

STRUCTURES INSPECTION FIELD REPORT

2-DIST
04

B.I.N.
2M4

ROUTINE INSPECTION

BR. DEPT. NO.
L-15-088

CITY/TOWN LOWELL	8-STRUCTURE NO. L15088-2M4-DOT-NBI	11-Kilo. POINT 000.000	41-STATUS P:POSTED	90-ROUTINE INSP. DATE NOV 16, 2022
07-FACILITY CARRIED HWY WOOD ST EXT	MEMORIAL NAME/LOCAL NAME ROURKE BRIDGE	27-YR BUILT 1983	106-YR REBUILT 0000	YR REHAB'D (NON 106) 0000
06-FEATURES INTERSECTED COMB BMRR & MERRIMACK R	26-FUNCTIONAL CLASS Urban Arterial	DIST. BRIDGE INSPECTION ENGINEER J. Dideo		
43-STRUCTURE TYPE 310 : Steel Truss - Thru	22-OWNER State Highway Agency	21-MAINTAINER State Highway Agency	TEAM LEADER S. St Hilaire	PROJ MGR HNTB Corporation
107-DECK TYPE 5 : Steel plate	WEATHER Varied	TEMP. (air) 4°C	TEAM MEMBERS E. B. ROTKIEWICZ, T. GOETZ, T. E. MANNING	

ITEM 58	5	
DECK		DEF
1. Wearing Surface	4	M-A
2. Deck Condition	5	M-A
3. Stay-in-Place Forms	5	M-P
4. Curbs	7	-
5. Median	N	-
6. Sidewalks	7	M-P
7. Parapets	N	-
8. Railing	6	M-P
9. Anti-Missile Fence	6	M-P
10. Drainage System	N	-
11. Lighting Standards	6	M-P
12. Utilities	5	M-P
13. Deck Joints	5	M-P
14.	N	-
15.	N	-
16.	N	-
CURB REVEAL (In millimeters)	E 130	W 130

APPROACHES		DEF
a. Appr. Pavement Condition	6	M-P
b. Appr. Roadway Settlement	6	M-P
c. Appr. Sidewalk Settlement	5	S-P
d.	N	-

OVERHEAD SIGNS (Attached to bridge)	(Y/N)	N
		DEF
a. Condition of Welds	N	-
b. Condition of Bolts	N	-
c. Condition of Signs	N	-

ITEM 59	6	
SUPERSTRUCTURE		DEF
1. Stringers	N	-
2. Floorbeams/Transoms	6	M-P
3. Floor System Bracing	5	M-P
4. Girders or Beams	N	-
5. Trusses - General	6	M-P
a. Upper Chords	7	-
b. Lower Chords	6	S-P
c. Web Members	7	-
d. Lateral Bracing	N	-
e. Sway Bracings	N	-
f. Portals	N	-
g. End Posts	5	M-P
6. Pins	6	S-P
7. Conn Plt's, Gussets & Angles	7	-
8. Cover Plates	N	-
9. Bearing Devices	6	M-P
10. Diaphragms/Cross Frames	N	-
11. Rivets & Bolts	6	M-P
12. Welds	7	-
13. Member Alignment	7	M-P
14. Paint/Coating	5	M-P
15.	N	-

Year Painted **N**

COLLISION DAMAGE: Please explain
None (X) Minor () Moderate () Severe ()

LOAD DEFLECTION: Please explain
None () Minor () Moderate (X) Severe ()

LOAD VIBRATION: Please explain
None () Minor () Moderate (X) Severe ()

Any Fracture Critical Member: (Y/N) **Y**

Any Cracks: (Y/N) **N**

ITEM 60	5			
SUBSTRUCTURE		DEF		
1. Abutments	Dive	Cur	6	
a. Pedestals	N	N		-
b. Bridge Seats	N	7		-
c. Backwalls	N	7		-
d. Breastwalls	N	6		M-P
e. Wingwalls	N	7		-
f. Slope Paving/Rip-Rap	N	6		M-P
g. Pointing	N	N		-
h. Footings	N	7		-
i. Piles	N	N		-
j. Scour	N	N		-
k. Settlement	N	7		-
l.	N	N		-
m.	N	N		-
2. Piers or Bents			5	
a. Pedestals	N	5		M-P
b. Caps	N	N		-
c. Columns	N	N		-
d. Stems/Webs/Pierwalls	N	6		M-P
e. Pointing	N	N		-
f. Footing	N	N		-
g. Piles	N	N		-
h. Scour	N	N		-
i. Settlement	N	7		-
j. Acrow Towers	N	H		M-P
k.	N	N		-
3. Pile Bents			6	
a. Pile Caps	N	6		M-P
b. Piles	6	H		M-P
c. Diagonal Bracing	N	N		-
d. Horizontal Bracing	N	N		-
e. Fasteners	N	N		-

UNDERMINING (Y/N) If YES please explain **N**

COLLISION DAMAGE:
None (X) Minor () Moderate () Severe ()

SCOUR: Please explain
None (X) Minor () Moderate () Severe ()

I-60 (Dive Report): **6** I-60 (This Report): **5**

93B-U/W (DIVE) Insp **09/30/2021**

X=UNKNOWN

N=NOT APPLICABLE H=HIDDEN/INACCESSIBLE

R=REMOVED

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ITEM 61 6

CHANNEL & CHANNEL PROTECTION

	Dive	Cur	DEF
1.Channel Scour	7	H	-
2.Embankment Erosion	5	6	M-P
3.Debris	6	5	M-P
4.Vegetation	7	7	-
5.Utilities	N	N	-
6.Rip-Rap/Slope Protection	5	6	M-P
7.Aggradation	8	8	-
8.Fender System	5	6	M-P

STREAM FLOW VELOCITY:
Tidal () High () Moderate () Low () None ()

ITEM 61 (Dive Report): 6 ITEM 61 (This Report): 6

93b-U/W INSP. DATE: 09/30/2021

ITEM 36 TRAFFIC SAFETY

	36	COND	DEF
A. Bridge Railing	0	6	M-P
B. Transitions	1	7	-
C. Approach Guardrail	0	5	M-P
D. Approach Guardrail Ends	0	5	M-P

WEIGHT POSTING Not Applicable

	H	3	3S2	Single
Actual Posting	20	25	28	N
Recommended Posting	20	25	28	N

Waived Date: 00/00/0000 EJDMT Date: 00/00/0000

At bridge		Other Advance	
N	S	N	S
Y	Y	Y	Y
7	6	7	6

Signs In Place (Y=Yes, N=No, NR=Not Required)
Legibility/Visibility

CLEARANCE POSTING

	E		W		meter
Not	ft	in	ft	in	
Actual Field Measurement		0		0	
Posted Clearance		0		0	

At bridge		Advance	
E	W	E	W
/	/	/	/

Signs In Place (Y=Yes, N=No, NR=Not Required)
Legibility/Visibility

ACCESSIBILITY (Y/N/P)

	Needed	Used
Lift Bucket	Y	Y
Ladder	Y	Y
Boat	N	N
Waders	N	N
Inspector 50	N	N
Rigging	N	N
Staging	N	N
Traffic Control	Y	Y
RR Flagger	Y	Y
Police	Y	Y
Other:		
LIFTBOAT	Y	Y

TOTAL HOURS 290

PLANS (Y/N): Y

(V.C.R.) (Y/N): N

TAPE#: _____

List of field tests performed:
Visual and Hands-on.

RATING

Rating Report (Y/N): Y

Date: 06/01/2003

Inspection data at time of existing rating
I 58: 7 I 59: 7 I 60: 5 Date : 10/11/2002

Recommend for Rating or Rerating (Y/N): N

If YES please give priority:
HIGH () MEDIUM () LOW ()

REASON: _____

CONDITION RATING GUIDE (For Items 58, 59, 60 and 61)

CODE	CONDITION	DEFECTS
N	NOT APPLICABLE	
G 9	EXCELLENT	Excellent condition.
G 8	VERY GOOD	No problem noted.
G 7	GOOD	Some minor problems.
F 6	SATISFACTORY	Structural elements show some minor deterioration.
F 5	FAIR	All primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
P 4	POOR	Advanced section loss, deterioration, spalling or scour.
P 3	SERIOUS	Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
C 2	CRITICAL	Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C 1	"IMMINENT" FAILURE	Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put it back in light service.
0	FAILED	Out of service - beyond corrective action.

DEFICIENCY REPORTING GUIDE

DEFICIENCY: A defect in a structure that requires corrective action.

CATEGORIES OF DEFICIENCIES:

M= Minor Deficiency Deficiencies which are minor in nature, generally do not impact the structural integrity of the bridge and could easily be repaired. Examples include but are not limited to: Spalled concrete, Minor pot holes, Minor corrosion of steel, Minor scouring, Clogged drainage, etc.

S= Severe/Major Deficiency Deficiencies which are more extensive in nature and need more planning and effort to repair. Examples include but are not limited to: Moderate to major deterioration in concrete, Exposed and corroded rebars, Considerable settlement, Considerable scouring or undermining, Moderate to extensive corrosion to structural steel with measurable loss of section, etc.

C-S= Critical Structural Deficiency A deficiency in a structural element of a bridge that poses an extreme unsafe condition due to the failure or imminent failure of the element which will affect the structural integrity of the bridge.

C-H= Critical Hazard Deficiency A deficiency in a component or element of a bridge that poses an extreme hazard or unsafe condition to the public, but does not impair the structural integrity of the bridge. Examples include but are not limited to: Loose concrete hanging down over traffic or pedestrians, A hole in a sidewalk that may cause injuries to pedestrians, Missing section of bridge railing, etc.

URGENCY OF REPAIR:

I = Immediate- [Inspector(s) immediately contact District Bridge Inspection Engineer (DBIE) to report the Deficiency and to receive further instruction from him/her].

A = ASAP- [Action/Repair should be initiated by District Maintenance Engineer or the Responsible Party (if not a State owned bridge) upon receipt of the Inspection Report].

P = Prioritize- [Shall be prioritized by District Maintenance Engineer or the Responsible Party (if not a State owned bridge) and repairs made when funds and/or manpower is available].

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REMARKS

BRIDGE ORIENTATION

The Rourke Bridge, L-15-088 (2M4), is a nine span bridge carrying Wood Street Extension over the Merrimack River and CSX Railroad in the City of Lowell. The bridge is oriented from south to north. Refer to **sketch 1** for the general bridge location.

The spans are numbered from 1 through 9 from south to north. The span 1 transom members are numbered 0 through 8, and for spans 2 through 8 the transom members are numbered 0 through 29. The piers are numbered 1 through 8 from south to north, and abutments are designated as south and north.

The superstructure of spans 1 to 8 consists of built-up steel Acrow trusses. Span 1 consists of galvanized steel Acrow panel type "triple single" truss panels (three wide x single height) at each fascia which support ten galvanized steel transoms labeled T0-T9. Spans 2 to 8 consist of galvanized steel Acrow panel type "triple double" truss panels (three wide x two high) at each fascia which support thirty galvanized steel transoms labeled T0-T29. The transoms support eleven steel deck panels with an epoxy aggregate wearing surface. The span 9 superstructure consists of a reinforced concrete deck slab which supports a bituminous concrete wearing surface.

The substructure consists of two reinforced concrete abutments labeled south and north, and eight piers labeled 1 to 8 from south to north. Piers 1 to 3, 5, and 6 consist of a pair of Acrow panel towers supported by concrete pedestals that are supported by steel pile bents with reinforced concrete pile caps. Pier 4 consists of a reinforced concrete pierwall supported by steel piles with a reinforced concrete pile cap. Pier 7 consists of a pair of reinforced concrete pedestals supported by steel piles with a reinforced concrete pile cap. Pier 8 consists of a pair of reinforced concrete stems.

GENERAL REMARKS

The floorbeams/transoms are considered fracture critical members.

LOAD POSTINGS

The bridge is currently posted for 20, 25, and 28 tons for H20, Type 3, and 3S2 truck loadings, respectively. The southeast advance approach posting sign is partially obstructed by a "local attractions" sign. Refer to **sketch 1** for sign locations and **sketch 2** for the condition of posting signs.

WORK ACCESS NOTES

Spans 3 to 7, portions of spans 2 and 8, and piers 2 to 7 were inspected utilizing a bucket boat lift. The underside of span 1, portions of the undersides of spans 2 and 8, and a portion of pier 1 were inspected utilizing an under-bridge inspection unit (UBIU). A portion of the underside of span 2 was inspected utilizing a hi-rail bucket truck, in conjunction with a CSX Railroad flagger. The south abutment and a portion of pier 1 was inspected on foot utilizing a six-foot ladder. The underside of span 9, a portion of the underside of span 8, pier 8, and the north abutment were inspected on foot utilizing a six-foot ladder. The upper and middle chords of the west trusses for all spans, and the western faces of the upper and middle chords of the east trusses for all spans were inspected with a bucket truck. The top of deck was inspected on foot. These efforts were performed in conjunction with a full bridge closure (9:00 pm to 5:00 am) and detour in-place with City of Lowell police details.

A railroad license agreement was obtained from CSX Railroad for inspection access. The entry permit is submitted electronically via the CSX property portal.

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REMARKS

ITEM 58 - DECK

Item 58.1 - Wearing Surface

In spans 1 to 8, the roadway deck panels are covered by an epoxy aggregate wearing surface. Up to 70% of the total top of deck area has many up to full panel width by full panel length areas of missing epoxy aggregate wearing surface, exposing the steel deck panels below (**see photos 1 and 2**). The heaviest areas of missing epoxy aggregate wearing surface occur at the panels located along the centerline and curbline. Many roadway deck panels have an exposed diamond tread plate pattern with no applied epoxy aggregate wearing surface (**see photo 3**).

In span 9, the bituminous concrete wearing surface has scattered transverse hairline cracks. Along the pier 8 joint, the deck has a patch 1'-6" long by full width.

Item 58.2 - Deck Condition

Spans 1 to 8

The deck consists of steel roadway deck panels, comprised of a steel deck plate welded to supporting purlin member, which span between each transom and are connected by bolts at each corner. There are eleven panels across the width of the deck. The underside of deck plate and purlins have scattered areas of failed galvanization with light to moderate surface rust with isolated areas of heavy surface rust (**see photo 4**). Numerous panels have gaps at the supports between the purlins and elastomeric bearing pads along the top of the transom top flanges due to loose or broken connection bolts. This condition causes banging and movement under live load, refer below and to **chart 1** for specific deficiencies. Refer to item 58.1 for additional information.

Scattered deck panels are lifted or shifted due to loose bolts and bent or worn purlins. The location and description of specific deficiencies are as follows:

- Span 1, 5th deck panel from east, at south abutment joint: Panel has gouge 2" long by 4" wide.
- Span 2, 11th deck panel from east, south face of T12: Panel has fracture in northeastern corner resulting in plate 3" long by 4" wide full section loss (**see photo 5**).
- Span 3, middle deck panel, north face of T3: Panel is 1/4" higher than panel to the south.
- Span 3, 4th panel from east, south face of T10: Panel shifted on top of and wearing into panel adjacent to the west.
- Span 4, middle deck panel between T4 and T5: Panel is 1/2" higher than the panel adjacent to the east (**see photo 6**).
- Span 5, middle deck panel, south face of T16: Panel has a 2" long by 6" wide gouge (**see photo 7**).
- Span 5, 5th deck panel from east, south face of T21: Panel is shifted north with minor gouges at north side (**see photo 3**), and eastern most purlins are bent 1" and 1-1/2" out-of-plane towards the west, respectively.
- Span 6, 10th deck panel from east, south face of T12, from below: The east four purlins have mutual wear with the transom top flange 1/8" deep (**see photo 8**). See **Item 59.2** for additional information.
- Span 8, 2nd and 3rd deck panels from east, between T3 and T4: Shifted north.
- Span 8, 3rd deck panel from east, north face of T5: Panel has fracture in southeast corner resulting in 4" long by 10" wide full section loss (**see photo 2**).
- Span 8, middle deck panel, south face of T10: Panel is shifted south, and is 1/4" higher than panel adjacent to the east.

