QuadGuard® II
Product Description Manual

TRINITY HIGHWAY
Ahead of the Curve®
QuadGuard® II

The QuadGuard® II has been tested pursuant to National Cooperative Highway Research Program (“NCHRP Report 350”) specifications. The QuadGuard® II has been deemed eligible for federal-aid reimbursement on the National Highway System by the Federal Highway Administration (“FHWA”).

Product Description Manual

Warning: The local highway authority, distributors, owners, contractors, lessors, and lessees are responsible for the assembly, maintenance, and repair of the QuadGuard® II. Failure to fulfill these RESPONSIBILITIES with respect to the assembly, maintenance, and repair of the QuadGuard® II could result in serious injury or death.

The instructions contained in this manual supersede all previous information and manuals. All information, illustrations, and specifications in this manual are based on the latest QuadGuard® II information available to Trinity Highway at the time of printing. We reserve the right to make changes at any time. Please contact Trinity Highway to confirm that you are referring to the most current instructions.
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Customer Service Contacts

Trinity Highway is committed to the highest level of customer service. Feedback regarding the QuadGuard® II, its assembly procedures, supporting documentation, and performance is always welcome. Additional information can be obtained from the contact information below:

**Trinity Highway**

| Telephone          | (888) 323-6374 (USA)  
|                   | +1 312 467 6750 (International) |
| E-mail            | TrinityHighway.com/Contact |
| Website           | TrinityHighway.com |

Limitations and Warnings

Trinity Highway contracts with FHWA approved testing facilities to perform crash tests, evaluate test results, and submit results to the FHWA for review.

The QuadGuard® II has been deemed eligible for reimbursement by FHWA as meeting the requirements and guidelines of NCHRP Report 350. NCHRP Report 350 tests are designed to evaluate product performance involving a range of vehicles on roadways, from lightweight cars (approx. 1800 lb. [820 kg]) to full size pickup trucks (approx. 4400 lb. [2000 kg]). A product can be certified for multiple Test Levels. The QuadGuard® II is certified to the Test Level(s) as shown below:

**Test Level 2:** 43 mph [70 km/h]

**Test Level 3:** 62 mph [100 km/h]

These FHWA directed tests are not intended to represent the performance of systems when impacted by every vehicle type or every impact condition existing on the roadway. This system is tested only to the test matrix criteria of NCHRP Report 350 as approved by FHWA.

Trinity Highway expressly disclaims any warranty or liability for injury or damage to persons or property resulting from any impact, collision or harmful contact with products, other vehicles, or nearby hazards or objects by any vehicle, object or person, whether or not the products were assembled in consultation with Trinity Highway or by third parties.

The QuadGuard® II is intended to be assembled, delineated, and maintained within specific state and federal guidelines. It is important for the highway authority specifying the use of a highway product to select the most appropriate product configuration for its site specifications. The customer should be careful to properly select, assemble, and maintain the product. Site lay out, vehicle population type; speed, traffic direction, and visibility are important elements that require evaluation in the selection of a highway product. For example, curbs could cause an untested effect on an impacting vehicle.

After an impact occurs, the debris from the impact should be removed from the area immediately and the specified highway product should be evaluated and restored to its original specified condition or replaced as the highway authority determines as soon as possible.
System Overview

The QuadGuard® II is a potentially reusable, re-directive, non-gating crash cushion for roadside obstacles ranging in width from 24" to 126" [610 mm to 3200 mm]. It consists of energy-absorbing cartridges surrounded by a framework of Quad-Beam® Panels. The decision as to whether this product is reusable after impact rests solely within the sound discretion of the trained engineer, experienced in highway products, who is working at the direction of the local DOT, or appropriate highway authority, which specified and now owns the product.

The QuadGuard® II utilizes two types of cartridges in a staged configuration designed to address both lighter cars and heavier, high center-of-gravity vehicles. Its modular design allows the system length to be tailored to the design speed and appropriate number of Bays for a site (p. 10).

Impact Performance

The 5 Bay QuadGuard® II has successfully passed the requirements outlined in NCHRP Report 350, Test Level 3 tests with both the light car and pickup at speeds of up to 62 mph [100 km/h] at angles up to 20 degrees.

During head-on impact testing, within NCHRP Report 350 criteria, the QuadGuard® II is designed to telescope rearward to absorb the energy of impact. When impacted from the side, within the applicable NCHRP Report 350 criteria, it is designed to redirect the vehicle back toward its original travel path and away from the roadside obstacle.

