

BRIDGE BARRIER

AS5100 Deck and Side Mounted Bridge Barrier

Product Manual



Release 03/24

TL2 & TL3 OPTIONS

AS 5100.2 COMPLIANT

AS/NZS 3845.1 COMPLIANT

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1.0 Introduction

The new addition to the Ezy-Guard family is the Ezy-Guard Bridge Barrier. Using many components from the MASH Test Level 4 Ezy-Guard High Containment system, the Bridge Barrier configuration is designed for bridges and structures requiring AS5100 compliant edge protection. The Bridge Barrier can be deck or side mounted to the bridge structure, saving valuable lane width.

The standard configuration of the system, with posts at 2m centres, is compliant to AS 5100.2 - Low Performance Level, AS/NZS 3845.1, and MASH Compliant. The Ezy-Guard HC baseplated post arrangement has been evaluated and approved by ASBAP and all state road agencies. When integrated with the MASH TL3, Ezy-Guard 4 system, it provides a high level of roadside safety.

AS5100.2 Low Performance Level is comparable to the MASH Test Level 2 containment level, this is a 2270kg vehicle impacting the barrier at 70km/h and 25°. However many structures requiring low performance level barriers have posted speeds of greater than 70km/h. For these locations, the system can be installed with the posts at a reduced spacing of 1m. This offers a MASH TL3 containment level.

2.0 Specifications

Thrie-Beam Length:	4,000mm
Ezy-Guard BB Z-Post Mass:	13.5kg
Corrosive Protection:	HDG to AS4680
Rail Height Above Ground:	980mm
Z-Post Height Above Ground:	970mm
Post Spacing:	1m or 2m
Ezy-Guard BB System Width:	245mm

The system uses the same 4m Thrie-beam as the Ezy-Guard HC system. An Ezy-HC Carriage is used to secure the rails to the posts eliminating the requirement for blocking pieces, saving valuable lane width.





Approach Transition Rail 1905mm
10001809



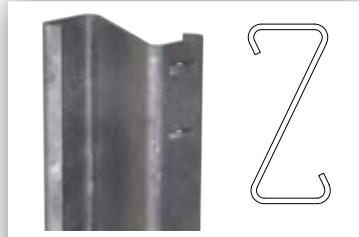
Departure Transition Rail 1905mm
10001811



W Beam 4000mm NLL
10000977



Thriebeam 4000mm NLL
10000837



Ezy-Guard HC Post 2000mm
10005540



Ezy-Guard 4 Post 1650mm
10007390



HC Carriage
10004116



Smart Carriage
10004115



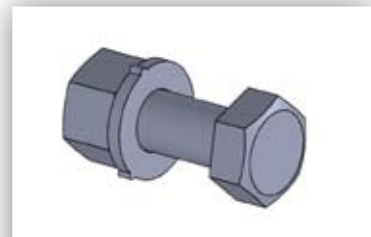
Carriage Bolt M16 x 30mm
10001832



Splice Bolt M16 x 32
10001248



Oversized M16 Nut
10001239



M20 Bolt, Nut, Washer
10009526



Side Mount Bracket
10010223

3.0 Crash Test Analysis

Crash test guidelines provide a minimum set of requirements that a roadside barrier has to meet in order to demonstrate its satisfactory impact performance.

Whilst crash test guidelines cannot include all possible impact conditions that may be experienced in the real world, the crash test matrix is selected to represent a "worst practical condition" for a roadside barrier impact.

The Ezy-Guard HC Barrier has been fully crash tested and evaluated according to the specifications for Test Level 4 (TL4) of the AASHTO Manual for Assessing Safety Hardware (MASH). The MASH TL4 crash test matrix requires the following impacts;

- 1,100kg car travelling at 100km/h and 25 degrees.
- 2,270kg pick-up travelling at 100km/h and 25 degrees.
- 10,000kg truck travelling at 90km/h and 15 degrees.

The Ezy-Guard Bridge Barrier system has been developed via FEM crash simulation modelling in accordance with NCHRP-179 - Procedures for the Verification and Validation of Computer Simulations used for Roadside Safety Applications. These models were calibrated against the Ezy-Guard HC crash testing.

4.0 Performance

The Ezy-Guard Bridge Barrier has been validated for two performance levels, each with a different post spacing.

For lower speed locations, the system can be installed with the on-structure posts at 2m centres. This configuration offers an AS5100.2 Low Performance Level, which is equivalent to MASH Test Level 2 or 70km/h.

For locations with speeds greater than 70km/h, the system can be installed with the posts at 1m centres. This configuration offers a containment level of MASH TL3.

Refer drawings EZY-HC-030 and EZY-BRG-002 for further detail.

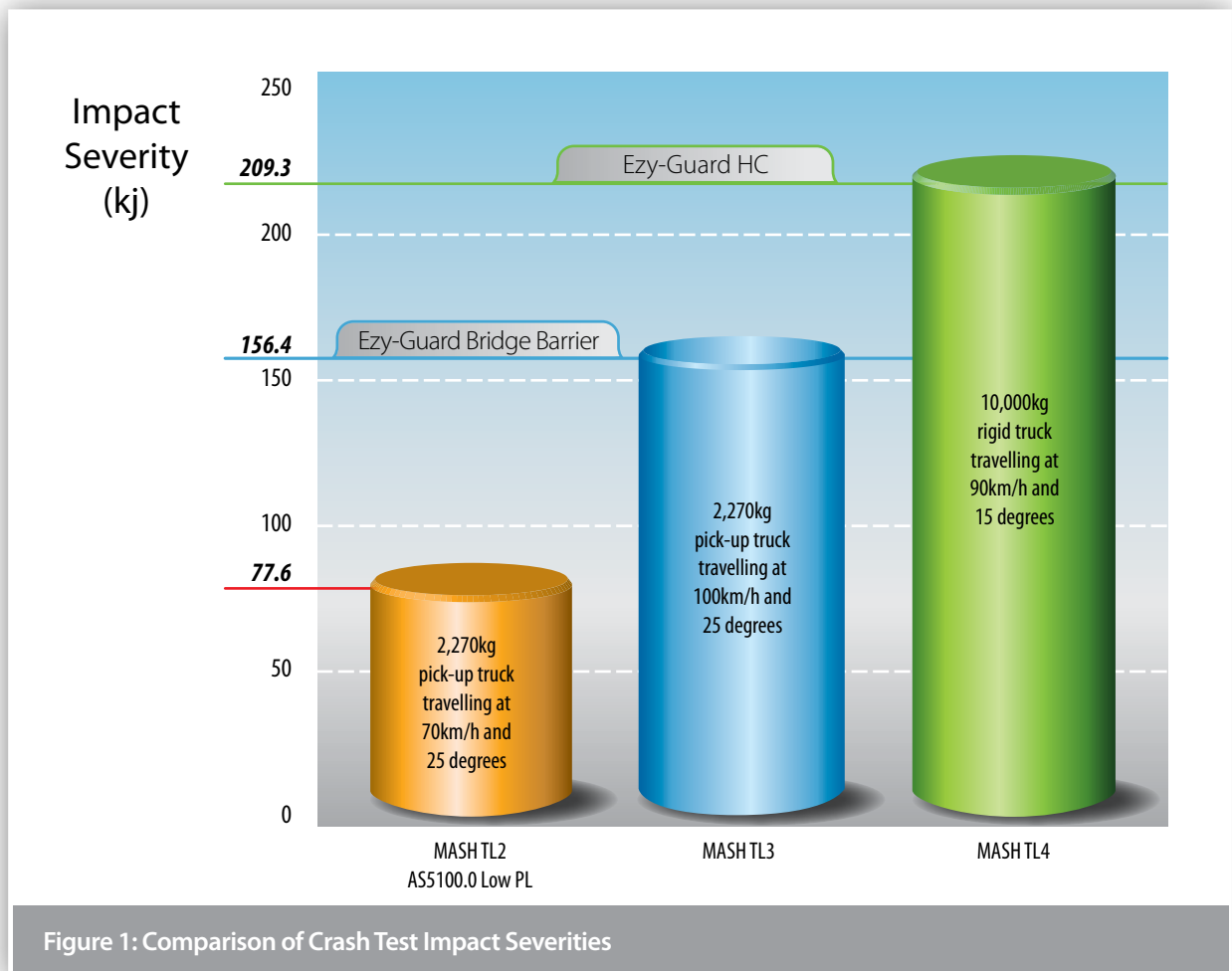


Figure 1: Comparison of Crash Test Impact Severities

5.0 Consideration for Vulnerable Road Users

Vulnerable road users include motorcyclists, pedestrians, cyclists and other road users. Ezy-Guard has been designed to provide consideration to vulnerable road users as follows:

Rounded Post Corners.

The Z-post contains smooth, rounded post edges and corners mitigating the risk and severity of fractures and/or contusions.

Energy Absorbing, Ductile Z-Posts.

The Z-posts are designed to yield by bending near ground level. This bending action absorbs impact energy reducing the potential for post fracturing. A fractured or split guardrail post presents a significant laceration hazard to vulnerable road users.

The Ezy-Guard design does not contain any elements that become projectiles and there are no aggressive edges.

Shielded Posts.

The innovative design of Ezy-Guard shields the top of the supporting Z-posts by positioning the top of the

rail above the posts. This eliminates dangerous snag points, reducing the potential for the barrier to dismount motorcyclists or cyclists. This is a significant safety benefit compared to traditional guardrail and cable barrier systems.

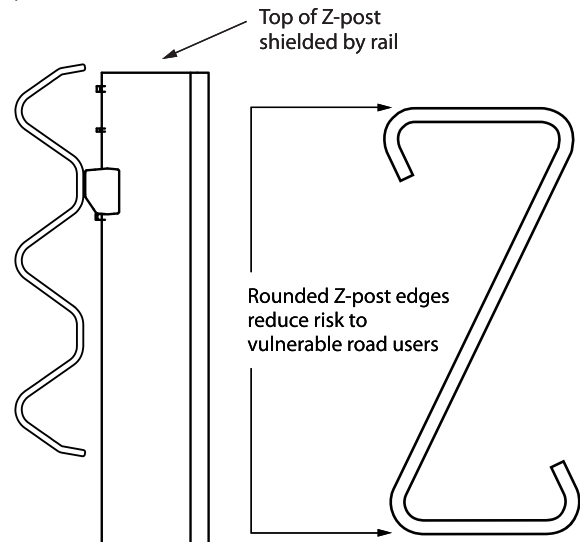


Figure 2: Ezy-Guard: Considerations for Vulnerable Road Users



6.0 Features and Benefits

6.1 Structure Preservation

Ezy-Guard Bridge Barrier is designed for minimal load transfer into the structure, reducing potential concrete damage in a crash. This means less road closures or need to repair concrete after impact damage.

There is also a lower impact risk to the vehicle occupants through the controlled yielding of the barrier posts.

An easy transition into Ezy-Guard 4 is achieved with a short 6m transition length. The shorter transition length results in returning to the higher MASH level crash rating when reconnecting to the Ezy-Guard 4 system.

6.2 Adaptable to the Site

The Ezy-Guard Bridge Barrier can be easily retrofitted to existing structures, with deck or side mounted options available. It also utilises the Ezy-Guard's narrow 250mm footprint, saving valuable lane width.

The Ezy-Guard Bridge Barrier system uses all off-the shelf components, with all stock readily available, minimising repair time in the event of a vehicle impact.

5.3 Rapid Installation & Repair

Ezy-Guard Bridge Barrier system installation can be up to twice as fast to install than conventional guardrail barriers.

The Ezy-Guard Bridge Barrier design uses fewer components and features 2,000mm Z-posts that are rapidly driven into the ground. The Z-post embedment depth is just 1,030mm, a significant reduction when compared to other Thriebeam guardrail posts. This reduces installation time providing significant cost savings.

Since the Z-posts are designed to yield by bending near ground level, damaged posts can be removed easily which reduces the time spent by work crews on the roadside.

6.4 Narrow Width

With a system width of just 245mm, the Ezy-Guard Bridge Barrier system is significantly narrower than the traditional guardrail barriers that incorporate the use of blocking pieces.

The Ezy-Guard HC, Transition and Ezy-Guard 4 conserves valuable formation width and allows a greater recovery width to be provided for errant vehicles.



6.5 Manual Handling

The Ezy-Guard Bridge Barrier system uses fewer components than the public domain guardrail systems. Z-posts weighing just 19.5kg are lighter than traditional Thrie-beam C-posts. The lightweight Z-post reduces manual lifting by installation crews.

The rounded edges of the Z-post provides a handle-like grip when lifting, reducing the possibility of hand lacerations. The Z-profile allows the installer to maintain a firm grip and facilitates correct lifting techniques.

5.6 Locally Designed & Produced

The Ezy-Guard Bridge Barrier system is manufactured in Australia by Ingal Civil Products using steel manufactured by BlueScope Steel. Z-posts and rail are stamped providing traceability to material mechanical and chemical analysis certificates. Hot dip galvanising is performed internally by Ingal and daily inspections ensure zinc thickness readings are in accordance with AS/NZS standards.

5.7 Soft Ride-Down Decelerations

The Ezy-HC-Carriage controls the release of the Thrie-beam rail from the Z-posts. This controlled release reduces the potential for vehicle pocketing and provides a soft ridedown for vehicle occupants.

EZY-GUARD HC
 IN GAL CIVIL PRODUCTS

EZY-GUARD
BRIDGE BARRIER



The Ezy-Guard Bridge Barrier System

The Ezy-Guard Bridge Barrier System is compatible with W-Beam Guardrails, but maximum MASH rating is achieved through the use of Ingal's proprietary Ezy-Guard 4 or Ezy-Guard HC guardrail systems.

Ezy-Guard HC High Containment Barrier

Transition to Ezy-Guard 4 Guardrail

Side Mounted Support Structure

The Ezy-Guard Bridge Barrier requires no additional footings and can be bolted directly to the bridge structure itself.

Bridge Structure



▲ Ezy-Guard 4 Guardrail



▲ Ezy-Guard HC Guardrail and Transition



◀ Ezy-Guard Support Structure

7.0 Installation

7.1 Terminals

Guardrail end terminals are installed at the beginning and end of a run of guardrail. Their primary purpose is to anchor the longitudinal barrier and to minimise deflection. Crashworthy terminals are typically used in locations where they can be impacted end-on as they are designed to provide a soft gating impact if impacted near the end rail. This prevents any spearing of an errant vehicle. Part of the end-terminal may also be redirective.

Ezy-Guard Bridge Barrier is installed at a system height of 980mm, measured to the top of the rail. This height is the Ezy-Guard HC system and the ET-SS end-terminal, refer to installation drawings.

Terminals should be installed in accordance with the proprietor's drawings and specifications. Z-posts are not to be used in the terminals unless approved by the proprietor.

The installation of terminals will typically incorporate the use of blocking/offset pieces positioned between the posts and rail. This will require the supporting posts to be offset from the set-out line used for the installation of the Z-posts which do not require blocking pieces.

In addition, the post spacing used in the terminals and transitions may vary from the 2m spacing used for installation of Ezy-Guard HC. The required post spacing for terminals and transitions will be contained in the proprietor's drawings.

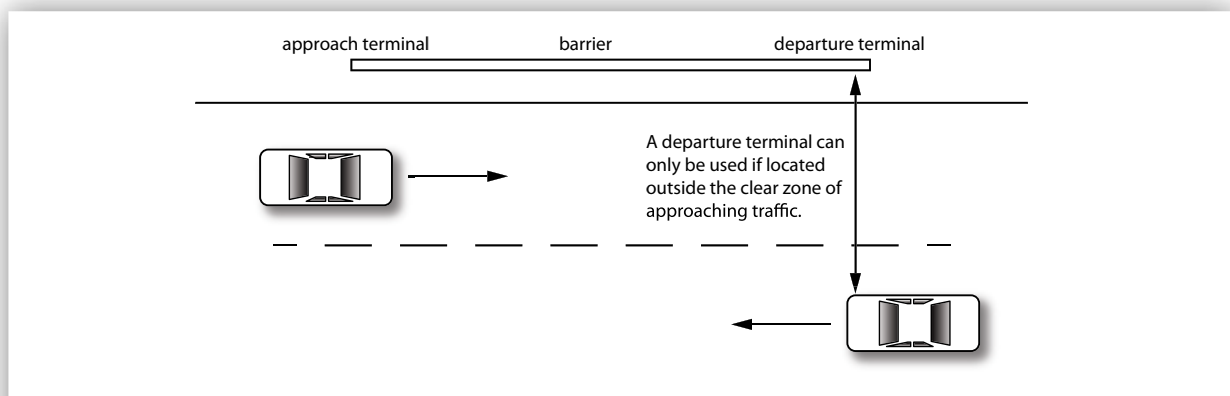


Figure 5: Clear Zone Requirement for the use of Departure Terminals



7.2 Minimum Length Requirements

There are two geometric methods used to determine the likely trajectory of a vehicle that leaves the road in the vicinity of a roadside hazard and the minimum length of need required to protect from this hazard.

The most common method is the run-out length method and an alternative is a method based on angle of departure.

Prior to design or installation, designers should consult the relevant road controlling authority to establish the local jurisdictional practice as the methods may result in different lengths. Both methods are detailed in the Austroads Guide to Road Design – Part 6.3.

For the on-structure section of the run of barrier, the Ezy-Guard Bridge Barrier requires a minimum of 4m upstream and 4m downstream of the structure with posts at 1m centres. The on-structure section of the barrier has a minimum length of 4m. Therefore, the minimum total length of Bridge Barrier is 12, not including transition panels. Refer drawing EZY-HC-030 for more detail.

7.3 Sequence of Work

Where Ezy-Guard is being constructed on a road open to traffic, it is recommended that the work commence at the end closest to the approaching traffic. Leading terminals and transitions shall be commissioned at the earliest practical time.

7.4 Modifications

Ezy-Guard shall be constructed in the configuration as detailed in Ingal Civil Products’ drawings. This is the configuration in which the system has been crash tested.

No modifications shall be made to the system unless verified by Ingal Civil Products.

Flame cutting of rails or posts is not permitted. Saw cutting and drilling is permitted in the event that a post is to be installed at an irregular spacing and/or rock is encountered and the post embedment depth has been modified.

Any modification carried out after fabrication will require repair to the galvanized coating. This is undertaken by applying two coats of an organic zinc rich epoxy paint complying with AS/NZS 3750.9. This is to be applied to the repair areas in two coats. Each coat shall have a minimum dry film thickness of 50 µm.

TL2 & TL3 OPTIONS

AS 5100.2 COMPLIANT

AS/NZS 3845.1 COMPLIANT

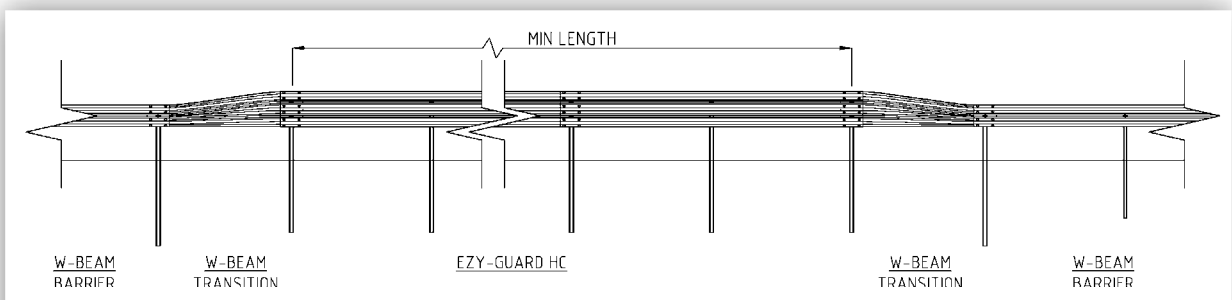


Figure 6: Minimum length measurement

7.5 Delineation

A specially designed delineator is attached to the Z-post. Typically, delineation is arranged so that drivers approaching from either direction will see only;

- Red retro-reflectors on their left;
- White retro-reflectors on their right on two-way carriageways; and
- Yellow retro-reflectors on their right on one-way carriageways and medians separating traffic in opposing directions

The spacing of delineators is dependant upon driver line of sight. As a general rule delineators are provided for installation every 20m on straight alignments. Installation on curves will require a closer spacing dependant upon the radius of the roadway.



7.6 Curving of Rails

Guardrail used for the assembly of Ezy-Guard may be shop curved to fit any radius from 2.4m to 45m Convex. Ezy-Guard HC for Concave Curves can be used from 2.4m to 45m. Curves in excess of 45m do not require shop curving as the rail can be field installed to suit. Guardrail may be curved either concave or convex to the traffic face and can be part-curved along its length to suit site requirements.

7.6.1 Measuring Curvature

1. Mark along the arc of the curve at 4m intervals.
2. Measure the corresponding chord length (C) - refer to Figure 9.
3. Measure the corresponding centre offset (H) - refer to Figure 9.
4. Use the values for C & H to select the radius from Table 2.
5. Determine the curvature orientation from Figure 10.

7.6.2 Identification of Curved Rails

Where a rail has been factory curved by Ingal, the radius of curvature is marked on the rear face of the rail.

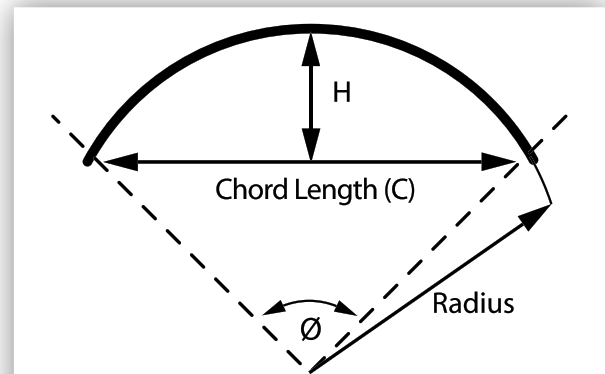


Figure 8: Curvature Measurements

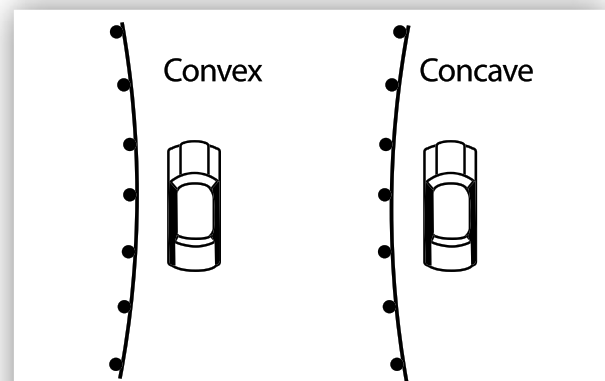


Figure 9: Curvature Orientation

Table 2: Rail Curvature Values

Radius (m)	Ø Degrees	C (mm)	H (mm)
2.4	95	3553	786
3	76	3710	642
4	57	3835	490
5	45	3894	395
6	28	3926	330
7	33	3946	284
8	29	3958	249
9	26	3967	221
10	23	3973	199
12	19	3982	166
14	16	3986	143
16	15	3990	125
20	12	3993	100
24	10	3995	83
28	8	3997	71
32	7	3997	62
35	7	3998	57
40	5	3998	50
45	5	3999	44



7.7 Installation Sequence

The following written instructions should be read in conjunction with Ingal Civil Products' drawings.

A generic Safe Work Method Statement is available from Ingal Civil Products to assist in the safe installation of Ezy-Guard

Only items purchased from Ingal Civil Products shall be used for the construction of Ezy-Guard.

1. Ensure the area has been inspected for underground hazards and that suitable traffic control is in place.
2. Post locations are marked ensuring any fixed object hazard to be protected is located outside the expected dynamic deflection of the barrier.
3. The post in relation to the direction of traffic is orientated as per Figure 11 and 12.

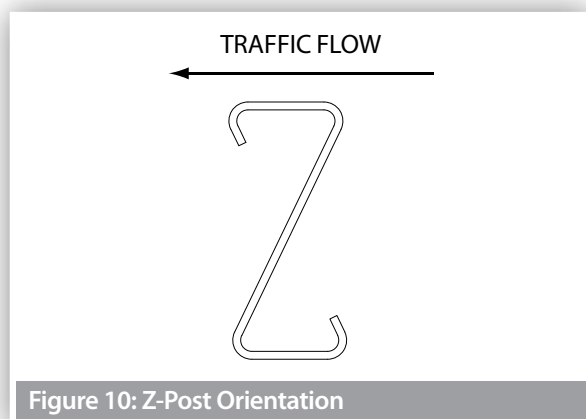


Figure 10: Z-Post Orientation

4. Posts can be anchored to the deck of the structure or to the side via the Side-Mount bracket. The post or bracket is secured to the structure via a series of chemically anchored M20 studs. For a new structure, refer to drawing EZY-HC-030 for anchor specification. For retrofit applications, anchor specification to be confirmed by project engineer.

Anchor studs shall be installed in accordance with the chemical anchor specifications.

5. The 4m of Ezy-Guard HC with posts at 1m centres located immediately upstream and downstream of the structure shall be installed in accordance with the Ezy-Guard HC product manual. These are typically driven into the ground.
6. The on-structure posts are spaced at 2m or 1m, depending on the required containment level, refer section 4.0.

7. The height of the Z-post above ground level is 970mm.
8. The Ezy-HC-Carriage is attached to the face of the post. The Ezy-HC-Carriage will come to rest on the positioning lug fabricated on the Z-post.

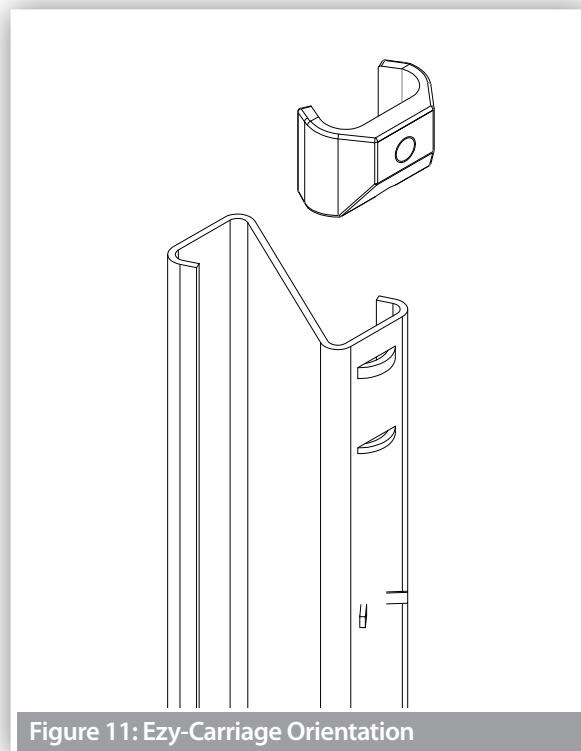


Figure 11: Ezy-Carriage Orientation

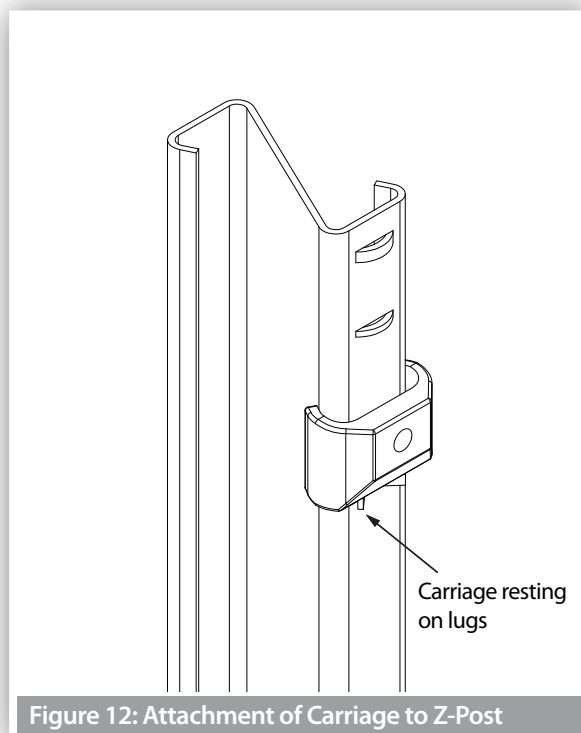


Figure 12: Attachment of Carriage to Z-Post

9. Rails are attached to the Ezy-HC-Carriage using the M16x30mm carriage bolts. The post bolts are identified by the socket recess located in the head of the bolt. The bolts are tightened to snug tight using a 10mm hex. key.
10. Rails are spliced together at every second post using M16x32mm mushroom head bolts and oversized nuts. There are 12 bolts required per splice connection. A pinch bar may be used to assist in the alignment of splice holes. The use of a driving pin to elongate the slots is NOT to be used since this may cause tearing of the rail at the slot location. The bolts are tightened to snug tight.

