

BRIDGE DESIGN MEMORANDUM – DM0119

TO: RPG Structural Design Engineers
Structural Design Consultants

DATE: December 18, 2019

RE: *Manual for Assessing Safety Hardware (MASH) Compliant Bridge Barrier Parapet / Railing Wall*

Apply these updated requirements to all new construction projects, where design has not advanced beyond the preliminary plan acceptance by the date this memorandum is released. Projects involving barrier modifications due to bridge widenings or rehabilitations will be reviewed on a case by case basis in coordination with the Structural Design Support Engineer.

Design all bridges using the MASH compliant bridge barrier parapet/railing wall described in this memo and as shown in Bridge Drawings and Details 705-01a, 705-01b, 705-01c, 705-01d, and 705-01e (hereafter referred to as referenced drawings).

The MASH compliant bridge concrete barrier parapet/railing wall is 42 inches tall. Projects will typically detail the barrier parapet/railing wall with a 10 inch wide top surface and a 12 inch wide base, allowing for slightly sloped faces to facilitate slip forming. An alternate detail has been provided to allow for a 42 inch tall barrier parapet/railing wall with a 12 inch constant width in the event that the barrier parapet/railing wall is hand formed. In the design of barrier parapet/railing wall, allow for the contractor to use the alternate hand formed option when detailing the slightly sloped barrier parapet/railing wall. Account for the additional weight of concrete in the 12 inch constant width barrier parapet/railing wall when designing the bridge deck, overhang and other bridge components affected by the additional weight. The 12 inch constant width alternate can be detailed in the plans, if determined to be needed by the designer or due to requirements of the project.

The referenced drawings are provided to aid the designer in preparation of the barrier parapet/railing wall drawings and the details in the referenced drawings are intended to be used as much as practical by the designer. Perform customized designs for steel reinforcement, as appropriate, for the bridge in accordance with AASHTO LRFD Bridge Design Specifications (latest edition adopted by SCDOT). Bridge Drawings and Details 705-01a and 705-01b show the barrier parapet with end transition on an approach slab. The end span of the bridge is shown assuming an integral end abutment. Revise this drawing to represent the barrier parapet/railing wall layout for the bridge being designed. Examples would include revising the drawing to represent where expansion joints occur in the bridge deck, where sidewalks are required, and where other approved safety hardware, such as crash attenuators, are determined to be necessary. The term “barrier parapet” refers to a concrete vehicular barrier on the outside of a roadway shoulder with no sidewalk present or on the traffic side of the sidewalk. The term “railing wall” is used on the edge of the deck when sidewalk is present. Modify the labeling to reflect the use of the “barrier parapet” or “railing wall” for the bridge, as appropriate. Also, use the appropriate sections through the barrier parapet or railing wall and the appropriate conduit notes and details. Insert all drawings and details related to barrier



parapet/railing wall into the plan set following the approach slab sheets, if approach slabs are used or following the superstructure details sheets when approach slabs are not used.

When overlays are required on top of the bridge deck, ensure that the barrier parapet/railing wall extends a minimum height of 36 inches above the top of the riding surface. Ensure 42 inches minimum above the riding surface if the route is designed to accommodate bicyclists. See Bridge Design Memorandum DM0113 for additional guidance on bicycle height barrier parapet/railing wall requirements.

The bridge barrier parapet/railing wall presented in this memorandum and the referenced drawings is not intended for use as a median barrier. When concrete median barrier is present on the roadway approaches and carried across the bridge separating traffic, provide a median barrier with an approximate 9 degree single slope on both faces. Use a Test Level 4 (TL-4) or Test Level 5 (TL-5) median barrier as required on the roadway approaches. If a Test Level 3 (TL-3) median barrier is required on the roadway approaches, use a TL-4 median barrier across the bridge. Design the median barrier for a 28 day concrete strength (f 'c) of 4000 psi and in accordance with the requirements of AASHTO LRFD Bridge Design Specifications (latest edition adopted by SCDOT).

Include the applicable quantities listed in the table below in the bridge plans. Include the pay item quantities and reinforcing steel schedule items for the barrier parapet/railing wall in the superstructure and approach slab quantities and reinforcing steel schedules, as appropriate. Include the length of the barrier parapet/railing wall transition in the total pay length of the bid item. The transition will be considered incidental to the cost of the barrier parapet/railing wall.

ITEM NO.	BID ITEM	UNIT	QUANTITY
7051040	42" MASH CONCRETE BARRIER PARAPET/RAILING WALL – HAND FORMED	LF	
7051050	42" MASH CONCRETE BARRIER PARAPET/RAILING WALL	LF	
7051060	42" CONCRETE MEDIAN BARRIER (TL-4) – BRIDGE	LF	
7051070	56" CONCRETE MEDIAN BARRIER (TL-5) – BRIDGE	LF	

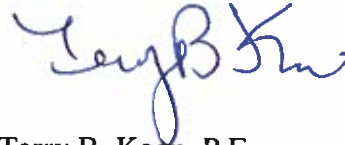
At this time, other Bridge Drawings and Details continue to show the older concrete barrier parapets which do not conform to MASH requirements. These can continue to be used on bridges that have advanced beyond preliminary plans acceptance by SCDOT. However until the drawings can be updated to reflect the new MASH barrier parapets/railing walls, the designer is responsible for revising the drawings as necessary to incorporate the MASH compliant barrier parapets/railing walls that are consistent with the updated SCDOT MASH bridge barrier parapet/railing wall details.

This memorandum supersedes Section 17.6.1.2 of SCDOT Bridge Design Manual.

Delete Section 17.6.1.5, Item 2 and replace with the following:

V ≥ 50 mph. Place the 42-in MASH barrier parapet between pedestrians and traffic; i.e., between the roadway portion of the bridge deck and the sidewalk. A 42-in pedestrian rail is then used at the outside edge of the sidewalk.





Terry B. Koon, P.E.
Structural Design Support Engineer

TBK:hl

ec:

John Boylston, Director of Preconstruction
Robbie Isgett, Director of Construction
David Cook, Director of Maintenance
Robert Perry, Director of Traffic Engineering
Chris Gaskins, Design Build Engineer
Ladd Gibson, Director of Mega Projects
Rob Bedenbaugh, Preconstruction Support Engineer

Jennifer Necker, RP Engineer - Lowcountry
Leah Quattlebaum, RP Engineer - Pee Dee
Philip Sandel, RP Engineer - Midlands
Julie Barker, RP Engineer - Upstate
Tad Kitowicz, FHWA
Blake Gerken, FHWA

File: PC/TBK/HL

