

# Rhode Island Department of Transportation

## Bridge Inspection Report

### Structure Inventory and Appraisal Sheet (English Units)

Name: **Washington Bridge South** Agency ID: **020001** Inspec Date: **07/28/2015**  
 AECOM-Commonwealth

#### IDENTIFICATION

Rte.(On/Under) <b>5A:</b> Route On Structure	State <b>1:</b> 44 Rhode Island
Rte. Signing Prefix <b>5B:</b> 1 Interstate Hwy	Facility Carried <b>7:</b> I-195 EB
Level of Service <b>5C:</b> 1 Mainline	Place Code <b>4:</b> East Providence
Route Number <b>5D:</b> 00195	SHD District <b>2:</b> District 3
Directional Suffix <b>5E:</b> 2 East	Feature Intersected <b>6:</b> SEEKONK RVR & STS
Border Bridge Code <b>98:</b> Not Applicable (P)	County Code <b>3:</b> Providence
Border Bridge Number <b>99:</b> -1	Location <b>9:</b> 1.0 Mi E of JCT I-95&195
Mile Post <b>11:</b> 24.144 mi	Latitude <b>16:</b> 41° 49' 08"
Struc Num <b>8:</b> 00000000002000	Longitude <b>17:</b> 071° 23' 13"
% Responsibility: Unknown	

#### INSPECTION

Inspection Date <b>90:</b> 7/28/2015	Frequency <b>91:</b> 24 months	Next Inspection: 7/28/2017
FC Inspection Date <b>93A:</b> NA	FC Frequency <b>92A:</b>	Next FC Inspection: NA
UW Inspection Date <b>93B:</b> 8/8/2013	UW Frequency <b>92B:</b> 60 months	Next UW Inspection: 8/8/2018
SI Date <b>93C:</b> NA	SI Frequency <b>92C:</b>	Next SI: NA
Element Insp. Date: 7/28/2015	Element Frequency: 24 months	Next Elem. Insp.: 7/28/2017

#### CONDITION

Deck <b>58:</b> 8 Very Good	Super <b>59:</b> 8 Very Good	Sub <b>60:</b> 6 Satisfactory	<b>SD/FO:</b> ND
Culvert <b>62:</b> N/A (NBI)	Channel/Channel Protection <b>61:</b> 6 Bank Slumping	<b>SUFF RATE:</b> 79.1	

#### LOAD RATING AND POSTING

Inventory Rating Method <b>65:</b> 3 LRFR Load & Res. Fact	Operating Rating Method <b>63:</b> 3 LRFR Load & Res. Fact
Inventory Rating <b>66:</b> 30.0 TONS	Operating Rating <b>64:</b> 40.0 TONS
Design Load <b>31:</b> 0 Unknown	Posting <b>70:</b> 5 At/Above Legal Loads
Posting Status <b>41:</b> A Open, no restriction	

#### GEOMETRIC DATA

Length Max Span <b>48:</b> 160.37 ft	Structure Length <b>49:</b> 1,670.79 ft
Width Curb to Curb <b>51:</b> 68.00 ft	Curb/Sdwlk Width L <b>50A:</b> 0.00 ft
Approach Roadway width <b>32:</b> 68.00 ft (w/ shoulders)	Curb/Sidewalk Width R <b>50B:</b> 0.00 ft
Deck Area: 119,461.48 sq. ft	Width Out to Out <b>52:</b> 71.50 ft
Skew <b>34:</b> 0.00°	Median <b>33:</b> 0 No median
Vertical Clearance <b>10:</b> 328.05 ft	Structure Flared <b>35:</b> 1 Yes, flared
Minimum Vertical Clearance Over Bridge <b>53:</b> 17.00 ft	Horizontal Clearance <b>47:</b> 83.80 ft
Minimum Vertical Underclearance Reference <b>54A:</b> H Hwy beneath struct	
Minimum Vertical Underclearance <b>54B:</b> 20.80 ft	
Minimum Lateral Underclearance Reference R <b>55A:</b> H Hwy beneath struct	
Minimum Lateral Underclearance R <b>55:</b> 14.50 ft	
Minimum Lateral Underclearance L <b>56:</b> 0.00 ft	

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#### AGE AND SERVICE

Year Built	27:	1930	ADT	29:	72,100
Type of Service on	42A:	1 Highway	Year Reconstructed	106:	2008
Type of Service under	42B:	6 Highway-waterway	Detour Length	19:	10.8 mi
Lanes on	28A:	5	Truck ADT	109:	10%
Lanes under	28B:	4	Year of ADT	30:	2008

#### STRUCTURE TYPE AND MATERIALS

Number of Approach Spans	46:	0	Number of Spans Main Unit	45:	14
Wearing Surface	108A:	1 Monolithic Concrete	Main Span Material Design	43A:	4 Steel Continuous
Membrane	108B:	0 None	Main Span Material Design	43B:	02 Stringer/Girder
Deck protection	108C:	1 Epoxy Coated Reinfo	Deck Type	107:	1 Concrete-Cast-ir

#### APPRAISAL

Bridge Rail	36A:	1 Meets Standards	Approach Rail	36C:	1 Meets Standards
Transition	36B:	1 Meets Standards	Approach Rail Ends	36D:	1 Meets Standards
Str Evaluation	67:	6 Equal Min Criteria	Deck Geometry	68:	4 Tolerable
Waterway Adequacy	71:	9 Above Desirable	Approach Alignment	72:	6 Equal Min Criteria
Scour Critical	113:	3 SC - Unstable			
Underclearance, Vertical and Horizontal	69:	9 Above Desirable			

