

Ministry of Transportation and Infrastructure

**Bridge Inspection and Assessment –
E&N Railway, Vancouver Island, BC Canada**

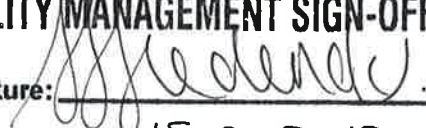
**Phase 1 - Inspection Report
Bridges from Mile 1.30 to Mile 65.10 and 2
Bridges on the Wellcox Spur (28 Bridges)**

February 15, 2012



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ASSOCIATED ENGINEERING QUALITY MANAGEMENT SIGN-OFF	
Signature:	
Date:	15-2-2012

#04-12-007

Appendix A: Non-Destructive Testing Reports
Appendix B: Field Inspection Notes

INTRODUCTION

Bridge inspections were performed during October and November of 2011 on the Victoria and Wellcox Subdivisions of the E&N Railway, owned by the Island Corridor Foundation (ICF), currently operated by Southern Railway of Vancouver Island [SVI]). Twenty-eight structures comprised of steel, timber and concrete were inspected between Victoria and Nanaimo, British Columbia. This inspection was performed by the following individuals:

- Dale Harrison, P.Eng., Associated Engineering
- Mark Torrie, E.I.T., Associated Engineering
- Adam Laws, Associated Engineering
- Karam Bahi, Associated Engineering
- Nikola Cuperlovic, P.Eng., Associated Engineering
- Michael O'Connor, P.E., Alfred Benesch & Company
- Phil Walsh, P.E., Alfred Benesch & Company
- Scott Wojteczko, P.E., Alfred Benesch & Company
- Matthew Becker, E.I.T., Alfred Benesch & Company

All inspections were performed in teams of one to three persons and Bryon Reed or Al Kutaj of Southern Railway of Vancouver Island accompanied the inspection teams at all times.

The purpose of this inspection was to identify structural deficiencies within the bridges and to determine the extent of any section loss for rating purposes. This report describes our inspection techniques and summarizes the defects found at all bridges.

SCOPE OF INSPECTION

The primary focus of each bridge inspection was to evaluate and document the condition of all elements related to the bridges with particular attention given to non-redundant members of truss structures. The preferred method of inspection for bridges in this condition includes a close-proximity inspection of all bridge elements, however as stated in the project proposal dated September 14, 2011, the project budget constraints made it impossible to fully access and inspect all members. Ultimately, our approach focused on inspecting an appropriate sampling of representative and key structural members at all bridges. Therefore, when comments are made regarding condition of bridge elements they are based on only the elements inspected.

When water height allowed, inspection comments were made with respect to scour at substructure elements. Underwater inspection with divers was not completed. A snooper truck with hi-rail equipment was used to access difficult to access areas of large steel truss structures and structures located far off the ground. Non-destructive testing was performed on select bridges to search for internal defects within steel members of non-redundant structures. In addition, several bridges were observed as trains crossed to look for unexpected behaviors under loading.

Inspection Techniques

Several inspection techniques were utilized during this inspection:

- | | | |
|-----------------|---|--|
| <u>Visual</u> | - | A visual sampling of steel, timber and concrete components and their surrounding areas was conducted on each bridge. |
| <u>Sounding</u> | - | A sampling of timber, concrete and steel bridge elements were hammer sounded to help ascertain the presence of internal decay/voids or cracks. |
| <u>Boring</u> | - | Timber elements found to be deteriorated due to hammer sounding were drilled with a 3/8" diameter drill bit. These holes were then inspected, using a shell and void indicator, to confirm the presence of internal decay and evaluate the remaining sound wood. The inspection holes were then plugged with a treated wooden dowel. |

On timber bridges, particular attention was paid to decay-vulnerable areas such as the ground line, waterline, brace bolt connections and bearing areas of the members. The size and location of internal voids were then recorded, along with any visual observations. Concrete and steel bridges were examined in areas which commonly develop structural deficiencies, such as bearing areas and connection points.

This inspection used subjective inspection techniques and also relied heavily upon human judgment. It is possible that some deficiencies may not have been discovered. The inspection does not guarantee that all defects were identified in timber, steel and concrete members. Internal steel defects and defects in inaccessible areas may not have been located, as only visual inspection techniques were utilized. This inspection did not include underwater inspection or excavation of buried members. All field inspection notes are provided in Appendix B.

Methods of Access

All bridges were visually inspected from both track level and ground level. The team was able to view the majority of the critical bridge elements using this method of inspection. In some cases, ladders were used to gain access to abutment seats and bearings. A snooper truck was used to inspect bridges elevated great distances from the ground.

The snooper truck used was an Aspen Aerial UB-30 snooper truck equipped with hi-rail equipment. The snooper truck had a maximum reach of approximately 40 feet below the track level and 30 feet above the track level. Two inspectors were able to work from the snooper bucket at all times. Inspectors were able to view many difficult to reach superstructure areas at close proximity using the snooper.

Each individual bridge report specifies the access method used. If "Snooper" is specified in the report, the inspection was performed using a snooper truck as well as track and ground access by foot. If "None" is specified, the inspection was performed from the track and ground on foot as well as ladder access.

Non-Destructive Testing (NDT)

Non-destructive testing (NDT) was performed by Acuren Group Inc. on Bridges 14.00, 39.30 and 47.90 and the results are located in the Appendix A. Note that only a sampling of pins and eye bars were tested at these bridges. The results of this sampling do not declare that other elements in the structure do not have issues.

Bridges Observed Under Load

As a supplement to the field inspections, several bridges were observed under load. The primary intent of the load testing was to identify any significant bridge movements (sway, settlement, etc.) and to identify how critical members were behaving. The load observation process was led by Benesch and AE; members of SVI's field staff assisted in the observations. The on-site team was spread throughout various locations on or around the bridge structures in an attempt to maximize the number of areas observed. It should be noted that only a sampling of each structure was seen under load; the loading was typically a short duration passing locomotive(s). For best results, the bridges should be observed under a full train of cars (at timetable speeds) providing sustained loading.

On 10/12/2011, the inspection team of Michael O'Connor (Benesch) and Matthew Becker (Benesch), assisted by Bryon Reed (SVI), observed Bridge 39.3 under the load of 1-GP9 locomotive and 8 empty freight cars at various speeds in both directions.

On 11/03/2011, the inspection team of Scott Wojteczko (Benesch) and Dale Harrison (AE), assisted by Bryon Reed, Al Kutaj, and Don McGregor (SVI), observed Bridges 14.0, 37.6, 37.8, 46.6 and 47.9 under the load of 2-GP9 locomotives at various speeds in both directions.

The observations of the load testing are presented within the report at each relevant bridge location.

INSPECTION DOCUMENTATION

Inspection Report Layout

All bridge inspection reports contain the following information:

- Bridge Layout Photos
- General Bridge Data and Information
 - Feature crossed
 - Inspection date
 - Nearest town
 - Inspectors
 - Number of spans
 - Stream depth (if applicable)
 - Flow direction of stream (if applicable)
 - Deck type (open or ballast deck)
 - Presence of walkways or handrails
 - Span lengths and type (span length is center to center of bearing)
 - Height above ground
 - Total length of bridge (typically back to back of backwall)
 - Access method
 - Observed under load
 - NDT testing (if performed)
- Inspection Findings
- Bridge General Arrangement
- Photos of Bridge Defects

Element Condition

As mentioned in the Scope of Inspection section, all elements of a bridge structure were not inspected. Assigning a condition to each bridge element was therefore outside the scope of this report. General conditions (i.e. good, fair, poor, etc.) have been called out for groups of elements based on the defects observed collectively, however these conditions may not be indicative of the state of each individual member.

Span Types

Span types are documented in each inspection report. The following are the abbreviations used:

- DPG - Deck Plate Girder
- HDPG - Half-Depth Plate Girder
- TPG - Through Plate Girder
- WFB - Wide Flange Beam
- TT - Through Truss (Steel)
- DT - Deck Truss (Steel)
- CDT - Cantilevered Deck Truss (Steel)
- TPT - Timber Pile Trestle
- TFT - Timber Frame Trestle

Element Numbering System

All bridge elements perpendicular to the track, such as piers and bents, are numbered in increasing order from south to north (increasing milepost). All bridge elements parallel to the track, such as girders and stringers, are numbered from left to right looking north. Pins in pin-connected truss structures will be numbered, starting with zero, from low mile post number to high mile post number.

Noted Deficiencies

Deficiencies are noted throughout this report as observed at each bridge. Some of the deficiencies that were found are considered to be of low concern at this time while others are of a higher concern. In order to highlight the items that are of a higher concern, a section titled “Noted Deficiencies” has been added to relevant bridges at the end of the individual bridge reports. Noted deficiencies are defined as items that are in need of repair as a priority, preferably within the next year, in order to safely operate the bridge under train loadings.

If a bridge report does not have a “Noted Deficiencies” section it means that none of the deficiencies found were determined to be in need of high priority repair.

BRIDGE INVENTORY

Mileage	Subdivision	Feature Crossed
1.30	Victoria	Hereward Rd
4.00	Victoria	Highway 1A
4.50	Victoria	Helmcken Rd
5.20	Victoria	Adams Place
5.34	Victoria	Island Hwy/Trail
5.45	Victoria	Brydon Rd
5.80	Victoria	Six Mile Rd
14.00	Victoria	Niagara Canyon
14.90	Victoria	Arbutus Canyon
18.20	Victoria	Unnamed Waterway
26.80	Victoria	Shawnigan Lake Rd
28.20	Victoria	Shawnigan Lake Tributary
28.40	Victoria	Shawnigan Lake Tributary
28.60	Victoria	Shawnigan Lake Tributary
29.80	Victoria	Northgate Rd
35.60	Victoria	Koksilah Rd
37.60	Victoria	Koksilah Overflow
37.80	Victoria	Koksilah River
39.30	Victoria	Cowichan River
40.60	Victoria	Unnamed Waterway
46.60	Victoria	Overflow
46.80	Victoria	Whitehouse Creek
47.90	Victoria	Chemainus River
60.70	Victoria	Harrison Creek
64.40	Victoria	Lochner Rd & Haslam Creek
65.10	Victoria	Nanaimo River
0.69	Wellcox	Old Island Hwy
1.02	Wellcox	Chase River

1.30 – Victoria Subdivision – Hereward Road



Track View (Looking North)



South Abutment View

1.30 – Victoria Subdivision – Hereward Road

FEATURE CROSSED: Hereward Road

INSPECTION DATE: 10/07/2011

STREAM DEPTH: N/A

HEIGHT: 15 ft

NEAREST TOWN: Victoria, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 56 ft

INSPECTORS: MJO/BA/BR

DECK TYPE: Open

SPANS: 47'-2" (HDPG)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Cast-In-Place Concrete

- Vegetation located on abutment seats
- Front edge of abutment seat is spalling under bearings (see attached photo)
- Some minor cracking throughout abutment face
- Bridge is on a skew and abutment ties are bearing on steel girders on one side and the extended abutment backwall on the other side

WINGWALL NOTES

Wingwall Type: Cast-In-Place Concrete

- Some spalling throughout

DECK NOTES

- Track located on a tangent alignment
- Ties = 10" wide x 18" deep x 12'-3" long (1/4" dap and 4 1/2" bearing length)
- Tie spacing = 14"
- 7 poor ties counted; ties are generally in fair to poor condition (consistent side checks)
- Backwall ties in poor condition; neoprene pads missing beneath abutment ties
- Structural ties at ends are sitting on soil; clean soil out of skewed area
- Section loss for structural ties = 10%

SPAN NOTES

Bearing Notes:

- Steel bearing plates
- Surface corrosion on all bearings; SE bearing plate has pack rust causing the plate to bend
- Other bearing plates have gap between plates
- Anchor bolts are in poor condition; missing nut (see attached photo)

Girder Notes:

- Steel is in fair condition; minor corrosion throughout girders
- Lateral bracing system is new; one member hit by vehicle
- Bearing stiffeners have been replaced recently
- Bottom flange of girders has 5% section loss

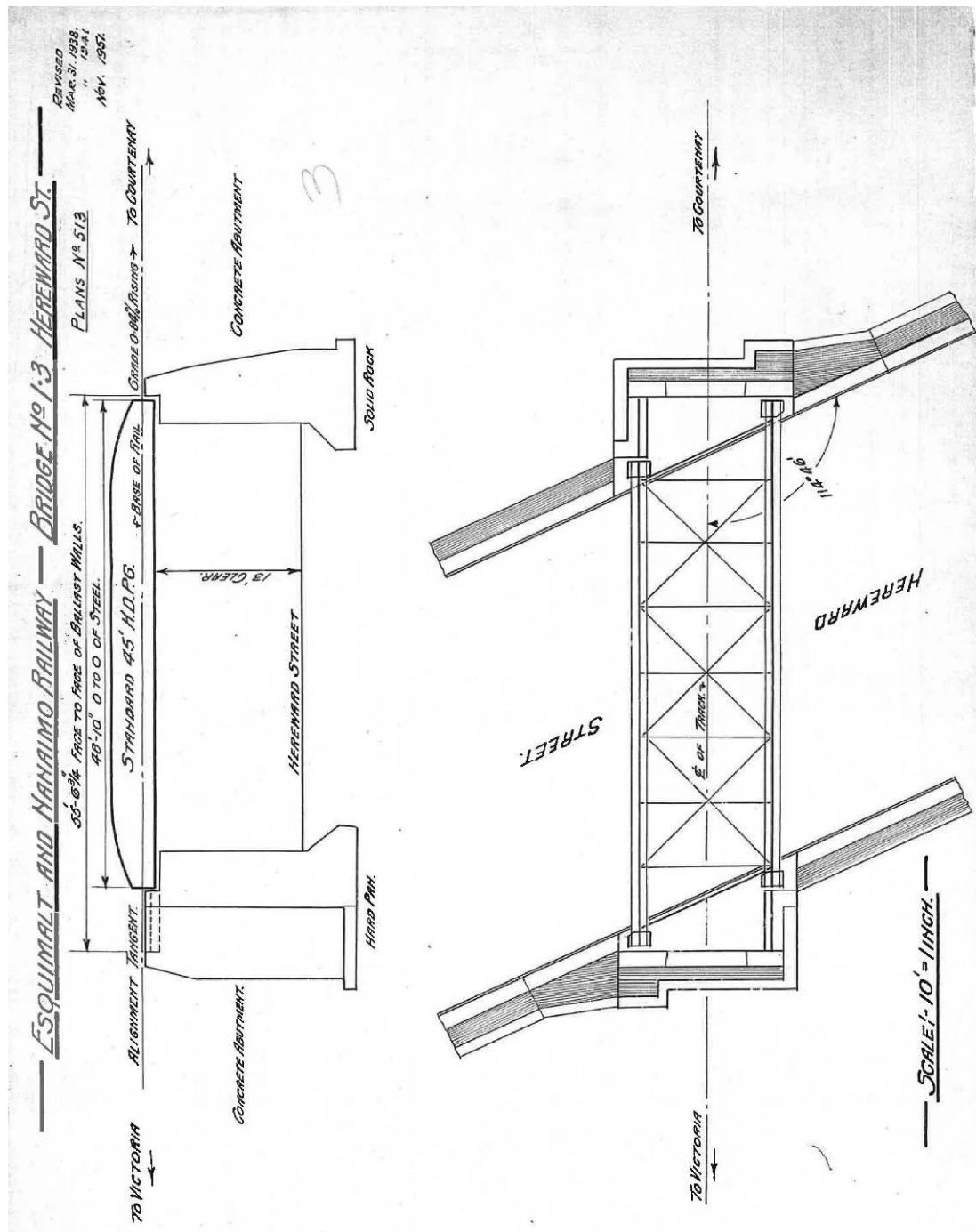
1.30 – Victoria Subdivision – Hereward Road

History:

- Original construction year = 1914
- Summary of bridge updates
 - Bottom lateral bracing replaced in 1987
 - Steel repairs completed in 1994

1.30 – Victoria Subdivision – Hereward Road

Bridge General Arrangement:



1.30 – Victoria Subdivision – Hereward Road

Additional Inspection Photos:



Anchor Bolt without Nut (Typical)



Concrete Spalling beneath Bearings



Bearing Corrosion (Typical)



SE Bearing with Spalled Area under Bearing

4.00 – Victoria Subdivision – Highway 1A



Track View (Looking North)



Girder Level View (Looking North)

4.00 – Victoria Subdivision – Highway 1A

FEATURE CROSSED: Highway 1A

INSPECTION DATE: 10/07/2011

STREAM DEPTH: N/A

HEIGHT: 17 ft

NEAREST TOWN: View Royal, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 44 ft

INSPECTORS: MJO

DECK TYPE: Ballast

SPANS: 41'-4" (TPG)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Cast-In-Place Concrete

- South abutment replaced in 2010
- North abutment top cap replaced in 2010; bottom half from 1911
- Both abutments are in good condition

WINGWALL NOTES

Wingwall Type: Precast Concrete (south); Timber (north)

- South abutment backwall is in good condition
- North abutment backwall is touching girder span

DECK NOTES

- Track located on a tangent alignment
- All ties new in 2010

SPAN NOTES

Bearing Notes:

- Bearings replaced in 2010 (see attached photo)
- Precast concrete blocks (north abutment) have a 3" x 1/8" gap at bearing with 1911 abutment (see attached photo)
- Anchor bolts are touching end floor beam when span expands; the floor beam flanges should have been notched to allow for span expansion

Girder Notes:

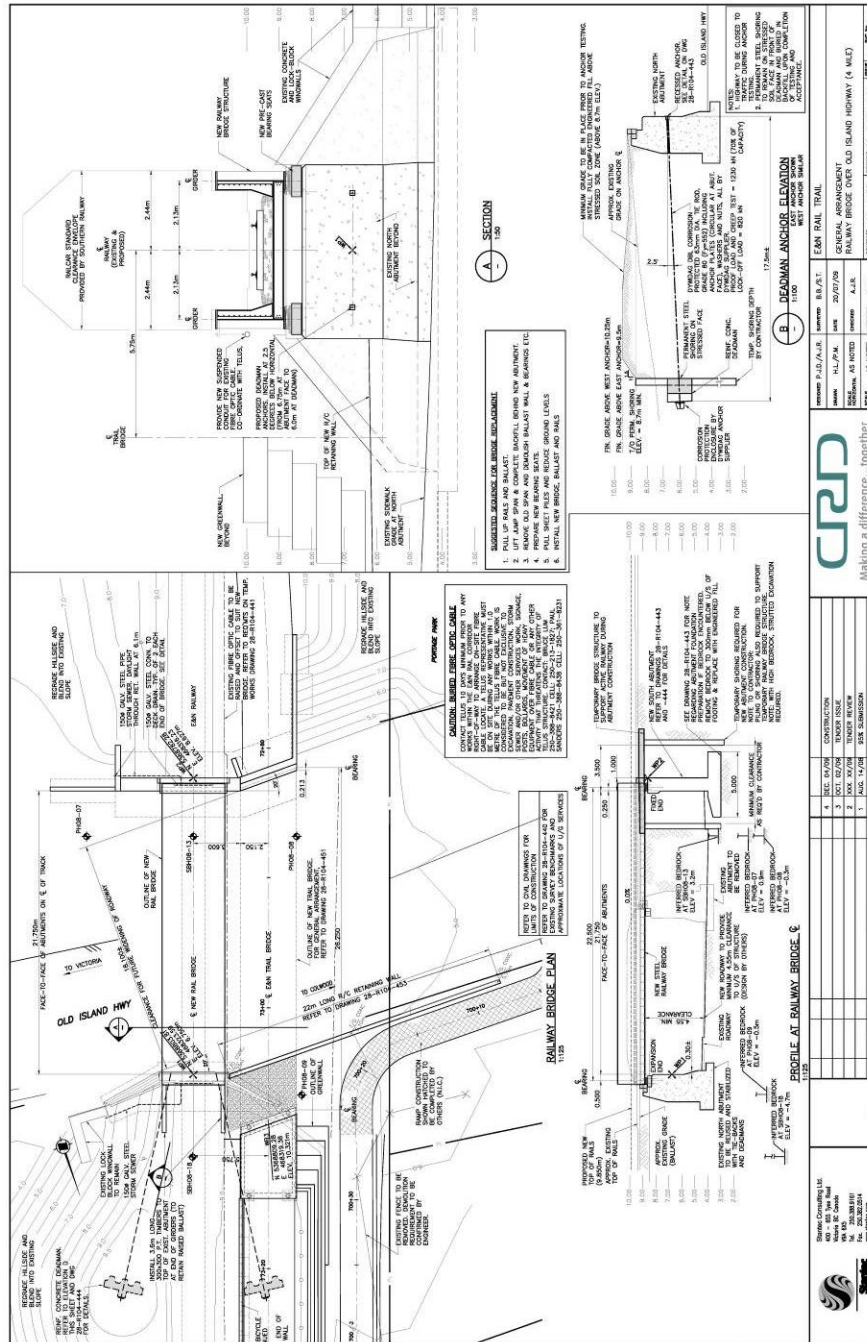
- Superstructure replaced in 2010
- All steel is in good condition

History:

- Original construction year = 1911
- Summary of bridge updates
 - Majority of bridge (superstructure, north abutment, part of south abutment) replaced in 2010
 - Portion of original 1911 north abutment remains

4.00 – Victoria Subdivision – Highway 1A

Bridge General Arrangement:



4.00 – Victoria Subdivision – Highway 1A

Additional Inspection Photos:



South Abutment View



North Abutment Bearing (Typical)



South Abutment Bearing (Typical)



Gap between N. Abut. Seat and CIP Bearing Pad



North Abutment View



Timber Backwall at North Abutment

4.00 – Victoria Subdivision – Highway 1A

Additional Inspection Photos:



N. Abut. Anchor Bolt Touching End Floorbeam



N. Timber Backwall Touching End of Girder

4.50 – Victoria Subdivision – Helmcken Road



Track View (Looking North)



North Abutment View

4.50 – Victoria Subdivision – Helmcken Road

FEATURE CROSSED: Helmcken Rd.

INSPECTION DATE: 10/07/2011

STREAM DEPTH: N/A

HEIGHT: 18 ft

NEAREST TOWN: View Royal, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 45 ft

INSPECTORS: MJO

DECK TYPE: Ballast

SPANS: 42'-10" (HDPG)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Cast-In-Place Concrete

- Small crack under both bearings at north abutment (see attached photo)
- No vegetation or debris located on bearings
- Abutments recently painted

WINGWALL NOTES

Wingwall Type: Cast-In-Place Concrete

- Large diagonal crack in NE wingwall (see attached photo)
- Minor cracking throughout all wingwalls

DECK NOTES

- Track located on a tangent alignment
- Ties = 8" wide x 6" deep x 8'-0" long (no dap)
- Tie spacing = 20"
- Some rail plates are cutting into ties
- Approximately 5% of all rail ties are poor; ties are generally in good to fair condition

SPAN NOTES

Bearing Notes:

- Steel bearing plates
- Minor surface corrosion
- One anchor bolt missing from both of south abutment bearings (see attached photo)

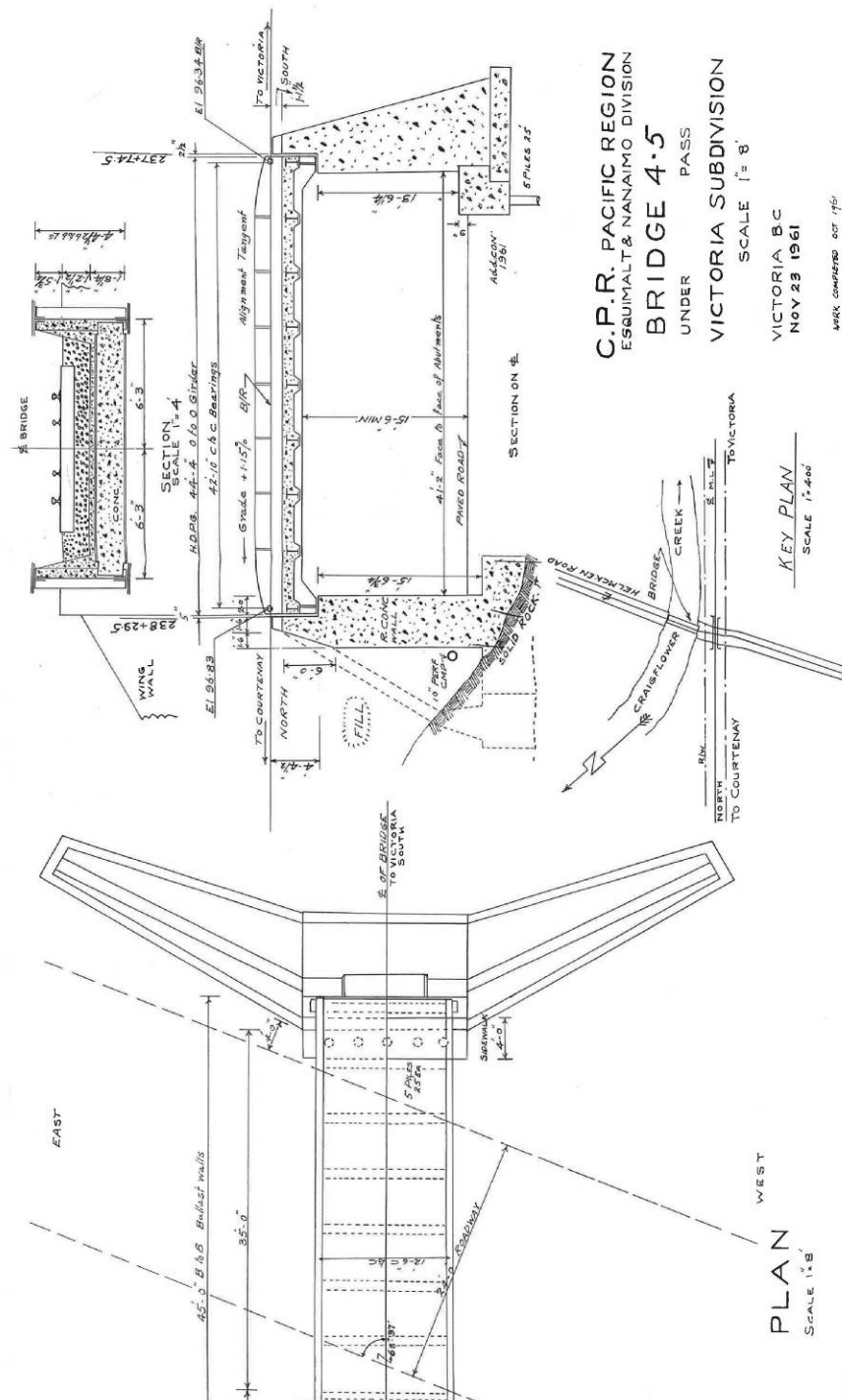
Girder Notes:

- Steel is in fair condition; minor pitting and corrosion in all steel plates
- Floor beams and lateral bracing system are encased in concrete

History:

- Original construction year = 1961

Bridge General Arrangement:



4.50 – Victoria Subdivision – Helmcken Road

Additional Inspection Photos:



Girder View (Looking East)



Diagonal Crack in NE Wingwall



Crack under NW Bearing Plates



Missing Anchor Bolt at SW Bearing

5.20 – Victoria Subdivision – Adams Place



Track View (Looking North)



North Abutment View

5.20 – Victoria Subdivision – Adams Place

FEATURE CROSSED: Adams Place

INSPECTION DATE: 10/07/2011

STREAM DEPTH: N/A

HEIGHT: 21 ft

NEAREST TOWN: View Royal, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 65 ft

INSPECTORS: MJO/AB/BR

DECK TYPE: Ballast

SPANS: 63'-5" (TPG)

NO. OF SPANS: One

WALKWAY: Yes (Both sides)

ACCESS METHOD: None

HANDRAILS: Yes (Both sides)

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Cast-In-Place Concrete

- Both abutments are in good condition

WINGWALL NOTES

Wingwall Type: Cast-In-Place Concrete

- Wingwalls are in good condition

DECK NOTES

- Track located on a tangent alignment
- Ties = standard ties (per plans) x 9'-0" long (no dap)
- No poor ties counted; ties are generally good condition

SPAN NOTES

Bearing Notes:

- Bearings are in good condition
- No significant defects found

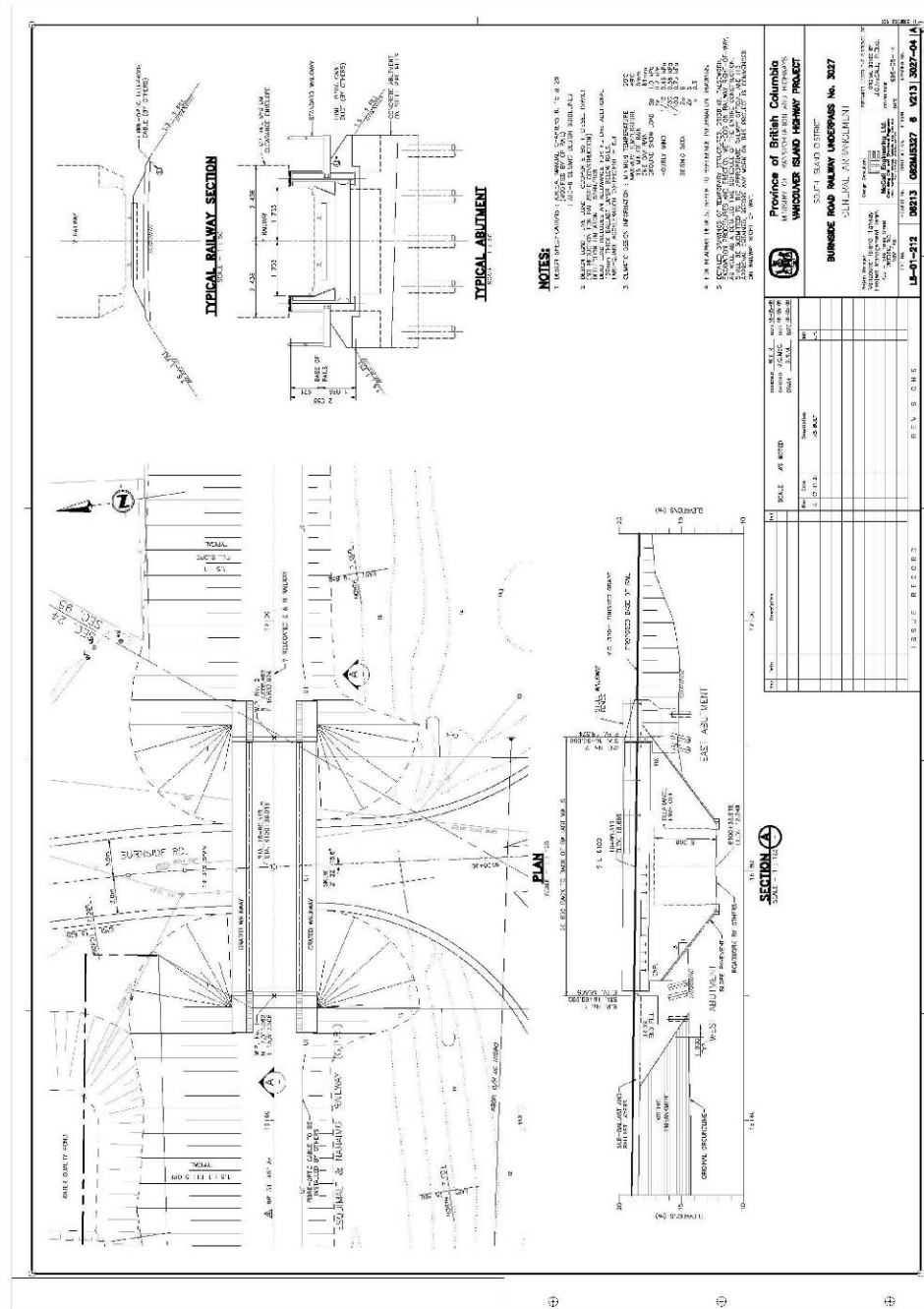
Girder Notes:

- Girder and bracing steel is in good condition
- No significant defects found

History:

- Original construction year = 1997

Bridge General Arrangement:



5.20 – Victoria Subdivision – Adams Place

Additional Inspection Photos:



South Abutment View



Floor Beam View (From Below Bridge)



Bearings (Typical)

5.34 – Victoria Subdivision – Island Highway



Track View (Looking North)



South Abutment View

5.34 – Victoria Subdivision – Island Highway

FEATURE CROSSED: Island Highway / Trail

INSPECTION DATE: 10/07/2011

STREAM DEPTH: N/A

HEIGHT: 27 ft

NEAREST TOWN: View Royal, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 220 ft

INSPECTORS: MJO/AB/BR

DECK TYPE: Ballast

SPANS: 82'-8" (TPG), 126'-3" (TPG) &

NO. OF SPANS: Three

WALKWAY: Yes (Both sides)

115'-11" (TPG)

ACCESS METHOD: None

HANDRAILS: Yes (Both sides)

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Cast-In-Place Concrete

- Both abutments are in good condition
- Hairline cracks found (minor)

WINGWALL NOTES

Wingwall Type: Cast-In-Place Concrete

- Wingwalls are in good condition (no significant defects)

PIER NOTES

Pier 1:

- No significant defects found

Pier 2:

- West side of cap exhibits map cracking (see attached photo)

DECK NOTES

- Track located on a curve
- Ties = Standard ties (per plans) x 9'-0" long (no dap)
- No poor ties counted; ties are generally good condition

SPAN NOTES

Bearing Notes:

- No significant defects found

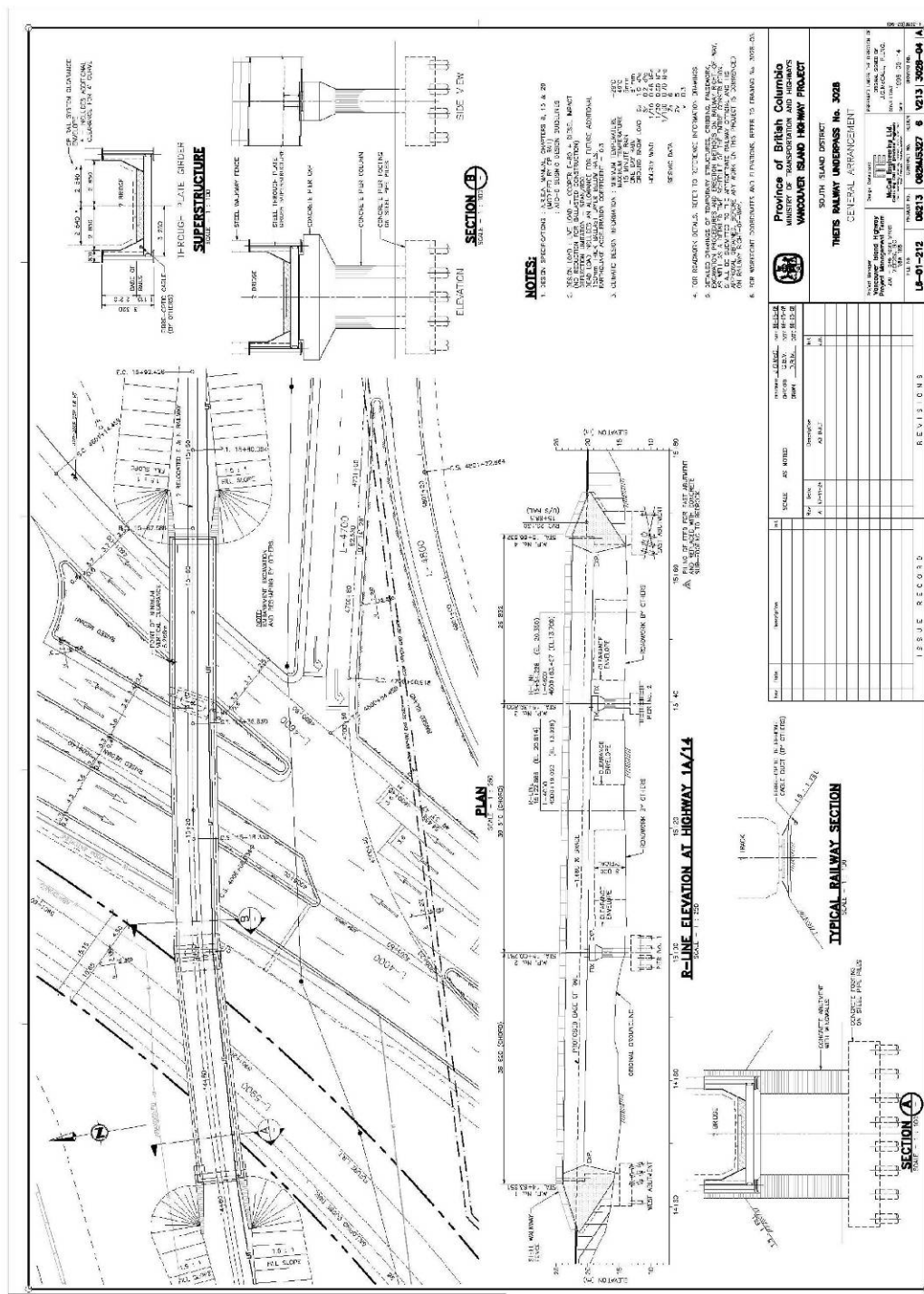
Girder Notes:

- No significant defects found
- Top girder flanges touching at Pier 1 on east side (see attached photo)

History:

- Original construction year = 1998

Bridge General Arrangement:



5.34 – Victoria Subdivision – Island Highway

Additional Inspection Photos:



Walkway View (Looking South)



Map Cracking on Pier 2 Cap



Pier View



Top Flanges Touching at Pier 1

5.45 – Victoria Subdivision – Brydon Road



Walkway View (Looking North)

5.45 – Victoria Subdivision – Brydon Road

FEATURE CROSSED: Brydon Road

INSPECTION DATE: 10/07/2011

STREAM DEPTH: N/A

HEIGHT: 26 ft

NEAREST TOWN: View Royal, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 68 ft

INSPECTORS: MT/KB

DECK TYPE: Ballast

SPANS: 63'-5" (TPG)

NO. OF SPANS: One

WALKWAY: Yes (Both sides)

ACCESS METHOD: None

HANDRAILS: Yes (Both sides)

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Cast-In-Place Concrete

- Both abutments are in good condition

WINGWALL NOTES

Wingwall Type: Cast-In-Place Concrete

- Wingwalls are in good condition (no significant defects)

DECK NOTES

- Track located on a slight curve
- Ties = 9" wide x 8" deep x 8'-0" long (no dap)
- Ties spaced at 24"
- No poor ties counted; ties are generally good condition

SPAN NOTES

Bearing Notes:

- No significant defects found

Girder Notes:

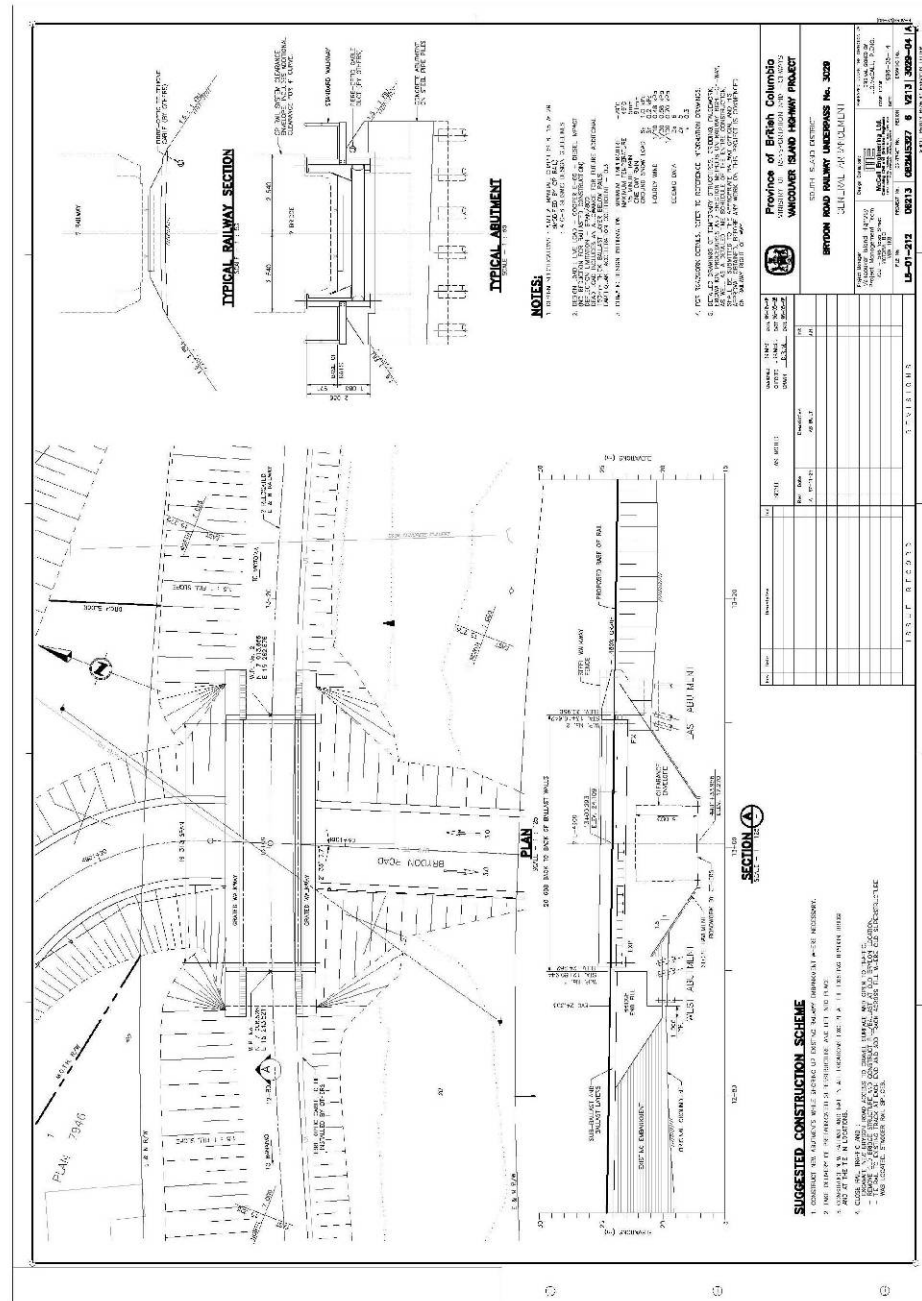
- No significant defects found
- Girders are in good condition

History:

- Original construction year = 1998

5.45 – Victoria Subdivision – Brydon Road

Bridge General Arrangement:



5.80 – Victoria Subdivision – Six Mile Road



Track View (Looking North)

5.80 – Victoria Subdivision – Six Mile Road

FEATURE CROSSED: Six Mile Road

INSPECTION DATE: 10/07/2011

STREAM DEPTH: N/A

HEIGHT: 21 ft

NEAREST TOWN: View Royal, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 109 ft

INSPECTORS: MT/KB

DECK TYPE: Ballast

SPANS: 104'-2" (TPG)

NO. OF SPANS: One

WALKWAY: Yes (Both sides)

ACCESS METHOD: None

HANDRAILS: Yes (Both sides)

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Cast-In-Place Concrete

- Both abutments are in good condition

WINGWALL NOTES

Wingwall Type: Cast-In-Place Concrete

- Wingwalls are in good condition (no significant defects)

DECK NOTES

- Track located on a slight curve
- Ties = 9" wide x 8" deep x 8'-0" long (no dap)
- Ties spaced at 24"
- No poor ties counted; ties are generally in good condition

SPAN NOTES

Bearing Notes:

- No significant defects found

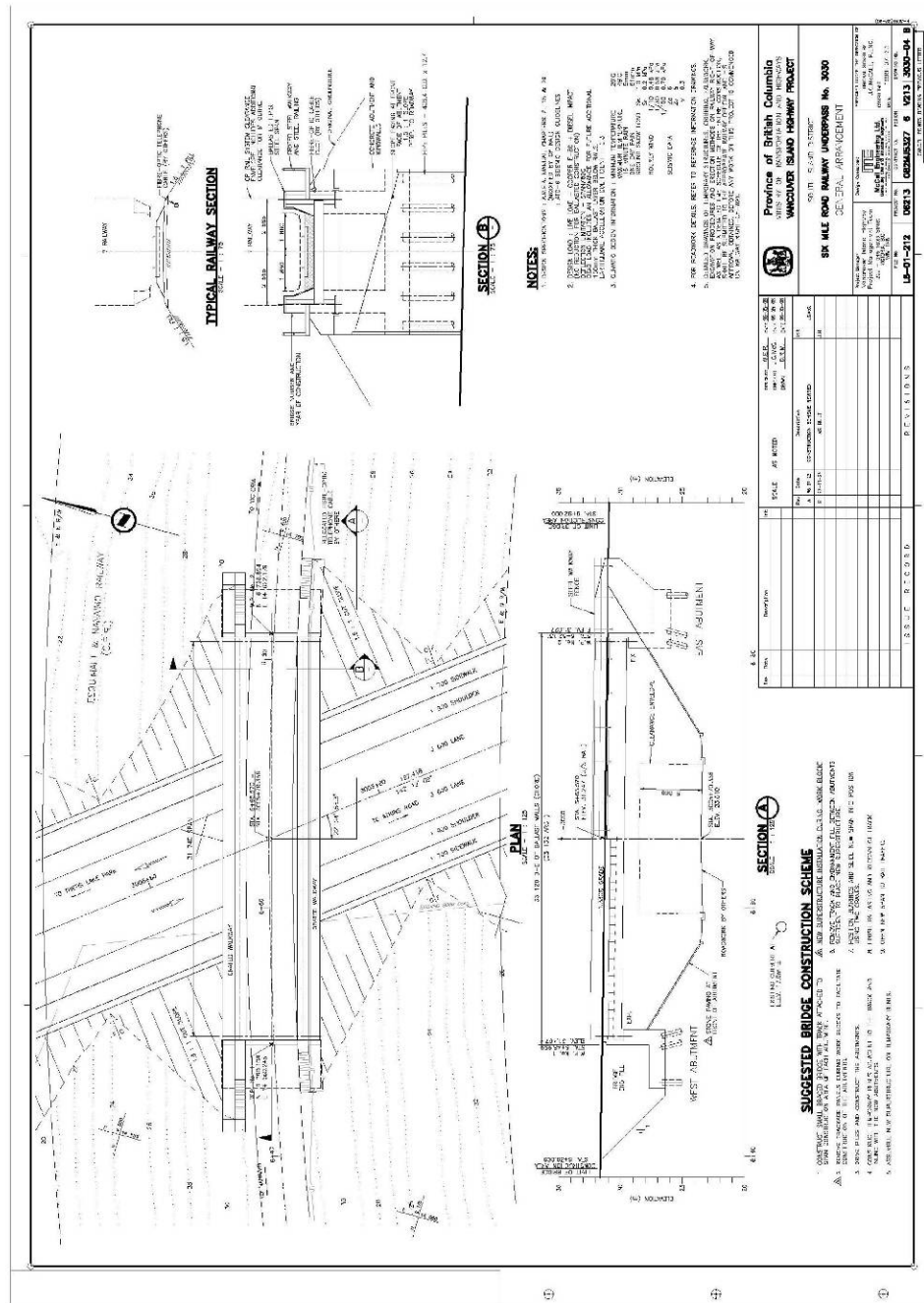
Girder Notes:

- No significant defects found
- Girders are in good condition

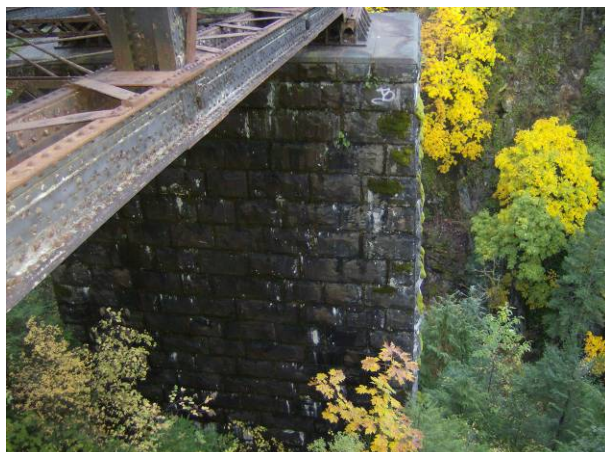
History:

- Original construction year = 1998

Bridge General Arrangement:



14.00 – Victoria Subdivision – Niagara Canyon



Masonry Pier (Typical)



Track View (Looking South)

14.00 – Victoria Subdivision – Niagara Canyon

FEATURE CROSSED: Niagara Canyon

INSPECTION DATE: 10/11/2011

STREAM DEPTH: 0 ft

HEIGHT: 246 ft

NEAREST TOWN: Millstream, BC

FLOW DIRECTION: East

TOTAL LENGTH: 525 ft

INSPECTORS: MJO/MFB/APW

DECK TYPE: Open

SPANS: 105' (CDT), 315' (CDT) & 105' (CDT)

NO. OF SPANS: Three

WALKWAY: No (3 Refuge bays)

ACCESS METHOD: Snooper

HANDRAILS: No

NDT TESTING: Yes

OBSERVED UNDER LOAD: Yes

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Masonry Stone

- Abutments are in good condition; no significant defects noted

WINGWALL NOTES

Abutment Type: Masonry Stone

- Wingwalls are in good condition; no significant defects noted

DECK NOTES

- Bridge is located on a tangent and therefore does not have a superelevation
- Ties = 8" wide x 10" deep x 14'-0" long (ties dapped 1" for curve transition at north abutment)
- Tie spacing = 13 ½"
- Poor ties: 65 (Span 1), 215 (Span 2) and 77 (Span 3); ties are generally in fair condition
- Poor ties were typically observed under rail joints, however many additional poor ties were observed away from the joints.

