30.065	G4-1	0.022	Shear Area = 1.21 in ² , Cv = 1

Steel_Beam_Z_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
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Steel_Beam Z_G 1: Results (continued)

Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Continuous Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

End floor beams: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Continuous Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Imaginary Stringer: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: Varies Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Torsion Shear Check

(extreme rows: extreme)

Member ↑ r	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL017	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.033	24.840	H3-1	0.001	Tr = 0.0075 K-ft, Venant Shear = 0.0326 Ksi
COL016	3x3x.188 with crack	0.000	Result Superposition Case 1 High Extreme	0.033	24.840	H3-1	0.001	Tr = 0.0075 K-ft, Venant Shear = 0.0326 Ksi
COL015	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.033	24.840	H3-1	0.001	Tr = 0.0075 K-ft, Venant Shear = 0.0326 Ksi

Cracked vertical members: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL016	3x3x.188 with crack	0.000	Result Superposition Case 1 High Extreme	1.746	77.761	D2-1	0.022	

Service Load Cases

Name	Source	SelfWeight	Loads	Pattern
D	Dead Loads	Vertical Direction	17	0
Di	Ice Weight Loads	Exclude	17	0
S	Snow Loads	Exclude	17	0

H5 Floorbeam Loading

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H5 Rear Axle	H5 back axle	Yes	BmX001,	Axle Loads: 0 ft : -4 K 6 ft : -4 K

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmX001	D	Force Y	-0.048 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	L	Force Y	-0.180 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	S	Force Y	-0.102 K/ft	Yes	0.000	11.916	No	N.A.

Steel_Beam X_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Steel_Beam X_G 1: Strong Flexure Check

(extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	4.369	H5 High Extreme	13.239	19.580	F7-10	0.676	Lp = 4.449 ft, Lr = 130.8 ft, Lb = 11.92 ft, Cb = 1

Steel_Beam X_G 1: Strong Shear Check

(extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	0.000	H5 High Extreme	5.746	61.361	G4-1	0.094	Shear Area = 2.47 in ² , Cv = 1

H10 Loading

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H10	H10	Yes	BmX048,	Axle Loads: 0 ft : -4 K 14 ft : -16 K

Top Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Top Chord: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.397	24.840	H3-1	0.016	Tr = -0.0913 K-ft, Venant Shear = 0.397 Ksi

Top Chord: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX026	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	0.099	1.000	H1-1b	0.099	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Lb = 4 ft, Axial Unity = 0.1848, Mz Unity = 0.0007, My Unity = 0.0056, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 1

Top Chord: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	12.835	69.462	E3-2	0.185	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Top Chord: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	-0.132	6.797	F7-1	0.019	Lb = 4 ft, Cb = 1

Top Chord: Weak Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX027	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	-0.039	6.797	F7-1	0.006	

Top Chord: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	-0.065	21.421	G4-1	0.003	Shear Area = 0.8623 in ² , Cv = 1

Diagonals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Diagonals: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V012	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	1.037	24.840	H3-1	0.042	Tr = 0.0985 K-ft, Venant Shear = 1.037 Ksi

Diagonals: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
V001	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.103	1.000	H1-1b	0.103	KLz = 5.202 ft, KLy = 4.648 ft, KL(torsion) = 5.202 ft, Lb = 5.202 ft, Axial Unity = 0.1343, Mz Unity = 0.0195, My Unity = 0.0164, Kz = 1, Ky = 0.8936, K(torsion) = 1, Cb = 1

Diagonals: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
V017	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	7.477	49.266	D2-1	0.152	

Diagonals: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.277	6.797	F7-1	0.041	Lb = 5.202 ft, Cb = 1

Diagonals: Weak Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.111	6.797	F7-1	0.016	

Diagonals: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.074	21.421	G4-1	0.003	Shear Area = 0.8623 in ² , Cv = 1

Verticals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	

Verticals: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True
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Verticals: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL010	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.103	24.840	H3-1	0.004	Tr = -0.0237 K-ft, Venant Shear = 0.1031 Ksi

Verticals: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL009	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	4.101	68.404	E3-2	0.060	KLz = 4.25 ft, KLy = 4.25 ft, KL(torsion) = 4.25 ft, Fn = 40.21 Ksi, Fe (E3-4) = 143.2 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Low Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): at Interior Crossings Lateral Bottom (-y): at Interior Crossings Strong (z): at Interior Crossings	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Low Chord: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	3.714	24.840	H3-1	0.150	Tr = 1.158 K-ft, Venant Shear = 3.714 Ksi

Low Chord: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	0.172	1.000	H1-1b	0.172	KLz = 2 ft, KLy = 1.955 ft, KL(torsion) = 2 ft, Lb = 2 ft, Axial Unity = 0.0617, Mz Unity = 0.1397, My Unity = 0.0015, Kz = 1, Ky = 0.9775, K(torsion) = 1, Cb = 1

Low Chord: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX039	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	5.721	92.736	D2-1	0.062	

Low Chord: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	1.446	10.350	F7-1	0.140	Lb = 2 ft, Cb = 1

Low Chord: Weak Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX019	HSS4X3X.188	2.000	Result Superposition Case 1 Low Extreme	-0.033	8.487	F7-1	0.004	

Low Chord: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	1.500	Result Superposition Case 1 Low Extreme	-1.295	30.065	G4-1	0.043	Shear Area = 1.21 in ² , Cv = 1

Steel Beam Z_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	

Steel_Beam Z_G 1: Results (continued)

<p>Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State</p>	<p>Bracing Lateral Top (+y): Continuous Lateral Bottom (-y): Unbraced Strong (z): Unbraced</p>	<p>Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True</p>
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End floor beams: Results

<p>Deflections - Strong (dy) Limit Type: None</p>	<p>Deflections - Weak (dz) Limit Type: None</p>	<p>Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False</p>
<p>Size Constraints Limit Depth?: False Limit Width?: False</p>	<p>Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False</p>	
<p>Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State</p>	<p>Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Continuous Strong (z): Unbraced</p>	<p>Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True</p>

Imaginary Stringer: Results

<p>Deflections - Strong (dy) Limit Type: None</p>	<p>Deflections - Weak (dz) Limit Type: None</p>	<p>Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False</p>
<p>Size Constraints Limit Depth?: False Limit Width?: False</p>	<p>Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False</p>	
<p>Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State</p>	<p>Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced</p>	<p>Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True</p>

Cracked vertical members: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: Varies Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL015	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.065	24.840	H3-1	0.003	Tr = 0.015 K-ft, Venant Shear = 0.0651 Ksi

Cracked vertical members: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL016	3x3x.188 with crack	0.000	Result Superposition Case 1 High Extreme	3.493	77.761	D2-1	0.045	

H10 Floorbeam Loading

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H10 Rear Axle	H10 rear axle	Yes	BmX001,	Axle Loads: 0 ft : -8 K 6 ft : -8 K

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmX001	D	Force Y	-0.048 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	L	Force Y	-0.180 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	S	Force Y	-0.102 K/ft	Yes	0.000	11.916	No	N.A.

Steel_Beam X_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Steel_Beam X_G 1: Strong Flexure Check

(extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	4.369	unfactored live load High Extreme	26.477	19.580	F7-10	1.352	Lp = 4.449 ft, Lr = 130.8 ft, Lb = 11.92 ft, Cb = 1

Steel_Beam X_G 1: Strong Shear Check

(extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	0.000	unfactored live load High Extreme	11.492	61.361	G4-1	0.187	Shear Area = 2.47 in ² , Cv = 1

H15 Loading

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H15	H15	Yes	BmX048,	Axle Loads: 0 ft : -6 K 14 ft : -24 K

Top Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Top Chord: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.595	24.840	H3-1	0.024	Tr = -0.1369 K-ft, Venant Shear = 0.5954 Ksi

Top Chord: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX026	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	0.286	1.000	H1-1a	0.286	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Lb = 4 ft, Axial Unity = 0.2772, Mz Unity = 0.0011, My Unity = 0.0083, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 1

Top Chord: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	19.253	69.462	E3-2	0.277	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Top Chord: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.416	6.797	F7-1	0.061	Lb = 5.202 ft, Cb = 1

Top Chord: Weak Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.167	6.797	F7-1	0.025	

Top Chord: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.111	21.421	G4-1	0.005	Shear Area = 0.8623 in ² , Cv = 1

Diagonals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Diagonals: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V012	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	1.556	24.840	H3-1	0.063	Tr = 0.1478 K-ft, Venant Shear = 1.556 Ksi

Diagonals: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
V017	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	11.216	49.266	D2-1	0.228	

Verticals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Verticals: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL010	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.155	24.840	H3-1	0.006	Tr = -0.0355 K-ft, Venant Shear = 0.1546 Ksi

Verticals: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL009	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	6.152	68.404	E3-2	0.090	KLz = 4.25 ft, KLy = 4.25 ft, KL(torsion) = 4.25 ft, Fn = 40.21 Ksi, Fe (E3-4) = 143.2 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Low Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	

Low Chord: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): at Interior Crossings Lateral Bottom (-y): at Interior Crossings Strong (z): at Interior Crossings	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True
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Low Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX046	HSS4X3X.188	0.000	Result Superposition Case 1 Low Extreme	4.951	24.840	H3-1	0.199	Tr = -1.544 K-ft, Venant Shear = 4.951 Ksi

