

# QUADGUARD–M10 Crash Cushion

## Product summary

|                    |  |
|--------------------|--|
| <b>Status</b>      | Accepted   |
| <b>Category</b>    | Permanent – Re-directive crash cushions  |
| <b>Test Level</b>  | Test Level 2 (MASH): <b>70km/h</b><br>Test Level 3 (MASH): <b>100km/h</b>      |
| <b>Supplier</b>    | Ingal Civil Products   |
| <b>Description</b> | QUADGUARD-M10 is an energy-absorbing non-gating and re-directive crash cushion |

## Introduction and purpose

This detail sheet is intended to supplement *VicRoads Road Design Note 06-04 - Accepted Safety Barrier Products*. Please refer to RDN 06-04 for the current VicRoads acceptance status, information on the product assessment process and general acceptance conditions.

The technical details within this document have been extracted from information submitted to VicRoads by the Supplier and the recommended 'Conditions for Use' from the Austroads Safety Barrier Assessment Panel (ASBAP).

**VicRoads requirements take precedence over the product manual and Austroads conditions.** Where a departure from these requirements is required, users should understand the risks and document their engineering decisions.

For more detailed product information, refer to the individual product manual or contact the System Supplier.

## Technical information

The QUADGUARD-M10 should be designed, installed and maintained in accordance with the following VicRoads conditions for use.

These conditions for use have been based on an Austroads assessment of technical performance against AS/NZS 3845 and contain VicRoads specific requirements when necessary.



Typical installation arrangement shown above.

## Summary Conditions for Use

|                                |   |
|--------------------------------|---|
| <b>Accepted configuration</b>  | QUADGUARD-M10 Crash Cushion - Permanent   |
| <b>Variants</b>                | QUADGUARD-M10 CZ (temporary installation on 150mm AC over 150mm compacted sub-base permitted using M20 x 460mm Gr8.8 chemical anchor) |
| <b>Product manual reviewed</b> | PN 625877 – Rev.C Sept 2019   |
| <b>ASBAP issue</b>             | 20 March 2020   |

Refer VicRoads conditions for use (below).

## VicRoads Conditions for Use

### Tested design requirements

| Containment level | Point of Redirection (m) |          | Tested article length (m) | Post/Pin Spacing (m) | Dynamic deflection (m) | Working width (m) | Notes  |
|-------------------|--------------------------|----------|---------------------------|----------------------|------------------------|-------------------|--|
|                   | Leading                  | Trailing |                           |                      |                        |                   |  |
| MASH TL2          | Fully redirective        |          | 4.0                       | Refer Drawings       | N/A                    | N/A               | Hazard free area 3.1 metres downstream and 11 metres laterally to be provided. |
| MASH TL3          | Fully redirective        |          | 6.71                      | Refer Drawings       | N/A                    | N/A               |  |

### Approved Terminals and Connections

*Crash Cushions or Terminals must be fitted to both ends of a barrier*

#### Public Domain Products

|                                |   |
|--------------------------------|---|
| W-Beam Guardrail               | Permitted - may only be installed where reverse impacts are highly improbable and a risk assessment has been completed and steps undertaken to mitigate any risks identified. |
| Thrie-Beam Guardrail           | Permitted - may only be installed where reverse impacts are highly improbable and a risk assessment has been completed and steps undertaken to mitigate any risks identified. |
| Type F Concrete Safety Barrier | Permitted   |

#### Proprietary Products

Refer to safety barrier Technical Conditions for Use for approved proprietary connections.

### Design Guidance

**This product must be installed and maintained in accordance with the Product Manual and Road Agency specifications. Road Agency specifications and standards shall have precedence.**

|                                |  |
|--------------------------------|--|
| System length                  | TL2 4.0 metres<br>TL3 6.71 metres  |
| System width                   | 0.61 metres  |
| Installation                   | This product must be installed and maintained in accordance with the Product Manual and Road Agency specifications. Road Agency specifications and standards shall have precedence.<br>Installation on reinforced concrete pad is permitted in accordance with manufacturer's drawing no. 626085 |
| Minimum distance to excavation | N/A  |
| Slope limit                    | Side slope limit: (8%)   |
| Systems conditions             | Installation on top of kerb is not recommended.  |
| Gore area use                  | Permitted  |
| Pedestrian area use            | Permitted – consider potential for snagging and deflection   |
| Cycleway use                   | Permitted – consider potential for snagging and deflection   |
| Frequent impact likely         | Permitted  |
| Remote location                | Permitted  |
| Median use                     | Permitted  |

