Orange County Bridge Review Summary

Dokken Engineering performed a field review of the Orange County bridge listed below in February 2017 to identify maintenance activities eligible for Caltrans' Bridge Preventive Maintenance Program (BPMP), dated December 2015, funding. Additional maintenance activities, if present, not eligible for BPMP funding were also noted. Maintenance recommendations, if noted in the most recent Caltrans Bridge Inspection Report (BIR), were confirmed.

Bridge Number: 55C0179

Bridge Name: Silverado Canyon Creek **Year Built:** 1947

Facility Carried: Silverado Canyon Road

The Silverado Canyon Creek Bridge at Silverado Canyon Road is a simply supported single span steel girder bridge with reinforced concrete open-end seat abutments supported on spread footings.

Caltrans BIR recommendations:

- Remove and replace broken wingwall on the north east corner.
- Replace missing metal most and two damaged metal posts on southern bridge railing.

Field Inspection Observations

- Minor delamination at the north end of bridge (photo 1).
- Efflorescence visible on soffit this is indicative of water seepage through deck cracks (photo 2). Recommend sealing deck.
- Minor delamination on top of the southeast wingwall (photo 4).
- Paint on steel girder flanges is chipping (photo 3).
- Northeast wingwall is broken (photo 6).
- Barrier on the south end have damaged metal post (photo 5).

Maintenance Needs Assessment

BPMP Assessment

- Because bridge railing does not meet current standards it is not eligible for funding. Caltrans can be contacted to determine if barrier upgrade can be performed, though typically also not eligible.
- Though not specifically covered in BPMP, petition Caltrans to fund broken wingwall repair.
- Spot paint steel girders.

General Maintenance – Non-BPMP

- Deck cracking condition is coded condition state 1, so deck treatment not eligible for BPMP funding.
- Repair damaged barrier posts.
- Remove and patch delaminated concrete at bridge north end. Considered low priority, and patch spalled concrete at the southeast wingwall.

Proposed BPMP Construction Costs

- Remove delaminated concrete and patch ≈ $15,000.
- Repair broken wingwall ≈ $25,000.
- Spot Paint girders ≈ $25,000. Possibly much higher if existing paint contains lead.

Construction Costs Not Funded by BPMP

- Repair Damaged Railing ≈ $15,000.