Low Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	0.258	1.000	H1-1b	0.258	KLz = 2 ft, KLy = 1.955 ft, KL(torsion) = 2 ft, Lb = 2 ft, Axial Unity = 0.0925, Mz Unity = 0.2096, My Unity = 0.0023, Kz = 1, Ky = 0.9775, K(torsion) = 1, Cb = 1

Low Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX039	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	8.582	92.736	D2-1	0.093	

Low Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	2.169	10.350	F7-1	0.210	Lb = 2 ft, Cb = 1

Low Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX019	HSS4X3X.188	2.000	Result Superposition Case 1 Low Extreme	-0.050	8.487	F7-1	0.006	

Low Chord: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	1.500	Result Superposition Case 1 Low Extreme	-1.943	30.065	G4-1	0.065	Shear Area = 1.21 in ² , Cv = 1

Low Chord: Combined Torsion Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX030	HSS4X3X.188	1.500	Result Superposition Case 1 Low Extreme	0.326	1.000	H3-6	0.326	Tr = -1.737 K-ft, Torsion Shear Stress Unity = 0.2243, Axial Unity = 0.0604, Bending Unity = 0.1817, Flexural Shear Unity = 0.0646

Steel_Beam Z_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Continuous Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

End floor beams: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Continuous Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Imaginary Stringer: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
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Imaginary Stringer: Results (continued)

Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: Varies Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL015	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.098	24.840	H3-1	0.004	Tr = 0.0225 K-ft, Venant Shear = 0.0977 Ksi

Cracked vertical members: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL016	3x3x.188 with crack	0.000	Result Superposition Case 1 High Extreme	5.239	77.761	D2-1	0.067	

H15 Floorbeam Loading

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H15 Rear Axle	H15 rear Axle	Yes	BmX001,	Axle Loads: 0 ft : -12 K 6 ft : -12 K

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmX001	D	Force Y	-0.048 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	L	Force Y	-0.180 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	S	Force Y	-0.102 K/ft	Yes	0.000	11.916	No	N.A.

Steel Beam X_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Steel Beam X_G 1: Strong Flexure Check

(extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	7.547	unfactored live load High Extreme	39.716	19.580	F7-10	2.028	Lp = 4.449 ft, Lr = 130.8 ft, Lb = 11.92 ft, Cb = 1

Steel Beam X_G 1: Strong Shear Check

(extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	11.916	unfactored live load Low Extreme	-17.238	61.361	G4-1	0.281	Shear Area = 2.47 in ² , Cv = 1

Pedestrian Loading

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmZ001	L	Force Y	-0.068 K/ft	Yes	0.000	12.417	No	N.A.
BmZ003	D	Force Y	-0.042 K/ft	Yes	0.000	12.417	No	N.A.
BmZ003	Di	Force Y	-0.011 K/ft	Yes	0.000	12.417	No	N.A.
BmZ003	L	Force Y	-0.158 K/ft	Yes	0.000	12.417	No	N.A.
BmZ003	S	Force Y	-0.089 K/ft	Yes	0.000	12.417	No	N.A.
BmZ004	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ004	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ004	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ004	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ005	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ005	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ005	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ005	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ006	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ006	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ006	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ006	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ007	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ007	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ007	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ007	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ008	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ008	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ008	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ008	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ009	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ009	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ009	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ009	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ010	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ010	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ010	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ010	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ011	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ011	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ011	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ011	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ012	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ012	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ012	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.

Member Loads, Uniform (continued)

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmZ012	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ013	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ013	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ013	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ013	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ014	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ014	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ014	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ014	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ015	D	Force Y	-0.042 K/ft	Yes	0.000	12.417	No	N.A.
BmZ015	Di	Force Y	-0.011 K/ft	Yes	0.000	12.417	No	N.A.
BmZ015	L	Force Y	-0.158 K/ft	Yes	0.000	12.417	No	N.A.
BmZ015	S	Force Y	-0.089 K/ft	Yes	0.000	12.417	No	N.A.
BmZ016	D	Force Y	-0.036 K/ft	No	6.208	12.417	No	N.A.
BmZ016	D	Force Y	-0.011 K/ft	No	0.000	6.208	No	N.A.
BmZ016	Di	Force Y	-0.011 K/ft	No	0.000	6.208	No	N.A.
BmZ016	Di	Force Y	-0.009 K/ft	No	6.208	12.417	No	N.A.
BmZ016	L	Force Y	-0.135 K/ft	Yes	0.000	12.417	No	N.A.
BmZ016	S	Force Y	-0.077 K/ft	No	0.000	6.208	No	N.A.
BmZ016	S	Force Y	-0.077 K/ft	No	6.208	12.417	No	N.A.
BmZ019	L	Force Y	-0.068 K/ft	Yes	0.000	12.417	No	N.A.
BmZ020	D	Force Y	-0.036 K/ft	No	6.208	12.417	No	N.A.
BmZ020	D	Force Y	-0.011 K/ft	No	0.000	6.208	No	N.A.
BmZ020	Di	Force Y	-0.011 K/ft	No	0.000	6.208	No	N.A.
BmZ020	Di	Force Y	-0.009 K/ft	No	6.208	12.417	No	N.A.
BmZ020	L	Force Y	-0.135 K/ft	Yes	0.000	12.417	No	N.A.
BmZ020	S	Force Y	-0.077 K/ft	No	0.000	6.208	No	N.A.
BmZ020	S	Force Y	-0.077 K/ft	No	6.208	12.417	No	N.A.

Top Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	

Top Chord: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True
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Top Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	0.183	24.840	H3-1	0.007	Tr = -0.042 K-ft, Venant Shear = 0.1826 Ksi

Top Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX012	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	0.229	1.000	H1-1a	0.229	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Lb = 4 ft, Axial Unity = 0.213, Mz Unity = 0.0155, My Unity = 0.0023, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 1.309

Top Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	14.796	69.462	E3-2	0.213	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Top Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Unfactored Pedestrian Loading	-0.151	6.797	F7-1	0.022	Lb = 4 ft, Cb = 2.211

Top Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX026	HSS3X3X.188	4.000	Unfactored Pedestrian Loading	-0.016	6.797	F7-1	0.002	

Top Chord: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Unfactored Pedestrian Loading	-0.064	21.421	G4-1	0.003	Shear Area = 0.8623 in ² , Cv = 1

Diagonals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Diagonals: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V012	HSS2X2X.188	0.000	Unfactored Pedestrian Loading	0.336	24.840	H3-1	0.014	Tr = 0.032 K-ft, Venant Shear = 0.3365 Ksi

Diagonals: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
V001	HSS3X3X.188	5.202	Unfactored Pedestrian Loading	0.107	1.000	H1-1b	0.107	KLz = 5.202 ft, KLy = 4.648 ft, KL(torsion) = 5.202 ft, Lb = 5.202 ft, Axial Unity = 0.1424, Mz Unity = 0.026, My Unity = 0.0094, Kz = 1, Ky = 0.8936, K(torsion) = 1, Cb = 2.243

Diagonals: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
V017	HSS2X2X.188	0.000	Unfactored Pedestrian Loading	7.635	49.266	D2-1	0.155	

Diagonals: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Unfactored Pedestrian Loading	0.177	6.797	F7-1	0.026	Lb = 5.202 ft, Cb = 2.243

Diagonals: Weak Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	0.064	6.797	F7-1	0.009	

Diagonals: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Unfactored Pedestrian Loading	0.063	21.421	G4-1	0.003	Shear Area = 0.8623 in ² , Cv = 1

Verticals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Verticals: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL006	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	0.057	24.840	H3-1	0.002	Tr = -0.0131 K-ft, Venant Shear = 0.0569 Ksi

Verticals: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL009	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	3.348	68.404	E3-2	0.049	KLz = 4.25 ft, KLy = 4.25 ft, KL(torsion) = 4.25 ft, Fn = 40.21 Ksi, Fe (E3-4) = 143.2 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Low Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): at Interior Crossings Lateral Bottom (-y): at Interior Crossings Strong (z): at Interior Crossings	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Low Chord: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX045	HSS4X3X.188	0.000	Unfactored Pedestrian Loading	1.271	24.840	H3-1	0.051	Tr = -0.3965 K-ft, Venant Shear = 1.271 Ksi

Low Chord: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Unfactored Pedestrian Loading	0.097	1.000	H1-1b	0.097	KLz = 2 ft, KLy = 1.955 ft, KL(torsion) = 2 ft, Lb = 2 ft, Axial Unity = 0.0517, Mz Unity = 0.0703, My Unity = 0.0009, Kz = 1, Ky = 0.9775, K(torsion) = 1, Cb = 2.193

Low Chord: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	0.000	Unfactored Pedestrian Loading	4.792	92.736	D2-1	0.052	

Low Chord: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX039	HSS4X3X.188	2.000	Unfactored Pedestrian Loading	0.727	10.350	F7-1	0.070	Lb = 2 ft, Cb = 2.171

Low Chord: Weak Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX019	HSS4X3X.188	2.000	Unfactored Pedestrian Loading	-0.017	8.487	F7-1	0.002	

Low Chord: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	1.500	Unfactored Pedestrian Loading	-0.600	30.065	G4-1	0.020	Shear Area = 1.21 in ² , Cv = 1

Steel_Beam_Z_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Continuous Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

End floor beams: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	

End floor beams: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Continuous Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True
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Imaginary Stringer: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: Varies Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL015	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	0.037	24.840	H3-1	0.001	Tr = 0.0085 K-ft, Venant Shear = 0.0372 Ksi

Cracked vertical members: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL016	3x3x.188 with crack	0.000	Unfactored Pedestrian Loading	1.780	77.761	D2-1	0.023	

Pedestrian Floorbeam Loading

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H15 Rear Axle	H15 rear Axle	Yes	BmX001,	Axle Loads: 0 ft : -12 K 6 ft : -12 K

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmX001	D	Force Y	-0.048 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	L	Force Y	-0.180 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	S	Force Y	-0.102 K/ft	Yes	0.000	11.916	No	N.A.

Steel_Beam X_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Steel_Beam X_G 1: Strong Flexure Check

(extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	5.958	Unfactored Ped Load	3.195	20.148	F7-1	0.159	Lb = 11.92 ft, Cb = 1.137

Steel_Beam X_G 1: Strong Shear Check

(extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	0.000	Unfactored Ped Load	1.072	61.361	G4-1	0.017	Shear Area = 2.47 in ² , Cv = 1

Appendix B: Ratings and Hand Calculations

Rating Factor Equation

$$RF = \frac{C - (\gamma_{DC})(DC) - (\gamma_{DW})(DW) \pm (\gamma_P)(P)}{(\gamma_{LL})(LL + IM)} \quad (6A.4.2.1-1)$$

For the strength limit states:

$$C = \phi_c \phi_s \phi R_n \quad (6A.4.2.1-2)$$

Where the following lower limit shall apply:

$$\phi_c, \phi_s \geq 0.85 \quad (6A.4.2.1-3)$$

For the service limit states:

$$C = f_R \quad (6A.4.2.1-4)$$

where:

RF = Rating factor

C = Capacity

f_R = Allowable stress specified in the LRFD code

R_n = Nominal member resistance (as inspected)

DC = Dead load effect due to structural components and attachments

DW = Dead load effect due to wearing surface and utilities

P = Permanent loads other than dead loads

LL = Live load effect

IM = Dynamic load allowance

γ_{DC} = LRFD load factor for structural components and attachments

γ_{DW} = LRFD load factor for wearing surfaces and utilities

γ_P = LRFD load factor for permanent loads other than dead loads = 1.0

γ_{LL} = Evaluation live load factor

ϕ_c = Condition factor

ϕ_s = System factor

ϕ = LRFD resistance factor

LL LF= Live load load factor

DL LF = dead load load factor

SL LF = Snow load load factor

Impact does not apply to trail bridges

LRFD resistance factor of 0.9 is applied to capacities of steel members in axial compression.

LRFD resistance factor of 1.0 is applied to steel bending and shear capacities.

A stringer distribution factor of (Spacing/8) is applied to the stringer live load Per AASHTO LRFD table 4.6.2.2.2a-1

Floor beam Distribution factor is not applicable for bridges with longitudinal stringers

Timber Capacities and Demand

8.4.4.1 General

Adjusted design values shall be obtained by adjusting reference design values by applicable adjustment factors in accordance with the following equations:

$$F_b = F_{bo} C_{KF} C_M (C_F \text{ or } C_V) C_{fu} C_i C_d C_\lambda \quad (8.4.4.1-1)$$

$$F_v = F_{vo} C_{KF} C_M C_i C_\lambda \quad (8.4.4.1-2)$$

$$F_t = F_{to} C_{KF} C_M C_F C_i C_\lambda \quad (8.4.4.1-3)$$

$$F_c = F_{co} C_{KF} C_M C_F C_i C_\lambda \quad (8.4.4.1-4)$$

$$F_{cp} = F_{cpo} C_{KF} C_M C_i C_\lambda \quad (8.4.4.1-5)$$

$$E = E_o C_M C_i \quad (8.4.4.1-6)$$

where:

F = applicable adjusted design values F_b , F_v , F_t , F_c , or F_{cp} (ksi)

F_o = reference design values F_{bo} , F_{vo} , F_{to} , F_{co} , or F_{cpo} specified in Article 8.4 (ksi)

E = adjusted modulus of elasticity (ksi)

E_o = reference modulus of elasticity specified in Article 8.4. (ksi)

C_{KF} = format conversion factor specified in Article 8.4.4.2

C_M = wet service factor specified in Article 8.4.4.3

C_F = size factor for visually-graded dimension lumber and sawn timbers specified in Article 8.4.4.4

C_V = volume factor for structural glued laminated timber specified in Article 8.4.4.5

C_{fu} = flat-use factor specified in Article 8.4.4.6

C_i = incising factor specified in Article 8.4.4.7

C_d = deck factor specified in Article 8.4.4.8

C_λ = time effect factor specified in Article 8.4.4.9

LRFD resistance factor of 0.85 is applied to timber members in flexure.

LRFD resistance factor of 0.75 is applied to timber members in shear.

Timber Flexure Demand = $0.8 * \frac{\text{Live load} * 12 * \frac{\text{plank width}}{10}}{S_{yy}}$

continuous Beam factor

Timber Shear Demand = $\frac{\frac{\text{Live load} * \frac{\text{plank width}}{10}}{A}}{.83}$

Continuous beam factor

Plank width/10 only applies for bridges with a plank width <10 inches, in cases where plank width is greater than or equal to 10 inches, the equations will be as follows.

Timber Flexure Demand = $0.8 * \frac{\text{Live load} * 12}{S}$

Timber Shear Demand = $\frac{\text{Live load}}{.83}$

Enter by user loads and capacities are from Visual Analysis Software without load or resistance factors applied. The "RF" output applies the applicable factors.

LL LF= 1.3

DL LF= 1.25

SL LF= 1.00

LL LF= 1.3

SL LF=

DL LF= 1.00

ϕ_c = 1.00

ϕ_c = 1.00

DL LF= 1

H5			
Trusses		Floor Beams	
	Axial loads		Bending loads
Dead Load=	5596 lb	Dead Load =	1056 ft-lb
Snow Load=	8383 lb	SL=	1810 ft-lb
Live Load =	6418 lb	Live Load =	13240 ft-lb
Member Capacity =	69462 lb	Member Capacity =	20148 ft-lb
		Floor Beam Spacing =	2 ft
		*distribution factor=	0.5
RF=	5.65	RF=	1.98

Trusses	Floor Beams
H5 Service II check	H5 Service II check
fLL= 3396 psi	fLL (+)= 36380 psi
fDL = 2961 psi	fDL (+)= 2901 psi
fSL= 4435 psi	fSL= 4975 psi
Fyf= 46000 psi	Fyf= 46000 psi
	Df= 0.5
RF= 6.66	RF= 1.22

H10			
Trusses		Floor Beams	
	Axial loads		Bending loads
Dead Load=	5596 lb	Dead Load =	1056 ft-lb
Snow Load=	8383 lb	SL=	1810 ft-lb
Live Load =	12840 lb	Live Load =	28060 ft-lb
Member Capacity =	69462 lb	Member Capacity =	20148 ft-lb
		Floor Beam Spacing =	2 ft
		*distribution factor=	0.5
RF=	2.82	RF=	0.93

Trusses	Floor Beams
H10 Service II check	H10 Service II check
fLL = 6791 psi	fLL (+)= 72760 psi
fDL = 2961 psi	fDL (+)= 2901 psi
fSL= 4435 psi	fSL= 4975 psi
Fyf= 46000 psi	Fyf= 46000 psi
	Df= 0.5
RF= 3.33	RF= 0.61

H15			
Trusses		Floor Beams	
	Axial loads		Bending loads
Dead Load=	5596 lb	Dead Load =	1056 ft-lb
Snow Load=	8383 lb	SL=	1810 ft-lb
Live Load =	19251 lb	Live Load =	39720 ft-lb
Member Capacity =	69462 lb	Member Capacity =	20148 ft-lb
		Floor Beam Spacing =	2 ft
		*distribution factor=	0.5
RF=	1.88	RF=	0.66

Trusses	Floor Beams
H15 Service II check	H15 Service II check
fLL = 10190 psi	fLL (+)= 109100 psi
fDL = 2961 psi	fDL (+)= 2901 psi
fSL= 4435 psi	fSL= 4975 psi
Fyf= 46000 psi	Fyf= 46000 psi
	Df= 0.5
RF= 2.22	RF= 0.41

* Distribution factors per AASHTO LRFD Table 4.6.2.2.2F-1

Enter by user

loads and capacities are from Visual Analysis Software without load or resistance factors applied. The "RF" output applies the applicable factors.

LL LF= 1.3

SL LF=

1.00

DL LF= 1

Pedestrian			
Trusses		Floor Beams	
	Axial loads		Bending loads
Dead Load=	5596 lb	Dead Load =	1056 ft-lb
Snow Load=	8383 lb	SL=	1810 ft-lb
Live Load =	14800 lb	Live Load =	3195 ft-lb
Member Capacity =	69462 lb	Member Capacity =	20148 ft-lb
		Floor Beam Spacing =	2 ft
		*distribution factor=	0.5
RF=	2.45	RF=	8.19

Trusses		Floor Beams	
Pedestrian Service II check		Pedestrian Service II check	
fLL =	5623 psi	fLL =	8780 psi
fDL =	1986 psi	fDL =	2901 psi
fSL=	4078 psi	fSL=	4975 psi
Fyf=	46000 psi	Fyf=	46000 psi
		Df=	0.5
RF=	4.20	RF=	5.07

* Distribution factors per AASHTO LRFD Table 4.6.2.2.2F-1

Deck width=	11.916
Bridge length=	30

bridge area= 357.48

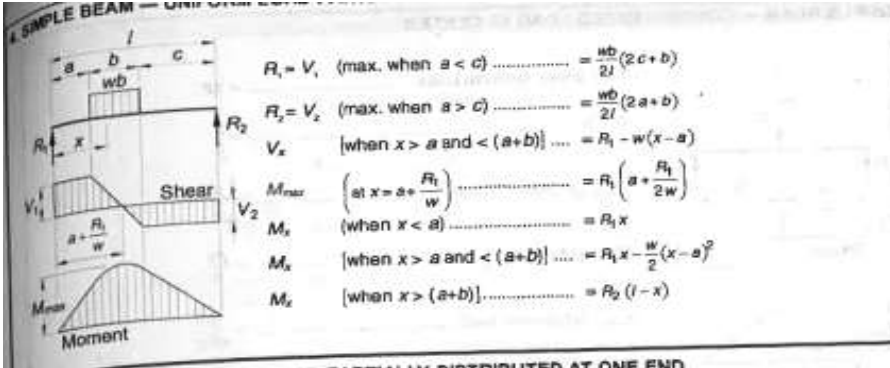
Planks

Plank length= 2 ft
 C-C Plank Spacing = 7.25 inches

*span between Floorbeam Flanges snow load = 51 psf

Truck wheel weight

		max moment	Max Shear
H5	4000 lb	573.9583 lb-ft	1147.917 lb
H10	8000 lb	1147.917 lb-ft	2295.833 lb
H15	12000 lb	1721.875 lb-ft	3443.75 lb
Ped	54.375 plf	27 lb-ft	54 lb
DL	14 plf	7 lb-ft	14 lb
SL	30.8125 plf	15 lb-ft	31 lb
Equestrian	1000 lb	500 lb-ft	500 lb



b= 10 inches 0.833333 ft

Tire location for max Shear

c= 1.166667 ft a= 0 ft max shear load location

max reactions used to calculate the max moment

a=c= 0.583333 max moment load location
 2000 lb
 4000 lb
 6000 lb

Enter by user loads are from Visual Analysis Software without load factors applied. The "RF" output applies the applicable factors.

LL LF= 1.3 DL LF= 1.25 SL LF=1.0 $\phi c=$ 1

Plank Deck Moment Check

H5		H10		H15	
Dead Load MY =	7.00 lb-ft	Dead Load MY =	7 lb-ft	Dead Load MY =	7 lb-ft
Snow load MY=	15.41 lb-ft	Snow load MY=	15.41 lb-ft	Snow load MY=	15.41 lb-ft
Live Load MY =	574 lb-ft	Live Load MY =	1148 lb-ft	Live Load MY =	1722 lb-ft
Plank depth =	1.5	Dressed 2x8 Lumber SYP #1 Assumed			
Plank width =	7.25				
% deterioration =	0%				
Syy=	2.72 in ³	Syy=	2.72 in ³	Syy=	2.72 in ³
LL Demand =	2026.67 psi	LL Demand =	4053.3 psi	LL Demand =	6080 psi
DL Demand =	24.7172 psi	DL Demand =	24.717 psi	DL Demand =	24.717 psi
SL Demand =	54.4 psi	SL Demand =	54.4 psi	SL Demand =	54.4 psi
Member Capacity, Fb' =	2442.77 psi	Member Capacity, Fb' =	2442.8 psi	Member Capacity, Fb' =	2442.8 psi
RF=	0.89	RF=	0.45	RF=	0.30
Fb=	1250 psi	Pedestrian		Equestrian	
Ckf=	2.94	Dead Load MY =	7 lb-ft	Dead Load MY =	7 lb-ft
CM=	0.85	Snow load MY=	15.406 lb-ft	Snow load MY=	lb-ft
CF=	1	Live Load MY =	27 lb-ft	Live Load MY =	500 lb-ft
Cfu=	1.15				
Ci=	1	Syy=	2.72 in ³	Syy=	2.72 in ³
Cd=	1				
Cλ=	0.8 STR I	LL Demand =	96 psi	LL Demand =	1765.5 psi
		DL Demand =	24.717 psi	DL Demand =	24.717 psi
		SL Demand =	54.4 psi	SL Demand =	0 psi
		Member Capacity, Fb' =	2442.8 psi	Member Capacity, Fb' =	2442.8 psi
		RF=	18.89	RF=	1.05

Enter by user loads are from Visual Analysis Software without load factors applied. The "RF" output applies the applicable factors.

LL LF= 1.3 DL LF= 1.25 SL LF=1.0 $\phi c=$ 1

Plank Deck Shear Check

H5		H10		H15	
Dead Load V =	14 lb	Dead Load V =	14 lb	Dead Load V =	14 lb
Snow Load V=	31 lb	Snow Load V=	30.813 lb	Snow Load V=	30.813 lb
Live Load V =	1147.92 lb	Live Load V =	2295.8 lb	Live Load V =	3443.8 lb
Plank depth =	1.5	Dressed 2x8 Lumber SYP #1 Assumed			
Plank width =	7.25				
% deterioration =	0%				
A=	10.875 in ²	A=	10.875 in ³	A=	10.875 in ³
LL Demand =	127.175 psi	LL Demand =	254.35 psi	LL Demand =	381.53 psi
DL Demand =	1.55103 psi	DL Demand =	1.551 psi	DL Demand =	1.551 psi
SL Demand =	3.41365 psi	SL Demand =	3.4137 psi	SL Demand =	3.4137 psi
Member Capacity, Fv' =	339.161 psi	Member Capacity, Fv' =	339.16 psi	Member Capacity, Fv' =	339.16 psi
RF=	2.02	RF=	1.01	RF=	0.67
Fv=	175 psi	Pedestrian		Equestrian	
Ckf=	3.33	Dead Load V =	14 lb	Dead Load V =	14 lb
CM=	0.97	Snow Load V=	30.813 lb	Snow Load V=	lb
Ci=	1	Live Load V =	54 lb	Live Load V =	500 lb
Cλ=	0.8	STR I			
		A=	10.875 in ³	A=	10.875 in ³
		LL Demand =	6.0241 psi	LL Demand =	55.394 psi
		DL Demand =	1.551 psi	DL Demand =	1.551 psi
		SL Demand =	3.4137 psi	SL Demand =	0 psi
		Member Capacity, Fv' =	339.16 psi	Member Capacity, Fv' =	339.16 psi
		RF=	42.62	RF=	4.68

Appendix C: U-Frame Analysis

U-FRAME STIFFNESS, THRU TRUSS CHECK

[AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges, Chapter 7][6th Edition of "Guide to Stability Design Criteria for Metal Structures"]

Definitions

- C= Applied lateral load for U-frame stiffness check
- h= Dimension from centerline of top chord to centerline of floorbeam, in
- b= dimension from centerline to centerline of verticals, in
- Iv= Moment of Inertia of verticals, in⁴
- I_{fb}= Moment of inertia of floor beams, in⁴
- L= Length of top chord between transverse frames, in
- P_c= factored compression of top chord
- F.S.= Factor of Safety
- n= Number of panels of transverse frames
- K= Effective Length Factor

Input Data

h=	51	in	
b=	146	in	
I _v =	2.46	in ⁴	HSS 3x3x3/16
I _{fb} =	13.1	in ⁴	HSS 6x2x1/4
E=	29000	ksi	
L=	48	in	
P _c =	31.24	kips	Str I (1.25*DL+1.0SL+1.3*9 Ton truck)
n=	6		
1/k=	0.496	See 1/k	
F.S.=	1.33		
Q=	1.73	reduction factor	

Output

C=	1.17	Kips	Factored
CL/P _c =	1.35		
K=	2.02	*inverse of 1/k	

CSI check for top chord =	0.985	CSI VALUE OKAY
CSI check for Verticals =	0.304	CSI VALUE OKAY

The Effective length factor K is applied manually to the top chord of the visual analysis model. The C is applied as a nodal load at the middle of the truss in the configuration as shown in the schematic below, to check the resulting combined stress index for the top chord and the verticals.

Since the truss does not fully adhere to the requirements laid out by the LRFD guide for pedestrian bridges, the stiffness factor of the columns has been reduced by Q=1.73, based on the differences between a fixed end column and a column attached to a low cord that can rotate.

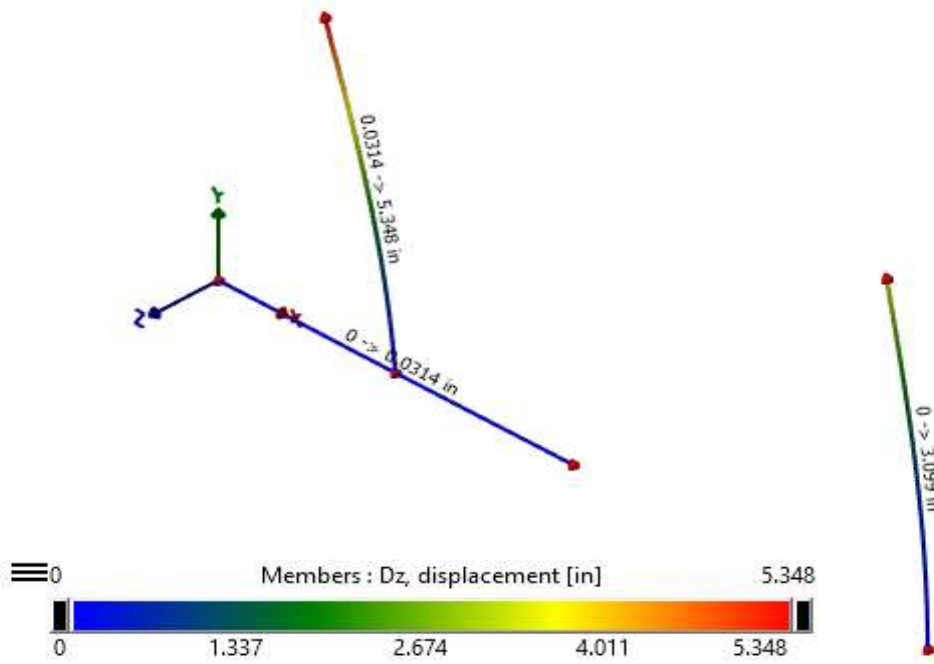
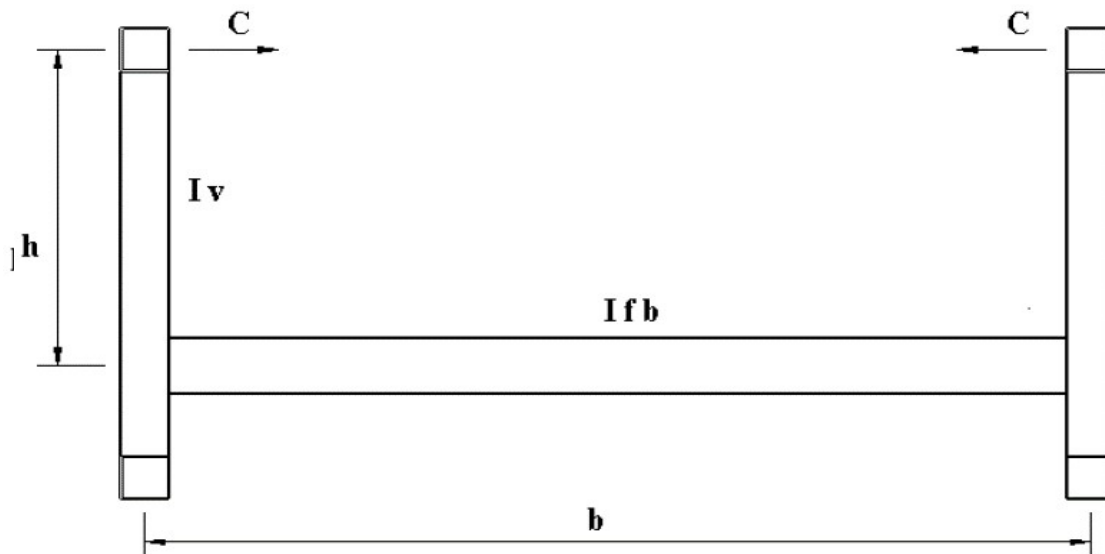


Table 7.1.2-1—Values of $1/K$ for Various Values of CL/P_c and n

$1/K$	$n = 4$	$n = 6$	$n = 8$	$n = 10$	$n = 12$	$n = 14$	$n = 16$
1.000	3.686	3.616	3.660	3.714	3.754	3.785	3.809
0.980		3.284	2.944	2.806	2.787	2.771	2.774
0.960		3.000	2.665	2.542	2.456	2.454	2.479
0.950			2.595				
0.940		2.754		2.303	2.252	2.254	2.282
0.920		2.643		2.146	2.094	2.101	2.121
0.900	3.352	2.593	2.263	2.045	1.951	1.968	1.981
0.850		2.460	2.013	1.794	1.709	1.681	1.694
0.800	2.961	2.313	1.889	1.629	1.480	1.456	1.465
0.750		2.147	1.750	1.501	1.344	1.273	1.262
0.700	2.448	1.955	1.595	1.359	1.200	1.111	1.088
0.650		1.739	1.442	1.236	1.087	0.988	0.940
0.600	2.035	1.639	1.338	1.133	0.985	0.878	0.808
0.550		1.517	1.211	1.007	0.860	0.768	0.708
0.500	1.750	1.362	1.047	0.847	0.750	0.668	0.600
0.450		1.158	0.829	0.714	0.624	0.537	0.500
0.400	1.232	0.886	0.627	0.555	0.454	0.428	0.383
0.350		0.530	0.434	0.352	0.323	0.292	0.280
0.300	0.121	0.187	0.249	0.170	0.203	0.183	0.187
0.293	0						
0.259		0					
0.250			0.135	0.107	0.103	0.121	0.112
0.200			0.045	0.068	0.055	0.053	0.070
0.180			0				
0.150				0.017	0.031	0.029	0.025
0.139				0			
0.114					0		
0.100						0.003	0.010
0.097						0	
0.085							0



$$C = \frac{E}{h^2 (h/3I_v + b/2 I_{fb})}$$

Nodal Loads

Node	Service Case	Type & Direction	Magnitude	Predefined Load
N014	L	Force Z	-1.170 K	N.A.
N029	L	Force Z	1.170 K	N.A.

Top Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: True Cb: 2.02 Override HSS t _{des} ?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Top Chord: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V005	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	2.609	24.840	H3-1	0.105	Tr = 0.5998 K-ft, Venant Shear = 2.609 Ksi

Top Chord: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	0.985	1.000	H1-1a	0.985	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Lb = 4 ft, Axial Unity = 0.4689, Mz Unity = 0.0166, My Unity = 0.5642, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 2.02

Top Chord: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	32.572	69.462	E3-2	0.469	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Top Chord: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.509	6.797	F7-1	0.075	Lb = 5.202 ft, Cb = 2.02

Top Chord: Weak Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
V001	HSS3X3X.188	5.202	Result Superposition Case 1 Low Extreme	-3.863	6.797	F7-1	0.568	

Top Chord: Weak Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vz K	Capacity Vz K	Code Reference	Unity Check	Details
BmX023	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	-0.771	21.421	G4-1	0.036	Shear Area = 0.8623 in ² , Cv = 1

Diagonals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Diagonals: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V006	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	3.068	24.840	H3-1	0.124	Tr = 0.2915 K-ft, Venant Shear = 3.068 Ksi

Diagonals: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
V017	HSS2X2X.188	2.918	Result Superposition Case 1 High Extreme	0.369	1.000	H1-1a	0.369	KLz = 5.836 ft, KLy = 5.836 ft, KL(torsion) = 5.836 ft, Lb = 5.836 ft, Axial Unity = 0.3643, Mz Unity = 0.0054, My Unity = 0, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 1

Diagonals: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
V017	HSS2X2X.188	5.836	Result Superposition Case 1 High Extreme	17.956	49.266	D2-1	0.364	

Diagonals: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V006	HSS2X2X.188	2.918	Result Superposition Case 1 High Extreme	0.015	2.750	F7-1	0.005	Lb = 5.836 ft, Cb = 1

Diagonals: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
V006	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	0.010	12.776	G4-1	0.001	Shear Area = 0.5143 in ² , Cv = 1

Verticals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Verticals: Combined Torsion Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
COL006	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.304	1.000	H3-6	0.304	Tr = -1.736 K-ft, Torsion Shear Stress Unity = 0.304, Axial Unity = 0.1309, Bending Unity = 0, Flexural Shear Unity = 0

Verticals: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL013	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	8.958	68.404	E3-2	0.131	KLz = 4.25 ft, KLy = 4.25 ft, KL(torsion) = 4.25 ft, Fn = 40.21 Ksi, Fe (E3-4) = 143.2 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Verticals: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL011	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.132	24.840	H3-1	0.005	Tr = -0.0304 K-ft, Venant Shear = 0.1323 Ksi

Low Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t _{des} ?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): at Interior Crossings Lateral Bottom (-y): at Interior Crossings Strong (z): at Interior Crossings	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Low Chord: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX044	HSS4X3X.188	0.000	Result Superposition Case 1 Low Extreme	4.474	24.840	H3-1	0.180	Tr = -1.395 K-ft, Venant Shear = 4.474 Ksi