**Foundation pavement conditions**

| Submitted Foundation Pavement Conditions  |               |                      |                      |   |                                   |
|---|---------------|----------------------|----------------------|---|-----------------------------------|
| Pavement                                  | Use           | Accepted Speed (max) | Post/Pin spacing (m) | Pavement construction   | Post/pin type                     |
| Concrete                                  | Permitted     | 100 km/h             | Refer Drawings       | Min 28MPa and 150mm min depth   | M20 x 180mm Gr8.8 chemical anchor |
| Deep lift asphaltic concrete              | Permitted     | 100 km/h             |                      | Installation on reinforced concrete pad is permitted in accordance with manufacturer's drawing no. 626085 | M20 x 180mm Gr8.8 chemical anchor |
| Asphaltic concrete over granular pavement | Permitted     | 100 km/h             |                      |   |                                   |
| Flush seal over granular pavement         | Permitted     | 100 km/h             |                      |   |                                   |
| Unsealed compacted formation              | Not Permitted |                      |                      |   |                                   |

**Note:** Installation in pavement conditions not listed above have not been justified to the Panel's satisfaction.

**Other considerations and comments**

**Damaged Components**

Damaged components must be repaired in accordance with the product manual.

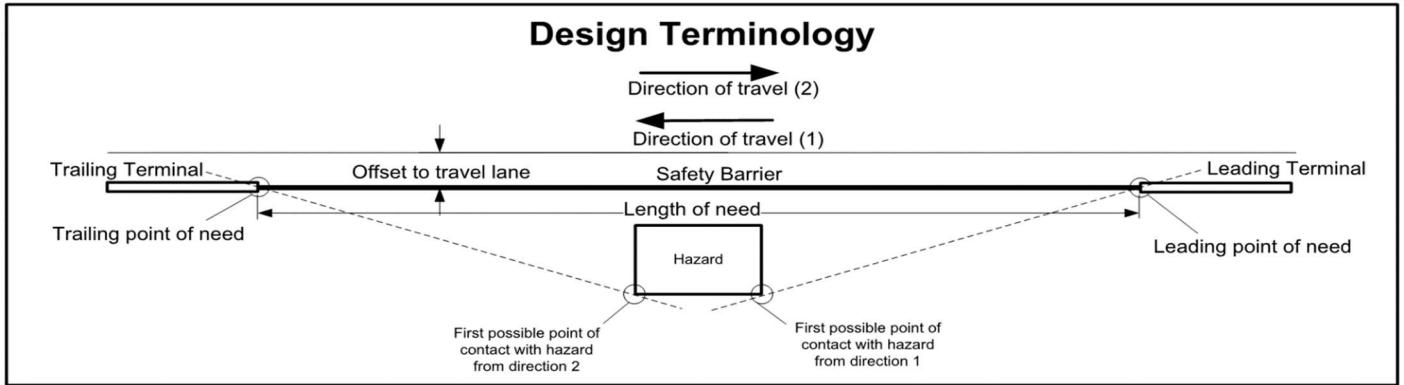
**References**

- Austroads Guide to Road Design – Part 6.
- VicRoads Supplement to Austroads Guide to Road Design – Part 6.
- VicRoads Road Design Note 06-04 Accepted Safety Barrier Products.
- Product Installation Manual and Product Operational Manual refer licensed product supplier website.

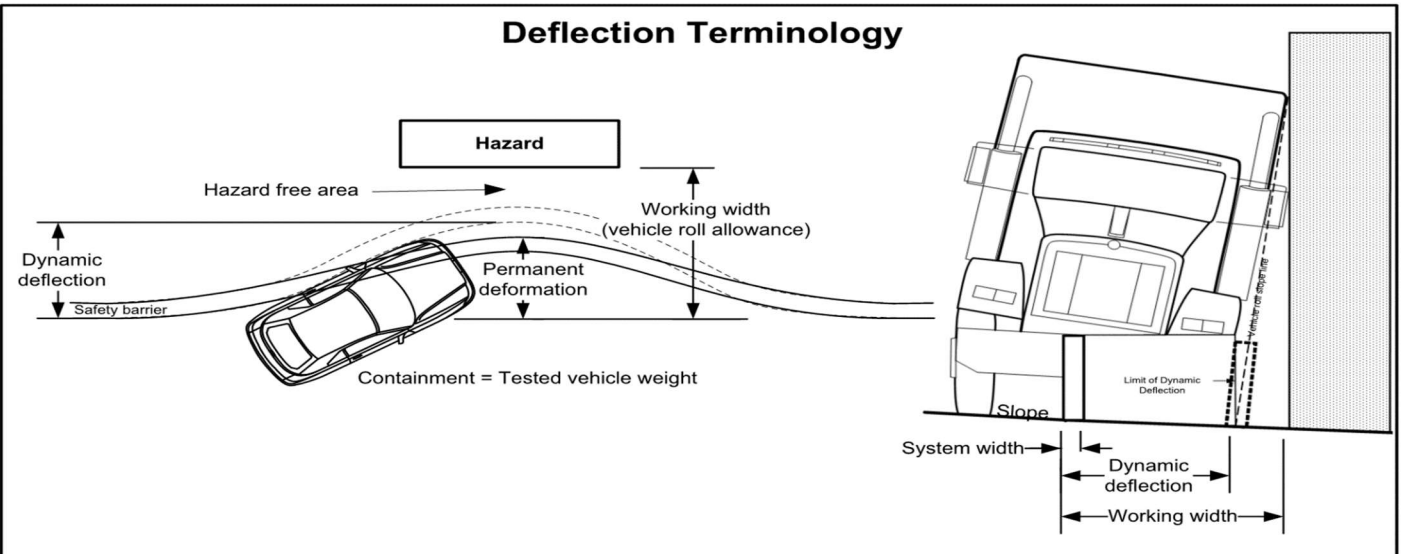
**Detail Sheet – Update Summary**

| Issue      | Approved | Amendment  |
|------------|----------|--|
| Dec 2019   | M-SSE    | First  |
| April 2020 | M-SSE    | MASH TL-2 Added<br>Variant Summary Changed<br>Installation Instruction Added<br>Foundation Pavement Condition Note |

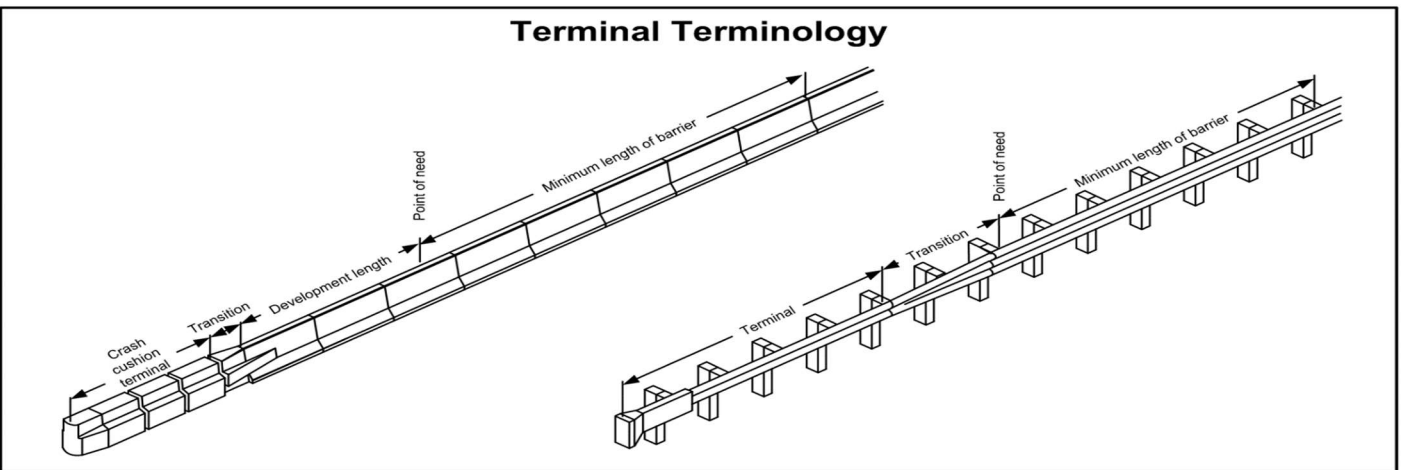
### Design Terminology



### Deflection Terminology



### Terminal Terminology



### Flare Terminology

