Standards Variation Note

Our Ref:	D26#487030
From:	**Acting Manager Electrical Asset Management**
Reference:	E&ITSDS-01-SVN-06
Effective Date:	01 July 2026
Cease Date:	Until further notice
Standard:	**08/62:** Lighting Design Guideline for Roadway and Public Spaces (Rev. 4W)
Clause(s):	**2**: Lighting Design, **3.4**: Conduits and Road Crossings, **3.8**: Cable Pits, **3.8.1**: Main Switchboard Cable Pit, **3.8.2**: Lighting Pole Cable Pit
Subject:	Cable theft mitigation in design and clarification on pit requirements for all roadway and pedestrian shared path lighting installations.

Purpose and Application

The Standard Variation Notes (SVN) are intended to provide temporary modifications to existing Main Roads standards, while these standards are being updated to reflect the changes. It is important to note that the information contained in the SVN does not supersede any statutory regulations unless Main Roads has obtained explicit permission to do so.

It is also important to note that the content of the SVN may be updated, clarified, or integrated into the appropriate standard at a later time as part of a revision to the aforementioned standard. This ensures that the information provided in the SVN remains relevant and accurate.

This SVN provides up-to-date details on cable theft mitigation practices and pit requirements for projects.

Background

Cable theft presents an ongoing and multifaceted risk to the Main Roads road network, affecting infrastructure performance, public safety, operational efficiency, and community trust. Theft-related outages can leave sections of Main Roads roadway or pedestrian shared paths without lighting, changing the risk profile of the road network, and creating additional maintenance burdens for the Main Roads electrical and ITS asset owner.

To effectively manage these risks in an evolving criminal landscape, secured-by-design principles must be considered into all new lighting infrastructure projects at the earliest practicable stage to determine mitigations and assure budget estimates are appropriate.

Relevant Existing Clause(s)

3.4 Conduits and Road Crossing

All conduits used for running the cable shall be heavy duty PVC conduit conforming to AS/NZS 2053 Series and the amendments thereto, and shall be of the following sizes:

- 80mm conduit - between Point of Attachment (P.O.A) and Main Switchboard
- 80mm or 63mm conduit - between cable pits. 80mm conduit should be used for 25mm^2 cable.
- 32mm corrugated conduit - between cable pit and pole.

The run of the conduit shall as far as possible be parallel to the carriageway and shall be located nominally 2.0 metres from the edge of the kerb or the edge of the carriageway. The conduits shall not be located under pedestrian ramps or crossings.

For road crossings, the following standard sized duct and pipe shall be used:

- 150mm PVC conduit complying with AS/NZS 2053.
- 300mm DN Fibre-Reinforced Concrete Pipe conforming to AS 4139.
- 140mm diameter Class 9 PE (preferred option).

Where these are required, the preferred method of installation is to be directional thrust-bore under and across the existing road pavement at the required depth and terminate each end of the crossing in pits which shall be located at between two to three metres from the edge of the kerb/shoulder. But where such sub-ducting is required, as for cases where telephone lines and street circuits are required to traverse the road, then the duct pits may be terminated at one metre from the duct's ends in order to permit the installation of the various services pits at distances which will facilitate the ease of installation and maintenance of the services concerned subsequently.

When the road-crossing conduit is used as a shared service between authorities, Main Roads electrical lighting cables shall be run within an 80mm or 63mm conduit inside the road crossing.

As far as possible, all cable runs shall be continuous throughout their designed routes. Where joints are required, they shall be affected inside cable pits only.

3.8 Cable Pits

To allow the greatest flexibility on maintenance and repairs, on both 3-phase and single phase lighting systems, all roadway lighting Schemes shall utilise a cable pit system. Only Roadway Lighting Scheme requires cable pit termination next to each light pole. Main Roads uses different sizes of pits according to the function each pit is to perform. Refer to Main Roads Specification 701.

Pedestrian Lighting scheme does not normally require cable pits to be installed at each pole. However, where due to project uniqueness and site constraints the requirements of cable pits may be considered. The internal pole wiring may require to be adjusted to suit the cable pit termination within cable pit. This method should be approved at 15% design phase.

3.8.1 Main Switchboard Cable Pit

The dimensions of the main switchboard cable pi" ("Viscount"P1" or similar) shall be of adequate size to facilitate cable installation in the 80mm and 63mm ducts inserted and fixed into the sides of the pit.

Refer to Main Roads Specification 701 for supply and installation of Roadway Lighting.

3.8.2 Lighting Pole Cable Pit

Each Roadway Light Pole shall be provided with a pit to facilitate cable drawing works and the tapping-off of power to the luminaire via Tee-off point in the pit and a flexible corrugated PVC conduit to the terminals at the control gear tray located at the base of the pole. It also permits easy isolation of faulty luminaires or damaged pole in the event of a collision.

The dimensions of the pit shall be as shown on the Standard Drawing 200231-0063 which is equivalent to "Viscount"P4" or similar approved cable pit. Refer to Main Roads Specification 701 for Roadway Lighting.

The location of the pit shall be at least 0.5 metre from the pole measured in a direction away from the kerb or the edge of the shoulder of the road.

Pits shall have lid plugs and gaskets fitted to prevent water and sand ingress.

Pits associated with light poles shall have the same reference as the pole. Starting from the pit nearest to the switchboard, each pit associated with the light pole shall be prefixed with an alphanumeric reference to include the switchboard number as well, e.g. 607P1, 607P2, 607P3 etc.

Clarification

The added and amended clauses to *Lighting Design Guideline for Roadway and Public Spaces* (Rev. 4W) is detailed below. Strikethrough text details withdrawn clauses from *Lighting Design Guideline for Roadway and Public Spaces* (Rev. 4W). No other clauses are updated as part of this variation notice.

2. Lighting Design

General Requirements

… [not shown for clarity]

2.1.16 Cable Theft Mitigation

The need for early determination of cable theft mitigation requirements for project design arises from the dynamic nature of theft methodologies and the continual review of mitigation techniques. As theft behaviours evolve and new countermeasures are assessed for effectiveness, projects must confirm requirements early to ensure that cost estimates are appropriate.