#### CLASSIFICATION

Defense Highway	100:	1 On Interstate STRAHNE	Parallel Structure	101:	Right of    bridge
Direction of Traffic	102:	1 1-way traffic	Temporary Structure	103:	Not Applicable (P)
Highway System	104:	3 On free road	NBIS Length	112:	Long Enough
Defense Hwy	110:	1 On the NHS	Functional Class	26:	11 Urban Interstate
Toll Facility	20:	1 On Interstate STRAHNE	Historical Significance	37:	5 Not eligible for NRHP
Owner	22:	01 State Highway Agency	Custodian	21:	01 State Highway Agency

#### PROPOSED IMPROVEMENTS

Bridge Cost	94:	\$82,878,000	Type of Work	75:	35 Rehabilitate-gen.
Roadway Cost	95:	\$8,287,800	Length of Improvement	76:	1,863.8 ft
Total Cost	96:	\$124,317,000	Future ADT	114:	80,000
Year of Cost Estimate	97:	2007	Year of Future ADT	115:	2030

#### NAVIGATION DATA

Navigation Control	38:	Permit Required	Horizontal Clearance	40:	98.1 ft
Vertical Clearance	39:	41.0 ft	Lift Bridge Vertical Clearance	116:	
Pier Protection	111:	2 In-Place, Functioning			

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**ELEMENT CONDITION STATE DATA**

Elm/Env	Description	Unit	Total Qty	% in 1	Qty. St. 1	% in 2	Qty. St. 2	% in 3	Qty. St. 3	% in 4	Qty. St. 4
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12	Re Concrete Deck
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Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
12	Re Concrete Deck	sq.ft	119,494.00	0%	1.00	100%	119,493.00	0%	0.00	0%	0.00

The topside of the reinforced concrete deck is bare, with no applied protective wearing surface (See Photos 6, 7, 12). As previously noted, there is a 4" diameter possible core hole in Span 14, patched with rubber.

The underside is covered by stay-in-place forms except for in Bay 'G' and at the overhangs (See Photos 3, 4). There is a longitudinal construction joint / phase line that runs along the middle of Bay 'G', with evenly spaced anchor bolt holes also observed in this bay, adjacent to Girder 'G' (See Photo 24, 43). These holes are presumably left over from construction, and some have been filled while others have not. A few of the holes that have not been filled exhibit signs of leakage (See Photo 15).

1080	lamination/Spall/Patched Ar	each	0.09	0%	0.00	100%	0.09	0%	0.00	0%	0.00
<p><i>On the topside of deck, areas of minor scaling were noted throughout the four main travel lanes in Span 14 (See Photo 12). In addition, as previously noted, there are a few patches on the topside along the low-speed shoulder in Span 12 that were applied to repair areas of scaling.</i></p> <p><i>In Span 13, the exposed deck underside in Bay 'G' exhibits a few areas of scaling up to 36" x 20" near the 1st interior cross-frame from Pier 12 (See Photo 43).</i></p>											
1120	Efflorescence/Rust Staining	each	0.09	0%	0.00	100%	0.09	0%	0.00	0%	0.00
<p><i>The exposed deck underside in Bay 'G' typically exhibits hairline to 0.013" wide transverse cracks, some with efflorescence (See Photos 24, 43).</i></p>											
1130	Cracking (RC and Other)	each	0.09	100%	0.09	0%	0.00	0%	0.00	0%	0.00
<p><i>On the topside, there are isolated hairline cracks throughout. Along the low-speed lane and low-speed shoulder there are scattered transverse cracks up to 0.020" wide (See Photo 7).</i></p> <p><i>The exposed deck underside in Bay 'G' typically exhibits hairline to 0.013" wide transverse cracks, some with efflorescence (See Photos 24, 43).</i></p>											
1190	Abrasion(PSC/RC)	each	11,101.08	0%	0.00	100%	11,101.08	0%	0.00	0%	0.00
<p><i>The exposed topside of the deck exhibits moderate wear, minor chips in the concrete and isolated scrape marks (See Photos 6, 7, 12).</i></p>											
8382	Stay-in-Place Form	sq.ft	97,500.00	85%	82,500.00	15%	15,000.00	0%	0.00	0%	0.00
<p><i>In Bays 'H' and 'I', the stay-in-place forms exhibit scattered areas of oxidation and rust, mainly at the interfaces between adjacent form sections (See Photo 16). An area of rusting was also observed in Span 11, Bay 'A' between the 1st and 2nd interior cross-frames from Pier 10, and it appears to be due to leakage occurring at the interface between the forms and Girder 'A' top flange (See Photo 38).</i></p>											

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			107	Steel Opn Girder/Beam							
Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
107	Steel Opn Girder/Beam	ft	16,674.00	100%	16,644.00	0%	24.00	0%	6.00	0%	0.00

The superstructure consists of 10 weathering steel plate girders, continuous over all piers except Piers 4 and 9 (See Photo 3). Span 14 is splayed at the East Abutment, with two rolled section kicker beams supporting the splayed section along the south side of the bridge (See Photo 4). The girder ends are painted below the deck joints at the abutments and at Piers 4 and 9 (See Photos 21, 47).

The girders are generally in good condition, with some minor localized deficiencies as discussed under the respective defect elements. A few areas of pigeon debris were noted on the bottom flanges and there are also some locations of concrete debris/over-pour from construction (See Photos 27, 47).

As previously noted in the 2013 Inspection Report, Girders 'A', 'B' and 'C' in Span 11 appear to exhibit a slight negative camber. In addition, Girder 'J' in Span 1 has a fabrication defect on the bottom flange, approximately 11' from Pier 1 measuring 5" long x 1/8" deep.

515	Steel Protective Coating	sq.ft	251,200.00	98%	246,200.00	2%	5,000.00	0%	0.00	0%	0.00
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*The girders are protected by a weathering steel patina (See Photos 3, 4). The girder ends are painted below the deck joints at the abutments and at Piers 4 and 9 (See Photo 21, 47).*

*The weathering steel girders typically exhibit a normal surface patina with some scattered areas of discoloration (See Photos 3, 4, 14, 20). There are also scattered areas of spotty orange surface rust, mainly along the top flanges. The painted girder ends are mostly in good condition, with only isolated spots of chipped paint (See Photos 21, 47).*

*In Span 10, at Pier 9, the backside of the bearing stiffeners for Girders 'G' and 'H' in Bay 'G' are not painted (See Photo 36).*

3430	x Flm/Txt Adhr(Stl Prot Coa	each	22,668.34	98%	22,203.83	2%	464.52	0%	0.00	0%	0.00
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*The weathering steel girders typically exhibit a normal surface patina with some scattered areas of discoloration (See Photos 3, 4, 14, 20). There are also scattered areas of spotty orange surface rust, mainly along the top flanges.*

*The Girder 'A' bottom flange has scattered areas exhibiting minor flaking (See Photo 23).*

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1000	Corrosion	each	4.57	0%	0.00	100%	4.57	0%	0.00	0%	0.00
<p><i>In Span 3, between the first and second interior cross-frames from Pier 3, Girder 'H' exhibits a 4' length of minor laminar rust to the bottom flange and bottom 3" of web (See Photo 15). The rusting appears to be due to leakage through the anchor bolt hole on the underside of deck in adjacent Bay 'G'.</i></p> <p><i>In Span 11, between the first and second interior cross-frames from Pier 10, there is a 4' length of Girder 'A' exhibiting minor corrosion and laminar rust due to active leakage along the interface of the girder top flange and the stay-in-place form (See Photo 38).</i></p> <p><i>In Span 14, the north face of Girder 'A' at the east field splice has a 62" long x 1.5" high area of laminar rust along the bottom of web.</i></p>											
1020	Connection	each	3.66	0%	0.00	50%	1.83	50%	1.83	0%	0.00
<p><i>In Span 4, at the Girder 'F' bolted field splice, one of the bolt heads at the bottom flange is not flush with the splice plate (See Photo 20).</i></p> <p><i>In Span 7, at the Girder 'G' west field splice, there are three missing bolts in the bottom flange (See Photo 29). The east Girder 'G' field splice in Span 7 is missing one bolt in the bottom flange.</i></p> <p><i>In Span 8, the bottom flange of Girder 'G' at the east field splice exhibits a 1/8" gap between the bottom flange plate the splice plate above it.</i></p> <p><i>In Span 9, at the Girder 'A' field splice, there is a loose, undersized bolt in the bottom flange (See Photo 33).</i></p>											
1900	Distortion	each	0.61	0%	0.00	100%	0.61	0%	0.00	0%	0.00
<p><i>In Span 2, Girder 'I' has an area of minor impact damage to the bottom flange near the second interior cross-frame from Pier 2, with the flange deflected upward approximately 3/4" (See Photo 14). Girder 'J' in Span 2 has a similar area of minor impact damage in the same location, deflected upward slightly.</i></p>											
7000	Damage	each	0.30	0%	0.00	100%	0.30	0%	0.00	0%	0.00
<p><i>In Span 2, Girder 'I' has an area of minor impact damage to the bottom flange near the second interior cross-frame from Pier 2, with the flange deflected upward approximately 3/4" (See Photo 14). Girder 'J' in Span 2 has a similar area of minor impact damage in the same location, deflected upward slightly.</i></p>											

<b>205</b>	<b>Re Conc Column</b>
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Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
205	Re Conc Column	each	39.00	100%	39.00	0%	0.00	0%	0.00	0%	0.00

There are three reinforced concrete columns at each pier. The north column (Column 1) is supported on an independent drilled shaft. The center and south columns (Columns 2 and 3) are supported by a reinforced concrete pier wall that was part of the original structure (See Photos 25, 30, 39, 42). The columns are all in good condition.

8368	Graffiti	sq.ft	1,190.00	100%	1,190.00	0%	0.00	0%	0.00	0%	0.00
<p><i>The columns have scattered areas of graffiti, particularly at the land piers (See Photos 30, 39, 42).</i></p>											

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			210	Re Conc Pier Wall							
Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
210	Re Conc Pier Wall	ft	587.00	69%	405.00	31%	182.00	0%	0.00	0%	0.00

The reinforced concrete pier walls are part of the original structure and support the center and south columns at each pier (Columns 2 and 3). See Photos 25, 30, 39, 42.

The pier walls have a stone masonry veneer. There are scattered areas of missing mortar between the masonry veneer stones (See Photos 25).

As previously noted in the most recent routine inspection report, at Pier 10, there is some erosion at the northwest corner of wall, exposing a 12' long x 3' high portion of the footing.

1080	lamination/Spall/Patched Ar	each	0.30	0%	0.00	100%	0.30	0%	0.00	0%	0.00
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*At Pier 10, there is a 1' high x 1' wide x 2" deep spall at the southwest corner of the pier wall.*

*At Pier 11, the previously noted 31" high x 23" wide x 4" deep area of heavy scaling on the west face has been repaired with a concrete patch (See Photo 39).*

*On the east face of the Pier 12 wall, the previously noted 39" high x 2' wide x up to 5" deep spall at the north end has been repaired with a concrete patch (See Photo 42).*

1120	Efflorescence/Rust Staining	each	0.30	0%	0.00	100%	0.30	0%	0.00	0%	0.00
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*Pier 13 – There are two vertical cracks on the west face and one on the east face, all measuring full height x up to 1/16" wide and exhibiting heavy efflorescence.*

1130	Cracking (RC and Other)	each	177.70	69%	122.83	31%	54.86	0%	0.00	0%	0.00
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*The pier walls typically have scattered vertical hairline cracks (See Photos 25, 39). Wider and more extensive cracking is present at the following piers:*

*Pier 9 – There is a full-width x 1/16" wide transverse crack across the top face and a full height x up to 1/8" wide vertical crack on the west face south of Column 3. There is also an area of hairline map-cracking 12' long x 6' wide on the top face of pier wall between Columns 2 and 3.*

*Pier 10 – South of Column 3, there are three full-width transverse cracks across the top, up to 1/8" wide and extending down the vertical faces of the wall. There is also a 3' long x 1/8" wide vertical crack at the northwest corner.*

*Pier 12 – There is a full height x 1/16" wide vertical crack on both the east and west face of the pier wall between Columns 2 and 3 (See Photo 42). There is also a full height x up to 1/2" wide vertical crack on the east face, south of Column 3 that has been repaired with epoxy injection.*

*Pier 13 – There are two vertical cracks on the west face and one on the east face, all measuring full height x up to 1/16" wide and exhibiting heavy efflorescence.*

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7360	Settlement	each	0.30	100%	0.30	0%	0.00	0%	0.00	0%	0.00
<p><i>As noted in the last routine inspection, settlement gages previously installed at Pier 12 have either been removed or covered/painted over. As a result, previously noted minor rotation of the pier wall could not be verified. There are some medium to wide vertical cracks in the pier walls of Piers 9, 10 and 12, but no signs of significant settlement were observed during this inspection (See Photo 42).</i></p> <p><i>Signs of potential settlement of the Pier 7 wall was noted during the most recent underwater inspection. The following notes were retained from the most recent underwater inspection, conducted on 8/8/2013.</i></p> <p><b>2013 UNDERWATER INSPECTION:</b>  <i>At Pier #7, on both the west and east faces of the pier, there are vertical cracks open to 1/4" wide that extend from the top of the cap down to the channel bottom near the midpoint of the pier stem that may indicate slight settlement of the pier (See Photo Nos. 8 and 9).</i></p>											
7361	Scour	each	0.30	100%	0.30	0%	0.00	0%	0.00	0%	0.00
<p><i>This element is assessed by an underwater inspection, which was not part of the scope of this routine inspection. The following notes were retained from the most recent underwater inspection, conducted on 8/8/2013.</i></p> <p><b>2013 UNDERWATER INSPECTION:</b>  <i>The channel bottom consists of mud, sand, and shells with scattered construction debris throughout. The maximum penetration into the channel bottom is 1'. As compared to the 2009 Underwater Inspection Report, there is evidence of scour that has exposed the steps / pile caps up to 3' vertically x up to the full-length of the piers at Pier #'s 4, 5, 8, and 9. There has been no apparent change to the channel orientation as compared to the 2009 Underwater Inspection Report (See Photo Nos. 13 and 14). There is no significant erosion observed along the channel embankments. There is construction debris consisting of concrete rubble and steel at the channel bottom adjacent to the piers due to construction on the bikepath / pedestrian bridge. There is no significant obstructions or debris accumulation which would affect the hydraulic opening at the bridge.</i></p>											
8368	Graffiti	sq.ft	3,240.00	0%	0.00	100%	3,240.00	0%	0.00	0%	0.00
<p><i>The pier walls on land typically exhibit areas of moderate to heavy graffiti (See Photos 39, 42).</i></p>											

		<b>215</b>	<b>Re Conc Abutment</b>								
Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
215	Re Conc Abutment	ft	171.00	98%	168.00	2%	3.00	0%	0.00	0%	0.00

The West Abutment of Bridge 200 is continuous with the west abutment for adjacent Bridge 700 to the north. The East Abutment of Bridge 200 is continuous with the remaining original section of abutment to the south.

The face of both abutments exhibits areas of light rust staining from the girders above (See Photos 13, 46). At the West Abutment, the previously noted areas of graffiti have been painted over. Also, there is a steel cable left on the beam seat of the West Abutment from construction.

1080	lamination/Spall/Patched Ar	each	0.61	0%	0.00	100%	0.61	0%	0.00	0%	0.00
<p><i>East Abutment – At the north corner, along the top of the abutment stem adjacent to the northeast return wall, there is a 9' high x 1' wide hollow area with perimeter cracking and adjacent 3' high x 10" wide x up to 8" deep spall (See Photo 46).</i></p>											
1120	Efflorescence/Rust Staining	each	0.30	0%	0.00	100%	0.30	0%	0.00	0%	0.00
<p><i>West Abutment - There is a 20' long horizontal hairline crack with efflorescence and moisture staining, located near the base of abutment under Bays 'H' and 'I'.</i></p> <p><i>East Abutment – The East Abutment face exhibits random cracks with efflorescence, some which have already been repaired (See Photo 46).</i></p>											



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1130	Cracking (RC and Other)	each	51.21	100%	51.21	0%	0.00	0%	0.00	0%	0.00
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*West Abutment – The face of the abutment exhibits scattered vertical and diagonal hairline cracks, most of which have been ground out and sealed (See Photo 13). There is also a 20' long horizontal hairline crack with efflorescence and moisture staining, located near the base of abutment under Bays 'H' and 'I'. Random areas of hairline map-cracking are present along the top 10' of the abutment face.*

*East Abutment – The East Abutment face exhibits random cracks with efflorescence, some which have already been repaired (See Photo 46).*

			220	Re Conc Pile Cap/Ftg							
Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
220	Re Conc Pile Cap/Ftg	ft	19.69	100%	19.69	0%	0.00	0%	0.00	0%	0.00

This is an underwater inspection element. Refer to previous underwater inspection notes from 8/8/2013, included below.

**2013 UNDERWATER INSPECTION:**

The piers are founded on reinforced concrete pile caps with unknown type piles and concrete tremie seals. The pile caps have been exposed as follows and exhibit scaling up to 1/2" deep on the exposed surfaces:

**Pier #4:** The sloped concrete step / pile cap (steps out 18" from the pier face then slopes off at the 45° angle towards the channel bottom) is exposed between 0.4' and 3' vertically extending from the northwest (upstream) shoulder, along the length of the east face of pier, and terminates at the south (downstream) nose. The exposed surfaces of the step / pile cap exhibit scaling up to 1/2" deep.

**Pier #5:** The reinforced concrete pile cap (steps out 2' from the pier face) has been exposed up to 1' vertically along the south (downstream) nose of the pier and over a length of 4' along the west face of the pier at the southwest corner. The exposed surfaces of the pile cap exhibit scaling up to 1/2" deep.

**Pier #6:** There is no observed exposure of the pier pile cap.

**Pier #7:** There is no observed exposure of the pier pile cap.

**Pier #8:** The sloped concrete step / pile cap (steps out 18" from the pier face then slopes off at the 45° angle towards the channel bottom) is exposed between 6' and 10' long x 3' vertically at the northwest (upstream), southwest (downstream), northeast (upstream), and southeast (downstream) corners of the pier. The exposed surfaces of the step / pile cap exhibit scaling up to 1/2" deep.

**Pier #9:** The sloped concrete step / pile cap (steps out 18" from the pier face then slopes off at the 45° angle towards the channel bottom) is exposed over a length of approximately 65' x up to 0.5' vertically along the west face of the pier originating approximately 5' from the north (upstream) shoulder. The exposed surfaces of the step / pile cap exhibit scaling up to 1/2" deep.

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<b>225</b>	<b>Steel Pile</b>
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Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
225	Steel Pile	(EA)	6.00	100%	6.00	0%	0.00	0%	0.00	0%	0.00

This element is accessed via an underwater inspection, which is not part of the scope of this routine inspection. Refer to the previous underwater inspection notes from 8/8/2013, attached below:

**2013 UNDERWATER INSPECTION:**

This element shall be used to rate the condition of the steel jacketed concrete filled caisson piles at the north (upstream) end of the piers.

The caisson piles have a fiberglass jacket in place that extends from the underside of the concrete cap section to 13.5' below the cap section that has no significant deficiencies (See Photo Nos. 2 - 12). At Pier #5, the exposed steel jacket exhibits a 1' high band of laminar corrosion with negligible section loss along the channel bottom. The remainder of the caisson piles have minor corrosion.

<b>234</b>	<b>Re Conc Pier Cap</b>
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Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
234	Re Conc Pier Cap	ft	920.00	99%	909.00	1%	11.00	0%	0.00	0%	0.00

There are reinforced concrete pier caps at each pier (See Photos 25, 30, 39, 42). The pier caps have isolated areas of minor debris on the beam seats, and at Piers 7 and 8 there are steel cables left on top of the beam seat from construction.

1080	lamination/Spall/Patched Ar	each	0.61	0%	0.00	100%	0.61	0%	0.00	0%	0.00
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*At the west face of Pier 1, there is a 6" wide x 3" high x 1/2" deep chip at the bottom edge between Columns 1 and 2. The east face of Pier 13 has a minor 6" diameter x 3/4" deep spall along the bottom edge between Columns 1 and 2.*

1120	Efflorescence/Rust Staining	each	0.30	0%	0.00	100%	0.30	0%	0.00	0%	0.00
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*The pier caps have scattered vertical and diagonal cracks, up to 0.016" wide x full-height, with some exhibiting light efflorescence (See Photo 31).*

1130	Cracking (RC and Other)	each	279.50	99%	277.06	1%	2.44	0%	0.00	0%	0.00
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*The pier caps have scattered hairline vertical and diagonal cracks, up to full-height, with some exhibiting light efflorescence (See Photo 31). There are also a few crescent shaped cracks present at the caps at Pier 6 and Pier 8.*

*At the west face of Pier 3, there are 2 vertical cracks in the pier cap beneath Girders 'E' and 'F' that extend onto the underside of cap (See Photo 17). Below Girder 'E' the vertical crack measures 6' high x 0.010" wide and continues across the full width of the cap underside. Below Girder 'F' the vertical crack measures 6' high x 0.005" wide and continues 12" onto the underside of cap.*

<b>300</b>	<b>Strip Seal Exp Joint</b>
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Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
300	Strip Seal Exp Joint	ft	68.00	0%	0.00	100%	68.00	0%	0.00	0%	0.00

There is a strip seal expansion joint at the West Abutment (See Photo 5). The seal is depressed downward slightly in a few locations.

2350	Debris Impaction	each	20.73	0%	0.00	100%	20.73	0%	0.00	0%	0.00
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*There is light to moderate dirt and debris in the joint (See Photo 5).*

# Rhode Island Department of Transportation

## Bridge Inspection Report

### Structure Inventory and Appraisal Sheet (English Units)

#### 301 Pourable Joint Seal

Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
301	Pourable Joint Seal	ft	161.00	100%	161.00	0%	0.00	0%	0.00	0%	0.00

There is pourable joint sealant at the approach slab joints at both ends of the bridge (See Photo 4). The joints and sealant were found to be in good condition.

#### 303 Assem Jnt With Seal

Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
303	Assem Jnt With Seal	ft	220.00	0%	0.00	100%	220.00	0%	0.00	0%	0.00

There are modular expansion joints at Piers 4 and 9 and at the East Abutment (See Photos 9, 10). At the Pier 4 joint, in the low-speed shoulder, there are few areas where the neoprene seal is bulging (See Photo 9).

2350	Debris Impaction	each	67.06	0%	0.00	100%	67.06	0%	0.00	0%	0.00
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*The modular joints typically exhibit light to moderate dirt and debris impaction, with heavier impaction observed in the low-speed shoulder (See Photos 9, 10).*

#### 321 Re Conc Approach Slab

Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
321	Re Conc Approach Slab	sq.ft	2,212.00	43%	952.00	57%	1,260.00	0%	0.00	0%	0.00

There are reinforced concrete approach slabs at either end of the bridge. The west approach slab is paved over with a bituminous wearing surface and is therefore not visible (See Photo 5). The east approach slab is bare and so the top surface is visible (See Photo 12).

510	Wearing Surfaces	sq.ft	952.00	100%	952.00	0%	0.00	0%	0.00	0%	0.00
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*The west approach slab is paved over with a bituminous wearing surface (See Photo 5).*

3220	Crack (Wearing Surface)	each	15.79	100%	15.79	0%	0.00	0%	0.00	0%	0.00
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*The asphalt overlay at the west approach slab has longitudinal cracks, both sealed and unsealed, along the paving seam in the low-speed lane (See Photo 5).*

1130	Cracking (RC and Other)	each	0.09	100%	0.09	0%	0.00	0%	0.00	0%	0.00
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*The east approach slab has scattered longitudinal cracks observed in the off-ramp lane (See Photo 12).*

1190	Abrasion(PSC/RC)	each	117.06	0%	0.00	100%	117.06	0%	0.00	0%	0.00
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*The east approach slab exhibits areas of minor to moderate wear throughout, as well as a few minor scrapes and gouges (See Photo 12).*

# Rhode Island Department of Transportation

## Bridge Inspection Report

### Structure Inventory and Appraisal Sheet (English Units)

#### 331 Re Conc Bridge Railing

Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
331	Re Conc Bridge Railing	ft	3,318.00	100%	3,318.00	0%	0.00	0%	0.00	0%	0.00

There are reinforced concrete bridge railings along both sides of the bridge (See Photos 6, 7, 12). The railings exhibit a few isolated scrapes and minor gouges from impact (See Photo 5).

1130	Cracking (RC and Other)	each	1,011.33	100%	1,011.33	0%	0.00	0%	0.00	0%	0.00
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*The concrete railings have scattered vertical cracks, from hairline to 0.030" wide (See Photo 8).*

#### 8060 Scupper

Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
8060	Scupper	(EA)	26.00	0%	0.00	85%	22.00	15%	4.00	0%	0.00

There are two scuppers at each pier, one adjacent to the north railing (at the edge of the high-speed lane) and one adjacent to the south railing (in the low-speed shoulder). The scuppers are typically 2/3 clogged with dirt, debris, and vegetation. At Piers 5, 6, 7, and 11, the south scuppers are completely clogged (See Photo 11). The scuppers along the north side of the bridge fall within the wheel line of the high speed lane and a loud banging noise is heard whenever traffic passes over them. Five of these scuppers located along the high speed lane are missing one of the grates.

At the east face of Pier 11, below Girder Bay 'A', the scupper drain pipe elbow does not extend far enough into the lower drain pipe, causing the water to splash out onto the pier face (See Photo 40).

#### 8213 R/C Return Wall

Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
8213	R/C Return Wall	(LF)	70.00	100%	70.00	0%	0.00	0%	0.00	0%	0.00

There is a reinforced concrete return wall at the northeast corner of the bridge. The northeast return wall has an architectural formliner finish and there is light-moderate vegetation growth in front of the wall (See Photo 46).

1130	Cracking (RC and Other)	each	21.34	100%	21.34	0%	0.00	0%	0.00	0%	0.00
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*As previously noted, the northeast return wall has vertical hairline cracks typically extending from the weepholes and measuring up to 10' high.*

#### 8218 Backwall, All Types

Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
8218	Backwall, All Types	(LF)	171.00	98%	168.00	1%	1.00	1%	2.00	0%	0.00

There are reinforced concrete backwalls at both abutments. The backwalls exhibit minor leakage stains.

1080	lamination/Spall/Patched Ar	each	0.61	0%	0.00	0%	0.00	100%	0.61	0%	0.00
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*At the north end of the East Abutment, there is a 24" wide x 7" high x up to 12" deep spall at the top of backwall, behind Girder 'A' (See Photo 47).*

1120	Efflorescence/Rust Staining	each	0.30	0%	0.00	100%	0.30	0%	0.00	0%	0.00
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*The backwalls have random hairline vertical cracks up to full height, with and without efflorescence (See Photo 48).*

1130	Cracking (RC and Other)	each	51.21	100%	51.21	0%	0.00	0%	0.00	0%	0.00
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*The backwalls have random hairline vertical cracks up to full height, with and without efflorescence (See Photo 48).*

# Rhode Island Department of Transportation

## Bridge Inspection Report

### Structure Inventory and Appraisal Sheet (English Units)

		<b>8316</b>	<b>Isolation Bearing</b>								
Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
8316	Isolation Bearing	(EA)	172.00	60%	103.00	40%	69.00	0%	0.00	0%	0.00

There are isolation bearings at all piers and both abutments. Several of the bearings have rust staining from the girders (See Photos 19, 28, 32, 45). In a few locations, the bearing plates exhibit areas of light to moderate surface rust (See Photos 18, 19, 21, 26). Concrete debris/over-pour from construction was observed at a few bearing locations (See Photo 27). Some bearings have missing anchor bolt washers.

Several of the bearings exhibit gaps between the masonry plate and the top surface of the concrete pedestal along the edges of the plate (See Photos 18, 28, 37, 41, 44). These gaps are generally around 1/4" but range up to 3/4" in a few locations. The gaps appear to be a result of the top surface of the pedestal having an uneven finish in these locations. In addition, the Girder 'H' bearing at Pier 5 exhibits a 1/16" gap between the bottom flange and sole plate on the east face of the bearing (See Photo 26).

1000	Corrosion	each	4.00	0%	0.00	100%	4.00	0%	0.00	0%	0.00
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*At Pier 3, the bearings for Girders 'E' and 'G' exhibit areas of light to moderate surface rust (See Photos 18, 19). Moderate surface rust was also noted on the masonry plate of the Girder 'J' bearing in Span 4 at Pier 4 (See Photo 21). At Pier 5, light surface rust was observed on the Girder 'H' bearing (See Photo 26).*

2220	Alignment	each	8.00	0%	0.00	100%	8.00	0%	0.00	0%	0.00
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*In Span 5, at most of the interior bearings at Pier 4, the girder centerline is positioned approximately 1" south of the bearing pad centerline (See Photo 22).*

*At Pier 8, the centerline of Girders 'G' and 'H' are positioned approximately 1.5" south of the bearing pad centerline.*

8375	Loose or Missing Bolts defect	(EA)	57.00	0%	0.00	100%	57.00	0%	0.00	0%	0.00
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*There are missing/loose anchor bolts/nuts at the following locations:*  
*West Abut. - Random loose nuts at Girders 'B'-'F', 'H' north, 'I' north and 'J' (not completely snug).*  
*Pier 1 - Loose nuts at Girders 'B', 'D', 'E', 'F' and 'J'. Girder 'J' north anchor bolt is tilted south.*  
*Pier 2 - Northeast anchor bolt is missing at Girders 'C', 'E' and 'F'. The northeast anchor bolt at Girder 'H' is not fully seated and tilted north. There are loose nuts at Girder 'I'. Girder 'J' south anchor bolt is tilted north.*  
*Pier 3 - Some bearings exhibit anchor bolts that are loose and/or not fully seated. At Girder 'G', the northeast anchor bolt is detached (See Photo 19).*  
*Pier 4 - Most of the bearings have anchor bolt nuts that are not fully seated/loose.*  
*Pier 5 - Girder 'E' southwest anchor bolt is backed off 1/8". Girders 'F' and 'G' are both missing a bolt at the northeast corner. The northwest anchor bolt nuts are loose at Girder 'J'.*  
*Pier 6 - At Girder 'A', the northeast and northwest anchor bolt nuts are missing. Girder 'C' southeast anchor bolt is backed off.*  
*Pier 7 - At Girders 'C' and 'D', one of the four anchor bolts have nuts that are backed off / not fully seated.*  
*Pier 8 - At Girders 'B' and 'G', two of the four anchor bolts are not fully seated (See Photo 32). At Girder 'J', one of the anchor bolt nuts is not fully seated.*  
*Pier 9 - At Girders 'C', 'D', and 'E', anchor bolt nuts are missing at one of the four anchor bolts.*  
*Pier 10 - The anchor bolts are backed off at Girders 'F', 'H', 'I' and 'J' (See Photo 37).*  
*Pier 11 - At Girders 'H', 'I' and 'J', the anchor bolts are all backed off / not fully seated (See Photo 41).*  
*Pier 12 - Anchor bolt nuts are not fully seated/loose at Girders 'I', 'H' and 'J'.*  
*Pier 13 - Girders 'H', 'I' and 'J' exhibit anchor bolt nuts that are backed off/loose (See Photo 45).*  
*East Abut. - A few anchor bolt nuts are backed off. Girder 'F' north anchor bolt is tilted north.*

		<b>8335</b>	<b>Guardrail, Vehicular</b>								
Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
8335	Guardrail, Vehicular	(LF)	200.00	100%	200.00	0%	0.00	0%	0.00	0%	0.00

The approach guardrail at the four corners of the bridge consists of reinforced concrete railing (See Photo 5, 12). The approach railing has some isolated scrape marks (See Photo 5).

# Rhode Island Department of Transportation

## Bridge Inspection Report

### Structure Inventory and Appraisal Sheet (English Units)

1130	Cracking (RC and Other)	each	60.96	100%	60.96	0%	0.00	0%	0.00	0%	0.00
<i>The reinforced concrete approach railing exhibits scattered vertical hairline cracks (See Photo 5).</i>											

			<b>8370</b>	<b>Steel Diaphragms</b>							
Elm	Description	Unit	Total Qty	% St 1	Qty. St 1	%St 2	Qty.St 2	%St 3	Qty. St 3	% St 4	Qty.St 4
8370	Steel Diaphragms	(EA)	805.00	100%	804.00	0%	1.00	0%	0.00	0%	0.00

The interior cross-frames and end diaphragms are generally in good condition, with some scattered areas of discoloration noted (See Photos 3, 4, 27, 48). There are also scattered locations of concrete debris / over-pour from construction.

In Bay 'G', at a few of the interior cross-frames, one of the washer plates used at the girder connections is bearing on the adjacent washer plate and is slightly bent (See Photo 34).

515	Steel Protective Coating	sq.ft	24,200.00	100%	24,200.00	0%	0.00	0%	0.00	0%	0.00
<i>The cross-frames and diaphragms are protected by a weathering steel patina (See Photos 3, 4, 27). The end diaphragms below the deck joints at the abutments and at Piers 4 and 9 are painted (See Photo 48).</i>											
<i>The weathering steel diaphragms and cross-frames typically exhibit a normal surface patina with some scattered areas of discoloration (See Photos 3, 4, 27).</i>											
<i>The painted end diaphragms are in good condition (See Photo 48).</i>											

1020	Connection	each	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
<i>In Span 10, Bay 'G' @ Pier 9, the bolts at the end diaphragm connections to Girder 'G' and 'H' are loose/not fully engaged (See Photo 36). There is also a slight gap between the bearing stiffener plate and the end diaphragm at both connections.</i>											

**BRIDGE NOTES**



# Rhode Island Department of Transportation

## Bridge Inspection Report

### Structure Inventory and Appraisal Sheet (English Units)

Item 60 - Substructure (Rating = 6):

At Pier #s 4 - 9, the steel jacketed concrete filled caisson pile exhibit minor corrosion below the fiberglass jackets and an isolated high band of laminar corrosion with negligible section loss along the channel bottom at Pier #5. At Pier #s 4 - 9, the granite stone masonry facade exhibits between 5% and 15% deteriorated mortar with between 3" and 6" of penetration between stones and isolated cracked stones. The reinforced concrete portion of the stems have scaling up to 1/2" deep throughout. On both the west and east faces of Pier # 7, there are vertical cracks open between 1/8" and 1/4" wide that extend from the top of the cap down to the channel bottom near the midpoint of the pier stem. At Pier #s 4, 5, 8, and 9, the steps / footings have been exposed up to 3" vertically x up to the full-length of the piers.

Item 61 - Channel & Channel Protection (Rating = 6):

As compared to the 2009 Underwater Inspection Report, there is evidence of scour that has exposed the steps / footings up to 3" vertically x up to the full-length of the piers at Pier #s 4, 5, 8, and 9. There has been no apparent change to the channel orientation as compared to the 2009 Underwater Inspection Report. There is no significant erosion observed along the channel embankments. There is construction debris consisting of concrete rubble and steel at the channel bottom adjacent to the piers due to construction on the bikepath / pedestrian bridge. There is no significant obstructions or debris accumulation which would affect the hydraulic opening at the bridge.

Item 113 - Scour Critical (Rating = 3):

As compared to the 2009 Underwater Inspection Report, there is evidence of scour that has exposed the steps / footings at Pier Nos. 4, 5, 8, and 9. A scour analysis was performed to evaluate the scour potential at the bridge site. Based on this scour analysis, the structure has be

#### PAST INSPECTION

Inspection Date:	08/02/2013	Type:	1 Regular NBI
Inspector:	NAZARETH, CRAIG	Pontis User Key:	ALAN.TARASENKO ALAN 1
Scope:			
NBI:	<input checked="" type="checkbox"/>	Other:	<input type="checkbox"/>
Underwater:	<input type="checkbox"/>	Fracture Critical:	<input type="checkbox"/>
Element:			<input checked="" type="checkbox"/>

#### INSPECTION NOTES

Routine Inspection by AI Engineers, Inc. Started on 6/26/2013 and completed on 8/2/2013

Crew: AT, LP, AP

Weather: Varied cloudy to rainy and 71°F to 85°F.

The bridge is logged from west to east with girder G1 at the north fascia. Span 14 has two additional flared partial length girders at the south fascia labelled as girder G11 and G12 from north to south. Based on the results of this inspection the bridge overall rating has decreased from good (rated 7) to satisfactory condition (rated 6). The condition ratings for the deck (item 58, rated 8), superstructure (item 59, rated 7), and channel (item 61, rated 7) remain unchanged. The condition rating for the substructure (item 60) has decreased from good (rated 7) to satisfactory (rated 6) due to the piers.

Sign Structure: There is a full span overhead sign structure mounted to the top of the concrete parapets over pier 13 with no notable deficiencies. See photo 9.

Channel: The Seekonk River is tidal and flows from north to south under spans 4-10. See Underwater Inspection Report. See photos 89 & 90.



# Rhode Island Department of Transportation

## Bridge Inspection Report

### Structure Inventory and Appraisal Sheet (English Units)

#### WORK CANDIDATES

Work Candidate ID	Action	Agency Status	Agency Priority	Assigned to a Project	Rec. Date	Comp. Date
0000000-WMWS-090815-3F416 4D751	Drain-Cln/Clr Dck Drain/Dwnspout	Unknown	Medium	0	07/28/2015	

At Piers 5, 6, 7 and 11, the south scuppers are completely clogged and need to be cleaned out. The quantity of scuppers requiring cleaning is 4 EA.

Also, there are 5 scuppers along the north side of the bridge that are missing a grate. The north scuppers fall within the wheel line of the high-speed lane and therefore these scupper grates should be replaced.