

15 7015 0415 0244

Hadfield Road
over
Beaver Creek

East Brandywine Township
Chester County, Pennsylvania



POSTING: 12 Tons

FRACTURE CRITICAL: Yes

LOAD RATING REVIEW RECOMMENDED:

Yes

INSPECTED: October 28, 2010 - Routine

PREPARED BY:

McCormick Taylor, Inc.
222 Valley Creek Blvd., Suite 130
Exton, PA 19341
610-640-3500

MAP: 19-G11, ADC 15th Edition

SUBMITTED TO:

Pennsylvania Dept. of Transportation
Engineering District 6-0

INSPECTED BY:

J.S. Payne-McAlear, E.I., CBSI
M.M. Kaczmarczyk, CBSI



This structure safety inspection document is confidential pursuant to 65 P.S. §66.1 et seq., 75 Pa. C.S. §3754, and 23 U.S.C. §409 and may not be disclosed or used in litigation.

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LOCATION MAP



N.T.S.

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BRIDGE DESCRIPTION

Year Built:	1919
Structure Type:	Steel Through Plate Girder
Structure Length:	47' – 0"
Number of Spans:	1
Curb-Curb Width:	16' – 0"
Approach Roadway Width:	18' – 0"
Underclearance:	2.7'
Skew Angle:	90°

INSPECTION SUMMARY

Approach Slab

Prior Condition Rating N
Current Condition Rating N

There is no approach slab at this structure.

Approach Roadway

Prior Condition Rating 5
Current Condition Rating 5

The bituminous pavement is in overall fair condition. The near approach paving joint seal re-opened and there is longitudinal cracking within 1' of the left edge of pavement. Additionally, there is a 2" drop-off from pavement to the unpaved shoulder at the near left corner. The far approach wearing course along the wheel paths exhibits cracking and delamination. There is longitudinal and map cracking within 1' of the pavements edges.

Deck Wearing Surface

Prior Condition Rating 7
Current Condition Rating 6

The bituminous pavement is in overall satisfactory condition with leaves and debris holding moisture along the curbs.

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Deck

Prior Condition Rating 4
Current Condition Rating 4

The top of the 7" thick reinforced concrete deck is not visible due to the bituminous wearing surface overlay. The underside is in overall poor condition with typical random hairline to 1/16" wide diagonal and map cracking with efflorescence and stalactites. There are numerous patched spalls adjacent to both girders as well as the top flanges of the floorbeams. Most previous patches are intact with no problems noted. Bays 5 and 6 have moderate spalls adjacent to the right girder. Bay 8 has a small 1/2" deep spall adjacent to Floorbeam 9 and the left girder connection. Additionally, there is a delaminated area of concrete adjacent to the top flange of Floorbeam 9 at center span. Bay 10 has minor edge spalling along the top flange of Floorbeam 11 for the full width of the span.

Superstructure

Prior Condition Rating 3
Current Condition Rating 3

The superstructure is in overall serious condition due to continued section loss and delamination to the girders and floorbeams. Significant corrosion and section loss has affected the strength of the girders and floorbeams. Active corrosion has reduced flange and web thicknesses and flange widths on the steel members with up to 100% section loss. Rivet heads at the girder bottom flanges are heavily corroded. The paint system has failed throughout. The steel plate bearings are heavily corroded, frozen, and inoperable.

Paint Condition

Prior Condition Rating 34
Current Condition Rating 21

The paint system on this structure has failed throughout the floorbeams and the interior faces of the girders below the deck. Loss of section and deep pitting has occurred affecting the strength of the members. Cleaning and painting of the entire bridge is needed.

Substructure

Prior Condition Rating 7
Current Condition Rating 7

The stone masonry stems, wingwalls and bridge seats are in good condition. The footings are below the streambed elevation. Rip-rap lines the far abutment with minor scour of the streambed in front of the rock protection. There is vegetation at the near right and far right wings.

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Channel

Prior Condition Rating 7
Current Condition Rating 7

The channel alignment is straight through the bridge, the stream flows through the east (far) half of the span. There is minor embankment erosion present along the upstream east (far) bank. There is minor scour present at the far abutment. The overall condition of the channel has not changed substantially since the 2008 NBIS inspection.

Safety Features

Prior Condition Rating 2222
Current Condition Rating 2222

The unprotected through-girders have a painted steel pipe hand railing. The concrete curbs are in overall satisfactory condition. There are no approach guiderail, transitions, or end treatments provided.

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LOAD RATING SUMMARY

The chart shown below is a summary of the current load ratings for this structure. PADOT's Bridge Analysis Rating computer program, version 7.13.0.0, was used for load rating of members by the Load Factor Method. Ratings were performed as a follow-up to the 2010 inspection to take into account 1/4" section left in web, 1/8" section loss to bottom flange, and a 4" wide bottom flange remaining width. The load carrying capacity of the bridge is governed by the H20 rating vehicle. This rating still controls as it is more restrictive than the revised beam ratings.

CRITICAL MEMBER	STRESS LEVEL	H	HS	ML80	TK527
FLOORBEAM	INVENTORY	3	7	11	12
	OPERATING	6	11	18	20

POSTING REVIEW

The bridge is currently posted for 12 Tons. As the condition of the bridge has changed since the 2008 NBIS inspection, the previous load test results are no longer valid. Due to continued section loss to the webs and bottom flanges of the girders and floorbeams, it is our recommendation to reduce the bridge posting from 12 Tons to 6 Tons.

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RECOMMENDATIONS

Maintenance

The following maintenance program is provided for the continued safe use of the bridge. The estimated costs listed below are based on PennDOT Bridge Management System unit costs. The actual costs may vary due to site-specific conditions.

Priority Code 0 – Critical

Replace the “Weight Limit 12 Tons” signs with the “Weight Limit 6 Tons” signs at both advances and approaches.

4 EA	x	\$200	\$800
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Priority Code 1 – High Priority

Repair or replace the steel floorbeams due to continued delamination with up to 100% section loss to isolated locations of the webs and bottom flanges.

11 EA	x	\$9,750	\$107,250
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Install standard structure mounted guiderail across the bridge in order to protect the fracture critical through girders.

91 LF	x	\$93	\$8,463
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Repair or replace the steel girders due to continued delamination with up to 100% section loss to the bottom flanges adjacent to the near bearing stiffeners.

2 EA	x	\$9,750	\$19,500
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Priority Code 2 – Priority

Install standard approach guiderail, transitions, and end treatments at each corner.

4 EA	x	\$1,000	\$4,000
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Fully clean and paint the superstructure.

1 EB	x	\$200,000	\$200,000
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Replace the frozen, inoperative, and heavily corroded steel plate bearings.

4 EA	x	\$1,650	\$6,600
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Priority Code 3 – Schedule

Patch and seal the approach pavement.

15 SY	x	\$40	\$600
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Priority Code 4 – Program

None			\$0
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Priority Code 5 – Routine

Clean and flush deck.

1 EB	x	\$400	\$400
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Total Repair Costs \$347,613

Inspection Schedule

PennDOT Publication 238, Bridge Safety Inspection Manual, Table IP 2.3.2.4-1 requires fracture critical bridges with superstructure condition code of 3 to be inspected on a 6-month interval. Interim inspection of critical areas may be used to meet the reduced interval between the biennial routine inspections. As such, the Hadfield Road Bridge requires inspection on a 6 month interval to monitor the serious condition of the superstructure.

Inspection Equipment

Special inspection equipment was not required for the regular NBIS inspection.

Waterway Information

Both abutments were accessible for the regular NBIS inspection; therefore, an underwater inspection is not warranted at this time.

5A01 SR ID: 15701504150244 **5A03** BR Key: 10683 **7A01** Inspection Date: October 28, 2010

1A09 Inspection Status: 9 - Accepted
7A02 Team Leader: 638 McCormick Taylor, In Payne McAleer
7A03 Inspection Type: R - Regular (routine)
7A05 Inspected By: 8 - Consulting Firm

Structure Description

5A08 FHWA Facility Carried: HADFIELD ROAD
5A07 Features Intersected: BEAVER CREEK
5A09 Location: E.BRANDYWINE TWP. 19F11
5C01 Roadway Name: HADFIELD RD.
5A06 City / Borough Name: 15/204 - EAST BRANDYWINE

Structure Type

Main

6A26 Material Makeup: 1 - Steel
6A27 Physical Makeup: 9 - Other or none
6A28 Span Interaction: 1 - Simple, non-comp
6A29 Structural Config: 14 - Girder riv/thru

Approach

6A26 Material Makeup:
6A27 Physical Makeup:
6A28 Span Interaction:
6A29 Structural Config:

5A01 SR ID: 15701504150244 **5A03** BR Key: 10683 **7A01** Inspection Date: October 28, 2010

Sign Information

Type of Sign	ID01	ID02	ID03	ID06	ID04	ID07	ID05	Comments
	Sign Needed	Sign Message	Near Adv	Bridge Site Near	Far	Far Adv		
0 - Bridge	Yes			G	G	G	G	NADV (At Zynn Road) - slightly leaning, good condition FADV (At Bondsville Road) - no problems noted
1 - Bridge Weight Limit	Yes	12 TONS		G	G	G	G	NAPP - no problems noted FAPP - no problems noted
2 - Except Combinations	No							
3 - One Truck at a Time	No							
4 - Vertical Clearance On	No							
5 - Vertical Clearance Under	No							
6 - One Lane Bridge	Yes			G			G	NAPP - no problems noted FAPP - no problems noted
7 - Narrow Bridge	No							
8 - Hazardous Clearance	Yes				G	G		NL - no problems noted NR - no problems noted
9 - Other	No							FL - no problems noted FR - no problems noted

Features Intersected

6C02	5C03	5B09	5C06	5C29	4A20	4A19	6C18	6C19	6C20	6C21	6C22	6C23	6C24	6B17
SR ID	On/Under	Skew Angle	Dir	NHS	Min Lat Cl Left	Right	Tot Hor Cl Left	Right	Min Vrt Cl Rdwys Left	Right	Vrt Cl Over 10ft Left	Right	VT Sign	ADT
-	-	1	90 N/A	0 - Not on NHS	-1.0	-1.0	-1.0	15.9	-1.0	99.9	-1.0	99.9	0	369
		2	0 N/A	-1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1

5A01 SR ID: 15701504150244 **5A03** BR Key: 10683 **7A01** Inspection Date: October 28, 2010

6B15 Design Exceptions:
6A50 Sup Latent Problem: _
6A51 Sub Latent Problem: _

Deck Geometry

Table Used for Appraisal: 1 - 2A/2B

Controlling Values

5C10 ADT: 369
5C27 Bridge Road Width: 16.0
4A10 Appraisal: 3 - Intolerable-Correct
Notes:

4A11 Underclr Appr: N - Not applicable (NBI)
6B13 Controlling Vertical: -1.0 FT
Controlling Lateral:

Traffic Safety Features

Feature Type	Location IA01	Adequacy Rating IA02	Description IA03	Posted Spd Lmt (mph) 5C08
1 - Railing		2 - Req not provided		25
Comment: The unprotected through-girder has a painted steel pipe hand railing. The curbs are in overall satisfactory condition. There is a loose patch as well as a 5' long x 2.5" wide x 1/2" deep area of deterioration along the roadway at the far right corner.				
2 - Transition		2 - Req not provided		25
Comment: None provided				
3 - Approach Guiderail		2 - Req not provided		25
Comment: None provided				
4 - Approach railend		2 - Req not provided		25
Comment: None provided				

Approach Alignment

4A02 Code: 7 - Above Min Criteria
Comment: No speed reduction required, slight limited sight distance from the near approach.

Approach Roadway

6B39 Code: 5 - Fair
Pavement: The bituminous pavement is in overall fair condition.

Near Approach - the approach paving joint seal re-opened and there is longitudinal cracking within 1' of the left edge of pavement. Additionally, there is a 2" drop-off from pavement to the unpaved shoulder at the near left.

Far Approach - the wearing course along the wheel paths exhibit cracking and delamination. There is longitudinal and map cracking within 1' of the pavements edges.

Drainage: Grassy
Shoulders: None

5A01 SR ID: 15701504150244 **5A03** BR Key: 10683 **7A01** Inspection Date: October 28, 2010

Approach Slab

6B38 Code: N - N/A

Pavement:

6B04 Bump at Bridge: No Bump No bump at bridge, smooth at transitions.

6A39 Relief Joints: 0 - Joints not present **6A41** Number of Joints: -1

Comment:

6B02 New Wearing Surface Under Bridge: No

5A01

SR ID: 15701504150244

5A03

BR Key: 10683

7A01

Inspection Date: October 28, 2010

Deck Wearing Surface

Main

5B02 Type of Wearing Surface: 6 - Bituminous
 5B03 Type of Memb. Water-Proof: 0 - None
 5B04 Deck Corrosion Protection: 0 - None
 6A33 Thickness: 3.0
 6A34 Date Recorded: 01/01/1901
 6B40 Condition Rating: 6 - Satisfactory-structural elements show some minor deterioration.
 IC02 Dk WS Notes: The bituminous pavement is in overall satisfactory condition with leaves and debris holding moisture along the curbs.

Approach

6A30 Type of Wearing Surface:
 6A31 Type of Memb. Water-Proof:
 6A32 Deck Corrosion Protection:
 6A33 Thickness: 0.0
 6A34 Date Recorded: 01/01/1901

Expansion Joints

6A41

Number of Expansion Joints: -1

Joint Number	VD25 Joint Type	VD26 Movement Class	VD27 Manufacture Code
0			

Deck

1A01 Condition Rating: 4 - Poor-advanced section loss, deterioration, spalling or scour.
 6B07 Est. Spall Delamination: 0.00 %
 6B10 Est. Chloride Content: 0.00 %
 1A07 Unrepaired Spalls: 5.00 SF
 6B08 Date: 01/01/1901
 6B11 Date: 01/01/1901

Deck Top: The top of 7" thick reinforced concrete deck is not visible due to the bituminous wearing surface overlay.

Deck Underside: The underside is in overall poor condition with typical random hairline to 1/16" wide diagonal and map cracking with efflorescence and stalactites. There are numerous patched spalls adjacent to both girders as well as along the top flanges of the floorbeams. Most previous patches are intact with no problems noted.

Bays 5 and 6 exhibit approximately 2' long x 8" wide x 1" deep spalling adjacent to the right girder.

Bay 8 has a small 2" long x 2" wide x 1/2" deep spall adjacent to floorbeam 9 and the left girder connection. Additionally, there is a delaminated area of concrete adjacent to the top flange of floorbeam 9 at center span.

Bay 10 exhibits minor edge spalling along the top flange of floorbeam 11 for the full width of the span.

Deck Drainage: 4 deck drains, leaves and debris along the curbs blocking the drains.

Expansion Joints: None

Deck Notes:

Superstructure

1A04 Condition Rating: 3 - Serious-loss of section, deterioration, spalling or scour have seriously affected primary structure
 Narrative: The superstructure is in overall serious condition due to continued section loss and delamination to the girders and floorbeams.

5A01

SR ID: 15701504150244

5A03

BR Key: 10683

7A01

Inspection Date: October 28, 2010

Girders/Beams: The 3' - 9 1/4" deep riveted steel plate through-girders exhibit typical heavy corrosion at joints and along the bottom flanges with approximately 15% section loss. The bottom flange effective width is 11 - 1/4" compared to the original width of 12". There is moderate corrosion of the webs with approximately 15% section loss and the rivet heads exhibit up to 30% section loss.

Left Girder - at the near bearing stiffener there is 100% section loss to the bottom flange for a length of 3" and the full width of the horizontal leg of the interior angle.

Right Girder - at the near bearing stiffener there is 100% section loss to the bottom flange for a length of 1 - 1/2" and half the width of the horizontal leg of the interior angle.

Floorbeams: The 12" deep steel I-beams exhibit severe corrosion along the bottom flanges with 1/8" section loss and portions corroded up to 100% of flange thickness. The bottom flange width has reduced from 5 - 1/4" to 5". Isolated locations of floorbeams have a bottom flange width of 4". The webs have moderate to heavy corrosion of with typical 1/16" section loss throughout and several areas off 100% section loss. In 2001 floorbeam webs typical section loss was measured as approximately 3/16" with 1/4" remaining.

