

New Jersey Department of Transportation CORRECTIVE ACTION NOTICE

CAPITAL PROGRAM SUPPORT

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Approved: Paul F. Schneider

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Subject: NJDOT GUIDANCE ON TRANSITION OF MASH IMPLEMENTATION FOR BRIDGE RAILINGS

Bureau(s) Affected: All Bridge Design Consultants; Bureau of Structural & Railroad Engineering Services; Other Bureaus in Bridge Engineering and Infrastructure Management

Description of Issue(s): Per 2016 AASHTO/FHWA Joint Implementation Agreement for the AASHTO Manual for Assessing Safety Hardware (MASH), after Dec. 31, 2019, only Bridge Railings (and other hardware) evaluated using the 2016 Edition of MASH criteria will be allowed for permanent installations and full replacements on the National Highway System (NHS). 2016 NJDOT Design Manual for Bridges and Structures does not include updated criteria and guidance for the updated MASH standards and process. NJDOT is in the process of updating the Design Manual and Standard Construction Details for Bridge Railings. This Guidance is intended to provide general guidance for the projects with Bridge Railings until the full MASH Implementation date (Dec. 31, 2019), including information on NJDOT Bridge Railing Selection, guide rail attachments, and aesthetic treatments.

Corrective Action Plan: Transition of MASH Implementation for Bridge Railings and clarification of General Bridge Railings Information.

1. Prior to full MASH Implementation, both MASH and NCHRP 350 compliant/crash-tested systems may be installed for projects on NHS and non-NHS with letting dates on or before December 31, 2019. The letting date is the receipt and opening of bids - "Activity 5040 Receive bids".

2. MASH Implementation Information can be found at the below website.

<https://design.transportation.org/mash-implementation/>

Resources on website related to Bridge Railings include:

- Clarifications on Implementing MASH 2016 (aka MASH Q&A), May 9, 2018
- AASHTO-FHWA Joint Implementation Agreement for MASH, 2016
- FHWA's Roadside Hardware Policy Memoranda and Guidance
- Federal-aid Eligibility Letters for Roadside Hardware
- *Manual for Assessing Safety Hardware* (MASH), 2016 Edition, in the AASHTO bookstore

Designers may reference these documents for NJDOT Bridge Railing Design. NJDOT requires a MASH crash-tested system to be used if available and appropriate for a project. In the case where a MASH crash-tested system is not available, NCHRP 350 systems may be used until a MASH system is available.

3. Bridge Railing Selection may follow the following:

a. *NJDOT Standard Construction Details for Bridges*

- i. Do not use Aluminum Railings (To be obsolete with this CAN).
- ii. Other Details are NCHRP 350 crash tested or equivalent based on analysis (unless otherwise specified), and can be used for projects with letting dates on or before December 31, 2019.

- iii. Check frequently for NJDOT BDC Announcements that will cover changes and updates for MASH Implementation. When a MASH compliant detail is announced it will replace a similar NCHRP 350 standard detail or will be an addition to the standard details.
- b. Bridge Railing systems with Eligibility Letters found on FHWA website for NCHRP 350 or MASH.
 - i. Explore availability of MASH systems, and use MASH systems over NCHRP 350 systems as practical.

4. Guide Rail Attachments

- a. Guide Rail Attachments to Bridge Railing Details shall follow the *NJDOT Standard Construction Details*. Guide Rail Attachments are MASH compliant. See CD-609-13 through CD-609-17E.
 - i. The 5:1 or flatter vertical transition slope (taper) for concrete pylons to Guide Rail Attachments is for new construction, reconstruction and limited scope projects.

5. Bridge Railing Aesthetic Treatments

- a. For Aesthetic Treatments on the traffic exposed face of Bridge Railings, Designers may refer to NCHRP Report 554 for design Guidance which was based on TL-3 crash testing and analysis.
 - i. On low speed roadways (≤ 45 mph) when a TL-4 or higher test level railing is used, these aesthetic guidelines may be used.
 - ii. On high speed roadways (> 45 mph) TL-4 and higher test level bridge railing, Aesthetic Treatments should follow the guidance in *NJDOT Design Manual for Bridges and Structures* Section 23, and be submitted to NJDOT for review and adoption. Aesthetic treatments not meeting these guidelines shall be considered for approval by NJDOT only on a project-by-project basis.
- b. Pilaster/pylon of bridge railings may follow the following guidance.
 - i. Snag points should be eliminated from pilaster/pylon design. Aesthetic Pilasters facing towards traffic are considered a snagging concern and should be limited in design. If it is specially required in a project, the Designer should contact NJDOT for approval on a project-by-project basis.
 - ii. Aesthetic Treatment for pilaster/pylon surface shall follow the guidance in "a." above.

Implementation: Immediate