Projects are required to implement the measures outlined in the Cable Theft Mitigation Factsheet in Appendix D. If projects wish to deviate from the Factsheet, a risk register must be completed in accordance with Main Roads Safety in Design Guideline, and submitted for review through the Main Roads Technical Query and Request for Information Process. This risk register should give particular consideration of the following identified risks:

- Safety – as outlined in AS/NZS 1158 series
- Fiscal – significant costs of remediation
- Legal – potential exposure to liability and associated litigation
- Political – escalation of customer complaints

Projects must allow for theft mitigation within their P90 or equivalent estimates, including incorporating the assumption that any existing copper has been removed within the electrical installation. Only the circuits within the scope of work are to be included in the P90 estimate. The replacement or upgrade of unaffected circuits is not expected.

Agreed cable theft mitigations with Main Roads will take precedence over any relevant clauses within this document.

3.4 Conduits and Road Crossing

All conduits used for running the cable shall be heavy duty PVC conduit conforming to AS/NZS 2053 Series and the amendments thereto, and shall be of the following sizes:

- ~~80~~63 mm conduit - between Point of ~~Attachment~~Supply ~~(P.O.S)~~ and Main Switchboard.
- 80 mm or 63 mm conduit - between cable pits. 80 mm conduit should be used for 25mm^2 cable.
- 32 mm corrugated conduit - between cable pit and pole.

The run of the conduit shall as far as possible be parallel to the carriageway and shall be located nominally 2.0 metres from the edge of the kerb or the edge of the carriageway. The conduits shall not be located under pedestrian ramps or crossings.

For road crossings, the following standard size~~d duct and pipe~~ conduit shall be used:

- 80 mm or 63 mm conduit, whichever is consistent with conduit between cable pits, complete with 2 spare.
- ~~150mm PVC conduit complying with AS/NZS 2053.~~
- ~~300mm DN Fibre-Reinforced Concrete Pipe conforming to AS 4139.~~
- ~~140mm diameter Class 9 PE (preferred option).~~

Where these are required, the preferred method of installation is to be directional thrust-bore under and across the existing road pavement at the required depth and terminate each end of the crossing in pits which shall be located at between two to three metres from the edge of the kerb/shoulder. ~~But where such sub-ducting is required, as for cases where telephone lines and street circuits are required to traverse the road, then the duct pits may be terminated at one metre from the duct's ends in order to permit the installation of the various services pits at distances which will facilitate the ease of installation and maintenance of the services concerned subsequently.~~

~~When the road-crossing conduit is used as a shared service between authorities, Main Roads electrical lighting cables shall be run within an 80mm or 63mm conduit inside the road crossing.~~

As far as possible, all cable runs shall be continuous throughout their designed routes. Where joints are required, they shall be affected inside cable pits only.

3.8 Cable Pits

To allow the greatest flexibility on maintenance and repairs, ~~on both 3-phase and single phase lighting systems,~~all roadway and pedestrian shared path lighting schemes shall utilise a cable pit system. ~~Only Roadway Lighting Scheme requires cable pit termination next to each light pole. Main Roads uses different sizes of pits according to the function each pit is to perform.~~ Refer to Main Roads Specification 701.

~~Pedestrian Lighting scheme does not normally require cable pits to be installed at each pole. However, where due to project uniqueness and site constraints the requirements of cable pits may be considered. The internal pole wiring may require to be adjusted to suit the cable pit termination within cable pit. This method should be approved at 15% design phase.~~

3.8.1 Main Switchboard Cable Pit

~~The dimensions of the main switchboard cable pi" ("Viscount"P1" or similar) shall be of adequate size to facilitate cable installation in the 80mm and 63mm ducts inserted and fixed into the sides of the pit. Refer to Main Roads Specification 701 for supply and installation of Roadway Lighting.~~

Main Switchboard pits shall be to the dimensions and placement indicated on Main Roads Standard Drawings 200231-0062 and 201531-0024 for single and double door switchboards respectively.

3.8.2 Lighting Pole Cable Pit

Each Main Roads roadway or shared path light pole shall be provided with a pit to facilitate cable drawing works and the tapping-off of power to the luminaire via tee-off point in the pit and a flexible corrugated PVC conduit to the terminals at the control gear tray located at the base of the pole. It also permits easy isolation of faulty luminaires or damaged pole in the event of a collision.

The dimensions of the pit shall be as shown on the Standard Drawing 200231-0063 which is equivalent to an industry standard P4 or similar cable pit. Refer to Main Roads Specification 701 for Roadway Lighting.

… [not shown for clarity]

9. Appendix D: Cable Theft Mitigation Factsheet

[refer to note's postscript]

Further information

Any additional questions or concerns on this Standard Variation Notice can be directed to the Main Roads *Technical Query and Request for Information Procedure* found on the Main Roads website.

Recommended

Tom Peacock
Senior Electrical Standards Engineer
Date: 08 June 2026

Reviewed

Campbell Millar
Acting Principal Electrical Standards Engineer
Date: 8 June 2026

Approved

S.Howells

Steven Howells
Acting Manager Electrical Asset Management
Date: 29 June 2026

mainroads WESTERN AUSTRALIA
CELEBRATING OUR CENTENARY YEAR 1926 TO 2026

FACTSHEET
April 2026

Cable Theft Mitigation Factsheet - Lighting

Context

Cable theft continues to pose a significant risk to project delivery, public safety, and Main Roads network reliability. Selecting an appropriate level of mitigation is essential to protecting assets during construction, minimising delays, and reducing wholeoflife costs for the asset owner. This fact sheet outlines the recommended mitigation measures for cable theft protection, providing project managers with a clear understanding of the controls, their application, and the expected outcomes. The measures described here are intended to support informed decision making and ensure that cable installations are safeguarded throughout construction and operational phases.

The below measures are intended to be incorporated into project estimates, detailed design and the eventual construction work.

Disclaimer

The information provided in this fact sheet does not override, amend, or take precedence over any contractual obligations, specifications, or project specific requirements, although it may inform the development of such project artefacts. Main Roads accepts no responsibility or liability for any theft, loss, or damage that occurs prior to the formal handover of any works. Project teams should ensure that all mitigation measures are assessed and implemented in accordance with the applicable contract and site conditions.

Determination of Mitigation

Cable theft mitigation is determined by Main Roads through the Electrical and ITS Asset Theft Mitigation Working Group, based on the assessed risk at this specific time. This ensures that requirements are applied consistently and in alignment with Main Roads objectives for protecting electrical assets.

Summary of Mitigation Measures

Mitigation Measure	Purpose	Key Requirements
Cable Adhesive	Mitigate cable extraction risk	Glue all cables in conduit using approved adhesive
Spare Conduit	Reduce downtime after theft	63 mm HDPVC spare conduit on all runs including under bores
Lockable Pits	Prevent unauthorised access	Reinforced lid, security locks, etched plate with-approved pits
Stainless Steel Label	Notification that cables are chemically anchored to deter theft	Etched notification plate as per 201948-3297

Mitigation Measures

Cable Adhesive

This measure exists to mitigate the risk of cables from being pulled out of conduits. By chemically anchoring cables inside the conduit, it significantly increases the effort and time required for theft, reducing the likelihood that offenders can remove large lengths of cable before exposure.

Requirements:

All cables in conduit from switchboard to light pole pit are glued in conduit.

- Adhesive products – refer to E&ITS Design Standard 04, pg 9, for pre-approved products.
- Installation methodology – project manager or Main Roads representative to contact Electrical Asset Management, elec&itsservicerequest@mainroads.wa.gov.au, for recommended installation methodology.

Spare Conduit

A spare conduit is installed so that, if a circuit is damaged or stolen, the site can be quickly restored without major excavation or delays.

Requirements:

All conduit runs must be supported with a 63 mm spare HDPVC conduit, including under bores. Pit to pole spare is not included.

Lockable Light Pole Pit and Lid

This control exists to prevent offenders from gaining easy access to live or installed cables. The reinforced concrete surround, tied in lid, padlock, and security locks make it far more difficult to lift or break into the pit. This deters theft attempts and reduces the chance of rapid cable extraction.

Requirements:

The standard P4 lighting pit used at light poles or when required for easy cable pulling must be replaced with a pit with the below features:

- A robust list that is tied into concrete surround.
- Concrete surround attached to pit body to mitigate easy ripping off the surround for access.
- Lid complete with padlock (247E keyed) and 2x security locks – security locks are Main Roads specific and the Electrical Asset Management Branch we will free issue keys to project.
- All pit lids to have etched stainless-steel plate attached indicating cables inside are chemically anchored – see Main Roads Standard Drawing 201948-3297 on website.
- Main Roads pre-approved pit for this application can be found in Appendix A.

Double Lid Pits

Double Lid pits (usually FC12) used in the switchboard and where required at road crossings must also be secured as per the below advice:

- *Greenfields* pre-approved pit: Channell Bulk 4 – refer to E&ITS Design Standard 04, pg 8, for contact details.
- *Brownfields* option 1: replace pit with the Bulk 4 as per above or option 2: retrofit a bolted aluminium cover plate over existing FC12s fixed into the concrete surround, further detailed in Appendix B.

NOTE: Channel Bulk 4 pit will require the procurement of Main Roads specific Barri Bolts.

Barri Bolt and Key Process

Barri bolts tie the pit lid firmly into the concrete surround so it cannot be easily pried open. By controlling the key distribution through Main Roads, only authorised personnel can access the pits. This prevents unauthorised entry and is another layer to minimise opportunities for cable theft.

Process:

All pits will have barri bolts to procure and install to tie pit lid down to the concrete surround. Guidance steps for the project manager or Main Roads representative below:

- Contact Main Roads Electrical Asset Management team at elec&itservicerequest@mainroads.wa.gov.au which includes the following:
    - Project number
    - Contract number
    - Number of bolts required
    - Main Roads Project Manager or representative responsible
    - Contact details of person who will be receive bolts
    - Issued for construction design package
    - Sensitivities

Main Roads will then provide a letter of approval to Spinafix Construction Supplies permitting the sale of bolts to said contact.

Electrical Asset Management Branch will then arrange with project manager or Main Roads representative to receive keys. Barri bolt keys are managed by Main Roads Electrical Asset Management branch only.

Appendices

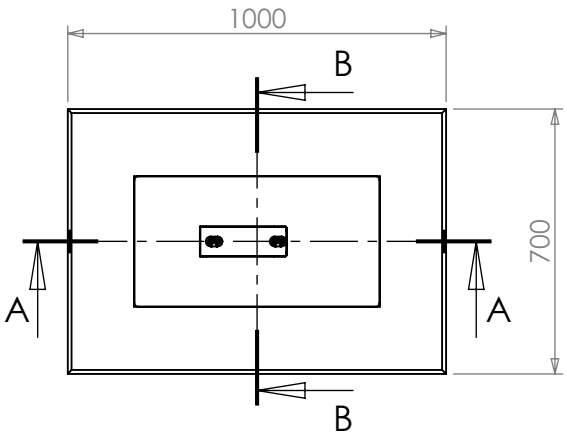
(Note below)

Appendix A: Main Roads Approved Anti-Theft Pit

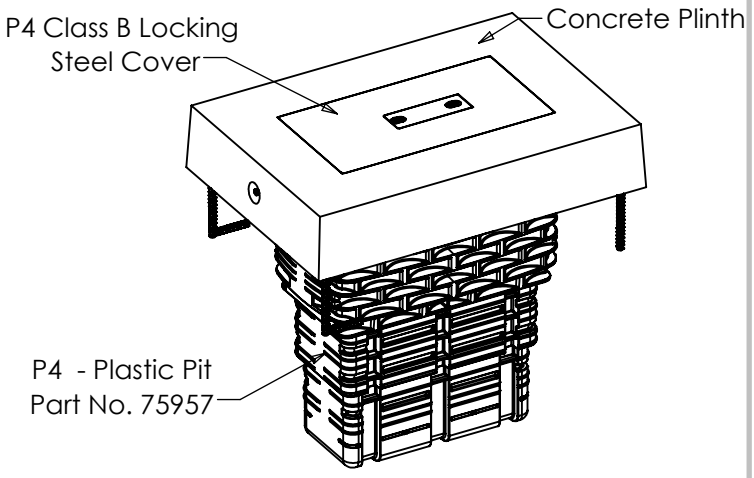
Appendix B: Switchboard Plinth Pit Cover Option - Sketch

Appendix C: Road Crossing Pit Cover Option - Sketch

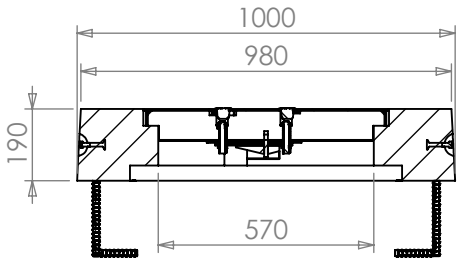
MRWA PLINTH WITH CLASS B LOCKING STEEL LID AND P4 PLASTIC PIT

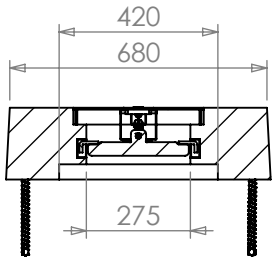


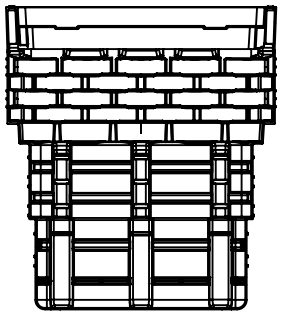
TOP VIEW



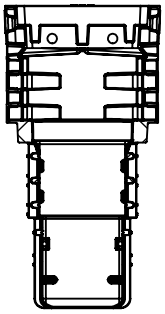
ISOMETRIC VIEW
(Exploded)







SECTION A-A
(Exploded)



SECTION B-B
(Exploded)

Note: All dimensions are in mm

SALES ILLUSTRATION

ACO Pty Ltd
134-140 Old Bathurst Road, Emu Plains NSW 2750
Tel: +61 2 4747 4000, Fax: +61 2 4747 4040, Website: www.acoaus.com.au

REF. No.	25-05
REVISION:	C
CHK'D	SN

MRWA PLINTH WITH CLASS B LOCKING STEEL LID AND P4 PLASTIC PIT

Installation Methodology

1. Excavation
Excavate around the existing pit to dimensions of **1600mm x 1300mm**, with a minimum depth of **450mm** to allow for plinth installation.

2. Pit Preparation
Prepare the existing pit to the required height, ensuring allowance for the **150mm depth** of the plinth, including an **additional 40mm recess** to enable the underside of the plinth to securely locate.

3. Plinth Lifting and Reo Bar Installation
Use **Swiftlift lifting equipment** to lift the plinth.Insert **reinforcement bars (reo bars)** into the ferrules located on the underside of the plinth.

4. Plinth Placement
Carefully position the plinth above the pit and lower it into place, ensuring the pit locates correctly into the recess on the underside of the plinth.

5. Concrete Backfill
Backfill with concrete around the pit to a minimum depth of the **underside of the plinth**, ensuring that the reinforcement bars are **fully encased** and 300mm wide from the pit.

6. Earth Backfill
Backfill the remaining area around the plinth with **compacted earth** up to the **finished ground level**.

7. Lid and Locking Bar Installation
Install the **locking bar** and **lid** into the plinth, aligning components correctly.

8. Security Fixing
Fix the lid in place using the **supplied security bolts** and **security key** provided.

9. Final Finishing
Insert the **plastic plugs** into the lid cavities to complete the installation.

Note: All dimensions are in mm

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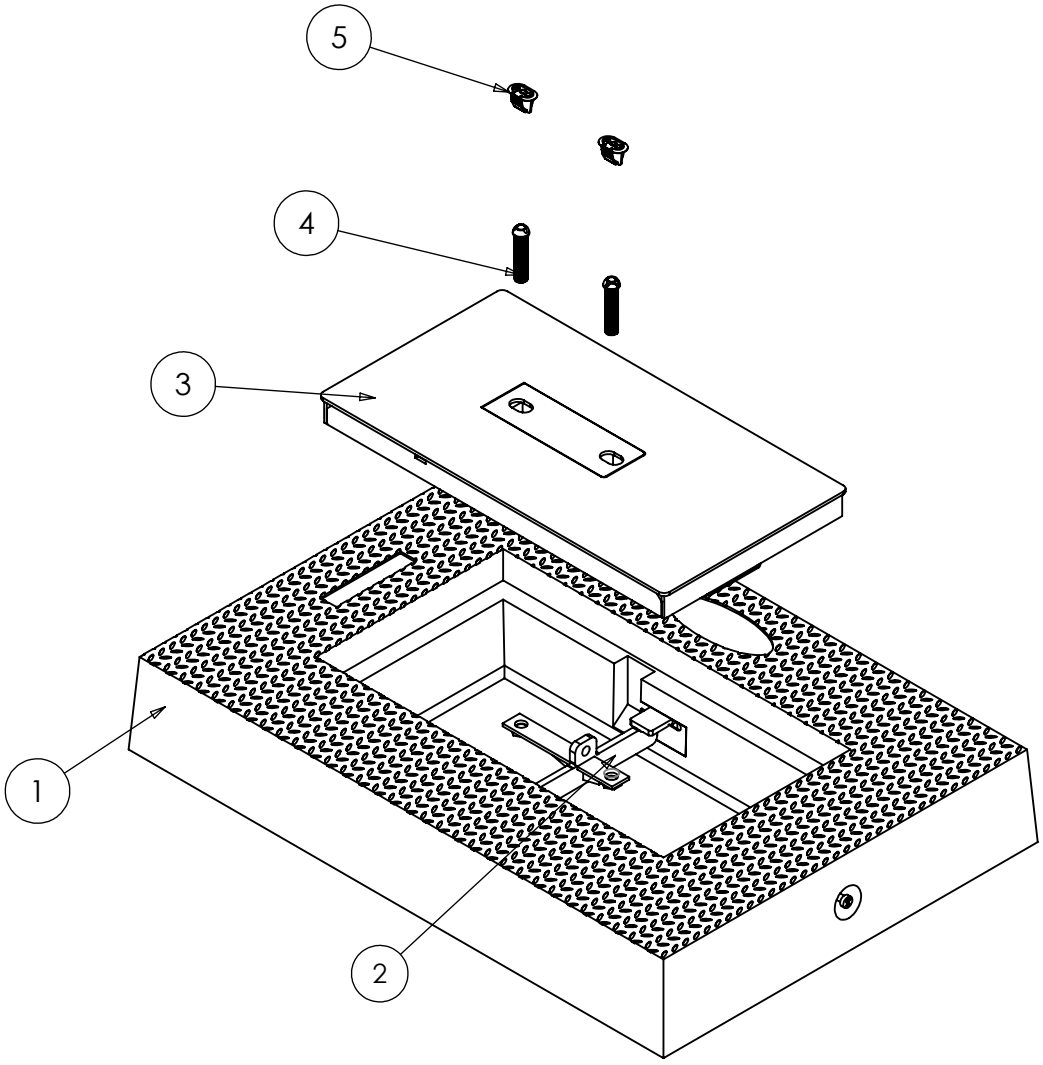
ITEM NO.	DESCRIPTION	QTY.
1	PLINTH	1
2	LOCKING BAR	1
3	MRWA STEEL LOCKING LID	1
4	M16x75 SECURITY BOLTS	1
5	GREY UNIVERSAL LID PLUGS	1



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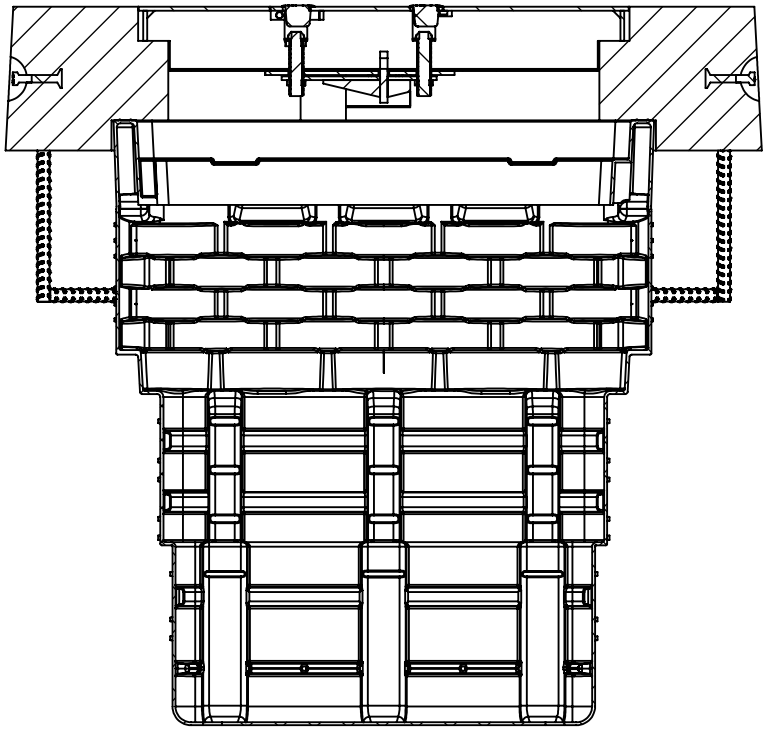

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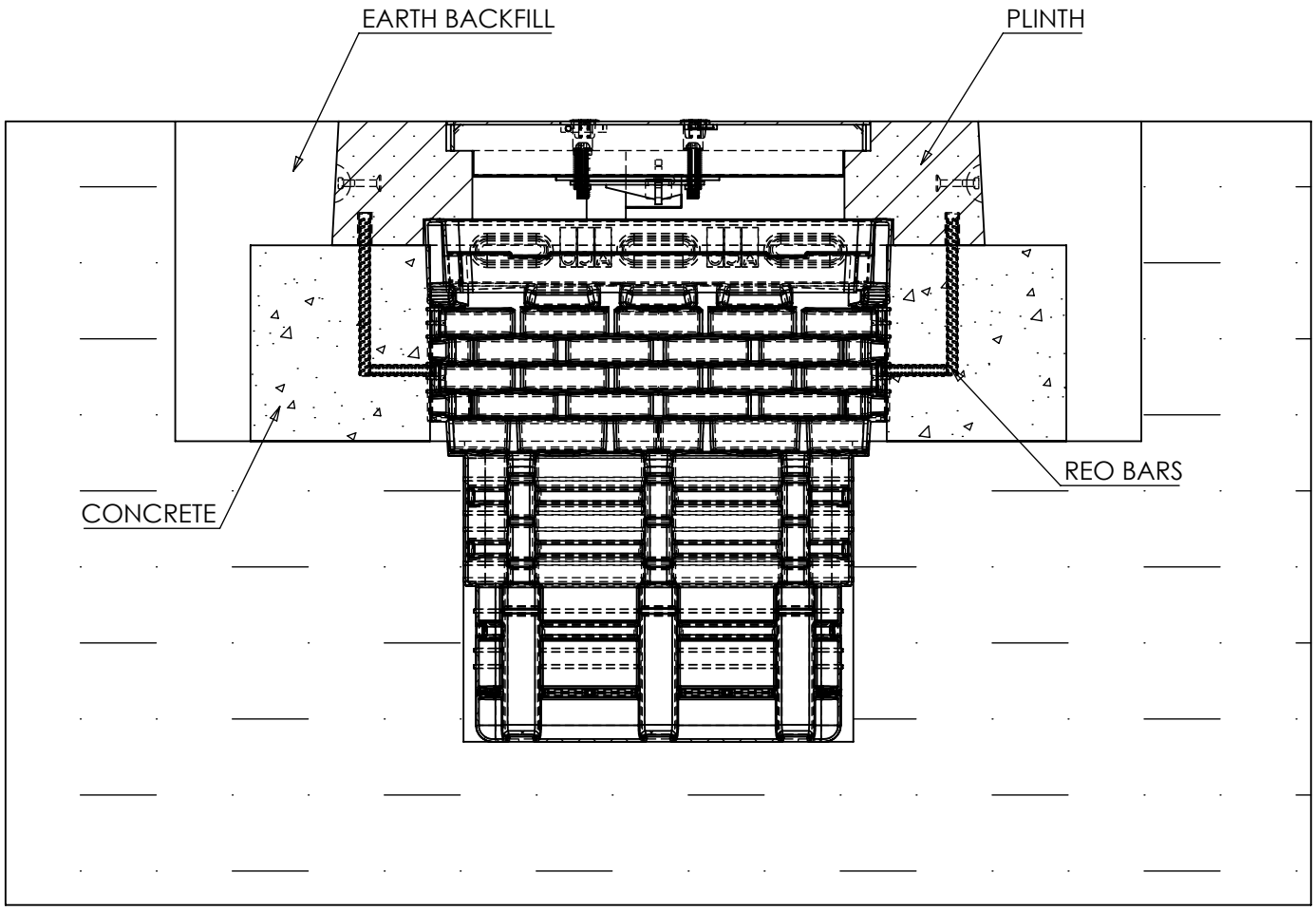

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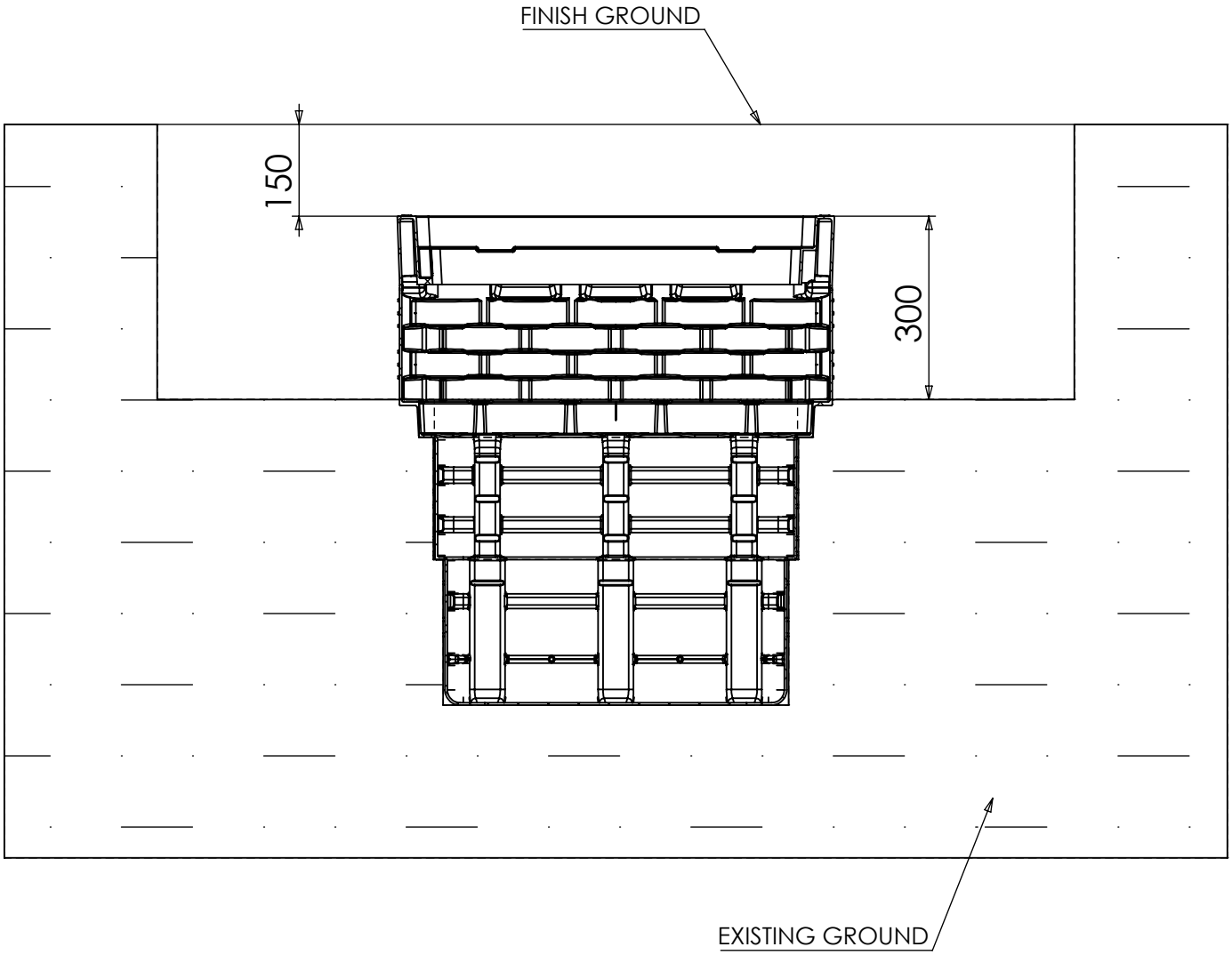

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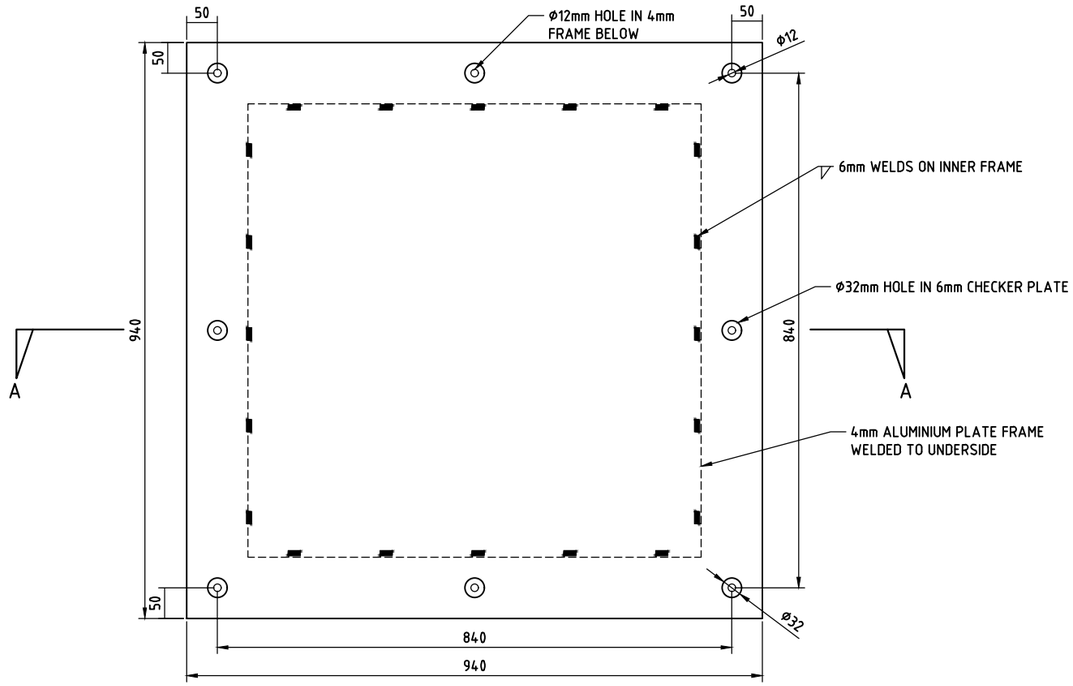

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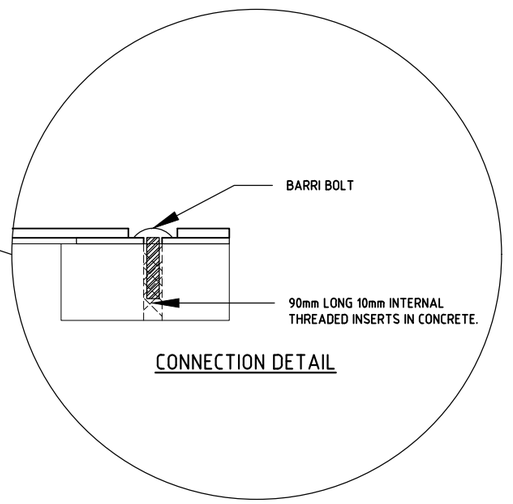
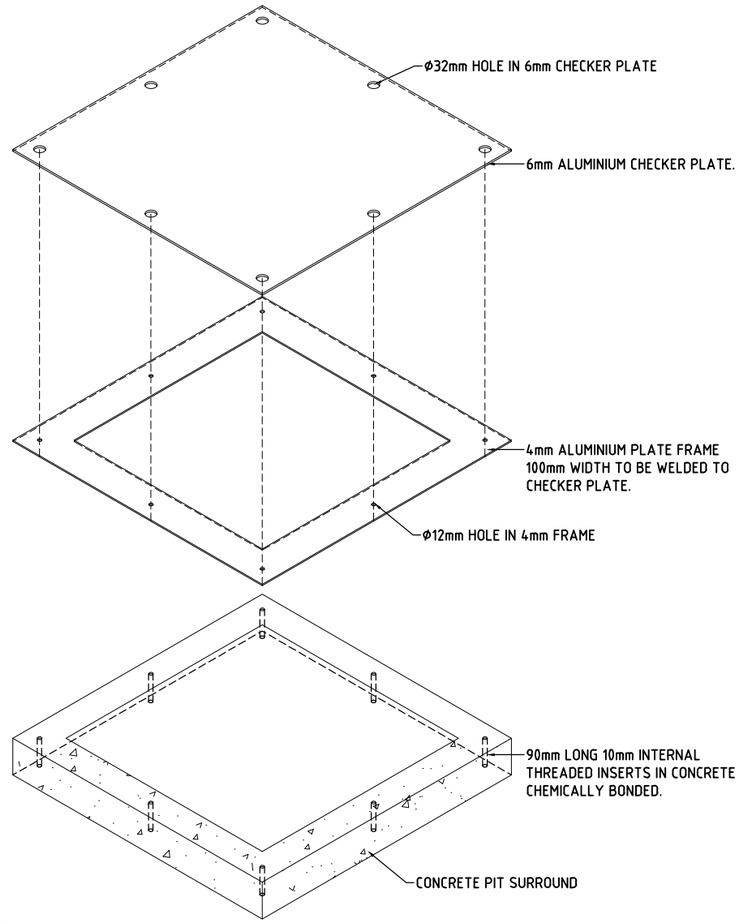
SECTIONAL ELEVATION (A-A)
SCALE: 1:5



CONNECTION DETAIL



ISOMETRIC DETAIL
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WORKING DRAFT - SKETCH

No.	DATE	DESCRIPTION	DRN	ENG	APP
A	5.03.2026	FOR INTERNAL REVIEW	RD	SH	

AMENDMENTS

DRAWING No.	DESCRIPTION
-	-

REFERENCES

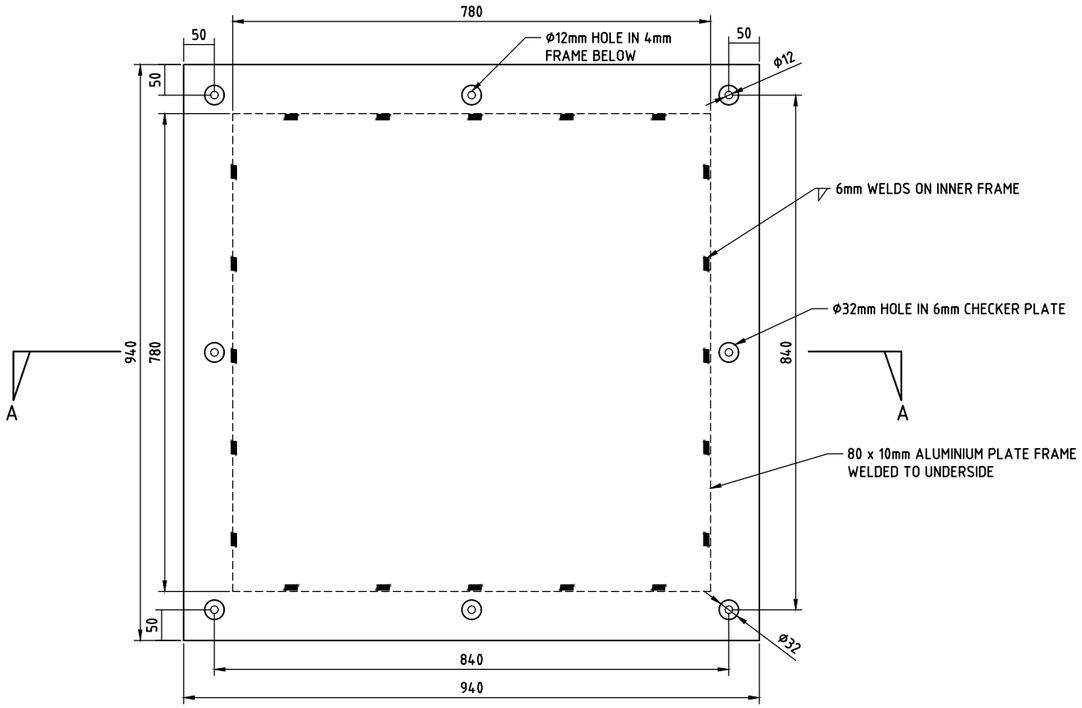
mainroads WESTERN AUSTRALIA
REGIONALMANAGEMENT AND OPERATIONS
METROPOLITAN REGION
WATERLOO CRESCENT EAST PERTH 6004
Telephone 138 138

DRAWN:	R. DESVEAUX	DATE:	5.03.2026
ENGINEER:	S. HOWELLS	DATE:	5.03.2026
VERIFIED:		DATE:	
APPROVED:		DATE:	

GUIDELINE & STANDARD DRAWING
CABLE THEFT
SWITCHBOARD PLINTH
ALUMINIUM DOUBLE LAYER PIT LID
LAYOUT DETAIL

LOCAL AUTHORITY: ...
MRWA DRG No:
REV: A
SHEET: 1 of 1
MRWA ASSET No:
TYPE:

SCALE: N.T.S
A1
COMMISSIONED:



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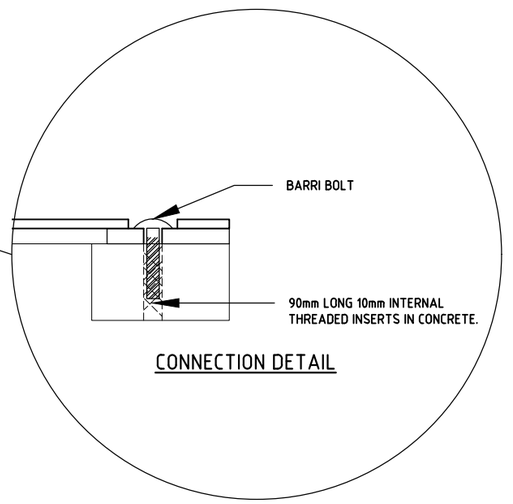
SCALE: 1:5

SECTIONAL ELEVATION (A-A)
SCALE: 1:5



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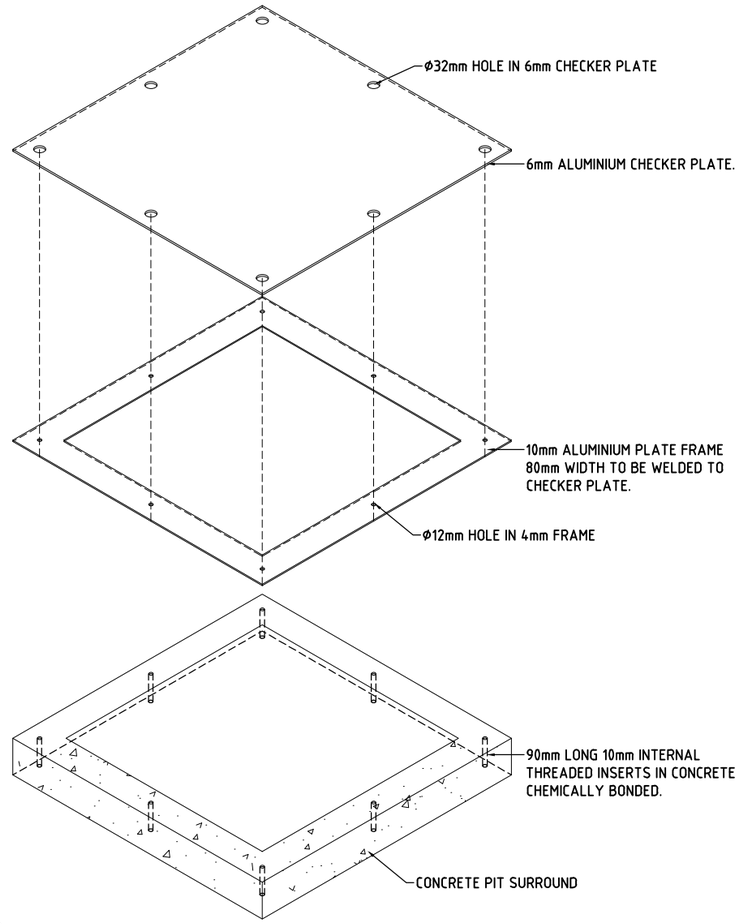

ISOMETRIC DETAIL
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WORKING DRAFT - SKETCH

No.	DATE	DESCRIPTION	DRN	ENG	APP
A	5.03.2026	FOR INTERNAL REVIEW	RD	SH	

AMENDMENTS

DRAWING No.	DESCRIPTION
-	-

REFERENCES

mainroads WESTERN AUSTRALIA
REGIONALMANAGEMENT AND OPERATIONS
METROPOLITAN REGION
WATERLOO CRESCENT EAST PERTH 6004
Telephone 138 138

DRAWN:	R. DESVEAUX	DATE:	5.03.2026
ENGINEER:	S. HOWELLS	DATE:	5.03.2026
VERIFIED:		DATE:	
APPROVED:		DATE:	

GUIDELINE & STANDARD DRAWING
CABLE THEFT
ROAD CROSSING
ALUMINIUM DOUBLE LAYER PIT LID
LAYOUT DETAIL

LOCAL AUTHORITY: ...
MRWA DRG No:
REV: A
SHEET: 1 of 1
MRWA ASSET No:
TYPE:

SCALE: N.T.S
A1
COMMISSIONED: