2-DIST B.I.N. 04 7VB

STRUCTURES INSPECTION FIELD REPORT

SPECIAL MEMBER INSPECTION

BR. DEPT. NO. B-07-015=W-04-039

CITY/TOWN	TOWN 8STRUCTURE NO. 11-Kilo. POINT 90-ROUTINE INSP. DATE 93*-SPEC. MEMB. INSP. DATE												
BELMONT=WALTHAM	B0	B07015-7VB-MUN-CUL			0.000	000	May 2, 20		2022	022 Nov 16, 2023			
07-FACILITY CARRIED ST 60 TRAPELO RD	MEMORIAL NAME/LOCAL NAME			IAME		27-YR I			REBUII 900	Т *Ү	*YR REHAB'D (NON 106) 0000		
06-FEATURES INTERSECTED WATER BEAVER BROOK	- 12	26-FUNCTIONAL CLASS Urban Arterial			DIST. BRIDGE INSPECTION ENGINEER J. Dideo								
43-STRUCTURE TYPE 801: Masonry Slab		22-OWNER 21-MAINTAINER Town Agency			THAM LEADER T. Leiper								
107-DECK TYPE 1 : Concrete Cast-in-Place	- 1	WEATHER CLEAR	TEMP. (air)		TEAM N S. GA	MEMBER ALLA	s GHE	R	1	۔ ۔	<i>/</i>	7	
Actual Posting N N N N Recommended Posting N N N N Waived Date: 00/00/0000 EJDMT Date: 00	igle V	Signs In I (Y=Yes,N: NR=Not R Legibility Visibility	=No, Required)	At E	bridge W		Advan E	w		.C.R.;			N N
RATING		Recomme	end for R	ating o	r Reratii	ng (Y/N): []	ı v	0.000		give p	riority:	M / \]
Rating Report (Y/N): N Date:		REAS	-	,			<u> </u>		HIGH () M	EDIUM (, 10	w () j
Inspection data at time of existing ratin I 58: - I 59: - I 60: - I 62: - Date:)/0000						89					
SPECIAL MEMBER(S):													
MEMBER CRACK (Y/N): WELD'S CONDITION (0-9)		LOCATION OF CORR COLLISION DAMAG					COND PREVIOUS (0-9)		INV. RA FROM F			SIS Def	iclencies
A Item 58.2 - Deck Condition N N	Se	See remarks in comments section. 3 3 Not Rated				S-A							
B or Beams N N	Se	ee remarks	in com	men	ts sec	tion.	3	3	No	t Ra	 ated		S-A
C													
D				×		11							
E													
List of field tests performed:									I-	-58	I-59	I-60	I-62
Hands on inspection				(Overa	all Previ	ous Co	nditio	1)	39	3	3	4	-
				(Overa	all Curre	nt Con	dition)			3	3	4	-
DEFICIENCY: A defect in a structure that requires corre	ective ac	ction.											
CATEGORIES OF DEFICIENCIES: M= Minor Deficiency Deficiencies which are minor in nature, g	enerally do	o not impact the structural	integrity of the	bridge and o	could easily b	e repaired. I	Examples in	nclude but a	are not limite	ed to: Spa	lled concr	ete, Minor po	ot
S= Severe/Major Deficiency/Deficiencies which are more e- comoded rebars, Considerable	xtensive in settlemen	ngued uramage, etc. In nature and need more plant, Considerable scouring o	anning and effo or undermining,	rt to repair. I Moderate to	Examples inc extensive c	lude but are orrosion to s	not limited tructural st	to: Modera eel with me	te to major o	deteriorat	ion in con on, etc.	crete, Expos	ed and
C-S= Critical Structural Deficiency of the bridge.													
C-H- Critical Hazard Deficiency Adeficiency in a com	ponent or	element of a bridge that p oose concrete hanging do	oses an extrem	ne hazard or	unsafe cond	tion to the p	ublic, but d	oes not imp	air the struc	ctural inte	grity of the	bridge, Exa	imples
URGENCY OF REPAIR: I = Immediate- [Inspector(s) Immediately contact District Bridge Ir	spection F	Engineer (DBIE) to report	the Deficiency	and to receiv	e further inst	ruction from	him/herl						
A = ASAP- [Action/Repair should be initiated by District Maintenance Engine Perforitize-	enance En	ngineer or the Responsible	e Party (if not a	State owner	d bridge) upo	n receipt of	he Inspecti						
X=UNKNOWN N=NOT	APDI	LICABLE		U=U	IDDEN	INAC	PEGGI	RIE			D=	REMO	VED

REMARKS

BRIDGE ORIENTATION

Structure B-07-015=W-04-039 (7VB) carries ST 60 Trapelo Road over Beaver Brook along the border line between the Town of Belmont and the City of Waltham. The approaches are west and east and the elevations are south and north. Beaver Brook flows from north to south.

