INGAL
CIVIL PRODUCTS
A valmont COMPANY

Ingal RBT

Rigid Barrier Transition

Product Manual

Release 02/24

www.ingalcivil.co.nz

Ingal RBT Rigid Barrier Transition

1.0 Introduction

Roadside barriers are generally classified according to stiffness into one of three categories: flexible, semi-rigid, and rigid. If barriers have a dramatically different stiffness have to be joined together, a stiffness transition is usually required to reduce the risk of vehicle rollover, pocketing, or rail rupture.

The Ingal RBT is a MASH Test Level 3 compliant transition for connecting a range of semi-rigid barriers to a rigid concrete structure.

The transition length for connecting Ezy-Guard 4 to the rigid structure is 6m and 8m for Ezy-Guard HC. The Ingal RBT has been crash tested when attached to the same rigid barrier as detailed in Austroads SBTA 21-005 Transition.

MASH TL3 COMPLIANT

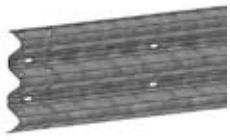
2.0 Specifications

Ingal RBT Post Length:	1,830mm
Ingal RBT Post Mass:	25kg
Ingal RBT System Mass:	251kg
Rail Height Above Ground:	880mm
Post Spacing:	Variable
Ingal RBT System Width:	235mm
Containment Level:	MASH Test Level 3

The Ingal RBT is manufactured in Australia by Ingal Civil Products using steel manufactured by BlueScope Steel. Posts and rails 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..

State specific product acceptance details are available upon request from your local Ingal representative. Acceptance of product variants should be confirmed prior to installation.

ClawBolt M20 x 200mm
10010398



Thriebeam (2.7) 4m NLL 1m centres
10000849

Thriebeam (3.5) 4m NLL Bridge Approach
10000854

Thriebeam (2.7) 2m NLL 1m centres
10000865

W Beam to Thriebeam Transition 2m NLL
10000869

W-Beam Rail (2.7) 3.81m NLL 0.953m centers
10007537

Thriebeam Terminal Connector
10006519

M16 X 50 Post Bolt Grade 4.6
10001233

M16 Oversize Nut
10001239

M16 X 32 Splice Bolt
10001248

M16 x 30mm Ezy-Guard Carriage Bolt
10001832

Ezy-Guard HD Carriage
10004116

HD Z Post 2000mm
10005540

Ezy-Guard 4 Z-Post - 1650mm
10007390

W6x9 1830mm RBT I-beam Post
10010287

3.0 How the Ingal RBT Works

A transition section is needed where a semi-rigid approach barrier is connected to a substantially stiffer downstream barrier. Transitions should produce a gradual stiffening of the overall approach barrier to reduce the risk of vehicle pocketing, snagging, or penetration at any position along the transition.

The Ingal RBT is a MASH Test Level 3 compliant transition for connecting a range of semi-rigid barriers to a rigid concrete structure.

The transition is 6m long and comprises a series of I-Beam posts at 1m and 0.5m spacing on the approach to the rigid structure. The transition posts are a common section used in guardrail end-terminals.

The posts support a 3.5mm BMT thrie-beam panel and a symmetric W-beam to thrie-beam transition panel.

Upon impact, the stiffness of the I-Beam resists lateral deflection of the rail, leading to the containment and redirection of the vehicle without excessive pocketing.

The upstream end of the transition can connect directly into the Ezy-Guard 4 system where the first 3.81m panel will have a reduced post spacing of 935mm.

Alternatively, the transition can connect to the Ezy-Guard HC and LDS systems, with the height discrepancy transitioned over two thrie-beam panels.

Refer installation drawings to the end of this manual for more detail.

The Ingal RBT has been crash tested when attached to the same rigid barrier as detailed in Austroads SBTA 21-005 Transition.

3.1 System Width

The Ingal RBT has a system width of 235mm when installed in the single sided configuration. This narrow width allows for greater flexibility when trying to avoid conflicts with under ground services

4.0 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 RBT has been fully crash tested and evaluated according to the specifications for Test Level 3 (TL3) of the AASHTO Manual for Assessing Safety Hardware (MASH).

In the revised standard AS/NZS 3845.1:2015, MASH has been nominated as the basis of testing procedures for road safety barrier systems.

The MASH TL3 crash test matrix requires the following impacts;

- Test 3-20, this is an 1,100kg car travelling at 100km/h and impacting the barrier at 25 degrees. This test is to evaluate the occupant risk and post-impact trajectory for small vehicle impacts.
- Test 3-21 is the capacity test, this is a 2,270kg utility travelling at 100km/h and impacting the barrier at 25 degrees. This test is to evaluate the strength of the barrier in containing and redirecting large utility style vehicles.

Crash test impact conditions are defined by the mass, speed, and angle of the impacting vehicle. Crash test standards and performance levels can be compared by calculating the impact severity (IS).

$$IS = \tfrac{1}{2} M (V \sin \theta)^2$$

Where IS is the impact severity in joules (J), M is the test inertial mass of the vehicle in kilograms (kg), V is the impact speed in metres/second (m/s) and θ is the impact angle in degrees.

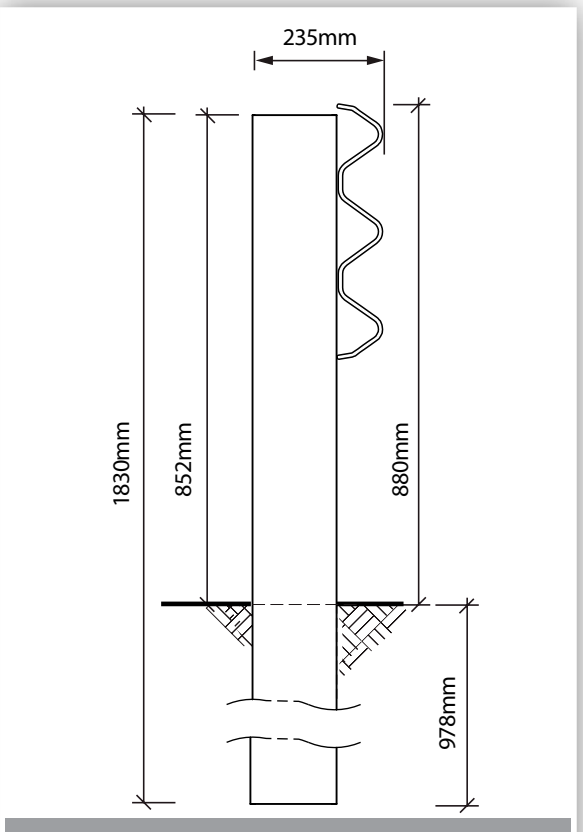


Figure 1: System Width

5.0 Installation

5.1 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 barrier 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 instances where geometric constraints limit the installation of the recommended length under these methods, the absolute minimum length of need for the run of barrier is dependent on the design containment level. Please refer to the safety barrier product manual for these system specific values.

5.2 Sequence of Work

Where the Ingal RBT 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.

5.3 Modifications

The Ingal RBT 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.

5.4 Soil Requirements & Embedment Depth

The Ingal RBT posts are designed to yield by bending near ground level during impact. Provided the post is embedded in material that allows this failure mechanism to be replicated, the transition functionality will be retained. The Z-posts will provide lateral resistance until the impacting vehicle causes deformation of the posts.

The Ingal RBT has been evaluated for installation in standard soil in accordance with AASHTO standard specifications for 'Materials for Aggregate and Soil Aggregate Subbase, Base and Surface Courses,' designation M147.

5.5 Delineation

A specially designed delineator is attached to the 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. Please refer to the asset owners specifications for further guidance.

5.6 Curving of Rails

Curving of the thrie-beam rails within the Ingal RBT is not permitted. If additional offset of the barrier is required and the rigid structure cannot be moved, the offset should be attained in the longitudinal barrier.

5.7 Slopes

The maximum cross fall for an installation of the Ingal RBT is 10H:1V (10%).

Proximity to a batter slope will depend on the required containment level and batter gradient. For a TL3 containment, the posts can be installed up to 500mm from the rounding point for batter gradients no steeper than 2H:1V.

6.0 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 the Ingal RBT.

Only items purchased from Ingal Civil Products shall be used for the construction of transition.

1. Ensure the area has been inspected for underground hazards and that suitable traffic control is in place.
2. Post locations are marked with the varying post spacing in accordance with the drawings to the end of this manual. Note, any fixed object hazard should be located outside the expected dynamic deflection of the barrier. The single sided configuration has a system width of 235mm.
3. Posts are driven directly into the ground and should be vertical. The post installation process shall not cause damage to the post, such that it reduces the effective operation of the safety barrier or its design life, or introduces sharp tearing edges, nor shall it cause damage to pavement. The use of a vibrating post hammer will reduce deformation to the top of the post and install the post at a controlled rate.
4. Alternate to driving the posts, a minimum 200-300mm hole can be augured and the post placed in the hole. The posthole is then backfilled with the material that was excavated. If installing in soil, the material should be placed in layers of 150mm and suitably compacted to not less than the density of the surrounding layers.
5. The height of posts 1 thru 6 is 852mm above ground level.
   - When connecting to Ezy-Guard 4, the height of post 7 is 814mm and post 8 is 756mm above ground level.
   - When connecting to Ezy-Guard HC, posts 7 thru 10 will gradually increase in height to bring the rail height up to 980mm. Refer drawing RBT-STD-007 and 008 for more detail.
6. The first rail is a 3.5mm BMT thrie-beam panel and this is attached to posts 1 thru 6 using the M16 x 50mm mushroom head bolts. The bolts are tightened to snug tight.
   - When connecting to Ezy-Guard 4, the symmetric W-Beam to Thrie-Beam panel is mounted between posts 6 and 8.
7. Rails are spliced together using M16x32mm mushroom head bolts and oversized nuts. There are twelve 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.

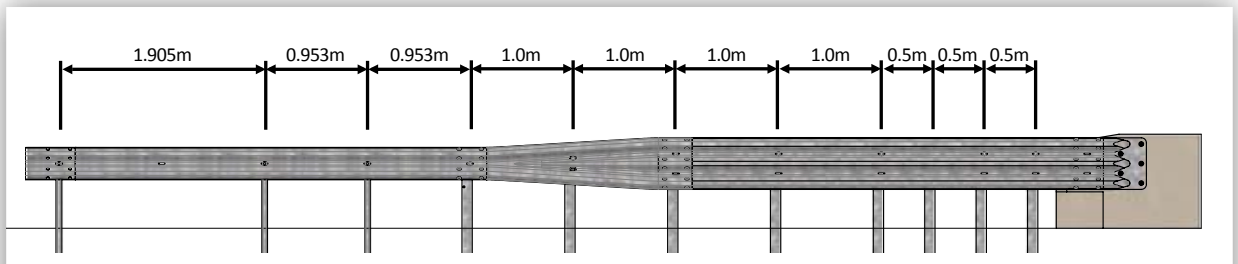


Figure 2: Transition to Ezy-Guard 4.

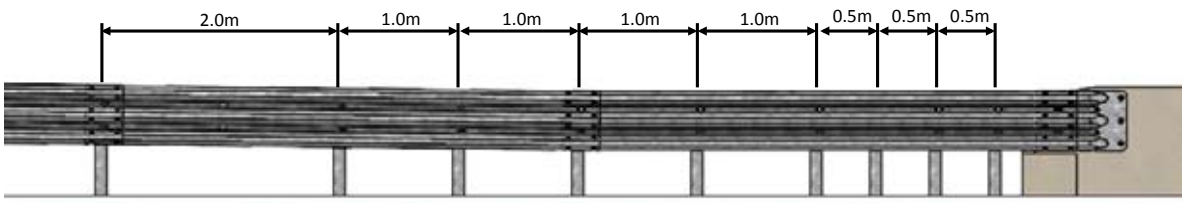


Figure 3: Transition to Ezy-Guard HC.

8. Rails are orientated so that no leading edge is presented to the traffic face as shown in Figure 18.
9. It is recommended that posts be installed only a few metres ahead of rail assembly to ensure correct post spacing and alignment.
10. The first rail is connected to the concrete via the thrie-beam structural connector. The lapping of the splice joint should follow figure 5 and uses twelve M16x32 splice bolts/nuts.

    The structural connector is fixed to the concrete via six M20x140 Hobson EAW-GD Clawbolt Anchor Through Bolt. Installation of these anchor bolts should be in accordance with the manufacturer's instructions.
11. The construction of Ingal RBT shall form a smooth line vertically and horizontally when viewed along the line of the system, free from humps, sags or other irregularities.
12. The Ingal RBT components are to be free from splits, burrs or sharp edges after installation. Any minor damage is to be repaired in accordance with section 5.4.
13. 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.

6.1 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.

Figure 4: Structural connector to concrete

7.0 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.

8.0 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.

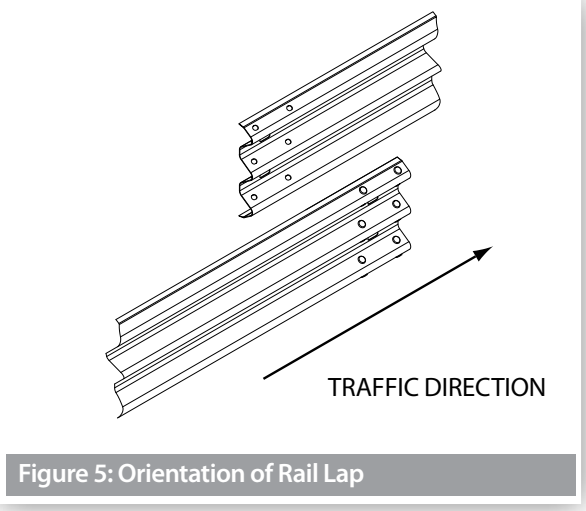


Figure 5: Orientation of Rail Lap

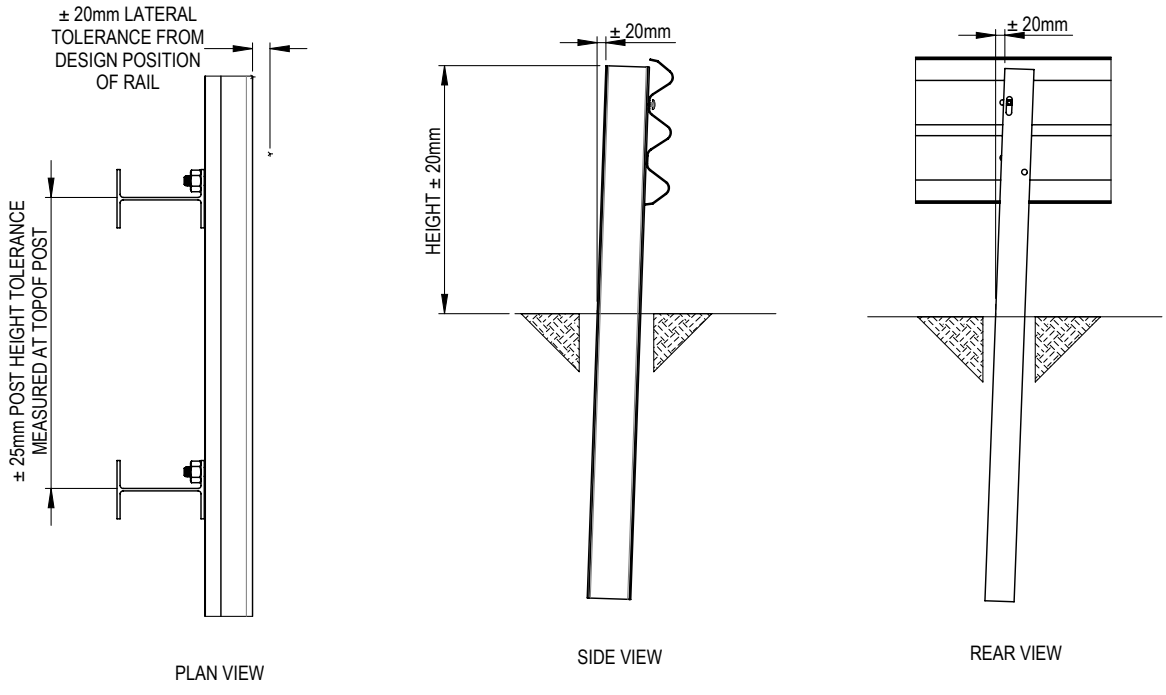


Figure 6: Ezy-Guard HC Installation Tolerances

Ingal RBT Installation Checklist		
Customer:		
Project:		
Barrier ID:		
Barrier Length:		
Checked By:		
Signed:		
Date		
Have the posts been positioned in accordance with the Ingal RBT drawings	☐ Yes	☐ No
Is the first Thrie-Beam rail the correct thickness of 3.5mm BMT	☐ Yes	☐ No
Posts are installed to the correct height (852mm) and within the tolerances of section 7.14	☐ Yes	☐ No
Is the first rail bolted to the post at locations 1, 2, 4, 5 and 6	☐ Yes	☐ No
The first rail is NOT bolted to posts 3	☐ Yes	☐ No
Have the rails been spliced observing the correct lap	☐ Yes	☐ No
Have the rails been spliced with M16x32mm mushroom head bolts and tightened to snug	☐ Yes	☐ No
Have the concrete anchors been installed in accordance with the manufacturers instructions	☐ Yes	☐ No
Is the upstream end of the run of barrier anchored with approved terminal	☐ Yes	☐ No
Where applicable, is the terminal cable tensioned to it's nominated torque (taut)	☐ Yes	☐ No
Has any minor damage been repaired using two coats of an organic zinc rich paint	☐ Yes	☐ No
Does the barrier form a smooth line vertically and horizontally when viewed along the system	☐ Yes	☐ No
Is the barrier system free from humps, sags or other irregularities	☐ Yes	☐ No
Has the ground or pavement around the post been left dense, tight and smooth	☐ Yes	☐ No
Are the barrier components free from splits, burrs or sharp edges after installation	☐ Yes	☐ 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.co.nz.

10.0 Repair

10.1 Bush Fire Damage

The Ingal RBT does not contain any plastic, timber or rubber components that will burn.

The performance of galvanized 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 the Ingal RBT.

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 transition.

10.3 Dismantling Sequence

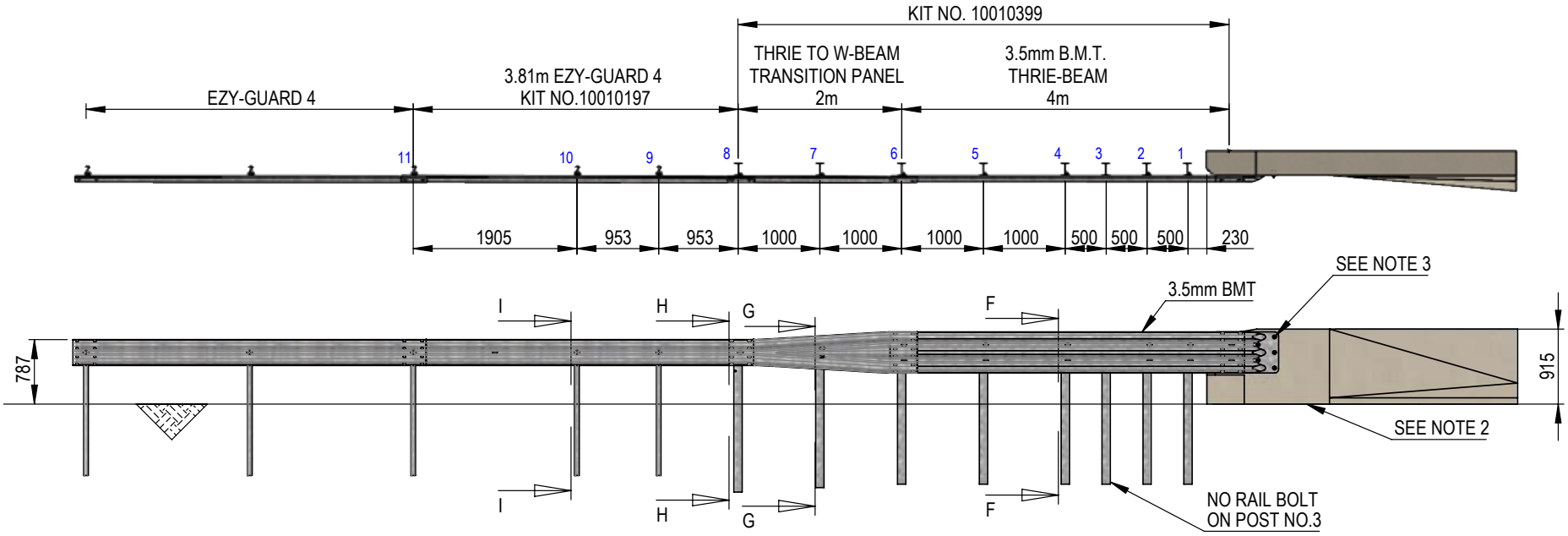
Prior to undertaking dismantling due to a vehicle impact, the area should be assessed for hazards. These include trip hazards, sharp edges and snag points.

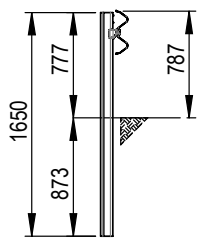
During a vehicle impact, the rail will disengage from the posts as they yield by bending at ground level. The recommended dismantling sequence is as follows;

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 M16 post bolt.
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 5.4. 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 5.4. The rail is to be replaced.
Mechanical damage on Z-Posts.	The post is bent. The post is twisted.	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.





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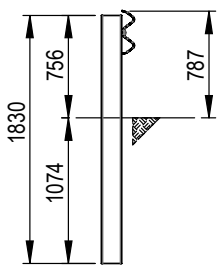

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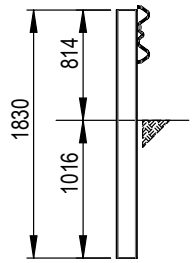

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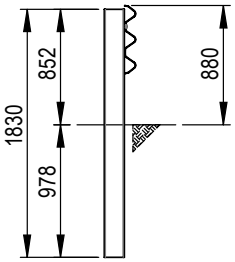

SECTION F-F
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NOTE:
1. REFER TO EZY-GUARD 4 MANUAL STANDARD EZY-GUARD 4 INSTALLATION
2. CONCRETE BARRIER TO BE CONSTRUCTED IN ACCORDANCE WITH SBTA 21-005 SHEET 5 AND 7
3. THE STRUCTURAL CONNECTOR IS FIXED TO THE CONCRETE VIA FIVE M20 x 200 HOBSON EAW-GD CLAWBOLT. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER's INSTRUCTION

REVISIONS

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

REFERENCES

DRAWING NUMBER	REFERENCE DRAWINGS

	NAME	DATE
DRAWN	KZ	17-02-2023
CHECKED	LG	17-02-2023
APPROVED	LG	17-02-2023
SCALE	1:70	SHEET: 4 of 4
ISSUE FOR		

INGAL CIVIL PRODUCTS
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PROJECT

TITLE
INGAL RBT TO EZY-GUARD 4 - 6m LHS APPROACH NZ CONFIGURATION

INGAL CIVIL PRODUCTS PART No.
10010399

DRAWING No.
RBT-STD-021

Rev: 0

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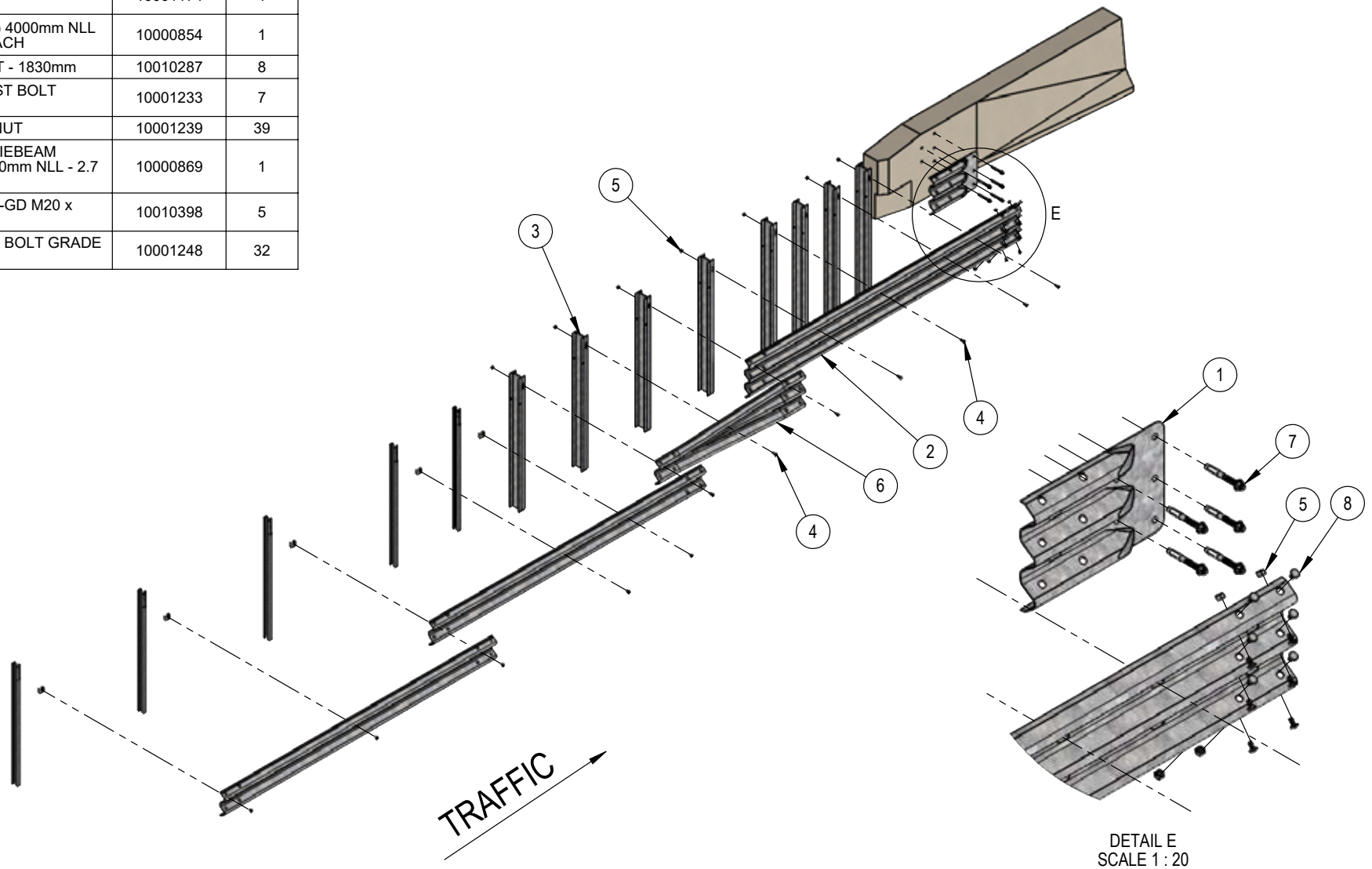
1	THRIEBEAM TERMINAL CONNECTOR	10001174	1
2	THRIEBEAM (3.5) 4000mm NLL BRIDGE APPROACH	10000854	1
3	W6 x 9 RBT POST - 1830mm	10010287	8
4	M16 X 50mm POST BOLT GRADE 4.6	10001233	7
5	M16 OVERSIZE NUT	10001239	39
6	W BEAM TO THRIEBEAM TRANSITION 2000mm NLL - 2.7 BMT	10000869	1
7	CLAWBOLT EAW-GD M20 x 200mm	10010398	5
8	M16 X 32 SPLICE BOLT GRADE 8.8	10001248	32



DETAIL E
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REVISIONS

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REFERENCES

DRAWING NUMBER	REFERENCE DRAWINGS

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CHECKED	LG	17-02-2023
APPROVED	LG	17-02-2023
SCALE	1:60	SHEET: 2 of 4
ISSUE FOR		

57-65 AIROS ROAD MINTO, N.S.W 2566 PH. +61 2 9827 3333 www.ingalcivil.com.au

PROJECT

TITLE
INGAL RBT TO EZY-GUARD 4 - EXPLODED VIEW

INGAL CIVIL PRODUCTS PART No.
10010399

DRAWING No.
RBT-STD-002

Rev: 1

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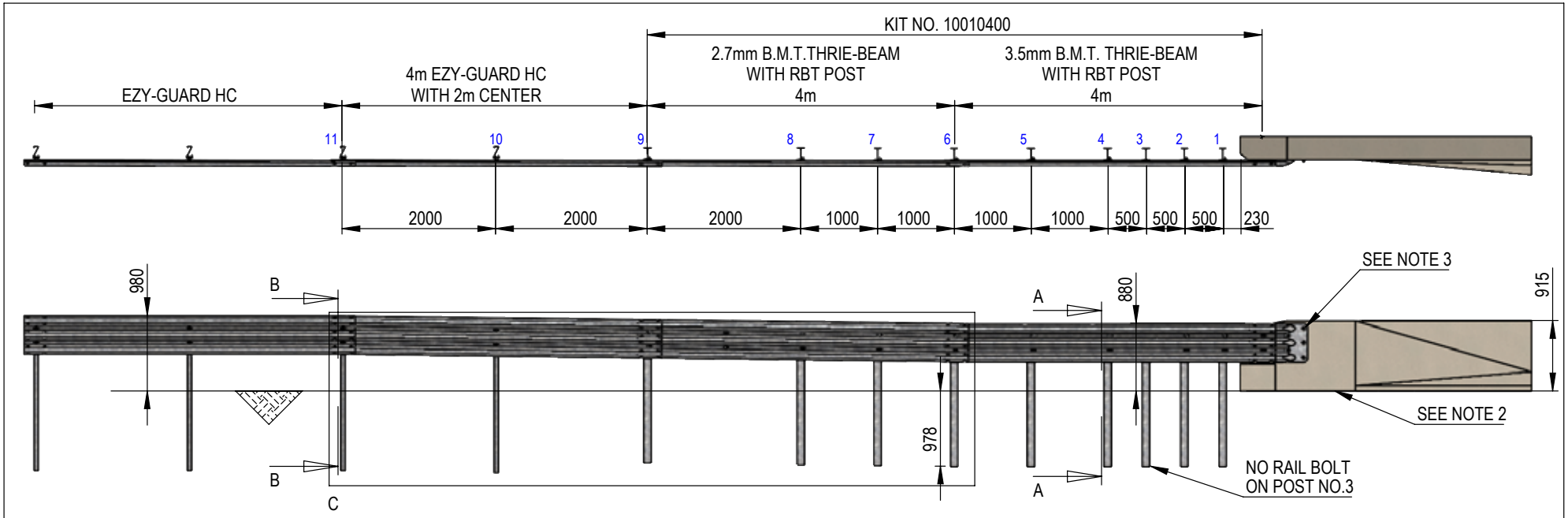
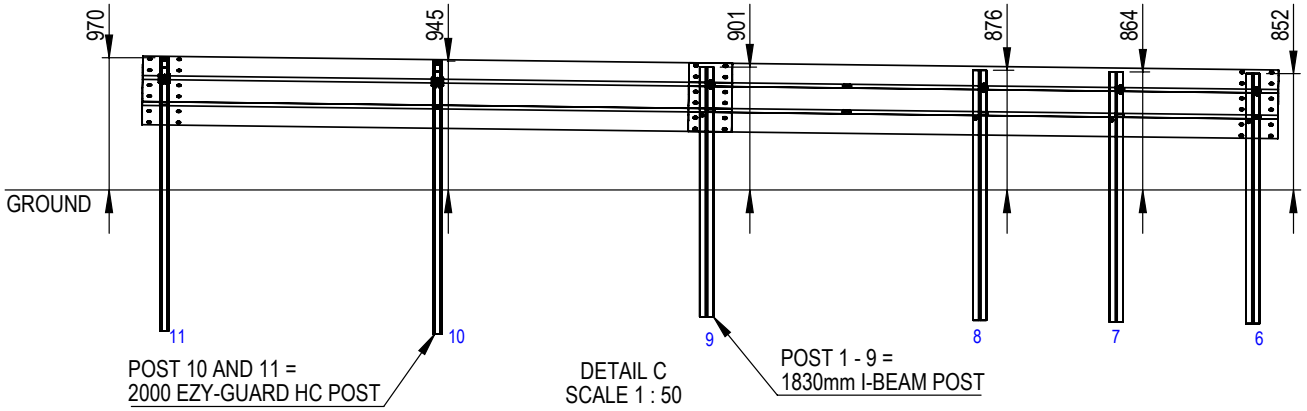
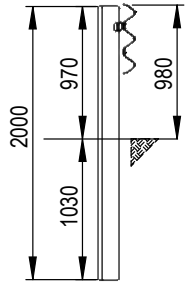


POST HEIGHT MEASUREMENT





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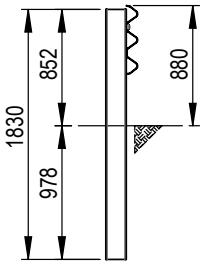

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POST 1-6 TYP
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NOTE:

1. REFER TO EZY-GUARD 4 MANUAL STANDARD EZY-GUARD 4 INSTALLATION
2. CONCRETE BARRIER TO BE CONSTRUCTED IN ACCORDANCE WITH SBTA 21-005 SHEET 5 AND 7
3. THE STRUCTURAL CONNECTOR IS FIXED TOTHE CONCRETE VIA FIVE M20 x 200 HOBSON EAW-GD CLAWBOLT. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER's INSTRUCTION

REVISIONS

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

REFERENCES

DRAWING NUMBER	REFERENCE DRAWINGS

	NAME	DATE
DRAWN	KZ	17-02-2023
CHECKED	LG	17-02-2023
APPROVED	LG	17-02-2023
SCALE	1:70	SHEET: 1 of 3
ISSUE FOR		

INGAL CIVIL PRODUCTS
A valmont COMPANY

57-65 AIROS ROAD
MINTO, N.S.W 2566
PH. +61 2 9827 3333
www.ingalcivil.com.au

PROJECT

TITLE
INGAL RBT TO EZY-GUARD HC - 8m LHS APPROACH

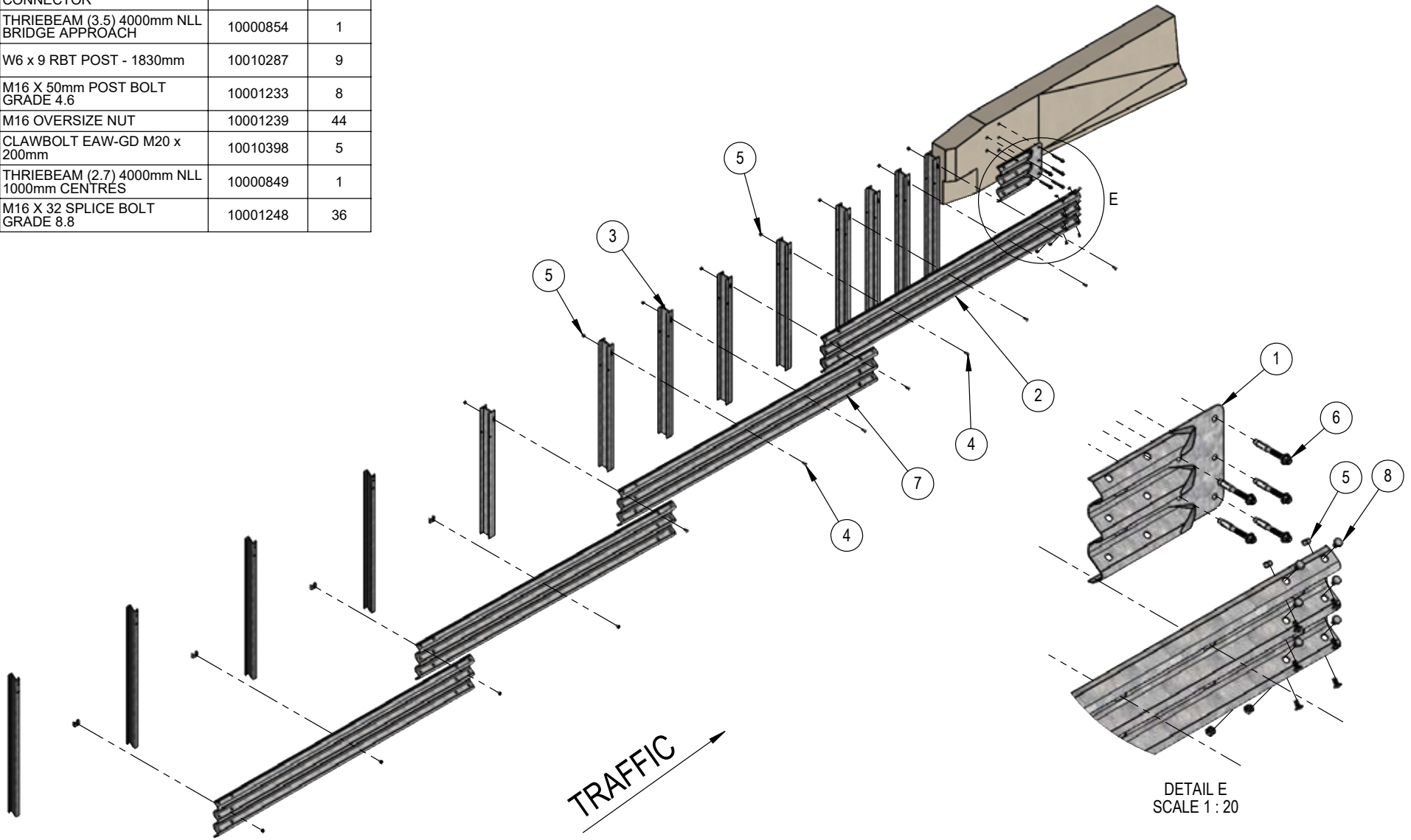
INGAL CIVIL PRODUCTS PART No.
10010400

DRAWING No.
RBT-STD-007

Rev: 0

FOLDER: C:\USERS\KZ7 17943\DESKTOP\KZ LOCAL FILE\RBT MODEL CLEANUP\MANUAL MODEL\

ID	DESCRIPTION	PART NO.	QTY.
1	THRIEBEAM TERMINAL CONNECTOR	10001174	1
2	THRIEBEAM (3.5) 4000mm NLL BRIDGE APPROACH	10000854	1
3	W6 x 9 RBT POST - 1830mm	10010287	9
4	M16 X 50mm POST BOLT GRADE 4.6	10001233	8
5	M16 OVERSIZE NUT	10001239	44
6	CLAWBOLT EAW-GD M20 x 200mm	10010398	5
7	THRIEBEAM (2.7) 4000mm NLL 1000mm CENTRES	10000849	1
8	M16 X 32 SPLICE BOLT GRADE 8.8	10001248	36



DETAIL E
SCALE 1 : 20

REVISIONS

REFERENCES

DRAWING NUMBER | REFERENCE DRAWINGS

	NAME	DATE
DRAWN	KZ	17-02-2023
CHECKED	LG	17-02-2023
APPROVED	LG	17-02-2023
SCALE	1:60	SHEET: 2 of 3
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PROJECT

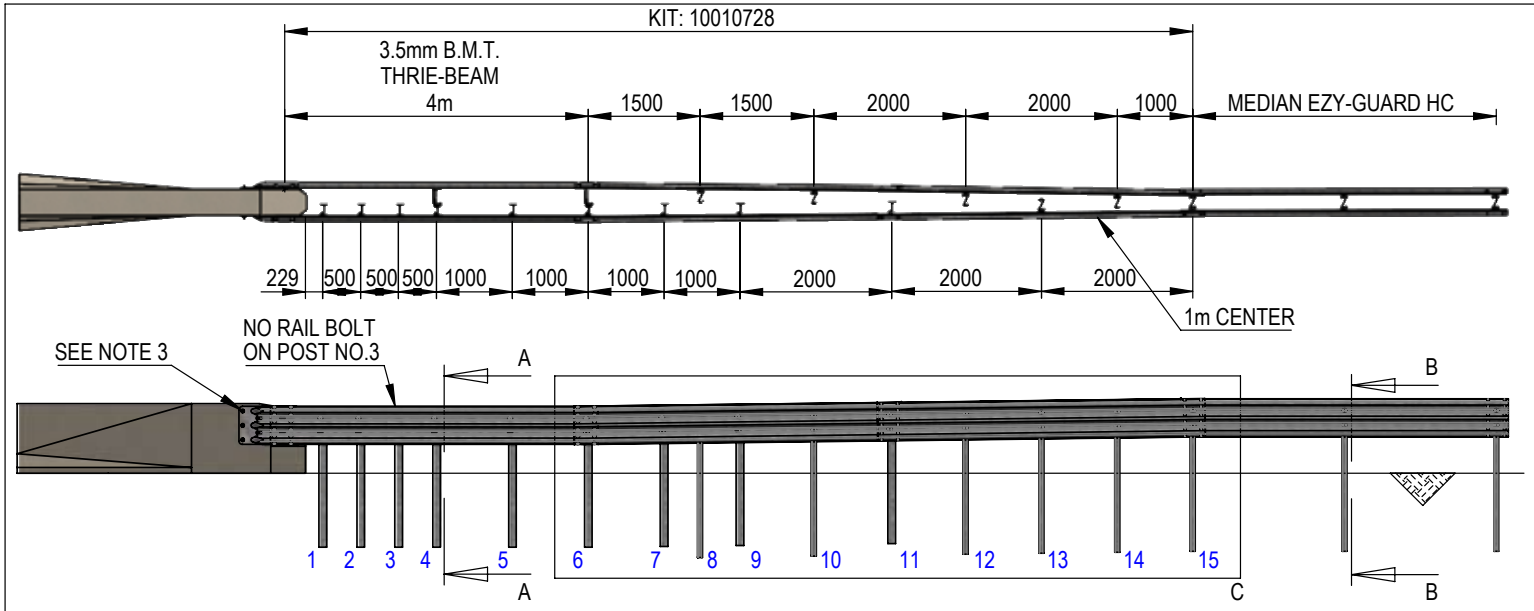
TITLE
INGAL RBT TO EZY-GUARD HC - EXPOSED VIEW

INGAL CIVIL PRODUCTS PART No.
10010400

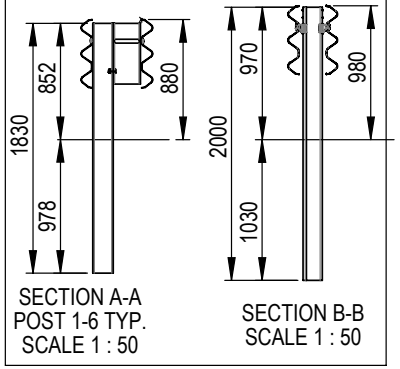
DRAWING No.
RBT-STD-008

Rev: 0

FOLDER: C:\USERS\KZ7 17943\DESKTOP\KZ LOCAL FILE\RBT MODEL CLEANUP\MANUAL MODEL\



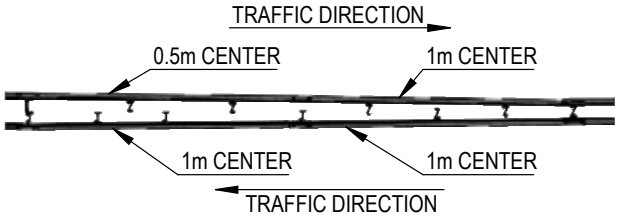
INGAL RBT AND MEDIAN EZY-GUARD HC POST HEIGHT



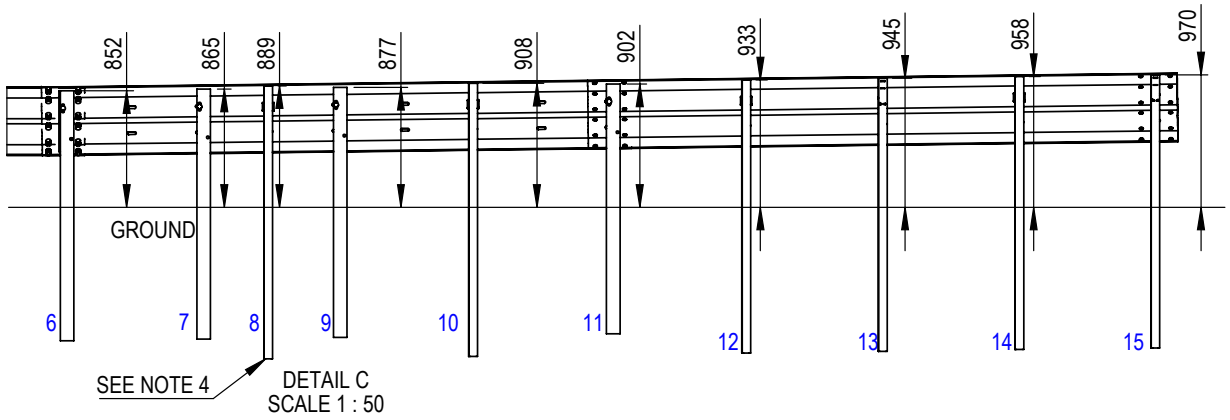
NOTE:

1. REFER TO EZY-GUARD HC MANUAL FOR MEDIAN EZY-GUARD HC INSTALLATION
2. CONCRETE BARRIER TO BE CONSTRUCTED IN ACCORDANCE WITH SBTA 21-005 SHEET 5 AND 7
3. THE STRUCTURAL CONNECTOR IS FIXED TOTHE CONCRETE VIA FIVE M20 x 200 HOBSON EAW-GD CLAWBOLT. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER's INSTRUCTION
4. POST 8, 10, 12, 13, 14, 15 ARE STANDARTD EZY-GUARD HC Z POST

TRANSITION SECTION PANEL SPEC



POST HEIGHT IN TRANSITION SECTION



REVISIONS

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

REFERENCES

DRAWING NUMBER	REFERENCE DRAWINGS

	NAME	DATE
DRAWN	KZ	06-02-2024
CHECKED	MW	06-02-2024
APPROVED	KZ	06-02-2024
SCALE	1:90	SHEET: 1 of 3
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PROJECT

TITLE
INGAL RBT TO MEDIAN EZY-GUARD HC - 14M

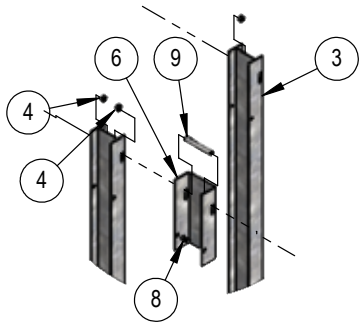
INGAL CIVIL PRODUCTS PART No.
10010728

DRAWING No.
RBT-STD-010

Rev: 0

FOLDER: F:\ENGINEERING\4. DRAWINGS IN PROGRESS_SOLIDWORKS MODEL IN PROGRESS\INGAL RBT\CURRENT\1_MODEL\

ID	DESCRIPTION	PART NO.	QTY.
1	THRIEBEAM TERMINAL CONNECTOR	10001174	2
2	THRIEBEAM (3.5) 4000mm NLL BRIDGE APPROACH	10000854	2
3	W6 x 9 RBT POST - 1830mm	10010287	9
4	M16 OVERSIZE NUT	10001239	106
5	M16 X 50mm POST BOLT GRADE 4.6	10001233	8
6	200mm x 110mm U BLOCK	10010579	2
7	M16 x 250mm TERMINAL BOLT	10009787	2
8	M16 x 40mm H/T HEX HEAD BOLT/NUT & WASHER GALV	10004513	2
9	20NB HEAVY GALV PIPE 185mm LONG	10010580	2
10	CLAWBOLT EAW-GD M20 x 200mm	10010398	10
11	HD MEDIAN Z POST 2000mm	10008505	1
12	Ezy-Guard HD Carriage	10004116	7
13	M16 x 30mm EZY-GUARD SMART POST BOLT	10001832	7
14	THRIEBEAM (2.7) 4000mm NLL 1000mm CENTRES	10000849	3
15	HD Z POST 2000mm	10005540	5
16	M16 X 32 SPLICE BOLT GRADE 8.8	10001248	96
17	THRIEBEAM 4000mm NLL 2.7mm BMT - 500 CENTRES	10002916	1



DETAIL F
SCALE 1 : 35

DETAIL E
SCALE 1 : 20

REVISIONS

REFERENCES

DRAWING NUMBER | REFERENCE DRAWINGS

	NAME	DATE
DRAWN	KZ	06-02-2024
CHECKED	MW	06-02-2024
APPROVED	KZ	06-02-2024
SCALE	1:70	SHEET: 2 of 3
ISSUE FOR		

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PROJECT

TITLE
INGAL RBT TO MEDIAN EZY-GUARD HC - EXPLODED VIEW

INGAL CIVIL PRODUCTS PART No.
10010728

DRAWING No.
RBT-STD-011

Rev: 0

FOLDER: F:\ENGINEERING\04. DRAWINGS IN PROGRESS_SOLIDWORKS MODEL IN PROGRESS\INGAL RBT\CURRENT\1_MODEL\

Notes:

INGAL
CIVIL PRODUCTS
A valmont COMPANY

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