PIER NOTES

Pier Type: Masonry Stone

- Cracks present in top of pier caps, near bearings (see attached photo)

SPAN NOTES

Bearing Notes:

- Surface corrosion on both bearings
- Expansion bearings appear to allow rotation properly
- Bearing links at the abutments have a hole that is larger than the pin due to wear
- Enlarged hole in bearing link at abutment is allowing movement during loading
- Bearings on top of piers were not inspected at close proximity due to accessibility

Top Chord Members:

- Surface corrosion on all top chord members
- Some bent lacing on top chords
- Strengthening plates have been welded to the top chord bars in multiple panels

14.00 – Victoria Subdivision – Niagara Canyon

Bottom Chord Members:

- Surface corrosion on all bottom chord members
- Some spacers at pin locations are cracked
- Strengthening plates have been welded to the bottom chords

Hanger Notes:

- No cracks noted
- Top 4" pin in northeast corner of north abutment has slackened by approximately 3/8" and the top hole in the end post/hanger plate at this location has elongated approximately 1/16"

Diagonal Notes:

- Surface corrosion on all diagonal members
- Majority of diagonals range from very tight to snug (functioning properly)
- Two diagonals on the east truss were found to be loose at the top pin when shaken (U25-L24 & U26-L25)

Post Notes:

- Surface corrosion on all post members
- No significant defects noted

Truss Bracing Notes:

- Surface corrosion on all bracing members
- Loose diagonal bracing members are present in all spans
- Some minor section loss at cross frame locations
- Some bottom braces in cantilever span have rotated
- Cracked turnbuckle found in Span 3, Panel 3 of east exterior truss (see attached photo)

Floor Beam and Stringer Notes:

- Surface corrosion on floor beams and stringers
- Welds on tension flanges of floor beams

REFUGE BAY NOTES

- Refuge bays are in good condition; no significant defects noted

OBSERVATIONS UNDER LOAD

- SW Bearing
 - Bottom pin drops under load (approximately 3/8" drop)
 - Link plate does not move
- SE Bearing
 - Top pin snug with hanger/bottom chord
 - Top pin drops within link plate (edge of link plate worn) until bearing on link plate; plate then drops and bears on bottom pin (approximately 3/8" net drop)
 - Bottom pin shows minimal movement
- NW/NE Bearing
 - Pin drops approximately 1/4"
- Expansion joints at end of suspended span are active
- Counters in suspension span engaged

14.00 - Victoria Subdivision – Niagara Canyon

Non-Destructive Testing:

- Non-Destructive Testing was conducted on October 21, 22 and 25 of 2011
- Pins (45 total) were tested ultrasonically
 - All pins were found to be acceptable with the exception of two locations (LU7-right and LU28-left)
Two pins that did not test well could not be verified because a proper back wall reflector could not be achieved on their pins
- Additional bridge components (36 total) were tested with wet visible magnetic particle method
 - Components included eyebars, turnbuckles, plates and welds
 - All of the components were found to be acceptable at the time of inspection
- For photos and more details see Appendix A

History:

- Bridge was fabricated and erected at different location in 1883
- Original construction year = 1912 (Bridge was moved to this location at this time)
- Cantilever members strengthened in 1928
- Steel strengthened in all spans to accommodate larger locomotives in 1940

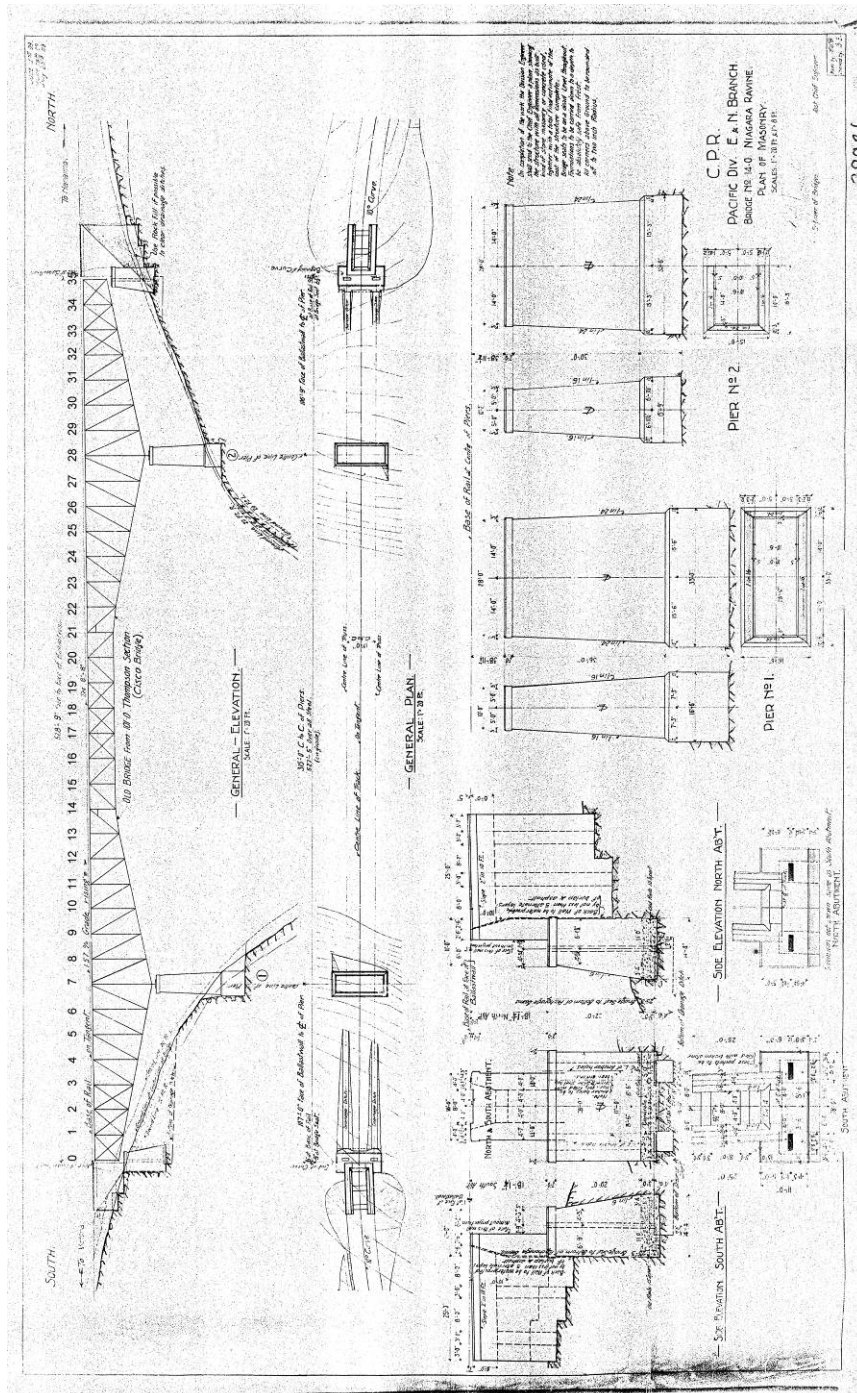
Noted Deficiencies:

- Bearing links at the abutments have a hole that is larger than the pin and are allowing movement during loading
- Cracked turnbuckle found in Span 3, Panel 3 of east exterior truss (see attached photo)
- Two diagonals on the east truss were found to be loose at the top pin when shaken (U25-L24 & U26-L25)
- The majority of the bridge ties are poor
- Top hole in last hangar/post on north end (west side) has elongated approximately 1/16" and pin at this location has slackened by approximately 3/16"
- Pin LU7-Right and LU28-Left did not have acceptable NDT testing results

Note: Bearings at top of piers were not inspected at close proximity in 2011

14.00 – Victoria Subdivision – Niagara Canyon

Bridge General Arrangement:



14.00 – Victoria Subdivision – Niagara Canyon

Additional Inspection Photos:



Bearing at North Abutment



View looking through Truss



View looking West from Bridge



Cracked Turnbuckle in Span 3, Panel 3 (East)

14.90 – Victoria Subdivision – Arbutus Canyon



Track View (Looking North)



View of Steel Towers

14.90 – Victoria Subdivision – Arbutus Canyon

FEATURE CROSSED: Arbutus Canyon

INSPECTION DATE: 10/11/2011

STREAM DEPTH: 0 ft

HEIGHT: 183 ft

NEAREST TOWN: Millstream, BC

FLOW DIRECTION: East

TOTAL LENGTH: 463 ft

INSPECTORS: MJO/MFB/APW

DECK TYPE: Open

SPANS: 75'-3" (DPG), 50' (DPG), 106' (DPG),

NO. OF SPANS: Six

WALKWAY: No (2 Refuge bays)

50' (DPG), 106' (DPG) & 75'-3" (DPG)

ACCESS METHOD: Snoopers

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Concrete

- Abutments are in good condition
- No concrete spalling exhibited
- Moss growing on all faces of abutments
- Ballast sitting on abutment seats

PIER NOTES

Pier 1 (Steel Tower w/ four legs):

- Surface corrosion of steel at top of steel bent columns
- Some debris and vegetation at bearing locations
- No close proximity visual inspection of base of pier due to accessibility

Pier 2 (Steel Tower w/ four legs):

- Bottom horizontal bracing pitted 20-30% section loss (see attached photo)
- Bearings exhibit moderate corrosion
- Lattice in bracing is corroded and bent in some locations
- One diagonal member is bent due to impact from tree
- Concrete pedestals are in good condition
- Steel members are heavily corroded near concrete pedestal base (see attached photo)

Pier 3 (Steel Bent w/ two legs):

- Surface corrosion of steel at top of steel bent columns
- No close proximity visual inspection of base of pier due to accessibility

DECK NOTES

- Track is superelevated at Span 1 (1 ¾" measured); superelevation goes away at Span 5
- Ties = 10" wide by 13 ½" deep by 13'-0" long (Ties are dapped, dap height varies)
- Tie spacing= 15"
- Poor ties: 25 (Span 1), 20 (Span 2) 28 (Span 3), 25 (Span 4), 42 (Span 5) and 20 (Span 6)
- Three ties rotting next to a broken tie near the north end; 3 additional broken ties within 20 ties at north end
- Remaining ties are generally in fair condition (combination of treated and untreated ties)

14.90 – Victoria Subdivision – Arbutus Canyon

SPAN NOTES

Bearing Notes:

- Bearings each have one anchor bolt (by design)
- Anchor bolt at south abutment, west girder has worked itself out of the abutment over time. Deflection of the anchor bolt was measured as 1 ½" at the top of the bearing plate connected to the girder (see attached photo)
- Anchor bolt at north abutment, west girder is broken off completely
- Anchor bolt at north abutment, east girder is broken off completely

Girder Notes:

- Moderate corrosion on deck plate girders
- Paint on girders is almost completely gone
- Girder stiffeners are pitted near the bottom flange approximately 4" x 1/8" (see attached photo)
- Bottom lateral gusset plates have some pitting (typical)
- Top lateral bracing members have been replaced more recently than the bottom lateral bracing members
- Top lateral gusset plates have deep pitting (some have already been replaced in Span 1)
- Panel 2 gusset plate in Span 1 has hole through south end
- Bottom angles in top chord horizontal bracing have excessive holes
- Section loss in deck plate girders
 - Top flange: 1/8" loss entire top horizontal surface
 - Bottom flange angles: approximately 1/8" loss on top surface of horizontal legs
 - Bottom angles of top flange: 6" x 1/8" loss (horizontal leg), 3" x 1/8" loss (vertical leg)
 - Bottom flange cover plates have edge loss of 1/8"; also 1/16 to 1/8" loss over 50% flange width

History:

- Original construction year = 1914
- Deck plate girders (east girder line only) were metalized around 1985
- Rivets were replaced (east girder line only) around 1985

Noted Deficiencies:

- Anchor bolt at south abutment, west girder is bent north approximately 1 ½" (see attached photo)
- Anchor bolt at north abutment, west girder is broken off completely
- Anchor bolt at north abutment, east girder is broken off completely
- Three ties rotting next to a broken tie near the north end; 3 additional broken ties within 20 ties at north end

Note; Bases of Towers 1 and 3 were not inspected at close proximity in 2011

Bridge General Arrangement:



14.90 – Victoria Subdivision – Arbutus Canyon

Additional Inspection Photos:



Anchor Bolt at South Abutment (West Girder)



Heavy Corrosion of Steel bottom of Pier 2



Pier Tower Bottom Lateral Lattice Corrosion



Stiffener Section Loss near Bottom Flange

18.20 – Victoria Subdivision – Unnamed Waterway



Track View looking North

18.20 – Victoria Subdivision – Unnamed Waterway

FEATURE CROSSED: Unnamed Waterway

INSPECTION DATE: 10/05/2011

STREAM DEPTH: 0 ft

HEIGHT: 7 ft

NEAREST TOWN: Millstream, BC

FLOW DIRECTION: East

TOTAL LENGTH: 17 ft

INSPECTORS: MT/KB

DECK TYPE: Open

SPANS: 14'-7" (TFT)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: 16" x 16" Timber Bent on 12" x 12" Blocking with Timber Backwall

- North bent has rot 1-2" deep on west end; not under bearing (see attached photo)
- Generally, timber end bents are in good condition
- Vegetation exists on the timber bents and blocking
- North abutment embankment is beginning to erode

DECK NOTES

- Bridge is located on a tangent and therefore does not have a superelevation
- Ties = 8" wide x 8" deep x 10'-0" long (no dap)
- Ties are spanning a distance of approximately 3'-0"
- Tie spacing = 13"
- 1 poor tie counted; ties are generally in good condition

SPAN NOTES

Bearing Notes:

- Timber stringers are bearing directly on timber bents (bearing area = 36" x 16") (see attached photo)
- No sign of deterioration around bearings

Stringer Notes:

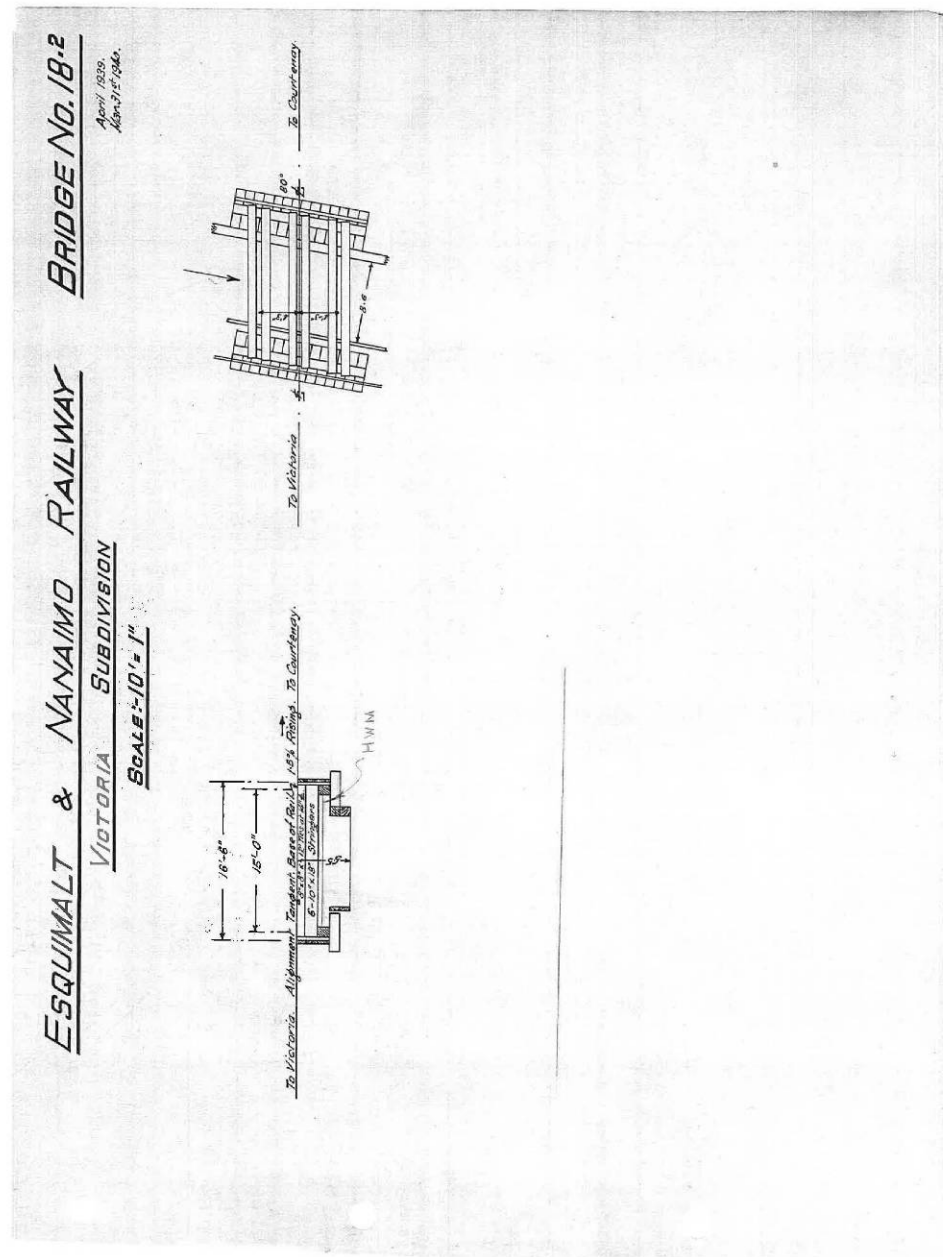
- Two sets of 3-12" wide by 20" deep stringers spaced at 5'-0" (Yellow Cedar)
- Timber stringers are in good condition; no significant rot or section loss noted

History:

- Original construction year = 1935

18.20 – Victoria Subdivision – Unnamed Waterway

Bridge General Arrangement:



Note: These are original plans. Stringers have been modified from original design.

18.20 – Victoria Subdivision – Unnamed Waterway

Additional Inspection Photos:



Bearing at North Abutment



View looking East from Bridge



View looking West from Bridge



Rot in North Abutment Bent

26.80 – Victoria Subdivision – Shawnigan Lake Rd



Track View (looking North)



North Masonry Abutment

26.80 – Victoria Subdivision – Shawnigan Lake Rd

FEATURE CROSSED: Shawnigan Lake Rd.

INSPECTION DATE: 10/05/2011

STREAM DEPTH: N/A

HEIGHT: 14 ft

NEAREST TOWN: Shawnigan Lk, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 34 ft

INSPECTORS: MT/KB

DECK TYPE: Open

SPANS: 30'-6" (TPG)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Masonry Stone Abutments with Concrete Cap

- Minor cracking throughout masonry stones
- Ballast and debris present on bearing seats
- Vegetation growing on abutment seats
- Minor tuck pointing needed at south abutment
- Concrete patch work has been previously completed at both abutments

WINGWALL NOTES

Wingwall Type: Masonry Stone Wingwalls

- Minor cracking throughout wingwalls
- Crash barrier added on oncoming traffic side of each wingwall

DECK NOTES

- Track located on a slight curve (curve radius not specified on available plans)
- Ties = 10" wide x 16" deep x 12'-2" long (2" dap)
- Tie spacing = 14"
- 5 poor ties counted; ties are generally in fair to good condition

SPAN NOTES

Bearing Notes:

- Steel bearing plates
- Light surface corrosion
- Anchor bolts are in good condition

26.80 – Victoria Subdivision – Shawnigan Lake Rd

Primary Steel Member Notes:

- Plate girders are in good condition (two thru girders spaced at 13'-2")
- Light surface corrosion present on plate girders

Secondary Steel Member Notes:

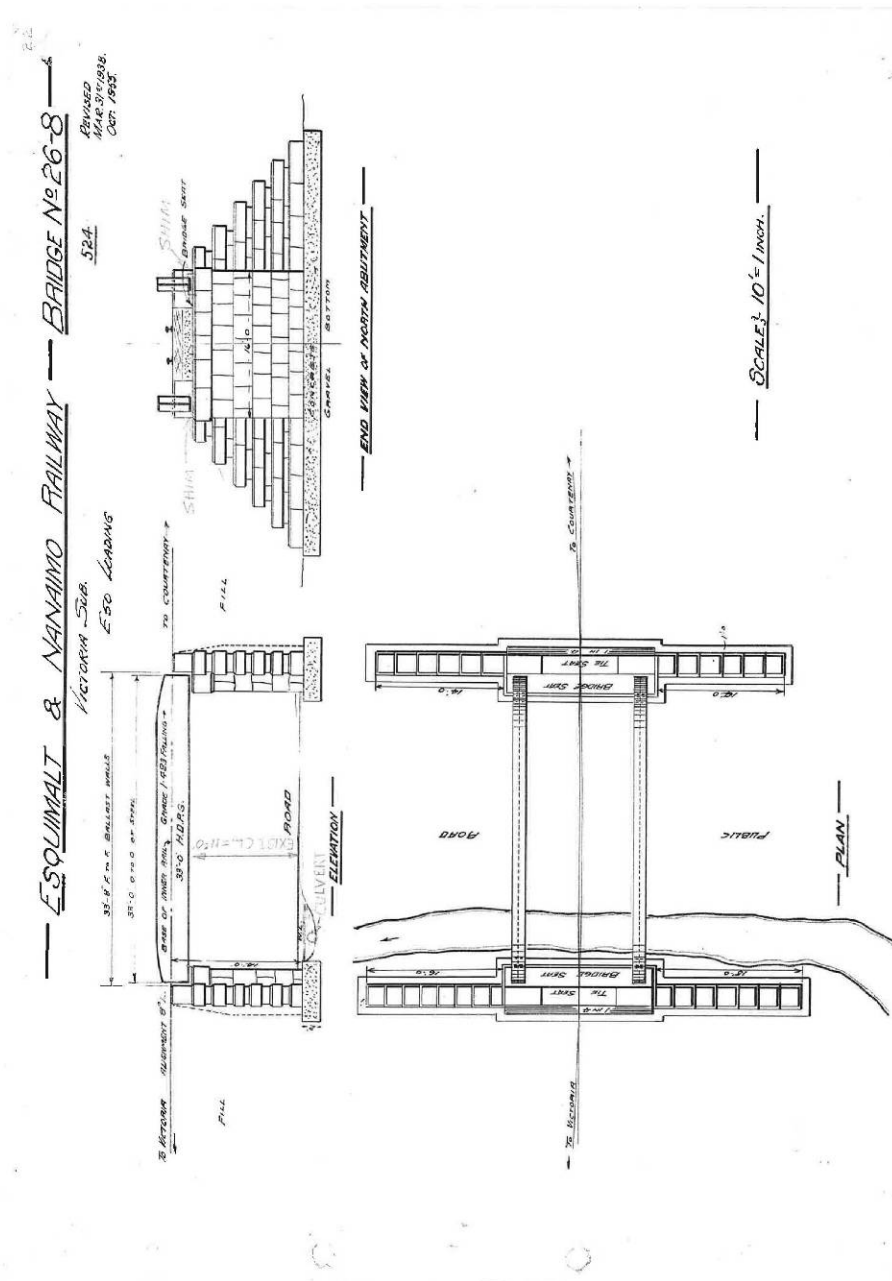
- Cross bracing angles are in fair to good condition
- One bottom lateral cross brace is bent from vehicle collision
- Light surface corrosion present on bracing members

History:

- Original construction year = 1906
- Summary of bridge updates
 - Repairs were made to abutments in 1951
 - Steel superstructure appears to have been replaced around 2005

26.80 – Victoria Subdivision – Shawnigan Lake Rd

Bridge General Arrangement:



26.80 – Victoria Subdivision – Shawnigan Lake Rd

Additional Inspection Photos:



South Masonry Stone Abutment



View of Bottom Lateral Cross Bracing

28.20 – Victoria Subdivision – Shawnigan Lk. Trib.



Track View looking North



Bottom Lateral Cross Bracing (Typical)

28.20 – Victoria Subdivision – Shawnigan Lk. Trib.

FEATURE CROSSED: Shawnigan Lake Tributary

INSPECTION DATE: 10/05/2011

STREAM DEPTH: 2'-0"

HEIGHT: 20 ft

NEAREST TOWN: Shawnigan Lk, BC

FLOW DIRECTION: North

TOTAL LENGTH: 44 ft

INSPECTORS: MT/KB

DECK TYPE: Open

SPANS: 41'-6" (DPG)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Masonry Stone Abutments w/ Concrete Backwalls

- Drift accumulating at base of abutments
- Some vegetation growing on surfaces of abutments
- Minimal tuck pointing needed between blocks
- Minor cracking in masonry blocks
- Minor erosion at base of abutments (see attached photo)

WINGWALL NOTES

Wingwall Type: Masonry Stone Wingwalls

- Minor cracking associated with mortar loss, both abutments

DECK NOTES

- Track located on tangent alignment
- Ties = 10" wide x 16" deep (no dap)
- Tie spacing = 16"
- Two poor ties counted; ties are generally in good condition
- North abutment approach ties are swinging (pivoting with respect to rail) (see attached photo)

SPAN NOTES

Bearing Notes:

- Steel bearing plates (bottom flange angles bearing on plates)
- Minor surface corrosion
- Anchor bolts are corroded slightly

Girder Notes:

- Minor surface corrosion on all steel surfaces of plate girders
- Lateral bracing system appears to be in better condition; possibly upgraded recently
- Girders spaced at 13'-2"

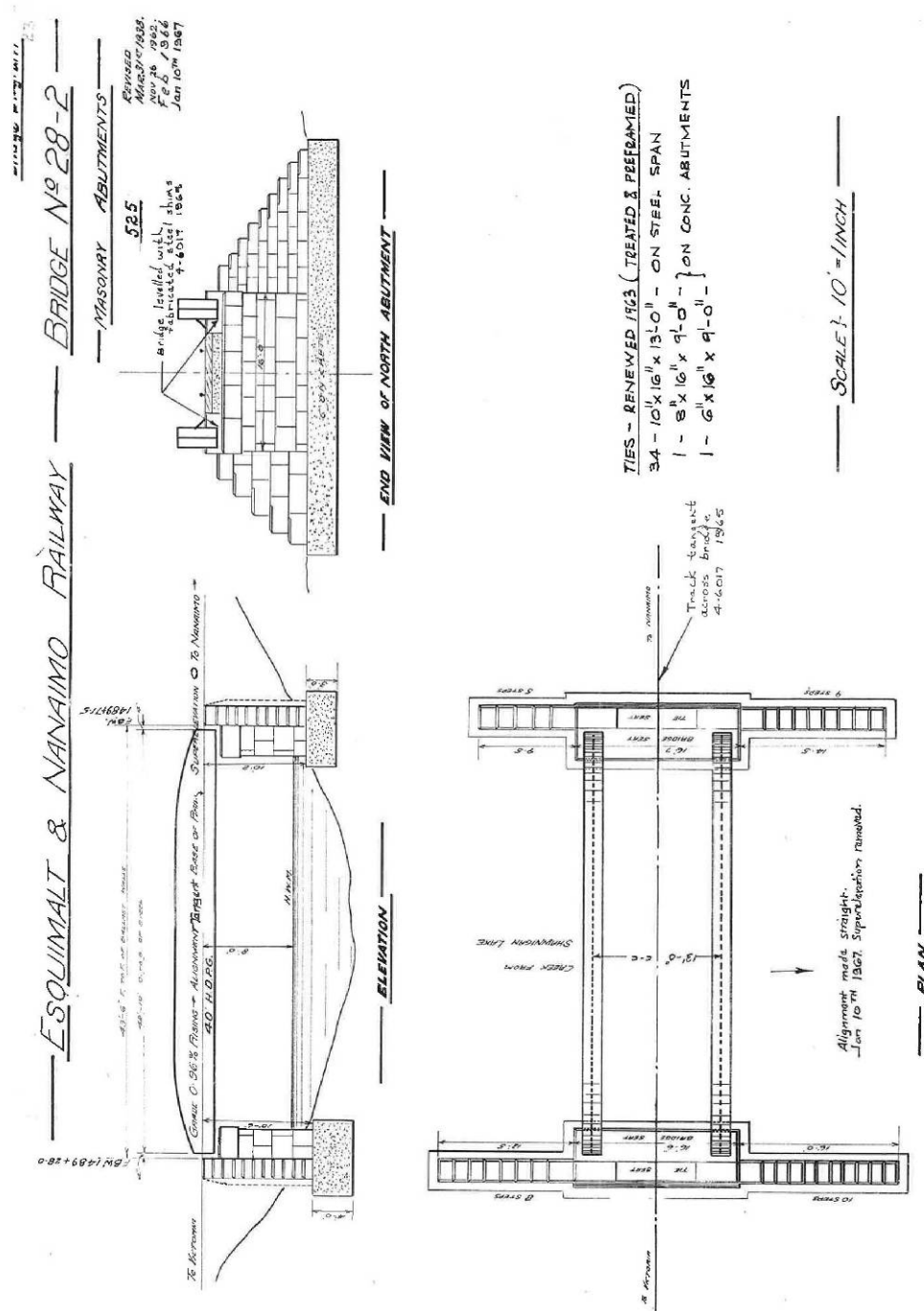
28.20 – Victoria Subdivision – Shawnigan Lk. Trib.

History:

- Original construction year = 1907
- Summary of bridge updates
 - Alignment of track made tangent and superelevation removed in 1967
 - Steel repairs made in 1994

28.20 – Victoria Subdivision – Shawnigan Lk. Trib.

Bridge General Arrangement:



28.20 – Victoria Subdivision – Shawnigan Lk. Trib.

Additional Inspection Photos:



Abutment Undermining (Typical)



Swinging Approach Ties (North Abutment)

28.40 – Victoria Subdivision – Shawnigan Lk. Trib.



Track View (Looking North)



Cross Bracing View (Looking North)

28.40 – Victoria Subdivision – Shawnigan Lk. Trib.

FEATURE CROSSED: Shawnigan Lake Tributary

INSPECTION DATE: 10/05/2011

STREAM DEPTH: 1 ft.

HEIGHT: 18 ft

NEAREST TOWN: Shawnigan Lk, BC

FLOW DIRECTION: East

TOTAL LENGTH: 44 ft

INSPECTORS: MT/KB

DECK TYPE: Open

SPANS: 39'-6" (HDPG)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Masonry Block Abutments with Concrete Repairs

- Scour evident (minor) at base of abutments (see attached photo)
- Moss accumulating on abutment seats (see attached photo)
- Some tuck pointing needed between blocks
- Crack found on north abutment (see attached photo)

WINGWALL NOTES

Wingwall Type: Masonry Block Wingwalls with Concrete Repairs

- Crack found on north abutment wingwall
- No significant defects found on south abutment wingwalls

DECK NOTES

- Track located on a tangent alignment
- Ties = 10" wide x 16" deep (no dap)
- Tie spacing = 16"
- Approximately 50% of bridge ties are poor (16 counted); ties are generally in poor condition
- Bearing on bottom angles of through girders (6" bearing width)

SPAN NOTES

Bearing Notes:

- Steel bearing plates
- Moderate surface corrosion
- Anchor bolts are present and have mild corrosion

Girder Notes:

- Steel exhibits light surface corrosion overall with localized areas of moderate corrosion on the web
- Minor pitting noted on bottom flanges
- Knee braces were replaced at one time (bolts used as fasteners)

28.40 – Victoria Subdivision – Shawnigan Lk. Trib.

History:

- Original construction year = 1907

Noted Deficiencies:

- Approximately 50% of bridge ties are poor (16 counted); ties are generally in poor condition

Bridge General Arrangement:



28.40 – Victoria Subdivision – Shawnigan Lk. Trib.

Additional Inspection Photos:



Base of South Abutment (Very Minor Scour)



Moss on Abutment Seat (Typical)



Crack in North Abutment (West End)

28.60 – Victoria Subdivision –Shawnigan Lake Trib.



Track View (Looking North)



North Abutment View

28.60 – Victoria Subdivision –Shawnigan Lake Trib.

FEATURE CROSSED: Shawnigan Lake Tributary

INSPECTION DATE: 10/08/2011

STREAM DEPTH: 1 ft.

HEIGHT: 17 ft

NEAREST TOWN: Shawnigan Lk, BC

FLOW DIRECTION: East

TOTAL LENGTH: 44 ft

INSPECTORS: MJO/DBH

DECK TYPE: Open

SPANS: 39'-6" (HDPG)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Masonry Block Abutments

- No evidence of scour or undermining
- Ballast and/or drift accumulating on abutment seats
- Masonry blocks are cracking under bearings at both abutments (see attached photo)
- Several blocks in both abutments are fractured

WINGWALL NOTES

Wingwall Type: Masonry Block Wingwalls

- Tuck pointing is required at both wingwalls

DECK NOTES

- Track located on a curved alignment (8 degree)
- Maximum superelevation = 3.5" (measured in field)
- Ties = 10" wide x 16" deep x 12'-8" long (no significant dap)
- Tie spacing = 15"
- Approximately 33% of ties are poor (11 of 34 poor ties counted); ties are in poor condition
- Bearing on bottom angles of through girders (6" bearing width)

SPAN NOTES

Bearing Notes:

- Steel bearing plates
- Minor surface corrosion
- Anchor bolts are present and have mild corrosion

Girder Notes:

- Minor to moderate corrosion of steel girders
- Bottom angle section loss of 3 ½" x ¼" (vertical leg) and 2" x 1/8" (horizontal leg)
- Stiffeners have 100% section loss near bottom flange angles (see attached photo)

28.60 – Victoria Subdivision –Shawnigan Lake Trib.

History:

- Original construction year = 1907

Noted Deficiencies:

- Approximately 33% of ties are poor (11 of 34 ties counted as poor); ties are in poor condition

Bridge General Arrangement:



28.60 – Victoria Subdivision –Shawnigan Lake Trib.

Additional Inspection Photos:



Crack under South Abutment Bearing (East)



Section Loss at Bottom of Stiffener (Typical)



Crack under South Abutment Bearing (West)

29.80 – Victoria Subdivision – Northgate Road



Track View (Looking North)



North Abutment View

29.80 – Victoria Subdivision – Northgate Road

FEATURE CROSSED: Northgate Rd.

INSPECTION DATE: 10/05/2011

NEAREST TOWN: Cobble Hill, BC

INSPECTORS: MT/KB

NO. OF SPANS: One

ACCESS METHOD: None

NDT TESTING: No

STREAM DEPTH: N/A.

FLOW DIRECTION: N/A

DECK TYPE: Ballast

WALKWAY: No

HANDRAILS: No

OBSERVED UNDER LOAD: No

HEIGHT: 18 ft

TOTAL LENGTH: 48 ft

SPANS: 45'-4" (WFB)

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Masonry Block Abutments with Concrete Repairs

- Minor debris accumulating on abutment seats
- No significant defects noted

WINGWALL NOTES

Wingwall Type: Masonry Block Wingwalls

- No significant defects noted

DECK NOTES

- Track located on a curved alignment (8 degree curve)
- Ties = 8" wide x 8" deep x 8'-0" long (no significant dap)
- Tie spacing = 16"
- Rail plates are cutting into ties occasionally
- Approximately 20% of ties counted as poor (non-structural ties in ballast)

SPAN NOTES

Bearing Notes:

- Steel bearing plates
- Minor surface corrosion
- Anchor bolts are present and have mild corrosion

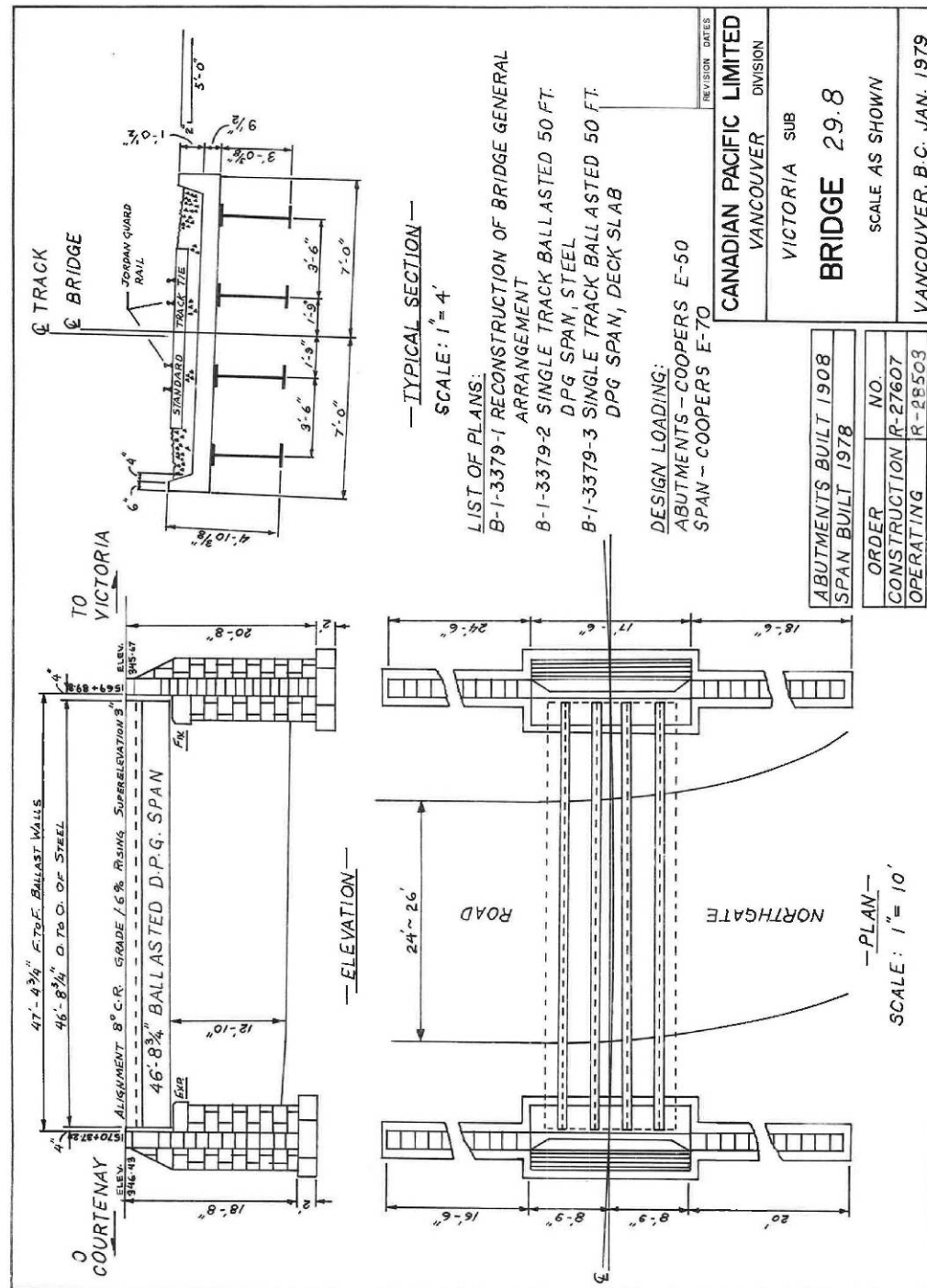
Girder Notes:

- Minor corrosion of steel girders
- No significant defects noted

History:

- Original construction year = 1908
- 1978: Deck plate girders installed and abutments raised 6"

Bridge General Arrangement:



29.80 – Victoria Subdivision – Northgate Road

Additional Inspection Photos:



Bearing View (Typical)



South Abutment View



View of Ties on Ballast Deck

35.60 – Victoria Subdivision – Koksilah Road



Track View (Looking North)



North Abutment View

35.60 – Victoria Subdivision – Koksilah Road

FEATURE CROSSED: Koksilah Rd.

INSPECTION DATE: 10/05/2011

STREAM DEPTH: N/A.

HEIGHT: 10 ft

NEAREST TOWN: Cowichan Bay, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 28 ft

INSPECTORS: MT/KB

DECK TYPE: Open

SPANS: 26'-3" (HDPG)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Masonry Block Abutments

- Signs of collision damage from vehicles (non-structural)
- Cracks in masonry abutment blocks (see attached photo)

WINGWALL NOTES

Wingwall Type: Masonry Block Wingwalls

- Minor cracks exhibited throughout wingwall blocks

DECK NOTES

- Track located on a tangent alignment
- Ties = 10" wide x 18" deep x 13'-0" long (no significant dap)
- Tie spacing = 14"
- Rail plates are cutting into ties
- Approximately 10% of ties counted as poor
- Ties have been notched at ends; approximately 20% removed (see attached photo)
- Ties are bearing on bottom angles (3 ½" bearing width)

SPAN NOTES

Bearing Notes:

- Steel bearing plates
- Minor surface corrosion

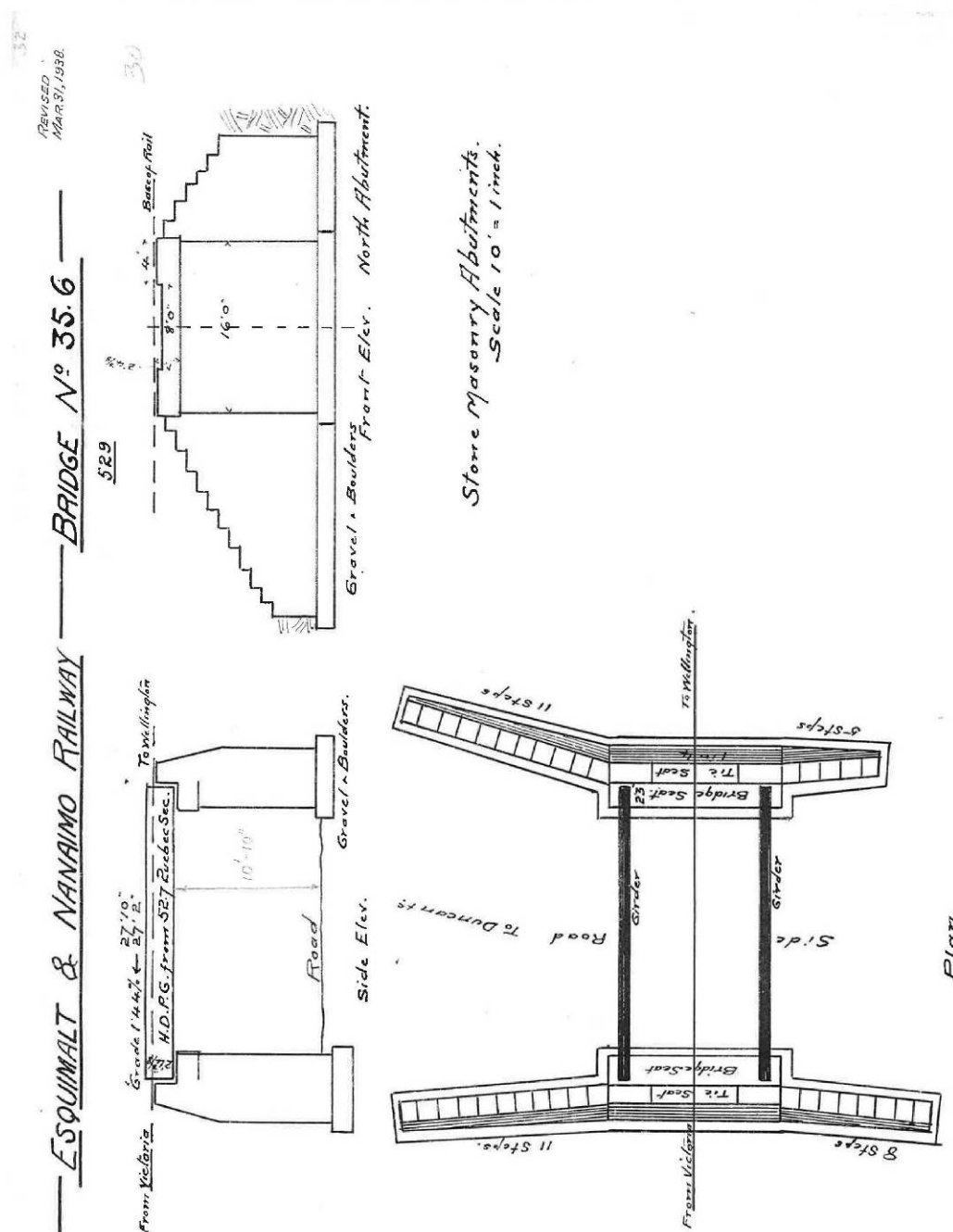
Girder Notes:

- Light to moderate corrosion throughout girders
- Bottom flange has been hit by vehicle
- Bottom lateral bracing system is heavily corroded with some holes through sections (see attached photo)

History:

- Original construction year = 1911

Bridge General Arrangement:



35.60 – Victoria Subdivision – Koksilah Road

Additional Inspection Photos:



Crack in Masonry Abutment



Bearing (Typical)



Notched Ties at Bearing Ends (Typical)



Corroded Bracing Members (Typical)

37.60 – Victoria Subdivision – Koksilah Overflow



Track View (Looking North)



Side View (Looking North)

37.60 – Victoria Subdivision – Koksilah Overflow

FEATURE CROSSED: Koksilah Overflow

INSPECTION DATE: 10/08/2011

STREAM DEPTH: 0 ft.

HEIGHT: 20 ft

NEAREST TOWN: Duncan, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 75 ft

INSPECTORS: MJO/DBH

DECK TYPE: Open

SPANS: 14'-5" (TPT), 3 @ 15'-0" (TPT) &

NO. OF SPANS: Five

WALKWAY: Yes (West)

14'-5" (TPT)

ACCESS METHOD: None

HANDRAILS: Yes (West)

NDT TESTING: No

OBSERVED UNDER LOAD: Yes

Inspection Findings:

END BENT NOTES

Four round timber piles (12-13") with a timber cap (14" wide x 13" deep)

- Both ends bents are generally in good condition
- North End Bent (#6), Pile 4 is leaning inwards and not providing full bearing to cap

WINGWALL NOTES

Wingwall Type: Timber Plank Wingwalls

- North wingwall is leaning outwards (east side)
- Erosion beneath wingwalls (see attached photo)

DECK NOTES

- Track located on a curved alignment (4 degree curve)
- Superelevation = 2 ¼" (measured at midspan)
- Ties = 8" wide x 8" deep x 10'-0" long (walkway ties are 14'-0")
- Ties and curb boards are in fair condition
- South approach is low (see attached photo)

SPAN NOTES

Stringer Notes:

- Two four-ply stringers (each ply is 9" wide x 17" deep)
- Stringers are in good condition

Intermediate Bent Notes:

- Five round timber piles (12-13") with a timber cap (14" wide x 13" deep)
- Intermediate bents are in good condition

Extra Timber Member Notes:

- Diagonal timber brace in Span 4 is broken on both west and east side (see attached photo)

37.60 – Victoria Subdivision – Koksilah Overflow

WALKWAY NOTES

- Walkway and handrail are in good condition
- Walkway boards are broken at south end (see attached photo)

Note: Substructure and superstructure are designed for E50 and E60 rating, respectively.

OBSERVATIONS UNDER LOAD

- North end bent pile cap rotates north under load (cap not centered on all piles, likely from pile out of plumb)
- North pile cap does not bear fully on pile 4

History:

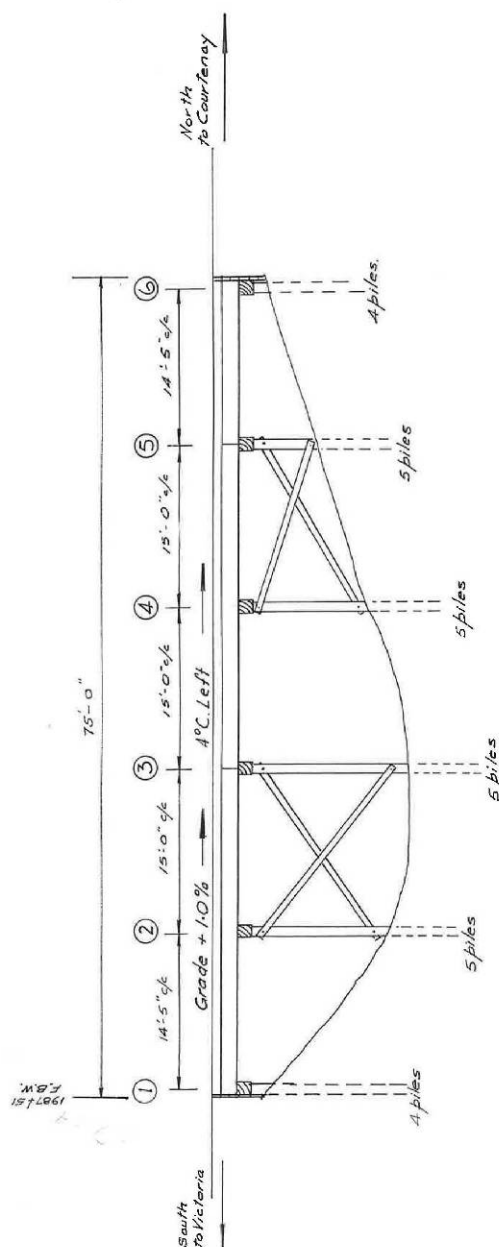
- Original construction year = 1965 (E50)
- Summary of repairs
 - Stringers replaced in 1993 (E60)
 - Ties replaced in 1993

Noted Deficiencies:

- Diagonal timber brace in Span 4 is broken on both west and east side (see attached photo)

37.60 – Victoria Subdivision – Koksilah Overflow

Bridge General Arrangement:



Bent No. Penetration.

1	33'
2	33'
3	35'
4	35'
5	35'
6	33'

Built in preframed treated timber to C.P.R. Standard Plans B-14-58 & B-14-60 series, in 1965, approx 4-6-11, by Company forces. Tie pads used.

This bridge is over flow channel for Koksilah River.

Scale: 1 inch = 10 feet

Canadian Pacific
Pacific Region. Vancouver Division.

Bridge 37.6 Victoria Subdivision.

E-50 Loading

February 11, 1966.
J.L. Comfort (Eng.)
Division Engineer.

37.60 – Victoria Subdivision – Koksilah Overflow

Additional Inspection Photos:



Broken Diagonal Member at Span 4 (East)



Low South Approach



Broken Walkway Boards (South End)



Erosion at North End Bent (East Side)

37.80 – Victoria Subdivision – Koksilah River



West Truss



Bridge Underside (Looking North)

37.80 – Victoria Subdivision – Koksilah River

FEATURE CROSSED: Koksilah River

INSPECTION DATE: 10/06/2011

STREAM DEPTH: 3 ft.

HEIGHT: 22 ft

NEAREST TOWN: Duncan, BC

FLOW DIRECTION: East

TOTAL LENGTH: 158 ft

INSPECTORS: MT/KB

DECK TYPE: Open

SPANS: 154'-1" (TT)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: Yes

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Concrete

- Heavy vegetation growth on all abutment faces
- Small hairline cracks with efflorescence, both abutments

WINGWALL NOTES

Wingwall Type: Concrete

- Minor cracks on wingwalls at each abutment

DECK NOTES

- Track located on a tangent alignment
- Ties = 10" wide x 14" deep x 11'-3" long (ties spaced at 15")
- Rail plates are occasionally cutting into ties
- 5 poor ties counted; ties are generally in good condition
- North approach is low; south approach is in good condition

SPAN NOTES

Bearing Notes:

- Moderate to heavy corrosion on bearings; anchor bolts have moderate corrosion (see attached photo)

Primary Member Notes:

- Light to moderate corrosion on all primary steel members
- First diagonal truss member of west truss has impact damage to flange (see attached photo)

Secondary Member Notes:

- Light to moderate corrosion on all primary steel members

37.80 – Victoria Subdivision – Koksilah River

OBSERVATIONS UNDER LOAD

- No excessive movement observed under loading

History:

- Original construction year = 1940
- Ties replaced in 1984

37.80 – Victoria Subdivision – Koksilah River

Bridge General Arrangement:

BRIDGE No 37.8

Koksilah River

Mar 31 - 1941
 Oct 1955

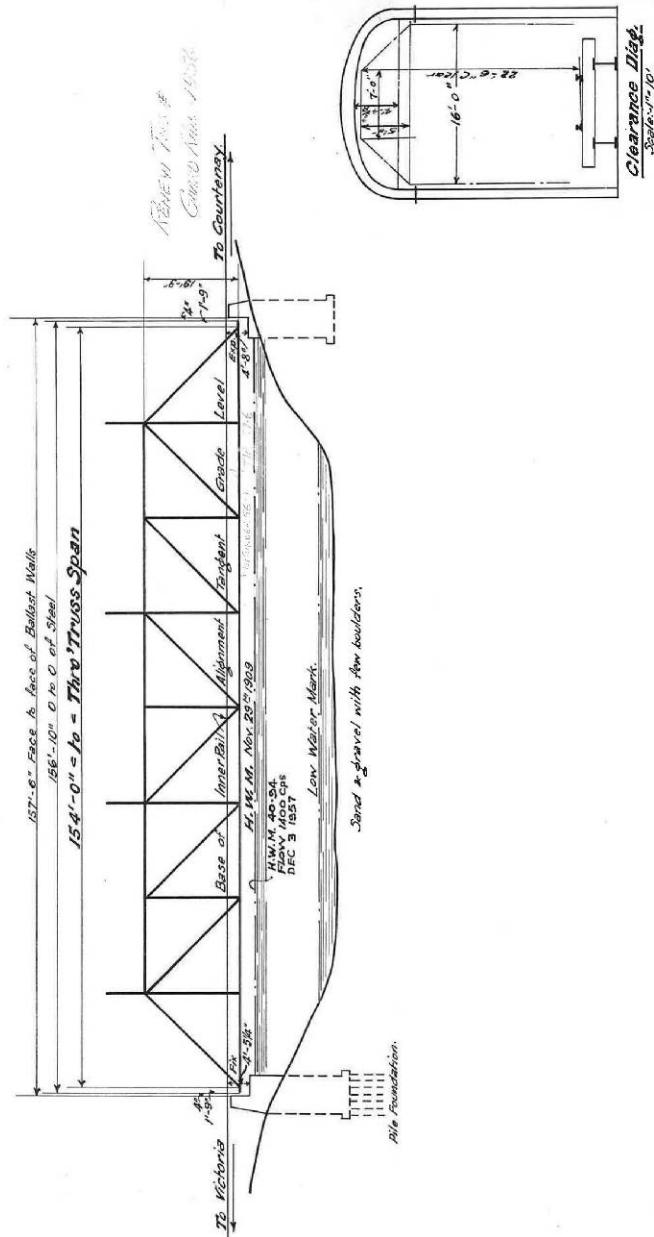
ESQUIMALT & NANAIMO RAILWAY

Victoria Subdivision

Scale: 1" = 20'

E-50 Loadings

THE HANS CHRISTIAN 1955



37.80 – Victoria Subdivision – Koksilah River

Additional Inspection Photos:



Impact Damage at South Diagonal (West Truss)



North Abutment View



North Abutment Bearing (Typical)

39.30 – Victoria Subdivision – Cowichan River



Track View (Looking South)



Underside of Bridge (Looking South)

39.30 – Victoria Subdivision – Cowichan River

FEATURE CROSSED: Cowichan River

INSPECTION DATE: 10/12/2011

STREAM DEPTH: 5 ft

HEIGHT: 32 ft

NEAREST TOWN: Duncan, BC

FLOW DIRECTION: East

TOTAL LENGTH: 224 ft

INSPECTORS: MJO/MFB

DECK TYPE: Open

SPANS: 219'-0" (TT)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: Snooper

HANDRAILS: No

NDT TESTING: Yes

OBSERVED UNDER LOAD: Yes

Inspection Findings:

ABUTMENT/BACKWALL NOTES

South Abutment:

- Abutment Type: Masonry block abutments
- Abutment backwall was cut out to provide room for truss stringers
- Minor tuck pointing needed

North Abutment:

- Abutment Type: Masonry block abutments
- Minor tuck pointing needed

DECK NOTES

- Bridge is located on a tangent and therefore does not have a superelevation
- Ties are yellow cedar (recently replaced)
- Ties = 10" wide by 10" deep by 10'-0" long (no tie dap)
- Tie spacing = 16"
- No poor ties counted; ties are generally in good condition
- One tie at the north approach is swinging (pivoting with respect to rail)

SPAN NOTES

Bearing Notes:

- South bearings are expansion bearings on rollers
 - Truss top bearing plates have moved south of centerline and are not fully bearing, inside rollers are exposed (see attached photo). Below is the distance the top bearing plate has moved beyond centerline
 - West truss: 6.125" (interior truss) and 6.5" (exterior truss)
 - East truss: 5.5" (interior truss) and 6.125" (exterior truss)
 - 1974 inspection states that trusses had only moved 4" south of centerline bearing
 - Mild corrosion on rollers and bearing plates
 - Anchor bolts are bent to the south
 - Stringers are bearing against backwall
 - Concrete pedestal is cracked (propagating from bearings)

39.30 – Victoria Subdivision – Cowichan River

- North bearings are fixed
 - Truss top bearing plate approximately 2" north of centerline bearing (see attached photo)
 - 1974 inspection states that the truss bearing was lined up with the centerline of bearing
 - Moderate corrosion on bearing steel
 - Anchor bolts are bent to the north
- Stringer bearings
 - Stringer bearings consist of two steel plates
 - Stringers are bearing against backwall and cannot expand further
 - 1974 inspection states that there is a 3" gap between stringers and backwall
 - Heavy corrosion of bearing plates with deep pitting

Primary Steel Member Notes:

- Primary steel compression members are composed of "Phoenix" sections
- Primary steel tension members are composed of eyebars
- Top chord members (Phoenix):
 - Longitudinal grooves
 - Longitudinal grooves were found along length of bridge (see attached photo)
 - Grooves appear to have existed for long time
 - Not behaving like a typical crack; may be a fabrication irregularity
 - Minor corrosion of top chord members
- Bottom chord members (Eyebars):
 - No significant section loss noted
 - Several bottom chord members are not tight (in unloaded condition)
 - Moderate corrosion of both I- Bars and pins
 - Slight buckle in several bottom chord members including L0 to L1 (West) and L0 to L1 (East)
 - Bottom chord members on West trusses are not level; implies some rotation occurring

Secondary Steel Member Notes:

- End diagonal at South Abutment (west interior truss) has settled 3/8"
- Several diagonal bars are loose
- Smaller Phoenix laterals at mid-height of truss are being pulled apart by pack rust
- Several top sway bracing members are loose
- Several bottom lateral bracing members are loose; one member is hanging very loosely
- Several of the diagonal bars have cracks in turnbuckle nuts (see attached photo)

Floor System Notes:

- Floor beams:
 - Top flange plates are corroded heavily (see attached photo)
 - Top flange plates exhibit holes in some locations
 - Minor corrosion at all other floor beam members
 - New angles have been added for floor beam to stringer connections
- Stringers:
 - Heavy corrosion of bottom flange angles near supports
 - Minor corrosion at all other locations of stringers
 - Stringers are bearing against south backwall
 - Stringer bearings at south abutment are heavily corroded with bent anchor bolts

39.30 – Victoria Subdivision – Cowichan River

OBSERVATIONS UNDER LOAD

- No significant movement detected in primary truss members
- Some secondary members began swaying; at one location the members swayed into each other creating a clanging sound

Non-Destructive Testing:

- Non-destructive testing was performed on October 17, 18 and 24 of 2011
- Pins (31 total) were tested ultrasonically
 - All pins tested were found to be acceptable
- Several components (22 total) were magnetic particle tested
 - Components consisted of eyebars, crossbar clevis, upper chords and turnbuckles
 - Deformities in upper chords that were found in the visual inspection were determined to be inherent defects from manufacturing
 - Cracks were found in eight turnbuckles that were tested
 - Eyebars members tested were found to be acceptable
 - Crossbar clevis members tested were found to be acceptable
- For photos and more details see Appendix A

History:

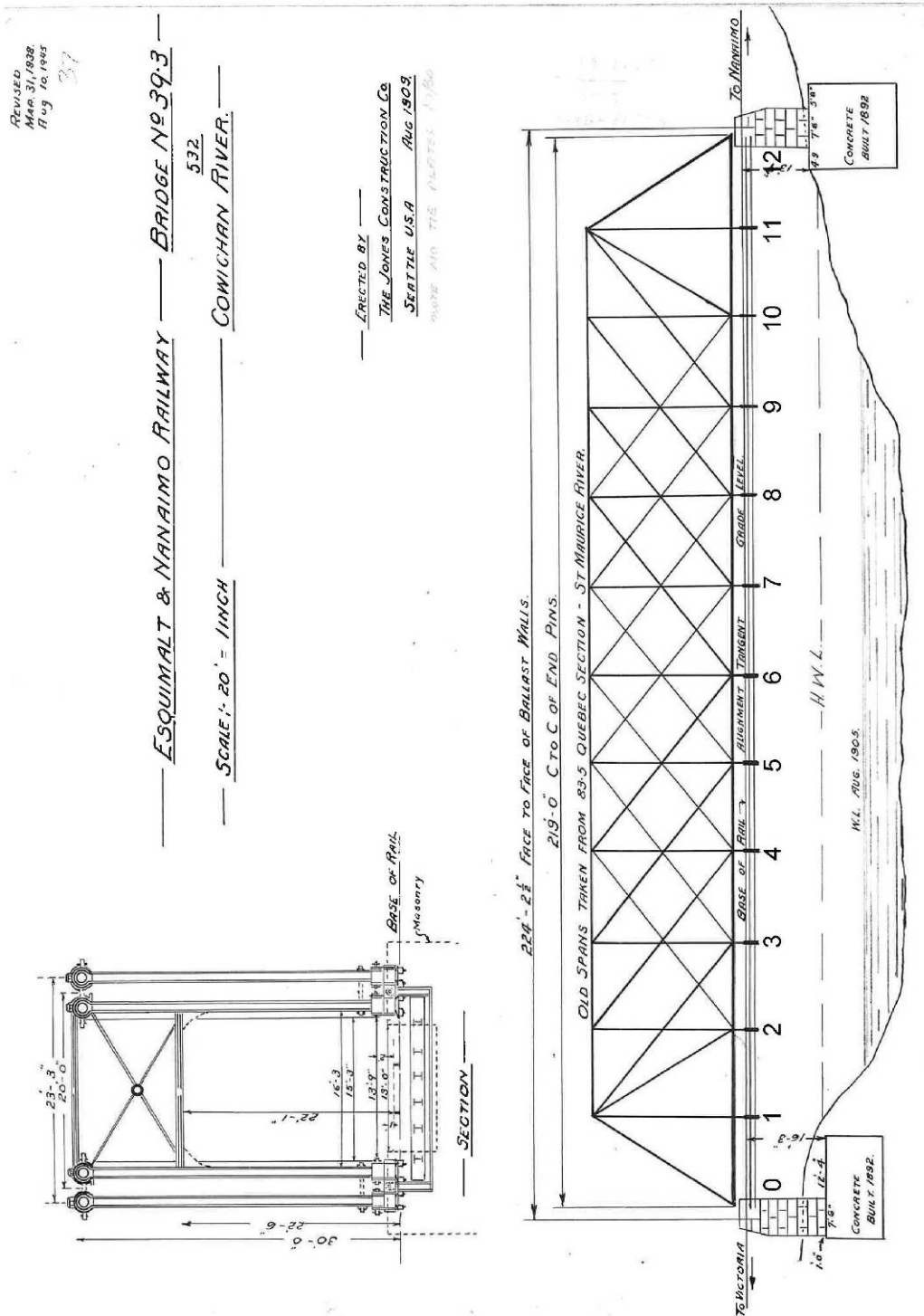
- Original construction year = 1909
- Truss last painted in 1958
- Masonry pedestals (concrete) installed in 1975
- Fixed bearings at north abutment
 - 1974: Truss pins are in line with centerline of bearing
 - 2011: Truss pins have expanded off of bearing approximately 2" to the north
- Expansion bearings at south abutment
 - 1974: Truss pins have expanded approximately 4" south of centerline of bearing
 - 2011: Truss pins have expanded 5.5" to 6.5" south of centerline of bearing
 - 2011: Exterior trusses have expanded further south than interior trusses
- Stringer bearings at south abutment
 - 1974: There exists at 3" gap between the stringers and backwall
 - 2011: There is no gap between the stringer and backwall
- Based on 2011 bearing observations that following conclusions could be made:
 - Truss expanded to the south until the stringers hit the backwall
 - Truss has continued to expand by pushing the fixed bearings to the north 2"
 - Truss members must be loosening and sagging in order to cause the excessive expansion observed
 - Trusses are expanding at different rates and may be stressing floor system
- All ties replaced very recently

Noted Deficiencies:

- Cracks were found in several turnbuckles at ends of diagonal truss members (See Appendix A)
- Truss top bearing plates are approx. 6" south of centerline, inside rollers exposed (see attached photo)
- Stringer bearings at south abutment are heavily corroded with bent anchor bolts

39.30 – Victoria Subdivision – Cowichan River

Bridge General Arrangement:



39.30 – Victoria Subdivision – Cowichan River

Additional Inspection Photos:



South Expansion Bearing (Rollers Exposed)



Bent Anchor Bolts at Stringer Bearing (Typical)



Floor Beam Top Flange (Typical Deterioration)



Groove in Top Chord Member (Typical)



Crack in Turnbuckle Nut of Diagonal



North Fixed Bearing

40.60 – Victoria Subdivision – Unnamed Waterway



Track View (Looking South)



Girder View (Looking South)

40.60 – Victoria Subdivision – Unnamed Waterway

FEATURE CROSSED: Unnamed Waterway

INSPECTION DATE: 10/05/2011

STREAM DEPTH: 2 ft.

HEIGHT: 11 ft

NEAREST TOWN: Duncan, BC

FLOW DIRECTION: East

TOTAL LENGTH: 38 ft

INSPECTORS: MT/KB

DECK TYPE: Open

SPANS: 35'-6" (HDPG)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Cast-In-Place Concrete

- Vegetation located on abutment seats
- Minor debris located on abutment seats
- Abutments in fair condition; no significant defects noted

WINGWALL NOTES

Wingwall Type: Cast-In-Place Concrete

- Wingwalls in fair condition; no significant defects noted

DECK NOTES

- Track located on a tangent alignment
- Ties = 10" wide x 18" deep x 12'-6" long (1/2" dap)
- Tie spacing = 15"
- Ties are in fair condition overall
- Ties are bearing on bottom flange angles (4 1/2" bearing width)
- Both approaches are low

SPAN NOTES

Bearing Notes:

- Steel bearing plates
- Light to moderate surface corrosion to both bearing plates and anchor bolts

Girder Notes:

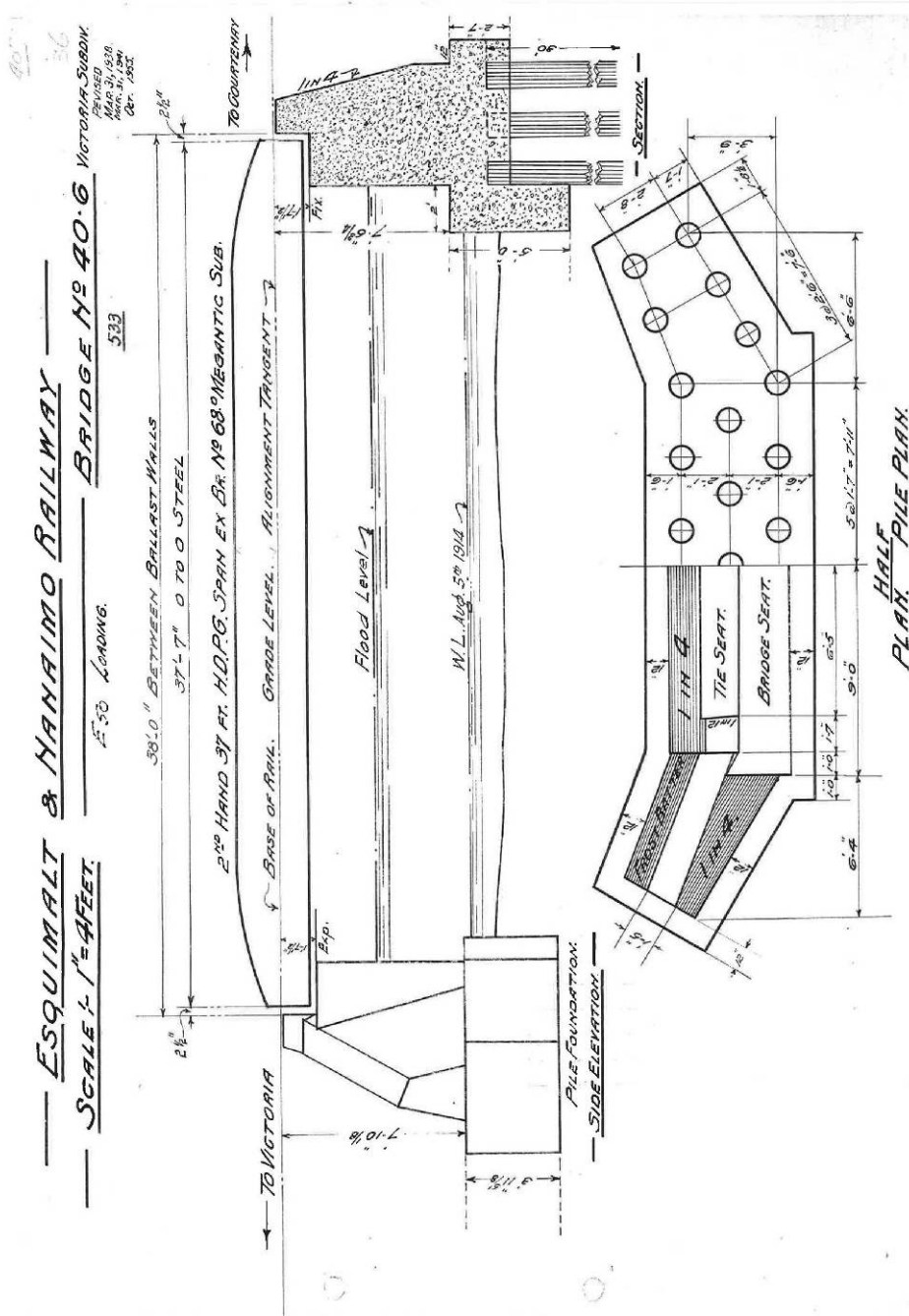
- Steel is in fair condition; minor corrosion throughout girders
- Bottom flange angles exhibit minor pitting

History:

- Original construction year =1917
- Deck plate girders replaced in 1940

40.60 – Victoria Subdivision – Unnamed Waterway

Bridge General Arrangement:



46.60 – Victoria Subdivision – Overflow



Interior Bent View

46.60 – Victoria Subdivision – Overflow

FEATURE CROSSED: Overflow

INSPECTION DATE: 10/04/2011

NEAREST TOWN: Crofton, BC

INSPECTORS: MT/DBH/NC

NO. OF SPANS: Three

ACCESS METHOD: None

NDT TESTING: No

STREAM DEPTH: 2 ft.

FLOW DIRECTION: East

DECK TYPE: Open

WALKWAY: No

HANDRAILS: No

OBSERVED UNDER LOAD: Yes

HEIGHT: 11 ft

TOTAL LENGTH: 45 ft

SPANS: 14'-5" (TPT), 15' (TPT) & 14'-5" (TPT)

Inspection Findings:

END BENT NOTES

Round timber piles with a timber cap

- Minor dirt and debris on bearings
- Minor vegetation on bearings
- Pile 2 of north end bent experiencing rot in core

WINGWALL NOTES

Wingwall Type: Timber Plank Wingwalls

- Wingwalls are in good condition

DECK NOTES

- Track located on a tangent alignment
- Ties = 8" wide x 8" deep x 10'-0" long
- Tie spacing = 12"
- 9 poor ties counted; ties are otherwise in good condition
- Rail plates are cutting into ties near approaches
- Approaches are low at both ends of bridge

SPAN NOTES

Stringer Notes:

- Two four-ply stringers (each ply is 9" wide x 17" deep)
- Stringers are in good condition

Intermediate Bent Notes:

- Six round timber piles with a timber cap
- Two of the six piles at Bent 2 are exhibiting significant section loss due to rot
 - Bent 2, Pile 3 has severe core rot (see attached photo)
 - Bent 2, Pile 6 has rot; approximately 1 ½" sound to rot (see attached photo)

Extra Timber Member Notes:

- No bracing timber members

46.60 – Victoria Subdivision – Overflow

OBSERVATIONS UNDER LOAD

- Some movement visible in bridge, nothing excessive noted
- Wave under axles due to tie flexure

History:

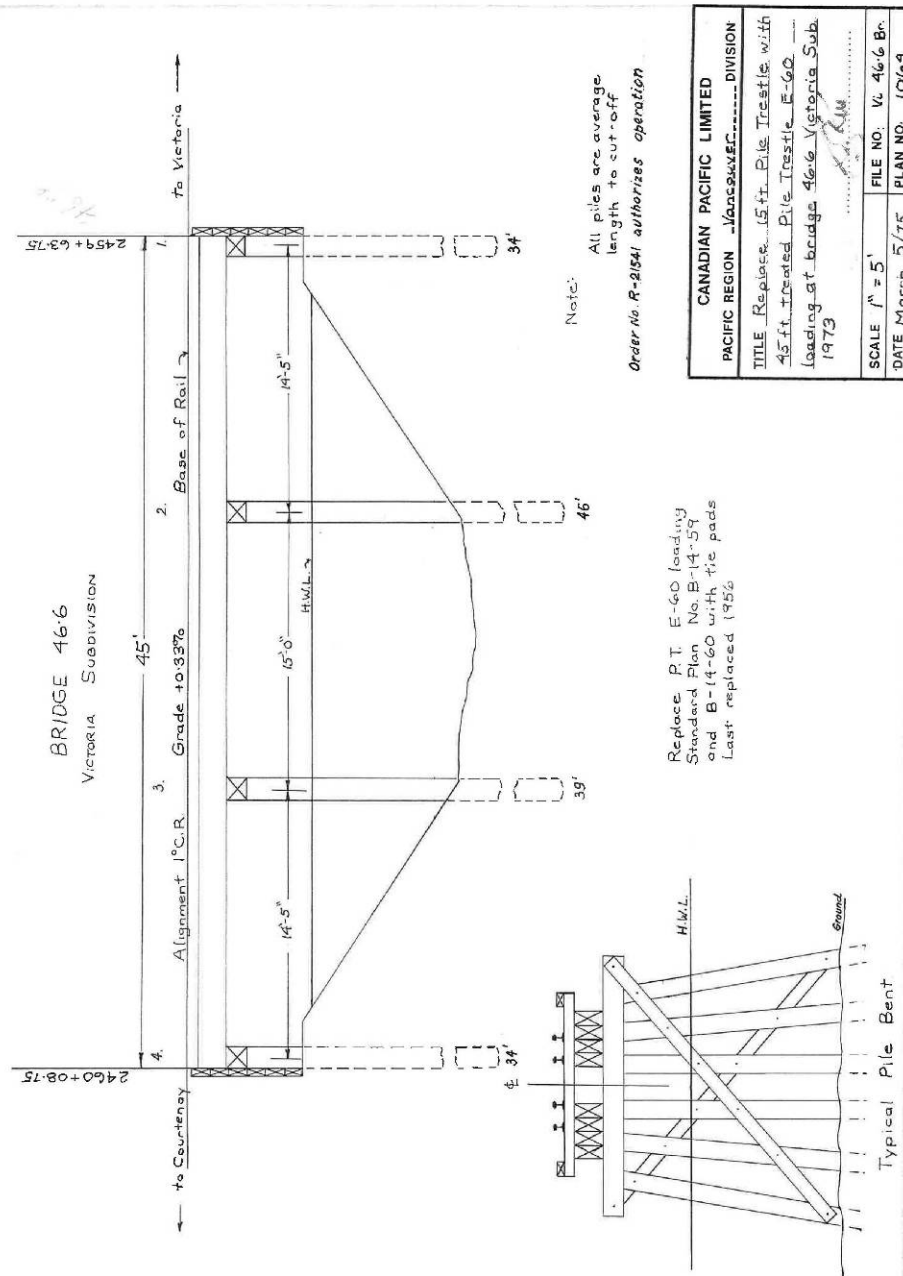
- Original construction year = 1973

Noted Deficiencies:

- Piles 3 and 6 of Bent 2 are exhibiting significant section loss due to rot

46.60 – Victoria Subdivision – Overflow

Bridge General Arrangement:



46.60 – Victoria Subdivision – Overflow

Additional Inspection Photos:



Rotten Pile at Bent 2 (Pile 3)



Rotten Pile at Bent 2 (Pile 6)



North End Bent Bearing

46.80 – Victoria Subdivision – Whitehouse Creek



North Abutment View (Note Undermining)



Track View (Looking North)

46.80 – Victoria Subdivision – Whitehouse Creek

FEATURE CROSSED: Whitehouse Creek

INSPECTION DATE: 10/04/2011

STREAM DEPTH: 1 ft.

HEIGHT: 13 ft

NEAREST TOWN: Crofton, BC

FLOW DIRECTION: East

TOTAL LENGTH: 31 ft

INSPECTORS: MT/DBH/NC

DECK TYPE: Open

SPANS: 24'-10" (DPG)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Cast-In-Place Concrete

- Creek appears to have begun undermining abutment footings (see attached photo)
- Debris and vegetation on abutments
- Minor spalling and cracks on face of abutments

WINGWALL NOTES

Wingwall Type: Cast-In-Place Concrete

- Minor cracks on face of wingwalls
- Minor spalling on wingwall footings

DECK NOTES

- Track located on a tangent alignment
- Ties = 10" wide x 14" deep x 13'-3" long (1/2" significant dap)
- Tie spacing = 15"
- Rail plates are cutting into ties
- Nearly all ties counted as poor (see attached photo)

SPAN NOTES

Bearing Notes:

- Steel bearing plates
- Minor surface corrosion and moderate corrosion of anchor bolts
- Anchor bolt has been added to west bearing at south abutment

Girder Notes:

- Light to moderate corrosion throughout girders
- Bottom flange plate has a section loss of approximately 3/16" at localized areas near bearing only
- Top flange plate has a section loss of approximately 1/16" (see attached photo)

46.80 – Victoria Subdivision – Whitehouse Creek

History:

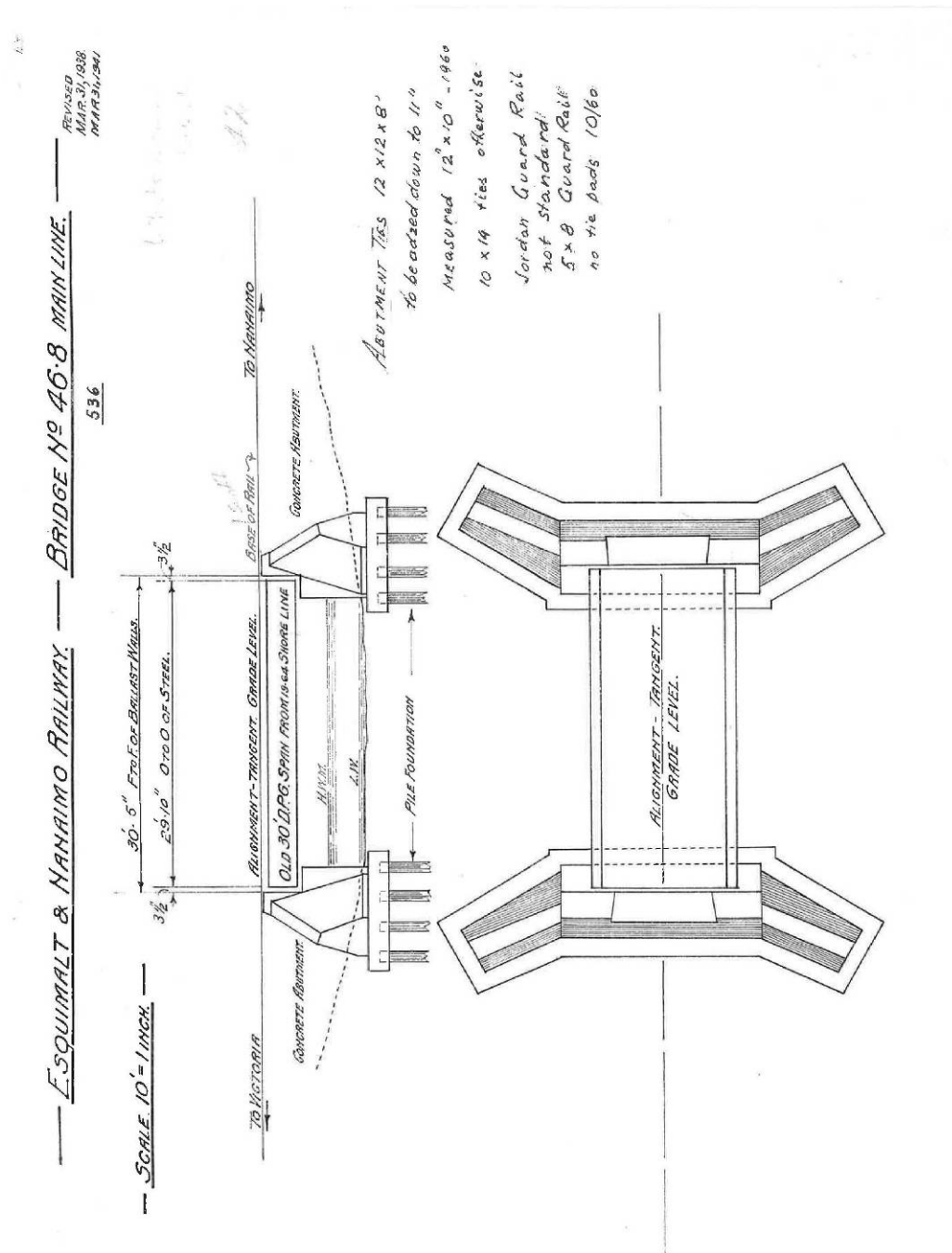
- Original construction year = 1940

Noted Deficiencies:

- Nearly all ties counted as poor (see attached photo)

46.80 – Victoria Subdivision – Whitehouse Creek

Bridge General Arrangement:



46.80 – Victoria Subdivision – Whitehouse Creek

Additional Inspection Photos:



West Bearing at South Abutment (Note New Bolt)



View of Corroded Top Flange from Above



Poor Tie Condition



Undermining of North Abutment Footing

47.90 – Victoria Subdivision – Chemainus River



South Abutment View



North Abutment View

47.90 – Victoria Subdivision – Chemainus River

FEATURE CROSSED: Chemainus River

INSPECTION DATE: 10/13/2011

STREAM DEPTH: 5 ft

HEIGHT: 23 ft

NEAREST TOWN: Crofton, BC

FLOW DIRECTION: East

TOTAL LENGTH: 157 ft

INSPECTORS: MJO/MFB/MT/KB

DECK TYPE: Open

SPANS: 155'-6" (TT)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: Snooper

HANDRAILS: No

NDT TESTING: Yes

OBSERVED UNDER LOAD: Yes

Inspection Findings:

ABUTMENT/BACKWALL NOTES

South Abutment:

- Masonry abutment with concrete facing
- Light brush present on and around bearings
- Minor cracks on face of concrete
- Cofferdam located in front of abutment is in good condition (see attached photo)

North Abutment:

- Masonry abutment
- Light brush present on and around bearings
- Minor cracking of masonry blocks
- Minor tuck pointing needed between blocks

WINGWALL NOTES

- Masonry block wingwalls
- Wingwalls are in good condition

DECK NOTES

- Bridge is located on a tangent and therefore does not have a superelevation
- Ties are yellow cedar
- Ties = 10" wide by 10" deep by 10'-0 long (no daps)
- Tie spacing = 16"
- Ties are generally in good condition; replaced in 2006

SPAN NOTES

Bearing Notes:

- Bearing rollers at south abutment are out of true alignment by approximately 2"
- Anchor bolt is bent 1 ½" towards abutments at south abutment west bearing (see attached photo)
- Mild corrosion on all bearings

47.90 – Victoria Subdivision – Chemainus River

Primary Steel Member Notes:

- Hangers have been tack welded
- Several diagonal members have a welded detail at the eye bar that could be fatigue-prone
- Moderate corrosion on all steel members
- Eyebars bent at 4th bay of west truss (see attached photo)
 - Likely a non-structural issue; probably caused by erection or maintenance activities

Secondary Steel Member Notes:

- Several of the lattice pieces in the truss members are sagging or “bowed”
- Horizontal side sway bracing members are necked down at locations where they intersect with each other
- Cotter pin missing from pin at horizontal side sway member from U6L to U7R
- Gusset plate for bottom lateral bracing (2LR) has failed (see attached photo)
 - Likely a non-structural issue; probably caused by erection or maintenance activities

Floor System Notes:

- Floor beams have been tack welded
- Steel strengthening detail (Queen posts) at floor beams does not appear to be functioning
 - Three of four rods are not tight at southernmost bay
 - This appears to be a typical condition throughout the bridge
 - Do not consider this strengthening when rating the bridge
 - Pin is missing from one of these strengthening rods
- Several loose rivets were found at the floor beam to stringer connections (located at Point 2)
 - At one location, three of the four rivets were loose
 - Only two bays at south end of bridge were inspected at close proximity
 - No proximity visual inspection of other bays due access

OBSERVATIONS UNDER LOAD

- Two or three bottom chord eyebars have slight bend (likely from erection, members do not see compression thus buckling should not be a concern); do not straighten under load, but vibrate as expected
- Queen post under truss at #4 stringer is loose; visible deflection in loose tie rod and stringer
- Slight horizontal vibration of bridge observed while sitting on floor beam

Non-Destructive Testing:

- Non-destructive testing was performed on October 20 of 2011
- Pins (10 total) were tested ultrasonically
 - All pins tested were found to be acceptable
- Several components (12 total) were magnetic particle tested
 - Components consisted of eyebars and turnbuckles
 - Cracks were found in two turnbuckles tested
 - Eyebars members tested were determined to be okay
- For photos and more details see Appendix A

History:

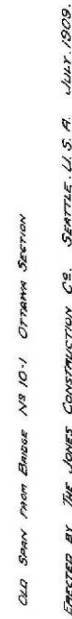
- Original construction year = 1909; Floor beams strengthened in 1940
- Cofferdam placed in front of South Abutment in 1957

47.90 – Victoria Subdivision – Chemainus River

Noted Deficiencies:

- Several loose rivets were found at the floor beam to stringer connections (located at Point 2)
- Cotter pin missing from pin at horizontal side sway member from U6L to U7R
- Steel strengthening detail (Queen posts) at floor beams does not appear to be functioning
- Bearing rollers at south abutment are out of true alignment by approximately 2"
- No close proximity visual inspection of most floor beam bays due to access

Bridge General Arrangement:



47.90 – Victoria Subdivision – Chemainus River

Additional Inspection Photos:



Bent Anchor Bolt (South Abutment, West Bearing)



Plate Failure at Bottom Lateral Bracing (L2R)



Track View (Looking South)



Bottom Eyebar Chords (Note Bent Bar)



Cofferdam in front of South Abutment



Underside of Bridge (Note Strengthening Detail)

60.70 – Victoria Subdivision – Harrison Creek



Track View looking North



Strengthened Stringer (Typical)

60.70 – Victoria Subdivision – Harrison Creek

FEATURE CROSSED: Harrison Creek

INSPECTION DATE: 10/13/2011

STREAM DEPTH: 4 ft

HEIGHT: 38 ft

NEAREST TOWN: Ladysmith

FLOW DIRECTION: East

TOTAL LENGTH: 107 ft

INSPECTORS: MJO/MFB

DECK TYPE: Open

SPANS: 103'-9" (TT)

NO. OF SPANS: One

WALKWAY: No

ACCESS METHOD: Snooper

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Concrete abutments on timber piles

- No spalling or cracking on abutment faces or backwalls
- No evidence of scour at base of abutments
- Moss present on majority of abutment seats
- Moisture evident leaking down backwall and face of abutment

DECK NOTES

- Track located on 4° curve according to existing plans
- Ties = 10" wide x 12" deep x 13'-6" long (2" dap)
- Tie spacing = 16"
- 14 poor ties counted; ties are generally in good condition

TRUSS MEMBER NOTES

Bearing Notes:

- North Abutment:
 - Fixed pot bearings (see attached photo)
 - Have been replaced in recent years
- South Abutment:
 - Expansion pot bearings or rocker bearings (see attached photo)
 - Older than bearings at North Abutment
 - May be locked and not allowing movement
- Note: There is a third bearing at the center of the end floor beams

General Steel Truss Member Notes:

- All steel truss members exhibit minor corrosion on all faces (see attached photo)
- Paint is peeling or completely gone from face of all steel members
- No significant section loss noted

60.70 – Victoria Subdivision – Harrison Creek

TRUSS BRACING NOTES:

- All truss bracing members have minor corrosion on all faces
- No significant section loss noted
- First bottom lateral member of west truss has a slight bow

FLOOR SYSTEM NOTES:

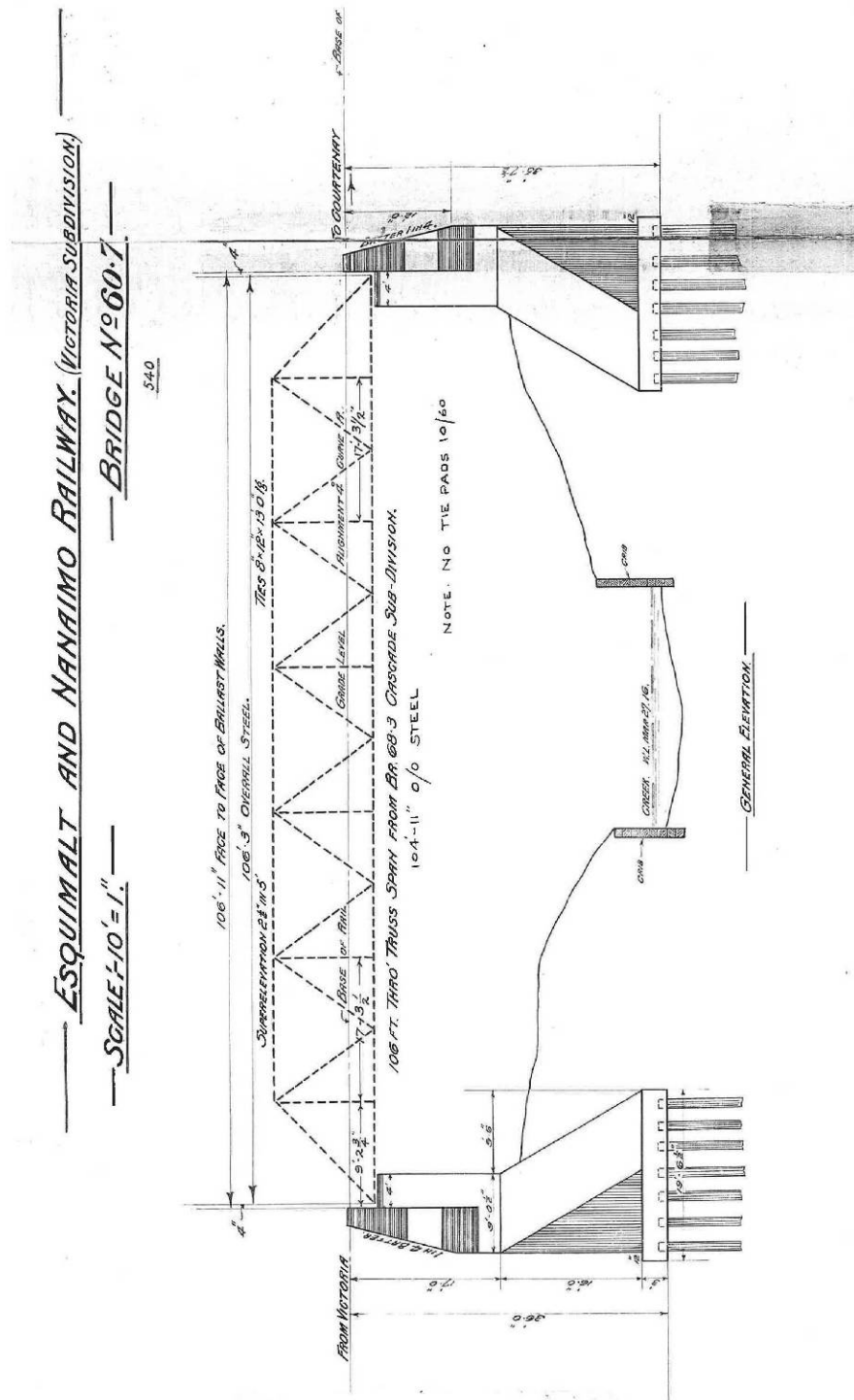
- All stringers and floor beams are exhibiting minor corrosion on all faces
- Paint is peeling or completely gone from face of stringers and floor beams
- No significant section loss noted
- Stringers have been strengthened with top and bottom angles (except for end stringer spans)
- Stringer connections to floor beams are rivets and tack welded (see attached photo)
 - No cracks found in welds
- Bottom flanges of floor beams and stringers at bearing locations are bent upwards from previous jacking (see attached photo)

History:

- Original construction year = Truss constructed in 1896; Bridge placed at current site in 1915
- Summary of bridge updates = Floor system strengthened in 1940 per existing plans
- Speed restriction of 10 mph applied to this bridge
 - No documentation available to explain reason for speed restriction
 - Speed restriction may be related to repairs made to floor system around 1940

60.70 – Victoria Subdivision – Harrison Creek

Bridge General Arrangement:



60.70 – Victoria Subdivision – Harrison Creek

Additional Inspection Photos:



Steel Corrosion (Typical)



Bent Bottom Flange at Bearing (Typical)



North Abutment Bearing



South Abutment Bearing



Bottom Lateral Bracing (Typical)



Floorbeam to Stringer Connection (Typical)

64.40 – Victoria Subdivision – Lochner Rd/Haslam Cr



Span over Lochner Road (Looking West)



Track View (Looking North)

64.40 – Victoria Subdivision – Lochner Rd/Haslam Cr

FEATURE CROSSED: Lochner Rd / Haslam Cr.

INSPECTION DATE: 10/14/2011

STREAM DEPTH: 2 ft.

HEIGHT: 30 ft

NEAREST TOWN: Cassidy, BC

FLOW DIRECTION: East

TOTAL LENGTH: 103 ft

INSPECTORS: MFB/DBH

DECK TYPE: Open

SPANS: 74' (DT) & 24' (WFB)

NO. OF SPANS: Two

WALKWAY: No

ACCESS METHOD: Snooper

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Cast-In-Place Concrete

- No scour or undermining detected at North Abutment (south abutment away from creek)
- Moss growing on both abutment seats
- Minor efflorescence on both abutments
- Diagonal crack on west corner of north abutment seat (see attached photo)
- Spalls on upstream side of south abutment
- South abutment backwall has been chipped away (see attached photo)
 - Assume this was done to accommodate steel truss
 - Cracks are propagating from this area

WINGWALL NOTES

Wingwall Type: Cast-In-Place Concrete

- Minor scaling and spalling of wingwalls
- Moss covering portions of the wingwalls
- Large diagonal crack in east wingwall at north abutment

PIER NOTES

Pier Type: Cast-In-Place Concrete Wall Pier

- Moss on face of pier
- Some minor scour at base of pier (rock has been placed to protect pier)
- End face of pier is scaled

DECK NOTES

- Track located on a tangent alignment
- Ties (Span 1) = 10" wide x 15" deep x 13'-0" long (1/2" dap in ties)
- Ties (Span 2) = 10" wide x 8" deep x 10'-0" long (with 1" dap in ties)
- Tie spacing = 16" (Span 1), 14" (Span 2)
- Ties on truss span are generally in poor condition (nearly all bridge ties poor)
- Ties on wide flange span are generally in fair condition
- Rail plates are cutting into ties in some locations
- North approach is low and ties are swinging (pivoting with respect to rail) at this location

64.40 – Victoria Subdivision – Lochner Rd/Haslam Cr

SPAN 1 NOTES

Bearing Notes:

- Moderate corrosion on all bearings
- South Bearings of Span 1 were set approximately 3" south of center
- South Bearings of Span 1 may be locked up
- North Bearings of Span 1 have anchor bolts bent south approximately 1" (see attached photo)

Steel Truss Members:

- Appears that the truss has been strengthened since initial construction
 - Strengthening completed around 1940 for larger locomotives
 - Strengthening includes a combination of rivets and tack welds
- Minor corrosion of steel generally seen throughout span
- Flanges of top and bottom chords are bent near bearings; possibly from jacking in the past
- Lattice on both the top and bottom chords is bowed in some locations
- Bottom plate of bottom chord is pitted; assume 1/8" loss across entire top face
- Top chord of east truss is bowed at midspan where vertical post connects (see attached photo)
- Vertical angles of posts have pack rust between them (see attached photo)

SPAN 2 NOTES

Bearing Notes:

- Minor corrosion of bearings

Steel Notes:

- Paint is flaking off of bottom flange
- Bottom flange has impact damage from vehicles
- No section loss noted

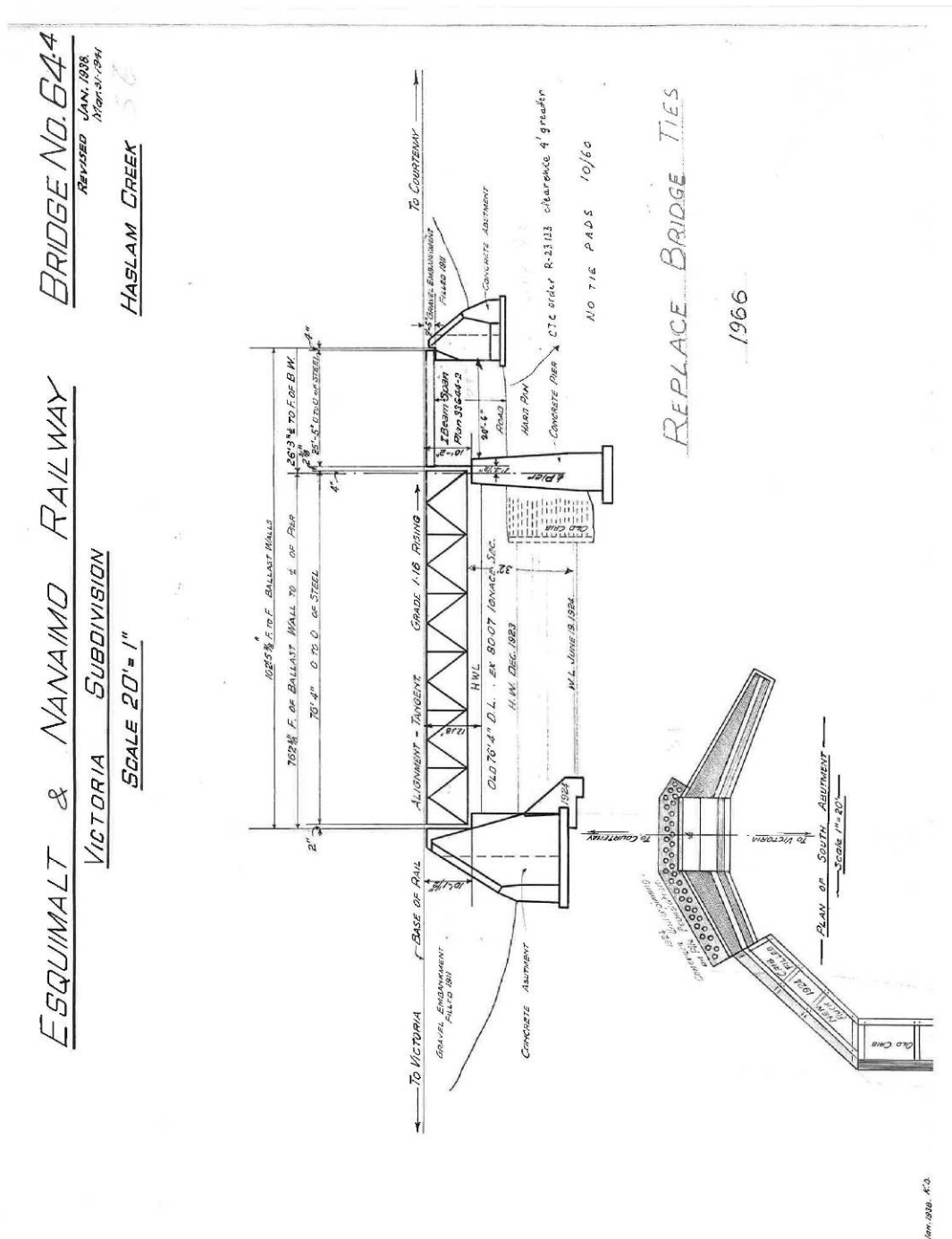
History:

- Original construction year = 1911
- Steel members of truss strengthen = 1940

Noted Deficiencies:

- Ties on truss span are generally in poor condition (nearly all bridge ties poor)

Bridge General Arrangement:



64.40 – Victoria Subdivision – Lochner Rd/Haslam Cr

Additional Inspection Photos (1 of 2):



North Abutment (Looking East)



View of Pier (Looking North)



Diagonal Crack in East Wingwall (North Abutment)



View of Pier (Looking East)



Swinging Ties at North Approach



Bent Anchor Bolt at NW Bearing of Span 1

64.40 – Victoria Subdivision – Lochner Rd/Haslam Cr

Additional Inspection Photos (2 of 2):



South Backwall (Chipped Out for Truss)



Pack Rust between Vertical Post Angles



Top Chord Flange Bent at Midspan Post

65.10 – Victoria Subdivision - Nanaimo River



Track View (Looking South)



Span 3 (Looking West)

65.10 – Victoria Subdivision - Nanaimo River

FEATURE CROSSED: Nanaimo River

INSPECTION DATE: 10/14/2011

STREAM DEPTH: 20+ ft.

HEIGHT: 112 ft

NEAREST TOWN: Cassidy, BC

FLOW DIRECTION: East

TOTAL LENGTH: 200 ft

INSPECTORS: MFB/DBH

DECK TYPE: Open

SPANS: 39'-2" (DPG), 128'-0" (DT) &

NO. OF SPANS: Three

WALKWAY: No (1 Refuge Bay)

26'-10" (WFB)

ACCESS METHOD: Snooper

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

ABUTMENT/BACKWALL NOTES

Abutment Type: Masonry Block (north), Masonry Block with Concrete Casing (south)

- Moss growing on the seat of the south abutment
- Minor tuck pointing required in masonry of north abutment
- One block fractured on north abutment

WINGWALL NOTES

Wingwall Type: Masonry Block (north), Timber (south)

- Timber wingwalls (south end of bridge) are starting to rot and lean
- Crack found in west masonry wingwall at north abutment
- Minor tuck pointing required at north masonry wingwalls

PIER NOTES

Pier Type: Masonry Block (both), Steel Bent on Pier 1 supports Span 1

- Minor cracking of some blocks in pier
- Minor tuck pointing needed in piers

DECK NOTES

- Track located on a tangent alignment
- Ties = 10" wide x 14" deep x 13'-0" long (1 1/2" dap in ties)
- Tie spacing = 16"
- 36 poor ties counted, ties are generally in fair to poor condition
- Rail plates are cutting into ties in some locations
- South approach is low

65.10 – Victoria Subdivision - Nanaimo River

SPAN 1 NOTES

Bearing Notes:

- Fixed steel bearings at South Abutment
 - East timber bearing block is splitting (see attached photo)
 - Bearings and anchor bolts are in good condition
 - Steel bent supports north end of Span 1 (good condition)

Steel Notes (Deck Plate Girders):

- Paint is flaking off of steel
- Minor surface corrosion on all steel
- Bottom plate is corroded to a “knife edge” for an 8” length near north bearing (see attached photo)
- Bracing members are in good condition
- Two intermediate stiffeners (west girder) are bent at top, 3rd and 4th stiffeners from South Abutment

SPAN 2 NOTES

Bearing Notes:

- Expansion bearings at south end of Span 2 (see attached photo)
 - Heavily corroded; may be partially frozen
 - Truss appears to have moved approximately 1-2” to the south
- Fixed bearings at north end of Span 2
 - Pot bearings are in good condition

Steel Notes (Deck Truss):

- Paint is flaking off of all members
- Minor corrosion of steel in all areas of the truss
- Some lattice elements have a slight bow
- No loose rivets in structure
- Diagonal members have been strengthened at connections (see attached photo)
- No measureable section loss

SPAN 3 NOTES

Bearing Notes:

- Fixed steel bearings at North Abutment
 - Bearings are in good condition
- South end of span is bearing on the Span 2 truss

Steel Notes:

- Beams are in good condition
- Minor surface rust on top flange

REFUGE BAY NOTES

- Refuge bay missing a railing (safety concern)

65.10 – Victoria Subdivision - Nanaimo River

History:

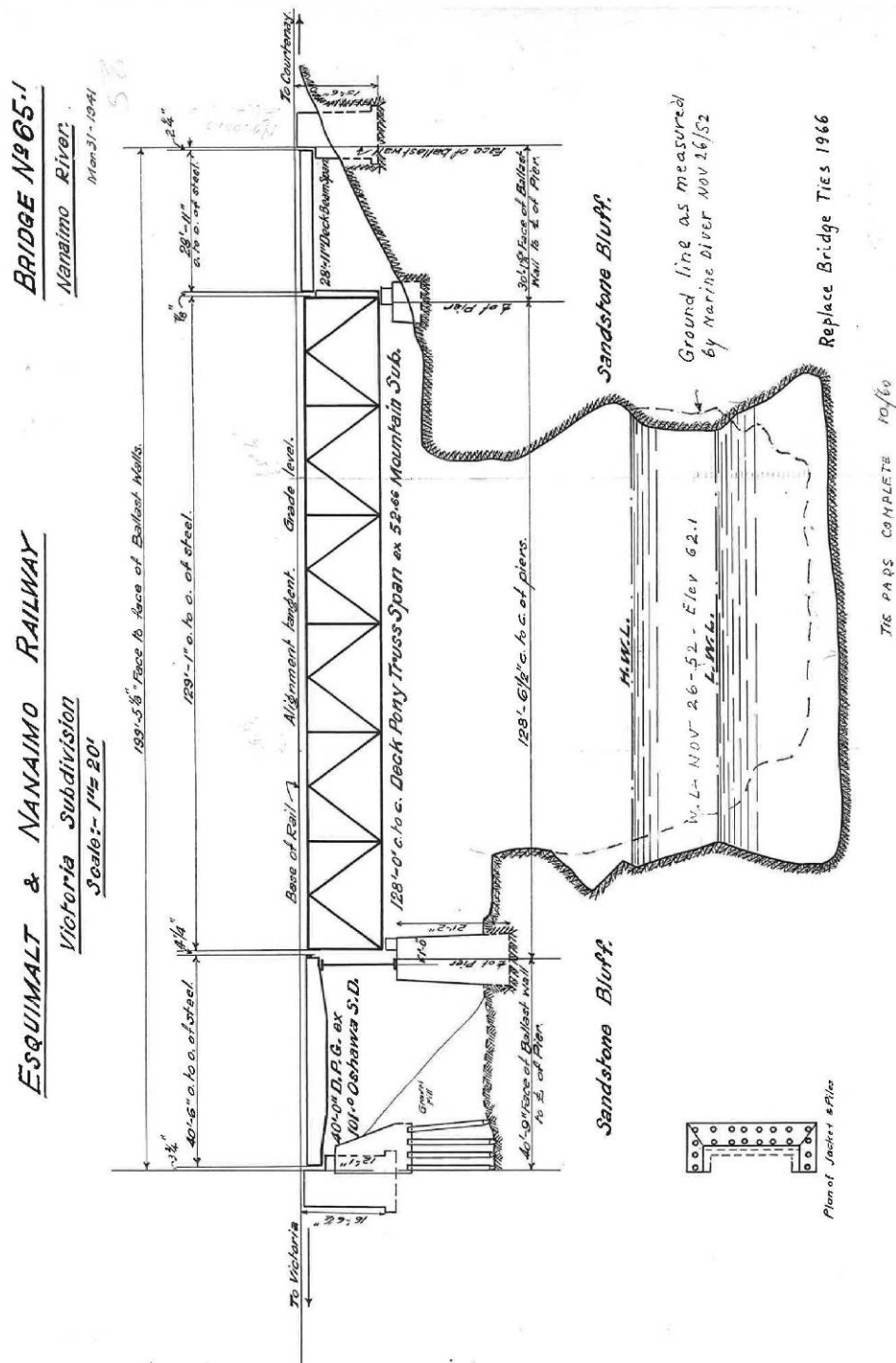
- Original construction year = 1909
- Steel members of truss strengthen = 1940
- Spans 1 and 3 replaced = 1940

Noted Deficiencies:

- Refuge bay missing a railing (safety concern)

65.10 – Victoria Subdivision - Nanaimo River

Bridge General Arrangement:



65.10 – Victoria Subdivision - Nanaimo River

Additional Inspection Photos:



Bottom Flange Section Loss (Span 1, Pier 1)



Span 1 Girder View (Looking Northeast)



Expansion Bearing (South End of Span 2)



South Abutment Bearing (Looking West)



Split Timber Bearing Block (South Abutment)

65.10 – Victoria Subdivision - Nanaimo River

Additional Inspection Photos:



Pier 1 View (Looking East)



Strengthened Diagonal Truss Member



Pier 2 View (Looking West)



Pier 2 Bearing (Looking West)

0.69 – Wellcox Subdivision – Old Island Highway



Track View (Looking North)



Partial Elevation View (Looking West and North)

0.69 – Wellcox Subdivision – Old Island Highway

FEATURE CROSSED: Old Island Highway

INSPECTION DATE: 10/10/2011

STREAM DEPTH: N/A

HEIGHT: 25 ft

NEAREST TOWN: Nanaimo, BC

FLOW DIRECTION: N/A

TOTAL LENGTH: 168 ft

INSPECTORS: MJO/AL

DECK TYPE: Open

SPANS: 2 @ 15' (TPT), 2 @ 52' (DPG) &

NO. OF SPANS: Six

WALKWAY: Yes (West)

2 @ 15' (TPT)

ACCESS METHOD: None

HANDRAILS: Yes (Spans 1 & 2)

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

END BENT NOTES

End Bents: Five round timber piles (12") with a timber cap (14" wide x 13" deep)

- South End Bent (Bent 1)
 - Pile cap is in good condition
 - Piles are in fair condition
- North End Bent (Bent 6)
 - Pile cap is in fair condition
 - Piles are in fair condition
 - Pile 3 has 30% section loss
 - Pile 4 has 10% section loss

WINGWALL NOTES

Wingwall Type: Timber Wingwalls

- Timber wingwalls are in good condition

INTERMEDIATE BENT NOTES

Intermediate Bent 2: Six round timber piles (12") with a timber cap (14" wide x 13" deep)

- No posted (cut off and partially replaced) piles
- Bent is plumb with no signs of pumping at base
- Pile 5 has 30% section loss

Intermediate Bent 3:

- Pony bent is in good condition

Intermediate Bent 4:

- Pony bent is in good condition

Intermediate Bent 5: Two square timber posts (12") and three round piles (12") with a timber cap (14" w x 13" d)

- Bent is plumb with no signs of pumping at base
- Piles 1 and 5 have 10% section loss

PIER NOTES

Pier Type: Cast-In-Place Concrete

- Concrete piers are in good condition

0.69 – Wellcox Subdivision – Old Island Highway

DECK NOTES

- Track located on a tangent alignment
- Ties (Spans 1, 2, 5 & 6) = 8" wide x 7 ½" deep x 10'-0" long (14'-0" in Spans 1 & 2 for walkway ties)
- Ties (Span 3) = 10" wide x 14" deep x 13'-0" (spaced at 10")
- Ties (Span 4) = 10" wide x 13 ½" deep x 13'-0" (spaced at 14"); with 1 ½" gap
- Poor ties counted:
 - Spans 1 & 2 = 4 poor ties
 - Span 3 = 0 poor ties
 - Span 4 = 22 poor ties
 - Spans 5 & 6 = 2 poor ties
- Rail plates are cutting into ties in some locations

TIMBER SPAN NOTES

2 Four-ply Timber Stringers (Each ply is approximately 9" wide x 17" deep)

- Span 1: All stringers are in good condition
- Span 2: Stringer 8 has a 2" x 2" section loss
- Span 5: All stringers are in good condition
- Span 6: All stringers are in good condition

STEEL SPAN NOTES

Span 3 Notes:

- Welded Plate Girder
- Good condition
- No significant defects noted

Span 4 Notes:

- Built-Up Rivets Plates and Angles
- Bottom flange was severely hit by vehicle (see attached photo)
 - Could not see any cracks at the impact from above
 - No close proximity visual inspection of bottom flange damage due to vehicle traffic
 - Appears that the girder has a slight bow where the impact took place

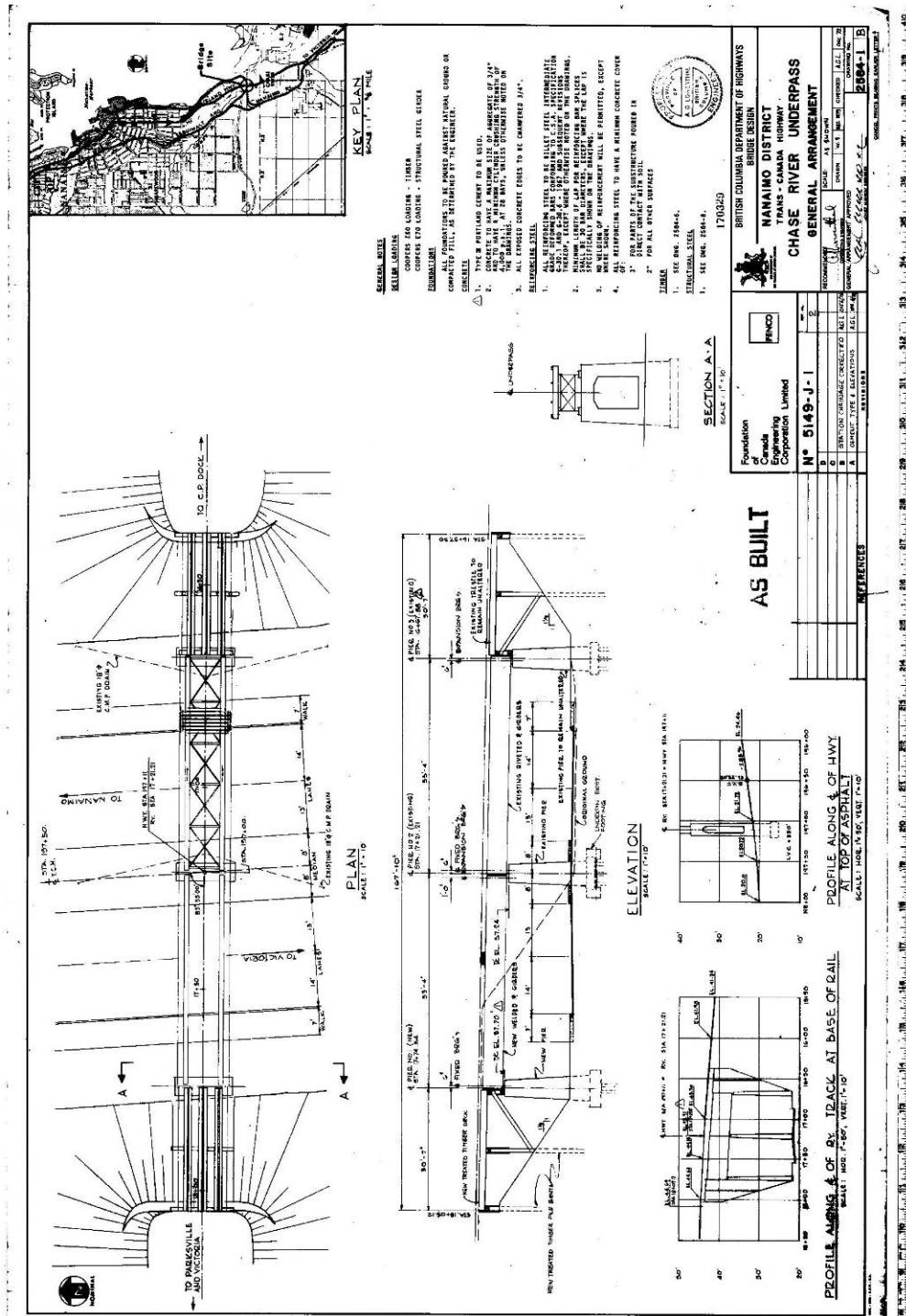
History:

- Original construction year = 1953

Noted Deficiencies:

- Bottom flange of Span 4 was severely hit by vehicle; further investigation required (see attached photo)

Bridge General Arrangement:



0.69 – Wellcox Subdivision – Old Island Highway

Additional Inspection Photos:



End Bent View (Typical)



Bent 2 View (Bent 5 Similar)



Span 1 Girder View (Looking Northeast)



Girders at Pier 3 (Note Different Girder Types)



Impact Damage at Span 4 Bottom Flange



Pony Bent at Pier 1 (Similar to Pony Bent at Pier 3)

1.02 – Wellcox Subdivision – Chase River



Track View (Looking North)

1.02 – Wellcox Subdivision – Chase River

FEATURE CROSSED: Chase River

INSPECTION DATE: 10/10/2011

STREAM DEPTH: 3 ft.

HEIGHT: 32 ft

NEAREST TOWN: Nanaimo, BC

FLOW DIRECTION: East

TOTAL LENGTH: 104 ft

INSPECTORS: MJO/AL

DECK TYPE: Open

SPANS: 2 @ 15' (TFT), 53' (DPG) &

NO. OF SPANS: Five

WALKWAY: No

2 @ 15' (TFT)

ACCESS METHOD: None

HANDRAILS: No

NDT TESTING: No

OBSERVED UNDER LOAD: No

Inspection Findings:

END BENT NOTES

- South End Bent (Bent 1): 4 round piles (12") and 3 square posts (14") with a timber cap (14" wide x 13" deep)
 - Pile cap is in fair condition
 - Pile 3 has 20% section loss
 - Pile 5 has 10% section loss
 - Pile 7 has 30% section loss
 - Three square posts added recently to south end bent have a gap under bent cap and are therefore not bearing
- North End Bent (Bent 6): Timber cap (14" wide x 13" deep bearing on soil)
 - Bent cap is in fair condition

Note: Square posts were added at south abutment because round piles were settling.

WINGWALL NOTES

Wingwall Type: Timber Wingwalls

- Timber wingwalls are in good condition

INTERMEDIATE BENT NOTES

Intermediate Bent 2: Five round piles (12") and four square posts (14") with a cap (14" wide x 13" deep)

- Bent is plumb with no signs of pumping at base
- Pile 5 has 10% loss

Intermediate Bent 3:

- Pony bent is in good condition

Intermediate Bent 4:

- Pony bent is in good condition

Intermediate Bent 5: Five square timber posts (14") with a timber cap (14" wide x 13" deep)

- Bent is plumb with no signs of pumping at base
- All posts are in good condition
- Posts sit on mud sill

1.02 – Wellcox Subdivision – Chase River

PIER NOTES

Pier Type: Cast-In-Place Concrete

- Concrete piers are in good condition

DECK NOTES

- Track located on a tangent alignment
- Ties (Spans 1, 2, 4 & 5) = 7 ½" wide x 7 ½" deep x 10'-0" long (spaced at 12")
- Ties (Span 3) = 10" wide x 16" deep x 13'-0" (spaced at 14")
- 2 poor ties counted on bridge; ties are generally in good condition
- Approach ties are swinging (pivoting with respect to rail) at both ends of bridge

TIMBER SPAN NOTES

2 Four-ply Timber Stringers (each ply is approximately 9" wide x 17" deep)

- Stringers are generally in fair condition with some splits
- No section loss noted

STEEL SPAN NOTES

Span 3 Notes:

- Deck Plate Girder
- Top flange has pitting on top
 - Section loss approximately ¼" x ¼" (each edge of flange)
- Bottom flanges have minimum section loss

History:

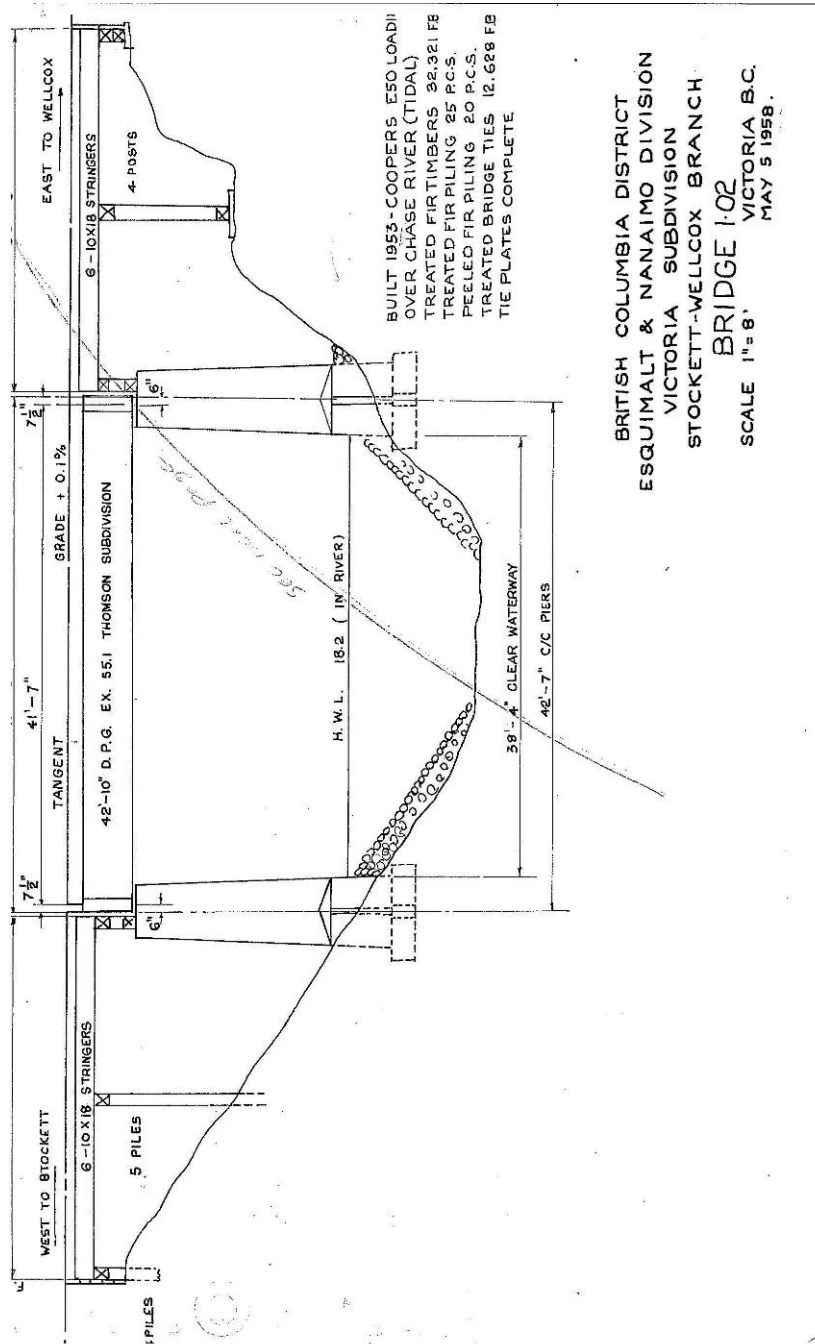
- Original construction year = 1953/1969
- North timber approach was replaced approximately 15 years ago due to a fire

Noted Deficiencies:

- Three square posts added recently to south end bent have a gap under bent cap and are therefore not bearing

1.02 – Wellcox Subdivision – Chase River

Bridge General Arrangement:



1.02 – Wellcox Subdivision – Chase River

Additional Inspection Photos:



South End Bent View



Base of Bent 2 (Looking South)



View of Steel Span (Span 3)



Span 2 Bearing on Pier 1 (Looking North)



Bent 5 (Looking North)



Base of Pier 1 (Looking East)

Closure

The services provided by Associated Engineering and Alfred Benesch & Company in preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession practicing under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,

Prepared by:

Reviewed by:

Michael J. O'Connor, 2/15/2012

Michael J. O'Connor, PE
Project Manager
Alfred Benesch & Company Engineering

N. Cuperlovic

Nikola Cuperlovic, P.Eng.
Project Manager
Associated Engineering



Feb 15/2012

Appendix A: Non-Destructive Testing Reports



Acuren Group Inc.

12271 Horseshoe Way
Richmond, BC, Canada V7A 4V4
www.acuren.com

Phone: 604.275.3800
Fax: 604.274.7235

**NDT, Inspection and Materials Engineering
a Rockwood Company**



**ASSOCIATED ENGINEERING
COMOX, BC**

ATTENTION: DALE B. HARRISON

BRIDGE 14.0 NIAGARA CANYON BRIDGE

OCTOBER 21 - 22, 2011

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**Acuren Group Inc.**

12271 Horseshoe Way
Richmond, BC, Canada V7A 4V4
www.acuren.com

Phone: 604.275.3800
Fax: 604.274.7235



NDT, Inspection and Materials Engineering
a Rockwood Company

NONDESTRUCTIVE EXAMINATION REPORT

TO: ASSOCIATED ENGINEERING
1994 COMOX AVENUE
COMOX, BC
V9M 3M7

PAGE: 1

DATE: October 21-22, 2011

TIME: ---

ACUREN JOB #: 6057420

P.O.: ---

WORK LOCATION: On Site

ATTENTION: **DALE B. HARRISON**

ACCEPTANCE

PROJECT: 14.0 Niagara Canyon Bridge

STANDARD: Client's Information REV./DATE: ---

PROCEDURE #: UT-0017

REV./DATE: Apr 07

ITEM(S) TESTED: Pins

TECHNIQUE #: ---

REV./DATE: ---

PART #: As labelled

MATERIAL: Cast steel/iron

THICKNESS: varied

SCOPE: Inspect pins as directed by Associated Engineering

TYPE(S) OF INSPECTION: Ultrasonic

RESULTS:

In total, forty-five (45) pins were tested ultrasonically on the 14.0 Niagara Canyon bridge. The pins range in length from approximately 15"-50". No test pins were provided as reference and the instrument was initially calibrated for distance using an IIW block. A lower pin was tested, in situ, and measured with a tape measure to confirm length. The amplitude on the instrument was adjusted until the back wall signal was at 100% full screen height. This amplitude (70DB) was used as a reference level for the rest of the pins. Scanning was performed at 6DB above reference level.

The pin's surface condition varied between each location. At some locations, the surface condition was extremely rough, mostly machine marks from installation. Where necessary and accessible a power grinder with grinding stone was used to provide an appropriate surface for testing. Other pin ends had a convex geometry with an inverted dimple in the centre making probe coupling difficult. Where possible the pins were read from both ends.

A note on the instrument's settings; Although the frequency of the available probe used was 2.25MHz the frequency on the instrument was set to 1.00MHz this provided a cleaner signal, in most cases, due to the material being tested. In addition, the filter settings were set to match the actual frequency of the probe used, this provided a cleaner signal, and is recommended in the Epoch XT user manual; "Due to the shifting of the frequency spectrum in most materials, it might be necessary to adjust filter settings to maximize instrument performance".

Pins were numbered from 0-35 starting from the south end. Right and Left sides of the bridge (looking north) were designated using an R or an L. They were also labelled as Upper (U), Lower (L) and Middle (M).

The following forty-five (45) pins were inspected as directed by Associated Engineering:



TABLE 1

Side	Location	Number
Right	Lower-Top	0
Right	Lower-Bottom	0 -Used as reference
Right	Upper	0
Right	Upper	2
Right	Upper	4
Right	Upper	6
Right	Upper-Left	7
Right	Upper-Right	7
Right	Upper	8
Right	Upper	10
Right	Upper	12
Right	Lower	14
Right	Middle	14
Right	Upper	14
Right	Upper	15
Right	Upper	16
Right	Lower	17
Right	Upper	18
Right	Upper	19
Right	Lower	19
Right	Lower	21
Right	Middle	21
Right	Upper	21
Right	Upper	22
Right	Upper	24
Right	Upper	36
Right	Lower	28
Right	Upper-Left	28
Right	Upper-Right	28
Right	Upper	30
Right	Upper	32
Left	Upper-Left	7
Left	Upper-Right	7 - See pictures for details
Left	Upper	14
Left	Middle	14
Left	Lower	14
Left	Lower	15
Left	Upper	17



TABLE 1

Side	Location	Number
Left	Lower	18
Left	Upper	21
Left	Middle	21
Left	Lower	21
Left	Upper-Right	28
Left	Upper-Left	28-See pictures for details
Left	Lower	28

All pins were found to be acceptable with the exception of Left Upper 28 - Left Side and Right Upper 7 - Right Side. A proper back wall reflector could not be achieved on these pins. Access to the inside of these 2 pins is extremely limited, less than a 1/2" gap between the inside pin face and the rail stringer, and so the inspection is limited in scope. At other locations on the bridge (RU10, RU24, RU26) getting a proper back wall signal proved difficult, but, when the inside end of the pin was cleaned and tested, a sufficient back wall signal (80% or better) was achieved. Having demonstrated the value of inspecting from both sides of the pin, LU7-right and LU28-left could not be evaluated conclusively.

See the following pictures and screen shots for more details:

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CLIENT REPRESENTATIVE:	TOTAL HOURS	S.T.	O.T.	SHIFT
TECHNICIAN: (Signature on original)	1ST TECHNICIAN:			Day <input type="checkbox"/>
PRINT NAME: B. McIntosh	2ND TECHNICIAN:			PM <input type="checkbox"/>
1 st Technician	KILOMETRES:	OTHER CHARGES: YES <input type="checkbox"/>	NO <input type="checkbox"/>	
CGSB/SNT Level II 11008				

Photo 1:

Pin RL0 - Lower (Right Lower Zero - Lower Pin) used as a reference for the rest of the pins tested on Bridge 14.0.



Photo 2:

Clean signal (100% Full Screen Height) achieved at 70 DB, used as a reference when inspecting the other pins.

Instrument settings were optimized for best performance. Although a 2.25MHz probe was used the frequency of the instrument was set to 1.00MHz and the filter was adjusted to correspond with the actual frequency of the transducer.



Photo 3:

Overview of the double pin configuration at LU7.



Photo 4:

Overview of the left pin at LU7-Left Pin.



Photo 5:

Screen shot of ultrasonic test done at LU7-Left Pin.

Similar to LU7-Right but a back wall was achieved after increasing amplitude slightly.

Note the amplitude of 90.4 required to achieve an 80% back wall.



Photo 6:

Overview of the right pin at LU7-Right Pin.



Photo 7:

Screen shot of ultrasonic test done at LU7-Right Pin. Note the amplitude of 90.4 and zero back wall showing. This was the result regardless of where the probe was positioned on the outside surface of the pin.

No access to the backside of the pin at this location. There is a space of approximately $\frac{1}{2}$ " between the pin and the bridge stringer.



Photo 8:

Overview of the double pin configuration at LU28.



Photo 9:

Overview of the Right pin at LU28.

Similar to LU28-Left but a back wall was achieved after increasing amplitude slightly.



Photo 10:

Screen shot of the right pin at LU28.
80% back wall achieved at 79.4 DB.

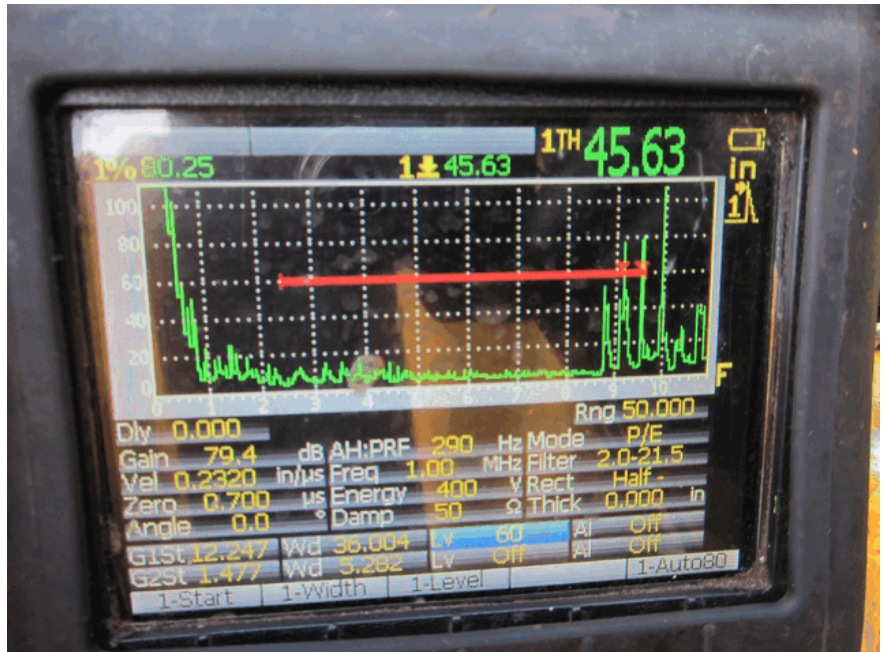


Photo 11:

Overview of the Left Pin at LU28.



Photo 12:

Screen shot of ultrasonic test done at LU28-Left Pin. Note the amplitude of 82.2 and zero back wall showing. (Amplitude was increased further but no back wall was seen). This was the result regardless of where the probe was positioned on the outside surface of the pin.

No access to the backside of the pin at this location. There is a space of approximately ½" between the pin and the bridge stringer.



Photo 13:

A typical pin showing surface condition.



Photo 14:

A typical pin showing back wall reflectors at Full Screen Height when scanning at 76DB (+6DB above reference).





TEST DETAILS: ULTRASONIC

TYPE: Flaw Detection				METHOD: Contact			
INSTRUMENT: Panametrics		MODEL: Epoch XT		S/N: ---		CAL DUE: ---	
CAL. BLOCK: IIW		S/N: see ("APPENDIX")		CABLE-TYPE: Coaxial		LENGTH: see ("APPENDIX")	
CAL. BLOCK: ---		S/N: ---		COUPLANT: UTX			
CAL. BLOCK: ---		S/N: ---		SPECIAL EQUIP.: ---			

TRANSDUCER MANUFACTURER & TECHNIQUE DETAILS:

	TEST ANGLE	PROBE TYPE	FREQUENCY (MHz)	SERIAL NUMBER	PROBE Ø	TRANSFER VALUE	TEST FROM	REFERENCE REFLECTOR	REFERENCE		SCAN SENSITIVITY	RANGE
									dB	% FSH		
1	0°	GE	2.25	022LDX	1"	0	surface	backwall	70	100	+6DB	50-70"

SURFACE CONDITION: As Ground

SURFACE TEMPERATURE: 0°C/32°F to 120°C/250°F



Acuren Group Inc.

12271 Horseshoe Way
Richmond, BC, Canada V7A 4V4
www.acuren.com

Phone: 604.275.3800
Fax: 604.274.7235

**NDT, Inspection and Materials Engineering
a Rockwood Company**



**ASSOCIATED ENGINEERING
COMOX, BC**

ATTENTION: DALE B. HARRISON

BRIDGE 14.0 NIAGARA CANYON

OCTOBER 25, 2011

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**Acuren Group Inc.**

12271 Horseshoe Way
Richmond, BC, Canada V7A 4V4
www.acuren.com

Phone: 604.275.3800
Fax: 604.274.7235



NDT, Inspection and Materials Engineering
a Rockwood Company

NONDESTRUCTIVE EXAMINATION REPORT

To: ASSOCIATED ENGINEERING
1994 COMOX AVENUE
COMOX, BC
V9M 3M7

PAGE: 1
TIME: ---

DATE: October 25, 2011

ACUREN JOB #: 605-7420

P.O.: ---

WORK LOCATION: On Site

ATTENTION: **DALE B. HARRISON**
PROJECT: Bridge 14.0 Niagara Canyon

ACCEPTANCE
STANDARD: Client's information REV./DATE: ---

PROCEDURE #: AGI MT01 REV./DATE: ---

ITEM(S) TESTED: Various Components on Bridge 14.0
(Niagara Canyon) as directed by
Associated Engineering

TECHNIQUE #: --- REV./DATE: ---

PART #: --- MATERIAL: Carbon steel THICKNESS: ---

SCOPE: Magnetic Particle testing on various components of Bridge 14.0 Niagara Canyon.

TYPE(S) OF INSPECTION: Magnetic Particle

TEST DETAILS: MAGNETIC PARTICLE

TYPE: Wet Visible		METHOD: Yoke	
PARTICLE BRAND: Ardrex	PRODUCT NO.: 8031	CURRENT: AC	MT INSTRUMENT: Parker B-300
PARTICLE COLOUR: Black		MT INSTRUMENT S/N: see "APPENDIX"	CAL DUE: see "APPENDIX"
SUSPENSION: Oil		BLACKLIGHT S/N: ---	MAKE: ---
CONTRAST PAINT: Ardrex	PRODUCT NO.: 8901W	LIGHTING EQUIPMENT: ---	
MAG TIME (SECONDS): 20	DEMAG REQUIRED?: No	LIGHT METER S/N: ---	CAL DUE: ---
		LIGHT INTENSITY: ---	

THE TECHNIQUE HAS BEEN DEMONSTRATED OVER A PAINTED SURFACE: Yes

SURFACE CONDITION: As ground

SURFACE TEMPERATURE: 57°C/135°F to 316°C/600°F

RESULTS: (Imperial)

The following components on Bridge 14.0 Niagara Canyon were tested using the wet visible magnetic particle method. At several locations only part of the component was accessible to be tested. All of the following components were found to be acceptable at the time of inspection. No rejectable indications noted.

Components were numbered from 0-35 starting from the south end. Right and Left sides of the bridge (looking north) were designated using an R or an L. They were also labelled as Upper (U), Lower (L) and Middle (M).

TABLE 1

Location	Description	Result
Right Upper 4 - Upper 5	Top chord reinforcement plate - eight (8) welds total	MT OK
Right Upper 7	Eyebar end	MT OK
Right Lower 14	Inside Eyebar end	MT OK
Right Lower 14	Outside Eyebar end	MT OK
Right Upper 14	Hanger	MT OK
Right Lower 16 - Upper 17	Diagonal end attachment	MT OK
Right Upper 17 - Lower 18	Diagonal end attachment	MT OK
Right Upper 29	Eyebar end	MT OK
Right Lower 35	Rocker Bearing	MT OK
Left Upper 0 - Upper 1	Turnbuckle	MT OK
Left Upper 7	Eyebar end	MT OK
Left Upper 9	Eyebar end	MT OK
Left Lower 16	Inside Eyebar end	MT OK
Left Lower 16	Outside Eyebar end	MT OK
Left Upper 18 - Lower 17	Turnbuckle on diagonal	MT OK
Left Upper 18 - Lower 19	Turnbuckle on diagonal	MT OK
Left Upper 22	Eyebar end	MT OK
Left Upper 30	Eyebar end	MT OK
Left Upper 30- Upper 31	Top chord reinforcement plate - eight (8) welds total	MT OK
Left Upper 34 - Lower 35	Turnbuckle	MT OK

Photo 1:

Overview of the rocker bearing tested on the Right Lower side at pin 35. MT OK.



Photo 2:

Overview of a typical turnbuckle tested. This one (1) on the Right side Upper 17 to Lower 18 diagonal support. MT OK.



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CLIENT REPRESENTATIVE:

TECHNICIAN: (Signature on original)

PRINT NAME: B. McIntosh

1st Technician
CGSB/SNT Level II CWB 1
CGSB Registration No. 11008

2nd Technician

	TOTAL HOURS	S.I.	O.I.	SHIFT
1ST TECHNICIAN:				Day <input type="checkbox"/>
2ND TECHNICIAN:				PM <input type="checkbox"/>
KILOMETRES:		OTHER CHARGES: YES <input type="checkbox"/> NO <input type="checkbox"/>		

Photo 3:

Overview of a typical Eyebar end tested. This one (1) on the Right Lower side at Pin 14 on the outside of the bridge. MT OK.



Photo 4:

Overview of the bottom Hanger tested on the Right upper side at Middle Pin 14. MT OK.



Photo 5:

Overview of a partial eyebar tested including the centre plate at Right Upper 7. MT OK.



Photo 6:

Eight (8) welds tested on the reinforcement plate on upper chord Right Upper 4 to Right Upper 5.





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**NDT, Inspection and Materials Engineering
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**ASSOCIATED ENGINEERING
COMOX, BC**

ATTENTION: DALE B. HARRISON

BRIDGE 39.3

OCTOBER 17, 18 & 24, 2011

SCOPE OF SERVICES: The agreement of Acuren to perform services extends only to those services specifically provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested inspection of specific equipment provided for in writing and the preparation of reports or similar documents. Any descriptions, statements, comments or expressions made reflect the opinion or observations of the Acuren examiner based solely upon data available at the time, and are not intended, nor can they be construed, as representations or warranties as to the actual circumstances. Acuren does not assume any responsibilities of the owner/operator, and the owner/operator retains complete responsibility for all engineering, repair and use decisions.

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To: ASSOCIATED ENGINEERING
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COMOX, BC
V9M 3M7

PAGE: 1

DATE: Oct. 17, 18 & 24, 2011

TIME: ---

ACUREN JOB #: 6057420

P.O.: ---

WORK LOCATION: On Site

ATTENTION: **DALE B. HARRISON**

ACCEPTANCE

PROJECT: Bridge 39.3

STANDARD: Client's information

REV./DATE: ---

PROCEDURE #: UT-0017

REV./DATE: Apr 07

ITEM(S) TESTED: Various components as per Client

TECHNIQUE #: ---

REV./DATE: ---

PART #: ---

MATERIAL: Carbon steel

THICKNESS: varied

SCOPE: Ultrasonic testing of pins and magnetic particle testing of various components on the bridge as directed by client.

TYPE(S) OF INSPECTION: Magnetic Particle; Ultrasonic

RESULTS: (Imperial)

ULTRASONIC TESTING

In total, thirty-one (31) pins were tested ultrasonically on the 39.3 Cowichan River Bridge. See Table 1 below for complete list and results. The pins range in length from approximately 15"-40". No test pins were provided as reference and the instrument was initially calibrated for distance using an IIW block. A lower pin was tested, in situ, and measured with a tape measure to confirm length. The amplitude on the instrument was adjusted until the back wall signal was at 80% full screen height. This amplitude (76DB) was used as a reference level for the rest of the pins. Scanning was performed at 6DB above reference level.

The pin's surface condition varied between each location. At some locations, the surface condition was extremely rough, mostly machine marks from installation. Where necessary and accessible a power grinder with grinding stone was used to provide an appropriate surface for testing. Other pin ends had a convex geometry with an inverted dimple in the centre making probe coupling difficult. Where possible the pins were read from both ends.

A note on the instrument's settings; Although the frequency of the available probe used was 2.25MHz the frequency on the instrument was set to 1.00MHz this provided a cleaner signal, in most cases, due to the material being tested. In addition, the filter settings were set to match the actual frequency of the probe used, this provided a cleaner signal, and is recommended in the Epoch XT user manual; "Due to the shifting of the frequency spectrum in most materials, it might be necessary to adjust filter settings to maximize instrument performance".

Pins were numbered from 0-12 starting from the south end. Right and Left sides of the trusses (looking north) were designated using an R or an L. There are four (4) trusses in total. They are labelled as follows, Eastern outside Truss "A", Eastern inside "D", Western outside "B" and Western inside "C". See the diagram in Photo 1 for clarification. The pins were also labelled as Upper (U), Lower (L) and Floor Pins.

TABLE 1: PINS UT INSPECTED AND LOCATION

Truss Letter	Pin Location	Column Number	Results
A	Lower	0	100% back wall.
B	Lower	0	100% back wall.
C	Lower	0	100% back wall.
D	Lower	0	100% back wall.
C	Upper - hip joint	1	100% back wall.
C	Upper - hanger	1	100% back wall.
D	Upper	2	100% back wall.
C	Lower	4	100% back wall.
D	Lower	4	100% back wall.
A	Lower	6	100% back wall.
B	Lower	6	100% back wall.
A	Upper	6	100% back wall.
B	Upper	6	100% back wall.
D	Lower	6	100% back wall.
D	Upper	6	100% back wall.
C	Upper	8	100% back wall.
C	Upper	9	100% back wall.
B	Upper	10	100% back wall.
C	Upper	10	100% back wall.
C	Upper - hip joint	11	100% back wall.
C	Upper - hanger	11	100% back wall.
D	Upper - hip joint	11	100% back wall.
D	Upper - hanger	11	100% back wall.
A	Lower	12	100% back wall.
B	Lower	12	100% back wall.
C	Lower	12	100% back wall.
D	Lower	12	100% back wall.
A-D	Lower Floor Pin	1	100% back wall.
B-C	Lower Floor Pin	1	100% back wall.
A-D	Lower Floor Pin	11	100% back wall.
B-C	Lower Floor Pin	11	100% back wall.

MAGNETIC PARTICLE TESTING

As requested, several areas and components were magnetic particle tested. See Table 2 below for the full scope and results of the testing, as well as the photos for more details.

Please note: Several inherent defects were noted throughout the bridge. Seam-like anomalies were noted running the length of four (4) of the upper chords. These "seams" run the entire length of upper chords and are very uniform in appearance. They were flagged as cracks on a previous visual inspection but after investigation and

magnetic particle testing it was determined that they are inherent defects from manufacturing. See photos for details (Photos 6-15).

Columns were numbered from 0-12 starting from the south end. Right and Left sides of the trusses (looking north) were designated using an R or an L. There are four Trusses in total. They are labelled as follows, Eastern outside Truss "A", Eastern inside "D", Western outside "B" and Western inside "C". See the diagram (Figure 1) for clarification. The areas were also labelled as Upper (U) or Lower (L). For example, A-L-0 is "A" Truss, Lower, and Column 0.

TABLE 2: COMPONENTS TESTED WITH MAGNETIC PARTICLE

Location	Description	Results
A-L-0	Eyebar end	MT Ok.
B-L-0	Eyebar end	MT Ok.
C-L-0	Eyebar end	MT Ok.
D-L-0	Eyebar end	MT Ok.
D-L-9 - D-U-11	Eyebar on diagonal	MT Ok.
A-L-12	Eyebar end	MT Ok.
B-L-12	Eyebar end	MT Ok.
C-L-12	Eyebar end	MT Ok.
D-L-12	Eyebar end	MT Ok.
A-L-6 (outside)	Eyebar end	MT Ok.
B-L-6 (outside)	Eyebar end	MT Ok.
C-U-6 - D-U-6	Crossbar clevis - left	MT Ok.
C-U-6 - D-U-6	Crossbar clevis - right	MT Ok.
D-L-4 - Left side	Turnbuckle including threads	2x2" crack indications on turnbuckle collar. These two areas were ground out at the client's request. Starting thickness of collar approximately 1.400" excavated to 0.960" before cracks were removed. Two areas of cracking noted in threads.
D-L-4 - Right side	Turnbuckle	2" crack indication
C-L-4 Right side	Turnbuckle including threads	1 ½ " crack indication and two areas of cracking in threads.
C-L-4 Left side	Turnbuckle	1" crack indication
D-L-5 - Left side	Turnbuckle	2x 1" crack indication
D-L-5 Right side	Turnbuckle	1" intermittent indication
D-U-5 to L-4	Upper Turnbuckle left	1" crack indication
D-U-5 to L-7	Upper Turnbuckle left	1" crack indication
D-U-6	Turnbuckle	MT Ok.

Photo 1:

Detail of Bridge 39.3 looking north showing the Truss labelling system.

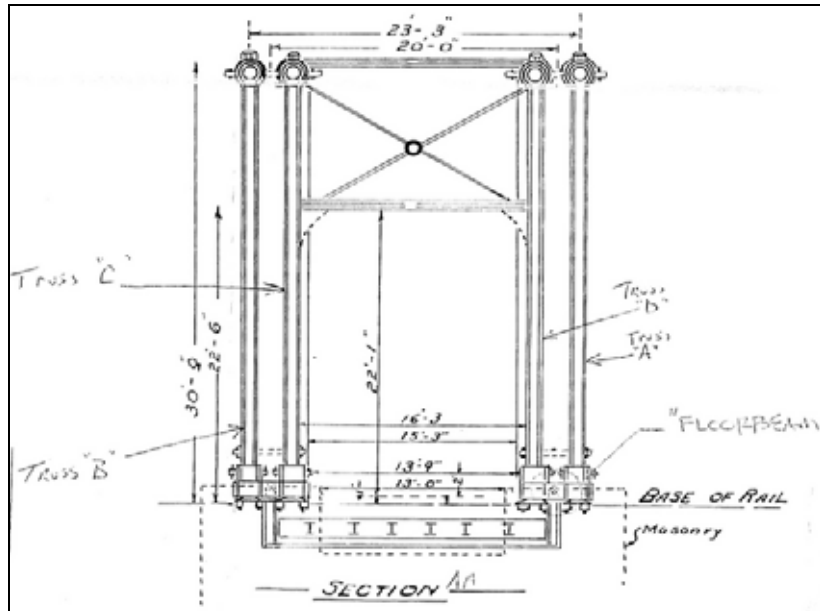


Photo 2:

Lower pin on Truss "D" used as reference.



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CLIENT REPRESENTATIVE:

TECHNICIAN: (Signature on original)

PRINT NAME: B. McIntosh

1st Technician

CGSB/SNT Level II CWB 1
CGSB Registration No. 11008

2nd Technician

TOTAL HOURS

S.T.

O.T.

SHIFT

1ST TECHNICIAN:

Day ☒

2ND TECHNICIAN:

PM ☐

KILOMETRES:

OTHER CHARGES: YES ☐ NO ☐

Photo 3:

Screen shot of results. See previous comments about optimization of the instruments settings.



Photo 4:

Overview to show location of floor pins.



Photo 5:

Typical screen shot of floor pin.



Photo 6:

Seam noted on top chord between Columns U9-U10. Seen elsewhere throughout bridge looking just as uniform.



Photo 7:

Magnetic particle testing showed no evidence of cracks propagating from the seam.



Photo 8:

Excessive pack rust noted on lower cross brace at Column 10.



Photo 9:

Typical cracking seen in six (6) of the turnbuckles tested. This one (1) on "D" Truss, Lower Column 4 right side.



Photo 10:

Close up showing the crack indication on one side of the collar of turnbuckle D-L-4-Right



Photo 11:

Overview of cracking on D-L-5-Left.



Photo 12:

Close up of D-L-5-Left showing an intermittent crack indication.

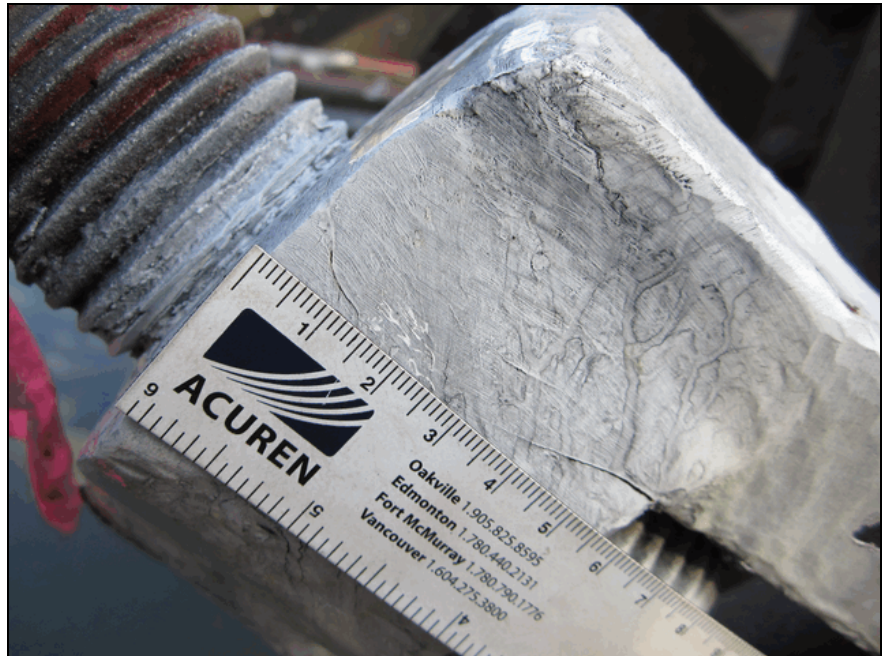


Photo 13:

Indications noted in CL4- Right side threads.



Photo 14:

Crack indications noted on CL4- Right. On the underside



Photo 15:

Crack indications noted in the threads on DL4-Left side.



Photo 16:

Upper turnbuckle tested at D-U-6 (inside) - MT Ok.





TEST DETAILS: MAGNETIC PARTICLE

TYPE: Wet Visible				METHOD: Yoke			
PARTICLE BRAND:	Ardrox	PRODUCT NO.:	8031	CURRENT:	AC	MT INSTRUMENT:	Parker B-300
PARTICLE COLOUR:	Black			MT INSTRUMENT S/N:	see "APPENDIX"	CAL DUE:	see "APPENDIX"
SUSPENSION:	Oil			BLACKLIGHT S/N:	---	MAKE:	---
CONTRAST PAINT:	Ardrox	PRODUCT NO.:	8901W	LIGHTING EQUIPMENT:	---		
MAG TIME (SECONDS):	20	DEMAG REQUIRED?:	No	LIGHT METER S/N:	---	CAL DUE:	---
				LIGHT INTENSITY:	---		
THE TECHNIQUE HAS BEEN DEMONSTRATED OVER A PAINTED SURFACE:				Yes			
SURFACE CONDITION:				As ground			
				SURFACE TEMPERATURE:			
				57°C/135°F to 316°C/600°F			

TEST DETAILS: ULTRASONIC

TYPE: Flaw Detection				METHOD: Contact			
INSTRUMENT:	Panametrics	MODEL:	Epoch XT	S/N:	see "APPENDIX"	CAL DUE:	see "APPENDIX"
CAL. BLOCK:	IIW	S/N:	see "APPENDIX"	CABLE-TYPE:	Coaxial	LENGTH:	see "APPENDIX"
CAL. BLOCK:	---	S/N:	---	COUPLANT:	UTX		
CAL. BLOCK:	---	S/N:	---	SPECIAL EQUIP.:	---		

TRANSDUCER MANUFACTURER & TECHNIQUE DETAILS:

	TEST ANGLE	PROBE TYPE	FREQUENCY (MHz)	SERIAL NUMBER	PROBE Ø	TRANSFER VALUE	TEST FROM	REFERENCE REFLECTOR	REFERENCE		SCAN SENSITIVITY	RANGE
									dB	% FSH		
1	0°	GE	2.25	022LDX	1"	0	Surface	Backwall	76	100	+6DB	50"
SURFACE CONDITION:				As ground								
				SURFACE TEMPERATURE:								
				0°C/32°F to 120°C/250°F								



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Richmond, BC, Canada V7A 4V4
www.acuren.com

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Fax: 604.274.7235

**NDT, Inspection and Materials Engineering
a Rockwood Company**



**ASSOCIATED ENGINEERING
COMOX, BC**

ATTENTION: DALE B. HARRISON

BRIDGE 47.9

OCTOBER 20, 2011

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NONDESTRUCTIVE EXAMINATION REPORT

To: ASSOCIATED ENGINEERING
1994 COMOX AVENUE
COMOX, BC
V9M 3M7

PAGE: 1
TIME: ---

DATE: October 20, 2011

ACUREN JOB #: 605-7420

P.O.: ---

WORK LOCATION: On Site

ATTENTION: **DALE B. HARRISON**

PROJECT: Bridge 47.9

ACCEPTANCE

STANDARD: Client's information REV./DATE: ---

PROCEDURE #: UT-0017

REV./DATE: Apr 07

ITEM(S) TESTED: Various Components as per Client

TECHNIQUE #: ---

REV./DATE: ---

PART #: ---

MATERIAL: Carbon steel

THICKNESS: varied

SCOPE: Ultrasonic testing of pins and Magnetic Particle testing of various components on the bridge as directed by client.

TYPE(S) OF INSPECTION: Magnetic Particle; Ultrasonic

RESULTS: (Imperial)

Ultrasonic Testing

In total, ten (10) pins were tested ultrasonically on the 47.9 Sable River Bridge. See Table 1 below for complete list and results. The pins range in length from approximately 15"- 40". No test pins were provided as reference and the instrument was initially calibrated for distance using an IIW block. A lower pin was tested, in situ, and measured with a tape measure to confirm length. The amplitude on the instrument was adjusted until the back wall signal was at 80% full screen height. This amplitude (72.5DB) was used as a reference level for the rest of the pins. Scanning was performed at 6DB above reference level.

The pin's surface condition varied between each location. At some locations, the surface condition was extremely rough, mostly machine marks from installation. Where necessary and accessible a power grinder with grinding stone was used to provide an appropriate surface for testing. Other pin ends had a convex geometry with an inverted dimple in the centre making probe coupling difficult. Where possible the pins were read from both ends.

A note on the instrument's settings; Although the frequency of the available probe used was 2.25MHz the frequency on the instrument was set to 1.00MHz. This provided a cleaner signal, in most cases, due to the material being tested. In addition, the filter settings were set to match the actual frequency of the probe used, this provided a cleaner signal, and is recommended in the Epoch XT user manual; "Due to the shifting of the frequency spectrum in most materials, it might be necessary to adjust filter settings to maximize instrument performance" (Photo 1).

Pins were numbered from 0-9 starting from the south end. Right and Left sides (looking north) were designated using an R or an L. The pins were also labelled as Upper (U), and Lower (L). All pins inspected found to be acceptable.

TABLE 1: PINS UT INSPECTED AND LOCATION.

Location	Number	Results
Left Lower	0	80 % back wall
Left Lower	9	80 % back wall
Left Upper	1	80 % back wall
Left Lower	1	80 % back wall
Left Lower	4	80 % back wall
Right Lower	0	80 % back wall
Right Lower	9	80 % back wall
Right Upper	1	80 % back wall
Right Lower	9	80 % back wall
Right Lower	4	80 % back wall

Magnetic Particle Testing

As requested, several areas and components were magnetic particle tested. See Table 2 below for the full scope and results of the testing, as well as the photos for more details (Photo 2-8).

Columns were numbered from 0-9 starting from the south end. Right and Left sides (looking north) were designated using an R or an L. Upper and Lower areas more with a U or an L. Eye bars and the Queen Post Trusses are numbered from Left to Right. Several eye bars were only partially accessible so were tested accordingly.

TABLE 2: LOCATION AND DESCRIPTION OF THE MAGNETIC PARTICLE TESTING

Location	Description	Results
Right Lower 1	#4 Eyebar end	MT Ok
Left Lower 8 to Lower 9	#4 Eyebar end	MT Ok
Right Lower 4 to Right Lower 3	#4 Eyebar end	MT Ok
Left Lower 1	#1 Eyebar end	MT Ok
Right Lower 7 to Lower 8	#4 Eyebar end	MT Ok
Right Lower 8 to Lower 9	#4 Eyebar end	MT Ok
Left Lower 7 to Lower 8	#4 Eyebar end	MT Ok
Left Lower 7 to Lower 8	#1 Eyebar end	MT Ok
Left Lower 3 to Lower 4	Turnbuckle on #3 Queen Post Truss	3" crack indication- see photos
Left Lower 6 to Lower 7	Turnbuckle on #3 Queen Post Truss	MT Ok
Right Upper 4 to Lower 5	Turnbuckle on Diagonal	3x 1" cracks, 2 on turnbuckle on in threads - see photos.
Right Upper 5 to Lower 6	Turnbuckle on Diagonal	MT Ok

Photo 1:

Screen shot showing typical inspection results. This one from Left side Upper pin number 4.



Photo 2:

Overview of Bridge 47.9.



SCOPE OF SERVICES: The agreement of Acuren to perform services extends only to those services specifically provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested inspection of specific equipment provided for in writing and the preparation of reports or similar documents. Any descriptions, statements, comments or expressions made reflect the opinion or observations of the Acuren examiner based solely upon data available at the time, and are not intended, nor can they be construed, as representations or warranties as to the actual circumstances. Acuren does not assume any responsibilities of the owner/operator, and the owner/operator retains complete responsibility for all engineering, repair and use decisions.

STANDARD OF CARE: In performing the services provided, Acuren shall use the degree of care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren, and all other warranties are expressly disclaimed. In the event of any breach of this warranty, Acuren's sole and exclusive obligation will be to correct or re-perform the deficient service or, at Acuren's option, to refund the amount paid for the deficient service.

LIMITATIONS OF LIABILITY: Nothing in this agreement shall be construed to mean that Acuren assumes any liability on account of injury to persons or property, including death, except and only to the extent those directly caused by the willful or negligent misconduct of Acuren in the context of performing the requested services. In no event shall Acuren's aggregate liability for any reason, in connection with any claim asserted, exceed the amount paid for the services in question. Acuren shall not be held responsible or liable for any loss, damage or delay caused by accidents, strikes, fires, floods, or other circumstances or causes beyond Acuren's control, including actions taken or not taken by the owner/operator or other third parties. In no event shall Acuren be liable for indirect, incidental, special, punitive, or consequential damages including, without limitation, damages relating to reputation, lost profits, goodwill, downtime, loss of use, business interruption or other economic loss.

CLIENT REPRESENTATIVE:

TECHNICIAN: (Signature on original)

PRINT NAME: B. McIntosh

1st Technician

CGSB/SNT Level II CWB 1
CGSB Registration No. 11008

2nd Technician

TOTAL HOURS

S.T.

O.T.

SHIFT

1ST TECHNICIAN:

Day ☒

2ND TECHNICIAN:

PM ☐

KILOMETRES:

OTHER CHARGES: YES ☐ NO ☐

Photo 3:

Overview of a Queen Post Truss.



Photo 4:

Overview of Turnbuckle Lower 3 to Lower 4 on Queen Post Truss #3.



3" crack
indication
found here

Photo 5:

Close up of 3" crack found on Turnbuckle Lower 3 to Lower 4 on Queen Post Truss #3.



Photo 6:

Overview of Right Upper 4 to Lower 5 Turnbuckle on diagonal.

Photo 7

Photo 8



Photo 7:

1" crack indication noted in the upper portion of the turnbuckle on the diagonal at Right Upper 4 to Lower 5.



Photo 8:

Two (2) crack indications, approximately 1" each, noted in the lower portion of the turnbuckle and in the threads on the diagonal at Right Upper 4 to Lower 5.





ASSOCIATED ENGINEERING

Bridge 47.9

Page 7

TEST DETAILS: MAGNETIC PARTICLE

TYPE: Wet Visible				METHOD: Yoke			
PARTICLE BRAND:	Ardrox	PRODUCT NO.:	8031	CURRENT:	AC	MT INSTRUMENT:	Parker B-300
PARTICLE COLOUR:	Black			MT INSTRUMENT S/N:	see "APPENDIX"	CAL DUE:	see "APPENDIX"
SUSPENSION:	Oil			BLACKLIGHT S/N:	---	MAKE:	---
CONTRAST PAINT:	Ardrox	PRODUCT NO.:	8901W	LIGHTING EQUIPMENT:	---		
MAG TIME (SECONDS):	20	DEMAG REQUIRED?:	No	LIGHT METER S/N:	---	CAL DUE:	---
				LIGHT INTENSITY:	---		

THE TECHNIQUE HAS BEEN DEMONSTRATED OVER A PAINTED SURFACE: Yes

SURFACE CONDITION: As ground

SURFACE TEMPERATURE: 57°C/135°F to 316°C/600°F

TEST DETAILS: ULTRASONIC

TYPE: Flaw Detection				METHOD: Contact			
INSTRUMENT:	Panametrics	MODEL:	Epoch XT	S/N:	see "APPENDIX"	CAL DUE:	see "APPENDIX"
CAL. BLOCK:	IIW	S/N:	see "APPENDIX"	CABLE-TYPE:	Coaxial	LENGTH:	see "APPENDIX"
CAL. BLOCK:	---	S/N:	---	COUPLANT:	UTX		
CAL. BLOCK:	---	S/N:	---	SPECIAL EQUIP.:	---		

TRANSDUCER MANUFACTURER & TECHNIQUE DETAILS:

	TEST ANGLE	PROBE TYPE	FREQUENCY (MHz)	SERIAL NUMBER	PROBE Ø	TRANSFER VALUE	TEST FROM	REFERENCE REFLECTOR	REFERENCE		SCAN SENSITIVITY	RANGE
									dB	% FSH		
1	0°	GE	2.25	022LDX	1"	0	Surface	Backwall	76	100	+6DB	50"

SURFACE CONDITION: As ground

SURFACE TEMPERATURE: 0°C/32°F to 120°C/250°F

Appendix B: Field Inspection Notes

HDPG SPANS**E&N Railway**

SECTION: Victoria to Nanaimo

MILE POST #1.30

CROSSING: <u>ROAD</u>	STREAM: <u>/</u>	SPAN TYPE: <u>HDPG</u>
INSPECTION DATE: <u>10/7</u>	STREAM DEPTH: <u>/</u>	HEIGHT: <u>3.7 M</u>
LOCATION: <u>Victoria</u>	FLOW DIRECTION: <u>/</u>	LENGTH: <u>45'-0"</u>
INSPECTORS: <u>MOO, BA, BR</u>	DECK TYPE: <u>Open</u> / Ballast	RATING: <u>/</u>
NO. OF SPANS: <u>1</u>	WALKWAY: (Yes/No) <u>/</u> - E/W side	SPAN LENGTH(S): <u>45'-0"</u>
NO. OF TRACKS: <u>1</u>	HANDRAILS: (Yes/No) <u>/</u> - E/W side	

Inspection Findings:**ABUTMENT NOTES**Type of Abutment Construction = CIPSouth:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings = Yes
4. Vegetation on face/seal = Yes (See Photos)
5. Spalling = Yes (See Photos)
6. Cracking under bearings = Yes - S. EAST
7. Cracking elsewhere = Some
8. Rotation = No
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

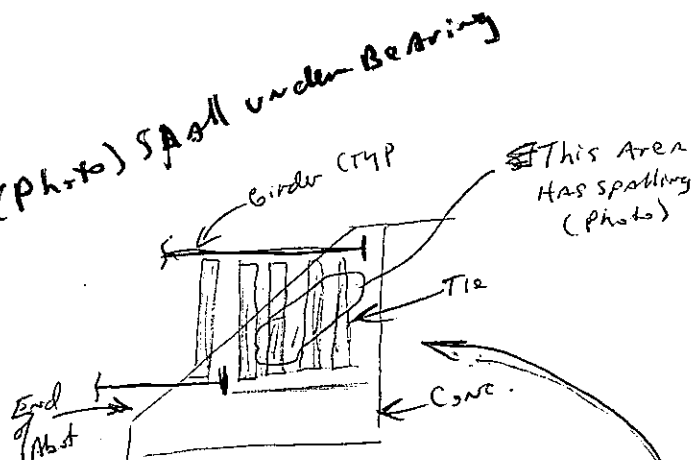
Bridge is on scow and end ties are bearing on steel beam on one side and extended abutment brick wall / slab (See Photos)

North:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings = Yes In Conc. Approach Slab (Should Clear out) Some ties sit in soil
4. Vegetation on face/seal = Yes Photos
5. Spalling = Yes Photos
6. Cracking under bearings = (Yes Spalling) (Photo)
7. Cracking elsewhere = Yes
8. Rotation = No
9. Exposed reinforcing steel = CR
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

Same As Above



BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = CIP

Type of Backwall Construction = CIP

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling = Some on Flat Surface SCW
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:North Abutment:

1. Undermining =
2. Cracks =
3. Spalling = Some on Flat Surface of SCW
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

DECK NOTES

Ballast / open deck =

Track Alignment Notes:

1. Bridge on tangent or curve =
2. Max. superelevation at midspan = N/A
3. Chord offset at midspan (distance from center of track to center of girders) = N/A

Other Notes:Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:Tie Notes:

1. Tie size = 10" wide x 18" deep x 12-3" long with bearing-bearing length = 4 1/2"
2. Tie spacing = 14"
3. Ties dapped for superelevation = NO
4. Rail plates cutting into ties = NO most have pad under tie
5. Overall tie condition = Fair to Poor Have side checks
6. Approach ties swinging = NO
7. Approx. number of bad ties = 7
8. Section loss to be used in rating flexural ties = 10%.

Other Notes:Tie Support Angles (if applicable):

1. Size of angles =
2. Overall condition =
3. Cracks evident =
4. Bearing length of tie on angle =

Other Notes:Backwall
Ties Bad need newTies have lap on Bot.
but not Req.

1/4" gap

Some need neoprene
neoprene pads under
10 Ties

No Ties sit on bottom Flange

Track Notes:

1. Rail section weight = 85 lbs
2. CWR or ~~jointed rail~~ =
3. Inner guardrail size/weight (if applicable) = Yes
4. Is line of track good = Y
5. Approaches low = North end

Other NotesWalkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:**SPAN NOTES**

Girder spacing = See Plans

Girder depth =

General steel condition = Fair for Age

Bearing Notes:

1. Type of bearings = *Photo*
2. Full bearing = *Yes*
3. Bearing corrosion = *Yes but gals photo EAST Girder S. Abut*
4. Anchor bolt condition = *- Bad not gone*
5. Expansion bearings functioning properly or frozen = ?
6. Bearings punching into abutment seat = *NO*

Other Notes:Span 1 Notes:

1. Web corrosion = *Minor*
2. Bottom flange plate corrosion = "
3. Bottom flange angle corrosion = "
4. Top flange plate corrosion = "
5. Lateral bracing system condition = *new but one was hit (see photo)*
6. Bearing stiffener condition = *Never Replaced All*
7. # of cross frames and spacing = *13' spacing - 4 total - Bridge on screen*
8. Loose rivets/bolts = *NO*
9. Welds on tension flange = *NO*
10. Any cracks observed = *NO*

Other Notes:**History:**

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

TPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 4.0

CROSSING: Road	STREAM: <input checked="" type="checkbox"/>	SPAN TYPE: TPG
INSPECTION DATE: 10/7/11	STREAM DEPTH: <input checked="" type="checkbox"/>	HEIGHT: 5.2 PLANS
LOCATION: Victoria	FLOW DIRECTION: <input checked="" type="checkbox"/>	LENGTH:
INSPECTORS: MJD	DECK TYPE: Open / <u>Ballast</u>	RATING:
NO. OF SPANS: 1	WALKWAY: (Yes/ <u>No</u> - E/W side)	SPAN LENGTH(S):
NO. OF TRACKS: 1	HANDRAILS: (Yes/ <u>No</u> - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = CIP

New Super 2010
Structure IN

South:

- ☒ 1. Evidence of scour / undermining =
- ☒ 2. Drift accumulated =
- ☒ 3. Ballast/debris on bearings =
- ☒ 4. Vegetation on face/seat =
- ☒ 5. Spalling =
- ☒ 6. Cracking under bearings =
- ☒ 7. Cracking elsewhere =
- ☒ 8. Rotation =
- ☒ 9. Exposed reinforcing steel =
- ☒ 10. Efflorescence =
- ☒ 11. Missing or fractured stones (masonry abutment) =
- ☒ 12. Missing mortar from joints (masonry abutment) =
- ☒ 13. Evidence of stone movement (masonry abutment) =

Other Notes:

New IN 2010
CIP Conc.

Looks good.

North:

- ☒ 1. Evidence of scour / undermining =
- ☒ 2. Drift accumulated =
- ☒ 3. Ballast/debris on bearings =
- ☒ 4. Vegetation on face/seat =
- ☒ 5. Spalling =
- ☒ 6. Cracking under bearings =
- ☒ 7. Cracking elsewhere =
- ☒ 8. Rotation =
- ☒ 9. Exposed reinforcing steel =
- ☒ 10. Efflorescence =
- ☒ 11. Missing or fractured stones (masonry abutment) =
- ☒ 12. Missing mortar from joints (masonry abutment) =
- ☒ 13. Evidence of stone movement (masonry abutment) =

Other Notes:

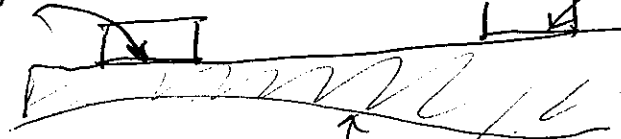
Both of Abut IS From 1911
Top cap new in 2010

Note 2-PLATES on Abutment
Are ~~new~~ new ~~Backs~~ ^{Covering} TIE ~~Backs~~
for new Abut.

New (Pre cast - Pads)
3" x 1/3" girth front
(Photos)

They did not
do enough great

Same Note



CIP Conc. 1911 (North only)

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction =

Type of Backwall Construction =

South Abutment:

(Pre Cast)

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

NEW condition

Other Notes:

North Abutment:

(Timber)

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Touching span (Photos)
(Not notched)

Other Notes:

DECK NOTES

Ballast open deck =

Track Alignment Notes:

1. Bridge on tangent or curve =
2. Max. superelevation at midspan = N/A
3. Chord offset at midspan (distance from center of track to center of girders) = N/A

Other Notes:

ALL new 2010

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

See PLANS

Other Notes:

Tie Notes:

1. Tie size = ____ wide x ____ deep x ____ long with bearing-bearing length = ____
2. Tie spacing =
3. Ties dapped for superelevation =
4. Rail plates cutting into ties =
5. Overall tie condition =
6. Approach ties swinging =
7. Approx. number of bad ties =

ALL Good NEW In 2010

Other Notes:

Track Notes:

1. Rail section weight = 85 lbs
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) = yes
4. Is line of track good = y
5. Approaches low = N

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

- Girder spacing =
Girder depth =
Floorbeam spacing =
Floorbeam depth =
Stringer spacing =
Stringer depth =
General steel condition =

Bearing Notes:

1. Type of bearings =
2. Full bearing =
3. Bearing corrosion =
4. Anchor bolt condition =
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat =

Other Notes:

Girder Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Floorbeam Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

AM new in 2019
All good condition
Have Plans

Stringer Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

All new
Ins 2010
Good Condition

Knee Brace Notes:

1. Corrosion =
2. Cracks in connection angles =
3. Loose/missing rivets =
4. Accident damage =

Other Notes:

History:

- Original construction year = 1911 - North Abutment
- Summary of bridge updates = 2010 - New South Abutment + Superstructure

Recommended Work:

ITEM #
1

RECOMMENDED WORK

BRIDGE SKETCHES (AS REQUIRED)

TPG SPANS

10F4

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 4.5

CROSSING: Street	STREAM: Stream	SPAN TYPE: TPG
INSPECTION DATE: 10/7	STREAM DEPTH:	HEIGHT:
LOCATION: Victoria	FLOW DIRECTION:	LENGTH:
INSPECTORS: MJD	DECK TYPE: Open / <u>Ballast</u>	RATING:
NO. OF SPANS: 1	WALKWAY: (Yes/ <u>No</u> - E/W side)	SPAN LENGTH(S):
NO. OF TRACKS: 1	HANDRAILS: (Yes/ <u>No</u> - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = CIP

South:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings =
4. Vegetation on face/seat =
5. Spalling =
6. Cracking under bearings = No
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

North:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings =
4. Vegetation on face/seat =
5. Spalling =
6. Cracking under bearings = Small crack (Photo)
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

EAST Bearings & WEST Bearings
NE wing wall (Photo)

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = CIP

Type of Backwall Construction = CIP

South Abutment:

1. Undermining =
2. Cracks = Minor Cracks
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

North Abutment:

1. Undermining =
2. Cracks = Yes some on North end See Photo
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

DECK NOTES

Open deck = No

Track Alignment Notes:

1. Bridge on tangent or curve = No
2. Max. superelevation at midspan =
3. Chord offset at midspan (distance from center of track to center of girders) =

Other Notes:

Tie Notes:

1. Tie size = 8" wide x 6" deep x 8' long with bearing-bearing length =
2. Tie spacing =
3. Ties dapped for superelevation =
4. Rail plates cutting into ties = Yes & Some
5. Overall tie condition = Good to Fair
6. Approach ties swinging = OK
7. Approx. number of bad ties = 5% Bad

Other Notes:

85lb Rail

Track Notes:

1. Rail section weight = 85
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) = Yes
4. Is line of track good = Yes
5. Approaches low = OK

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

Note other spans today
100 lb

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:**SPAN NOTES**

Girder spacing =

Girder depth =

Floorbeam spacing =

Floorbeam depth =

Stringer spacing =

Stringer depth =

General steel condition = *Minor Pitting Bottom Plates (Photo)**See Plans*Bearing Notes:1. Type of bearings = *Sliding Plates*2. Full bearing = *Yes*3. Bearing corrosion = *Minor*4. Anchor bolt condition = *Missing (Girders on West side S. Abut) (Photo)*5. Expansion bearings functioning properly or frozen = *Look Fine*6. Bearings punching into abutment seat = *No*Other Notes:Girder Notes:

1. Web corrosion =

2. Bottom flange plate corrosion = *Minor Pitting (Photo)*3. Bottom flange angle corrosion = *"*4. Top flange plate corrosion = *"*

5. Lateral bracing system condition =

6. Bearing stiffener condition = *Minor Corr.*

7. # of cross frames and spacing =

8. Loose rivets/bolts =

9. Welds on tension flange =

10. Any cracks observed = *No*Other Notes:Floorbeam Notes:1. Web corrosion = *Covered in Concrete*2. Bottom flange plate corrosion = *none*3. Bottom flange angle corrosion = *"*4. Top flange plate corrosion = *Covered in Conc.*

5. Lateral bracing system condition =

6. Bearing stiffener condition =

7. # of cross frames and spacing =

8. Loose rivets/bolts =

9. Welds on tension flange =

10. Any cracks observed =

Other Notes:

Stringer Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion = *Minor*
4. Top flange plate corrosion =
5. Lateral bracing system condition = *Covered in case.*
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Knee Brace Notes:

1. Corrosion =
2. Cracks in connection angles =
3. Loose/missing rivets =
4. Accident damage =

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

BRIDGE SKETCHES (AS REQUIRED)

THRU TRUSS SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 5.2

CROSSING: Road	STREAM: <input checked="" type="checkbox"/>	SPAN TYPE: True-Girder
INSPECTION DATE: 10/7/11	STREAM DEPTH: <input checked="" type="checkbox"/>	HEIGHT:
LOCATION: Victoria	FLOW DIRECTION: <input checked="" type="checkbox"/>	LENGTH:
INSPECTORS: MSO, B, Bryon	DECK TYPE: Open / Ballast	RATING:
NO. OF SPANS: /	WALKWAY: (Yes/No - E/W side)	SPAN LENGTH(S):
NO. OF TRACKS: /	HANDRAILS: (Yes/No - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = C H

South:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings =
4. Vegetation on face/seat =
5. Spalling =
6. Cracking under bearings =
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

OK - good condition
newer bridge

North:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings =
4. Vegetation on face/seat =
5. Spalling =
6. Cracking under bearings =
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

OK - good condition
newer bridge

BACKWALL/WINGWALL NOTES

2 of 4

Type of Wingwall Construction = CIP

Type of Backwall Construction = CIP

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

N/A - Good Condition

North Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

N/A - Good Condition

DECK NOTES

Ballast / open deck =

Track Alignment Notes:

1. Bridge on tangent or curve =
2. Max. superelevation at midspan =
3. Chord offset at midspan (distance from center of track to center of girders) =

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

See Plans

Tie Notes:

1. Tie size = ____ wide x ____ deep x ____ long with bearing-bearing length = ____
2. Tie spacing =
3. Ties dapped for superelevation =
4. Rail plates cutting into ties =
5. Overall tie condition =
6. Approach ties swinging =
7. Approx. number of bad ties = none

Other Notes:

See Plans

Track Notes:

1. Rail section weight = 100 lbs.
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = ok
5. Approaches low = ok

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:**SPAN NOTES**

- Girder spacing =
 Girder depth =
 Floorbeam spacing =
 Floorbeam depth =
 Stringer spacing =
 Stringer depth =
 General steel condition =

Bearing Notes:

1. Type of bearings =
2. Full bearing =
3. Bearing corrosion =
4. Anchor bolt condition =
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat =

Other Notes:*Good Condition
new bridge***Girder Notes:**

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:*Good Condition
new bridge***Floorbeam Notes:**

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Stringer Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Knee Brace Notes:

1. Corrosion =
2. Cracks in connection angles =
3. Loose/missing rivets =
4. Accident damage =

Other Notes:

*Newer Bridge
good Condition*

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

BRIDGE SKETCHES (AS REQUIRED)

TPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 5.34

CROSSING: <u>Road/Island Hwy</u>	STREAM:	SPAN TYPE: <u>TPG</u>
INSPECTION DATE: <u>10/7/11</u>	STREAM DEPTH:	HEIGHT:
LOCATION: <u>Victoria</u>	FLOW DIRECTION:	LENGTH:
INSPECTORS: <u>MTO, AB, BR</u>	DECK TYPE: <u>Open / Ballast</u>	RATING:
NO. OF SPANS: <u>3</u>	WALKWAY: <u>(Yes/No - E/W side) Both</u>	SPAN LENGTH(S): <u>89', 118', 126'</u>
NO. OF TRACKS: <u>1</u>	HANDRAILS: <u>(Yes/No - E/W side) Both</u>	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = CIP

South:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings =
4. Vegetation on face/seat =
5. Spalling =
6. Cracking under bearings =
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

*Minor Very
Small cracks*

*All Good
Bridge Built In 1998*

North:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings =
4. Vegetation on face/seat =
5. Spalling =
6. Cracking under bearings = N/A
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

ALL

*Good
Bridge built In 1998*

PIER #2

*WEST side top of cap has
map cracking (photo)*

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = CIP

Type of Backwall Construction = CIP

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

North Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

All on
Good Condition

DECK NOTES

Ballast / open deck =

Track Alignment Notes:

1. Bridge on tangent or curve =
2. Max. superelevation at midspan =
3. Chord offset at midspan (distance from center of track to center of girders) =

Other Notes:

See Plans

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

All good
See Plans

Tie Notes:

1. Tie size = ____ wide x ____ deep x ____ long with bearing-bearing length = ____
2. Tie spacing =
3. Ties dapped for superelevation =
4. Rail plates cutting into ties =
5. Overall tie condition =
6. Approach ties swinging =
7. Approx. number of bad ties =

Other Notes:

Track Notes:

1. Rail section weight = 100
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = ok
5. Approaches low = ok

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

Good

SPAN NOTES

- Girder spacing =
 Girder depth =
 Floorbeam spacing =
 Floorbeam depth =
 Stringer spacing =
 Stringer depth =
 General steel condition =

Span #1
 East girder touch (Photo)
 at top Flange

Bearing Notes:

1. Type of bearings =
2. Full bearing =
3. Bearing corrosion =
4. Anchor bolt condition =
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat =

Other Notes:

Good Cond.

Girder Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

All good condition

Floorbeam Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

4045

Stringer Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

good.

Knee Brace Notes:

1. Corrosion =
2. Cracks in connection angles =
3. Loose/missing rivets =
4. Accident damage =

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

BRIDGE SKETCHES (AS REQUIRED)



Associated
Engineering

GLOBAL PERSPECTIVE.
LOCAL FOCUS.

5005

Project No.: 067 7/2011

File: _____

Client: _____

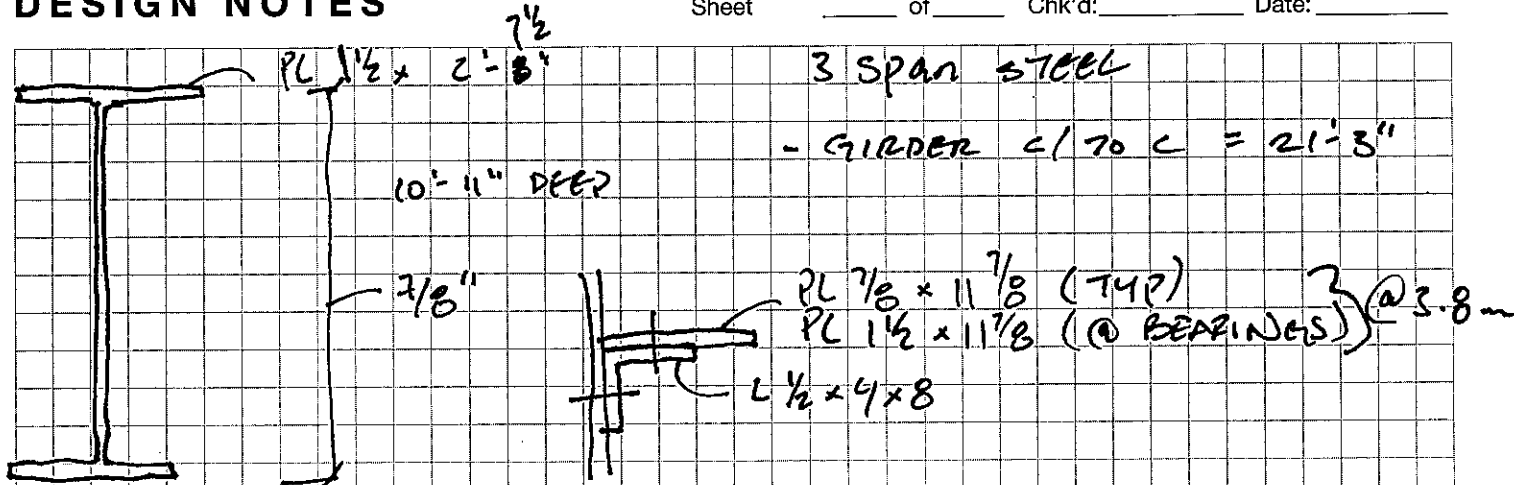
Subject: BRIDGE @ 5.34

By: _____

Date: _____

Sheet _____ of _____ Chk'd: _____ Date: _____

DESIGN NOTES





Associated
Engineering

GLOBAL PERSPECTIVE.
LOCAL FOCUS.

Project No.: OCT 7/2011 File: _____

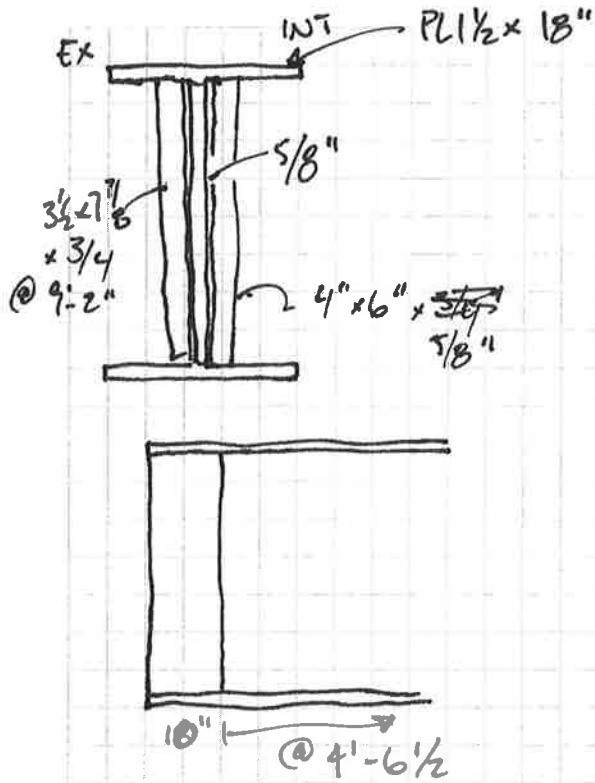
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Subject: BRIDE @ 5.45

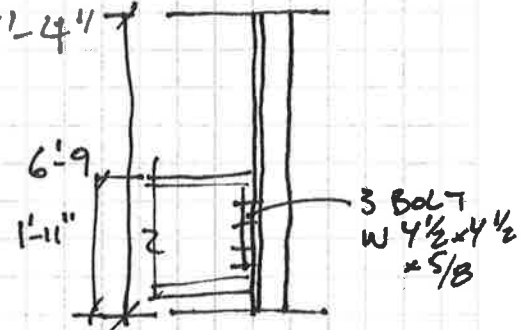
By: _____ Date: _____

Sheet _____ of _____ Chk'd: _____ Date: _____

DESIGN NOTES



LENGTH = 65'-4"



TIES = 7N x 8 DEEP @ 24"
8'-1" LONG.



Associated
Engineering

GLOBAL PERSPECTIVE.
LOCAL FOCUS.

Project No.: OCT 7' 2011 File: _____

Client: _____

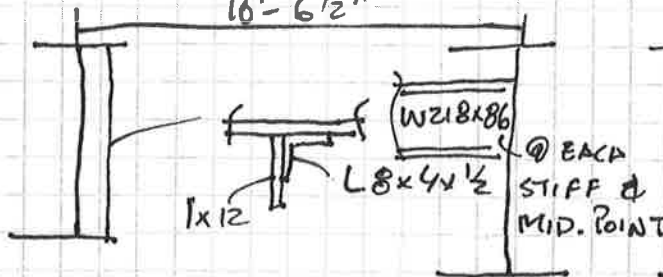
Subject: BRIDGE @ 5.8 MILE

By: _____ Date: _____

Sheet _____ of _____ Chk'd: _____ Date: _____

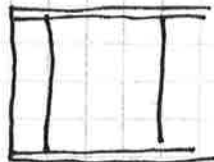
DESIGN NOTES

DECK - EXCELLENT
8" x 6" DEEP TIES @ 19" O.C
16'-6 1/2"

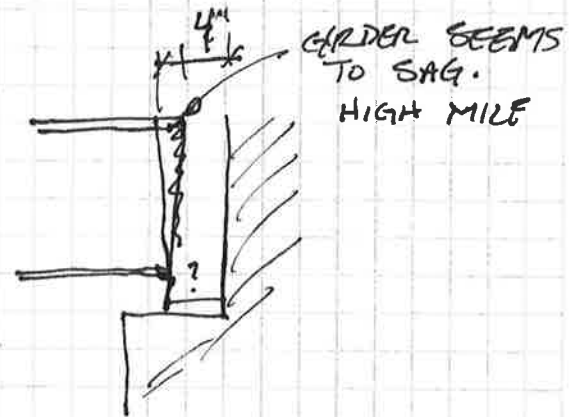


T.F = 2-1/6" x 2'-9 1/2"
5/16 PLATE
Ø 1-3
@ TOP

106' LONG



9.5 x 6.5 @ 9'-1" = PLATED
(4' 6" TYP STIFFS)

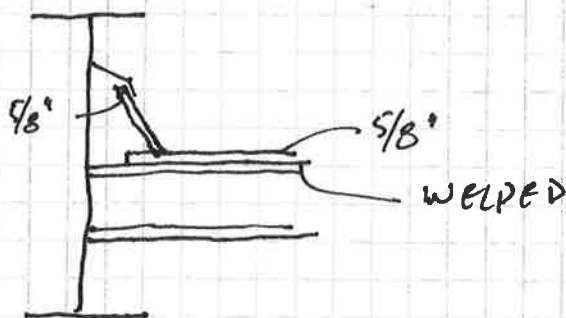


SUB-DECK - EX

DRAINS - EX

ABUT - EX

BEARINGS - EX



DECK TRUSS SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST #

14.0

CROSSING: Niagara Canyon	STREAM:	SPAN TYPE: Cantilever Truss
INSPECTION DATE: 10/11/11	STREAM DEPTH:	HEIGHT: 246 ft
LOCATION:	FLOW DIRECTION:	LENGTH: 529'-0"
INSPECTORS: mjd/mfb	DECK TYPE: Open / Ballast	RATING:
NO. OF SPANS: 3	WALKWAY: (Yes/No - E/W side)	SPAN LENGTH(S): 0
NO. OF TRACKS: 1	HANDRAILS: (Yes/No - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = Masonry

South:

1. Evidence of scour / undermining = No
2. Drift accumulated = No
3. Ballast/debris on bearings = No
4. Vegetation on face/seat = No
5. Spalling = No
6. Cracking under bearings = No
7. Cracking elsewhere = No
8. Rotation = No
9. Exposed reinforcing steel = No
10. Efflorescence = No
11. Missing or fractured stones (masonry abutment) = No
12. Missing mortar from joints (masonry abutment) = No
13. Evidence of stone movement (masonry abutment) = No

Other Notes:

North:

1. Evidence of scour / undermining = No
2. Drift accumulated = No
3. Ballast/debris on bearings = No
4. Vegetation on face/seat = No
5. Spalling = No
6. Cracking under bearings = No
7. Cracking elsewhere = No
8. Rotation = No
9. Exposed reinforcing steel = No
10. Efflorescence = No
11. Missing or fractured stones (masonry abutment) = No
12. Missing mortar from joints (masonry abutment) = No
13. Evidence of stone movement (masonry abutment) = No

Other Notes:

Overall bridge
Condition is good
- very little corrosion.
A lot of loose bracing,
diagonals - have worked off
vertical planes.

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = *Masonry*

Type of Backwall Construction = *Masonry*

South Abutment:

1. Undermining = *No*
2. Cracks = *No*
3. Spalling = *No*
4. Leaning = *No*
5. Exposed reinforcing steel = *No*

Other Notes:

North Abutment:

1. Undermining = *No*
2. Cracks = *No*
3. Spalling = *No*
4. Leaning = *No*
5. Exposed reinforcing steel = *No*

Other Notes:

DECK NOTES

Open deck = *Yes*

Track Alignment Notes:

1. Bridge on tangent or curve = *tangent*
2. Max. superelevation at midspan = *0*
3. Chord offset at midspan (distance from center of track to center of girders) = *0*

Other Notes:

Tie Notes:

1. Tie size = *8* wide x *10* deep x *14'* long with bearing-bearing length = *68"*
2. Tie spacing = *13 1/2"*
3. Ties dapped for superelevation = *Yes* - location on span 3 - max 1" of dabbat.
4. Rail plates cutting into ties = *No*
5. Overall tie condition = *Good*
6. Approach ties swinging = *No*
7. Approx. number of bad ties = *105 (Span 1), 215 (Span 2), 77 (Span 3)*

Other Notes:

Track Notes:

1. Rail section weight = *85lb*
2. CWR or jointed rail = *jointed* - joints located on bridge
3. Inner guardrail size/weight (if applicable) = *85lb* - rail length limited to 72 ft
4. Is line of track good = *Yes*
5. Approaches low = *No* - gaud timbers

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge = *No*
2. Walkway condition = *No*
3. Refuge bays on bridge = *Yes* Midspan 51' 0" 0" 0"
4. Refuge bay condition = *Good*

Other Notes:

TRUSS MEMBER NOTES

General steel condition = *Surface corrosion*

Bearing Notes:

1. Type of bearings = *Fixed & Expansion*
2. Full bearing = *Yes*
3. Bearing corrosion = *Surface*
4. Anchor bolt condition = *OK*
5. Expansion bearings functioning properly or frozen = *Appears to be some movement*
6. Bearings punching into abutment seat = *No*

Other Notes:

Top Chord Notes:

1. Section loss at critical locations = *Surface corrosion*
2. Adequate bracing = *Yes*
3. Cracks at chord splices = *No*
4. Wear in web pin holes = *None visible*
5. Fasteners condition = *Good*

Notes (by nodal location established in field):

Some bend loading on chords - mainly thru chord posts 3-6 on tower 3.

All trusses exhibit loose diagonal bracing & show wear at X-joint locations.


Bottom Chord Notes:

1. Section loss at critical locations = *Surface corrosion - some pitting at gussets under pins on end trusses.*
2. Eyebars tightness = *Appear tight*
3. Pack rust at eyebars = *No*
4. Eyebars section loss = *No*
5. Pins worn, scored or corroded = *No*
6. Chord cracks = *No*
7. Condition of splices = *Good*

Notes (by nodal location established in field):

Some cracked splices at various pin locations - some clamped

Top & bot chords have strengthening plates welded to webs

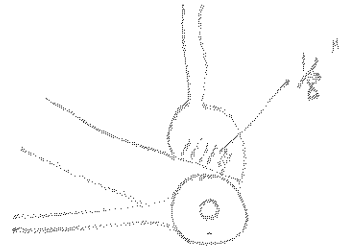
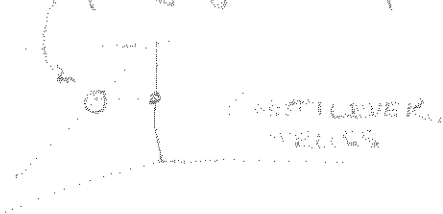
 *plate added & stitch welded + riveted.*

Hanger Notes:

1. Section loss in body above floorbeam connection = *No - except cable hanger (sp 2) outside*
2. Cracks at upper truss connection, lower row of fasteners = *No*
3. Stress concentrations in the form of welds, edge corrosion = *No* *End end 1/8" corrosion*
4. Accident damage = *No*

Notes (by nodal location established in field):

lost retial West side Nth end - nut is not fully engaged on pin - appears tight.



Diagonal Notes:

1. Section loss = *Surface*
2. Compression/tension members = *Good*
3. End connection condition = *Good*
4. Tight (if tension members) = *Most diagonals loose*

Notes (by nodal location established in field):

Post Notes:

1. Alignment of post = *Good*
2. Internal bracing = *Good*
3. Member end condition = *Good*

Notes (by nodal location established in field):

End Post Notes:

1. Alignment of post = *Good*
2. Internal bracing = *Good*
3. Section loss = *Surface corrosion*

Notes (by nodal location established in field):



TRUSS BRACING NOTES

Top Laterals Notes:

1. Section loss = *Surface*
2. Connection condition = *Good*
3. Rod system components = *Good*

Notes (by nodal location established in field):

Bottom Laterals Notes:

1. Section loss = *Surface corrosion*
2. Connection condition (truss/stringers) = *Good*
3. Rod system components = *Some loose & some section loss at X-bracing locations*

Notes (by nodal location established in field):

Some bottom bracing rotated on Span 2 (cantilever span)

Sway Frame Notes:

1. Section loss = *Surface corrosion*
2. Connection condition (top chords/verticals) = *Good*
3. Fatigue cracks = *No*
4. Rod system components = *Good, some appear loose.*

Notes (by nodal location established in field):

*Cracked timber on Span 3
Int. Lateral Panel 2 outside*

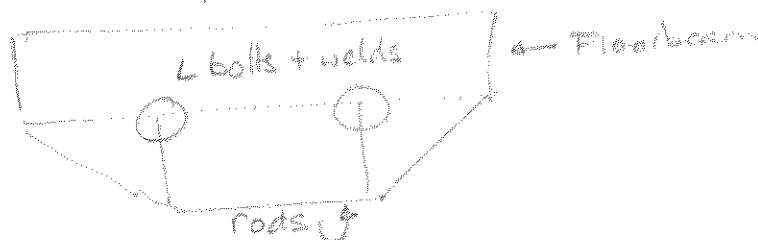
FLOOR SYSTEM NOTES

- Floorbeam spacing = *—*
Floorbeam depth = *—*
Stringer spacing = *— see pg 2*
Stringer depth = *—*
General steel condition = *Good - surface corrosion*

Floorbeam Notes:

1. Web corrosion = *Surface*
2. Bottom flange plate corrosion = *Surface*
3. Bottom flange angle corrosion = *Surface*
4. Top flange plate corrosion = *Surface*
5. Lateral bracing system condition = *Good*
6. Bearing stiffener condition = *Good*
7. # of cross frames and spacing = *—*
8. Loose rivets/bolts = *No*
9. Welds on tension flange = *Yes*
10. Any cracks observed = *No*

Other Notes:



Stringer Notes:

1. Web corrosion = *Surface*
2. Bottom flange plate corrosion = *Surface*
3. Bottom flange angle corrosion = *Surface*
4. Top flange plate corrosion = *Surface*
5. Lateral bracing system condition = *---*
6. Bearing stiffener condition = *---*
7. # of cross frames and spacing = *---*
8. Loose rivets/bolts = *No*
9. Welds on tension flange = *No*
10. Any cracks observed = *No*

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

- fiber-optic cable on west side of bridge

MILE 14.0

00721/11

BT. DBH

SUPPLEMENTARY INSPECTION.

BT DBH

RIGHT TRUSS

DIAGONAL

1 2 3 4

U15-U16 ✓ LOOSER X X

U18-L9 ✓ ✓ ✓ LOOSER

LEFT TRUSS

BOTTOM CHORD

L21-L18 - SOUNDED X X X

OKAY

L17-L16 ✓ LOOSER X X

DIAGONALS

U19-U18 LOOSER ✓ X X

U18-L17 LOOSER ✓ X X

U17-L16 LOOSER ✓ X X

U16-L17 ✓ LOOSER X X

NOTE

1. DIAGONALS NUMBERED LEFT TO

RIGHT FACING NORTH

NOV 3/11 (1)

MIKE 14.0 - SUPPLEMENTARY DBM SW.

EAST TRUSS - EYEBARS

DIAGONALS

	#1	#2	#3	#4
L0-U1	26		VERY	
	=	=	TIGHT	=
L1-U2	← APPROX EQUAL			→
L2-U3		← SLIGHTLY		→
		← TIGHTER		→
L3-U4	31	28	25	26
L4-U5	30	26	29	29
L5-U6	28	30	34	32
L6-U7	← ALL TIGHT - CLAMPED			→
		← MID SPAN		→
L8-U7	←	TIGHT		→
L9-U8	←	OKAY		→
L10-U9	←	OKAY		→
L11-U10	←	OKAY		→
L12-U11	← INSIDE LITRE			→
		LOSER		→
L13-U12	←	OK		→

L0-U1

L1-U2

L2-U3

L3-U4

L4-U5

L5-U6

L6-U7

L8-U7

L9-U8

L10-U9

L11-U10

L12-U11

L13-U12

NOTE: EYEBARS NUMBERED FROM LEFT TO RIGHT

CYCLES/10 SECS

NOV 3/11 (2)

MIKE 14.0

DBM SW.

EAST TRUSS - EYEBARS

TOP CHORD

	#1	#2	#3	#4
U12-U13	- OK	-	X	X
U13-U14	- OK	-	X	X
HANGER				
U14-L14	- OK	-	X	X
DIAGONAL				
U15-L16	VERY TIGHT	35	X	X
U16-L17	35	29	X	X
COUNTERS				
U17-L18	- OK	-	X	X
U18-L17	- OK	-	X	X
DIAGONAL				
U19-L18	LOOSE		X	X
	50%			
U20-L19	- TIGHT	-	X	X

U12-U13

U13-U14

HANGER

U14-L14

DIAGONAL

U15-L16

U16-L17

COUNTERS

U17-L18

U18-L17

DIAGONAL

U19-L18

U20-L19

NOV 3/11 ③

MILE 14.0

EAST TRUSS - EYEBARS

#1 #2 #3 #4

HANGER

U21-L21 - TIGHT - X X

TOP CHORD

U21-U22 - TIGHT - X X

U22-U23 - TIGHT - X X

DIAGONAL

U23-L22 35 35 32 30

U24-L23 OUTSIDE SLIGHTLY

U25-L24 7@5sec 27 28 28

(#1 LOOSE @ TOP PIN)

U26-L25 11@5sec 27 27 31

(#1 LOOSE @ TOP PIN)

U27-L26 - TIGHT -

#4 LATERALLY UN-RESTRAINED - FREE TO ROTATE LATERALLY

④

NOV 3/11

MILE 14.0

EAST TRUSS

DIAGONALS

#1 #2 #3 #4

U28-L27 - TIGHT -

U28-L29 - TIGHT -

U29-L30 R17

U30-L31 - TIGHT - SLIGHTLY

U31-L32 LOOSE

U31-L32 LOOSE

(#1 LATERALLY UN-RESTRAINED

A7 TOP & BOTTOM PINS)

U32-L33 - TIGHT -

U33-L34 - TIGHT -

U34-L35 - TIGHT -

NOV 3/11 (5)

MILE 14.0

- 1) OBSERVE UNDER LOAD - 2-GR9
- 2) SPEED - WALKING @ 10MPH
- 3) OBSERVED BEARINGS @ NORTH ABUTMENT
- 4) INITIALLY 2 LOCOMOTIVES
 - a) STOPPED ON NORTH END
 - b) " IN CENTRE SPAN
 - c) " ON SOUTH END

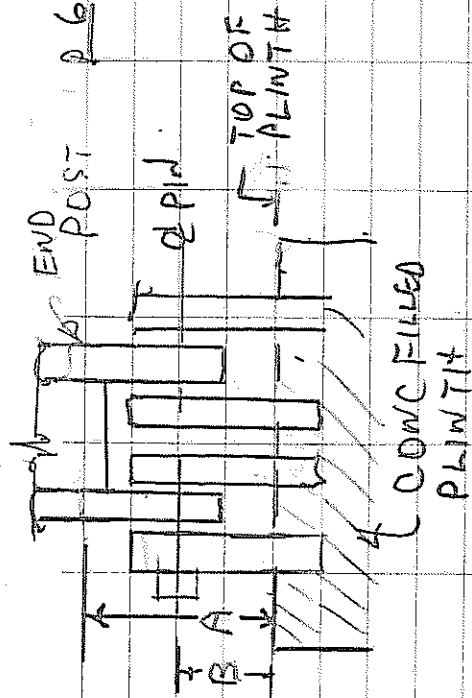
OBSERVATIONS

N-W BEARING

	Initial	4(a)	4(b)	4(c)
A	38 1/8"	37 7/8"	38 1/8"	38 7/8"
B	18"	17 3/4"	18"	

N-E BEARING

	Initial	4(a)	4(b)	4(c)
A	35 1/4"	35"	35 1/4"	35 1/4"
B	19"	18 3/4"	19"	



MILE 14.0 - ABUTMENT 7 BEARING

NOTE

TOOK VIDEO CLIP OF LOCOMOTIVES CROSSING BRIDGE.

OBSERVED TRUSS DEFLECTION FROM DECK LEVEL - EST 1 1/2"

LOOKING INTO SUN - NOT EASY TO PHOTOGRAPH

DPG SPANS: STEEL BENTS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 14.9

CROSSING: <i>Arbutus Canyon</i>	STREAM:	SPAN TYPE:
INSPECTION DATE: <i>10/11/11</i>	STREAM DEPTH:	HEIGHT: <i>183 ft</i>
LOCATION:	FLOW DIRECTION:	LENGTH: <i>463 ft</i>
INSPECTORS: <i>mja/mFB</i>	DECK TYPE: <i>Open / Ballast</i>	RATING:
NO. OF SPANS: <i>6</i>	WALKWAY: (Yes/No) - <i>EW</i> side	SPAN LENGTH(S): <i>2-50'</i>
NO. OF TRACKS: <i>1</i>	HANDRAILS: (Yes/No) - <i>EW</i> side	<i>2-75'</i>
		<i>2-186'</i>

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = *Conc*

South:

1. Evidence of scour / undermining = *No*
2. Drift accumulated = *No*
3. Ballast/debris on bearings = *Some Ballast & debris*
4. Vegetation on face/seat = *Some moss*
5. Spalling = *No*
6. Cracking under bearings = *No*
7. Cracking elsewhere = *No*
8. Rotation = *No*
9. Exposed reinforcing steel = *No*
10. Efflorescence = *No*
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

North:

1. Evidence of scour / undermining = *No*
2. Drift accumulated = *No*
3. Ballast/debris on bearings = *Some Ballast & debris*
4. Vegetation on face/seat = *Moss*
5. Spalling = *No*
6. Cracking under bearings = *No*
7. Cracking elsewhere = *No*
8. Rotation = *No*
9. Exposed reinforcing steel = *No*
10. Efflorescence = *No*
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction =

Cone

Type of Backwall Construction =

Cone

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

North Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

STEEL TOWER BENT NOTES

Tower 1:

1. Single or double bent = Double
2. Tower general condition = Good

Misc. Notes (braces, plumbness, etc):

Tower 1, Base of Legs:

1. SW Base Notes =
2. SE Base Notes =
3. NW Base Notes (if double bent) =
4. NE Base Notes (if double bent) =

Not needed.

Tower 1, Top of Legs:

1. SW Top Notes =
2. SE Top Notes =
3. NW Top Notes (if double bent) =
4. NE Top Notes (if double bent) =

All good cond.

Surface corrosion - some debris from vegetation at bays

Tower 2:

1. Single or double bent = Double
2. Tower general condition = Good

Misc. Notes (braces, plumbness, etc):

Tower 2, Base of Legs:

1. SW Base Notes =

7

Bent Notes:

- Did not see bents 1 & 3 due to accessibility

Bent 2

- Bottom horizontal bracing pitted - 20-30% section loss
- bearings exhibit moderate corrosion
- lattice at bottom truss should be replaced in ten years
- one diagonal member is bent due to tree impact

2. SE Base Notes =
3. NW Base Notes (if double bent) =
4. NE Base Notes (if double bent) =

} Not reached

Tower 2, Top of Legs:

1. SW Top Notes =
2. SE Top Notes =
3. NW Top Notes (if double bent) =
4. NE Top Notes (if double bent) =

} All good cond.
Surface corrosion only

Tower 3:

1. Single or double bent =
2. Tower general condition =

Single
Good

Misc. Notes (braces, plumbness, etc):

Tower 3, Base of Legs:

1. SW Base Notes =
2. SE Base Notes =
3. NW Base Notes (if double bent) =
4. NE Base Notes (if double bent) =

} Not reached

Tower 3, Top of Legs:

1. SW Top Notes =
2. SE Top Notes =
3. NW Top Notes (if double bent) =
4. NE Top Notes (if double bent) =

} All good cond.
Surface Corrosion

Tower 4:

1. Single or double bent =
2. Tower general condition =

Misc. Notes (braces, plumbness, etc):

Tower 4, Base of Legs:

1. SW Base Notes =
2. SE Base Notes =
3. NW Base Notes (if double bent) =
4. NE Base Notes (if double bent) =

Tower 4, Top of Legs:

1. SW Top Notes =

2. SE Top Notes =
3. NW Top Notes (if double bent) =
4. NE Top Notes (if double bent) =

DECK NOTES

Ballast / open deck =

Track Alignment Notes:

1. Bridge on tangent or curve =
2. Max. superelevation at midspan =
3. Chord offset at midspan (distance from center of track to center of girders) =

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 13' wide x 13 1/2" deep x 10" long
2. Tie spacing = 15"
3. Ties dapped for superelevation = yes
4. Rail plates cutting into ties =
5. Overall tie condition =
6. Approach ties swinging =
7. Approx. number of bad ties = Span 1 (25), Span 2 (20), Span 3 (28), Span 4 (25),

Other Notes:

Span 5 (42), Span 6 (2)

Track Notes:

1. Rail section weight = 85# rail
2. CWR or jointed rail = jointed
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good =
5. Approaches low =

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge = no
2. Walkway condition = N/A
3. Refuge bays on bridge = yes
4. Refuge bay condition = handrail needs to

Other Notes:

ie replaced

Superelevation

Span	SE
1	— 1 3/4"
2	— 1 3/4" 1 3/4"
3	— 1 3/4" 1 3/4"
4	— 1 3/4" 3/4"
5	— 1 3/4" 1/4"
6	— 0"

SOUTH ABUT.

DAP = 1/2" DAP (EAST) ← USE FOR
= 2" DAP (WEST) ROUTING

Track Alignment

Location	← Girders to G. Rail
S. Abut	22 3/4"
Span 1	41"
Pier 1	24"
Span 2	30 1/2"
Pier 2	23 1/2"
Span 3	40 1/2"
Pier 3	24 1/2"

↓ changed for current

SPAN NOTES

Girder spacing = 10'
Girder depth =
General steel condition = Good

Span 1 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Span 2 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Span 3 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Span 4 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Some debris on btm flg & gusset
Some pitting
no loss inside

General Notes:

low side some pitting $\frac{1}{16}$ " x $\frac{1}{8}$ ". Edge loss same. Over 50% flange width.
1985, East DP6. were metallized.
- rivet heads replaced (East girders only)

Span 1:

- West Girder @ S. Abut:
- anchor bolt butt rod. 11'
- bearing appears to be working
- only one anchor bolt per bearing (per design)

- St.iffeners are pitted at thim-
base (4" x 1/2" typ.)
bottom lateral gusset plates have some pitting, typ.
- top lateral bracing have been replaced more recently than bottom.

- deep pitting on top gusset plates (some replaced already)
- the rest should be also

See photocopy of section loss

Good
Some pitting
First 3 bays
pitting in gusset
Panel 2 top
hole thru gusset
@ S. End

new stiffeners
some loss - upto

$\frac{1}{16}$ " x $\frac{1}{8}$ "
 $\frac{1}{16}$ " x $\frac{1}{8}$ "

Surface

out 1/16" in 1/4 x 3" midspan

Good - some stiffener select have 1/8" loss to first node line

Surface

outside 1/16 x 2"

Surface

Good

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

No

Span 5 Notes:

1. Web corrosion = *Surface*
2. Bottom flange plate corrosion = *Surface*
3. Bottom flange angle corrosion = *midspan*
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Span 6 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Span 7 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

inside 1/16" x 1/2" width - near deck inside
N. Abut:
1/8" x 75% width

- anchor bolt on W. Girder is
broken off completely

- bottom lateral gusset plates minor
pitting

- top chord brace

- minor corrosion

- not as bad as span 11

- anchor bolt at east girder is
broken off completely.

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

MILE 14.9

DEC 24/11

DBH

SUPPLEMENTARY INSPECTION

NOTES - DBH.

TIMBER TIES - COUNTED
FROM SOUTH END

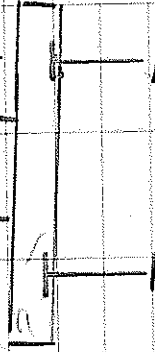
TREATED 49

UNTREATED - 30 10x14 @ 16
2 1/2" DAP.

TREATED - ?

CURVE

150' x 3'-6"



PARTIALLY

3 ROTTEN + 1 BROKEN TIE GROUPED
NEAR NORTH END

3 BROKEN TIES WITHIN 20 TIES
AT NORTH END.

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 18.2

CROSSING:	STREAM: YES	SPAN TYPE: SINGLE - TIMBER
INSPECTION DATE: WED OCT 5	STREAM DEPTH: —	HEIGHT: 20" 3-12" X 20" STRINGERS @ 5'-0"
LOCATION: SVI-ML 18.2	FLOW DIRECTION: —	LENGTH: 171.3"
INSPECTORS: MT/KB	DECK TYPE: Open Ballast	RATING: —
NO. OF SPANS: 1	WALKWAY: (Yes/No - E/W side)	SPAN LENGTH(S): 14'-7"
NO. OF TRACKS: 1	HANDRAILS: (Yes/No - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = TIMBER 16"X16" ON 12"X12" BLOCKING

South:

1. Evidence of scour / undermining = —
2. Drift accumulated = —
3. Ballast/debris on bearings = —
4. Vegetation on face/seal = YES
5. Spalling = — N/A
6. Cracking under bearings = — N/A
7. Cracking elsewhere = — N/A
8. Rotation = —
9. Exposed reinforcing steel = N/A
10. Efflorescence = N/A
11. Missing or fractured stones (masonry abutment) = N/A
12. Missing mortar from joints (masonry abutment) = N/A
13. Evidence of stone movement (masonry abutment) = N/A

Other Notes:

North:

1. Evidence of scour / undermining = —
2. Drift accumulated = —
3. Ballast/debris on bearings = —
4. Vegetation on face/seal = YES
5. Spalling = N/A
6. Cracking under bearings = N/A
7. Cracking elsewhere = NA
8. Rotation = —
9. Exposed reinforcing steel = N/A
10. Efflorescence = N/A
11. Missing or fractured stones (masonry abutment) = N/A
12. Missing mortar from joints (masonry abutment) = N/A
13. Evidence of stone movement (masonry abutment) = N/A

Other Notes:

NORTH ABUTMENT 12"X12" - 1" to 2" surface rot on west side

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = *N/A*

Type of Backwall Construction = *Timber*

South Abutment:

1. Undermining = *—*
2. Cracks = *—*
3. Spalling = *—*
4. Leaning = *—*
5. Exposed reinforcing steel = *N/A*

Other Notes:

North Abutment:

1. Undermining = *—*
2. Cracks = *—*
3. Spalling = *—*
4. Leaning = *—*
5. Exposed reinforcing steel = *N/A*

Other Notes:

DECK NOTES

Ballast / open deck = *OPEN*

Track Alignment Notes:

1. Bridge on tangent or curve = *NO*
2. Max. superelevation at midspan = *— FLAT TOEYE*
3. Chord offset at midspan (distance from center of track to center of girders) = *NO*

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = *8"* wide x *8"* deep x *10'* long with bearing-bearing length = *36"*
2. Tie spacing = *13" o/c*
3. Ties dapped for superelevation = *NO*
4. Rail plates cutting into ties = *NO*
5. Overall tie condition = *GOOD*
6. Approach ties swinging = *—*
7. Approx. number of bad ties = *1*
8. Section loss to be used in rating flexural ties = *N/A*

Other Notes:

Tie Support Angles (if applicable):

1. Size of angles =
2. Overall condition =
3. Cracks evident =
4. Bearing length of tie on angle =

Other Notes:

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS OK
5. Approaches low = NOT OBSERVED TO BELOW

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

Girder spacing = 5'-0" o/c
Girder depth = 20"
General ~~steel~~ WOOD condition = GOOD

Bearing Notes:

1. Type of bearings = WOOD ON WOOD
2. Full bearing = YES
3. Bearing corrosion = N/A
4. Anchor bolt condition = FAIR
5. Expansion bearings functioning properly or frozen = N/A
6. Bearings punching into abutment seat = NO

Other Notes:

Span 1 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 26.8

CROSSING: ROAD	STREAM: NA	SPAN TYPE: STEEL THRU GIRDER
INSPECTION DATE: OCT 5	STREAM DEPTH: NA	HEIGHT: GIRDER 3'-1"
LOCATION: SUI-M 26.8	FLOW DIRECTION: NA	LENGTH: 32'-0" C/C
INSPECTORS: MT/KB	DECK TYPE: Open / Ballast	RATING: -
NO. OF SPANS: 1	WALKWAY: (Yes/No - E/W side)	SPAN LENGTH(S): 32'-0" C/C
NO. OF TRACKS: 1	HANDRAILS: (Yes/No - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = Masonry

South:

1. Evidence of scour / undermining = -
2. Drift accumulated = -
3. Ballast/debris on bearings = YES
4. Vegetation on face/seat = YES
5. Spalling = -
6. Cracking under bearings = -
7. Cracking elsewhere = MINOR CRACKING THROUGHOUT
8. Rotation = -
9. Exposed reinforcing steel = N/A
10. Efflorescence = MINOR
11. Missing or fractured stones (masonry abutment) = NO
12. Missing mortar from joints (masonry abutment) = YES - MIDDLE OF ABUTMENT
13. Evidence of stone movement (masonry abutment) = NOT EVIDENT

Other Notes:

- PATCH REPAIR EVIDENT ON SE WALL

North:

1. Evidence of scour / undermining = -
2. Drift accumulated = -
3. Ballast/debris on bearings = YES
4. Vegetation on face/seat = YES
5. Spalling = -
6. Cracking under bearings = -
7. Cracking elsewhere = MINOR CRACKING THROUGHOUT
8. Rotation = -
9. Exposed reinforcing steel = N/A
10. Efflorescence = VERY MINOR SIGNS
11. Missing or fractured stones (masonry abutment) = NO
12. Missing mortar from joints (masonry abutment) = NO
13. Evidence of stone movement (masonry abutment) = NO

Other Notes:

- PATCH REPAIR EVIDENT ON BOTH SIDES OF ABUTMENT

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = MASONRY

Type of Backwall Construction = MASONRY

South Abutment:

1. Undermining = —
2. Cracks = MINOR
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes:

-CRASH BARRIER/GUIDE ADDED

North Abutment:

1. Undermining = —
2. Cracks = MINOR
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes:

-CRASH BARRIER/GUIDE ADDED

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = SLIGHT SPIRAL CURVE
2. Max. superelevation at midspan = NO
3. Chord offset at midspan (distance from center of track to center of girders) = —

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 16" deep x 12'-3" long with bearing-bearing length = 6" (approx)
2. Tie spacing = 14"
3. Ties dapped for superelevation = —
4. Rail plates cutting into ties = —
5. Overall tie condition = 16 NEW = 600d → 12 old - fair
6. Approach ties swinging = —
7. Approx. number of bad ties = 5
8. Section loss to be used in rating flexural ties = 2' x 3" - varies

Other Notes: -TIES TAPERED



Tie Support Angles (if applicable):

1. Size of angles =
2. Overall condition =
3. Cracks evident =
4. Bearing length of tie on angle =

Other Notes:

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS TO BE OK
5. Approaches low = NO

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

Girder spacing = 13'-2"
Girder depth = 3 L1"
General steel condition = Good

Bearing Notes:

1. Type of bearings = STEEL BEARING R
2. Full bearing = YES
3. Bearing corrosion = - VERY LIGHT SURFACE
4. Anchor bolt condition = Good
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat =

Other Notes:

Span 1 Notes:

1. Web corrosion = light surface
2. Bottom flange plate corrosion = light surface
3. Bottom flange angle corrosion =
4. Top flange plate corrosion = light surface
5. Lateral bracing system condition = light surface - WAS PREVIOUSLY IMPACTED BY TRUCK - YIELDED
6. Bearing stiffener condition = good
7. # of cross frames and spacing = 4 - [@ 10'-2" C/C 12" deep, 3" top Flange
8. Loose rivets/bolts =
9. Welds on tension flange = FOR LATERAL BRACING COUPON
10. Any cracks observed =

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # **28.2**

CROSSING: WATER	STREAM: YES	SPAN TYPE: STEEL THRU GIRDER
INSPECTION DATE: OCT 5, 2011	STREAM DEPTH: —	HEIGHT: GIRDER 4'-3 1/2"
LOCATION: SUI-ML28-2	FLOW DIRECTION: —	LENGTH: 41'-6" C/C
INSPECTORS: MT/KB	DECK TYPE: Open / Ballast	RATING: —
NO. OF SPANS: 1	WALKWAY: (Yes/No) — E/W side	SPAN LENGTH(S): 41'-6" C/C
NO. OF TRACKS: 1	HANDRAILS: (Yes/No) — E/W side	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = **MASONRY & CONCRETE**

South:

1. Evidence of scour / undermining = **MODERATE**
2. Drift accumulated = **MINOR DRIFT**
3. Ballast/debris on bearings = **—**
4. Vegetation on face/seat = **MINOR VEG**
5. Spalling = **—**
6. Cracking under bearings = **—**
7. Cracking elsewhere = **MINOR CRACKING ON ABUTMENT**
8. Rotation = **—**
9. Exposed reinforcing steel = **N/A**
10. Efflorescence = **—**
11. Missing or fractured stones (masonry abutment) = **—**
12. Missing mortar from joints (masonry abutment) = **MINOR MORTAR MISSING**
13. Evidence of stone movement (masonry abutment) = **—**

Other Notes:

North:

1. Evidence of scour / undermining = **MODERATE**
2. Drift accumulated = **MINOR DRIFT**
3. Ballast/debris on bearings = **—**
4. Vegetation on face/seat = **MINOR VEGETATION**
5. Spalling = **—**
6. Cracking under bearings = **—**
7. Cracking elsewhere = **MINOR CRACKS SPARSELY SPACED ON ABUTMENT**
8. Rotation = **—**
9. Exposed reinforcing steel = **N/A**
10. Efflorescence = **—**
11. Missing or fractured stones (masonry abutment) = **—**
12. Missing mortar from joints (masonry abutment) = **MINOR MORTAR MISSING**
13. Evidence of stone movement (masonry abutment) = **—**

Other Notes:

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = MASONRY/CONCRETE

Type of Backwall Construction = MASONRY/CONCRETE

South Abutment:

1. Undermining = —
2. Cracks = MINOR CRACK ASSOCIATED TO MORTAR LOSS
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = N/A

Other Notes:

North Abutment:

1. Undermining = —
2. Cracks = MINOR CRACK ASSOCIATED TO MORTAR LOSS
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = N/A

Other Notes:

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = NO
2. Max. superelevation at midspan = 4 APPEARS TO BE
3. Chord offset at midspan (distance from center of track to center of girders) = NO

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 16" deep x NOT NOTED long with bearing-bearing length = 6" (approx)
2. Tie spacing = 16"
3. Ties dapped for superelevation = —
4. Rail plates cutting into ties = NO
5. Overall tie condition = Good - but 1st TIE FROM high mileage - ROTTED
6. Approach ties swinging = high mileage approach TIES swinging slightly
7. Approx. number of bad ties = 2 - TIES appear TO BE Douglas Fir
8. Section loss to be used in rating flexural ties = —

Other Notes:

Tie Support Angles (if applicable):

1. Size of angles =
2. Overall condition =
3. Cracks evident =
4. Bearing length of tie on angle =

Other Notes:

BEARING ON BOTTOM FLANGE Angles - NOT SHELF ANGLES

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS GOOD
5. Approaches low = NO

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

- Girder spacing = APPROX 13'-2"
Girder depth = 4'-3 1/2"
General steel condition = MODERATE SURFACE CORROSION

Bearing Notes:

1. Type of bearings = STEEL @
2. Full bearing = YES
3. Bearing corrosion = MINOR SURFACE CORROSION
4. Anchor bolt condition = MINOR SURFACE CORROSION
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat = NO

Other Notes:

Span 1 Notes:

1. Web corrosion = - MINOR SURFACE CORROSION
2. Bottom flange plate corrosion = - MINOR SURFACE CORROSION
3. Bottom flange angle corrosion = - MINOR SURFACE CORROSION
4. Top flange plate corrosion = - MINOR SURFACE CORROSION
5. Lateral bracing system condition = - GOOD - APPEARS TO HAVE BEEN UPGRADED - BOLTING PRESENT
6. Bearing stiffener condition = - GOOD - MINOR SURFACE CORROSION
7. # of cross frames and spacing = 4 CROSS JOISTS @ 16'-0" C/C
8. Loose rivets/bolts = NONE NOTED
9. Welds on tension flange = NONE NOTED
10. Any cracks observed = NONE NOTED

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # **28.4**

CROSSING: WATER	STREAM: YES	SPAN TYPE: STEEL THRU GIRDER
INSPECTION DATE: OCT 5, 2011	STREAM DEPTH: —	HEIGHT: GIRDER 4'-3 1/2"
LOCATION: SUI-M28.4	FLOW DIRECTION: —	LENGTH: 41'-6" C/C
INSPECTORS: MT/KB	DECK TYPE: Open Ballast	RATING: —
NO. OF SPANS: 1	WALKWAY: (Yes/No) — E/W side	SPAN LENGTH(S): 41'-6" C/C
NO. OF TRACKS: 1	HANDRAILS: (Yes/No) — E/W side	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = **MASONRY & CONCRETE**

South:

1. Evidence of scour / undermining = **moderate**
2. Drift accumulated = **—**
3. Ballast/debris on bearings = **—**
4. Vegetation on face/seat = **YES - MOSS**
5. Spalling = **—**
6. Cracking under bearings = **—**
7. Cracking elsewhere = **—**
8. Rotation = **—**
9. Exposed reinforcing steel = **N/A**
10. Efflorescence = **—**
11. Missing or fractured stones (masonry abutment) = **—**
12. Missing mortar from joints (masonry abutment) = **MINOR MORTAR LOSS**
13. Evidence of stone movement (masonry abutment) = **—**

Other Notes:

North:

1. Evidence of scour / undermining = **MODERATE**
2. Drift accumulated = **—**
3. Ballast/debris on bearings = **—**
4. Vegetation on face/seat = **YES - MOSS**
5. Spalling = **—**
6. Cracking under bearings = **YES - HAIRLINE CRACK**
7. Cracking elsewhere = **YES - HAIRLINE CRACK CONTINUES**
8. Rotation = **—**
9. Exposed reinforcing steel = **N/A**
10. Efflorescence = **—**
11. Missing or fractured stones (masonry abutment) = **—**
12. Missing mortar from joints (masonry abutment) = **MINOR MORTAR LOSS**
13. Evidence of stone movement (masonry abutment) = **—**

Other Notes:

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = MASONRY/CONCRETE

Type of Backwall Construction = MASONRY/CONCRETE

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel = N/A

Other Notes:

North Abutment:

1. Undermining =
2. Cracks = AAW HAIRLINE CRACK - SEE PHOTO
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel = N/A

Other Notes:

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = NO
2. Max. superelevation at midspan = APPEARS TO BE
3. Chord offset at midspan (distance from center of track to center of girders) = NO

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 16" deep x NOT NOTED long with bearing-bearing length = 6" (APPROX) OF BEARING
2. Tie spacing = 16" C/C
3. Ties dapped for superelevation =
4. Rail plates cutting into ties = NO
5. Overall tie condition = SOB POOR
6. Approach ties swinging =
7. Approx. number of bad ties = 16 x SOB
8. Section loss to be used in rating flexural ties = MEASURE - POOR TIES APPEAR TO HAVE HIGH ROT

Other Notes:

Tie Support Angles (if applicable): BEARING ON BOTTOM FLANGE ANGLES - NOT SHELF ANGLES

1. Size of angles = 8" x 8" x 1/4" (APPROX THICKNESS)
2. Overall condition = MODERATE SURFACE CORROSION
3. Cracks evident = NO
4. Bearing length of tie on angle = 6" APPROX

Other Notes:

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS OK
5. Approaches low = NO

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

Girder spacing = APPROX 13'-2"

Girder depth = 4'-3 1/2"

General steel condition = MODERATE CORROSION ON ALL EXPOSED STEEL
-2-3mm PITTING ON BOTTOM FLANGE

Bearing Notes:

1. Type of bearings = STEEL
2. Full bearing = YES
3. Bearing corrosion = MODERATE SURFACE CORROSION
4. Anchor bolt condition = GOOD
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat = NO

Other Notes:

Span 1 Notes:

1. Web corrosion = LOCALIZED MODERATE SURFACE CORROSION
2. Bottom flange plate corrosion = 2-3mm PITTING ON BOTTOM FLANGE PLATE - SEE PICTURE
3. Bottom flange angle corrosion = MODERATE SURFACE CORROSION
4. Top flange plate corrosion = LIGHT SURFACE CORROSION
5. Lateral bracing system condition = LIGHT SURFACE CORROSION
6. Bearing stiffener condition = LIGHT SURFACE CORROSION
7. # of cross frames and spacing = 4 CROSS JOISTS @ 10'-0" C/C
8. Loose rivets/bolts = NONE NOTED
9. Welds on tension flange = NONE NOTED
10. Any cracks observed = NONE NOTED

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

HDPG SPANS

1023

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST #130 28.60

CROSSING:	STREAM:	SPAN TYPE: HDPG
INSPECTION DATE: OCT 8/11	STREAM DEPTH: 0.5	HEIGHT:
LOCATION: SHAWIGAN	FLOW DIRECTION: EAST	LENGTH:
INSPECTORS: PH/MO	DECK TYPE: Open / Ballast	RATING:
NO. OF SPANS: 1	WALKWAY: (Yes/No - E/W side) NO	SPAN LENGTH(S):
NO. OF TRACKS: 1	HANDRAILS: (Yes/No - E/W side) X	UTILITY: 6" - FIBRE OPTIC - WEST

W

INSPECTION: LADDER

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = MASONRY

South:

1. Evidence of scour / undermining = NO
2. Drift accumulated = NO
3. Ballast/debris on bearings = YES
4. Vegetation on face/seat = SOME
5. Spalling = NO
6. Cracking under bearings = YES, SEE #11 & 12
7. Cracking elsewhere = NO
8. Rotation = NO
9. Exposed reinforcing steel = NO
10. Efflorescence = NO
11. Missing or fractured stones (masonry abutment) = EAST & WEST GIRDERS - 2nd COURSE FRACTURE
12. Missing mortar from joints (masonry abutment) = EAST GIRDER CRACK IN MORTAR - TOP 2 COURSES
13. Evidence of stone movement (masonry abutment) = NO

Other Notes:

North:

1. Evidence of scour / undermining = NO
2. Drift accumulated = NO
3. Ballast/debris on bearings = YES
4. Vegetation on face/seat = YES
5. Spalling = NO
6. Cracking under bearings = YES - UNDER WEST GIRDER - PHOTO - 3 TOP COURSES - MONITOR
7. Cracking elsewhere = NO
8. Rotation = NO
9. Exposed reinforcing steel = NO
10. Efflorescence = NO
11. Missing or fractured stones (masonry abutment) = SEE ITEM #6
12. Missing mortar from joints (masonry abutment) = NO
13. Evidence of stone movement (masonry abutment) = NO

Other Notes:

MILE 28.6

2013

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = Masonry

Type of Backwall Construction = Masonry

South Abutment:

1. Undermining =
 2. Cracks =
 3. Spalling =
 4. Leaning =
 5. Exposed reinforcing steel =
- ok Masonry Joints Need morden

Other Notes:

Need backwall ties

North Abutment:

1. Undermining =
 2. Cracks =
 3. Spalling =
 4. Leaning =
 5. Exposed reinforcing steel =
- Same as Above

Other Notes:

Need backwall ties

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = CURVE
2. Max. superelevation at midspan = 3.5"
3. Chord offset at midspan (distance from center of track to center of girders) = SEE PLANS

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 10 wide x 16 deep x 12'-8" long with bearing-bearing length = 4" 1/4" DAP @ SUPPORT
 2. Tie spacing = 15"
 3. Ties dapped for superelevation = NO
 4. Rail plates cutting into ties = NO, PADS FAIR - PHOTO
 5. Overall tie condition = POOR - FAIR
 6. Approach ties swinging =
 7. Approx. number of bad ties = 11 OF 34
 8. Section loss to be used in rating flexural ties =
- PHOTO OF BEARING LENGTH

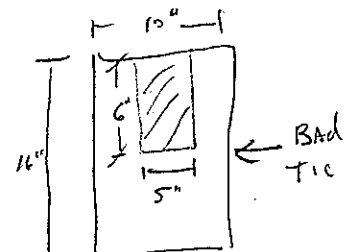
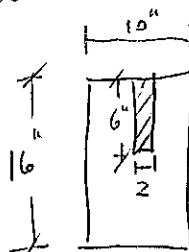
Other Notes:

Tie Support Angles (if applicable):

1. Size of angles =
2. Overall condition =
3. Cracks evident =
4. Bearing length of tie on angle =

Other Notes:

Support on Bottom Flange



301-3
Mile 28.6

Track Notes:

1. Rail section weight = 85
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = Y
5. Approaches low = N

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

Girder spacing = 13'-0"
Girder depth =
General steel condition =

Bearing Notes:

1. Type of bearings = 2 - PLATES
2. Full bearing = YES
3. Bearing corrosion = MINOR
4. Anchor bolt condition = FAIR
5. Expansion bearings functioning properly or frozen = OK PERFORMING OK
6. Bearings punching into abutment seat = NO

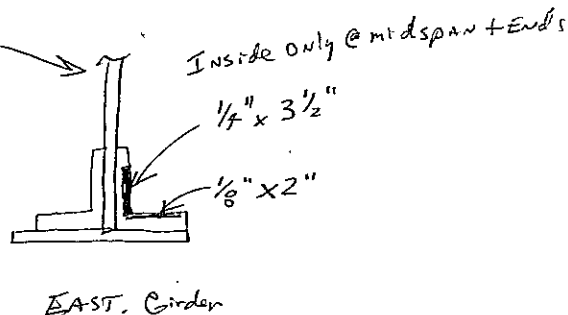
Other Notes:

Span 1 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion = YES, EAST girder
4. Top flange plate corrosion = N
5. Lateral bracing system condition =
6. Bearing stiffener condition = OK
7. # of cross frames and spacing =
8. Loose rivets/bolts = N
9. Welds on tension flange = N
10. Any cracks observed =

Other Notes:

Stiffeners All have gap or hole at bottom angle:



History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

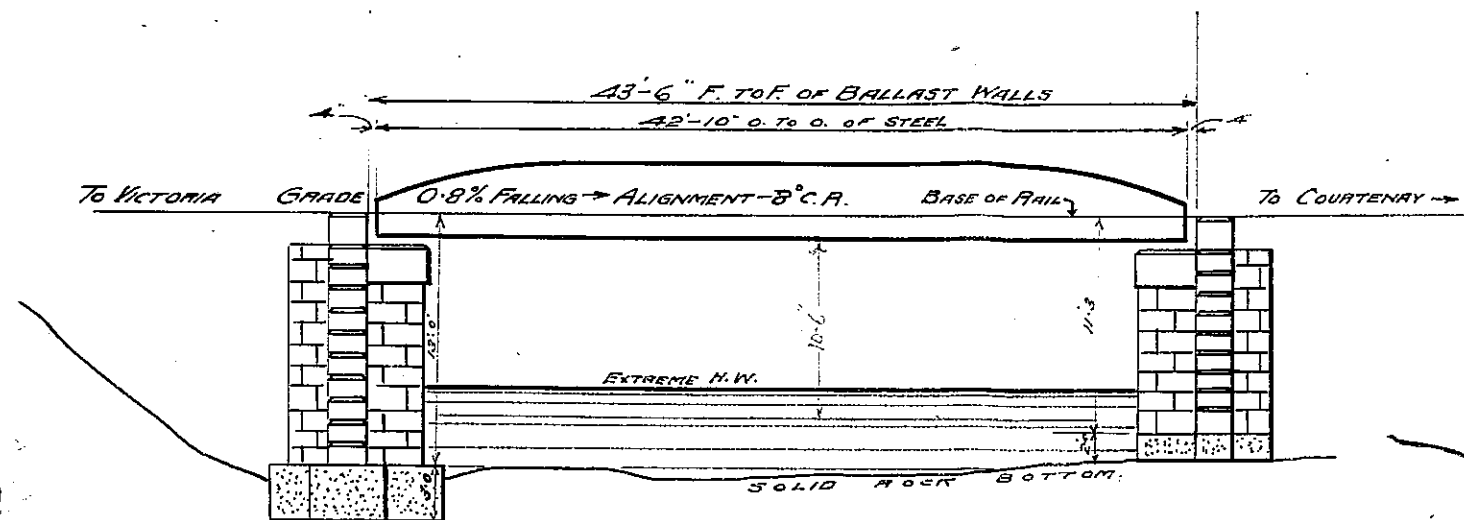
ESQUIMALT & NANAIMO RAILWAY

BRIDGE No 28-6

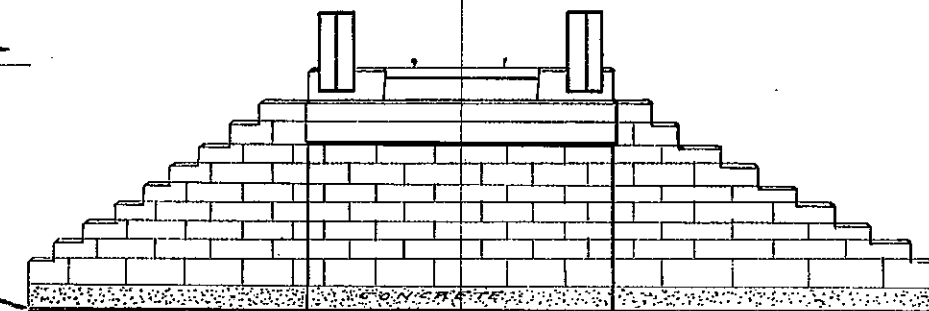
MASONRY ABUTMENTS

527

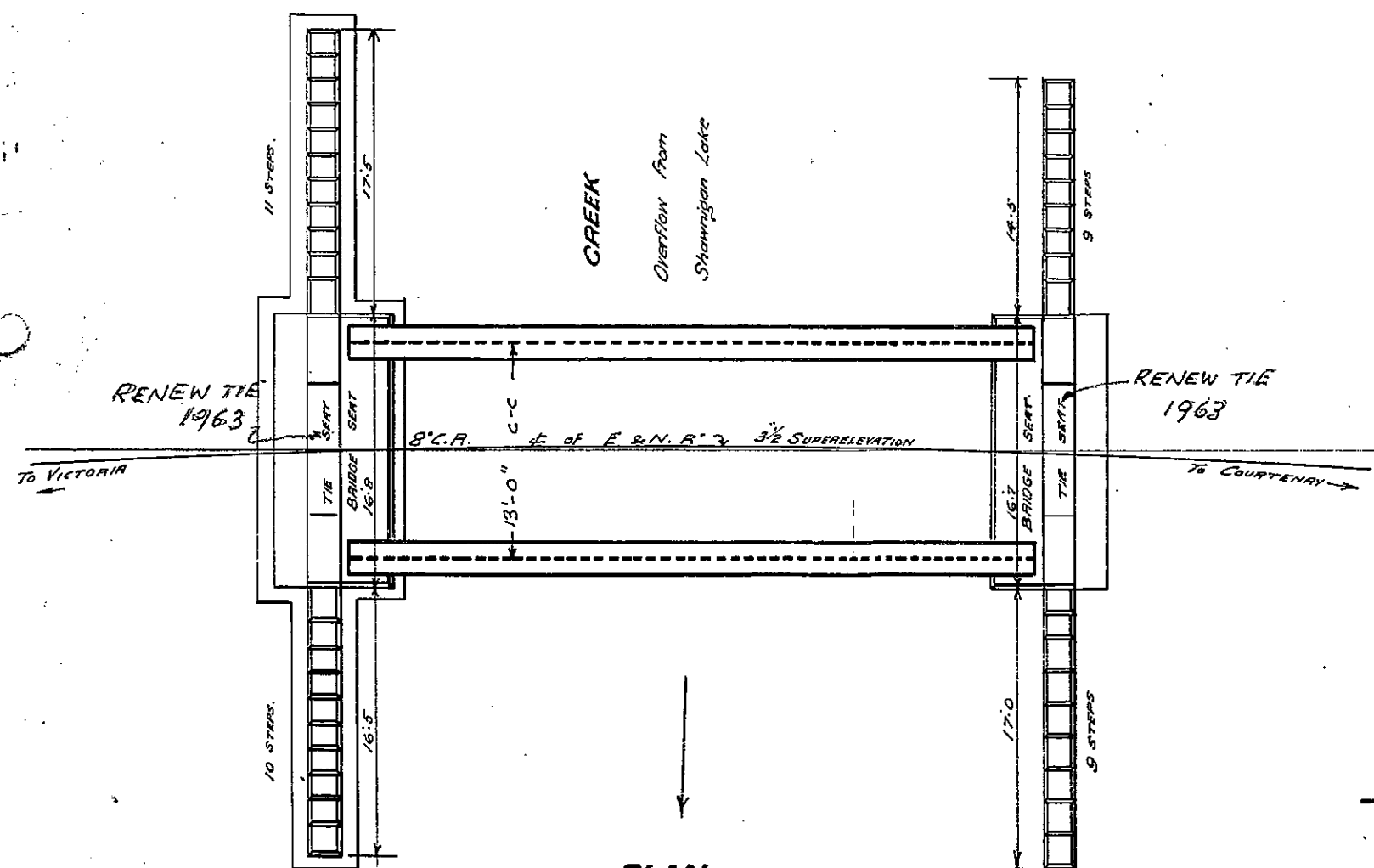
REVISED
MAR. 31ST 1938.
NOV. 26 1962.



ELEVATION



END VIEW OF NORTH ABUTMENT



PLAN

TIES - RENEW 1963 IN TRTD. & P.F.
34-10" x 16" x 13'-0" ON STEEL SPAN
2-8" x 16" x 9'-0" ON CONC. ABUTMENTS.

SCALE - 10' = 1 INCH

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # **28.6**

CROSSING:	STREAM:	SPAN TYPE:
INSPECTION DATE:	STREAM DEPTH:	HEIGHT:
LOCATION:	FLOW DIRECTION:	LENGTH:
INSPECTORS:	DECK TYPE: Open / Ballast	RATING:
NO. OF SPANS:	WALKWAY: (Yes/No - E/W side)	SPAN LENGTH(S):
NO. OF TRACKS:	HANDRAILS: (Yes/No - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = **MASONRY**

South:

1. Evidence of scour / undermining = **moderate**
2. Drift accumulated = **Minor Drift w/ channel**
3. Ballast/debris on bearings = **NO**
4. Vegetation on face/seat = **MOSS**
5. Spalling = **—**
6. Cracking under bearings = **YES**
7. Cracking elsewhere = **YES - ABUTMENT FACE**
8. Rotation = **—**
9. Exposed reinforcing steel = **N/A**
10. Efflorescence = **—**
11. Missing or fractured stones (masonry abutment) = **—**
12. Missing mortar from joints (masonry abutment) = **MINOR MORTAR LOSS**
13. Evidence of stone movement (masonry abutment) = **—**

Other Notes:

North:

1. Evidence of scour / undermining = **MODERATE**
2. Drift accumulated = **MINOR DRIFT ACCUMULATED**
3. Ballast/debris on bearings = **NO**
4. Vegetation on face/seat = **YES - MOSS**
5. Spalling = **—**
6. Cracking under bearings = **—**
7. Cracking elsewhere = **VERY SMALL 1cm CRACKS - VERY SPARSE**
8. Rotation = **—**
9. Exposed reinforcing steel = **N/A**
10. Efflorescence = **—**
11. Missing or fractured stones (masonry abutment) = **—**
12. Missing mortar from joints (masonry abutment) = **MINOR MORTAR LOSS - SPOTTY THROUGHOUT**
13. Evidence of stone movement (masonry abutment) = **—**

Other Notes:

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = MASONRY & CONCRETE

Type of Backwall Construction = MASONRY & CONCRETE

South Abutment:

1. Undermining = SIGNS OF MINOR UNDERMINING PRESENT
2. Cracks = HAIR LINE CRACK PRESENT ON FACE - LARGER CRACK UNDER BEARING
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = N/A

Other Notes:

North Abutment:

1. Undermining = SIGNS OF MINOR UNDERMINING PRESENT
2. Cracks = HAIR LINE CRACK ON FACE
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = N/A

Other Notes:

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = SPIRAL CURVE
2. Max. superelevation at midspan = N/A OBSERVED - YES
3. Chord offset at midspan (distance from center of track to center of girders) = NOT NOTED

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 16" deep x 13' long with bearing-bearing length = 12' (assuming 6" bearing)
12'-6" if c/c bearing
2. Tie spacing = 16" C/C
3. Ties dapped for superelevation = —
4. Rail plates cutting into ties = YES - COMMON
5. Overall tie condition = 100% POOR
6. Approach ties swinging = NORTH TIE ON ABUTMENT
7. Approx. number of bad ties = ALL
8. Section loss to be used in rating flexural ties = UNSURE - WOULD ASSUME 100%

Other Notes:

Tie Support Angles (if applicable):

1. Size of angles = 5" x 5" x 1/4" (APPROX)
2. Overall condition = MODERATE TO SEVERE CORROSION LOSS
3. Cracks evident = NO
4. Bearing length of tie on angle = 6"

Other Notes:

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS OK
5. Approaches low = NO

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

Girder spacing = APPROX 13'-2"

Girder depth = 4'-3 1/2"

General steel condition = MODERATE CORROSION ON ALL EXPOSED STEEL
- 2-3mm PITTING ON BOTTOM FLANGE

Bearing Notes:

1. Type of bearings = STEEL
2. Full bearing = YES
3. Bearing corrosion = MODERATE SURFACE CORROSION
4. Anchor bolt condition = GOOD
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat = NO

Other Notes:

Span 1 Notes:

1. Web corrosion = LOCALIZED MODERATE SURFACE CORROSION
2. Bottom flange plate corrosion = 2-3mm PITTING ON BOTTOM FLANGE PLATE - SEE PICTURE
3. Bottom flange angle corrosion = MODERATE SURFACE CORROSION
4. Top flange plate corrosion = LIGHT SURFACE CORROSION
5. Lateral bracing system condition = LIGHT SURFACE CORROSION
6. Bearing stiffener condition = LIGHT SURFACE CORROSION
7. # of cross frames and spacing = 4 CROSS JOISTS @ 10'-0" C/C
8. Loose rivets/bolts = NONE NOTED
9. Welds on tension flange = NONE NOTED
10. Any cracks observed = NONE NOTED

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS TO BE OK
5. Approaches low = NO

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

Girder spacing = APPROX 13'-2"

Girder depth = 4'-3 1/2"

General steel condition = WEST GIRDER IS POOR 1/8" SECTION LOSS ON BOTTOM FLANGE

Bearing Notes:

1. Type of bearings = STEEL R
2. Full bearing = YES
3. Bearing corrosion = MODERATE → SEVERE SURFACE CORROSION
4. Anchor bolt condition = FAIR - WEST → GOOD - EAST
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat = NO

Other Notes:

Span 1 Notes:

1. Web corrosion = WEST GIRDER MODERATE → SEVERE CORROSION
2. Bottom flange plate corrosion = SEVERE ON WEST - LIGHT ON EAST
3. Bottom flange angle corrosion = MODERATE TO SEVERE ON WEST - LIGHT ON EAST
4. Top flange plate corrosion = LIGHT TO MODERATE - BOTH SIDES
5. Lateral bracing system condition = LIGHT SURFACE CORROSION
6. Bearing stiffener condition = LIGHT SURFACE CORROSION
7. # of cross frames and spacing = LATERAL JOISTS @ 10' = 5
8. Loose rivets/bolts = NONE NOTED
9. Welds on tension flange = NONE NOTED
10. Any cracks observed = NONE NOTED

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # **29.8**

CROSSING: ROAD	STREAM: — N/A	SPAN TYPE: STEEL R GIRDER
INSPECTION DATE: OCT 5, 2011	STREAM DEPTH: N/A	HEIGHT: 3'-1/4" GIRDER
LOCATION: SUI-ML 29.8	FLOW DIRECTION: N/A	LENGTH: 46'-9" → 45'-9" C/C
INSPECTORS: MT/KB	DECK TYPE: Open (Ballast)	RATING: —
NO. OF SPANS: 1	WALKWAY: (Yes/No — E/W side) (No)	SPAN LENGTH(S): 45'-9" C/C
NO. OF TRACKS: 1	HANDRAILS: (Yes/No — E/W side) (No)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = **MASONRY & CONCRETE**

South:

1. Evidence of scour / undermining = **N/A**
 2. Drift accumulated = **N/A**
 3. Ballast/debris on bearings = **MINOR DRIFT**
 4. Vegetation on face/seat = **—**
 5. Spalling = **—**
 6. Cracking under bearings = **—**
 7. Cracking elsewhere = **—**
 8. Rotation = **—**
 9. Exposed reinforcing steel = **—**
 10. Efflorescence = **—**
 11. Missing or fractured stones (masonry abutment) = **—**
 12. Missing mortar from joints (masonry abutment) = **—**
 13. Evidence of stone movement (masonry abutment) = **—**
- Other Notes: **APPEARS TO BE IN GOOD CONDITION**

North:

1. Evidence of scour / undermining = **N/A**
 2. Drift accumulated = **N/A**
 3. Ballast/debris on bearings = **MINOR DRIFT**
 4. Vegetation on face/seat = **—**
 5. Spalling = **—**
 6. Cracking under bearings = **—**
 7. Cracking elsewhere = **—**
 8. Rotation = **—**
 9. Exposed reinforcing steel = **—**
 10. Efflorescence = **—**
 11. Missing or fractured stones (masonry abutment) = **—**
 12. Missing mortar from joints (masonry abutment) = **—**
 13. Evidence of stone movement (masonry abutment) = **—**
- Other Notes: **APPEARS TO BE IN GOOD CONDITION**

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = MASONRY & CONCRETE

Type of Backwall Construction = MASONRY & CONCRETE

South Abutment:

1. Undermining = —
2. Cracks = —
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes:

North Abutment:

1. Undermining = —
2. Cracks = —
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes:

CABLE TO SUPPORT BC TEL ATTACHED TO SOUTH ABUTMENT
(GIRDER BEARING SEAT)

DECK NOTES

Ballast / open deck = Ballast

Track Alignment Notes:

1. Bridge on tangent or curve = YES - SPIRAL CURVE
2. Max. superelevation at midspan = NOT NOTED
3. Chord offset at midspan (distance from center of track to center of girders) = NOT NOTED

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth = 16" - APPROX
2. Ballast retainer size = 14' WIDE, 4" BOTTOM SLAB
3. Floor plate / floor timber condition = BALLAST RETAINER SOFFIT IN GOOD CONDITION
4. Deck width = 14'

Other Notes:

Tie Notes:

1. Tie size = 8" wide x 6" deep x 8' long with bearing-bearing length = N/A
2. Tie spacing = NOT IN NOTES - @ 16" O/C SOUNDS FAMILIAR
3. Ties dapped for superelevation = —
4. Rail plates cutting into ties = OCCASIONALLY
5. Overall tie condition = 20% POOR - NON STRUCTURAL TIES
6. Approach ties swinging = —
7. Approx. number of bad ties = 20%
8. Section loss to be used in rating flexural ties = N/A

Other Notes:

Tie Support Angles (if applicable):

1. Size of angles =
2. Overall condition =
3. Cracks evident =
4. Bearing length of tie on angle =

Other Notes:

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS TO BE GOOD
5. Approaches low = NO

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

- Girder spacing = 3'-6 1/2" c/c (4911
Girder depth = 3'-1 1/4"
General steel condition = MINOR & SPOTTED SURFACE CORROSION

Bearing Notes:

1. Type of bearings = STEEL R
2. Full bearing = YES
3. Bearing corrosion = LIGHT SURFACE CORROSION
4. Anchor bolt condition = GOOD
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat = NO

Other Notes:

Span 1 Notes:

1. Web corrosion = light surface
2. Bottom flange plate corrosion = light surface
3. ~~Bottom flange angle corrosion = light surface~~ N/A
4. Top flange plate corrosion = light surface
5. Lateral bracing system condition = 3 Diaphragms, Middle & ENDS
6. Bearing stiffener condition = GOOD
7. # of cross frames and spacing = 3 @ START, MID SPAN & ENDS
8. Loose rivets/bolts = NONE NOTED
9. Welds on tension flange = NONE NOTED
10. Any cracks observed = NONE NOTED

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 35.6

CROSSING: ROAD	STREAM: N/A	SPAN TYPE: THROUGH GIRDER
INSPECTION DATE: OCT 5, 2011	STREAM DEPTH: N/A	HEIGHT: 21.7" GIRDER
LOCATION: SVI-35.6	FLOW DIRECTION: N/A	LENGTH: 27'-3 0/0
INSPECTORS: MT/KB	DECK TYPE: Open / Ballast	RATING:
NO. OF SPANS: 1	WALKWAY: (Yes/No - E/W side)	SPAN LENGTH(S): 26'-3 1/2
NO. OF TRACKS: 1	HANDRAILS: (Yes/No - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = MASONRY & CONCRETE

South:

1. Evidence of scour / undermining = N/A
2. Drift accumulated = N/A
3. Ballast/debris on bearings = —
4. Vegetation on face/seat = —
5. Spalling = —
6. Cracking under bearings = —
7. Cracking elsewhere = —
8. Rotation = —
9. Exposed reinforcing steel = —
10. Efflorescence = —
11. Missing or fractured stones (masonry abutment) = —
12. Missing mortar from joints (masonry abutment) = —
13. Evidence of stone movement (masonry abutment) = —

Other Notes:

- Signs of Collision ON ABUTMENTS - ROAD ON CURVE
- Single lane under bridge.

North:

1. Evidence of scour / undermining = N/A
2. Drift accumulated = N/A
3. Ballast/debris on bearings = —
4. Vegetation on face/seat = —
5. Spalling = —
6. Cracking under bearings = —
7. Cracking elsewhere = —
8. Rotation = —
9. Exposed reinforcing steel = —
10. Efflorescence = —
11. Missing or fractured stones (masonry abutment) = —
12. Missing mortar from joints (masonry abutment) = —
13. Evidence of stone movement (masonry abutment) = —

Other Notes:

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = CONCRETE & MASONRY

Type of Backwall Construction = CONCRETE & MASONRY

South Abutment:

1. Undermining = N/A
2. Cracks = very few minor cracks on masonry wing walls
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes: —

North Abutment:

1. Undermining = N/A
2. Cracks = VERY FEW MINOR CRACKS ON MASONRY WING WALLS
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes: —

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = NO
2. Max. superelevation at midspan = NOT NOTED
3. Chord offset at midspan (distance from center of track to center of girders) = NO

Other Notes: —

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes: —

Tie Notes:

1. Tie size = 10" wide x 18" deep x 13' long with bearing-bearing length = — CONFIRM ON DWGS
2. Tie spacing = 14" O/C
3. Ties dapped for superelevation = —
4. Rail plates cutting into ties = YES
5. Overall tie condition = FAIR - TIES HAVE BEEN NOTCHED @ ENDS BOTH ON UNDERSIDE AND SIDE
6. Approach ties swinging = —
7. Approx. number of bad ties = 102 approx
8. Section loss to be used in rating flexural ties = 206 @ ENDS

- estimated loss of 206 of cross section

Other Notes: —

Tie Support Angles (if applicable):

1. Size of angles = 4" x 4" x 1/4"
2. Overall condition = MODERATELY CORRODED
3. Cracks evident = NONE OBSERVED - ACCESS LIMITED EVEN W/ SNAKE VIDEO CAMERA
4. Bearing length of tie on angle = 3 1/2"

Other Notes: —

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS TO BE GOOD
5. Approaches low = NO

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

Girder spacing = 13'-2" (CONFIRM ON DWGS)

Girder depth = 2'-7"

General steel condition = FAIR TO POOR (IMPACT ON BOTTOM FLANGE, CORROSION ON SHELF ANGLES)

Bearing Notes:

1. Type of bearings = STEEL PL
2. Full bearing = YES
3. Bearing corrosion = MINOR/LIGHT SURFACE
4. Anchor bolt condition = FAIR - SLIGHT DEFLECTION - SEE PICTURE
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat = NO

Other Notes:

Span 1 Notes:

1. Web corrosion = Light to moderate surface corrosion
2. Bottom flange plate corrosion = moderate - SECTION LOSS DUE TO IMPACT - SEE PICTURE
3. Bottom flange angle corrosion = moderate
4. Top flange plate corrosion = Light to moderate corrosion
5. Lateral bracing system condition = Light to moderate corrosion
6. Bearing stiffener condition = FAIR - Light surface corrosion
7. # of cross frames and spacing = 3 CROSS FRAMES @ 9'-8" FROM ENDS OF GIRDER
8. Loose rivets/bolts = NONE NOTED
9. Welds on tension flange = NONE NOTED
10. Any cracks observed = NONE NOTED

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

Timber Trestles

10F7
E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 37.6

CROSSING: 37.6	STREAM:	SPAN TYPE:
INSPECTION DATE: 10/8/11	STREAM DEPTH:	HEIGHT:
LOCATION:	FLOW DIRECTION:	LENGTH:
INSPECTORS: MJO, DH,	DECK TYPE: <u>Open</u> / Ballast	RATING:
NO. OF SPANS: 1	WALKWAY: <u>Yes</u> /No - E/W side	SPAN LENGTH(S):
NO. OF TRACKS: 1	HANDRAILS: <u>Yes</u> /No - E/W side	

Inspection Findings:

Ties new in 93 + stringers

→ E60 - Super
ESD - Substructure

END BENT NOTES

Type of End Bent Construction =

1. # of piles = 4
2. Pile diameter = 12" → 13"
3. Pile cap size = 13" deep x 14" wide

South End (Bent 1):

1. Drift accumulated =
2. Bent rotation =
3. Pile cap general condition = G
4. Pile cap bulging/splitting =
5. Pile cap has excessive internal/external decay =
6. Pile general condition = G
7. Piles have excessive internal/external decay =
8. Piles bulging/splitting =

Other Notes:

North End (Bent TBD):

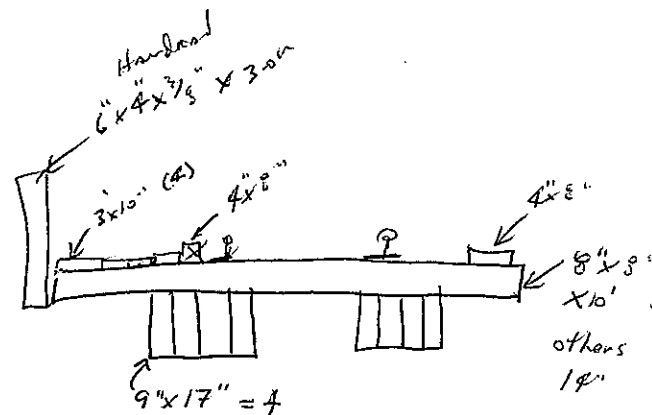
1. Drift accumulated =
2. Bent rotation =
3. Pile cap general condition =
4. Pile cap bulging/splitting =
5. Pile cap has excessive internal/external decay =
6. Pile general condition =
7. Piles have excessive internal/external decay =
8. Piles bulging/splitting =

Other Notes:

INTERMEDIATE BENT NOTES

Use timber schematic to mark up section loss in individual piles.

1. # of piles =
2. Pile diameter =
3. Pile cap size = _____ deep x _____ wide
4. Bents plumb =
5. Signs of pumping piles =
6. Signs of scour/erosion =
7. Posted piles =



Cap 13" deep x 14" wide
Type.

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction =

Type of Backwall Construction =

South End:

1. Undermining =
2. Cracks =
3. Leaning =

Other Notes:

North End:

1. Undermining =
2. Cracks =
3. Leaning =

Other Notes:

DECK NOTES

Ballast / open deck =

Track Alignment Notes:

1. Bridge on tangent or curve = ? *Gradual Curve*
2. Max. superelevation at midspan = $2\frac{1}{4}\%$
3. Chord offset at midspan (distance from center of track to center of stringers) =

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =
5. Floor timber size =

Other Notes:

Tie Notes:

1. Tie size = ____ wide x ____ deep x ____ long
2. Tie spacing =
3. Ties dapped for superelevation =
4. Rail plates cutting into ties =
5. Overall tie condition =
6. Approach ties swinging =
7. Approx. number of bad ties =
8. Method of tie connection =

Other Notes:

Track Notes:

1. Rail section weight = $8\frac{1}{2}$
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good =
5. Approaches low = *yes - south (photo)*

Other Notes

204

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

3 of 4

SPAN NOTES

1. # of stringers =
2. Stringer size = _____ deep x _____ wide
3. Out-out of exterior stringers =
4. General stringer condition =

Use timber span schematic for marking up section loss in individual stringers where required

5. Ends of stringers crushing =
6. Horizontal shear cracks in stringers =
7. Fractured stringers =
8. Decay/insect damage =

Other Notes:

EXTRA TIMBER MEMBER NOTES (WHERE IN PLACE)

1. Longitudinal bracing =
2. Longitudinal bracing size =
3. Longitudinal bracing condition =
4. Sway bracing =
5. Sway bracing size =
6. Sway bracing condition =
7. Sash bracing =
8. Sash bracing size =
9. Sash bracing condition =
10. Mud sills @ bents =
11. Mud sill condition =

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

RAILROAD BRIDGE INSPECTION REPORT

Date: _____

Bridge: _____

		TIMBER TRESTLE CONDITION FOR RATING										CAP. SIZES:	
Incr. Milepost												<input type="checkbox"/>	____ Dia.
N / S Abutment												<input type="checkbox"/>	____ Dia.
Span												<input type="checkbox"/>	X
Bent												<input type="checkbox"/>	____ Dia.
Span												<input type="checkbox"/>	X
Bent												<input type="checkbox"/>	____ Dia.
Span												<input type="checkbox"/>	X
Bent												<input type="checkbox"/>	____ Dia.
Span												<input type="checkbox"/>	X
Bent 6												<input type="checkbox"/>	____ Dia.
Span												<input type="checkbox"/>	X
Bent 5												<input type="checkbox"/>	____ Dia.
Span												<input type="checkbox"/>	X
Bent 4												<input type="checkbox"/>	____ Dia.
Span												<input type="checkbox"/>	X
Bent 3												<input type="checkbox"/>	____ Dia.
Span												<input type="checkbox"/>	X
Bent 2												<input type="checkbox"/>	____ Dia.
Span												<input type="checkbox"/>	9" x 17"
S / N Abutment /												<input type="checkbox"/>	____ Dia.

REMARKS:

Note 4 @ Abutments
 5 @ Bents
 S. my brace broken SPAN #4 - East Side (Photo)
 on diagonal + West Side

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 37.8

CROSSING: <u>WATER</u>	STREAM: <u>YES</u>	SPAN TYPE: <u>THRU TRUSS</u>
INSPECTION DATE: <u>OCT 6, 2011</u>	STREAM DEPTH: <u>—</u>	HEIGHT: <u>—</u>
LOCATION: <u>SVI-37.8</u>	FLOW DIRECTION: <u>—</u>	LENGTH: <u>157'-0"</u>
INSPECTORS: <u>MT/KB</u>	DECK TYPE: <u>Open</u> / Ballast	RATING: <u>—</u>
NO. OF SPANS: <u>1</u>	WALKWAY: (Yes/No) <u>—</u> E/W side	SPAN LENGTH(S): <u>157'-0"</u>
NO. OF TRACKS: <u>1</u>	HANDRAILS: (Yes/No) <u>—</u> E/W side	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = CIP-CONCRETE

South:

1. Evidence of scour / undermining = —
2. Drift accumulated = —
3. Ballast/debris on bearings = —
4. Vegetation on face/seat = VEGETATION GROWTH
5. Spalling = —
6. Cracking under bearings = —
7. Cracking elsewhere = small hairline cracks w/ efflorescence
8. Rotation = —
9. Exposed reinforcing steel = —
10. Efflorescence = YES - w/ hair line cracks
11. Missing or fractured stones (masonry abutment) = N/A
12. Missing mortar from joints (masonry abutment) = N/A
13. Evidence of stone movement (masonry abutment) = N/A

Other Notes:

North:

1. Evidence of scour / undermining = —
2. Drift accumulated = —
3. Ballast/debris on bearings = —
4. Vegetation on face/seat = VEGETATION GROWTH ON FACE
5. Spalling = —
6. Cracking under bearings = —
7. Cracking elsewhere = small hairline cracks w/ efflorescence
8. Rotation = —
9. Exposed reinforcing steel = —
10. Efflorescence = YES - w/ Hair line cracks
11. Missing or fractured stones (masonry abutment) = N/A
12. Missing mortar from joints (masonry abutment) = N/A
13. Evidence of stone movement (masonry abutment) = N/A

Other Notes:

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = CIP-CONCRETE

Type of Backwall Construction = CIP-CONCRETE

South Abutment:

1. Undermining = —
2. Cracks = MINOR CRACKS ON FACE
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes:

North Abutment:

1. Undermining = —
2. Cracks = MINOR
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes:

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = NO HORIZONTAL CURVE
2. Max. superelevation at midspan = NOT NOTED
3. Chord offset at midspan (distance from center of track to center of girders) = NOT NOTED

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 14" deep x 11'-3" long with bearing-bearing length = STRINGER C/C
2. Tie spacing = 15" O/C
3. Ties dapped for superelevation = —
4. Rail plates cutting into ties = OCCASIONAL
5. Overall tie condition = GOOD W/ RARE EXCEPTION
6. Approach ties swinging = NO
7. Approx. number of bad ties = 58
8. Section loss to be used in rating flexural ties = UNSURE

Other Notes:

Tie Support Angles (if applicable):

1. Size of angles =
2. Overall condition =
3. Cracks evident =
4. Bearing length of tie on angle =

Other Notes:

Track Notes:

1. Rail section weight =
 2. CWR or jointed rail =
 3. Inner guardrail size/weight (if applicable) =
 4. Is line of track good = APPEARS TO BE GOOD ALIGNMENT
 5. Approaches low = high mileage approach is LOW
- Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

- Girder spacing = NOT NOTED
Girder depth = NOT NOTED
General steel condition = Light to MODERATE

Bearing Notes:

1. Type of bearings = STEEL - SEE PICTURE
2. Full bearing = YES
3. Bearing corrosion = MODERATE SURFACE CORROSION
4. Anchor bolt condition = MODERATE CORROSION
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat = NO

Other Notes:

Span 1 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

- NOTE: SOUTH WEST - FIRST
COMPRESSION MEMBER - LOCAL BULGING
DUE TO IMPACT BY HOUSE. FLANGE
2" (estimated) OUT OF PLANE.
rough measure

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

THRU TRUSS SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 39.3

CROSSING:	STREAM:	SPAN TYPE: Pin connected truss
INSPECTION DATE: 10/12/11	STREAM DEPTH: ~ FOUR FT	HEIGHT: 32 ft
LOCATION:	FLOW DIRECTION:	LENGTH: 224 ft
INSPECTORS: MJO/MFB	DECK TYPE: <u>Open</u> Ballast	RATING:
NO. OF SPANS: ONE	WALKWAY: (Yes/ <u>No</u> - E/W side)	SPAN LENGTH(S): 224 ft
NO. OF TRACKS: ONE	HANDRAILS: (Yes/ <u>No</u> - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = MASONRY STONE W/ CIP FACING

South:

1. Evidence of scour / undermining = NONE
2. Drift accumulated = NO
3. Ballast/debris on bearings = NO
4. Vegetation on face/seat = NO
5. Spalling = NO
6. Cracking under bearings = NO
7. Cracking elsewhere = NO
8. Rotation = NO
9. Exposed reinforcing steel = NO
10. Efflorescence = NO
11. Missing or fractured stones (masonry abutment) = NO
12. Missing mortar from joints (masonry abutment) = MINOR TUCKPOINTING NEEDED
13. Evidence of stone movement (masonry abutment) = NO

Other Notes:

North:

1. Evidence of scour / undermining = NO
2. Drift accumulated = NO
3. Ballast/debris on bearings = NO
4. Vegetation on face/seat = NO
5. Spalling = NO
6. Cracking under bearings = NO
7. Cracking elsewhere = NO
8. Rotation = NO
9. Exposed reinforcing steel =
10. Efflorescence = NO
11. Missing or fractured stones (masonry abutment) = NO
12. Missing mortar from joints (masonry abutment) = MINOR TUCKPOINTING NEEDED
13. Evidence of stone movement (masonry abutment) = NO

Other Notes:

SOUTH ABUTMENT BACKWALL WAS CUT INTO TO PROVIDE ROOM FOR SECOND HAND STAIRS.

BACKWALL/WINGWALL NOTES

N/A

Type of Wingwall Construction =

Type of Backwall Construction =

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

North Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

DECK NOTES

Open deck = YES

Track Alignment Notes:

1. Bridge on tangent or curve = TANGENT
2. Max. superelevation at midspan = -
3. Chord offset at midspan (distance from center of track to center of girders) =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 10" deep x 10' long with bearing-bearing length =
2. Tie spacing = 16"
3. Ties dapped for superelevation = NO TIE DAP
4. Rail plates cutting into ties = NO
5. Overall tie condition = VERY GOOD
6. Approach ties swinging = ONE TIE AT N. APPROACH IS SWINGING
7. Approx. number of bad ties = 0

Other Notes:

TIES ARE YELLOW CEDAR, RECENTLY REPLACED.

Track Notes:

1. Rail section weight = 85# RAIL
2. CWR or jointed rail = JOINTED
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good =
5. Approaches low =

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge = NO WALKWAY
2. Walkway condition = - N/A
3. Refuge bays on bridge = NO REFUGE BAYS
4. Refuge bay condition = N/A

Other Notes:

TRUSS MEMBER NOTES

General steel condition =

Bearing Notes:

1. Type of bearings = TWO STEEL PLATES AT EACH STRUGGAN
2. Full bearing = YES
3. Bearing corrosion = HEAVY CORROSION AT BOTH ABUTMENTS
4. Anchor bolt condition = ANCHOR BOLTS ARE BEST SOUTH AT S. ABUT, NORTH AT N. ABUT.
5. Expansion bearings functioning properly or frozen = EXPANSION END IS JAMMED AGAINST BACKWALL
6. Bearings punching into abutment seat = NOT VISIBLE

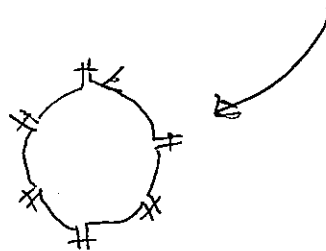
Other Notes:

BEARING PLATES ARE SEVERELY CORRODED W/ DEEP PITTING
ALL BEARINGS

Top Chord Notes:

1. Section loss at critical locations =
2. Adequate bracing =
3. Cracks at chord splices =
4. Wear in web pin holes =
5. Fasteners condition =

Notes (by nodal location established in field):



- composed of large "Phoenix" sections

- ~~top~~

*** - very straight longitudinal "groove" in member, typ. at most members

- grooves varies from hairline to 1/16"
- may be a fabrication irregularity
- may be a fatigue issue
- should be monitored and further researched.
- varying length

Bottom Chord Notes:

1. Section loss at critical locations = NO SIGNIFICANT SECTION LOSS NOTED
2. Eyebars tightness = VARIABLE, SOME NOT TIGHT
3. Pack rust at eyebars = NO
4. Eyebars section loss = NOT SIGNIFICANT
5. Pins worn, scored or corroded = PINS ARE CORRODED (MOD.), PAINT PEELING
6. Chord cracks = NO CRACKS NOTED
7. Condition of splices =

Notes (by nodal location established in field):

TRUSS A: OUTER (EAST) BAR FROM L0 TO L1 HAS
A SLIGHT BUCKLE

TRUSS B: OUTER (WEST) BAR FROM L0 TO L1 HAS
A SLIGHT BUCKLE

Bottom Chords (Out-of-Level from Inside to Outside Chord)

Pin	Elev. Ch.	Pin	Elev. Change	Pin	Elev. Change	
0	3/16"	4	1"	8	5/8"	* All at w/ truss. E-truss is level.
1	1/8"	5	1 1/8"	9	3/8"	
2	1/2"	6	1 1/8"	10	1/8"	
3	2 3/8"	7	1 1/8"	11	3/4"	

Hanger Notes:

1. Section loss in body above floorbeam connection =
2. Cracks at upper truss connection, lower row of fasteners =
3. Stress concentrations in the form of welds, edge corrosion =
4. Accident damage = NO

Notes (by nodal location established in field):

Eyebar at Dull has 0" gap at top of eye and $\frac{3}{8}$ " gap at bottom of eye
Cull pin has a $\frac{3}{8}$ " gap

- Several other hangers are either "bowed" or
have a "gap" at pin

Diagonal Notes:

1. Section loss =
2. Compression/tension members =
3. End connection condition =
4. Tight (if tension members) =

Notes (by nodal location established in field):

- END DIAGONAL AT SOUTH 1st BUT. (TRUSS B) HAS SETTLED $\frac{3}{8}$ "

Loose diagonals:

Bar on W. Truss	from 5 to 7 (2nd from inside)	" " 2 to 4 (1 st " ")
Bar on W. Truss	from 5 to 3 (2nd " ")	" " 2 to 4 (2nd " ")
"	" 4 to 6 (2nd " ")	" " 1 to 0 (2nd " ")
"	" 3 to 1 (1 st " ")	" " 1 to 0 (1 st " ")
"	" 3 to 1 (2nd " ")	

Medium-level lateral bracing:

- Small Phoenix section

- pack rust starting to pull
apart sections at several
locations

Post Notes:

1. Alignment of post =
2. Internal bracing =
3. Member end condition =

Notes (by nodal location established in field):

see hanger notes

End Post Notes:

1. Alignment of post =
2. Internal bracing =
3. Section loss =

Notes (by nodal location established in field):

TRUSS BRACING NOTES

Top Laterals Notes:

1. Section loss =
2. Connection condition =
3. Rod system components =

Notes (by nodal location established in field):

- several top laterals are loose

Bottom Laterals Notes:

1. Section loss =
 2. Connection condition (truss/stringers) =
 3. Rod system components =
- Notes (by nodal location established in field):

- one bottom lateral is hanging
(very loose)
- some other bottom laterals are also loose

Sway Frame Notes:

1. Section loss = none
2. Connection condition (top chords/verticals) =
3. Fatigue cracks =
4. Rod system components =

Notes (by nodal location established in field):

- Sway bracing is loose at several locations

End Portal Notes:

1. Section loss =
2. Accident damage =
3. Connection condition =

Notes (by nodal location established in field):

} see sway bracing notes

FLOOR SYSTEM NOTES

Floorbeam spacing =

Floorbeam depth =

Stringer spacing =

Stringer depth =

General steel condition = minor corrosion except
for top plate

- NEW ANGLES & H.S.
BOLTS HAVE BEEN OBSERVED

Replaced Floorbeam to
string connections

Floorbeam Notes:

1. Web corrosion = none to minor
2. Bottom flange plate corrosion = minor
3. Bottom flange angle corrosion = minor
4. Top flange plate corrosion = see table
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed = none observed

Other Notes:

no holes - N
holes - H
chewed edges - C
deep pitting - P
mod. pitting - m

Floorbeam
TOP PLATE CORROSION

1 st	from North "N/P"	
2	" " - G, P	10 th - m
3	" " - H, G, P	11 th - m
4	" " - H, G, P	
5	" " - N, m	
6	" " - G, P	
7	" " - m, N	
8	" " - G, P	
9	" " - m	

Stringer Notes:

1. Web corrosion = MINOR TO NONE
2. Bottom flange plate corrosion = ~~HEAVY~~
3. Bottom flange angle corrosion = HEAVY CORROSION NEAR SUPPORTS, MINOR TO NONE ELSEWHERE
4. Top flange plate corrosion = MINOR TO NONE, SOME PITTING
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed = NONE SEEN

Other Notes: STRINGERS ARE UP AGAINST SOUTH BACKWALL. BRIDGE MAY HAVE MOVED (EXPANDED) TO THE SOUTH UNTIL MOVEMENT WAS ARRESTED BY BACKWALL. OF SECONDHAND BRIDGE DIDN'T FIT INTO ABUTMENTS.

Knee Brace Notes:

1. Corrosion =
2. Cracks in connection angles =
3. Loose/missing rivets =
4. Accident damage =

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

NOTE: BRIDGE VIEWED UNDER LOADING

LOADING: LOCOMOTIVE & 8 CARS (3 RUNS @ 10 MPH)

- NO SIGNIFICANT MOVEMENT OF PRIMARY MEMBERS
- SOME SWAGING OF SECONDARY TRUSS MEMBERS
- BAY 3 OF THE WEST TRUSSES EXHIBITED SOME CRACKING

- FIBER OPTIC ON WEST SIDE OF BRIDGE

- ALL TRUSS BEARINGS ARE POST BEARING

N. ABUT.
A - 1 3/4"
B - 2"

C - 2 7/8"
D - 2"

S. ABUT.
A - 6 1/2"
B - 6 1/8"

NOTE: IT APPEARS THAT @ S. ABUT., EXT. C - 5 1/2" TRUSSES HAVE EXPANDED MORE
D - 6 1/8"

TPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 40.6

CROSSING: <u>STREAM</u>	STREAM: <u>YES</u>	SPAN TYPE: <u>STEEL THICK PLATE GIRDER</u>
INSPECTION DATE: <u>OCT 5, 2011</u>	STREAM DEPTH: <u> </u>	HEIGHT: <u>4' 2 1/2"</u>
LOCATION: <u>SUI-40.6</u>	FLOW DIRECTION: <u> </u>	LENGTH: <u>37'-7" 0/0</u>
INSPECTORS: <u>MT/KB</u>	DECK TYPE: <u>Open</u> / Ballast	RATING: <u> </u>
NO. OF SPANS: <u>1</u>	WALKWAY: (Yes/ <u>No</u> - E/W side)	SPAN LENGTH(S): <u>35'-6" 0/0</u>
NO. OF TRACKS: <u>1</u>	HANDRAILS: (Yes/ <u>No</u> - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = CIP-CONCRETE

South:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings = MINOR DEBRIS
4. Vegetation on face/seat = MINOR VEGETATION
5. Spalling =
6. Cracking under bearings =
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

North:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings = MINOR DEBRIS &
4. Vegetation on face/seat = VEGETATION
5. Spalling =
6. Cracking under bearings =
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = CIP CONCRETE

Type of Backwall Construction = CIP CONCRETE

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

North Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = NO
2. Max. superelevation at midspan = NOT NOTED
3. Chord offset at midspan (distance from center of track to center of girders) = NO

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 18" deep x 126" long with bearing-bearing length = 75" 4.5" APPROX (BACK CALCULATED)
2. Tie spacing = 15" o/c
3. Ties dapped for superelevation =
4. Rail plates cutting into ties =
5. Overall tie condition = FAIR
6. Approach ties swinging =
7. Approx. number of bad ties =

Other Notes:

TIES ARE NOTCHED 1/2"

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS TO BE OK
5. Approaches low = YES BOTH SIDES

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

Girder spacing = 13'00"/C

Girder depth = 4'-2 1/2"

Floorbeam spacing =

Floorbeam depth =

Stringer spacing =

Stringer depth =

General steel condition = FAIR - APPROX 3mm pitting on bottom FLANGE

Bearing Notes:

1. Type of bearings = STEEL R
2. Full bearing = YES
3. Bearing corrosion = SURFACE
4. Anchor bolt condition = FAIR
5. Expansion bearings functioning properly or frozen = YES
6. Bearings punching into abutment seat = NO

Other Notes:

Girder Notes:

1. Web corrosion = LIGHT SURFACE
2. Bottom flange plate corrosion = 3mm pitting
3. Bottom flange angle corrosion = 3mm pitting
4. Top flange plate corrosion = LIGHT SURFACE
5. Lateral bracing system condition = OK
6. Bearing stiffener condition = MODERATE SURFACE CORROSION
7. # of cross frames and spacing = 2 BAYS OF \boxtimes OUT OF 3"x3"x1/4"
8. Loose rivets/bolts = NONE NOTED
9. Welds on tension flange = NONE NOTED
10. Any cracks observed = NONE NOTED

Other Notes:

Floorbeam Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Stringer Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Knee Brace Notes:

1. Corrosion =
2. Cracks in connection angles =
3. Loose/missing rivets =
4. Accident damage =

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

BRIDGE SKETCHES (AS REQUIRED)

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 46.6

CROSSING: WATER	STREAM: —	SPAN TYPE: PILE TRUSS
INSPECTION DATE: OCT 4, 2011	STREAM DEPTH: —	HEIGHT: 17' deep girders
LOCATION: 6VI-46.6	FLOW DIRECTION: —	LENGTH: 45'
INSPECTORS: MT/OH/NC	DECK TYPE: Open / Ballast	RATING: —
NO. OF SPANS: 3	WALKWAY: (Yes/No) — E/W side	SPAN LENGTH(S): 14'-5" → 15'-0" → 14'-5"
NO. OF TRACKS: 1	HANDRAILS: (Yes/No) — E/W side	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = TIMBER (PILE & BENT)

South:

1. Evidence of scour / undermining = —
2. Drift accumulated = —
3. Ballast/debris on bearings = ~~none~~ minor dirt/debris on bearings
4. Vegetation on face/seat = small vegetation on bearing
5. Spalling = — N/A
6. Cracking under bearings = N/A
7. Cracking elsewhere = N/A
8. Rotation = —
9. Exposed reinforcing steel = —
10. Efflorescence = N/A
11. Missing or fractured stones (masonry abutment) = —
12. Missing mortar from joints (masonry abutment) = —
13. Evidence of stone movement (masonry abutment) = —

Other Notes: ~~pile~~

North:

1. Evidence of scour / undermining = —
2. Drift accumulated = —
3. Ballast/debris on bearings = minor dirt/debris on bearing 5
4. Vegetation on face/seat = small vegetation on bearings
5. Spalling = N/A
6. Cracking under bearings = N/A
7. Cracking elsewhere = N/A
8. Rotation = —
9. Exposed reinforcing steel = —
10. Efflorescence = N/A
11. Missing or fractured stones (masonry abutment) = —
12. Missing mortar from joints (masonry abutment) = —
13. Evidence of stone movement (masonry abutment) = —

Other Notes:

- PILE #2 (FROM WEST) IS POOR - CORE EXPERIMENTING ROT

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = TIMBER

Type of Backwall Construction = TIMBER

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

North Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = NO
2. Max. superelevation at midspan = NOT NOTED
3. Chord offset at midspan (distance from center of track to center of girders) = NO

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 8" wide x 8" deep x long with bearing-bearing length =
2. Tie spacing = 12" c/c
3. Ties dapped for superelevation =
4. Rail plates cutting into ties = YES - SPECIFICALLY ON APPROACHES
5. Overall tie condition = 80% GOOD - 20% REPLACE
6. Approach ties swinging = NO
7. Approx. number of bad ties = 9
8. Section loss to be used in rating flexural ties = N/A (BEARING TIES)

Other Notes:

Tie Support Angles (if applicable):

1. Size of angles =
2. Overall condition =
3. Cracks evident =
4. Bearing length of tie on angle =

Other Notes:

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS TO BE GOOD
5. Approaches low = YES - BOTH APPROACHES

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

- Girder spacing = 5'-0" C/C
Girder depth = 17"
General steel condition = GOOD
WOOD

Bearing Notes:

1. Type of bearings = WOOD TO WOOD
2. Full bearing = YES
3. Bearing corrosion = N/A
4. Anchor bolt condition = MINOR SURFACE CORROSION ON BOLTS FOR KEEPER
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat = NO

Other Notes:

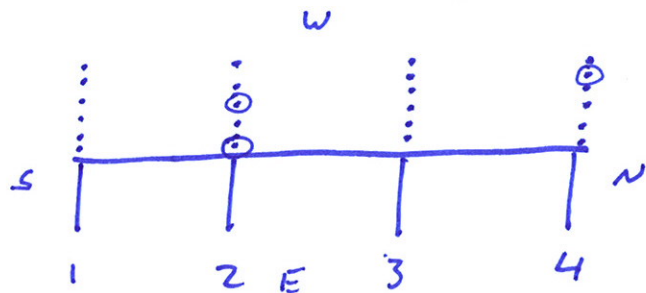
Span 1 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

N/A

NOTE: BENT #2 (FROM SOUTH)
PILE #3 - POOR - SEVERE CORE ROT
PILE #6 - 1 3/8" solid
4" VOID



History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # **46.8**

CROSSING: WATER	STREAM: YES	SPAN TYPE: STEEL PL GIRDERS
INSPECTION DATE: OCT 4, 2011	STREAM DEPTH: —	HEIGHT: 36" deep
LOCATION: SUI-46.8	FLOW DIRECTION: —	LENGTH: 29'-10"
INSPECTORS: MT/DH/NC	DECK TYPE: Open / Ballast	RATING:
NO. OF SPANS: 1	WALKWAY: (Yes/No - E/W side) NO	SPAN LENGTH(S): 29'-10"
NO. OF TRACKS: 1	HANDRAILS: (Yes/No - E/W side) NO	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = **CIP-CONCRETE**

South:

1. Evidence of scour / undermining = **YES**
2. Drift accumulated = **SMALL BRUSH**
3. Ballast/debris on bearings = **YES**
4. Vegetation on face/seat = **YES-MOSS**
5. Spalling = **MINOR SPALLING**
6. Cracking under bearings = **—**
7. Cracking elsewhere = **MINOR CRACKS ON FACES**
8. Rotation = **—**
9. Exposed reinforcing steel = **—**
10. Efflorescence = **ON FACES UNDER BEARINGS**
11. Missing or fractured stones (masonry abutment) = **N/A**
12. Missing mortar from joints (masonry abutment) = **N/A**
13. Evidence of stone movement (masonry abutment) = **N/A**

Other Notes:

North:

1. Evidence of scour / undermining = **YES - SEE PICTURE**
2. Drift accumulated = **SMALL BRUSH**
3. Ballast/debris on bearings = **YES**
4. Vegetation on face/seat = **YES-MOSS**
5. Spalling = **MINOR PATCHING**
6. Cracking under bearings = **—**
7. Cracking elsewhere = **MINOR CRACKING ON FACES**
8. Rotation = **—**
9. Exposed reinforcing steel = **—**
10. Efflorescence = **EFF NOTED ON FACE BELOW BEARINGS**
11. Missing or fractured stones (masonry abutment) = **N/A**
12. Missing mortar from joints (masonry abutment) = **N/A**
13. Evidence of stone movement (masonry abutment) = **N/A**

Other Notes:

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = CONCRETE - CID

Type of Backwall Construction = CONCRETE - CIP

South Abutment:

1. Undermining = YES - OFF FOOTING
2. Cracks = YES - MINOR CRACKS ON FACE
3. Spalling = MINOR CRACK SPALLING ON FOOTING
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes:

North Abutment:

1. Undermining = YES - OFF FOOTING
2. Cracks = YES - MINOR CRACKS ON FACE
3. Spalling = MINOR SPALLING ON FOOTING
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes:

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = NO
2. Max. superelevation at midspan = NOT NOTED
3. Chord offset at midspan (distance from center of track to center of girders) = NO

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 14" deep x 13'3" long with bearing-bearing length =
2. Tie spacing = 15" OC
3. Ties dapped for superelevation = —
4. Rail plates cutting into ties = YES
5. Overall tie condition = 100% POOR
6. Approach ties swinging = NO
7. Approx. number of bad ties = 24
8. Section loss to be used in rating flexural ties = 1/2" NOTCHING OF TIES

Other Notes:

Tie Support Angles (if applicable):

1. Size of angles =
2. Overall condition =
3. Cracks evident =
4. Bearing length of tie on angle =

Other Notes:

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS TO BE GOOD
5. Approaches low = NO

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

- Girder spacing = ~~18'~~ - NOT NOTED
Girder depth = 36"
General steel condition = LIGHT TO MODERATE SURFACE CORROSION
- 1/16" TOP FLANGE LOSS
- 3/16" BOTTOM FLANGE LOSS

Bearing Notes:

1. Type of bearings = STEEL R
2. Full bearing = YES
3. Bearing corrosion = YES
4. Anchor bolt condition = SOUTH WEST BOLT ARMED - MODERATE SUR
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat = NO

Other Notes:

Span 1 Notes:

1. Web corrosion = light surface corrosion
2. Bottom flange plate corrosion = 3/16"
3. Bottom flange angle corrosion =
4. Top flange plate corrosion = 1/16"
5. Lateral bracing system condition = light surface corrosion
6. Bearing stiffener condition = Good - light surface corrosion
7. # of cross frames and spacing = NOT NOTED
8. Loose rivets/bolts = NONE OBSERVED
9. Welds on tension flange = NONE OBSERVED
10. Any cracks observed = NONE OBSERVED

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

HDPG SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 47.9

CROSSING: <u>WATER</u>	STREAM: <u>YES</u>	SPAN TYPE: <u>STEEL</u>
INSPECTION DATE: <u>OCT 6, 2011</u>	STREAM DEPTH: <u>—</u>	HEIGHT: <u>NOT MEASURED</u>
LOCATION: <u>SVI - 47.9</u>	FLOW DIRECTION: <u>—</u>	LENGTH: <u>155'-6" C/C</u>
INSPECTORS: <u>MT/KRB</u>	DECK TYPE: <u>Open</u> Ballast	RATING:
NO. OF SPANS: <u>1</u>	WALKWAY: (Yes <u>No</u> - E/W side)	SPAN LENGTH(S): <u>155'-6"</u>
NO. OF TRACKS: <u>1</u>	HANDRAILS: (Yes <u>No</u> - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = MASONRY & CONCRETE

South:

1. Evidence of scour / undermining = —
2. Drift accumulated = —
3. Ballast/debris on bearings = —
4. Vegetation on face/seat = light brush on bearings
5. Spalling = —
6. Cracking under bearings = —
7. Cracking elsewhere = MINOR CRACKS ON FACE
8. Rotation = —
9. Exposed reinforcing steel = —
10. Efflorescence = —
11. Missing or fractured stones (masonry abutment) = —
12. Missing mortar from joints (masonry abutment) = YES - MORTAR MISSING - SEE PICTURE
13. Evidence of stone movement (masonry abutment) = —

Other Notes:

COFFER DAM

North:

1. Evidence of scour / undermining = —
2. Drift accumulated = —
3. Ballast/debris on bearings = —
4. Vegetation on face/seat = light brush on bearings
5. Spalling = —
6. Cracking under bearings = —
7. Cracking elsewhere = MINOR CRACKING ON FACE
8. Rotation = —
9. Exposed reinforcing steel = —
10. Efflorescence = —
11. Missing or fractured stones (masonry abutment) = —
12. Missing mortar from joints (masonry abutment) = YES - MORTAR JOINT CRACKS
13. Evidence of stone movement (masonry abutment) = —

Other Notes:

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = MASONRY & CONCRETE

Type of Backwall Construction = MASONRY & CONCRETE

South Abutment:

1. Undermining = —
2. Cracks = MASONRY JT. & small Masonry
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes:

North Abutment:

1. Undermining = —
2. Cracks = MASONRY JT. & small Masonry
3. Spalling = —
4. Leaning = —
5. Exposed reinforcing steel = —

Other Notes:

DECK NOTES

Ballast / open deck = OPEN

Track Alignment Notes:

1. Bridge on tangent or curve = NO
2. Max. superelevation at midspan = NOT NOTED
3. Chord offset at midspan (distance from center of track to center of girders) = NO

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 10" deep x 10' long with bearing-bearing length = —
2. Tie spacing = 16" o/c
3. Ties dapped for superelevation = —
4. Rail plates cutting into ties = NO
5. Overall tie condition = GOOD
6. Approach ties swinging = NO
7. Approx. number of bad ties = 5
8. Section loss to be used in rating flexural ties = NOT NOTED

Other Notes:

TIE SPLITTING - 2" in depth - YELLOW CEDAR

Tie Support Angles (if applicable):

1. Size of angles =
2. Overall condition =
3. Cracks evident =
4. Bearing length of tie on angle =

Other Notes:

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = APPEARS TO BE GOOD
5. Approaches low = NO

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

- Girder spacing = 4 STRINGERS UNDER TRS
Girder depth = NOT NOTED
General steel condition = LIGHT SURFACE CORROSION

Bearing Notes:

1. Type of bearings = PIN
2. Full bearing = YES
3. Bearing corrosion = light surface
4. Anchor bolt condition = GOOD
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat = NO

Other Notes:

Span 1 Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

NOTES: - PIN MISSING ON LOW ML
2nd BAY - INTERIOR CABLE
- SEE PIC
- FLOOR BEAMS RFT W/ STITCH WELD
- FLOOR BEAM BENDING RFT
1/2" R X 3" WIDE ON TOP FL
- BOTTOM CHORD - EYEBARS ON 5TH
BAY FROM HIGH ML - BENT
- LATERAL BRACING - FAILED PIN A
- SEE PICTURE
- MOST MEMBERS OUT OF SAFE RANGES
- EYEBAR MEMBERS ONLY INSPECTED
FROM TRACK LEVEL NO SNOOPER
INSPECTION ~~PERFORMED~~ TAKEN
ON THIS INSPECTION

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #

1

RECOMMENDED WORK

THRU TRUSS SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 47.9

CROSSING: Chemainus River	STREAM: ←	SPAN TYPE: Thru - Truss
INSPECTION DATE: 10/13	STREAM DEPTH:	HEIGHT: 23 ft
LOCATION:	FLOW DIRECTION:	LENGTH: 157 ft
INSPECTORS: MJO/MFB	DECK TYPE: <u>Open</u> Ballast	RATING:
NO. OF SPANS: ONE	WALKWAY: (Yes/ <u>No</u> - E/W side)	SPAN LENGTH(S): 157 ft.
NO. OF TRACKS: ONE	HANDRAILS: (Yes/ <u>No</u> - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction =

South:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings =
4. Vegetation on face/seat =
5. Spalling =
6. Cracking under bearings =
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

North:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings =
4. Vegetation on face/seat =
5. Spalling =
6. Cracking under bearings =
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction =

Type of Backwall Construction =

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

North Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

DECK NOTES

Open deck =

Track Alignment Notes:

1. Bridge on tangent or curve =
2. Max. superelevation at midspan =
3. Chord offset at midspan (distance from center of track to center of girders) =

Other Notes:

Tie Notes:

1. Tie size = ____ wide x ____ deep x ____ long with bearing-bearing length = ____
2. Tie spacing =
3. Ties dapped for superelevation =
4. Rail plates cutting into ties =
5. Overall tie condition =
6. Approach ties swinging =
7. Approx. number of bad ties =

Other Notes:

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good =
5. Approaches low =

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

TRUSS MEMBER NOTES

General steel condition =

Bearing Notes:

1. Type of bearings =
2. Full bearing =
3. Bearing corrosion =
4. Anchor bolt condition =
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat =

Other Notes:

Top Chord Notes:

1. Section loss at critical locations =
2. Adequate bracing =
3. Cracks at chord splices =
4. Wear in web pin holes =
5. Fasteners condition =

Notes (by nodal location established in field):

- bearing plates are thin plate
- very corroded
- anchor bolt is bent $1\frac{1}{2}$ " towards abutments (S. Abut.)
- rollers are out of square by 2" on the corners (S. Abut.)
- no anchor bolt on insides of S. Abut bearings (there is an empty hole)
- Some lattice pieces are sagging or "bowed" a bit

Bottom Chord Notes:

1. Section loss at critical locations =
2. Eyebars tightness =
3. Pack rust at eyebars =
4. Eyebars section loss =
5. Pins worn, scored or corroded =
6. Chord cracks =
7. Condition of splices =

Notes (by nodal location established in field):

Hanger Notes:

1. Section loss in body above floorbeam connection = No
2. Cracks at upper truss connection, lower row of fasteners = No
3. Stress concentrations in the form of welds, edge corrosion = No
4. Accident damage = No

Notes (by nodal location established in field):

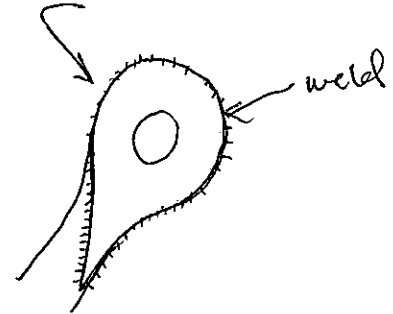
- END HANGARS have a gap at the pin
- tack welding used on hangers

Diagonal Notes:

1. Section loss =
2. Compression/tension members =
3. End connection condition =
4. Tight (if tension members) =

Notes (by nodal location established in field):

- several diagonals have a fatigue detail at the eyebar



Post Notes:

1. Alignment of post =
2. Internal bracing =
3. Member end condition =

Notes (by nodal location established in field):

End Post Notes:

1. Alignment of post =
2. Internal bracing =
3. Section loss =

Notes (by nodal location established in field):

- weld on corner hangers should be monitored
- tack welding

TRUSS BRACING NOTES

Top Laterals Notes:

1. Section loss =
2. Connection condition =
3. Rod system components =

Notes (by nodal location established in field):

- top laterals are necked down at intersection pts.

Bottom Laterals Notes:

1. Section loss =
2. Connection condition (truss/stringers) =
3. Rod system components =

Notes (by nodal location established in field):

Sway Frame Notes:

1. Section loss =
2. Connection condition (top chords/verticals) =
3. Fatigue cracks =
4. Rod system components =

Notes (by nodal location established in field):

- sway bracing is necked down at intersection of rods.

- nail missing from pin in sideways from U6L to U7R

End Portal Notes:

1. Section loss =
2. Accident damage =
3. Connection condition =

Notes (by nodal location established in field):

FLOOR SYSTEM NOTES

- Floorbeam spacing =
- Floorbeam depth =
- Stringer spacing =
- Stringer depth =
- General steel condition =

Floorbeam Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =

- floorbeams have tack welding

- tie repair under floor beams does not appear to be working

- three of four rods are not tight at last bay

- do not consider repair when rating

10. Any cracks observed =

Other Notes:

Stringer Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

- stringer 3 of 6 at Pt. 2 has
one loose rivet at connection to
floorbeam

- stringer 4 of 6 at Point 2 has 3 of 4
loose rivets.

- it can be assumed that this is a
typical occurrence

Knee Brace Notes:

1. Corrosion =
2. Cracks in connection angles =
3. Loose/missing rivets =
4. Accident damage =

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

THRU TRUSS SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 60.7

CROSSING: Harrison Creek	STREAM: Harrison Creek	SPAN TYPE: Pony Truss
INSPECTION DATE: 10/13/11	STREAM DEPTH: 4.5 ft	HEIGHT: 38 ft
LOCATION: Ladysmith	FLOW DIRECTION: East	LENGTH: 107 ft
INSPECTORS: mjo [mtr]	DECK TYPE: Open / Ballast	RATING:
NO. OF SPANS: 1	WALKWAY: (Yes/No) - E/W side	SPAN LENGTH(S): 107 ft
NO. OF TRACKS: 1	HANDRAILS: (Yes/No) - E/W side	103'-9" (c. to c. bearings)

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = Concrete

South:

1. Evidence of scour / undermining = NO
2. Drift accumulated = NO
3. Ballast/debris on bearings = NO
4. Vegetation on face/seat = moss on bearing seat
5. Spalling = NO
6. Cracking under bearings = NO
7. Cracking elsewhere = NONE
8. Rotation = NO
9. Exposed reinforcing steel = NO
10. Efflorescence = NO
11. Missing or fractured stones (masonry abutment) = N/A
12. Missing mortar from joints (masonry abutment) = N/A
13. Evidence of stone movement (masonry abutment) = N/A

Other Notes:

moisture working down from bearing seat

North:

1. Evidence of scour / undermining =
2. Drift accumulated =
3. Ballast/debris on bearings =
4. Vegetation on face/seat =
5. Spalling =
6. Cracking under bearings =
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence =
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

SAME AS SOUTH

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction =

Type of Backwall Construction =

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

North Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

See backwall
notes in abutment
section

DECK NOTES

Open deck = YES

Track Alignment Notes:

1. Bridge on tangent or curve = 4° curve
2. Max. superelevation at midspan = NO
3. Chord offset at midspan (distance from center of track to center of girders) =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 12" deep x 13'6" long with bearing-bearing length =
2. Tie spacing = 16"
3. Ties dapped for superelevation = NO (2" dap)
4. Rail plates cutting into ties = NO
5. Overall tie condition = GOOD
6. Approach ties swinging = NO
7. Approx. number of bad ties = 14 BAD

Other Notes:

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good =
5. Approaches low =

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge = NONE
2. Walkway condition = N/A
3. Refuge bays on bridge = NONE
4. Refuge bay condition = N/A

Rail alignment:

N. Abut

midspan

S. Abut.

W Rail & to
Girder 1 of 2

3 3/4"

18 3/8"

8 3/4"

Other Notes:

TRUSS MEMBER NOTES

General steel condition =

Bearing Notes:

1. Type of bearings =
2. Full bearing =
3. Bearing corrosion =
4. Anchor bolt condition =
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat =

Other Notes:

N. Abut: Pot bearings, fixed,
— recently replaced

S. Abut: older than N. Abut.
— two rolls of rollers on
a pot bearing on rollers
— may be locked

— there is a center
bearing at center of floorbeam

Top Chord Notes:

1. Section loss at critical locations =
2. Adequate bracing =
3. Cracks at chord splices =
4. Wear in web pin holes =
5. Fasteners condition =

Notes (by nodal location established in field):

Bottom Chord Notes:

1. Section loss at critical locations =
2. Eyebars tightness =
3. Pack rust at eyebars =
4. Eyebars section loss =
5. Pins worn, scored or corroded =
6. Chord cracks =
7. Condition of splices =

Notes (by nodal location established in field):

Hanger Notes:

1. Section loss in body above floorbeam connection =
2. Cracks at upper truss connection, lower row of fasteners =
3. Stress concentrations in the form of welds, edge corrosion =
4. Accident damage =

Notes (by nodal location established in field):

Diagonal Notes:

1. Section loss =
2. Compression/tension members =
3. End connection condition =
4. Tight (if tension members) =

Notes (by nodal location established in field):

Post Notes:

1. Alignment of post =
2. Internal bracing =
3. Member end condition =

Notes (by nodal location established in field):

End Post Notes:

1. Alignment of post =
2. Internal bracing =
3. Section loss =

Notes (by nodal location established in field):

TRUSS BRACING NOTES

Top Laterals Notes:

1. Section loss =
 2. Connection condition =
 3. Rod system components =
- Notes (by nodal location established in field):

Bottom Laterals Notes:

1. Section loss =
 2. Connection condition (truss/stringers) =
 3. Rod system components =
- Notes (by nodal location established in field):

• West truss, first bottom lateral
is bowed.

Sway Frame Notes:

1. Section loss =
 2. Connection condition (top chords/verticals) =
 3. Fatigue cracks =
 4. Rod system components =
- Notes (by nodal location established in field):

End Portal Notes:

1. Section loss =
 2. Accident damage =
 3. Connection condition =
- Notes (by nodal location established in field):

FLOOR SYSTEM NOTES

Floorbeam spacing =
Floorbeam depth =
Stringer spacing =
Stringer depth =
General steel condition =

Floorbeam Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =

10. Any cracks observed =

Other Notes:

Stringer Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Steel has minor to moderate corrosion entire face

Stringer at end spans have not been strengthened

Strengthening angles

- 1) Top angles $3" \times 3" \times 3/8"$
 - top of flange to top of angle leg = $1 7/8"$

- 2) Bottom angles $3 1/2" \times 3" \times 3/8"$
 - $3 1/2"$ is horizontal leg.

- bottom of bottom flange to bottom of angle = $1 1/2"$

* all strengthening angles start $2'-10"$ from end of stringers.

Knee Brace Notes:

1. Corrosion =
2. Cracks in connection angles =
3. Loose/missing rivets =
4. Accident damage =

Other Notes:

good condition - minor corrosion

- stringers have connections

angles to floorbeams that are riveted and welded (back)

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

- fiber optic along west side of bridge

DECK TRUSS SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 64.4

CROSSING:	STREAM:	SPAN TYPE:
INSPECTION DATE:	STREAM DEPTH:	HEIGHT:
LOCATION:	FLOW DIRECTION:	LENGTH:
INSPECTORS:	DECK TYPE: Open / Ballast	RATING:
NO. OF SPANS:	WALKWAY: (Yes/No - E/W side)	SPAN LENGTH(S):
NO. OF TRACKS:	HANDRAILS: (Yes/No - E/W side)	

Inspection Findings:

ABUTMENT NOTES

Type of Abutment Construction = Concrete

South:

1. Evidence of scour / undermining = ~~no~~ monitor base,
2. Drift accumulated = no
3. Ballast/debris on bearings =
4. Vegetation on face/seat = moss on seat face, seat ~~area~~ full of ballast
5. Spalling = some spalling, upstream side, and front face (see photos)
6. Cracking under bearings = no cracking
7. Cracking elsewhere =
8. Rotation =
9. Exposed reinforcing steel = no
10. Efflorescence = very minor
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

North:

1. Evidence of scour / undermining = no scour, abutment at roadway
2. Drift accumulated = N/A
3. Ballast/debris on bearings = ~~there~~ no
4. Vegetation on face/seat = moss
5. Spalling =
6. Cracking under bearings =
7. Cracking elsewhere = crack on west corner of seat (diagonal)
8. Rotation =
9. Exposed reinforcing steel =
10. Efflorescence = minor efflorescence
11. Missing or fractured stones (masonry abutment) =
12. Missing mortar from joints (masonry abutment) =
13. Evidence of stone movement (masonry abutment) =

Other Notes:

Abutment stamped "1911"

S. BACKWALL:

- BACKWALL WAS CHIPPED OUT TO MAKE ROOM FOR TRUSS
- CRACKING EXTENDING FROM CHIPPED AREA.

Pier Notes:

No cracking on S. Face
moss on S. FACE.

Some Scour

- Rocks (rip rap)
HAVE BEEN PLACED
UPSTREAM

- GILD JOINT
SEPARATION IN
PIER CAP

- END FACE OF
PIER IS SCALED.

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction =

Type of Backwall Construction =

South Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

North Abutment:

1. Undermining =
2. Cracks =
3. Spalling =
4. Leaning =
5. Exposed reinforcing steel =

Other Notes:

concrete wingwalls
minor scaling/spalling
moss-covered

NE wingwall

- large diagonal crack.

DECK NOTES

Open deck =

Track Alignment Notes:

1. Bridge on tangent or curve =
2. Max. superelevation at midspan =
3. Chord offset at midspan (distance from center of track to center of girders) =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 15" deep x 13' long with bearing-bearing length =
2. Tie spacing = 16"
3. Ties dapped for superelevation = NO
4. Rail plates cutting into ties = AT SOME LOCATIONS
5. Overall tie condition = POOR
6. Approach ties swinging =
7. Approx. number of bad ties =

Other Notes:

(truss section)

12 1/2" deep with dop

10" wide x 8" deep with 1" dop

10 ft long 14" spacing

(beam section)

Track Notes:

1. Rail section weight =
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good =
5. Approaches low = N. SIDE APPROACH

Other Notes:

LOW TIES, SWINGING

EAST RAIL E TO EAST PLATE E

S. ABUT. 30'

MID-SPAN 30'

PIER 1 29.5'

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN 2

RAIL IS 1 1/2" OFFSET TO WEST
OF EXTENSION GIRDERS

TRUSS MEMBER NOTES

General steel condition =

Bearing Notes:

1. Type of bearings =
2. Full bearing =
3. Bearing corrosion =
4. Anchor bolt condition =
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat =

Other Notes:

Top Chord Notes:

1. Section loss at critical locations =
2. Adequate bracing =
3. Cracks at chord splices =
4. Wear in web pin holes =
5. Fasteners condition =

Notes (by nodal location established in field):

- ANGLE AT MIDSPAN (BOTH SIDES)
- PROBABLY STRENGTHENED

Both

- Bottom ANGLED AND ENDS OF TOP CHORD ARE BENT, ^{MAYBE} ~~CRACKED~~ FROM JACKING [SEE BRIDGE SKETCH SHEET]

Bottom Chord Notes:

1. Section loss at critical locations =
2. Eyebars tightness =
3. Pack rust at eyebars =
4. Eyebars section loss =
5. Pins worn, scored or corroded =
6. Chord cracks =
7. Condition of splices =

Notes (by nodal location established in field):

- LATTICE ON BOTTOM OF BOTTOM CHORD ~~WAS~~ BOWED IN SOME AREAS

- REPAIRS AT BOTTOM CHORD, MIDSPAN
- MADE UP OF SIDE PLATES

- PACK RUST STARTING TO PUSH APART VERTICAL ANGLES
- ^{INSIDE} BOTTOM ANGLES BENT AT BEARINGS

* fiber optic along west side

- BOTTOM PLATE ON BOTTOM CHORD IS PITTED. ^{on 1/8"} FULL SECTION 1/2", SECTION LOSS OF APPROX. 1/16" ACROSS EXPOSED FACE

Span 1, ~~North~~ North end

- anchor bolts present
(1 in each bearing)
- anchor bolts bent south (approx. 1")

Span 2, south end

- anchor bolts present
- (1 in each bearing)
- nut ~~not~~ not tight to base
- no mild corrosion

Span 1, South End (Exp.)

- BEARING SET 3 1/4" SOUTH OF CENTER
- ANCHOR BOLT ON OUTSIDE ONLY. (ONLY 1 DESIGNED)
- MODERATE CORROSION
- BOLT IS TIGHT

Beams -

- hit by traffic in a couple locations

- STRENGTHENING ~~WAS~~ DUE TO LARGE LOCOMOTIVES.

[SEE BRIDGE SKETCH SHEET]

Hanger Notes:

1. Section loss in body above floorbeam connection =
2. Cracks at upper truss connection, lower row of fasteners =
3. Stress concentrations in the form of welds, edge corrosion =
4. Accident damage =

Notes (by nodal location established in field):

Diagonal Notes:

1. Section loss =
2. Compression/tension members =
3. End connection condition =
4. Tight (if tension members) =

Notes (by nodal location established in field):

- REINFORCED IN 1940 OR 1941.
- STRENGTHENINGS
- ~~PLATES~~ ARE RIVETED AND TACK-WEIDED
- NO TO MINOR SECTION LOSS.
- PAINT IS CHIPPED AND FLAKING OFF

Post Notes:

1. Alignment of post =
2. Internal bracing =
3. Member end condition =

Notes (by nodal location established in field):

- EAST TRUSS
- *** - MIDSPAN, POST TO TO CHORD CONNECT. IS BONED (SEE PHOTOS)

End Post Notes:

1. Alignment of post = - MINOR CORROSION
2. Internal bracing =
3. Section loss = NONE TO ~~MINOR~~ MINOR.

Notes (by nodal location established in field):

BEAM SPAN:

- PAINT IS FLAKING OFF BOTTOM FLANGE
- BOTTOM FLANGE IS HIT ON BOTTOM EXTERIOR GIRDING
- NO SECTION LOSS

TRUSS BRACING NOTES

Top Laterals Notes:

1. Section loss =
2. Connection condition =
3. Rod system components =

Notes (by nodal location established in field):

- SINGLE ANGLES
- NO SECTION LOSS
- MINOR CORROSION

Bottom Laterals Notes:

1. Section loss =
2. Connection condition (truss/stringers) =
3. Rod system components =

Notes (by nodal location established in field):

- SINGLE ANGLES
- NO SECTION LOSS
- MINOR CORROSION

Sway Frame Notes:

1. Section loss =
2. Connection condition (top chords/verticals) =
3. Fatigue cracks = NO WELDS ON THIS DETAIL
4. Rod system components =

Notes (by nodal location established in field):

SINGLE
- ANGLES CROSSED
- MINOR CORROSION
- NO SECTION LOSS
- NO RUST VISIBLE FROM RIVER

FLOOR SYSTEM NOTES

Floorbeam spacing =
Floorbeam depth =
Stringer spacing =
Stringer depth =
General steel condition =

Floorbeam Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Stringer Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

History:

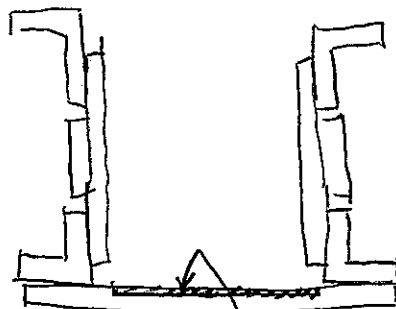
- Original construction year =
- Summary of bridge updates =

Recommended Work:

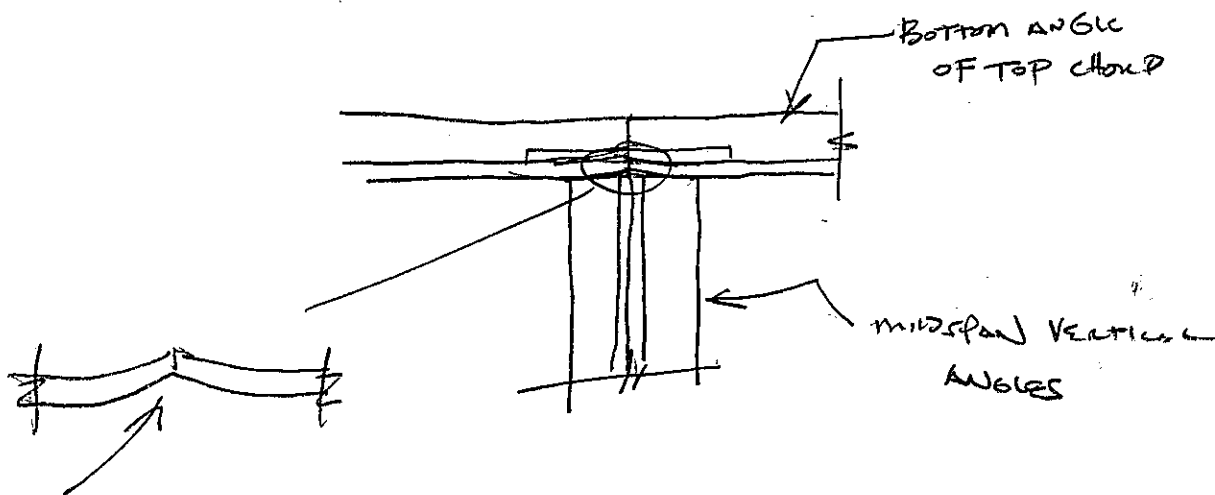
ITEM #
1

RECOMMENDED WORK

BRIDGE SKETCHES (AS REQUIRED)



$\frac{1}{16}$ " to $\frac{1}{8}$ " less across entire face



BOTTOM LEG OF ANGLE

APPEARS TO BE PUSHED UPWARD BY

VERTICAL ANGLES

DECK TRUSS SPANS

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 65.1

CROSSING:	STREAM:	SPAN TYPE:
INSPECTION DATE: 10/14/2011	STREAM DEPTH:	HEIGHT:
LOCATION:	FLOW DIRECTION: EAST	LENGTH:
INSPECTORS: DBH/MFB	DECK TYPE: Open Ballast	RATING:
NO. OF SPANS: 3	WALKWAY: (Yes/No - E/W side)	SPAN LENGTH(S):
NO. OF TRACKS: 1	HANDRAILS: (Yes/No - E/W side)	

Inspection Findings:

ONE REFUGE BAY ON WEST SIDE

FIBER OPTIC ALONG WEST SIDE

ABUTMENT NOTES

Type of Abutment Construction = MASONRY ABUT.

South: MASONRY W/ CONC. CASSING

1. Evidence of scour / undermining = N/A
2. Drift accumulated = N/A
3. Ballast/debris on bearings = NO
4. Vegetation on face/seat = moss
5. Spalling = NO
6. Cracking under bearings = NO
7. Cracking elsewhere = NO
8. Rotation = NO
9. Exposed reinforcing steel = NO
10. Efflorescence = FRONT FACE OF ABUTMENT
11. Missing or fractured stones (masonry abutment) = NO
12. Missing mortar from joints (masonry abutment) = NO
13. Evidence of stone movement (masonry abutment) = NO

Other Notes:

Backwall (concrete) is vertical

North: MASONRY

1. Evidence of scour / undermining = NO
2. Drift accumulated = NO
3. Ballast/debris on bearings = NO
4. Vegetation on face/seat = NO
5. Spalling = NO
6. Cracking under bearings = NO
7. Cracking elsewhere = CRACKING IN ONE ROW.
8. Rotation = NO
9. Exposed reinforcing steel = NO
10. Efflorescence = NO
11. Missing or fractured stones (masonry abutment) = ONE STONE
12. Missing mortar from joints (masonry abutment) = YES, APPROX 20 FT.
13. Evidence of stone movement (masonry abutment) = NO

Other Notes:

SPAN 1

THICK PR NEEDED
(APPROX. 20 FT.)

/ PHOTO

SPAN 3

- BEAUTIFUL

- minor rust
on top
flange

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction =

Type of Backwall Construction =

South Abutment:

1. Undermining = NO
2. Cracks = SEE →
3. Spalling = NO
4. Leaning = NO
5. Exposed reinforcing steel = NO

Other Notes:

North Abutment:

1. Undermining = NO
2. Cracks = SEE →
3. Spalling = NO
4. Leaning = NO
5. Exposed reinforcing steel = NO

Other Notes:

S. TIMBER RETAINING WALLS

- STARTING TO ROT AND FALL

N. MASONRY WINGWALL

- EXC

- CRACK IN NW WALL

- MAY NEED TUCKPT.

DECK NOTES

Open deck = YES.

Track Alignment Notes:

1. Bridge on tangent or curve = TANGENT
2. Max. superelevation at midspan = 0
3. Chord offset at midspan (distance from center of track to center of girders) =

Other Notes:

Tie Notes:

1. Tie size = 10" wide x 14" deep x 13 ft long with bearing-bearing length = 10 ft
2. Tie spacing = 16"
3. Ties dapped for superelevation = NO
4. Rail plates cutting into ties = SOME LOCATIONS
5. Overall tie condition = Fair to poor
6. Approach ties swinging = no
7. Approx. number of bad ties = 36 BAD TIES

Other Notes:

(5 MORE YEARS)

Track Notes:

1. Rail section weight =
2. CWR or jointed rail = JOINTED
3. Inner guardrail size/weight (if applicable) = N/A
4. Is line of track good =
5. Approaches low = S. APPROACH IS LOW

Other Notes:

Walkways/Refuge Bay Notes:

1. Walkways on bridge = NO
2. Walkway condition = N/A
3. Refuge bays on bridge = ONE ON WEST SIDE OF BRIDGE
4. Refuge bay condition = REFUGE BAY MISSING RAIL

Other Notes:

PIER 1

- MASONRY STONE PIER

- STEEL BEAM FOR SPAN 1

- CONCRETE PIER FOR SPAN 2

- SOME FLUTING AT BEAM BEARING

- MINOR CRACKING IN SOME BRICKS (1 1/2" deep)

29" FROM E WEST PLATE TO E WEST RAIL (CENTRED)

PIER 2

- POT BEARINGS - MINOR PITS

- MASONRY FOUNDATION w/ STEEL TOWER

- MINOR TUCKPT

TRUSS MEMBER NOTES

General steel condition =

Bearing Notes:

1. Type of bearings =
2. Full bearing =
3. Bearing corrosion =
4. Anchor bolt condition =
5. Expansion bearings functioning properly or frozen =
6. Bearings punching into abutment seat =

Other Notes:

SEE NOTES

STRENGTHENING AT
- DIAGONAL CONNECTOR
TO CHORDS.

TRUSS IS EXPANDED
TO THE SOUTH APPROX.
1-2"

Top Chord Notes:

1. Section loss at critical locations = NONE MEASURABLE
2. Adequate bracing = YES
3. Cracks at chord splices = NO CRACKS
4. Wear in web pin holes =
5. Fasteners condition =

Notes (by nodal location established in field):

- PAINT FLAKING OFF

- RUSTING (MINOR)

- NO SECTION LOSS MEASURABLE

- SOME LATTICE HAVE SLIGHT BOW, NOTHING

- RIVETS NOT LOOSE

SIGNIFICANT N. ABUT. BEARING

S. BEARING

- FIXED,
- MINOR CORROSION
- BOTH ANCHOR BOLTS AT EACH BEARING ARE GOOD
- BEARINGS ON TIMBER BLOCKS
- EAST BLOCK SPLITTING

Bottom Chord Notes:

1. Section loss at critical locations = NONE
2. Eyebars tightness =
3. Pack rust at eyebars =
4. Eyebars section loss =
5. Pins worn, scored or corroded =
6. Chord cracks = NONE
7. Condition of splices =

Notes (by nodal location established in field):

- MINOR CORROSION

- NO SECTION LOSS

- SOME LATTICE ARE BOWED
SLIGHTLY

- FIXED -
- PLATES
- ANCHOR BOLTS -

* PIER BEARINGS NOTED
ON PREVIOUS SHEET

** NOTE: "BULB" ANGLES
ON DIAGONAL MEMBERS.

* NOTE: SET OF PHOTOS TAKEN
AT PKA 1. BEARING SEAT.
(MATT'S CAMERA)

Hanger Notes:

1. Section loss in body above floorbeam connection =
2. Cracks at upper truss connection, lower row of fasteners =
3. Stress concentrations in the form of welds, edge corrosion =
4. Accident damage =

Notes (by nodal location established in field):

Int. stiffeners are bent
Two 1st at top, West Girders,
slightly 3rd and 4th from S. Abut.

Diagonal Notes:

1. Section loss = NONE MEASURABLE
2. Compression/tension members =
3. End connection condition = SEE NOTE BELOW
4. Tight (if tension members) =

Notes (by nodal location established in field):

- END CONNECTIONS HAVE BEEN STRENGTHENED
 - SOME ARE WELDED MODIFICATIONS
 - SOME ARE RIVETED MODIFICATIONS
- STRENGTHENING (RIVETED) ALONG ENTIRE DIAGONAL IN SOME CASES.

Post Notes:

1. Alignment of post = GOOD
2. Internal bracing = LATTICE (GOOD CONDITION)
3. Member end condition = GOOD

Notes (by nodal location established in field):

- MINOR PITTING
- FLAKED PAINT
- NO SECTION LOSS

End Post Notes:

1. Alignment of post = GOOD
2. Internal bracing = LATTICE (GOOD CONDITION)
3. Section loss = NONE MEASURABLE

Notes (by nodal location established in field):

SPAN 3

- NEWER ROLLED BEAMS
- GOOD CONDITION

SPAN 1

DECK PL. GIRDING

- BRACING IS IN GREAT CONDITION
- PAINT FLAKING OFF GIRDING
- MINOR CORROSION
- SECTION LOSS AT PIER 1
 - BOTTOM PLATE KNIFE
 - LOSS OF 3/16" FOR 8" LENGTH
- ANCHOR BOLTS

DIAGONALS

- 1st - RIVETED PLATE, FULL LENGTH RIVETED CONNECTION
- 2nd - "BULB" ANGLED, NO PLATE
 - RIVETED/WELDED
- 3rd - RIVETED LARGE PLATE RIVETED CONNECTION

TRUSS BRACING NOTES

Top Laterals Notes:

1. Section loss = **NONE**
2. Connection condition =
3. Rod system components =

Notes (by nodal location established in field):

Bottom Laterals Notes:

1. Section loss = **NO SECTION LOSS**
2. Connection condition (truss/stringers) = **GOOD**
3. Rod system components = **-**

Notes (by nodal location established in field):

- SOME CORROSION

Sway Frame Notes:

1. Section loss =
2. Connection condition (top chords/verticals) =
3. Fatigue cracks =
4. Rod system components =

Notes (by nodal location established in field):

- SLIGHT BOW TO ~~RIGHT~~
ANGLE AT [SEE PHOTO]

ALL BRACING

- 1) PAINT FLAKING
- 2) SECTION LOSS NOT APPARENT
- 3) MINOR CORROSION
- 4)

FLOOR SYSTEM NOTES

Floorbeam spacing =
Floorbeam depth =
Stringer spacing =
Stringer depth =
General steel condition =

Floorbeam Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

Stringer Notes:

1. Web corrosion =
2. Bottom flange plate corrosion =
3. Bottom flange angle corrosion =
4. Top flange plate corrosion =
5. Lateral bracing system condition =
6. Bearing stiffener condition =
7. # of cross frames and spacing =
8. Loose rivets/bolts =
9. Welds on tension flange =
10. Any cracks observed =

Other Notes:

History:

- Original construction year =
- Summary of bridge updates =

Recommended Work:

ITEM #
1

RECOMMENDED WORK

Timber Trestles W/DPG SPAN

1 of 3
0.69
Wellcox Sub.

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 0.69 Wellcox Sub

CROSSING: Roadway	STREAM:	SPAN TYPE: 4-15', 2-53' DPG
INSPECTION DATE: 10/11	STREAM DEPTH:	HEIGHT: PT
LOCATION: Nanaimo	FLOW DIRECTION:	LENGTH: 167.83'
INSPECTORS: MJO, AL	DECK TYPE: Open / Ballast	RATING:
NO. OF SPANS: 6	WALKWAY: (Yes/No - E/W side)	SPAN LENGTH(S):
NO. OF TRACKS: 1	HANDRAILS: (Yes/No - E/W side)	Span # 1 + 2 only

Inspection Findings:

END BENT NOTES

Type of End Bent Construction =

- # of piles = 5
- Pile diameter = 12"
- Pile cap size = 13' deep x 14' wide

Note to MJO
check IF Photo's show
Pony Bent

South End (Bent 1):

- Drift accumulated =
- Bent rotation =
- Pile cap general condition = Good
- Pile cap bulging/splitting =
- Pile cap has excessive internal/external decay =
- Pile general condition = Fair
- Piles have excessive internal/external decay =
- Piles bulging/splitting =

Other Notes:

North End (Bent TBD):

- Drift accumulated =
- Bent rotation =
- Pile cap general condition = Fair
- Pile cap bulging/splitting = No
- Pile cap has excessive internal/external decay = No
- Pile general condition = Poor
- Piles have excessive internal/external decay = Some
- Piles bulging/splitting = Yes

Other Notes:

INTERMEDIATE BENT NOTES

Use timber schematic to mark up section loss in individual piles.

1. # of piles = 6	5
2. Pile diameter = 12"	12" w/ 1 square 12"
3. Pile cap size = 13' deep x 14' wide	Same
4. Bents plumb = Y	Y
5. Signs of pumping piles = No	No
6. Signs of scour/erosion = No	No
7. Posted piles = No	1-Posted
Bent #2	Bent #5

#6 Timber
N. Abut.

#5 Timber

#4 Conc. Pier

#3 Conc. Pier

#2 Timber

#1 Timber
(S. Abut.)

PLAN VIEW

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = *Timber*

Type of Backwall Construction = *Timber*

South End:

1. Undermining = *OK*
2. Cracks =
3. Leaning =
- Other Notes:

North End:

1. Undermining =
2. Cracks =
3. Leaning = *OK*
- Other Notes:

DECK NOTES

Ballast / open deck =

Track Alignment Notes:

1. Bridge on tangent or curve =
2. Max. superelevation at midspan =
3. Chord offset at midspan (distance from center of track to center of stringers) =
- Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =
2. Ballast retainer size =
3. Floor plate / floor timber condition =
4. Deck width =
5. Floor timber size =
- Other Notes:

Tie Notes:

1. Tie size = 8" wide x 7 1/2" deep x 10' long - *Span 1, 2, 5 & 6 Approach*
2. Tie spacing =
3. Ties dapped for superelevation =
4. Rail plates cutting into ties = *some*
5. Overall tie condition = *Fair*
6. Approach ties swinging =
7. Approx. number of bad ties = *Span #1 & #2 = 4 bad, Span 3 = 0 bad, Span 4 = 22 bad, Span 5 & 6 = 2 bad*
8. Method of tie connection =
- Other Notes:

Track Notes:

1. Rail section weight = *100 lbs*
2. CWR or jointed rail =
3. Inner guardrail size/weight (if applicable) =
4. Is line of track good = *Yes*
5. Approaches low = *OK*
- Other Notes:

20F3

0.69

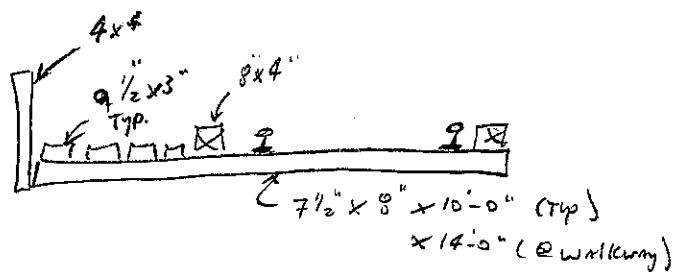
Span # 3 + #4 DPG

Span #3 - Welded Plate girder good
Condition

Span #4 Built up Angles + Plates Riveted

- Span was hit by load See Photos
- Could not see any cracks from above
May want to look from below. Could
not during this Review due to live
traffic. Looking along girder looks
like it has slight bow in it due to
Impact.

10" x 14" x 13'-0" — Span #3 — *Random (10" tie spacing)*
10" x 13 1/2" x 13'-0" — Span #4 — *Random w/ 1 1/2" dapped Inties (14" tie spacing)*



SPAN 1+2 only have
walkingway

RAILROAD BRIDGE INSPECTION REPORT

Bridge: 0-69 Well. & Sub.

CONDITION FOR RATING

CAP. SIZES:

Dia. _____

 X

Dia. _____

X

Dia.

 X

 Dia.

7-9th & 17th

Dia. _____

Dia.

112 Dia

1. *Chlorophyll a* (Chl *a*)

X

_____ Dia.

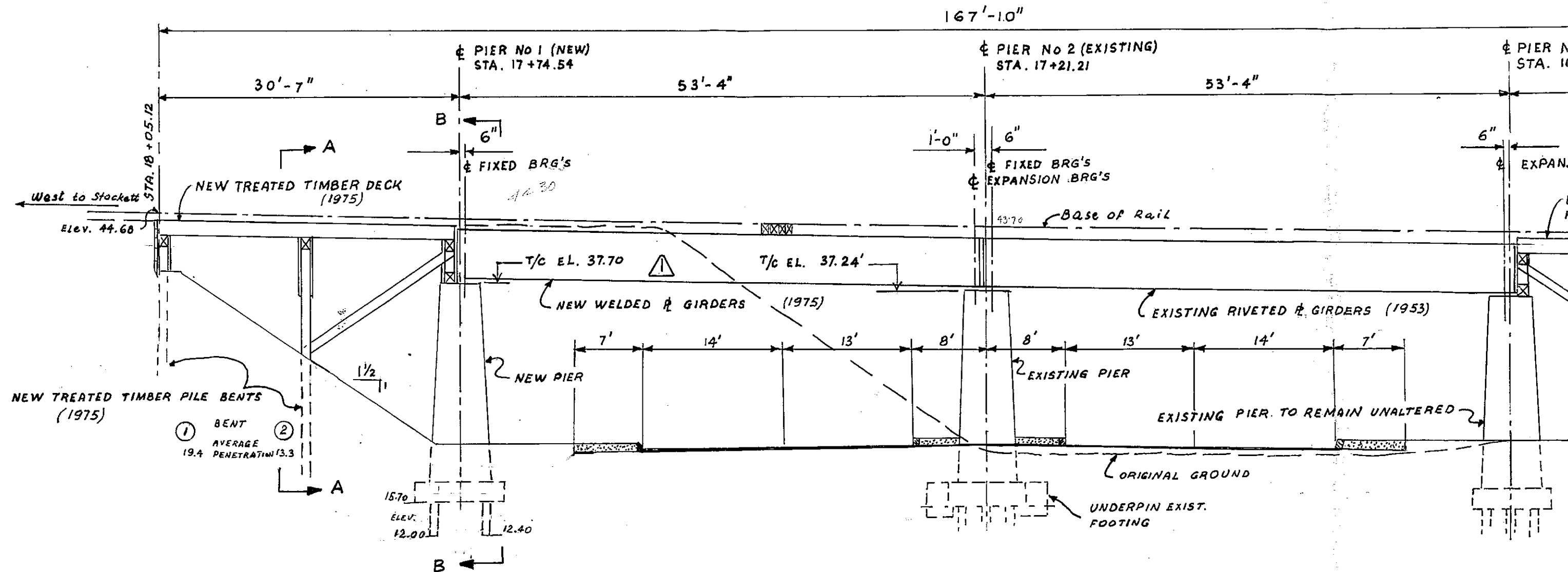
1000

(S) / N Abutment /

REMARKS:

+ Treated Plywood skins under stringers at cap (Abutments + Bent #2) look OK

Br. 0.69 Stockett (UNDERPASS)



NEW TREATED TIMBER PILE BENTS (1975)

① BENT AVERAGE 19.4 PENETRATION 13.3

PIER No 1 (NEW)

H Pile	Elev.
S.E.	12.40
S.W.	12.00
N.E.	14.10
N.W.	14.50

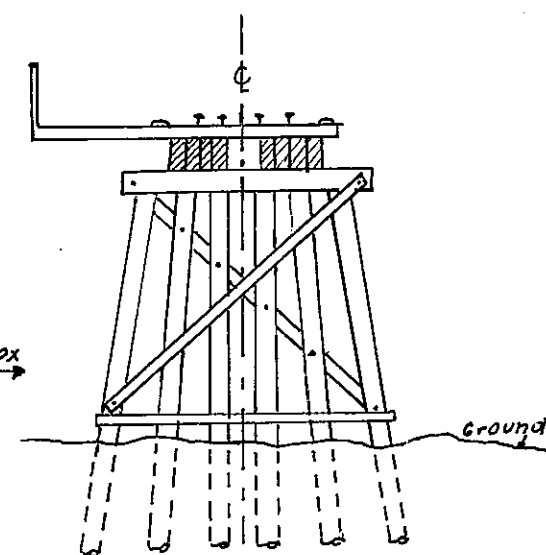
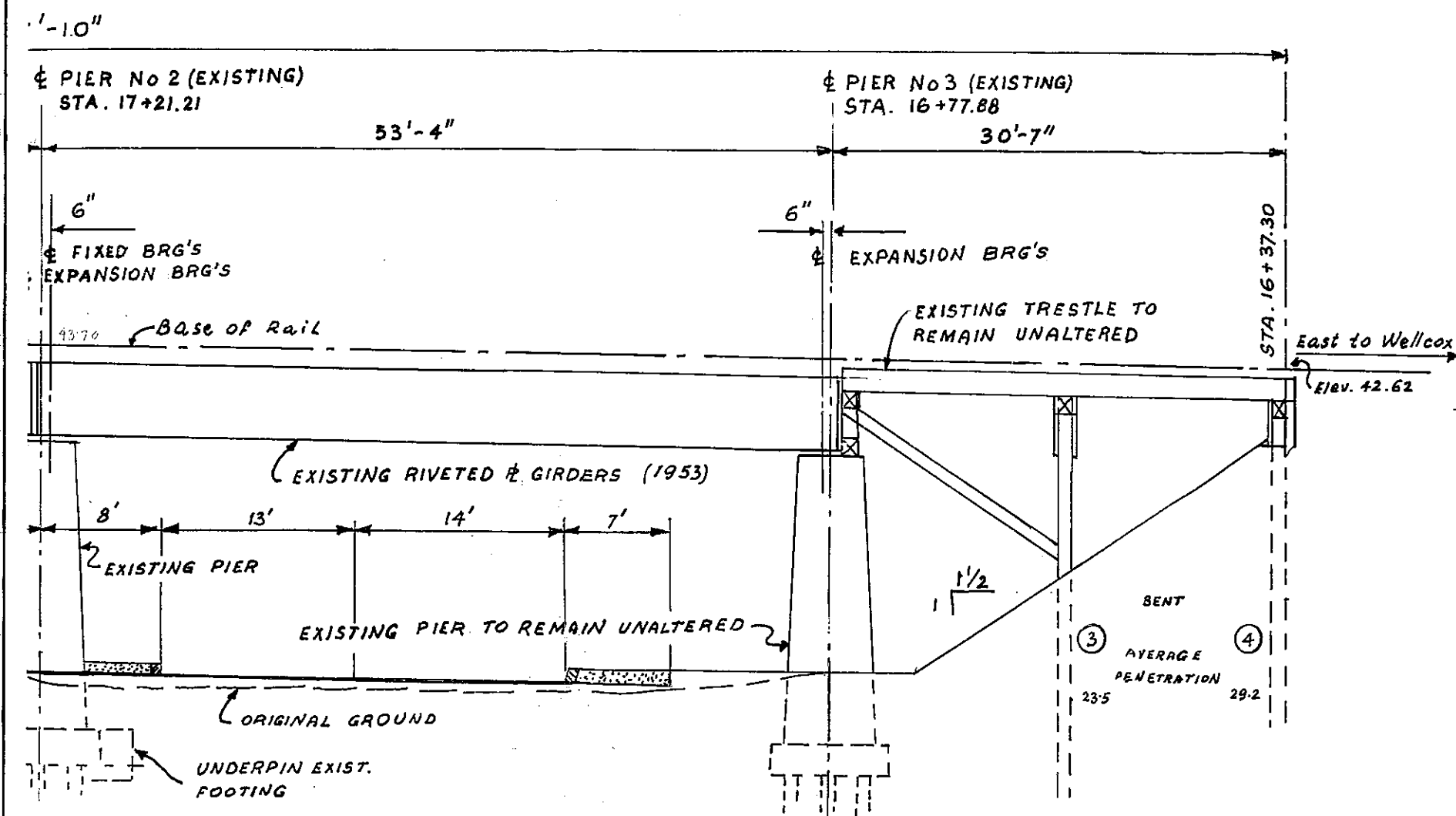
Br. built	Pier No 2 - East	1953
	Pier No 2 - West	1975
Material		
TIES	On timber Trestle	8"x8"x10'
	On steel span	10"x14"x13'
Guard rail		4"x8"
Jordan Guard rail		25/8

Data	No
Standard Plan	
C.T.C. Approval	81762/53, 86030/56 R-20345/75
Loading	E-60

CTC order R-29896 The cost of reconstruction paid by Applicant (Dept. of Highways) 50% & Crossing Fund 50%

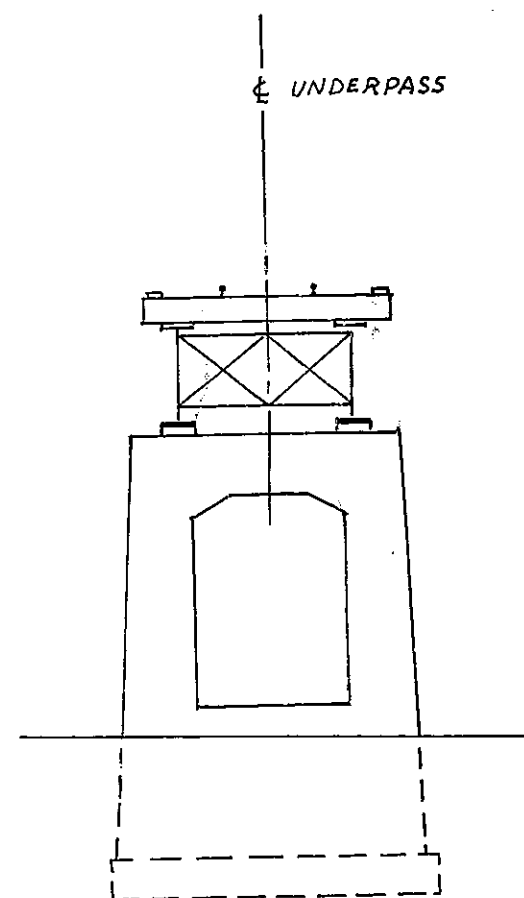
b) cost of maintenance of superstructure and center pier over southbound lanes of traffic including the approaches, road surface and drainage - by Applicant, the other costs of maintenance of superstructure & substructure - by C. P. Ltd

Br. 0.69 Stockett (UNDERPASS)



Typical Pile Bent

Section A-A

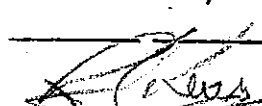


Section B-B

Order No. R-23895 NOV. 9, 1976 - CPR authorized to operate

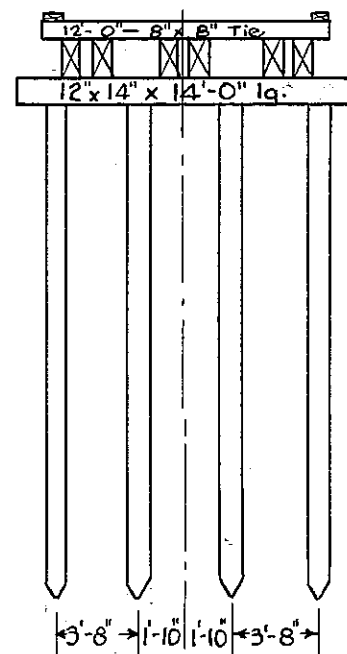
Data	No
Standard Plan	
C.T.C. Approval	B1762/53, 86080/56 R-20345/75
Loading	E-60

Bent No	No. of Piles	Distance from cut-off
1	4	22.4
2	5	24.3
3	5	34.9
4	4	31.2

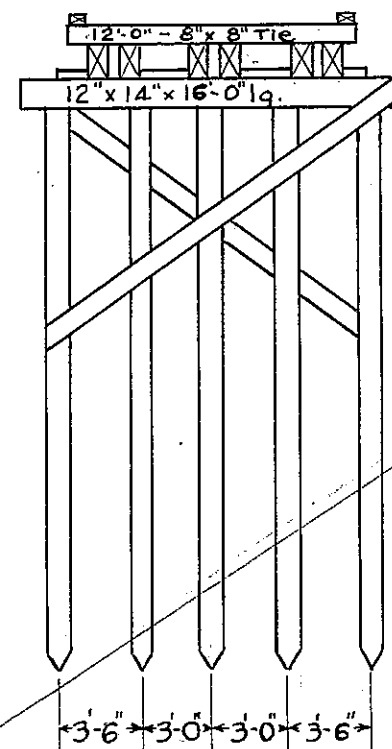
CANADIAN PACIFIC LIMITED	
PACIFIC REGION	Vancouver DIVISION
TITLE <u>Bridge 0.69 Stockett</u>	
<u>Wellcox - Underpass</u>	
 DIVISION ENGINEER	
SCALE 1" = 10'	FILE NO: Br. 0.69SW
DATE Sep. 14, 1976	PLAN NO:

Surface and drainage - by Applicant,

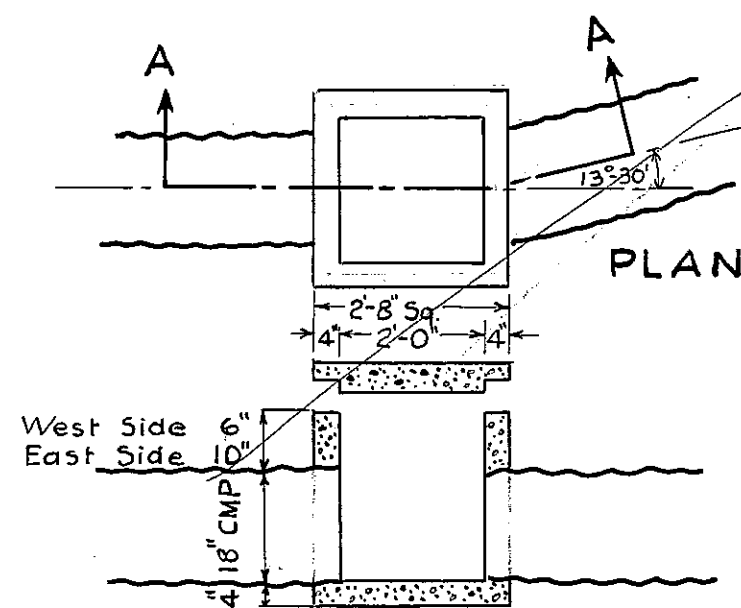
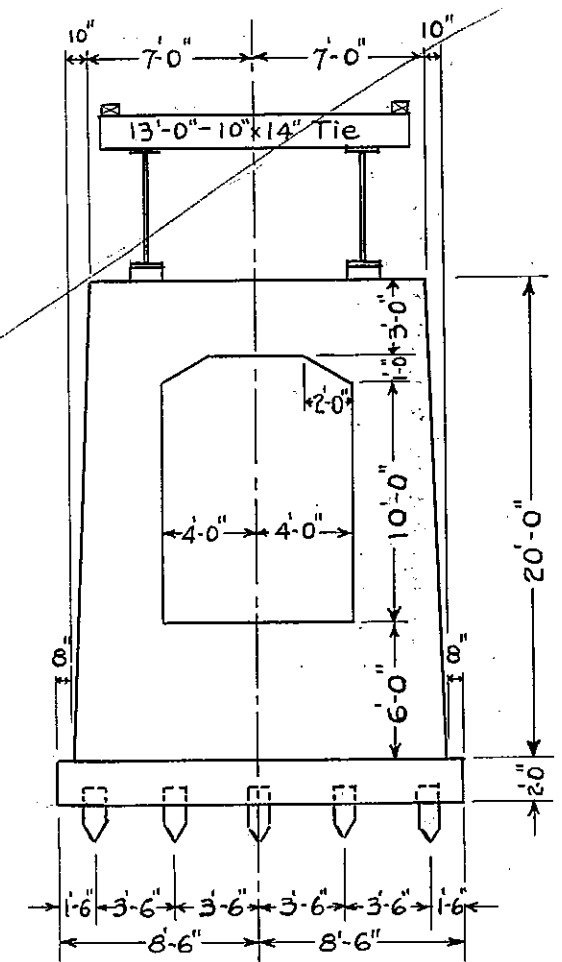
TYPICAL BENT 1 & 6



TYPICAL BENT 2 & 5



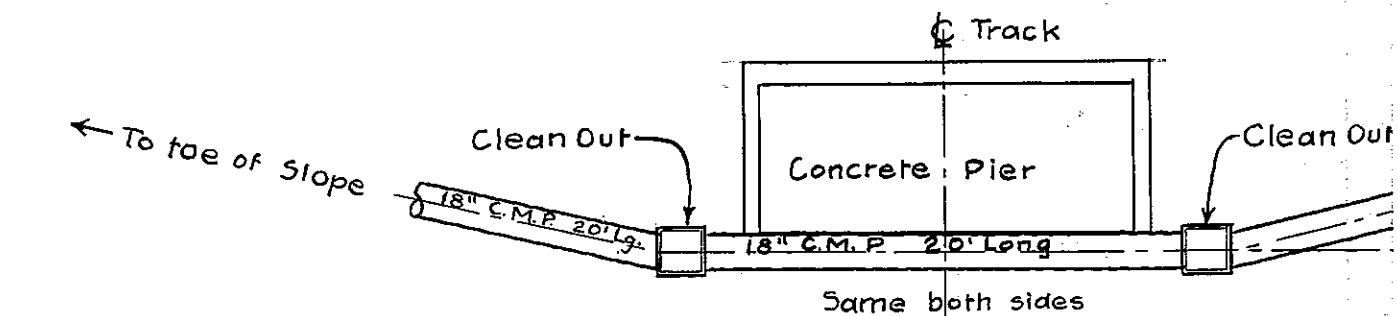
TYPICAL PIER 3 & 4



SECTION A-A

Scale $\frac{3}{8}$ in. = 1 ft.

PLAN



CLEANOUT BASINS

Timber Trestles W/ DPG SPAN

1.02 4
1.02

E&N Railway

SECTION: Victoria to Nanaimo

MILE POST # 1.02 Welltox Spur

CROSSING:	STREAM:	SPAN TYPE: 4-15' (PT) + 53 DPG
INSPECTION DATE: 10/10/11	STREAM DEPTH: 10	HEIGHT:
LOCATION: Nanaimo	FLOW DIRECTION: EAST	LENGTH:
INSPECTORS: MJO, AL	DECK TYPE: Open / Ballast	RATING:
NO. OF SPANS: 5	WALKWAY: (Yes/No) - EW side	SPAN LENGTH(S):
NO. OF TRACKS: 1	HANDRAILS: (Yes/No) - EW side	

Inspection Findings:

END BENT NOTES

Type of End Bent Construction = Timber

1. # of piles = 7
2. Pile diameter = 4-12" dia + 3-square 14"x14"
3. Pile cap size = 13 1/4" deep x 14" wide

South End (Bent 1):

1. Drift accumulated =
2. Bent rotation =
3. Pile cap general condition =
4. Pile cap bulging/splitting =
5. Pile cap has excessive internal/external decay =
6. Pile general condition = 4-round piles have splits, 2-piles have loss 50% sheet.
7. Piles have excessive internal/external decay = yes 1 has 10% loss, other 30%
8. Piles bulging/splitting = N/A

Other Notes:

(Note: Additional \square -piles were added since other piles were settling. Some \square piling have gash need shim

North End (Bent TBD):

1. Drift accumulated =
2. Bent rotation =
3. Pile cap general condition =
4. Pile cap bulging/splitting =
5. Pile cap has excessive internal/external decay =
6. Pile general condition =
7. Piles have excessive internal/external decay =
8. Piles bulging/splitting =

Other Notes:

Abutment sitting on soil not No piles found

INTERMEDIATE BENT NOTES

Use timber schematic to mark up section loss in individual piles.

- Bent #2
1. # of piles = 9
 2. Pile diameter = 5-12" dia, 4- \square piles
 3. Pile cap size = 13 1/4" deep x 14" wide
 4. Bents plumb = Y
 5. Signs of pumping piles = ~~yes~~ not now additional 4- \square piles were added.
 6. Signs of scour/erosion = Y
 7. Posted piles = Y

Bent #5 has 14"x14" \square piles Founded on concrete pad (Footings)

BACKWALL/WINGWALL NOTES

Type of Wingwall Construction = *Timber*

Type of Backwall Construction = "

South End:

1. Undermining = *OK*

2. Cracks =

3. Leaning =

Other Notes:

North End:

1. Undermining =

2. Cracks =

3. Leaning =

Other Notes:

DECK NOTES

Ballast / open deck =

Track Alignment Notes:

1. Bridge on tangent or curve =

2. Max. superelevation at midspan =

3. Chord offset at midspan (distance from center of track to center of stringers) =

Other Notes:

Ballast Deck Notes (if applicable):

1. Ballast depth =

2. Ballast retainer size =

3. Floor plate / floor timber condition =

4. Deck width =

5. Floor timber size =

Other Notes:

Tie Notes:

1. Tie size = $7\frac{1}{2}"$ wide x $7\frac{1}{2}"$ deep x $10'$ long = *Span 1, 2, 4+5*

2. Tie spacing = $12"$ (Span 1, 2, 4+5) $14"$ span = 3

3. Ties dapped for superelevation =

4. Rail plates cutting into ties = *Ne*

5. Overall tie condition = *Good*

6. Approach ties swinging = *yes Both sides*

7. Approx. number of bad ties = *2*

8. Method of tie connection = *J-Bolt*

Other Notes:

Track Notes:

1. Rail section weight = *100 lbs*

2. CWR or jointed rail = *9" x 8"*

3. Inner guardrail size/weight (if applicable) =

4. Is line of track good = *Yes*

5. Approaches low = *Yes*

Other Notes

Walkways/Refuge Bay Notes:

1. Walkways on bridge =
2. Walkway condition =
3. Refuge bays on bridge =
4. Refuge bay condition =

Other Notes:

SPAN NOTES

1. # of stringers = 8
2. Stringer size = _____ deep x _____ wide
3. Out-out of exterior stringers =
4. General stringer condition = Fair Some splits
- Use timber span schematic for marking up section loss in individual stringers where required (See Markup)
5. Ends of stringers crushing = No
6. Horizontal shear cracks in stringers = No
7. Fractured stringers = No
8. Decay/insect damage = No

Other Notes:

EXTRA TIMBER MEMBER NOTES (WHERE IN PLACE)

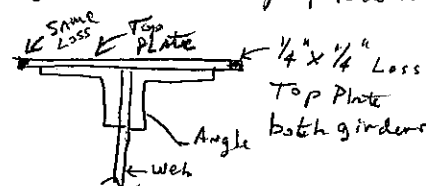
1. Longitudinal bracing =
2. Longitudinal bracing size =
3. Longitudinal bracing condition =
4. Sway bracing =
5. Sway bracing size =
6. Sway bracing condition =
7. Sash bracing =
8. Sash bracing size =
9. Sash bracing condition =
10. Mud sills @ bents =
11. Mud sill condition =

Other Notes:

Side 1 + Side 2
3 - 17 1/4" x 10"
1 - 17 1/4" x 9"

53' - DPG SPAN

- Top Flange has pitting on top
Reduce section on top plate at edge



- Bottom Flanges has minimum loss.

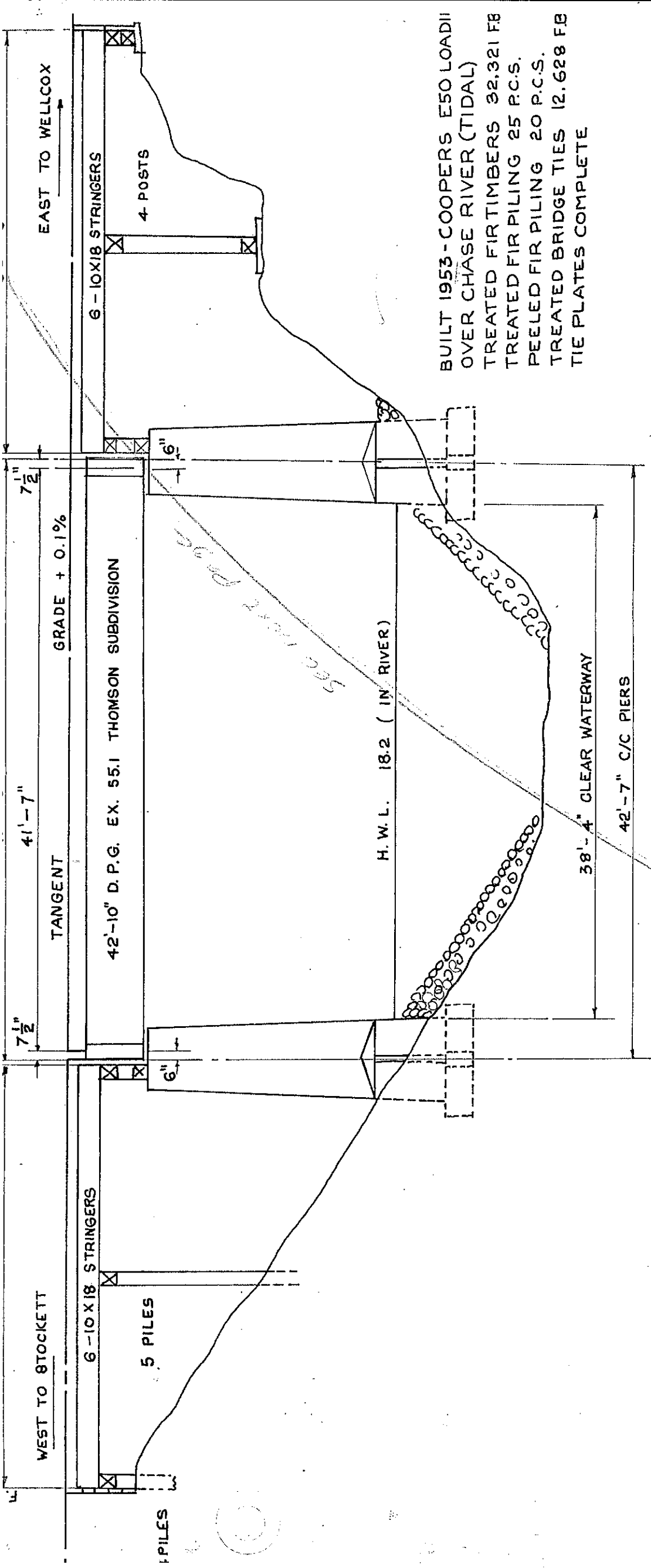
History:

- Original construction year = ?
- Summary of bridge updates = North & timber approach was replaced 15 years ago due to fire loss.

Recommended Work:

ITEM #
1

RECOMMENDED WORK



BRITISH COLUMBIA DISTRICT
 ESQUIMALT & NANAIMO DIVISION
 VICTORIA SUBDIVISION
 STOCKETT-WELLCOX BRANCH

BRIDGE 1.02

SCALE 1" = 8'
 VICTORIA B.C.
 MAY 5 1958.

NOV 3/11 ①

MILE 37.6 - 25 MPH

TIMBER TRESTLE

OBSERVED EAST SIDE FROM

SOUTH-EAST CORNER

OBSERVED STRINGER DEFLECTION

NO VISIBLE BUMPING OF PILES

MILE 37.8 - 25 MPH

OBSERVED EAST TRUSS FROM

S-E CORNER

TIE DEFLECTION - NO VISIBLE

FLOOR BEAM OR TRUSS

DEFLECTION

MILE 39.3 - 5 MPH

OBSERVED WEST TRUSSES 'B&C'

FROM S-W CORNER

NO VISIBLE DIFFERENTIAL DEFLECT

BE TWEEN TRUSSES

NOV 3/11 ②

MILE 46.6 - 25 MPH

- OBSERVED FROM S-E CAP.

① SOME PILECAP MOVEMENT

② WAVE UNDER AXLES DUE TO

TIE FLEX.

MILE 47.9 - 10 MPH

① OBSERVED FROM S.E. CORNER

- QUEEN POST UNDER - TRUSS

@ 44 STRINGER IS LOOSE

- VISIBLE DEFLECTION IN LOOSE

TIE ROD & STRINGER

② OBSERVED WEST TRUSS - BOTTT

CHORD EYE BARS - SPAN 2-3

(OR 3-4 ?)

EYE BARS HAVE SLIGHT BEND.

IN PLAN

NO VISIBLE STRAIGHTENING

TYPICAL VIBRATION ONLY

SLIGHT HORIZ VIBRATION OF BRIDGE
WHILE SITTING ON FLOOR BEAM