

Ingal MPR

Motorcyclist Protection

Product Manual

MASH TL3 COMPLIANT

EN1317-8 COMPLIANT



Release 05/24

www.ingalcivil.com.au

1.0 Introduction

The Ingal Motorcyclist Protection Rail (Ingal MPR) is a protective enhancement installed on existing four-wheel vehicle restraint systems to reduce the chances of serious injury to motorcyclists and pillion passengers in run-off-road accidents.

Traditional highway safety barriers installed on the road carriageways to restrain vehicles from impacting roadside hazards, these typically take the form of the W-Beam rail supported by a series of posts. These posts introduce a significant hazard to an errant motorcyclist in a run-off-road accident. The Ingal MPR consists of an under-riding rail which is mounted on a spring bracket. Upon impacting this rail, the spring bracket deflects back absorbing some of the impact energy from the motorcyclist, whilst the rail contains and re-directs the motorcyclist away from the rigid posts and hazards.

2.0 Specification

Ingal MPR Rail Length:	4m NLL
4m MPR Rail Mass:	12.3kg
Ingal MPR System Mass:	4.65kg per metre
Rail Height Above Ground:	60mm
Post Spacing:	2m or 2.5m
Ingal MPR Crash Test Impact Severity:	Level 1

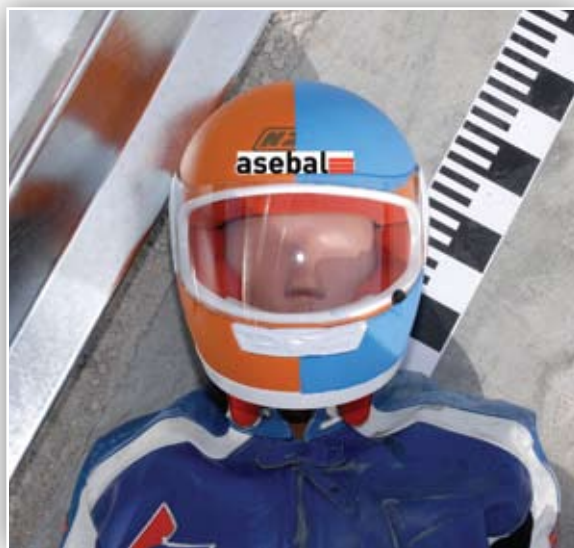
The Ingal MPR rails and brackets are manufactured from hot-rolled steel flat products in accordance with AS/NZS1594. These items are hot dip galvanised in accordance with AS/NZS 4680 after fabrication leaving no surface untreated.

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 Ingal MPR system has been fully crash tested and evaluated according to Standards UNE 135900-1 and 2 and UNE EN-1317-1 and 2, and has produced satisfactory results in the following full scale crash tests. **The dummy tests recorded an impact severity of Level 1 which is the lowest severity for this testing standard.**

- TM1.6.0: Dummy to post, 60 km/h 30° angle of impact.
- TM.3.60: Dummy to point on barrier midway between posts, 60 km/h 30° angle of impact.

Ingal MPR has also been crash tested to MASH Test Level 3, this is the containment of a 2270kg utility and 1100kg car at 100 km/h.



4.0 Features and Benefits

- The specially designed anchoring system fully facilitates the positioning of the guard rail at the correct height, ensuring a uniform distance from the ground throughout the run and compensating for uneven terrain and height differences in the existing barriers. The mounting bracket also allows the motorcyclists rail to be raised to match alterations in the level of the road surface.
- The motorcyclist rail can be assembled and raised without the need to modify the traditional vehicle barrier system
- More space between the system and the ground (60mm), allowing water drainage, snow clearance, cleaning of hard shoulders, etc.
- The mounting bracket is symmetric, and is therefore the same for both the right and left side of the carriageway.
- Small number of components and ease of installation make the system very cost-effective.

5.0 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.

6.0 Installation

The specially designed anchoring system facilitates the positioning of the guard rail at the correct height, allowing deflection of the system when impacted.

Only items provided by Ingal are to be used for the installation of the Ingal MPR. The following written instructions are to be read in conjunction with Ingal's drawings. A generic Safe Work Method Statement is available upon request for installation operations.

6.1 Site Preparation

This site should be prepared free of obstructing vegetation and other hazards that may interfere with the installation or operational performance of the system. Some sites may require minor grading if installed beyond the edge of the pavement shoulder.



6.2 Assembly

Refer detailed assembly drawings to end of this manual. Typical assembly steps as follows.

6.2.1 Assembly with Post Bracket

Step 1a Assembly should be initiated with placing the post bracket around the guardrail posts, particular care should be taken to ensure the bracket is oriented in the correct direction with the open side facing the oncoming traffic for verge installations.

Step 2a Attach the rail bracket to the post bracket with the M16 x 190 Hex Bolts. Typically the rail bracket will need to be abutting the underside of the block in the G4 guardrail system for convenient assembly. Tighten all fasteners to snug tight.



Motorcyclist Protection Rail
10006773



"C" post bracket
10006774



Rail Mounting Bracket
10006772



Ø35x17x4 mm Washer
10006773



M16x30 oval headed bolt
10001248



M16x200 hex bolt
10001228



2 mm thick Ø70 washer with 30x18
mounting hole - 10006771



M16x40 oval headed bolt
10006769



M12 Metric Square U Bolt & Nut Kit
10010370



M16 nut
10007834

6.2.2 Assembly with U-Bolt (Ezy-Guard 4 only)

Step 1b Assembly should be initiated with placing the M12 U-Bolt into the guardrail posts with specific pre-drilled mounting holes. The bolt will be inserted from the inside to the outside of the Z-post

Step 2b Attach the rail mounting bracket to the U-Bolt and secure to post via two flanged M12 flanged bolts. Typically the rail bracket will need to be abutting the underside of the block in the G4 guardrail system for convenient assembly. Tighten all fasteners to snug tight.

6.2.3 Assembly of Ingall MPR Rail

Step 3 Mount the rail on the rail brackets with the appropriate fastener configuration. Before tightening, ensure a 60mm clearance between finished ground level and MPR rail.

Step 4 Terminate beginning and end of run with MPR terminal piece.

6.3 Curved Installations

The MPR rails can be field curved down to a radius of 26m. Rails can be machine curved down to a radius of 12m. Contact your local Ingall office for details.

Ingal MPR Installation Checklist

Customer:

Project:

Barrier ID:

Barrier Length:

Checked By:

Signed:

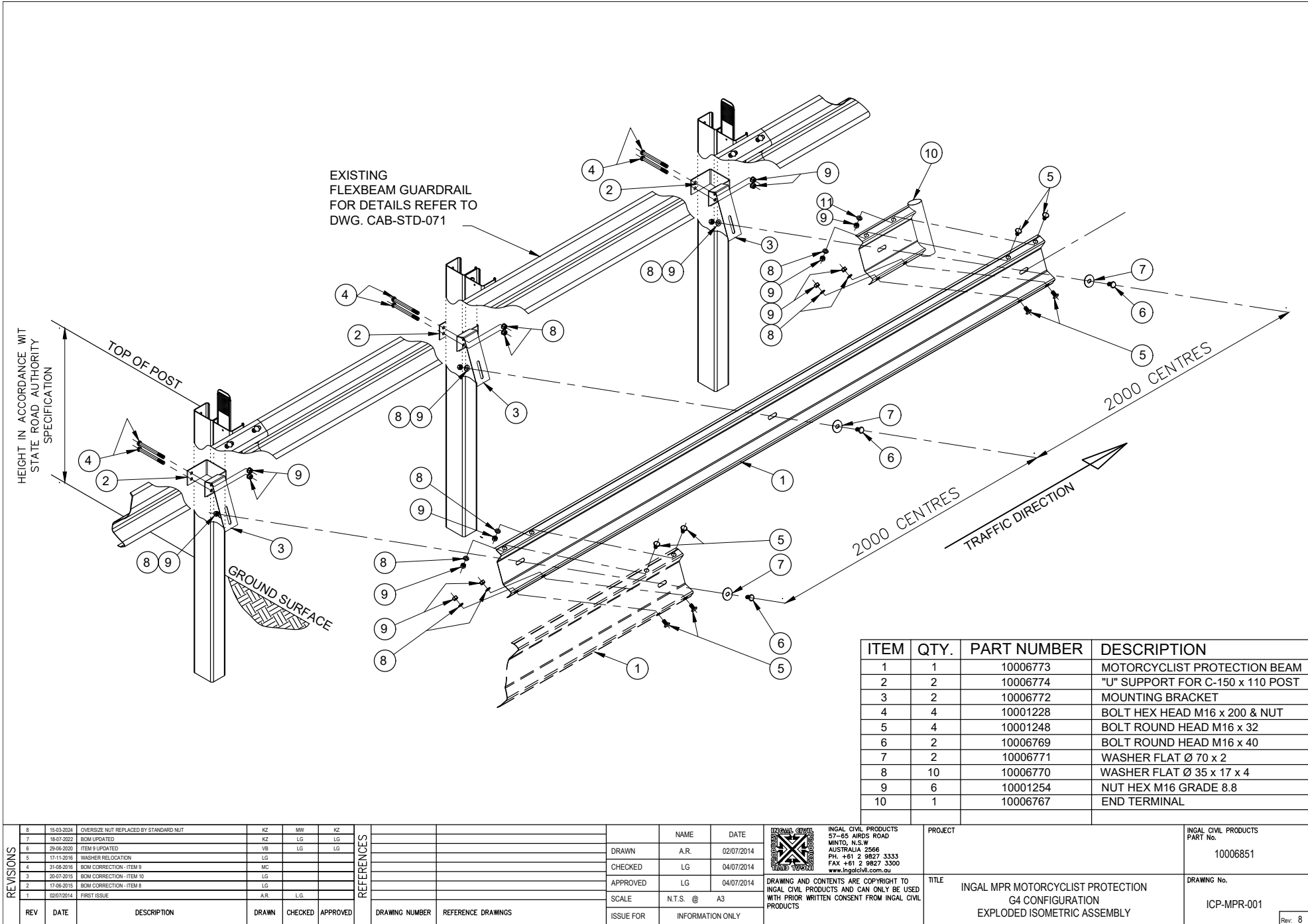
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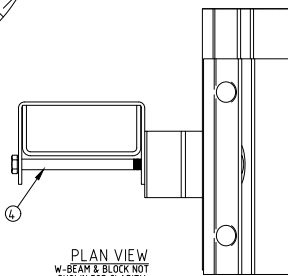
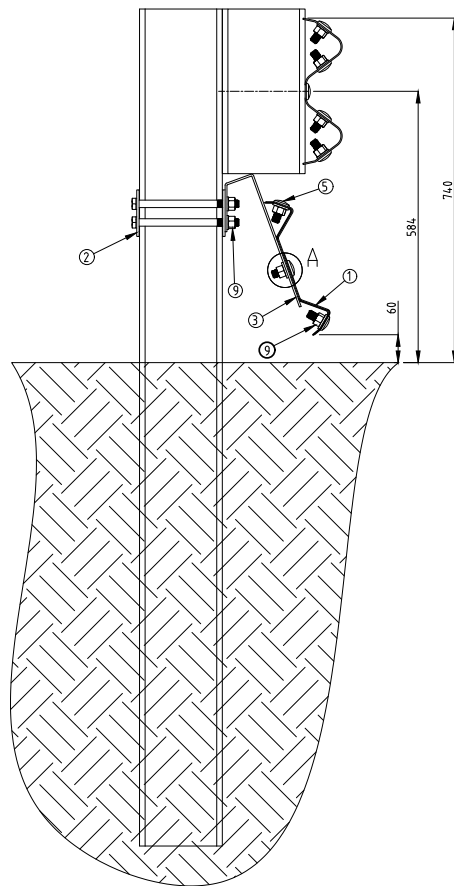
Is the MPR rail ground clearance within tolerance of 60mm \pm 20mm	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Has each end of the run been terminated with an MPR Terminal End	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have all fasteners been tightened to snug tight	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Has a Ø70 x 2mm slot washer been used on the traffic side of the rail mounting	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Has a Ø35 x 17 x 4mm washer been used on the verge side of the rail mounting	<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
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
Does the barrier form a smooth line vertically and horizontally when viewed along the run	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Notes

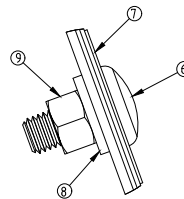
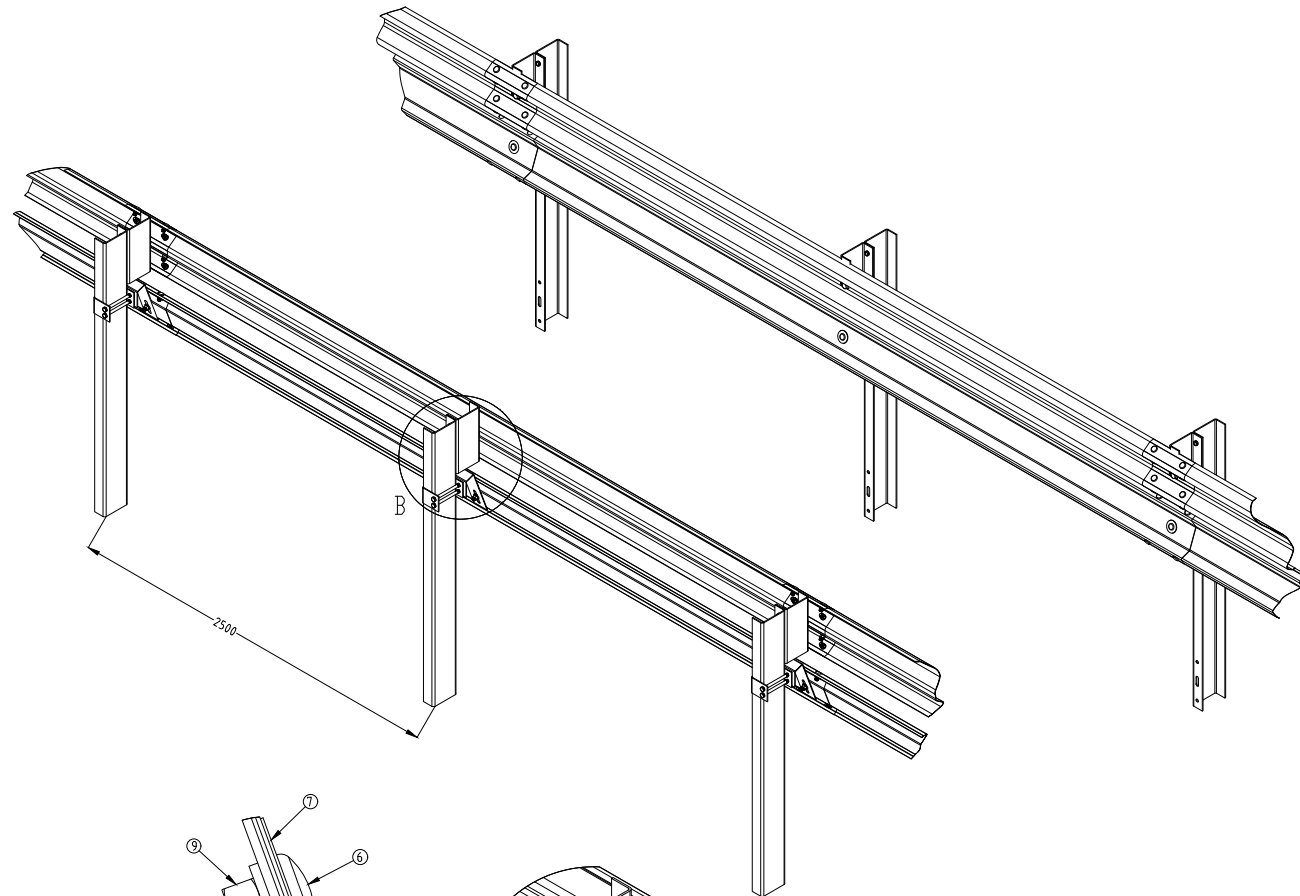
Disclaimer:

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.

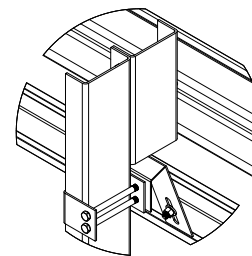




PLAN VIEW
W-BEAM & BLOCK NOT
SHOWN FOR CLARITY




DETAIL A
1 : 2



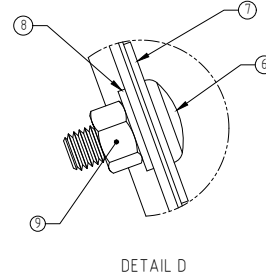
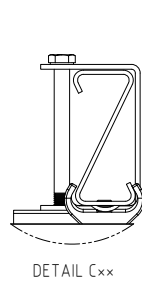
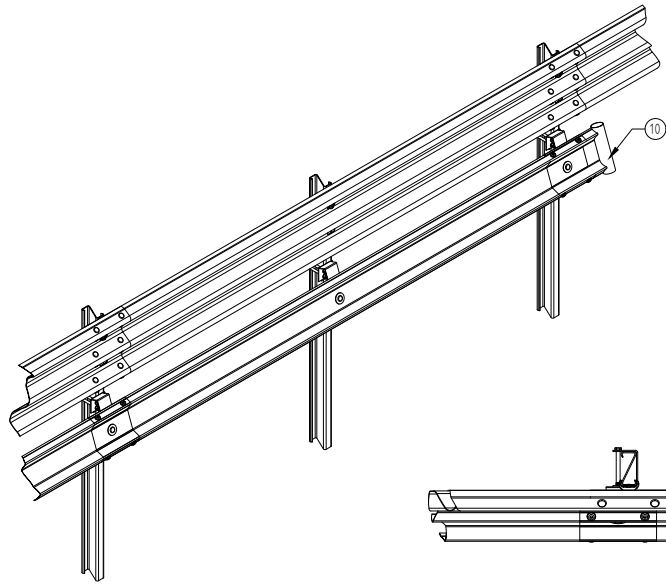
DETAIL B
2 : 25

TYPE B - U-POST - BILL OF MATERIALS				
ITEM	QTY	PART No	DESCRIPTION	
1	1	10007376	Motorcyclist protection beam 5m NLL	
2	2	10006768	MPS U-Post bracket	
3	2	10006772	Rail mounting bracket	
4	4	10004064	M16x220 HEX HEAD BOLT GALV	
5	4	10001248	Round head bolt M16x32	
6	2	10006769	Round head bolt M16x40	
7	2	10006771	Slot washer ϕ 70x2	
8	10	10006770	Washer ϕ 35x17x4	
9	10	10001254	M16 nut Grade 8.8	

REVISIONS							REFERENCES			NAME	DATE		INGAL CIVIL PRODUCTS 57-65 AIRDS ROAD MINTO, N.S.W. AUSTRALIA 2566 PH. +61 2 9827 3333 FAX +61 2 9827 3300 www.ingalcivil.com.au	PROJECT	INGAL CIVIL PRODUCTS PART No.
3	18-07-2022	BOM UPDATED		KZ	LG	LG			DRAWN	A.R.	11-12-2014	<div>DRAWING AND CONTENTS ARE COPYRIGHT TO INGAL CIVIL PRODUCTS AND CAN ONLY BE USED WITH PRIOR WRITTEN CONSENT FROM INGAL CIVIL PRODUCTS</div>	INGAL MPR MOTORCYCLIST PROTECTION TYPE-B GUARDRAIL CONFIGURATION ASSEMBLY DETAILS	10007768	
2	29-06-2020	ITEM 9 UPDATED		VB	LG	LG			CHECKED	LG	11-12-2014				
1	30-10-2015	BOM UPDATED		MC	LG	LG			APPROVED	LG	11-12-2014				
0	11-12-2014	ORIGINAL ISSUE		AR	LG	LG			SCALE	N.T.S. @	A3				
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED	DRAWING NUMBER	REFERENCE DRAWINGS	ISSUE FOR	INFORMATION ONLY						
DRAWING No. ICP-MPR-004															
Rev. 3															

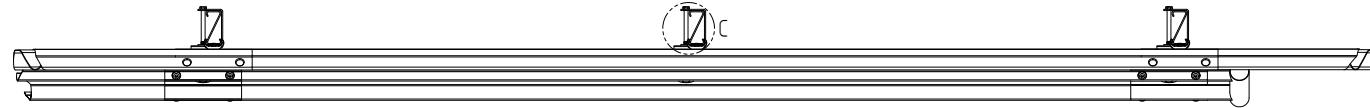
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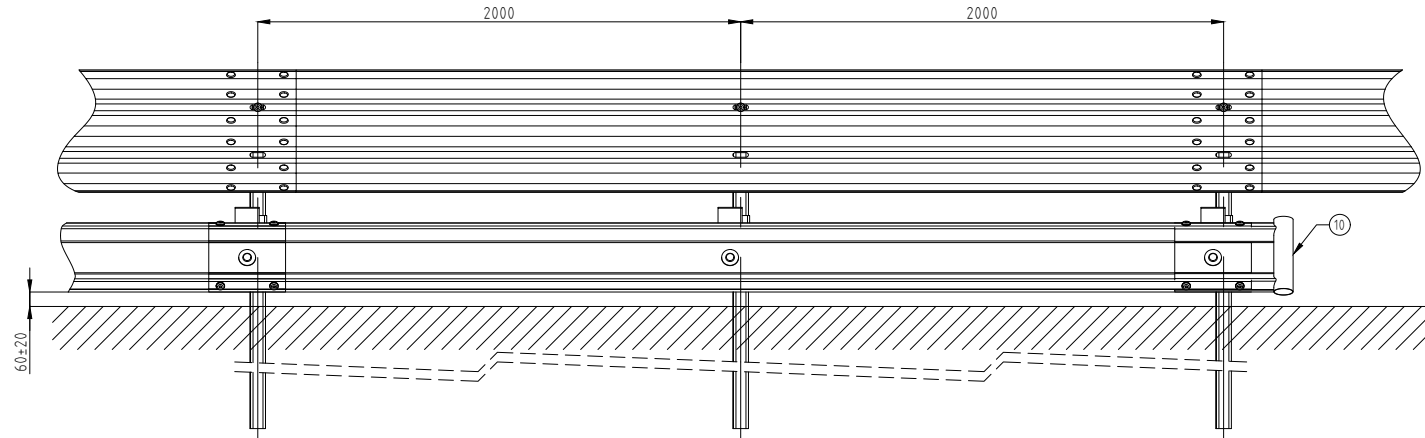
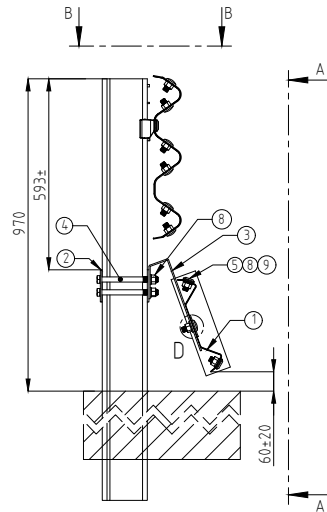


INGAL MPR ON EZY-HC - 4M BOM			
ITEM	QTY	PART No	DESCRIPTION
1	1	10006773	MPR Rail - 4m NLL
2	2	10008582	HC "Z"-Post bracket
3	2	10006772	Rail mounting bracket
4	4	10001282	M16x180 hex bolt & nut
5	4	10001248	Round head bolt M16x32
6	2	10006769	Round head bolt M16x40
7	2	10006771	Slot washer ϕ 70x2
8	10	10006770	Washer - ϕ 35x17x4
9	6	10001254	M16 nut
10	x	10006767	MPR Terminal Piece

- x ONE TERMINAL PIECE REQUIRED AT BEGINNING AND END OF RUN ONLY.
 xx EZY-GUARD HC POST SHOWN FOR CLARITY.



SECTION B-B



SECTION A-A

- NOTES:
 1. ALL STEELWORK TO BE HOT DIP GALVANISED AFTER FABRICATION TO AS/NZS4680.
 2. TO BE READ IN CONJUNCTION WITH THE INGAL MPR PRODUCT MANUAL.

REVISONS						REFERENCES		DRAWING NUMBER		REFERENCE DRAWINGS		NAME		DATE		PROJECT		INGAL CIVIL PRODUCTS PART No.	
4	20-03-2024	OVERSIZE NUT REPLACED BY STANDARD NUT	KZ	MM	KZ							DRAWN	WD	09-03-2018				10009373	
3	26-07-2022	LDS DETAILS ADDED	KZ	LG	LG							CHECKED	HF	09-03-2018					
2	19-07-2022	BOM UPDATE	KZ	LG	LG							APPROVED	LG	09-03-2018					
1	17-06-2020	UPDATED QUANTITY FOR ITEM 8	VB	LG	LG							SCALE	N.T.S. @	A3					
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED							ISSUE FOR	INFORMATION ONLY						



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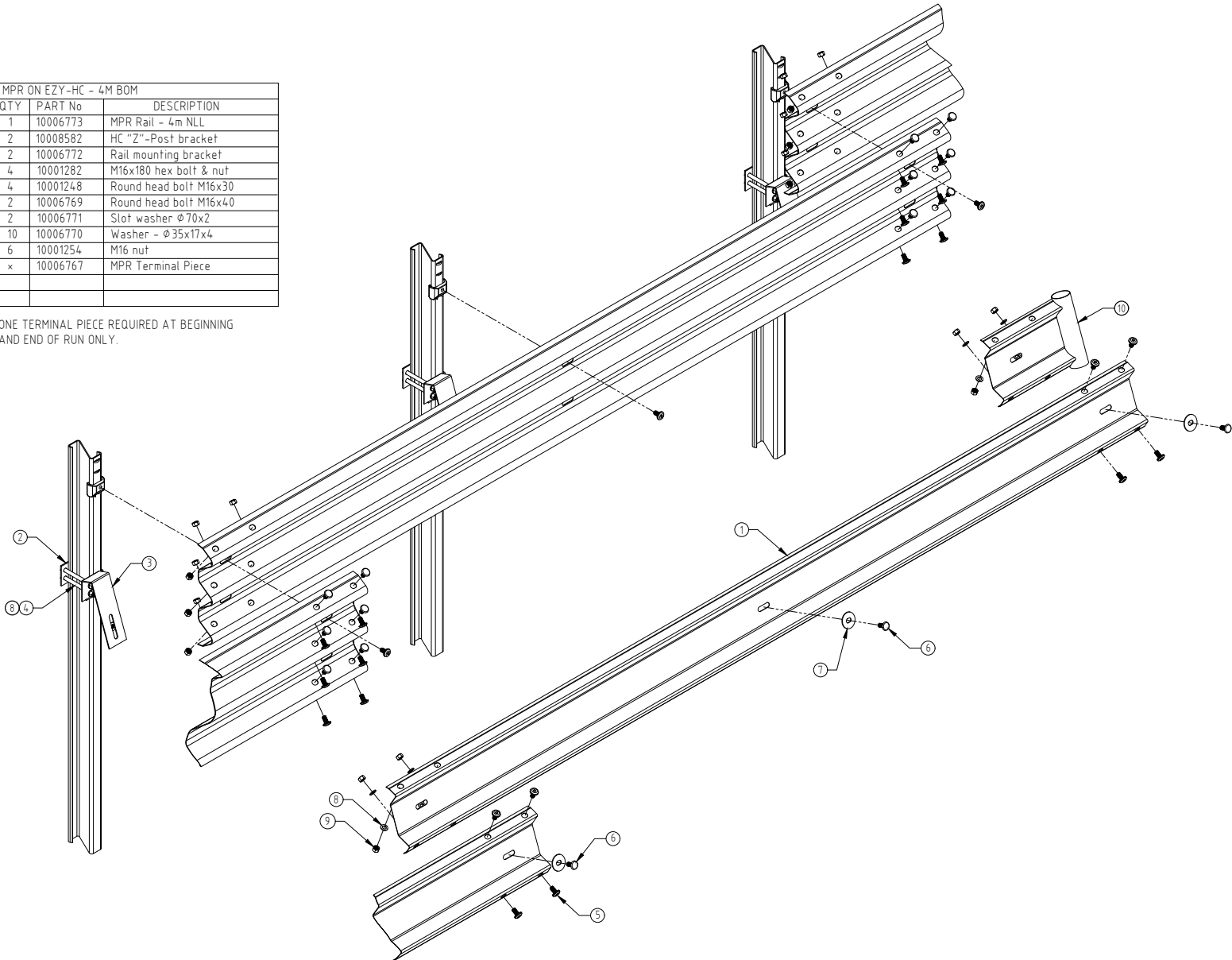
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INGAL MPR - MOTORCYCLIST PROTECTION EZY-GUARD HC/LDS CONFIG GENERAL ARRANGEMENT		ICP-MPR-014	


Rev. 4

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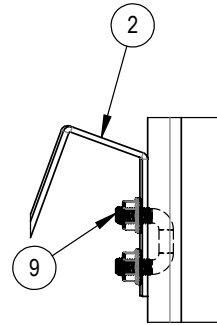
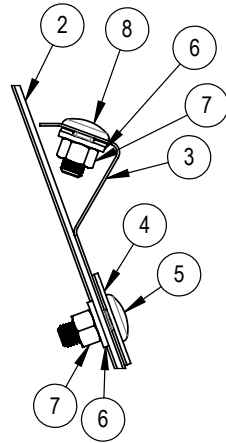
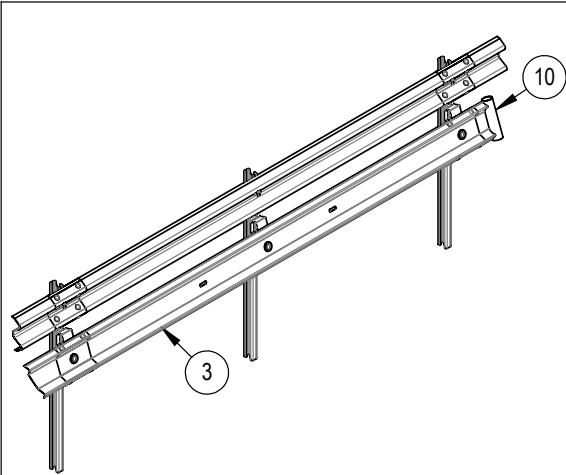
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ITEM	QTY	PART No	DESCRIPTION
1	1	10006773	MPR Rail - 4m NLL
2	2	10008582	HC "Z"-Post bracket
3	2	10006772	Rail mounting bracket
4	4	10001282	M16x180 hex bolt & nut
5	4	10001248	Round head bolt M16x30
6	2	10006769	Round head bolt M16x40
7	2	10006771	Slot washer ϕ 70x2
8	10	10006770	Washer - ϕ 35x17x4
9	6	10001254	M16 nut
10	x	10006767	MPR Terminal Piece

x ONE TERMINAL PIECE REQUIRED AT BEGINNING AND END OF RUN ONLY.



REVISIONS						REFERENCES				NAME		DATE		 INGAL CIVIL PRODUCTS <small>A valmont COMPANY</small>	PROJECT		INGAL CIVIL PRODUCTS PART No.						
										DRAWN		WD			09-03-2018		10009373						
4 20-03-2024 OVERSIZE NUT REPLACED BY STANDARD NUT						KZ		MM		KZ													
3 26-07-2022 EZY-LDS DETAILS ADDED						KZ		LG		LG													
2 18-07-2022 BOM UPDATE						KZ		LG		LG													
1 17-08-2020 UPDATED QUANTITY FOR ITEM 8						VB		LG		LG													
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														DRAWING AND CONTENTS ARE COPYRIGHT TO INGAL CIVIL PRODUCTS AND CAN ONLY BE USED WITH PRIOR WRITTEN CONSENT FROM INGAL CIVIL PRODUCTS 57-65 AIRDS ROAD MINTO, N.S.W 2566 PH. +61 2 9827 3333 www.ingalcivil.com.au				INGAL MPR - MOTORCYCLIST PROTECTION EZY-GUARD HC/LDS CONFIG EXPLODED ASSEMBLY				DRAWING No. ICP-MPR-015	
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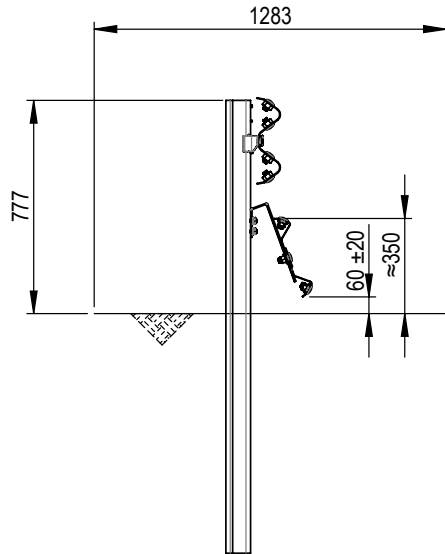
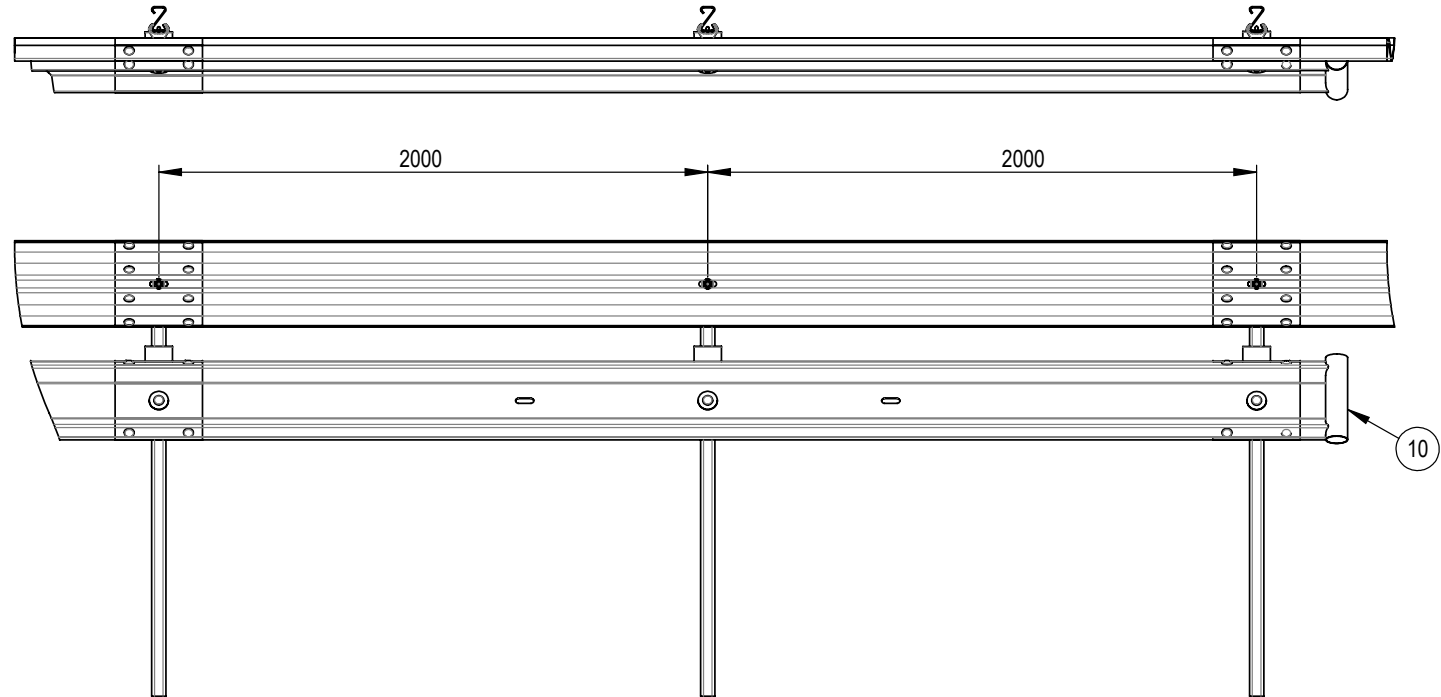
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1	EZY-GUARD 4 Z-POST 1650mm - WITH MPR HOLES	10010576
2	MPR MOUNTING BRACKET	10006772
3	MPR RAIL 4m NLL	10006773
4	MPR 70 DIA SLOTTED WASHER	10006771
5	M16 X 40mm SPLICE BOLT	10006769
6	MPR M16 WASHER OD35 ID17 4mm THICK	10006770
7	M16 NUT GRADE 8.8	10001254
8	M16 X 32 SPLICE BOLT	10001248
9	M12 SQUARE U-BOLT & NUT KIT 27 x 30mm	10010370
10	MPR END PIECE	10006767

NOTE:

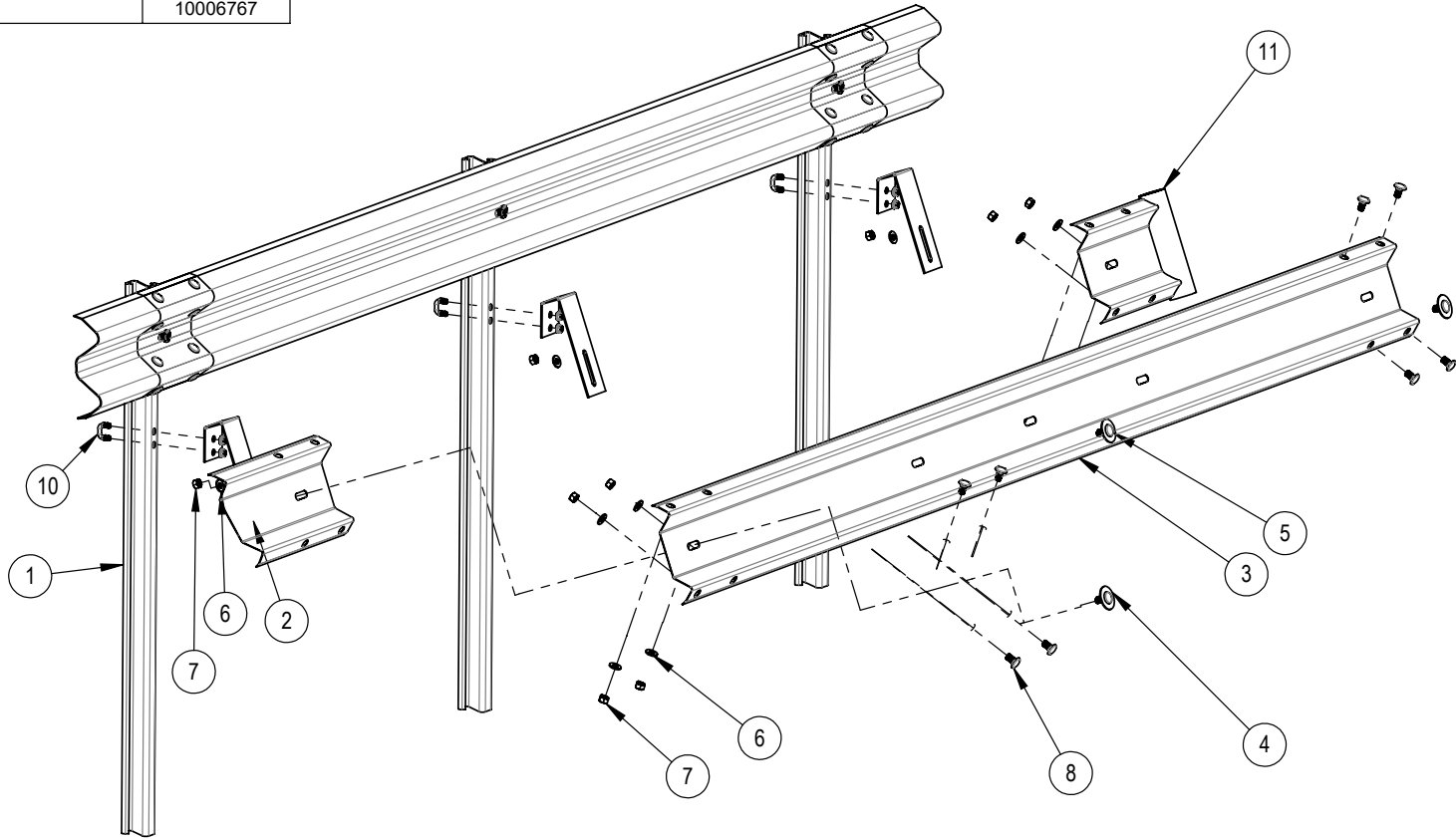
- ALL STEEL WORK TO BE HDGALV AFTER FABRICATION TO AS/NZS 4680 AND STRAIGHTENED AFTER GALVANISING IF REQUIRED
- TO BE READ IN CONJUNCTION WITH THE INGAL MPR PRODUCT MANUAL




REVISIONS				REFERENCES				DRAWING INFORMATION			
2	20/03/2024	OVERSIZE NUT REPLACED BY STANDARD NUT	KZ	MW	KZ			DRAWN	KZ	10-08-2023	
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								INGAL CIVIL PRODUCTS			
								PROJECT			
								INGAL CIVIL PRODUCTS PART No.			
								10010771			
								DRAWING No.			
								MPR EZY-GUARD 4 CONFIGURATION WITH U-BOLT			
								ICP-MPR-020			
								Rev. 2			

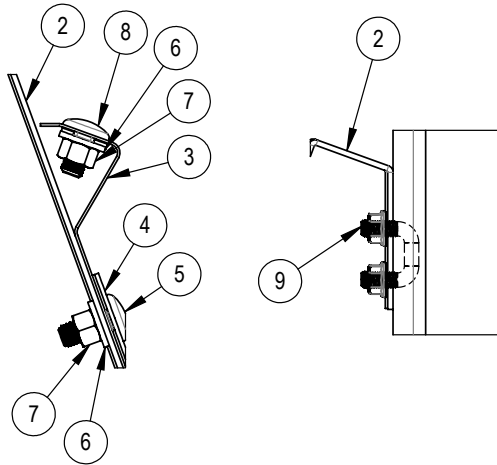
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ID	DESCRIPTION	PART NO.
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2	MPR MOUNTING BRACKET	10006772
3	MPR RAIL 4m NLL	10006773
4	MPR 70 DIA SLOTTED WASHER	10006771
5	M16 X 40mm SPLICE BOLT	10006769
6	MPR M16 WASHER OD35 ID17 4mm THICK	10006770
7	M16 NUT GRADE 8.8	10001254
8	M16 X 32 SPLICE BOLT	10001248
9	M16 OVERSIZE NUT	10001239
10	M12 SQUARE U-BOLT & NUT KIT 27 x 30mm	10010370
11	MPR END PIECE	10006767



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																	DRAWN			KZ									10-08-2023								
																				CHECKED			LG			10-08-2023											
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2							20/03/2024							OVERSIZE NUT REPLACED BY STANDARD NUT							KZ		MW		KZ		DRAWING AND CONTENTS ARE COPYRIGHT TO INGAL CIVIL PRODUCTS AND CAN ONLY BE USED WITH PRIOR WRITTEN CONSENT FROM INGAL CIVIL PRODUCTS							TITLE MPR EZY-GUARD 4 CONFIGURATION WITH U-BOLT - EXPLODED		DRAWING No. ICP-MPR-021	
1							16/08/2023							ADDED PART NUMBER TO THE POST							KZ		LG		LG												
REV							DATE							DESCRIPTION							DRAWN		CHECKED		APPROVED		57-45 ARDIS ROAD MINTO, N.S.W 2566 PH: +61 2 9827 3333 www.ingalcivil.com.au							Rev 2			

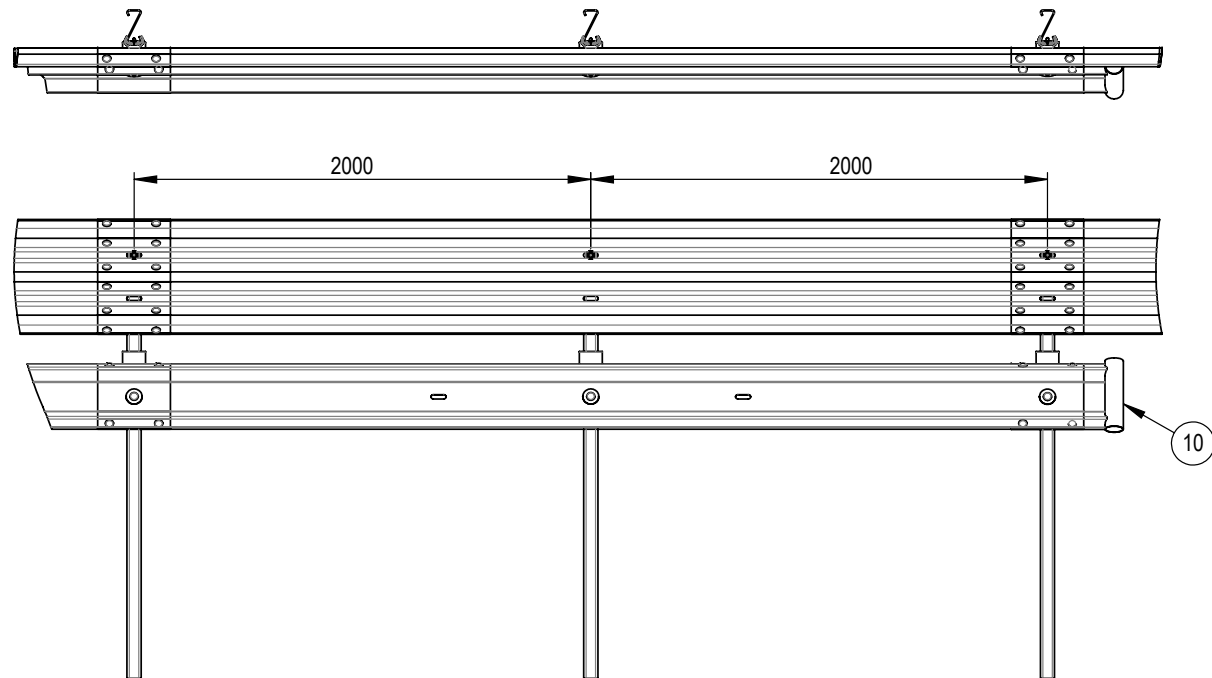
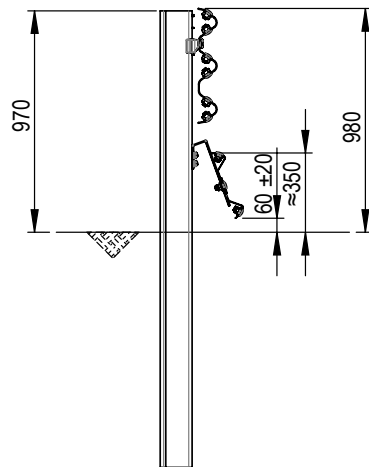
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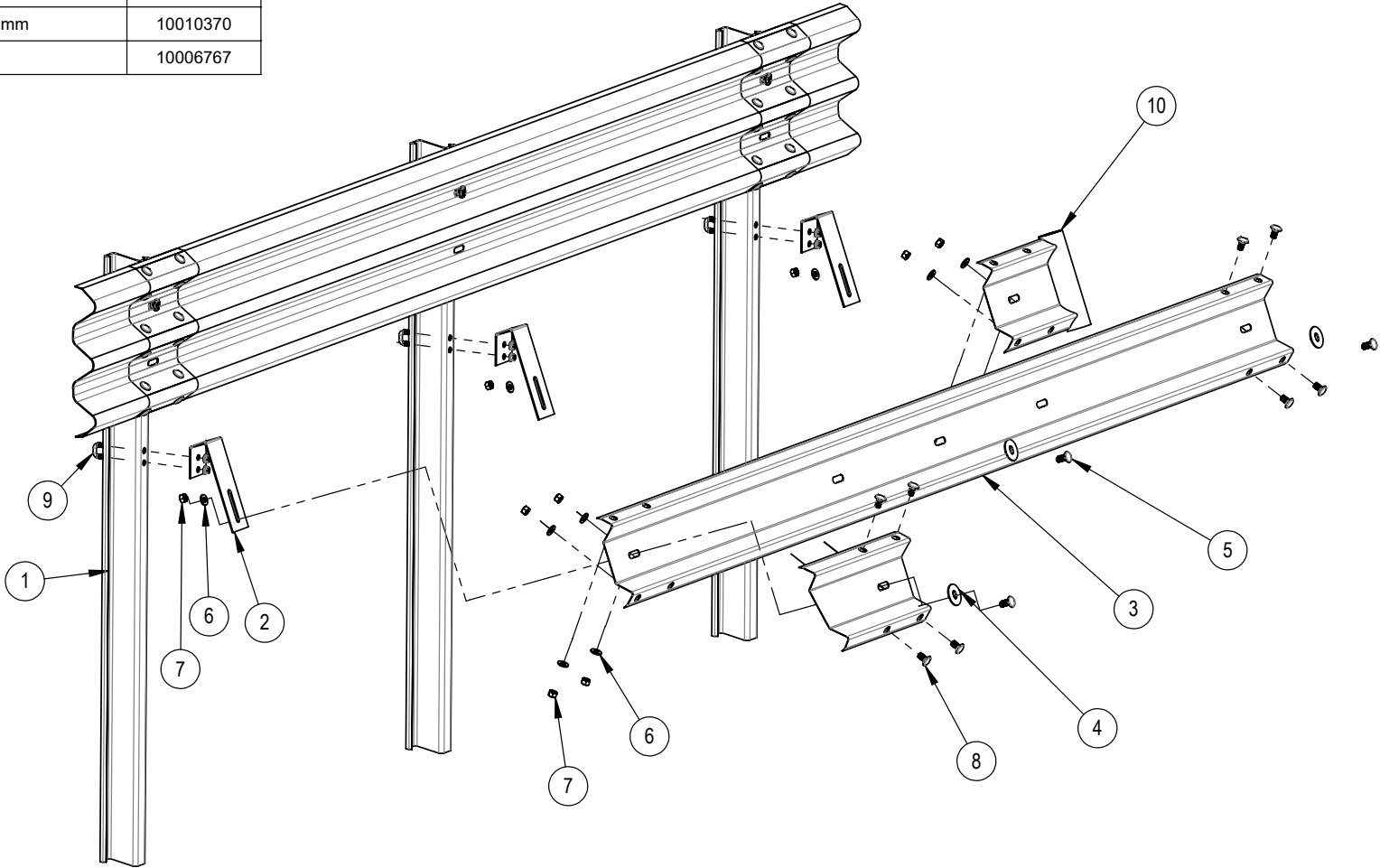
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2	MPR MOUNTING BRACKET	10006772
3	MPR RAIL 4m NLL	10006773
4	MPR 70 DIA SLOTTED WASHER	10006771
5	M16 X 40mm SPLICE BOLT	10006769
6	MPR M16 WASHER OD35 ID17 4mm THICK	10006770
7	M16 NUT GRADE 8.8	10001254
8	M16 X 32 SPLICE BOLT	10001248
9	M12 SQUARE U-BOLT & NUT KIT 27 x 30mm	10010370
10	MPR END PIECE	10006767

NOTE:

- NOTE:**
1. ALL STEEL WORK TO BE HDGALV AFTER FABRICATION TO AS/NZS 4680 AND STRAIGHTENED AFTER GALVANISING IF REQUIRED
 2. TO BE READ IN CONJUNCTION WITH THE INGAL MPR PRODUCT MANUAL

[illegible]

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5	M16 X 40mm SPLICE BOLT	10006769
6	MPR M16 WASHER OD35 ID17 4mm THICK	10006770
7	M16 NUT GRADE 8.8	10001254
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10	MPR END PIECE	10006767



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