Floorbeam 1 (near end floorbeam): at the left end there is a 5" long x 1" high hole in web adjacent to the bottom flange. At the right end there is a 2" long x 1" high hole in the web adjacent to the top flange. The web is razor thin along the bottom flange. The bottom flange exhibits 100% section loss along the far face beginning at the girder and continuing for a length of 18".

Floorbeam 4: there are two small holes in the web adjacent to the top flange within 1' of the connection with the left girder. Each area of 100% section loss measures approximately 1" square. The bottom flange width measures 4" wide with razor thin edges beginning 4'-9" from the left girder. There is a 1/2" diameter hole adjacent to the top flange at 4'-5" from the right girder.

Floorbeam 8: there are 3 holes in web adjacent to the bottom flange. The holes total 5" long x 1/2" high and are located 7" from left girder connection. The bottom flange width at this location is 4 - 1/2".

Floorbeam 9: bottom flange width is 4-1/4" with razor thin edges at points along the beam.

Stringers: None

Diaphragms: None

Truss Members: None

Portals/Bracings: None

Bearings: Double steel plates, frozen and inoperative; heavily corroded.

Drainage System: None

5A01 SR ID: 15701504150244 **5A03** BR Key: 10683 **7A01** Inspection Date: October 28, 2010

1A02 Substructure Condition Rating: 7 - Good - some minor problems

Notes: The substructure unit is in overall good condition with rip-rap in place along the far abutment and minor scour.

Near Abutment

Backwall: None

Bridge Seats: Stone masonry; good condition.

Cheekwalls: None

Stem: Stone masonry; good condition.

Wings: Stone masonry; good condition. Vegetation growing out of base of near right and near left wings.

Footing: Below streambed, no apparent problems.

Piles: None

IN20 Scour Undermine: 0 - No

Settlement: None evident

Embank Slope-wall: None

Wall Drainage: None

Far Abutment

Backwall: None

Bridge Seats: Stone masonry; good condition.

Cheekwalls: None

Stem: Stone masonry; good condition.

Wings: Stone masonry; good condition.

Footing: Below streambed, no apparent problems.

Piles: None

IN20 Scour Undermine: 1 - Yes

Settlement: None evident

Embank Slope-wall: None

Wall Drainage: None

5A01 SR ID: 15701504150244 **5A03** BR Key: 10683 **7A01** Inspection Date: October 28, 2010

Main

6A44 Group: 1 - Group 1
6A45 - 6A48 Critical Rating Factor: 4182
6A49 Total Critical Rating Factor: 15

Structure Type (Dept)

6A26 Material Makeup: 1 - Steel
6A27 Physical Makeup: 9 - Other or none
6A28 Span Interaction: 1 - Simple, non-comp
6A29 Structural Config: 14 - Girder riv/thru

Approach

6A44 Group:
6A45 - 6A48 Critical Rating Factor: 0001
6A49 Total Critical Rating Factor: 1

Structure Type (Dept)

6A26 Material Makeup:
6A27 Physical Makeup:
6A28 Span Interaction:
6A29 Structural Config:

Fracture Critical Details

IF01 Location: M - 1 **IF02** Type: 01 - Girder **IF05** FC Stress Category: D
IF03 Member: Girder tension zone.

IF04 Member Detail: Net section. Riveted connection.
IF06 Notes: No cracks noted. Delamination and section loss of the webs and bottom flanges.

IF01 Location: M - 1 **IF02** Type: 01 - Girder **IF05** FC Stress Category: E'
IF03 Member: Girder/floorbeam connection.

IF04 Member Detail: Out of plane bending.
IF06 Notes: No cracks noted. Severe corrosion of flanges, rivets, girder webs.

5A01 SR ID: 15701504150244 **5A03** BR Key: 10683 **7A01** Inspection Date: October 28, 2010

IU00a UW Reviewer Action:

IU00b Reviewer Comments:

IU02 Number of Units: 2

IU01 Recalculate SCBI: 0 - no recalc needed

IU03 SCBI Source: C - computation

4A08 SCBI: 3 - SC - Unstable

IU04 Overall SCBI: 3

IU05 SAR: 31.00

IU06 Streambed Material #1: A4 - Alluvium/advanced

IU06 Streambed Material #2:

IU07 Notes: Cobbles, many fines.

Current Countermeasures

CM Num	Type	Location	Condition	Subunit
	IU21	IU22	IU23	IU24

Possible Countermeasures

PCM Num	Location	Work Candidate
	IU25	IU26

SAR Calculation Data

IU08 Debris Potential: 1 - Medium

IU09 Trapping Potential: 1 - Medium

IU10 Pressure Flow: 0 - No

IU11 NAB Location: 2 - Right

IU12 FAB Location: 1 - Left

US Left Wingwall

IU13 Presence: 1 - Yes

IU14 Condition: 1 - Good

US Right Wingwall

IU15 Presence: 1 - Yes

IU16 Condition: 1 - Good

Horizontal Debris Blockage

IU17 Start: 48

IU18 End: 100

Vertical Debris Blockage

IU19 Start: 0

IU20 End: 25

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Sub Unit OSA Data

Observed Scour Rating Components

IN01	IN12	IN13	IN14	IN15	IN19	IN04	IN05	IN06	IN07	IN08	IN09	IN10	IN11	IN03
Sub Unit	Pier/ Abut Type	Inv. Found Type	Found Type	Strmbd Mat	Move Ind	Chg Since Last Insp	Scour Hole	Debris Potential	Scour-ability	Opening Adeq. / Channel	Sediment	Alignment	Velocity/ Stream Slope	Observed Scour Rating
NAB	6	P	5	A4	0	6	9	6	4	5	6	6	9	4
FAB	6	P	5	A4	0	7	8	6	4	5	8	6	9	4

Other Subunit Details

IN01	IN16	IN18	IN17	IN20	IN21	IN02	IN22	IN23	IU27
Sub Unit	UW Insp Type	Water Dept	Observed Scour Depth	Scour Undermine	Counter-measures	Info from Current Insp	100 yr Flood Calc Scour Depth	500 yr Flood Calc Scour Depth	SCBI Code
NAB	E	0.0	0.0	0	0	1	-1.0	-1.0	3

IN24 Notes: Dry.

FAB	E	0.0	0.5	1	0	1	-1.0	-1.0	3
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IN24 Notes: Partially protected by rip-rap, minor scour.

Underclearance

IL09	Origin Description:
IL10	Horizontal:
IL11	Vertical:
IL12	Notes:

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Channel

1A05 Channel/ Channel Protection Cond. Rating: 7
Channel: Channel alignment is straight through bridge. 50% of opening is dry, 40% of opening is aligned with channel.
Minor scour in front of far abutment.
Banks: Minor embankment erosion present; Northeast side (upstream east far bank) - minor undercutting.
Streambed Movements: None evident
Debris, Vegetation: None
River Control Devices: None
Embank/Streambed Contr: None
Drift Other: None

Waterway Adequacy

1A06 Appraisal Code: 6
Notes: Approx. 7 year flood.

IL02 Overtop Risk: S - Slight

IL03 Traffic Delay: I - Insignificant

5C22 Functional Class: 09 - Rural Local

High Water Mark

IL05 Elevation: -1.0 **IL06** Date: January 01, 1901 **IL07** New High Water Mark: No
Notes:

5A01 SR ID: 15701504150244 **5A03** BR Key: 10683 **7A01** Inspection Date: October 28, 2010

Paint Condition

6B36 Paint Cond Rating: 2 - Critical **6B37** Ext of Paint Cond: 1 - Blast and Paint

6B35 New Paint: 0 - no new paint

Int Beam / Gird: Paint system failed throughout the floorbeams and the interior faces of the girders below the deck. Loss of section and deep pitting has occurred affecting the strength of the members. Cleaning and painting of the entire bridge is needed.

Fascias: N/A

Splsh Zone Truss Gird: N/A

Truss: N/A

Bearings: Paint system failure with corrosion and section loss.

Other: N/A

4B03 Brdge Cap. Appraisal: 2 - 20.0-29.9%below

6B16 Controlling: 1 - H

4A09 Struct Cond Appraisal: 3

Structure Condition Appraisal Based on

The following Ratings:

1A04 Superstructure Condition R 3 - Serious-loss of section, deterioration, spalli

1A02 Substructure Condition Rating: 7 - Good - some minor problems

1A03 Culvert Rating: N - Not applicable

Load Ratings

4B15 Load Rating Review Recommended: Recalc not required

Due To: continued section loss to the girder bottom flanges and the floorbeams webs and bottom flanges.

IR03 Calculation Date: March 22, 2011

IR02 Rating Approval Date: April 15, 2011

Load Rating Details

LOAD TYPE	IR10	IR11	IR05	IR06	IR07	IR16	IR14	IR15	IR13	IR12
	IR LOAD	OR LOAD	NBI IND	RTNG ANAL METH	CONT MEM TYPE	ANALYSIS ENGINEER	AASHTO MANUAL YEAR	AASHTO SPEC YEAR	OPR GOV CRITERIA	INV GOV CRITERIA
1	3	6	0	2	2		-1	-1	M	M
Notes Description:										
2	7	11	0	2	2		-1	-1	M	M
Notes Description:										
8	11	18	0	2	2		-1	-1	M	M
Notes Description:										
0	12	20	1	2	2		-1	-1	M	M
Notes Description:										

5A01 SR ID: 15701504150244 **5A03** BR Key: 10683 **7A01** Inspection Date: October 28, 2010

IM01 Type of Work	IM03 Action	IM04 Est Qty	UOM	IM05 Priority	IM06 Date Rec	IM08 Target Year	IM11 Ass. WK
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Flexible	23 - A743101-CLEAN/FLUSH DK	1	EB	5	11/20/1998	0	No
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IM07 Status: 0 - Work not planned **IM15** Notes: Clean and flush deck.

IM09 Location

Flexible	27 - RDGDERL-CONNECT GDERAIL TO BR	4	EA	2	11/28/2000	0	No
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IM07 Status: 0 - Work not planned **IM15** Notes: Install standard approach guiderail, transitions and end treatments at each corner.

IM09 Location

Flexible	50 - B744602-RPR/RPL.STL.FLBM	11	EA	1	12/20/2006	0	No
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IM07 Status: 0 - Work not planned **IM15** Notes: Repair or replace the steel floorbeams due to continued delamination with up to 100% section loss to the webs and bottom flanges.

IM09 Location

A priority notification letter was sent to Mr. Steve Fromnick, Director of the Chester County Department of Facilities Management on December 2, 2010.

Flexible	65 - C743201-PAINT SUPERSTRUCTURE	1	EB	2	10/05/2007	0	No
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IM07 Status: 0 - Work not planned **IM15** Notes: Fully paint the superstructure.

IM09 Location

Flexible	61 - B744501-RPL.STEEL BRG	4	EA	2	10/07/2008	0	No
----------	----------------------------	---	----	---	------------	---	----

IM07 Status: 0 - Work not planned **IM15** Notes: Replace steel bearing.

IM09 Location

5A01 SR ID: 15701504150244 **5A03** BR Key: 10683 **7A01** Inspection Date: October 28, 2010

Flexible 49 - C744602-RPR.STEELGIRDER 2 EA 1 10/07/2008 0 No

IM07 Status: 0 - Work not planned

IM15 Notes: Repair or replace the steel girders due to continued delamination and up to 100% section loss to the bottom flanges.

IM09 Location

A priority notification letter was sent to Mr. Steve Fromnick, Director of the Chester County Department of Facilities Management on December 2, 2010.

Flexible 40 - RDPVMT-PATCH/RAISE PAVEMENT 15 SY 3 10/07/2008 0 No

IM07 Status: 0 - Work not planned

IM15 Notes: Patch and seal the approach pavement.

IM09 Location

Flexible 17 - RLGSTRM-RPR/RPL.STR.MTD.G.R. 91 LF 1 10/21/2009 0 No

IM07 Status: 0 - Work not planned

IM15 Notes: Install standard structure mounted guiderail to protect the fracture critical through girders.

IM09 Location

A priority notification letter was sent to Mr. Steve Fromnick, Director of the Chester County Department of Facilities Management on December 2, 2010.

Flexible 70 - RDLDSGN-RPL.LOAD LIMIT SIGN 4 EA 0 04/15/2011 0 No

IM07 Status: 2 - Work planned/Contr

IM15 Notes: Replace 12 ton signs with 6 ton signs at approaches and advance intersections.

IM09 Location

5A01

SR ID: 15701504150244

5A03

BR Key: 10683

7A01

Inspection Date: October 28, 2010

Current Inspection

7A03 Primary Type: R - Regular (routine)

7A06 Types of Inspections Performed:

NBI	Underwater	Element	Fracture Critical	Other Special
Yes	No	Yes	No	No

Inspection Man Hours

6B26	NBI Crew:	21.00	6B30	Underwater:	0.00
6B28	Fracture Critical:	0.00	6B29	Other 1:	11.00
6B27	Crane:	0.00	6B31	Other 2:	0.00

Inspection Costs (Entered to nearest dollar)

6B32	Engineering:	1,086	6B33	Rigging:	0
			6B34	Office:	1,195

Special Equip Used:

6B12	Temperature:	64.0	6B09	Weather:	1 - Clear
6B03	Inventory Review Recommended:	No			

Change Notes:

Inspection Team

7A05	Inspected By:	8 - Consulting Firm
7A02	Team Leader:	McCormick Taylor, In Payne McAleer
6B23	Team Member:	MMK
6B24	Hired By:	1
6B25	Insp Contract Num:	E02107
2A02	Inspection Notes:	No ACM observed.

SCBI recalculated on November 4, 2010 to account for current site conditions. SCBI = 3

USGS EF = 3.

Item 4A08 is based on the calculated EF = 3.

5A01

SR ID: 15701504150244

5A03

BR Key: 10683

7A01

Inspection Date: October 28, 2010

Next Inspection

7A14

Next Inspection By: 8 - Consulting Firm

6B20

Next Insp Type: I - Interim (special)

Schedule

Insp Types	7A07 Required	7A09 Frequency	7A10 Next Date
NBI	----	24	October 29, 2012
Fractical Critical	No	0	January 01, 1901
Underwater	No	0	January 01, 1901
Other Special	Yes	6	April 29, 2011
Element	----	0	January 01, 1901
Crane	----		6B18 January 01, 1901

6B01

Special InspType:

Estimated Inspection Man Hours

7A12

NBI Crew: 21.00

7A15

Fracture Critical: 0.00

7A13

Crane: 0.00

7A17

Underwater: 0.00

7A16

Other 1: 12.00

7A18

Other 2: 0.00

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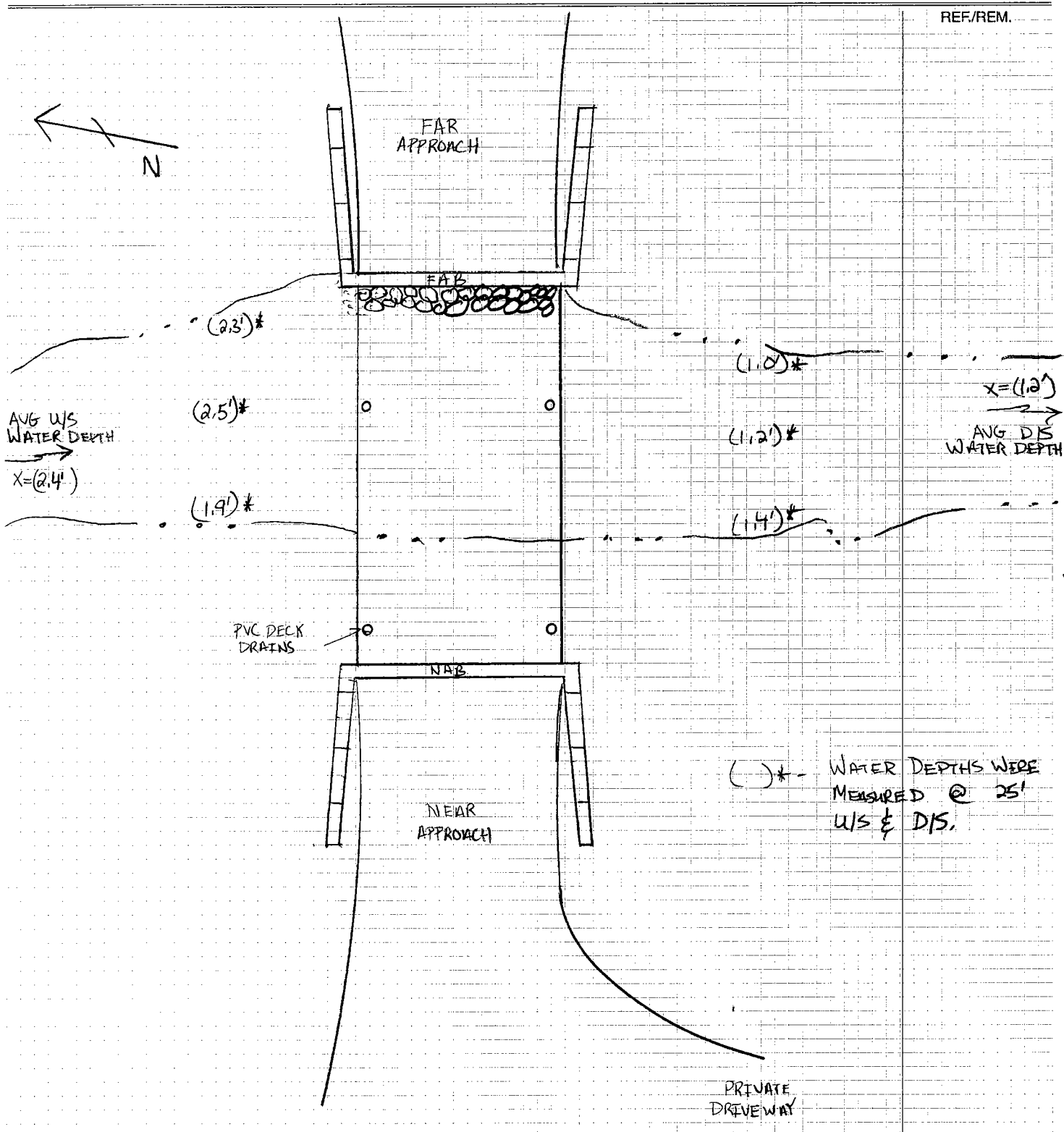
PROJECT BMS No. 15 7015 0415 0244 JOB NO. 5317-01-6 SHEET NO. 1 OF 4

LOCATION Hadfield Road over Beaver Creek

SUBJECT Plan View (N.T.S.)

