

BRIDGE MANAGEMENT INFORMATION SYSTEM

13 Apr 2015

CDAVIS

Condition Inspection Report

Criteria: Structure No = 01140 - Include Inspection Condition Photos = N
 - Include Additional Blank Lines for Notes = N - Show Not Applicable Components = Y

Structure No: 01140 - TAYLOR

Status: Open/In Use

Inspection Type: Routine Condition

Region: 3 - Northern Region

District: 8 - Peace District

Contract Area: 22 - North Peace CA

RFI: 22-A-J-00097N - Rte 97 NB - Alaska Highway - ON

Features Crossed: PEACE RIVER/ALASKA HIGHWAY

Component Group/Component		E	G	F	P	V	X	N/A
HYDROTECHNICAL :								
1.	Debris Risk		100					N
2.	Channel		25	25	25		25	N
3.	Erosion Protection		75	25				N
4.	Substructure Scour		50	50				N
SUBSTRUCTURE :								
5.	Foundation Movement		85	15				N
6.	Abutments		75	24	1			N
7.	Wing/Retaining Walls		70	20	10			N
8.	Embankment		90	10				N
9.	Footings/Piling		5				95	N
10.	Pier Columns/Walls/Cribs		85	10	1		4	N
11.	Bearings		70	15	5		10	N
12.	Caps		90	10				N
13.	Corbels							Y
14.	Dolphins/Fenders		50				50	N
SUPERSTRUCTURE :								
15.	Floor Beams/Transoms		78	1	1		20	N
16.	Stringers		78	1	1		20	N
17.	Girders							Y
18.	Portals							Y
19.	Bracing/Diaphragms		49	1			50	N
20.	Truss Chords/Arch Ribs		30	19	1		50	N
21.	Arch Ties							Y
22.	Truss Diagonals		49	1			50	N
23.	Truss Rods/Verticals		49	1			50	N
24.	Cables							Y
25.	Panels							Y
26.	Pins/Bolts/Rivets		30	9	1		60	N
27.	Camber/Sag		50	50				N
28.	Live Load Vibration		50	48	2			N
29.	Coating (Structure)		25	21	4		50	N
DECK :								
30.	Sub Deck/Cross Ties		97	2	1			N
31.	Wearing Surface		20	30	50			N
32.	Deck Joints		60	20	20			N
33.	Curbs/Wheelguards		99		1			N
34.	Sidewalk(s)		60	38	2			N
35.	Railings/Parapets		99	1				N
36.	Median Barrier							Y
37.	Drains/Pipes		40	60				N
38.	Coating (Railings)		100					N
APPROACHES :								
39.	Signing/Lighting		99		1			N
40.	Roadway Approaches		50	50				N
41.	Roadway Flares		100					N

1st Abutment Position: S

Year Built: 1960 Estimated? ☐

Length (m): 712.200

Note:

Main Span Length: 168.400

Main Span Type: OTHER

Spans: 6

Urgency: 4

BCI Rating: 2.25

Adjusted BCI Rating: 2.3

Inspector/Inspected By: Mike Odowichuk

On 2014/06/17

Amendment/Partial Inspection?

Urgency Notes:

Urgency Rating Note: Steel grid deck and catwalk deterioration. Localized corrosion issues. High/increasing maintenance costs and traffic delays for deck repairs. Major route. Long detours.

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Utility Concerns Note: Spectra Energy gas pipelines currently charged with low pressure static "sweet" gas. Contact May Fong S.22

S.22

Pembina owns 12" oil pipeline Pembina Pipeline Group 1 800 360-4706.

Telus and Total Telcom (Rohl Geomatics) own fibre optics cables alongside upper catwalk.

Item Notes:

- | | |
|--------------------------|---|
| 2 . Channel | 2014 Channel flow is skewed at about 40 deg to pier 3, 20 deg to pier 2. Note that degree of skew at pier 3 seems to vary depending on volume of flow, which is moderate at time of inspection. Channel subject to shifting, local aggradation and degradation. |
| 3 . Erosion Protection | 2014: No change. Minor erosion and loss of riprap at upstream end of riprap on south bank - approx 10m upstream of bridge. |
| 4 . Substructure Scour | <p>2014: No change.</p> <p>2012 Hydrographic survey consultant report based on 2011 data identified:</p> <ul style="list-style-type: none"> -aggradation at piers 1,2, and 4 (1.0m range) -degradation at pier 3 (2.5m range) - a small scour hole (4.0 m deep) approx 7.0m downstream of pier 3. - no immediate threat to any piers. <p>Note: Current prevents scour measurement at immediate base of piers. Cannot access pier columns with snoopers.</p> |
| 5 . Foundation Movement | Cracking of south abutment side retaining walls may be caused by settlement of approach foundation. Engineers evaluation required. See Wing/Retaining wall photos. |
| 6 . Abutments | <p>2014: Damage to top of north abutment wall from vehicle impact with west curb armour. Otherwise abutment conditions same as previous except gradual deterioration.</p> <p>Previously:</p> <ul style="list-style-type: none"> -North abutment spalled at upstream corner, and delaminated areas on vertical face below. -South abutment abutment wall has various spalls scaling, cracks. Older (lower) wall section pre-dates existing bridge, and is more deteriorated than top section. |
| 7 . Wing/Retaining Walls | <p>Includes side walls on north and south abutments.</p> <p>2014 No closeup access possible without snoopers. Cracks in side walls appear to be widening and rebar deteriorating.</p> <p>Previous - still appl: South abutment side retaining walls have one wide full-height crack in approximate center of each wall. Cracks are widest at the top and partly reflect through the sidewalks and curbs above. Previous epoxy injection repairs have re-cracked quickly, suggesting movement, as there is no apparent water source to create hydrostatic pressure..</p> |
| 8 . Embankment | <p>2014: No change from previous.</p> <ul style="list-style-type: none"> -Settlement and sluffing of gravel fill under north span noted previously - no significant change. -Erosion gulleys on slope below span 5 (north bank). |
| 9 . Footings/Piling | <p>Except for top of south abutment footing all piles and footings are underground or under water.</p> <p>No indication of problems with footings or piling.</p> |

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Item Notes:

- 10 . Pier Columns/Walls/Cribs 2014: No change from previous. Limited access. Minor deterioration since 2010 major inspection.
- Generally sound with minor cracking, and a few minor-to-moderate spalls and delaminations.
 Previous spalls noted at water line on piers #2 and #3, not visible in 2014 due to water level.
- Previous ratings brought forward. See also notes from 2010 detailed inspection.
- 11 . Bearings
- Refers to main truss pot, rocker, and fixed pin bearings, rocker bearings on north abutment, wind braces and non-fixed stringer supports on floor beams below the deck.
- 2014: North abutment bearing #5 is out of horizontal alignment by about 5 degrees, and vertical space for vibration 1mm approx between rocker and top plates on bearings #3,4,5 and 8.
- Increased deformation and wear on upper shear connectors, especially at panel points 36 and 46. PP36 has deformation of upper horizontal fixed and sliding plates. Corrosion and deformation of steel and "lubrite" plates may be limiting movement.
- Previously noted but still pertinent:
 - Fixed bearings on Piers 2 and 4 show no sign of recent movement and may be frozen, hence poor rating. - Some cracked vertical welds on floor beam "knee braces" which support stringers. eg at panel point 12.
 - Corrosion and pack rust on upper deck windbrace sliding connections.
 - "not inspected" refers to fyfe bearings on piers 1 and 3. as did not have tools or safe access to remove covers. No evidence of problems with them.
- See 2010 inspection notes and note to file "BT Comments" dated April 1, 2010 regarding fixed bearings on Piers 2 and 4, rusted windbrace connections and weld cracks below steel knee-brace stringer supports. None of these deficiencies are considered high-priority repairs.
- 12 . Caps
- Includes concrete pier caps but not abutment bridge seats which are rated with abutments.
- 2014: No change from previous. Hairline cracks and some minor spalls and delaminations - slightly more than noted previously.
 - N abut spalled at upstream corner, and delaminated areas on vertical face below bearings.
- 14 . Dolphins/Fenders
- 2014:
 Mostly obscured by high water. Previous rating 75% good 25% fair due to plate on pier #4 lifting at bottom.
- 15 . Floor Beams/Transoms
- 2014: Gradual deterioration but no significant change since 2010.
- 2010: Light to medium corrosion of floor beam webs at random stringer connections.
- 16 . Stringers
- 2014: Gradual deterioration but no significant change since 2010.
- 2010: Corrosion pitting at random cross brace and floor beam connections.
- 19 . Bracing/Diaphragms
- 2014
 Access limitations. Previously noted local pitting and corrosion.
- 20 . Truss Chords/Arch Ribs
- 2014: Access limitations. Previously noted local pitting and corrosion. Fair and poor % ratings brought forward for 2010 detailed inspection.
- 22 . Truss Diagonals
- 2014: Access limitations. Previously noted local pitting and corrosion. No significant changes since 2010 detailed inspection. Previous fair rating brought forward.

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Item Notes:

- | | | |
|------|----------------------|--|
| 23 . | Truss Rods/Verticals | 2014 access limitations. Previously noted local pitting and corrosion. No change since 2010 detailed inspection. Previous fair rating brought forward. |
| 26 . | Pins/Bolts/Rivets | 2014: Access Limitations. Bolt not seated pp25 stringer C. See also 2010 detailed inspection notes.

Previous Fair and poor ratings brought forward. |
| 27 . | Camber/Sag | Previous note: Uneven ride on bridge deck, more noticable going south.

2014 no change. |
| 28 . | Live Load Vibration | 2014: Vibration of south joint armour plate has lessened but not disappeared since Feb 2014 repair. Vibration as traffic crosses abutment joint N abutment has increased.

Previous note: General side sway previously noted when heavy loads cross bridge, more noticable at south 1/3 of bridge when heavy traffic is southbound at higher speeds. |
| 29 . | Coating (Structure) | 2014 Previously noted general rust becomming gradually more widespread as winter sand and salt fall though deck, contributing to deterioration.

Varying degrees of failed coating, rust and corrosion is evident at plate and angle connections connections throughout bridge, particularly at downstream lower truss chords. |
| 30 . | Sub Deck/Cross Ties | Refers to connections between 5" deck I-beam connections with support stringers.

2014: Access limitations. Assessment by inspector based on observations from catwalk plus detailed knowledge of past deck repairs.

Very poor condition refers to areas where breaks have occurred and weld repairs completed under adverse conditions where parent metal is deteriorated. In these locations welds are prone to re-breaking. |
| 31 . | Wearing Surface | 2014: Smallest grid bars are worn approx 10% in wheel paths. Surface welds in wheel paths are worn 20% to 40%. Assessment by inspector is partly based on detailed knowledge of past and ongoing deck repairs. To date 35 repair panels have been installed, including replacement of 2 older repair panels.

Currently rattles at downstream panel points 1.2, 58 and 85 and upstream 41 and 62.1. Recent rapair of bad section at downstream panel point 33.9 downstream (older panel repair).

Seasonal welding completed recently so deck is quieter than usual.

Pothole on top of concrete south abutment centerline |
| 32 . | Deck Joints | 2014 - North abutment joint cover plate is warped and has multiple weld repairs, repair welds prone to re-crack.

Joint opening measurements at 23 deg C: pp10=190mm,14=25mm 32=32mm, 36=198mm, 46=51mm, 50=33mm, 59=28mm, 72=200mm, 78=20mm 86=25mm |
| 33 . | Curbs/Wheelguards | North abutment and southeast end curb cracks, small spalls and delaminations. |
| 34 . | Sidewalk(s) | 2013-Weld connections broken at upstream south abutment sidewalk joint. Minor concrete spalling around loosened joint armor. Not hazardous, but noisy. |

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Item Notes:

- 35 . Railings/Parapets 2014
 pp 36 downstream rail slight bend in vertical
 pp 33 downstream rail light damage (bent bars)
 pp 13.8 upstream rail vertical bent
 pp 6.6 downstream rail vertical bent
 pp 61 upstream rail posts misaligned from May 2014 damage repair.
 Concrete endpost damage both ends of bridge on downstream side. Rebar corrosion evident.
 None of above constitutes a hazard.
- 37 . Drains/Pipes Refers to steel flume in NE corner. Various sections with bends, minor settlement, and relatively minor corrosion .
- 39 . Signing/Lighting 19 deck centerline reflectors missing.
- 40 . Roadway Approaches 2014: 1cm full width transverse cracks spaced at 5 to 7 meters apart on south approach. Slight sway/bounce as northbound traffic goes onto bridge. South approach has area of distressed and cracked pavement within 2.5m of abutment. Moderate severity.

Inspection Notes:**General Inspection Notes**

2010: detailed inspection with T. Mackay

Note: BMIS inventory first abutment = north, but design drawings number panel points from south abutment. FOR PANEL NUMBERS USE FIRST ABUTMENT = SOUTH TO AGREE WITH DRAWINGS.

2011: routine inspection by consultant

2014: Data collected on June 6 and June 18, 2014.

Other Posted Hazard Warning Signs

Northbound: 70 km/h; bridge deck symbol and tab; "Metal Bridge Deck - Steering May Be Affected"; Cyclists 50 km/h; No Stopping (symbol); Peace River.

Southbound: Frost Warning- Bridge deck ahead may be slippery; Motorcycle symbol+tab "Metal Bridge Deck"; "Metal Bridge Deck - Steering May Be Affected - Cyclists 50 km/h"; No Stopping (symbol); No Stopping On Bridge; Peace River.

Drainage Area Description

Peace River Watershed includes Williston Lake, Halfway River and Pine River. Flow under bridge is mainly regulated by BC Hydro at the Bennett and Peace Canyon dams near Hudsons Hope.

Scour Notes

See Hydrographic Survey report by Associated Engineering Project 05206-0011 March 2012.

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Inspection Notes:**Rehab Work Notes**

1991-94 Bridge Painted
 1997: Bearings replaced on piers #1 and #3
 1998: Large hole in deck at north abutment starts investigation project.
 1999 Westcoast Energy (now Spectra) installed slope indicators at NW corner of bridge.
 2004: Security fence installed at south abutment.
 2005: Deck replacement project initiated, managed by regional office.
 2007: First shipment of deck repair panels received.
 2010: Deck replacement concept design completed. Deterioration of catwalks is flagged as an upcoming issue.
 2013: Second (redesigned) shipment of deck repair panels received Project 36127.

2014 Current Rehab/Engineering Issues

- Deck Maintenance/Replacement. See Buckland and Taylor/COWI report April 2014.
- Paint to arrest spot corrosion - throughout structure, especially at connections and downstream lower chord. See Buckland and Taylor/COWI Report April 2014 - S.17 for paint program.
- North abutment rocker bearings - looseness, misalignment.
- Deterioration of Catwalks - corrosion at connections and rail splice plates breaking. Design repair, replacement or reinforcement of existing.
- Inspection/maintenance of instream pier columns below water line
- Upper shear connectors - removal of pack rust would require disassembly and design of temporary bracing.
- Deck Joint Plate - North abutment - confirm repair procedure.
- South Abutment side wall cracks - investigate cause and design repair - consider possible effects of pavement expansion above.
- Check all bolt tensions - recommended by consultant in 2012.

Maintenance Work Notes

2014

- steel grid deck inspection and maintenance - ongoing - (high p)
- repair of south abutment concrete side walls and sidewalk soffits - requires investigation, and prescription or design. Consider possibility of pavement expansion being the cause (med p)
- replace 19 missing deck centerline reflectors (med p).
- cover or seal sliding chord connections and lubricate to reduce pack rust - snooper required (med p).
- tighten loose bolt near the first southerly pier on the west edge of the deck, (id'd by consultant in 2011) (med/low p)
- monitor welds and plates at upper windbraces for effects of pack rust. After-note Aug 27, RBE recommends monitor until breakage occurs (med p).
- remove graffiti from bridge steelwork and concrete. (m/l p)
- repair minor rail damage at upstream pp13.8 and pp54 and at downstream pp6.6, pp32, pp36, and straighten posts at PP61 (m/l p)
- consider flashing or blocks to prevent dirt and gravel from getting trapped inside connections -
- replace missing bolts at upstream U78 and U61 and seal empty "fake bolt" holes at downstream U50 (m/l p).
- repair concrete cracks and patch top of north abut wall (road surface) (low p)
- spot steel paint of truss connections is beyond maintenance. Rehab needed.
- check all bolt tensions in future (2011 consultant recommendation) beyond maintenance. Rehab.