MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**IMPACT ATTENUATOR (LOW BID PURCHASE), TEST LEVEL 3 FURNISHED AND INSTALLED**

GCB:CT 1 of 5 APPR:CAL:CRB:03-17-21

**a. Description.** This work consists of furnishing and delivering a *National Cooperative Highway Research Program Report* 350 (NCHRP 350), Test Level 3 (TL-3) or *Manual for Assessing Safety Hardware* (MASH), Test Level 3 (TL-3) impact attenuator, selected from those listed herein, of the type shown on the plans, to the job site; constructing the required base pad and foundation or modifying an existing foundation and attachments; and installing the device as shown on the plans. Complete this work in accordance with the impact attenuator manufacturer’s details and specifications, and this special provision. When the requirements of this special provision conflict with the manufacturer’s specifications, ensure the requirements of this special provision are followed.

**b. Materials.**

1. Construct attenuator base pad, anchor block and/or concrete backup unit using 4000 or 4000HP concrete in accordance with section 1004 of the Standard Specifications for Construction, or as directed by the Engineer.

2. Provide epoxy-coated steel reinforcement for constructing attenuator base pads, anchor blocks and/or concrete backup units meeting the requirements of section 905 of the Standard Specifications for Construction. Ensure epoxy coating for steel reinforcement meets the requirements of subsection 905.03.C of the Standard Specifications for Construction.

3. Provide impact attenuators meeting NCHRP 350, TL-3 or MASH, TL-3 criteria and having a letter of federal aid eligibility from the FHWA.

4. Provide an attenuator of the type specified on the plans.

5. Ensure the attenuator backup/backstop is of the type specified on the plans or as directed by the Engineer.

6. For the specified attenuator type, furnish any of the alternates permitted in Table 1.

7. Ensure transition assemblies used to increase the effective width of the attenuator meets all of the following requirements:

A. Ensure transition assembly is of the type specified on the plans or as directed by the Engineer;

B. Ensure transition assembly conforms to a crash-tested guardrail-to-bridge rail design meeting or exceeding NCHRP 350, TL-3 or MASH, TL-3;

C. For uni-directional applications, where traffic is flowing from the front toward the rear of the attenuator, the transition assembly must meet or exceed the requirements of NCHRP 350, TL-3 or MASH, TL-3, without securing the transition assembly to the hazard being shielded;

D. Ensure transition assembly can be furnished with posts designed to be secured to the surface of a concrete base pad or similar concrete surface, and will meet or exceed the requirements of NCHRP 350, TL-3 or MASH, TL-3;

E. Provide detailed shop drawings to the Engineer of the proposed transition assembly for review and approval by the Department. Engineer’s approval is required to use a transition assembly that increases the effective width of an attenuator, and;

F. Provide a signed certification letter from the attenuator manufacturer and any supporting documents certifying that the transition assembly meets all of the requirements of this special provision.

The Contractor, attenuator vendors, other contractors, and other third parties are prohibited from acting as the attenuator manufacturer.

8. Ensure attenuator transition assemblies, transition panels, end panels, and other miscellaneous accessories required for proper installation meet the manufacturer’s specifications.

9. Ensure the 24 inch square attenuator object marker sign is made of 0.040 inch thick aluminum. Ensure the yellow stripes on the attenuator object marker sign meet *ASTM D4956* specifications for Type IX retroreflective sheeting, and the requirements of Section 2C.64 and 2C.65 of the *Manual of Uniform Traffic Control Devices*.

10. Ensure guardrail beam elements, including associated hardware, and steel guardrail posts are in accordance with the requirements specified in section 908 of the Standard Specifications for Construction.

11. Ensure wood guardrail posts and guardrail blocks meet the requirements of section 912 of the Standard Specifications for Construction.

**c. Construction.** Ensure the impact attenuator meets the requirements specified in section b of this special provision, as well as any other requirements specified on the plans. Contact the Engineer and verify the backup/backstop type required before ordering the attenuator. If using a transition assembly that increases the effective width of the attenuator, obtain the Engineer’s approval to use the transition assembly before ordering the attenuator.

Furnish and deliver the impact attenuator to the job site.

Ensure prior to attenuator installation, the attenuator manufacturer or authorized attenuator vendor in Michigan provides the Engineer with the name, telephone number and electronic mail (e-mail) address of a manufacturer’s representative or vendor’s representative assigned to the project. Ensure the manufacturer’s representative or vendor’s representative has thorough knowledge of the attenuator and related components being installed. The manufacturer’s representative or vendor’s representative cannot be employed, either directly or under contract, by the Contractor. The Contractor is prohibited from acting as the manufacturer’s representative or the vendor’s representative.

Provide an employee trained by the manufacturer in the proper installation of the impact attenuator system supplied for the project.

Construct any required concrete base pads, anchor blocks or concrete backup units with steel reinforcement in accordance with the plans and/or manufacturer’s specifications. Construction of concrete base pads, anchor blocks or concrete backup units without steel reinforcement is prohibited. Ensure when the MDOT plans or the requirements of this special provision conflict with the manufacturer’s specifications, the requirements of the MDOT plans or this special provision are followed.

Ensure the manufacturer’s representative and/or vendor’s representative is on-site to witness the attenuator installation, including the final torque-check of all attenuator anchors.

Contact the Engineer at least 24 hours prior to attenuator installation and provide the attenuator installation date. Unless otherwise directed by the Engineer, ensure the Engineer is present during attenuator installation and the final torque-check of all attenuator anchors.

Install the unit and connect the unit to the backup and to the front anchoring system as required for proper installation of the system.

Furnish and install attenuator transition assemblies (including guardrail beam elements, guardrail posts, guardrail blocks, and miscellaneous hardware), transition panels, end panels, and other miscellaneous accessories required for proper connection to guardrail, concrete barrier, or other concrete structure. Install these items per manufacturer’s specifications.

Furnish and install an object marker, with alternating black and yellow stripes, to the nose of the attenuator. Ensure the object marker is constructed and installed in accordance with the diagram titled “Impact Attenuator Object Marker” WZD-150 Series.

Attachments to the attenuator (appurtenances) approved by the attenuator manufacturer may be installed per manufacturer’s specifications. Do not attach unapproved appurtenances to the attenuator.

Provide written certification to the Engineer that the attenuator is installed in accordance with the plans, manufacturer’s specifications and guidelines, and this special provision.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

**Pay Item** **Pay Unit**

Impact Attenuator, Test Level-3, Furn and Install, Type \_\_ Each

**Impact Attenuator, Test Level-3, Furn and Install, Type \_\_** includes all materials, labor, and equipment required to:

1. Furnish and deliver the impact attenuator;

2. Construct the base pad, anchor block and/or concrete backup unit;

3. Install the attenuator (including all hardware and appurtenances) in accordance with the plans, manufacturer’s specifications and guidelines, and this special provision;

4. Connect the unit to the backup and to the front anchoring system as required;

5. Provide a trained installer on-site during installation;

6. Provide a manufacturer’s representative and/or vendor’s representative on-site during attenuator installation, including the final torque-check of all attenuator anchors;

7. Furnish and install all necessary transition assemblies, transition panels, end panels, and other miscellaneous accessories required for proper connection to guardrail, concrete barrier, or other concrete structure. This includes furnishing and installing guardrail beam elements, guardrail posts, guardrail blocks, and miscellaneous hardware required for proper installation, and;

8. Furnish and install an object marker to the nose of the attenuator.

The Contractor is responsible for furnishing attenuators, transition assemblies, and associated hardware in accordance with the requirements of this special provision. Ensure attenuators, transition assemblies, and/or associated hardware not conforming to the requirements of this special provision and rejected by the Department, are removed and replaced with devices meeting the requirements of this special provision at no additional cost to the contract.

**Table 1. Approved Attenuator Types and Manufacturers**

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| Attenuator Type | Description | Approved Attenuators | Manufacturer of Each Respective Attenuator |
| 1 | 24 inch Standard Attenuator (Protects object up to 24 inches in width) | 1) Quadguard II2) TAU-II3) Quadguard Elite4) SCI 100 GM5) TAU-II-R | 1) Trinity Highway Products2) Lindsay Transportation Solutions3) Trinity Highway Products4) Hill & Smith5) Lindsay Transportation Solutions |
| 2 | 30 inch Standard Attenuator (Protects object up to 30 inches in width) | 1) Quadguard II2) TAU-II3) Quadguard Elite4) TAU-II-R5) SCI 100 GM | 1) Trinity Highway Products2) Lindsay Transportation Solutions3) Trinity Highway Products4) Lindsay Transportation Solutions5) Hill & Smith |
| 3 | 36 inch Standard Attenuator (Protects object up to 36 inches in width) | 1) Quadguard II2) TAU-II3) Quadguard Elite4) TAU-II-R5) REACT 3506) REACT 350 II7) SCI 100 GM | 1) Trinity Highway Products2) Lindsay Transportation Solutions3) Trinity Highway Products4) Lindsay Transportation Solutions5) Trinity Highway Products6) Trinity Highway Products7) Hill & Smith |
| 4 | 48 inch Standard Attenuator (Protects object up to 48 inches in width) | 1) Quadguard II2) TAU-II3) TAU-II-R4) SCI 100 GM | 1) Trinity Highway Products2) Lindsay Transportation Solutions3) Lindsay Transportation Solutions4) Hill & Smith |
| 5 | 69 inch Standard Attenuator (Protects object up to 69 inches in width) | 1) Quadguard II2) TAU-II3) Quadguard Elite4) TAU-II-R5) SCI 100 GM | 1) Trinity Highway Products2) Lindsay Transportation Solutions3) Trinity Highway Products4) Lindsay Transportation Solutions5) Hill & Smith |
| 6 | 90 inch Standard Attenuator (Protects object up to 90 inches in width) | 1) Quadguard II2) TAU-II3) Quadguard Elite4) TAU-II-R5) SCI 100 GM | 1) Trinity Highway Products2) Lindsay Transportation Solutions3) Trinity Highway Products4) Lindsay Transportation Solutions5) Hill & Smith |
| 7 | 24 inch Low-Maintenance Attenuator (Protects object up to 24 inches in width) | 1) Quadguard Elite2) SCI 100 GM3) TAU-II-R | 1) Trinity Highway Products2) Hill & Smith3) Lindsay Transportation Solutions |
| 8 | 30 inch Low-Maintenance Attenuator (Protects object up to 30 inches in width) | 1) Quadguard Elite2) SCI 100 GM3) TAU-II-R | 1) Trinity Highway Products2) Hill & Smith3) Lindsay Transportation Solutions |
| 9 | 36 inch Low-Maintenance Attenuator (Protects object up to 36 inches in width) | 1) Quadguard Elite2) REACT 3503) REACT 350 II4) TAU-II-R5) SCI 100 GM | 1) Trinity Highway Products2) Trinity Highway Products3) Trinity Highway Products4) Lindsay Transportation Solutions5) Hill & Smith |
| 10 | 60 inch Low-Maintenance Attenuator (Protects object up to 60 inches in width) | 1) REACT 350 Wide2) TAU-II-R3) SCI 100 GM | 1) Trinity Highway Products2) Lindsay Transportation Solutions3) Hill & Smith |
| 11 | 69 inch Low-Maintenance Attenuator (Protects object up to 69 inches in width) | 1) Quadguard Elite2) TAU-II-R3) SCI 100 GM | 1) Trinity Highway Products2) Lindsay Transportation Solutions3) Hill & Smith |
| 12 | 90 inch Low-Maintenance Attenuator (Protects object up to 90 inches in width) | 1) Quadguard Elite2) TAU-II-R3) SCI 100 GM | 1) Trinity Highway Products2) Lindsay Transportation Solutions3) Hill & Smith |
| 13 | 96 inch Low-Maintenance Attenuator (Protects object up to 96 inches in width) | 1) REACT 350 Wide2) TAU-II-R3) SCI 100 GM | 1) Trinity Highway Products2) Lindsay Transportation Solutions3) Hill & Smith |
| 14 | 120 inch Low-Maintenance Attenuator (Protects object up to 120 inches in width) | 1) REACT 350 Wide2) SCI 100 GM | 1) Trinity Highway Products2) Hill & Smith |