How to Determine Left/Right

To determine left from right when ordering parts, stand in front of the system facing the roadside feature. Your left is the system’s left and your right is the system’s right.

Counting the Number of Bays

One Bay consists of one Cartridge, one Diaphragm, two Fender Panels, etc. The Nose section is not considered a Bay, though there is a Cartridge in the Nose of each system. Note that this means there will always be one more Cartridge in the system than the number of Bays in the system. To determine number of Bays, count Fender Panels on one side (Figure 1).
Measuring the Width

The QuadGuard® II is available in seven (7) nominal widths:

- 24" [610 mm]
- 30" [760 mm]
- 36" [915 mm]
- 48" [1219 mm]
- 69" [1755 mm] - (Minimum 3 Bays Required)
- 90" [2285 mm] - (Minimum 3 Bays Required)
- 126" [3200 mm] - (Minimum 6 Bays Required)

The nominal width of a parallel system is the width of the diaphragm (Figure 2). The nominal width of a wide system is the width at the location shown in Figure 3. The outside width of the system is approximately 6" [150 mm] to 9" [230 mm] wider than the nominal width. The width of the system is not the same as the width of the Backup.
Trinity Highway Approved Adhesive Anchoring System

A Trinity Highway approved adhesive anchoring system is required to securely anchor crash cushions. Each approved adhesive kit contains adhesive, studs, nuts, washers and instructions. Both vertical and horizontal assemblies are possible using an approved adhesive anchoring system.

Site Conditions

Cross-slope exists – If there is a cross-slope of more than 8% (5 degrees), or if the cross-slope varies (twists) more than 2% (1 degree) over the length of the system, a concrete leveling pad may be required (Figure 4).

No cross-slope – No additional action is required.

1) Specify Backup Structure

The two Backup designs available are the Tension Strut Backup and the Concrete Backup. Both types are appropriate for use on grade or deck.

2) Special Conditions

Contact Trinity Highway Customer Service Department if you would like input with your application. You will need to answer the following questions:

1. Are curbs, islands or elevated objects (delineators or signs) present at the site? What height and width are they? All curbs and elevated objects over 4" [100 mm] high should be removed. If possible, curbs taller than 4" [100 mm] high should be removed approximately 50’ [15 m] in front of the QuadGuard® II and as far back as the system’s Backup. Any curbs that must remain should be 4" [100 mm] maximum and be mountable.

2. What is the angle of divergence if the construction site is a gore area?

What is the general geometry of the site, including the roadway for at least 500’ [150 m] in front, so traffic patterns can be visualized?

3. Is there an existing barrier? Where there is an existing guardrail or median barrier at the site, the Backup of the QuadGuard® II should tie into it when possible.

4. Will there be traffic approaching from the rear of the system? Is the system in a two-way traffic situation, with traffic going in opposite directions on either side of the system? Or, is the system on the side of the road in a location where crossover traffic is a concern? If so, a Transition from the back of the system to the hazard is necessary to prevent vehicle interaction (pp. 12 & 13).

5. Are there any other unique features at the site that may affect positioning or performance of the QuadGuard® II?
3) **Other Factors that May Affect Your Deployment:**

1. The existence of drain inlets.
2. Junction boxes or other appurtenances located near the hazard.
3. Insufficient space for the length preferred.
4. The location and movement of expansion joints.

If these or any other special site conditions exist, please contact Trinity Highway Customer Service Department before proceeding with your design (p. 3).

**Important:** It is the responsibility of the appropriate highway authority to select the location for the QuadGuard II in accordance with the Roadside Design Guide. Trinity Highway is not responsible for choosing the location where a system will be placed.

Impact conditions which differ from those described in the NCHRP Report 350 test matrix for non-gating, redirecting crash cushions may result in different crash results than those encountered in testing.

Furthermore, impacts in excess of TL-3 impact severity, or the existence (at the site of assembly) of curbs or cross-slopes in excess of 8%, may yield performance which does not meet NCHRP Report 350 evaluation criteria relative to structural adequacy, occupant risk and vehicle trajectory factors.

![Model Number Key](image)

**Figure 5**

**Model Number Key**
These following charts represent the modified versions of the QG II length relative to impact speed, which is based on the capacity of the system using a 2000 kg [4400 lb.] pickup truck.