Low Chord: Combined Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX029	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	0.366	1.000	H1-1b	0.366	KLz = 1.5 ft, KLy = 1.455 ft, KL(torsion) = 1.5 ft, Lb = 1.5 ft, Axial Unity = 0.0378, Mz Unity = 0.1049, My Unity = 0.2424, Kz = 1, Ky = 0.9697, K(torsion) = 1, Cb = 1

Low Chord: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX039	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	12.572	92.736	D2-1	0.136	

Low Chord: Strong Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX040	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	2.561	10.350	F7-1	0.247	Lb = 2 ft, Cb = 1

Low Chord: Weak Flexure Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX037	HSS4X3X.188	1.500	Result Superposition Case 1 High Extreme	2.058	8.487	F7-1	0.242	

Low Chord: Weak Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vz K	Capacity Vz K	Code Reference	Unity Check	Details
BmX037	HSS4X3X.188	1.500	Result Superposition Case 1 High Extreme	1.597	21.421	G4-1	0.075	Shear Area = 0.8623 in ² , Cv = 1

Low Chord: Combined Torsion Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX030	HSS4X3X.188	1.500	Result Superposition Case 1 Low Extreme	0.464	1.000	H3-6	0.464	Tr = -1.692 K-ft, Torsion Shear Stress Unity = 0.2184, Axial Unity = 0.0947, Bending Unity = 0.286, Flexural Shear Unity = 0.0709

Low Chord: Strong Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX045	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	2.142	30.065	G4-1	0.071	Shear Area = 1.21 in ² , Cv = 1

Steel_Beam Z_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Continuous Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

End floor beams: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Continuous Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Imaginary Stringer: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	

Imaginary Stringer: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True
---	--	--

Cracked vertical members: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: Varies Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Combined Torsion Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
COL015	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.247	1.000	H3-6	0.247	Tr = 1.412 K-ft, Torsion Shear Stress Unity = 0.2472, Axial Unity = 0.0766, Bending Unity = 0, Flexural Shear Unity = 0

Cracked vertical members: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL020	3x3x.188 with crack	0.666	Result Superposition Case 1 High Extreme	6.021	77.761	D2-1	0.077	

Appendix D: Inspection Report

Tr. Bridge Name: Hay Creek Bridge Feature Crossed: Hay Creek Trail #-MP: 091304-55555-0.0

TRACS TRAIL BRIDGE INSPECTION

BRIDGE IDENTIFICATION AND LOCATION				Category	COMPLEX
Trail Bridge Name:	Hay Creek Bridge	Trail Number-Bridge MP:	091304-55555-0.0		
Location:	Hay Creek Bridge	Feature Crossed:	Hay Creek		
Latitude:	45.274	Longitude:	-88.365		
Trail Class:	3	Designed Use:	ATV		
Forest/Special Use Unit:	CNNF	District:	Lakewood-Laona		

STRUCTURE TYPE AND MATERIAL

Superstructure	Number of Main Spans:	1	Number of Approach Spans:	0			
Main Span Type:	SIDE TRUSS	Material:	STEEL				
Quantity and Dimensions (Q x D" x W" x L'):		x	x	x	30'		
Approach Span Type:	Choose an item.	Material:	Choose an item.				
Quantity and Dimensions (Q x D" x W" x L'):		x	x	x			
Substructure Type:	SPREAD FOOTING	Material:	CONCRETE				
Deck Type:	PLANK	Material:	TIMBER, SAWN TREATED				
Dimensions (D"xW"xL"):	2" x 8" x	Wearing Surface:	TIMBER RUNNING PLANKS - TREATED				
User Barrier Rail Type:	RAILING INTEGRAL WITH TRUSS/SIDER GIRDER						
Rail Material:	Choose an item.	Rail Ht: (in)		Max Rail Opening: (in)			
Curb Material:	Choose an item.	Curb (Ht" x W"):		x			
Geometry / Design / Rating	Plan Number:						
Overall Length (ft):	30'	Overall Deck Width (in):	149"	Service Under Bridge:	WATERWAY		
Maximum Span (ft):	30'	Horizontal Clear Width (in):	143"	Vertical Under Bridge Opening (ft):			
Clear Span (ft):		Tread Width (in):		Top of Deck Height (ft):			
Bridge Skew (°):	0	Bridge Flare (Y/N):		Vertical Clear Height (ft):			

Structure Remarks

Nonredundant Steel Tension Members (NSTM's): Two welded steel trusses. NSTM's are bottom chords, truss diagonals, and floorbeams as shown in red on the sketch (last page of report).

Tr. Bridge Name: Hay Creek Bridge		Feature Crossed: Hay Creek		Trail #-MP: 091304-55555-0.0	
Inspection Date:	10/3/2024	Inspection Frequency (Months):			
Inspected by:	Gust Junttila, P.E.				
Description:	Routine and NSTM inspection.				
CONDITION CODES and REMARKS					
ITEM		CODE	REMARKS		
Wearing Surface:		6	Only the edge visible as sand covers the deck.		
58. DECK:		7	Condition of the longit plank deck is solid as viewed from side and below.		
Cleanliness		Poor	Sand covers the deck.		
Deck Slab/Panels		-			
Drains and Drainage		Poor	Sand covers the deck with built up sand windrows at the sides.		
Utilities		-			
Deck Joints		Good	Only end joints as the trail abuts the bridge. No problems.		
36. User Barriers:		Pick			
Railing		-	Trusses serve as bridge railing.		
Post		-			
Curb		-			
59. SUPERSTRUCTURE (Main Span):		4	See defects noted in truss members. The defects warrant structural review and load rating.		
All	Bearings	Good	Good condition, but must be cleaned as they are covered in sand.		
	Paint	-	Weathering Steel		
	Bracing	-			
Flooring	Floor Beams	Good	No apparent section loss, but corrosion is initiating/worsening.		
	Stringers/Girders	-	No stringers, only floorbeams.		
	Bracing	-	No bracing.		
Truss	Truss Members	Poor	3 vertical cracks observed and noted on members (see photos). Cracks in L1 panel point (upstream truss looking north, 1st panel pt), L6, and R6 panel points. At L6, there is a noticeable bulge in the vertical. The crack is 1/16" wide. At R6, there is a noticable bulge in the vertical. The crack is 1/32" wide.		

Tr. Bridge Name: Hay Creek Bridge		Feature Crossed: Hay Creek		Trail #-MP: 091304-55555-0.0	
60. SUBSTRUCTURE:		8			
All	Alignment/Settlement/Skew	Good			
	Scour/Erosion	Good		No scour.	
Abutments	Backing Plank/Backwall	-			
	Gabion/Reinforced Earth	-			
	Sill/Grade Beam	Good		Concrete abutment in good condition. No defects noted.	
61. Channel		7		Channel appears stable due to heavy vegetation and riprap. The bridge opening appears adequate, however, the banks/riprap are silted indicating the water may get high at this crossing.	
Channel Protection		Good		Thick vegetation with stable banks. Fair to good riprap protecting slopes in front of abutments.	
Channel Scour/Erosion		Good		No scour or erosion.	
Vegetation		Good		Thick vegetation/tree lined channel.	
Waterway Obstruction/Drift		Fair		2 large logs in the channel beneath the bridge.	
TRAIL APPROACHES:		6		With no wingwalls, the trail sand sloughs at the ends of the bridge.	
Approach Settlement		Good		No observed settlement.	
Shoulder Embankment		Fair		Poor drainage due to sandy windrows at the edges of the road.	
Surfacing		Poor		Soft sand.	
71. WATERWAY ADEQUACY:		7		Apparently slight chance of overtopping, but it may be more than slight based on the observed sand/silt at the bearings and riprap slopes.	
Opening/Stream Constraint		Good			
Vertical Underbridge Opening		Good			
Appraisal – Bridge Elements Meet TMO? (Print TMO direct from INFRA Tr. Bridge Module)					
COMPONENT		VALUE	MEET	REMARKS	
Deck Width		149	Y		
User Barrier		-	-		
Bridge Grade			Y		
Trail Alignment			Y		
Trail Grade			Y		
Tread Width		0	-		
Other			-		

Tr. Bridge Name: Hay Creek Bridge		Feature Crossed: Hay Creek		Trail #-MP: 091304-55555-0.0	
Tasks					
Item Category	Task	Material	Cost/Unit Severity	Quantity	
Superstructure	Repair/replace superstructure component		-	-	
	Task ID	TB-CPX-SUP-			
	Comments	Arrest the vertical cracks noted and reinforce the members per MFR recommendations or per analysis.			
Superstructure	-		-	-	
	Task ID	-			
	Comments	Perform detailed load rating of the bridge superstructure.			
Whole_Bridge	Basic Maintenance		-	-	
	Task ID	TB-CPX-WHL-01A			
	Comments	Clean sand off the bridge deck and bearings to limit the dead load, allow drainage, and limit moisture trapping around bearings/members.			
Whole_Bridge	Basic Maintenance		-	-	
	Task ID	TB-CPX-WHL-01A			
	Comments	Install warning signs or load posting signs to not allow log trucks or any large vehicles.			
Approaches	-		-	-	
	Task ID	-			
	Comments	Install better/higher reflective object marker signs.			

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS



Hay Creek Bridge - looking north



Closer view looking north

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Downstream side. Sand windrow at edges



Upstream Truss

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



DS Channel



US channel

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Looking south



Toward crack at L1 panel point (Left truss looking north (upstream truss), 1st panel pt)

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Closeup of L1 crack



SW corner, typical of all

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Typical at edge



South abut looking DS

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



South riprap slope looking DS



Channel under bridge

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Toward north abut



Bot chord butt weld

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Typical floorbeam connection



Typical FB condition

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Toward north abut



Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Toward crack at L6



L6 panel point crack in vert

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail # -MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Another view of crack width at L6



Toward R6 crack from NE quad

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



R6 vert crack



R6 width

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Toward upstream



Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.

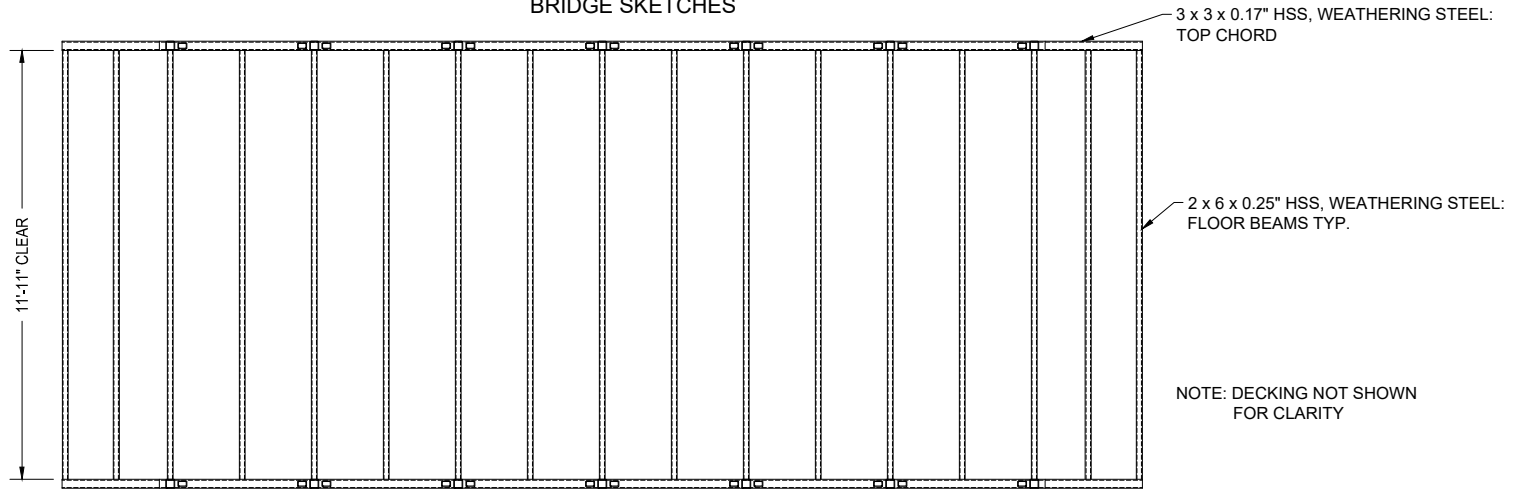


Signs looking south. Log trucks should not use this bridge

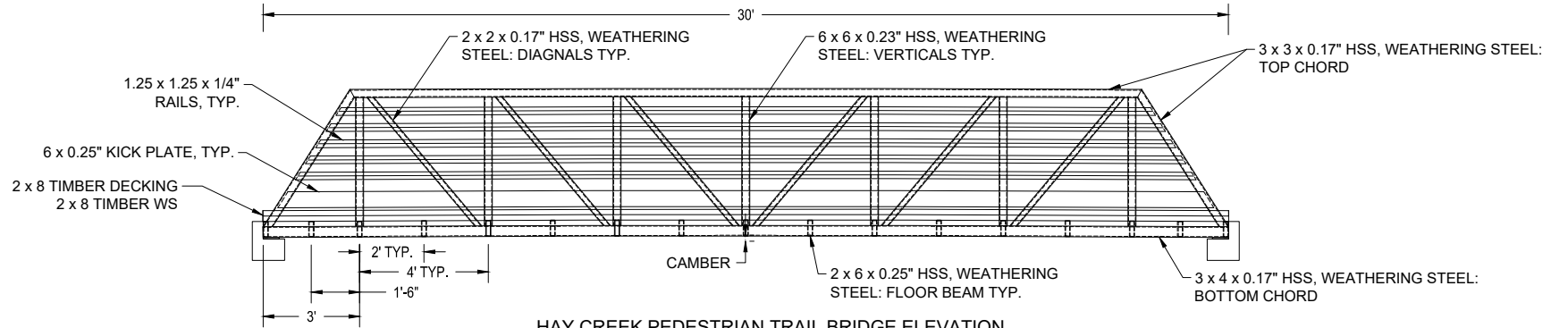
Insert photo here.

Structure Name:	Hay Creek Bridge	Date:	10/3/2024
Trail #-MP:	091304-55555-0.0	Feature Crossed:	Hay Creek
BRIDGE SKETCHES			

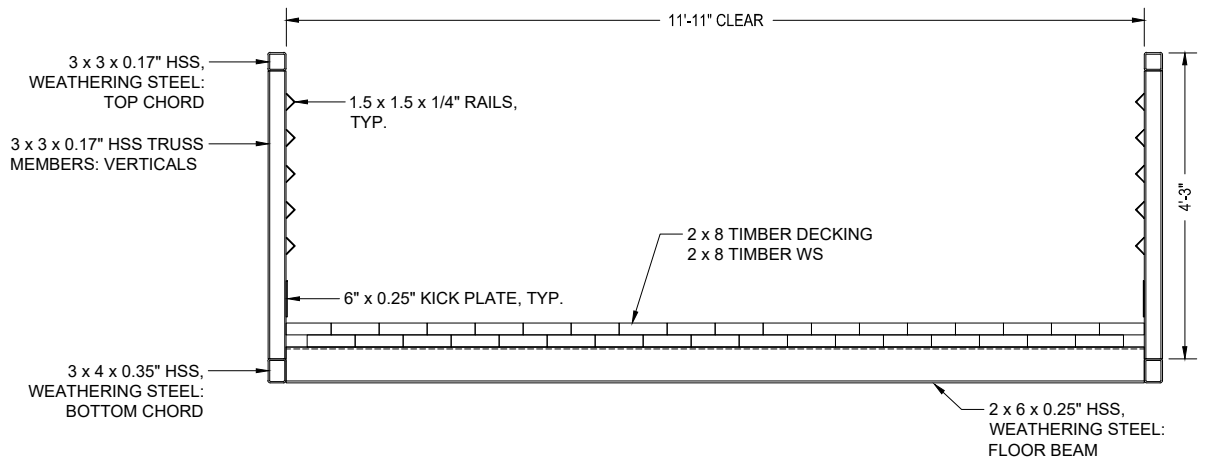
BRIDGE SKETCHES



HAY CREEK PEDESTRIAN TRAIL BRIDGE PLAN
SCALE: 3/16" = 1'-0"



HAY CREEK PEDESTRIAN TRAIL BRIDGE ELEVATION
SCALE: 3/16" = 1'-0"



HAY CREEK PEDESTRIAN TRAIL BRIDGE SECTION
SCALE: 3/8" = 1'-0"

Structure Name:	HAY CREEK
Trail #/MP:	-
Date:	9/24/2024
Feature Crossed:	Ephemeral

Tr. Bridge Name: Hay Creek Bridge		Feature Crossed: Hay Creek		Trail #-MP: 55555-0.0000	
TRACS TRAIL BRIDGE INSPECTION					
Digitally signed by TYLER LEMAHIEU LEMAHIEU Date: 2024.10.31 05:57:25 -05'00'					
BRIDGE IDENTIFICATION AND LOCATION				Category	COMPLEX
Trail Bridge Name:	Hay Creek Bridge		Trail Number-Bridge MP:	55555-0.0000	
Location:	LKLN ATV Trail		Feature Crossed:	Hay Creek	
Latitude:	45.274		Longitude:	-88.365	
Trail Class:	3		Designed Use:	SNOWMOBILE	
Forest/Special Use Unit:	Chequamegon-Nicolet NF		District:	Lakewood Laona RD	
STRUCTURE TYPE AND MATERIAL					
Superstructure	Number of Main Spans:		1	Number of Approach Spans:	
Main Span Type:	SIDE TRUSS		Material:	STEEL	
Quantity and Dimensions (Q x D" x W" x L'):			x	x	x
Approach Span Type:	Choose an item.		Material:	Choose an item.	
Quantity and Dimensions (Q x D" x W" x L'):			x	x	x
Substructure Type:	SPREAD FOOTING		Material:	CONCRETE	
Deck Type:	PLANK		Material:	TIMBER, SAWN TREATED	
Dimensions (D"xW"xL"):			2x8	x	nominal
			x	Wearing Surface: TIMBER RUNNING PLANKS - TREATED	
User Barrier Rail Type:			POST WITH HORIZONTAL RAILING		
Rail Material:	STEEL		Rail Ht: (in)	45"	Max Rail Opening: (in)
Curb Material:	STEEL		Curb (Ht" x W"):	7.5"	x 0.25"
Geometry / Design / Rating			Plan Number:		
Overall Length (ft):	30.5'	Overall Deck Width (in):	142"	Service Under Bridge:	
Maximum Span (ft):	29'	Horizontal Clear Width (in):	140"	Vertical Under Bridge Opening (ft):	
Clear Span (ft):	28.2'	Tread Width (in):	140"	10'	
Bridge Skew (°):	0	Bridge Flare (Y/N):	N	Vertical Clear Height (ft):	
99.9'					
Structure Remarks					
- Excessive sand on deck - Inspected per SNBI					