GENERAL REMARKS

There are multiple superstructure types for this bridge. There are sixteen (16) granite slabs labeled Slab 1 through 16 from south to north. There are eight (8) steel beams labeled Beam 1 through 8 between Slabs 4 and 5, with a utility main at Beam 5. There is a concrete slab with stay-in- place forms between Slabs 12 and 13. North of Slab 16 there is a concrete extension. The original abutments are comprised of dry laid stone at the south side, and the bridge was widened using cast- in-place concrete abutments on the north side. There is a bituminous wearing surface that has been retrofitted with steel roadway plates that span the length of the superstructure (see sketches 1 - 3).

ITEM 58 - DECK

Item 58.2 - Deck Condition

The roadway plates are designated as P1 through P6 from south to north (see sketch 1).

There are isolated fully broken tack welds between roadway plates. The plates with broken tack welds typically deflect under live load (see photo 1).

There is typically minor scrapes and gouges on the leading edge of the roadway plates.

There are isolated transverse hairline cracks in the approaches adjacent to the plates.

There is a depressed bituminous patch with radial cracks, up to 1/8", at the northeast corner of P5.

ITEM 59 - SUPERSTRUCTURE

<u>Item 59.4 - Girders or Beams</u> <u>Granite Slabs:</u>

There are isolated longitudinal and diagonal hairline cracks, some with efflorescence near the abutments. There are several up to full width transverse hairline cracks, some with efflorescence near mid-span (see sketch 2).

The southwest corner of Slab 1 is unsupported for 6".

Slab 4: Diagonal hairline crack at the east end (see photo 2).

Slab 6; Transverse split with previous water leakage noted near midspan (see photo 3).

Slab 7; Transverse split near mid-span, up to 2" wide x full depth, with a 20" long x 13" wide x 2" deep spall at the south edge (see photo 4).

Slabs 6 & 7 are monitored with crack gauges. The crack gauges indicated little to no movement since installation. The crack gauge at Slab 7 read 0.5 mm from zero (see photos 5 & 6).

REMARKS

Steel I-Beams:

There is timber shielding between the steel I-beams preventing inspection of the web and top flanges. The beams typically exhibit minor rotation about the longitudinal axis, resulting in the bottom flanges no longer being level (see photo 7).

There is typically heavy rust and laminated rust throughout the beams with many having up to 1/4" remaining and down to 1/16" remaining. The top and bottom flanges of isolated beams near the abutments and at midspan have up to 100% section loss x full width (see sketch 3 and photos 8 & 9).

Reinforced Concrete Slab:

The reinforced concrete slab which acts as part of the superstructure below the westbound roadway is missing 50% of the stay in place forms on the north side of the slab.

There are two spalls with exposed rebar along the south edge measuring up to $2'-6" \log x 9" \operatorname{high} x 6" \operatorname{wide}$. There is a $24" \log x 16" \operatorname{wide}$ delamination at the northwest corner.

Sketch / Photo Log

Sketch 1:	Roadway Plate Conditions
Sketch 2:	Superstructure Conditions
Sketch 3:	Steel Beam Conditions

Photo 1: Typical condition of the steel plates. Note the height difference between P1 & P2 due to broken welds.

Photo 2: Granite Slab 4, there is a diagonal hairline crack at the east end.

Photo 3: Granite Slab 6 - Split at mid-span.
Photo 4: Granite Slab 7 - Split at mid-span.
Photo 5: Granite Slab 6 - Split crack gauge.
Photo 6: Granite Slab 7 - Split crack gauge.

Photo 7: The beams typically exhibit minor rotation about the longitudinal axis, resulting in the bottom flanges no longer being level. Beams 1 - 3 shown. Note the timber shielding in between

beams.