### Speed & Cartridge Placement Chart For Narrow Systems

<table>
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<th># of Bays</th>
<th>Model #</th>
<th>kph [mph]</th>
<th>Type I</th>
<th>Type II</th>
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<td>2</td>
<td>QG 270_ _</td>
<td>70 [44]</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3*</td>
<td>QG 280_ _</td>
<td>80 [50]</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4*</td>
<td>QG 290_ _</td>
<td>90 [56]</td>
<td>3</td>
<td>2</td>
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<tr>
<td>5</td>
<td>QG 2100_ _</td>
<td>100 [62]</td>
<td>3</td>
<td>3</td>
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<tr>
<td>6*</td>
<td>QG 2105_ _</td>
<td>105 [65]</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>7*</td>
<td>QG 2110_ _</td>
<td>110 [68]</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>8*</td>
<td>QG 2115_ _</td>
<td>115 [71]</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9*</td>
<td>QG 2120_ _</td>
<td>120 [75]</td>
<td>4</td>
<td>6</td>
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</table>

### Speed & Cartridge Placement Chart For Wide Systems

<table>
<thead>
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<th># of Bays</th>
<th>Model #</th>
<th>kph [mph]</th>
<th>Type I</th>
<th>Type II</th>
</tr>
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<tbody>
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<td>3*</td>
<td>QG 270_ _</td>
<td>70 [44]</td>
<td>2</td>
<td>2</td>
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<td>4*</td>
<td>QG 280_ _</td>
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<td>8*</td>
<td>QG 2115_ _</td>
<td>115 [71]</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9*</td>
<td>QG 2120_ _</td>
<td>120 [75]</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

*System capacity estimated through calculation.
Figure 6
Plan & Elevation
5 - Bay system with Tension Strut Backup
Transitioning

Quad-Beam™ End Shoe Transition Panel

The Quad-Beam™ End Shoe Panel transitions the QuadGuard® II system to vertical faced concrete structures whether it is a concrete Backup or concrete barrier wall (p. 13). An Extended End Shoe is also available. In cases where the corners of the hazard are not chamfered, it may be necessary to add wheel deflectors to the structure in order to prevent wheel interaction.

Quad-Beam™ to Guardrail Transition Panel (W-Beam and Thrie-Beam)

The Quad-Beam™ to W-Beam and Quad-Beam™ to Thrie-Beam Transition Panels transition the QuadGuard® II system to new and existing runs of standard guardrail (p. 13).

Quad-Beam™ to Safety Barrier Transition Panel

There are several options available when transitioning the QuadGuard® II system to safety shape barrier depending on the shape and position of the barrier.

When transitioning to barriers with a “New Jersey” style profile, the 4” offset Transition Panel is most commonly used (p. 13). For transitioning to barriers that are in line with the side of the system, use transition assembly 616041B or 616044B. For transitioning a wide system to barrier that runs parallel to the centerline of the system, transition assembly 616048B or 616049B is used. A 9” offset Transition Panel is also available for transitioning to barriers that are in line with the side of the system.

When transitioning the Single Slope style barriers and parapets, 6” and 8” offset Transition Panels are available. For transitioning a wide system to barrier that runs parallel to the centerline of the system, a 6” offset panel is available.

How do you determine the Transition Panel offset?

Transition Panel offset is determined by measuring the distance between the face of the barrier and the top edge of the Backup Diaphragm at 32” above ground level (Figure 7). Remember, when assembling the QuadGuard® II that the correct Transition Panel offset must be achieved in order for the offset bracket to nest between the barrier and Transition Panel ensuring proper performance of the transition.

![Figure 7](image)

Figure 7
Transition Panel Offset
**Transition Panel Types**

If a system is placed in a location where traffic will be approaching from the rear, a Transition Panel is necessary. Standard panel types are illustrated below and there are variations for each panel type. The specific panel applied will depend on system and site conditions. Therefore, it is important to send site specific data to the Trinity Highway Customer Service Department for exact panel requirements of your application.

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**Figure 8**
Quad-Beam™ to Safety Barrier (NJ shape) Transition Panel

**Figure 9**
Quad-Beam™ to Thrie-Beam Transition Panel

**Figure 10**
Quad-Beam™ to W-Beam Transition Panel

**Figure 11**
Quad-Beam™ End Shoe Transition Panel
QuadGuard® II CZ Deployment Criteria

This portable compact crash cushion is for construction zones. The QuadGuard® II CZ is available in the same narrow sizes as permanent systems.

The QuadGuard® II CZ must be properly anchored.