Tr. Bridge Name: Hay Creek Bridge		Feature Crossed: Hay Creek		Trail #-MP: 55555-0.0000	
Inspection Date:	10/29/2024	Inspection Frequency (Months):	60		
Inspected by:	Tyler LeMahieu				
Description:	Routine				
CONDITION CODES and REMARKS					
ITEM	CODE	REMARKS			
Wearing Surface:	6	Difficult to inspect			
58. DECK:	6	Widespread minor defects due to drainage; but deck materials appear sound			
Cleanliness	Poor	3" to 6" of sand and gravel throughout deck			
Deck Slab/Panels	Good	No observed defects			
Drains and Drainage	Poor	No drainage at present; sides clogged with sand			
Utilities	-				
Deck Joints	-				
36. User Barriers:	5	Some moderate defects			
Railing	Good	Minor local CS-2 corrosion spots throughout; pitting of weathering steel			
Post	Fair	Cracking of 3 vertical members; likely from freezing water draining into bottom of posts.			
Curb	Good	Minor local CS-2 corrosion spots throughout; pitting of weathering steel			
59. SUPERSTRUCTURE (Main Span):	5	Some moderate defects			
All Bearings	Good	Not observable			
Paint	-				
Bracing	Good				
Flooring Floor Beams	Fair	CS-2 rust spots throughout (beyond weathering steel patina)			
Stringers/Girders	Fair	CS-2 rust spots throughout (beyond weathering steel patina)			
Bracing	Good				
Truss Truss Members	Fair	Cracking of 3 vertical members; likely from freezing water draining into bottom of posts. See images. No progression of cracking noted since last inspection			
	-				
	-				
59. SUPERSTRUCT (Approach Span):	Pick				
NA	-				
	-				
NA	-				
	-				
	-				
NA	-				
	-				
	-				
	-				

Tr. Bridge Name: Hay Creek Bridge		Feature Crossed: Hay Creek		Trail #-MP: 55555-0.0000	
60. SUBSTRUCTURE:		8	Isolated minor defects		
All	Alignment/Settlement/Skew	Good			
	Scour/Erosion	Good			
Abutments	Backing Plank/Backwall	Fair	Minor CS-2 abrasion of exposed portion of concrete backwall		
	Gabion/Reinforced Earth	-			
	Sill/Grade Beam	Good			
		-			
		-			
		-			
		-			
		-			
Piers	Sill/Grade Beam	-			
		-			
		-			
		-			
		-			
		-			
		-			
		-			
61. Channel		7	Some minor defects		
Channel Protection		Good			
Channel Scour/Erosion		Fair	Minor slumping of banks US and DS		
Vegetation		Good			
Waterway Obstruction/Drift		Fair	Minor amounts of drift present in channel		
TRAIL APPROACHES:		7	Some minor defects		
Approach Settlement		Good			
Shoulder Embankment		Good			
Surfacing		Fair	not crowned		
71.WATERWAY ADEQUACY:		6	Bridge above approaches, with occasional overtopping		
Opening/Stream Constraint		Good			
Vertical Underbridge Opening		Good			
Appraisal – Bridge Elements Meet TMO? (Print TMO direct from INFRA Tr. Bridge Module)					
COMPONENT		VALUE	MEET	REMARKS	
Deck Width		142	N	Shy of 12' for snowmobile	
User Barrier		-	Y		
Bridge Grade			Y		
Trail Alignment			Y		
Trail Grade			Y	Shy of 12' for snowmobile	
Tread Width		140	N		
Other			-		

Tasks				
Item Category	Task	Material	Cost/Unit Severity	Quantity
Deck	Repair/replace Deck Component	-	-	
	Task ID TB-CPX-DCK-			
	Comments Shovel off and clean all sand from the deck; Do not dump into river			
Approaches	Repair/replace/install safety signage	-	-	
	Task ID TB-CPX-APR-SGN-02A			
	Comments Install 4 reflective object markers and posts			
Approaches	Repair/replace/install safety signage	-	-	
	Task ID TB-CPX-APR-SGN-02A			
	Comments Load rate and post bridge			
Superstructure	Repair/replace superstructure members	-	-	
	Task ID TB-CPX-SUP-			
	Comments Drill drain holes in verticals to stop cracks from forming			
-	-	-	-	
	Task ID -			
	Comments			
-	-	-	-	
	Task ID -			
	Comments			
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	Task ID -			
	Comments			
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	Task ID -			
	Comments			
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	Comments			
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	Task ID -			
	Comments			

Tasks				
Item Category	Task	Material	Cost/Unit Severity	Quantity
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	Comments			
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	Task ID	-		
	Comments			

Structure Name:	Hay Creek Bridge	Date:	10/29/2024
Trail #-MP:	55555-0.0000	Feature Crossed:	Hay Creek

BRIDGE PHOTOS



River Right Approach



River Left Approach

Structure Name:	Hay Creek Bridge	Date:	10/29/2024
Trail #-MP:	55555-0.0000	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Looking Upstream from the Bridge Deck



Looking Downstream from the Bridge Deck

Structure Name:	Hay Creek Bridge	Date:	10/29/2024
Trail #-MP:	55555-0.0000	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Looking Upstream - Elevation Profile



Looking Downstream - Elevation Profile

Structure Name:	Hay Creek Bridge	Date:	10/29/2024
Trail #-MP:	55555-0.0000	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



River Right Abutment



River Left Abutment

Structure Name:	Hay Creek Bridge	Date:	10/29/2024
Trail #-MP:	55555-0.0000	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



View of Superstructure



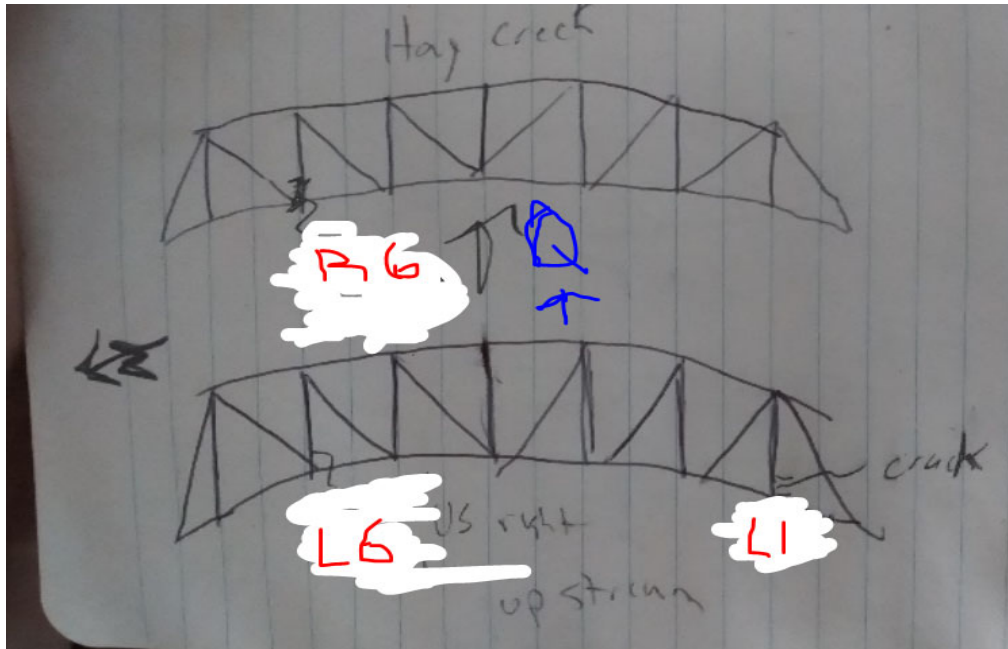
View of Deck and Rails

Structure Name:	Hay Creek Bridge	Date:	10/29/2024
Trail #-MP:	55555-0.0000	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Excessive sand on deck



Map of three locations with cracked verticals

Structure Name:	Hay Creek Bridge	Date:	10/29/2024
Trail #-MP:	55555-0.0000	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



R6 vertical crack



L6 vertical crack

Structure Name:	Hay Creek Bridge	Date:	10/29/2024
Trail #-MP:	55555-0.0000	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



L1 Vertical Crack



Backwall abasion where visible (SE quad)

Structure Name:	Hay Creek Bridge	Date:	10/29/2024
Trail #-MP:	55555-0.0000	Feature Crossed:	Hay Creek

BRIDGE PHOTOS - cont.



Typical rust on floor beams

Insert photo here.

Backwall abasion where visible (SE quad)