DESIGNED BY MMK DATE 10-28-10 CHECKED BY JSP DATE 10-28-10

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____



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PROJECT BMS No. 15 7015 0415 0244 JOB NO. 5317-01-01 SHEET NO. 2 OF 4

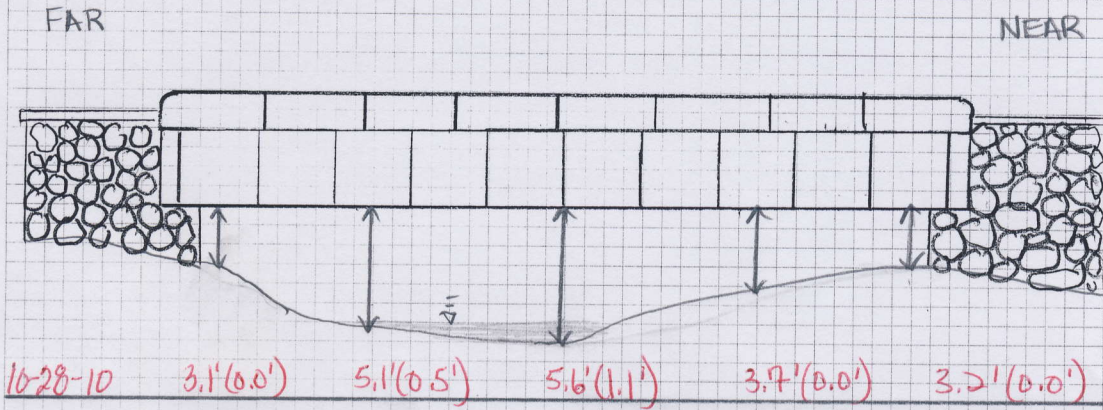
LOCATION Hedfield Road over Beaver Creek

SUBJECT Upstream Elevation (N.T.S.)

DESIGNED BY MMK DATE 10-28-10 CHECKED BY JSP DATE 10-28-10

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

REF./REM.



() WATER DEPTHS

McCormick Engineers & Planners Since 1946 Taylor

PROJECT BMS No. 15 7015 0415 0244 JOB NO. 5317-01-01 SHEET NO. 3 OF 4

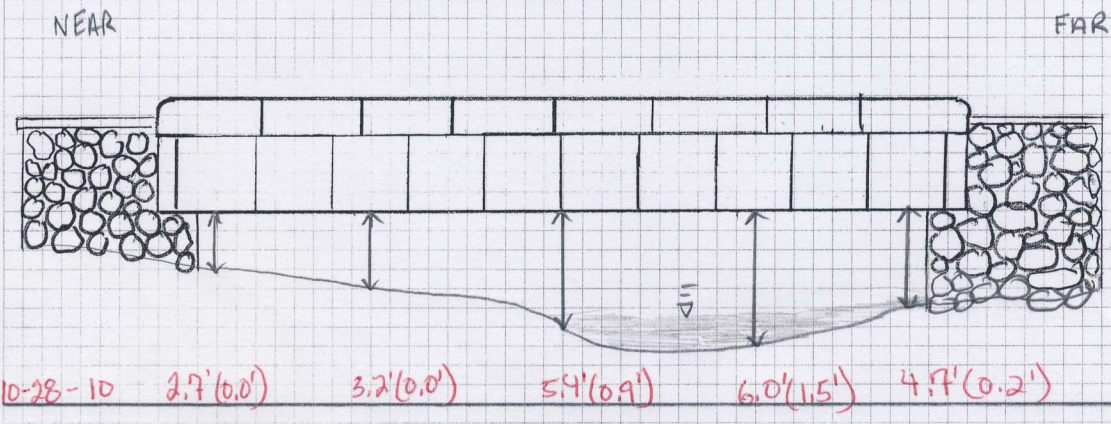
LOCATION Hedfield Road over Beaver Creek

SUBJECT Downstream Elevation (N.T.S.)

DESIGNED BY MMK DATE 10-28-10 CHECKED BY JSP DATE 10-28-10

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

REF./REM.

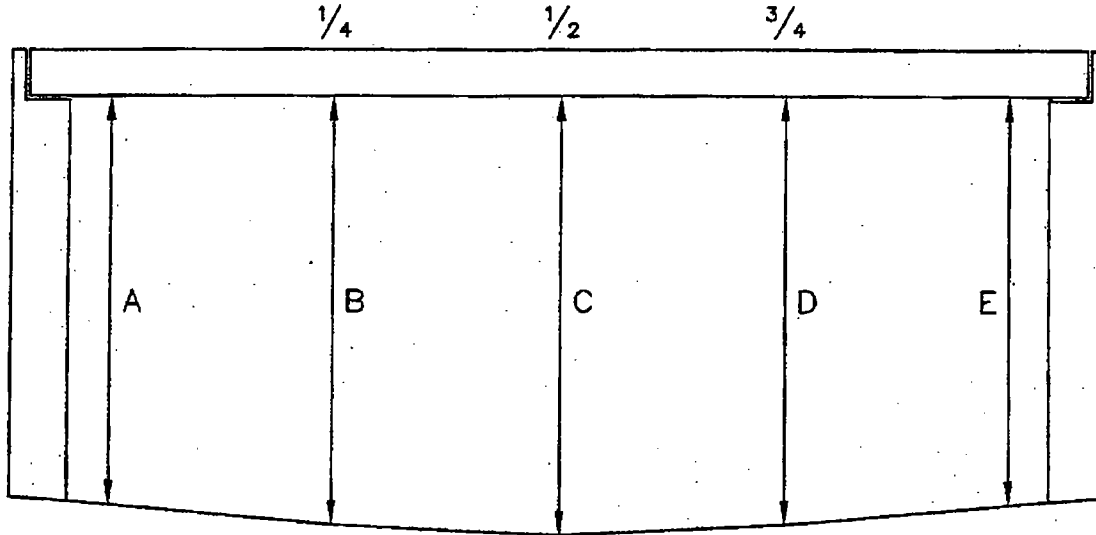


() WATER DEPTHS

McCormick Engineers & Planners Since 1946 Taylor

PROJECT BMS No. 15 7015 0415 0244 JOB NO. 5319-01-01 SHEET NO. 4 OF 4
 LOCATION Hadfield Road over Beaver Creek
 SUBJECT Cross Section
 DESIGNED BY MMK DATE 10-28-10 CHECKED BY JSP DATE 10-28-10
 REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

REF/REM.



CROSS SECTION SCALE: N.T.S.

Left Elevation		Upstream									
Year		2010									
FAR	A	3.1'(0.0')									
	B	5.1'(0.5')									
	C	5.6'(1.1')									
	D	3.7'(0.0')									
NEAR	E	3.2'(0.0')									
Right Elevation		Downstream									
Year		2010									
NEAR	A	2.7'(0.0')									
	B	3.2'(0.0')									
	C	5.4'(0.9')									
	D	6.0'(1.5')									
FAR	E	4.7'(0.2')									

() WATER DEPTHS

Hedfield Road

over

Beaver Creek

SHEET NO. 1 of 1
JOB NO. 5317-01-01
BY: MMK DATE: 10-28-10
BY: JSP DATE: 10-28-10

BMS NO. 15 7015 0415 0244

APPROACH CORNER

IA02

2222

MAINT. PRIORITY 1222

DESCRIPTION	CIRCLE LOCATION	LEFT	NEAR	RIGHT	LEFT	FAR	RIGHT
-------------	-----------------	------	------	-------	------	-----	-------

(check if applicable) Trailing end of One-Way Road _____ Trailing end of Divided Road _____

TRANSITION: Height: -

(circle) Length: 25' <25' w/ Restriction <25' w/ No Restriction None

(circle) Type: Standard 2SC 2S Other: None

(circle) Offset Brackets: Steel Timber Plastic None

(check if present) Rub Rail _____ Spacer Tube _____ Nested First _____

(check if applicable) Transition Guiderail is not provided ✓
(special notes) none provided

APPROACH: Height: -

(circle) Length: 25' <25' w/ Restriction <25' w/ No Restriction None

(circle) Type: Standard 2SC 2S Other: None

(circle) Offset Brackets: Steel Timber Plastic None

(check if present) Rub Rail _____ Restriction _____ (Describe) _____

(check if applicable) Approach Guiderail is not provided ✓
(special notes) none provided

END: (circle) Continuous (>87.5' from Bridge) Turned Down RC-52 Boxing Glove

(circle) BCT (Steel Posts) BCT (Timber Posts) None (or Blunt End)

(circle) ET2000 Impact Attenuator Buried in Embankment

(check if applicable) In Clear Zone _____ Out of Clear Zone _____ @ Restriction _____
(special notes) none provided

DECK GEOMETRY 3 POSTED SPEED LIMIT 25mph Non NHS ✓ NHS _____

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



NEAR ADVANCE POSTING
West, At Zynn Road Intersection

The advance weight limit posting is slightly leaning but otherwise in good condition.



FAR ADVANCE POSTING
East, At Bondsville Road Intersection

All required signs are in place with no problems noted.

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



NEAR APPROACH

West

All required signs are in place with no problems noted.



FAR APPROACH

East

All required signs are in place with no problems noted.

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



**UPSTREAM (LEFT)
ELEVATION**
North



**DOWNSTREAM (RIGHT)
ELEVATION**
South

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



UPSTREAM CHANNEL
Looking North (Left)



DOWNSTREAM CHANNEL
Looking South (Right)

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



NEAR ABUTMENT
West

The stone masonry stem wall is in overall good condition with no problems noted.



FAR ABUTMENT
East

The stone masonry stem wall is in overall good condition and is partially protected by rip-rap with minor scour of the streambed in front of the rip-rap.

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



**GENERAL VIEW OF THE
UNDERSIDE OF DECK AND
SUPER STRUCTURE**

Looking Back

The deck is in overall poor condition due to map cracking with leaching and stalactites at the cracks. There are numerous patched spalls adjacent to the girders and spalling along the right girder.



**REINFORCED CONCRETE
DECK, BAY 5**

Right Girder, Looking Downstream

The concrete patch adjacent to the far face of Floorbeam 5 is intact with no problems noted.

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



DECK UNDERSIDE, BAY 6
Right Girder, Looking Downstream

There is a 2' long x 8" wide x 1" deep spall adjacent to the right girder and the surrounding concrete is wet and delaminated.



DECK UNDERSIDE, BAY 9
Looking Upstream

Typical hairline to 1/16" wide random cracking with efflorescence throughout.

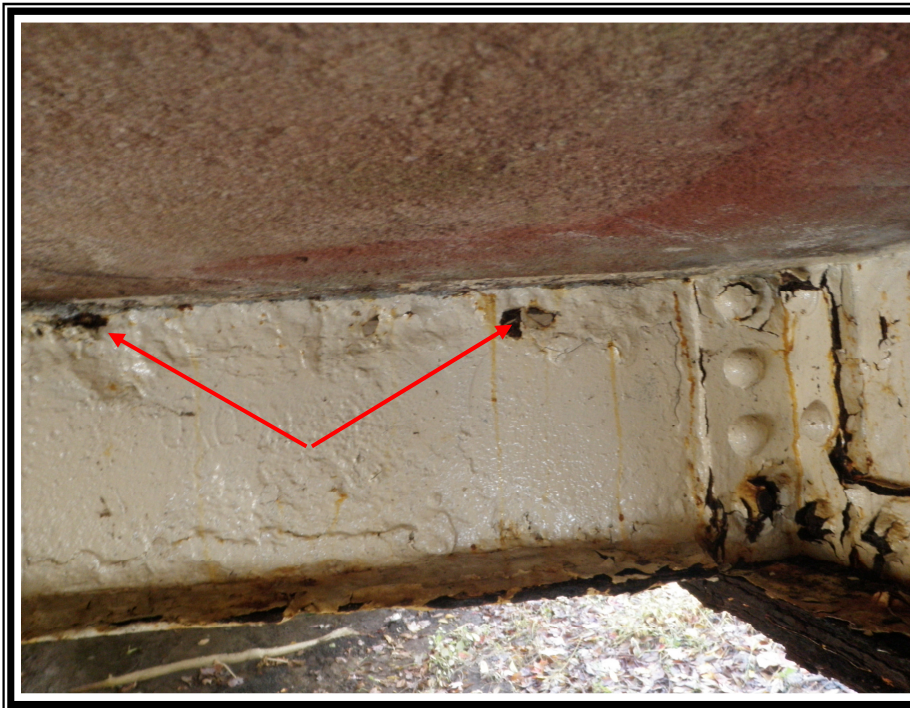
BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



NEAR END FLOORBEAM

Left Side

There is a 5" long x 1" high area exhibiting 100% section loss to the web adjacent to the bottom flange.



FLOORBEAM 4

Far Face, Looking Back

There are two 1" square areas of 100% section loss to the web of the beam adjacent to the top flange. The web between the holes exhibits prior section loss and pitting. The first hole is within 1' of the connection with the left girder.

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



FLOORBEAM 4 BOTTOM FLANGE

Far Face, Looking Upstream

The bottom flange width and thickness are reduced due to corrosion and section loss.



FLOORBEAM 7

Near Face, Looking Upstream

There is severe corrosion along the bottom flange with typical 1/8" section loss and portions corroded 100% of the flange thickness.

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



FLOORBEAM 8

Near Face, Looking Ahead

There are three areas of 100% section loss through the web of the floorbeam adjacent to the bottom flange measuring 5" long x 1/2" high.



LEFT GIRDER BOTTOM FLANGE

Near Left Bearing

The girder bottom flange adjacent to the near left bearing stiffener exhibits 100% section loss for the full width of the bottom leg of the interior angle for a length of 3".

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



**RIGHT GIRDER BOTTOM
FLANGE**

Near Right Bearing

The girder bottom flange adjacent to the near right bearing stiffener exhibits 100% section loss for half the width of the bottom leg of the interior angle.



**RIGHT GIRDER BOTTOM
FLANGE**

Looking Back

Heavy corrosion to the bottom flange with up to 15% section loss is typical. Additionally, there is approximately 30% section loss to the rivet heads and the bottom flange effective width is 11 – 1/4” wide compared to the original 12” wide. The interior face of the girder below the deck is saturated with severe delamination.

