Department of Energy, Environment and Climate Action

Level 3
8-12 Seymour Street
Traralgon, VIC 3844

Chairperson
Gunaikurnai Land and Waters Aboriginal Corporation
27 Scriveners Road
Kalimna West Victoria 3909

Date: 5 December 2025
Our Reference: 1504483

Dear Chairperson

RE: NOTICE CONCERNING WORKS ON NATIVE TITLE LANDS (RIGHT TO COMMENT)
PROPOSED PEDESTRIAN BRIDGE REPLACEMENT – VICTORY PARK, TRARALGON

The Proposal

West Gippsland Catchment Management Authority proposes to replace the pedestrian bridge over Traralgon Creek in Victory Park, Traralgon.

The current bridge is sagging, is too narrow to function as a dual path, and is not compliant with current regulations.

The design of the new bridge is attached. Works will involve removing the current bridge, constructing a new single span bridge at the same location with a slightly wider footprint, removing one tree and widening the footprint of the approaches to the bridge.

The location of the area subject to proposal is outlined in the following attachments:

- Project design – including aerial photos, site plans and structure designs
- Cadastral plan

Description of The Native Title Land and Waters Affected

Crown allotment 12, Section 17, Township of Traralgon, Parish of Traralgon (P261274), SPI 12~17\PP5801

The allotment is Crown land reserved for Public Purposes by notice published in the *Victoria Government Gazette* in 1881 on page 1389.

Privacy Statement
*Any personal information about you or a third party in your correspondence will be protected under the provisions of the **Information Privacy Act 2000**. It will only be used or disclosed to appropriate Ministerial, Statutory Authority, or departmental staff in regard to the purpose for which it was provided, unless required or authorised by law. Enquiries about access to information about you held by the Department should be directed to the Manager Privacy, Department of Environment, Land, Water and Planning, PO Box 500, East Melbourne, 3002.*

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OFFICIAL

Seeking Your Comments

The *Native Title Act 1993* (NTA) requires DEECA to consult and seek comments from the Traditional Owners of Native Title lands and incorporate appropriate conditions into consent to use and develop the land.

We understand that the proponent may also be obliged under Cultural Heritage legislation to contact the Gunaikurnai RAP body concerning this project and we will advise them of those responsibilities as a matter of standard process. However, if you would also like DELWP to raise some specific conditions on cultural heritage protection matters in the exercise of your native title right to protect cultural heritage as part of this formal commentary and approvals process, we will be happy to do so at your direction.

Further, your comments on how this proposal might affect your other native title rights and interests, and how that can be managed or addressed as part of this approvals process are also keenly sought.

These recognised rights and interests include the:

- right to have access to or enter and remain on the land and waters;
- right to use and enjoy the land and waters;
- right to take the resources of the land and waters for the purposes of satisfying personal, domestic or communal needs, but not for any commercial purposes;
- right to protect and maintain places and areas on the land and waters which are of importance according to Gunaikurnai traditional laws and customs;
- right to camp
- right to engage in cultural activities;
- right to engage in rituals and ceremonies;
- right to hold meetings and gatherings;
- right to teaching and learning about the physical, spiritual and cultural attributes of places and areas of importance.

Please note that the 'non-extinguishment' principle applies to these works and your native title rights will continue to exist over the site.

The Department intends to advise the proponent that the project can proceed after 40 days from the date of this notification have elapsed. We would appreciate the opportunity to discuss this proposal however in the meantime please contact Matt Kelly at the following details.

Will Hoban
Program Officer, Land & Buit Environment Gippsland
Department of Energy, Environment and Climate Action
Level 3, 8-12 Seymour Street
Traralgon, Victoria, 3844

Email: william.hoban@deeca.vic.gov.au
Phone: 0400 230 034

VICTORIA State Government

Legislative Basis for this Notice

The proposed activity is a valid future act pursuant to Section 24 JA of the *Native Title Act 1993*.

Subdivision J of the *Native Title Act 1993* (NTA) allows for acts to be carried out on reserves provided that the act is in good faith with the purpose of the reservation. Where the act involves the construction of a public work, it is necessary that formal procedural notice be given to any Body Corporate and to any registered Representative Body.

This notice is also prepared and issued cognisant of the agreed terms outlined in Section 7.3 of the Indigenous Land Use Agreement between the State of Victoria and the Gunaikurnai Land and Waters Aboriginal Corporation dated 22 October 2010 and registered with the National Native Title Tribunal on 8 February 2011.

The proposed works are to be carried out over land that was validly reserved prior to 23/12/96. The future act is in accordance with the purpose of the reservation (Public Purposes Reserve).

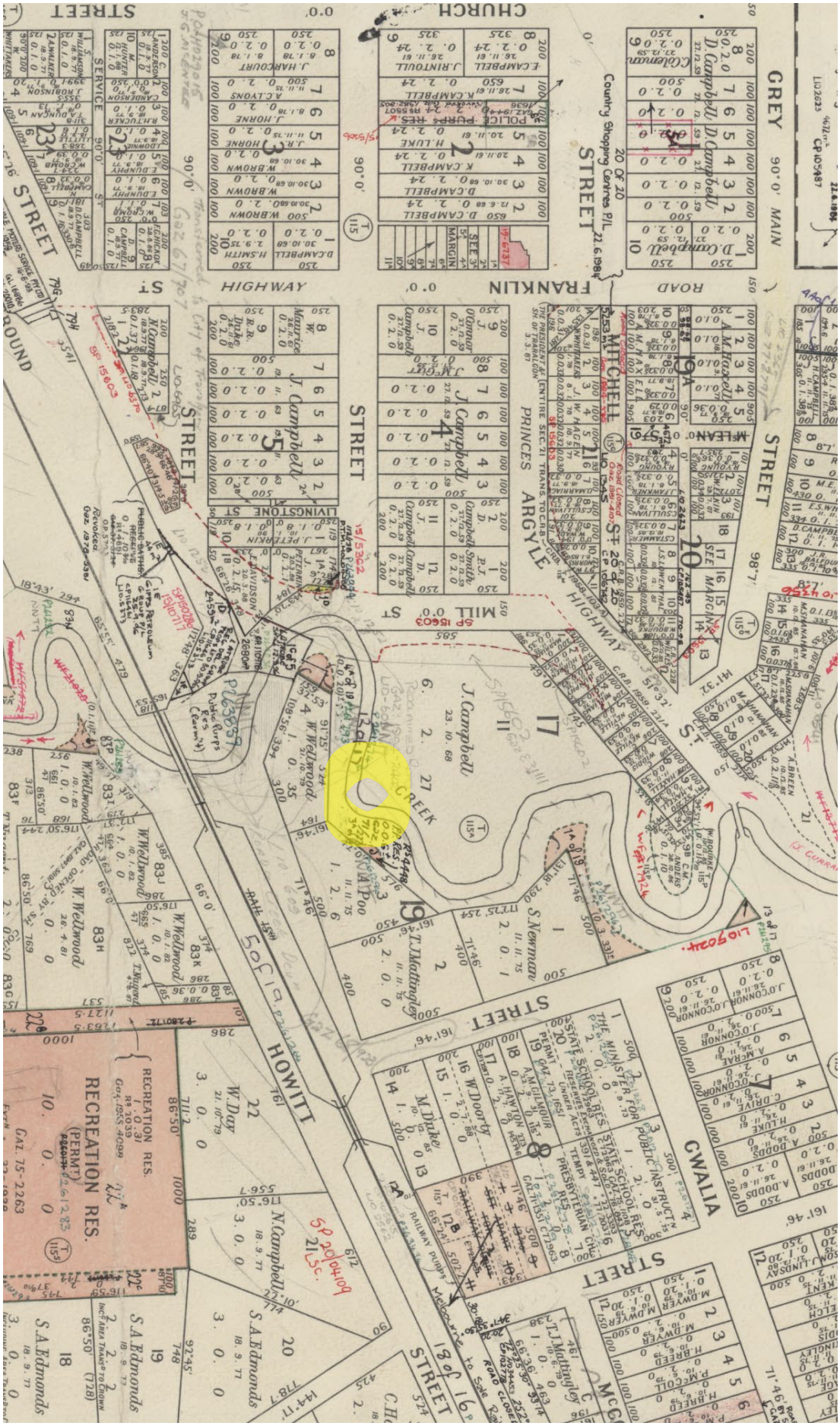
The proposed works are considered "a structure that is a fixture" which constitutes the establishment of public works under Part 15, Division 4, Section 253 of the *Native Title Act 1993*.

The non-extinguishment principle applies.

Will Hoban
Program Officer Land & Built Environment, Gippsland
Department of Energy, Environment and Climate Action

Date of Notice: 5 December 2025

Traralgon Township Plan



CHRIS O'BRIEN & COMPANY PTY LTD
CONSULTING CIVIL & STRUCTURAL ENGINEERS
ABN: 69 006 752 656

Victory Park Pedestrian Bridge Replacement over Traralgon Creek

Design Report & Risk Assessment

For: Latrobe City Council
Report Number: 50925-RPT-00001
Document Reference Number: 25330
Date: 10th November 2025

All correspondence to:

P.O. Box 18
Traralgon Vic. 3844

13A Church Street
Traralgon Vic. 3844

Telephone: (03) 5174 9911
Email: reception@chrisobrien.com.au

Project Name:	Victory Park Pedestrian Bridge Replacement over Traralgon Creek
Internal Reference:	50925
Report prepared for:	Latrobe City Council

REVISION APPROVAL

Revision	Date	Author	Reviewer	Approval
1	10/11/2025	Jack Downes	Luke Milstein	10/11/2025
2				

ISSUE REGISTER

Distribution List	Date Issued	Issued Via.
Latrobe City Council: **Marcus Slavnic**	10/11/2025	Email

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CHRIS O'BRIEN & COMPANY PTY LTD	
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Table of Contents

NOMENCLATURE

Abbreviation	Term
AHD	Australian Height Datum
ARI	Average Recurrence Interval
AS	Australian Standards
AS/NZS	Australian Standard/New Zealand Standard
km	Kilometre
km/h	Kilometre/hour
m	Metre
m/s	Metre/second
mm	Millimetre
MPa	Mega Pascal
Mz,cat	Wind load factor for terrain category based on height
NATA	National Association of Testing Authorities, Australia
REF	Review of Environmental Factors
RL	Reduced Level
SAM	Software used to model member sections to obtain section properties
SLS	Service Limit State Design
ULS	Ultimate Limit State Design
uPVC	Unplasticised polyvinyl chloride

1. INTRODUCTION

1.1 Background

Latrobe City Council has comissioned Chris O'Brien & Company Pty Ltd to undertake the investigation and detailed design for the proposed Victory Park Pedestrian Bridge Replacement over Traralgon Creek. The works include the demolition of the existing structure, the removal of a single tree, minor works to the bridge approaches and the construction of a new single-span bridge.

The replacement structure has been designed to accommodate 5kPa pedestrian loading in accordance with AS5100.

Black Geotechnical have provided geotechnical investigation, reporting and design services and Gippslocate has undertaken service location works. Topographcial Feature Survey has been completed by Crowther & Sadler of Bairnsdale.

This report is to be read in conjunction with the drawings contained in Appendix A, Black Geotechnical Report No. V2424R1 (Appendix B) and the Design Stage Risk Assessment (Appendix C).

Figure 1: Site locality plan, bridge location denoted by yellow point. North is up the page.

1.2 Project Objectives

The primary objective of the project is to replace the existing crossing with a safe, durable and fit-for-purpose bridge. The existing bridge has reached the end of its serviceable life. The structure, comprising steel beams and a cast-in-situ R.C. overlay, has a noticeable sag, damaged collapsible rails, and does not have sufficient width for shared path functionality or DDA compliance. The project objectives include:

- Enhance pedestrian and cyclist accessibility by providing a wider, fit-for-purpose crossing.
- Provide the best value for money - whole of life and capital cost.
- Provide a durable structure, meeting the requirements of AS5100.

1.3 Design Interfaces

To ensure an integrated, safe and practical project design, the bridge replacement and associated works have been designed to match in with the existing design surface. The crossing will be closed to the public during construction, with a short detour available via Whittakers Road.

The design has been progressively reviewed for functionality, constructability, safety and compliance with the project specifications in accordance with Chris O'Brien & Company's internal checking and verification process, together with third-party independent proof engineering of structural elements.

This report and associated documentation have been provided for review and comment to the Latrobe City Council and other stakeholders as appropriate. All comments have been considered and incorporated into the design where appropriate and as agreed.

2. SCOPE OF DESIGN REPORT

This Design Report provides the following information for the Victory Park Pedestrian Bridge Replacement over Traralgon Creek:

- The design criteria;
- Design assumptions;
- Referenced documents;
- Details of the design including features and dimensions;
- Details of design issues and integration with other design components;
- Construction considerations;
- Durability considerations;
- Safety in design considerations.

3. STRUCTURAL DETAILED DESIGN

3.1 Design reference documents

The structural design of the bridge replacement has been undertaken in accordance with the requirements of the project scope, relevant Australian Standards, VicRoads Specifications and AASHTO Standards. The bridge complies with and exceeds the width requirements of the project scope.

3.1.1 Standards and Technical References

The following engineering standards are applicable to the structural design:

Table 1: Applicable Engineering Standards

Reference No.	Document Title	Issue Date
AS5100	Bridge Design	2017
AS4100	Steel Structures	2020
AS3600	Concrete Structures	2018
AS/NZS 1170.0	Structural Design Actions - General Principles	2002
AS/NZS 1170.1	Structural Design Actions - Permanent, Imposed and Other Actions	2002
AS/NZS 1170.2	Structural Design Actions - Wind Actions	2021
AS 2159	Piling Design and Installation	2009

- Department of Transport and Planning Bridge Technical Notes.
- Department of Transport and Planning Technical Specifications

3.1.2 Order of Precedence

Unless stated otherwise the order of precedence of design reference documents for the project is:

- Australian Standards.
- Department of Transport and Planning Technical Notes.

3.2 Design Life

In developing the design solution, the following key design assumptions have been made:

- The design life of the bridge replacement is 100 years in accordance with AS5100.1 Clause 8.2.
- The design life for ancillary elements including drainage systems is 50 years in accordance with AS5100.1 Clause 23.2.

3.3 Design Criteria

The following design criteria have been used for the detailed design of the bridge:

3.3.1 Bridge Type

The bridge consists of concrete prestressed beams with a cast-in-situ deck overlay supported by built-in reinforced concrete abutments. The abutments are supported by reinforced, reinforced concrete driven piles.

3.3.2 Geometry

The bridge geometry has been determined in accordance with the requirements of the project scope.

3.4 Material Parameters

The following material parameters have been used:

3.4.1 Concrete

Table 2: Concrete Properties

Parameter	Value
Short term Elastic Modulus	38,000 MPa for 50 MPa concrete
	35,000 MPa for 40 MPa concrete
Basic shrinkage strain	850 x 10-6
Basic creep factor	2.4 for 50 MPa
	2.8 for 40 MPa
Coefficient of thermal expansion (conc.)	11 x 10-6/ °C
Coefficient of thermal expansion (steel)	12 x 10-6/ °C

3.4.2 Reinforcing Steel

All reinforcing steel shall comply with AS/NZS 4671.

The material parameters of the reinforcement have been taken as:

Table 3: Steel Reinforcement Properties

Parameter	Value
Elastic Modulus	200,000 MPa
Yield Strength - Deformed Bars Grade D500N	500 MPa
Yield Strength - Plain Bars Grade D250N	250 MPa
Yield Strength - Hard Drawn Wires Grade D500N	500 MPa
Yield Strength - Welded wire fabric Grade D500N	500 MPa
Min. Breaking Strength - 15.2mm Low Relaxation Prestressing Strands	1790 MPa

3.5 Loadings

3.5.1 Permanent Effects

3.5.1.1 *Dead Loads*

Dead loads include the self-weight of concrete, steel and any embedded elements using the following unit weights:

Table 4: Unit weights for materials

Material	Value
Steel	77.0 kN/m3
Reinforced Concrete	25.0 kN/m3
Unreinforced Concrete	24.0 kN/m3

Load factors were applied to the dead loads in accordance with Table 6.2 of AS 5100.2.

3.5.1.2 *Superimposed Dead Load*

Superimposed dead load includes the weight of the material that can be removed or replaced including the wearing surface. Load factors were applied to the superimposed dead loads in accordance with Table 6.3 Item (a) of AS 5100.2.

3.5.1.3 *Shrinkage*

Shrinkage effects were assessed using the shrinkage model described in Section 6.1.7 of AS 5100.5.

3.5.1.4 *Creep*

Creep effects have been assessed using the creep model described in Section 6.1.8 of AS 5100.5.

3.5.1.5 *Earth Pressure*

Earth pressure and design requirements shall be in accordance with Sections 2 and 8 of AS5100.3.

General Soil Properties:

- Earth Density: 20 kN/m3
- Friction Angle: 25°

3.5.2 Transient Effects

3.5.2.1 *Traffic Load*

- Pedestrian loads in accordance with Section 8 of AS 5100.2.
- ULS Load Factors in accordance with Section 8 of AS 5100.2.
- Fatigue load effects were calculated in accordance with Section 7.9 of AS 5100.2.

- Deflection does not exceed the requirements stated in Section 8.4 of AS 5100.2.

3.5.2.2 *Temperature Effects*

The wing walls are located "Inland Region" in accordance with Table 18.2(A) of AS 5100.2.

- Maximum shade air temperature = 45 °C.
- Minimum shade air temperature = -5 °C.

3.5.2.3 *Differential Temperature Load*

The vertical differential temperature profiles are in accordance with Figure 18.3 of AS5100.2.

3.5.2.4 *Wind Load*

Assessment of the wind loading is in accordance with Section 17 of AS 5100.2 and AS/NZS 1170.2.

20-year average return interval wind speed = 37 m/s (Serviceability Limit State)

2000-year average return interval wind speed = 48 m/s (Ultimate Limit State)

3.6 Design Limit States

The structure has been designed for Serviceability Limit State and Ultimate Limit State.

3.6.1 Serviceability Limit States

Stresses were investigated at each critical section, under each service load combination as defined in Section 2.7 of this report. The limiting allowable stresses for crack control under the service loads is in accordance with Sections 8.6, 9.4 and II of AS 5100.5.

3.6.2 Ultimate Limit States

The retaining elements were checked for flexural strength, shear strength and torsional strength at each critical section, under each ultimate load design combination as defined in Section 2.7 of this report.

3.7 Load Combinations

The following load combinations have been considered in accordance with Section 22 of AS 5100.2.

3.7.1 Serviceability Limit State Load Combination Cases:

At the serviceability limit states, more than one transient load can co-exist at any time. The basic combination to be considered for serviceability limit state was as follows:

Permanent effects + (serviceability design load for one transient or thermal effect) + K (serviceability design load for one or more other transient or thermal effect)

Where K = coefficient = 0.7 for one additional effect and = 0.5 for two additional effects

3.7.2 Ultimate Limit State Load Combination Cases

The ultimate limit state load combinations considered for ultimate analysis were:

a) Permanent effects + ultimate thermal effects

b) Permanent effects + ultimate traffic loads

c) Permanent effects + ultimate wind load

For items (a), where they produced more severe loading, the serviceability traffic loads were included in the combinations provided that the structure is open to traffic under ultimate conditions.

For items (b) and (c), where they produce more severe loading, the serviceability thermal effects were included in the combinations if they produced an adverse effect.

4. GEOTECHNICAL DETAILED DESIGN

4.1 Bridge Piling

The geotechnical design for piling has been completed by Black Geotechnical Pty and included cone penetrometer testing (CPT). A full copy of Black Geotechnical's Interpretative Report V2424R1 is included in Appendix B.

Black Geotechnical have provided the following further information due to reduced pile loading:

> *'Based on the parameters provided in Section 3.3.2 of our report for the pedestrian bridge at Victory Park (V2424R1), the estimated pile lengths can be reduced due to the reduction in ULS load. Based on the ULS load reducing from 400 kN to 300 kN, the estimated pile lengths will reduce from 12.3 m to 10.8 m. This assumes 350 PC concrete piles and a 7-day set-up.*

5. SAFETY IN DESIGN

Safety in Design (SiD) is a risk minimisation strategy with the purpose of preventing injury through the consideration of hazards early in the planning and design process, with the view of enhancing safety through design choices. The SiD process considers the risks posed to those who construct, operate, use, maintain and decommission assets. Parties involved in the planning and design phase have the opportunity and means to reduce and eliminate risks that arise during the asset's life cycle.

Designers of a building, structure or plant have an obligation under the OHS Act to ensure that designs are safe and risks considered. Work Safe Victoria outlines the safe design approach processes:

d) Identifying Hazards

e) Identify the hazards relating to all stages of the product.

f) Assess the Risk

g) Assess the likelihood of the hazard causing harm to people.

h) Eliminate or Control the Risk

i) Implement effective control measures to eliminate the risk, or if this is not possible, reduce the risk of harm to an acceptable level.

j) Review

k) Review the effectiveness of the controls to ensure they are working to reduce the risk to an acceptable level.

As designers, Chris O'Brien & Company have identified and mitigated a number of potential risks within the limitations of our scope, in consultation with other members of the design team.

The below Safety in Design Risk Assessment has been prepared in accordance with our OHS obligations. This assessment encompasses our scope of works for the design of the Victory Park Pedestrian Bridge, as shown on the Chris O'Brien & Company Drawings referenced in Appendix A.

The risk assessment has been conducted in accordance with the Department of Transport and Planning's Risk Matix, presented in Table 1 below.

Table 1: Risk Matrix.

Likelihood	Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Almost Certain (5)	Medium	High	High	Extreme	Extreme
Likely (4)	Medium	Medium	High	High	Extreme
Possible (3)	Low	Medium	Medium	High	Extreme
Unlikely (2)	Low	Low	Medium	Medium	High
Rare (1)	Low	Low	Low	Medium	High

Consequence

The Department of Transport and Planning's Likelihood Matrix, presented in Table 2 below, was also used in the risk assessment.

Table 2: Likelihood Matrix

Rating	Likelihood	Frequency Single Events	Frequency Recurring Events
Almost Certain (5)	76-100%	More than likely to happen	Several times a year
Likely (4)	51-75%	As likely as not to happen (50/50)	Once or twice a year
Possible (3)	31-50%	Likelihood less than 50/50	Once in two years
Unlikely (2)	11-30%	Likelihood low but not negligible	Once in five years
Rare (1)	0-10%	Negligible likelihood	Once in 10 years or unlikely for the event to occur

Controls were rated for how effectively they mitigate and/or manage risk. Control effectiveness was rated in accordance with the Department of Transport and Planning's Control Effectiveness Matrix, presented below in Table 3.

Table 3: Control Effectiveness Matrix

Control rating	Description
Effective	*Controls are minimising risks to tolerable levels* • Nothing more to be done except review and monitor the existing controls. Controls are well designed for the risk, address the root causes and management believes that they are effective and reliable at all times. • Controls provides reasonable assurance that risks are being managed and objectives should be met.
Partially effective	*Controls have limitations or are inconsistent in minimising risks to tolerable levels* • Most controls are designed correctly and are in place and effective. Some more work to be done to improve operating effectiveness or management has doubts about operational effectiveness and reliability. • Controls evaluated are unlikely to provide reasonable assurance that risks are being managed and objectives should be met.
Not effective	*Controls are potentially detrimental and may increase risks* • Significant control gaps. Controls do not treat root causes, or do not operate at all effectively. • Controls do not provide reasonable assurance that risks are being managed and objectives should be met
Untested	*Controls not having been tested or examined*

Residual hazards and appropriate control measures have been listed in Appendix C, for consideration by both Council and the Contractor.

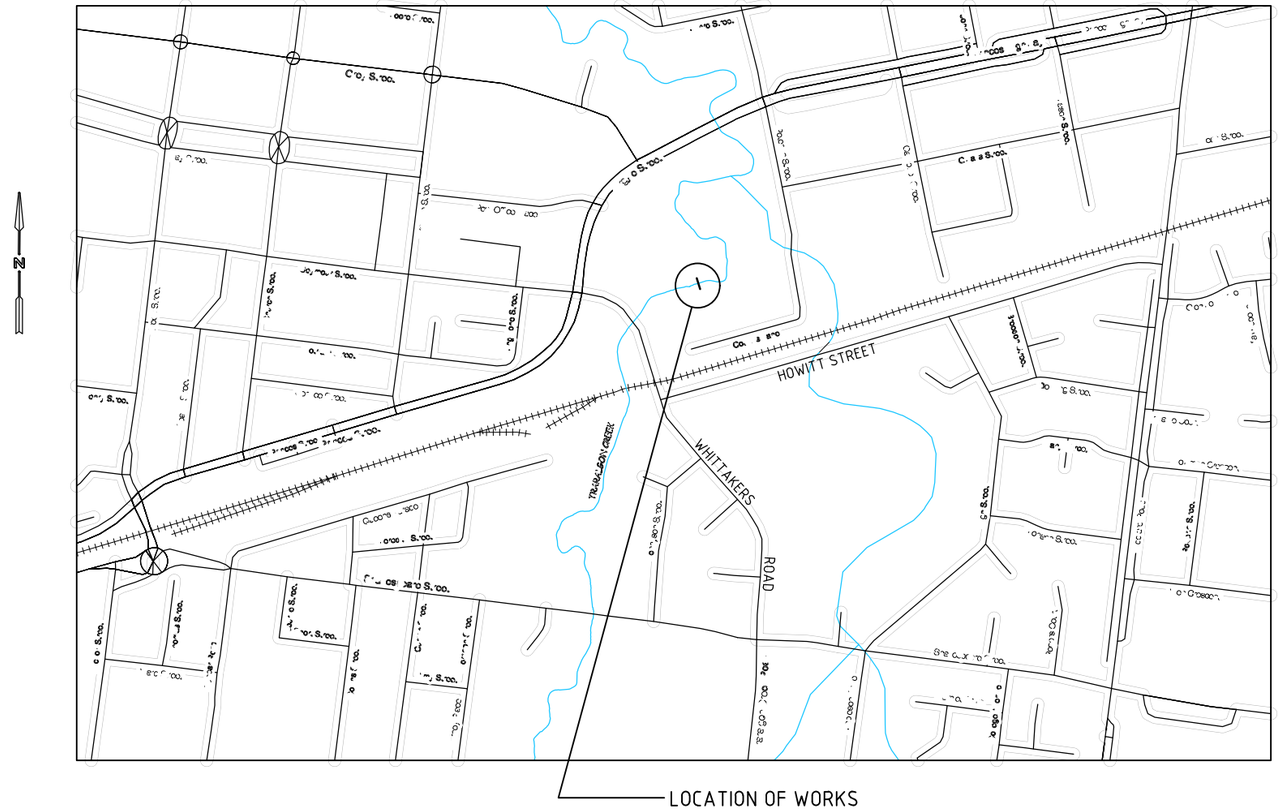
Should Latrobe City Council have any queries with respect to the contents of this report, please do not hesitate to contact our office on telephone (03) 5174 9911.

CHRIS O'BRIEN & COMPANY PTY LTD

Appendix A

Chris O'Brien & Company Detailed Design Drawings No. 50925, dated 29th October, 2025.

VICTORY PARK BRIDGE REPLACEMENT
OVER TRARALGON CREEK
TRARALGON, VIC



LOCALITY PLAN
NOT TO SCALE

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DWG FILE NAME: 50925-C1.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
B	DETAILED DESIGN	29/10/2025	JGD
A	ISSUED FOR COMMENT	16/10/2025	JGD

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134 Church Street, Traralgon Vic. 3844
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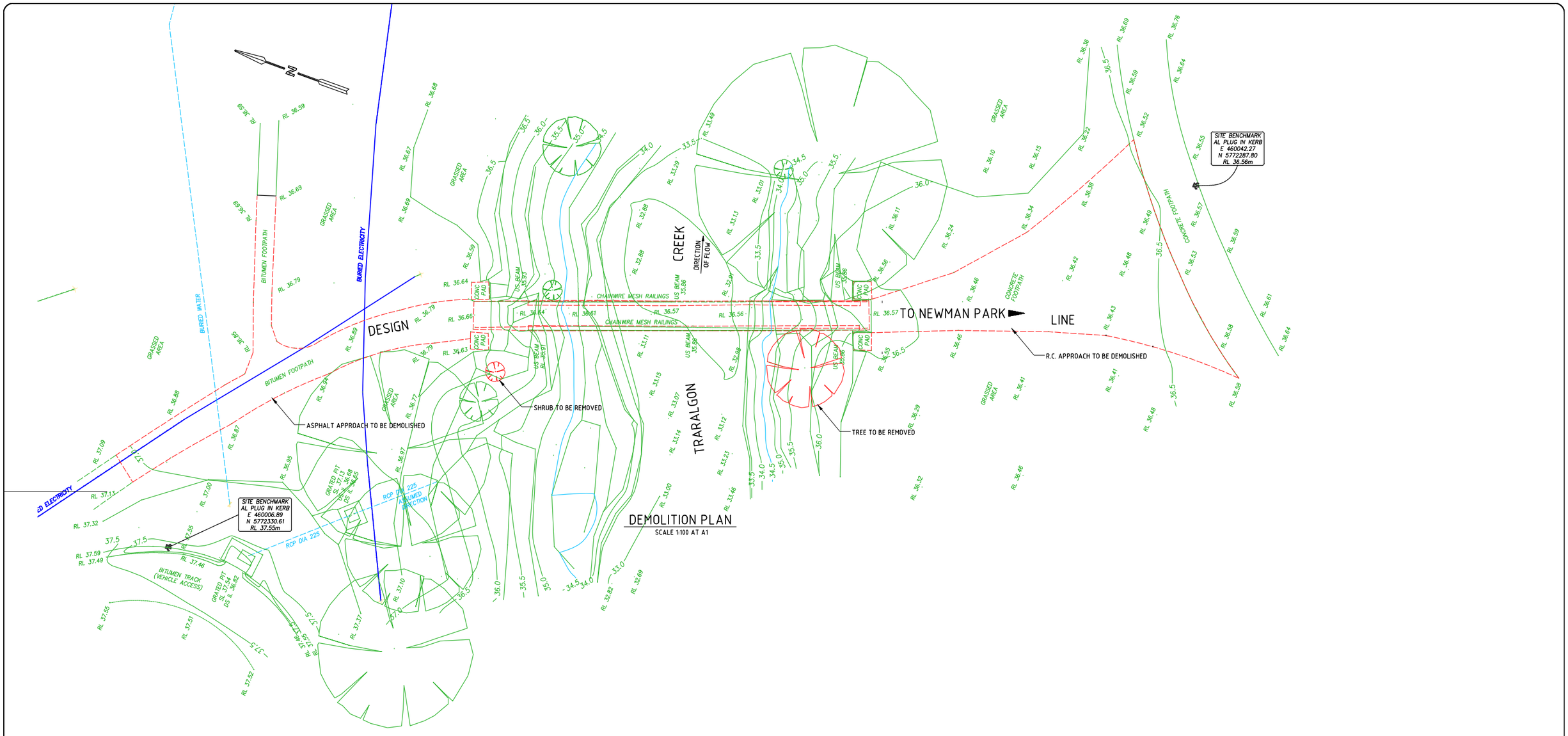
Facsimile 03 5174 0011

DRAWN	JGD
DESIGNED	JGD
CHECKED	LDM
SIGNED	

COVER SHEET

PROJECT
PROPOSED PEDESTRIAN BRIDGE
REPLACEMENT OVER TRARALGON CREEK
AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	C1 OF 4
PROJECT No.	50925



DEMOLITION PLAN

SCALE 1:100 AT A1

0 1 2 4 6 8

SCALE 1:100 AT A1 SIZE

DWG FILE NAME: 50925-C2.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
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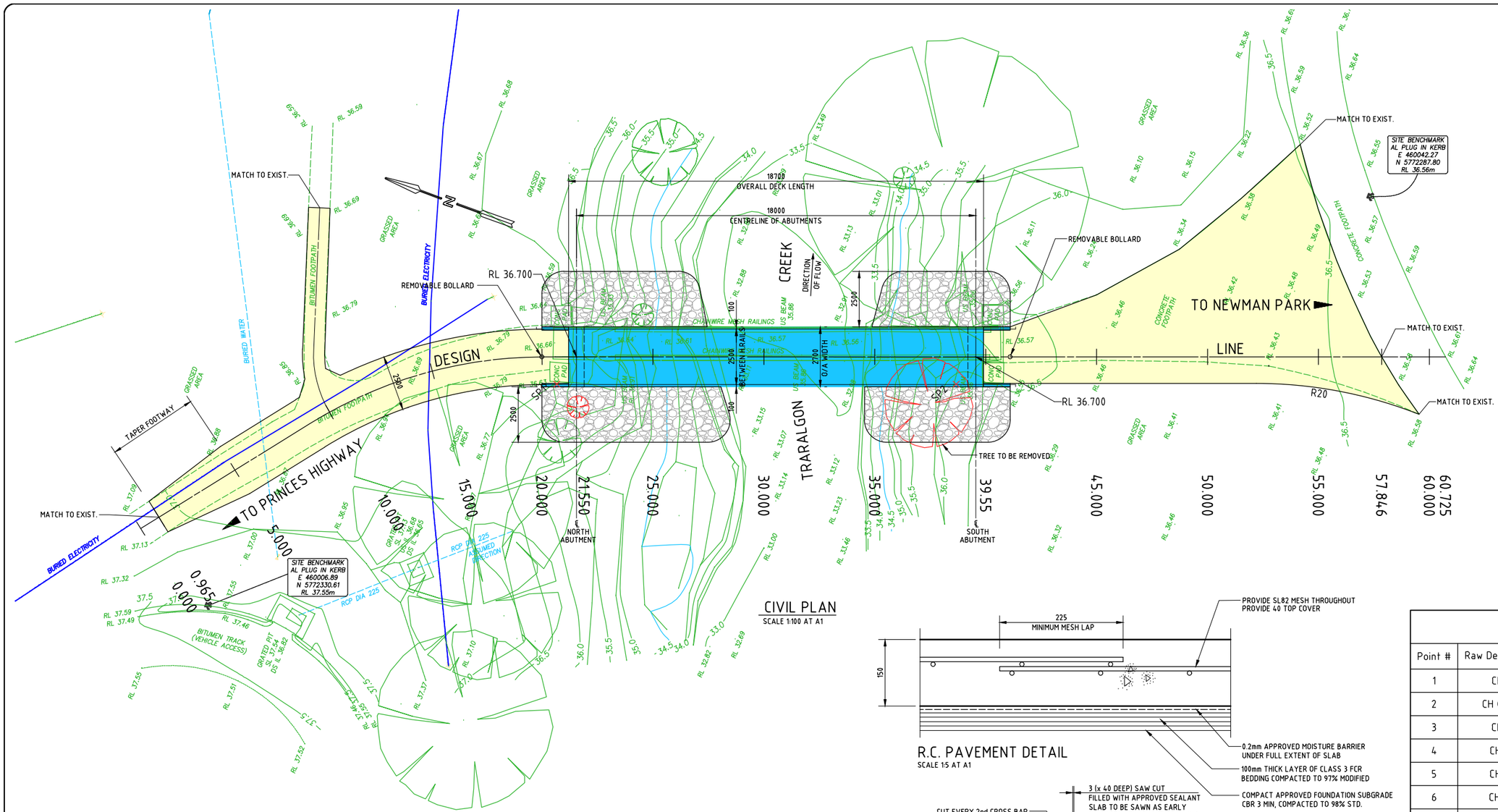
DRAWN	JGD
DESIGNED	JGD
CHECKED	LDM
SIGNED	

DEMOLITION PLAN

PROJECT

PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	C2 OF 4
PROJECT No.	50925



CIVIL PLAN
SCALE 1:100 AT A1

150 THICK R.C. FOOTPATH (150m²)

R.C. BRIDGE DECK AND WINGWALLS

0 1 2 4 6 8
SCALE 1:100 AT A1 SIZE

R.C. PAVEMENT DETAIL
SCALE 1:5 AT A1

SAWCUT JOINT (GREEN CUT WITHIN 12 HOURS)
SCALE 1:10 AT A1
NOTED AS S.C.J. ON PLAN

CONCRETE PAVEMENT NOTES:
1. CONCRETE STRENGTH SHALL BE 32MPa MINIMUM.
2. BEDDING SHALL EXTEND 300mm BEYOND EDGE OF CONCRETE PAVEMENT.
3. SURFACES OF CONCRETE SHALL BE FREE DRAINING WITH A MINIMUM 1:100 FALL.
4. CONCRETE SHALL HAVE A STIFF BROOM FINISH.
5. PROVIDE APPROVED ABLEFLEX AND JOINT SEALANT BETWEEN WINGWALLS AND FOOTPATH
6. JOINTS BETWEEN NEW AND EXISTING CONCRETE SHALL BE IN ACCORDANCE WITH IDM SD 210

Point Table

Point #	Raw Description	Elevation	Easting	Northing
1	CH 0	0.000	460009.0850	5772334.6645
2	CH 0.965	0.000	460009.8455	5772334.0705
3	CH 5	0.000	460013.0255	5772331.5867
4	CH 10	0.000	460016.9498	5772328.4890
5	CH 15	0.000	460020.2833	5772324.7798
6	CH 20	0.000	460022.5954	5772320.3612
7	CH 21.55	0.000	460023.1312	5772318.9067
8	CH 39.55	0.000	460029.3510	5772302.0155
9	CH 45	0.000	460031.2343	5772296.9012
10	CH 50	0.000	460032.9620	5772292.2092
11	CH 55	0.000	460034.6897	5772287.5172
12	CH 60	0.000	460036.4175	5772282.8252
13	CH 60.725	0.000	460036.6678	5772282.1454

NOTE: CONCRETE SURFACES SHALL HAVE A MINIMUM 2% CROSSFALL AND NEATLY MATCH EXISTING WITH A MAXIMUM 3mm STEP BETWEEN ABUTTING SURFACES

DWG FILE NAME: 50925-C3.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
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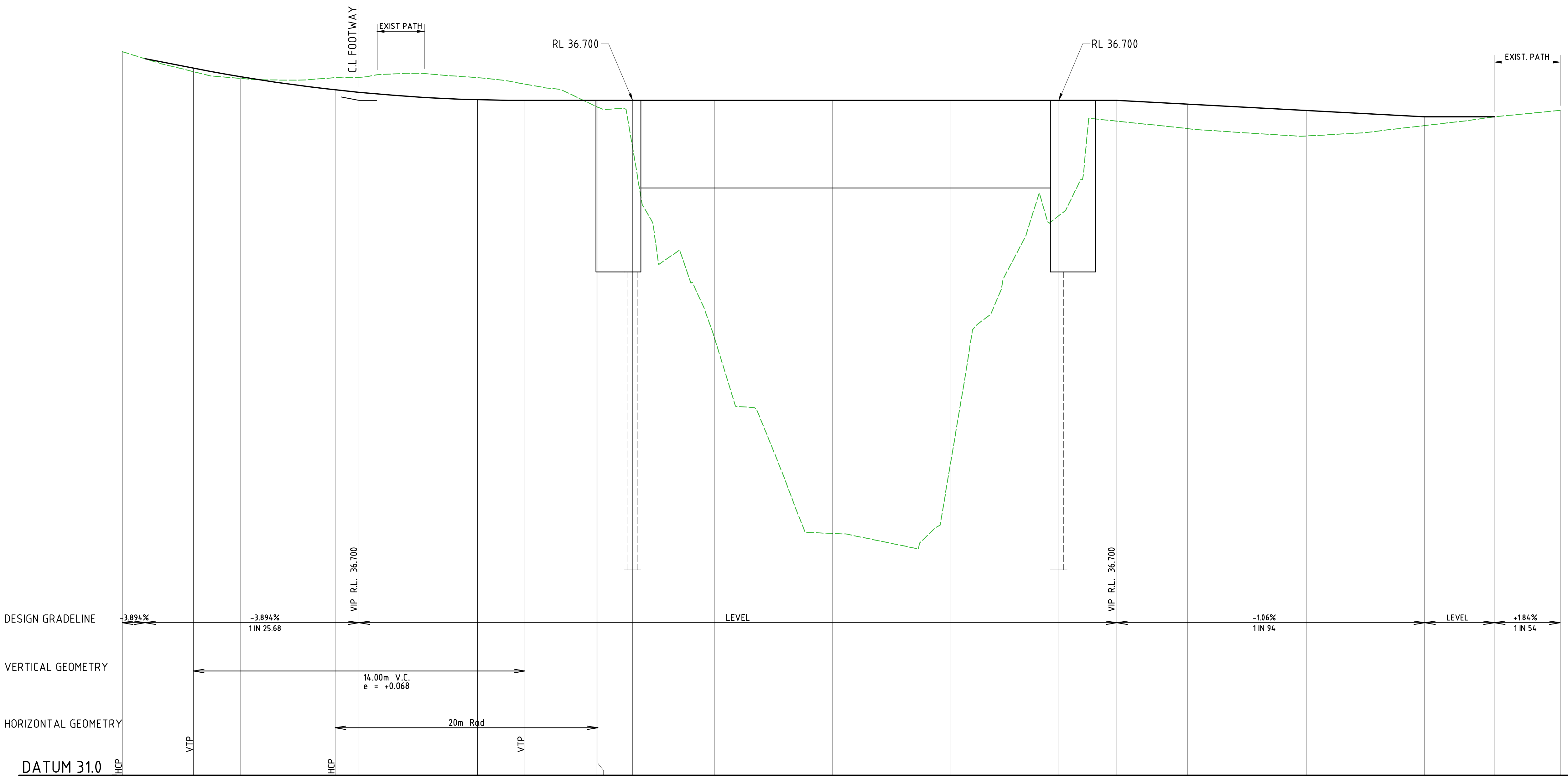
DRAWN	JGD
DESIGNED	JGD
CHECKED	LDM
SIGNED	

CIVIL WORKS PLAN

PROJECT
PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	C3 OF 4
PROJECT No.	50925



CHAINAGE	DESIGN SURF	EXIST SURF
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0.965	37.111	37.111
3	36.973	36.943
5	36.9	36.885
8.988	36.789	36.891
10	36.768	36.894
15	36.706	36.891
17	36.7	36.837
20	36.7	36.65
20.085	36.7	36.642
21.55	36.7	36.299
25	36.7	34.699
30	36.7	33.042
35	36.7	33.66
39.55	36.7	35.717
42	36.7	36.524
45	36.668	36.461
50	36.615	36.399
55	36.562	36.487
57.846	36.562	36.562
60.724	36.615	36.615

LONGITUDINAL SECTION DLINE

Horizontal scale 1:100 AT A1
Vertical scale 1:20 AT A1

DWG FILE NAME: 50925-C4.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
B	DETAILED DESIGN	29/10/2025	JGD
A	ISSUED FOR COMMENT	16/10/2025	JGD

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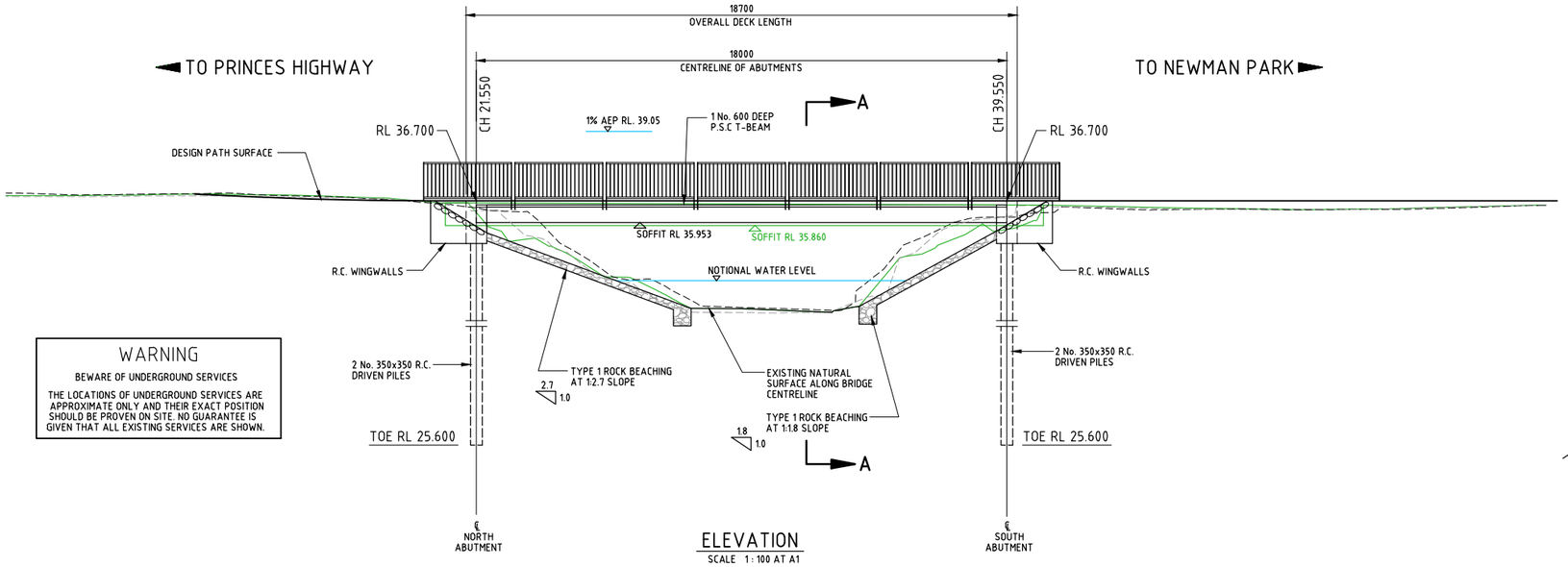
DRAWN	JGD	LONGITUDINAL SECTION	DATE: SEPT 2025
DESIGNED	JGD	PROJECT: PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON	SCALE: AS SHOWN
CHECKED	LDM		SHEET No.: C4 OF C4
SIGNED			PROJECT No.: 50925



ELEVATION
SCALE 1 : 100 AT A1

WARNING

BEWARE OF UNDERGROUND SERVICES

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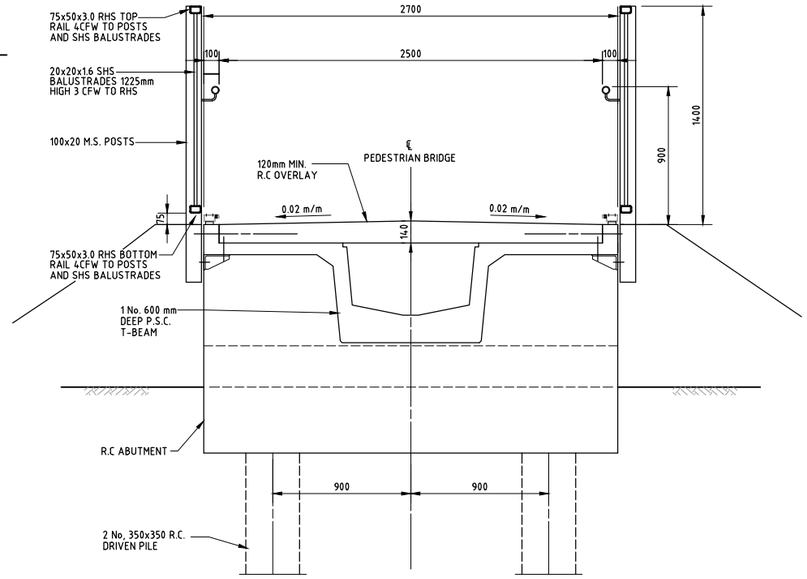
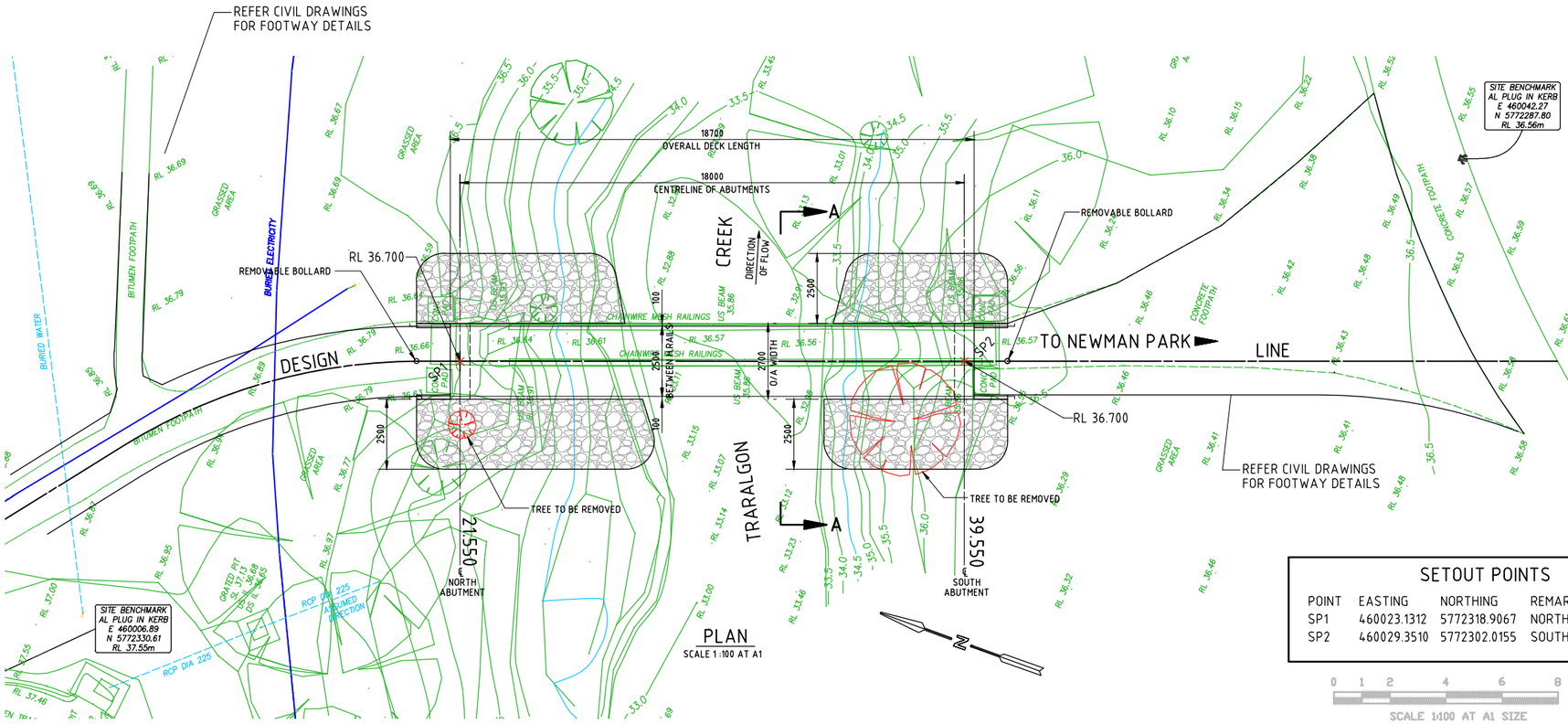


SECTION A-A
SCALE 1 : 20 AT A1



PLAN
SCALE 1 : 100 AT A1

SETOUT POINTS

POINT	EASTING	NORTHING	REMARKS	CH
SP1	460023.1312	5772318.9067	NORTH ABUT	21.550
SP2	460029.3510	5772302.0155	SOUTH ABUT	39.550

0 1 2 4 6 8
SCALE 1:100 AT A1 SIZE

GENERAL

1. DECK LEVELS ARE TO TOP OF CONCRETE
2. DESIGN TRAFFIC LOAD: 5 KPa
3. BRIDGE CONTAINMENT BARRIER: PEDESTRIAN & CYCLIST
4. EXISTING BRIDGE SHALL BE DEMOLISHED AND REMOVED FROM SITE.

ALIGNMENT

5. ABUTMENT CENTRELINES ARE PARALLEL

CONCRETE

6. CONCRETE STRENGTH GRADE SHALL BE 40 MPa
7. ALL CORNERS SHALL HAVE 20 mm x 20 mm FILLETS OR CHAMFERS UNLESS NOTED OTHERWISE.
8. EXPOSURE CLASSIFICATION FOR SURFACES OF CONCRETE SHALL BE INDICATED BELOW UNLESS NOTED ON THE DRAWING.
   IN CONTACT WITH THE GROUND.....B1
   ABOVE GROUND.....A

WATERWAY

9. 1% AEP: 39.05m AHD, v = 1.2m/s
10. EXISTING WATERWAY AREA = 29.9m²
11. PROPOSED WATERWAY AREA = 35.5m²

DWG FILE NAME: 50925-S1.dwg
DATE PLOTTED: 29-10-2025

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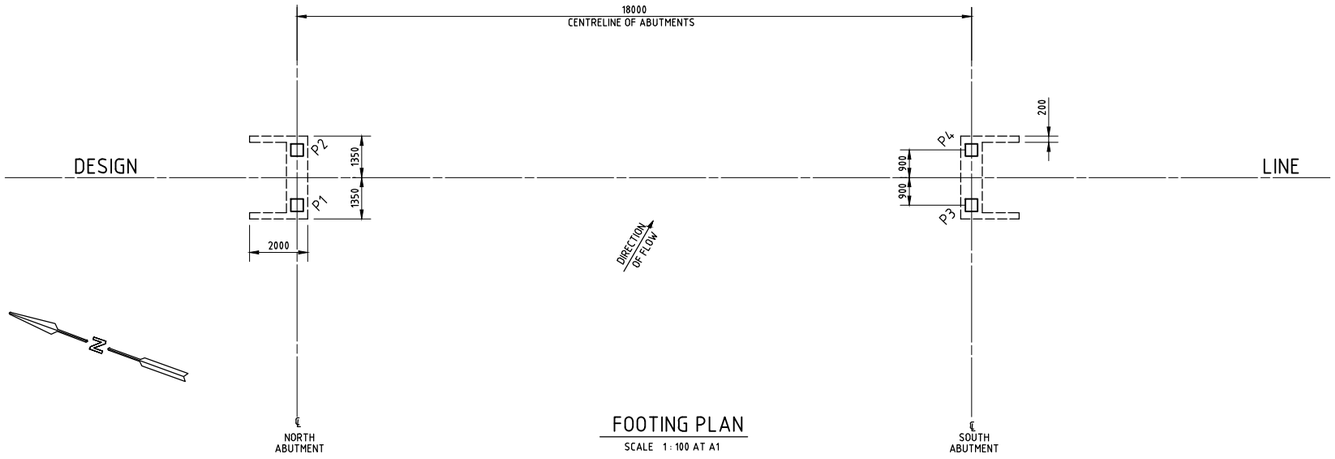
GENERAL ARRANGEMENT

PROJECT
PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S1 OF 12
PROJECT No.	50925



FOOTING PLAN

SCALE 1:100 AT A1

NOTE: CONTRACTOR TO CHECK BRIDGE ALIGNMENT LOCATIONS PRIOR TO COMMENCING CONSTRUCTION POSITION MAY NEED TO BE ADJUSTED

WARNING

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PILE SCHEDULE

LOCATION	PILE No.	TYPE	APPROX # TOE LEVEL R.L.	APPROX # LENGTH (m)	LOAD SERVICEABILITY (kN.)	LOAD ULTIMATE (kN.)	MOMENT ULTIMATE (kN.m)	EASTING	NORTHING
NORTH ABUTMENT	1	350x350 R.C. DRIVEN PILE	25.700	11.5m	250	300	50	460022.2866	5772318.5958
	2	350x350 R.C. DRIVEN PILE	25.700	11.5m	250	300	50	460023.9757	5772319.2178
SOUTH ABUTMENT	3	350x350 R.C. DRIVEN PILE	25.700	11.5m	250	300	50	460028.5065	5772301.7046
	4	350x350 R.C. DRIVEN PILE	25.700	11.5m	250	300	50	460030.1956	5772302.3265

NOTES

FOUNDATIONS

1. ALL PILES ARE VERTICAL
2. PILE POSITION SHOWN ARE TO UNDERSIDE OF ABUTMENT CROSSHEAD.
3. PILE CAPACITY TO BE ASSESSED ON SITE USING PDA TESTING. ONE PILE IN EACH ABUTMENT SHALL BE DRIVEN AND TESTED.
   THE DYNAMIC PILE TESTING AND ANALYSIS OF THE TEST DATA SHALL BE UNDERTAKEN BY QUALIFIED PERSONAL OR AN EXPERIENCED GEOTECHNCIAL ENGINEER. GEOTECHNICAL REDUCTION FACTOR = 0.8.
4. THE CONTRACTOR SHALL EXCAVATE AS REQUIRED FOR PILE DRIVING PURPOSES.
5. TO AVOID DAMAGE TO THE PILES, PILE DRIVING SHALL CEASE AS SOON AS DRIVING INDICATES THE PILE HAS ACHIEVED EFFECTIVE REFUSAL.
6. PILE TOE LEVELS ARE BASED ON A 7-DAY SETUP.

GENERAL

7. CHAINAGES ARE MEASURED ALONG ROAD DESIGN LINE.
8. ABUTMENT CENTRELINES ARE PARALLEL.
9. DRIVEN PILES SHALL BE A MINIMUM OF 6.0m INTO NATURAL GROUND
10. REFER TO GEOTECHNICAL REPORT No. V2424R1 BY BLACK GEOTECHNICAL
11. PILE TOLERANCE SHALL BE IN ACCORDANCE WITH DTP SECTION 605

DWG FILE NAME: 50925-S2.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
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A	ISSUED FOR COMMENT	16/10/2025	JGD

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CHECKED	LDM
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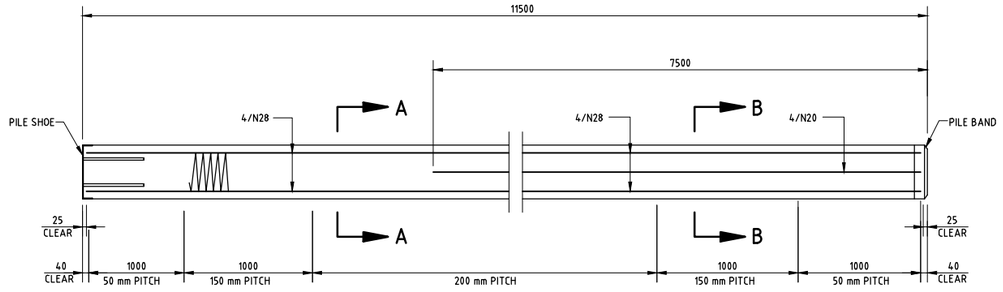
FOOTING PLAN

PROJECT

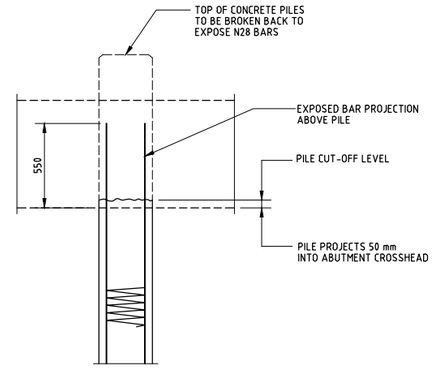
PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S2 OF 12
PROJECT No.	50925



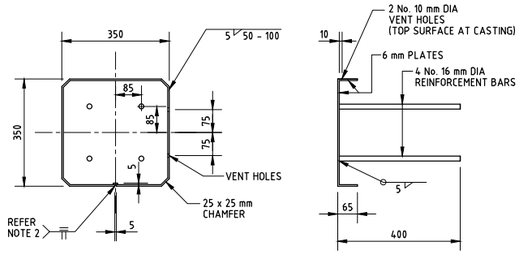
ELEVATION

SCALE 1 : 20 AT A1



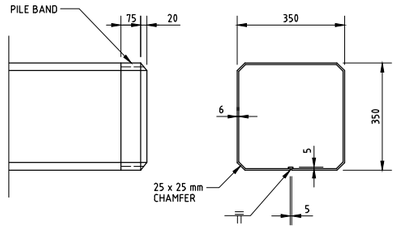
ELEVATION
PILE CUT-OFF DETAIL

SCALE 1 : 20 AT A1



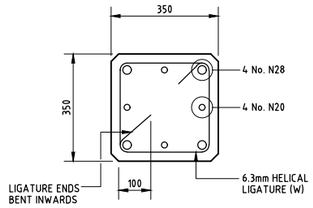
FLAT PLATE DRIVING SHOE
DETAILS

SCALE 1 : 10 AT A1



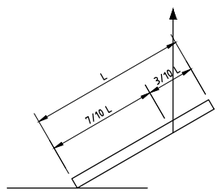
PILE BAND DETAIL

SCALE 1 : 10 AT A1

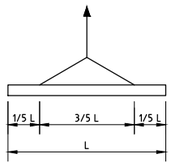


SECTION B - B

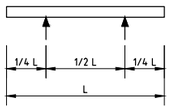
SCALE 1 : 10 AT A1



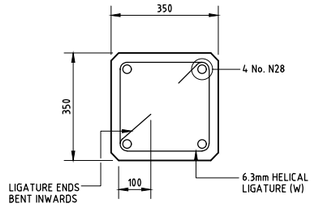
PITCHING



LIFTING



STORAGE



SECTION A - A

SCALE 1 : 10 AT A1

NOTES

CONCRETE

1. CONCRETE SHALL BE SPECIAL CLASS PERFORMANCE CONCRETE AS SPECIFIED IN VICROADS SPECIFICATION FOR BRIDGEWORKS

CONCRETE GRADE	CHARACTERISTIC COMPRESSIVE STRENGTH AT 28 DAYS f'c (MPa)	CEMENTITIOUS MATERIAL CONTENT (MIN.) (kg/m^3)	WATER/CEMENTITIOUS MATERIAL RATIO (MAX.)
VR 450/40	50	450	0.40

EXPOSURE CLASSIFICATION - UP TO AND INCLUDING B2

2. ALL CORNERS SHALL HAVE 25 x 25 mm FILLETS OR CHAMFERS UNLESS NOTE OTHERWISE.
3. ALL LONGITUDINAL SURFACES SHALL HAVE A FINISH EQIVALENT TO A STEEL FLOAT FINISH.

REINFORCEMENT

4. REINFORCEMENT SHALL BE GRADE 500 (N) HOT ROLLED DEFORMED BARS TO COMPLY WITH AS/NZS. 4671.
5. (W) DENOTES HARD DRAWN REINFORCING WIRE TO AS/NZS. 4671
6. HELICAL LIGATURES SHALL HAVE 1.5 TURNS AT ENDS OF PILE AND SHALL HAVE A SPLICE LENGTH OF 1.5 TURNS
7. ALL SPLICES IN MAIN REINFORCMENT SHALL BE BUTT WELDED TO AS 1554 - PART 3. BUTT WELDS SHALL BE STAGGERED AND LOCATED WITHIN L/4 OF ENDS OF PILES.
8. MINIMUM CLEAR COVER SHALL BE 40 mm TO HELICAL LIGATURE UNLESS NOTE OTHERWISE

STEELWORK

9. PILE BAND SHALL COMPLY WITH AS 3678 GRADE 250.
10. ALL WELDS SHALL BE FULL PENETRATION BUTT WELDS.
11. ALL WELDS SHALL BE PERFORMED WITH E48XX ELECTRODES.
12. ALL WELDS SHALL BE CATEGORY SP TO AS 1554 - PART 1.

PILE SHOE

13. FLAT - PLATE PILE SHOE STEEL SHALL COMPLY WITH AS 3678 GRADE 250. THE ANCHOR BARS SAHLL RESIST A TENSILE FORCE OF 50 kN.

GENERAL

14. CALCULATED MASS OF PILE BASED ON CONCRETE DENSITY OF 2650 kg/m3
SECTION 350 x 350 mm 325kg/m
15. THE PILE JOINT CAPACITY TO BE EQUAL OR EXCEED THAT OF THE PILE ITSELF.

LIFTING AND HANDLING

16. MINIMUM CONCRETE STRENGTH AT TIME OF LIFTING SHALL BE 20 MPa AND CONCRETE MATURITY NOT LESS THAN 420 °C HOURS.
17. MINIMUM CONRETE STRENGTH AT TIME OF PITCHING SHALL BE 40 MPa.
18. PILES SHALL NOT BE DRIVEN UNTIL 7 DAYS AFTER CASTING WHEN FULLY STEAM CURED OR 14 DAYS WHEN MOIST CURED OR PARTIALLY STEAM CURED.

DWG FILE NAME: 50925-S3.dwg
DATE PLOTTED: 29-10-2025

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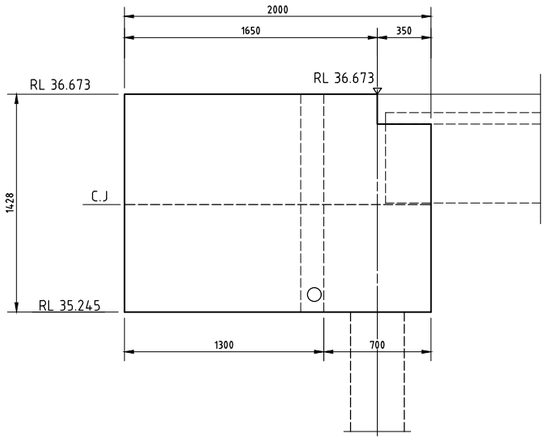
350x350 SQ R.C PILE WITH FLAT PLATE SHOE

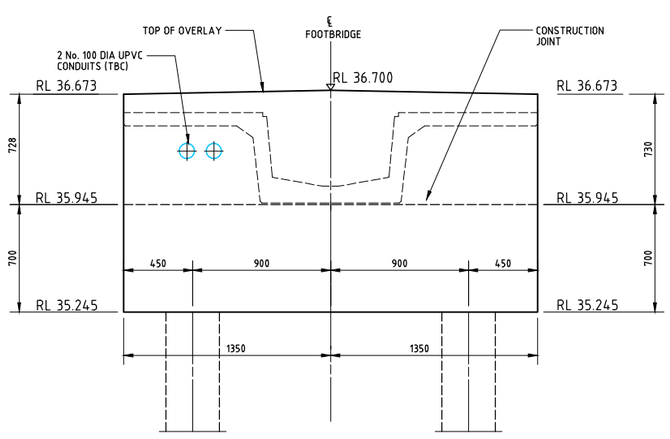
PROJECT
PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S3 OF 12
PROJECT No.	50925



WEST ELEVATION

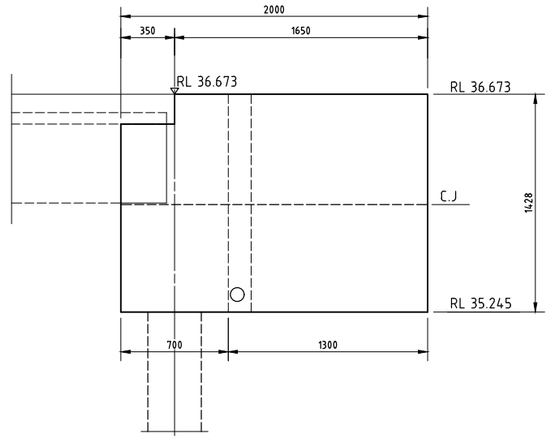
SCALE 1:20 AT A1



SOUTH ELEVATION

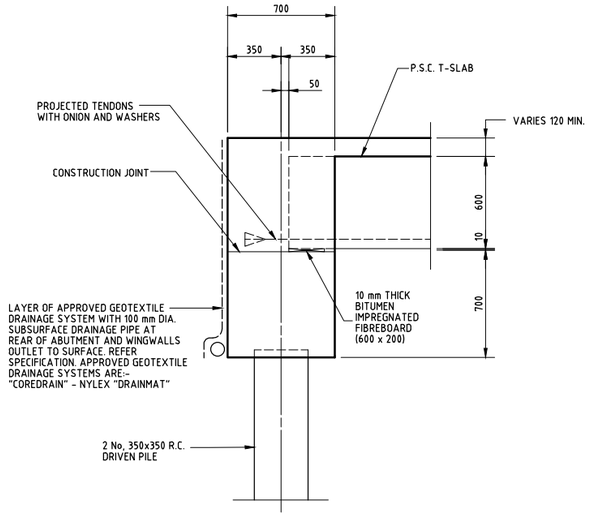
SCALE 1:20 AT A1

LEVEL SHOWN AND DESIGN CENTRELINE



EAST ELEVATION

SCALE 1:20 AT A1



SECTION A - A

SCALE 1:20 AT A1

PLAN - NORTH ABUTMENT

SCALE 1:20 AT A1

SECTION B - B

SCALE 1:10 AT A1

WARNING

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NOTES

CONCRETE

1. CONCRETE STRENGTH GRADE SHALL BE VR450/50
2. ALL CORNERS SHALL HAVE 20 x 20 mm FILLETS OR CHAMFERS UNLESS NOTED OTHERWISE.
3. THE REDUCED LEVELS ARE BASED ON A MINIMUM OVERLAY THICKNESS OF 120 mm MIN. AT THE ABUTMENT.

DWG FILE NAME: 50925-S4.dwg
DATE PLOTTED: 29-10-2025

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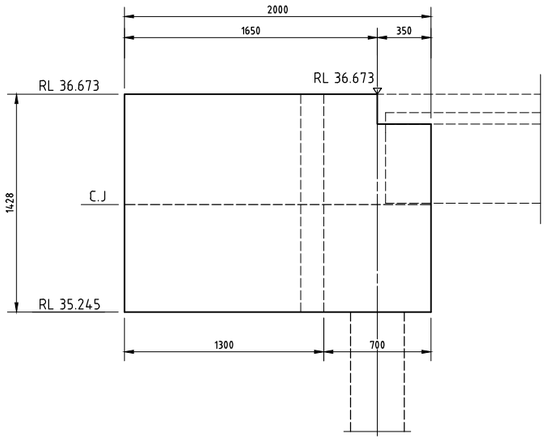
NORTH ABUTMENT - CONCRETE

PROJECT

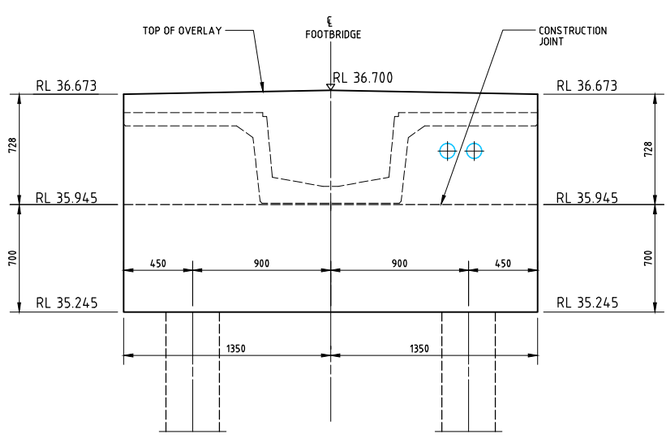
PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S4 OF 12
PROJECT No.	50925



EAST ELEVATION

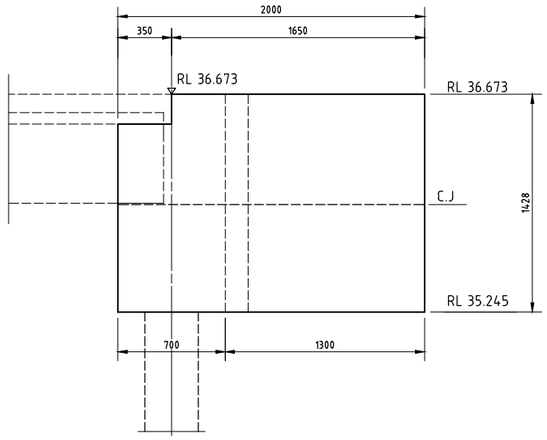
SCALE 1:20 AT A1



NORTH ELEVATION

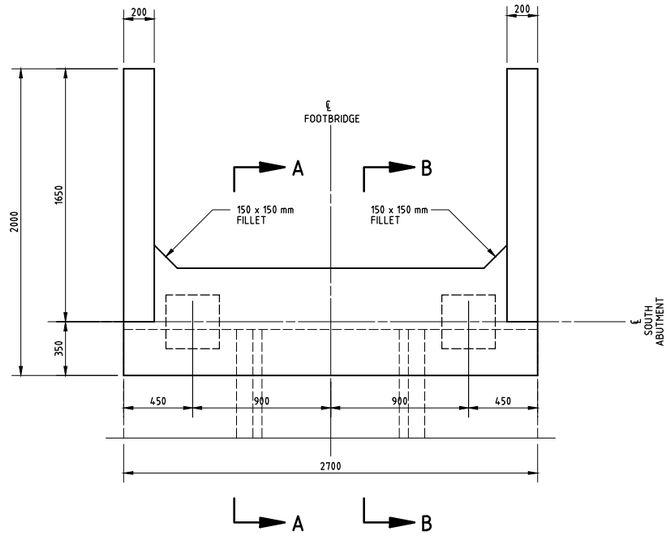
SCALE 1:20 AT A1

LEVEL SHOWN AND DESIGN CENTRELINE



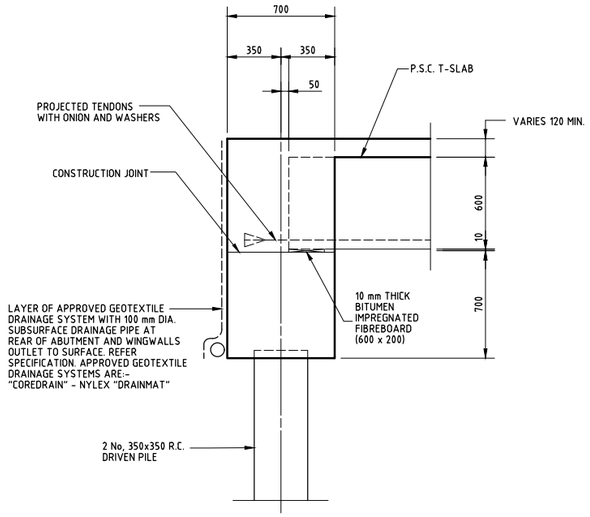
WEST ELEVATION

SCALE 1:20 AT A1



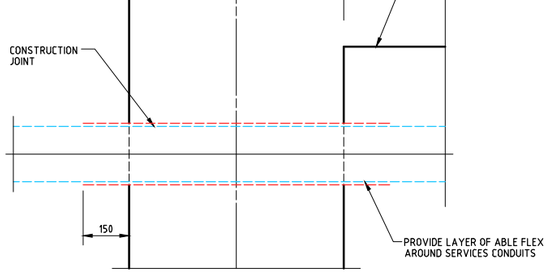
PLAN - SOUTH ABUTMENT

SCALE 1:20 AT A1



SECTION A - A

SCALE 1:20 AT A1



SECTION B - B

SCALE 1:10 AT A1

WARNING

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NOTES

CONCRETE

1. CONCRETE STRENGTH GRADE SHALL BE VR450/50
2. ALL CORNERS SHALL HAVE 20 x 20 mm FILLETS OR CHAMFERS UNLESS NOTED OTHERWISE.
3. THE REDUCED LEVELS ARE BASED ON A MINIMUM OVERLAY THICKNESS OF 120 mm MIN. AT THE ABUTMENT. DUE TO THE EFFECT OF BEAM HOG AND DEFLECTION CAUSED BY THE DECK CAST. ADJUSTMENT MAY BE REQUIRED TO THE REDUCED LEVELS TO ALLOW FOR BEAM HOG VARIATIONS.

DWG FILE NAME: 50925-S5.dwg
DATE PLOTTED: 29-10-2025

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B	DETAILED DESIGN	29/10/2025	JGD
A	ISSUED FOR COMMENT	16/10/2025	JGD

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Facsimile 03 5174 0011

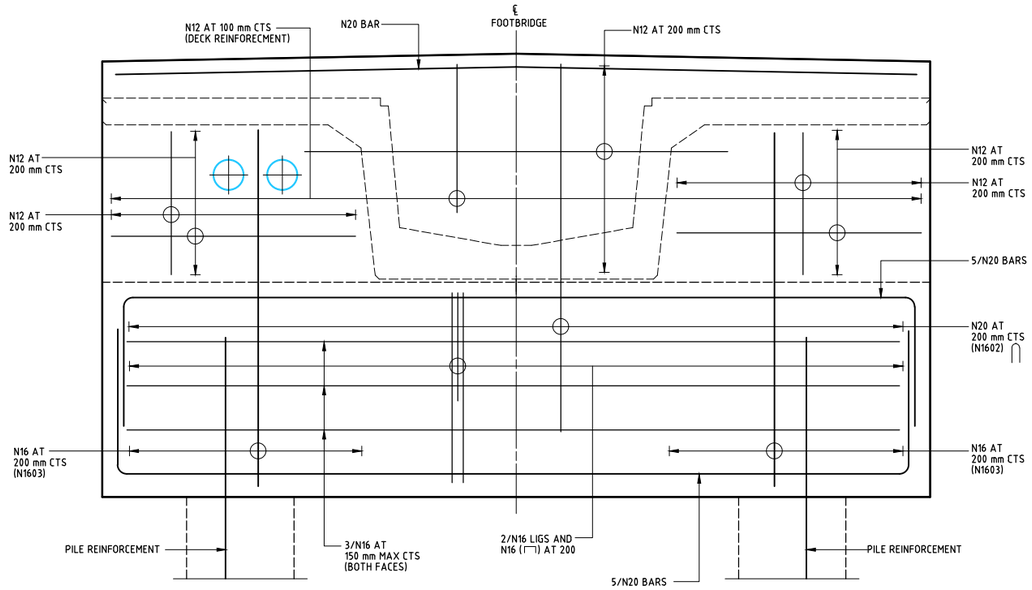
DRAWN	JGD
DESIGNED	JGD
CHECKED	LDM
SIGNED	

SOUTH ABUTMENT - CONCRETE

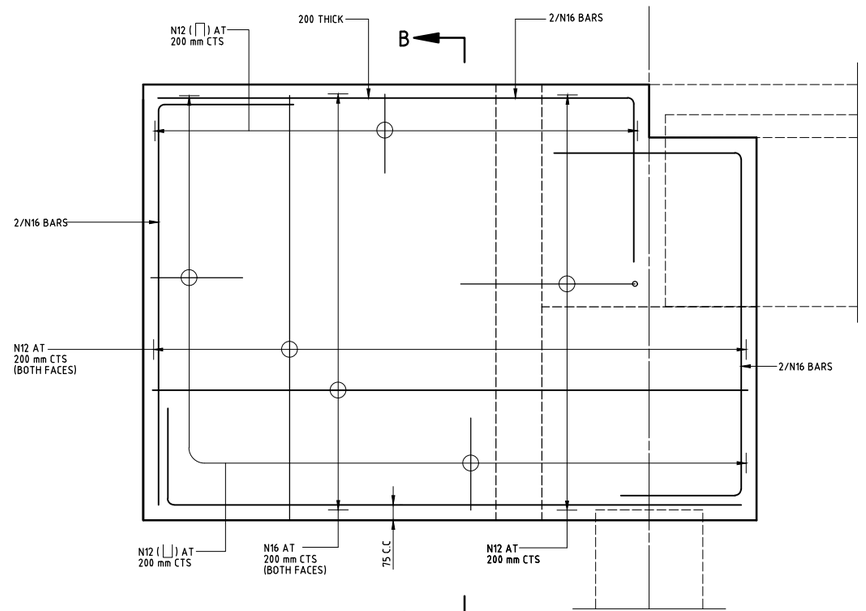
PROJECT

PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

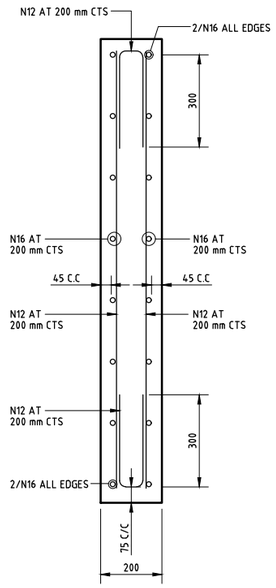
DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S5 OF 12
PROJECT No.	50925



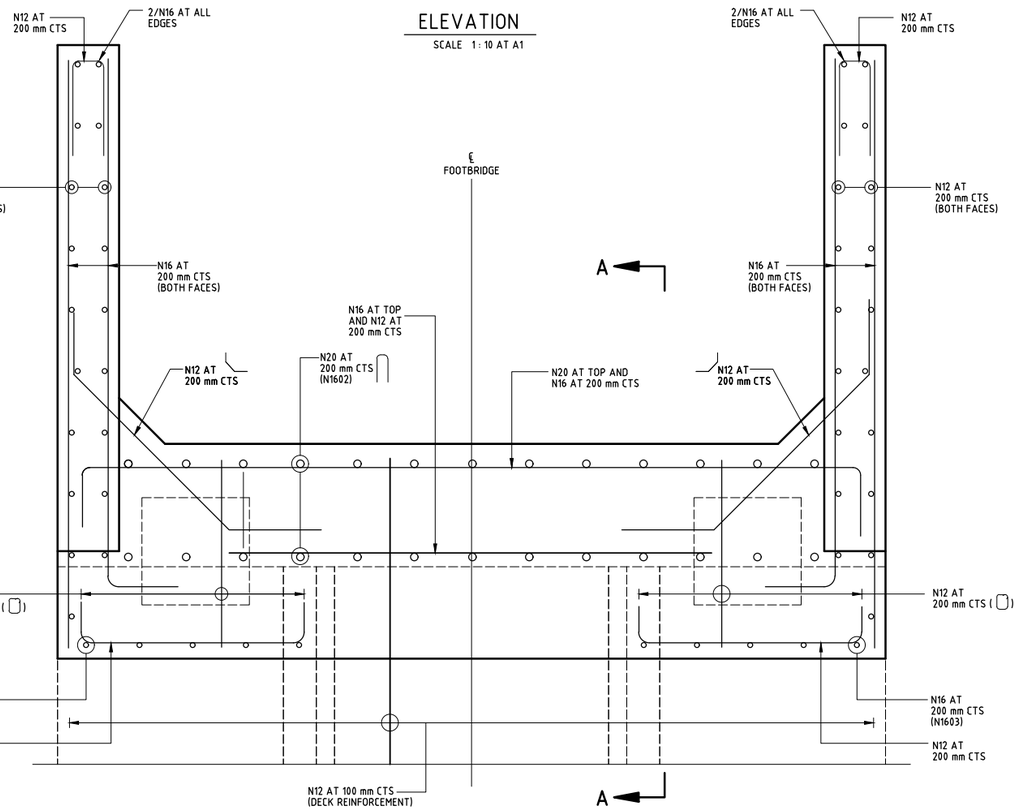
ELEVATION
SCALE 1 : 10 AT A1



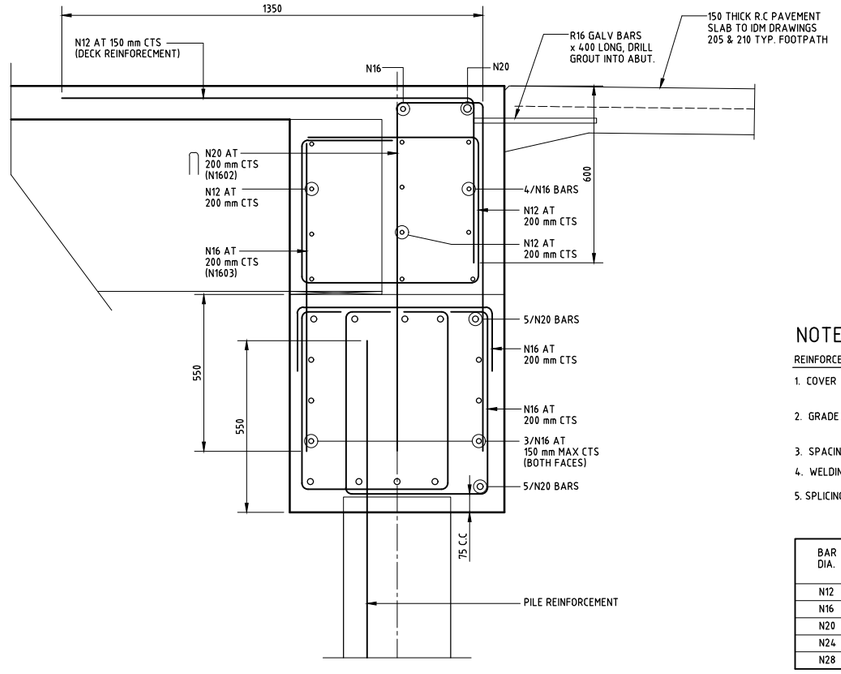
ELEVATION - WINGWALL
SCALE 1 : 10 AT A1



SECTION B - B
SCALE 1 : 10 AT A1



PLAN - ABUTMENT
SCALE 1 : 10 AT A1



SECTION A - A
SCALE 1 : 10 AT A1

NOTES

REINFORCEMENT

1. COVER :- 45mm ABUTMENT AND WINGWALLS UNLESS NOTED OTHERWISE.
2. GRADE :- 500 (N) HOT ROLLED DEFORMED BARS TO AS/NZS. 4671 (R) DENOTES PLAIN REINFORCING BARS TO AS/NZS. 4671
3. SPACING :- TAKEN AS EQUAL UNLESS NOTED OTHERWISE.
4. WELDING :- SHALL NOT BE PERMITTED UNLESS NOTED OTHERWISE
5. SPLICING :- SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITION SHOWN ON THE DRAWINGS OR AS OTHERWISE APPROVED BY THE SUPERINTENDENT. BAR LAPS IN MILLIMETRES ARE TO BE AS SHOWN BELOW UNLESS SHOWN OTHERWISE,

BAR DIA.	LAP LENGTH (mm)
N12	500
N16	700
N20	900
N24	1100
N28	1350

ALL HOOKS, BENDS AND COGS ARE STANDARD AND SHALL BE IN ACCORDANCE WITH AS 5100.5 - 2017 UNLESS NOTED OTHERWISE.

DWG FILE NAME: 50925-S6.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
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A	ISSUED FOR COMMENT	16/10/2025	JGD

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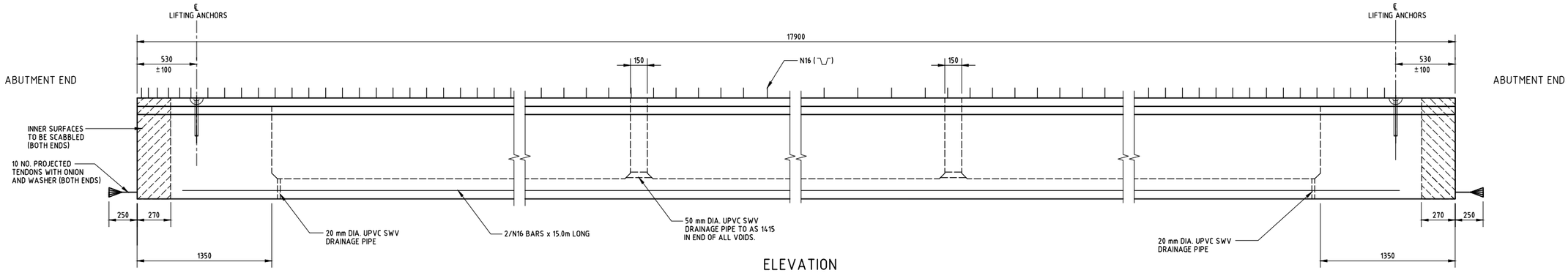
DESIGNED	JGD
CHECKED	LDM
SIGNED	

ABUTMENTS - REINFORCEMENT

PROJECT
PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

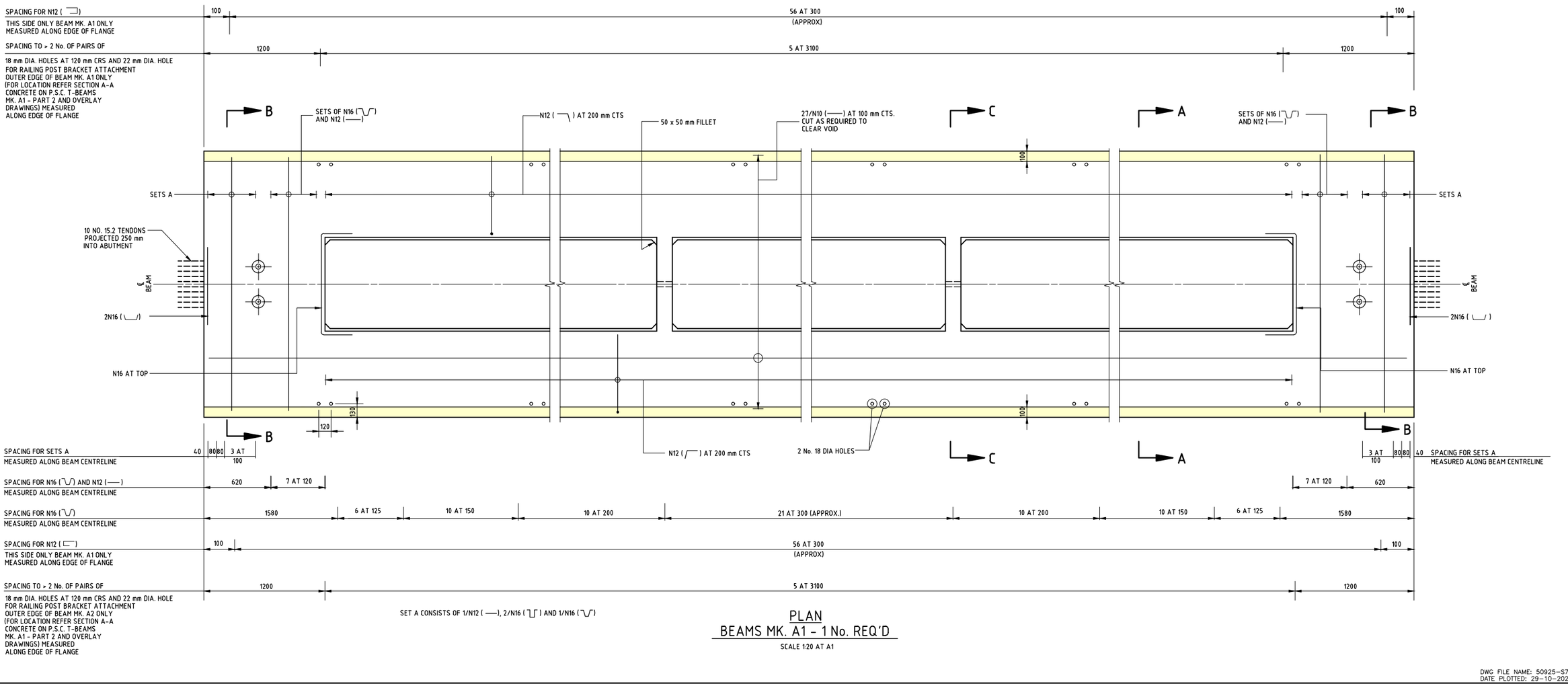
DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S6 OF 12
PROJECT No.	50925



ELEVATION

SCALE 1:10 AT A1

KERB REMOVED FOR CLARITY



SET A CONSISTS OF 1/N12 ( ), 2/N16 ( ) AND 1/N16 ( )

PLAN
BEAMS MK. A1 - 1 No. REQ'D

SCALE 1:20 AT A1

DWG FILE NAME: 50925-S7.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
B	DETAILED DESIGN	29/10/2025	JGD
A	ISSUED FOR COMMENT	16/10/2025	JGD

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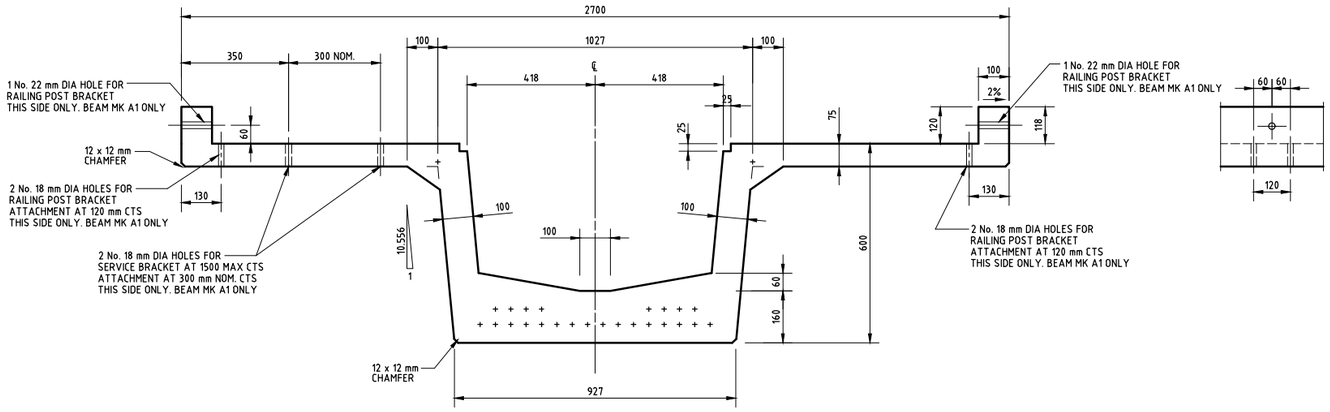
CHECKED	LDM
SIGNED	

P.S.C T-BEAM - PART 1

PROJECT

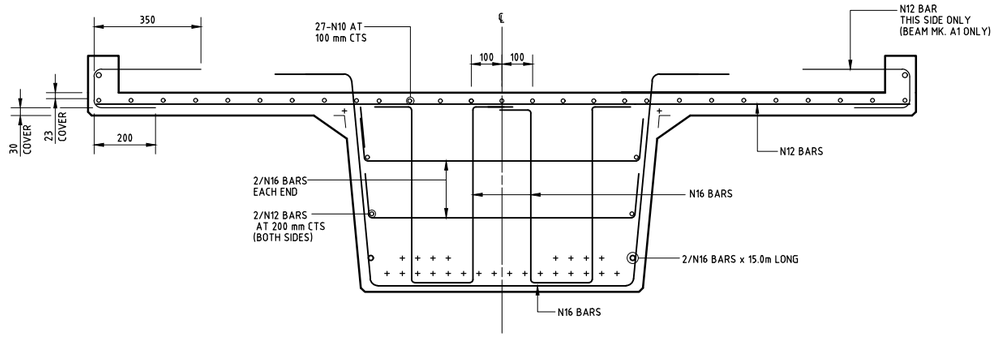
PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S7 OF 12
PROJECT No.	50925



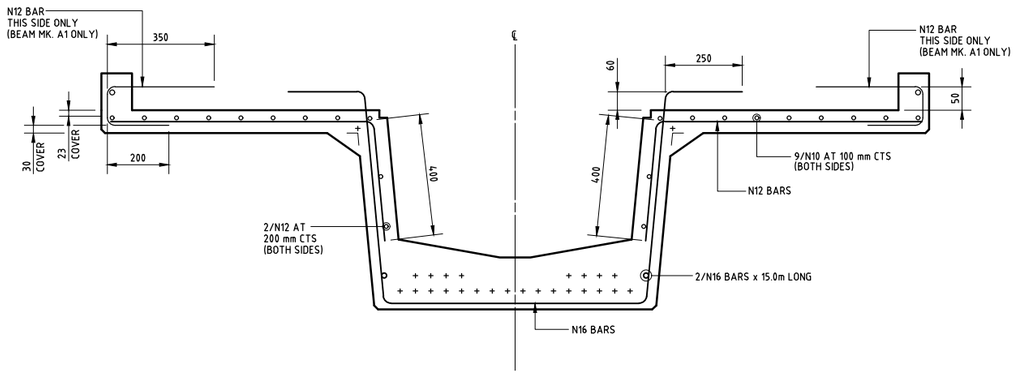
SECTION A-A - CONCRETE

SCALE 1:10 AT A1



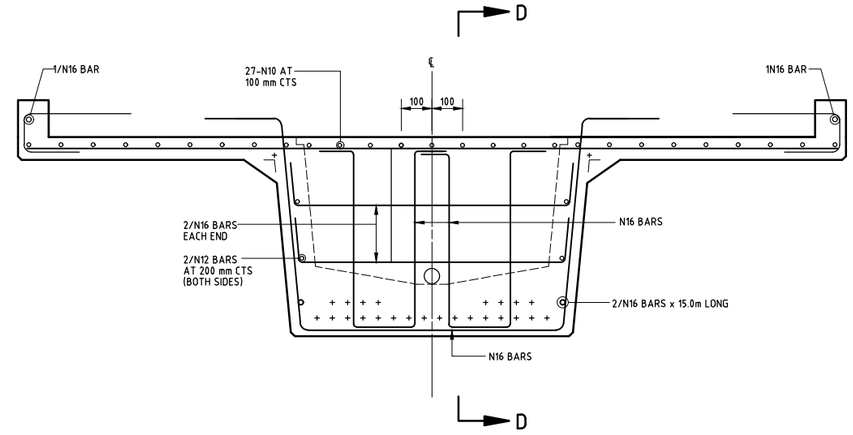
SECTION B-B - REINFORCEMENT

SCALE 1:10 AT A1



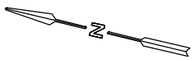
SECTION A-A - REINFORCEMENT

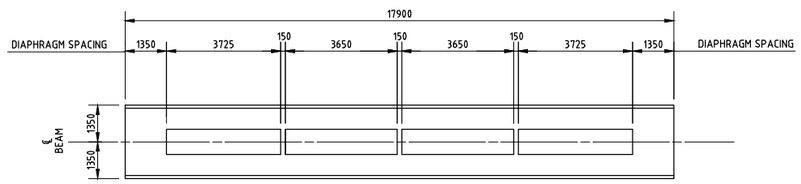
SCALE 1:10 AT A1



SECTION C-C - REINFORCEMENT

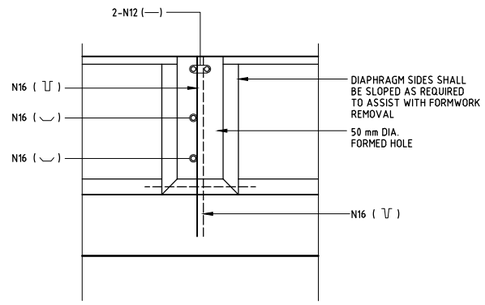
SCALE 1:10 AT A1





BEAM DIAPHRAGM DIMENSIONING DETAILS

SCALE 1:100 AT A1



SECTION D-D

SCALE 1:10 AT A1

DWG FILE NAME: 50925-S8.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
B	DETAILED DESIGN	29/10/2025	JGD
A	ISSUED FOR COMMENT	16/10/2025	JGD

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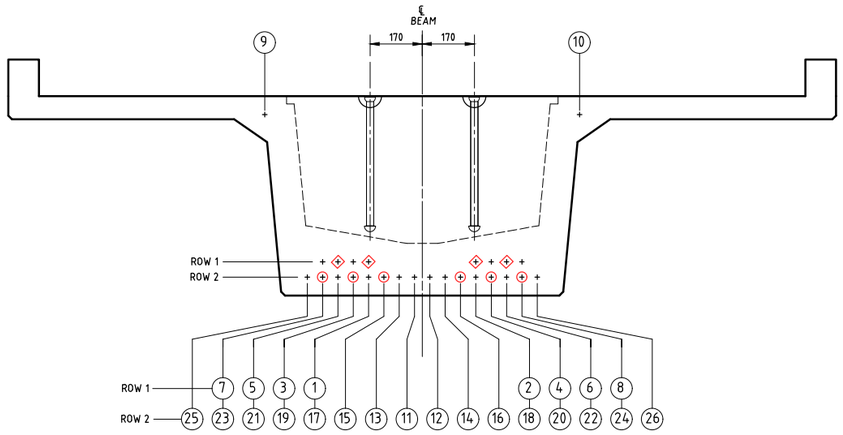
DESIGNED	JGD
CHECKED	LDM
SIGNED	

P.S.C T-BEAM - PART 2

PROJECT

PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S8 OF 12
PROJECT No.	50925



THE FOLLOWING TENDONS SHALL BE DEBONDED AT BOTH ENDS:-

15, 16, 19, 20 ,23 & 24 1800 mm

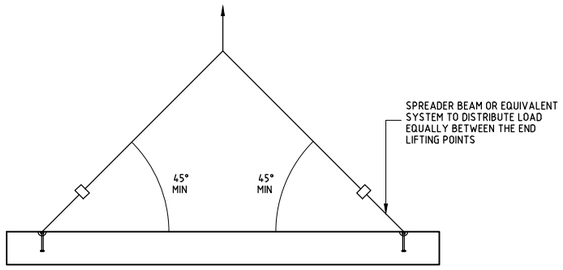
NOTE: DEBONDING OF TENDONS SHALL NOT BE BY A GREASE COATING

NOTE: TENDONS SHALL BE RELEASED IN ORDER FROM (1) TO (26)

TENDON RELEASE ORDER

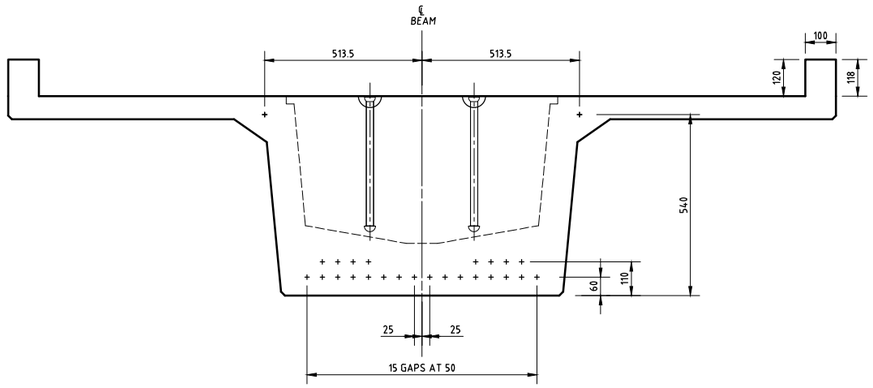
BEAM MK. A1

SCALE 1:10 AT A1



LIFTING DIAGRAM

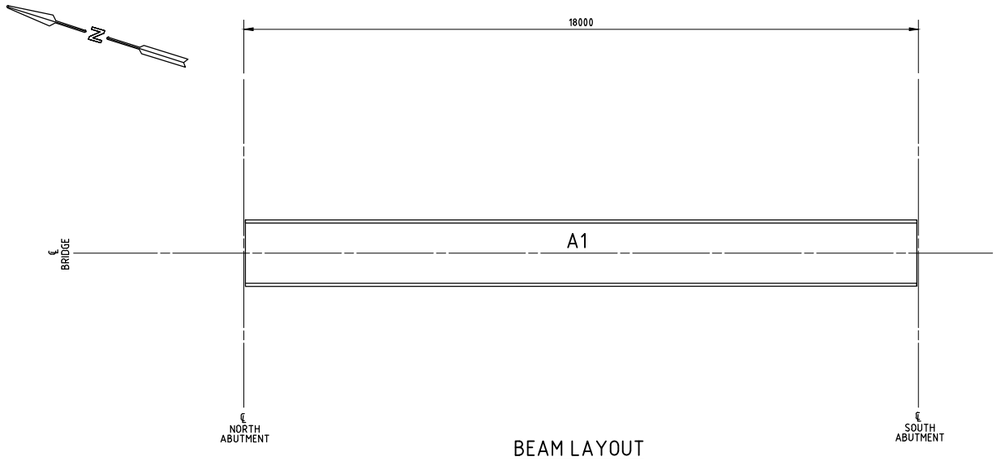
NOT TO SCALE



SECTION A-A - TENDONS

BEAM MK. A1

SCALE 1:10 AT A1



BEAM LAYOUT

SCALE 1:100 AT A1

NOTES

CONCRETE

1. BEAMS SHALL BE CAST HORIZONTAL.
2. DIMENSIONED LENGTH OF THE BEAM IS REQUIRED LENGTH OF THE FINISHED PRODUCT. AT TIME OF CASTING OVERALL LENGTH SHALL BE 'L'+10 mm, 'L' DENOTES BEAM LENGTHS
3. CONCRETE SHALL BE SPECIAL CLASS PERFORMANCE CONCRETE AS FOLLOWS:

CONCRETE GRADE	CHARACTERISTIC COMPRESSIVE STRENGTH AT 28 DAYS f'c (MPa)	CEMENTITIOUS MATERIAL CONTENT (MIN.) (kg/m^3)	WATER/CEMENTITIOUS MATERIAL RATIO (MAX.)
50 MPa	50	450	0.40

4. MINIMUM CONCRETE STRENGTH GRADE AT RELEASE OF TENDONS SHALL BE 40 MPa.
5. EXPOSURE CLASSIFICATION FOR SURFACES OF CONCRETE SHALL BE B1.

REINFORCEMENT

6. COVER :- 30 mm UNLESS NOTED OTHERWISE.
7. SPACING :- TAKEN AS EQUAL UNLESS NOTED OTHERWISE.
8. GRADE :- 500 (VN) HOT ROLLED DEFORMED BARS TO AS/NZS 4671
   :- 500 (RF) WELDED WIRE FABRIC TO AS/NZS 4671
   :- (W) DENOTES HARD DRAWN REINFORCING WIRE COMPLYING WITH AS/NZS 4671
9. SPLICING :- 8 mm AND 12 mm DIA. BARS 435 mm MINIMUM. SPLICES TO ALTERNATE AND NO MORE THAN 50% OF SPLICES TO BE IN ANY ONE LOCATION.

PRESTRESSING

10. TENDONS SHALL BE 15.2 mm DIA. 'STRESS-RELIEVED' SUPER GRADE LOW RELAXATION STRAND COMPLYING WITH AS 1311.
11. TOTAL INITIAL FORCE IN TENDONS SHALL BE 4680 kN (EQUIVALENT TO 180 kN PER TENDON) AFTER ALLOWANCES HAVE BEEN MADE FOR ALL LOSSES IN GRIPS, JACKS ETC.
12. TOTAL CALCULATED FINAL TENDON FORCE 3406 kN (EQUIVALENT TO 131 kN PER TENDON). AT MIDSPAN AFTER LONG TERM SHRINKAGE AND CREEP LOSSES.
13. CALCULATED HOG AT TRANSFER OF PRESTRESS : 21 mm
14. CALCULATED HOG AFTER 3 MONTHS : 30 mm.

LIFTING ANCHORS

15. LIFTING ANCHORS SHALL BE SWIFTLIFT EYE ANCHORS 10.0 TONNES x 340 mm LONG OR APPROVED EQUIVALENT.
16. ANCHORS SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH AS/NZS 4680.

LIFTING AND HANDLING

17. CALCULATED MASS OF THE BEAM (AT 2650 kg/m3) : 23.0 TONNES.
18. BEAM SHALL BE LIFTED BY LIFTING ANCHORS PROVIDED.
19. THE ANGLE BETWEEN SLINGS ALONG THE BEAM CENTRELINE SHALL NOT EXCEED 90^.
20. BEAM SHALL BE STORED AND TRANSPORTED ON TEMPORARY SUPPORTS LOCATED NOT MORE THAN 600 mm FROM ENDS OF THE BEAM.
21. AFTER PLACING BEAMS THE OUTER BEAMS SHALL BE ADEQUATELY TIED TO THE INNER BEAMS PRIOR TO FIXING KERB FORMWORK.
22. TO PREVENT BEAMS "WALKING" THE BEAMS SHALL BE SECURED TEMPORARILY TO PIER CROSSHEAD AS THE BEAMS ARE ERECTED.

DESIGN ASSUMPTIONS

23. CALCULATED DEFLECTION DUE TO CASTING OF DECK OVERLAY : 17 mm.

DWG FILE NAME: 50925-S9.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
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DESIGNED	JGD
CHECKED	LDM
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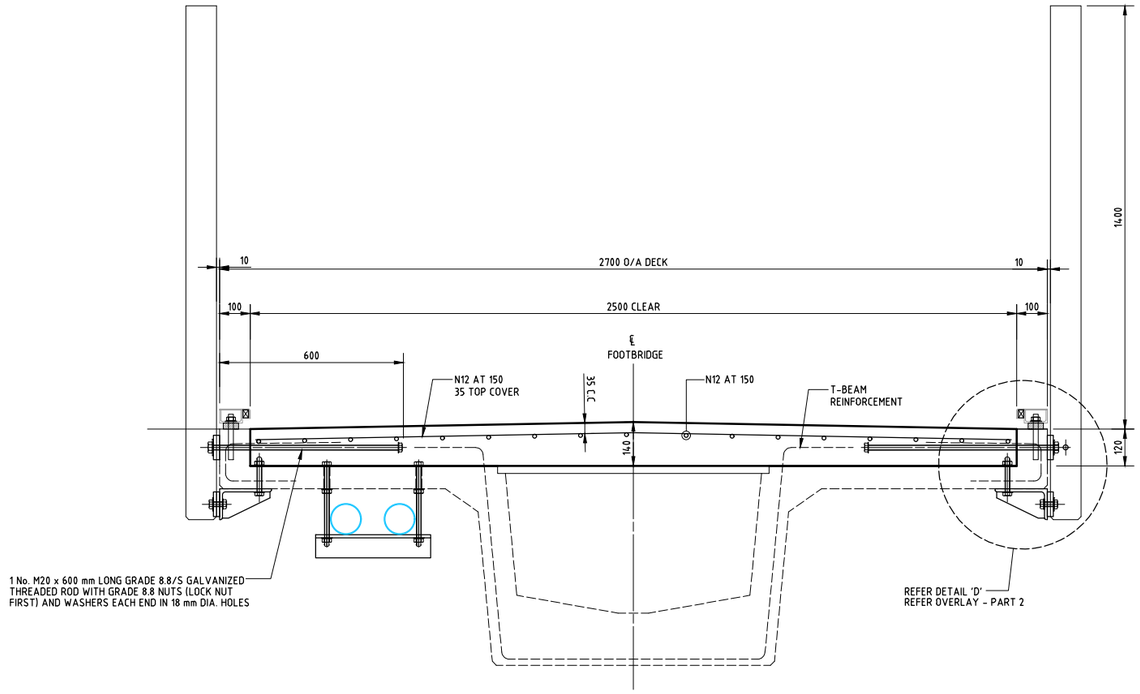
PROJECT

P.S.C T-BEAM - PART 3

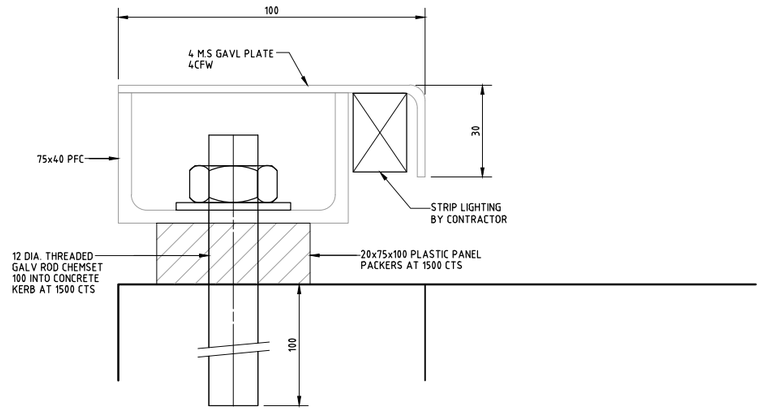
PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S9 OF 12
PROJECT No.	50925



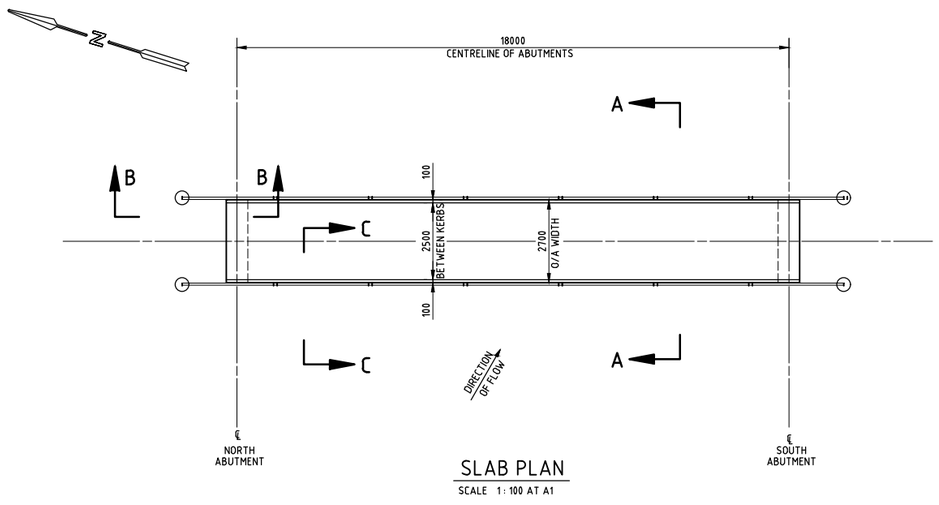
SECTION A - A

SCALE 1 : 10 AT A1



LIGHTING KERB DETAIL

SCALE 1 : 1 AT A1



SLAB PLAN

SCALE 1 : 100 AT A1

NOTES

CONCRETE

1. CONCRETE STRENGTH GRADE SHALL BE VR450/50
2. ALL CORNERS SHALL HAVE 20 x 20 mm FILLETS OR CHAMFERS UNLESS NOTED OTHERWISE.

GENERAL

3. MINIMUM OVERLAY THICKNESS SHALL BE 120 mm AT DECK EDGE DECK LEVEL OF BRIDGE SHALL FOLLOW TOP SURFACE OF BEAM AFTER ALLOWANCE FOR PRECAMBER.
4. DECK LEVELS TO BE ADJUSTED FOR DEFLECTION DUE TO CASTING OF REFER DECK SCREED CAMBER DIAGRAM.

REINFORCEMENT

5. COVER :- 40mm DECK OVERLAY UNLESS NOTED OTHERWISE.
6. GRADE :- 500 (N) HOT ROLLED DEFORMED BARS TO AS/NZS. 4671 (R) DENOTES PLAIN REINFORCING BARS TO AS/NZS. 4671
7. SPACING :- TAKEN AS EQUAL UNLESS NOTED OTHERWISE.
8. WELDING :- SHALL NOT BE PERMITTED UNLESS NOTED OTHERWISE
9. SPLICING :- SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITION SHOWN ON THE DRAWINGS OR AS OTHERWISE APPROVED BY THE SUPERINTENDENT. BAR LAPS IN MILLIMETRES ARE TO BE AS SHOWN BELOW UNLESS SHOWN OTHERWISE,

BAR DIA.	LAP LENGTH (mm)
N12	500
N16	700
N20	900
N24	1100
N28	1350

ALL HOOKS, BENDS AND COGS ARE STANDARD AND SHALL BE IN ACCORDANCE WITH AS 5100.5 - 2017 UNLESS NOTED OTHERWISE.

DWG FILE NAME: 50925-S10.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
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A	ISSUED FOR COMMENT	16/10/2025	JGD

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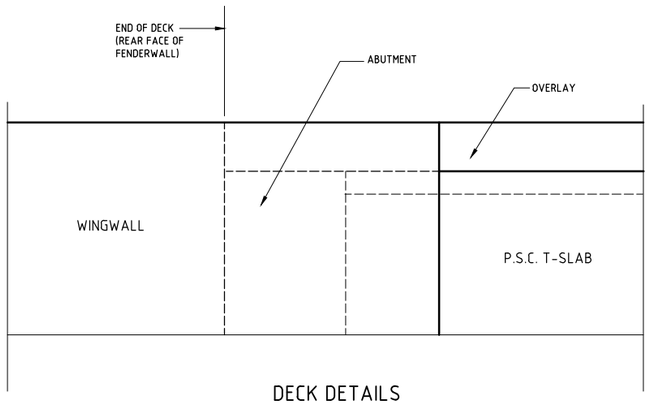
DESIGNED	JGD
CHECKED	LDM
SIGNED	

DECK OVERLAY - PART 1

PROJECT

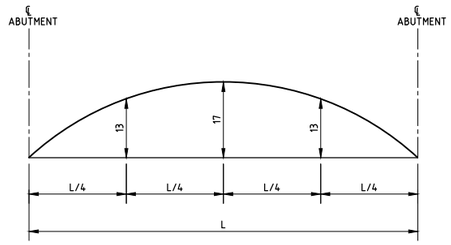
PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S10 OF 12
PROJECT No.	50925



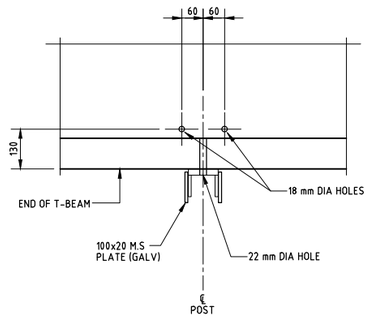
DECK DETAILS

SCALE 1 : 10 AT A1



DECK SCREED CAMBER

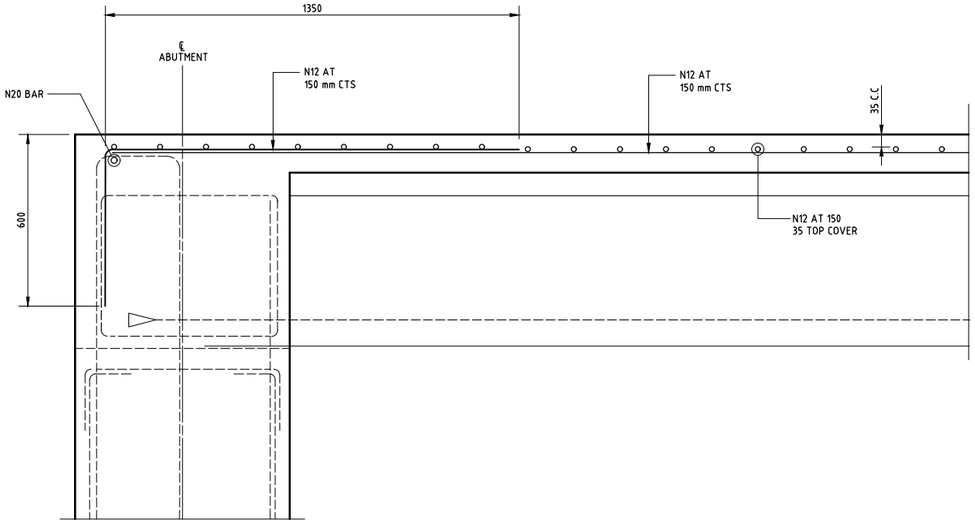
SCALE 1 : 10 AT A1



DETAIL 'D'

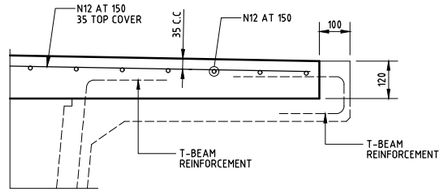
TYPICAL POST LOCATION

SCALE 1 : 10 AT A1



SECTION B - B

SCALE 1 : 10 AT A1



SECTION C - C

SCALE 1 : 10 AT A1

NOTES

CONCRETE

1. CONCRETE STRENGTH GRADE SHALL BE VR450/50
2. ALL CORNERS SHALL HAVE 20 x 20 mm FILLETS OR CHAMFERS UNLESS NOTED OTHERWISE.

GENERAL

3. MINIMUM OVERLAY THICKNESS SHALL BE 120 mm AT DECK EDGE DECK LEVEL OF BRIDGE SHALL FOLLOW TOP SURFACE OF BEAM AFTER ALLOWANCE FOR PRECAMBER.
4. DECK LEVELS TO BE ADJUSTED FOR DEFLECTION DUE TO CASTING OF REFER DECK SCREED CAMBER DIAGRAM.

REINFORCEMENT

5. COVER :- 40mm DECK OVERLAY UNLESS NOTED OTHERWISE.
6. GRADE :- 500 (N) HOT ROLLED DEFORMED BARS TO AS/NZS. 4571 (R) DENOTES PLAIN REINFORCING BARS TO AS/NZS. 4671
7. SPACING :- TAKEN AS EQUAL UNLESS NOTED OTHERWISE.
8. WELDING :- SHALL NOT BE PERMITTED UNLESS NOTED OTHERWISE
9. SPLICING :- SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITION SHOWN ON THE DRAWINGS OR AS OTHERWISE APPROVED BY THE SUPERINTENDENT. BAR LAPS IN MILLIMETRES ARE TO BE AS SHOWN BELOW UNLESS SHOWN OTHERWISE,

BAR DIA.	LAP LENGTH (mm)
N12	500
N16	700
N20	900
N24	1100
N28	1350

ALL HOOKS, BENDS AND COGS ARE STANDARD AND SHALL BE IN ACCORDANCE WITH AS 5100.5 - 2017 UNLESS NOTED OTHERWISE.

DWG FILE NAME: 50925-S11.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
B	DETAILED DESIGN	29/10/2025	JGD
A	ISSUED FOR COMMENT	16/10/2025	JGD

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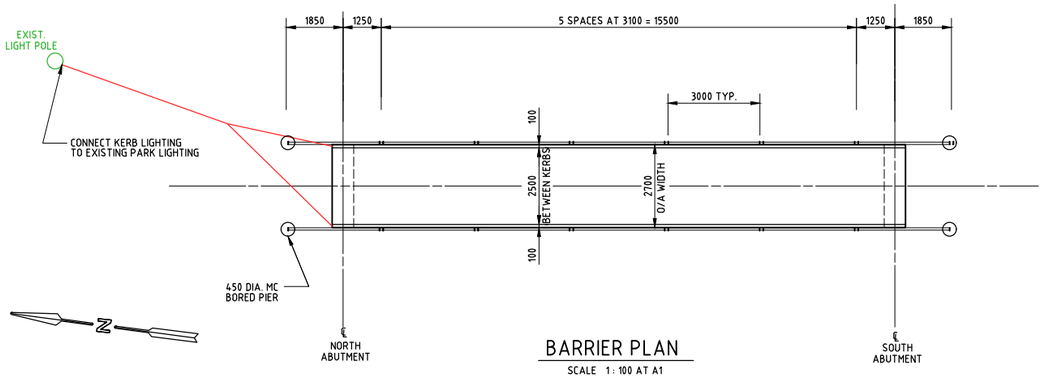
DECK OVERLAY - PART 2

PROJECT

PROPOSED PEDESTRIAN BRIDGE REPLACEMENT OVER TRARALGON CREEK AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S11 OF 12
PROJECT No.	50925



BARRIER PLAN

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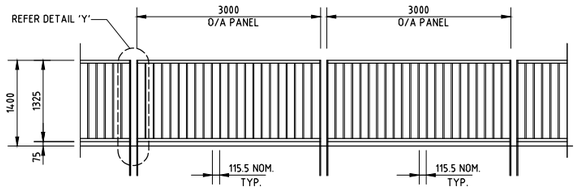

PANEL DETAIL

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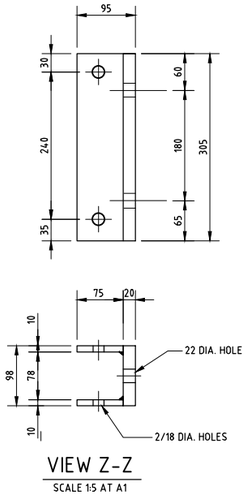
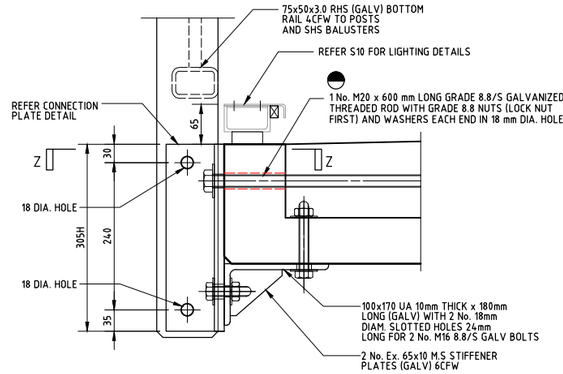


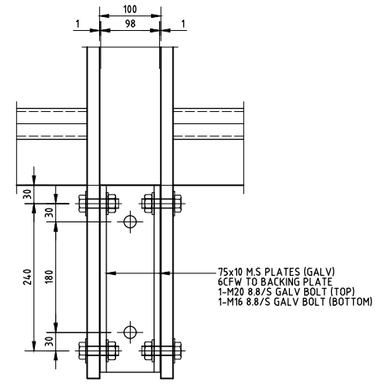
VIEW Z-Z

SCALE 1:5 AT A1



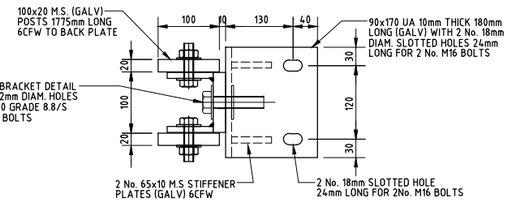
GUARD RAIL POST CONNECTION DETAIL

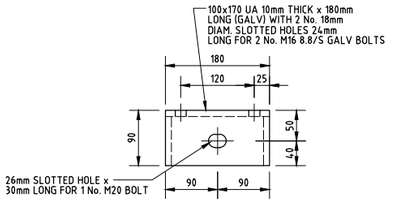
SCALE 1:5 AT A1



CONNECTION PLATE DETAILS

SCALE 1:5 AT A1





GUARD RAIL POST
POST CONNECTION DETAILS

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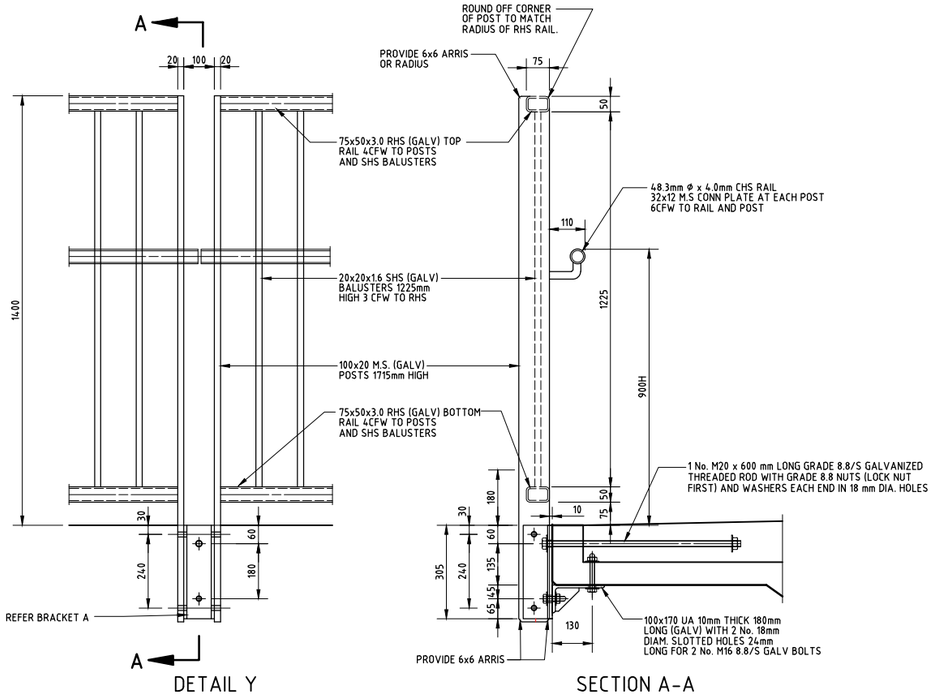
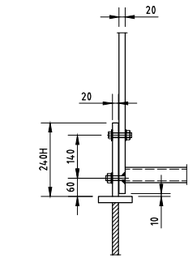


DETAIL Y

SCALE 1:10 AT A1
UPSTREAM SIDE SHOWN

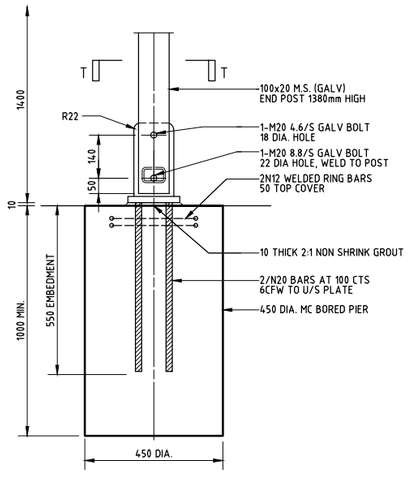
SECTION A-A

SCALE 1:10 AT A1
UPSTREAM SIDE SHOWN



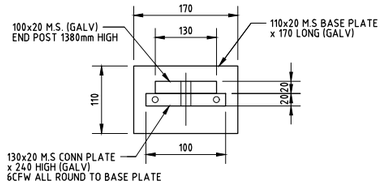
CONN PLATE DETAILS

SCALE 1:5 AT A1



END POST FOOTING DETAIL

SCALE 1:10 AT A1



VIEW T-T

SCALE 1:5 AT A1

NOTES

STEELWORK

1. (a) STEEL PLATES SHALL COMPLY WITH AS. 3678 GRADE 350 UNLESS NOTED OTHERWISE.
   (b) STEEL RECTANGULAR HOLLOW SECTIONS SHALL COMPLY WITH AS. 1163 GRADE 350.
   (c) STEEL HOT ROLLED ANGLES SHALL COMPLY WITH AS/NZS 3679.1 GRADE 300 PLUS.
2. BARRIER RAILING AND STEELWORK SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AS/NZS 4680.
3. GRADE 8.8 BOLTS, NUTS AND WASHERS TO AS. 1252 GALVANIZED TO AS/NZS 4680 UNLESS NOTED OTHERWISE.
4. WELDING SHALL BE IN ACCORDANCE WITH AS. 1554 - PART 1 SP.
5. ON COMPLETION OF SITE WELDING ANY DAMAGED COATING SHALL BE MADE GOOD USING 2 COATS OF ZINC RICH PAINT ('DULUX' PHENOXY OR APPROVED EQUIVALENT) IN ACCORDANCE WITH APPENDIX E OF AS/NZS 4680.
6. BARRIER POSTS SHALL BE ERECTED VERTICAL.

DWG FILE NAME: 50925-S12.dwg
DATE PLOTTED: 29-10-2025

No.	REVISION	DATE	BY
B	DETAILED DESIGN	29/10/2025	JGD
A	ISSUED FOR COMMENT	16/10/2025	JGD

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DESIGNED	JGD
CHECKED	LDM
SIGNED	

BARRIER DETAILS

PROJECT
PROPOSED PEDESTRIAN BRIDGE
REPLACEMENT OVER TRARALGON CREEK
AT VICTORY PARK, TRARALGON

DATE	SEPT 2025
SCALE	AS SHOWN
SHEET No.	S12 OF 12
PROJECT No.	50925

Appendix B

Black Geotechnical Report No. V2424R1, dated 3rd October, 2025.

CHRIS O'BRIEN & COMPANY

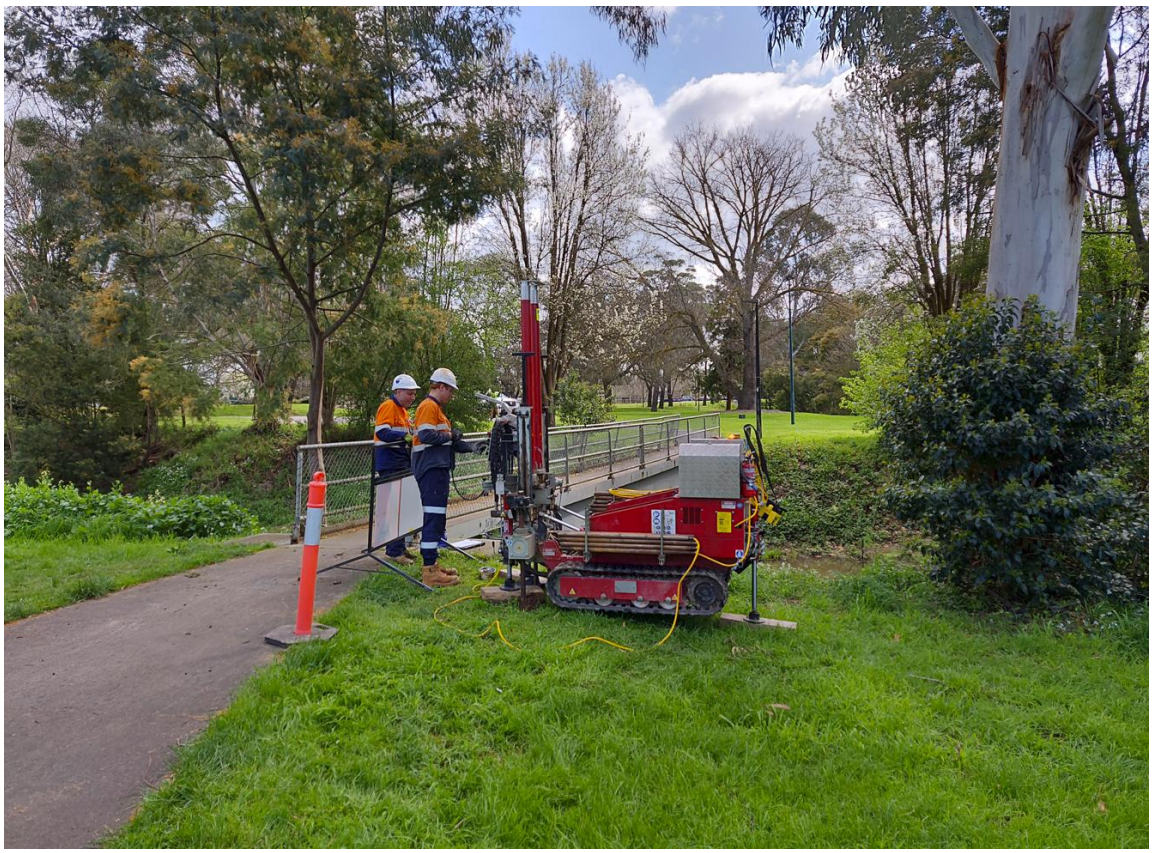
LATROBE CITY COUNCIL

VICTORY PARK, TRARALGON

PROPOSED REPLACEMENT PEDESTRIAN BRIDGE OVER TRARALGON CREEK

GEOTECHNICAL INVESTIGATION

INTERPRETIVE REPORT NO V2424R1 OCTOBER 2025



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CONSULT AUSTRALIA

DOCUMENT INFORMATION

project number	V2424
author	Frank O'Dea & Ned Smith
name of client	Chris O'Brien & Company
name / address of project	Victory Park, Traralgon. Proposed Replacement Pedestrian Bridge over Traralgon Creek
document version	R1

version	date issued	reviewed by	issued to
R1	03/10/2025	George Black	Luke Milstein, Chris O'Brien & Co. luke@chrisobrien.com.au Jack Downes, Chris O'Brien & Co. jack@chrisobrien.com.au

version	version description/comments
R1	first issue

Information about this document

This document has been produced for the client, Chris O'Brien & Company, with specific reference to the proposed development or specific structures as detailed in the document. The use of this document for development or structures outside of those detailed may not be suitable. This document must be viewed as a whole with no part used in isolation.

This document presents the conditions encountered at the time of the fieldwork and is not intended to be a complete and exhaustive statement of all conditions present. The information in this document is limited by the investigation scope and/or extent, as well as other information provided to, or obtained by, Black Geotechnical.

Site conditions and legal requirements may change over time from various influences, including (but not limited to) anthropogenic, climatic, and regulatory variations, which may invalidate recommendations provided in this document.

Conditions may differ between investigation points or below investigation depths, which may invalidate recommendations provided in this document.

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CONTENTS

APPENDIX A

1.0 GENERAL

1.1 Purpose of investigation

This report presents the results of a geotechnical investigation performed at the site of the proposed replacement pedestrian bridge over Traralgon Creek in Victory Park, Traralgon Road.

A locality plan is shown in below in Image 1.

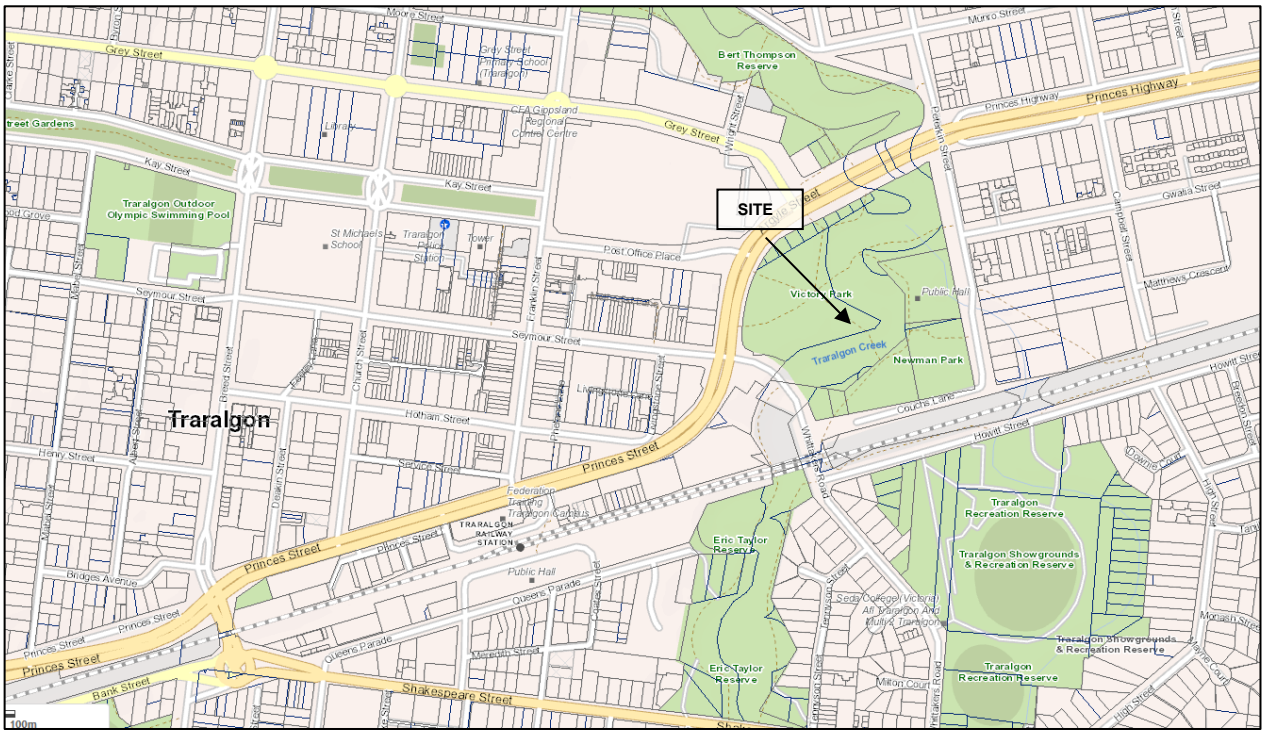

Image 1. MapshareVic database extract.

The purpose of the investigation was to:

- Determine the sub-surface conditions at the site.
- Provide an earthquake sub-soil class in accordance with AS 1170.4 – 2024.
- Provide recommendations on footing type, depth, capacity and testing.
- Provide estimates of footing settlement.
- Discuss construction.

1.2 Proposed pedestrian bridge

We understand that it is proposed to construct a replacement footbridge at Victory Park, Traralgon. The replacement pedestrian bridge will be a single span, 18.7 m long x 2.5 m wide, with abutments located near the existing bridge abutments.

Preliminary design of the proposed replacement bridge produced by Chris O'Brien & Co. is shown in document No. 50925 – LCC (VICTORY PARK) – CONCEPT GA. Extracts from these drawings are shown below in Image 2 to Image 4.

The proposed bridge will have a similar horizontal and vertical alignment to the existing bridge. The substructure will be driven 350 mm square precast concrete piles. Two piles per abutment are proposed. Concrete abutments and wingwalls are proposed.

The estimated total abutment load is about 600 kN SLS and 800 kN ULS. Based on two piles per abutment, the individual pile SLS and ULS loads are about 300 and 400 kN, respectively. These loads should be confirmed by the bridge designer.

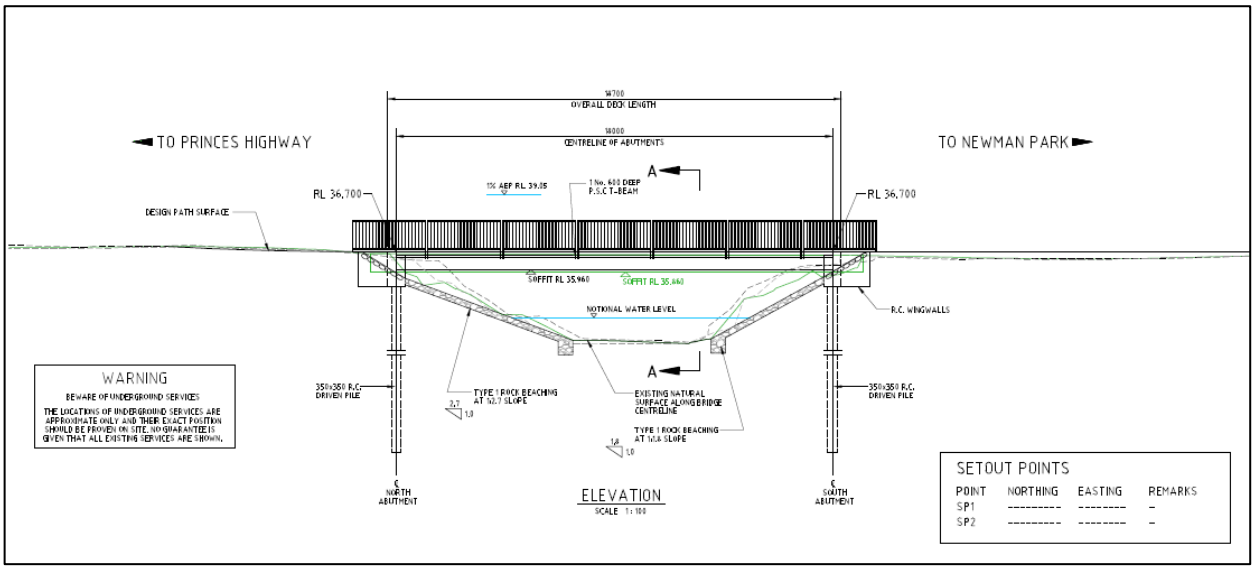

Image 2. Cross sectional view of the proposed bridge layout. Source - document No. 50925 – LCC (VICTORY PARK) – CONCEPT GA.

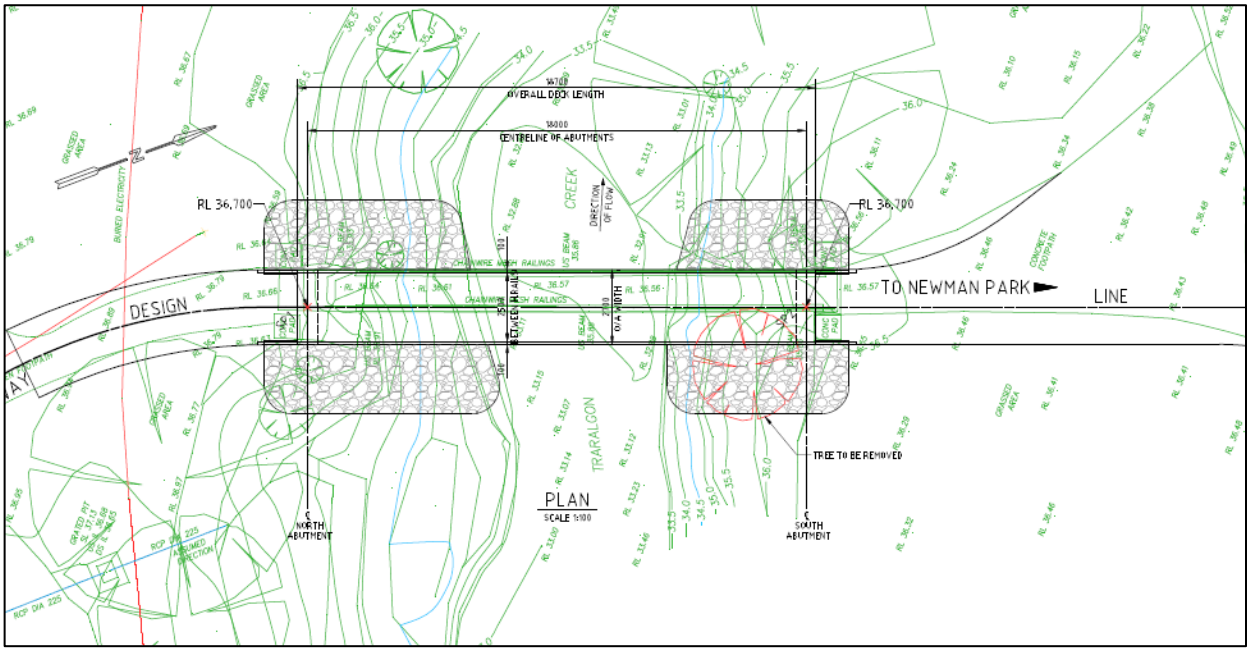

Image 3. Plan view of the proposed bridge layout. Source - document No. 50925 – LCC (VICTORY PARK) – CONCEPT GA

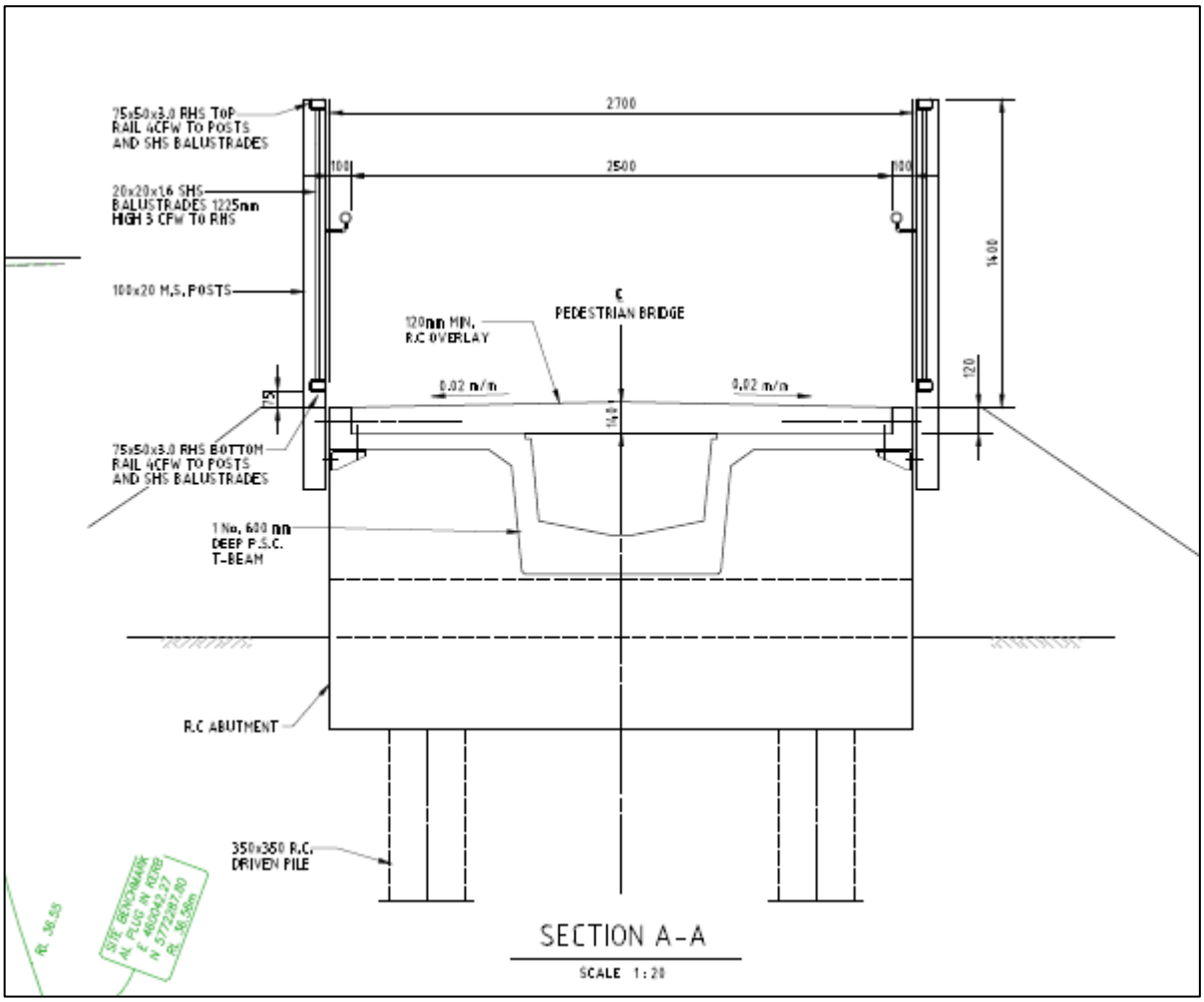

Image 4. Typical view of the abutment layout. Source - document No. 50925 – LCC (VICTORY PARK) – CONCEPT GA

1.3 Existing conditions

The existing bridge and environment are as follows.

- *Dimensions.* Length. 20 m. Width. 2.5 m. Single span.
- *Superstructure.* The bridge is supported by a steel girder beam and precast concrete deck.
- *Substructure.* The existing footing system is not visible behind the spill through abutments.
- *Environment*
  - The path runs north-south at the bridge site.
  - Deck to creek bed is 2.7 m.
  - Depth of water in creek was 2.9 m at the time of drilling.
  - Minor scour was observed in the creek banks.
  - The creek banks are vegetated with grass and trees.
  - There is about 2 m of fill at both abutments.

  Photos of the bridge site are shown in Image 5 to Image 7.

- Services. There is a decommissioned NBN Fibre optic cable at the north abutment. There are two separate underground electricity cables about 5 m from the north abutment. These are connected to light poles and an electricity box near the bridge site. There is a north-south running stormwater drain 10 m west of the north abutment, flowing towards Traralgon Creek.

Image 5. Aerial image of Victory Park and the existing footbridge.

Image 6. At the south abutment looking northwest.

Image 7. At the north abutment looking southwest.

2.0 SUBSURFACE CONDITIONS

2.1 Reported geology

The GeoVic3 online, 1: 250,000 series, 2007-2014 seamless geological database, indicates the site surface geology is Quaternary period alluvial deposits (Qa1). Neogene period Haunted Hills Formation (Nlh) is shown about 600 m and 800 m to the east and west, respectively, of the site. The Haunted Hills Formation typically consists of very stiff to hard clays and silts, with dense/cemented sand and ironstone layers. It is likely that the Haunted Hills Formation underlies the alluvium at the site.

An extract from the GeoVic3 database is shown in Image 8.

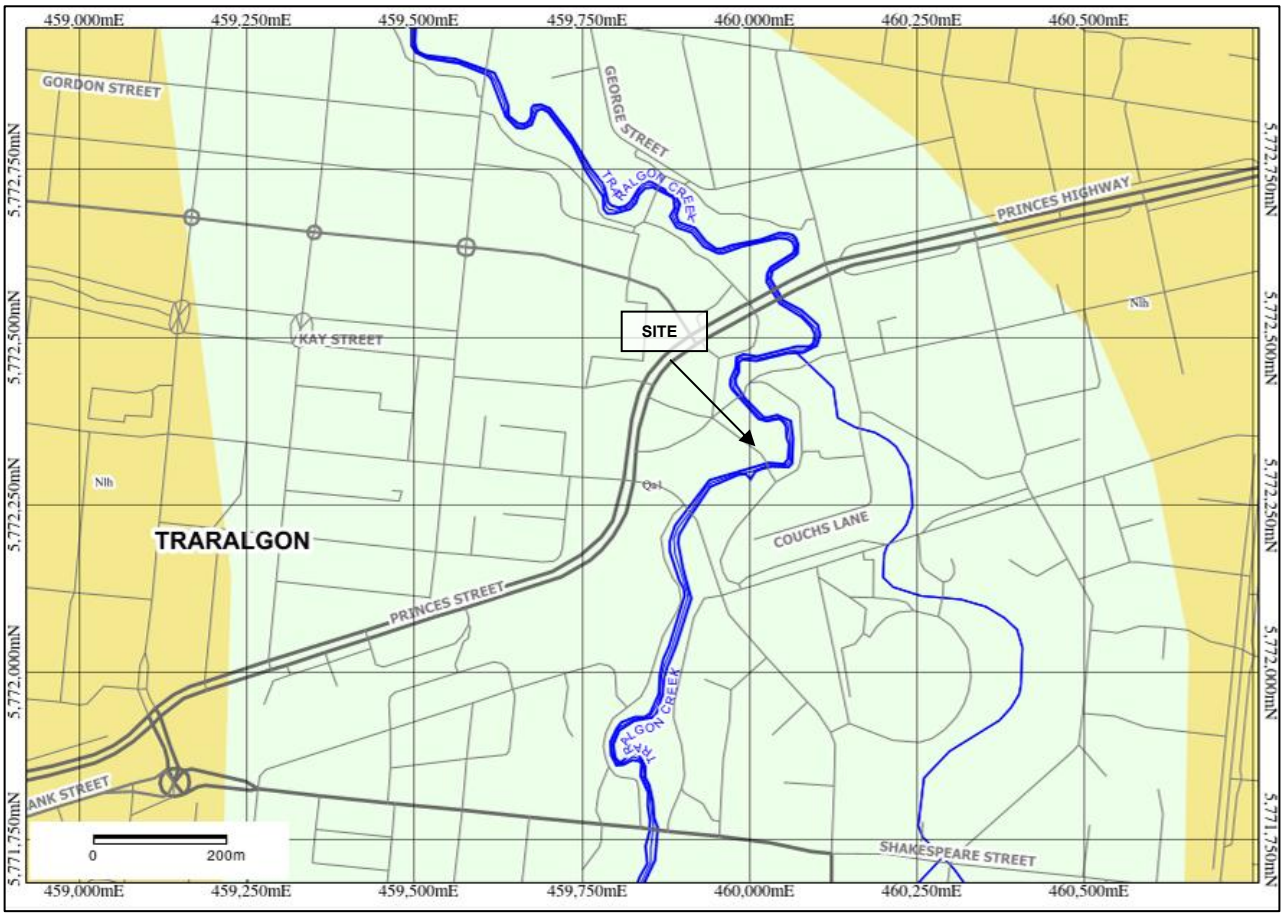

Image 8. GeoVic3 database extract

2.2 Fieldwork

To assess the site subsurface conditions three cone penetration tests (CPT 01, 02 and 03) were pushed to a maximum depth of 17.13 m below the existing surface level.

The CPTs were conducted using a tracked pagani rig, owned and operated by Black Insitu Testing.

CPT plots showing corrected cone resistance, sleeve friction, pore pressure, friction ratio and soil behaviour plots together with a description of the cone penetration test are included in Appendix A.

A hand auger borehole was drilled at each abutment to a maximum depth of 1.6 m below the existing surface level. The main purpose of the hand auger boreholes was to collect disturbed samples for laboratory testing.

Engineering logs of the boreholes together with a summary of the descriptive terms used in logging are also included in Appendix A.

Approximate borehole and CPT locations are shown in Appendix A, Figure 1. An extract of Figure 1 is shown below in Image 9.

Recovered soil samples may be inspected by prior arrangement at 258 Hyde Street, Yarraville. The samples will be disposed of six months after the completion of the fieldwork.

Image 9. Test location plan.

2.3 Subsurface profile

The CPTs encountered relatively uniform sub-surface conditions with firm to stiff clays/silty clays interbedded with very dense sand/silty sand layers.

CPT 01 at the south abutment was terminated at a depth of 5.3 m on an inferred dense cohesionless soil layer due to excessive inclination.

CPT 02 at the south abutment encountered refusal on a very dense cohesionless soil layer at a depth of 9.5 m.

CPT 03 at the north abutment penetrated the dense layer, which was encountered between 9.5 m and 11.25 m and was continued in very stiff to hard cohesive soil to 17.1 m, where the anchors providing the thrust reaction failed.

The boreholes encountered fragments of bituminous coal between 0.5 – 1.1 m (Image 10).

The subsurface profile encountered in the CPTs is summarised in Table 1.

Table 1. Summary of sub-surface conditions.

unit	type	description	depth top	depth base	thickness
1A	FILL	CPT 01 & 02, Silty CLAY, stiff, low to medium plasticity	0.0	1.8 – 2.0	1.8 – 2.0
1B		In CPT 03, Silty CLAY, stiff to very stiff, low to medium plasticity	0	0.9	0.9
1C		In CPT 03, Silty SAND, medium dense	0.9	2.4	1.5
2	ALLUVIUM over/or HAUNTED HILLS FORMATION	COHESIVE SOIL, typically firm to stiff in CPT 01 & 02, and stiff to very stiff in CPT 03. CPT 01 terminated at 5.3 m due to excessive inclination possibly due to a dense sand layer	1.8, – 2.4	8.6 – 9.4	6.8 – 7.0
3A	HAUNTED HILLS FORMATION	COHESIONLESS SOIL, dense to very dense. Refusal at 9.5 m in CPT 02	8.6, 9.4	>9.5, 11.1	1.6
3B		COHESIVE SOIL, very stiff to hard (CPT03 only)	11.1	> 17.1	>6.0

Image 10. Fragments of coal encountered in HA01 at 1.1m.

2.4 Groundwater

When the CPTs were completed and the rods withdrawn, the holes were dipped to record any groundwater.

The CPT 01 hole collapsed at the surface.

The CPT 02 & 03 holes remained open to depths of 8.7 m & 4.0 m, respectively, and groundwater was recorded at depths of 2.2 m (RL 34.17 m) & 2.4 m (RL 34.3 m), respectively.

The water level of Traralgon Creek at the time of testing was RL 34 m.

For design purposes, a regional groundwater level of RL 34.2 m has been assumed.

2.5 Laboratory testing

2.5.1 Geotechnical laboratory testing

Natural moisture content and Atterberg limits determinations were performed on selected soil samples recovered from the boreholes.

Test certificates are included in Appendix A.

The results are summarised in Table 2.

Table 2. Summary of geotechnical laboratory test results.

log ID	depth	soil type	W	W_L	W_P	I_P
HA01	0.3 – 0.5	Silty CLAY	23.2	41	26	15
HA01	0.5 – 0.9	Silty CLAY	23.7	37	22	15
HA02	0.5 – 0.8	Silty CLAY	16.7	30	17	13
HA02	1.3 – 1.6	Silty CLAY	16.6	25	14	11

where: W = natural moisture content, W_L = Liquid Limit, W_P = Plastic Limit, I_p = Plasticity Index

The tests indicate that the near surface clay at the site has a low to medium plasticity.

2.5.2 Environmental laboratory testing

A suite of environmental laboratory tests, including pH, chloride, sulphate, and conductivity, were conducted on samples of soil recovered from the site for the purpose of durability design.

The test results are summarised in Table 3. The test certificates and chain of custody are included in Appendix A.

Table 3. Summary of environmental laboratory testing results

log ID	depth, m	soil condition [A]	pH	conductivity (µS/cm)	resistivity (ohm.cm)	chloride [B] (ppm)	sulphate [B] (ppm)
HA01	1.1 – 1.2	B	5.9	31	33,000	<50	<100
HA02	1.3 – 1.6	B	5.8	27	37,000	<50	<100

[A] Refer to AS2159 – 2009, Table 6.4.2(C) and Table 6.5.2(C). Relevant to recovered sample.
[B] Units in parts per million (ppm), or mg/kg for soil samples and mg/L for water sample.

AS2159 – 2009, Table 6.4.2(C) and Table 6.5.2(C) provide the following classification for soil type:

- Soil condition A – high permeability soils (e.g., sands and gravels) which are in groundwater.
- Soil condition B – low permeability soils (e.g., silts and clays) or all soils above groundwater.

Based on AS2159 – 2009, Table 6.4.2(C) and Table 6.5.2(C), and the above laboratory test results, the following exposure classifications are applicable:

- Concrete piles in soil – ‘mild’ for soil condition A, and ‘non-aggressive’ for soil condition B.
- Steel piles in soil – ‘non-aggressive’ for soil conditions A and B.

The soil condition is judged to be ‘Soil condition B’ due to the cohesionless soil layers below the groundwater table. The soil encountered in the boreholes is non-aggressive.

3.0 DISCUSSION & RECOMMENDATIONS

3.1 Earthquake classification

The Earthquake Site Sub-Soil Class in accordance with AS 1170.4 – 2024, Structural design actions, Part 4: Earthquake actions in Australia, Section 4, is judged to be **Class D_e** due to the significant thickness of the Haunted Hills Formation and underlying unconsolidated soil.

The Hazard Factor (Z) in accordance with AS 1170.4 – 2024 is **0.11**.

3.2 Relevant levels and depths

Relevant levels and depths are shown in Table 4.

Table 4. Relevant levels and depths

location	depth below proposed deck (m)[1]	reduced level, RL (m)
existing bridge deck	0.0	36.7
creek bed	5.7	31.0
creek water at time of investigation	2.7	34.0
top of CPT 01	0.40	36.3
CPT 01 termination depth	5.7	31.0
top of CPT 02	0.30	36.4
CPT 02 refusal depth	9.8	26.9
top of CPT 03	0.0	36.7
CPT 03 termination depth	17.1	19.6

[1]proposed deck level is RL 36.70 m

The proposed driven 350 mm precast concrete piles are well suited to this site. There are no consistent end bearing layers at the site so the piles will derive most of their capacity from shaft adhesion, with less contribution from end bearing.

Driven piles compact the soil adjacent to the pile during driving, so they achieve a higher shaft adhesion than bored piles which do not compact, and instead disturb, the soil adjacent to the piles. The relatively shallow water table coupled with cohesionless soil layers would also make the construction of bored piles difficult compared to driven piles.

The proposed footing system is discussed in Section 3.3 of this report.

3.3 Footing recommendations

3.3.1 Pile capacity plots

The cone penetration test (CPT) records soil parameters (cone resistance, sleeve friction, pore pressure) every 10 mm and driven pile capacity can be determined directly from these 10 mm records. Pile capacity plots have been produced using the method for pile design based on the CPT proposed by Bustamante and Gianeselli (1982) as described in 'Cone Penetration Testing in Geotechnical Practice' by Lunne, Robertson & Powell, 1997. The method involves factors based on soil type, soil strength and pile type, which are applied directly to the corrected cone resistance values to determine ultimate and design geotechnical strength shaft adhesion pressures and end bearing pressures.

The method recognises that any layer encountered by the CPT may not be continuous and the end bearing contribution is the mean qc (cone resistance) value measured along two fixed distances, *a*, where *a* =1.5 D (D is the pile diameter) above (– *a*) and below (+ *a*) the pile tip. High qc values below the tip (any qc > 1.3 times the average over – *a* to + *a*), and high and low (any qc < 0.7 times the average over – *a*) values above the tip, are discarded.

This means that the computed pile capacity is at a depth above the CPT termination depth equal to 1.5 x the pile diameter. It also means that when a CPT reaches refusal, the high refusal cone resistance is not included in the pile capacity computation.

Plots of design geotechnical strength pile capacity versus depth for a 350 mm PC concrete pile for CPTs 02 & 03, are included in Appendix A. The plots are for a zero-day and seven-day set-up based on Svinkin & Skov, 2000, ß = $A(\log_{10}t+1)$ +1, where ß = setup multiplier, t = time in days, A ≈ 0.2 for sand and A ≈ 0.36 for clay.

Pile capacity plots are shown below in Image 11 and Image 12. The plots are based on CPT 02 & CPT 03, assuming a 7-day set-up. The capacity derived from shaft adhesion is noticeably lower in CPT 02.

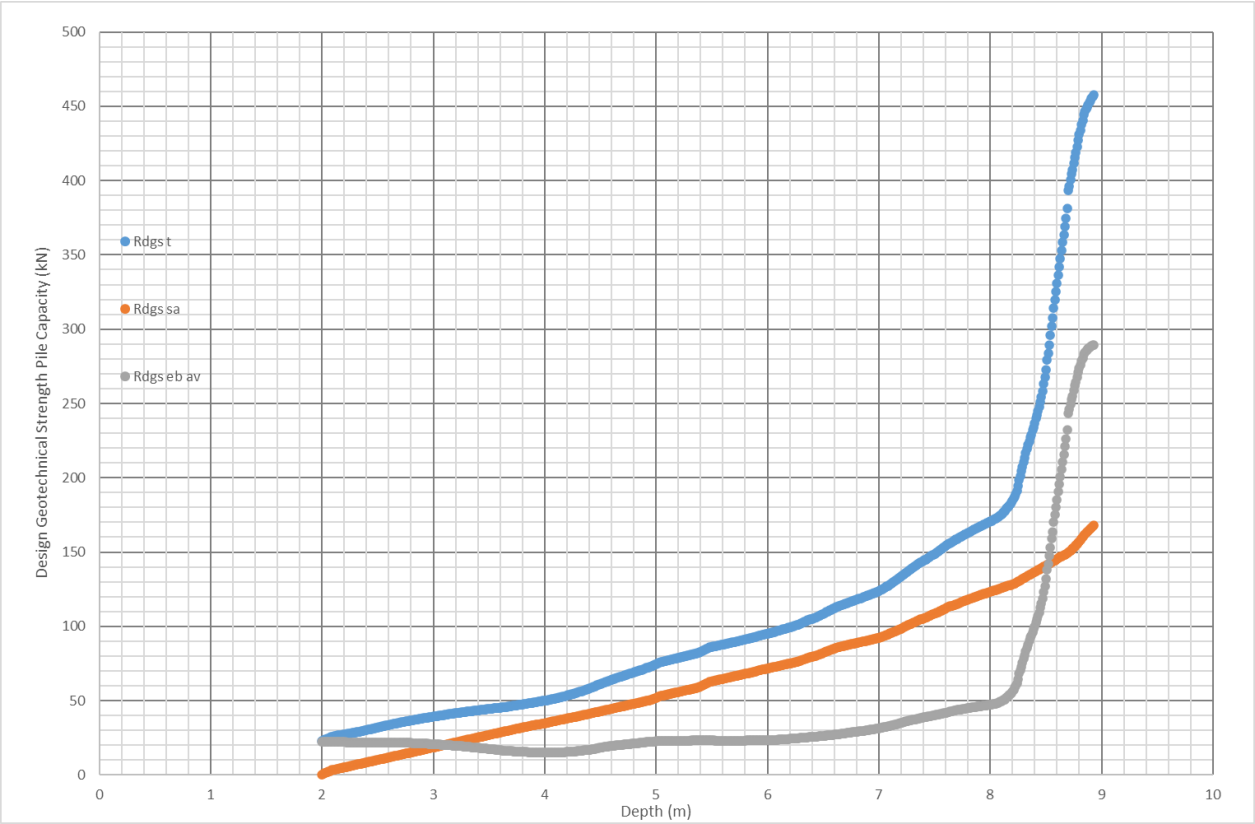

Image 11. Pile capacity plot for a 350 PC concrete pile with a 7-day set-up based on CPT 02.

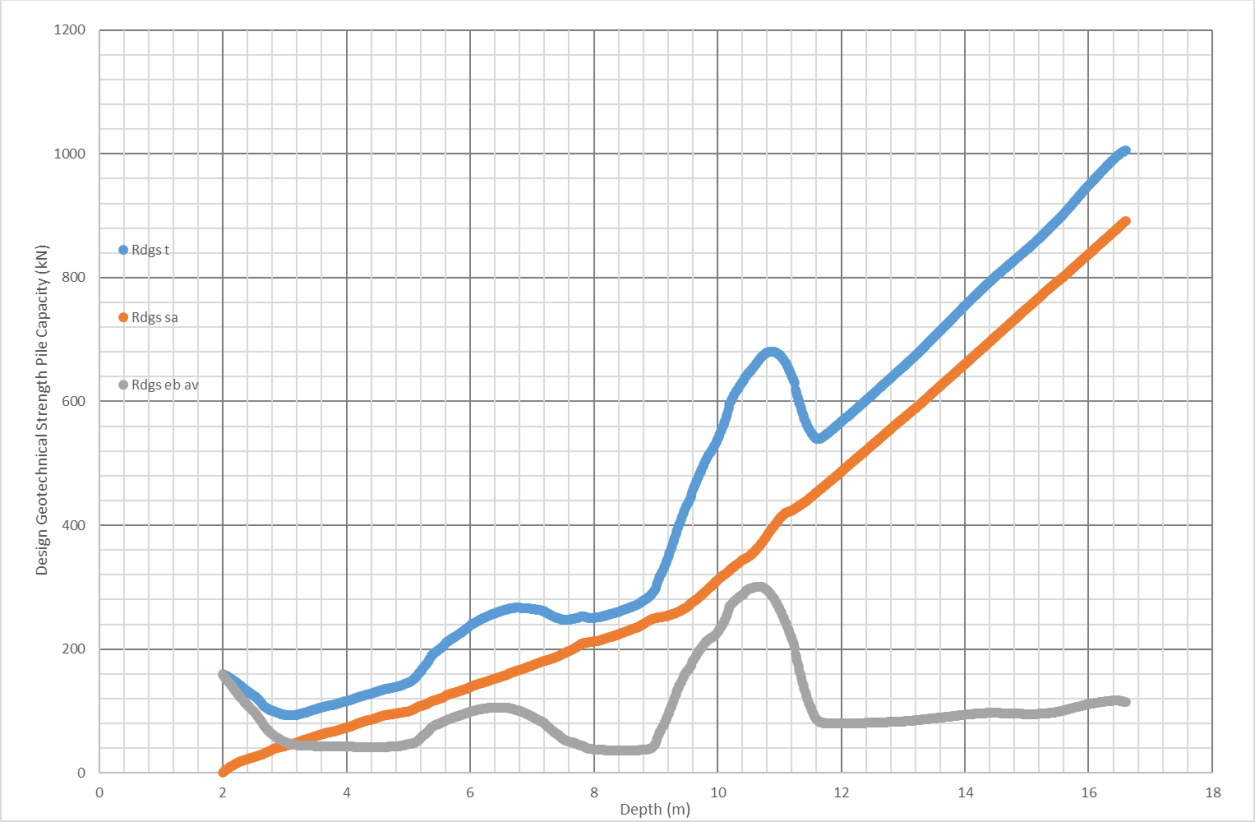

Image 12. Pile capacity plot for a 350 PC concrete pile with a 7-day set-up based on CPT 03.

3.3.2 Pile design parameters

Table 5 lists the design geotechnical shaft adhesion, fs_{dgs}, parameters that may be adopted in Units 2 and 3 in Table 1. The shaft adhesion should not be applied to the top 2 m of the pile.

Table 5. Design geotechnical strength shaft adhesion, fs_{dgs}, for driven concrete piles.

pile depth (m)	Reference level (m, AHD)	0-day set-up	7-day set-up
2 – 9.5	27.2 – 34.7	10	12.5
> 9.5	< 27.2	37.5	50

A design geotechnical strength end bearing pressure, fb_{dgs}, of 650 kPa may be adopted in the Haunted Hills Formation stratum below RL 27.2 m (9.5 m below deck level).

The design geotechnical strength pile capacity must exceed the applied ULS pile load.

For the preliminary pile loads discussed in Section 1.2, based on the above pile design parameters, and assuming a 7-day set-up, the piles will require an embedment length of 12.3 m below deck level and a pile toe level of RL 24.4 m.

The pile capacity is calculated as follows:

Pile capacity = (9.5 - 2) x (1.4 x 12.5) {shaft adhesion above 9.5 m} + (12.3 - 9.5) x (1.4 x 50) {shaft adhesion below 9.5 m} + (0.35 x 0.35 x 650) {end bearing} = 406 kN > 400 kN

It should be noted that CPT 02 at the south abutment encountered refusal on a dense/cemented cohesionless layer at RL 26.9 m. This is above the recommended toe depth. CPTs in the Haunted Hills Formation often encounter refusal on thin dense/cemented sand layers.

These layers do not typically cause driven pile refusal, and the driven piles penetrate into weaker soil below these layers. It is therefore expected that the proposed piles at the south abutment will achieve the design embedment depth and not encounter refusal at the CPT02 refusal depth. However, sometimes driven piles will achieve refusal within the CPT refusal layer. In this case, piles driven to refusal with enough energy to mobilise the design test load will be suitable for the design ULS load even if they do not achieve a pile toe RL of 24.4 m.

As a general rule, piles driven to 'refusal' will achieve a capacity consistent with the energy applied during driving. Pile driving 'refusal' is achieved when a set of less than 3 mm per blow is recorded when the pile is impacted with a hammer that delivers enough energy to the pile to satisfy the design pile capacity.

As a guide, the driving energy in kN.m should be about 2% of the pile test load in kN. For example, for a ULS load of 400 kN and a basic geotechnical strength reduction factor, Φ_g, of 0.80 (see Section 3.3.4), the test load is about 500 kN and the required driving energy is about 10 kNm. Black Geotechnical can confirm the pile driving system energy requirements when the pile type and loads have been decided.

3.3.3 Footing settlement

The theoretical maximum post construction settlement of the proposed driven piles under SLS loads due to ground compression is less than 5 mm. Driven pile settlement estimates are based on the elastic solutions of Poulos, 1972.

3.3.4 Footing testing

It is recommended that high strain dynamic testing with wave matching analysis (PDA testing) is conducted on a minimum of two piles. It is recommended that a pile from each abutment is tested. Dynamic testing should be conducted using a Pile Driving Analyzer® with CAPWAP modelling (or similar).

The pile test load is calculated by dividing the design action effect on the pile (i.e. the pile ULS load), E_d, by the geotechnical strength reduction factor, Φ_g. where $\Phi_g = \Phi_{gb} + (\Phi_{tf} - \Phi_{gb}) * K \geq \Phi_g$

Φ_g = geotechnical strength reduction factor
Φ_{gb} = basic geotechnical strength reduction factor (determined as in Appendix A)
Φ_{tf} = intrinsic geotechnical strength reduction factor = 0.8 for dynamic load testing of preformed piles
K = testing benefit factor = $1.13p/(p+3.3) \leq 1$
p = percentage of the total piles that are tested and meet the specified acceptance criteria

For this site, it is estimated that Φ_{gb} = 0.48 (refer Appendix A). For two piles tested (one per abutment), a Φ_g of 0.80 is appropriate.

The capacities of untested piles can be confirmed by driving to a minimum set and energy determined by CAPWAP modelling.

Black Geotechnical can provide a fee to perform PDA testing at the site.

3.4 Scour protection

It is recommended that the Type 1 ungrouted beaching proposed by Chris O'Brien & Company is placed on the batter below the deck and on the banks for 2 m to 3 m on either side of the deck. Refer to Department of Transport and Planning (VicRoads) Standard Document Section 713.

3.5 Construction

No construction difficulties are expected with the bridge footings provided the new piles are away from any existing piles.

PDA testing of piles requires sensors to be attached to the sides of the test piles at least 1.5 (preferably 2, or more) pile diameters below the top of the pile. For high strain dynamic testing to be conducted on the piles, contractors should ensure there is sufficient and safe access to the sides of the test piles for sensor attachment.

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APPENDIX A

Figure 1	**Test location plan**
Figure 1A	**Soil classification sheet**
Figure 1B	**Rock classification sheet**
Logs	**BH01 to BH02**
Figure 1C	**CPT description**
Plots	**CPT01 to CPT03**
Plots	**Pile capacity vs depth (2 sheets)**
Results	**Geotechnical laboratory tests (5 sheets)**
Results	**Environmental laboratory tests (2 sheets)**
Sheet	**Calculation of basic geotechnical strength reduction factor, ϕ_{gb}**

VERSION 2.9, 1 JAN 2024

CO-ORDINATE DATUM / PROJECTION: GDA2020 MGA55
ELEVATION DATUM: AHD
SURVEY BY BLACK GEOTECHNICAL USING LEICA ZENO FLX100 INSTRUMENT WITH REPORTED ACCURACY: HORIZ. ±20 mm & VERT. ±30 mm
AERIAL IMAGE: NEARMAP - CAPTURE DATE 26/12/2024

BLACK GEOTECHNICAL

BLACK GEOTECHNICAL PTY LTD
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www.blackgeotechnical.com.au

REVISION	DETAILS OF AMENDMENT	DATE
A	First Issue	03/10/25

PROJECT TITLE / ADDRESS
VICTORY PARK, TRARALGON.
PROPOSED REPLACEMENT BRIDGE OVER TRARALGON CREEK

DRAWING TITLE
TEST LOCATION PLAN

SCALE	SIZE	DRAWN	CHECKED	PROJECT NO.	DRAWING NO.	REV.
1:200	A3	FOD	NDS	V2424	FIGURE 1	A

Plot Date: 2025-10-01 11:30:21
File: W:\2025 Job Files\V2424 - Victory Park Pedestrian Bridge, Traralgon\Drawings\V2424 - Figure 1.dwg

DESCRIPTIVE TERMS & GRAPHIC SYMBOLS FOR SOIL

FIG. 1A

Doc. Ver. 2.5

CLASSIFICATION BASED ON UNIFIED SOIL CLASSIFICATION. AS1726 – 1993

WATER

▽	Water level at time of drilling.	GROUNDWATER NOT OBSERVED Groundwater observation was not possible due to water used in drilling process. Groundwater may be present.
▼	Static water level.	
→	Water inflow to borehole or test pit.	GROUNDWATER NOT ENCOUNTERED No groundwater was encountered at time of drilling or excavation in the borehole or test pit.
←	Water loss in borehole.	

SAMPLES AND TESTS

SPT	Standard Penetration Test (AS1289.6.3.1 – 2004). Blows per 150 mm. N = Blows for 300 mm after 150 mm seating.	SV	Shear Vane. Measures Shear Strength (s_u). Peak Strength/Residual Strength.
DCP	Dynamic Penetrometer Test (AS1289.6.3.2 – 1997). Blows per 100 mm.	N	SPT with sample collected from spoon.
U63	Undisturbed sample (Push Tube) – 63 mm diameter. 50 mm tube may be used (U50).	N*	SPT with no sample collected in spoon.
PP	Pocket Penetrometer. Measures Unconfined Compressive Strength (UCS).	Nc	SPT with solid cone. No sample.
D	Disturbed sample.	N'(60)	Corrected normalised N-value. Also known as $N_{1,60}$.
B	Bulk disturbed sample.	R	DCP / SPT refusal.

SOIL GRAPHICS (Sample)

CLAY (CL, CI, CH) | FILL | SILT (ML, MH)

GRAVEL (GW, GP) | SAND (SW, SP) | COBBLES AND BOULDERS

Graphic representation of mixed materials, such as silty clay, would be a combination of these symbols.

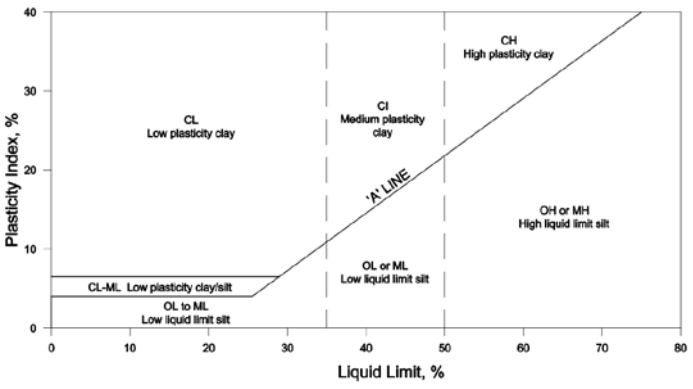
DRILLING METHOD

SSA	Solid Stem Auger	WB	Washbore
HSA	Hollow Stem Auger	ODEX	ODEX Retractable Bit System
HA	Hand Auger	AIRH	Down-the-hole Air Hammer
EX	Excavator	HE	Hand Excavation
BH	Backhoe	CC	Concrete Coring
NMLC	52mm Diamond Core	RCB	Rock Core Barrel
NDD	Non-Destructive Drilling	MC	Macro Core

PARTICLE SIZE

Boulders		> 200mm
Cobbles		63 to 200mm
Gravel	Coarse	20 to 63mm
	Medium	6.0 to 20mm
	Fine	2.0 to 6.0mm
Sand	Coarse	0.6 to 2.0mm
	Medium	0.2 to 0.6mm
	Fine	0.075 to 0.2mm
Silt		0.002 to 0.075mm
Clay		< 0.002mm

PLASTICITY PROPERTIES



PLASTICITY

Description	*Liquid Limit*
Low	< 35%
Medium	30 to 50%
High	> 50%

SECONDARY COMPONENT

Trace	0 to 5%
Presence just detectable by feel or eye	
With	5 to 12%
Presence easily detectable by feel or eye	

MOISTURE CONDITION

Dry	Looks and feels dry
Moist	Feels cool, darkened in colour, no free water or remoulding
Wet	Feels cool, darkened in colour, free water or remoulding
W	Natural moisture content
Wp	Plastic limit

CONSISTENCY

s_u kPa, AS1726 Table A4

TERM	very soft	soft	firm	stiff	very stiff	hard
s_u kPa	12	25	50	100	200	

If a soil crumbles on test it is described as friable.

DENSITY INDEX

I_d %, AS1726 Table A5

TERM	very loose	loose	medium dense	dense	very dense
I_d %	15	35	65	85	

BLACK GEOTECHNICAL

DESCRIPTIVE TERMS & GRAPHIC SYMBOLS FOR ROCK

FIG. 1B

Doc. Ver. 2.5

CLASSIFICATION BASED ON UNIFIED SOIL CLASSIFICATION. AS1726 – 1993

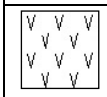
WATER

	Water level at time of drilling	GROUNDWATER NOT OBSERVED Groundwater observation was not possible due to water used in drilling process. Groundwater may be present.
	Static water level	
	Water inflow to borehole or test pit	GROUNDWATER NOT ENCOUNTERED No groundwater was encountered at time of drilling or excavation in the borehole or test pit.
	Water loss in borehole	

ROCK CORE RECOVERY

RUN	RECOVERY (%)	RQD (%)
Coring run number	Percentage of core recovered	Rock Quality Designation

ROCK GRAPHICS (Sample)

 BASALT

 SANDSTONE

 SILTSONE

 LIMESTONE

 GRANITE

 DOLERITE

DEFECT DESCRIPTION

Defect Type	J Joint BP Bedding Plane C Cleavage SP Sheared Plane F Fault HB Handling Breakage DB Drilling Break	*Coating or Infilling*	Cn Clean St Stained Vr Veneer Ct Coating
Planarity	Pl Planar Un Undulating St Stepped	*Roughness*	Ro Rough Sm Smooth Sl Slickensided

Dip measured normal to core stick.

STRENGTH

Symbol	*Term*	*Point Load Index, $I_{s(50)}$ (MPa)*	*Field Guide*
EL	Extremely Low	< 0.03	Easily remoulded by hand to a material with soil properties.
VL	Very Low	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 3 cm thick can be broken by finger pressure.
L	Low	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
H	High	1 to 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
VH	Very High	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

WEATHERING

Symbol	*Term*	*Field Guide*
RS	Residual Soil	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
XW	Extremely Weathered	Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded, in water.
DW	Distinctly Weathered	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
SW	Slightly Weathered	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
FR	Fresh	Rock shows no sign of decomposition or staining.

POINT LOAD TEST

Point Load Strength Index, $I_{s(50)}$.
Test performed in accordance with AS4133.4.1 – 2007.
Uniaxial Compressive Strength (UCS) determined by multiplication of $I_{s(50)}$ by a coefficient, K.
$UCS = K \times I_{s(50)}$

REPORT OF BOREHOLE: HA01

Job No	: V2424	Easting	: 460029.78	Sheet	: 1 OF 1
Client	: Chris O'Brien & Co.	Northing	: 5772296.80	Logged	: Frank O'Dea
Project	: Victory Park Pedestrian Bridge over Traralgon Creek	Coordinate System	: EPSG:7855	Logged Date	: 18/09/2025
Location	: Cnr Princes Highway &, Whittakers Rd, Traralgon VIC 3844, Australia	Drill Rig	: Hand Auger	Checked	: Ned Smith
Contractor	: Black Geotechnical Pty Ltd	Inclination	:	Checked Date	: 02/10/2025

Drilling Method	Elevation / Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency / Relative Density	Samples
Hand Auger / Hand Excavation	36.3 0.1		CI	FILL (TOPSOIL); SILTY CLAY; stiff to very stiff; medium plasticity; dark brown; W = Wp, with organic matter	w = wp	St-VSt	
			CI	FILL: ; SILTY CLAY; stiff to very stiff; medium plasticity; dark brown; W > Wp	w > wp	St-VSt	0.30-0.50, Disturbed 0.50-0.90, Disturbed
	35.3 1.1		CI	Becoming brown; W = Wp, with coal fragments from 1.1 m	w = wp	St-VSt	1.10-1.20, Enviro
				HA01 Terminated - target depth achieved 1.5 m 2025-09-18 11:00:00			

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

REPORT OF BOREHOLE: HA02

Job No	: V2424	Easting	: 460015.89	Sheet	: 1 OF 1
Client	: Chris O'Brien & Co.	Northing	: 5772325.49	Logged	: Frank O'Dea
Project	: Victory Park Pedestrian Bridge over Traralgon Creek	Coordinate System	: EPSG:7855	Logged Date	: 18/09/2025
Location	: Cnr Princes Highway &, Whittakers Rd, Traralgon VIC 3844, Australia	Drill Rig	: Hand Auger	Checked	: Ned Smith
Contractor	: Black Geotechnical Pty Ltd	Inclination	:	Checked Date	: 02/10/2025

Drilling Method	Elevation / Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency / Relative Density	Samples
Hand Auger / Hand Excavation	36.9 0.2		CI	FILL (TOPSOIL); SILTY CLAY; firm; medium plasticity; dark brown; W > Wp	w > wp	F	
	36.6 0.5		CL	FILL; SILTY CLAY; very stiff; low plasticity; dark brown; W = Wp	w = wp	VSt	
			CL	With coal fragments from 0.5 m	w = wp	VSt	0.50-0.90, Disturbed
	36.1 1.0		SC-SM	FILL; SILTY CLAYEY SAND; loose; fine grained; brown; moist; low to medium plasticity clay	m	L	1.30-1.60, Disturbed
				HA02 Terminated - target depth achieved 1.6 m 2025-09-18 14:00:00			

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

A DESCRIPTION OF CONE PENETRATION TESTING

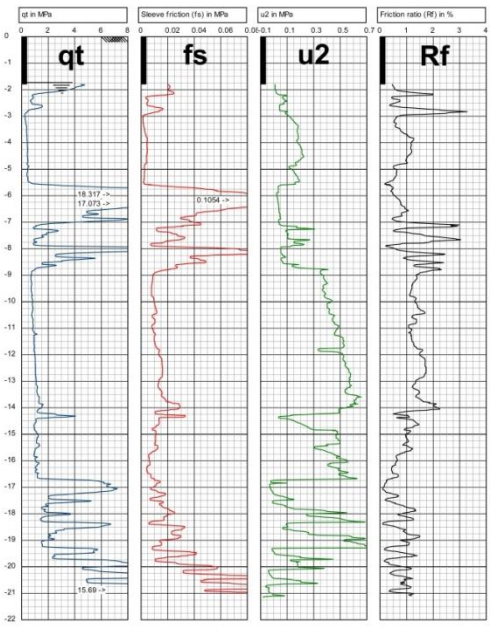
A Cone Penetration Test (CPT) involves using hydraulic rams to push 36 mm diameter rods into the soil from a ballasted truck anchored drill rig or anchored portable rams. Attached to the end of the rods is a cone containing sensors that measure qc (cone resistance) fs (sleeve friction) u2 (pore water pressure) and inclination. The cone is connected to a data acquisition system during the test with the data logged every 10 mm and viewed live by the operator and engineer.

The collected data allows reliable interpretation of soil strength and stiffness parameters and the soil type.

The live inclination measurement allows the operator to determine if the cone is being bent in the soil and therefore reduces risk of damage. Clients are not responsible for any costs associated with damage to cones.

The results are presented in plots and provided in a raw format (.t t). The following procedures are applied to the data:

- The qc is corrected for pore water pressure effects to provide qt.
- The friction ratio Rf (fs qt 100%) helps identify soil type.



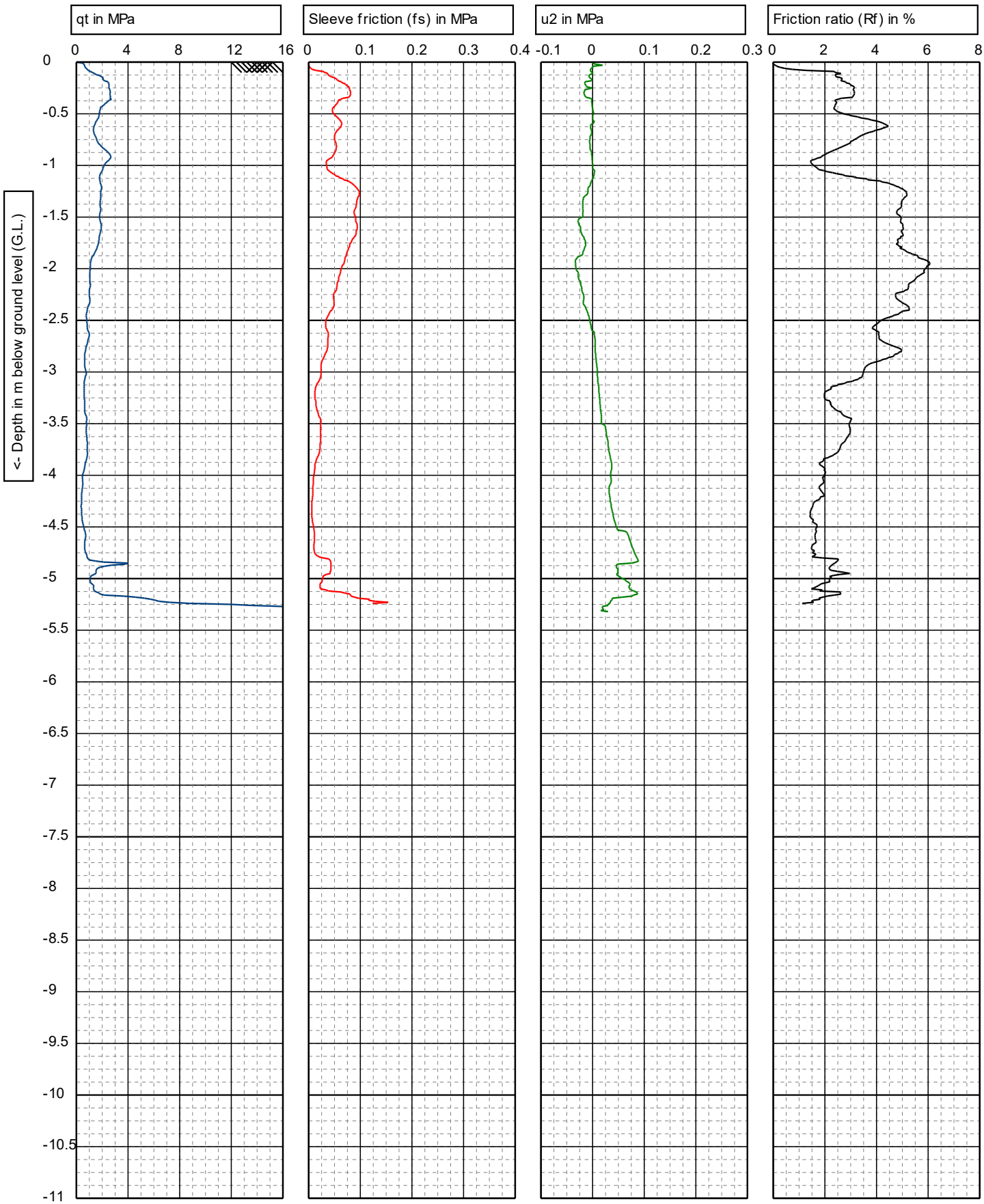
A 15 cm cone (larger and stronger) can be used where adverse soil conditions(gravels cobbles) are e pected.

Soil samples can be rapidly collected with the use of ertek or MOSTAP soil piston samplers.

Testing depths of 40 m or more are achievable depending on soil conditions.

A CPT conducted to a depth of 25 m will take about 2 hours. This is much quicker and therefore cheaper than drilling which may take a day or more and would not provide the same level of detailed useful subsurface information.

Black Insitu Testing Pty Ltd
258 Hyde Street arraville ictoria Australia 3013
Ph: 03 9689 0200 – Fa : 03 9689 0155
office blackinsitutesting.com.au – www.blackinsitutesting.com.au



Refusal at 5.32 m Inclination

BLACK INSITU TESTING

r u2
L 150 cm²
10 cm²

Client: Black Geotechnical

G.L.: **36.31 m**

Project: **Pedestrian Bridge Traralgon Creek**

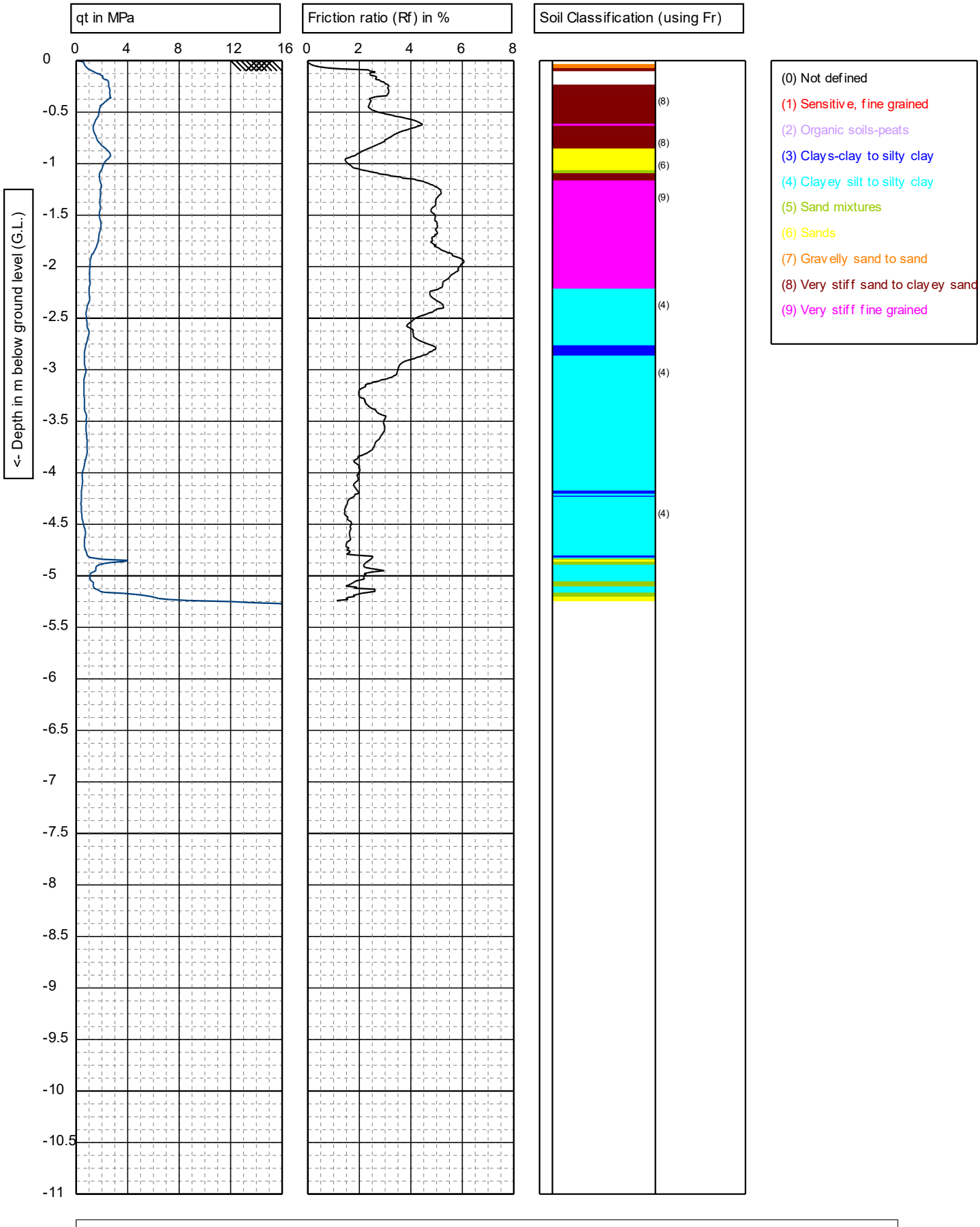
Location: **Victoria Park Traralgon**

Position: **460027.99, 5772299.37**

Predrill:	**0.00 m Predrilled**
Date:	**18/09/2025**
Cone no.:	**C10CFIIP.C16325**
Project no.:	**L039**
CPT no.:	**CPT 01** 1/2

Processed by: OL Checked by: NDS

1.47



Refusal at 5.32 m Inclination

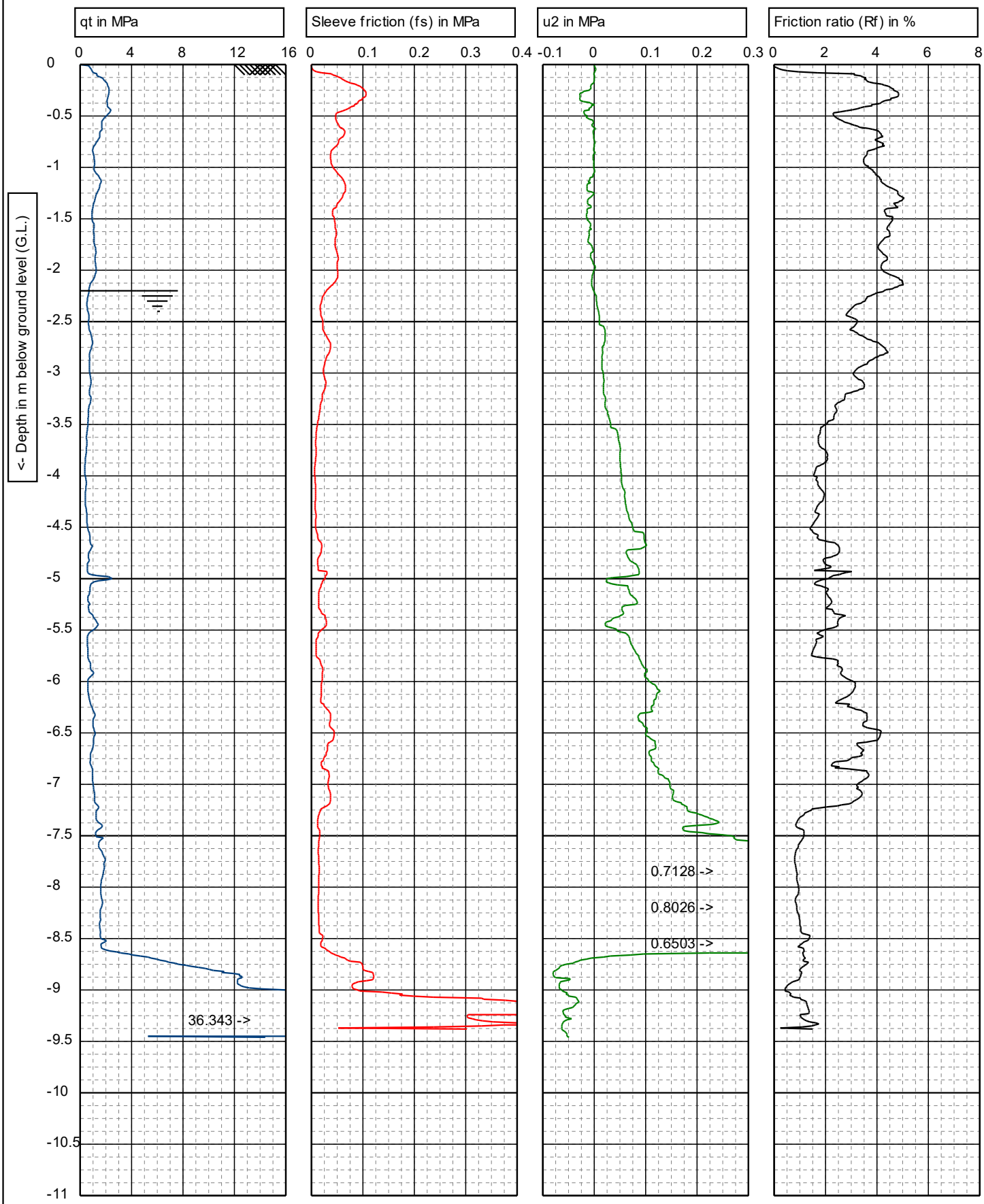
BLACK INSITU TESTING

r u2
L 150 cm²
10 cm²

Client: Black Geotechnical		Predrill:	**0.00 m Predrilled**
G.L.: **36.31 m**		Date:	**18/09/2025**
Project:	**Pedestrian Bridge Traralgon Creek**	Cone no.:	**C10CFIIP.C16325**
Location:	**Victoria Park Traralgon**	Project no.:	**L039**
Position:	**460027.99, 5772299.37**	CPT no.:	**CPT 01** 2/2

Processed by: OL Checked by: NDS

1.47



Refusal at 9.46 m. Anchor Failure

Hole to 8.7 m. Water to 2.2 m

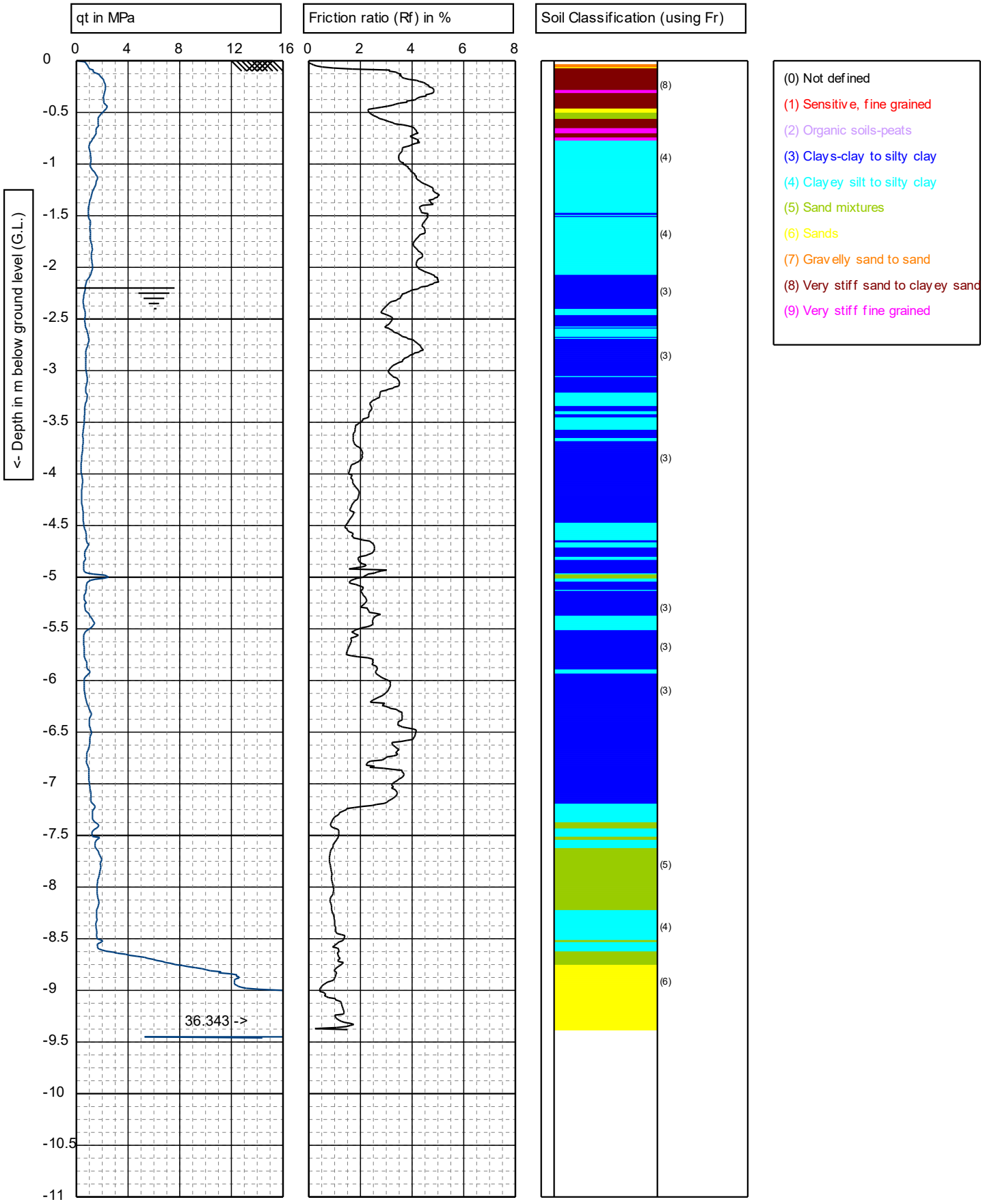
BLACK INSITU TESTING

r u2
L 150 cm²
10 cm²

Client: Black Geotechnical		Predrill:	**0.00 m Predrilled**
G.L.: **36.38 m**	W.L.: **-2.20 m**	Date:	**18/09/2025**
Project: **Pedestrian Bridge Traralgon Creek**		Cone no.:	**C10CFIIP.C16325**
Location: **Victoria Park Traralgon**		Project no.:	**L039**
Position: **460033.3, 5772300.51**		CPT no.:	**CPT 02** **1/2**

Processed by: OL Checked by: NDS

1.47



Refusal at 9.46 m. Anchor Failure

Hole to 8.7 m. Water to 2.2 m

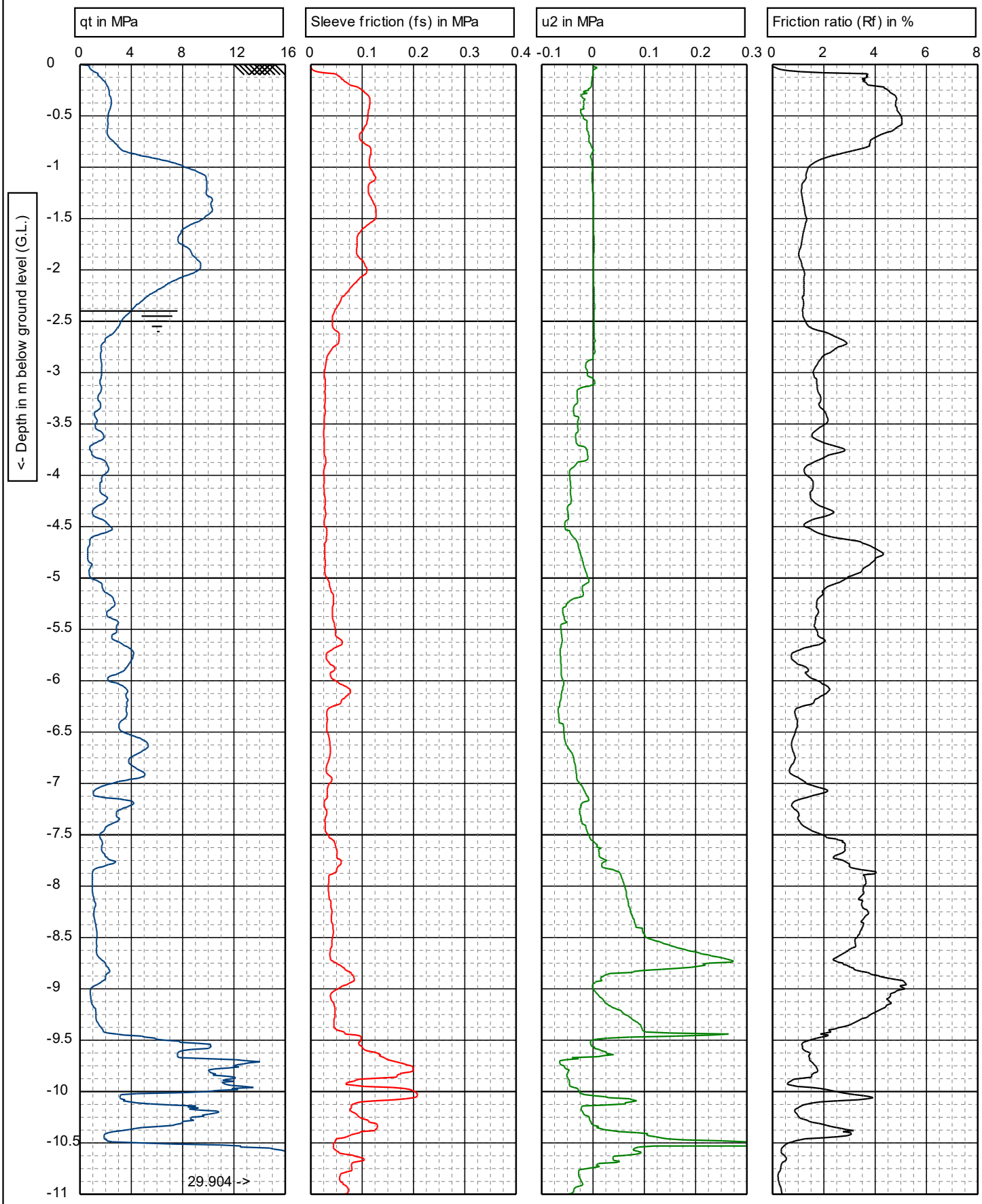
BLACK INSITU TESTING

r u2
L 150 cm²
10 cm²

Client: Black Geotechnical		Predrill:	**0.00 m Predrilled**
G.L.: **36.38 m**	W.L.: **-2.20 m**	Date:	**18/09/2025**
Project: **Pedestrian Bridge Traralgon Creek**		Cone no.:	**C10CFIIP.C16325**
Location: **Victoria Park Traralgon**		Project no.:	**L039**
Position: **460033.3, 5772300.51**		CPT no.:	**CPT 02** **2/2**

Processed by: OL Checked by: NDS

1.47



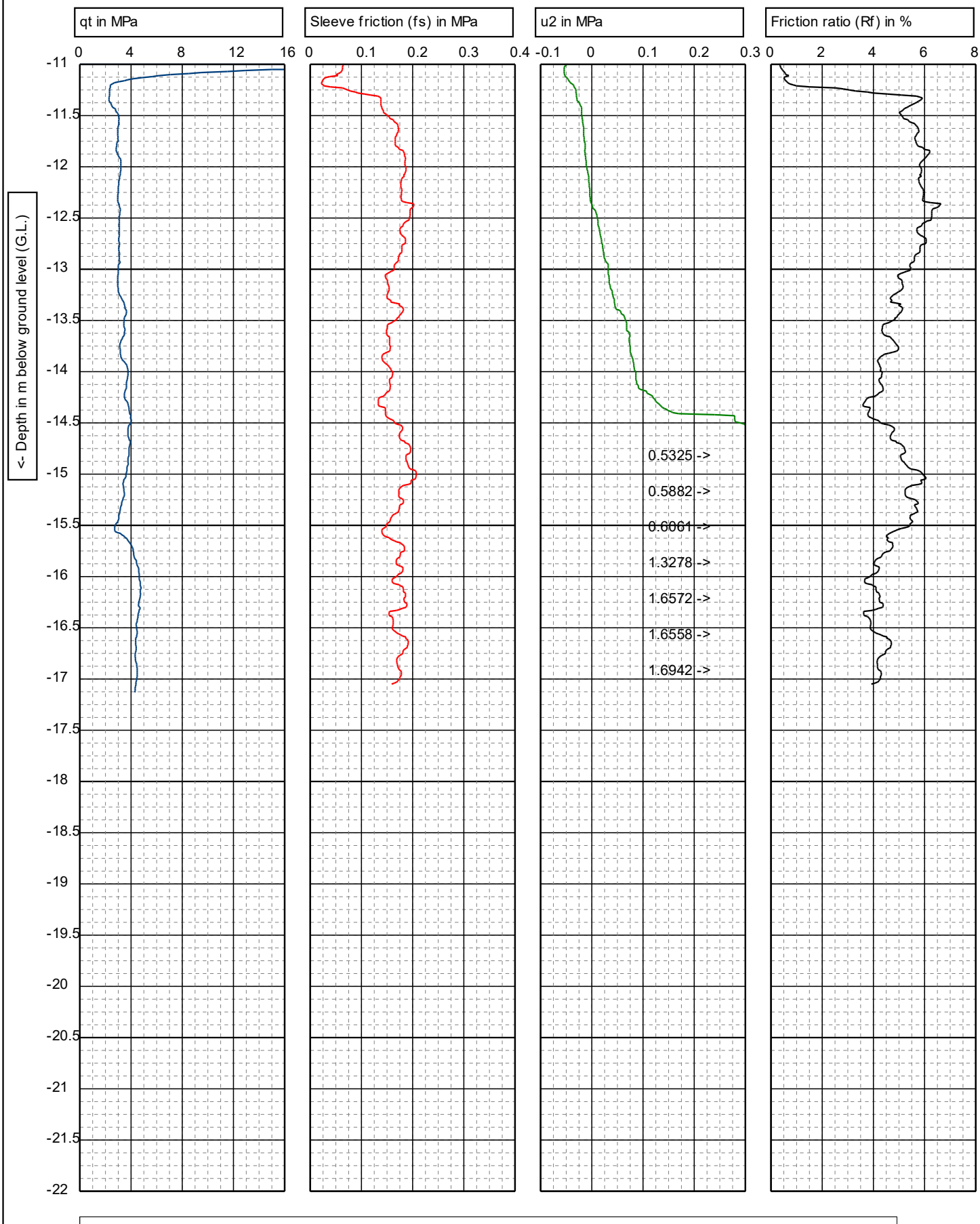
BLACK INSITU TESTING

r u2
L 150 cm²
10 cm²

Client: Black Geotechnical		Predrill:	**0.00 m Predrilled**
G.L.: **36.73 m**	W.L.: **-2.40 m**	Date:	**18/09/2025**
Project: **Pedestrian Bridge Traralgon Creek**		Cone no.:	**C10CFIIP.C16325**
Location: **Victoria Park Traralgon**		Project no.:	**L039**
Position: **460019.21, 5772322.46**		CPT no.:	**CPT 03** **1/4**

Processed by: OL Checked by: NDS

1.47



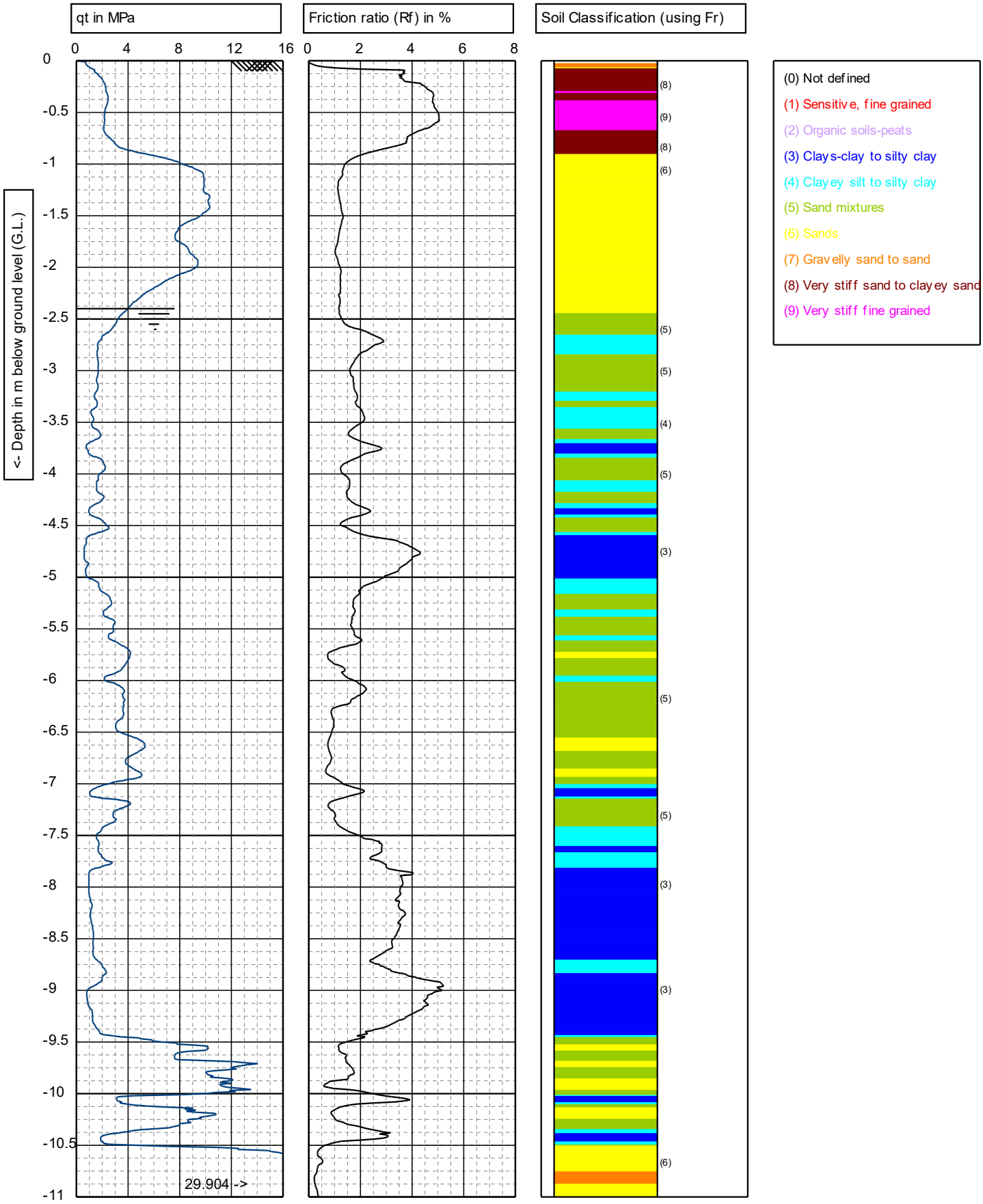
BLACK INSITU TESTING

r u2
L 150 cm²
10 cm²

Client: Black Geotechnical		Predrill:	**0.00 m Predrilled**
G.L.: **36.73 m**	W.L.: **-2.40 m**	Date:	**18/09/2025**
Project: **Pedestrian Bridge Traralgon Creek**		Cone no.:	**C10CFIIP.C16325**
Location: **Victoria Park Traralgon**		Project no.:	**L039**
Position: **460019.21, 5772322.46**		CPT no.:	**CPT 03** 2/4

Processed by: OL Checked by: NDS

1.47



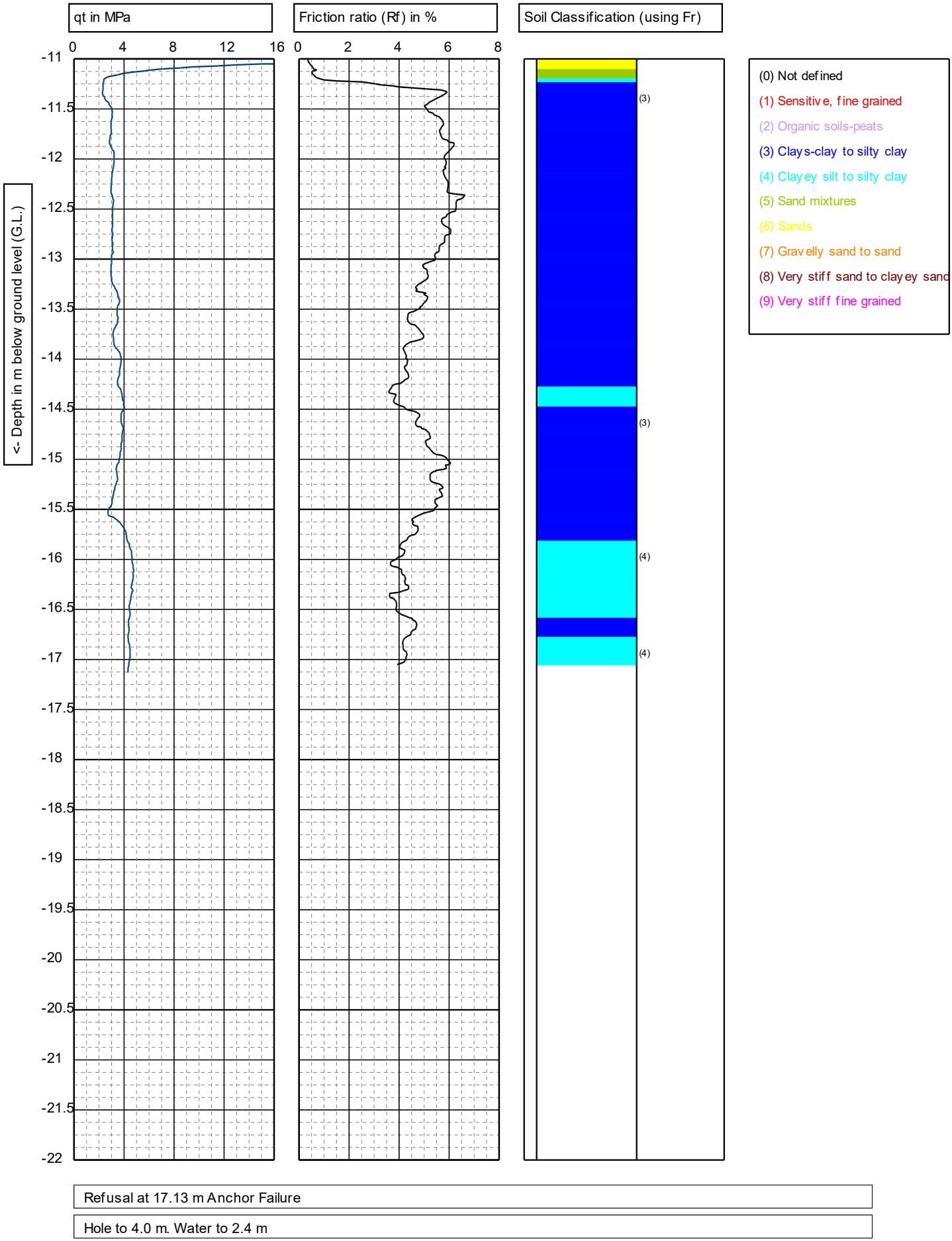
BLACK INSITU TESTING

r u2
L 150 cm²
10 cm²

Client: Black Geotechnical		Predrill:	**0.00 m Predrilled**
G.L.: **36.73 m**	W.L.: **-2.40 m**	Date:	**18/09/2025**
Project: **Pedestrian Bridge Traralgon Creek**		Cone no.:	**C10CFIIP.C16325**
Location: **Victoria Park Traralgon**		Project no.:	**L039**
Position: **460019.21, 5772322.46**		CPT no.:	**CPT 03** 3/4

Processed by: OL Checked by: NDS

1.47



Refusal at 17.13 m Anchor Failure

Hole to 4.0 m. Water to 2.4 m

BLACK INSITU TESTING

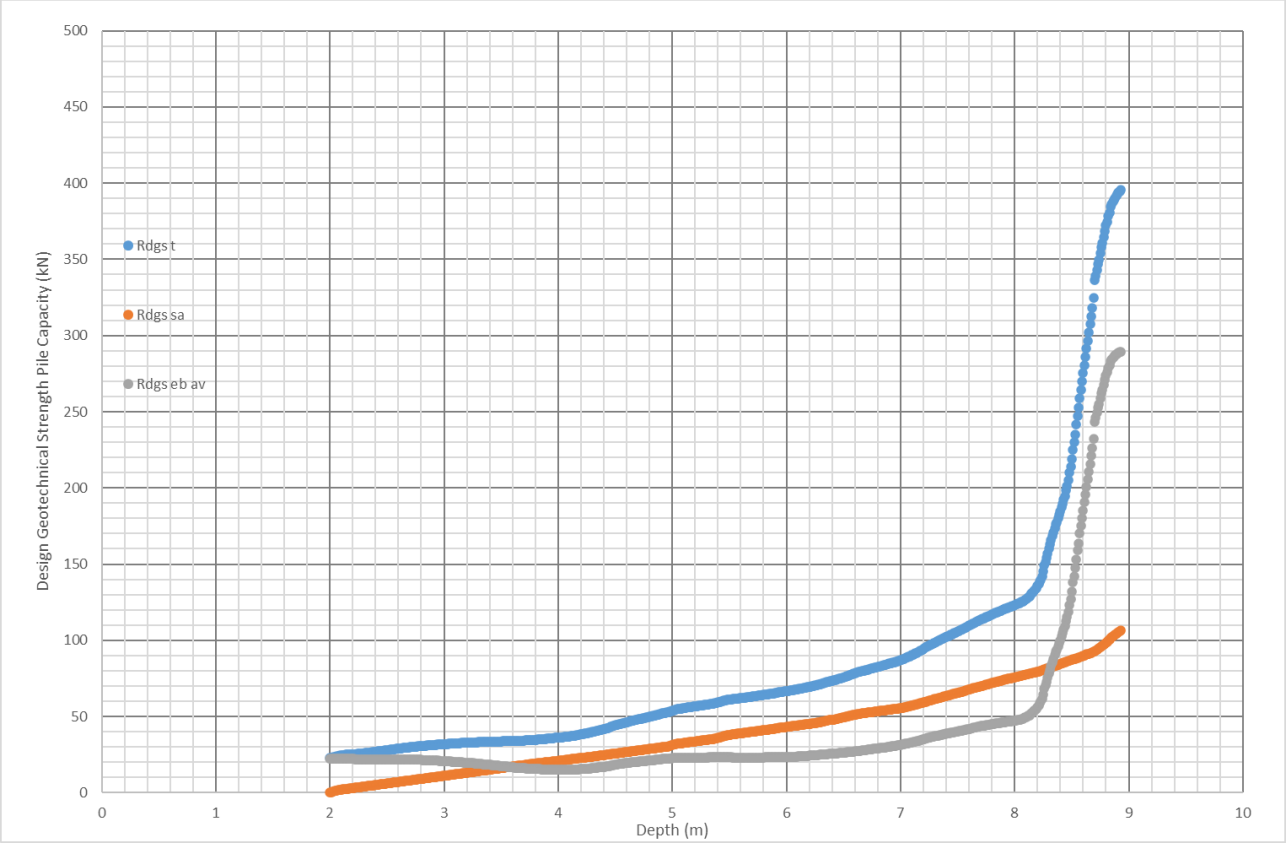
r u2
L 150 cm²
10 cm²

Client: Black Geotechnical		Predrill:	**0.00 m Predrilled**
G.L.: **36.73 m**	W.L.: **-2.40 m**	Date:	**18/09/2025**
Project: **Pedestrian Bridge Traralgon Creek**		Cone no.:	**C10CFIIP.C16325**
Location: **Victoria Park Traralgon**		Project no.:	**L039**
Position: **460019.21, 5772322.46**		CPT no.:	**CPT 03** **4/4**

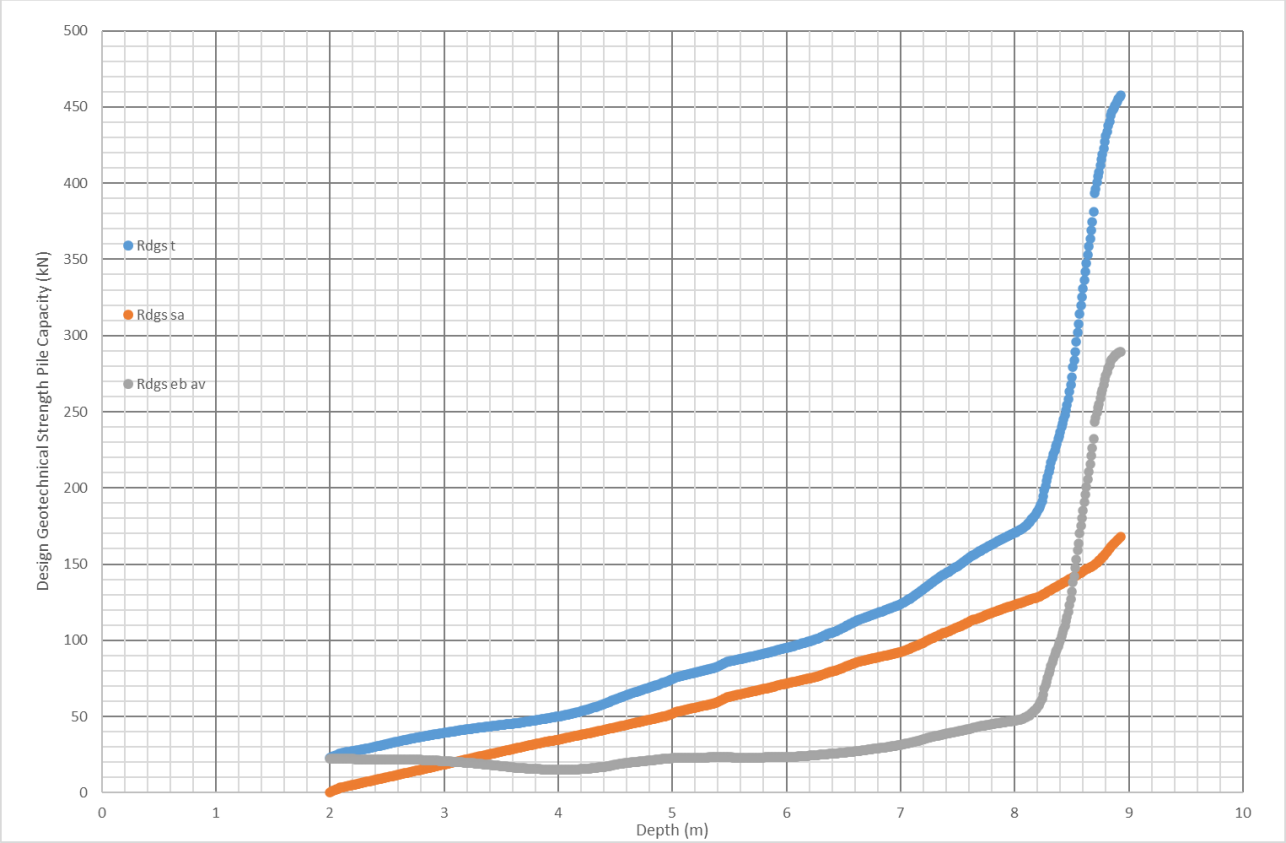
Processed by: OL Checked by: NDS

1.47

V2424 – Victory Park, Traralgon. Pedestrian bridge over Traralgon Creek
Pile capacity plots. Sheet 1 of 2

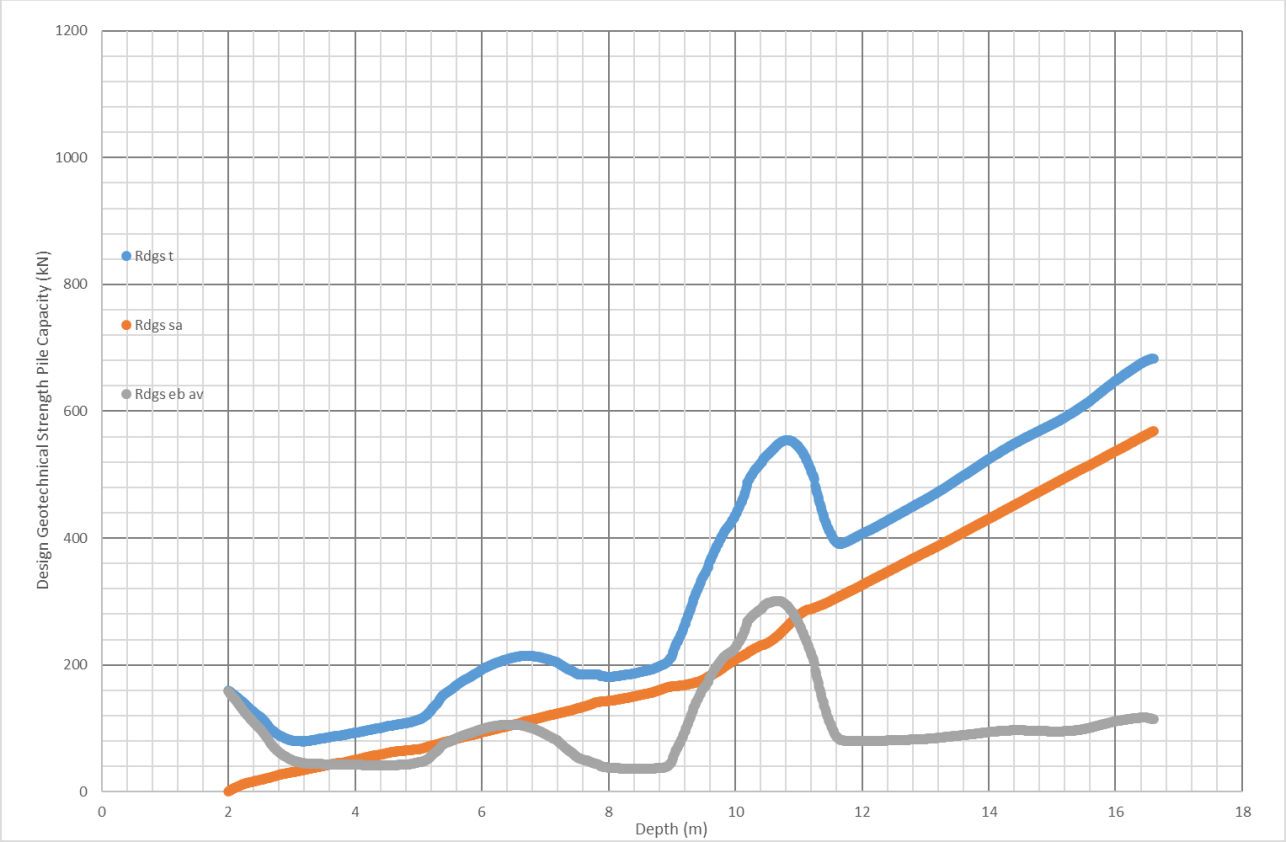


CPT02 – 350 PC Concrete – 0-day set-up

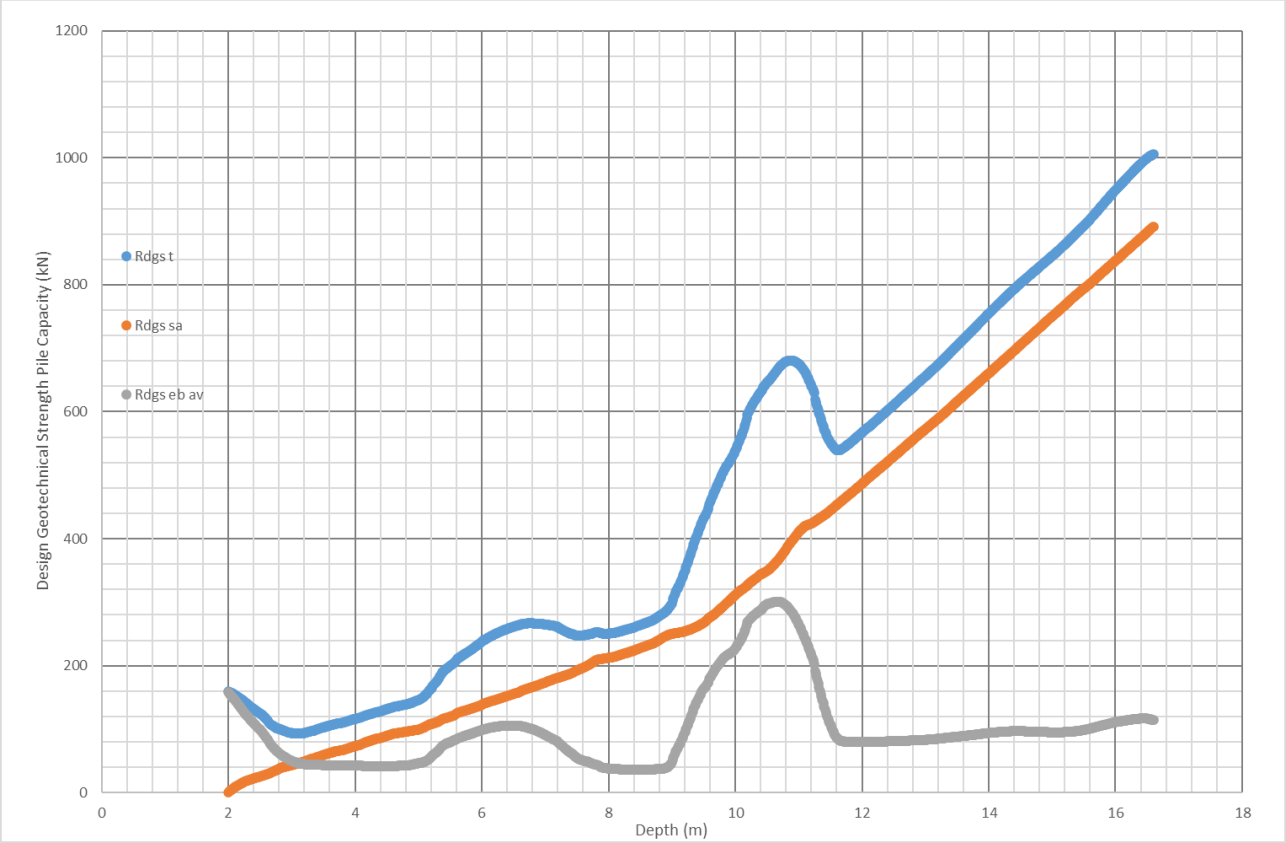


CPT02 – 350 PC Concrete – 7-day set-up

V2424 – Victory Park, Traralgon. Pedestrian bridge over Traralgon Creek
Pile capacity plots. Sheet 2 of 2



CPT03 – 350 PC Concrete – 0-day set-up



CPT03 – 350 PC Concrete – 7-day set-up

Construction Sciences
a kiwa company

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
60 - 64 Vella Drive,
Sunshine West VIC 3020

Laboratory: Melbourne Laboratory
Phone: 03 9364 9301
Fax: 03 9338 3255
Email: Melbourne@constructionsciences.net

MOISTURE CONTENT REPORT

Client:	Black Geotechnical Pty Ltd	Report Number:	14874/R/25-29907-1
Client Address:	258 Hyde Street, YARRAVILLE	Project Number:	14874/P/2859
Project:	Victory Park Pedestrian Bridge over Traralgon Creek	Lot Number:	
Location:	Various	Internal Test Request:	14874/T/25-12211
Supplied To:	n/a	Client Reference/s:	V2424
Area Description:		Report Date / Page:	23/09/2025 Page 1 of 1

Test Procedures:	AS1289.2.1.1

Sample Number	14874/S/25-86273	14874/S/25-86274	14874/S/25-86275	14874/S/25-86276
ID / Client ID	-	-	-	-
Lot Number	-	-	-	-
Date / Time Sampled	22/09/2025	22/09/2025	22/09/2025	22/09/2025
Sampling Method	Tested As Received	Tested As Received	Tested As Received	Tested As Received
Sampled By	Client Supplied	Client Supplied	Client Supplied	Client Supplied
Tested By	Layla Somo	Layla Somo	Layla Somo	Layla Somo
Date Tested	22/09/2025	22/09/2025	22/09/2025	22/09/2025
Material Source	Onsite	Onsite	Onsite	Onsite
Material Type	Clay	Clay	Clay	Silty Clay
Borehole No.	HA01	HA01	HA02	HA02
Depth	0.3 - 0.5	0.5 - 0.9	0.5 - 0.8	1.3 - 1.6
Moisture Content (%)	**23.2**	**23.7**	**16.7**	**16.6**

Sample Number				
ID / Client ID				
Lot Number				
Date / Time Sampled				
Sampling Method				
Sampled By				
Tested By				
Date Tested				
Material Source				
Material Type				
Borehole No.				
Depth (m)				
Moisture Content (%)				

Remarks	Results apply to the sample/s as received.,

NATA

Accredited for compliance with ISO/IEC 17025 – Testing

Accreditation Number: 1986
Corporate Site Number: 14874

Approved Signatory: Jagdish Chand
Form ID: W20Rep Rev 3

Construction Sciences
a kiwa company

Construction Sciences Pty Ltd
ABN: 74 128 806 735

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Sunshine West VIC 3020

Laboratory: **Melbourne Laboratory**
Phone: 03 9364 9301
Fax: 03 9338 3255
Email: Melbourne@constructionsciences.net

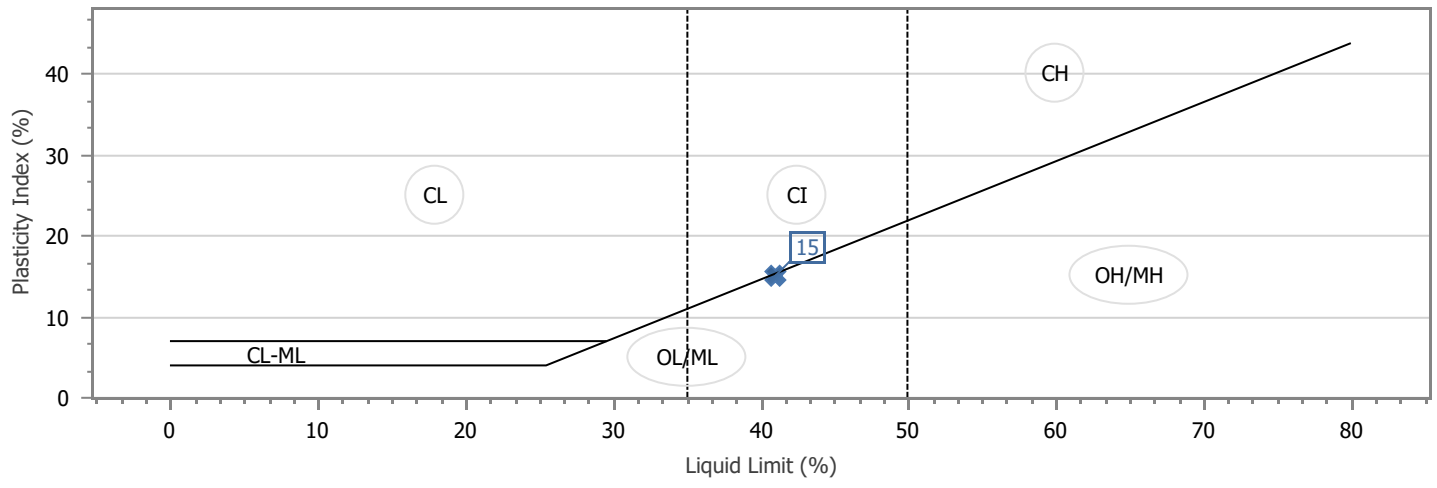
ATTERBERG LIMITS REPORT

Client:	Black Geotechnical Pty Ltd	Report Number:	14874/R/25-30232-1
Client Address:	258 Hyde Street, YARRAVILLE	Project Number:	14874/P/2859
Project:	Victory Park Pedestrian Bridge over Traralgon Creek	Lot Number:	
Location:	Various	Internal Test Request:	14874/T/25-12211
Supplied To:	n/a	Client Reference/s:	V2424
Area Description:		Report Date / Page:	25/09/2025 Page 1 of 4

Test Procedures:	AS1289.3.1.2, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	14874/S/25-86273	Sample Location	
Sampling Method	Tested As Received	Borehole No.	HA01
Date Sampled	22/09/2025	Depth (m)	0.3 - 0.5
Sampled By	Client Supplied		
Date Tested	24/09/2025		
Drying / Prep Method	Oven Dried / Dry Sieved	Material Source	Onsite
LL Water Type	Potable	Material Type	Clay
LL Device Type	Cassagrande	Specification	-
Client Reference	-	Prep Mat > 53mm (%)	-
Material Description	Clay		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**41**	
Plastic Limit (%)		**26**	
Plasticity Index (%)		**15**	
Linear Shrinkage (%)		**7.5**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 125.2mm / None		

Atterberg Limits 'A-Line' Graph



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

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Accreditation Number: 1986
Corporate Site Number: 14874

Approved Signatory: Jagdish Chand
Form ID: W11Rep Rev 2

Construction Sciences
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Sunshine West VIC 3020

Laboratory: **Melbourne Laboratory**
Phone: 03 9364 9301
Fax: 03 9338 3255
Email: Melbourne@constructionsciences.net

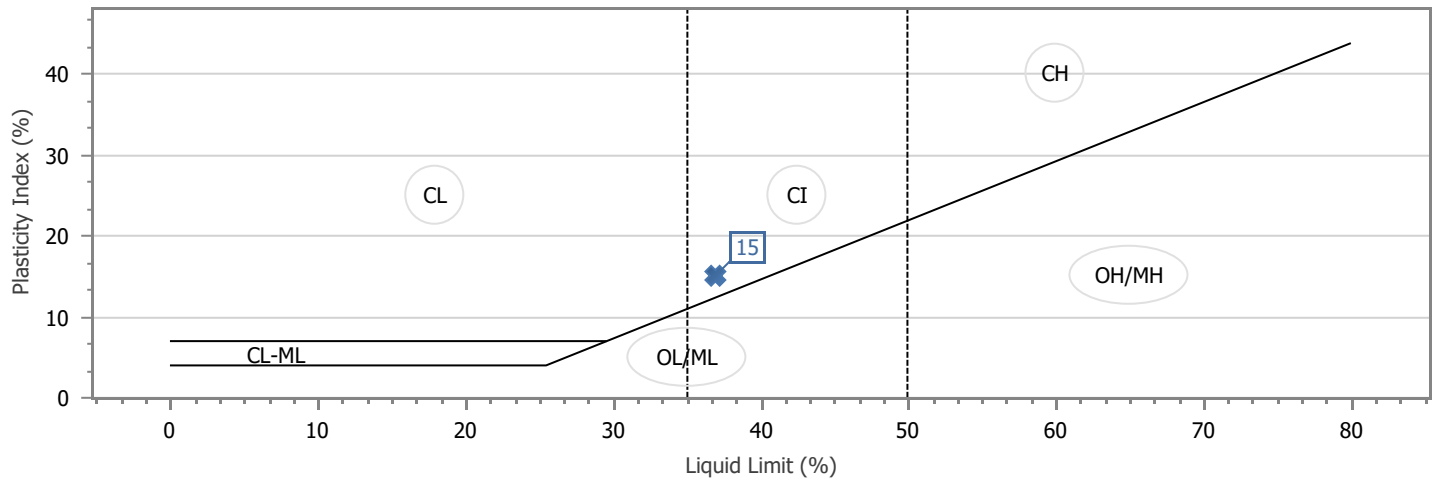
ATTERBERG LIMITS REPORT

Client:	Black Geotechnical Pty Ltd	Report Number:	14874/R/25-30232-1
Client Address:	258 Hyde Street, YARRAVILLE	Project Number:	14874/P/2859
Project:	Victory Park Pedestrian Bridge over Traralgon Creek	Lot Number:	
Location:	Various	Internal Test Request:	14874/T/25-12211
Supplied To:	n/a	Client Reference/s:	V2424
Area Description:		Report Date / Page:	25/09/2025 Page 2 of 4

Test Procedures:	AS1289.3.1.2, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	14874/S/25-86274	Sample Location	
Sampling Method	Tested As Received	Borehole No.	HA01
Date Sampled	22/09/2025	Depth (m)	0.5 - 0.9
Sampled By	Client Supplied		
Date Tested	24/09/2025		
Drying / Prep Method	Oven Dried / Dry Sieved	Material Source	Onsite
LL Water Type	Potable	Material Type	Clay
LL Device Type	Cassagrande	Specification	-
Client Reference	-	Prep Mat > 53mm (%)	-
Material Description	Clay		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**37**	
Plastic Limit (%)		**22**	
Plasticity Index (%)		**15**	
Linear Shrinkage (%)		**5.0**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 249.8mm / Cracking		

Atterberg Limits 'A-Line' Graph



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 14874

Approved Signatory: Jagdish Chand
Form ID: W11Rep Rev 2

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Laboratory: **Melbourne Laboratory**
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Fax: 03 9338 3255
Email: Melbourne@constructionsciences.net

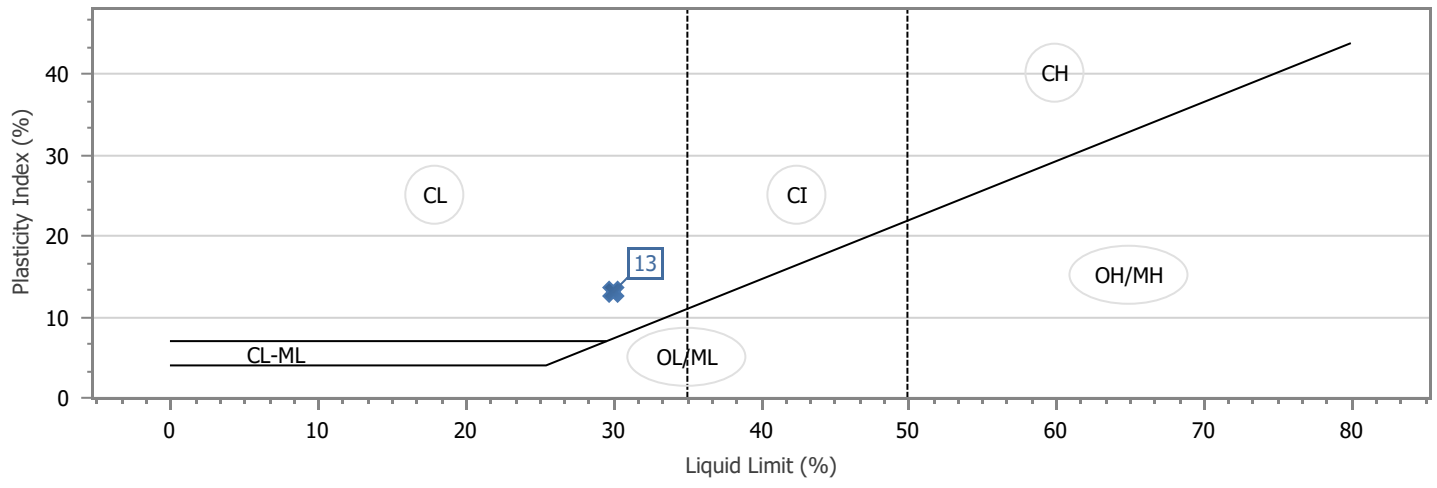
ATTERBERG LIMITS REPORT

Client:	Black Geotechnical Pty Ltd	Report Number:	14874/R/25-30232-1
Client Address:	258 Hyde Street, YARRAVILLE	Project Number:	14874/P/2859
Project:	Victory Park Pedestrian Bridge over Traralgon Creek	Lot Number:	
Location:	Various	Internal Test Request:	14874/T/25-12211
Supplied To:	n/a	Client Reference/s:	V2424
Area Description:		Report Date / Page:	25/09/2025 Page 3 of 4

Test Procedures:	AS1289.3.1.2, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	14874/S/25-86275	Sample Location	
Sampling Method	Tested As Received	Borehole No.	HA02
Date Sampled	22/09/2025	Depth (m)	0.5 - 0.8
Sampled By	Client Supplied		
Date Tested	24/09/2025		
Drying / Prep Method	Oven Dried / Dry Sieved	Material Source	Onsite
LL Water Type	Potable	Material Type	Clay
LL Device Type	Cassagrande	Specification	-
Client Reference	-	Prep Mat > 53mm (%)	-
Material Description	Clay		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**30**	
Plastic Limit (%)		**17**	
Plasticity Index (%)		**13**	
Linear Shrinkage (%)		**5.5**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 125.0mm / Cracking		

Atterberg Limits 'A-Line' Graph



Remarks	Results apply to the sample/s as received.,

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Accreditation Number: 1986
Corporate Site Number: 14874

Approved Signatory: Jagdish Chand
Form ID: W11Rep Rev 2

Construction Sciences
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Laboratory: Melbourne Laboratory
Phone: 03 9364 9301
Fax: 03 9338 3255
Email: Melbourne@constructionsciences.net

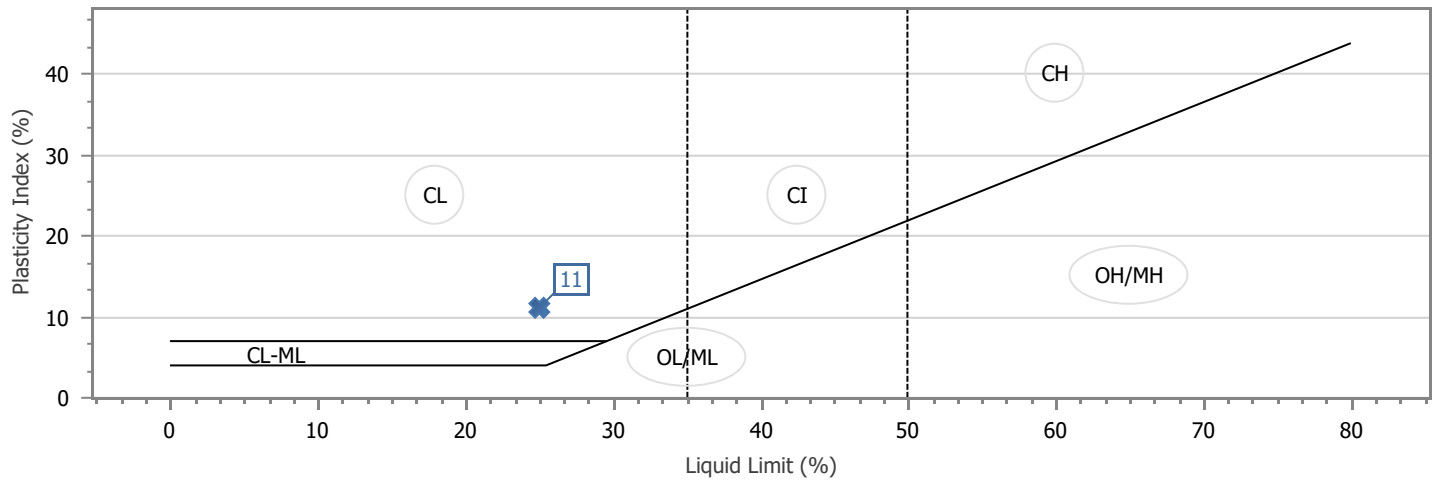
ATTERBERG LIMITS REPORT

Client:	Black Geotechnical Pty Ltd	Report Number:	14874/R/25-30232-1
Client Address:	258 Hyde Street, YARRAVILLE	Project Number:	14874/P/2859
Project:	Victory Park Pedestrian Bridge over Traralgon Creek	Lot Number:	
Location:	Various	Internal Test Request:	14874/T/25-12211
Supplied To:	n/a	Client Reference/s:	V2424
Area Description:		Report Date / Page:	25/09/2025 Page 4 of 4

Test Procedures:	AS1289.3.1.2, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	14874/S/25-86276	Sample Location	
Sampling Method	Tested As Received	Borehole No.	HA02
Date Sampled	22/09/2025	Depth (m)	1.3 - 1.6
Sampled By	Client Supplied		
Date Tested	24/09/2025		
Drying / Prep Method	Oven Dried / Dry Sieved	Material Source	Onsite
LL Water Type	Potable	Material Type	Silty Clay
LL Device Type	Cassagrande	Specification	-
Client Reference	-	Prep Mat > 53mm (%)	-
Material Description	Silty Clay		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**25**	
Plastic Limit (%)		**14**	
Plasticity Index (%)		**11**	
Linear Shrinkage (%)		**5.5**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 124.9mm / None		

Atterberg Limits 'A-Line' Graph



Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 14874

Approved Signatory: Jagdish Chand
Form ID: W11Rep Rev 2

BLACK GEOTECHNICAL

Chain of Custody Documentation

20252819

Black Geotechnical
258 Hyde Street
Yarraville VIC 3013
Ph: 03 9689 0200 Fax: 03 9689 0155
E-mail Report to: frank@blackgeotechn

Laboratory: AMAL Analytical
Address: 27 Shafton Street, Huntingdale
Contact: Jeremy Martens
Phone: 03 9544 4111

Job Number: V2424
Project Name: Victory Park Pedestrian Bridge over Traralgon Creek
Sampled By: Frank O'Dea
Project Manager: Frank O'Dea
Contact Ph: / Mobile: 0426793114

Purchase Order:
Quote No:
Turn Around Time:
CoC Page #: 1

Sample Information					Container Information		Analysis Required												
Lab ID	Sample ID	Matrix*	Date	Time	Type/Code	Total Containers	C/S pH (soil & groundwater)	C Sulfates (SO_4, soil & groundwate,)	C/S Chlorides (Cl, soil & groundwater)	S Resistivity (soil)	VIC EPA IWRG Screen	Pesticides, PCB, Heavy Metals, PAH, TPH, pH	Heavy Metals, PAH, TPH, pH	Heavy Metals, pH				Comments: C = concrete, S = steel. Sulfates & Chlorides in ppm. Resistivity in ohm.cm.
HA01 ACE091	1.1 - 1.2 m	S	19/09/25	11:00	GC	1	☒	☒	☒	☒									Trace coal fragments
HA02 11 92	1.3 - 1.6 m	S	19/09/25	13:00	GC	1	☒	☒	☒	☒									

AMAL ANALYTICAL PTY LTD
Received By: Dylan H
Time: 10:45AM Date: 22/9/25

AMAL ANALYTICAL PTY LTD
27 SHAFTON STREET
HUNTINGDALE VIC 3166
AUSTRALIA

Relinquished By:		Received By:		Method of Shipment:
Name: Frank O'Dea	Date: 22/09/25	Name: Jeremy Martens	Date:	Courier: Uber
Of: Black Geotechnical	Time: 09:00	Of: Amal Analytical	Time:	Transport Co:
Name:	Date:	Name: Karen	Date: 22/09/25	
Of:	Time:	Of: Amal	Time: 1:10pm	
Name:	Date:	Name:	Date:	
Of:	Time:	Of:	Time:	

(*) **Matrix Type:** Soil = **S**; Water = **W**; Gas = **G**; Sediment = **Sed**; Other = **O (F) = Fill soil; (N) = Natural soil**

Container Codes: GC = Glass (Clear); **GA** = Glass (Amber); **UP** = Unpreserved Plastic; **NPP** = Nitric Acid (HNO3) Preserved Plastic; **SPP** = Sodium Hydroxide (NaOH) Preserved Plastic; **VGHP** = VOA Vial Hydrochloric (HCl) Acid Preserved; **HPP** = HCl Preserved Plastic; **SPP** = Suphuric Acid (H2SO4) Preserved Plastic; **SPG** =H2SO4 Preserved Glass; **SP** = Sterile Plastic; **SG** = Sterile Glass; **PB** = Plastic Bag; **GC** = Gas Canister; **GT** = Gas Tube; **ZNPP**= Zinc Acetate + NaOH Preserved Plastic; **EZPP** = EDTA + Zinc Acetate Preserved Plastic; **OPPN**= Opaque Plastic Preserved with NaOH, **PVC-L** = PVC liner with plastic end caps

amal ANALYTICAL Laboratory Services for the Environment and Occupational Health

Certificate of Analysis 20252819

Client Name:	Black Geotechnical	*Date Samples Received:*	22-Sep-25
Address:	258 Hyde Street, Yarraville, VIC 3013	*Date Samples Analysed:*	24-Sep-25
Contact:	Frank O'Dea	*Certificate Issue Date:*	25-Sep-25
Job Number:	V2424	*Page:*	1 of 1
Client Reference:	Victory Park Pedestrian Bridge over Traralgon Creek		

Results

Laboratory ID:	AC6091	AC6092
Sample Type:	Soil	Soil
Date Sampled:	19-Sep-25	19-Sep-25
Client Reference:	HA01	HA02
	1.1-1.2m	1.3-1.6m

Analyte	LOR	Units		
Chloride	50	mg/kg	<50	<50
Sulphate	100	mg/kg	<100	<100
Conductivity	NA	uS/cm	31	27
Resistivity	NA	ohm.cm	33000	37000
pH (1:5 in H2O)	NA	pH units	5.9	5.8

Report Details

Method ID	Details	Holding Days	Holding
AGGRESS	Anions (1:5 aqueous) by IC. pH and conductivity (1:5 aqueous)	7	OK

Definitions
mg/kg - milligrams per kilogram
LOR - Level of reporting

Remarks

Results Authorised By

J. Wells (B.Sc)
Laboratory Analyst

Sample(s) are analysed as received on site by AMAL Analytical (Australia) Pty Ltd unless otherwise noted. Results pertain only to the sample(s) analysed and are reported on a dry weight basis for soils, and an 'as received' basis for other matrices. Where a sample holding time is exceeded, the validity of results cannot be guaranteed. This report supersedes any released prior and shall not be reproduced, except in full, without express written permission from the laboratory.

AMAL Analytical (Australia) Pty Ltd
27 Shafton Street Huntingdale VIC 3166 Australia
Web: www.amalanalytical.com.au
Email: info@amalanalytical.com.au
Phone: +61 3 9544 4111
ABN: 79 681 080 526

BLACK GEOTECHNICAL

258 Hyde Street, Yarraville, VIC 3013
Ph.: +61 (0) 3 9689 0200
office@blackgeotechnical.com.au
www.blackgeotechnical.com.au

AS 2159 - 2009 Piling - Design and installation

Clause 4.3.2. Calculation of the basic geotechnical strength reduction factor (ϕ_{gb})

Project information	
Job no.	V2424
Project name	Victory Park, Traralgon. Proposed pedestrian bridge
Evaluation date	Thursday, 2 October 2025
Evaluation person(s)	NDS
Other information	

Table 4.3.2(B) Individual Risk Rating (IRR)

Risk level	Individual Risk Rating (IRR)
Very low	1
Low	2
Moderate	3
High	4
Very high	5

Table 4.3.2(A) Weighting factors and individual risk ratings for risk factors

Risk Factor	Weighting factor (w_i)	Typical description of risk circumstances for individual risk rating (IRR)			Assigned IRR	w_iIRR
		1 (Very low risk)	3 (Moderate)	5 (Very high risk)		
Site						
Geological complexity of site	2	Horizontal strata, well-defined soil and rock characteristics	Some variability over site, but without abrupt changes in stratigraphy	Highly variable profile of presence of karstic features or steeply dipping rock levels or faults present on site, or combination of these	**3**	6
Extent of ground investigation	2	Extensive drilling investigation covering whole site to an adequate depth	Some boreholes extending at least 5 pile diameters below the base of the proposed pile foundation level	Very limited investigation with few shallow boreholes	**4**	8
Amount and quality of geotechnical data	2	Detailed information on strength compressibility of the main strata	CPT probes over full depth of proposed piles or boreholes confirming rock as proposed founding level for piles	Limited amount of simple in situ testing (e.g., SPT) or index tests only	**4**	8
Design						
Experience with similar foundations in similar geological conditions	1	Extensive	Limited	None	**1**	1
Methods of assessment of geotechnical parameters for design	2	Based on appropriate laboratory or in situ tests or relevant existing pile load test data	Based on site-specific correlations or on conventional laboratory or in situ testing	Based on non-site-specific correlations with (for example) SPT data	**3**	6
Design method adopted	1	Well-established and soundly based method or methods	Simplified methods with well-established basis	Simple empirical methods or sophisticated methods that are not well established	**3**	3
Method of utilising results of in situ test data and installation data	2	Design values based on minimum measured values on piles loaded to failure	Design methods based on average values	Design values based on maximum measured values on test piles loaded up only to working load, or indirect measurements used during installation, and not calibrated to static loading tests	**3**	6
Installation						
Level of construction control	2	Detailed with professional geotechnical supervision, construction processes that are well established and relatively straightforward	Limited degree of professional geotechnical involvement in supervision, conventional construction procedures	Very limited or no involvement by designer, construction processes that are not well established or complex	**3**	6
Level of performance monitoring of the supported structure during and after construction	0.5	Detailed measurements of movements and pile loads	Correlation of installed parameters with on=site static load tests carried out in accordance with this Standard	No monitoring	**5**	2.5
Σw_i =	**14.5**				**$\Sigma(w_i$IRR) =**	**46.5**

NOTES:

1. The pile design shall include the risk circumstances for each individual risk rating category and consideration of all of the relevant site and construction factors.

2. High redundancy systems include large pile groups under large caps, piled rafts and pile groups with more than 4 piles. Low redundancy systems include isolated heavily loaded piles and piles set out at large spacings.

3. If risk circumstances are unknown, the most conservative IRR (i.e. 5) should be adopted.

(Eq. 4.3.2) **ARR = $\Sigma(w_i$IRR) / Σw_i**

ARR =	**3.21**
Overall risk category =	**Moderate**
Low system redundancy - ϕ_{gb} =	**0.48**
High system redundancy - ϕ_{gb} =	**0.56**

Table 4.3.2(C) Basic geotechnical strength reduction factor (ϕ_{gb}) for average risk rating (ARR)

Range of average risk rating (ARR)	Overall risk category	ϕ_{gb} for low redundancy systems	ϕ_{gb} for high redundancy systems
ARR ≤ 1.5	Very low	0.67	0.76
1.5 < ARR ≤ 2.0	Very low to low	0.61	0.70
2.0 < ARR ≤ 2.5	Low	0.56	0.64
2.5 < ARR ≤ 3.0	Low to moderate	0.52	0.60
3.0 < ARR ≤ 3.5	Moderate	0.48	0.56
3.5 < ARR ≤ 4.0	Moderate to high	0.45	0.53
4.0 < ARR ≤ 4.5	High	0.42	0.50
ARR > 4.5	Very high	0.40	0.47

Appendix C

Chris O'Brien & Company Safety in Design Register.

Victory Park Bridge Replacement - Safety in Design Register

CHRIS O'BRIEN & COMPANY PTY LTD
CONSULTING CIVIL & STRUCTURAL ENGINEERS
ABN: 69 006 752 656

Risk	Likelihood	Consequence	Risk Rating	Mitigation measures (ONLY REQUIRED FOR HIGH AND EXTREME RISKS)	Responsibility	Address in Specification?	Likelihood	Consequence	Risk Rating
	A - Almost Certain B - Likely C - Possible D - Unlikely E - Rare	5 - Catastrophic 4 - Major 3 - Moderate 2 - Minor 1 - Insignificant	E - Extreme H - High M - Medium L - Low				A - Almost Certain B - Likely C - Possible D - Unlikely E - Rare	5 - Catastrophic 4 - Major 3 - Moderate 2 - Minor 1 - Insignificant	E - Extreme H - High M - Medium L - Low
Demolition & Construction									
Limited area available for site compound results in incident between workers and vehicles	C	3	M	1. Check availability of adjacent roadside, crown or private land for use as site offices, storage of plant. Incorporate requirement into specification or details of a possible location with contact details for tenderers. 2. Nominate compound in tender documents	Designer & Contractor	NA	D	2	L
Contractor does not maintain reserve as per standard which results in incident with pedestrians or cyclists.	C	4	H	1. Address in specification and post award meeting with contractor 2. Ongoing surveillence by Council	Council & Contractor	Yes	C	3	M
Public accesses construction site out of hours resulting in injury	C	4	H	1. Appropriate site fencing by Contractor to prevent public access 2. Appropriate warning signage in accordance with relevant Standards 3. Appropriate surveillance by Council to ensure sufficient fencing 4. Include requirements in Specification	Council & Contractor	Yes	C	3	M
Services struck by construction equipment during construction works	C	4	H	1. Services located 2. BYDA conducted 3. Services to be marked on drawings and on site	Contractor	Yes	E	3	L
Accidents - - Death or injury as a result of safety management - Legal implications arising from safety management - Damage to reputation due to safety management	C	5	H	1. Undertake SID process during design 2. Ensure adequate Safety Management Plan (SWMS, Toolbox Meetings, Inductions, Tickets, Licences, Plant, PPE) 3. Complete Site Surveillance OHS Checklist 4. Undertake OH&S review and audit and Surveillance (include in iAuditor Surveillance Plan) 5. Provide requirement in specifications 6. Confirm compliance with specification requirements 7. Include in Safety in Contract Meeting agenda to review safety issues, near misses or accidents.	Contractor	Yes	D	3	M
Errant debris strikes workers/vehicles during demolition activities	C	4	H	1. Include demolition in spec 2. Adequate surveillance by Council 3. Demolition methodology by designer to be strictly followed	Council & Contractor	Yes	E	3	L
Incident due to Formwork/Falsework resulting in harm to workers	C	3	M	1. Formwork/Falsework to be designed in accordance with relevant DTP Spec. 2. Ensure adequate surveillance by Council 3. Ensure formwork/falsework designers and proof engineers are suitably qualified 4. Design to minimise need for high risk formwork including columns in lieu of blade piers	Contractor	Yes	D	2	L
Incident between workers and vehicles due to inadequate separation	C	3	M	1. Provide requirement in specifications 2. Design includes complete separation through construction and minimal staging 3. Ensure approved temporary barrier products are used 4. Ensure adequate surveillance by Council	Council & Contractor	Yes	D	3	M
Contractor working without a valid MOA	C	3	M	Surveillance, ensure MOA is renewed when expired.	Council & Contractor	Yes	D	2	L
After hours signage not maintained resulting in collision	C	3	M	Address in contract specification. After hours contact clearly displayed on site. Surveillance.	Council & Contractor	Yes	D	2	L
Street & Services signage removed or not maintained appropriately resulting in collision	C	3	M	Address in contract specification. Contractor to maintain existing Signage for Services & Tourist Info on site. Surveillance.	Contractor	Yes	D	2	L
Pedestrians & Cyclists not allowed for within the Traffic Management Plans, resulting in collision	C	3	M	Ensure this is addressed in Traffic Management Strategy. Surveillance. Address at intital Site Meeting and ensure Contractor arranges TMP's appropriately.	Contractor	Yes	D	2	L
Incident while implementing and Dismantling of Traffic Management, or end of queue incident	C	4	H	Ensure this is addressed in SWMS and TGS. Surveillance.	Council & Contractor	No	D	3	M
Hazardous materials found on site, either residual in-ground or resulting from demolition activities, resulting in long term harm to workers	C	4	H	Contractor to address in SWMS.	Contractor	Yes	D	3	M
Incident due to working at heights/trenching	C	4	H	1. Minimise need for trenching in design. 2. Include anchor points in design for harness attachment where appropriate 2. Ensure drawings have appropriate references to trenching safety. 3. Address in SWMS & Specification. 4. Hazard analysis conducted prior to commencement of work on site for working at heights /or in trenches. 5. Surveillance.	Designer, Council & Contractor	Yes	D	3	M
Incident due to incorrect manual handling/lifting	C	3	M	1. Address in SWMS. 2. Surveillance. 3. Site Safety Inspection	Contractor	No	D	2	L
Incident due to faulty plant and equipment	C	3	M	1. Surveillance. 2. Surveillance of prestart inspection safety checklists. 3. Site safety audit on Contractors QA	Contractor	No	D	2	L
Incident due to lack of communication to subcontractors	C	3	M	1. Raise at post-award meeting and Site Meetings. Toolbox meetings, inductions. 2. Surveillance.	Contractor	No	D	2	L
High tide event resulting in site inundation and possible harm to workers and temporary access	C	3	M	1. Ensure materials and plant are stored away from beach. 2. Design to minimise need for large excavations. 3. Ensure temporary access provisions are at an appropriate level to minimise risk of inundation	Contractor	No	D	2	L
Incident as PPE not worn	C	3	M	1. Address in post-award meetings. 2. Address in Site Meeting and Site Inductions. 3. Surveillance.	Contractor	No	D	2	L
Incident due to movement of powered plant	C	4	H	1. Address in SWMS. 2. Surveillance. 3. Reversing beepers on plant.	Contractor	No	D	3	M
General Public Use									
Flooding impacts bridge and results in harm to users	C	4	H	1. Ensure bridge is suitably designed to accommodate flood impacts	Designer & Council	No	D	3	M
Maximum load exceeded resulting in harm to users	C	3	M	1. Bridge to be designed for 5kPa 2. Council to maintain appropriate register of bridge design capacities 3. Bollards to be positioned at either approach to prevent vehicle access	Designer & Council	No	D	3	M
Falling/jumping from bridge results in injury or death	C	4	H	1. Provide compliant barriers (125mm max gaps & 1400 high)	Designer	No	D	3	M
Slips, trips and falls due to surfacing	C	3	M	1. Ensure appropriate surface treatment	Designer & Council	Yes	D	3	M
Cyclists travelling at high speeds collide with pedestrians	C	3	M	1. Ensure sufficient sight lines for cyclists 2. Ensure suitable calming works for surrouding precinct (by others)	Designer & Council	No	D	3	M
Scour of approaches results in road damage and vehicular incident	C	3	M	1. Include suitable scour protection works	Designer	No	D	3	M
Insufficient durability considerations for concrete elements results in premature wear and failure	C	3	M	1. Designer to ensure durability requirements are considered in detailed design	Designer	No	D	3	M
Maintenance and Decomissioning									
Injuries, slips, trips and falls during maintenance activities to underside of bridge	C	3	M	1. Council to undertake appropriate risk assessments prior to maintenance activities 2. Designer to incorporate low maintenance materials to the greatest extent possible to reduce need for maintenance activities (ie. Integral bridge)	Designer & Council	NA	D	2	L
Injuries during mowing to bridge approaches	C	3	M	1. Ensure batters do not exceed 4:1 where possible to ensure safe mowing	Designer	NA	D	2	L