APPENDIX A

Photos and BIR

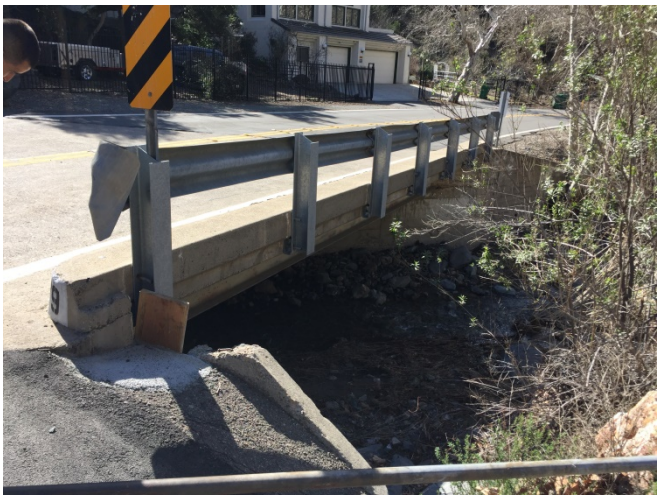


Photo 1: Silverado Canyon Creek Bridge

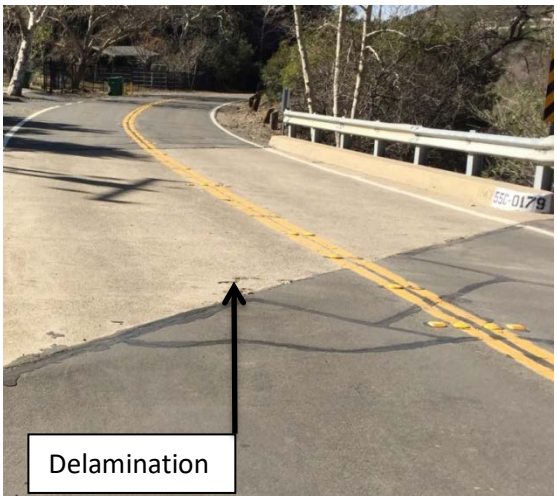


Photo 2: Concrete Delamination on bridge deck

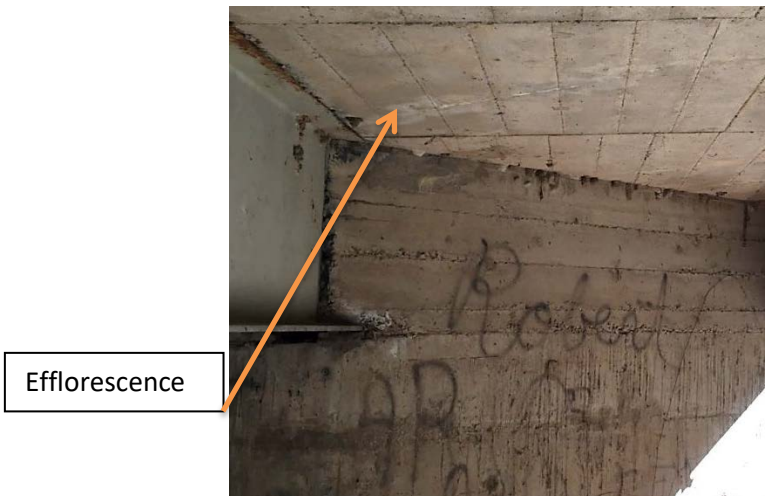


Photo 3: Efflorescence on Bridge Soffit

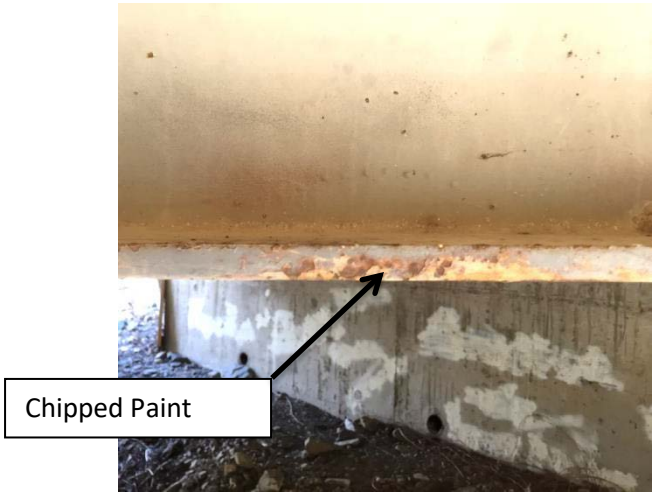


Photo 4: Paint chipping on grinder flange

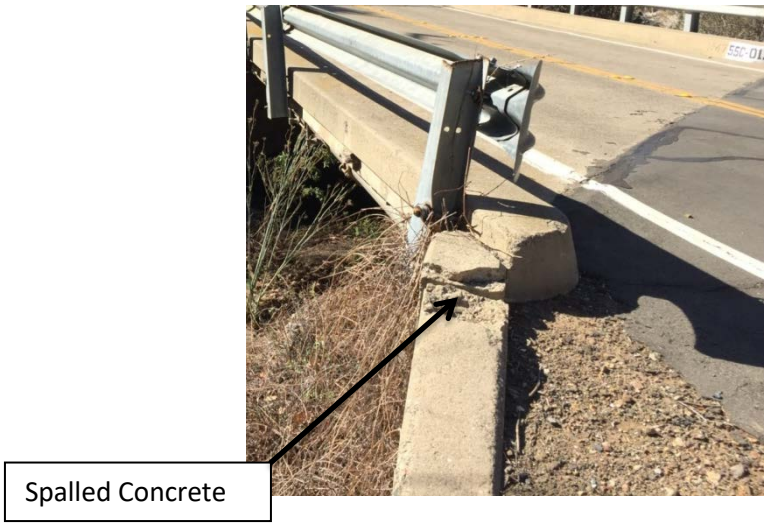


Photo 5: Concrete spalling on wingwall

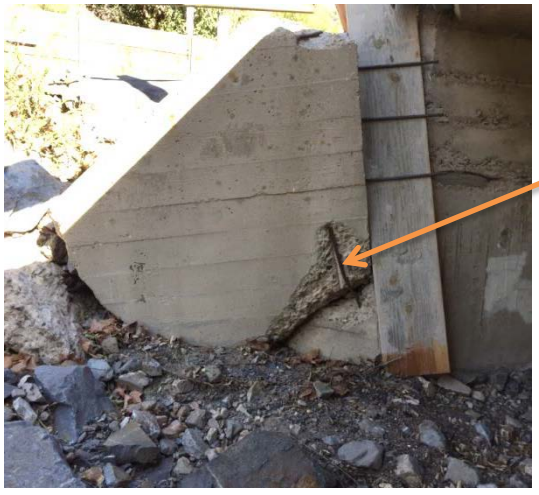


Photo 6: Broken Wingwall

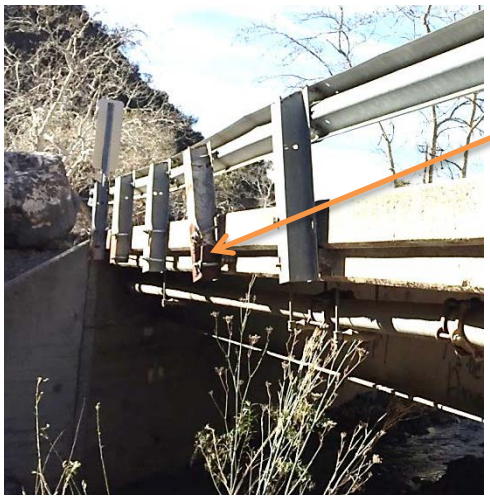


Photo 7: Damaged Metal Post

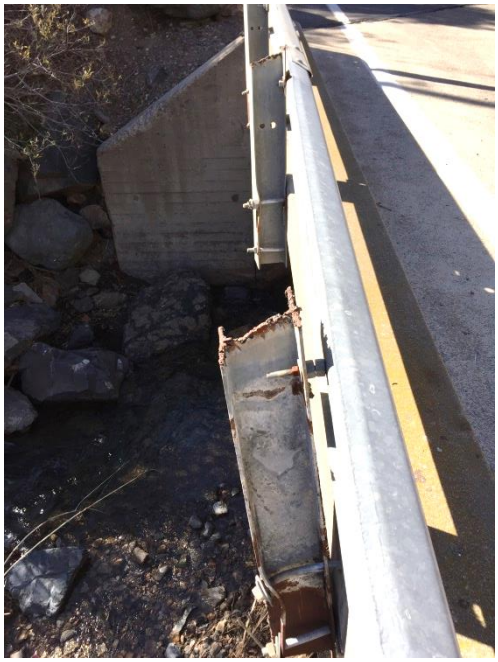


Photo 8: Broken Post

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 55C0179
Facility Carried: SILVERADO CANYN RD
Location : 5.4 MI E/O SANTIAGO CYN
City :
Inspection Date : 12/14/2013
Inspection Type
Routine FC Underwater Special Other
X

Bridge Inspection Report

STRUCTURE NAME: SILVERADO CANYON CREEK

CONSTRUCTION INFORMATION

Year Built : 1947
Year Widened: N/A
Length (m) : 12.2
Skew (degrees): 45
No. of Joints : 0
No. of Hinges : 0

Structure Description: Simply supported single span steel girders (4 each) with RC open end seat abutments, all supported upon spread footings.

Span Configuration : (W) 1 @ 11.9 m (E) c/c

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: 20.8 metric tons Calculation Method: NO RATING ANALYSIS
Operating Rating: 33.5 metric tons Calculation Method: NO RATING ANALYSIS
Permit Rating : G0000