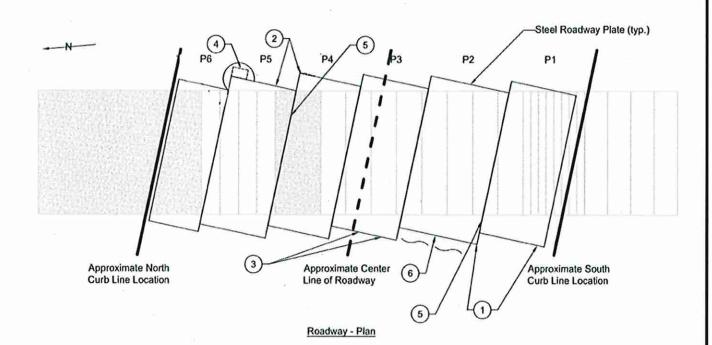
Photo 8: Typical heavy section loss and lamintination to the steel at the east end bottom flanges

Northern side of Beam 8 shown.

Photo 9: Heavy section loss up to 100% at the west end bottom flanges of Beams 7 (left) & Beam 8

(right).

SKETCHES



Legend:



- Delamination (typ.)

- Patch

- Hairline Crack (U.O.N)

- Hairline Crack with

Efflorescence (U.O.N)

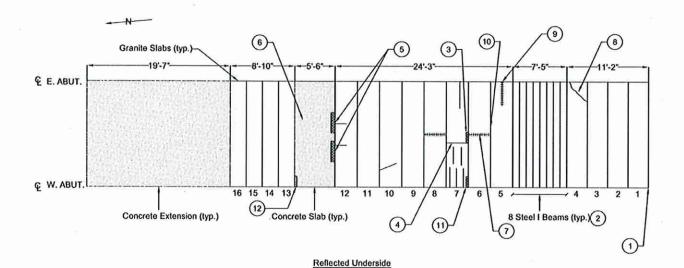
Condition:

- 1. Southwest corner deflects under live load
- 2. Northeast corner deflects under live load
- 3. Minor spalls adjacent to roadway plate
- 2'-0" W x 7" L depressed bituminous patch with radial cracks ¹/₈" W
- 5. Full length broken tack weld (typ. 5° L)
- 6. Minor scrapes and gouges (typ.)

Sketch 1: Roadway Plate Conditions

CITY/TOWN B.I.N. BR. DEPT. NO. 8.-STRUCTURE NO. INSPECTION DATE BELMONT=WALTHAM 7VB B-07-015=W-04-039 B07015-7VB-MUN-CUL NOV 16, 2023

SKETCHES



Legend:

- Spall (typ.)
- Delamination (typ.)
- Hairline Crack (U.O.N)

- Hairline Crack with

Efflorescence (U.O.N)

Condition:

- Granite Slab end unsupported at the SW corner for 6"
 See Sketch 3: Steel Beam Conditions
 Granite Slab with a 20" L x 13" W x 2" D spall
 Granite slab with up to 2" W x full depth crack. Crack gauge reads 0.05mm
 Two (2) up to 30" L x 6" W x up to 9" D edge spall with exposed rebar
- 50% of stay in place forms are missing Full width hairline crack with efflorescnce. Note: Crack gauge reads 0.00mm
- 6'-0" L hairline crack 2-6" L hairline crack with minor efflorescence
 Loose pointing between the beams
 2-0" L x 5" W x 2" D spall

- 12. 2'-0" L x 16" W delamination

Sketch 2: **Superstructure Conditions**

CITY/TOWN

B.I.N.

BR. DEPT. NO.

8.-STRUCTURE NO.

INSPECTION DATE

BELMONT=WALTHAM

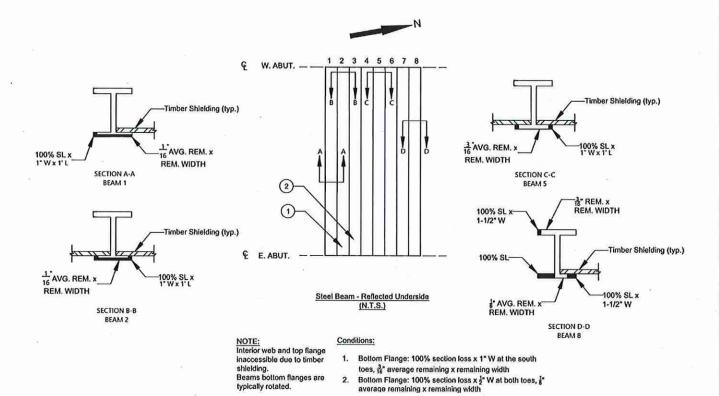
7VB

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SKETCHES



Sketch 3: Steel Beam Conditions

CITY/TOWN BELMONT=WALTHAM B.I.N. **7VB** BR. DEPT. NO. B-07-015=W-04-039 8.-STRUCTURE NO.
B07015-7VB-MUN-CUL

INSPECTION DATE NOV 16, 2023



Photo 1: Typical condition of the steel plates. Note the height difference between P1 & P2 due to broken welds.

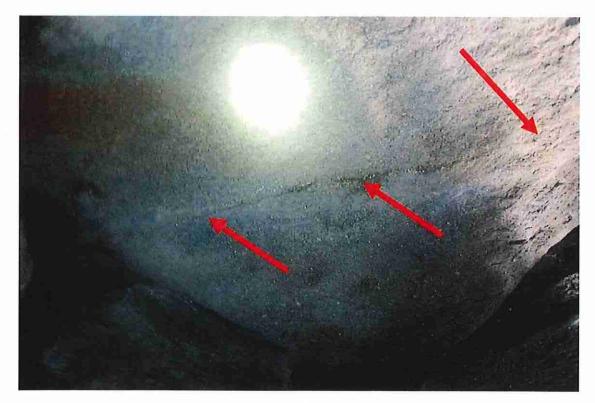


Photo 2: Granite Slab 4, there is a diagonal hairline crack at the east end.

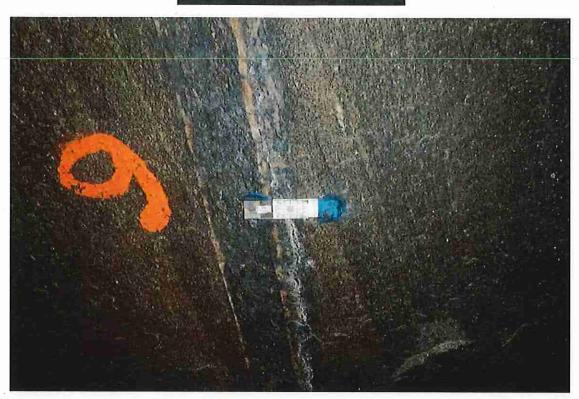


Photo 3: Granite Slab 6 - Split at mid-span.



Photo 4: Granite Slab 7 - Split at mid-span.

CITY/TOWN BELMONT=WALTHAM B.I.N. **7VB** BR. DEPT, NO. B-07-015=W-04-039 8.-STRUCTURE NO.
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Photo 5: Granite Slab 6 - Split crack gauge.

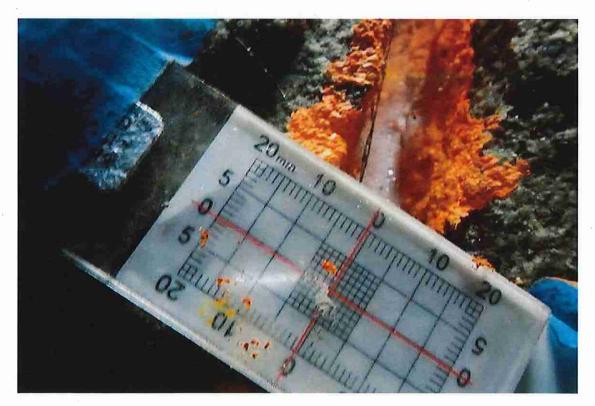


Photo 6: Granite Slab 7 - Split crack gauge.

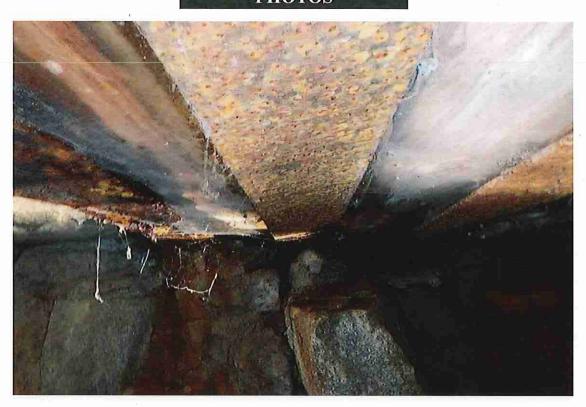


Photo 7: The beams typically exhibit minor rotation about the longitudinal axis, resulting in the bottom flanges no longer being level. Beams 1 - 3 shown. Note the timber shielding in between beams.



Photo 8: Typical heavy section loss and lamintination to the steel at the east end bottom flanges Northern side of Beam 8 shown.

CITY/TOWN BELMONT=WALTHAM B.I.N. **7VB** BR. DEPT. NO. B-07-015=W-04-039 8.-STRUCTURE NO.

B07015-7VB-MUN-CUL

INSPECTION DATE NOV 16, 2023



Photo 9: Heavy section loss up to 100% at the west end bottom flanges of Beams 7 (left) & Beam 8 (right).

Report Date: October 16, 2023	ClassificationCode
BDEPT#= B07015=W04039 Agency Br.No.	(112) NBIS Bridge Length N
Town= Belmont=Waltham L.O.	(104) Highway System N
B.I.N= 7VB . AASHTO= 002.0	(26) Functional Class - Urban Arterial 14
RANK= 0 H.I.= 90.6 % FHWA Select List= N (6/21/2017)	(100) Defense Highway
(8) Structure Number B070157VBMUNCUL	(101) Parallel Structure N
(5) Inventory Route 200000000	(102) Direction of Traffic - 2-way traffic 2
(2) State Highway Department District 04	(103) Temporary Structure Y
(3) County Code 017 (4) Place code 05070	(105) Fèderal Lands Highways 0
(6) Features Intersected WATER BEAVER BROOK	(110) Designated National Network N
(7) Facility Carried ST 60 TRAPELO RD	(20) Toll - On free road 3
(9) Location	(21) Maintain - Town Agency 03
(11) Kilometerpoint 0000.000	(22) Owner - Town Agency 03
(12) Base Highway Network N	(37) Historical Significance undetermined
(13) LRS Inventory Route & Subroute 00000000000	Condition Code (58) Deck
(16) Latitude 42 DEG 23 MIN 25.94 SEC	(58) Deck 3 (59) Superstructure 3
(17) Longitude 71 DEG 11 MIN 48.22 SEC	(60) Substructure 4
(98) Border Bridge State Code Share % (99) Border Bridge Structure No. #	(61) Channel & Channel Protection 5
Structure Type and Material	(62) Culverts N
(43) Structure Type Main: Masonry Code 801	Load Rating and PostingCode
Slab Jointless bridge type: Not applicable	(31) Design Load - Unknown 0
(44) Structure Type Appr:	(63) Operating Rating Method - Allowable Stress (AS) 2 (64) Operating Rating 00.0
Other Code 000	(64) Operating Rating 00.0 (65) Inventory Rating Method - Allowable Stress (AS) 2
(45) Number of spans in main unit 001	(66) Inventory Rating 00.0
(46) Number of approach spans 0000	(70) Bridge Posting 0
(107) Deck Structure Type - Concrete Cast-in-Place Code 1	(41) Structure - Open with shoring D
(108) Wearing Surface / Protective System:	Code
A) Type of wearing surface - Bituminous Code 6	(67) Structural Evaluation 2
B) Type of membrane - Unknown Code 8	(68) Deck Geometry 2 (69) Underclearances, vert. and horiz. N
C) Type of deck protection - None Code 0	(71) Waterway adequacy 7
Age and Service	(72) Approach Roadway Alignment 7
(27) Year Built 1850	(36) Traffic Safety Features 0 0 0 0
(106) Year Reconstructed 1900 (42) Type of Service: On - Highway-Ped	(113) Scour Critical Bridges 6
Under - Waterway Code 55	(90) Inspection Date 05/02/22 (91) Frequency 24 MO
(28) Lanes: On Structure 04 Under structure 00	(92) Critical Feature Inspection: (93) CFI DATE
(29) Average Daily Traffic 033000	(A) Fracture Critical Detail N 00 MO A) 00/00/00
(30) Year of ADT 2018 (109) Truck ADT 08 %	(B) Underwater Inspection Y 12 MO B) 11/29/21
(19) Bypass, detour length 005 KM	(C) Other Special Inspection Y 06 MO C) 11/14/22
Geometric Data	(*) Other Inspection () N 00 MO *) 00/00/00
(48) Length of maximum span 0002.0 M	(*) Closed Bridge N 00 MO *) 00/00/00
(49) Structure Length 00002.9 M	(*) UW Special Inspection . N 00 MO *) 01/13/17
(50) Curb or sidewalk: Left 02.7 M Right 00.0 M	(*) Damage Inspection MO *) 00/00/00 Rating Loads
(51) Bridge Roadway Width Curb to Curb 013.3 M (52) Deck Width Out to Out 023.7 M	Report Date 00/00/00 H20 Type 3 Type 3S2 Type HS
(52) Deck Width Out to Out 023.7 M (32) Approach Roadway Width (w/shoulders) 013.3 M	Operating 0.0 0.0 0.0 0.0
(33) Bridge Median - No median Code 0	Inventory 0.0 0.0 0.0 0.0
(34) Skew 00 DEG (35) Structure Flared N	Field Posting Status Posting Date 00/00/00
(10) Inventory Route MIN Vert Clear 99,99 M	Status Posting Date 00/00/00 2 Axle 3 Axle 5 Axle Single
(47) Inventory Route Total Horiz Clear 13.3 M	Actual
(53) Min Vert Clear Over Bridge Rdwy 99.99 M	Recommended
(54) Min Vert Underclear ref N 00.00 M	Missing Signs N Misc.
(55) Min Lat Underclear RT ref N 00.0 M	Bridge Name
(56) Min Lat Underclear LT 00.0 M	N Anti-missile fence N Acrow Panel N Jointless Bridge
Navigation Data	Freeze/Thaw N : Not Applicable
(38) Navigation Control - No navigation control on waterway Code 0 (111) Pier Protection Code	# Stairs On/Adjacent 0 Stair Owner(s)
1993 3349 (2010) 1993 (2010) 1	Accessibility (Needed/Used)
(39) Navigation Vertical Clearance	
(39) Navigation Vertical Clearance 000,0 M (116) Vert-lift Bridge Nav Min Vert Clear M	N/N Liftbucket N/N Rigging N/N Other
(39) Navigation Vertical Clearance 000.0 M (116) Vert-lift Bridge Nav Min Vert Clear M (40) Navigation Horizontal Clearance 0000.0 M	N/N Ladder N/N Staging
(116) Vert-lift Bridge Nav Min Vert Clear M	N / N Ladder N / N Staging N / N Boat N / N Traffic Control
(116) Vert-lift Bridge Nav Min Vert Clear M	N/N Ladder N/N Staging N/N Boat N/N Traffic Control

Report Date: December 5, 2023 State Information		ClassificationCode
BDEPT#= B07015=W04039 Agency Br.No		(112) NBIS Bridge Length N
Town= Belmont=Waltham	L.O.	(104) Highway System N
B.I.N= 7VB	AASHTO= 002.0	(26) Functional Class - Urban Arterial 14
RANK= 0 H.I.= 90.6 % FHWA Sele	ct List= N (6/21/2017)	(100) Defense Highway
	B070157VBMUNCUL	(101) Parallel Structure
(5) Inventory Route	200000000	(102) Direction of Traffic - 2-way traffic 2
(2) State Highway Department District	04	(103) Temporary Structure Y
(3) County Code 017 (4) Place code	05070	(105) Federal Lands Highways
(6) Features Intersected WATE	R BEAVER BROOK	(110) Designated National Network
(7) Facility Carried	ST 60 TRAPELO RD	(20) Toll - On free road
(9) Location		(21) Maintain - Town Agency 03
(11) Kilometerpoint	0000.000	(22) Owner - Town Agency 03
(12) Base Highway Network	N	** 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
(13) LRS Inventory Route & Subroute 000000000	000	ConditionCode
(16) Latitude 42 DEG	23 MIN 25.94 SEC	
(17) Longitude 71 DEG	11 MIN 48.22 SEC	(59) Superstructure 3
(98) Border Bridge State Code	Share %	(60) Substructure 4 (61) Channel & Channel Protection 5
(99) Border Bridge Structure No. #	**	(62) Culverts
Structure Type and Material		Load Rating and PostingCode
(43) Structure Type Main: Masonry	Code 801	(31) Design Load - Unknown 0
Slab Jointless bridge type:	Not applicable	(63) Operating Rating Method - Allowable Stress (AS) 2
(44) Structure Type Appr:		(64) Operating Rating 00.0
Other	Code 000	(65) Inventory Rating Method - Allowable Stress (AS)
(45) Number of spans in main unit	001	(66) Inventory Rating 00.0
(46) Number of approach spans	0000	(70) Bridge Posting 0
(107) Deck Structure Type - Concrete Cast-in-Place	Code 1	(41) Structure - Open with shoring
(108) Wearing Surface / Protective System:		AppraisalCode (67) Structural Evaluation 2
A) Type of wearing surface - Bituminous	Code 6	(67) Structural Evaluation 2 (68) Deck Geometry 2
B) Type of membrane - Unknown	Code 8	(69) Underclearances, vert. and horiz.
C) Type of deck protection - None	Code 0	(71) Waterway adequacy 7
Age and Service	Form and	(72) Approach Roadway Alignment 7
(27) Year Built	1850	(36) Traffic Safety Features 0 0 0 0
(106) Year Reconstructed	1900	(113) Scour Critical Bridges 6
(42) Type of Service: On - Highway-Ped	9 8	Inspections
Under - Waterway	Code 55	(90) Inspection Date 05/02/22 (91) Frequency 24 M
(28) Lanes: On Structure 04 Under s		(92) Critical Feature Inspection: (93) CFI DATE
(29) Average Daily Traffic	033000	(A) Fracture Critical Detail N 00 MO A) 00/00/0
(30) Year of ADT 2018 (109) Truck ADT	08 %	(B) Underwater Inspection Y 12 MO B) 11/29/2
(19) Bypass, detour length Geometric Data	005 KM	(C) Other Special Inspection Y 06 MO C) 11/16/2
(48) Length of maximum span	0002.0M	(*) Other Inspection () N 00 MO *) 00/00/0
(49) Structure Length	0002.0 M	(*) Closed Bridge N 00 MO *) 00/00/0 (*) UW Special Inspection N 00 MO *) 01/13/1
(50) Curb or sidewalk: Left 02.7 M	Right 00.0 M	(*) UW Special Inspection N 00 MO *) 01/13/1 (*) Damage Inspection MO *) 00/00/0
(51) Bridge Roadway Width Curb to Curb	013.3 M	Rating Loads
(52) Deck Width Out to Out	023.7 M	Report Date 00/00/00 H20 Type 3 Type 3S2 Type HS
(32) Approach Roadway Width (w/shoulders)	013.3 M	Operating 0.0 0.0 0.0 0.0
(33) Bridge Median - No median	Code 0	Inventory 0.0 0.0 0.0 0.0
(34) Skew 00 DEG (35) Structure Flared		Field Posting
(10) Inventory Route MIN Vert Clear	99,99 M	Status Posting Date 00/00/00
(47) Inventory Route Total Horiz Clear	13.3 M	2 Axle 3 Axle 5 Axle Single Actual
(53) Min Vert Clear Over Bridge Rdwy	99.99 M	Recommended
(54) Min Vert Underclear ref N	00.00 M	Missing Signs N
(55) Min Lat Underclear RT ref	00.00 M	Misc
(56) Min Lat Underclear LT		Bridge Name
So) will Lat Underclear L1 Navigation Data	00.0M	N Anti-missile fence N Acrow Panel N Jointless Bridge
38) Navigation Control - No navigation control on waterway	Code 0	Freeze/Thaw N : Not Applicable
111) Pier Protection	Code	# Stairs On/Adjacent 0 Stair Owner(s)
39) Navigation Vertical Clearance	000.0 M	Accessibility (Needed/Used)
		N/N Liftbucket N/N Rigging N/N Other
116) Vert-lift Bridge Nav Min Vert Clear	M	
116) Vert-lift Bridge Nav Min Vert Clear 40) Navigation Horizontal Clearance	M 0000.0 M	N/N Ladder N/N Staging