Span 9

The reinforced concrete slab deck in span nine has up to 4'-9" long by 2'-4" wide areas of delamination along the underside of the deck at both the east and west edges of deck at the north end. The underside of the deck at both the eastern and western outer edges exhibit full length by up to 3'-4" wide areas of hairline map cracking with moisture (**see photo 9**). The underside of the deck 4'-0" from the east edge of deck and 3'-0"

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REMARKS

from the north abutment has a 2'-0" diameter area of delamination. The underside of the slab is painted with areas of light graffiti. The south end vertical face of the slab at pier 8 has hollow areas throughout with an up to 7'-6" long by 1'-0" high by up to 2-1/2" deep spall at the east end with exposed rebar (**see photo 10**). The span 9 and south approach concrete sidewalk undersides are concealed by stay-in-place (SIP) forms, refer to **Item 58.3**.

The top of deck typically has minor accumulation of dirt and debris along the curb lines.

Item 58.3 - Stay-in-Place Forms

Stay-in-place (SIP) forms are installed at the underside of the concrete sidewalk in span 9 and at the south approach sidewalk. Timber shielding is in place below the SIP forms in span 9, (**see photo 9**), which prevents access to the majority of the SIP forms except at the south end of the span 9 sidewalk at pier 8. The SIP forms that are visible have moderate rust throughout with areas of heavy rust and corrosion holes most notably along the north half and typically along SIP joints and edges (**see photo 11**).

Item 58.4 - Curbs

The steel plate curbs have scattered areas of minor to moderate delamination and minor galvanization loss throughout the roadway faces. Scattered curb plates are misaligned up to 1/2" out-of-plane creating a potential hazard for plows.

Item 58.6 - Sidewalks

The span 1 sidewalk has a light accumulation of debris along the edges. In spans 1 to 8, the steel tread plate sidewalk has scattered plates bowed upwards up to 5/8" high at the ends of the plates, which do not create a tripping hazard. At span 3, north of transom T11, the sidewalk west kick plate connection is missing one bolt. The underside of the steel tread plates have scattered areas of corrosion along the east and west edges (**see photo 12**). The south approach concrete sidewalk has light to moderate scaling and light accumulation of debris along the edges.

Item 58.8 - Railing

The railings have isolated minor collision scrapes and dents throughout. The location and description of specific deficiencies are as follows:

- Span 5, West Rail Post at T3: North flange exhibits a 2" long by 1" high upward bent.
- Span 7, West Rail Post at T28: North flange has impact damage and bent 2" long x 1" downwards.
- Span 8, West Rail Post at T9: North flange has impact damage and bent 2" long x 2" downwards (**see photo 13**).
- Span 8, West Railing at Pier 8: Lower rail expansion sleeve has heavy rust with a hole along the edge of the vertical connection plate.

The sidewalk pedestrian handrail is incorporated into the anti-missile fence assembly.

Item 58.9 - Anti-Missile Fence

The anti-missile fence typically has light rust throughout. The fence has heavy vine growth throughout the south approach, the first two panels of span 1, and from T25 to T28 in span 8. In span 4 between T8 and T9, the west half of a previous repair is torn and loose (**see photo 14**). The connection fasteners of the repaired section of fence in span 5 between T26 and T27 exhibit light surface rust.

Item 58.11 - Lighting Standards

The lighting standards mounted to the top of the trusses along both sides of the bridge are typically missing one of two access cover connection bolts and the covers are slightly loose.

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The lighting standards typically have welded conduit connections located at the base of the pole. At various locations lighting standard have missing conduit connection caps, or were not illuminated at night during the time of inspection. The location and description of specific deficiencies are as follows:

- Span 3, East Truss, at Pier 3 (Pole Marking "21L"): North face of conduit connection to light pole base with cracked weld over 90% the circumference and cracks emanating towards the east and west. The luminaire was not illuminated at the time of overnight inspection.
- Span 5, East Truss, at South Third Point in Span (Pole Marking "20L"): North face of conduit connection to light pole base with cracked weld over 100% the circumference and one crack emanating towards the east 1-3/4" and two cracks emanating towards the west 1-1/4" and 1/2" (**see photo 15**). The luminaire was not illuminated at the time of overnight inspection.
- Span 6, East Truss, at North Third Point in Span (Pole Marking "19L"): Missing cap on top of pole.
- Span 7, East Truss, at Pier 7 (Pole Marking "18L"): Missing cap on top of pole.
- Span 8, West Truss, at North Third Point in Span (Pole Marking "13L"): South face of conduit connection to light pole base with cracked weld over the bottom 50% of circumference.

Item 58.12 - Utilities

The lighting standard conduits are seated on steel brackets held in place by clamps which are mounted to the top of both trusses. Scattered clamps throughout the bridge have light rust. The east truss light conduit is missing the protective wrapping and has light rust along the north end of span 1 and the threaded connection at the north end of the span is disconnected. The east truss conduit access cover at pier 1 is missing one of two connection bolts and is secured with tape. The east truss conduit throughout span 6 is not seated on the steel brackets (**see photo 16**). The east truss conduit in span 6 has a torn protective wrapping at T21. The west truss conduit connection clamps are missing from T20 of span 3 to T6 of span 4, and from T12 of span 6 to T15 of span 8.

Item 58.13 - Deck Joints

The Transflex expansion joints at the south abutment and pier 8 are comprised of reinforced elastomeric molded rubber (5 total rubber modules, inclusive of modules with oval openings for anchorages) and steel angle sections at the south and north limits of the joint. The elastomeric covering of the expansion joint system is gouged, torn and worn away in various areas exposing the internal joint plates. Several of the oval anchorage cover plugs are missing throughout. The steel joint angles along each side of the Transflex joints have scattered areas of light rust and scattered minor plow gouges. The location and description of more severe deterioration are as follows:

- South Abutment Joint, Southern Armor Angle, Northbound Lane: Gouge 2-3/4" long by 6" wide, near the centerline.
- South Abutment Joint, 2nd Elastomeric Module from South, Southbound Lane: The internal steel joint plates are missing over 2'-0" long by 6" wide and 6'-0" long by 6" wide sections of the joint (**see photo 17**).
- Pier 8 Joint, 2nd Elastomeric Module from South, Northbound Lane: The internal steel plate is missing over a 6'-0" long by 6" wide section.
- Pier 8 Joint, 2nd Elastomeric Module from North, Northbound Lane: The internal steel plate is missing over a 6'-0" long by 6" wide section.

APPROACHES

Approaches a - Appr. Pavement Condition

The south and north approach roadways have minor to moderate wheel line rutting, areas of light raveling, areas of map cracking, and patches along the west curb lines.

The south approach roadway pavement is heaved along the centerline at the south abutment deck joint.

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Approaches b - Appr. Roadway Settlement

The approach pavement has areas of minor settlement where map cracking is present along the west curb lines.

Approaches c - Appr. Sidewalk Settlement

The south approach bituminous sidewalk has up to 2" settlement throughout and is filled with up to 3 1/2" of debris/sand(see photo 18).

The northwest approach bituminous sidewalk has uneven areas and up to 1" settlement at the concrete transition to the bridge sidewalk. The concrete transition has hairline map cracks throughout and scattered minor edge spalls.

ITEM 59 - SUPERSTRUCTURE

Item 59.2 - Floorbeams/Transoms

The transoms typically have areas of galvanization loss with moderate to heavy surface rust at the lower portion of web, bottom flange, and around bracing and deck plate connections (see photo 19). There are isolated locations of heavy surface rust and up to 1/8" deep pitting at areas of failed galvanization (see photos 20 and 21). The webs and flanges have scattered rolling defects typically up to 1/16" deep.

The transom to Acrow truss connections have scattered locations with broken, loose, missing, or improperly installed fasteners (see photo 22). For details, refer to charts 2 through 9.

The transoms have isolated areas of failed galvanization and section loss, specific deficiencies are as follows:

- Span 5, T26, North Face, Underside of Top Flange, Full Length: Failed galvanization and heavy surface rust with no measurable section loss.
- Span 6, T4, South Face, Underside of Top Flange and Web, 10'-0" from East Truss: Area of failed galvanization 1'-6" wide by 1'-6" high, and heavy surface rust with up to 1/32" section loss.
- Span 6, T12, South Face, Underside of Top Flange, 8'-0" from East Truss: Area of 100% section loss 1" long by 2" wide tapering to full flange section over 7-1/4" long (see photo 23).
- Span 6, T12, South Face, Top Flange, Below 10th Deck Panel from East: Four locations of 2-1/4" wide by 1/4" deep section loss in transom top flange resulting from mutual wear of four purlins, located above with transom top flange caused by loose deck panel (see photo 8). See Item 58.2 for additional information.
- Span 6, T12, North Face, Web, Midspan: Area of 1'-8" wide by 1'-8" high by 1/32" deep section loss (see photo 24).
- Span 7, T14, Bottom Flange North Edge, 10'-0" from West Truss: 1/8" section loss at edge, tapering to zero loss at transom web (see photo 25).

The span 9 south end of deck support floorbeam typically has heavy surface rust throughout the south face of the member. At the east half of member, the bottom of bottom flange exhibits heavy surface rust, and the south face of the web has up to 1/16" deep section loss/pitting by up to full height of web (see photo 10).

Item 59.3 - Floor System Bracing

The floor bracing bars typically exhibit failed galvanization and surface rust. Scattered floor bracing bars have loose or missing connection bolts causing them to vibrate under live load (see photo 26). Scattered bracing bar to transom web connections have moderate to heavy surface rust and various bracing bars have areas of up to 100% section loss (see photos 27 and 28). Refer to charts 10 through 17 for specific deficiencies.

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REMARKS

Item 59.5 - Trusses - General

The Acrow truss panels have targeted areas failed galvanization throughout with light to moderate surface rust (**see photo 29**). Isolated locations throughout panels have slag present adjacent to welds generated during fabrication. The west truss in span 8 between transoms T27 and T29 has heavy vegetation growth. Refer to **Items 59.5.a, 59.5.b, 59.5.c** and **59.5.g** for details.

Item 59.5.a - Upper Chords

The upper chord channel flanges have isolated bends and gouges which appear to be from construction. The location of specific deficiencies are as follows:

- Span 2, East Truss at T4: East lower channel bottom flange is bent 1/2" upward over a 3" length (**see photo 30**).
- Span 4, East Truss between T22 and T23: West lower channel top and bottom flanges have gouges up to 2" long by 1/4" high with loss of galvanization.
- Span 6, East Truss at T2: West lower channel bottom flange has a rolling defect.
- Span 6, East Truss at T26: West lower channel bottom flange has a 2" long by 1/4" high gouge.
- Span 7, East Truss between T7 and T8: East lower channel bottom flange south of the pin has two areas with up to 1/2" upward bend over 8" long (total).
- Span 7, East Truss between T5 and T6: East upper channel bottom flange is bent up 1/2" out-of-plane over a 4-1/2" length.
- Span 7, East Truss between T13 and T14: East lower channel bottom flange is bent up 1/2" out-of-plane over a 5-1/2" length.
- Span 7, East Truss between T17 and T18: East lower channel bottom flange is bent up 1/2" out-of-plane over a 3" length.
- Span 7, East Truss between T21 and T22: East lower channel bottom flange is bent up 1/2" out-of-plane over a 3" length.
- Span 8, East Truss between T4 and T5: East upper channel top flange is bent 1/2" out-of-plane over a 3" length.
- Span 8, East Truss between T28 and T29: West lower channel bottom flange has a gouge 3" long by 1/2" high.

Item 59.5.b - Lower Chords

The lower chords at scattered panel point locations exhibit minor to moderate abrasion wear with heavy fretting. The pin connection openings have been enlarged due to the wear and these locations typically have gaps up to 1/8" wide between the panel point connection holes and the connection pins (**see photo 31**). The largest gap is up to 1/4" wide in span 1 at the east truss panel point T9-Bearing (**see photo 32**). Refer to **charts 2 through 9** for specific deficiencies.

The lower chords have several areas of pigeon debris/nesting and heavy debris buildup between chord members. The lower chords also have loss of galvanization with light to moderate rust (**see photo 29**).

The lower chord channel flanges have isolated bends and gouges which appear to be from construction. The location of specific deficiencies are as follows:

- Span 6, East Truss just north of T9: East upper channel top flange is bent 1/2" out-of-plane over a 3" length.
- Span 8, East Truss at T1: East lower channel bottom flange has a gouge 3-1/2" long by 1/2" high.

Item 59.5.c - Web Members

The web member to lower chord connection plates that the transoms bear on are typically filled with debris and the connection plates have heavy rust with isolated section loss. The location and description of specific deficiencies are as follows:

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- Span 2, East Truss at T5: West panel connection plate has a hole 1/2" long by 1/4" high with surrounding section loss.
- Span 3, West Truss at T0: East panel connection plate has a hole 4" long by up to 1-1/2" high with a section loss induced crack along the full width of the connection plate weld.
- Span 3, East Truss at T5: West panel connection plate has a hole 3" long by 1" high with an adjacent full length cracked weld resulting in full separation on both the south and north sides of the west panel point **(see photo 33)**.
- Span 5, East Truss between T1-T2: West vertical member between the lower and middle chord south of the pin has active corrosion at the bottom of the vertical member at the lower chord connection.
- Span 5, West Truss between T1-T2: East vertical member between the upper and middle chord north of the pin has an impact gouge 1-1/2" high by 1/4" deep.
- Span 6, West Truss between T7-T8: Center vertical member between the lower and middle chord south of the pin has moderate surface rust around the drain hole located at bottom of the vertical member at the lower chord connection.
- Span 6, East Truss between T9-T10: West vertical member between the lower and middle chord south of the pin has moderate surface rust around the drain hole located at bottom of the vertical member at the lower chord connection **(see photo 34)**.
- Span 6, East Truss between T27-T28: Center vertical member between the lower and middle chord south of the pin has moderate surface rust around the drain hole located at bottom of the vertical member at the lower chord connection.
- Span 6, East Truss between T29-Bearing: West vertical member between the lower and middle chord south of the pin has moderate surface rust around the drain hole located at bottom of the vertical member at the lower chord connection.
- Span 8, East Truss between T19-T20, South of T19-T20 Pin: Upper east channel web has a longitudinal flaw 2-3/16" long **(see photo 35)**.

Item 59.5.g - End Posts

The truss end posts below the south abutment deck joint and the pier 8 deck joint typically have moderate to heavy rust surrounding the drain holes.

In span 1, at the south abutment, the end posts have the following deficiencies:

- East Face of the East Truss, East End Post: Hole 2" long by 1-1/2" high.
- East Face of the East Truss, West End Post: Hole 4" long by 2" high.
- West Face of the East Truss, West End Post: Hole 6" long by 2" high.
- East and West Faces of the West Truss, East End Post: Holes up to 6" long by 4" high **(see photo 36)**.
- West Truss, West End Post: Post is slightly loose and able to be moved by hand.