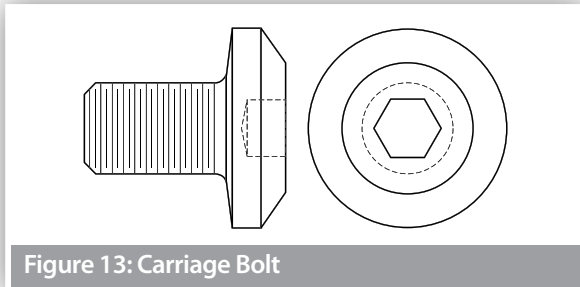


Figure 13: Carriage Bolt

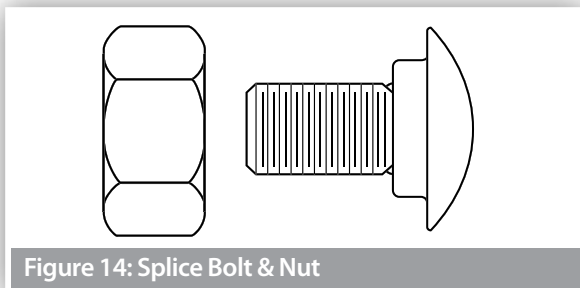


Figure 14: Splice Bolt & Nut

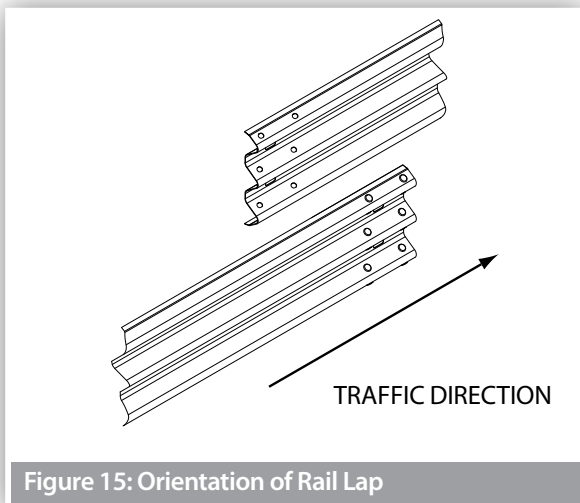


Figure 15: Orientation of Rail Lap

11. Rails are orientated so that no leading edge is presented to the traffic face as shown in Figure 18.
12. It is recommended that posts be installed only a few metres ahead of rail assembly to ensure correct post spacing and alignment. On curves, the rails can be used as a template and laid on the ground to determine post locations.
13. The construction of Ezy-Guard shall form a smooth line vertically and horizontally when viewed along the line of the system, free from humps, sags or other irregularities.
14. The Ezy-Guard components are to be free from splits, burrs or sharp edges after installation. Any minor damage is to be repaired in accordance with section 7.4.

7.8 Installation Tolerances

- The tolerance on height of the barrier shall be plus or minus 20mm.
- The tolerance for the line of the barrier shall be plus or minus 20mm in plan view.
- The tolerance for departure from the upright axis shall be plus or minus 15mm at the top of the barrier.
- The tolerance on post spacing shall be plus or minus 25mm.

8.0 Maintenance

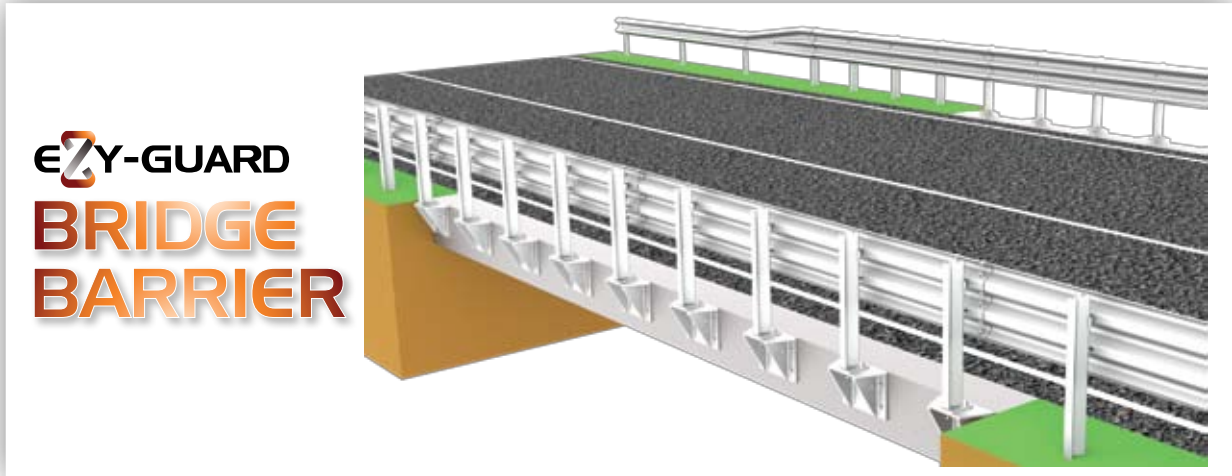
It is recommended that annual inspections be performed to ensure the following;

- The system is appropriately delineated;
- Debris has not accumulated around the system that may impede the performance of the barrier or the trajectory of an impacting vehicle;
- The system is suitably anchored with appropriate terminals and/or transitions. If the system is anchored with terminals, the cable assembly shall be taut and tensioned to its recommended value; and
- All splice bolts and post bolts are snug tight.

9.0 Product Storage

All posts and rails are hot dip galvanized in accordance with AS/NZS 4680. It is important that stored galvanized work is stacked so that each item is well ventilated and can adequately drain rainwater from its surfaces.

Poor storage can give rise to wet storage stain (white rust) which is caused by water (rain or condensation) in badly drained or ventilated conditions. This can occur very quickly, particularly in warm, humid conditions.



EZY-GUARD
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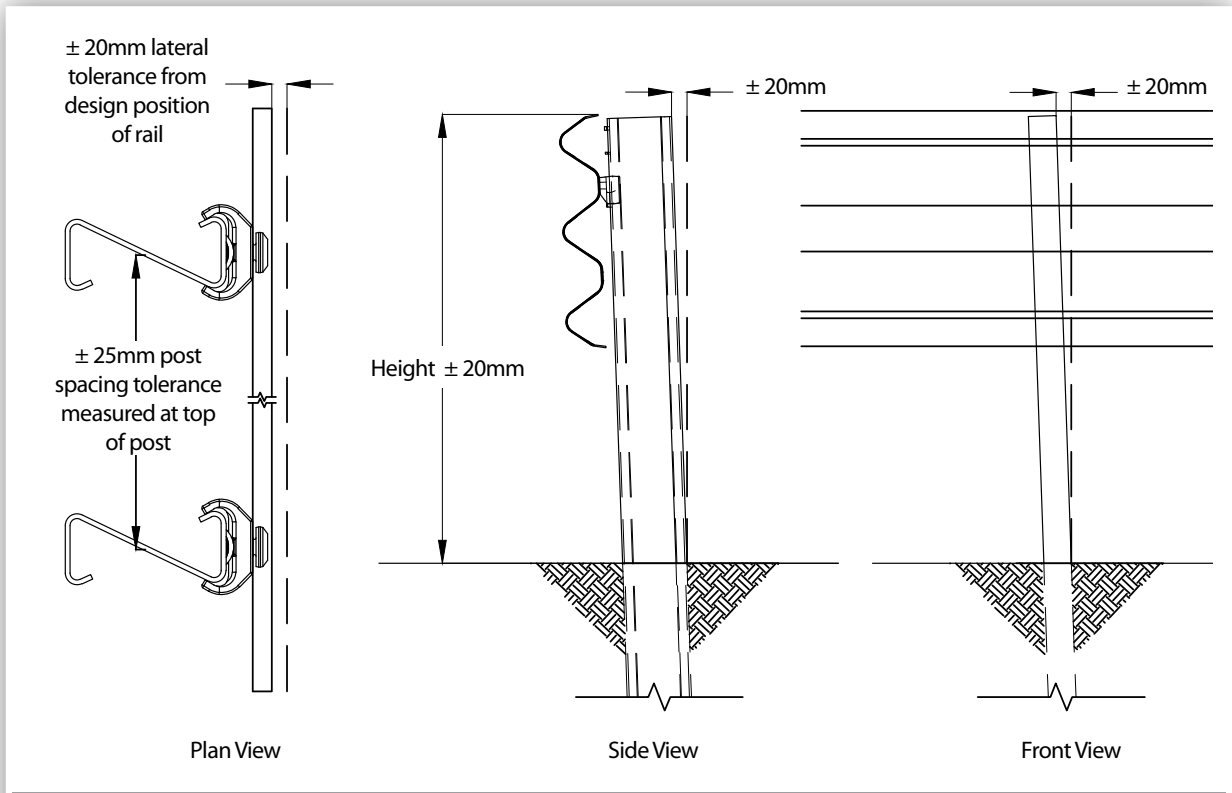


Figure 16: Ezy-Guard HC Installation Tolerances

Ezy-Guard Bridge Barrier Installation Checklist

Customer:

Project:

Barrier ID:

Barrier Length:

Checked By:

Signed:

Date

Is the post spacing in accordance with the project drawings	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Carriages are positioned on the posts between the retaining lugs and the resistance tabs	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Posts are installed to the correct height (970mm) and within the tolerances of section 7.14	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have the Ezy-HC-Carriages been correctly orientated	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have the rails been attached to the Ezy-HC-Carriages using the appropriate carriage bolt	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have the rails been spliced observing the correct lap	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have the rails been spliced with M16x32mm mushroom head bolts	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are all splice bolts and post bolts snug tight	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is the 4m of barrier upstream and downstream of the structure installed at 1m post spacing	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are both ends of the run anchored with approved terminals	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Where applicable, are the terminal anchor cables tensioned to their nominated torque (taut)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Has any minor damage been repaired using two coats of an organic zinc rich paint	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Does the barrier form a smooth line vertically and horizontally when viewed along the system	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is the barrier system free from humps, sags or other irregularities	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are the barrier components free from splits, burrs or sharp edges after installation	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Disclaimer:

Important Note: The conformity of the installation is the responsibility of the installation contractor, and Ingal Civil Products accepts no liability for or in connection with any installation that is outside of the specifications of this manual or the Road Controlling Authority. For more information, please refer to our Standard Terms and Conditions of Sale available on our website: www.ingalcivil.com.au.

10.0 Repair

10.1 Bush Fire Damage

Ezy-Guard HC does not contain any plastic, timber or rubber components that will burn.

The performance of galvanised coatings when subjected to fires depends upon a number of factors, such as flame duration and intensity.

Typical bushfire conditions may expose steel structures to an air temperature of 800°C for periods of up to 120 seconds, however zinc coatings are generally reflective and will not absorb heat at the same rate as an uncoated steel surface. Depending on the section thickness of the steel, the actual steel surface temperature may not exceed 350°C.

Typically, the bushfire flame duration and intensity are not high enough to compromise the structural strength of the steel. The hot dip galvanized coating will also typically remain unaffected through a bushfire event. If the bushfire causes damage to the galvanized surface, then the item(s) shall be replaced.

10.2 Damage Assessment

In the event of a vehicle impact, damage to the barrier is to be assessed in accordance with Table 3.

A Safe Work Method Statement is available from Ingal Civil Products upon request to assist in the safe repair of Ezy-Guard HC.

Any item that is replaced is to be reinstated observing the installation tolerances nominated in Section 7.11. Only items purchased from Ingal Civil Products shall be used for the repair of Ezy-Guard HC.

10.3 Dismantling Sequence

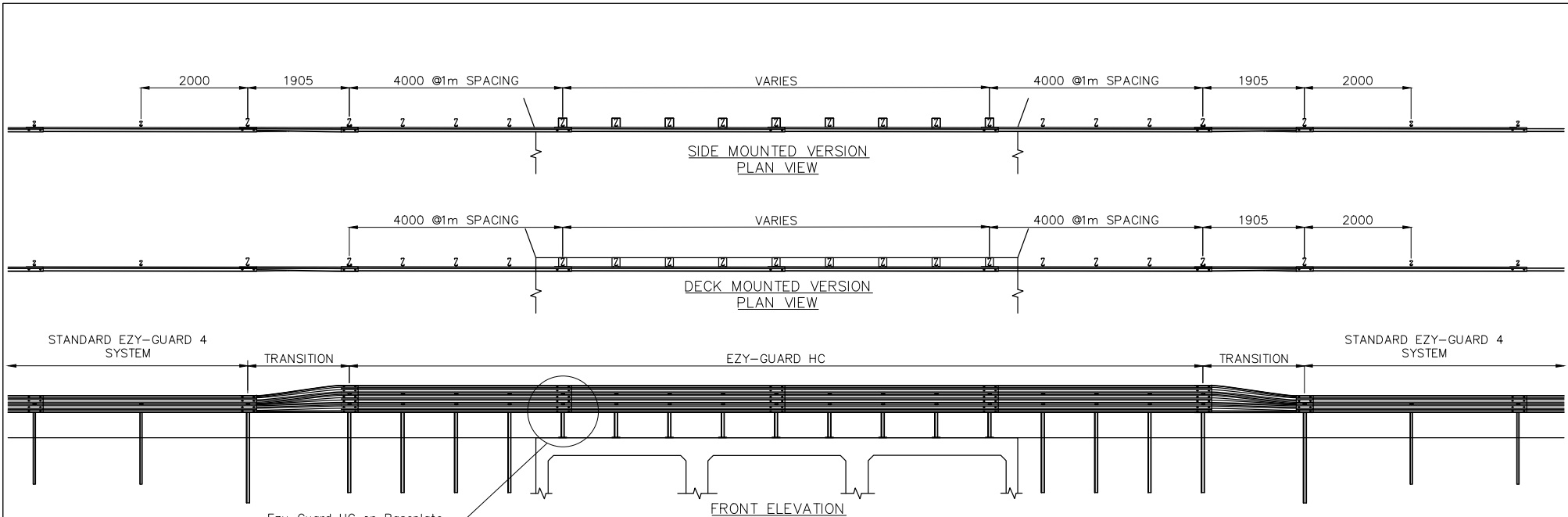
Prior to undertaking dismantling due to a vehicle impact, the area should be assessed for hazards. These include trip hazards, sharp edges and snag points.

During a vehicle impact, the rail will disengage from the posts as they yield by bending at ground level. The recommended dismantling sequence is as follows;

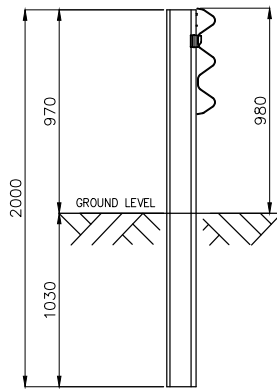
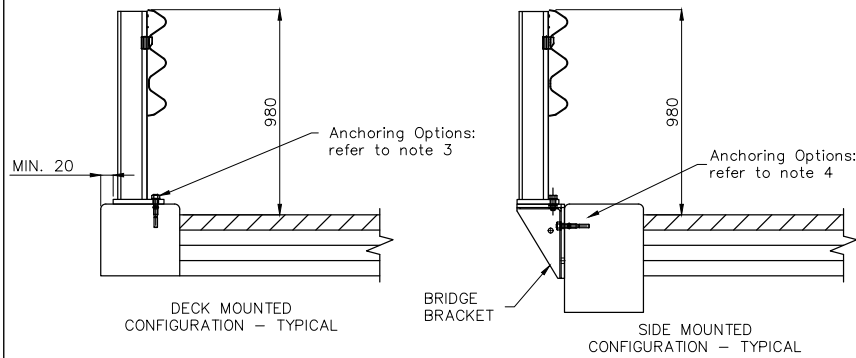
1. Dismantle the rail splice by removing the M16x32mm mushroom head bolts and nuts. There are 8 bolts located at each splice location.
2. Rails that are still attached to posts outside the impact area are disconnected by removing the carriage bolts. A 10mm hex key is required.
3. Once the area is clear of damaged rail, the posts can be removed. Since the posts yield by bending near ground level, a sling or chain can be attached below the bent section.
4. The damaged post can be lifted using a backhoe or post extractor attachment.
5. Any disturbed pavement material shall be left dense, tight, and smooth prior to the installation of replacement posts.
6. Rails, posts and carriages to be disposed of, should be recycled at a ferrous scrap recycling facility.

Table 3: Damage Assessment of Ezy-Guard HC

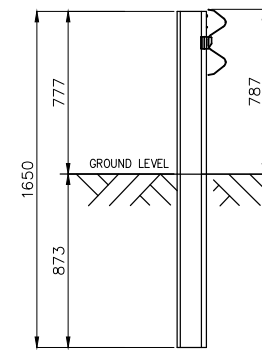
Type of Defect	Description of the Defect	Action to be Taken
Galvanizing damage on Z-Posts.	The sum total of the damaged area does not exceed 35cm ² (0.5% of the total surface area). The sum total of the damaged area exceeds 35cm ²	An organic zinc rich epoxy paint is to be applied to the repair area in two coats as per section 7.4. The Z-post is to be replaced.
Galvanizing damage on rails.	The sum total of the damaged area does not exceed 200cm ² (0.5% of the total surface area) and no individual damaged area does not exceed 40cm ² . The sum total of the damaged area exceeds 200cm ² (0.5% of the total surface area) and/or an individual damaged area exceeds 40cm ² .	An organic zinc rich epoxy paint is to be applied to the repair area in two coats as per section 7.4. The rail is to be replaced.
Mechanical damage on Ezy-HC-Carriages.	The Ezy-HC-Carriage has chips or cracks.	The Ezy-HC-Carriage is to be replaced.
Mechanical damage on Z-Posts.	The post is bent. The Ezy-Carriage cannot travel freely along the post due to distortion.	The post is to be replaced. The post is to be replaced.
Mechanical damage on rail.	The rail is dented, twisted or flattened. There are tears in any part of the rail. The slots in the rail are distorted.	The rail is to be replaced. The rail is to be replaced. The rail is to be replaced.
Mechanical damage on bolts.	The body of the bolt is distorted. The thread of the bolt is damaged.	The bolt is to be replaced. The bolt is to be replaced.
Disturbance of material around posts	The material around the post is loose or uncompacted.	Any disturbed pavement or material around a post shall be left dense, tight and smooth so that resistance to water penetration is similar to that of the adjacent surface.



Ezy-Guard HC on Baseplate Attachment to EXISTING Box Culvert



PART SECTION EZY-GUARD HC POST



PART SECTION EZY-GUARD 4 POST

NOTES:

1. ALL DIMENSIONS IN MM, UNLESS SPECIFIED OTHERWISE.
2. TO BE READ IN CONJUNCTION WITH EZY-GUARD 4 AND EZY-GUARD HC PRODUCT MANUALS.
3. TOP MOUNT ANCHORING: RAMSET CHEMSET ANCHOR STUDS WITH CHEMSET REO 502 CHEMICAL ANCHOR EPOXY. 2 NO. x M20 x 250mm GRADE 8.8 WITH MIN EMBEDMENT 200mm.
4. SIDE MOUNT ANCHORING: RAMSET CHEMSET ANCHOR STUDS WITH CHEMSET REO 502 CHEMICAL ANCHOR EPOXY. 4 NO. x M20 X 230mm GRADE 8.8 WITH MIN EMBEDMENT 180mm.
5. ANCHOR SPEC ASSUMING 32MPa NON-CRACKED CONCRETE. FOR RETROFIT APPLICATIONS, ANCHOR SUITABILITY TO BE CONFIRMED BY PROJECT ENGINEER.
6. 2m POST SPACING: MASH TL2 / AS5100 LOW PERFORMANCE LEVEL. 1m POST SPACING: MASH TL3 COMPLIANT.

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
3	09-08-2023	DM CHANGE	KZ	LG	LG
2	05-12-2022	UPDATED BRIDGE BRACKET DETAIL AND NOTES	KZ	LG	LG
1	13-07-2022	UPDATE THE POST ON THE LOWER SIDE OF THE TRANSITIONS TO HC POST	KZ	LG	LG

DRAWING NUMBER	REFERENCE DRAWINGS

NAME	DATE
DRAWN VB	21/06/2021
CHECKED LB	05/11/2021
APPROVED LG	01/12/2021
SCALE N.T.S. @ A3	
ISSUE FOR INFORMATION ONLY	

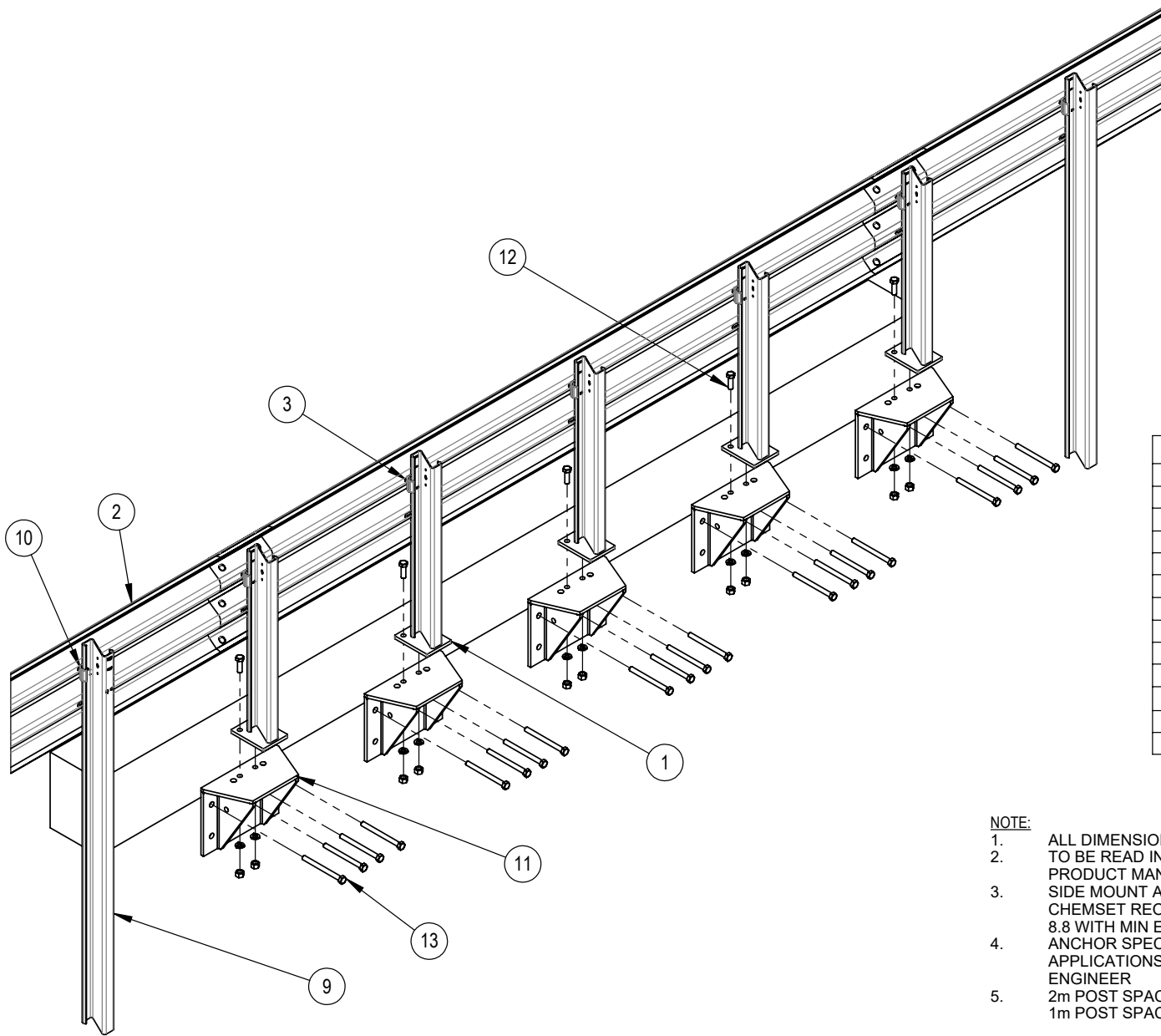
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PROJECT	EZY-GUARD HIGH CONTAINMENT
TITLE	BRIDGE BARRIER DETAIL

INGAL CIVIL PRODUCTS PART No.	
DRAWING No.	EZY-HC-030

Rev: 3

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ID	DESCRIPTION	PART NO.
1	EZY-HC POST 954mm ON BASEPLATE (970mm OVERALL)	10008366
2	Thriebeam (2.7) 4000mm NLL 1000mm centres	10000849
3	M16 x 30mm Ezy-Guard Smart Post Bolt	10001832
4	W to Thrie beam ASY Transition - 2.7 BMT	10001809
5	Thrie to W beam ASY Transition - 2.7 BMT	10001811
6	Ezy-Guard 4 Z-Post	10007390
7	Ezy-guard Smart Carriage	10004115
8	W-Beam Rail 4000mm NLL	10000977
9	HD Z Post 2000mm	10005540
10	Ezy-Guard HD Carriage - C2903G	10004116
11	Bridge Barrier Mousing Bracket 16mm	10010223
12	M20 x 65mm STRUCTURAL HEX BOLT NUT & WASHER GALV 8.8	10009526
13	M20 Anchor Stud	-

NOTE:

- ALL DIMENSIONS IN MM, UNLESS SPECIFIED OTHERWISE
- TO BE READ IN CONJUNCTION WITH EZY-GUARD 4 AND EZY-GUARD HC PRODUCT MANUALS
- SIDE MOUNT ANCHORING: RAMSET CHEMSET ANCHOR STUDS WITH CHEMSET REO 502 CHEMICAL ANCHOR EPOXY. 4 NO. x M20 X 230mm GRADE 8.8 WITH MIN EMBEDMENT 180mm.
- ANCHOR SPEC ASSUMING 32MPa NON-CRACKED CONCRETE. FOR RETROFIT APPLICATIONS, ANCHOR SUITABILITY TO BE CONFIRMED BY PROJECT ENGINEER
- 2m POST SPACING: MASH TL2 / AS5100 LOW PERFORMANCE LEVEL.
1m POST SPACING: MASH TL3 COMPLIANT

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

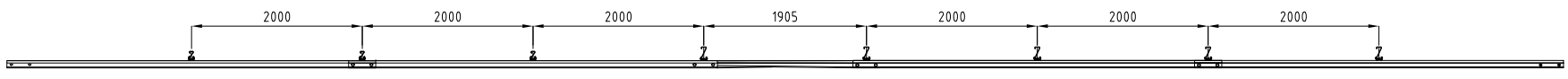
REFERENCES	DRAWING NUMBER	REFERENCE DRAWINGS

NAME	DATE
DRAWN KZ	10-08-2023
CHECKED LG	10-08-2023
APPROVED LG	10-08-2023
SCALE 1:25	SHEET: 1 of 1
ISSUE FOR	

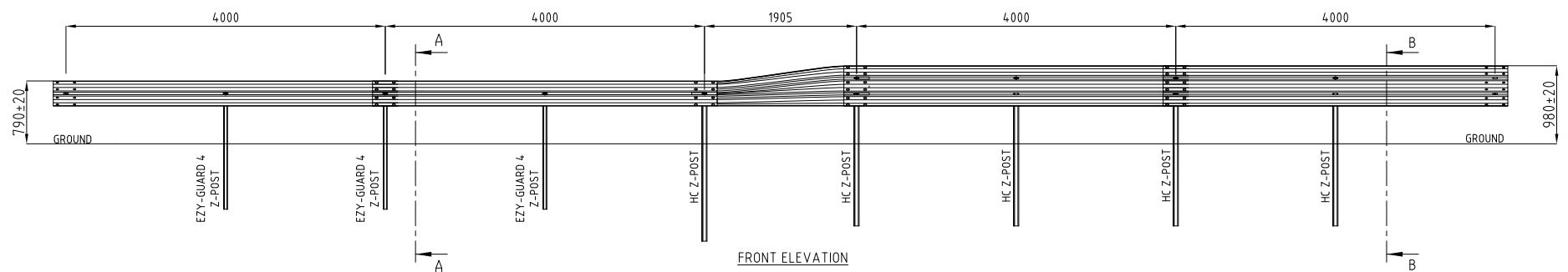
	PROJECT	INGAL CIVIL PRODUCTS PART NO.
	TITLE	DRAWING NO.

57-65 AIRDS ROAD MINTO, N.S.W 2566 PH: +61 2 9827 3333 www.ingalcivil.com.au	EZY-GUARD BRIDGE BARRIER - EXPLODED VIEW HC-BRG-002	Rev. 0
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FOLDER: E:\ENGINEERING\SALES & MARKETING\DRAWINGS\EZY-HC_BRIDGE BARRIER\REV MODEL\VC-BRG-002

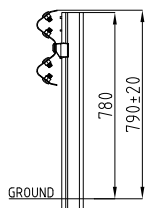


PLAN VIEW

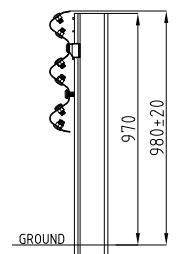


FRONT ELEVATION

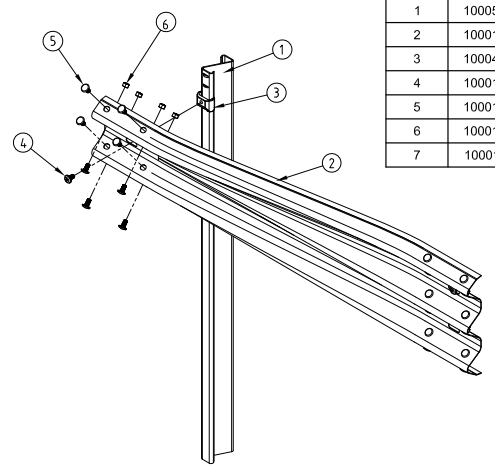
Item	Part	Description	Qty
1	10005540	Ezy-Guard HC Z-Post 2000mm	1
2	10001809	Asymmetric Transition 1905mm LHS W to Thrie	1
3	10004116	Heavy Duty Carriage	2
4	10001832	M16 x 30mm Ezy-Guard Carriage Bolt	2
5	10001248	M16 x 32mm Splice Bolt Grade 8,8	12
6	10001239	M16 Oversized Nut	12
7	10001811	Asymmetric Transition 1905mm RHS Thrie to W	1



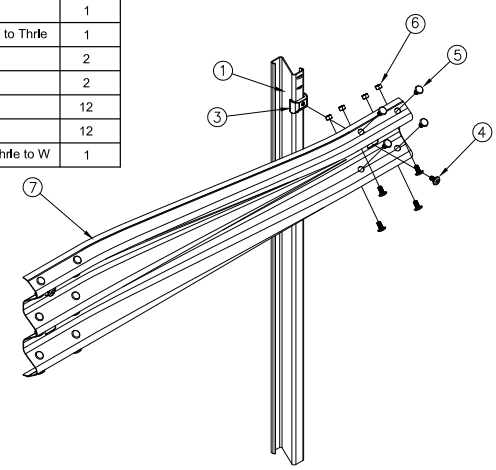
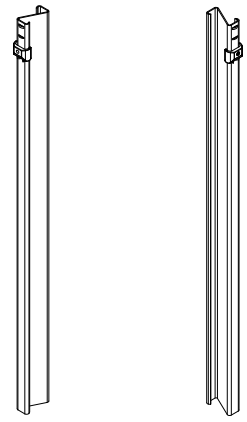
SECTION A-A
1:20



SECTION B-B
1:20



W-BEAM TO THRIE-BEAM (LHS)
TRANSITION AND POST ASSEMBLY



THRIE-BEAM TO W-BEAM (RHS)
TRANSITION AND POST ASSEMBLY

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED	DRAWING NUMBER	REFERENCE DRAWINGS	NAME	DATE	PROJECT	INGAL CIVIL PRODUCTS PART No.
1	07-12-16	POST LABELS CORRECTED	MC	LG	LG			AUSCOL	05-07-2016	EZY-GUARD HIGH CONTAINMENT TRANSITION DETAIL	EZY-HC-002
2	20-01-2022	RHS TRANSITION DETAIL ADDED	LG	BH	LG			LG	12-07-2016	EZY-GUARD HC TO 790MM W-BEAM	

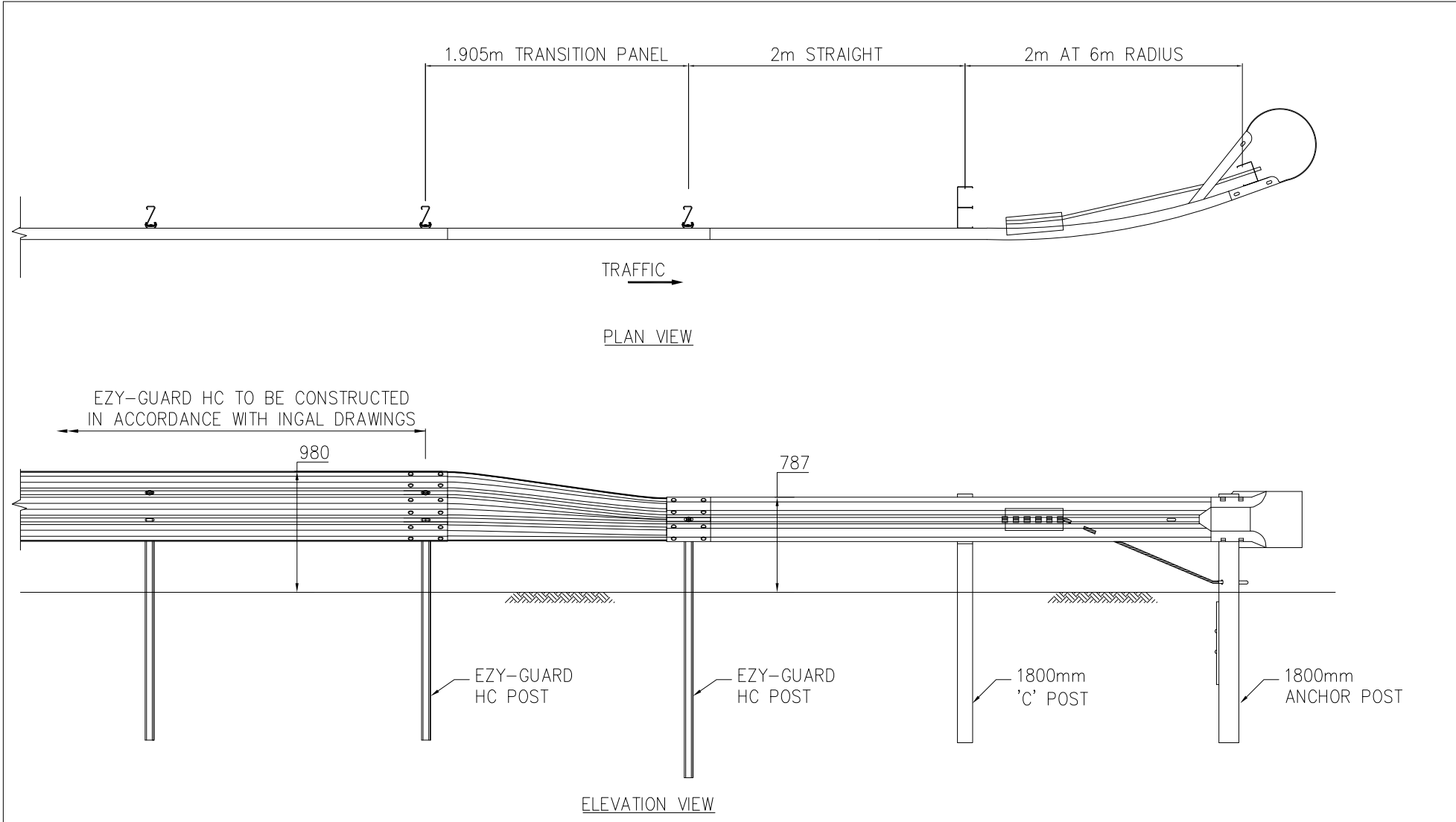
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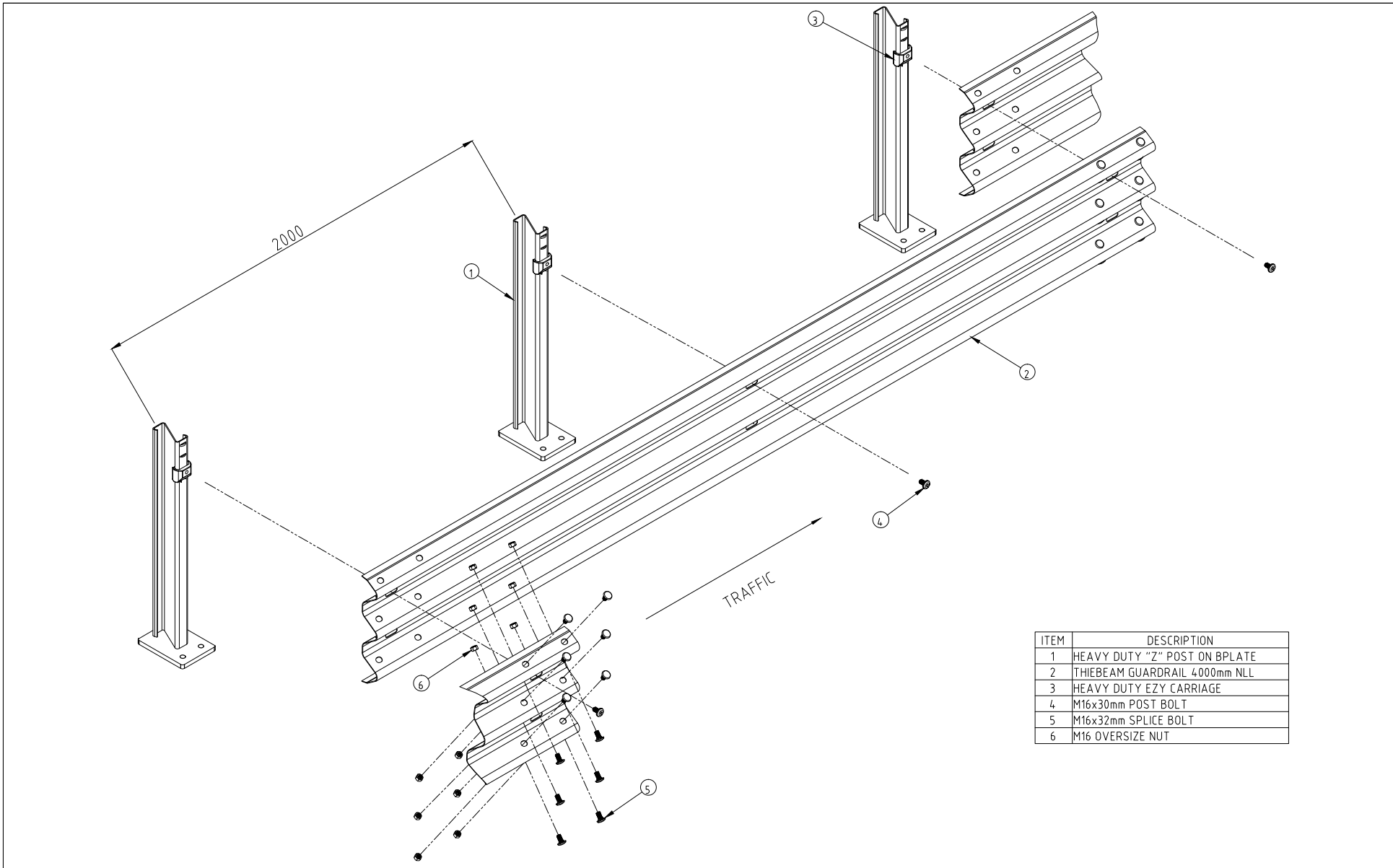
NOTE
 TRAILING TERMINAL TO BE USED IN DEPARTURE END OF SAFETY BARRIER ONLY.
 NOT TO BE USED WITHIN CLEAR ZONE OF OPPOSING TRAFFIC.

REVISIONS			REFERENCES			DRAWING NUMBER			REFERENCE DRAWINGS		
0		ORIGINAL ISSUE									
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED	DRAWING NUMBER	REFERENCE DRAWINGS				

NAME	DATE	PROJECT	INGAL CIVIL PRODUCTS PART No.
DRAWN MC	11-10-16		EZY-GUARD HIGH CONTAINMENT TRANSITION DETAIL
CHECKED LG	11-10-16		
APPROVED LG	11-10-16		
SCALE	N.T.S. @ A3		
ISSUE FOR	INFORMATION ONLY	TITLE	EZY-GUARD HC TO TRAILING TERMINAL

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ITEM	DESCRIPTION
1	HEAVY DUTY "Z" POST ON BPLATE
2	THIEBEAM GUARDRAIL 4000mm NLL
3	HEAVY DUTY EZY CARRIAGE
4	M16x30mm POST BOLT
5	M16x32mm SPLICE BOLT
6	M16 OVERSIZE NUT

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

DRAWING NUMBER	REFERENCE DRAWINGS

NAME	DATE
DRAWN AUSCOL	05-07-2016
CHECKED LG	12-07-2016
APPROVED LG	12-07-2016
SCALE N.T.S. @	A3
ISSUE FOR	

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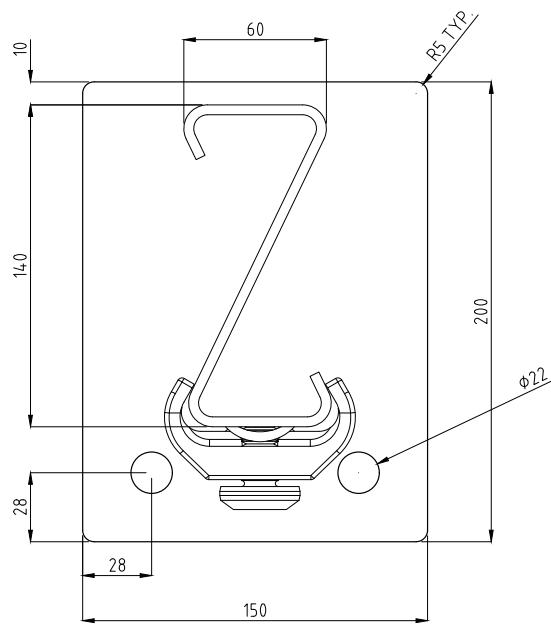
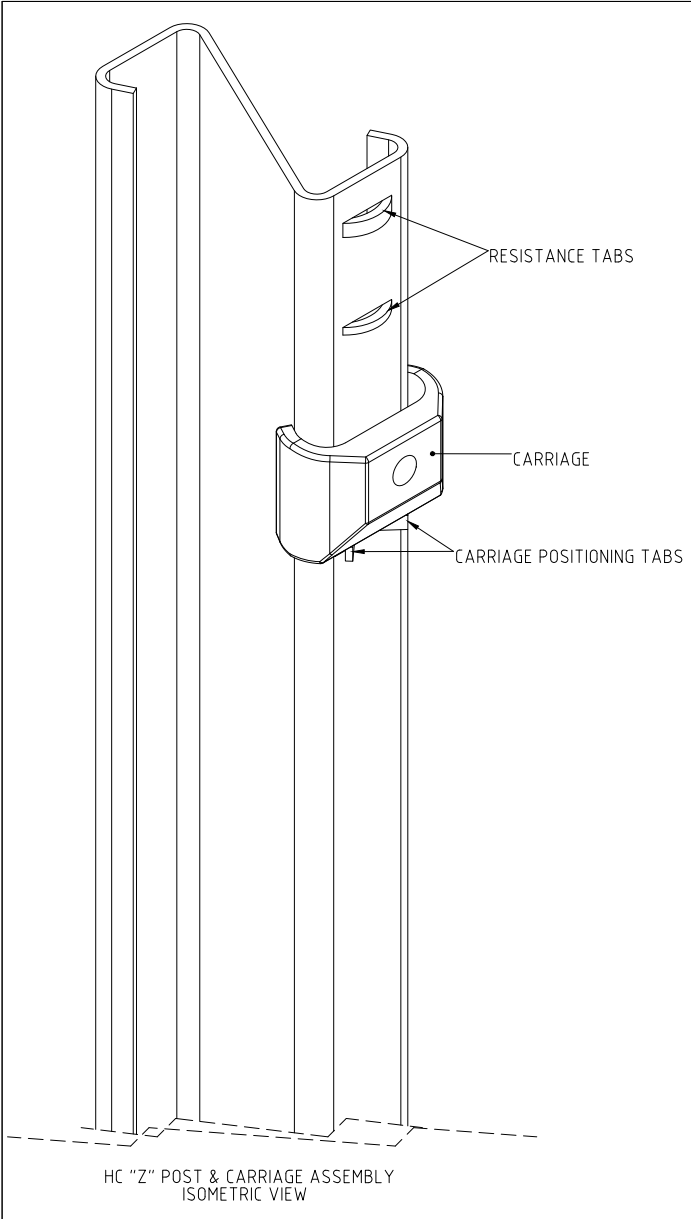
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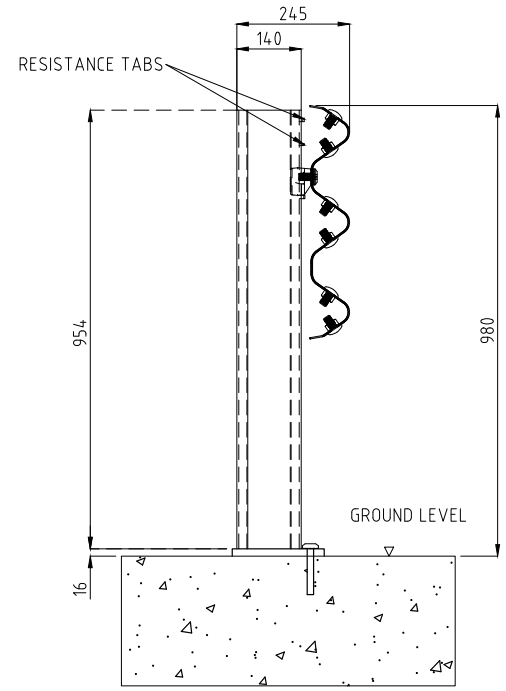
PROJECT	
TITLE	EZY-GUARD HIGH CONTAINMENT POST ON BASE PLATE ASSEMBLY DETAIL EXPLODED VIEW

INGAL CIVIL PRODUCTS PART No.	
DRAWING No.	EZY-HC-005
Rev.	0

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HC "Z" POST & CARRIAGE ASSEMBLY
PLAN VIEW



HC "Z" POST & CARRIAGE ASSEMBLY
SIDE VIEW

HC "Z" POST & CARRIAGE ASSEMBLY
ISOMETRIC VIEW

REVISIONS				REFERENCES			DRAWING INFORMATION			PROJECT		INGAL CIVIL PRODUCTS	
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED	DRAWING NUMBER	REFERENCE DRAWINGS	SCALE	ISSUE FOR	NAME	DATE	TITLE	PART No.
2	19-03-2024	BASEPLATE ANCHOR HOLE EDGE DISTANCE UPDATED	KZ	HF	KZ			N.T.S. @	A3	MC	04-10-2016	EZY-GUARD HIGH CONTAINMENT POST ON BASE PLATE CONFIGURATION DETAIL	INGAL CIVIL PRODUCTS PART No.
1	09/07/2018	BASEPLATE HOLES DIAMETER UPDATED	VB	LG	LG					LG	04-10-2016		DRAWING No. EZY-HC-006

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ENGINEERING SALES & MARKETING DRAWINGS SEZY-GUARD/HCEZ/HIC006 - POST ON BR/ATE CONFIGURATION/DWG

Rev. 2

Notes:



A series of horizontal lines for writing notes, spanning the width of the page.



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