

## **Orange County Bridge Review Summary**

Dokken Engineering performed a field review of the Orange County bridge listed below in April 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:** 55C0049

**Bridge Name:** Santiago Creek

**Year Built:** 1967

**Facility Carried:** Santiago Canyon Road

The Santiago Creek Bridge at Santiago Canyon Rd is a continuous three span cast-in-place reinforced concrete T-beam with reinforced concrete single column bents and reinforced concrete open end seat abutments all supported on spread footings. OCPW noted the existing deck has been treated.

### **Caltrans BIR recommendations:**

- Replace joint seal at abutment 4.

### **Field Inspection Observations**

- Efflorescence is visible on the bridge soffit (photo 3). No immediate action is required but the bridge soffit should continue to be monitored to determine if water is continuing to seep through the bridge deck.
- Confirmed joint seal is in need of replacement. Portions of the joint seal are missing (photo 5).
- No approach slab. It appears there is some AC settlement behind the abutments (photo 2). No immediate action is required but the approach should continue to be monitored.

### **Maintenance Needs Assessment**

#### **BPMP Assessment**

- Repair Abutment 4 joint seal. This is a pourable seal so less extensive work than other joint seal systems.

#### **General Maintenance – Non-BPMP**

- None

### **Proposed BPMP Construction Costs**

- Estimated Total Construction Cost ≈ \$20,000 (with engineering, traffic control, mobilization and contingency)

### **Construction Items Not Funded by BPMP**

- N/A

# **Appendix A**

## **Photos and BIR**



Photo 1:



Photo 2:



Efflorescence

Photo 3: Bridge Soffit



Photo 4:

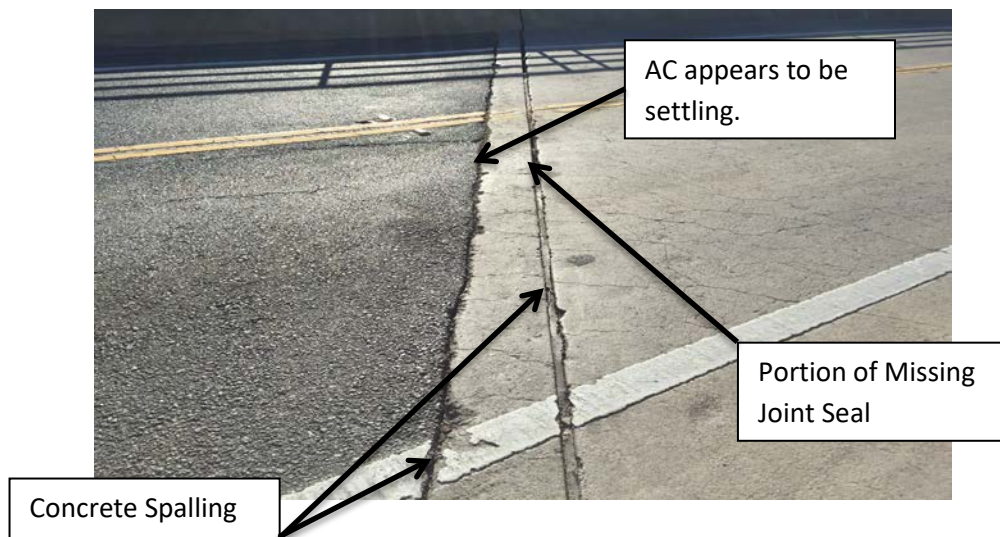


Photo 5: Joint Seal



**DEPARTMENT OF TRANSPORTATION**  
Structure Maintenance & Investigations

Bridge Number : 55C0049  
Facility Carried: SANTIAGO CANYON RD  
Location : 0.3 MI S/O MODJESKA RD  
City :  
Inspection Date : 08/13/2015  
Inspection Type  
Routine FC Underwater Special Other

**Bridge Inspection Report**

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**STRUCTURE NAME:** SANTIAGO CREEK

**CONSTRUCTION INFORMATION**

Year Built : 1967  
Year Widened: N/A  
Length (m) : 60  
Skew (degrees): 18  
No. of Joints : 1  
No. of Hinges : 0

Structure Description: Continuous three span CIP/RC T-beam (5 each) with RC single column bents and RC open end seat abutments, all supported upon spread footings.

Span Configuration : (S) 18.0 m, 24.8 m, 18.0 m (N) c/c

**SAFE LOAD CAPACITY AND RATINGS**

Design Live Load: MS-18 OR HS-20  
Inventory Rating: 40.8 metric tons  
Operating Rating: 68.0 metric tons  
Permit Rating : PPPPP  
Posting Load : Type 3: Legal  
Calculation Method: LOAD FACTOR  
Calculation Method: LOAD FACTOR  
Type 3S2: Legal  
Type 3-3: Legal

**DESCRIPTION ON STRUCTURE**

Deck X-Section: (W) 0.5 m br, 9.0 m, 0.5 m br (E)  
Total Width: 10.1 m Net Width: 9.0 m No. of Lanes: 2 Speed: 55 mph  
Min. Vertical Clearance: Unimpaired Overlay Thickness: 0.0 Inches  
Rail Code: 1111

Rail Type	Location	Length (ft)	Rail Modifications
Type 25	Right/Left	480	Hand rail

**DESCRIPTION UNDER STRUCTURE**

Channel Description: Natural earth trapezoida with a cobbled bottom.

**NOTICE**

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

**INSPECTION COMMENTARY**

**CONDITION OF STRUCTURE**

The channel was dry at time of inspection; all elements were visually inspection.

**SAFE LOAD CAPACITY**

The load rating for this structure is being reviewed by SM&I Ratings Branch. An updated Load Rating Summary Sheet will be archived when this review is complete. The current rating is based on BDS computer output dated 6/14/1979.

**ELEMENT INSPECTION RATINGS AND NOTES**

Elem No.	Defect /Prot	Element Description	Env	Total Qty	Units	Qty in each St. 1	St. 2	St. 3	State St. 4
16		Top Flange-RC	2	600	sq.m	580	20	0	0
1120		Efflorescence/Rust Staining	2	20		0	20	0	0
1130		Cracking (RC and Other)	2	580		580	0	0	0
521		Concrete Coat. (Meth/Paint/Seal)	2	600	sq.m	600	0	0	0

(16-1120)

There are short transverse crack in the soffit 0.5 mm wide by 2 ft long and longitudinal hairline cracks 3ft long with white efflorescence.

(16-1130)

The cracks have been sealed with methacrylate

(16-521)

There were no significant defects noted.

110		Girder/Beam-RC	2	300	m	300	0	0	0
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(110)

There were no significant defects noted.

205		Column-RC	2	2	each	2	0	0	0
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(205)

There were no significant defects noted.

215		Abutment-RC	2	34	m	34	0	0	0
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(215)

There were no significant defects noted.

234		Pier Cap-RC	2	18	m	18	0	0	0
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(234)

There were no significant defects noted.

301		Joint-Pourable Seal	2	12	m	0	0	12	0
2310		Leakage (Joints)	2	6		0	0	6	0
2330		Seal Damage (Joints)	2	6		0	0	6	0

(301-2310)

There are water stain at the abutment wall #4 (north)

(301-2330)

There are missing dry and section of the seal

312		Bearing-Enclosed	2	2	each	2	0	0	0
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(312)

The bearing element is included to indicate the presence of bearings on this structure. The bearings were not exposed for visual inspection. No indication of bearing distress was noted in any substructure element.

331		Railing-RC	2	120	m	120	0	0	0
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(331)

There were no significant defects noted.

**WORK RECOMMENDATIONS**



WORK RECOMMENDATIONS

RecDate: 05/13/2011  
 Action : Joints-Replace  
 Work By: LOCAL AGENCY  
 Status : PROPOSED

EstCost:  
 StrTarget: 2 YEARS  
 DistTarget:  
 EA:

Replace the joint seal at Abutment 4  
 (north) which is dry and 3 m is missing.

CHANNEL X-SECTION

Side : Upstream

X-Section Date: 08/13/2015

Measured From : Soffit of east girder

Location	Horiz (m)	Vert (m)	Comments
Abut 1	0.00	2.16	face of abut wall
	2.10	2.56	top of slope
Bent 2	-3.40	7.78	toe of slope
	0.00	7.76	CL of bent 2
	5.55	7.15	
	13.05	6.30	
	17.70	6.73	
	20.50	6.95	thalweg
Bent 3	0.00	6.35	CL of bent 3
	1.84	5.90	toe of slope
	7.30	3.40	break point
	12.95	1.43	top of slope
Abut 4	0.00	1.20	face of abut wall

Team Leader : Mikhael T. Zaarour

Report Author : Mikhael T. Zaarour

Inspected By : MT.Zaarour/KD.Henderson

*Mikhael**9/23/15*

Mikhael T. Zaarour (Registered Civil Engineer) (Date)

CC:



STRUCTURE INVENTORY AND APPRAISAL REPORT

## \*\*\*\*\* IDENTIFICATION \*\*\*\*\*

(1) STATE NAME- CALIFORNIA 069  
 (8) STRUCTURE NUMBER 55C0049  
 (5) INVENTORY ROUTE(ON/UNDER)- ON 140000000  
 (2) HIGHWAY AGENCY DISTRICT 12  
 (3) COUNTY CODE 059 (4) PLACE CODE 00000  
 (6) FEATURE INTERSECTED- SANTIAGO CREEK  
 (7) FACILITY CARRIED- SANTIAGO CANYON RD  
 (9) LOCATION- 0.3 MI S/O MODJESKA RD  
 (11) MILEPOINT/KILOMETERPOINT 0  
 (12) BASE HIGHWAY NETWORK- PART OF NET 1  
 (13) LRS INVENTORY ROUTE & SUBROUTE 000000000000  
 (16) LATITUDE 33 DEG 42 MIN 44.92 SEC  
 (17) LONGITUDE 117 DEG 38 MIN 42.4 SEC  
 (98) BORDER BRIDGE STATE CODE % SHARE %  
 (99) BORDER BRIDGE STRUCTURE NUMBER

## \*\*\*\*\* STRUCTURE TYPE AND MATERIAL \*\*\*\*\*

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE CONT  
 TYPE- TEE BEAM CODE 204  
 (44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA  
 TYPE- OTHER/NA CODE 000  
 (45) NUMBER OF SPANS IN MAIN UNIT 3  
 (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 1967  
 (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 8000  
 (30) YEAR OF ADT 2012 (109) TRUCK ADT 3 %  
 (19) BYPASS, DETOUR LENGTH 2 KM

## \*\*\*\*\* GEOMETRIC DATA \*\*\*\*\*

(48) LENGTH OF MAXIMUM SPAN 23.8 M  
 (49) STRUCTURE LENGTH 60.0 M  
 (50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M  
 (51) BRIDGE ROADWAY WIDTH CURB TO CURB 9.0 M  
 (52) DECK WIDTH OUT TO OUT 10.1 M  
 (32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 12.5 M  
 (33) BRIDGE MEDIAN- NO MEDIAN 0  
 (34) SKEW 18 DEG (35) STRUCTURE FLARED NO  
 (10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M  
 (47) INVENTORY ROUTE TOTAL HORIZ CLEAR 9.0 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

## \*\*\*\*\* SUFFICIENCY RATING \*\*\*\*\*

SUFFICIENCY RATING = 80.0  
 STATUS  
 HEALTH INDEX 99.5  
 PAINT CONDITION INDEX = N/A

## \*\*\*\*\* CLASSIFICATION \*\*\*\*\*

(112) NBIS BRIDGE LENGTH- YES Y  
 (104) HIGHWAY SYSTEM- ROUTE ON NHS 1  
 (26) FUNCTIONAL CLASS- OTHER PRIN ART URBAN 14  
 (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 \*\*\*\*\*

(58) DECK 7  
 (59) SUPERSTRUCTURE 8  
 (60) SUBSTRUCTURE 8  
 (61) CHANNEL & CHANNEL PROTECTION 8  
 (62) CULVERTS N

## \*\*\*\*\* LOAD RATING AND POSTING \*\*\*\*\*

(31) DESIGN LOAD- MS-18 OR HS-20 5  
 (63) OPERATING RATING METHOD- LOAD FACTOR 1  
 (64) OPERATING RATING- 68.0  
 (65) INVENTORY RATING METHOD- LOAD FACTOR 1  
 (66) INVENTORY RATING- 40.8  
 (70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5  
 (41) STRUCTURE OPEN, POSTED OR CLOSED- A  
 DESCRIPTION- OPEN, NO RESTRICTION

## \*\*\*\*\* APPRAISAL \*\*\*\*\*

(67) STRUCTURAL EVALUATION 8  
 (68) DECK GEOMETRY 2  
 (69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N  
 (71) WATER ADEQUACY 9  
 (72) APPROACH ROADWAY ALIGNMENT 8  
 (36) TRAFFIC SAFETY FEATURES 1111  
 (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 12365  
 (115) YEAR OF FUTURE ADT 2035

## \*\*\*\*\* INSPECTIONS \*\*\*\*\*

(90) INSPECTION DATE 08/15 (91) FREQUENCY 48 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)