

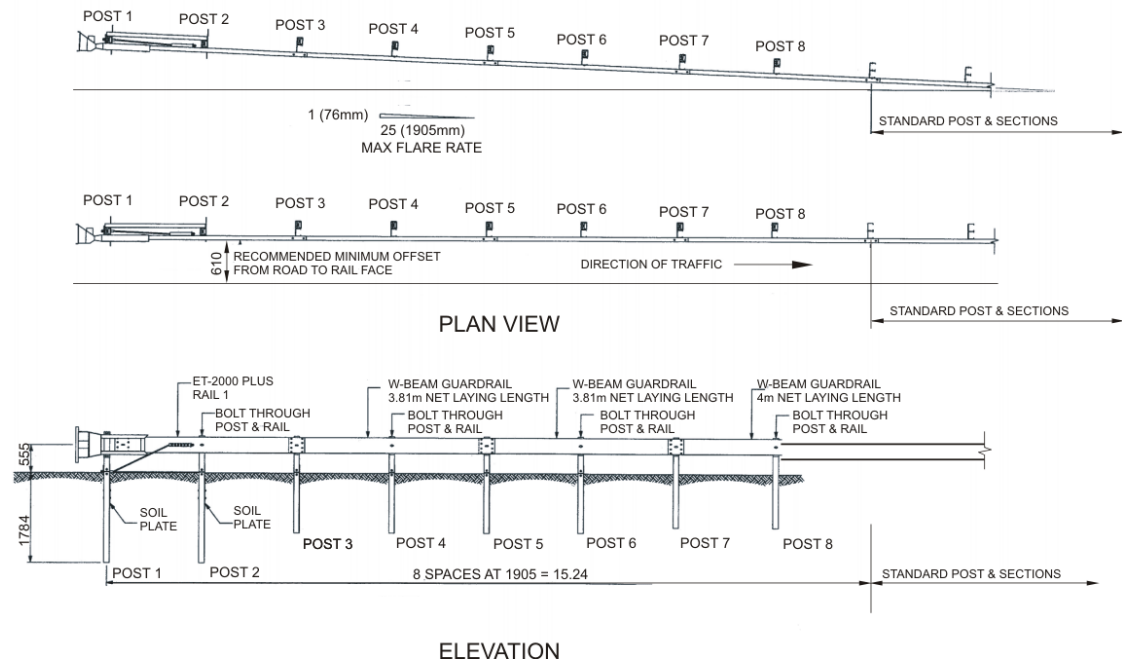
# ET2000 PLUS

## REVISION REGISTER

Issue & Revision	Description	Date
1	Issued for use.	23/2/2004.
1 A	Minor revisions and Kingblock added as a suitable replacement for timber blockout.	3/03/2006.
1 B	Supplier details amended.	24/06/2008
1 C	Change in post details and sticker requirements.	11/05/2009.
1 D	Change in Supplier Details.	3/07/2013.
1 E	Update Supplier details	17/08/15
1 F	New MRWA Guideline Drawing for Terminals issued. More details please refer to Drg 201531-0096 and 201531-0097	23/12/2015

The ET2000 Plus is an extruder gating end terminal and is also referred to as the ET2000, however the ET2000 Plus has a different extruder head. When hit end on the impact head is forced along the W-beam extruding the beam onto the verge side.

### Drawing:



**Ownership:** Trinity Industries Inc. USA  
[www.highwayguardrail.com](http://www.highwayguardrail.com)

**Supplier:** Ingal Civil Products  
 3 Temperley Close, Welshpool WA 6106  
 Ph: (08) 9452 9111 Fax: (08) 9358 9111  
 Website - <http://www.ingalcivil.com.au/>

**Test Level:** Tested in accordance with NCHRP 350 to TL2 & TL3.

## ET2000 PLUS

TL	Length (m)	Speed (km/hr)	Length of Need (m)*	Allowable Flare (mm)	Post Details	Suppliers Drawing
2	7.62	70km/hr	3.81	Can be installed parallel or on either 25:1 over full length.	Post 1: Steel hinged breakaway post Post 2-4 Steel Yielding Posts (SYTP) W150 x 13	CAB-STD-58-60 inclusive
3	15.24**	100km/hr	11.43	Can be installed parallel or on either 25:1 over full length.	Post 1: Steel hinged breakaway post. Post 2-8 Steel Yielding Posts (SYTP) W150 x 13	CAB-STD-54-57 inclusive

\* (starts at 3<sup>rd</sup> post measured from start of system).

\*\* There is also an 11.43m TL3 version of the system which is not accepted for use by Main Roads Western Australia.

### Configuration:

- The system is to be installed with posts one being a steel hinged breakaway (HBA) posts and the remaining posts being SYTP as specified in FHWA approval letter CC-12L.
- The sticker on the impact head which is 700 mm x 350 mm is to be Black bands on White Class 1 reflective backgrounds with the width marker pattern as shown in Australian Standard 1742.2 Sign D4-3 (L,R).
- System shall be supplied with Kingblock blockout.

### Design:

- Design to be in accordance with the ET-2000 Plus Design Manual provided by Ingal.
- Preferred plan layout is to install the end treatment at the recommended flare of 25:1 to reduce nuisance impacts.
- In locations of constrained width or on high embankments where the cost to provide additional width is not warranted then the terminal may be installed parallel to the road.
- Refer to Main Roads Drawings 201531-0096 and 201531-0097 for grading requirements around the ET-2000.
- As part of the design, the Designer shall check to ensure that there are no site constraints such as rock, cover to services or pipes or other factors that would preclude the use of the normal post lengths. There are shorter posts lengths that can be used but this requires approval from Senior Engineer Structures.
- Under reverse impact conditions the impact head can be projected 60 m downstream of the end treatment.
- As the end treatment is gating a run-out area in accordance with the requirements of AS /NZS 3845 Figure F11 should be provided.
- When the ET-2000 is installed on the departure end of a barrier system the system is to be oriented as per Sketch 1.

### Limitations:

- Must be installed on a straight flare or parallel to the travel way.
- Shall not be used in median situations where there is less than 6 m from the outlet side of the head and the adjacent edge of the traffic lane.

## ET2000 PLUS

### Installation and Maintenance Requirements:

The end treatment shall be installed and repaired after impact in accordance with the installation instructions that can be found at the Ingal website at [http://www.ingalcivil.com.au/pdfs/et\\_2000\\_plus\\_manual.pdf](http://www.ingalcivil.com.au/pdfs/et_2000_plus_manual.pdf)

### Parts to be Replaced after Impact:

Rail and posts.

### Parts Typically Re-Useable after Impact:

Impact head.

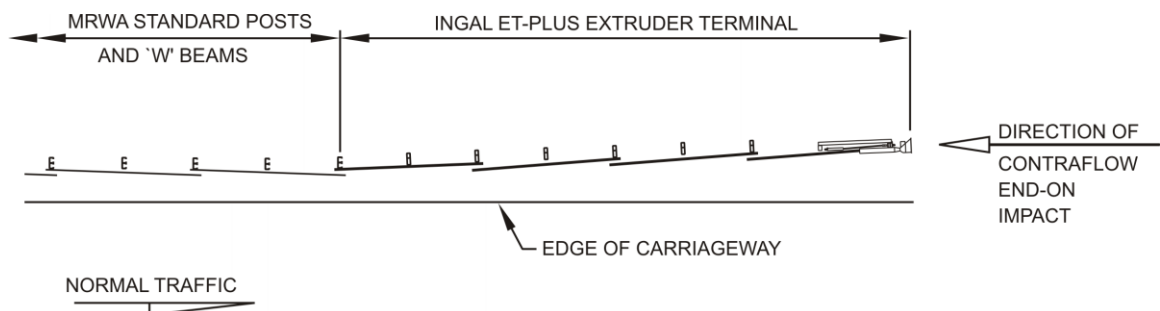
### References:

1. Senior Engineering Structure Circular SES 01/03.

### Relevant FHWA Approval Letters:

(Refer to website [http://safety.fhwa.dot.gov/fourthlevel/hardware/term\\_cush.htm](http://safety.fhwa.dot.gov/fourthlevel/hardware/term_cush.htm))

Code	Description
CC-12L	Modified post design.
CC-12K	Hinged breakaway post approval.
CC-12H	TL2 Approval.
CC-12G	TL3 Approval with 11.43 m length. Note length is shown under Figure 14.
CC-12L	Approval of Steel Yielding Posts (SYTP) W150 x 13.



- Departure end terminal guardrail to be lapped against the normal traffic flow as shown.
- Post associated with the end treatment are to be orientated for an end-on impact on the extruder head, that is, against the normal traffic flow.

Sketch 1: ET-Plus Departure End Treatment Layout  
(SES 01/03)