W-BEAM GUARD FENCE

Details
Category: Longitudinal
Sub Category: Semi-Rigid
Main Material: Steel
Gating/Non Gating: NA
Redirective/Non-Redirective: Redirective
Permanent/Temporary: Permanent

Ownership
Public Domain

Supplier:
Public Domain

Accepted Test Level
Deemed to comply with NCHRP 350 to Test Level 3 (TL3): 100km/h

Description
W-Beam is a semi-rigid steel rail barrier system with a double wave profile. The w-beam rail is supported by a blockout attached to steel posts. The system is commonly referred to as the public domain strong post W-Beam system or the G4 W-Beam system (different from the American G4 W-Beam).

NOTE: BOLT DOWN APPLICATIONS TO A FOUNDATION REQUIRE STRUCTURAL DESIGN & PROOF ENGINEERING BY A VICROADS PREQUALIFIED DESIGN CONSULTANT.

Drawing
Design

- Design should be undertaken in accordance with VicRoads Standard Specification for Roadworks Section 708 – Steel Beam Guard Fence and relevant VicRoads Standard Drawings for Roadworks.

Post Embedment

- Posts need to be driven to a sufficient depth in order to achieve the required stiffness to redirect vehicles in a crash. Refer to VicRoads Standard Drawing SD3661.
- If the desired post depth cannot be achieved, a plate and post assembly may be fixed to the concrete foundation.
- Bolt down applications to a foundation require structural design & proof engineering by a VicRoads prequalified design consultant.

Length of Redirection (LoR)

- The LoR of the W-Beam System depends on the specific site conditions.
- Refer to VicRoads Standard Drawings SD3511 and SD3521 for specific rail length and offset requirements.
- The minimum length of redirection allowable for W-Beam guard fence is 30m excluding end treatments. At lengths less than this the barrier has insufficient strength to resist impacts.

Offset from Kerbing

- The required offset for W-Beam guard fence depends on the type of kerb or shoulder present.
- Guidelines regarding guard fence offsets is summarised in Table 1 below. Refer to VicRoads Standard Drawing SD3502 for details.

<table>
<thead>
<tr>
<th>Kerb Type or Shoulder</th>
<th>Guard Fence Offset</th>
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</thead>
<tbody>
<tr>
<td>Barrier Kerb</td>
<td>Guard fence either in front of kerb or ≥3m behind kerb</td>
</tr>
<tr>
<td>Semi-Mountable Kerb</td>
<td>Guard fence either 0-1m behind kerb or ≥3m behind kerb</td>
</tr>
<tr>
<td>Mountable Kerb</td>
<td>No Restrictions</td>
</tr>
<tr>
<td>Shoulder</td>
<td>Width ≥ 3m: generally 0-1m behind shoulder Width ≤2.5m: 0.5-1m behind shoulder</td>
</tr>
</tbody>
</table>

Table 1: Offset Requirements

Deflection

- Australian Standard AS3845: 1999 nominates a dynamic deflection of 1.0 m under NCHRP 350 TL-3 conditions.
- In constrained locations where deflection must be minimised, the barrier system can be stiffened by reducing the post spacing to 1.0m. Refer to Road Design Note 06-08 – The Use of Guard Fence (pending).

Height Correction

- Where the face of the guard fence is erected within 0 to 1m behind the back of kerb or within 1.5m from edge of pavement without kerb, the mounting height shall be measured from the adjacent road pavement surface.
- For distances beyond 1.5m from back of kerb, the mounting height shall be measured from the ground surface at the guard fence location.

End Treatments

- Any of the appropriate accepted proprietary end treatments are suitable with public domain guard fence.
- The trailing terminal may be used on the departure side providing the site meets the restrictions placed on this end treatment.
- Restrictions on the use of any of the end treatments can be found in the relevant End Treatment Design Sheet.

Limitations

- The cross slope shall be not greater than 10% for the area between the edge of travelled way and the barrier.
- An obstacle free area at least 2m wide with a slope not steeper than 10 to 1 shall be provided in front of the guard fence. Preferably, this flat area should cover the full width from the edge of verge to the guard fence.
- If kerbing is required in front of system then mountable kerbing is preferred.
- Trailing terminals must not be located within the clear zone of opposing traffic.

Installation & Maintenance

- **Parts to be re-used after impact**: Undamaged sections
- **Parts to be replaced after Impact**: W-Beam, blockout and posts may need to be replaced after impact.

References

- Road Design Note 6-08 – The Use of Guardfence (pending)
- VicRoads Standard Section 708 – Steel Beam Guard Fence
- VicRoads Standard Drawings SD3511, SD3521 & SD3661