In span 8, at pier 8, the end posts have the following deficiencies:

- East Face of the East Truss, East End Post: Hole 6" long by 4" high **(see photo 37)**.
- West Face of the East Truss, East End Post: Hole 5" long by 3" high.
- East Face of the East Truss, Center End Post: Hole 5" long by 3-1/2" high **(see photo 37)**.
- West Face of the East Truss, West End Post: Hole 3" long by 1-1/2" high.
- East Face of the West Truss, East End Post: Hole 6" long by 3" high.
- West Face of the West Truss, East End Post: Hole 3" long by 2" high.
- East Face of the West Truss, Center Post: Hole 3" long by 2" high.

Item 59.6 - Pins

The Acrow panels are connected with pins to form the built-up Acrow trusses. Numerous pins at the connections are loose and move freely by hand. Numerous Acrow panels have abrasion wear and fretting at the pin locations indicating movement around the pin. Isolated pin locations have gaps typically up to 1/8" wide between the panel pin connection holes and the connection pins. The largest gap is 1/4" wide in span 1

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at the east truss panel point T9-Bearing, on the west face of the west chord. Refer to **charts 2 through 9** and **photos 31 and 32** for specific deficiencies.

The pins typically have light to moderate rust, and isolated pins have heavy surface rust. The pin at the west end post of the east truss in span 1 at the south abutment has heavy surface rust to the pin and the connection plate, and the pin is missing a retainer clip on the east side (**see photo 38**). Scattered pins have minor gouges to the end face of the pin.

Item 59.9 - Bearing Devices

The bearing plates typically have complete loss of galvanization with scattered areas of light to moderate rust. The sheet metal bearing covers typically have holes and 100% section loss throughout and are deteriorating into the bearing assemblies below (**see photo 39**).

At the south abutment east truss bearing, the west anchor bolts have heavy corrosion, the northwest anchor bolt nuts have 50% section loss (**see photo 40**), and the southeast anchor bolt has a reduced bolt length with a single nut (no double nut). At the south abutment west truss bearing, the southeast and the northeast anchor bolts have reduced bolt lengths with single nuts (no double nuts).

At the pier 8 and the south abutment east truss bearings, all four anchor bolts are slightly bent to the east (**see photo 41**) and the bearings are partially covered by sand and debris. At the pier 8 west truss bearing, the east anchor bolts are bent slightly to the east.

Item 59.11 - Rivets & Bolts

The galvanized coating on the bolts and fasteners throughout the bridge is beginning to fail with discoloration and light surface rust present (**see photos 19, 20, and 22**). The pier 1 transom to lower chord connection has three of eight loose bolts.

Item 59.13 - Member Alignment

Transom T0 at pier 1 has vertical misalignment 3/8" out-of-plane at the east end connection. Additionally, the bottom cope of the member bears on the bearing guide plates and moves slightly under live load. Three of eight connection bolts are loose at this location, and all eight bolts have fretting.

Item 59.14 - Paint/Coating

The galvanized coating on the transoms, trusses, pins, and bolts throughout the bridge is beginning to fail with discoloration and moderate surface rust present at various locations throughout (**see photos 19, 20, 22, 29, and 39**).

SuperStructure Load Deflection Notes

Spans 1 to 8 have moderate deflection under live load.

SuperStructure Load Vibration Notes

Spans 1 to 8 have moderate vibration under live load, most notably under heavy live load in spans 1 and 2 over pier 1.

ITEM 60 - SUBSTRUCTURE

Item 60.1 - Abutments

Item 60.1.c - Backwalls

The north abutment backwall exhibits moderate efflorescence at the interface with the construction joints near each fascia (**see photo 41**).

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Item 60.1.d - Breastwalls

The south and north abutment breastwalls have scattered areas of graffiti throughout (**see photos 41 and 42**). The south abutment breastwall exhibits scattered hollow areas and spalls with exposed rebar (**see photo 43**). Refer to **chart 18** for specific deficiencies.

Item 60.1.f - Slope Paving/Rip-Rap

The south abutment slope has previously noted areas of erosion up to 1'-1" deep that appear to be stable. Refer to **chart 18** for specific deficiencies.

Item 60.1.h - Footings

The south abutment footing is exposed over an area 12'-0" long by up to 8" high (**see photo 42**).

Item 60.2 - Piers or Bents

Piers 1, 2, 3, 5, and 6 are comprised of a pair of Acrow panel towers atop a pair of reinforced concrete pedestals, supported by a steel pile bent with a reinforced concrete pile cap.

Pier 4 is comprised of a reinforced concrete pierwall, atop a steel pile bent with a reinforced concrete pile cap.

Pier 7 is comprised of a reinforced concrete pedestal, supported by a steel pile bent with a reinforced concrete pile cap.

Pier 8 is comprised of a pair of reinforced concrete pedestals.

Refer to **Items 60.2.a, 60.2.d** and **60.2.j** for pedestal, pierwall and Acrow tower remarks and conditions, as well as **Items 60.3, 60.3.a,** and **60.3.b** for pile bents, pile caps, and pile remarks and conditions.

Item 60.2.a - Pedestals

The reinforced concrete pedestals typically have hollow areas up to full length by full width, and spalls with exposed and debonded rebar (**see photos 44 to 47**). Refer to **charts 19 and 20** for specific deficiencies.

Item 60.2.d - Stems/Webs/Pierwalls

The pier 4 reinforced concrete pierwall typically has hairline map cracking throughout up to full height by full width, some with moisture (**see photo 48**). Refer to **chart 19** for specific deficiencies.

Item 60.2.j - Acrow Towers

The Acrow panel towers and pins have areas of moderate rust. The Acrow towers at piers 1 to 3 have an Acrow panel frame installed horizontally between the column panels as bracing. The bracing panel channels typically have an accumulation of heavy debris and/or standing water with heavy rust due to the panels being installed with the legs facing upwards. The previously noted pier 1 bracing panels for both the east and west acrow towers have been replaced since the prior inspection.

The pair of distribution beams at the top of each tower typically have heavy debris and steel delamination with up to 1/16" section loss of the interior faces of the beams and the underside of the bottom flanges. The original flange thickness for the distribution beam rolled shapes is 11/16". The location and description of specific deficiencies are as follows:

- Pier 2 East Acrow Tower, Interior Sides of East and West Distribution Beams: Bottom flanges have 3/8" remaining flange thickness, along interior side of the beams.
- Pier 2 West Acrow Tower, Interior Sides of East and West Distribution Beams: Bottom flanges have 3/8" remaining flange thickness, along interior Sides of the beams.

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- Pier 3 East Acrow Tower, Interior Sides of East and West Distribution Beams: Bottom flanges have 7/16" remaining flange thickness, along interior sides of the beams.
- Pier 3 West Acrow Tower, Interior Sides of East and West Distribution Beams: Bottom flanges have 7/16" remaining flange thickness, along interior sides of the beams.
- Pier 5 East Acrow Tower, Interior Sides of East and West Distribution Beams: Bottom flanges have 7/16" remaining flange thickness, along interior sides of the beams.
- Pier 5 West Acrow Tower, Interior Sides of East and West Distribution Beams: Bottom flanges have 7/16" remaining flange thickness, along interior sides of the beams.
- Pier 6 East Acrow Tower, Interior Sides of East and West Distribution Beams: Bottom flanges have 7/16" remaining flange thickness, along interior sides of the beams.
- Pier 6 West Acrow Tower, Interior Side of West Distribution Beam: Bottom flange has 7/16" remaining flange thickness, along the interior side of the beam (**see photo 49**).

The pier 1 east acrow tower east panel north top pin is loose. The pier 2 east acrow tower north panel west bottom pin is missing the south clip, with no signs of movement.

Item 60.3 - Pile Bents

The pile caps and upper portions of the exterior piles are visible with the remaining portions of the piles concealed by the waterline.

Item 60.3.a - Pile Caps

The pile caps typically exhibit up to full width by up to 10" high by up to 6" deep spalls around the base with exposed rebar (**see photo 50**).

Item 60.3.b - Piles

The visible portions of the piles typically exhibit heavy rust.

Refer to the **2021 Underwater Inspection Report** for comments on the concealed portions of the pile.

ITEM 61 - CHANNEL AND CHANNEL PROTECTION

Item 61.2 - Embankment Erosion

The south channel embankment beneath span 2 exhibits minor slumping beyond the limits of the riprap (**see photo 51**).

Item 61.3 - Debris

During this inspection, the upstream end of the fender systems exhibited no visible accumulation of debris except at the west ends of pier 2, 4, and 6.

Refer to **charts 19 and 20** and the **2021 Underwater Inspection Report** for specific deficiencies.

Item 61.6 - Rip-Rap/Slope Protection

The rip-rap protection along the south channel embankment has scattered displaced stones.

Refer to the **2021 Underwater Inspection Report** for specific deficiencies.

Item 61.8 - Fender System

The timber fender systems have scattered areas of shallow checks and minor damage throughout. Additionally, the fenders have scattered open drilled holes with no bolts installed, however, all undamaged fenders were secured.

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The timber fender systems around the pile caps at piers 3 to 6 have scattered damaged wales and isolated broken wales (**see photo 52**).

Refer to **charts 19 and 20** and the **2021 Underwater Inspection Report** for specific deficiencies.

TRAFFIC SAFETY

Item 36a - Bridge Railing

A steel twin pipe traffic railing forms the bridge rail for both sides of the roadway. Refer to **Item 58.8** for specific deficiencies.

Item 36b - Transitions

Reinforced concrete endposts terminate the steel bridge railings at all four corners of the bridge. The rail transitions into W-beams from the concrete end posts for all four approaches. W-beam to endpost connection bolts typically have moderate rust, and the reinforced concrete endposts have scattered hairline cracks.

Item 36c - Approach Guardrail

A W-beam guardrail with steel rail posts forms the approach guardrail at all four corners of the bridge. The guardrails typically have minor scrapes and scattered galvanization loss throughout.

The southwest approach guardrail has minor collision damage 6" out-of-plane over an 8'-0" length approximately 35'-0" south of the bridge.

The northwest approach guardrail has minor collision damage approximately 48'-0" north of the bridge, with the 10th, 11th, 12th, 16th, 18th, and 19th rail posts bent (numbered from end of bridge), but still attached to the guardrail (**see photo 53**).

The northeast approach guardrail has heavy collision damage 3'-0" out-of-plane to the east over a 25'-0" length, with four bent rail posts, approximately 54'-0" north of the bridge. There is a 5'-0" long missing section of granite curb at this location.

The fence posts for the chain link fence along the west edge of the southwest approach sidewalk are leaning to the west.

Item 36d - Approach Guardrail Ends

The northwest approach guardrail end is buried and damaged (**see photo 54**).

The northeast approach guardrail terminates in a boxing glove end. The northeast approach guardrail boxing glove end has minor collision damage.

The south approach guardrails extend beyond the limits of the approach, and the ends are not considered part of this structure.

Sketch / Chart / Photo Log

- Sketch 1 : Location map and posting sign layout.
- Sketch 2 : Posting sign conditions.
- Chart 1 : Deck panel deficiencies.
- Chart 2 : Span 1 - transom fastener and truss pin connections.
- Chart 3 : Span 2 - transom fastener and truss pin connections.
- Chart 4 : Span 3 - transom fastener and truss pin connections.
- Chart 5 : Span 4 - transom fastener and truss pin connections.

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Chart 6 :	Span 5 - transom fastener and truss pin connections.			
Chart 7 :	Span 6 - transom fastener and truss pin connections.			
Chart 8 :	Span 7 - transom fastener and truss pin connections.			
Chart 9 :	Span 8 - transom fastener and truss pin connections.			
Chart 10 :	Span 1 - floor system bracing deficiencies.			
Chart 11 :	Span 2 - floor system bracing deficiencies.			
Chart 12 :	Span 3 - floor system bracing deficiencies.			
Chart 13 :	Span 4 - floor system bracing deficiencies.			
Chart 14 :	Span 5 - floor system bracing deficiencies.			
Chart 15 :	Span 6 - floor system bracing deficiencies.			
Chart 16 :	Span 7 - floor system bracing deficiencies.			
Chart 17 :	Span 8 - floor system bracing deficiencies.			
Chart 18 :	Substructure deficiencies - abutments.			
Chart 19 :	Substructure deficiencies - piers (1 of 2).			
Chart 20 :	Substructure deficiencies - piers (2 of 2).			
Photo 1 :	Span 4, Roadway Deck Panels, Looking North - General view of areas of missing epoxy aggregate wearing surface exposing surfaces of steel panels below.			
Photo 2 :	Span 8, Roadway Deck Panel North of T5, 3rd Panel from East Curb, Looking North - Areas of missing epoxy aggregate wearing surface exposing surface of steel panel below. Note fracture at corner.			
Photo 3 :	Span 5, Roadway Deck Panel South of T21, 5th Panel from East Curb, Looking Northeast - Note exposed steel diamond tread plate pattern. Note panel is shifted north with minor gouges at north side.			
Photo 4 :	Span 4, Roadway Deck Panel between T4 and T5, 5th Panel from East Curb, Looking South - Failed galvanization and heavy surface rust on underside.			
Photo 5 :	Span 2, Roadway Deck Panel South of T12, 11th Panel from East Curb, Looking North - 3" long by 4" wide fracture/100% section loss.			
Photo 6 :	Span 4, Roadway Deck Panel between T4 and T5, 6th Panel (Middle Panel) from East Curb, Looking West - Panel is 1/2" higher than adjacent panel to east.			
Photo 7 :	Span 5, Roadway Deck Panel South of T16, 6th Panel (Middle Panel) from East Curb, Looking North - Gouge at corner.			
Photo 8 :	Span 6, Transom T12 Top Flange below 10th Roadway Deck Panel from East Curb, South Face of T12, Looking North - Four purlins have mutual wear with transom top flange, caused by loose panel above.			
Photo 9 :	Span 9, Underside of Deck, At West Fascia, Looking South - Hairline map cracking with moisture throughout edge of deck. Note timber shielding in place below concrete sidewalk.			
Photo 10 :	Span 9, at Pier 9, South End Conc Deck, and South Support Floorbeam, South Face, Looking Northwest - Spall with exposed reinforcing. Note floorbeam w/ section loss & pitting along full height.			
Photo 11 :	South Approach, SIP Forms under Sidewalk, near South Abutment, Looking Northeast - Areas of heavy rust and corrosion holes along SIP joints and edges.			
Photo 12 :	Span 5, Underside Sidewalk, Between T8-T9, Looking East - Moderate surface rust on underside of steel tread plate at edge.			
Photo 13 :	Span 8, West Rail Post at T9, Looking Southwest - Impact damage to north flange bent downwards.			
Photo 14 :	Span 4, Anti-Missile Fence on Sidewalk, between T8-T9, Looking Southwest - West half of previous repair on the anti-missile fence is torn and loose.			
Photo 15 :	Span 5, Lighting Standard on East Truss, at South Third Point in Span (Pole Marking "20L"), Looking Southeast - 100% cracked weld for conduit connection, w/ cracks emanating east and west.			

