



# ASR/LFR BRIDGE LOAD RATING SUMMARY

Version 1.0

Page 1 of 2

SECTION 1 - GENERAL BRIDGE DATA					
(8) Asset ID 07934	Route Type Interstate	(27) Year Built 1985	(90) Date of Inspection 12/2019	(411) Date Rated 11/11/2020	
(9) Bridge Location 4 MI NW OF COLUMBIA		(7) Facility Carried RAMP OFF I-126 WB	(6) Feature Intersected/Route Crossing SALUDA RIV & I-26 & I-126 & RR		
(49) Length 2487 ft.	(11) Milepost 0.316	(2) District 1	(3) County RICHLAND	(22) Owner SCDOT	(418) Conditions During Rating (NBI Item 58, NBI Item 59, NBI Item 60) 6, 6, 7
(43, 44, 45, & 46) Bridge Description Continuous 18 Span SS Bridge			(31) Design Load HS-20+Mod	(108) Existing Wearing Surface Type & Depth MONOLITHIC CONCRETE	
Rating Program & Version BrR 6.8.4 - AASHTO Engine		Rating Program & Version N/A		Rating Method LFR	AASHTO Reference MBE 3rd Edition, w/ 2019 Interims
(58) Deck 6 Satisfactory	(59) Superstructure 6 Satisfactory	(60) Substructure 7 Good	(62) Culvert N N/A (NBI)	(113) Scour Critical 8 Stable Above Footing	

SECTION 2A - INVENTORY RATINGS - Design Vehicles and AASHTO Legal Trucks							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
H-20	Truck	20	G4	10.10	Design Shear - Steel	1.162	23
H-20 Lane	Lane	20	G1	3.00	Design Shear - Steel	0.640	12
HS-20	Truck	36	G4	10.10	Design Shear - Steel	0.709	25
HS-20 Lane	Lane	36	G1	3.00	Design Shear - Steel	0.640	23
Alternate Military Loading	Truck	24	G4	10.10	Design Shear - Steel	0.965	23
Modified AASHTO SC - Type 3	Truck	25	G4	10.10	Design Shear - Steel	0.990	24
Modified AASHTO SC - Type 3S2	Truck	36.6	G4	3.00	Design Shear - Steel	0.761	27
AASHTO - Type 3-3	Truck	40	G4	3.00	Design Shear - Steel	0.733	29

SECTION 2B - INVENTORY RATINGS - Specialized Hauling Vehicles (SHV)							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC-SHV1A	Truck	32.5	G4	10.10	Design Shear - Steel	0.740	24
SC-SHV1B	Truck	35	G4	10.10	Design Shear - Steel	0.694	24
SC-SHV2A	Truck	33	G4	10.10	Design Shear - Steel	0.740	24
SC-SHV2B	Truck	40	G4	10.10	Design Shear - Steel	0.621	24
SC-SHV3A	Truck	42.5	G4	3.00	Design Shear - Steel	0.658	27
SC-SHV3B	Truck	45	G4	3.00	Design Shear - Steel	0.622	27
SC Representative School Bus	Truck	17.525	G1	7.76	Design Flexure - Steel	1.341	23
SC-SU2	Truck	20	G4	10.10	Design Shear - Steel	1.220	24
SU4	Truck	27	G4	10.10	Design Shear - Steel	0.908	24
SU5	Truck	31	G4	10.10	Design Shear - Steel	0.808	25
SU6	Truck	34.75	G4	10.10	Design Shear - Steel	0.732	25
SU7	Truck	38.75	G4	10.10	Design Shear - Steel	0.677	26

This ASR/LFR Load Rating is based on:			<input checked="" type="checkbox"/> Design Plans	<input type="checkbox"/> Design Plans & Approved Shop Drawings	<input type="checkbox"/> Other (Please explain in Remarks)
			<input type="checkbox"/> As-Built Plans		
SECTION 3 - BRIDGE LOAD RATING SUMMARY					
Controlling Legal Truck EV3	Load Posting Required? If Yes, complete Signing/Posting Form. Yes	Controlling Legal Load Rating Factor (at Operating level) 0.957			

SECTION 4 - REMARKS & SIGN/SEAL					
Load Rating Engineer		Quality Control Engineer		<input type="checkbox"/> Structure is part of QA sample set. Quality Assurance Engineer	
Name:	Shovon Mukherjee	Name:	T. Brian Query	Name:	
Company/Title:	STV/ Engineering Specialist	Company/Title:	STV /Project Manager	Company/Title:	
Date:	3/5/2020	Date:	11/4/2020	Date:	
Remarks: 1. As-Let plans 3240.378.7 dated 10/28/1983 were used for the rating. 2. Based on the 12/2019 Inspection Report and 09/25/2019 Site Assessment, there is no measurable deterioration to warrant a deteriorated structure model in BrR. 3. For all spans, the barrier load was evenly distributed to all girders. 4. Traffic data was input into BrR using Directional % = 100% and Truck % = 12%. 5. Asset 07934 has 4 continuous units: Unit A has 4 Spans, Unit B has 5 Spans, Unit C has 4 Spans and Unit D has 5 Spans. Units were labeled based on As-Let Plans. 6. Sacrificial wearing surface = 0" per LRGD section 11.2.1.1. 7. Condition factor of 1.00 was used based on the Site Assessment Report dated 09/25/2019 and 12/2019 Inspection Report. 8. An additional 10% of self-load was applied to all steel girders to account for splice plates and transverse intermediate stiffeners as well as welds, bolts, etc. 9. The controlling location represents the span number and controlling point (i.e. controlling location 1.X for span 1, 2.X for Span 2, etc.). 10. As per TN01, Item #1, intermediate stiffeners that are partial height were not modeled in Unit A, B and D. Unit C generated unjustifiably low factors where shear was the controlling limit state. In this unit all intermediate stiffeners (including the stiffeners that are partial height) were modeled in attempt to avoid posting.					



## ASR/LFR BRIDGE LOAD RATING SUMMARY

Version 1.0

Page 2 of 2

SECTION 1 (PAGE 2) - GENERAL BRIDGE DATA							
(8) Asset ID 07934		Route Type Interstate		(27) Year Built 1985	(90) Date of Inspection 12/2019		(411) Date Rated 11/11/2020
(9) Bridge Location 4 MI NW OF COLUMBIA			(7) Facility Carried RAMP OFF I-126 WB		(6) Feature Intersected/Route Crossing SALUDA RIV & I-26 & I-126 & RR		
(49) Length 2487 ft.	(11) Milepost 0.316	(2) District 1	(3) County RICHLAND		(22) Owner SCDOT	(418) Conditions During Rating (NBI Item 58, NBI Item 59, NBI Item 60) 6, 6, 7	
(43, 44, 45, & 46) Bridge Description Continuous 18 Span SS Bridge				(31) Design Load HS-20+Mod		(108) Existing Wearing Surface Type & Depth MONOLITHIC CONCRETE	
Rating Program & Version BrR 6.8.4 - AASHTO Engine			Rating Program & Version N/A			Rating Method LFR	AASHTO Reference MBE 3rd Edition, w/ 2019 Interims
(58) Deck 6 Satisfactory	(59) Superstructure 6 Satisfactory		(60) Substructure 7 Good		(62) Culvert N N/A (NBI)	(113) Scour Critical 8 Stable Above Footing	

SECTION 5 - OPERATING RATINGS - Design Vehicles & AASHTO Legal Trucks							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
H-20	Truck	20	G4	10.10	Design Shear - Steel	1.940	38
H-20 Lane	Lane	20	G1	3.00	Design Shear - Steel	1.069	21
HS-20	Truck	36	G4	10.10	Design Shear - Steel	1.183	42
HS-20 Lane	Lane	36	G1	3.00	Design Shear - Steel	1.069	38
Alternate Military Loading	Truck	24	G4	10.10	Design Shear - Steel	1.612	38
Modified AASHTO SC - Type 3	Truck	25	G4	10.10	Design Shear - Steel	1.653	41
Modified AASHTO SC - Type 3S2	Truck	36.6	G4	3.00	Design Shear - Steel	1.271	46
AASHTO - Type 3-3	Truck	40	G4	3.00	Design Shear - Steel	1.224	48

SECTION 6A - OPERATING RATINGS - SC Specialized Hauling Vehicles (SHV) - Legal on Non-Interstate and Permit on Interstate							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC-SHV1A	Truck	32.5	G4	10.10	Design Shear - Steel	1.236	40
SC-SHV1B	Truck	35	G4	10.10	Design Shear - Steel	1.159	40
SC-SHV2A	Truck	33	G4	10.10	Design Shear - Steel	1.236	40
SC-SHV2B	Truck	40	G4	10.10	Design Shear - Steel	1.038	41
SC-SHV3A	Truck	42.5	G4	3.00	Design Shear - Steel	1.099	46
SC-SHV3B	Truck	45	G4	3.00	Design Shear - Steel	1.039	46

SECTION 6B - OPERATING RATINGS - Two Miscellaneous SHV & AASHTO SHV - Legal on all roads							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC Representative School Bus	Truck	17.525	G3	7.25	Design Flexure - Steel	1.475	25
SC-SU2	Truck	20	G4	10.10	Design Shear - Steel	2.037	40
SU4	Truck	27	G4	10.10	Design Shear - Steel	1.516	40
SU5	Truck	31	G4	10.10	Design Shear - Steel	1.350	41
SU6	Truck	34.75	G4	10.10	Design Shear - Steel	1.222	42
SU7	Truck	38.75	G4	10.10	Design Shear - Steel	1.130	43

SECTION 6C - OPERATING RATINGS - Standard Permit Vehicles & Typical Cranes							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC - 100k	Truck	50	G4	3.00	Design Shear - Steel	0.951	47
SC - 120k	Truck	60	G4	3.00	Design Shear - Steel	0.787	47
SC - 130k	Truck	65	G4	3.00	Design Shear - Steel	0.737	47
SC Crane #544726	Truck	80	G4	3.00	Design Shear - Steel	0.611	48
SC Crane #527568	Truck	88.85	G4	3.00	Design Shear - Steel	0.562	49

SECTION 6D - OPERATING RATINGS - Emergency Vehicles (EV)							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
EV2	Truck	28.75	G4	10.10	Design Shear - Steel	1.416	40
EV3	Truck	43	G4	10.10	Design Shear - Steel	0.957	41

### Remarks:

11. All girders of this bridge are hybrid sections. Section 1.1 of 2003 AASHTO Guide for Horizontally Curved Steel Girder Highway Bridges states the following: "All components of each girder cross section shall be homogeneous with respect to steel grade". This makes it impossible to run a hybrid section using LFR methodology. For this reason, two Superstructure Definitions are created for each unit. One superstructure definition represents the hybrid section which was used to generate the LRFR rating factors, while the other represents a homogeneous section with a A36 steel grade for all components, which was used to generate the LFR rating factors.

12. Unit A and Unit C are supported on integral interior bents. Due to BrR limitations to model concrete bearing stiffeners, steel bearing stiffeners from the end bents were assumed at these integral bents as well. The following boundary conditions were assumed for the integral bents: Longitudinal, Transverse and Vertical Translation - fixed; Rotation along the Longitudinal and Transverse Axis - fixed; Rotation along the Vertical Axis - free.

13. Posting is required.