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: (S) 0.5 m br, 7.2 m, 0.5 m br (N)
Total Width: 8.2 m Net Width: 7.3 m No. of Lanes: 2 Speed: 25 mph
Min. Vertical Clearance: Unimpaired
Rail Code: 1000

Rail Type	Location	Length (ft)	Rail Modifications
MBBR	Right/Left	78	

DESCRIPTION UNDER STRUCTURE

Channel Description: Natural earth trapezoidal with a cobbled bottom.

INSPECTION COMMENTARY

SCOPE AND ACCESS

The water in the channel is 8" deep, so all substructure elements were visually inspected.

REVISIONS

ELI #215 (RC Concrete Abutment): a quantity of 2 m was moved to state 2.

Element 337 (W6X25 steel posts): The quantities were modified as follows: from [St. 1 = 18, St. 2 = 6] to [St. 1 = 12, St. 2 = 6, St. 3 = 6].

Smart flag 358 (Deck cracking) was added (State 2).
S
mart flag 359 (Soffit) was added (State 2).

MISCELLANEOUS

INSPECTION COMMENTARY

Photo underside of this structure was taken and is included with this report.

A new stream section was performed at this time and is included in this report.

DECK AND ROADWAY

There is missing a metal post and two damaged metal posts in the southerly bridge railing.

The concrete deck exhibits:
* 90% light scaling due to weather and aging.
* two areas of unsound concrete -/+ 1 ft X 1 ft at the north shoulder at 10 ft and 20 ft from the east end.
* few transverse cracks up to 1.5 mm wide and up to 10 ft long in both lanes.

There were transverse cracks with white efflorescence, 2 cracks in every bay of the soffit.

SUPERSTRUCTURE

Freckled rust is forming on the steel girders without corrosion.
In steel girder #4 (south), the bottom flange is damaged and bent at three different locations at mid-span, the total length of this deterioration is 18" total.

SUBSTRUCTURE

The wing wall adjacent to the north end of the east abutment has broken off at the base and tilted, this condition is old condition and does not appear to have any effect on the structure.
The west abutment exhibits:
* a vertical crack 0.5 mm wide under girder #3.
* few spots of abrasion at 1 ft from the ground, mostly at the southern half of the abutment.

ELEMENT INSPECTION RATINGS

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
12	Concrete Deck - Bare	2	60	sq.m.	60	0	0	0	0
107	Painted Steel Open Girder/Beam	2	48	m.	0	0	48	0	0
215	Reinforced Conc Abutment	2	24	m.	22	2	0	0	
337	Metal Railing (W6X25 Posts)	2	24	m.	12	6	6	0	
358	Deck Cracking	2	1	ea.	0	1	0	0	0
359	Soffit of Concrete Deck or Slab	2	1	ea.	0	1	0	0	0

WORK RECOMMENDATIONS

RecDate: 05/18/2009
Action : Sub-Misc.
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Remove the broken wing wall at the north east corner and replace it within kind.

WORK RECOMMENDATIONS

RecDate: 02/09/2005
Action : Railing-Repair
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Replace the missing metal post and the two damaged metal posts in the southerly bridge railing.

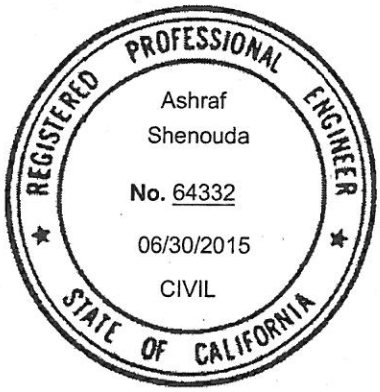
CHANNEL X-SECTION

Side : Upstream
Measured From : Top of rail (south). H=0.88 m

X-Section Date: 12/14/2013

Location	Horiz(m)	Vert(m)	Comments
Abutment #1	0.00	4.15	face W. abutment, thalweg, w. edge water
	2.55	3.90	mid-span
	4.25	3.80	east edge of water
	7.10	3.30	toe of slope
	9.10	2.80	top of slope
Abutment #2	11.65	2.75	Face of the east abutment.

Team Leader : Ashraf Shenouda
Report Author : Ashraf Shenouda
Inspected By : A.Shenouda/KD.Henderson



Ashraf Shenouda (Registered Civil Engineer) 2/10/14 (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER 55C0179
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 12
(3) COUNTY CODE 059 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- SILVERADO CANYON CREEK
(7) FACILITY CARRIED- SILVERADO CANYN RD
(9) LOCATION- 5.4 MI E/O SANTIAGO CYN
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 33 DEG 44 MIN 45.52 SEC
(17) LONGITUDE 117 DEG 35 MIN 54.75 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- STEEL
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 302
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 1
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- NONE CODE 0
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1947
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 2000
(30) YEAR OF ADT 2009 (109) TRUCK ADT 1 %
(19) BYPASS, DETOUR LENGTH 199 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 11.9 M
(49) STRUCTURE LENGTH 12.2 M
(50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 7.3 M
(52) DECK WIDTH OUT TO OUT 8.2 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 6.4 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 45 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 7.3 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NOT APPLICABLE CODE N
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

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SUFFICIENCY RATING = 43.1
STATUS
HEALTH INDEX 80.1
PAINT CONDITION INDEX = 50.0

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- COLLECTOR URBAN 17
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 5
(59) SUPERSTRUCTURE 5
(60) SUBSTRUCTURE 6
(61) CHANNEL & CHANNEL PROTECTION 8
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- NO RATING ANALYSIS 5
(64) OPERATING RATING- 33.5
(65) INVENTORY RATING METHOD- NO RATING ANALYSIS 5
(66) INVENTORY RATING- 20.8
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 4
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 9
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 1000
(113) SCOUR CRITICAL BRIDGES 8

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- CODE
(76) LENGTH OF STRUCTURE IMPROVEMENT M
(94) BRIDGE IMPROVEMENT COST
(95) ROADWAY IMPROVEMENT COST
(96) TOTAL PROJECT COST
(97) YEAR OF IMPROVEMENT COST ESTIMATE
(114) FUTURE ADT 4121
(115) YEAR OF FUTURE ADT 2029

********** INSPECTIONS **********

(90) INSPECTION DATE 12/13 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)