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- Photo 16 : Span 6, Conduit on East Truss, Looking South - Conduit throughout span not seated on the steel brackets, and conduit has shifted.
- Photo 17 : South Abut., Deck Joint, S.B. Lane, Lkg. South - Gouged & worn elastomeric cover exposing the internal plates w/ two missing sections of internal joint plates. Note gouging to joint armor angles.
- Photo 18 : South Approach, Sidewalk, Looking North - Settlement throughout bituminous sidewalk with low points filled with debris.
- Photo 19 : Span 7, Transoms in Northern Third of Span, Looking South - Areas of galvanization loss, and light to moderate surface rust at bottom of web.
- Photo 20 : Span 2, Transom T27, Bottom Flange, Looking Northeast - Loss of galvanization and pitting section loss.
- Photo 21 : Span 3, Transom T0, Web, North Face, Looking South - Localized pitting section loss at area of failed galvanization.
- Photo 22 : Span 3, Transom T16 at West Truss Bearing Area, Looking West - One bolt missing in southeast corner of transom bearing area. Note galvanization loss and surface rust on bolts.
- Photo 23 : Span 6, Transom T12, 8'-0" from East Truss, Top Flange, South Face, Looking North - Hole at edge of top flange, surrounded by area of section loss.
- Photo 24 : Span 6, Transom T12, at Midspan, Web, North Face, Looking Southeast - Up to 1/32" section loss on web around floor system bracing connection.
- Photo 25 : Span 7, Transom T14, 10'-0" from West Truss, Bottom Flange, North Face, Looking South - Up to 1/8" section loss at north edge of bottom flange.
- Photo 26 : Span 2, Floor System Brace Between T12-T13, Connection at T12 for Middle East Brace, North Face, Looking South - Loose/disengaged bolt at bracing member connection.
- Photo 27 : Span 4, Floor System Braces Between T17-T18, Middle East and West Braces Near T18, South Face, Looking North - Areas of up to 100% section loss.
- Photo 28 : Span 2, Floor System Brace Between T7-T8, Middle West Brace near T8, South Face, Looking Northwest - Areas of up to 100% section loss.
- Photo 29 : Span 4, East Truss, Lower Chord, Pin Between T17-T18, Underside, Looking Northwest - Loss of galvanization and surface rust.
- Photo 30 : Span 2, East Truss, Upper Chord, East Bottom Channel located North of Pin Between T3-T4, East Face, Looking Southwest - East bottom flange bent upward.
- Photo 31 : Span 7, West Truss, Lower Chord, All Lower Pins Between T5-T6, Underside, Looking North - All lower pins loose with abrasion dust.
- Photo 32 : Span 1, East Truss, Lower Chord, West Lower Pin Between T9-Bearing, West Face, Looking Northeast - Loose pin with abrasion dust and up to 1/4" gap.
- Photo 33 : Span 3, East Truss, Lower Chord, Transom T5 West Panel Point Connection Plate, W Face, Lkg SE - Hole w/ adj full length crack of conn PL resulting in full separation on both sides of panel point.
- Photo 34 : Span 6, East Truss, South of Pin Between T9-T10, West Vertical Member At Lower Chord Connection, North Face, Looking Southwest - Active corrosion at bottom of vertical member.
- Photo 35 : Span 8, East Truss, Middle Chord South of T19-T20 Pin, Upper East Channel Web, East Face, Looking West - Longitudinal flaw in channel web.
- Photo 36 : Span 1, West Truss, at South Abutment, East End Post, East Face, Looking West - Holes in east and west faces.
- Photo 37 : Span 8, East Truss, at Pier 8, East and Center End Posts, East Faces, Looking Southwest - Holes in east faces. Note north face of support floorbeam for span 9 reinforced concrete deck.
- Photo 38 : Span 1, East Truss, at South Abutment, West End Post, East Face, Looking Southwest - Pin and connection plate have heavy surface rust, and pin is missing retainer clip.
- Photo 39 : Pier 5, West Truss Bearing, Guide Plate, Looking Southeast - Failed galvanization with surface rust. Note sheet metal bearing cover section loss/holes and deterioration.

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- Photo 40 : South Abutment, East Truss Bearing, West Anchor Bolts, Looking South - Section loss on northwest anchor bolt nut.
- Photo 41 : Pier 8, East Truss Bearing, East Anchor Bolts, Looking North - Anchor bolts bent to east. Note north abutment backwall with efflorescence, and graffiti on breastwall.
- Photo 42 : South Abutment, Breastwall and Footing, Looking Southwest - Graffiti on breastwall, and exposed footing.
- Photo 43 : South Abutment, Breastwall, West Half, Looking Southwest - Three spalls with exposed rebar.
- Photo 44 : Pier 1, West Pedestal, West Face, Looking Northeast - Spall with exposed rebar with heavy surface rust and corrosion.
- Photo 45 : Pier 3, West Pedestal, East Face, Looking West - Spalls with exposed rebar with section loss.
- Photo 46 : Pier 6, West Pedestal, South Face, Looking Northwest - Spall with exposed rebar and punky concrete.
- Photo 47 : Pier 8, East Pedestal, East Face, Looking West - Full width spalled area with exposed rebar.
- Photo 48 : Pier 4, Pierwall, North and West Faces, Looking Southeast - Hairline map cracking with moisture on N face, and hairline map cracking with efflorescence and spall within hollow area at NW corner of W face.
- Photo 49 : Pier 6, West Acrow Tower, East and West Distribution Beams, Underside, Looking South - Section loss on bottom flange of west distribution beam, along interior face of beam.
- Photo 50 : Pier 2, Pile Cap, South Elevation at East End, Looking Northwest - Spalls around base of pile cap.
- Photo 51 : Channel, South Embankment, Below Span 2, Looking West - Minor slumping beyond the limits of the riprap.
- Photo 52 : Pier 5, Timber Fender System, South Elevation, Looking North - Damaged waler 6th from top on west half of south face, and missing waler 6th from top at the west nose.
- Photo 53 : Northwest Approach Guardrail, Rail Post #11, Looking North - Collision damage to guardrail, and bent rail post.
- Photo 54 : Northwest Approach Guardrail, Terminal End, Looking Southwest - Terminal end is buried and damaged.

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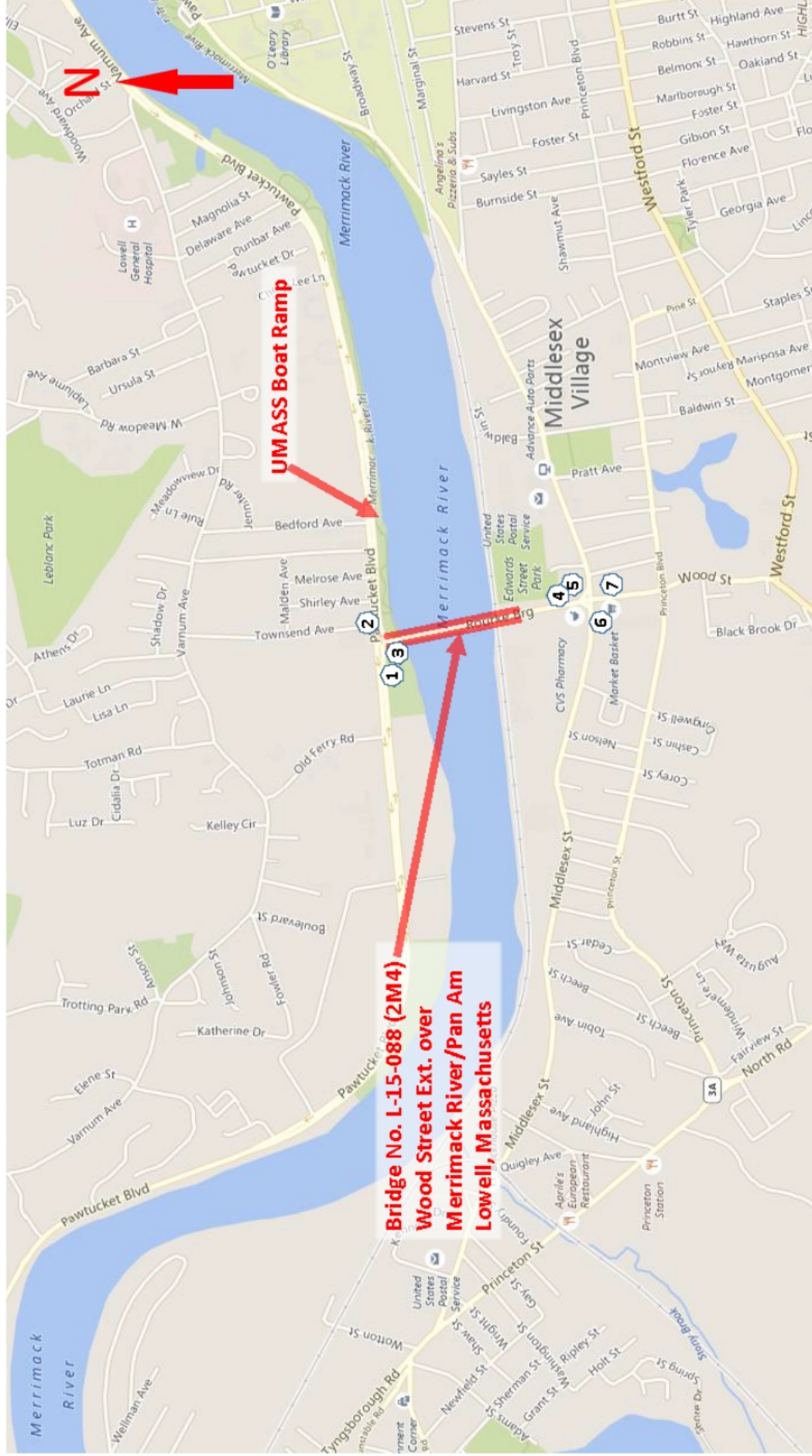
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SKETCHES



LEGEND

WEIGHT POSTING SIGN - SEE SKETCH 2 FOR DESCRIPTIONS

Sketch 1: Location map and posting sign layout.

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SKETCHES

POSTING SIGN CONDITIONS:



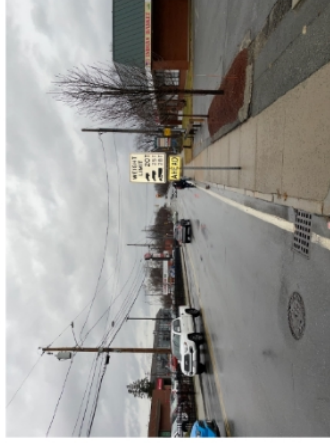
① Advance weight posting sign that reads: "20, 25, and 28 tons."



③ At bridge weight posting sign that reads: "20, 25, and 28 tons."



⑤ Advance weight posting sign that reads: "20, 25, and 28 tons," partially obscured by another traffic sign.



⑦ Advance weight posting sign that reads: "20, 25, and 28 tons ahead."



② Advance weight posting sign that reads: "20, 25, and 28 tons."



④ At bridge weight posting sign that reads: "20, 25, and 28 tons."



⑥ Advance weight posting sign that reads: "20, 25, and 28 tons."

Sketch 2: Posting sign conditions.

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CHARTS

Loose Deck Panel Deficiency Table								
Location	Span 1	Span 2	Span 3	Span 4	Span 5	Span 6	Span 7	Span 8
T0 SF		8						2, 5, 7, 8, 10
T0 NF	9			2, 3, 7, 8	9, 10	1		
T1 SF								
T1 NF	4, 5, 6							
T2 SF								
T2 NF		2, 3					7, 8	10
T3 SF		3					7, 8	2
T3 NF				10			3, 5, 6	9
T4 SF			9				5, 6	3, 5
T4 NF				4, 5, 6				
T5 SF				2, 5, 6			5	
T5 NF	2, 3							
T6 SF			2				7, 8, 9	
T6 NF		4						
T7 SF		4, 5						
T7 NF								6, 7
T8 SF								7, 8
T8 NF	10							3, 7, 8
T9 SF								
T9 NF		9	2, 3, 9, 10			9	10	3, 5
T10 SF		7, 8, 9	3					3, 5, 6
T10 NF		7, 9						
T11 SF		9					10	
T11 NF			2, 3					
T12 SF		4	2, 3			10		
T12 NF			2					
T13 SF			2					
T13 NF								4, 5
T14 SF		11		10			3	4, 5
T14 NF				9, 10				
T15 SF				9, 10	2, 3	9, 10		
T15 NF				9, 10	6, 7	3		
T16 SF					2, 3	2, 3		
T16 NF								
T17 SF					2, 3			
T17 NF			9, 10		9, 10			
T18 SF			9, 10		9, 10	4, 5		8, 9
T18 NF							5	
T19 SF								5, 6
T19 NF								
T20 SF								
T20 NF					4			
T21 SF					4, 5			7
T21 NF			10					7
T22 SF			10					
T22 NF								
T23 SF								
T23 NF								
T24 SF							2, 3	
T24 NF			2			3		
T25 SF							2, 3	
T25 NF			2	6, 7 (1/4" gap)			4	
T26 SF			2	6, 7 (1/4" gap)			2, 3	
T26 NF							2, 3	
T27 SF							2, 3	
T27 NF						2, 4, 5		
T28 SF						2, 4, 5		
T28 NF								
T29 SF								3
T29 NF						5		

NF = Deck Panel connected to north face of Transom;
SF = Deck Panel connected to south face of Transom;
= Panel from the east side that is loose or banging under live load;
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 = No Deck Panel (Deck Panel edge) located at north or south face of Transom at that span.

Chart 1: Deck panel deficiencies.

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CHARTS

Span 1									
Location	East Truss Pins Between			West Truss Pins Between			Transom	East Truss Transom Bolts	West Truss Transom Bolts
	Lower Chord	Middle Chord	Upper Chord	Lower Chord	Middle Chord	Upper Chord			
Bearing-T0	All 3, (NF) w/ AD.	N/A		E(NF)+C(NF)+W pin @ bearing, L.	N/A	W pin @ bearing, L.	T0		
T1-T2		N/A		W pin, L w/ AD.	N/A		T1		
T3-T4		N/A			N/A		T2		
T5-T6		N/A			N/A		T3		
T7-T8		N/A			N/A		T4		
							T5		
							T6		
							T7		
							T8		
							T9		
T9-Bearing	C+W pins, L w/ AD; E+C pins w/ 1/8" gap; W pin w/ 1/4" gap.	N/A	W pin, L w/ 1/4" gap w/ AD.	W+E pins, L (NF), C pin, L.	N/A	W+E pins, L.	Bearing		

L = Loose; **Br** = Broken; **M** = Missing; **BC** = Broken Clip; **MC** = Missing Clip; **E** = East; **C** = Center; **W** = West
HE = Enlarged Pin Hole; **AD** = Abrasion Dust (signs of movement); **R** = Replaced; **NF** = Not Found
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 The upper pins in the upper chord are offset and located near the northern pins.
 **Replaced with inverted fastener.

Chart 2: Span 1 - transom fastener and truss pin connections.

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CHARTS

Span 2							Transom	East Truss Transom Bolts	West Truss Transom Bolts
Location	East Truss Pins Between			West Truss Pins Between					
	Lower Chord	Middle Chord	Upper Chord	Lower Chord	Middle Chord	Upper Chord			
Bearing-T0	E lower, L w/ AD.		N/A			N/A	T0		
T1-T2					E upper & lower, L.		T1		
T3-T4		W+C lower, L.			E lower, L.	W lower w/ AD.	T2		
T5-T6		W lower, L.			All 3 lower, L.	W lower w/ AD.	T3		
T7-T8	E+W lower w/ AD.		W lower, L.			C lower, L.	T4		
T9-T10		W upper, L.	W lower, L w/ AD.		E(NF)+W upper, L; All 3 lower, L.		T5		
T11-T12		W upper, L.			E upper & lower, L w/ 1/16" gap.		T6		
T13-T14	E+W lower, L.		E lower, L.		E lower, L.		T7		
T15-T16				E upper, minor section loss.	E upper, L.	E+W lower, L w/ AD.	T8		
T17-T18			W lower, L.		E+W upper, L.		T9		
T19-T20		W upper & lower, L.	C lower, L.		W+C upper, L.		T10		
T21-T22	All 6 L w/ AD; E lower w/ 3/32" gap (max. of E lower and W upper).	All 3 upper & C lower, L; C upper & C+E lower w/ AD.	C+E lower & E upper, L w/ AD.	E upper, L w/ 1/8" gap; E lower w/ 3/32" gap; All other pins 1/16" gaps; All pins heavy AD.		E+C upper, L.	T11		
T23-T24		W upper & lower, L w/ AD.	E upper, L (NF).			C+W upper, L.	T12		
T25-T26		E upper, L.	E upper, L (NF).		E+C upper, L.	E+W upper, L.	T13		
T27-T28			E pin, lower E face w/ 1-1/2"W x 1/2"L x 1/8"D gouge.		W upper, L.		T14		
T29-Bearing		E upper, L; W upper & lower, L w/ AD.			E upper & W lower, L.		T15		

L = Loose; Br = Broken; M = Missing; BC = Broken Clip; MC = Missing Clip; E = East; C = Center; W = West
 HE = Enlarged Pin Hole; AD = Abrasion Dust (signs of movement); R = Replaced; NF = Not Found
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 The upper pins in the upper chord are offset and located near the northern pins.
 **Replaced with inverted fastener.

Chart 3: Span 2 - transom fastener and truss pin connections.

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CHARTS

Span 3							Transom	East Truss Transom Bolts	West Truss Transom Bolts
Location	East Truss Pins Between			West Truss Pins Between					
	Lower Chord	Middle Chord	Upper Chord	Lower Chord	Middle Chord	Upper Chord			
Bearing-T0		E upper, L; W upper & lower, L w/ AD.			E upper & W lower, L.		T0		
T1-T2		W upper & lower, L; E lower, L.					T1		
T3-T4					All lower, L w/ AD.	W upper, L.	T2		
T5-T6			E+C upper, L.		C upper, L.		T3		
T7-T8		W upper & lower, L w/ AD.		W upper w/ 1/16" gap.			T4		
T9-T10	All 6, L w/ AD w/ up to 1/4" gap (max at W lower) w/ movement under LL.	W upper & all 3 lower, L w/ AD w/ 1/16" gap.		All 6 L w/ AD w/ 3/32" gap w/ movement under truck LL.	C upper & W lower, L w/ AD.	C lower, L.	T5		
T11-T12	W upper & lower, L w/ AD.	E+W lower, L; C+W upper, L.	W+C lower, L w/ AD.		E upper & E+C lower, L.		T6		
T13-T14	W+C upper & lower, L (NF); W+C upper & all 3 lower w/ AD.	W lower, L; E+W upper, L.	E lower, L.	E lower, L w/ AD w/ 1/16" gap; W+C lower & all 3 upper w/ AD (NF).	C+W upper & lower, L w/ AD.		T7		
T15-T16	C lower w/ AD.	E+W (NF) upper, L.	E upper, L.		W lower & upper, L.	C+W lower, L w/ AD.	T8		2 bolts, M.
T17-T18		W upper & lower (NF) , L.	C+W lower, L.		E+W upper, L.	E+C lower, L; E lower w/ 1/8" gap.	T9		
T19-T20	E upper, L (NF); W lower, L; all 3 lower pins w/ AD.	W upper, L.	E upper & E+W lower, L.	E upper, L; all E+C pins w/ AD.	All 6, L.	E+C lower & W upper, L.	T10		
T21-T22	All pins, L w/ AD w/ 1/8" gap.	All upper, L; E lower, L w/ 1/16" gap; all 6 w/ AD.		All upper, L; E (NF)+C+W lower, L; all 6 w/ AD.	All upper pins, L w/ AD.	W upper, L w/ AD; E lower pin, L.	T11		
T23-T24	W upper, W side MC.	W upper, L.					T12		
T25-T26							T13		
T27-T28		W upper & E lower, L.			E upper, L.		T14		
T29-Bearing					E upper, L.		T15		

L = Loose; **Br** = Broken; **M** = Missing; **BC** = Broken Clip; **MC** = Missing Clip; **E** = East; **C** = Center; **W** = West
HE = Enlarged Pin Hole; **AD** = Abrasion Dust (signs of movement); **R** = Replaced; **NF** = Not Found
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 The upper pins in the upper chord are offset and located near the northern pins.
 **Replaced with inverted fastener.

Chart 4: Span 3 - transom fastener and truss pin connections.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 4							Transom	East Truss Transom Bolts	West Truss Transom Bolts
Location	East Truss Pins Between			West Truss Pins Between					
	Lower Chord	Middle Chord	Upper Chord	Lower Chord	Middle Chord	Upper Chord			
Bearing-T0					E upper, L.		T0		
T1-T2		W upper, L.			E lower, L.	E upper, L.	T1		
T3-T4			C upper, L.		C lower, L.		T2		
T5-T6	All 6, L w/ AD w/ 3/32" gap (typ. all pins).	All 3 lower, L w/ AD.	E+W upper, L.	E+W upper & lower, L; all w/ AD.	E+W lower, L w/ AD.	C lower, L.	T3		
T7-T8	E upper & E+W lower, L; W upper w/ 1/8" gap; 3 lower w/ AD.	W lower, L.	C lower, L.	E+C lower & all upper, L; E+C lower & upper w/ AD.	E+W lower, L w/ AD.		T4		
T9-T10	C lower, L.	E+C upper, L.	C lower, L.		E upper, L.	E+W lower, L.	T5		
T11-T12		W upper & W+E lower, L.	W lower, L.		E lower, L.		T6		
T13-T14	E+W lower w/ AD.		All 3 lower, L.	E lower, L (NF).	E upper & lower, L.	E+C lower, L.	T7		
T15-T16	E lower, L.	All lower & C upper, L; C lower & upper w/ AD.	E+C lower, L; E lower w/ AD.		E lower & C upper, L.		T8		2 bolts, M.
T17-T18		All pins except E upper, L; C lower & upper w/ AD.	E+C lower, L w/ AD.			C lower, L.	T9		
T19-T20		W lower, L (NF); E upper, L.	E+W lower, L.		W upper, L.	W+E lower, L.	T10		
T21-T22		E+C+W upper & C lower, L.	E+C lower, L.	E upper, L; all 6 w/ AD; E upper w/ 3/32" gap.	All upper, L.	All lower, L.	T11		
T23-T24		E lower, L.					T12		
T25-T26		E+C upper, L.		E upper, L.	E upper, L.	W upper, L.	T13		
T27-T28		W upper, L.					T14		
T29-Bearing		E lower, L.					T15		
							T16		
							T17		
							T18		
							T19		
							T20		
							T21		
							T22		
							T23		
							T24		
							T25		
							T26		
							T27		
							T28		
							T29	1 bolt¹, L.	

¹Up to 1/8" gap between Transom W Bottom flange & seat plate @ middle bolt

L = Loose; Br = Broken; M = Missing; BC = Broken Clip; MC = Missing Clip; E = East; C = Center; W = West
 HE = Enlarged Pin Hole; AD = Abrasion Dust (signs of movement); R = Replaced; NF = Not Found
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 The upper pins in the upper chord are offset and located near the northern pins.
 **Replaced with inverted fastener.

Chart 5: Span 4 - transom fastener and truss pin connections.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 5							Transom	East Truss Transom Bolts	West Truss Transom Bolts
Location	East Truss Pins Between			West Truss Pins Between					
	Lower Chord	Middle Chord	Upper Chord	Lower Chord	Middle Chord	Upper Chord			
Bearing-T0		E lower, L.					T0		
T1-T2		E lower, L.	W upper, L.		E+C lower, L.	E upper, L.	T1		
T3-T4		C lower, L.	E+W upper, L.		E lower, L.		T2		
T5-T6	E upper, L; E upper & lower w/ AD.	C+W upper, L.	C+W lower, L; W upper, L (NF).		E+W lower, L.	E+C lower, L.	T3		
T7-T8	W upper & lower, w/ AD.	C lower, L.	E lower, L.	E upper & lower, L w/ 3/32" gaps; C upper & lower, L w/ 1/16" gaps; W lower, L w/ 1/32" gap; all 6 w/ AD.	E lower, L.	C lower, L.	T4	1 bolt, Br.	
T9-T10		E lower, L.	E+W lower, L.		C lower, L.		T5		
T11-T12		C upper & lower, L w/ AD.	C lower, L; E+C lower w/ AD.		E lower, L.	E lower, L.	T6		
T13-T14		W lower, L.	C lower, L.			E lower, L.	T7		
T15-T16			All 3 lower, L.		E upper & lower, L; C upper & lower (NF), L.	W lower, L.	T8		
T17-T18		E upper & lower, L.	C+W lower, L.	E upper, L w/ AD.	E upper & lower, L.	E upper, L.	T9		
T19-T20	C lower, L w/ AD.			E upper & lower, w/AD.	W upper, L.	C lower & all upper, L.	T10		
T21-T22	All upper & E lower, L ; All 6 w/ AD.	E upper, L w/ AD; E+W (NF) lower, L; all lower w/ AD, E upper & lower 1/16" gap.	C lower, L w/ AD; W upper, L.	All upper, L; all 6 w/ AD.	E upper & lower, L; C upper, L ; all 6 w/ AD.	W lower + all upper, L.	T11		
T23-T24	W upper, L w/ AD.		E lower, L; C upper, L.		E lower, L (NF).		T12		
T25-T26			C upper, L.				T13		
T27-T28		W lower, L.			E+W upper, L.		T14		
T29-Bearing							T15		

L = Loose; Br = Broken; M = Missing; BC = Broken Clip; MC = Missing Clip; E = East; C = Center; W = West
 HE = Enlarged Pin Hole; AD = Abrasion Dust (signs of movement); R = Replaced; NF = Not Found
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 The upper pins in the upper chord are offset and located near the northern pins.
 **Replaced with inverted fastener.

Chart 6: Span 5 - transom fastener and truss pin connections.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 6							Transom	East Truss Transom Bolts	West Truss Transom Bolts
Location	East Truss Pins Between			West Truss Pins Between					
	Lower Chord	Middle Chord	Upper Chord	Lower Chord	Middle Chord	Upper Chord			
Bearing-T0							T0		
T1-T2			E upper, L.		E upper, L.	E upper, L.	T1		
T3-T4			E+C upper, L.		E lower, L.	C+E upper, L.	T2		
T5-T6	C upper & lower, L w/ AD w/ 1/16" gaps.	C lower, L; W upper, L (NF).	E lower & E+C+W upper, L.	E upper, L.	E+W lower, L.	C+W upper & E lower, L.	T3		
T7-T8	E+W upper & lower, L; all 6 w/ AD; E upper & lower w/ 3/32" gaps; W upper w/ 1/8" gap; W lower w/ 3/32" gap.	E upper & lower, L w/ AD w/ 1/16" gap.	C lower, L.	All 6, L w/ AD w/ 3/32" gap.	E+W lower & E+C upper, L.	C upper + E upper, L.	T4		
T9-T10	E lower, AD; W lower, L w/ AD.	E+C upper & W lower, L.	E+C lower, L.	E+C lower, L w/ AD.	E upper, L.	W lower, L (NF).	T5	1 washer, Br.	
T11-T12	W lower, L w/ AD.	E (NF)+C upper & E lower, L.	W lower, L.		W upper, L.	All lower, L.	T6	2 bolts, Br.	
T13-T14	E lower, L; all lower w/ AD.	C upper & E lower, L.	All 3 lower, L.			W+C lower, L.	T7	2 bolts, L (NF).	
T15-T16		C+E upper & C lower, L; all lower w/ AD.	All 3 lower, L w/ AD.		W upper & lower & E lower, L.	E+W lower, L.	T8		
T17-T18		E+W upper & W lower, L.	C+W lower, L.		E upper, L.	C+W lower, L.	T9		
T19-T20			C lower, L.	E upper (NF) & E+C lower, w/ AD.	E+W upper & E lower, L.	E+W lower, L.	T10		
T21-T22	All 3 upper, L w/ 3/32" gap; all 6 w/ AD.	E+W upper & W lower, L.	C lower, L.	E upper & lower, L w/ AD.	E+W upper, L.	E+W lower, L.	T11		
T23-T24		W upper, L.	All upper, L.		E upper & lower, L.	E+W upper, L.	T12		
T25-T26	E upper, L.	E lower, L; C upper, L.		W upper w/ AD (NF).			T13		
T27-T28	W upper, L.	W upper & lower, L.			E upper, L.		T14		
T29-Bearing		W upper, L.			E upper, L.		T15		

L = Loose; Br = Broken; M = Missing; BC = Broken Clip; MC = Missing Clip; E = East; C = Center; W = West
 HE = Enlarged Pin Hole; AD = Abrasion Dust (signs of movement); R = Replaced; NF = Not Found
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 The upper pins in the upper chord are offset and located near the northern pins.
 **Replaced with inverted fastener.

Chart 7: Span 6 - transom fastener and truss pin connections.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 7							Transom	East Truss Transom Bolts	West Truss Transom Bolts
Location	East Truss Pins Between			West Truss Pins Between					
	Lower Chord	Middle Chord	Upper Chord	Lower Chord	Middle Chord	Upper Chord			
Bearing-T0		W upper, L.			E+C+W(NF) upper, L.	E upper, L (NF).	T0		
T1-T2		E upper & lower, L.	E+W upper, L.		E(NF) +W upper, L.	E upper, L.	T1		
T3-T4	W upper, L.	C+W lower, L.	All upper, L.			W+C upper, L.	T2		
							T3		
T5-T6				All 6 pins, L w/ heavy AD; E upper & lower pins w/ 1/8" gap; W upper pin w/ 1/8" gap; W lower pin w/ 1/16" gap.	W lower, L w/ AD.		T4		
							T5		
T7-T8	All 6 pins L w/ heavy AD; E upper & lower pins w/ 1/8" gap; C+W upper & lower pins w/ 3/16" gap; large movement under LL.	All upper, L; C+W lower, L; all 6 pins w/ AD.		C upper, L w/ AD; W lower, L.	W lower, L.	W upper & lower, L.	T6		
							T7		
T9-T10	C upper (NF) + lower, L w/ AD.	E lower, L.	C lower, L w/ AD.		W upper, L.		T8		
							T9		
T11-T12		W upper, L.	All lowers, L.	E lower, L w/ AD.	E lower, L.	All lower, L.	T10		
							T11		
T13-T14		C upper & lower, L.	All lower, L; W upper, L.	C lower, L.	W upper, L.	W lower, L.	T12		
							T13		
T15-T16	All 6 pins w/ AD.	W upper & lower, L; C upper & lower, L (NF).	All lower, L.		All 6, L.	All lower, L.	T14		
							T15		
T17-T18		E(NF) + C(NF) +W upper, L; W lower, L (NF).	C+E lower & E+W upper, L.		W upper & lower & E upper (NF), L.	W+E lower, L.	T16		
							T17		
T19-T20	All pins, L w/ AD; W lower w/ 3/32" gap.	E + W upper & lower, L; all 6 w/ AD.	W lower, L w/ AD; E+C upper, L.	All lower pins w/ AD.	C+W upper, L.	W upper & C+E lower, L.	T18		
							T19		
T21-T22	E+W upper & W lower (NF), L; all 6 pins w/ AD.	All 3 upper & C lower (NF), L; all 6 pins w/ AD.	E+W lower, L.	All 3 upper & W lower, L; all 6 w/ AD.	C upper, L; W lower w/ AD.	W+C upper, L.	T20		
							T21		
T23-T24		C lower, L.	C+E upper, L.			W+E upper, L.	T22		
							T23		
T25-T26		E upper, L.				E upper, L.	T24		
							T25		
T27-T28		W+E upper, L; E upper w/ AD.			C upper, L.		T26		
							T27		
T29-Bearing							T28		
							T29		

L = Loose; Br = Broken; M = Missing; BC = Broken Clip; MC = Missing Clip; E = East; C = Center; W = West
 HE = Enlarged Pin Hole; AD = Abrasion Dust (signs of movement); R = Replaced; NF = Not Found
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 The upper pins in the upper chord are offset and located near the northern pins.
 **Replaced with inverted fastener.

Chart 8: Span 7 - transom fastener and truss pin connections.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 8							Transom	East Truss Transom Bolts	West Truss Transom Bolts
Location	East Truss Pins Between			West Truss Pins Between					
	Lower Chord	Middle Chord	Upper Chord	Lower Chord	Middle Chord	Upper Chord			
Bearing-T0							T0		
T1-T2					W+E lower, L.		T1		
T3-T4		W lower, L.	W upper, L (NF).			C+W upper, L.	T2		
T5-T6	C+W upper & lower, L w/ AD w/ 1/8" gap; E upper, L.	All 3 lower, L w/ AD.	E upper, L.	E lower, L; W upper & E+W lower w/ AD.			T3		
T7-T8	W lower, L; C upper, L (NF); all 3 lower w/ AD (NF).	W+C lower, L.	W lower, L.	E lower, L; all lower w/ AD.	E+C lower, L w/ AD.	E upper, L.	T4		
T9-T10	E+C lower, L; W lower w/AD.	W lower, L.		E+W lower, L.		W lower, L w/ AD.	T5		
T11-T12	All 3 lower w/ AD; W lower, L.	W upper & all 3 lower, L.	E lower, L w/ AD (NF); C lower, L w/ AD.		W+E lower, L; E upper, L w/ AD.	W lower, L.	T6		
T13-T14		E lower, L.			E lower, L.		T7		
T15-T16							T8		
T17-T18	E lower w/ AD.	E upper, L.					T9		
T19-T20		All 6, L.			E lower, L.		T10		
T21-T22		E lower, L; all upper w/ AD (NF); all upper w/ rust staining.	W upper, L (NF); W lower, L.		C upper, L.		T11		
T23-T24		All upper & E+W lower, L.					T12		
T25-T26		W upper & E+C lower, L.		W lower, L.	W upper, L.		T13		
T27-T28		W upper & lower, L w/ AD.	C lower, L.		W upper, L.		T14		
T29-Bearing	All lower, L.		N/A	All lower, L.		N/A	T15		

L = Loose; Br = Broken; M = Missing; BC = Broken Clip; MC = Missing Clip; E = East; C = Center; W = West
 HE = Enlarged Pin Hole; AD = Abrasion Dust (signs of movement); R = Replaced; NF = Not Found
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 The upper pins in the upper chord are offset and located near the northern pins.
 **Replaced with inverted fastener.

Chart 9: Span 8 - transom fastener and truss pin connections.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 1				
Location	Floor System Bracing Member Location			
	East Outside	East Middle	West Middle	West Outside
** T0-T1	At T1: Loose connection bolt (NF).			
T1-T2				
T2-T3				Along brace: Numerous 100% corrosion holes 2'-9" L x 1" H on all 4 sides throughout S half of member.
T3-T4				
T4-T5			Along brace: 100% corrosion hole.	
T5-T6			Along brace: 100% corrosion hole.	
T6-T7				
T7-T8				
** T8-T9				
T9-T10(Brg)				

East Outside = Floor system brace member (sway brace member) between east end and east quarter point along transom;
East Middle = Floor system brace member (sway brace member) between east quarter point along transom and midspan of transom;
West Middle = Floor system brace member (sway brace member) between midspan of transom and west quarter point along transom;
West Outside = Floor system brace member (sway brace member) between west quarter point along transom and west end;
R = Replaced; **NF** = Not Found; **L** = Long; **W** = Wide; **H** = High; **E** = East; **W** = West; **S** = South; **N** = North
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 Bay between transoms with single diagonal bracing (typ. unless noted with **).

Chart 10: Span 1 - floor system bracing deficiencies.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 2				
Location	Floor System Bracing Member Location			
	East Outside	East Middle	West Middle	West Outside
T10(Brg)-T0		Along 4th brace from E: 100% corrosion hole.		
** T0-T1	At T0 top chord to E brace: Loose connection bolt with fret staining at transom (NF).			
T1-T2				
T2-T3		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T3-T4			Along brace: 100% corrosion hole.	
T4-T5				
T5-T6		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T6-T7		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.
T7-T8			Along brace: 100% corrosion hole.	
T8-T9				
T9-T10		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T10-T11	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T11-T12		Along brace: 100% corrosion hole.	At T11: Severe deterioration of connection bolt/nut.	At T11: Severe deterioration of connection bolt/nut.
T12-T13				
T13-T14				
T14-T15				
T15-T16				
T16-T17				
T17-T18	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.		
T18-T19				
T19-T20				
T20-T21				
T21-T22				
T22-T23				
T23-T24				
T24-T25				
T25-T26				
T26-T27				
T27-T28				
** T28-T29				
T29(Sp2)-T0(Sp3)				

East Outside = Floor system brace member (sway brace member) between east end and east quarter point along transom;
East Middle = Floor system brace member (sway brace member) between east quarter point along transom and midspan of transom;
West Middle = Floor system brace member (sway brace member) between midspan of transom and west quarter point along transom;
West Outside = Floor system brace member (sway brace member) between west quarter point along transom and west end;
R = Replaced; **NF** = Not Found; **L** = Long; **W** = Wide; **H** = High; **E** = East; **W** = West; **S** = South; **N** = North
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 Bay between transoms with single diagonal bracing (typ. unless noted with **).

Chart 11: Span 2 - floor system bracing deficiencies.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 3				
Location	Floor System Bracing Member Location			
	East Outside	East Middle	West Middle	West Outside
T29(Sp2)-T0(Sp3)				
** T0-T1				
T1-T2				
T2-T3				
T3-T4			Along brace: 100% corrosion hole 8" L x 1-1/2" W.	
T4-T5				
T5-T6				
T6-T7				
T7-T8				
T8-T9				
T9-T10				
T10-T11				
T11-T12				
T12-T13				
T13-T14				
T14-T15				
T15-T16				
T16-T17				
T17-T18				
T18-T19				
T19-T20				
T20-T21				
T21-T22				
T22-T23				
T23-T24				
T24-T25				
T25-T26				
T26-T27				
T27-T28				
** T28-T29			Along brace, oriented from W quarter point of T28 to midspan of T29: Numerous 100% corrosion holes up to 6" L x 1" H on all 4 sides of member, throughout N half of member. Along brace, oriented from midspan of T28 to W quarter point of T29: 100% corrosion hole.	
T29(Sp3)-T0(Sp4)				

East Outside = Floor system brace member (sway brace member) between east end and east quarter point along transom;
East Middle = Floor system brace member (sway brace member) between east quarter point along transom and midspan of transom;
West Middle = Floor system brace member (sway brace member) between midspan of transom and west quarter point along transom;
West Outside = Floor system brace member (sway brace member) between west quarter point along transom and west end;
R = Replaced; **NF** = Not Found; **L** = Long; **W** = Wide; **H** = High; **E** = East; **W** = West; **S** = South; **N** = North
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 Bay between transoms with single diagonal bracing (typ. unless noted with **).

Chart 12: Span 3 - floor system bracing deficiencies.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 4				
Location	Floor System Bracing Member Location			
	East Outside	East Middle	West Middle	West Outside
T29(Sp3)-T0(Sp4)				
** T0-T1				
T1-T2			Along brace: 100% corrosion hole.	
T2-T3				
T3-T4				
T4-T5				
T5-T6				
T6-T7				
T7-T8				
T8-T9				
T9-T10		Along brace: 100% corrosion hole.		
T10-T11				
T11-T12		Along brace: 100% corrosion hole.		
T12-T13				
T13-T14				
T14-T15				
T15-T16				
T16-T17				
T17-T18		At T18: Numerous 100% corrosion holes 9" L x 1" W.	At T18: Numerous 100% corrosion holes 9" L x 1" W.	
T18-T19				
T19-T20				
T20-T21				
T21-T22				
T22-T23				
T23-T24				
T24-T25				
T25-T26		Along brace: 100% corrosion hole 9" L x up to 1" W.		
T26-T27		Along brace: 100% corrosion hole 6" L x up to 3/4" W (NF).		
T27-T28				
** T28-T29				
T29(Sp4)-T0(Sp5)				

East Outside = Floor system brace member (sway brace member) between east end and east quarter point along transom;
East Middle = Floor system brace member (sway brace member) between east quarter point along transom and midspan of transom;
West Middle = Floor system brace member (sway brace member) between midspan of transom and west quarter point along transom;
West Outside = Floor system brace member (sway brace member) between west quarter point along transom and west end;
R = Replaced; **NF** = Not Found; **L** = Long; **W** = Wide; **H** = High; **E** = East; **W** = West; **S** = South; **N** = North
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 Bay between transoms with single diagonal bracing (typ. unless noted with **).

Chart 13: Span 4 - floor system bracing deficiencies.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 5				
Location	Floor System Bracing Member Location			
	East Outside	East Middle	West Middle	West Outside
T29(Sp4)-T0(Sp5)				
** T0-T1				
T1-T2		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole 10" L x 3/4" W.	
T2-T3				
T3-T4				
T4-T5				
T5-T6				
T6-T7				
T7-T8			Along brace: 100% corrosion hole.	
T8-T9				
T9-T10		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T10-T11				
T11-T12				
T12-T13				
T13-T14		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T14-T15			Along brace: 100% corrosion hole 1" diameter.	
T15-T16		At T16: 100% corrosion hole/crack 10" L x up to 3/4" W.	Along brace: 100% corrosion hole.	
T16-T17				
T17-T18	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.		
T18-T19		Along brace: 100% corrosion hole.		
T19-T20		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T20-T21				
T21-T22			Along brace: 100% corrosion hole.	
T22-T23		Along brace: 100% corrosion hole.		
T23-T24				
T24-T25			Along brace: 100% corrosion hole.	
T25-T26				
T26-T27				
T27-T28		Along brace: 100% corrosion hole 1-3/4" L x 1/2" W.	Along brace: 100% corrosion hole.	
** T28-T29		Along brace, oriented from midspan of T28 to E quarter point of T29: 100% corrosion hole 8" L x up to 3/4" W.	Along brace, oriented from midspan of T28 to W quarter point of T29: 100% corrosion hole.	
T29(Sp5)-T0(Sp6)		Along brace: Numerous 100% corrosion holes up to 2" L x 1/2" W.		

East Outside = Floor system brace member (sway brace member) between east end and east quarter point along transom;
East Middle = Floor system brace member (sway brace member) between east quarter point along transom and midspan of transom;
West Middle = Floor system brace member (sway brace member) between midspan of transom and west quarter point along transom;
West Outside = Floor system brace member (sway brace member) between west quarter point along transom and west end;
R = Replaced; **NF** = Not Found; **L** = Long; **W** = Wide; **H** = High; **E** = East; **W** = West; **S** = South; **N** = North
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 Bay between transoms with single diagonal bracing (typ. unless noted with **).

Chart 14: Span 5 - floor system bracing deficiencies.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 6				
Location	Floor System Bracing Member Location			
	East Outside	East Middle	West Middle	West Outside
T29(Sp5)-T0(Sp6)		Along brace: Numerous 100% corrosion holes up to 2" L x 1/2" W.		
** T0-T1	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.		
T1-T2		At T2: 100% corrosion hole up to 5" L x 3/4" W.	At T2: 100% corrosion hole up to 5" L x 3/4" W.	
T2-T3				
T3-T4	Along brace: 100% corrosion hole.	At T4: Numerous 100% corrosion holes 1'-0" L x 1/2" W.	Along brace: 100% corrosion hole.	
T4-T5		At T5: 100% corrosion hole 1" L x 1/2" W.		
T5-T6		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T6-T7			Along brace: 100% corrosion hole.	
T7-T8		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T8-T9		At T9: 100% corrosion hole 3-1/2" L x 1/4" W.		
T9-T10		Along brace: 100% corrosion hole.		
T10-T11				
T11-T12		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T12-T13		Along brace: 100% corrosion hole.		
T13-T14		Along brace: Up to 100% section loss throughout N half of member.		
T14-T15		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T15-T16	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	At T16: 100% corrosion hole 1" diameter.	
T16-T17				
T17-T18		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T18-T19			Along brace: 100% corrosion hole.	
T19-T20		Along brace: 100% corrosion hole.		
T20-T21				
T21-T22			Along brace: 100% corrosion hole.	
T22-T23				Along brace: 100% corrosion hole.
T23-T24	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T24-T25				Along brace: 100% corrosion hole.
T25-T26	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole 8" L x 1" W.	Along brace: 100% corrosion hole 5" L x 1/4" W.	
T26-T27	Along brace: 100% corrosion hole.			Along brace: 100% corrosion hole.
T27-T28		Along brace: 100% corrosion hole.		
** T28-T29		Along brace, oriented from E quarter point of T28 to midspan of T29: 100% corrosion hole.	Along brace, oriented from midspan of T28 to W quarter point of T29: 100% corrosion hole. Along brace, oriented from W quarter point of T28 to midspan of T29: 100% corrosion hole.	Along brace, oriented from W truss of T28 to W quarter point of T29: 100% corrosion hole.
T29(Sp6)-T0(Sp7)				

East Outside = Floor system brace member (sway brace member) between east end and east quarter point along transom;
East Middle = Floor system brace member (sway brace member) between east quarter point along transom and midspan of transom;
West Middle = Floor system brace member (sway brace member) between midspan of transom and west quarter point along transom;
West Outside = Floor system brace member (sway brace member) between west quarter point along transom and west end;
R = Replaced; **NF** = Not Found; **L** = Long; **W** = Wide; **H** = High; **E** = East; **W** = West; **S** = South; **N** = North
Items in **BOLD RED LETTERS** have been updated from the last inspection.
Bay between transoms with single diagonal bracing (typ. unless noted with **).

Chart 15: Span 6 - floor system bracing deficiencies.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 7				
Location	Floor System Bracing Member Location			
	East Outside	East Middle	West Middle	West Outside
T29(Sp6)-T0(Sp7)				
** T0-T1		At T1, oriented from E quarter point of T0 to midspan of T1: 100% corrosion hole up to 1'-0" L x 1/2" W.	At T1, oriented from midspan of T0 to W quarter point of T1: 100% corrosion hole up to 1'-0" L x 1/2" W. At T1, oriented from W quarter point of T0 to midspan of T1: 100% corrosion hole up to 1'-0" L x 1/2" W.	
T1-T2			Along brace: 100% corrosion hole.	
T2-T3			At T3: Numerous 100% corrosion holes 10" L x 1/2" W.	
T3-T4		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T4-T5				
T5-T6		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T6-T7				
T7-T8		At T8: Numerous 100% corrosion holes 1'-0" L x 1/2" W.	At T8: Numerous 100% corrosion holes 1'-0" L x 1/2" W.	
T8-T9			At T9: Up to 100% section loss throughout N half of member.	
T9-T10		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T10-T11		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T11-T12		Along brace: 100% corrosion hole.	At T12: 100% corrosion hole 10" L x 1/2" W.	
T12-T13				Along brace: 100% corrosion hole.
T13-T14		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T14-T15				
T15-T16		At T16: Up to 100% section loss throughout N half of member.	Along brace: 100% corrosion hole.	
T16-T17		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T17-T18				
T18-T19				Along brace: 100% corrosion hole.
T19-T20			Along brace: 100% corrosion hole.	
T20-T21				
T21-T22			At T22: 100% corrosion hole 3" L x 1/2" W.	
T22-T23		Along brace: 100% corrosion hole.		
T23-T24		At T24: 100% corrosion hole up to 2" L x 1/2" W.		
T24-T25	Along brace: 100% corrosion hole.	At T25: Numerous 100% corrosion holes up to 10" L x 1/4" W.		
T25-T26		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T26-T27	Along brace: 100% corrosion hole.			Along brace: 100% corrosion hole.
T27-T28		Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
** T28-T29		Along brace, oriented from E quarter point of T28 to midspan of T29: 100% corrosion hole.		
T29(Sp7)-T0(Sp8)	Along brace: 100% corrosion hole.			

East Outside = Floor system brace member (sway brace member) between east end and east quarter point along transom;
East Middle = Floor system brace member (sway brace member) between east quarter point along transom and midspan of transom;
West Middle = Floor system brace member (sway brace member) between midspan of transom and west quarter point along transom;
West Outside = Floor system brace member (sway brace member) between west quarter point along transom and west end;
R = Replaced; **NF** = Not Found; **L** = Long; **W** = Wide; **H** = High; **E** = East; **W** = West; **S** = South; **N** = North
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 Bay between transoms with single diagonal bracing (typ. unless noted with **).

Chart 16: Span 7 - floor system bracing deficiencies.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

Span 8				
Location	Floor System Bracing Member Location			
	East Outside	East Middle	West Middle	West Outside
T29(Sp7)-T0(Sp8)	Along brace: 100% corrosion hole.			
** T0-T1		Along brace, oriented from E quarter point of T0 to midspan of T1: 100% corrosion hole.		Along brace, oriented from E truss of T0 to west quarter point of T1, 100% corrosion hole.
T1-T2	Along brace: 100% corrosion hole.			
T2-T3			Along brace: 100% corrosion hole.	
T3-T4			Along brace: 100% corrosion hole.	
T4-T5		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T5-T6		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T6-T7	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T7-T8				
T8-T9		Along brace: 100% corrosion hole.		
T9-T10				
T10-T11		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T11-T12	Along brace: 100% corrosion hole.		At T12: 100% corrosion hole 4" L x 3/4" W.	Along brace: 100% corrosion hole.
T12-T13		Along brace: 100% corrosion hole.	At T13: 100% corrosion hole 4" L x 3/4" W.	
T13-T14	Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.	
T14-T15		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T15-T16				
T16-T17		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T17-T18	Along brace: 100% corrosion hole.			
T18-T19		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T19-T20				Along brace: 100% corrosion hole.
T20-T21		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T21-T22	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	Along brace: 100% corrosion hole.	
T22-T23		Along brace: 100% corrosion hole.		Along brace: 100% corrosion hole.
T23-T24				Along brace: 100% corrosion hole.
T24-T25				
T25-T26		Along brace: 100% corrosion hole.		Along brace: 100% section loss 10" L x 1" W.
T26-T27		Along brace: 100% corrosion hole.		
T27-T28	Replaced brace.	Replaced brace.		Replaced brace.
** T28-T29	Replaced brace, oriented from E truss of T28 to E quarter point of T29.	Replaced brace, oriented from E quarter point of T28 to midspan of T29. Replaced brace, oriented from midspan of T28 to E quarter point of T29.	Replaced brace, oriented from midspan of T28 to W quarter point of T29. Replaced brace, oriented from W quarter point of T28 to midspan of T29.	

East Outside = Floor system brace member (sway brace member) between east end and east quarter point along transom;
East Middle = Floor system brace member (sway brace member) between east quarter point along transom and midspan of transom;
West Middle = Floor system brace member (sway brace member) between midspan of transom and west quarter point along transom;
West Outside = Floor system brace member (sway brace member) between west quarter point along transom and west end;
R = Replaced; **NF** = Not Found; **L** = Long; **W** = Wide; **H** = High; **E** = East; **W** = West; **S** = South; **N** = North
 Items in **BOLD RED LETTERS** have been updated from the last inspection.
 Bay between transoms with single diagonal bracing (typ. unless noted with **).

Chart 17: Span 8 - floor system bracing deficiencies.

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CHARTS

SUBSTRUCTURE DEFICIENCY TABLE - ABUTMENTS			
	Breastwall	Wingwalls	Comments
South Abutment	W half: 2'-0"H x 1'-6"L HA & 3 spalls w/ exp. rebar up to 1'-0"W x 1'-8"H x 2"D; E half: 3 HA's up to 5'-6"L x 4'-0"H; Below E truss bearing: 2'-2"L x 3'-0"H HA and 2'-6"W x 2'-0"H HA.	SE & SW WW: Hairline map cracking w/ moisture.	Top of footing exposed for 12'-0"L x up to 8" high. Covered with graffiti. Slope erosion up to 1'-1"D from footing to bottom of slope.
North Abutment	Graffiti throughout.	NE WW: Heavy vegetation; NW WW: Missing joint filler.	

Items in **BOLD RED LETTERS** have been updated from the last inspection.
Delam = Delamination; HA = Hollow area; Efflo. = Efflorescence; Exp. = Exposed; NF = Not found;
FH = Full Height; FW = Full Width; Vert. = Vertical;
L = Long; W = Wide; H = High; E = East; We = West; S = South; N = North

Chart 18: Substructure deficiencies - abutments.

CITY/TOWN LOWELL	B.I.N. 2M4	BR. DEPT. NO. L-15-088	8.-STRUCTURE NO. L15088-2M4-DOT-NBI	INSPECTION DATE NOV 16, 2022
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CHARTS

SUBSTRUCTURE DEFICIENCY TABLE - PIERS											
PIER	PIER STEM		EAST PEDESTAL				WEST PEDESTAL				COMMENTS
	NORTH	SOUTH	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	
Pier 1	N/A	N/A	50% area hollow sounding. Upper 6'-6"L x up to 1'-5"H HA/delam. Lower 8'-0"L x up to 4'-4"H delam.	-	4'-0"W x 5'-6"H HA/delam w/ heavy efflo at upper NE corner.	40% area hollow sounding. Lower region 8'-0"L x up to 4'-9"H delam. At S end (at SW corner) FH x up to 1/4"W vertical crack.	2 HA's up to 2'-0"W x 4'-0"H w/ up to 1/16"W map cracking.	2'-8"W x 3'-4"H x 10"W (EF) x 4-1/2"D spall @ SE corner spall, w/ exp. and 4 debonded rebar, w/adj. 2'-6"W x 2'-0"H HA.	Up to 4'-8"W x 6'-0"H HA & SE corner spall.	6'-0"W x up to 2'-6"H x 3"D spall w/ exp. rebar and w/ heavy surface rust/corrosion. 50% HA.	Vert. & map cracks w/ efflo, w/ punky concrete. Graffiti all around.
Pier 2	Typical	Typical	-	10"H x 4"W x 1/2"D spall.	1'-0" Ø D delam. FW x FH hairline map cracks w/ efflo. FW x 1/8"W crack at top (NF).	1'-0" Ø delam w/ map cracks. 4"W x 1'-2"H x 1"D spall.	Hairline mapcracks throughout.	(2) - 2'-0"W x 1'-0"H delams.	3'-0"W x 3'-0"H delam w/ up to 1/16"W map cracking.	Hairline map cracking throughout w/ efflo.	Channel debris on W end stuck into fender system.
Pier 3	Typical	Typical	-	-	Vert. hairline cracks w/ efflo.	3-1/2"L x 1'-0"W x 1-1/4"D spall at SW corner.	Hairline mapcracks throughout.	75% delam w/ surface spalls up to 2-1/4"D. 1'-0"W x 2'-3"H x up to 2-1/4"D spall.	4'-8"W x up to 3'-2"H x up to 4"D spall, 2'-2"W x up to 4'-0"H x up to 4"D spall w/ exp rebar w/ SL up to 25%, and remaining area delam.	1'-0" Ø delam. Hairline map cracking w/ efflo throughout.	Minor damage to lower sections of W end of fender system. Surface splintering N side near waterline.
Pier 4	Typical	Typical	North Face: Graffiti throughout, FH x FW hairline map cracking with moisture, and 11'-6"H x 2'-0"W HA at N face top corner at E end (also see West Face for additional remarks on same HA). South Face: FH x FW hairline map cracking w/ moisture, 1'-0"W x FH HA w/ 1/4" vert. cracks at W end, 10"W x 3'-0"H HA at E end, and SE corner at base 1'-3"H x 6"W x 3"D spall. West Face: FH x FW hairline map cracks w/ efflo, 7"L x 5'-0"H x 2"D spall within 1'-0"W x up to 1'-0"L x 8'-6"H corner HA.								Numerous shrinkage cracks throughout repaired faces. Broken waler 5th from top of fender system on N face. Missing waler 6th from top of fender system on SW face. Debris caught in W end of fender system.

Typical: The lower up to 10" of the pier caps, just above the water line, are typically delaminated with spalling, exposed and debonded rebar, and random hairline cracks with efflorescence. Tops of pile caps have construction and bird debris.

Items in **BOLD RED LETTERS** have been updated from the last inspection.
Delam = Delamination; **HA** = Hollow area; **Efflo.** = Efflorescence; **Exp.** = Exposed; **NF** = Not found;
FH = Full Height; **FW** = Full Width; **Vert.** = Vertical;
L = Long; **W** = Wide; **H** = High; **E** = East; **We** = West; **S** = South; **N** = North

Chart 19: Substructure deficiencies - piers (1 of 2).

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CHARTS

SUBSTRUCTURE DEFICIENCY TABLE - PIERS											
PIER	PIER STEM		EAST PEDESTAL				WEST PEDESTAL				COMMENTS
	NORTH	SOUTH	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	
Pier 5	Typical	Typical	2'-0"W x 6'-0"H delam at base of E end.	Moderate-heavy scaling w/ 3'-0"W x 2'-0"H delam, and up to FH x FW map cracks.	-	Up to FH x FW map cracks w/ moderate efflo.	(1) 1'-0"L x 2'-0"H HA. (1) 1'-0" Ø HA at the W end. 4'-0"L x 4'-0"H delam w/ hairline map cracking.	Up to FH x FW map cracks w/ efflo.	Up to FH x FW map cracks w/ efflo and w/ moisture.	(2) - 1'-0" Ø delams at N and S ends at the base.	Damaged waler 6th from top of fender system on W half of S face. Damaged/missing waler 6th from top of fender system between W nose and midlength of fender. SW and SE corners of E and W pedestals respectively have concrete overpour.
Pier 6	Typical	Typical	1'-6" Ø delam & 1'-0" Ø x 1"D spall and delam. 20% area w/ up to 1"D spalling throughout.	5'-0"W x 3'-0"H delam w/ map cracking w/ efflo. Within this delam area, 1'-6"W x 1'-0"H x 1-1/2"D spall.	1'-6" Ø delam w/ scattered hairline map cracking.	Heavy laminate rust on vert. steel angles at corners w/ up to 1/8"D SL at bottom 1'-0"H. FH vert. hairline cracks w/ rust staining throughout.	FH x 1/8"W vert. crack at NE corner. Scattered spalls up to 1"D.	3'-6"W x 3'-6"H x up to 6"D spall w/ exp rebar and punky concrete.	FH vert. hairline cracks w/ moderate to heavy efflo and rust staining.	75% area delam. Up to 5'-0"L x 2'-0"H x 2"D spall w/ exp rebar w/ heavy surface rust.	Damaged lower wale at SW end, w/ debris in fender system (hidden due to high water level).
Pier 7	Typical	Typical	Corner spall, and cracks adjacent to spall on W face w/ heavy efflo.	FH x up to 6'-0"W HA w/ up to 10" Ø x 2"D spall.	FH hairline cracks w/ moderate efflo.	1'-4"L x 9"W x 5'-0"H x 3"D spall w/ exp rebar w/ FH crack w/ heavy efflo at SW corner. 4'-0"L x up to 3'-0"W x up to 5"D spall w/ exp punky concrete at upper N corner.	70% area delam w/ 6"W x 6"H x 2-1/2"D spall.	-	75% area delam w/ up to FH x FW HA w/ cracks up to 1/8"W. Spalling at corners up to 1-1/2"D.	-	Up to 8"H debris on pier cap. 3'-0"L x 4"H section loss to 6th waler from top of fender system on S face.
Pier 8	N/A	N/A	1'-4"W x 1'-6"H previously patched HA.	Upper NE corner 4'-9"W x 3'-0"H map cracking.	FW x 1'-3"H HA w/ 5"W x 8"H x 1-1/2"D corner spall w/ exp. rebar. FW (2'-11"W) x 1'-3"H x up to 1"D spalled HA w/ exp. rebar.	-	1'-0"W x 1'-0"H HA.	1'-6"W x 1'-2"H delaminated patch.	-	-	-

Typical: The lower up to 10" of the pier caps, just above the water line, are typically delaminated with spalling, exposed and debonded rebar, and random hairline cracks with efflorescence. Tops of pile caps have construction and bird debris.

Items in **BOLD RED LETTERS** have been updated from the last inspection.
 Delam = Delamination; HA = Hollow area; Efflo. = Efflorescence; Exp. = Exposed; NF = Not found;
 FH = Full Height; FW = Full Width; Vert. = Vertical;
 L = Long; W = Wide; H = High; E = East; We = West; S = South; N = North

Chart 20: Substructure deficiencies - piers (2 of 2).

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PHOTOS



Photo 1: Span 4, Roadway Deck Panels, Looking North - General view of areas of missing epoxy aggregate wearing surface exposing surfaces of steel panels below.

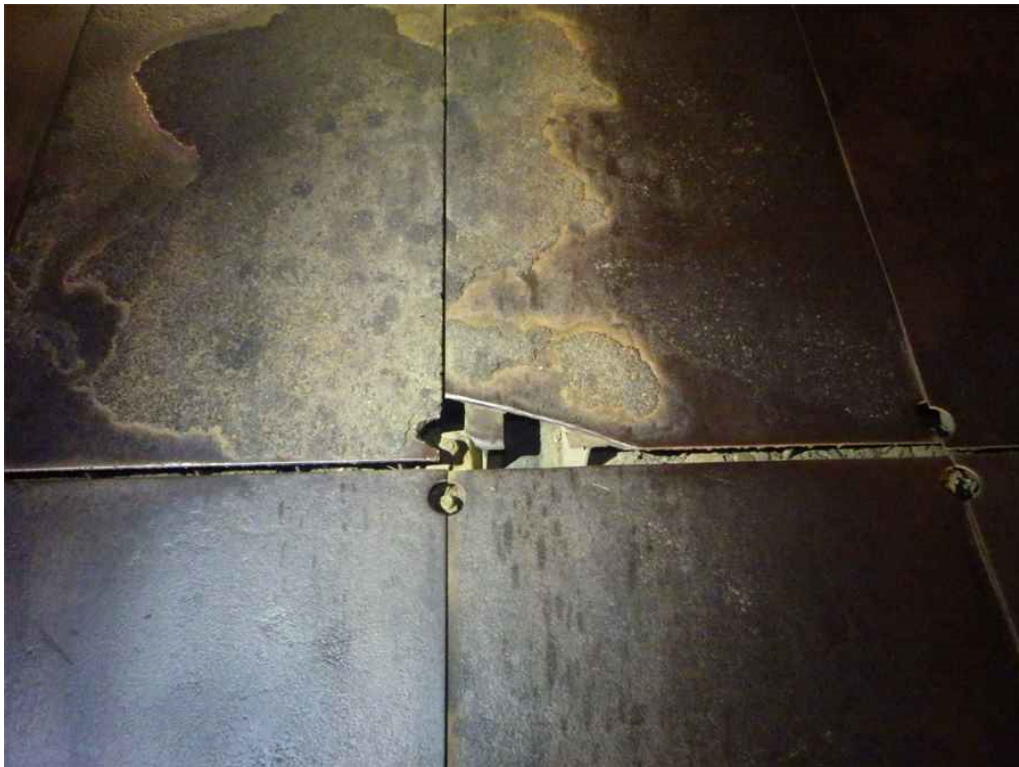


Photo 2: Span 8, Roadway Deck Panel North of T5, 3rd Panel from East Curb, Looking North - Areas of missing epoxy aggregate wearing surface exposing surface of steel panel below. Note fracture at corner.

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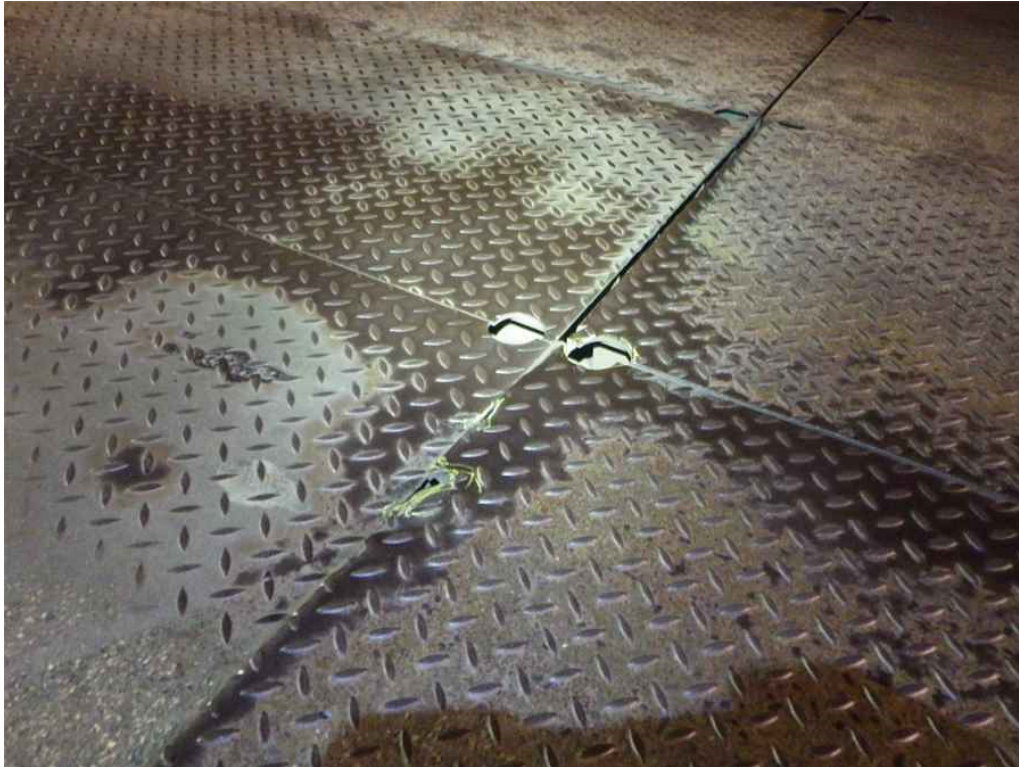
PHOTOS

Photo 3: Span 5, Roadway Deck Panel South of T21, 5th Panel from East Curb, Looking Northeast - Note exposed steel diamond tread plate pattern. Note panel is shifted north with minor gouges at north side.



Photo 4: Span 4, Roadway Deck Panel between T4 and T5, 5th Panel from East Curb, Looking South - Failed galvanization and heavy surface rust on underside.

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PHOTOS



Photo 5: Span 2, Roadway Deck Panel South of T12, 11th Panel from East Curb, Looking North - 3" long by 4" wide fracture/100% section loss.

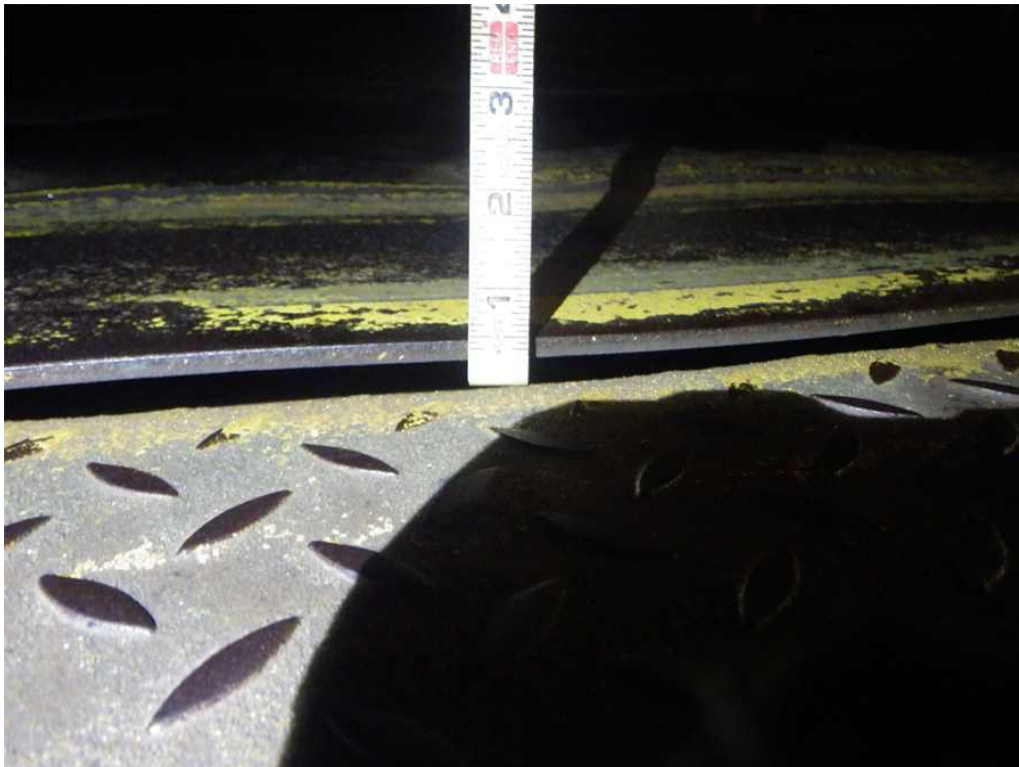


Photo 6: Span 4, Roadway Deck Panel between T4 and T5, 6th Panel (Middle Panel) from East Curb, Looking West - Panel is 1/2" higher than adjacent panel to east.

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PHOTOS



Photo 7: Span 5, Roadway Deck Panel South of T16, 6th Panel (Middle Panel) from East Curb, Looking North - Gouge at corner.



Photo 8: Span 6, Transom T12 Top Flange below 10th Roadway Deck Panel from East Curb, South Face of T12, Looking North - Four purlins have mutual wear with transom top flange, caused by loose panel above.

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PHOTOS



Photo 9: Span 9, Underside of Deck, At West Fascia, Looking South - Hairline map cracking with moisture throughout edge of deck. Note timber shielding in place below concrete sidewalk.



Photo 10: Span 9, at Pier 9, South End Conc Deck, and South Support Floorbeam, South Face, Looking Northwest - Spall with exposed reinforcing. Note floorbeam w/ section loss & pitting along full height.

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PHOTOS



Photo 11: South Approach, SIP Forms under Sidewalk, near South Abutment, Looking Northeast - Areas of heavy rust and corrosion holes along SIP joints and edges.



Photo 12: Span 5, Underside Sidewalk, Between T8-T9, Looking East - Moderate surface rust on underside of steel tread plate at edge.

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PHOTOS

Photo 13: Span 8, West Rail Post at T9, Looking Southwest - Impact damage to north flange bent downwards.



Photo 14: Span 4, Anti-Missile Fence on Sidewalk, between T8-T9, Looking Southwest - West half of previous repair on the anti-missile fence is torn and loose.

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PHOTOS



Photo 15: Span 5, Lighting Standard on East Truss, at South Third Point in Span (Pole Marking "20L"), Looking Southeast - 100% cracked weld for conduit connection, w/ cracks emanating east and west.



Photo 16: Span 6, Conduit on East Truss, Looking South - Conduit throughout span not seated on the steel brackets, and conduit has shifted.

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PHOTOS



Photo 17: South Abut., Deck Joint, S.B. Lane, Lkg. South - Gouged & worn elastomeric cover exposing the internal plates w/ two missing sections of internal joint plates. Note gouging to joint armor angles.



Photo 18: South Approach, Sidewalk, Looking North - Settlement throughout bituminous sidewalk with low points filled with debris.

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PHOTOS

Photo 19: Span 7, Transoms in Northern Third of Span, Looking South - Areas of galvanization loss, and light to moderate surface rust at bottom of web.



Photo 20: Span 2, Transom T27, Bottom Flange, Looking Northeast - Loss of galvanization and pitting section loss.

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PHOTOS



Photo 21: Span 3, Transom T0, Web, North Face, Looking South - Localized pitting section loss at area of failed galvanization.



Photo 22: Span 3, Transom T16 at West Truss Bearing Area, Looking West - One bolt missing in southeast corner of transom bearing area. Note galvanization loss and surface rust on bolts.

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PHOTOS



Photo 23: Span 6, Transom T12, 8'-0" from East Truss, Top Flange, South Face, Looking North - Hole at edge of top flange, surrounded by area of section loss.



Photo 24: Span 6, Transom T12, at Midspan, Web, North Face, Looking Southeast - Up to 1/32" section loss on web around floor system bracing connection.

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PHOTOS



Photo 25: Span 7, Transom T14, 10'-0" from West Truss, Bottom Flange, North Face, Looking South - Up to 1/8" section loss at north edge of bottom flange.



Photo 26: Span 2, Floor System Brace Between T12-T13, Connection at T12 for Middle East Brace, North Face, Looking South - Loose/disengaged bolt at bracing member connection.

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PHOTOS



Photo 27: Span 4, Floor System Braces Between T17-T18, Middle East and West Braces Near T18, South Face, Looking North - Areas of up to 100% section loss.



Photo 28: Span 2, Floor System Brace Between T7-T8, Middle West Brace near T8, South Face, Looking Northwest - Areas of up to 100% section loss.

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PHOTOS

Photo 29: Span 4, East Truss, Lower Chord, Pin Between T17-T18, Underside, Looking Northwest - Loss of galvanization and surface rust.



Photo 30: Span 2, East Truss, Upper Chord, East Bottom Channel located North of Pin Between T3-T4, East Face, Looking Southwest - East bottom flange bent upward.

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PHOTOS



Photo 31: Span 7, West Truss, Lower Chord, All Lower Pins Between T5-T6, Underside, Looking North - All lower pins loose with abrasion dust.



Photo 32: Span 1, East Truss, Lower Chord, West Lower Pin Between T9-Bearing, West Face, Looking Northeast - Loose pin with abrasion dust and up to 1/4" gap.

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PHOTOS



Photo 33: Span 3, East Truss, Lower Chord, Transom T5 West Panel Point Connection Plate, W Face, Lkg SE - Hole w/ adj full length crack of conn PL resulting in full separation on both sides of panel point.



Photo 34: Span 6, East Truss, South of Pin Between T9-T10, West Vertical Member At Lower Chord Connection, North Face, Looking Southwest - Active corrosion at bottom of vertical member.

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PHOTOS



Photo 35: Span 8, East Truss, Middle Chord South of T19-T20 Pin, Upper East Channel Web, East Face, Looking West - Longitudinal flaw in channel web.



Photo 36: Span 1, West Truss, at South Abutment, East End Post, East Face, Looking West - Holes in east and west faces.

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PHOTOS



Photo 37: Span 8, East Truss, at Pier 8, East and Center End Posts, East Faces, Looking Southwest - Holes in east faces. Note north face of support floorbeam for span 9 reinforced concrete deck.



Photo 38: Span 1, East Truss, at South Abutment, West End Post, East Face, Looking Southwest - Pin and connection plate have heavy surface rust, and pin is missing retainer clip.

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PHOTOS



Photo 39: Pier 5, West Truss Bearing, Guide Plate, Looking Southeast - Failed galvanization with surface rust. Note sheet metal bearing cover section loss/holes and deterioration.



Photo 40: South Abutment, East Truss Bearing, West Anchor Bolts, Looking South - Section loss on northwest anchor bolt nut.

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PHOTOS



Photo 41: Pier 8, East Truss Bearing, East Anchor Bolts, Looking North - Anchor bolts bent to east. Note north abutment backwall with efflorescence, and graffiti on breastwall.



Photo 42: South Abutment, Breastwall and Footing, Looking Southwest - Graffiti on breastwall, and exposed footing.

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PHOTOS

Photo 43: South Abutment, Breastwall, West Half, Looking Southwest - Three spalls with exposed rebar.



Photo 44: Pier 1, West Pedestal, West Face, Looking Northeast - Spall with exposed rebar with heavy surface rust and corrosion.

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Photo 45: Pier 3, West Pedestal, East Face, Looking West - Spalls with exposed rebar with section loss.



Photo 46: Pier 6, West Pedestal, South Face, Looking Northwest - Spall with exposed rebar and punky concrete.

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PHOTOS



Photo 47: Pier 8, East Pedestal, East Face, Looking West - Full width spalled area with exposed rebar.



Photo 48: Pier 4, Pierwall, North and West Faces, Looking Southeast - Hairline map cracking with moisture on N face, and hairline map cracking with efflorescence and spall within hollow area at NW corner of W face.

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PHOTOS



Photo 49: Pier 6, West Acrow Tower, East and West Distribution Beams, Underside, Looking South - Section loss on bottom flange of west distribution beam, along interior face of beam.



Photo 50: Pier 2, Pile Cap, South Elevation at East End, Looking Northwest - Spalls around base of pile cap.

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PHOTOS



Photo 51: Channel, South Embankment, Below Span 2, Looking West - Minor slumping beyond the limits of the riprap.



Photo 52: Pier 5, Timber Fender System, South Elevation, Looking North - Damaged waler 6th from top on west half of south face, and missing waler 6th from top at the west nose.

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PHOTOS

Photo 53: Northwest Approach Guardrail, Rail Post #11, Looking North - Collision damage to guardrail, and bent rail post.



Photo 54: Northwest Approach Guardrail, Terminal End, Looking Southwest - Terminal end is buried and damaged.