Important: QuadGuard® II wide systems should not be anchored to asphalt.

<table>
<thead>
<tr>
<th>QuadGuard® II CZ Plate Model Numbers and Widths</th>
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<tbody>
<tr>
<td>Number of Bays</td>
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<td>----------------</td>
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<td>2</td>
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<tr>
<td>5</td>
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</tbody>
</table>

Model Number Description

![QuadGuard II CZ (Construction Zone) Design Speed (km/h) Plate/Monorail Sections Width of the Backup (610 mm [24"], 760 mm [30"], 915 mm [36"], 1219 mm [48"])](image)

Figure 12
Model Number Key
Foundation/Anchoring

**Warning:** It is the responsibility of the installer that this assembly conforms with the guidance provided by the AASHTO Roadside Design Guide, including, but not limited to, those regarding placement on or adjacent to curbs.

**Asphalt Installations**

Systems with a Tension-Strut Backup may be temporarily installed in construction zones on asphalt. Assemblies on **Asphalt Concrete (“A.C.”)** must provide a minimum of 76 mm [3"] layer of asphalt over a minimum of 76 mm [3"] layer of **Portland Cement Concrete (“P.C.C.”)**, 152 mm [6"] layer of asphalt over 152 mm [6"] layer of subbase, or 203 mm [8"] layer of asphalt with no subbase.

**Important:** Only 460 mm [18"] threaded rods, utilizing Trinity Highway approved adhesive, can be used with asphalt foundations. Contact Trinity Highway for a complete list of approved adhesives (p. 3).

**Concrete Installations**

For concrete installations, the QuadGuard® II should be installed only on an existing or freshly placed and cured concrete base (28 MPa [4000 psi] minimum). Orientation of the concrete base and the attenuator must comply with the project plans or as otherwise determined by the resident project engineer or appropriate highway authority.

Recommended dimension and reinforcement specifications for new concrete pads can be found on the standard drawings.

The QuadGuard® II may be installed on any of the following foundations using the specified anchorage:

**Foundation A: Reinforced Concrete Pad or Roadway**

Foundation: 150 mm [6"] minimum depth P.C.C.
Anchorage: Approved adhesive with 180 mm [7"] studs 140 mm [5 1/2"] embedment

**Foundation B: Asphalt over P.C.C.**

Foundation: 76 mm [3"] minimum asphalt concrete (A.C.) over 76 mm [3"] minimum P.C.C.
Anchorage: Length of anchor required is 460 mm [18"] 420 mm [16 1/2"] embedment

**Foundation C: Asphalt over Subbase**

Foundation: 150 mm [6"] minimum A.C. over 150 mm [6"] minimum Compacted Subbase (C.S.)
Anchorage: Approved adhesive with 460 mm [18"] studs 420 mm [16 1/2"] embedment

**Foundation D: Asphalt Only**

Foundation: 200 mm [8"] minimum A.C.
Anchorage: Approved adhesive with 460 mm [18"] studs - 420 mm [16 1/2"] embedment
QuadGuard® II w/Tension Strut Backup Wide

Key:
- **TRAFFIC**
- **ELEVATION**
- **PLAN**

**NOTES:**
1. IN COMPLIANCE WITH THE AASHTO 2011 ROADSIDE DESIGN GUIDE, MANUFACTURER RECOMMENDS REMOVAL OF ALL CURBS AND ISLANDS TO ENSURE PROPER IMPACT PERFORMANCE.
2. Provision shall be made for rear fender panels to slide rearward upon impact 750 [25.60] ft.
3. 150 [6.00] min. reinforced 28 MPa (4000 PSI) F.C. concrete pad or 200 [6.60] min. non-reinforced 28 MPa (4000 PSI) F.C. concrete roadway, measuring at least 3 [0.92] m (24 in) wide by 1,24 m (57 in) long. Anchor block is not required when using 8" concrete pad installed against an immovable structure such as a concrete wall or abutment.
4. See the "QuadGuard II System Product Manual" for a description of its impact performance characteristics and design limitations before placing a system at a given site. Information and copies of above manual are available by calling customer service department at 1-888-123-4567.
5. Where necessary, the customer shall supply an adequate transition from the QuadGuard II system to the object being shielded.
6. Units of measurement are meters (inches) unless otherwise noted.
7. Back-up, monorail, and node assemblies are not included in model number, order separately.
8. The QuadGuard II has been fully tested to NCHRP 350 TL-3.

**REFERENCES:**
- **TRIANGLE CARTRIDGE**
- **MONORAIL**
- **DIAPHRAGM**
- **NOSE ASSEMBLY**
- **DIAPHRAGM SHEATH**
- **CONE**
- **BACKUP**
- **CONCRETE PAD**

**Dimensions:**
- **EFFECTIVE LENGTH:** 120 [4.72] ft.
- **SYSTEM LENGTH:** 150 [4.72] ft.
QuadGuard® II w/Concrete Backup
35-40-11 - 1 of 3

8" Concrete Pad for Tension Strut Backup

Table

<table>
<thead>
<tr>
<th>NO. OF BAYS</th>
<th>PAD LENGTH (m)</th>
<th>15&quot; Concrete Pad Required (m³)</th>
<th>YARDS OF CONCRETE IN PAD</th>
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<td>6.40</td>
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Four 13mm #6 bars equally spaced.

16mm #5 bars at 610 [24.00] centers.

Place 16mm #5 bar at 76 [3.00] from rear edge of pad.

Plan View

28 MPa [4000 P.S.I.] minimum, P.C. concrete pad and anchor block. 2324 kg/m³ [145 lbs/cu. ft].

Notes:
1. Cross slope of pad shall not exceed 3% and not vary more than 2% from front to back.
2. Units of measurement are millimeters [inches] unless otherwise noted.
Optional 8" Concrete Pad for Tension Strut Backup
Backup Assembly, Tension Strut, QG
Concrete Backup, QG on Grade
Concrete B-up, QG on Existing Concrete Structure
Concrete Pad, for Concrete Backup, QG
Concrete Pad, CZ, QG
Concrete Pad & Backup, QG Wide

**Plan View**

1. **L** (SEE TABLE)
2. **QUADGUARD II**
3. **QUADGUARD PAD**

**Elevation View**

- **356 [14]**
- PROVIDE LANDSCAPING APPROXIMATELY AS SHOWN
- **457 [18]**
- **430 [12]**

**Notes**

1. CROSS SLOPE OF PAD SHALL NOT EXCEED 8%, AND NOT VARY MORE THAN 2% FROM FRONT TO BACK.
2. ALL CONCRETE TO BE 25MPa (4000 PSI) P.C. CONCRETE.
3. FOR EXISTING APPROVED CONCRETE SURFACES:
   - **A)** MIN 150 [6] DECK STRUCTURE.
   - **B)** MIN 200 [8] NON-REINFORCED ROADWAY MEASURING AT LEAST 3.6 m (12'-0") WIDE BY 15.24 m (50'-0") LONG, OR
   - **C)** MIN 150 [6] REINFORCED PAD.

**TABLE C** (SEE NOTE 2)

<table>
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<tr>
<th>NO. OF SEWS</th>
<th>(PAD LENGTH)</th>
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<th>CONCRETE REQUIRED</th>
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**Concrete Pad Details**


**Section A-A**

- **356 [14] TYP.**
- **76 [3]**
- **76 [3]**

**References**

- D. Staus 7/25/97
- B.D. 7/24/97
- J. Machado 8/19/97
- 3540411-0000.dwg

**Energy Absorption Systems, Inc.**

**Quadguard System**

**Concrete Pad & Backup, QG Wide**
(69") Concrete Pad & Backup, QG Wide on Grade
(90") Concrete Pad & Backup, QG Wide on Grade
Wide System Fender Panel Assembly
PCMB Anchor Assembly

612006

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<th>ASSEMBLY NO.</th>
<th>ITEM 1</th>
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<td>612006C</td>
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NOTE:
1. THE REINFORCEMENT SHOWN IN DETAIL "A" IS RECOMMENDED FOR PORTABLE CONCRETE BARRELL TO ENSURE ADEQUATE BARRIER INTEGRITY WHEN USED IN COMBINATION WITH THE QUADGUARD SYSTEM. THE DETAIL SHOWN IS BASED ON STATE OF CALIFORNIA STANDARD PLANS FOR TEMPORARY RAILING (TYPE K). VARIATIONS MAY BE AUTHORIZED AND DETERMINATIONS MADE AS TO REASONABLE EQUIVALENCE BY PROJECT ENGINEER.

2. USE ANCHOR PLATE AS TEMPLATE FOR DRILLING.
3. RECOMMENDED HOLE DEPTH INTO PCMB IS 1.5X здоровьи. DRILL 4 HOLES IF NECESSARY TO INSTALL MINIMUM OF 2 ANCHOR BOLTS PER BRACKET. FINAL TORQUE TO 183 NM[135 ft-lb](Typ).

4. IMPACT FORCES CAN BE TRANSFERRED INTO TERMINAL END OF THE BARRIER. ADEQUATE ANCHORAGE IS REQUIRED TO ENSURE PROPER IMPACT PERFORMANCE. PCMB MUST BE ANCHORED TO A RIGID SURFACE (NOT DIRT) WITH A MINIMUM OF 12 TAPPED RODS ITEM 3) AS SHOWN. ANCHOR BOTH SIDES OF BARRIER USING ITEM 1 (6 REQUIRED). ATTACH PCMB USING ONE OF THE FOLLOWING:
   a) 1/2" STUDS MAY BE USED TO ANCHOR PCMB TO 28 MPa [4000 PSI] MIN. R.C. CONCRETE PER THE FOLLOWING MINIMUM CONCRETE DEPTH.**
   b) 150 [6.00] NON-REINFORCED ROADWAY.
   c) 150 [7.00] DECK STRUCTURE.
   d) THROUGH TAPPED RODS MAY BE USED TO ANCHOR PCMB TO ASPHALT, 6" MIN. THICKNESS.**
   e) ROCK 108 MPa [4000 PSI] P.C. CONCRETE MEDIAN BARRIER.

5. DIMENSIONS ARE IN MILLIMETERS [INCHES], UNLESS OTHERWISE NOTED.

**NOTE TO THE QUADGUARD MP-3 ANCHORING SYSTEM INSTALLATION INSTRUCTIONS FOR SPECIFICATIONS.

REFERENCES

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<tr>
<td>J. Espinosa</td>
<td>7/31/97</td>
</tr>
<tr>
<td>S. Turner</td>
<td>11/07/96</td>
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<td>KRM</td>
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ENGLUND & ASSOCIATES, INC.
ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD™ SYSTEM
PCMB ANCHOR ASSEMBLY
INSTRUCTION NUMBER 612006
N.T.S. 612006
1 of 1 0
End Shoe Assembly

NOTES:
1. DIMENSIONS ARE IN MILLIMETERS (INCHES).
2. USE END SHOE AS TEMPLATE FOR DRILLING.
   RECOMMENDED HOLE DEPTH 127 [5.00]
   FINAL TORQUE TO BE 1632 in-lb [160 ft-lb] (TYP),
   ANCHOR STUD END SHOULD BE FLUSH WITH
   OUTSIDE SURFACE OF ANCHOR NUT.

REFERENCES

<table>
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<tr>
<th>Name</th>
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<tr>
<td>D. Straus</td>
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ASSEMBLY NO. 608105B
ENERGY ABSORPTION SYSTEMS, INC.
ENGINEERING AND RESEARCH DEPARTMENT
QUADGUARD® SYSTEM
END SHOE ASSY.06
4" Offset Transition Assembly
Quad-Beam to W-Beam Transition Assembly
Quad-Beam to Thrie-Beam Transition Assembly

NOTES:
1. PANEL OVERLAP SHOWN IS FOR TRAFFIC DIRECTION SHOWN. ACTUAL OVERLAP SHALL BE DETERMINED BY THE SITE CONDITIONS AND PROJECT ENGINEER PER TRAFFIC DIRECTION. USE STANDARD QUADRANT CONNECTOR.
2. RIGHT SIDE OF ROAD APPLICATION SHOWN. ASSEMBLY MAY BE USED ON EITHER OR BOTH SIDES FOR LEFT, RIGHT, MIDDLE OR CENTER APPLICATIONS. SEE NOTE 1. THIS ASSEMBLY IS NOT INCLUDED IN THE MODEL NUMBER AND MUST BE ORDERED SEPARATELY.
3. ENERGY ABSORPTION SYSTEMS, INC. SUPPLIES THE STOCK ITEMS SHOWN IN THE PARTS LIST. ALL OTHER COMPONENTS OF THE DOWNSTREAM QUADRANT ARE STANDARD HIGHWAY MATERIALS AND MAY BE OBTAINED FROM YOUR LOCAL HIGHWAY SUPPLY VENDORS.
4. TRANSITION AND GUARDRAIL PANEL CONNECTIONS MAY BE SLOTTED IN ORDER TO ACCOMMODATE THERMAL EXPANSION AND CONTRACTION.

~END~
Notes: