



Our ref: WR21/12026

19 May 2021

Queensland Rail
c/- Corrosion Control Engineering (CCE) and GHD
Level 13, 203 Robina Town Centre Drive
ROBINA QLD 4226
sarah.wilson@ghd.com

Attention: Sarah Wilson

Dear Ms Wilson

Exemption certificate given

The Department of State Development, Infrastructure, Local Government and Planning (the department) received your request for an exemption certificate to be given for the development described below on 20 April 2021.

Under section 46(2) of the *Planning Act 2016*, the department advises that an exemption certificate is given for the development described below.

Applicant details

Applicant name: Queensland Rail
Applicant contact details: c/- Corrosion Control Engineering (CCE) and GHD
Level 13, 203 Robina Town Centre Drive
ROBINA QLD 4226
sarah.wilson@ghd.com

Premises details

Street address: Kolan River, Moorland
Real property description: Adjacent lots 2 on RP28936 and 81 on RP117077
Local government area: Bundaberg Regional Council
Premises Owner: Department of Resources

Development details

Operational Work that is Tidal Works or Work in a Coastal Management District (Installation of Cathodic Protection Devices on Queensland Rail Bridge in Kolan River)

As described above in accordance with the following plans/specifications.

Plans/specifications	Prepared by	Date	Reference no.	Version/issue
Aspect of development: Operational Work				
Project Locality and Constraints Mapping Kolan River Rail Bridge	GHD	16 Apr 2021	12537191	0
Queensland Rail Bridge Cathodic Protection Skid General Arrangement	CMKE Engineering	16 Mar 2020	C20021D-GA Sheet 1 of 2	1
Queensland Rail Bridge Cathodic Protection Skid General Arrangement	CMKE Engineering	16 Mar 2020	C20021D-GA Sheet 2 of 2	1
Queensland Rail Three Steel Bridges Kolan River Bridge Cathodic Protection Overview	CCE	9 Dec 2020	QR-C-D89164	2
Queensland Rail Three Steel Bridges Cathodic Protection Skid Details	CCE	11 Mar 2021	QR-C-D89166	3
Queensland Rail Three Steel Bridges Cathodic Protection Skid Assembly Details Cathodic Protection Skid Details	CCE	9 Dec 2020	QR-C-D89171	2
Cathodic Protection Construction Methodology Queensland Rail Three River Bridges	CCE	9 Mar 2021	450848	1

Assessable development

This exemption certificate relates to the following provisions of the Planning Regulation 2017:

- 8.4.3(l) Operational work that is – (i) tidal works not on strategic port land; or (ii) work carried out completely or partly within a coastal management district

Reasons for giving the exemption certificate

This exemption certificate is given as the effects of the development would be minor or inconsequential, considering the circumstances under which the development was categorised as assessable development.

When exemption certificate ceases to have effect

Pursuant to section 46(8) of the *Planning Act 2016* this exemption certificate has effect for two years.

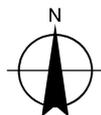
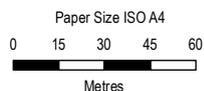
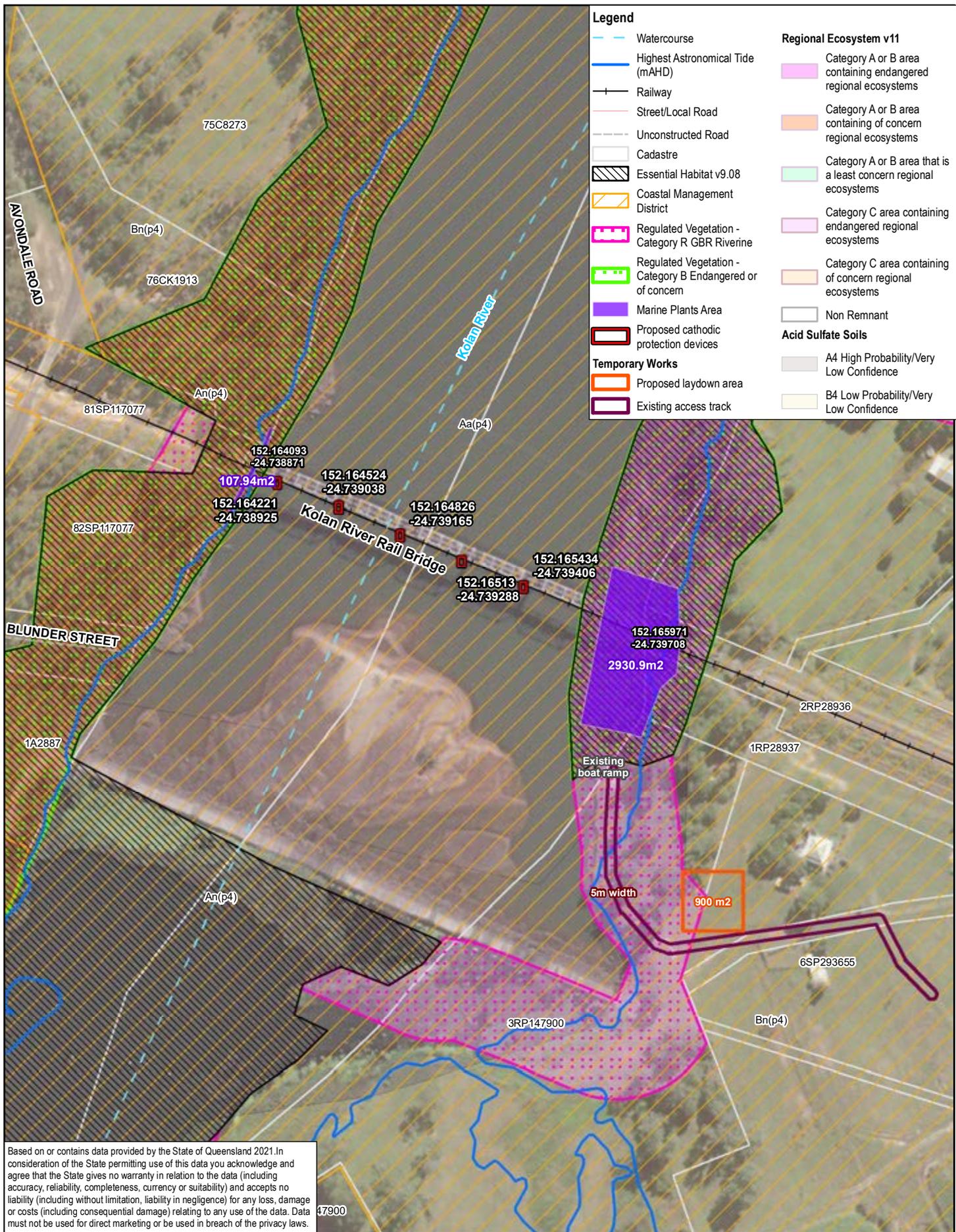
Advice to the Applicant

Please note this exemption certificate does not relate to operational work that is the removal, destruction or damage of marine plants (Schedule 8, Table 4, Item 3(e) of the Planning Regulation 2017). If the removal, destruction or damage of marine plants cannot comply with the Accepted Development Requirements for Operational Work that is the Removal, Destruction or Damage of Marine Plants, a development approval under the *Planning Act 2016* will be required for that component of the development.

For further information please contact Cavannah Deller, Planning Officer, on (07) 4331 5614 or via WBBSARA@dsmip.qld.gov.au who will be pleased to assist.

Yours sincerely

Brett Nancarrow
Regional Director - North
Planning and Development Services
Planning Group



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

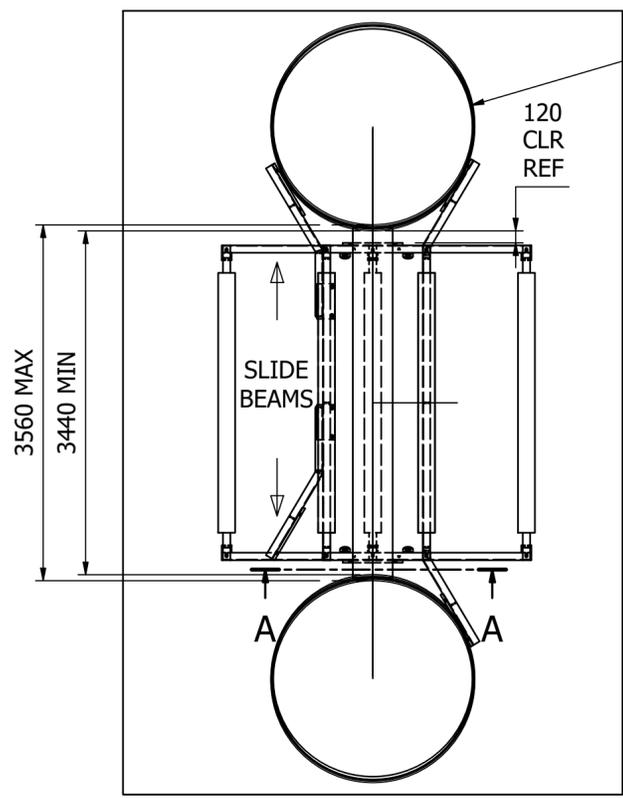


Corrosion Control Engineering (Qld) Pty Ltd
REP-A-Environmental Report for the installation
of cathodic protected devices at Kolan River

Project No. 12537191
Revision No. 0
Date 16/04/2021

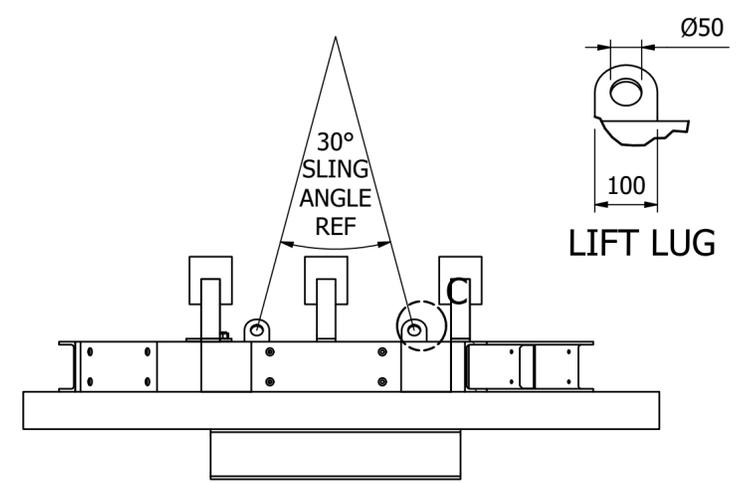
Project locality and constraints mapping
Kolan River Rail Bridge

FIGURE 3.3



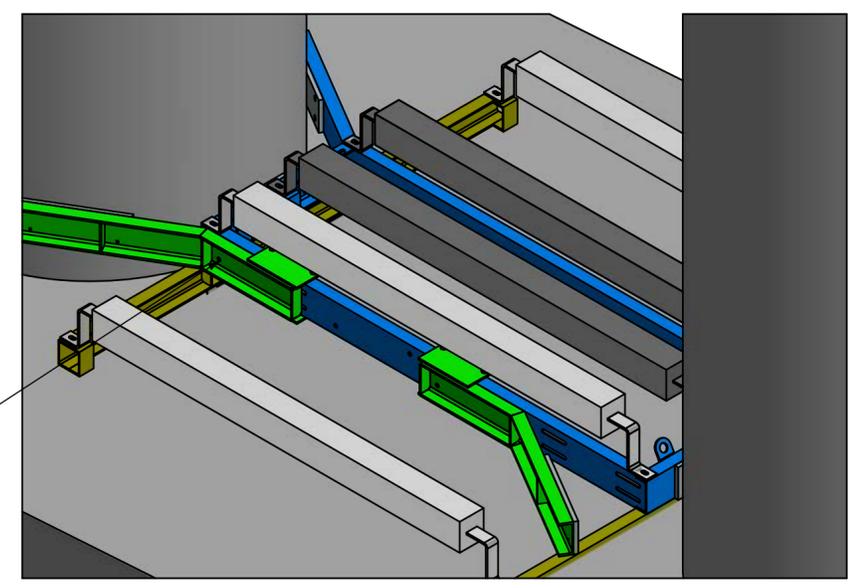
PLAN

VARIATION IN PYLON POSITIONS

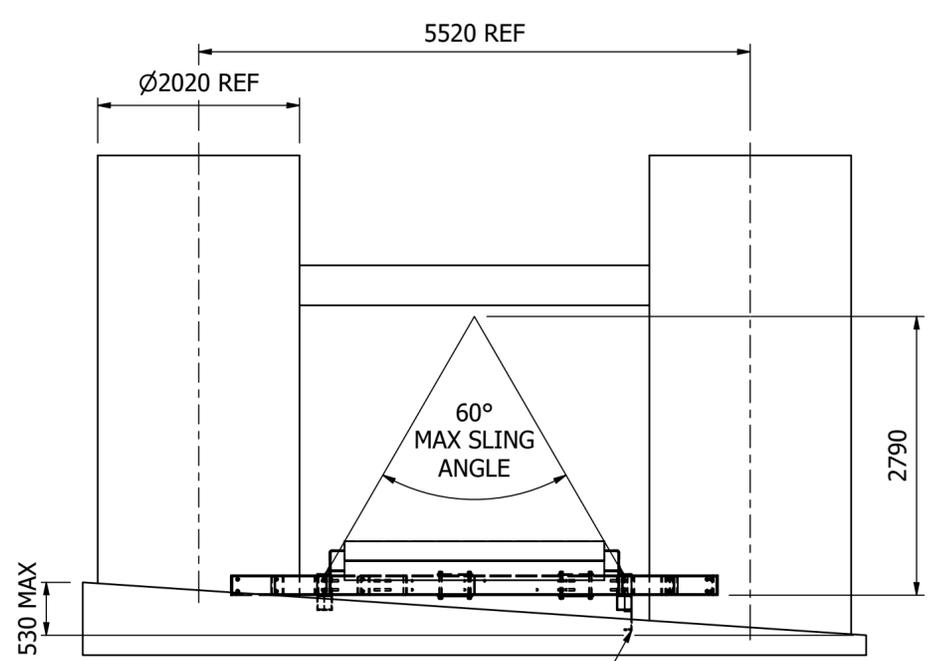
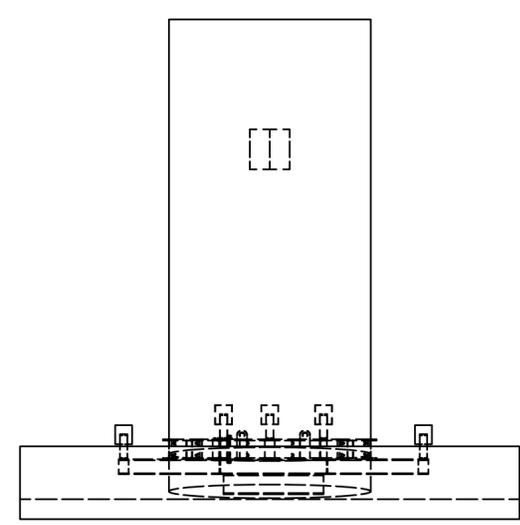


SECTION A-A

NOTE 5
4 PLACES
PER END

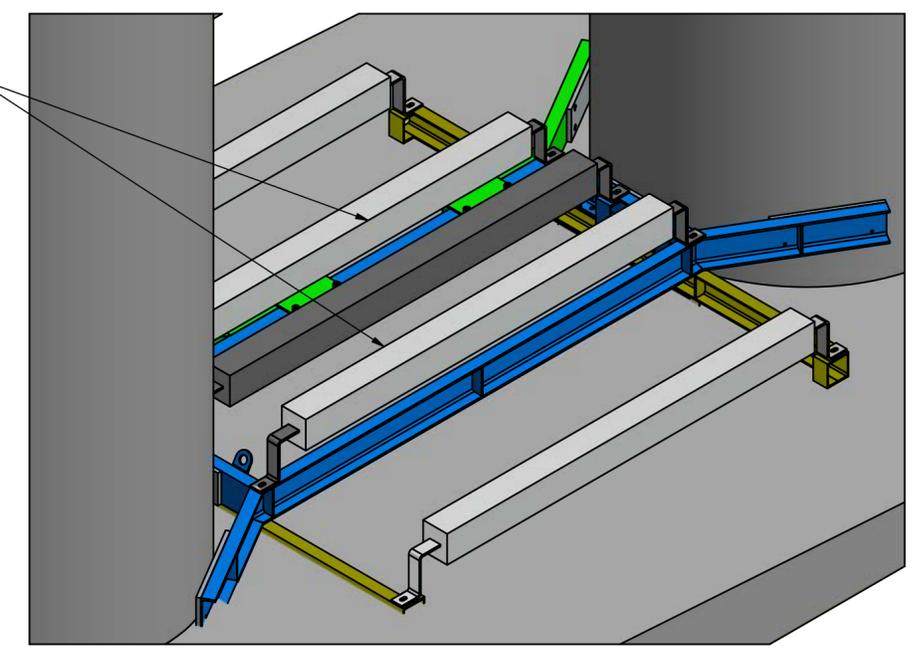


LOCK BEAM SIDE



PACKER BEAM
WHERE
REQUIRED

ANODE
OPTIONS

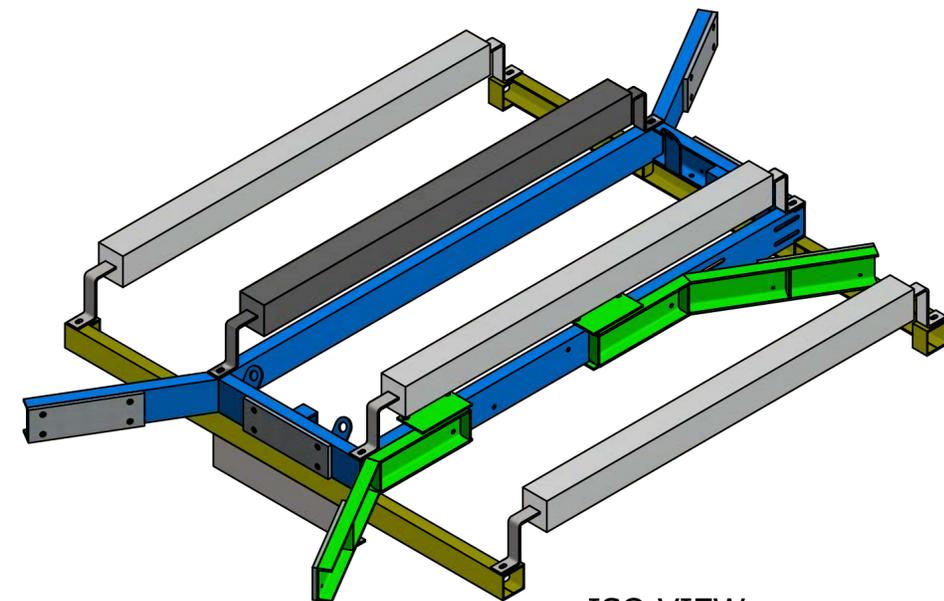
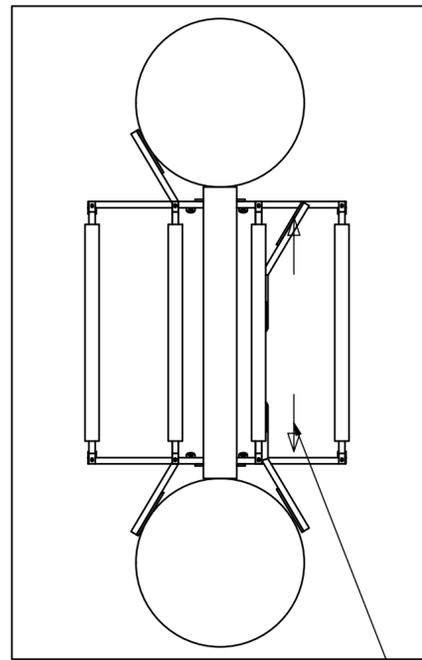
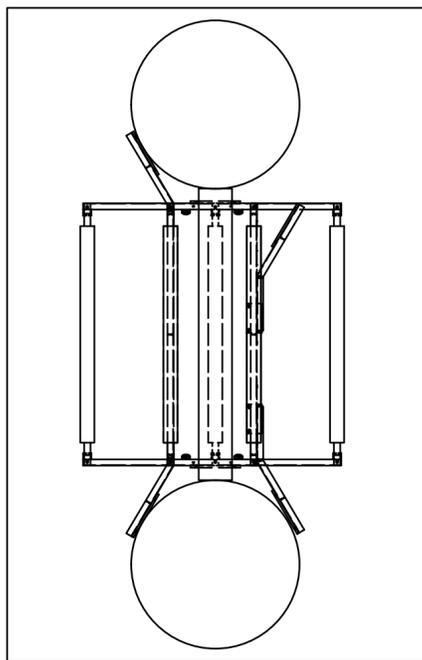
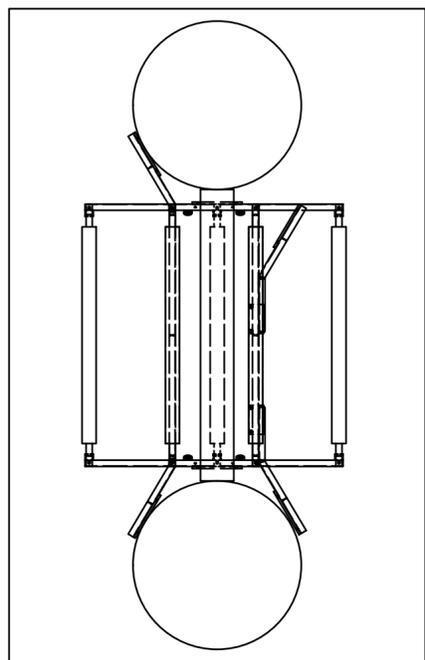
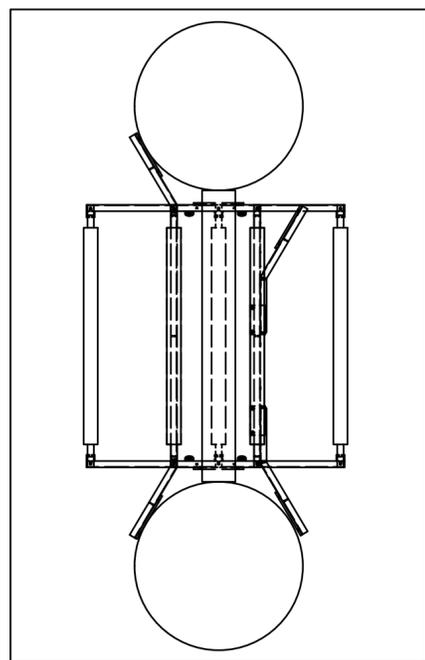


FIXED BEAM SIDE

- NOTES:**
1. FABRICATE IN ACCORDANCE WITH AS4100 OR EQ.
 2. WELD TO AS1554.1 GRADE SP.
 3. WELD 6 CONT. FILLET UNO.
 4. GRIND ALL SHARP EDGES AND REMOVE WELD SPATTER.
 5. SLIDE ARM ATTACHMENT BOLT TORQUE 143Nm ON ASSEMBLY AT PYLON.

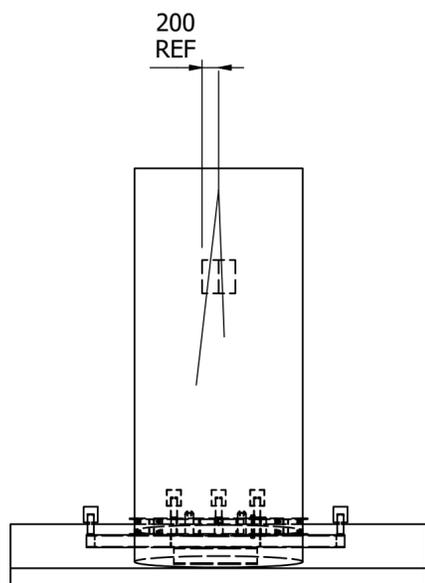
PYLON DETAILS - REFERENCE ONLY			
LOCATION	PYLON DIAMETER	DISTANCE B/T PYLONS	MAXIMUM CROSS SLOPE
BURNETT	2018	3485±45	530
KOLAN	2040	3495±25	NEG.
BOYNE	1993	3530±30	NEG.

1	4 ANODE TYPE ADDED - QTY CHANGED	28/10/2020	CMK
REV	DESCRIPTION	DATE	APP.
REVISIONS			
Design & Drafted By	Client	Drawn	Checked
 MOB: 0408 903 379 EMAIL: eng@cmk.com.au	 Sydney Melbourne Brisbane Perth Townsville Auckland New Plymouth	CMK	
		Approved	Date
		16/03/2020	
Title			
QUEENSLAND RAIL BRIDGE CATHODIC PROTECTION SKID GENERAL ARRANGEMENT			
Drawing Number		Sheet	Revision
C20021D-GA		1 of 2	1
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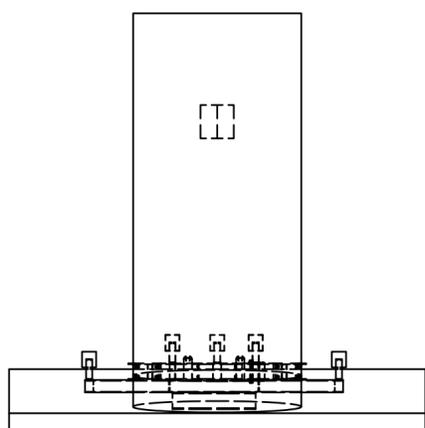


ISO VIEW
TYPE 3

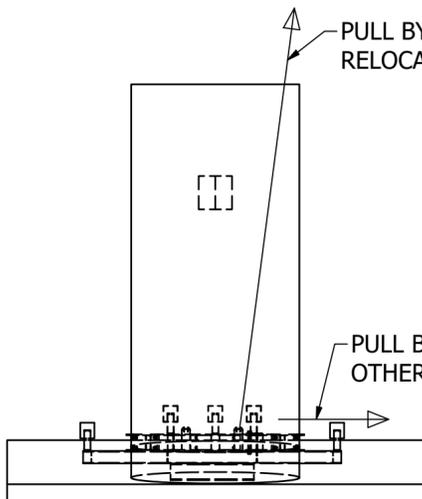
MOVE ACROSS
"COMEALONG"
FINAL BOLT
INTO POSITION



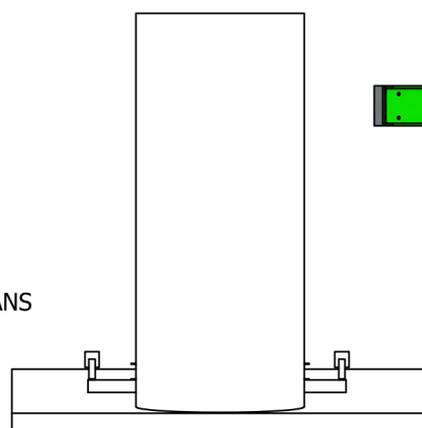
LOWER BY CRANE
OFFSET SLING



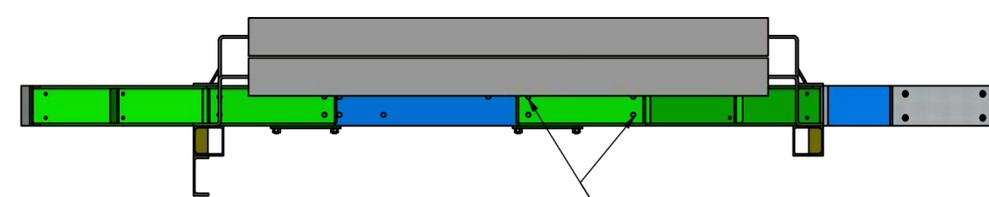
INITIAL
RESTING POSITION



FINAL POSITION



LOCKED



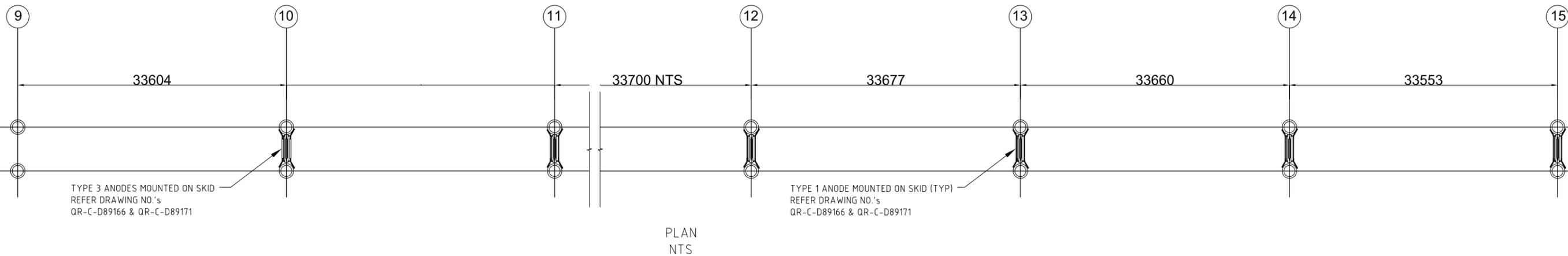
SIDE VIEW

TEMPORARY FIXTURE BOLTS

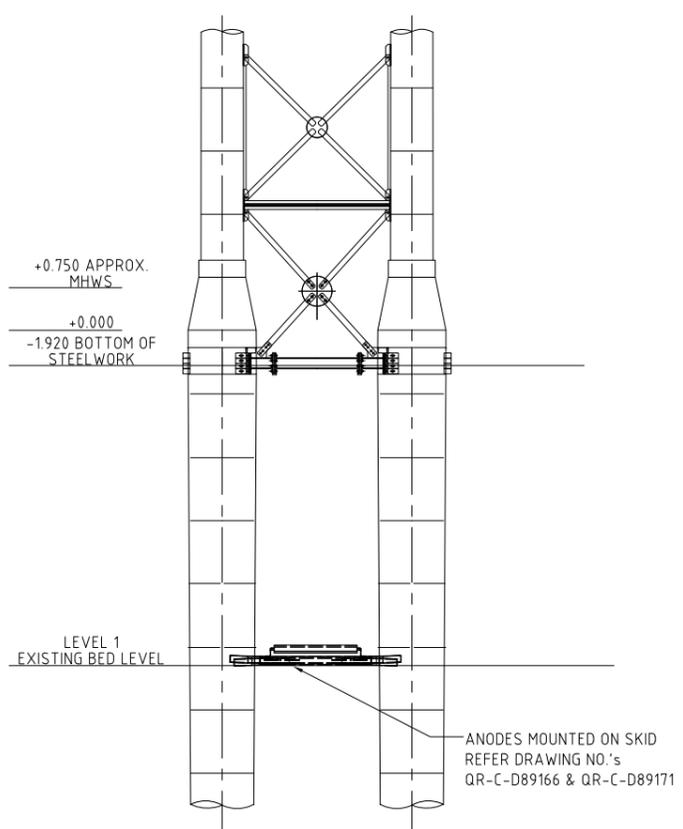
SKID WEIGHTS [kg]			
COMPONENT	SKID 1	SKID 2	SKID 3
FRAME	260	260	260
SIDE ARMS	120	120	120
CROSS BEAMS	-	-	120
ANODES	230	460	920
TOTAL	610	840	1420

1	4 ANODE TYPE ADDED - QTY CHANGED	28/10/2020	CMK
REV	DESCRIPTION	DATE	APP.
REVISIONS			
Design & Drafted By	Client	Drawn	Checked
 MOB: 0408 903 379 EMAIL: eng@cmk.com.au	 Sydney Melbourne Brisbane Perth Townsville Auckland New Plymouth	CMK	
		Approved	Date
		16/03/2020	
Title			
QUEENSLAND RAIL BRIDGE CATHODIC PROTECTION SKID GENERAL ARRANGEMENT			
Drawing Number		Sheet	Revision
C20021D-GA		2 of 2	1

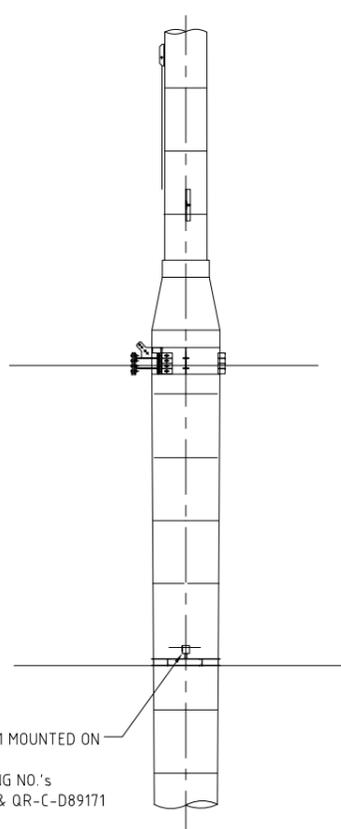
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PLAN
NTS

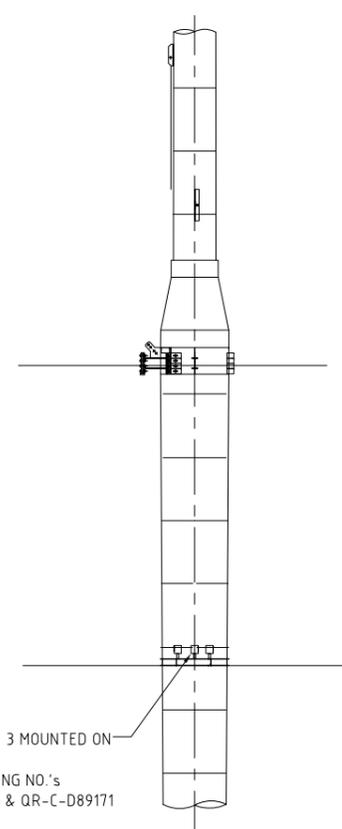


TYPICAL SECTION
NTS



ANODE TYPE 1 MOUNTED ON
SKID (TYP)
REFER DRAWING NO.'s
QR-C-D89166 & QR-C-D89171

VIEW
NTS



ANODE TYPE 3 MOUNTED ON
SKID (TYP)
REFER DRAWING NO.'s
QR-C-D89166 & QR-C-D89171

CERTIFIED ON: 12/04/2021
BY ENGINEER JAMES STEELE *[Signature]*
RPEQ: 11373

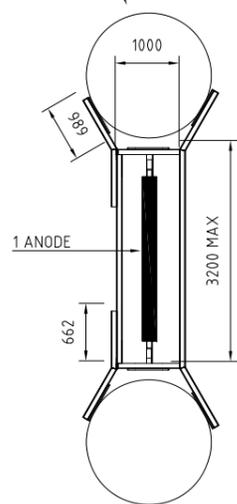
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	2	DETAILS UPDATED	A.ZHAO	- 9.12.20
SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING				

DESIGNED	Q.LI	28-05-20	ORIGINAL ISSUE BY QUEENSLAND RAIL
DESIGN CHECK	D.PARKER	28-05-20	approv2by NAME
DRAWN	B.BOLGER	28-05-20	DATE
DRG CHECK	R.MCKAY	28-05-20	approv2da DATE
DESIGN APPROVAL / CERTIFICATION		approv2h1 NAME	DATE
PROFESSIONAL QUALIFICATION	DATE	approv2h1 POSITION TITLE	DATE
		RESPONSIBILITY FOR THIS DESIGN REMAINS WITH THE DESIGN APPROVER / CERTIFIER	

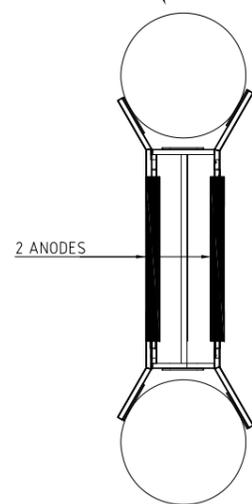
Network - Civil Engineering
QUEENSLAND-RAIL
THREE-STEEL-BRIDGES
KOLAN-RIVER-BRIDGE
CATHODIC-PROTECTION-OVERVIEW

DRAWING NUMBER	ISSUE
QR-C-D89164	2
CONSULTANT DWG No.	J8808-DWG-02

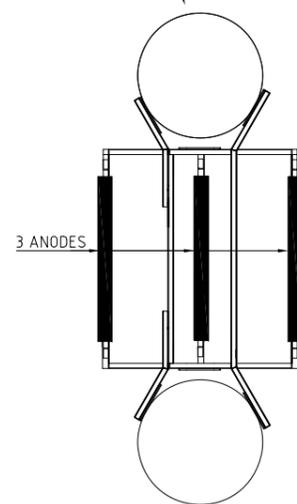
PIERS - TYPICAL



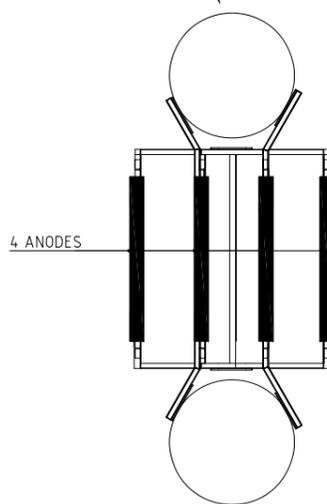
PLAN TYPE 1 ANODE ARRANGEMENT



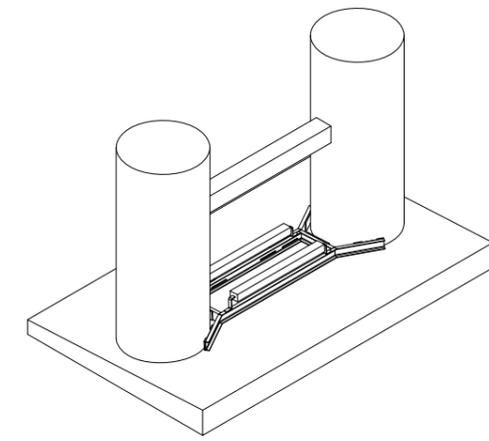
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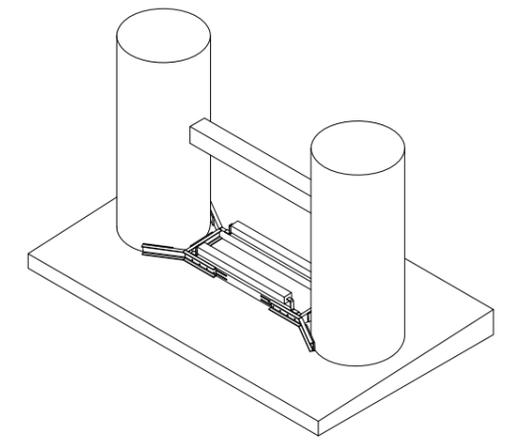
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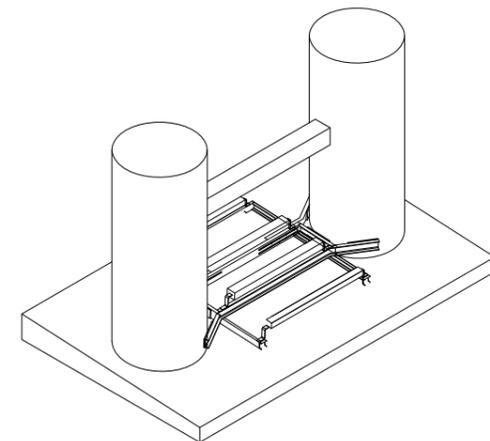
PLAN TYPE 4 ANODE ARRANGEMENT



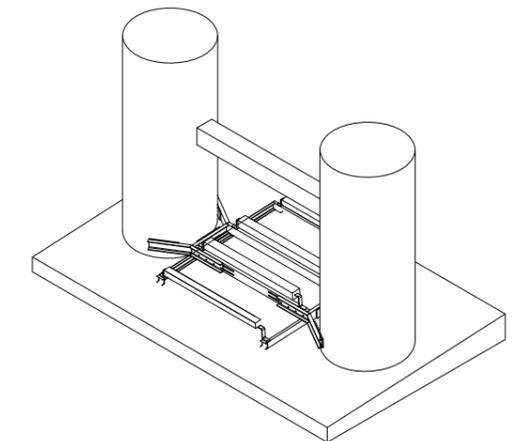
FIXED BEAM SIDE TYPE 2 ANODE FRAME



LOCKED BEAM SIDE TYPE 2 ANODE FRAME



FIXED BEAM SIDE TYPE 4 ANODE FRAME



LOCKED BEAM SIDE TYPE 4 ANODE FRAME

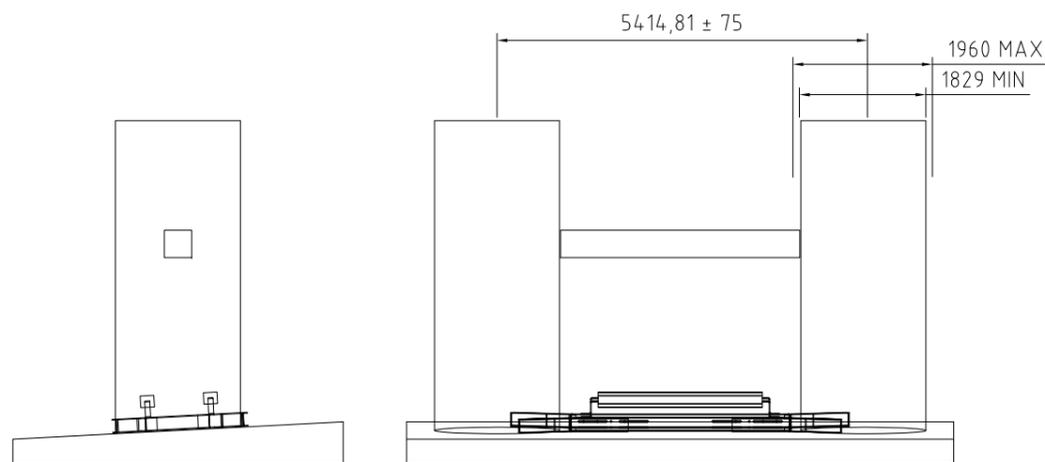
ANODE SCHEDULE

LOCATION	PIER REF.	No. OF ANODES REQ'd PER PIER	TOTAL No. OF ANODES REQ'd	TYPE
BURNETT RIVER	4 TO 9	2	12	2
BURNETT RIVER	3 AND 10	4	8	3
KOLAN RIVER	11 TO 15	1	5	1
KOLAN 10		4	4	3
BOYNE RIVER	13 TO 16	1	4	1

NOTES:

- (1) ALL ANODES:
DIMENSIONS: 2600x170x190
ALLOY WEIGHT: 224kg NOMINAL

CERTIFIED ON: 12/04/2021
BY ENGINEER JAMES STEELE *[Signature]*
RPEQ: 11373



JOB No	ALTERATIONS																				
17/12028	<table border="1"> <thead> <tr> <th>ISSUE</th> <th>DESCRIPTION</th> <th>NAME</th> <th>RPEQ</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>REVIEW</td> <td>A.ZHAO</td> <td>-</td> <td>28.05.20</td> </tr> <tr> <td>2</td> <td>DETAILS UPDATED</td> <td>A.ZHAO</td> <td>-</td> <td>9.12.20</td> </tr> <tr> <td>3</td> <td>DETAILS UPDATED</td> <td>A.ZHAO</td> <td>-</td> <td>11.03.21</td> </tr> </tbody> </table>	ISSUE	DESCRIPTION	NAME	RPEQ	DATE	1	REVIEW	A.ZHAO	-	28.05.20	2	DETAILS UPDATED	A.ZHAO	-	9.12.20	3	DETAILS UPDATED	A.ZHAO	-	11.03.21
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2	DETAILS UPDATED	A.ZHAO	-	9.12.20																	
3	DETAILS UPDATED	A.ZHAO	-	11.03.21																	

CCE CORROSION CONTROL ENGINEERING
 UNIT 2/7 LUKE ST., LYTTON, QLD 4178
 P.O. BOX 716, HEMMANT, QLD 4174
 PHONE: +61 7 3393 3200
 reception-ql@cceng.com.au www.cceng.com.au

DESIGNED	Q.LI	28-05-20
DES CHK	D.PARKER	28-05-20
DRAWN	B.BOLGER	28-05-20
DRG CHK	R.MCKAY	28-05-20

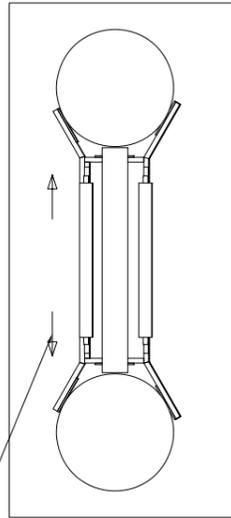
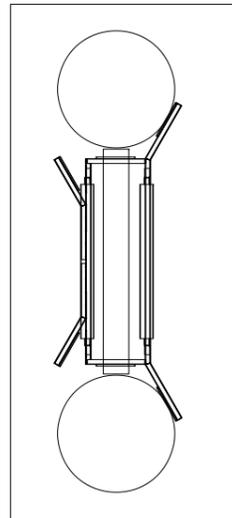
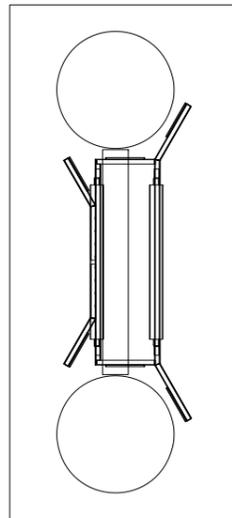
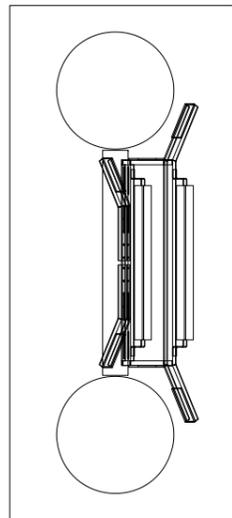
DESIGN APPROVAL / CERTIFICATION
 _____ APPROV'D BY _____ APPROV'D DATE _____
 PROFESSIONAL QUALIFICATION _____ RPEQ _____

ORIGINAL ISSUE BY QUEENSLAND RAIL
 QueenslandRail
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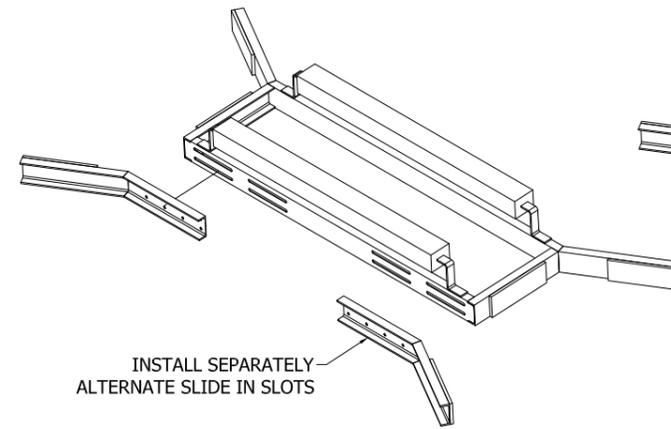
Network - Civil Engineering
 QUEENSLAND-RAIL
THREE-STEEL-BRIDGES
 CATHODIC-PROTECTION-SKID-DETAILS

DRAWING NUMBER	ISSUE
QR-C-D89166	3

CONSULTANT DWG No. J8808-DWG-04



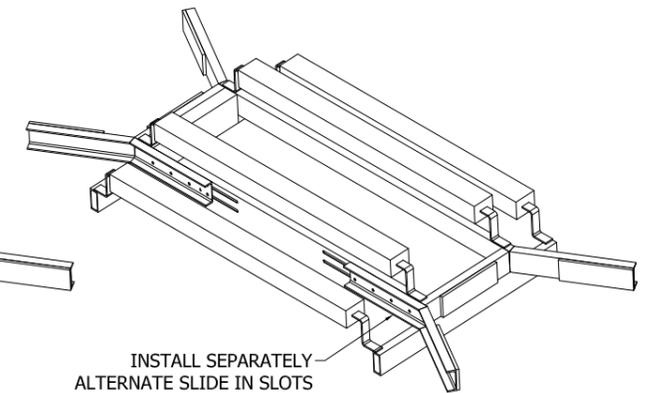
MOVE ACROSS
"COMEALONG"
FINAL BOLT
INTO POSITION



INSTALL SEPARATELY
ALTERNATE SLIDE IN SLOTS

EXPLODED VIEW

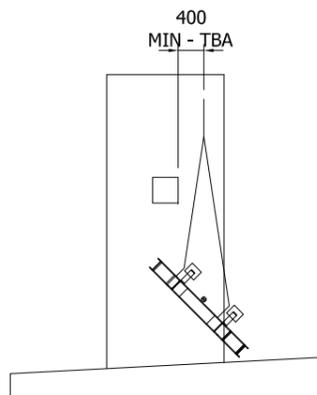
ESTIMATED WEIGHT
FRAME 1 X 260kg
SIDE ARMS 2 X 60kg
ANODES 230kg EACH
TOTAL 610kg (1 ANODE)
840kg (2 ANODES)



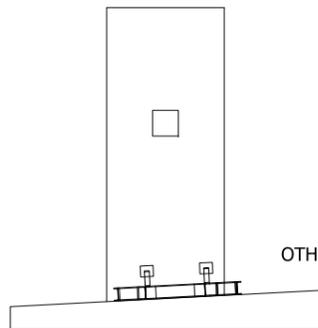
INSTALL SEPARATELY
ALTERNATE SLIDE IN SLOTS

**ISO VIEW
(TYPE 3 ANODE SKID)**

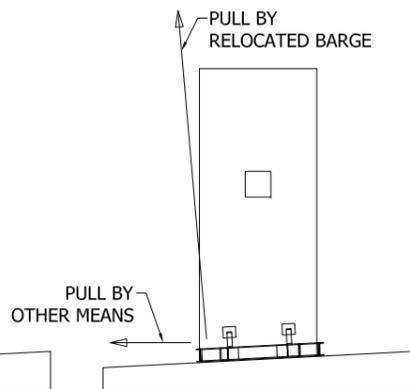
ESTIMATED WEIGHT
FRAME 1 X 260kg
SIDE ARMS 2 X 60kg
ANODES 230kg EACH
TOTAL 1190kg (3 ANODES)
1420kg (4 ANODES)



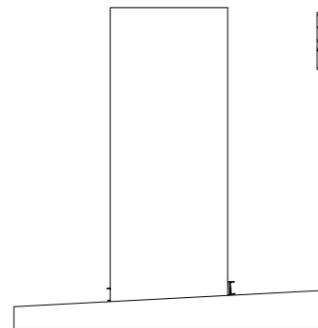
LOWER BY CRANE



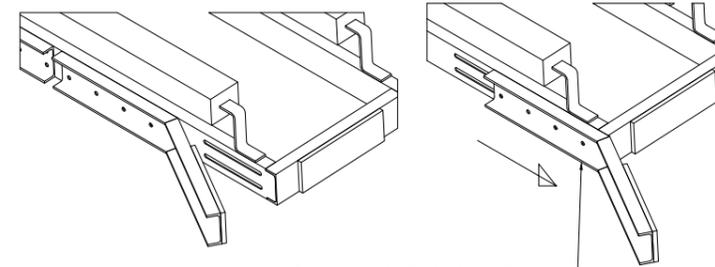
INITIAL
RESTING POSITION



FINAL POSITION



DESCRIPTION
(1 :60)



**HOLD: SLIDE PROCEDURE REQUIRES
BOLTS TO BE JUMPED ACROSS SLOTS.
4 BOLTS ASSEMBLED WHEN SLIDING.**

SLIDE IN SLOTS
JACKING POINTS NO SHOWN

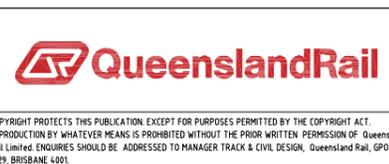
NOTES:

1. ADDITIONAL STIFFENERS AND LIFT / JACKING POINTS TO BE ADVISED.

JOB No	ALTERATIONS			
ISSUE	DESCRIPTION	NAME	RPEQ	DATE
17/12028	1 REVIEW	A.ZHAO	-	28.05.20
	2 DETAILS UPDATED	A.ZHAO	-	9.12.20



DESIGNED	Q.LI	28-05-20	ORIGINAL ISSUE BY	QUEENSLAND RAIL
DES CHK	D.PARKER	28-05-20	approv2by	approv2da
DRAWN	B.BOLGER	28-05-20	NAME	DATE
DRG CHK	R.MCKAY	28-05-20	approv2titl	POSITION TITLE
DESIGN APPROVAL / CERTIFICATION				
approv1by	approv1da	DATE	RESPONSIBILITY FOR THIS DESIGN REMAINS WITH THE DESIGN APPROVER / CERTIFIER	
PROFESSIONAL QUALIFICATION	JPEQ			



Network - Civil Engineering		DRAWING NUMBER	ISSUE
QUEENSLAND-RAIL THREE-STEEL-BRIDGES CATHODIC-PROTECTION-SKID-ASSEMBLY-DETAILS		QR-C-D89171	2
CATHODIC-PROTECTION-SKID-DETAILS		CONSULTANT DWG No.	J8808-DWG-08

CATHODIC PROTECTION CONSTRUCTION METHODOLOGY QUEENSLAND RAIL THREE RIVER BRIDGES

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DATE: 9 March 2021



PURPOSE AND SCOPE				
This document was developed in order to address the following requirements:				
<ul style="list-style-type: none"> To outline the methodology Corrosion Control Engineering and their sub-contractors will follow to complete the installation of cathodic protection at Queensland Rail's Burnett River Bridge. 				
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Updated on: Additional information for Kolan and Boyne Wording Appendix				
IMPACT ASSESSMENT				

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1. Introduction

Corrosion Control Engineering (CCE) QLD Pty Limited (CCE) were engaged by Queensland Rail to provide detailed design, materials supply, installation, and commissioning of cathodic protection (CP) systems for railway bridge piers at three bridges. The three bridges are Burnett River Bridge, Kolan River Bridge, and Boyne River Bridge. This document will provide the methodology to be undertaken during the installation of the cathodic protection systems on all three bridges.

2. System Description

This detailed design proposes the following CP systems for the immersed up to MSL and embedded surfaces of the cast iron piers (two piles per pier) and associated immersed braces and clamps up to MSL. The reported original pile diameter was 1829 mm at all bridges. After the most recent strengthening project, the measured pile circumference is ranging between 6410 mm and 6260 mm. The embedded depth varies from pier to pier. The distance between two piles at each pier is ranging between 3440 mm and 3560 mm. In general, pile spacing of 3.5 m is used as a guidance and reference.

At Burnett River, there are nine piers (Pier 2 – Pier 11) to be included in the CP systems, which will consist of the following:

- one skid per pier from Pier 3 to Pier 10 as detailed in Table 1
- bonding cables at each pier
- bonding cables between Pier 2 and 3 and between Pier 10 and 11
- one test point per pier
- and one corrosion probe per bridge

Table 1: Burnett River Bridge Anode Skid Details

Pier	Anode Type (See Figure 1)	Number of Anodes	Maximum Sled Dimensions (L x W)	Anode Skid Footprint	Anode Sled Mass
2	Bonded to Pier 3				
3	Type 3	4	5.0 m x 3.2 m	16.0 m ²	1420 kg
4	Type 2	2	5.0 m x 2.2 m	11.0 m ²	840 kg
5	Type 2	2	5.0 m x 2.2 m	11.0 m ²	840 kg
6	Type 2	2	5.0 m x 2.2 m	11.0 m ²	840 kg
7	Type 2	2	5.0 m x 2.2 m	11.0 m ²	840 kg
8	Type 2	2	5.0 m x 2.2 m	11.0 m ²	840 kg
9	Type 2	2	5.0 m x 2.2 m	11.0 m ²	840 kg
10	Type 3	4	5.0 m x 3.2 m	16.0 m ²	1420 kg
11	Bonded to Pier 10				

At Kolan River, there are seven piers (Pier 9 – Pier 15) to be included in the CP systems, which will consist of the following:

- One skid per pier from Pier 10 to Pier 15 as detailed in Table 2
- Bonding cables at each pier
- Bonding cable between Pier 9 and Pier 10

- One test point per pier
- And one corrosion probe per bridge

Table 2: Kolan River Bridge Anode Skid Details

Pier	Anode Type (See Figure 1)	Number of Anodes	Maximum Sled Dimensions (L x W)	Anode Skid Footprint	Anode Sled Mass
9	Bonded to Pier 10				
10	Type 3	3	5.0 m x 3.2 m	16.0 m ²	1190 kg
11	Type 1	1	5.0 m x 2.2 m	11.0 m ²	610 kg
12	Type 1	1	5.0 m x 2.2 m	11.0 m ²	610 kg
13	Type 1	1	5.0 m x 2.2 m	11.0 m ²	610 kg
14	Type 1	1	5.0 m x 2.2 m	11.0 m ²	610 kg
15	Type 1	1	5.0 m x 2.2 m	11.0 m ²	610 kg

At Boyne River, there are four piers (Pier 13 – Pier 16) to be included in the CP systems, which will consist of the following:

- One skid per pier from Pier 13 to Pier 16 as detailed in Table 3
- Bonding cables at each pier
- One test point per pier
- And one corrosion probe per bridge

Table 3: Boyne River Bridge Anode Skid Details

Pier	Anode Type (See Figure 1)	Number of Anodes	Maximum Sled Dimensions (L x W)	Anode Skid Footprint	Anode Sled Mass
13	Type 1	1	5.0 m x 2.2 m	11.0 m ²	610 kg
14	Type 1	1	5.0 m x 2.2 m	11.0 m ²	610 kg
15	Type 1	1	5.0 m x 2.2 m	11.0 m ²	610 kg
16	Type 1	1	5.0 m x 2.2 m	11.0 m ²	610 kg

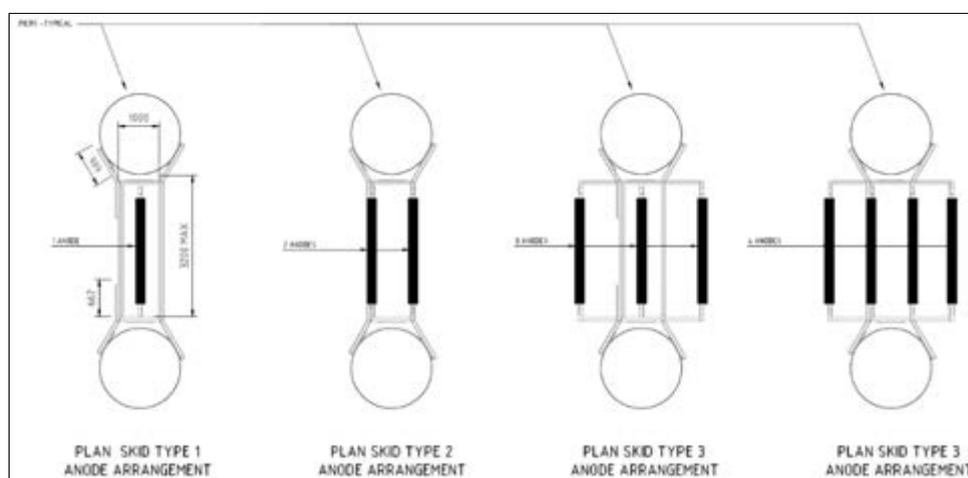


Figure 1: Anode Arrangements

3. Equipment

The following equipment is required to complete the “procedure” testing:

- Telehandler to move materials around site
- Use a crane/Franca for mobilisation and demobilisation
- Investigator Dumb Barge (12 m x 6 m X 1.2 m) (optional)
- Avicennia work boat (7 m x 2.4 m x 0.90 m)
- Maxilift UNIC crane (come with Investigator)
- Working at heights platform (scaffolding, etc) - HBV 10 m powered barge with 1t sea crane
- Pin brazing machine
- Possible EWP (no permit/licence required under 11 m)
- Various hand tools, etc (hydraulic or pneumatic tools for drilling and fastening)
- SSBA diving equipment
- Lift bag (optional)
- Chain blocks/slings/shackles/chains

4. Applicable Standards

The jurisdictional regulations, industry publications or reference applicable to the procedure are listed as follows:

- AS 2832.3:2005 Cathodic protection of metals: Fixed immersed structures
- AS 2239:2003 Galvanic (sacrificial) anodes for cathodic protection
- AS/NZS 3000:2018 Wiring rules

5. Procedure

5.1 Site/Equipment Set-Up

1. Site office, lay down area, and equipment routes to be established on site. Where possible, gravel pads/paths from previous projects are to be utilised. Site details are shown in the drawing in Appendix A.
 - a) Install adequate fencing around the site office/lay down area
 - b) Install information and warning signage on the fence around off/laydown area
2. Install flags and signage to identify the equipment path. Mobilise equipment and materials to site
3. Freight company to deliver material to the site laydown area
4. Launch the barge using the existing boat ramp (See Appendix A)

5.2 Loading Materials to the Barge

Move the skids to the barge using the dedicated pathway via telehandler. Ensure to remain on dedicated pathing system.

5.3 Install Anode Skids

1. Move barge to installation position at the respective pile. Anchor to riverbed (temporary marine plants disturbance)
2. Debris survey will be conducted prior by the diver/s before the lowering of skids
3. Using the endless chain blocks to transfer from barge to structure as a controlled lowering practice.

4. If required, float skid into position between piles (optional)
5. Release airbags and drop skids into place (optional). Divers submerge to install the legs around the piles to ensure secure positioning

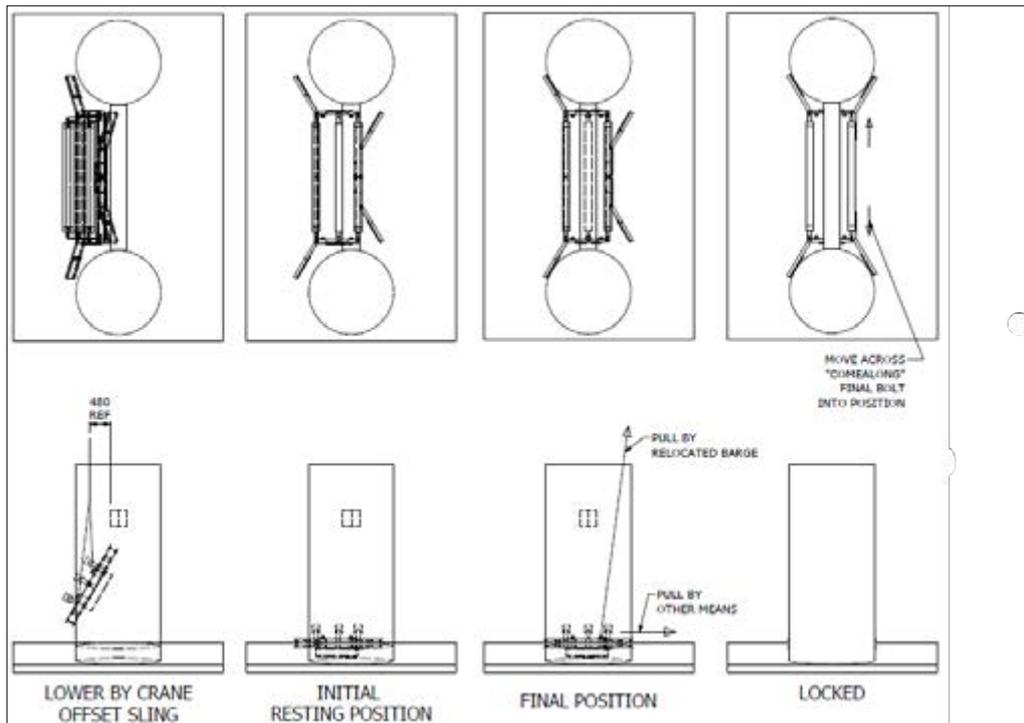


Figure 2: Anode Installation Process

5.4 Cable Installation

1. Cable to be strapped to the piles using Smartband (Denso brand)
2. Install anode connection using EWP under 11 m on barge to ensure safe working at heights
3. Install cabling and continuity bond on cross-bracing from the barge - no affect to marine life
4. Pin brazing above water position
5. Drill and tap M12 holes on the bottom brace - may need divers or low tide

5.5 Demobilisation

1. Remove barge from water at same location as entry
2. Demobilise from site
3. Site rehabilitated

5.6 Other Considerations

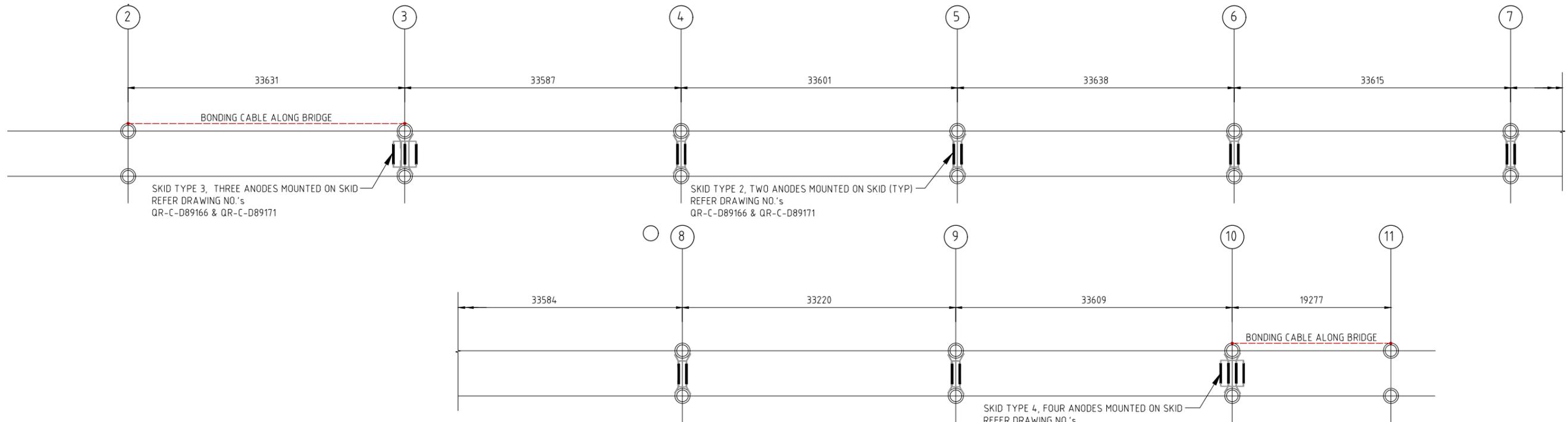
1. The slopes of the beds and banks of the tidal area will not be affected during installation
2. No temporary works for installation are expected to affect marine life
3. Stay clear of mangroves
4. Use previous access used by Canstruct
5. Temporary fenced areas for Kolan and Boyne may be required

6. References

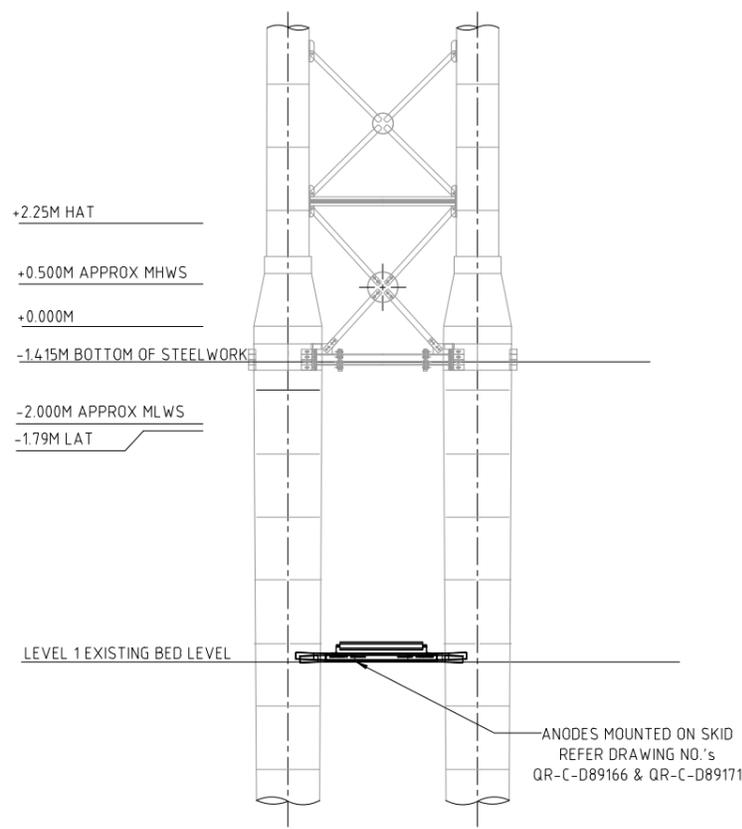
Refer to the following CCE documents for further information:

- 450015 – Cathodic Protection Design Report
- 450043 – Cathodic Protection Material and Construction Specification

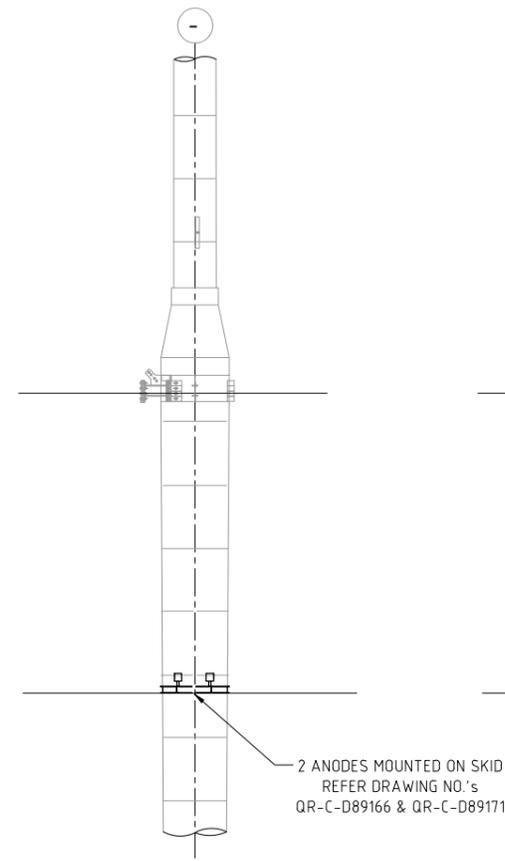
Appendix A – Site Details



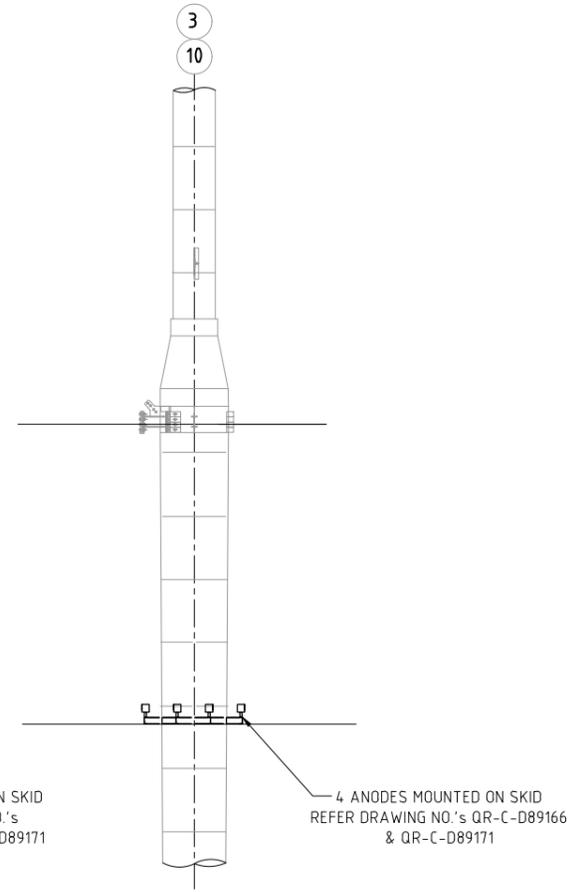
PLAN BURNETT RIVER BRIDGE
NTS



TYPICAL CROSS SECTION
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TYPICAL PIER SIDE VIEW
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PIERS 3 & 10 SIDE VIEW
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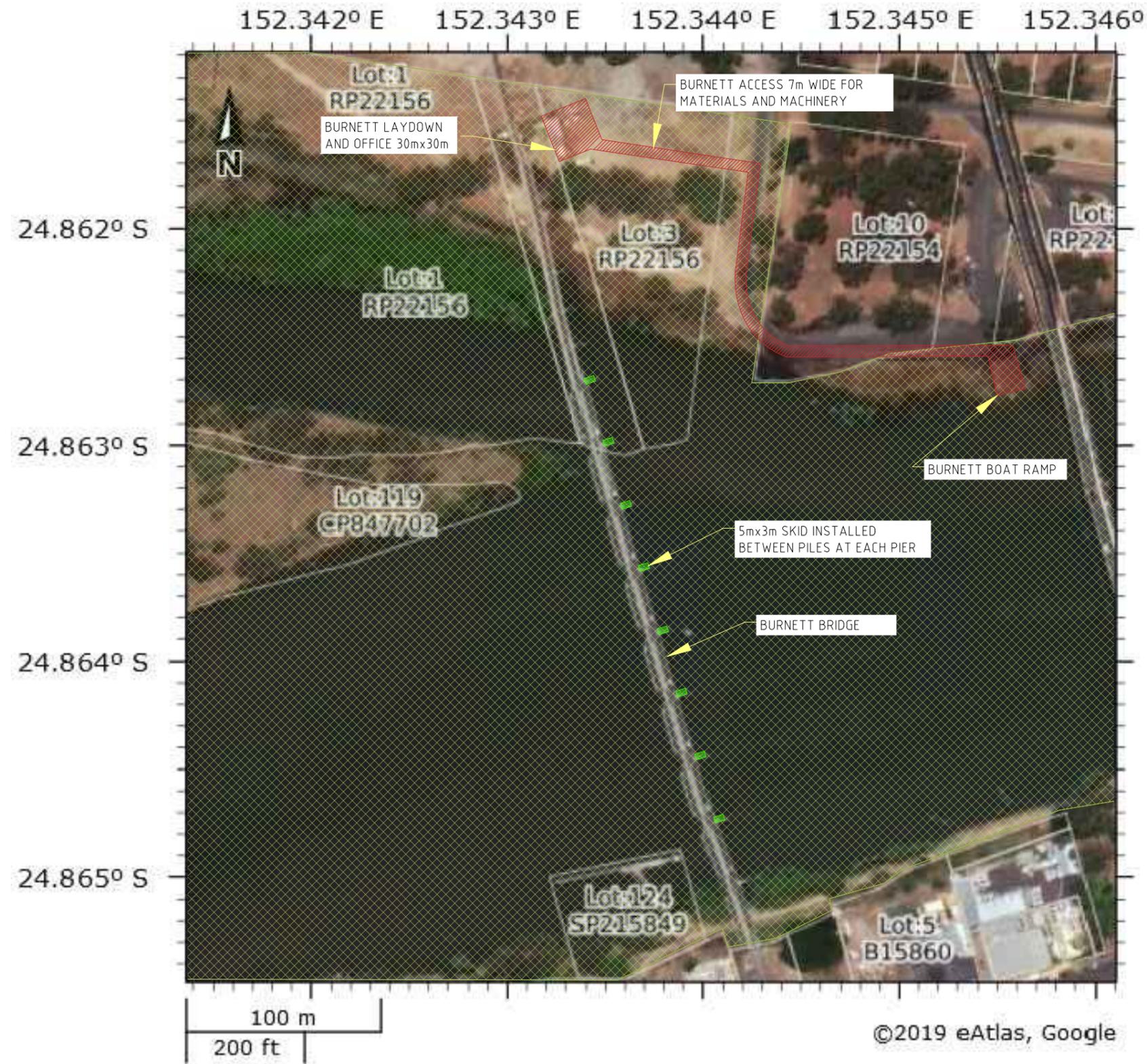
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14/12028	1 REVIEW	A.ZHAO	-	28.05.20
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CONSULTANT DWG No. J8808-DWG-01		



- LEGEND**
- DENOTES SKID FOOTPRINT AT PIERS (5m x 3m)
 - DENOTES ONSHORE WORK AREA
 - DENOTES BURNETT COASTAL MANAGEMENT DISTRICT AREA

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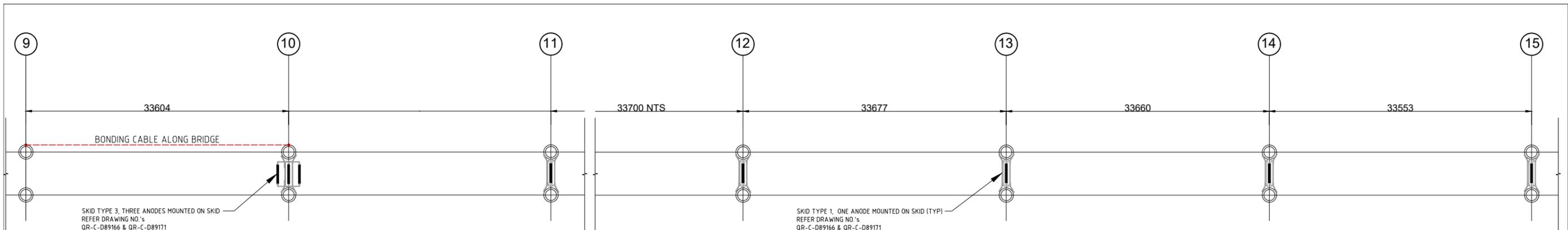
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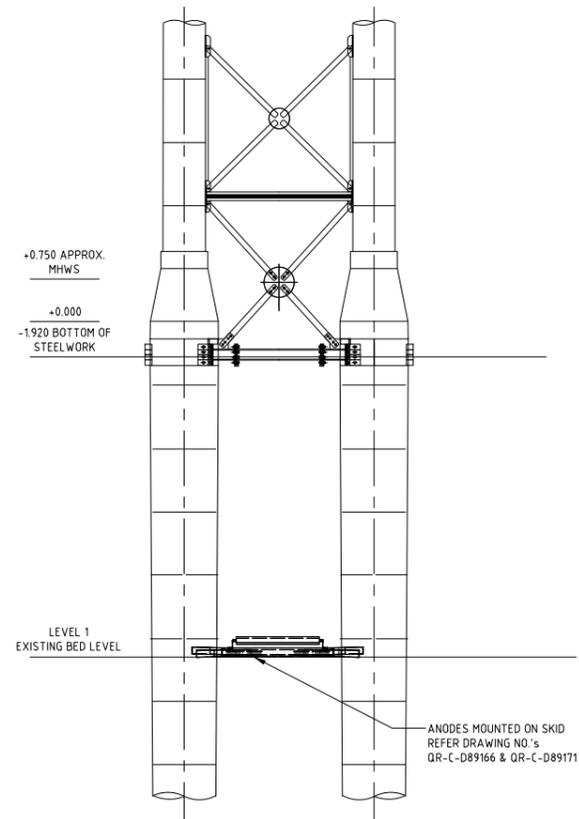
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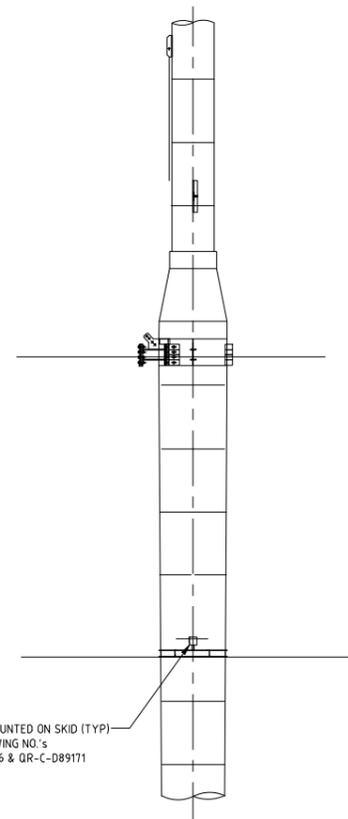
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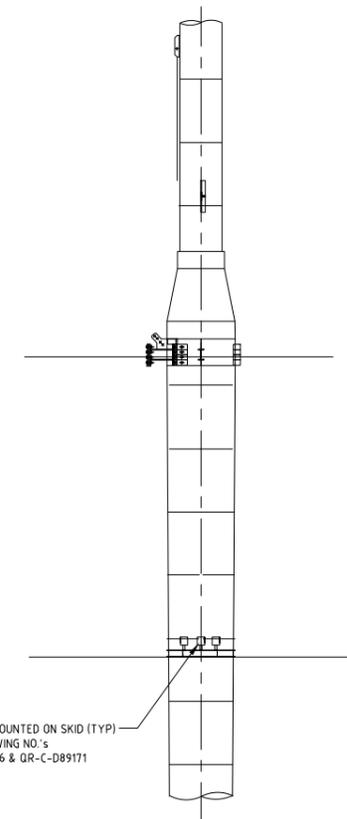
PLAN
NTS



TYPICAL SECTION
NTS



TYPICAL PIER SIDE VIEW (A)
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PIER 10 SIDE VIEW
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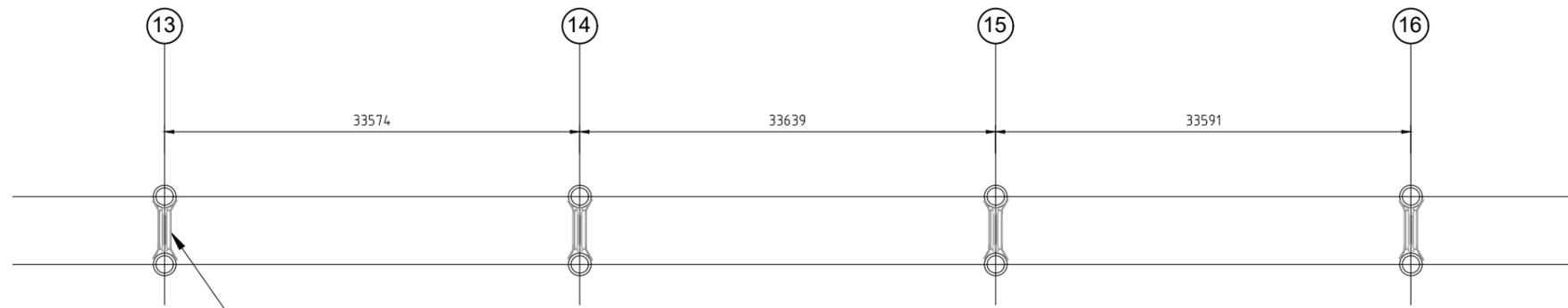
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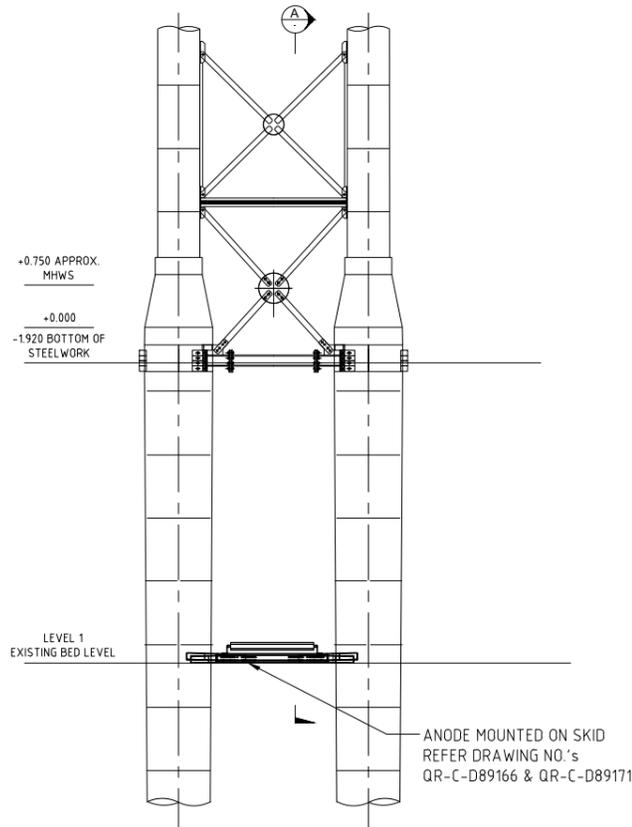
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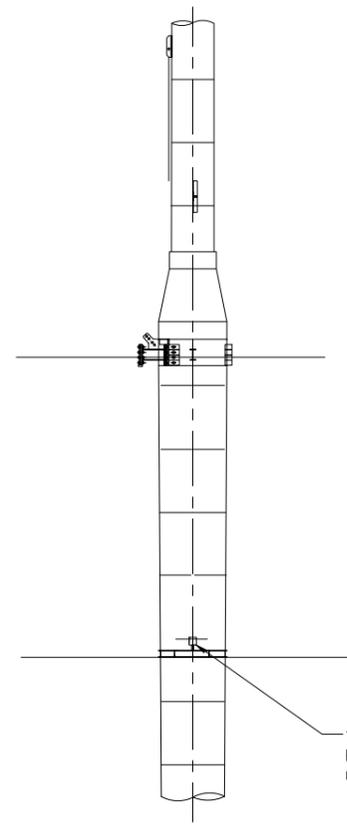
SKID TYPE 1, ONE ANODE MOUNTED ON SKID (TYP)
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PLAN
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TYPICAL SECTION
SCALE 1:100

ANODE MOUNTED ON SKID
REFER DRAWING NO.'s
QR-C-D89166 & QR-C-D89171



TYPICAL PIER SIDE VIEW
A
NTS

1 ANODE MOUNTED ON SKID
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QR-C-D89166 & QR-C-D89171

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CATHODIC-PROTECTION-OVERVIEW

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2

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