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



FLOORBEAM 10 & RIGHT GIRDER CONNECTION
Fracture Critical Detail

There is severe corrosion of the flange, rivets, and girder webs with no cracking noted.



FLOORBEAM 7 & RIGHT GIRDER CONNECTION
Looking Downstream

The paint system has failed throughout the underside of the superstructure and the steel is wet and delaminated.

BMS # 15 7015 0415 0244
Hadfield Road over Beaver Creek



RIGHT GIRDER

Bay 1

There is severe corrosion of the flange, rivets, and girder web, typical.



GENERAL VIEW OF THE WEARING SURFACE OVERLAY

Looking Ahead

The bituminous pavement is in overall satisfactory condition with leaves and debris holding moisture along the curbs.

LOAD RATING SUMMARY FORM

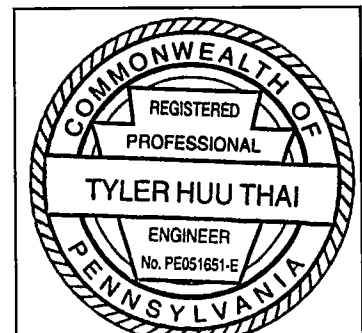
Done By: THK Date: 3/21/11
 Checked By: THT Date: 3/22/11

Structure ID (5A01): 15-7015-0415-0244 Inspection Date (7A01): 10/28/10
 Facility Carried (5A08): HADFIELD ROAD
 Feature Intersected (5A07): BEAVER CREEK
 Structure Type (6A26 - 6A29): NON-COMPOSITE STEEL THROUGH GIRDER WITH FLOOR BEAM
 Spans / Members Analyzed: 1 SPAN / THROUGH GIRDER & FLOOR BEAM
 Analysis Method: LFD
 PennDOT Program / Version: BAR 7.13.0.0

VEHICLE	IR (Factor / TONS)	OR (Factor / TONS)	CONTROLLING MEMBER / SPAN		LOAD EFFECT (M/V)	
			IR	OR	IR	OR
H20	$\frac{0.19}{3.9}$	$\frac{0.32}{6.5}$	FLOOR BEAM	FLOOR BEAM	M	M
HS20	$\frac{0.19}{7.0}$	$\frac{0.32}{11.6}$	FLOOR BEAM	FLOOR BEAM	M	M
ML80	$\frac{0.30}{11.0}$	$\frac{0.50}{18.4}$	FLOOR BEAM	FLOOR BEAM	M	M
TK527	$\frac{0.30}{12.0}$	$\frac{0.50}{20.0}$	FLOOR BEAM	FLOOR BEAM	M	M

Comments/Assumptions*: FLOOR BEAM WEB ASSUMED $\frac{1}{4}$ " SECTION LEFT IN
WEB, BOTTOM FLANGE WIDTH HAS $\frac{1}{8}$ " SECTION LOSS AND 4"
WIDTH REMAIN. (BEAM #4).
BRIDGE SHOULD BE POSTED FOR 6 TONS.

* Identify the amount, location and member with the controlling section loss, wearing surface thickness, and other significant information. These comments should also be recorded in BMS2 item IR19



[Signature] 3/22/2011

PROJECT 15 7015 0415 0244 JOB NO. _____ SHEET NO. 1 OF 1
 LOCATION Hadfield Road over Beaver Creek
 SUBJECT Previous Load Rating Overview
 DESIGNED BY MDM DATE 10/23/08 CHECKED BY _____ DATE _____
 REVISED BY THK DATE 3/21/11 BACK CHECKED BY THT DATE 3/22/11

REF/REM.

From 2008 NBIS Inspection Report: (2011 UPDATE)

Plate girders:

- ✓ 15% section loss at bottom flanges with heavy corrosion (not applied in 2001, ^{∴ Apply in 2011})
- ✓ 15% section loss at webs with moderate corrosion. (same as above)
- ✓ 30% section loss to rivet heads.
- ✓ Bottom flange effective width = 11.25" (originally 12") ^{Use 11.00" (conservative)}
- Bottom flange @ abut = 100% section loss in ins angle (say OK - sheer)

Floor beams:

- 1/8" section loss at bottom flanges (not applied in 2001, ^{∴ apply in 2011})
- 1/16" section loss at webs (2001 used $t_w = 3/16"$; ^{3/16"} local web thickness ^{∴ use 1/4" t_w per 2001 inspection})
- Bottom flange width = 5" (originally 5.25") ^{2001 inspection measurement/findings.}
- Floor beam 8 has (3) holes in the web (5" x 1/2") located 7" from the left girder just above the bottom flange.
- Isolated locations of the floorbeams have bottom flange width of 4"

↑ SEE

From Load Rating Analysis done in August 2008: Apply in 2011.

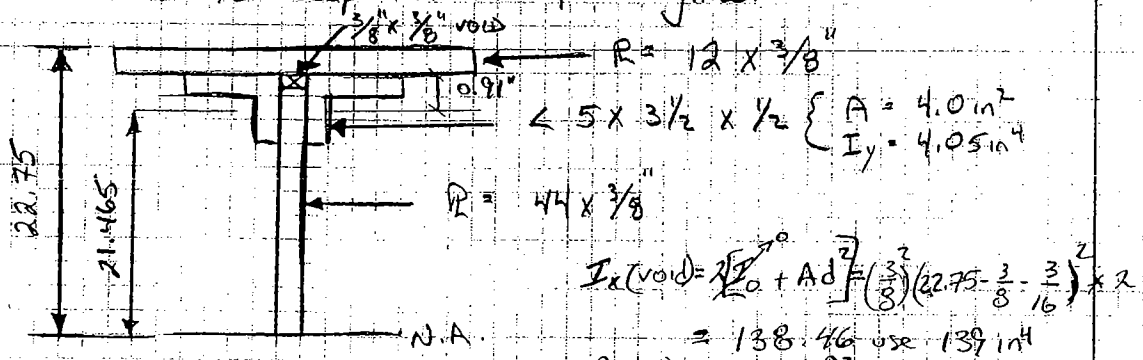
- 1/16" section loss was accounted for in the angles (not applied in 2001) connecting the webs and bottom flanges of the plate girders.
- ✓ The plate girder bottom flange width was taken as 11" <sup>$t_w = 1/16"$ S.L.
 $t_f = 1/16"$ S.L.</sup>
- ✓ The floorbeam bottom flange width was taken as 4" ^{$t_f = 1/8"$ S.L.}
- Holes and section loss in the floorbeam webs were accounted for. (2001 used $t_w = 3/16"$, use $t_w = 1/4"$ Rr 2011)

Conclusion: Load Rating Review not Recommended due to conservative assumptions made in 2001 analysis

PROJECT BR # 244 JOB NO. 4618 DATE 8/1/01
 LOCATION Chester County
 SUBJECT Bridge Rating (BAR 7.4)
 SHEET NO. 1 OF 1
 COMPUTED BY JJV CHECKED BY DW

Bridge Data (Through Plate Girder) REF/REM.

- Steel Girder - Floorbeam - Concrete Deck (GFF)
- SPAN
 Girder = 45' 6" long by g. SPACING = 18'
 Floor = 18' 0" SPACING = 4'-8" INT
~~4'-10"~~ ~~4'-8"~~
 4'-1" END
- DECK
 6" CONCRETE
 4 1/2" - 5" BC Wearing Course
- Overall width = 18' 0" # to # of Girders
 R/W width = 16' 0"
- Girder
 45 1/2" deep rivetted plate girder



$$I_x(\text{void}) = \frac{1}{12} b d^3 + A d^2 = \frac{1}{12} \left(\frac{3}{8}\right) \left(\frac{3}{8}\right)^3 + 2 \left(\frac{3}{8}\right) \left(\frac{3}{8}\right)^2 \left(22.75 - \frac{3}{8} - \frac{3}{16}\right)^2 \times 2$$

$$= 138.46 \text{ use } 139 \text{ in}^4$$

$$A(\text{void}) = 2 \times \left(\frac{3}{8}\right)^2 = 0.28 \text{ in}^2$$

Full Section: $I_x = 14773 \text{ in}^4$
 $A = 41.78 \text{ in}^2$ } From Acad.

There is a gap between the web plate and flange. To be consistent w/ load rating section properties subtract this area from I_x and A values.

$$I_x = 14634 \text{ in}^4$$

$$A = 41.5 \text{ in}^2$$

- 139
 - .28

MTA

McCormick, Taylor & Associates, Inc.
Engineers and Planners

PROJECT BR #244 JOB NO. 4618 DATE 8/1/01

LOCATION Chester County

SUBJECT BRIDGE RATINGS (BAR 7.9)

SHEET NO. 2 OF

COMPUTED BY JLV CHECKED BY DW

- Floor beams

JOIST 12I 40 See attached property sheet from AISC "Iron & Steel Beams 1873 to 1952" Load Test Report (1991)

ENDS C12 X 20.7 Use section properties from AISC "Manual of Steel Construction" 2nd Edition Load Test Report (1991)

Bridge Cross Section & Loading

- Shear use 0.5 (1/2 axle)
- Moment - AASHTO 3.23.3.5 (1992) (1996)
use $\frac{1}{2} \left(\frac{5}{6.0} \right) = \frac{4.67}{6(2)} = 0.389$
- Deflection $\frac{1}{2(\text{girders})} = 0.5$

- Dead load DL1

• Add 10% weight of girder for stiffeners and connections

$$DL1 = \frac{41.5 \text{ m}^2}{144} \times \frac{490 \text{ lb}}{1000} \times 0.10 = 0.014 \text{ KLF}$$

$$\text{RAILING} = \text{USE } 0.010 \text{ KLF} = 0.010 \text{ KLF}$$

$$\Sigma = 0.024 \text{ KLF}$$

- Dead load DL2

Curb $\frac{12 \times 12}{144} \times 0.150 \text{ K/ft}^3 = 0.150 \text{ KLF} \checkmark$

WS $\frac{5''}{12} \times 16' \times 0.140 \text{ K/ft}^3 \times \frac{1}{2} = 0.467 \text{ KLF}$
 $\Sigma = 0.617 \text{ KLF}$

REF/REM.



McCormick, Taylor & Associates, Inc.
Engineers and Planners

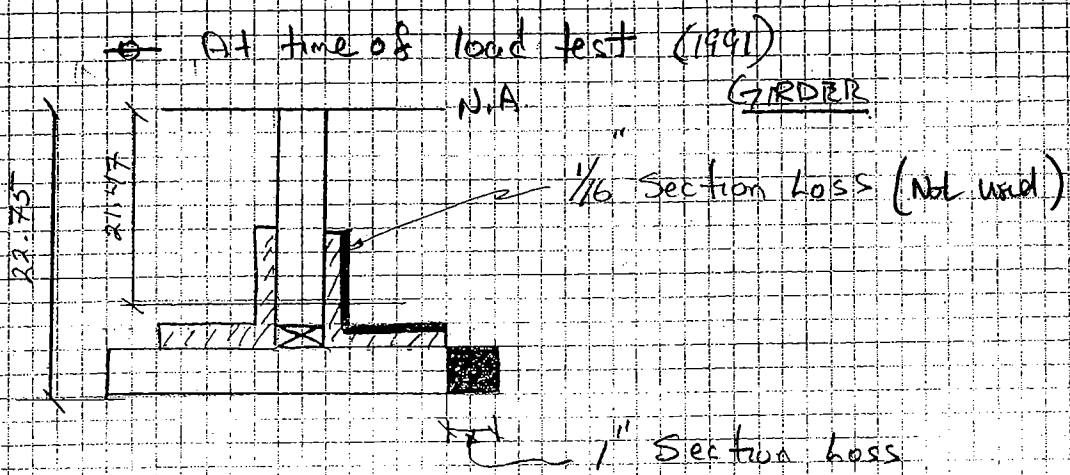
5

4

PROJECT BR #244 JOB NO. 4618 DATE 8/1/07
LOCATION Chester County
SUBJECT Bridge Rating (BAR 7.8)
SHEET NO. 3 OF
COMPUTED BY JJV CHECKED BY DW

	REF./REM.
USE $f_c = 2500 \text{ psi}$, $n = 12$	'Manual For Condition Evaluation of Bridges'
$E_s = 30 \text{ ksi}$	

PROJECT BR # 244 JOB NO. 4618 DATE 8/3/01
 LOCATION Chester County
 SUBJECT BRIDGE PATING (BAR 7.9)
Deteriorated Sections - SHEET NO. 4 OF
 COMPUTED BY JJV CHECKED BY DAW THT 3/22/11



$I_x = 14257 \text{ in}^4$
 $A = 40.72 \text{ in}^2$ } From Acad. drawing (attached)

Time of Inspection 7/24/01

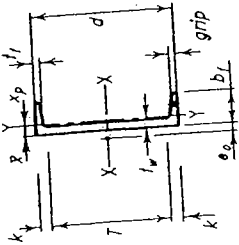
- Interior Floor beam (General $3/16$ " section loss in web) ⇒ use ✓ OK
 t.w. $1/4$ "

CRITICAL ⇒ FLOORBEAM #4 - SECTION LOSS

- (SHEAR) (1) $1/2$ " ϕ hole in web - 41'-5" from right girder
- (BONDRE) ✓ (2) $3/16$ " web thickness 7'-3" from right girder ← Local S.L.
- ✓ ✓ (3) 4" Bottom flange width (thin edge)
 41'-9" from left girder
- (SHEAR) OK (4) Holes in web near top
 - $3 1/2$ " x 1" 2'-5" from left girder
 - 1" x 1" 1'-3" " " "

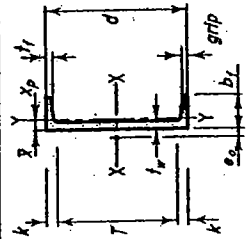
50 CHESCO BR # 244
FLOOR BEAM - ENDS

CHANNELS
AMERICAN STANDARD
Dimensions



Designation	Area A	Depth d	Web		Flange		Distance		Max. Fag-tener
			Thickness tw	tw/2	Width bf	Thickness tf	T	k	
C15x50	14.7	15.00	3/8	3/8	3.716	3/4	12 1/2	1 1/8	1
x40	11.8	15.00	1/2	3/8	3.520	3/2	12 1/2	1 1/8	1
x33.9	9.96	15.00	3/8	3/8	3.400	3/8	17 1/8	1 1/8	1
C12x30	8.82	12.00	1/2	3/8	3.170	3/8	9 3/4	1 1/8	7/8
x25	7.35	12.00	3/8	3/8	3.047	3	9 3/4	1 1/8	7/8
x20.7	6.09	12.00	3/8	3/8	2.942	3	9 3/4	1 1/8	7/8
C10x30	8.82	10.00	1/2	3/8	3.033	3	8	1 1/8	3/4
x25	7.35	10.00	3/8	3/8	2.886	2 3/8	8	1 1/8	3/4
x20	5.88	10.00	3/8	3/8	2.739	2 3/4	8	1 1/8	3/4
x15.3	4.49	10.00	1/2	3/8	2.600	2 5/8	8	1 1/8	3/4
C9x20	5.88	9.00	1/2	3/8	2.648	2 5/8	7 1/8	1 1/8	3/4
x15	4.41	9.00	3/8	3/8	2.485	2 1/2	7 1/8	1 1/8	3/4
x13.4	3.94	9.00	3/8	3/8	2.433	2 3/8	7 1/8	1 1/8	3/4
C8x18.75	5.51	8.00	1/2	3/8	2.527	2 1/2	6 1/8	1 1/8	3/4
x13.75	4.04	8.00	3/8	3/8	2.343	2 3/8	6 1/8	1 1/8	3/4
x11.5	3.38	8.00	1/2	3/8	2.260	2 1/4	6 1/8	1 1/8	3/4
C7x12.25	3.60	7.00	3/8	3/8	2.194	2 1/4	5 1/4	7/8	3/8
x9.8	2.87	7.00	3/8	3/8	2.090	2 1/8	5 1/4	7/8	3/8
C6x13	3.83	6.00	7/8	3/8	2.157	2 1/8	4 3/8	13/16	5/8
x10.5	3.09	6.00	3/8	3/8	2.034	2	4 3/8	13/16	5/8
x8.2	2.40	6.00	3/8	3/8	1.920	1 7/8	4 3/8	13/16	5/8
C5x9	2.64	5.00	3/8	3/8	1.885	1 7/8	3 1/2	3/4	5/8
x6.7	1.97	5.00	3/8	3/8	1.750	1 3/4	3 1/2	3/4	5/8
C4x7.25	2.13	4.00	3/8	3/8	1.721	1 3/4	2 5/8	1 1/8	5/8
x5.4	1.59	4.00	3/8	3/8	1.584	1 5/8	2 5/8	1 1/8	5/8
C3x6	1.76	3.00	3/8	3/8	1.596	1 5/8	1 1/2	1 1/8	5/8
x5	1.47	3.00	3/8	3/8	1.498	1 1/2	1 1/2	1 1/8	5/8
x4.1	1.21	3.00	3/8	3/8	1.410	1 1/8	1 1/2	1 1/8	5/8

CHANNELS
AMERICAN STANDARD
Properties



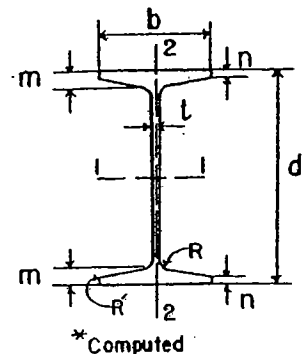
Nominal Wt. per ft	Shear Center Location e0	PNA Location Xp	Axis X-X				Axis Y-Y			
			I	Z	S	r	I	Z	S	r
50	0.798	0.488	404	68.2	53.8	5.24	11.0	8.17	3.76	0.867
40	0.777	0.390	349	57.2	46.5	5.44	9.23	6.87	3.37	0.866
33.9	0.787	0.330	315	50.4	42.0	5.62	8.13	6.23	3.11	0.904
30	0.674	0.366	162	33.6	27.0	4.29	5.14	4.33	2.06	0.763
25	0.674	0.305	144	29.2	24.1	4.43	4.47	3.84	1.88	0.780
20.7	0.695	0.252	129	25.4	21.5	4.61	3.88	3.49	1.73	0.799
30	0.649	0.439	103	26.6	20.7	3.42	3.94	3.78	1.65	0.669
25	0.617	0.366	91.2	23.0	18.2	3.52	3.36	3.19	1.48	0.676
20	0.606	0.292	78.9	19.3	15.8	3.66	2.81	2.71	1.32	0.682
15.3	0.634	0.223	67.4	15.8	13.5	3.87	2.28	2.35	1.16	0.713
20	0.583	0.325	60.9	16.8	13.5	3.22	2.42	2.47	1.17	0.642
15	0.586	0.243	51.0	13.5	11.3	3.40	1.93	2.05	1.01	0.681
13.4	0.601	0.217	47.9	12.5	10.6	3.48	1.76	1.95	0.962	0.669
18.75	0.565	0.343	44.0	13.8	11.0	2.82	1.98	2.17	1.01	0.599
13.75	0.553	0.251	36.1	10.9	9.03	2.99	1.53	1.73	0.854	0.615
11.5	0.571	0.199	32.6	9.55	8.14	3.11	1.32	1.58	0.781	0.625
12.25	0.525	0.255	24.2	8.40	6.93	2.60	1.17	1.43	0.703	0.571
9.8	0.540	0.203	21.3	7.12	6.08	2.72	0.968	1.26	0.625	0.581
13	0.514	0.317	17.4	7.26	5.80	2.13	1.05	1.36	0.642	0.525
10.5	0.499	0.255	15.2	6.15	5.06	2.22	0.866	1.15	0.564	0.529
8.2	0.511	0.198	13.1	5.13	4.38	2.34	0.693	0.993	0.492	0.537
9	0.478	0.282	8.90	4.36	3.56	1.83	0.632	0.918	0.450	0.489
6.7	0.484	0.217	7.49	3.51	3.00	1.95	0.479	0.763	0.378	0.493
7.25	0.459	0.264	4.59	2.81	2.29	1.47	0.493	0.697	0.343	0.450
5.4	0.457	0.241	3.85	2.26	1.93	1.56	0.319	0.569	0.283	0.449
6	0.455	0.291	2.07	1.72	1.38	1.08	0.305	0.544	0.268	0.416
5	0.438	0.242	1.85	1.50	1.24	1.12	0.247	0.466	0.233	0.410
5	0.436	0.284	1.66	1.30	1.10	1.17	0.197	0.401	0.202	0.404

X 6

12" AMERICAN STANDARD BEAMS

REFERENCES, SEE COLUMN (1) AND PAGE 4

CP 1889	6	29	2,3,4,7,10,11,12,	B66
CP 1890	C 1916	PH 1912	13,14,15,16,17,18,	C 1921
5	C 1917	PH 1915	19,20,21, 23,	C 1923
C 1913	C 1919	PH 1923	24,25,26,27,28,	
C 1915	C 1920	31	30,32,33,35	
9	8	PH 1929	See Page 21	
GIL 1946	IL 1914	PH 1931	22	
GIL 1948	IL 1925	34	NJ 1889	
US 1950	IL 1932	K 1950	NJ 1891	



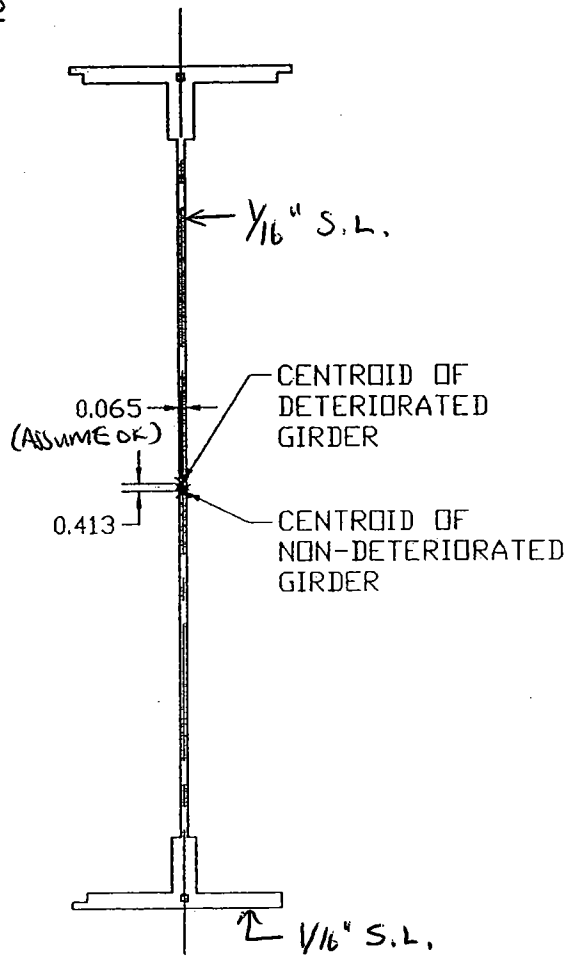
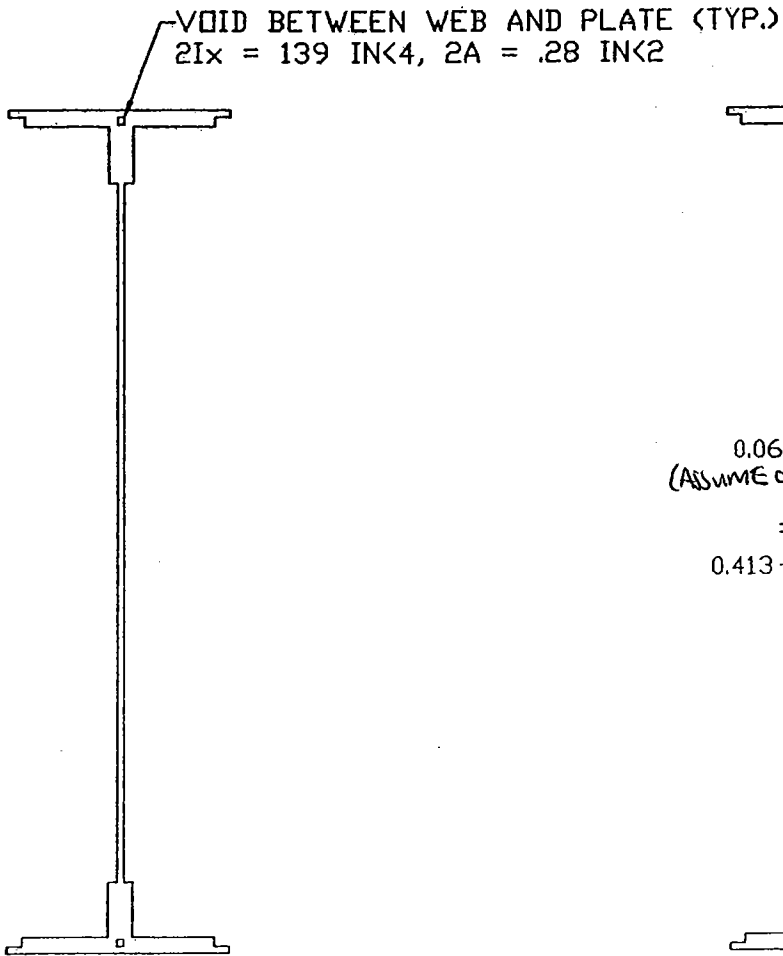
COL. (1)	WEIGHT		DEPTH d In.	FLANGE		WEB THICK t In.	DIMENSIONS				SLOPE INSIDE FLANGE %	AXIS 1-1			AXIS 2-2		
	PER FOOT Lb.	AREA Sq. In.		WIDTH b In.	THICK t In.		m	n	R	R'		I	S	r	I	S	r
	In.	In.		In.	In.		In.	In.	In.	In.		In. ⁴	In. ³	In.	In. ⁴	In. ³	In.
4,10,13,17,19,21	40.0	11.84	12.0	5.250	.460	.859	.46	.56	.276	16 2/3	268.9	44.8	4.77	13.81	5.3	1.08	
23,24	40.0	11.8	12.0	5.50	.39	.88	.50	.50	-	14.9	281.3	46.9	4.90	16.8	6.11	1.20	
27	40.0	11.77	12.0	5.25	.42	.88	.48	.52	.24	16 2/3	274.68	45.8	4.83	14.26	5.43	1.10	
28	40.0	11.76	12.0	5.250	.460	.859	.46	.56	.276	16 2/3	268.9	44.8	4.77	13.81	5.26	1.08	
13,15	40.0	11.76	12.0	5.215	.558	.738	.35	.45	.21	16 2/3	245.9	41.0	4.57	10.95	4.2	.96	
22	40.0	11.73	12.0	5.50	.39	.91	.50	.50	-	16.0	281.3	46.9	4.90	16.76	6.09	1.20	
12,3,28	40.0	11.7	12.0	5.50	.39	.88	.50	.50	-	14.9	281.3	46.9	4.90	16.8	6.1	1.20	
26	39.4	11.6	12.0	5.25	.40	.86	.50	-	-	14.8	268.30	44.72	4.81	14.57	5.55	1.12	
2	39.0	11.5	12.0	5.425	.525	.72	.35	.50	-	15.1	247.5	41.3	4.64	12.1	4.5	1.03	
25	39.0	11.52	12.0	5.213	.553	.672	.344	.50	-	14.1	235.56	39.26	4.52	10.37	3.98	.95	
26	38.4	11.29	12.0	5.19	.53	.68	.33	-	-	15.0	233.80	38.97	4.55	10.19	3.93	.95	
16	38.0	11.2	12.0	5.468	.343	.844	.469	.50	-	14.6	265.4	44.2	4.86	15.6	5.71	1.18	
16	37.5	11.4	12.0	5.414	.508	.703	.328	.50	-	15.3	238.7	39.8	4.58	11.5	4.25	1.00	
25	36.6	10.80	12.0	5.153	.493	.672	.344	.50	-	14.1	226.92	37.82	4.58	10.07	3.91	.97	
3	36.0	10.6	12.0	5.35	.45	.72	.35	.50	-	15.1	236.7	39.5	4.73	11.53	4.3	1.04	
24	35.0	10.3	12.0	5.22	.44	.71	.34	.50	-	15.5	232.9	38.8	4.77	10.5	4.02	1.01	
4,10,13,19,21,28	35.0	10.29	12.0	5.086	.436	.738	.35	.45	.21	16 2/3	228.3	38.0	4.71	10.07	4.0	.99	
17	35.0	10.29	12.0	5.085	.436	.739	.35	.45	-	16 2/3	228.3	38.0	4.71	10.07	3.97	.99	
27	35.0	10.29	12.0	5.07	.42	.74	.35	.45	.21	16 2/3	230.95	38.5	4.74	10.01	3.95	.99	
7,9,11,12,14,20,33,34	35.0	10.20	12.0	5.078	.428	.738	.350	.45	.21	16 2/3	227.0	37.8	4.72	10.0	3.9	.99	
25	34.1	10.04	12.0	5.090	.430	.672	.344	.50	-	14.1	217.85	36.31	4.66	9.67	3.80	.98	
22	32.0	9.46	12.0	5.25	.32	.78	.38	.50	-	16.2	229.2	38.2	4.92	11.64	4.43	1.11	
12,3,28	32.0	9.4	12.0	5.25	.35	.72	.35	.50	-	15.1	222.3	37.0	4.85	10.3	3.9	1.04	
32	31.8	9.35	12.0	5.00	.35	.738	.350	.45	.21	16 2/3	217.0	36.2	4.82	9.50	3.80	1.01	
7,9,11,12,14,20,25,30,33,34,35	31.8	9.26	12.0	5.000	.350	.738	.350	.45	.21	16 2/3	215.8	36.0	4.83	9.5	3.8	1.01	
25	31.73	9.31	12.0	5.029	.369	.672	.344	.50	-	14.1	209.07	34.85	4.74	9.17	3.65	.99	
27	31.5	9.27	12.0	5.00	.35	.74	.35	.45	.21	16 2/3	218.71	36.5	4.86	9.45	3.78	1.01	
23,24	31.5	9.3	12.0	5.13	.35	.71	.34	.50	-	15.5	220.5	36.7	4.88	10.3	4.02	1.04	
17,26	31.5	9.3	12.0	5.00	.35	.739	.35	.45	-	16 2/3	215.81	36.0	4.82	9.5	3.8	1.01	
4,10,13,19,21,28	31.5	9.26	12.0	5.000	.350	.738	.35	.45	.21	16 2/3	215.8	36.0	4.83	9.50	3.8	1.01	
26	30.6	9.01	12.0	5.00	.34	.68	.33	-	-	15.0	207.9	34.65	4.80	9.00	3.60	1.00	
25	30.5	8.96	12.0	5.00	.34	.672	.344	.50	-	14.1	204.89	34.15	4.78	9.04	3.62	1.00	
16	30.0	9.1	12.0	5.218	.312	.703	.328	.50	-	15.3	211.7	35.3	4.82	10.2	3.91	1.05	
33	28.0	8.24	11.88	6.569	.314	.485	.225	.35	-	8 1/2	193.6	32.6	4.85	13.9	4.28	1.30	
6	28.0	8.15	12.0	6.000	.284	.540	.280	.26	-	9.1	199.4	33.2	4.95	12.6	4.2	1.24	
B66, 7	27.9	8.15	12.0	6.000	.284	.540	.280	.26	-	9.1	199.4	33.2	4.95	12.6	4.2	1.24	
31	27.5	8.09	12.0	5.061	.301	.662	.265	.40	.16	16 2/3	191.5	31.9	4.88	8.01	3.17	.99	
29	27.5	8.09	12.0	5.00	.255	.710	.315	.40	-	16 2/3	199.6	33.3	4.98	8.70	3.48	1.04	
5	27.5	8.04	12.0	5.000	.255	.710	.315	.40	-	16 2/3	199.6	33.3	4.98	8.7	3.5	1.04	
33	25.0	7.35	11.88	6.495	.240	.485	.225	.35	-	8 1/2	182.8	30.8	4.98	13.4	4.12	1.35	
8	25.0	7.35	12.0	5.00	.270	.570	.270	.270	-	12.7	175.5	29.2	4.89	7.30	2.92	1.00	
31	25.0	7.35	12.0	5.000	.240	.662	.265	.40	.16	16 2/3	182.7	30.5	4.99	7.60	3.04	1.02	

GIRDER

REVISED

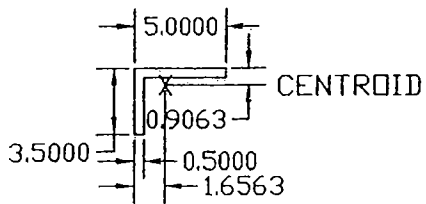
✓THT 3/22/11

8

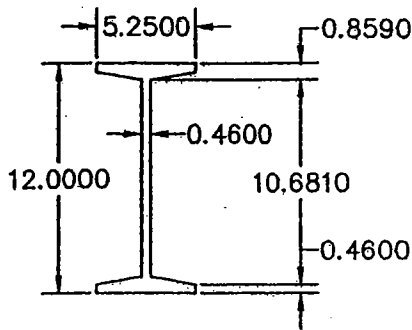


NO SECTION LOSS ASSUMED
 $I_x = 14773 - 139 = 14634 \text{ IN}^4$
 $A = 41.78 - .28 = 41.5 \text{ IN}^2$

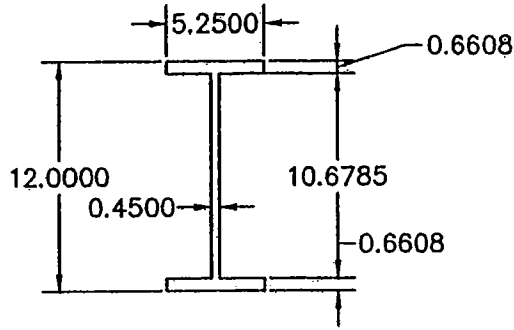
SECTION LOSS AT TIME
 OF LOAD TEST
 $I_x = 14396 - 139 = 14257 \text{ IN}^4$
 $A = 41.00 - .28 = 40.72 \text{ IN}^2$



TYPICAL FLOORBEAM SECTION
NO SECTION LOSS INCLUDED



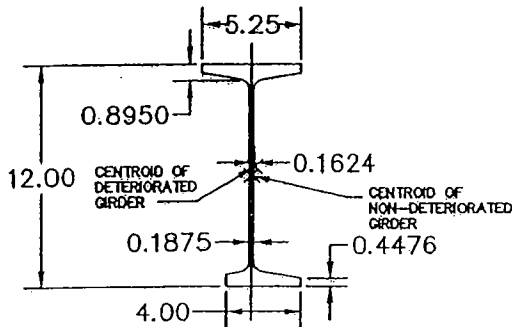
APPROX. 12 x 40 ROLLED BEAM
 $I_x = 268.9 \text{ IN}^4$
 $A = 11.84 \text{ IN}^2$



EQUIVALENT PLATE GIRDER
 $I_x = 268.9 \text{ IN}^4$
 $A = 11.74 \text{ IN}^2$

REVISED.
 V/THT 3/22/11

SECTION LOSS AT FLOORBEAM #4
 (VALUES FOR USE IN 244RATE7 COMPUTER RUN)



$I_x = 224.378 \text{ IN}^4$
 $A = 8.5182 \text{ IN}^2$

W&B THICK. CONSIDERING SECTION LOSS 0.1875 (3/16)

APPROX. AREA OF SECTION LOSS FOR FLANGE = 0.7052 IN^2

INPUT VALUES
 $I_x = 249.00 \text{ IN}^4$
 $A = 9.223 \text{ IN}^2$
 * I_x w/out CONSIDERING LOSS OF PLANGE SECTION

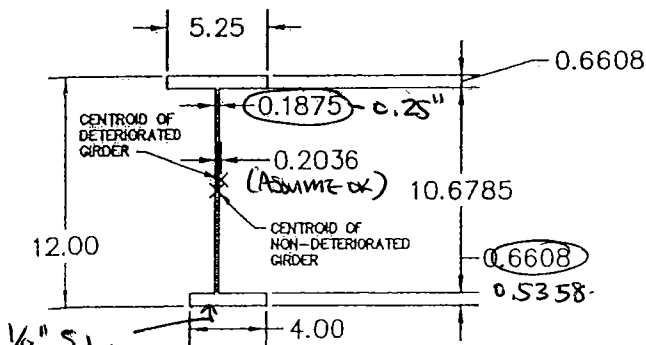
REGIONS

Area:	8.5182
Perimeter:	40.1222
Bounding box:	X: 82.8301 --- 88.0801 Y: -13.3289 --- -1.3289
Centroid:	X: 85.6175 Y: -6.8558
Moments of inertia:	X: 624.4071 Y: 62452.4604
Product of inertia:	XY: -5008.5652
Radii of gyration:	X: 8.5617 Y: 85.6248
Principal moments and X-Y directions about centroid:	I: 10.3725 along [0.0401 -0.9992] J: 224.3776 along [0.9992 0.0401]

REGIONS

Area:	9.2234
Perimeter:	42.4312
Bounding box:	X: 144.4529 --- 149.7029 Y: -13.3289 --- -1.3289
Centroid:	X: 147.0779 Y: -7.3289
Moments of inertia:	X: 744.3988 Y: 199533.2758
Product of inertia:	XY: -9942.0229
Radii of gyration:	X: 8.9837 Y: 147.0829
Principal moments and X-Y directions about centroid:	I: 13.7446 along [0.0000 -1.0000] J: 248.9895 along [1.0000 0.0000]

SECTION LOSS AT FLOORBEAM #4
 (VALUES FOR USE IN 244RATE6 COMPUTER RUN)

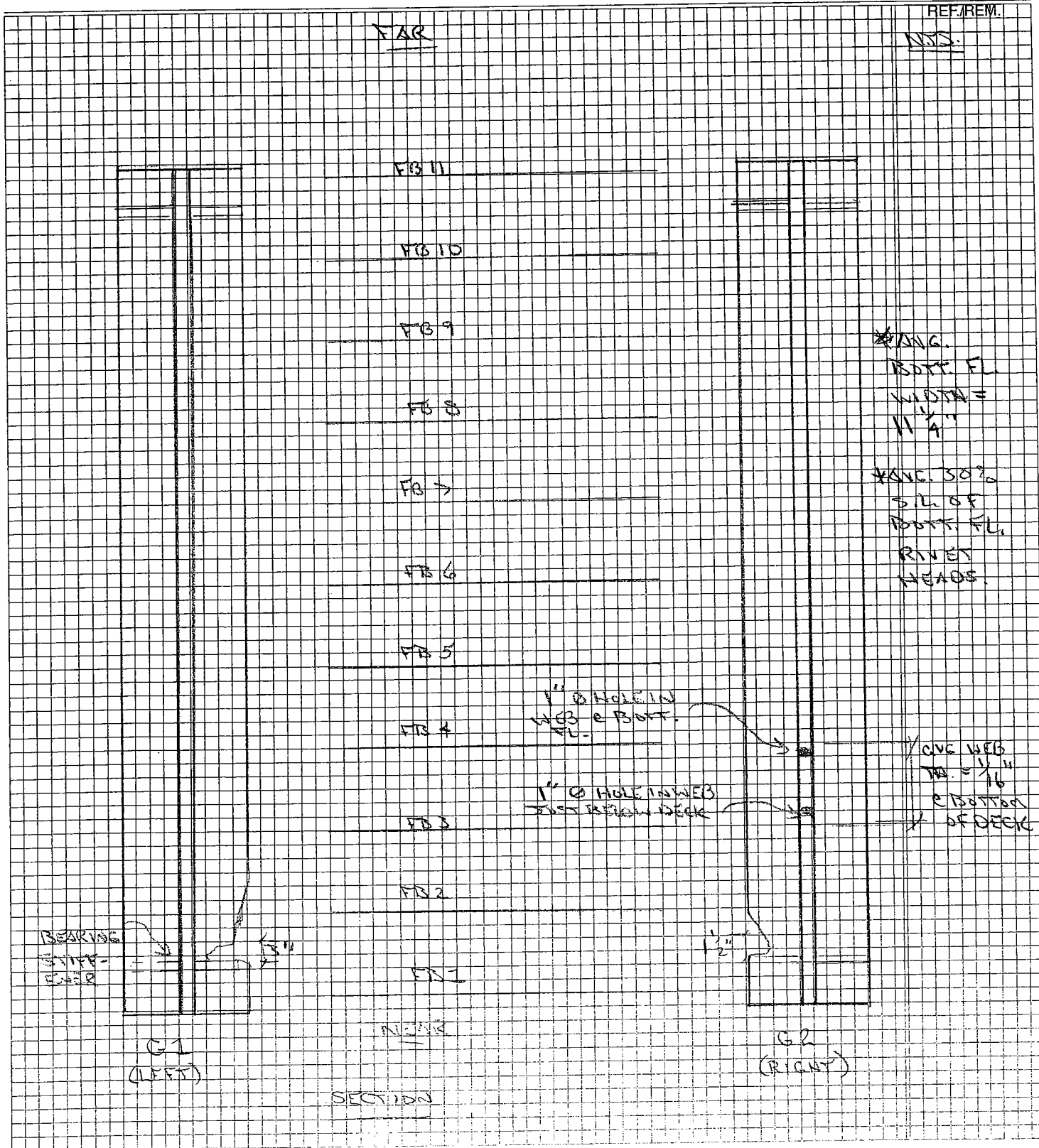


$I_x = 213.541 \text{ IN}^4$
 $A = 8.1142 \text{ IN}^2$

REGIONS

Area:	8.1142
Perimeter:	42.1250
Bounding box:	X: 115.8262 --- 121.0762 Y: -13.3289 --- -1.3289
Centroid:	X: 118.6548 Y: -6.7518
Moments of inertia:	X: 582.9056 Y: 114251.0388
Product of inertia:	XY: -6510.7957
Radii of gyration:	X: 8.4757 Y: 118.6611
Principal moments and X-Y directions about centroid:	I: 11.6649 along [0.0512 -0.9987] J: 213.5410 along [0.9987 0.0512]

PROJECT 13 7015 0413 0244 JOB NO. 5317-01 SHEET NO. 1 OF 2
 LOCATION HADFIELD RD. OVER BEAVER CRK.
 SUBJECT SECTION LOSS
 DESIGNED BY AGE DATE 1-20-11 CHECKED BY _____ DATE _____
 REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____



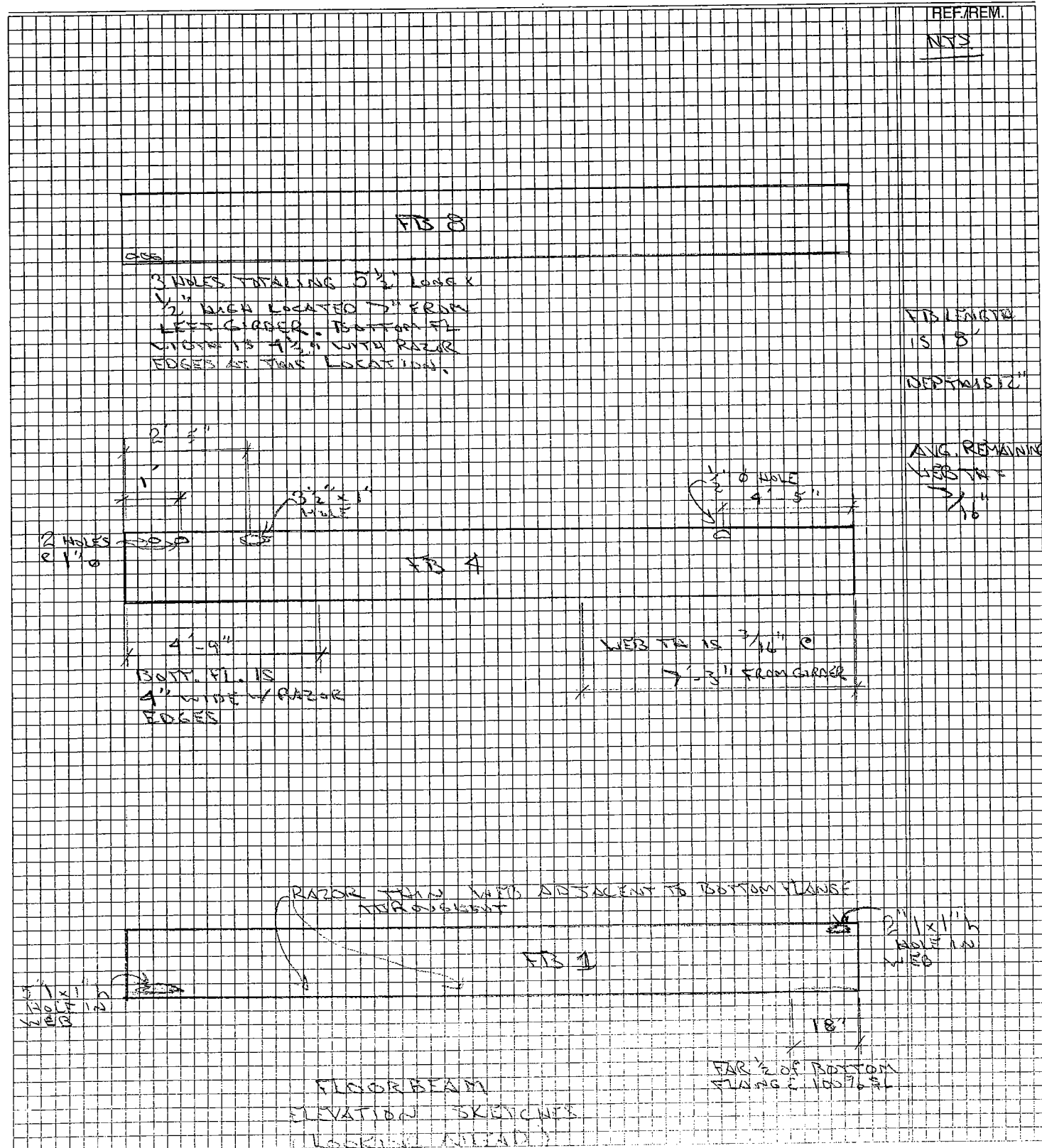
PROJECT 15 7015 0415 0244 JOB NO. 5317-01 SHEET NO. 2 OF 2

LOCATION HADFIELD ROAD OVER BEAVER CREEK

SUBJECT SECTION LOSS

DESIGNED BY RGE DATE 1-20-11 CHECKED BY _____ DATE _____

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____



PROJECT BR 244

JOB NO. 4618-01

DATE 7-24-01

LOCATION HADFIELD RD OVER BEAVER CREEK IN E. BRANDYWINE TWP.

SUBJECT STEEL SECTION LOSS

SHEET NO. 2 OF 3

COMPUTED BY AGE PFW

CHECKED BY _____

REF./REM.

ORIGINAL GIRDER MEASUREMENTS

WEB TH MEASURES BETWEEN $\frac{5}{16}$ " + $\frac{3}{8}$ "

BOTTOM FLANGE WIDTH = 12"

FLOORBEAM ORIGINAL MEASUREMENTS

STEEL STAMPED PENCOPYD

BOTTOM FLANGE EDGE TH = $\frac{9}{16}$ "

BOTTOM FL WIDTH = $5\frac{1}{4}$ "

TH @ WEB = $\frac{13}{16}$ "

WEB TH = $\frac{7}{16}$ "

SECTION LOSS

FLOORBEAM #4

PHOTO #4

HOLE IN FLOORBEAM #4 4-5" FROM RIGHT GIRDER

$\frac{1}{2}$ " DIAMETER

WEB THICKNESS @ 5'-3" FROM RIGHT GIRDER IS $\frac{3}{16}$ " } Localized

PHOTO #7

BOTTOM FLANGE WIDTH IS 4" W/ RAZOR THIN EDGE THICKNESS
LOCATION 4'-9" FROM LEFT GIRDER

PHOTOS #8-8c

HOLE IN WEB $3\frac{1}{2} \times 1$ " LOCATED 2-5" FROM LEFT GIRDER

HOLE IN WEB 1×1 " LOCATED 1-3" FROM LEFT GIRDER

FLOORBEAM #1

PHOTO #2A

NOT VISIBLE IN PHOTO - 75% OF BOTTOM FLANGE MISSING
WITHIN 2' OF BEARING 1' x 1' HOLE IN WEB WITHIN 2' OF BEARING

BOTTOM FLANGE AT THIS LOCATION IS MAXIMUM 2" WIDE W/ 0" TH @ EDGE

FLOORBEAM #9

PHOTO #17

BOTTOM FLANGE WIDTH IS $4\frac{1}{4}$ " W/ RAZOR THIN EDGES TH

244RATE.OUT

 BRIDGE ANALYSIS AND RATING (BAR7) 333518
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 0 BRIDGE ANALYSIS AND RATING (BAR7) 333518
 PROGRAM P4353000 03/22/2011 16:27
 VERSION 7.13.0.0 DOCUMENTATION 04/2010

THT 3/22/2011

INPUT: 244RATE.inp
 NON-COMPOSITE ACTION, DOES NOT CONSIDER END BEAM
 CRITICAL FLBM - #: INCLUDES DETERIORATED SECTIONS
 STRUCTURE ID - 15701504150244 - BR#-244 FLBM 4 W/ LOSS
 PROJECT IDENTIFICATION
 BRG SLC LIVE OUT- IMP GAGE PASS FAT- CONC RE- S OVER END
 TYPE LEV LANES LOAD PUT 0 0.00 0.0 0.0 FACT DIST IGUE DECK SPEC DIST DIR FACTOR PAN
 GFF D 0 0.00 0.0 0.0
 Page 1

SKEW
 CORR
 HYB FACTOR
 0.000

BRIDGE CROSS SECTION AND LOADING

OVERHANG CL OF ROADWAY DISTRIBUTION FACTORS
 OR GIRDER OR WIDTH SHEAR MOMENT DEFLECT
 DECK SPACING TRUSS TO CURB 16.00 0.500 0.389 0.500
 1.00 0.500 0.389 0.500
 DEAD LOADS F'C N SYMMETRY
 SLAB THICKNESS HAUNCH DL1 DL2 Y
 6.00 0.00 0.024 0.617 2.500 12.
 STRINGER FLOORBEAM UNIT WEIGHT
 DL1 DL1 DECK CONCRETE
 0.000 0.000 0.

SPAN LENGTHS (SIMPLE)

SPAN # 1
 LENGTH 45.50

TRAFFIC LANE LOCATIONS

LANE #	1	2	3	4	5	6
DIST						
WIDTH						
% LL						

STRINGER SPAN LENGTHS (SIMPLE)

SPAN #	1	2	3	4	5	6	7	8
LENGTH	4.07	4.67	4.67	4.67	4.67	4.67	4.67	4.67
SPAN #	9	10						
LENGTH	4.67	4.07						

STEEL MEMBER PROPERTIES

S	T	WF	BM	WF	BM	FLANGE	OR	WF	BM					
G P	Y	M	OF	I	AREA	OR	V	OR	WEB					
F A	P	OR	VRT	OR	HRZ	ANGLE	FLANGE	A	PLATE					
S N	RANGE	E	LEG	THICK	WIDTH	R	DEPTH	THICK	WEB					
G 1	22.75	B	3.50	5.00	0.5000	0.000	44.00	0.3125	DEPTH					
			TPW	TPT	BPW	BPT	COMP	FY	FY	TOP	CG	TOP	CG	BOT
			12.00	0.3750	11.00	0.3125	30.0	0.0	0.0	0.0	0.000	0.000	0.065	
RANGE	F 2	9.00	P	0.00	0.00	0.0000	THICK	WIDTH	V	DEPTH	THICK			
							10.68	0.2500						
							5.25	0.6608	4.00	0.5358	30.0	0.0	0.000	0.204

LATERAL BRACE POINTS AND STIFFENER SPACINGS

B OR G	S F	C	O NO.	C	O NO.	C	O NO.
CODE	SPAN	E SPCS	SPACING	E SPCS	SPACING	E SPCS	SPACING
BG	1	0	4.07	4	4.67	4	4.67
SG	1	0	4.07	4	4.67	0	0.00
BF	2	0	9.00	0	0.00	0	0.00

DEFAULT VALUES

SLC LEVEL	LANES	GAGE DISTANCE	PASSING DISTANCE	UNIT
I	---	6.0	4.0	WEIGHT DECK
				150.0

 + GIRDER ANALYSIS +

LIVE LOAD DISTRIBUTION FACTORS

INPUT GIRDER	SLAB WEIGHT	FL BEAM WEIGHT	STRINGER WEIGHT	FL BEAM STRINGER WEIGHT	TOTAL DL1	TOTAL DL2
0.024	0.128	0.675	0.056	0.000	0.883	0.617

NOTE: IF THE LIVE LOAD STRESS IS ZERO AT ANY SECTION THE RATING FACTOR IS PRINTED AS 999.99 INDICATING THAT IT IS INFINITE.

NOTE: IF A SECTION DOES NOT MEET FLANGE OR WEB BUCKLING CRITERIA OF CURRENT AASHTO SPECIFICATIONS FOR LOAD FACTOR METHOD, THE RATING FACTORS ARE REPRINTED AS 888.88. THIS INDICATES THAT THERE IS A POTENTIAL FATIGUE PROBLEM.

GIRDER SECTION PROPERTIES

DEPTH	GROSS AREA	MOMENT OF INERTIA	SECTION MODULUS TOP	SECTION MODULUS BOTTOM
44.69	37.69	13241.62	608.90	577.21

DEFLECTIONS

SPAN 1 - LIVE LOAD IMPACT FACTOR FOR DEFLECTION: 1.29

X	DEAD LOAD		LIVE LOAD + IMPACT	
	DL1	DL2	HS20	TK527 ML80
0.00	0.000	0.000	0.000	0.000
4.55	0.069	0.048	0.065	0.115
9.10	0.131	0.091	0.124	0.220
13.65	0.179	0.125	0.171	0.303
18.20	0.209	0.146	0.199	0.355
22.75	0.220	0.154	0.208	0.371

 * GIRDER - LIVE LOAD H20 *

MAXIMUM REACTIONS

SUPPORT	DL1	DL2	+(LL+I)	-(LL+I)	REACTIONS +I.F. -I.F.	MOMENTS +I.F. -I.F.
1	20.1	14.0	35.0	0.0	1.29	

UNFACTORED MOMENTS AND SHEARS

SPAN 1 - LIVE LOAD IMPACT FACTORS : POS MOM 1.29

X	DL1		+(LL+I)		-(LL+I)		DL2		+(LL+I)		-(LL+I)	
	MOMENT	MOMENT	MOMENT	MOMENT	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR
0.00	0.0	0.0	0.0	0.0	20.1	14.0	35.0	0.0	14.0	0.0	1.29	
4.55	82.3	57.5	131.6	0.0	16.1	11.2	30.5	0.0	11.2	0.0	1.30	
9.10	146.2	102.2	231.8	0.0	12.1	8.4	26.1	0.0	8.4	0.0	1.30	
13.65	191.9	134.1	300.6	0.0	8.0	5.6	22.1	0.0	5.6	0.0	1.30	
18.20	219.4	153.3	338.0	0.0	4.0	2.8	18.7	0.0	2.8	0.0	1.30	
22.75	228.5	159.7	344.0	0.0	0.0	0.0	15.2	0.0	0.0	0.0	1.30	

FLEXURAL STRESSES - BEAM

X	TOP FIBER STEEL STRESS		-(LL+I)		+(LL+I)		BOTTOM FIBER STEEL STRESS		-(LL+I)		+(LL+I)	
	DL1	DL2	DL1	DL2	DL1	DL2	DL1	DL2	DL1	DL2	DL1	DL2
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.55	-1.621	-1.133	-2.593	0.000	1.710	1.195	2.735	0.000	1.710	1.195	2.735	0.000
9.10	-2.882	-2.014	-4.567	0.000	3.040	2.124	4.818	0.000	3.040	2.124	4.818	0.000
13.65	-3.783	-2.643	-5.923	0.000	3.990	2.788	6.248	0.000	3.990	2.788	6.248	0.000
18.20	-4.323	-3.021	-6.661	0.000	4.560	3.187	7.026	0.000	4.560	3.187	7.026	0.000
22.75	-4.503	-3.147	-6.780	0.000	4.750	3.319	7.152	0.000	4.750	3.319	7.152	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

SPAN 1

244RATE.OUT

SHEAR STRESSES		ALLOW COMPR		RATING FACTORS	
DL1	DL2	-(LL+I)	IR	OR	
0.00	1.045	1.73 V	2.67 V		
4.55	1.196	2.74 V	4.02 V		
9.10	0.897	1.000	2.13 I	3.24 I	
13.65	0.598	0.627	1.56 B	2.52 B	
18.20	0.299	0.418	1.25 B	2.10 B	
22.75	0.000	0.209	1.18 B	2.02 B	

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

STRENGTHS AND LOAD FACTOR RATINGS

NON-COMP		NON-COMPACT		COMPACT	
MOMENT	SHEAR	RATING FACTORS	COMPACT	RATING FACTORS	OR
STRENGTH	STRENGTH	IR	MOMENT	IR	
0.00	1443.0 B	1.58 V	2.64 V		
4.55	1443.0 B	1.154.4	3.97 V		
9.10	1443.0 B	1.154.4	1.98 I	3.30 I	
13.65	1443.0 B	1.154.4	1.57 B	2.61 B	
18.20	1443.0 B	1.154.4	1.31 B	2.18 B	
22.75	1443.0 B	1.154.4	1.26 B	2.10 B	

* GIRDER - LIVE LOAD HS20 *

MAXIMUM REACTIONS

REACTIONS		MOMENTS				
SUPPORT	DL1	DL2	-(LL+I)	+(LL+I)	-(LL+I)	+(LL+I)
1	20.1	14.0	49.3	0.0	1.29	1.30

UNFACTORED MOMENTS AND SHEARS

UNFACTORED MOMENTS AND SHEARS		POS MOM 1.29				
SUPPORT	DL1	DL2	-(LL+I)	+(LL+I)	-(LL+I)	+(LL+I)
1	20.1	14.0	49.3	0.0	1.29	1.30

FLEXURAL STRESSES - BEAM
Page 5

244RATE.OUT

TOP FIBER STEEL STRESS		BOTTOM FIBER STEEL STRESS	
DL1	DL2	-(LL+I)	+(LL+I)
0.00	0.000	0.000	0.000
4.55	-1.621	-1.133	1.710
9.10	-2.882	-0.623	3.040
13.65	-3.783	-0.264	3.990
18.20	-4.323	-0.173	3.187
22.75	-4.503	-0.147	3.319

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

SHEAR STRESSES		ALLOW COMPR		RATING FACTORS	
DL1	DL2	-(LL+I)	IR	OR	
0.00	1.045	3.672	1.22 V	1.89 V	
4.55	1.196	0.836	1.93 V	2.82 V	
9.10	0.897	0.627	1.50 I	2.28 I	
13.65	0.598	0.418	1.12 B	1.80 B	
18.20	0.299	0.209	0.90 B	1.52 B	
22.75	0.000	0.000	0.87 B	1.49 B	

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

STRENGTHS AND LOAD FACTOR RATINGS

NON-COMP		NON-COMPACT		COMPACT	
MOMENT	SHEAR	RATING FACTORS	COMPACT	RATING FACTORS	OR
STRENGTH	STRENGTH	IR	MOMENT	IR	
0.00	1443.0 B	1.12 V	1.87 V		
4.55	1443.0 B	1.154.4	2.80 V		
9.10	1443.0 B	1.154.4	1.59 I	2.32 I	
13.65	1443.0 B	1.154.4	1.12 B	1.87 B	
18.20	1443.0 B	1.154.4	0.95 B	1.58 B	
22.75	1443.0 B	1.154.4	0.93 B	1.55 B	

* GIRDER - LIVE LOAD TK527 *

MAXIMUM REACTIONS

REACTIONS		MOMENTS				
SUPPORT	DL1	DL2	-(LL+I)	+(LL+I)	-(LL+I)	+(LL+I)
1	20.1	14.0	55.4	0.0	1.29	1.29

UNFACTORED MOMENTS AND SHEARS

SPAN 1 - LIVE LOAD IMPACT FACTORS : POS MOM 1.29

DL1 DL2 +(LL+I) -(LL+I) DL1 DL2 +(LL+I) -(LL+I)

page 6

244RATE OUT

 * GIRDER -- LIVE LOAD ML80 *

MAXIMUM REACTIONS

REACTIONS MOMENTS
 +I.F. -I.F. +I.F. -I.F.

SUPPORT DL1 DL2 +(LL+I) -(LL+I) +I.F. -I.F. +I.F. -I.F.

1 20.1 14.0 55.7 0.0 1.29 0.0

UNFACTORED MOMENTS AND SHEARS

SPAN 1 - LIVE LOAD IMPACT FACTORS : POS MOM 1.29

=====

X	DL1	DL2	+(LL+I)	-(LL+I)	SHEAR	SHEAR	DL1	DL2	+(LL+I)	-(LL+I)
0.00	0.0	0.0	0.0	0.0	20.1	14.0	55.7	0.0	0.0	0.0
4.55	82.3	57.5	223.9	0.0	16.1	11.2	49.5	0.0	0.0	0.0
9.10	146.2	102.2	388.7	0.0	12.1	8.4	223.9	0.0	0.0	0.0
13.65	191.9	134.1	501.2	0.0	8.0	5.6	36.4	0.0	0.0	0.0
18.20	219.4	153.3	573.5	0.0	4.0	2.8	29.9	0.0	0.0	0.0
22.75	228.5	159.7	586.6	0.0	0.0	0.0	23.3	0.0	0.0	0.0

FLEXURAL STRESSES - BEAM

SPAN 1

=====

X	DL1	DL2	+(LL+I)	-(LL+I)	TOP FIBER STEEL STRESS	BOTTOM FIBER STEEL STRESS
0.00	0.000	0.000	0.000	0.000	0.000	0.000
4.55	-1.621	-1.133	-4.413	0.000	1.710	1.195
9.10	-2.882	-2.014	-7.660	0.000	3.040	2.124
13.65	-3.783	-2.643	-9.878	0.000	3.990	2.788
18.20	-4.323	-3.021	-11.303	0.000	4.560	3.187
22.75	-4.503	-3.147	-11.561	0.000	4.750	3.319

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

SPAN 1

=====

X	DL1	DL2	+(LL+I)	-(LL+I)	SHEAR STRESSES	ALLOW COMPR	RATING FACTORS
0.00	1.495	1.045	4.147	0.000	1.08 V	1.000	1.68 V
4.55	1.196	0.836	3.682	-0.149	1.69 V	1.000	2.48 V
9.10	0.897	0.627	3.195	-0.447	1.29 I	1.000	1.97 I
13.65	0.598	0.418	2.708	-0.845	0.93 B	1.000	1.51 B
18.20	0.299	0.209	2.221	-1.248	0.73 B	1.000	1.24 B
22.75	0.000	0.000	1.735	-1.735	0.69 B	1.000	1.18 B

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

244RATE OUT

MOMENT SHEAR SHEAR I.F.

0.0 0.0 0.0 1.29

SIMULT 20.1 14.0 55.4 0.0

4.55 82.3 57.5 219.9 0.0

9.10 16.1 11.2 48.6 -2.0 1.30

13.65 48.6 34.6 219.9 81.5 1.30

18.20 12.1 8.4 41.4 -5.7 1.30

22.75 41.4 208.0 375.1 208.0 1.30

27.30 8.0 5.6 34.6 -10.3 1.30

31.85 47.0 28.2 376.0 376.0 1.30

36.40 4.0 2.8 28.2 -15.0 1.30

40.95 228.5 159.7 541.9 16.0 1.30

45.50 228.5 159.7 549.7 16.0 1.30

50.05 0.0 0.0 21.8 -21.8 1.30

54.60 0.0 0.0 492.9 492.9 1.30

FLEXURAL STRESSES - BEAM

SPAN 1

=====

X	DL1	DL2	+(LL+I)	-(LL+I)	TOP FIBER STEEL STRESS	BOTTOM FIBER STEEL STRESS
0.00	0.000	0.000	0.000	0.000	0.000	0.000
4.55	-1.621	-1.133	-4.333	0.000	1.710	1.195
9.10	-2.882	-2.014	-7.392	0.000	3.040	2.124
13.65	-3.783	-2.643	-9.458	0.000	3.990	2.788
18.20	-4.323	-3.021	-10.680	0.000	4.560	3.187
22.75	-4.503	-3.147	-10.833	0.000	4.750	3.319

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

SPAN 1

=====

X	DL1	DL2	+(LL+I)	-(LL+I)	SHEAR STRESSES	ALLOW COMPR	RATING FACTORS
0.00	1.495	1.045	4.125	0.000	1.09 V	1.000	1.69 V
4.55	1.196	0.836	3.615	-0.149	1.72 V	1.000	2.52 V
9.10	0.897	0.627	3.084	-0.427	1.34 I	1.000	2.04 I
13.65	0.598	0.418	2.577	-0.766	0.97 B	1.000	1.58 B
18.20	0.299	0.209	2.099	-1.163	0.78 B	1.000	1.31 B
22.75	0.000	0.000	1.621	-1.621	0.74 B	1.000	1.26 B

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

244RATE.OUT
 0.028 0.328 0.000 0.300

 * FLOORBEAM - LIVE LOAD H20 *

LIVE LOAD REACTION FROM DECK (ONE TRUCK) : 24.90
 LIVE LOAD IMPACT FACTORS : POS MOM 1.30

UNFACTORED MOMENTS AND SHEARS

X	DL1	DL2	LL+I	DL1	DL2	LL+I	IR	I.F.
MOMENT	MOMENT	MOMENT	SHEAR	SHEAR	SHEAR	SHEAR		
0.00	0.0	0.0	0.0	3.2	2.7	21.6		1.30
1.80	5.2	4.4	38.8	2.6	2.2	21.6		1.30
3.60	9.2	7.8	73.8	1.9	1.6	20.5		1.30
5.40	12.1	10.2	93.2	1.3	1.1	17.3		1.30
7.20	13.8	11.6	101.0	0.6	0.5	14.0		1.30
9.00	14.4	12.1	97.1	0.0	0.0	10.8		1.30

FLEXURAL STRESSES - BEAM

X	TOP FIBER STEEL STRESS			BOTTOM FIBER STEEL STRESS		
	DL1	DL2	+(LL+I)	DL1	DL2	-(LL+I)
0.00	0.000	0.000	0.000	0.000	0.000	0.000
1.80	-1.601	-1.348	-11.984	0.000	2.345	16.051
3.60	-2.847	-2.396	-22.770	0.000	3.833	30.498
5.40	-3.736	-3.145	-28.762	0.000	5.003	38.323
7.20	-4.270	-3.594	-31.159	0.000	5.719	41.734
9.00	-4.448	-3.744	-29.960	0.000	5.958	40.129

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

X	SHEAR STRESSES		ALLOW COMPRESSIVE REDUCTION		RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)	IR	OR
0.00	1.200	1.010	8.081	0.000	0.96	1.41
1.80	0.960	0.808	8.081	0.000	0.78	1.10
3.60	0.720	0.606	7.677	0.000	0.31	0.51
5.40	0.480	0.404	6.465	0.000	0.19	0.34
7.20	0.240	0.202	5.253	0.000	0.14	0.29
9.00	0.000	0.000	4.041	0.000	0.14	0.29

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

244RATE.OUT
 STRENGTHS AND LOAD FACTOR RATINGS

SPAN 1	NON-COMPACT MOMENT		NON-COMPACT RATING FACTORS		COMPACT RATING FACTORS	
	STRENGTH	OVERLOAD MOMENT	IR	OR	IR	OR
X	1443.0	1154.4	0.99	1.66		
4.55	1443.0	1154.4	1.47	2.45		
9.10	1443.0	1154.4	1.20	2.01		
13.65	1443.0	1154.4	0.94	1.56		
18.20	1443.0	1154.4	0.77	1.29		
22.75	1443.0	1154.4	0.74	1.23		

FLOORBEAM SPAN: 18.00 CANTILEVER: 0.00

FLOORBEAM LIVE LOAD MOMENT AND SHEAR FACTORS

FACTOR	LANE 1/4/7		LANE 2/5/8		LANE 3/6	
	M	V	M	V	M	V
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.667	3.00	9.00	3.00	9.00	3.00	9.00
1.200	3.00	9.00	3.00	9.00	3.00	9.00
0.667	3.00	9.00	3.00	9.00	3.00	9.00
2.280	3.60	9.60	3.60	9.60	3.60	9.60
0.633	5.40	11.40	5.40	11.40	5.40	11.40
0.533	7.20	13.20	7.20	13.20	7.20	13.20
3.120	3.00	9.00	3.00	9.00	3.00	9.00
0.433	9.00	15.00	9.00	15.00	9.00	15.00

FACTOR CODES: M - MOMENT, V - SHEAR



FLOORBEAM SECTION PROPERTIES

NON-COMPOSITE	DEPTH		GROSS AREA		MOMENT OF INERTIA		SECTION MODULUS	
	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
11.88	8.28	197.43	6.80	38.89	29.04			

DEAD LOADS ACTING ON FLOORBEAM

FLBEAM WEIGHT	SLAB WEIGHT	UNIFORM LOAD INPUT	DL1 INPUT	DL2 INPUT

STRENGTHS AND LOAD FACTOR RATINGS

X	NON-COMPACT MOMENT		NON-COMPACT RATING FACTORS		COMPACT RATING FACTORS	
	STRENGTH	OVERLOAD MOMENT	IR	OR	IR	OR
0.00	72.6	58.1	0.83	1.38	0.83	1.38
1.80	72.6	58.1	0.71	1.19	0.75	1.25
3.60	72.6	58.1	0.52	0.83	0.33	0.56
5.40	72.6	58.1	0.22	0.36	0.23	0.38
7.20	72.6	58.1	0.18	0.30	0.19	0.32
9.00	72.6	58.1	0.18	0.30	0.19	0.32

244RATE.OUT
* FLOORBEAM - LIVE LOAD TK527 *

LIVE LOAD REACTION FROM DECK (ONE TRUCK) : 16.03
LIVE LOAD IMPACT FACTORS : POS MOM 1.30

UNFACTORED MOMENTS AND SHEARS

X	DL1		LL+I		DL2		LL+I		I.F.
	MOMENT	SHEAR	MOMENT	SHEAR	MOMENT	SHEAR	MOMENT	SHEAR	
0.00	0.0	0.0	0.0	0.0	0.0	2.7	13.9	1.30	
1.80	5.2	4.4	25.0	3.2	2.7	2.2	13.9	1.30	
3.60	9.2	7.8	47.5	1.9	1.6	1.3	13.2	1.30	
5.40	12.1	10.2	60.0	1.3	1.1	1.1	11.1	1.30	
7.20	13.8	11.6	65.0	0.6	0.5	9.0	1.30		
9.00	14.4	12.1	62.5	0.0	0.0	6.9	1.30		

FLEXURAL STRESSES - BEAM

X	TOP FIBER STEEL STRESS		BOTTOM FIBER STEEL STRESS	
	DL1	DL2	DL1	DL2
0.00	0.000	0.000	0.000	0.000
1.80	-1.601	-1.348	0.000	0.000
3.60	-2.847	-2.396	0.000	0.000
5.40	-3.736	-3.145	0.000	0.000
7.20	-4.270	-3.594	0.000	0.000
9.00	-4.448	-3.744	0.000	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

X	SHEAR STRESSES		ALLOW COMP		RATING FACTORS	
	DL1	DL2	REDUCTION	IR	OR	IR
0.00	1.200	1.010	1.000	1.50	2.19	1.50
1.80	0.960	0.808	1.000	1.21	1.80	1.21
3.60	0.720	0.606	1.000	0.48	0.79	0.48
5.40	0.480	0.404	1.000	0.29	0.54	0.29
7.20	0.240	0.202	1.000	0.22	0.45	0.22
9.00	0.000	0.000	1.000	0.21	0.45	0.21

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

STRENGTHS AND LOAD FACTOR RATINGS

X	NON-COMP OVERLOAD		NON-COMPACT		COMPACT	
	MOMENT	STRENGTH	RATING FACTORS	MOMENT	RATING FACTORS	MOMENT
0.00	72.6	58.1	1.29	92.7	1.29	92.7
1.80	72.6	58.1	1.11	92.7	1.16	92.7
3.60	72.6	58.1	0.49	92.7	0.52	92.7
5.40	72.6	58.1	0.34	92.7	0.36	92.7
7.20	72.6	58.1	0.28	92.7	0.30	92.7
9.00	72.6	58.1	0.28	92.7	0.30	92.7

* FLOORBEAM - LIVE LOAD ML80 *

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* FLOORBEAM - LIVE LOAD HS20 *

LIVE LOAD REACTION FROM DECK (ONE TRUCK) : 24.90
LIVE LOAD IMPACT FACTORS : POS MOM 1.30

UNFACTORED MOMENTS AND SHEARS

X	DL1		LL+I		DL2		LL+I		I.F.
	MOMENT	SHEAR	MOMENT	SHEAR	MOMENT	SHEAR	MOMENT	SHEAR	
0.00	0.0	0.0	0.0	21.6	0.0	2.7	13.9	1.30	
1.80	5.2	4.4	38.8	2.2	2.2	2.2	13.0	1.30	
3.60	9.2	7.8	73.8	1.9	1.6	20.5	11.30	1.30	
5.40	12.1	10.2	93.2	1.3	1.1	17.3	11.30	1.30	
7.20	13.8	11.6	101.0	0.6	0.5	14.0	11.30	1.30	
9.00	14.4	12.1	97.1	0.0	0.0	10.8	11.30	1.30	

FLEXURAL STRESSES - BEAM

X	TOP FIBER STEEL STRESS		BOTTOM FIBER STEEL STRESS	
	DL1	DL2	DL1	DL2
0.00	0.000	0.000	0.000	0.000
1.80	-1.601	-1.348	0.000	0.000
3.60	-2.847	-2.396	0.000	0.000
5.40	-3.736	-3.145	0.000	0.000
7.20	-4.270	-3.594	0.000	0.000
9.00	-4.448	-3.744	0.000	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

X	SHEAR STRESSES		ALLOW COMP		RATING FACTORS	
	DL1	DL2	REDUCTION	IR	OR	IR
0.00	1.200	1.010	1.000	0.96	1.41	1.41
1.80	0.960	0.808	1.000	0.78	1.16	1.16
3.60	0.720	0.606	1.000	0.31	0.51	0.31
5.40	0.480	0.404	1.000	0.19	0.34	0.19
7.20	0.240	0.202	1.000	0.14	0.29	0.14
9.00	0.000	0.000	1.000	0.14	0.29	0.14

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

STRENGTHS AND LOAD FACTOR RATINGS

X	NON-COMP OVERLOAD		NON-COMPACT		COMPACT	
	MOMENT	STRENGTH	RATING FACTORS	MOMENT	RATING FACTORS	MOMENT
0.00	72.6	58.1	0.83	92.7	0.83	92.7
1.80	72.6	58.1	0.71	92.7	0.75	92.7
3.60	72.6	58.1	0.32	92.7	0.33	92.7
5.40	72.6	58.1	0.22	92.7	0.23	92.7
7.20	72.6	58.1	0.18	92.7	0.19	92.7
9.00	72.6	58.1	0.18	92.7	0.19	92.7

* FLOORBEAM - LIVE LOAD ML80 *

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MEMBER: GIRDER

Table with columns: LOAD, H20, HS20, TK527, ML80, ALLOWABLE STRESS, TONS, X, SPAN, RATING, FACTOR, LOAD, TONS, X, SPAN, RATING, FACTOR.

MEMBER: FLOORBEAM

Table with columns: LOAD, H20, HS20, TK527, ML80, ALLOWABLE STRESS, TONS, X, FLBM, RATING, FACTOR, LOAD, TONS, X, FLBM, RATING, FACTOR.

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

STRENGTHS AND LOAD FACTOR RATINGS

Table with columns: X, DLI, MOMENT, OVERLOAD, SHEAR, STRENGTH, RATING, COMPACT, MOMENT, STRENGTH, RATING, COMPACT, IR, OR, RATING, FACTORS.

+++++ R A T I N G S U M M A R Y +++++

244RATE.OUT

LIVE LOAD REACTION FROM DECK (ONE TRUCK) : 16.03
LIVE LOAD IMPACT FACTORS : POS MOM 1.30

UNFACTORED MOMENTS AND SHEARS

Table with columns: X, DLI, MOMENT, SHEAR, DL1, LL+I, DL2, LL+I, DL2, SHEAR, LL+I, I.F.

FLEXURAL STRESSES - BEAM

Table with columns: X, DLI, TOP FIBER, BOTTOM FIBER, STEEL STRESS, DL1, LL+I, DL2, LL+I, DL2, STEEL STRESS.

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

Table with columns: X, DLI, SHEAR STRESSES, ALLOW COMP, REDUCTION, RATING, FACTORS, IR, OR, RATING, FACTORS.

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

STRENGTHS AND LOAD FACTOR RATINGS

Table with columns: X, DLI, MOMENT, OVERLOAD, SHEAR, STRENGTH, RATING, COMPACT, MOMENT, STRENGTH, RATING, COMPACT, IR, OR, RATING, FACTORS.

+++++ R A T I N G S U M M A R Y +++++

NOTE: ALL RATINGS ARE BASED ON THE NUMBER OF DESIGN LANES OR THE ACTUAL TRAFFIC LANES AS DEFINED BY "D" OR "L" ENTERED FOR LANES IN THE PROJECT IDENTIFICATION.

BAR7 v7.13.0.0 PROGRAM WAS EXECUTED COMPLETELY AND SUCCESSFULLY.

December 2, 2010

Mr. Steve Fromnick, Director
County of Chester
Department of Facilities Management
2 North High Street, Suite 167
West Chester, PA 19380

REFERENCE: Hadfield Road over Beaver Creek
BMS # 15 7015 0415 0244

Dear Mr. Fromnick:

We recently inspected the Hadfield Road Bridge (Hadfield Creamery Bridge) as part of our contract with PennDOT to inspect locally owned bridges within District 6-0.

The following High Priority maintenance items are recommended, and in accordance with PennDOT Publication 238, Chester County should complete the listed items within six months of notification:

- Install standard structure mounted guiderail across both sides of the bridge in order to protect the fracture critical through girders. (91 LF)
- Repair or replace the steel girders due to continued delamination and up to 100% section loss to the bottom flanges adjacent to the near bearing stiffeners. Additionally, there is moderate corrosion of the webs with up to 15% section loss as well as 30% section loss of rivet heads. (2 EA)
- Repair or replace the steel floorbeams. (11 EA)

Should you have any questions or require additional information, please do not hesitate to call me or Jennifer Payne-McAleer at 610-640-3500.

Sincerely,



Sandy Martin, P.E.
Associate

Pc: Richard Strayves, PennDOT District 6-0
William Ahola, P.E., AECOM
Jennifer Payne-McAleer, E.I., McCormick Taylor, Inc.

April 15, 2011

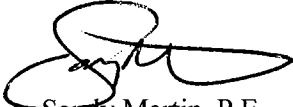
Mr. Steve Fromnick, Director
County of Chester
Department of Facilities Management
2 North High Street, Suite 167
West Chester, PA 19380

REFERENCE: Hadfield Road over Beaver Creek
BMS # 15 7015 0415 0244

Dear Mr. Fromnick:

The Hadfield Road Bridge (Hadfield Creamery Bridge) was inspected as part of our contract with PennDOT to inspect locally owned bridges located within District 6-0. Due to additional section loss found during the inspection, updated load ratings were recommended, approved and performed which require the bridge posting to be reduced from 12 Tons to 6 Tons, effective immediately. A Bridge Posting Sheet is attached for your use. Should you have any questions or require additional information, please do not hesitate to call me or Jennifer Payne-McAleer at 610-640-3500.

Sincerely,



Sandy Martin, P.E.
Associate

Pc: Richard Strayves, PennDOT District 6-0
William Ahola, P.E., AECOM
Jennifer Payne-McAleer, E.I., McCormick Taylor, Inc.

BRIDGE POSTING SHEET

BMS NUMBER 5A01 115 210115 10H1151021414

Hadfield Road OVER Beaver Creek

PENNDOT STANDARDS
 SIGNS - PENNDOT PUBLICATION 236
 PLACEMENT - 1C-870Z B AND C
 ADVANCE POSTING PLACEMENT - TITLE 67 615.301
 GENERAL INSTALLATION- TITLE 67, SUBCHAPTER B

* NL- no problems noted
 NR- no problems noted
 FL- no problems noted
 FR- no problems noted.

25 Rd

