# NOTICE OF PROPOSED DEVELOPMENT

**Notice is hereby given that an application has been made for planning approval for the following development:**

## SITE:
## 150 GREENS ROAD, ORIELTON

## PROPOSED DEVELOPMENT:
## OUTBUILDING (SHED)

The relevant plans and documents can be inspected at the Council Offices at 47 Cole Street, Sorell during normal office hours, or the plans may be viewed on Council's website at www.sorell.tas.gov.au until **Monday 27th July 2026.**

Any person may make representation in relation to the proposal by letter or electronic mail (sorell.council@sorell.tas.gov.au) addressed to the Chief Executive Officer. Representations must be received no later than **Monday 27th July 2026.**

**APPLICATION NO:** **5.2026-61.1**
**DATE:** **10 JULY 2026**

150 Greens Road, Orielton

9-Jul-2026


**Roads**
- DSG Roads
- Council Roads

**Property**
- Property
- Titles

**Transport**

Capital Works 2026
- Footpath
- Recon
- Reseal
- Resheet

Roads

SORELL COUNCIL

**Disclaimer**

Any information extracted from this document (from the face of the document or by scale) should be verified on site. Council takes no responsibility for the accuracy of any information contained or presented in the document. While every care has been taken to ensure the accuracy of this information, Council makes no representations or warranties about the accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and liability.

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*Part B: Please note that Part B of this form is publicly exhibited.*

| | |
|---|---|
| Full description of Proposal: | *Use:* Storage<br>*Development:* New shed 10a<br>*Large or complex proposals should be described in a letter or planning report.* |
| Design and construction cost of proposal: | $ 90,000.00 |

| | |
|---|---|
| Is all, or some the work already constructed: | No: ☑ Yes: ☐ |

| | |
|---|---|
| Location of proposed works: | Street address: 150 Greens Road<br>Suburb: Orielton Tas Postcode: 7172<br>Certificate of Title(s) Volume: 171025 Folio: 1 |

| | |
|---|---|
| Current Use of Site | Casual use |

| | |
|---|---|
| Current Owner/s: | Name(s) Daniel John Hunter |

| | | |
|---|---|---|
| Is the Property on the Tasmanian Heritage Register? | No: ☑ Yes: ☐ | *If yes, please provide written advice from Heritage Tasmania* |
| Is the proposal to be carried out in more than one stage? | No: ☑ Yes: ☐ | *If yes, please clearly describe in plans* |
| Have any potentially contaminating uses been undertaken on the site? | No: ☑ Yes: ☐ | *If yes, please complete the Additional Information for Non-Residential Use* |
| Is any vegetation proposed to be removed? | No: ☑ Yes: ☐ | *If yes, please ensure plans clearly show area to be impacted* |
| Does the proposal involve land administered or owned by either the Crown or Council? | No: ☑ Yes: ☐ | *If yes, please complete the Council or Crown land section on page 3* |

If a new or upgraded vehicular crossing is required from Council to the front boundary please complete the Vehicular Crossing (and Associated Works) application form
https://www.sorell.tas.gov.au/services/engineering/

*Part B continued: Please note that Part B of this form is publicly exhibited*

| Declarations and acknowledgements |
|---|
| • I/we confirm that the application does not contradict any easement, covenant or restriction specified in the Certificate of Title, Schedule of Easements or Part 5 Agreement for the land.<br>• I/we consent to Council employees or consultants entering the site and have arranged permission and/or access for Council's representatives to enter the land at any time during normal business hours.<br>• I/we authorise the provision of a copy of any documents relating to this application to any person for the purposes of assessment or public consultation and have permission of the copyright owner for such copies.<br>• I/we declare that, in accordance with s52(1) of the *Land Use Planning and Approvals Act 1993*, that I have notified the owner(s) of the intention to make this application.<br>• I/we declare that the information in this application is true and correct.<br><br>*Details of how the Council manages personal information and how you can request access or corrections to it is outlined in Council's Privacy Policy available on the Council website.* |
| • I/we acknowledge that the documentation submitted in support of my application will become a public record held by Council and may be reproduced by Council in both electronic and hard copy format in order to facilitate the assessment process, for display purposes during public exhibition, and to fulfil its statutory obligations. I further acknowledge that following determination of my application, Council will store documentation relating to my application in electronic format only. |
| • Where the General Manager's consent is also required under s.14 of the *Urban Drainage Act 2013*, by making this application I/we also apply for that consent. |

| | |
|---|---|
| **Applicant Signature:** | Signature: ..... Date: 23.02.2026 |

| Crown or General Manager Land Owner Consent |
|---|
| If the land that is the subject of this application is owned or administered by either the Crown or Sorell Council, the consent of the relevant Minister or the Council General Manager whichever is applicable, must be included here. This consent should be completed and signed by either the General Manager, the Minister, or a delegate (as specified in s52 (1D-1G) of the *Land Use Planning and Approvals Act 1993*).<br><br>Please note:<br>• If General Manager consent if required, please first complete the General Manager consent application form available on our website www.sorell.tas.gov.au<br>• If the application involves Crown land you will also need a letter of consent.<br>• Any consent is for the purposes of making this application only and is not consent to undertaken work or take any other action with respect to the proposed use or development. |
| I _____ being responsible for the<br><br>administration of land at _____<br><br>declare that I have given permission for the making of this application for<br><br>_____ |

Sorell Council
Development Application: Development Application - 150 Greens Road, Orielton - P1.pdf
Plans Reference:P3
Date Received:26/02/2026

| | |
|---|---|
| **Signature of General Manager, Minister or Delegate:** | Signature: ..... Date: ..... |

# RESULT OF SEARCH

RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

SEARCH OF TORRENS TITLE

| VOLUME | FOLIO |
|---|---|
| 171025 | 1 |
| EDITION | DATE OF ISSUE |
| 2 | 04-Aug-2016 |

SEARCH DATE : 27-Jan-2026
SEARCH TIME : 06.02 pm

## DESCRIPTION OF LAND

Parish of SORELL Land District of PEMBROKE
Lot 1 on Sealed Plan 171025
Derivation : Part of 6000 Acres Gtd. to Thomas Augustus Wolstenholme and Henry Goodford
Prior CT 139093/1

## SCHEDULE 1

M582447 TRANSFER to TANIA MAREE HUNTER and DANIEL JOHN HUNTER Registered 04-Aug-2016 at noon

## SCHEDULE 2

Reservations and conditions in the Crown Grant if any
SP171025 FENCING COVENANT in Schedule of Easements
SP139093 FENCING COVENANT in Schedule of Easements
E58675 MORTGAGE to Australia and New Zealand Banking Group Limited Registered 04-Aug-2016 at 12.01 pm

## UNREGISTERED DEALINGS AND NOTATIONS

E439740 DISCHARGE OF MORTGAGE E58675 Lodged by DYE & DURHAM (ANZ) on 27-Nov-2025 BP: E439740
M582447 & N297469 TRANSFER to DANIEL JOHN HUNTER Lodged by DYE & DURHAM (ANZ) on 27-Nov-2025 BP: E439740

OWNER BRIAN THOMAS ROTHERY
NORMA JEAN ROTHERY

FOLIO REFERENCE C.T.139093/1

GRANTEE PART OF 6000 ACRES GRANTED TO THOMAS AUGUSTUS WOLSTENHOLME & HENRY GOODFORD

## PLAN OF SURVEY

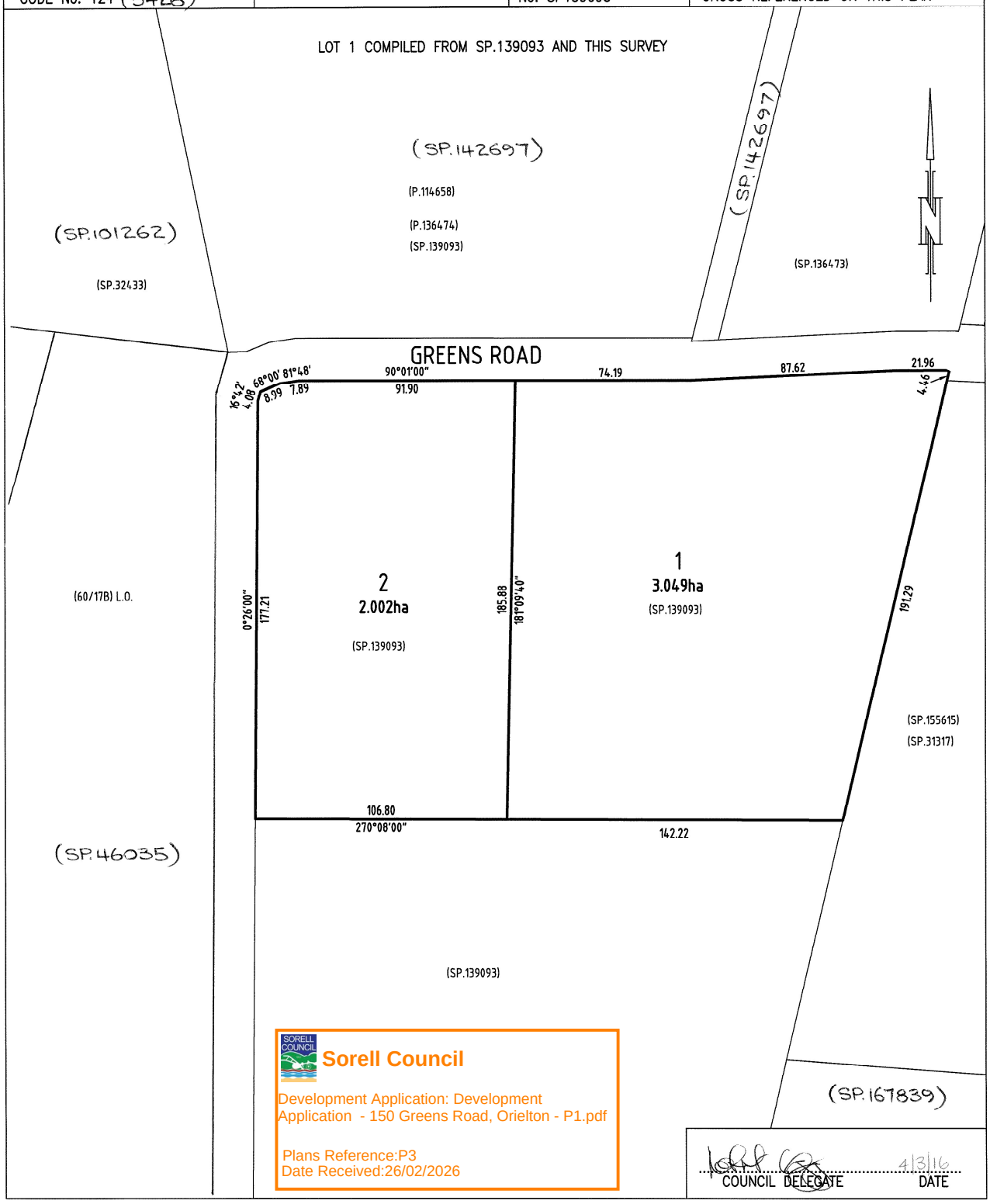
BY SURVEYOR CRAIG BRADLEY ROGERSON
ROGERSON AND BIRCH SURVEYORS
UNIT 1 – 2 KENNEDY DRIVE, CAMBRIDGE PARK
PH 6248-5898 MOB. 0418-120-796

LAND DISTRICT OF PEMBROKE
PARISH OF SORELL
SCALE 1: 1500 LENGTHS IN METRES

REGISTERED NUMBER
**SP171025**

APPROVED
EFFECTIVE FROM 11 MAR 2016
Alice Kanva
Recorder of Titles

| MAPSHEET MUNICIPAL CODE No. 124 (5426) | LAST UPI No. | LAST PLAN No. SP139093 | ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN |
|---|---|---|---|



| SCHEDULE OF EASEMENTS | Registered Number |
|---|---|
| **NOTE:** THE SCHEDULE MUST BE SIGNED BY THE OWNERS & MORTGAGEES OF THE LAND AFFECTED. SIGNATURES MUST BE ATTESTED. | SP 171025 |



## EASEMENTS AND PROFITS

Each lot on the plan is together with:-
(1) such rights of drainage over the drainage easements shown on the plan (if any) as may be necessary to drain the stormwater and other surplus water from such lot; and
(2) any easements or profits a prendre described hereunder.
Each lot on the plan is subject to:-
(1) such rights of drainage over the drainage easements shown on the plan (if any) as passing through such lot as may be necessary to drain the stormwater and other surplus water from any other lot on the plan; and
(2) any easements or profits a prendre described hereunder.
The direction of the flow of water through the drainage easements shown on the plan is indicated by arrows.

FENCING COVENANT

The Owners of each Lot of the Plan covenant with the Vendor, Brian Thomas Rothery and Norma Jean Rothery, that the Vendor shall not be required to fence.

Signed by BRIAN THOMAS ROTHERY as registered proprietor of the Land )
comprised in Folio of the Register Volume 139093 Folio 1 in the presence of: )

Witness Signature:
Name: KATRINA GREGG.
Address: 2 DAVEY ST HOBART.
Occupation: SOLICITOR.

Signed by NORMA JEAN ROTHERY as registered proprietor of the Land )
comprised in Folio of the Register Volume 139093 Folio 1 in the presence of: )

Witness Signature:
Name: KATRINA GREGG.
Address: ~~22~~ 2 DAVEY STREET HOBART.
Occupation: SOLICITOR.

(USE ANNEXURE PAGES FOR CONTINUATION)

| | |
|---|---|
| SUBDIVIDER: B.T + N.J. ROTHERY<br>FOLIO REF: 139093/1<br>SOLICITOR & REFERENCE: KATRINA GREGG. | PLAN SEALED BY: Sorell Council<br>DATE: 4/3/16<br>7.2015.23.1<br>REF NO.<br>Council Delegate |

**NOTE:** The Council Delegate must sign the Certificate for the purposes of identification.

Island Life Designers
A: Howrah TAS 7018
M: 0422 531 710
E: info@islandlifedesigners.com
Web: http://islandlifedesigners.com/

# Agent Authorisation

| | |
|---|---|
| Project Address: | 150 Greens Road, Orielton TAS |

I/we

| | |
|---|---|
| Owner Name/s: | Dan Hunter |
| Postal Address: | As above |
| Phone Number: | 0429 059 900 |
| Email Address: | djhunter0174@gmail.com |

hereby appoint the following person/business representative

| | |
|---|---|
| Agent Name: | Island Life Designers |
| Phone Number: | 0422 531 710 |
| Email Address: | info@islandlifedesigners.com |

Act as my/our authorised agent to apply for any required certificates and permits, and to provide any necessary information to, or communication with the relevant council.

| | | | | | |
|---|---|---|---|---|---|
| Owner Name: | Dan Hunter | Owner Signature: | | Date: | 29-1-26 |
| Owner Name: | | Owner Signature: | | Date: | |

TassieSheds

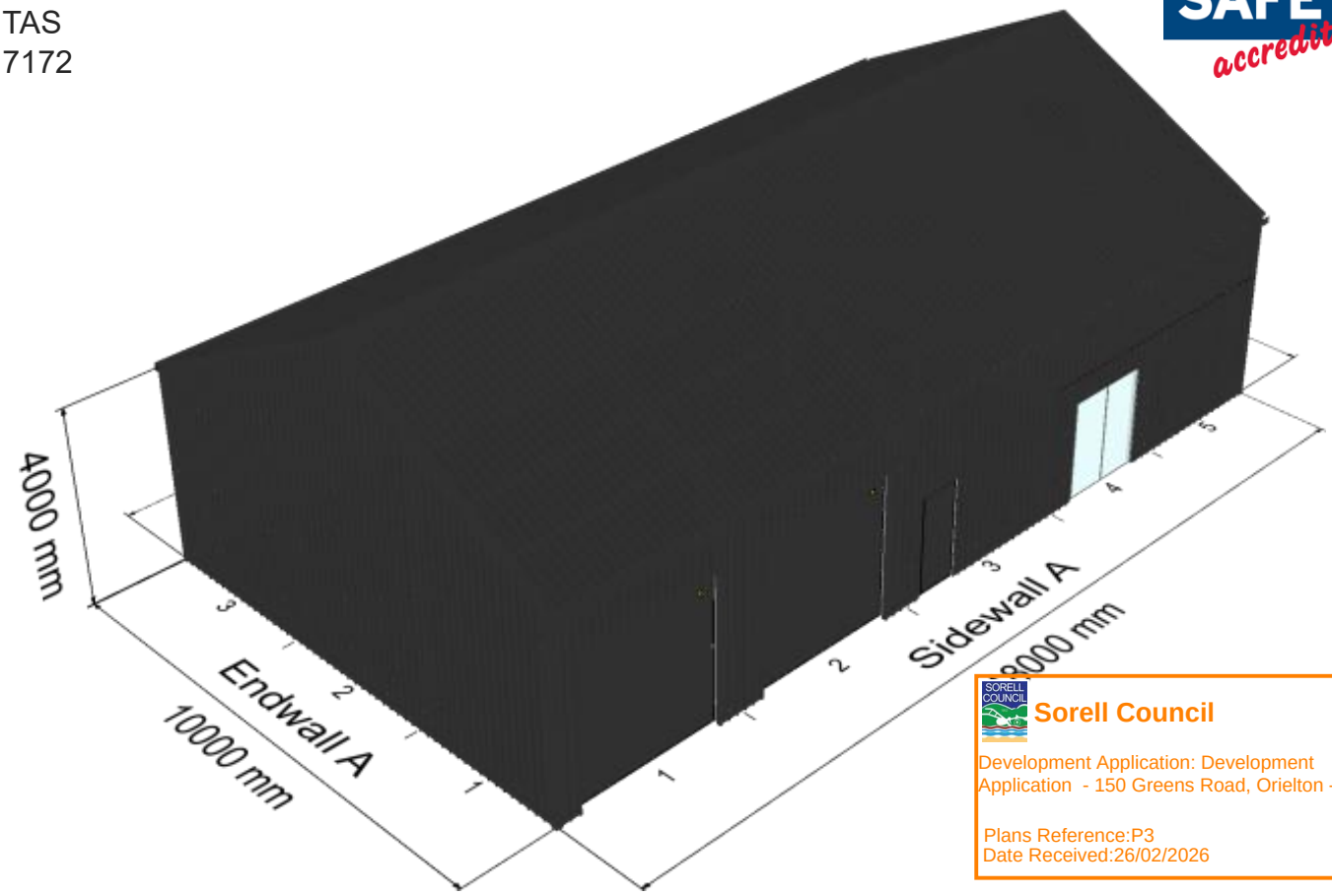

**TASSIE SHEDS**
(03) 6165 0204
info@tassiesheds.com.au
CAN: 644 258 560


15-01-2026
Quote #1026811447

# Quotation

Dan Hunter
150 Greens Road
Orielton
TAS
7172

SHED SAFE® accredited




**Sorell Council**

Development Application: Development Application - 150 Greens Road, Orielton - P1.pdf

Plans Reference:P3
Date Received:26/02/2026

STEEL SUPPLIED BY BLUESCOPE STEEL

Colorbond® Zincalume®

MADE IN AUSTRALIA

**Quote #1026811447, 15-01-2026**

**Building Specifications**

## Building Site Address:

150 Greens Road, Orielton, TAS, 7172

## Design Criteria:

Snow Load: N/A
Wind Load/Exposure: 41.2 m/s
Building Class: 10a
Wind Region: A4
Importance Level: 2
Terrain Category: 2
Shielding: 1
Topography: 1

## Sheeting and Trim Details:

Roof Type: Trimdek 0.42 BMT 0.47 TCT
Roof Colour: Monument
Wall Type: Trimdek 0.42 BMT 0.47 TCT
Wall Colour: Monument
Gutter Type: Quad Gutter 150 Hi-Front
Trim Colour: Monument (MO)
Base Trim: None
Solar Load: N/A

## Building Dimensions:

Width: 10.000 m
Length: 18.000 m
Eave Height: 4.000 m
Apex Height: 6.603 m
Roof Pitch: 27.5 deg
# Sidewall Bays: 5 Varies
# Endwall Bays: 3 3.333 m

## Building Specs:

Columns: C30024
Rafters: C30024
Floor Area: 180.000 sqm
Endwall Column: C20024
Roof Purlins: Z10015
Side Wall Girts: Z10015
End Wall Girts: Z10012

## Leanto A Details:

Span: N/A
Bays: N/A
Drop: N/A
Roof Pitch: N/A
Eave Height: N/A

## Leanto B Details:

Span: N/A
Bays: N/A
Drop: N/A
Roof Pitch: N/A
Eave Height: N/A

## Slab and Footing Details: (Slab Details For Quoting – Not Included)

Bored Engineering plans included
Bolt Down Anchor Brackets
100mm Slab (100mm,125mm & 150mm Available)
Main Column Footings: 800 mm - 600 mm (Depth x Diameter)
End Mullion Footings: 500 mm - 600 mm (Depth x Diameter)

## Opening Details:

- Personnel doors: 1x Larnec 2040 x 820 x 35mm - P/C Tube Frame - N4 & C1 Monument 3x 2100X1810 OX Basalt
- Roller Doors: 3000h x 3000w Roller Door (opening) Monument Sidewall A
  3000h x 3000w Roller Door (opening) Monument Sidewall A
- Included Windows: 3x 895X1731 XO Basalt
- Framed Openings: None
- Open Bays: None
- Translucent Panels: None
- Door Extras: 2x Box A Door

## Insulation Details:

None

## Mezzanine:

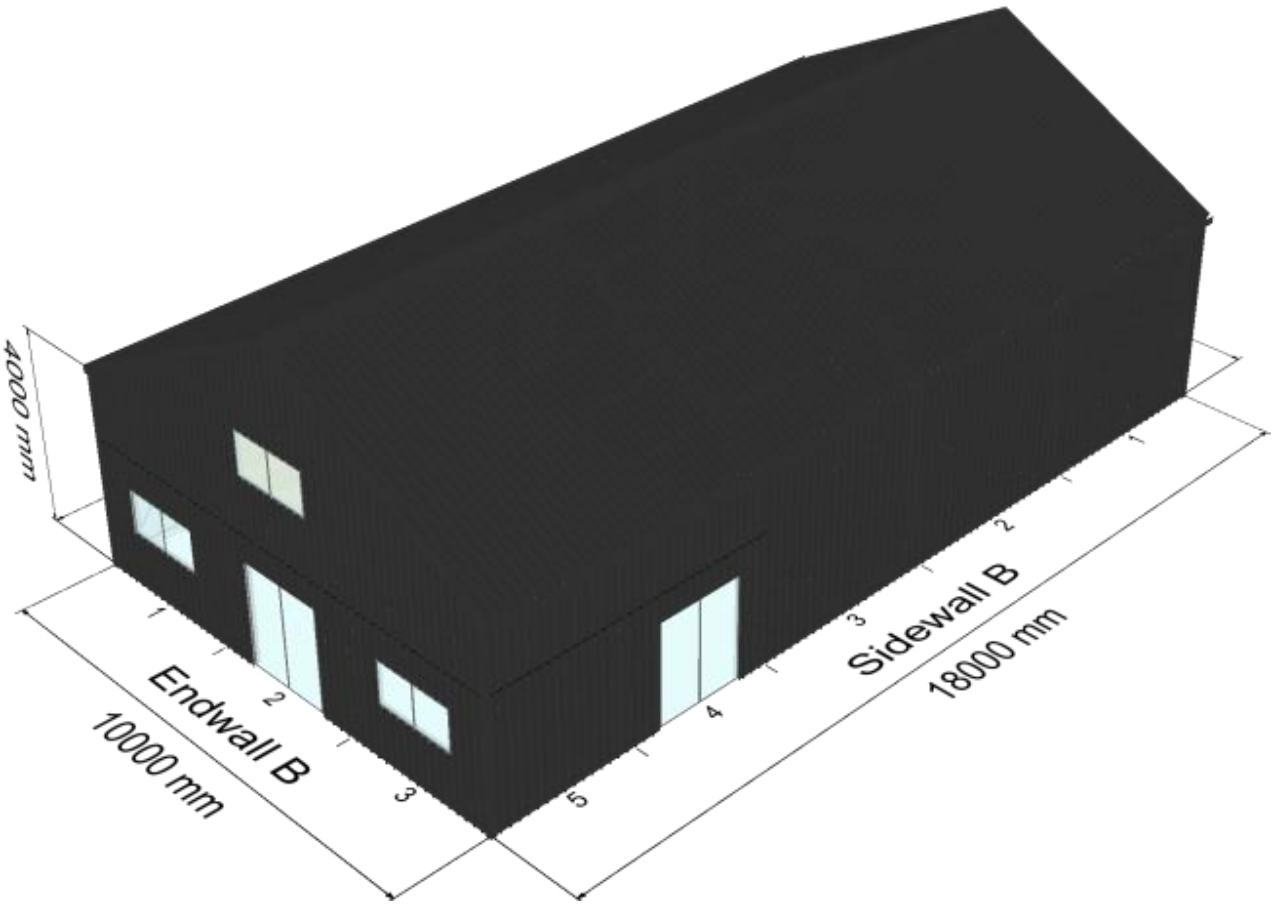
Floor Height: 2.200 m to bottom of bearer Bays: 2
Live Load: 1.5kPa (residential) Joist Spacing: 450 mm

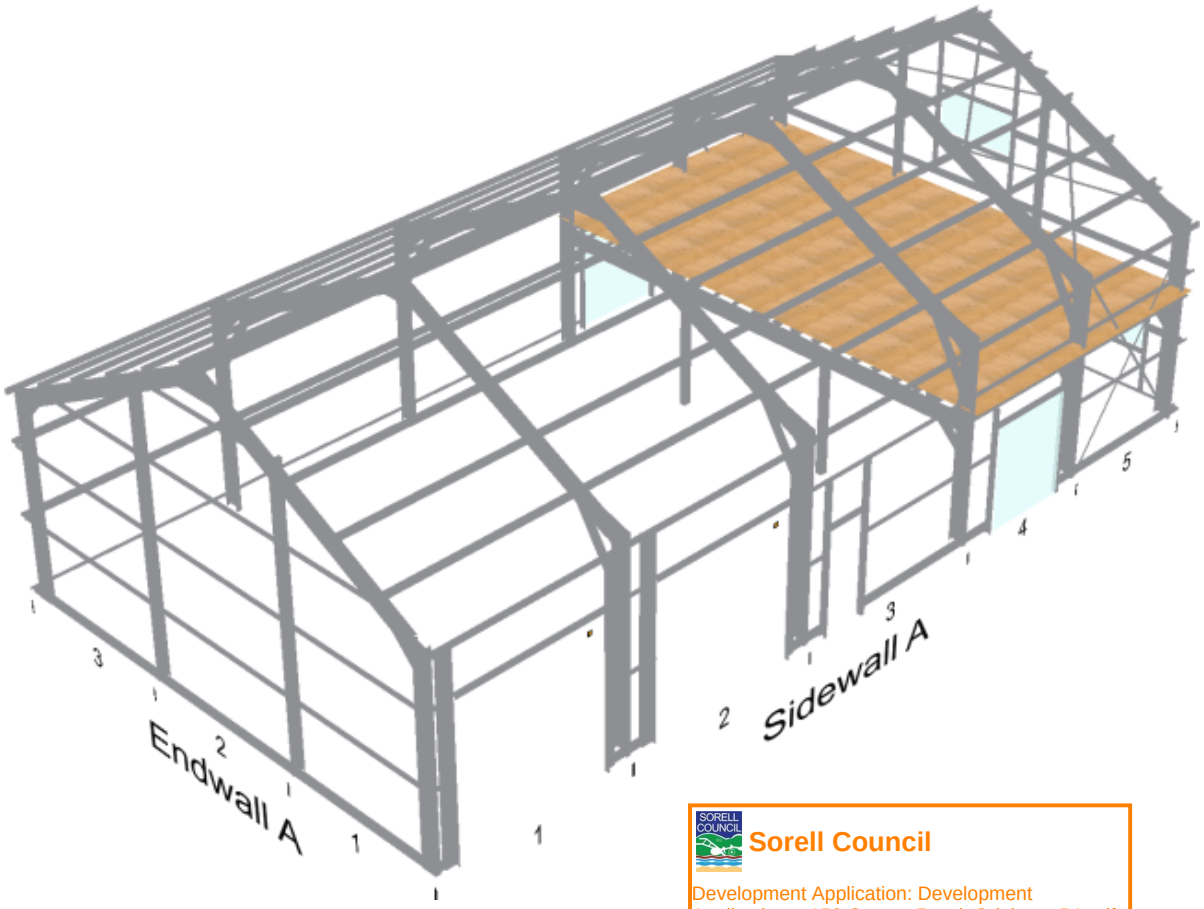
## Extra Options:

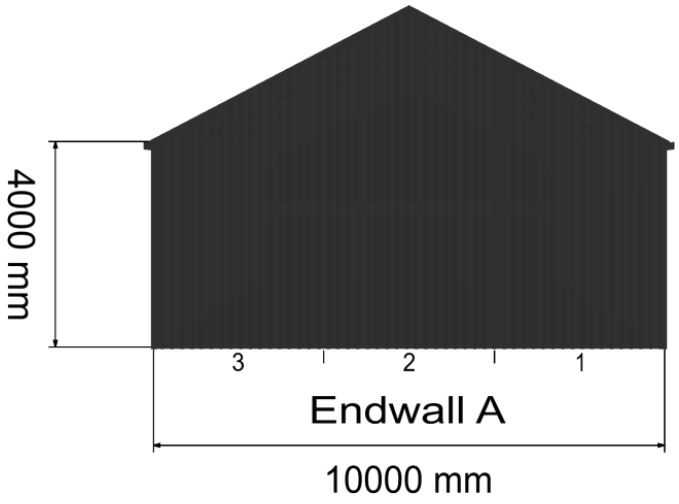
N/A
Knee Brace: C15024
Apex Brace: N/A

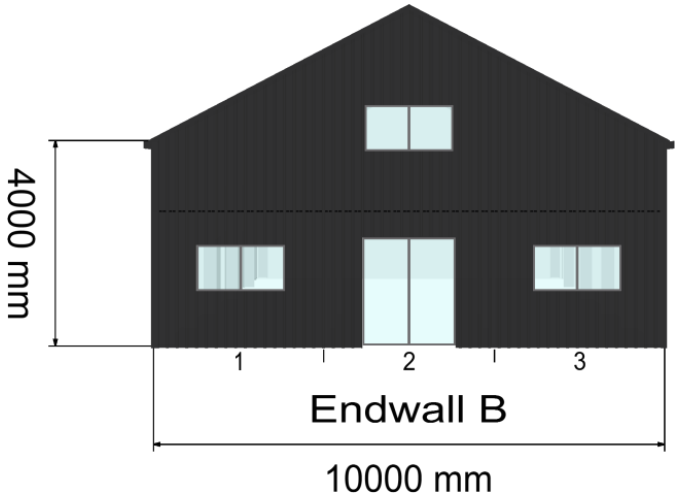
## Total Building Weight:

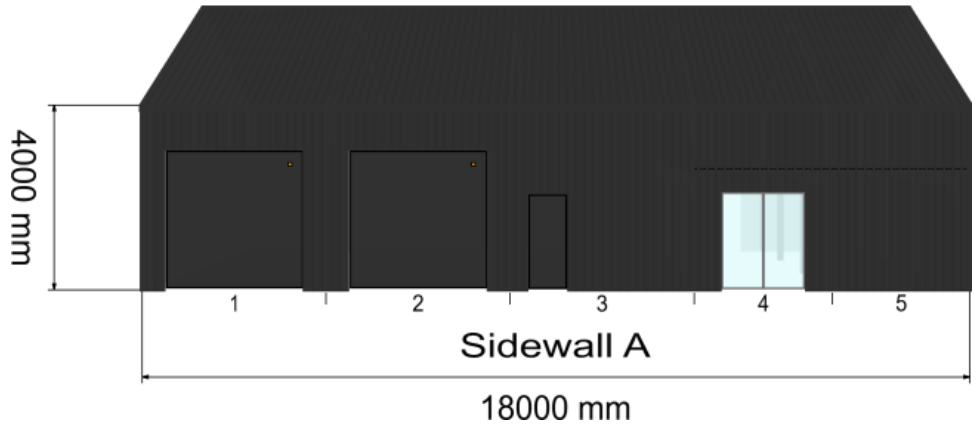
7048.44kg

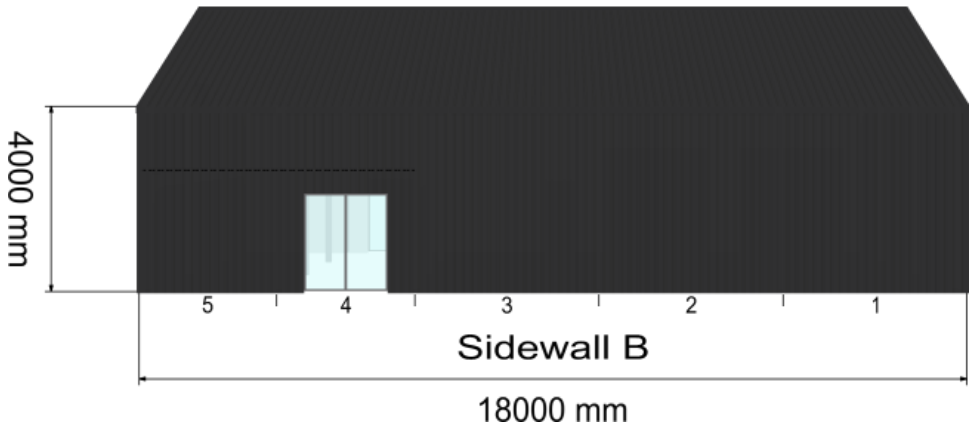




## Pricing & Payment Terms

**Purchase Conditions:**
10% Deposit for stamped engineering drawings.
50% Total prior to manufacturing. (40% due if 10% engineering has been paid)
50% Balance to be paid 14 days before delivery.

**Special Terms – Must Read**
Delivery is to the front of the property only unless there is sufficient area for the delivery truck to turn around on your property.
The shed package remains the property of Tassie Sheds until fully paid for.
The purchaser agrees to accept the shed package within 4-6 weeks of ORDERING, barring any steel shortages or unforeseen issues. **In the event of a material price rise by the material manufacturer, the purchaser agrees to pay the increase.**

## Client Details

CLIENT: Dan Hunter
Quote #1026811447
Clients Address: [redacted]
Orielton, [redacted]
Phone: [redacted]
Date: 15-01-2026

## Kit Price

**$47,747.46 (Inc. GST.)**

**Delivery Included** (If on standard delivery route)
**Price valid for 14 days** (Unless price rises)

## Quote Acceptance

**Signed Acceptance of Building Price and Design.**

_____

**Signed That Terms and Conditions Have Been Read.**

_____

Sorell Council

Development Application: Development Application - 150 Greens Road, Orielton - P1.pdf

Plans Reference:P3
Date Received:26/02/2026

**Tick Your Required Invoice:**

☐ **10% Engineering Invoice (We provide full engineering documents and local certificate.)** We need a total of 50% to go to manufacture. Only after paying 50% are you excluded from future price rises.)

☐ **50% Manufacturing Invoice (You receive your engineering documentation, and we begin manufacture.)** Final 50% delivery invoice payment due 14 days before delivery.

☐ **100% Full Payment Invoice (You receive your engineering documentation, and we begin manufacture.)**

# Important Terms & Conditions

1. **Payment**

(a) The Customer shall pay the Supplier the amount(s) stated as per payment schedule accompanying the order.

(b) The Supplier is not obliged to deliver any Goods unless the Customer has paid all amounts in full.

(c) The Customer must pay to the Supplier all debt collection costs, including any legal fees associated with the recovery or attempted recovery of any amount due to the Supplier under the Agreement.

(d) Goods for each building are made as required, any orders cancelled after order placement will not be refunded.

2. **Ownership**

(a) Ownership of the Goods does not pass to the Customer until all amounts due are paid to the Supplier.( b) Unless payment for the Goods is made to the Supplier by due date, the Supplier, or its agents or employees, may at any time enter on to the site where the Goods are stored and remove the Goods.

(c) The Customer must indemnify the Supplier in respect of any claims, losses, costs, or damages that the Supplier may incur as a result of the Supplier taking action under clause 2(b).

(d) Until the Customer has paid for the Goods;

(i) The Customer must not use, sell, lease, dispose, assign, or encumber the Goods (by mortgage, lien, charge or otherwise) without the consent of the Supplier; and

(ii) The Customer must store the Goods separately in a readily identifiable state.

3. **Council**

(a) The Customer agrees to pay any additional costs incurred should the Local Council require any changes be made to the building.

(b) A rejection of any building application or scope of works by the Local Council does not constitute a cancellation of the order and all moneys payable by the Customer to the Supplier shall become immediately due and payable.

4. **Delivery**

(a) The Customer will at his expense provide or cause to be provided full and clear access to the delivery site.

(b) Times for delivery are approximate and the Supplier can in no way be held responsible for variations to the proposed times.

(c) Where delivery is specified to be made to a site, any additional mechanical assistance required to unload the Goods (e.g. crane, etc) must be paid for and organised by the Customer.

(d) The Customer is to immediately notify the Supplier in writing upon discovery of any defect or shortage in the Goods. The Customer is deemed to have accepted the Goods and shall not have any claim in respect of defects or shortage unless the Supplier is notified in writing within forty-eight (48) hours of delivery of the Goods.

(e) Windows are delivered direct to site or directed location via courier or and do not come with the shed delivery.

(f) If delivery can not be made, we can generall hold the shed for the Customer for 2 weeks after which time it may be transferred to a storage yard at a cost of $200 a week payable by the Customer.

5. **General**

(a) Minor variations in measurements from those shown in the order shall not give rise to any claim for damages or breach of Agreement.

(b) To the extent permitted by law, the Supplier's liability with respect to the supply of defective or faulty Goods is limited to the lowest of:

(i) The replacement or repair of the Goods; or

(ii) Payment of the costs of replacing the Goods or supplying equivalent Goods, in each case, at the Suppliers discretion. The Supplier shall not be liable for any labour costs associated with such repair or replacement.

(c) The Customer warrants that he has carried out his own inquiries and investigations as to adequacy or suitability of the Goods for the purpose for which the Customer intends to use the Goods and the Customer has not relied on the Supplier or the supplier's employees, agents or distributors in determining the adequacy or suitability of the Goods for the Customer's purposes.

(d) If the Customer defaults under any term of the Agreement or these Terms & Conditions, the Supplier may terminate the Agreement and all moneys payable by the Customer to the Supplier shall become immediately due and payable.

(e) We use windlocked doors in region C & D as directed under the building code. Windlocked doors are not required to be used in other areas even if in a high wind speed location. Windlocked doors will not be used unless directed by the Customer and included in the signed quote that windlocked doors are to be used. If you, the Customer requite windlocked doors, please advise the sales agent.

(f) Please note the building dimensions are taken from the outside of the sidewall girts, the dimensions do not include the sheeting or the gutters. E.g. a 6 meter x 6 meter shed measure 6000mm x 6000mm to the outside of the girts that the sheeting is then fixed to. The slab will also be 6000mm x 6000mm allowing the sheeting to run down the wall and past the edge of the slab.

(g) Mezzanine quotes only include the steel bearer,joists and fixings and the does not include stairs, wood flooring or balustrades.

# Classic finish





**Dover White™**
Classic finish
SA = 0.28



**Surfmist®**
Classic finish
SA = 0.33
U

**Evening Haze®**
Classic finish
SA = 0.43



**Southerly®**
Classic finish
SA = 0.40

**Dune®**
Classic finish
SA = 0.48
U

**Paperbark®**
Classic finish
SA = 0.43



**Classic Cream™**
Classic finish
SA = 0.33

**Shale Grey™**
Classic finish
SA = 0.44
U

**Bluegum®**
Classic finish
SA = 0.57

**Windspray®**
Classic finish
SA = 0.60
U

**Gully®**
Classic finish
SA = 0.64

**Jasper®**
Classic finish
SA = 0.67

**Wallaby®**
Classic finish
SA = 0.64
U

**Basalt®**
Classic finish
SA = 0.67

**Woodland Grey®**
Classic finish
SA = 0.70
U

**Monument®**
Classic finish
SA = 0.73
U

**Night Sky®**
Classic finish
SA = 0.95

**Ironstone®**
Classic finish
SA = 0.73

**Deep Ocean®**
Classic finish
SA = 0.74

**Cottage Green®**
Classic finish
SA = 0.73

**Pale Eucalypt®**
Classic finish
SA = 0.60

**Manor Red®**
Classic finish
SA = 0.70

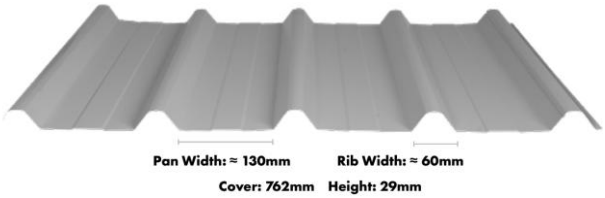
## Full Sheeting And Flashing Colour Breakdown:

Roof Colour:  Monument
Wall Colour:  Monument
Gutter Colour:  Monument
Ridge Colour:  Monument
Downpipe Colour:  N/A
Corner Flashings Colour:  Monument
Vermin FlashingColour:  N/A
Opening Flashings:  Monument
Barge Flashing:  Monument

## Sheeting Profiles:

Corro


Trimclad



**From:** Nick Young
**To:** Sorell Council
**Subject:** Re: 5.2026.61.1 - Request For Information - 150 Greens Road, Orielton
**Date:** Friday, 12 June 2026 1:50:48 PM
**Attachments:** [redacted]

Sorell Council
Development Application: 5.2026.61.1 - Response to Request For Information - 150 Greens Road, Orielton - P2.pdf
Plans Reference: P2
Date received: 12/06/2026



Attn: Senior Planner Kate Guinane,

Update plans & Geotechnical report attached

RFI response:

1. A description of the intended use of the proposed outbuilding; **- Proposed shed is for use of storage/ farm equipment for the site.**

2. An amended site plan that includes details of the vehicular access proposed to the outbuilding, and shows both existing accesses from Greens Road; **- See drawing 02 existing access and proposed access from existing access.**

3. Amended elevations to include reference to natural ground level and the maximum height of the proposed outbuilding above natural ground level; **- Overall Height 6.82M See attached plans drawing 08**

4. Documentation to address the requirements of Clause 11.4.1 (P1) of the Tasmanian Planning Scheme – Sorell (the Scheme), in relation to proposed site coverage; -

11.4.1 Site coverage
**Total Site Coverage is 573m2**
P1 The site coverage must be consistent with that existing on established properties in the area, having regard to:
(a) the topography of the site; **Gradient Fall across site will require minimal site works of cut to the proposed shed location to establish a slab on ground base - to align consistent with existing buildings on surrounding properties.**
(b) the capacity of the site to absorb runoff; **the site been 30,490sqm has ample capacity for site absorption and runoff without affecting neighbouring properties**
(c) the size and shape of the site; **The size and shape of the site allows for the existing and proposed site coverage while maintaining open area of the site**

**similar to other sites that have multiple structures.**
(d) the existing buildings and any constraints imposed by existing development; **the proposed shed does place any constraint on the existing properties in the area, several of the surrounding properties in the area have**
(e) the need to remove vegetation; **No vegetation is been removed from site. Low level cut to the site for the proposed shed will not affect existing vegetation, that consists of existing dry/ dead grass.**
(f) the character of development existing on established properties in the area. **Several of the surrounding existing properties contain multiple buildings/ structures. The proposed shed to 150 Greens road will remain consistent with the surrounding sites and their existing multiple building structures.**

5. Documentation to address the requirements of Clause 11.4.2 (P2) of the Scheme, in relation to the proposed front setback, noting that the performance criteria requires that the building must be compatible with the character of the area having regard to setbacks of adjacent buildings and the appearance when viewed from Greens Road.

**Setback from shed to North Boundary (Greens Rd) is minimum of 16M to the proposed shed and 26M to the East boundary**
P2 Buildings must be sited to be compatible with the character of the area, having regard to:
(a) the topography of the site; **The existing fall across site will require minimal site works of cut to the proposed shed location to establish a slab on ground base - to align consistent with existing buildings on surrounding properties.**
(b) the setbacks of adjacent buildings; **Setback from shed to North Boundary (Greens Rd) is minimum of 16M to the proposed shed and 26M to the East boundary.**
**Example of closer setbacks - No. 212 Greens Rd - Buildings are closer than 20M to the North Boundary of Greens Rd. Existing dwelling is 10M and shed/ outbuilding is 3M.**
(c) the height, bulk and form of existing and proposed buildings; **The proposed shed 6.82M overall height (lower to site due to cut) is similar to surrounding properties having similar size buildings.**
(d) the appearance when viewed from roads and public places; **Far less visually impacting of 16M setback to 150 Greens rd as apposed to example property No. 212 Greens Rd - which existing buildings are closer than 20M to the North Boundary of Greens Rd. Existing dwelling is 10M and shed/ outbuilding is 3M.**
(e) the retention of vegetation. **No vegetation is affected or been removed from site.**

6. A dispersive soils assessment, required to address the Dispersive Soils Specific Area Plan at S1.0 of the Scheme. **- See Attached Geotechnical report**

What date is the planning assessment due to be completed?

Warmly,

Nicholas Young
Building Designer
ISLAND LIFE DESIGNERS
M:0422531710
E: foreveryoungnickdesigner@yahoo.com

Island Life Designers – Affordable Top End Luxury

On Thursday 5 March 2026 at 11:51:14 am AEST, Sorell Council <info@sorell.tas.gov.au> wrote:

Good afternoon,

Please find attached **Request for Information** Letter for the above address.

**Please submit your additional information to the Sorell Council via:**

- email to sorell.council@sorell.tas.gov.au (in .pdf or .docx format not exceeding 20MB);
- hard copy form in person at the Council chambers, 47 Cole Street, Sorell; or
- hard copy form by post to PO Box 126, Sorell, TAS 7172.

**Additional information submitted in any other way will not be accepted.**

Please note that if additional information is lodged by 4.30pm on a day that the Council is open for business, the information will be accepted on that day. In any other case, the information will be accepted on the next day the Council is open for business.

Kind regards,

**Vicki Foster**
Customer & Business Support Officer

**T:** 03 6269 0000

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CONSULTANTS
Geotechnical & Environmental Services

# GEOTECHNICAL SITE INVESTIGATION

## 150 GREENS ROAD - ORIELTON

## PROPOSED SHED

**Client: Dan Hunter**

**Certificate of Title: 171025/1**

**Investigation Date: 24/04/2026**

**Refer to this Report As**

Enviro-Tech Consultants Pty. Ltd. 2026. Geotechnical Site Investigation Report for a Proposed Shed, 150 Greens Road - Orielton. Unpublished report for Dan Hunter by Enviro-Tech Consultants Pty. Ltd., 24/04/2026.

**Report Distribution**

This report has been prepared by Enviro-Tech Consultants Pty. Ltd. (Envirotech) for use by parties involved in the proposed development of the property named above.

Permission is hereby given by Envirotech and the client, for this report to be copied and distributed to interested parties, but only if it is reproduced in colour, and only distributed in full. No responsibility is otherwise taken for the contents.

**Limitations of this report**

In some cases, variations in actual Site conditions may exist between subsurface investigation boreholes. This report only applies to the tested parts of the Site at the Site of testing, and if not specifically stated otherwise, results should not be interpreted beyond the tested areas.

The Site investigation is based on the observed and tested soil conditions relevant to the inspection date and provided design plans (building footprints presented in Attachment A). Any Site works conducted outside the scope of the provided Site plans have not been assessed. Subsurface conditions may change laterally and vertically between test Sites, so discrepancies may occur between what is described in the reports and what is exposed by subsequent excavations. No responsibility is therefore accepted for any difference in what is reported, and actual Site and soil conditions for parts of the investigation Site which were not assessed at the time of inspection.

This report has been prepared based on provided plans detailed herein. Should there be any significant changes to these plans, then this report should not be used without further consultation which may include drilling new investigation holes to cover the revised building footprint. This report should not be applied to any project other than indicated herein.

No responsibility is accepted for subsequent works carried out which deviate from the Site plans provided or activities onsite or through climate variability including but not limited to placement of fill, uncontrolled earthworks, altered drainage conditions or changes in groundwater levels.

Footing exposure classification is presented on a layer-by-layer basis. In practice, some layers may be removed during excavation or replaced as part of site cuts and fills, while others may be incorporated within the building envelope. The information should therefore be regarded as guidance only, and the designer must assess the actual founding conditions and make the final determination of concrete strength, curing and cover requirements.

At the time of construction, if conditions exist which differ from those described in this report, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets that requirement referenced herein or stipulated by an engineer before any footings are poured.

# Investigation Summary

## Site Classification

In accordance with AS 2870 – 2011 and after thorough consideration of the known details pertaining to the proposed building and associated works (hereafter referred to as the Site), the geology, soil conditions, soil properties, and drainage characteristics of the Site have been classified as follows:

**CLASS M** on the basis that soil profiles around the proposed building envelope are classified as being Moderately reactive to soil moisture variation, with some if not all the test locations being potentially subject to surface movement of up to 25 mm

## Foundations

Concentrated loads including but not limited to slab edge or internal beam or strip footings shall be supported directly on piers or pads which are founded on the basalt bedrock at 0.6 to 0.9 m depth or greater (with an allowable bearing capacity of 350 kPa).

# Site Investigation

The Site investigation is summarised in Table 1.

*Table 1 Summary of Site Investigation*

| | |
|---|---|
| **Client** | **Dan Hunter** |
| **Project Address** | 150 Greens Road - Orielton |
| **Council** | Sorell |
| **Planning Scheme** | Tasmanian Planning Scheme |
| **Overlays** | Sorell Local Provisions Schedule Dispersive Soils Specific Area Plan |
| **Proposed** | Shed |
| **Investigation** | Fieldwork was carried out by an Engineering Geologist on the 24/4/2026 |
| **Site Topography** | The Site is defined by the proposed building and works area which has a moderate slope of approximately 9% (5°) to the southeast |
| **Site Drainage** | The Site receives overland flow runoff directly from the northwest. |
| **Soil Profiling** | Two investigation holes were direct push sampled from surface level around the proposed shed (Appendix A): |
| **Investigation Depths** | The target excavation depth was estimated at 2.3 m. Borehole BH01 was direct push sampled to 0.9 m and borehole BH02 was direct push sampled to 0.6 m (both ending in BASALT). Borehole logs and photos are presented in Appendix B & C. |
| **Soil moisture and groundwater** | Recovered soil at the site was dry at the time of the investigation. Groundwater was not encountered. |
| **Geology** | According to 1:250,000 Mineral Resources Tasmania geological mapping (accessed through The LIST), the geology comprises of: Cretaceous - Neogene Basalt. |

## Soil Profiles

The geology of the Site has been documented and described according to Australian Standard AS 1726 for Geotechnical Site Investigations, which includes the Unified Soil Classification System (USCS). Soil layers, and where applicable, bedrock layers, are summarized in Table 2.

*Table 2 Soil Summary Table*

| # | Layer | Details | USCS | BH01 | BH02 |
|---|---|---|---|---|---|
| 1 | Silty CLAY | TOPSOIL: Silty CLAY trace sand, reddish black, well sorted, medium plasticity, roots; massively structured, St-H | CI | 0-0.3 DS@0.1 | 0-0.3 DS@0.1 |
| 2 | Gravelly CLAY | Gravelly CLAY trace sand, very dark grey, well sorted, high plasticity; angular gravel; massively structured, H | CH | | 0.3-0.5 DS@0.4 |
| 3 | CLAY | CLAY with gravel, trace sand, very dark grey, high plasticity; angular gravel; massively structured, VSt | CH | 0.3-0.6 DS@0.5 | |
| 4 | Clayey Gravelly SILT | Clayey Gravelly SILT trace sand, dark greyish brown, well sorted, low plasticity; angular gravel; massively structured, St-VSt | ML | 0.6-0.8 DS@0.7 | |
| 5 | BASALT | BASALT Bedrock | | 0.8-0.9 REF | 0.5-0.6 DS@0.5 REF |

**Consistency**[1] **VS** Very soft; **S** Soft; **F** Firm; **St** Stiff; **Vst** Very Stiff; **H** Hard. Consistency values are based on soil strengths AT THE TIME OF TESTING and is subject to variability based on field moisture condition
**Density**[2] **VL** Very loose; **L** Loose; **MD** Medium dense; **D** Dense; **VD** Very Dense
**Rock Strength** **EL** Extremely Low; **VL** Very Low; **L** Low; M Medium; **H** High; **VH** Very High; **EH** Extremely High
**PL** Point load test (lump)
**DS** Disturbed sample
**PV** Pocket vane shear test
**FV** Downhole field vane shear test
**U50** Undisturbed 48mm diameter core sample collected for laboratory testing.
**REF** Borehole refusal
**INF** DCP has continued through this layer and the geology has been inferred.

# Planning – DISPERSION

## Sorell local provisions schedule - SOR-S1.7.1 Development on dispersive soils

### Objective

That buildings and works with the potential to disturb dispersive soil are appropriately located or managed:

(a) to minimise the potential to cause erosion; and

(b) to reduce risk to property and the environment to an acceptable level.

### Acceptable Solutions

Given the proposed development involves disturbance of soils and is not for a habitable building or an extension less than 100 m$^2$, the building and works do not meet LPS acceptable solutions, and performance solution SOR-S1.7 is to be addressed.

[1] Soil consistencies are derived from a combination of field index, DCP and shear vane readings.
[2] Soil density descriptions presented in engineering logs are derived from the DCP testing.

## Performance Criteria

| Performance Criteria | Recommendations |
|---|---|
| Building and works must be designed, sited and constructed to minimise the risks associated with dispersive soil to property and the environment, having regard to: | |
| (a) the dispersive potential of soils in the vicinity of proposed buildings, driveways, services and the development area generally; | Testing indicates variable dispersive potential across the Site. Layers 1 and 3 are slightly dispersive, Layer 2 is dispersive, and Layer 4 is severely dispersive. Layer 4 was encountered in BH01 from 0.6 m to 0.8 m depth and should be treated as the main dispersive soil risk. |
| (b) the potential of the development to affect or be affected by erosion, including gully and tunnel erosion; | The development has potential to expose dispersive soils through pad excavation, service trenching and drainage works. The risk is highest where pale-coloured soils between the darker surface soils and basalt bedrock are exposed to concentrated runoff. |
| (c) the dispersive potential of soils in the vicinity of water drainage lines, infiltration areas and trenches, water storages, ponds, dams and disposal areas; | Drainage lines, service trenches, cut-off drains and any stormwater discharge areas should be located and constructed to avoid concentrating water within dispersive soils. Shallow drains should be used where practical, and exposed dispersive soils within drains or trenches should be treated with gypsum and protected from erosion. |
| (d) the level of risk and potential consequences for property and the environment from potential erosion, including gully and tunnel erosion; | If unmanaged, erosion or tunnel erosion could result in localised ground loss, batter erosion, settlement of fill, or damage to footings, drainage infrastructure and surrounding ground. The risk is considered manageable if dispersive soils are avoided as founding or fill material and drainage is controlled. |
| (e) management measures that would reduce risk to an acceptable level; and | Risk can be reduced to an acceptable level by founding concentrated loads on basalt bedrock, not reusing Layer 4 as fill, using non-dispersive imported or bedrock-derived fill, treating exposed dispersive soils with gypsum, protecting treated surfaces with topsoil, loam or paving, and directing surface water away from the shed footprint. |
| (f) the advice contained in a dispersive soil management plan. | The recommendations in the dispersive soil management section and Appendix G should be adopted during earthworks, footing construction, drainage installation and long-term Site maintenance. |

# Recommendations

## Dispersive soil Management

Findings

The results presented in Appendix E indicate:

- Shallow soil Layers 1 to 3 are considered either not dispersive (Class 4 or greater) or only slightly dispersive (Class 3).
- Deeper soil Layer 4 comprises Emerson Class 1 category soils which are considered severely dispersive. Layer 4 has been logged in BH01 only and ranges in depth from 0.6 to 0.8m depth.

Site specific recommendations

- Foundations should not be placed directly on moderately to severely dispersive soils where these are encountered, unless the founding material is assessed and approved by the project engineer.
- In this case Layer 4 is also used to describe any soil present between the darker organic soil layers 1 to 3 and the bedrock.
- Moderately to severely dispersive soils should not be reused as structural fill or general fill beneath the proposed shed.
- Any fill placed beneath the shed should comprise imported or bedrock derived non-dispersive, well-compacted material.
- Exposed pale-coloured soils between the darker organic-rich surface soils and basalt bedrock should be assumed to be potentially dispersive unless confirmed otherwise by testing.
- Exposed dispersive soils should be treated with gypsum immediately following excavation.
- Treated dispersive soil surfaces should be covered with topsoil, loam, paving, or other suitable protective cover to limit direct rainfall impact and infiltration.
- Shallow upslope cut-off drains should be installed to divert surface water away from the shed footprint and cut faces.
- Cut-off drains should generally be shallow, preferably about 300 mm deep, to avoid cutting into dispersive subsoils.
- Gypsum should be placed in the base of cut-off drains where dispersive soils are exposed or suspected.
- Collected surface water should be discharged to stable areas away from exposed dispersive soils and spread back over the landscape where practical.
- Concentrated discharge onto exposed dispersive soil should be avoided.
- All exposed cut batters should be stabilised as soon as practical following excavation.
- The final earthworks layout should aim to minimise exposure of Layer 4 soils and prevent water from ponding or infiltrating into these materials.

For further guidance, general recommendations are presented in Appendix G.

## Soil Exposure Classification

The soil has been tested for salinity impacts on footings in accordance with AS 2870, as well as preliminary pH testing as a proxy to potential sulphate aggressivity.

- For an exposure classification of A1, it is recommended to utilize concrete with a minimum strength of 20 MPa, provide at least 40 mm cover without a membrane (30mm with), and ensure curing for no less than three days. (A1)
- It is also essential to refer to other applicable construction standards to ensure compliance with all relevant guidelines and best practices.

## Plumbing

Refer to hydraulic design drawings for detailed plumbing advice and requirements.

Refer to Table 3 to assess soil movement (Ys) around pipework for different depth ranges.

*Table 3 Millimetres soil movement (Ys) for determining plumbing requirements for various soil depths **

| Building | Profiles | P* | E Ys >75 | H2 Ys 60-75 | H1 Ys 40-60 | M Ys 20-40 | S Ys 0-20 | A Ys 0 |
|---|---|---|---|---|---|---|---|---|
| Shed | BH01 BH02 | No | | | | 0-0.2 | 0.2-0.8 | 0.8-3 |

* Depths in this table are based on surfaces at the time of testing and do not allow for the influence of any additional fill added to the soil profile unless the Iss calculation depth has been modified based on the proposed cut and fill (see 'Footing Minimum Target Depths'). Where additional fill is proposed (and not indicated in the attached plans) Enviro-Tech are to be advised of final FFL's so the Site classification can be recalculated according to the specific fill reactivity and thickness used in the design.



Class A and S

When pipework service trench bases fall within Class A to S depth range as shown in Table 5, and all plumbing recommendations herein have been implemented, the drainage system does not require any additional protection and should be installed following the AS/NZS 3500 series standards.

## Wastewater and Stormwater Management

Stormwater must remain at surface level and be controlled through surface distribution drains which terminate in contour drains.

## Site Drainage

As part of the building design plan, drains are recommended upslope of earth retaining structures, soil cuts, filled areas and the proposed building Site to capture and divert Site stormwater flow.

Surface drainage shall be considered in the design of the footing system, and necessary modifications shall be included in the design documentation. The surface drainage of the site shall be controlled from the beginning of the preparation and construction of the site. The drainage system shall be completed after the completion of the building construction.

Ideally, the areas around the footprint of the building should be graded or drained so that the water cannot pond against or near the building. As soon as footing construction has been completed, the ground immediately adjacent to the building should be graded to a uniform fall of 50mm minimum away from the building over the first metre. The final provision of paving to the edge of the building can greatly limit soil moisture variations due to seasonal wetting and drying.

## Temporary Site Drainage

It is recommended that drainage protection works (cut off drains/mounds) are put in place above (upgradient of) the work area to prevent water and sediment from accumulating in and around footings and reduce the risk of erosion and instability around any proposed earth retaining structures.

## Rock Excavatability

The rock strength is highly variable, so a larger 8-tonne excavator may be needed to prepare the building pad.

## Permanent Cut Batters – Soil and Rock

To ensure that cuts remain serviceable, it is recommended that unretained cuts in soil do not exceed 1V: 2H and unsupported batters in bedrock do not exceed 2V: 1H. Before cuts are approached by workers, cuts must be appropriately scaled to remove any loose soil and rock. The bedrock should not be increased beyond 2.0 m height relative to depth below natural level, without inspection by a suitably qualified person to ensure that these cuts are safe to work under.

## Filling Works

- In the case where either of the following conditions occur, the Site is classified as Class P (AS 2870 Clauses 2.5.2 and 2.5.3), in which case footings are to be designed in accordance with engineering specifications:
  - FILL OTHER THAN SAND exceeds 0.4 m depth.
  - SAND FILL exceeds 0.8 m depth.
- It is recommended that footing (edge beams, internal beams, and load support thickenings) concentrated loads are transferred through the fill to target founding layers.
- Subject to engineering advice, edge beams, internal beams, and load support thickenings may need to be founded on natural ground.
- SAND or FCR is always recommended rather than fill containing SILT or CLAY.
- Compacted CLAY or SAND FILL on well drained slopes should not exceed 1V:2H unless supported by an engineered retaining wall.
- Compacted SILT fill on well drained slopes should not exceed 1V:4H unless supported by an engineered retaining wall.
- Compacted stable rock fill on well drained slopes should not exceed 2V:3H unless supported by an engineered retaining wall.
- Any proposed filling works must be in accordance with AS 3798 'Earthworks for Residential and Commercial Developments'.
- Before placing fill for landscaping, all topsoil should be removed from the filled area.
- Fill in embankments shall be keyed 150mm into natural ground.

## Long-term erosion management

The following measures are generally recommended for maintaining long-term erosion stability of soil slopes:

- Slopes exceeding 1V: 4H and up to 1V: 3H will need to be effectively stabilised with mulch/topsoil mixes, drill/broadcast seeding, hydroseeding or soil binders.
- Slopes up to 1V:2H can be stabilised with straw mulching.
- Slopes exceeding 1V: 2H and up to 1V:1.5H may be effectively stabilised with hydromulching

- Slopes exceeding 1V:1.5H but no greater than 1V: 1H will generally require measures such as erosion control blankets.

## Earth-Retaining Structures

Any excavations higher than 1.0m and exceeding the recommended batter angle should be supported with a retaining wall engineered that allows free drainage of the retained soil and rock.

## Building Pad Preparation

Any organic matter or other deleterious materials will need to be removed from the building envelope.

Topsoil containing grass roots must be removed from the area on which the footing will rest.

Earthworks should be carried out in accordance with AS 3798 'Earthworks for Residential and Commercial Developments'. Unsuitable materials in structural fill are listed in AS 2870 Section 4.3.

The base of the excavation must be generally level but may slope not more than 1:40 to allow excavations to drain.

## Footing Preparation

Footing excavations must be free of loose earth, tree roots, mud or debris immediately before pouring concrete, ensuring the footing is appropriately seated on the target layer.

## Foundation Maintenance

Details on appropriate site and foundation maintenance practices from the CSIRO BTF 18 Foundation Maintenance and Footing Performance: A Homeowner's Guide are presented in Appendix H of this report.

Kris Taylor, BSc (hons)

Environmental & Engineering Geologist

# Notes About Your Assessment

The Site classification provided and footing recommendations including foundation depths are assessed based on the subsurface profile conditions present at the time of fieldwork and may vary according to any subsequent *Site works* carried out. *Site works* may include changes to the existing soil profile by cutting more than 0.5 m and filling more than 0.4 to 0.8 m depending on the type of material and the design of the footing. All footings must be founded through fill *other than* sand not exceeding 0.4 m depth or sand not exceeding 0.8 m depth, or otherwise a Class P applies (AS 2870 Clauses 2.5.2 and 2.5.3).

For reference, borehole investigation depths relative to natural soil surface levels are stated in borehole logs where applicable.

In some cases, variations in actual Site conditions may exist between subsurface investigation boreholes. At the time of construction, if conditions exist which differ from those described in this report, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirement referenced herein or stipulated by an engineer before any footings are poured.

The site classification assumes that the performance requirements as set out in Appendix B of AS 2870 are acceptable and that site foundation maintenance is carried out to avoid extreme wetting and drying.

It is the responsibility of the homeowner to ensure that the soil conditions are maintained and that abnormal moisture conditions do not develop around the building. The following are examples of poor practises that can result in abnormal soil conditions:



- The effect of trees being too close to a footing.
- Excessive or irregular watering of gardens adjacent to the building.
- Failure to maintain Site drainage.
- Failure to repair plumbing leaks.
- Loss of vegetation near the building.

The pages that make up the last six pages of this report are an integral part of this report. The notes contain advice and recommendations for all stakeholders in this project (i.e. the structural engineer, builder, owner, and future owners) and should be read and followed by all concerned.

# References

AS 1289.6.3.2-2003 Soil strength and consolidation tests - Determination of the penetration resistance of a soil - 9 kg dynamic cone penetrometer test, Standards Australia, Sydney, Retrieved from SAI Global

AS 1289.7.1.1-2003 Methods of testing soils for engineering purposes Method 7.1.1: Soil reactivity tests—Determination of the shrinkage index of a soil—Shrink-swell index, Standards Australia, Sydney, Retrieved from SAI Global

AS 1726-2017, Geotechnical Site investigations, Standards Australia, Sydney, Retrieved from SAI Global

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AS 4055 (2021). Australian Standard. Prepared by Committee BD-099, Wind Loads for Housing. Approved on behalf of the Council of Standards Australia on 1st June 2021 and published on 25th June 2021.

DPIPWE 2009. Dispersive Soils and their Management. Technical Reference Manual. Sustainable Land Use Department of Primary Industries Water and Environment.

Webster, S.L., Brown, R.W. and Porter, J.R. (1994) Force Projection Site Evaluation Using the Electric Cone Penetrometer (ECP) and the Dynamic Cone Penetrometer (DCP). Technical Report No. GL-94-17, Air Force Civil Engineering Support Agency, US Air Force, Tyndall Air Force Base, FL.

# Appendix A Mapping


*Figure 1 Site Borehole Locations*

# Appendix B Borehole Logs

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Positioning: GDA94 & mAHD

**ASSESSMENT:** Geotechnical Site Investigation
**STRUCTURE:** Shed
**EASTING:** 544331.4 **ACCURACY**
**NORTHING:** 5269386.3 **HORIZ:** 0.1m **VERT:** 0.1m

Borehole : BH01
**DATE TESTED:** 24/04/2026
**LOGGED BY:** Y. Karki
**ELEVATION:** 55

**LOCATION:** 150 Greens Road - Orielton
**CLIENT:** Dan Hunter
**EQUIPMENT:** AMS Powerprobe 9120 RAP
**ESTIMATED GROUND m (m AHD):**

| DEPTH (m) | GRAPHIC | DESCRIPTION | DENSITY CONSIST. STRENGTH | LAYER | ELEVATION (mAHD) | MOISTURE Index | MOISTURE % | MOISTURE Well | SAMPLE | TEST | Cu (kPa) | UCS (kg/cm²) | (IS50 MPa) (CBR) NSPT | NDCP/100mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | CI | TOPSOIL: Silty CLAY trace sand, reddish black, well sorted, medium plasticity, roots massively structured | stiff to very stiff | 1 | 54.9 | | 19 | | DS | | | | (4) (7) (14) | 3.0 5.0 8.0 |
| | | | | | 54.7 | | | | | | | | | |
| 0.5 | CH | CLAY with gravel, trace sand, very dark grey, high plasticity angular gravel; massively structured | very stiff | 3 | 54.5 | Dry | 21 | | DS | | | | (14) (15) (REF) | 8.0 9.0 REF |
| | ML | Clayey Gravelly SILT trace sand, dark greyish brown, well sorted, low plasticity angular gravel; massively structured | stiff to very stiff | 4 | 54.3 | | 21 | | DS | | | | | |
| | | BASALT Bedrock olive | | 5 | 54.1 | | | | | | | | | |
| | | Direct Push Sampler Refusal on BASALT Bedrock | | | | | | | | | | | | |
| | | End of borehole at 0.9m depth. | | | | | | | | | | | | |

**GROUNDWATER:** Not Encountered

PAGE 1 of 1

**TESTING:** Penetrometer: AS 1289.6.3.2

DCP Blows per 100mm. For penetrometer blows per 100mm <1, distance travelled per blow is measured and converted back to blows per 100mm

DS: disturbed sample; PV: pocket vane; PP: pocket penotrometer; FV(Ømm): downhole field vane; U50: undisturbed 50mm sample; REF: DCP refusal

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Positioning: GDA94 & mAHD

**ASSESSMENT:** Geotechnical Site Investigation
**STRUCTURE:** Shed
**EASTING:** 544316.2 **ACCURACY**
**NORTHING:** 5269395.8 **HORIZ:** 0.1m **VERT:** 0.1m

Borehole : BH02
**DATE TESTED:** 24/04/2026
**LOGGED BY:** Y. Karki
**ELEVATION:** 56.8

**LOCATION:** 150 Greens Road - Orielton
**CLIENT:** Dan Hunter

**EQUIPMENT:** AMS Powerprobe 9120 RAP
**ESTIMATED GROUND m (m AHD):**

| DEPTH (m) | GRAPHIC | DESCRIPTION | DENSITY CONSIST. STRENGTH | LAYER | ELEVATION (mAHD) | MOISTURE Index | % | Well | SAMPLE | TEST | Cu (kPa) | UCS (kg/cm²) | (IS50 MPa) (CBR) NSPT | NDCP/100mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | CI | TOPSOIL: Silty CLAY trace sand, reddish black, well sorted, medium plasticity, roots massively structured | stiff to hard | 1 | 56.6 | Dry | 16 | | DS | | | | (4) (9) (20) | 3.0 6.0 14.0 |
| | CH | Gravelly CLAY trace sand, very dark grey, well sorted, high plasticity angular gravel; massively structured | hard | 2 | 56.4 | | 18 | | DS | | | | (15) (REF) | 20.0 REF |
| 0.5 | | BASALT Bedrock olive | | 5 | 56.2 | | | | DS | | | | | |



Direct Push Sampler Refusal on BASALT Bedrock

End of borehole at 0.6m depth.

**GROUNDWATER:** Not Encountered



**TESTING:** Penetrometer: AS 1289.6.3.2

DCP Blows per 100mm. For penetrometer blows per 100mm <1, distance travelled per blow is measured and converted back to blows per 100mm

DS: disturbed sample; PV: pocket vane; PP: pocket penotrometer; FV(Ømm): downhole field vane; U50: undisturbed 50mm sample; REF: DCP refusal

# Appendix C Core Photographs

## BH01

## BH02

*** 1 metre core tray length**

# Appendix D Explanatory Notes

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## USCS Soil Classification Methodology

Soil classification was undertaken in accordance with the Unified Soil Classification System (USCS) and AS 1726 – Geotechnical Site Investigations, using a combination of particle size distribution and plasticity assessment. This process was applied consistently to all soil layers encountered.

### 1. Particle Size Distribution (Wet Sieve Analysis)

Particle size analysis was performed by wet sieving in accordance with Australian Standard sieve sizes:

- Gravel fraction: >2.36 mm
- Sand fraction: 0.075 mm to 2.36 mm
- Fines fraction (silt + clay): <0.075 mm

Samples were soaked (often overnight) to fully disperse fines prior to sieving. Wet sieving is particularly effective for Tasmanian soils, which are often dispersive, ensuring accurate quantification of the fines fraction. The oversize fraction (>63 mm) was excluded from the mass percentages before classification.

### 2. Plasticity Assessment

Plasticity of the fines fraction was determined using:

- Laboratory Atterberg limits, where available, with liquid limit (WL) and plasticity index (PI) plotted on the Plasticity Chart (AS 1726) to determine the fines classification (silt vs clay) and plasticity level (low, medium, high).
- Field index tests (where Atterberg limits were not available), following Table 1 & Table 2:
  - Dry strength – resistance of dried soil to crushing.
  - Dilatancy – reaction of a moist soil pat to shaking.
  - Toughness – resistance of a soil thread near the plastic limit.

**Table 1 Field Assessment of Fine-Grained Soils (adapted from AS 1726 Table 7)**

| Dry Strength | | Dilatancy (reaction to shaking) | | Toughness (consistency near plastic limit) | |
|---|---|---|---|---|---|
| None | The dry specimen crumbles into powder with mere pressure of handling. | None | No visible reaction or change in the specimen. | Low | Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft. |
| Low | The dry specimen crumbles into powder with some finger pressure. | Slow | Water appears slowly on the surface of the specimen during shaking and does not disappear during squeezing. | | |
| Medium | The dry specimen breaks into pieces or crumbles with considerable finger pressure. | | | Medium | Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness. |
| High | The dry specimen cannot be broken with finger pressure. Specimen will break into pieces between thumb and a hard surface. | Rapid | Water appears quickly on the surface of the specimen during shaking and disappears during squeezing. | High | Considerable pressure is required to roll the thread near the plastic limit. The thread and the lump have very high stiffness. |
| Very High | The dry specimen cannot be broken between the thumb and a hard surface. | | | | |

**Table 2 Identification of Fine-Grained Soils by Visual–Tactile Methods (adapted from AS 1726 Table 8)**

| Soil description | Identification of inorganic fine-grained soils | | |
|---|---|---|---|
| | Dry Strength | Dilatancy | Toughness and Plasticity |
| SILT | None to low | Slow to rapid | Low or thread cannot be formed |
| Clayey SILT — Clay/silt mixtures of low plasticity | Low to medium | None to slow | Low to medium |
| Silty CLAY — Silt/clay mixtures of medium plasticity | Medium to high | None to slow | Medium |
| High plasticity CLAY | High to very high | None | High |

## 3. Classification Hierarchy

### 3.1 Fine- vs Coarse-Grained determination

- Fine-grained soils: More than 35% (by mass) passes the 0.075 mm sieve → classify using Table 3
- Coarse-grained soils: More than 65% (by mass) is retained on the 0.075 mm sieve → classify using Table 4.

### 3.2 Coarse-grained soils (Table 4):

1. **Determine Gravel vs Sand:**
    - Gravel (G*) – more than 50% of the coarse fraction is retained on the 2.36 mm sieve.
    - Sand (S*) – less than 50% of the coarse fraction is retained on the 2.36 mm sieve.
2. **Assign fines modifiers:**
    - ≤5% fines: "Clean" gravels/sands (GW, GP, SW, SP).
    - 5–12% fines: Dual classification (e.g., SP-SM, GW-GM).
    - ≥12% fines: Silty or clayey modifiers (GM, GC, SM, SC) based on fines plasticity from Atterberg limits or field index tests.

### 3.3 Fines classification for coarse-grained soils

When coarse-grained soils contain ≥12% fines, the fines fraction is classified as silty or clayey based on:

- Atterberg limits where available; or
- Field index tests (Table 1 & Table 2) where Atterberg limits are not available.

### 3.4 Fine-grained soils (Table 3)

Fine-grained soils are those with >35% (by mass) passing the 0.075 mm sieve.

- With Atterberg limits available: WL and PI are plotted on the Plasticity Chart (AS 1726) to determine plasticity level (low, medium, or high) and USCS classification (ML, CL/CI/CH, MH, OL, OH).
- Where Atterberg limits are not available: The fines are classified directly in accordance with Table 3 by comparing field index test results (dry strength, dilatancy, toughness) to the criteria given for each USCS group. This allows direct assignment of ML, CL/CI/CH, MH, or OL/OH without reference to the A-line.

Organic soils (OL, OH) are identified based on colour, odour, and fibrous texture in addition to field index characteristics.

**4. Integration of Results**

The final USCS group symbol for each layer was determined by integrating:

- The proportion of gravel, sand, and fines from wet sieve analysis.
- The classification of the fines fraction using either Atterberg limits or field index methods.
- The classification hierarchy in Table 3 & Table 4.

This combined approach ensures that soil classification is both quantitatively accurate and fully compliant with AS 1726, while allowing consistent classification whether laboratory Atterberg limit testing is available.

**Table 3 Classification of Fine-Grained Soils (adapted from AS 1726 Table 10)**

| Major Division | Group Symbol | Typical names | Field classification of silt and clay | | | Laboratory classification |
|---|---|---|---|---|---|---|
| | | | Dry strength | Dilatancy | Toughness | % <0.075 |
| SILT and CLAY (low to medium plasticity, %) | ML | Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity | None to low | Slow to rapid | Low | Below A line |
| | CL, CI | Inorganic clay of low to medium plasticity, gravelly clay, sandy clay | Medium to high | None to slow | Medium | Above A line |
| | OL | Organic silt | Low to medium | Slow | Low | Below A line |
| SILT and CLAY (high plasticity) | MH | Inorganic silt | Low to medium | None to slow | Low to medium | Below A line |
| | CH | Inorganic clay of high plasticity | High to very high | None | High | Above A line |
| | OH | Organic clay of medium to high plasticity, organic silt | Medium to high | None to very slow | Low to medium | Below A line |
| Highly organic soil | Pt | Peat, highly organic soil | — | — | — | — |

**Table 4 Classification of Coarse-Grained Soils (adapted from AS 1726 Table 9)**

| Major Division | Group Symbol | Typical names | Field classification of sand and gravel | Laboratory classification |
|---|---|---|---|---|
| GRAVEL (more than half of coarse fraction is larger than 2.36 mm) | GW | Gravel and gravel–sand mixtures, little or no fines | Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength | ≤5% fines, Cu > 4, 1 < Cc < 3 |
| | GP | Gravel and gravel–sand mixtures, little or no fines, uniform gravels | Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength | ≤5% fines, fails to comply with above |
| | GM | Gravel–silt mixtures and gravel–sand–silt mixtures | 'Dirty' materials with excess of non-plastic fines, zero to medium dry strength | ≥12% fines, fines are silty |

| Major Division | Group Symbol | Typical names | Field classification of sand and gravel | Laboratory classification |
|---|---|---|---|---|
| | GC | Gravel–clay mixtures and gravel–sand–clay mixtures | 'Dirty' materials with excess plastic fines, medium to high dry strength | ≥12% fines, fines behave as clay |
| SAND (more than half of coarse fraction is smaller than 2.36 mm) | SW | Sand and gravel–sand mixtures, little or no fines | Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength | ≤5% fines, Cu > 6, 1 < Cc < 3 |
| | SP | Sand and gravel–sand mixtures, little or no fines, uniform sands | Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength | ≤5% fines, fails to comply with above |
| | SM | Sand–silt mixtures | 'Dirty' materials with excess of non-plastic fines, zero to medium dry strength | ≥12% fines, fines are silty |
| | SC | Sand–clay mixtures | 'Dirty' materials with excess plastic fines, medium to high dry strength | ≥12% fines, fines are clayey |

## Standard Methodology for Determination of Soil Reactivity and Index of Shrink–Swell (Ips) for SIFE Investigations

### 1. Introduction

This methodology outlines the procedures adopted by Enviro-Tech Consultants Pty. Ltd. for determining soil reactivity and deriving the Index of Shrink–Swell (Ips) for each soil layer in accordance with the principles of AS 2870. The method combines Australian Standard testing procedures with enhanced correlation techniques developed from an extensive dataset of over 2,000 field and laboratory tests.

The approach ensures consistent, accurate classification of soil reactivity across a wide range of soil types. By combining standard and modified testing procedures, it enables calculation of profile movement for complex soil profiles, accounting for groundwater levels, bedrock depth, and particle size distribution.

### 2. Sampling and Preparation

#### 2.1 Undisturbed Sampling

Undisturbed samples are collected using a thin-wall sampler to preserve natural soil structure and in-situ moisture conditions when performing shrink–swell testing. A 45 mm diameter core sampler is used for these tests to ensure uniformity and comparability between results. Most other laboratory testing is carried out on disturbed samples, which is one of the advantages of the linear shrinkage and modified linear shrinkage testing methods.

#### 2.2 Sample Identification

All samples are assigned a Unified Soil Classification System (USCS) code using accurate laboratory and field identification techniques in accordance with AS 1726 (detailed procedure included herein). This classification underpins the correlation methods described in later sections.

#### 2.3 Moisture Content Measurement

Field moisture content is recorded at the time of sampling, providing baseline data for correlation to laboratory shrink–swell results.

### 3. Standard Testing Procedures

#### 3.1 Shrink–Swell Testing

Shrink–swell testing is performed on cohesive soils in accordance with the relevant Australian Standard method for determining the shrink–swell index. This test provides the primary Ips value for these soil types.

#### 3.2 Linear Shrinkage Testing

Linear shrinkage testing is carried out in accordance with the Australian Standard method, which determines shrinkage from a soil prepared at its liquid limit. This standard approach typically excludes a proportion of the sandy fraction.

### 4. Secondary Modified Linear Shrinkage Method

#### 4.1 Rationale

In practice, the relationship between shrink–swell test results and standard linear shrinkage results is often inconsistent, particularly for non-cohesive or marginally cohesive soils. To improve correlation, a secondary modified linear shrinkage method has been developed.

### 4.2 Modified Moisture Basis

Instead of preparing samples solely at the liquid limit, this method uses a "modified moisture" content representative of upper-range field moisture conditions for each USCS soil type. These values are derived from a dataset of over 2,000 samples collected predominantly during winter or immediately thereafter, representing the highest seasonal moisture levels without crossing into "abnormal moisture conditions" as defined in AS 2870.

### 4.3 Application to Non-Cohesive Soils

This approach enables reactivity assessment of sandy and silty soils that are unsuitable for shrink–swell testing due to their inability to remain intact during testing, but which still display measurable reactivity.

## 5. Gravel and Cobble Fraction Adjustments

### 5.1 Gravel Fraction

For all materials, the sand fraction is retained in testing, and the gravel fraction is re-added into the calculation. Because gravel has negligible moisture absorption, its proportion is used to adjust shrinkage values downwards.

### 5.2 Cobbles

Where cobbles are present:

- 0–35% cobbles: shrinkage is scaled according to the proportion of soil matrix between cobbles.
- 35% cobbles: shrinkage is considered negligible, as the soil matrix is insufficient to impart meaningful reactivity.

## 6. Correlation and Calibration

### 6.1 Dataset Development

Extensive correlation has been undertaken between:

- Standard shrink–swell results
- Standard linear shrinkage results
- Modified linear shrinkage results

### 6.2 USCS-Based Correlation

Accurate USCS classification is the key input variable. Once correlations are established for each USCS class, Ips values can be assigned to future samples based solely on classification and moisture parameters, without requiring repeated shrink–swell testing.

## 7. Predictive Modelling and Database Search Method

Enviro-Tech Consultants maintains a large and continuously expanding database of soil test results, including shrink–swell, linear shrinkage, particle size distribution, USCS classification, and detailed field descriptions (e.g., colour, texture, structure).

When assessing a new Site, we search this database for comparable sites using multiple parameters:

- Geology – parent material type and origin
- USCS classification – precise laboratory classification

- Soil colour and descriptive features – matching field logging records
- Particle size distribution – percentage gravel, sand, and fines

This multi-parameter search allows us to identify highly similar soils and adopt Ips values from past testing at those sites with confidence. The approach reduces the need for repeated shrinkage or shrink–swell testing where soils are well represented in the database, while still meeting the requirements for reliable reactivity estimation.

**8. Compliance with AS 2870 – Clause 2.3.2 (C2 & C3)**

Our predictive approach aligns directly with the requirements of AS 2870 Clause 2.3.2:

c (ii): We maintain and utilise a database of past test results to estimate soil reactivity for sites with similar soil and geological conditions.

C (iii): Testing is repeated at regular intervals to ensure correlations remain valid. At minimum, reactivity testing is conducted once every 50 sites, but in practice we test far more frequently – typically at least once every 20 sites, and rarely more than six months between tests. On average, new verification testing is undertaken approximately monthly.

This compliance ensures that our methods are both technically robust and standards-compliant, providing clients with defensible, high-quality results.

**9. Calculation of Profile Movement**

**9.1 Ips Values per Layer**

An Ips value is determined for each soil layer based on test results or correlations.

**9.2 Adjustment for Groundwater and Bedrock**

Where groundwater or bedrock occurs within the profile, Ips values are reduced for the affected layers in accordance with AS 2870 principles.

**9.3 Design Suction Change Depth (Hs)**

Given the lack of statewide, high-resolution climatic data for Tasmania, a conservative Hs value of 3.0 m is adopted for all sites, in preference to regionalised values. This ensures a cautious approach where actual depth of suction change cannot be accurately modelled.

**9.4 Surface Suction Change (Δus)**

A standard surface suction change of 1.2 is applied in calculations, in line with AS 2870.

**10. Advantages of the Modified Method**

- Allows for reactivity assessment across all soil types, including non-cohesive sands and silts.
- Provides consistent correlation between laboratory and field methods.
- Enables accurate whole-profile movement estimation based on standardised USCS classification.
- Incorporates gravel and cobble fraction corrections for more realistic movement predictions.
- Reduces reliance on repeat laboratory shrink–swell testing for every sample.
- Fully compliant with AS 2870 Clause 2.3.2 (C2 & C3).

## 11. Limitations

- The method assumes accurate USCS classification and field moisture determination.
- The modified linear shrinkage method requires prior calibration for each USCS type.
- Adoption of a conservative Hs value may slightly overestimate movement in some locations.

## 12. Conclusion

This methodology blends rigorous Australian Standard test procedures with enhanced, data-driven correlation techniques, enabling Enviro-Tech Consultants Pty. Ltd. to deliver accurate, consistent, and site-specific soil reactivity assessments across Tasmania. The inclusion of >2,000 test results, gravel and cobble adjustments, predictive modelling from a comprehensive database, and modified moisture testing provides a robust basis for predicting profile movement in varied geological conditions, while maintaining strict compliance with AS 2870.

# Appendix E Soil and Rock Testing

## Dynamic Cone Penetrometer (DCP)

Dynamic cone penetrometer (DCP) testing was conducted according to AS 1289.6.3.2 with the results presented in Appendix B.

## Soil Characterisation

Table 4 summarises the soil classification results for each layer encountered, including particle size distribution, plasticity assessment, and the assigned USCS group symbol.

Classifications were undertaken in accordance with AS 1726 – Geotechnical Site Investigations using the methodology provided in the Explanatory Notes section of this report.

Particle size distributions were determined by wet sieve analysis, and fines classifications were based on Atterberg limits where available, or on field index tests (dry strength, dilatancy, toughness) in accordance with AS 1726 Tables 7, 8, 9, and 10.

Full explanatory notes and reference tables are provided in Explanatory Notes section of this report.

*Table 4 Summary of the Soil Characterisation*

| Layer | Soil | Borehole | Depth From (m) | Field Moisture % | Gravel % | Sand % | Fine % | Analysed Plasticity | Assigned USCS |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Silty CLAY | BH01 | 0.1 | 18.6 | 1.3 | 10.9 | 87.8 | M | CI |
| 2 | Gravelly CLAY | BH02 | 0.4 | 18 | 41.4 | 14 | 44.6 | H | CH |
| 3 | CLAY | BH01 | 0.5 | 20.8 | 26.6 | 14.7 | 58.7 | H | CH |
| 4 | Clayey Gravelly SILT | BH01 | 0.7 | 20.8 | 56.7 | 6.7 | 36.6 | L | ML |

## Soil Dispersion (Emerson aggregate test)

Select soil samples were tested for dispersion susceptibility using the Emerson Class number method according to AS1289.3.8.1. The results presented in Table 5 demonstrate that:

- Layer 1 and Layer 3 are slightly dispersive, with Emerson Class 3 results.
- Layer 2 comprises Emerson Class 2 soil and is considered moderately dispersive.
- Layer 4 comprises Emerson Class 1 soil and is considered severely dispersive. Layer 4 was logged in BH01 only and ranges in depth from 0.6 m to 0.8 m.
- For management purposes, any pale-coloured soil present between the darker organic-rich surface soils and basalt bedrock should be assumed to be moderately to severely dispersive unless further testing confirms otherwise.

*Table 5 Summary of the Emerson class results.*

| Layer | Soil | Depth | Sample ID | Emersion Class | Date Tested | Water | pH |
|---|---|---|---|---|---|---|---|
| 1 | TOPSOIL: Silty CLAY trace sand | 0.1 | BH01 0.1 | Class 3 | 8/05/2026 | DI 14°C | 6.1 |
| 1 | TOPSOIL: Silty CLAY trace sand | 0.1 | BH02 0.1 | Class 3 | 8/05/2026 | DI 14°C | 6.5 |
| 2 | Gravelly CLAY trace sand | 0.4 | BH02 0.4 | Class 2 | 8/05/2026 | DI 14°C | 6.2 |
| 3 | CLAY with gravel, trace sand | 0.5 | BH01 0.5 | Class 3 | 8/05/2026 | DI 14°C | 6.7 |
| 4 | Clayey Gravelly SILT trace sand | 0.7 | BH01 0.7 | Class 1 | 8/05/2026 | DI 14°C | 6.9 |

## Soil Aggressivity Testing (Footing Exposure Classification)

Soil samples from across the Site were assessed for potential aggressivity to concrete in accordance with the requirements of AS 2870:2011 – Residential Slabs and Footings (Clauses 5.5.1–5.5.3). Testing was undertaken to determine the salinity exposure class and provide an indicative assessment of sulphate soil potential.

The results are summarised in Table 6 which presents the sampling depth and location, soil texture classification, electrical conductivity (EC1:5), salinity factor (K), calculated saturated extract electrical conductivity (ECe), and the corresponding salinity exposure class (Table 5.1, AS 2870). Soil pH values were also measured and used as a conservative indicator of potential sulphate aggressivity, together with the assigned soil condition class, to derive an indicative sulphate exposure class (Table 5.2, AS 2870).

It is noted that the sulphate assessment has been undertaken on the basis of pH values only, and therefore represents a conservative assumption. Where soils exhibit pH < 5.5 or are otherwise classified within B or C exposure classes, confirmatory laboratory testing of sulphate concentrations may be warranted to refine the exposure classification and confirm appropriate concrete durability requirements.

Salinity testing has been undertaken in accordance with the relevant guidelines and provides a direct basis for assigning salinity exposure classification.

Where aggressive soils are discerned, detailed recommendations for the management of aggressive soils, including concrete strength, curing and reinforcement cover requirements, are presented in

Appendix **F.**

*Table 6 Soil Aggressivity Assessment in Accordance with AS 2870:2011*

| Layer | Location | Depth | Saline Soil Determination | | | | | Sulphate Soil Potential^ | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | From (m) | USDA Soil Texture Class | EC1:5 mS/cm | K* | Ece dS/m | Exposure Class | pH1:5 | Soil Condition Class | Exposure Class |
| 1 | BH01 | 0.1 | Silty clay | 0.14 | 5.8 | 0.81 | A1 | 6.1 | B | A1 |
| 1 | BH02 | 0.1 | Silty clay | 0.14 | 5.8 | 0.81 | A1 | 6.5 | B | A1 |
| 2 | BH02 | 0.4 | Clay | 0.31 | 5.5 | 1.71 | A1 | 6.2 | B | A1 |
| 3 | BH01 | 0.5 | Clay | 0.57 | 5.5 | 3.14 | A1 | 6.7 | B | A1 |
| 4 | BH01 | 0.7 | Silty clay loam | 2.13 | 6.3 | 13.42 | B1 | 6.9 | B | A1 |

^ Preliminary findings based on soil pH only. Further sulphate testing required to rule out sulphate soil exposure risks

*Electrical conductivity of the 1:5 soil–water extract (EC1:5) was measured at 25 °C and converted to an equivalent saturated paste extract (ECe) using texture-based conversion factors (ECe = k × EC1:5) following Slavich, P.G. & Patterson, R.A. (1990). Estimating the electrical conductivity of saturated paste extracts from 1:5 soil:water suspensions and texture. Australian Journal of Soil Research, 28, 453–463.

# Appendix F Geotechnical Interpretation

## Footing Minimum Target Depths

Footing design for the proposed structures are to consider the depths of limiting layers at the base of potentially problematic soils. Where practical/allowable, thickened beams may be deepened through problematic soil layers according to engineering specifications (Table 7). Table 8 should be referred to where only 50 kPa allowable bearing capacity is required.

Table 7 also presents a summary of the estimated soil depths and associated layers where less than 5mm of vertical soil movement can be expected due to soil moisture fluctuations from normal seasonal wetting and drying cycles. Where 5mm tolerances are required, concentrated loads including but not limited to slab edge or internal beam or strip footings shall be supported directly on piers in accordance with minimum target layer depths presented in Table 7, with considerations given to required bearing capacities in accordance with Table 8.

All footing depth, soil movement, and bearing capacity calculations presented in this section are based on interpretive $I_{PS}$ or $I_{SS}$ values derived from field and laboratory data, as outlined in the Explanatory Notes section of this report. These values are used to infer soil reactivity in the absence of direct measurement, in accordance with industry best practice.

*Table 7 Soil characteristic surface movements and recommended footing minimum target depths*

| Footing design parameters | BH01 | BH02 |
|---|---|---|
| Ys Calculation Depth | 0m^ | 0m^ |
| Surface movement Ys (mm) | 25 | 15 |
| Soil reactivity class | M | S |
| Base of problem soil layer (m)* | - | - |
| Layer at base of problem soil* | - | - |
| Pier/Footing minimum target depth (m)# | 0.9^ | 0.6^ |
| Pier/footing minimum target layer# | 5 | 5 |
| Allowable bearing capacity at min target depth (kPa)# | 350 | 350 |

- No problem layers encountered

^ Calculations relative to surface of borehole at the time of investigation

~ Calculated based on revised soil profile depth/thickness following indicative cut and fill. Inferred fill reactivity indicated (Iss value) which is typically based on more reactive soils expected to be encountered within inferred cut.

* Base of problematic soil layer depth below top of borehole surface at the time of testing to achieve 100 kPa allowable bearing capacity or greater.

# Target soil layer depth where Ys values from normal wetting and drying cycles are estimated at less than 5mm vertical movement. >minimum bored pier depths (see bearing capacity table for bored pier design depths).

## Soil and Rock Allowable Bearing Capacity & End Bearing Capacity

Soil allowable bearing capacity was calculated from correlations with DCP blow counts. A recommended safety factor of 3 is applied in accordance with AS 2870. Where high clay and silt content is observed in the soil, soil allowable bearing capacity is determined from undrained shear strengths using field vane correlated DCP values. Interpretive bearing capacity values are presented in Table 8.

*Table 8 Soil allowable bearing capacities and problematic ground conditions.*

| Depth below investigation surface (m) | Allowable Bearing Capacity (kPa) | |
|---|---|---|
| | BH01 | BH02 |
| 0 | 100* | 100* |
| 0.1 | 200 | 240 |
| 0.2 | 330 | >400 |
| 0.3 | 330 | >400 |
| 0.4 | >400 | REF |
| 0.5 | REF | BASALT |
| 0.6 | | |
| 0.7 | | |
| 0.8 | BASALT | |

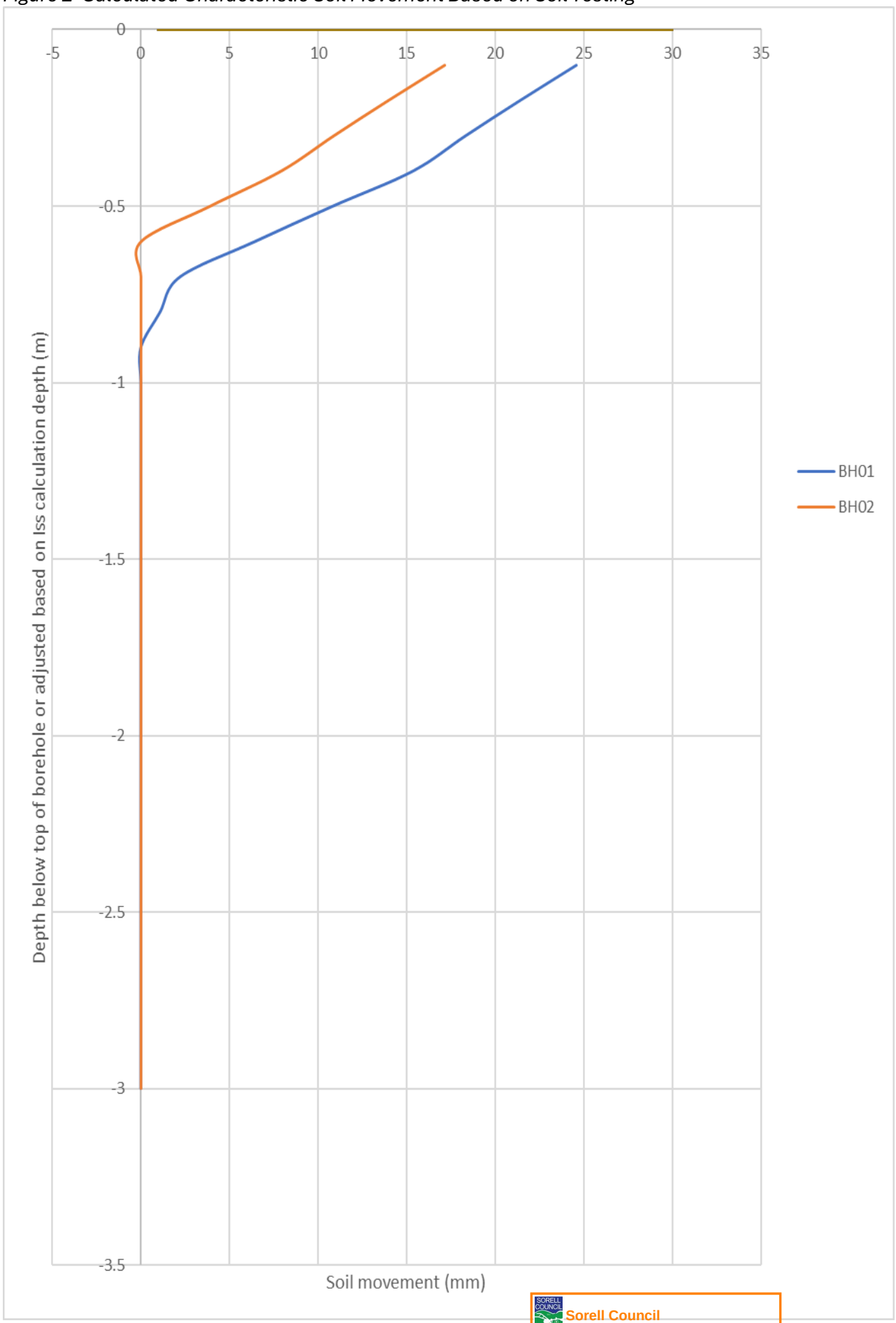
Correlations drawn from DCP and vane shear testing.
REF - Penetrometer Refusal
^ Footings to be founded through the FILL
~ Problematic soil layer attributed to loose, soft, or low allowable bearing capacity soil (<100 kPa)
*Soil layer expected at the base of problematic soil layers at test location (or at surface where problematic soils not encountered) to achieve 100 kPa allowable bearing capacity or greater.

## Characteristic Soil Movement (Ys)

The characteristic soil movement (soil reactivity) from wetting and drying cycles is calculated according to AS 2870 Section 2.3. The calculations are based on Iss % testing results or correlations with linear shrink data and are based on complete soil profiles for boreholes drilled within the building Site. In the case of where cut and fill are proposed and building finished floor levels (FFL) are made available, the Iss value is recalculated based on the FFL and estimated cut and fill as per Table 7.

According to AS 2870 Section 2.3, calculations consider the depth of groundwater and bedrock. Soil characteristic movements based on lab testing are presented in Figure 2.

*Figure 2 Calculated Characteristic Soil Movement Based on Soil Testing*



## Concrete Durability Requirements

The soil aggressivity testing results presented in Table 6 have been interpreted in Table 9 to provide indicative requirements for minimum concrete strength, curing duration and reinforcement cover in accordance with AS 2870:2011. This table builds on the previous classification summary by applying the relevant durability provisions to each individual soil layer encountered across the Site.

From these results presented in Table 9, it is generally discerned that in all investigated areas of the Site:

- For an exposure classification of A1, it is recommended to utilize concrete with a minimum strength of 20 MPa, provide at least 40 mm cover without a membrane (30mm with), and ensure curing for no less than three days. (A1)
- It is also essential to refer to other applicable construction standards to ensure compliance with all relevant guidelines and best practices.

*Table 9 Interpretation of Soil Aggressivity Results – Minimum Concrete Strength, Curing and Cover*

| Layer | Location | Depth | Exposure Classification | | Minimum Concrete | Minimum Days Curing | Cover~ |
|---|---|---|---|---|---|---|---|
| | | From (m) | Salinity | Sulphate^ | Strength f'c (MPa)^ | | |
| 1 | BH01 | 0.1 | A1 | A1 | 20 | 3 | 40-40 |
| 1 | BH02 | 0.1 | A1 | A1 | 20 | 3 | 40 |
| 2 | BH02 | 0.4 | A1 | A1 | 20 | 3 | 40-40 |
| 3 | BH01 | 0.5 | A1 | A1 | 20 | 3 | 40-40 |
| 4 | BH01 | 0.7 | B1 | A1 | 32 | 7 | 40-50# |

^Sulphate class is conservatively estimated from soil pH and further testing is required on soil samples to confirm if the low pH is attributed to sulphate or other anions within the soil. If pH conditions are attributed primarily to sulphate, then the indicated exposure classification is expected to be reliable but subject to sulphate concentration threshold presented in AS 2870.

# Where a damp-proofing membrane is installed, the minimum reinforcement cover in non-A1 saline soils may be reduced to 30 mm

' Where a damp-proofing membrane is installed, the minimum reinforcement cover in non-A1 sulphate soils may be reduced by 10 mm.

# Appendix G General Advice - Dispersive Soil Management

The Site may be susceptible to tunnel erosion if subsurface drainage is not adequately managed. Tunnel erosion typically initiates in excavated cuts; however, it can also develop where dispersive soils are exposed through excavation, leading to the release of pore water and concentrated groundwater discharge. Additional contributing factors may include broken pipes, ineffective stormwater infrastructure, or unmanaged surface flows. If left unaddressed, these conditions can result in progressive subsoil loss, potentially undermining footings or causing settlement-related damage to the structure.

Tunnel erosion typically progresses upslope, initiated by the dissolution and removal of highly dispersive Class 1 and Class 2 soil layers. As tunnels enlarge, they can undermine surrounding soils that may not be dispersive but are still susceptible to collapse due to loss of subsoil support. If unmanaged, tunnel erosion can extend beyond property boundaries, posing a risk to nearby infrastructure including buildings, roads, and underground services. For further background on the management of Emerson Class 1 soils, refer to the Department of Primary Industries, Parks, Water and Environment (DPIPWE, 2009) guidance document.

*Dispersive soils should be managed through a combination of drainage control and ground treatment measures. These may include overland flow management, controlled cut and fill practices, and, in more severe cases, the installation of sand barriers to interrupt subsurface flow paths. Where dispersive soils are exposed—particularly on batters or in excavation faces—chemical treatment using gypsum or lime may be employed to improve soil cohesion and reduce erosion potential. Application rates should be guided by Emerson Class test results, as outlined in Table 10.*
Gypsum and hydrated lime are proven effective in mitigating erosion in dispersive soils by displacing sodium ions on clay particles and replacing them with calcium. This cation exchange improves soil structure, increases shear strength, and enhances resistance to tunnel and surface erosion. The effectiveness of treatment is influenced by the soil's properties; higher application rates of gypsum are typically required for soils with greater cation exchange capacity, elevated pH, and lower Emerson Class numbers. Application guidelines should be based on laboratory test results, including Emerson Class assessment, to ensure appropriate treatment dosages.

*Table 10 Prescribed gypsum and hydrated lime application rates – see Emerson soil testing results*

| Dispersive soil Emerson class | Gypsum/Hydrated Lime Application Rate pH < 7.5 | Gypsum Application Rate pH > 7.5 |
|---|---|---|
| Class 3 | 0 to 0.3 kg/m2 | 0.2 – 0.5 kg/m2 |
| Class 2 | 0.5 kg/m2 | 1.0 kg/m2 |
| Class 1 | 1.0 kg/m2 | 1.5 kg/m2 |

Where practicable, vehicle driveways and parking areas should be located on level or gently sloping terrain to minimise the need for deep excavation and reduce disturbance to dispersive soils identified on Site.

General Recommendations

To minimise disturbance and erosion in areas where Class 1 dispersive soils have been identified, the following measures are recommended:

- **Drainage Control:** Construct soil cut-off mounds or shallow interceptor trenches in non-dispersive soils, no deeper than 0.2 m above the interface with Class 1 dispersive soils. These should be positioned upslope of any proposed cuts to divert surface water before it reaches vulnerable areas.
- **Chemical Treatment:** Apply gypsum or hydrated lime to exposed dispersive soils where surface water movement is expected—particularly on freshly cut embankments, filled areas, service trenches, and zones where topsoil has been removed.
- **Surface Protection:** Cover all severely dispersive soils with either impermeable surfacing (e.g. paving) or a layer of non-dispersive topsoil to reduce erosion and limit moisture ingress.
- **Batter Stabilisation:** Place non-dispersive topsoil over freshly cut batters to protect against surface erosion and reduce the likelihood of tunnel initiation.
- **Remediation of Existing Tunnels:** Where tunnel erosion has already occurred, additional stabilisation of natural or constructed drainage gullies may be required. This may include the use of sand barriers and, in more severe cases, geotextile-wrapped drainage rock structures. When correctly designed, such barriers can intercept subsurface flow, promote controlled surface discharge, and direct water away from at-risk areas.

Key Management Measures for Dispersive Soils in Cut Embankments:

Surface water drainage can erode dispersive soils in embankment cuts. Groundwater discharge may worsen tunnel erosion by accelerating the development of secondary porosity—where subsurface flow progressively enlarges voids within the soil mass, leading to tunnel formation and internal instability. Management considerations:

- **Topsoil Removal Risks:** Earthworks commonly begin with the removal of non-dispersive topsoil, which often acts as a natural protective layer. Once removed, the underlying dispersive soils become highly vulnerable to erosion.
- **Barrier Construction in Cut Slopes:** Where excavation is necessary, erosion can be mitigated through immediate installation of physical barriers:
    - Place a sand layer (sand barrier) over exposed dispersive soil within the cut to interrupt flow paths.
    - Construct an earth retaining wall in front of the cut to contain soil and stabilise the slope face.
- **Timely Implementation:** All erosion control measures must be implemented immediately following excavation to prevent the initiation of tunnel erosion.
- **Use of Retaining Structures:** Low-height retaining walls (e.g., timber sleeper walls) constructed at the base of cut faces can assist in retaining eroding soils and maintaining the effectiveness of sand barriers.

Sand Barriers

To manage dispersive soils exposed in cut slopes, the following layered treatment is recommended:

- **Chemical Stabilisation:** Apply gypsum or hydrated lime at application rates specified in Table 10, based on Emerson Class testing.
- **Sand Layer:** Install a minimum 100 mm thick layer of clean, free-draining sand to act as a barrier and interrupt preferential flow paths.
- **Topsoil Cover:** Place a layer of non-dispersive, free-draining topsoil (such as loam) over the sand barrier to retain the sand in place and facilitate effective revegetation or application of surface treatments.
- **Erosion Control:** Implement surface erosion protection measures as outlined in the Erosion Control section to prevent wash-off and maintain system effectiveness.

Retaining Walls

The following measures are recommended when constructing retaining walls in areas with dispersive soils:

- Retaining walls should be founded on bedrock or non-dispersive soils to reduce the risk of tunnel erosion and structural instability.
- Where walls are constructed in Class 1 dispersive soils, freshly cut surfaces may be treated with gypsum or hydrated lime at application rates specified in Table 10 to reduce erosion potential.

Drainage

Effective drainage is critical in dispersive soil environments to prevent erosion, tunnel formation, and structural damage. The following measures are recommended:

- Divert surface water away from cut and fill slopes to reduce infiltration into dispersive soils.
- A sealed toe drain is essential to prevent water from soaking into freshly cut dispersive soils and migrating through dispersive fill layers beneath paved surfaces.
- For optimal surface drainage over Class 1 soils, install concrete spoon drains in preference to earthen swales to minimise erosion risk.
- Where earthen swale drains are used, stabilise Class 1 soils with gypsum or hydrated lime at a rate adjusted to soil pH. A liner (e.g. 20 mm bentonite layer) beneath topsoil and turf may be used to limit vertical water infiltration.
- Subsurface drains installed in Class 1 soils should be backfilled with a sand mix containing 2% gypsum or hydrated lime to inhibit dispersion and maintain flow pathways.
- Non-perforated drainage pipes should be used to divert water away from identified groundwater discharge points, limiting further erosion.

Filling

The use of dispersive soils as fill presents a significant risk for tunnel erosion, especially where water movement is poorly controlled. The following measures are recommended to reduce risk and ensure long-term stability:

- Dispersive soil used as fill is highly susceptible to tunnel erosion, particularly when exposed to concentrated surface or groundwater flow.
- Groundwater can migrate along the base of and within fill layers, initiating erosion of dispersive materials and undermining overlying structures.
- All proposed filling, especially within or near building footprints, should be carefully managed. This may involve either:
    - Removal of Class 1 dispersive soil from beneath the structure, or
    - Chemical treatment of dispersive fill using gypsum or hydrated lime, applied to the surface of each compacted lift.
    - Preventing water from intercepting dispersive soil by liming the fill or with careful drainage management
- When chemically treating fill:
    - Use 300 mm thick lifts with full application rates as specified in Table 10.
    - For 150 mm thick lifts, halve the application rate accordingly.
- Ensure compaction is achieved close to optimum moisture content, particularly in areas adjacent to footings and structures.
- Paved surfaces over filled areas significantly reduce the risk of tunnel erosion, if cut-off drains are installed to prevent water ingress at the fill base.
- Where feasible, spoon drains and pavement edges at the toe of cut batters should be founded on non-dispersive soil or bedrock to intercept all surface water and eliminate seepage pathways.
- If topsoil is removed prior to filling, and it is classified as slightly dispersive (Class 3) or non-dispersive (Class 4 or higher), it may be replaced with a liner or imported non-dispersive material to protect the dispersive fill beneath.

Roofed and Paved Area Stormwater Management

All captured water on-site, including roof runoff, must be managed to remain at the surface and be evenly dispersed downslope across the Site. Roof runoff must be directed to detention tanks, with overflow discharged via surface irrigation—not into soakage pits. Due to the absence of non-dispersive topsoil, imported loam is required in irrigation areas. Irrigation must either:

1. Be delivered just below the surface, draining directly into the imported loam without contact with dispersive soils; or
2. Be applied via above-ground sprinklers onto imported loam to prevent erosion and maintain surface stability.

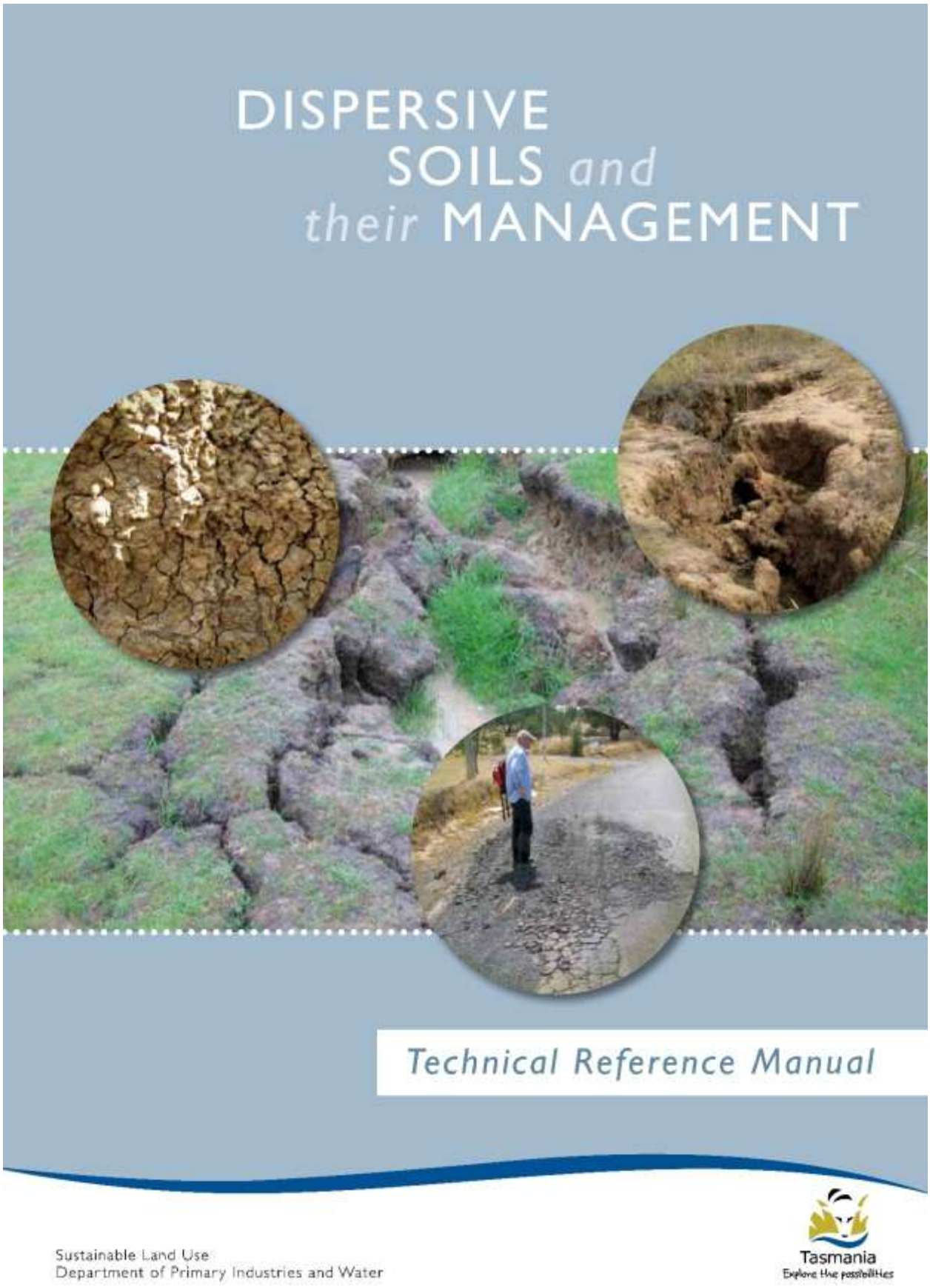
Runoff from pavements and other impervious surfaces must either be captured and redirected into detention tanks for controlled redistribution.

For driveways, runoff should be directed via cross-slope or in-slope alignment into lined side drains or swales. These must convey collected water to designated redistribution areas —such as detention tanks with surface irrigation or into distribution swales. Overflow must be dispersed across imported loam soils which is not located upgradient or downgradient of existing structures and ensuring water is not concentrated near foundations or fill. If distribution swales are used, they must be lined, constructed with low gradients, and designed to promote sheet flow rather than concentrated runoff. Distribution swale overflow must discharge onto non-dispersive imported loam soils.

Service Trenches

An effective measure to prevent stormwater ingress into backfilled service trenches is to ensure the trench surface is well sealed with non-dispersive soils or stable topsoil. As an additional site-specific recommendation, service trenches should be backfilled with compacted sand, which will help prevent water channelisation and reduce the risk of tunnel erosion along trench alignments.

**DPIPWE 2009 Dispersive Soils and their Management. Technical Reference Manual. Sustainable Land Use Department of Primary Industries Water and Environment.**



## 4.1 MANAGEMENT OPTIONS FOR TUNNEL EROSION

Past efforts to repair tunnel erosion in agricultural landscapes have relied on mechanical destruction of the tunnel system by deep ripping, contour furrowing, and contour ripping. Unfortunately many of these techniques either failed or resulted in tunnel re-emergence in an adjacent areas (Floyd 1974, Boucher 1995). The use of these 'agricultural' techniques is inappropriate in peri-urban areas where tunnel repair requires a low incidence of re-failure due to the potential for damage to infrastructure. Experience with the construction of earth dams using dispersive clays, demonstrates that repair and prevention of tunnel erosion in urban and peri-urban environments is best achieved using a combination of,

- Identification and avoidance of dispersive soils.
- Precise re-compaction.
- Chemical amelioration.
- Sand blocks and barriers.
- Topsoil, burial and revegetation.

## 4.2 IDENTIFICATION AND AVOIDANCE OF DISPERSIVE SOILS

The risk of tunnel erosion resulting from construction activities on dispersive soils can often be reduced or eliminated by identifying and avoiding areas containing dispersive soils. The presence and severity of dispersive soils can vary enormously over short distances (Figure 13). In many instances, large scale (ie 10 x 10 or 20 x 20 meter grid) soil survey and screening of soils for dispersion, (using the Emerson crumb test - section 3, Appendix I) can be used to site dwellings and infrastructure away from dispersive soils. Advice should be sought from a suitably qualified and experienced engineer or soil professional.

## 4.3 COMPACTION

Ritchie (1965) demonstrated that the degree of compaction within the dam wall was the single most important factor in reducing dam failure from piping (tunnel erosion). A high degree of compaction reduces soil permeability, restricting the movement of water and dispersed clay through the soil matrix, which decreases the severity of dispersion and restricts tunnel development (Vacher *et al.* 2004). However, dispersive soils can be difficult to compact as they lose strength rapidly at or above optimum moisture content, and thus may require greater compactive force than other soils (McDonald *et al.* 1981). Bell & Bryun (1997) and Bell and Maud (1994) suggest that dispersive clays must be compacted at a moisture content 1.5 -2% above the optimum moisture content in order to achieve suficent density to prevent piping (Elges 1985).

> Construction of structures such as earth dams and footings for buildings with dispersive soils require geotechnical assessment and advice from a qualified and experienced engineer, in order to determine compaction measures such as the optimal moisture content, number of passes, and maximum thickness of compacted layers.

Normal earth moving machinery including bull-dozers, excavators and graders do not provide sufficient compactive force to reduce void spaces or achieve adequate compaction in dispersive soils. A sheepsfoot roller of appropriate weight is usually required to compact dispersive soils. By comparison a D6 dozer applies only 0.6 kg/cm$^2$ pressure compared to 9.3 kg/cm$^2$ for a sheepsfoot roller (Sorensen 1995).


Figure 13. The severity (or sodium content) and depth of dispersive subsoils can vary considerably over short distances. (a). At this site highly dispersive subsoils exist meters away from (b) non-dispersive soils.

## 4.4 CHEMICAL AMELIORATION

Initiation of tunnel erosion is predominantly a chemical process, so it makes sense to use chemical amelioration strategies when attempting to prevent or repair tunnel erosion in dispersive soils. Despite the widespread use of gypsum and lime to treat sodic soils in agriculture, the use of gypsum and lime to treat tunnel affected areas has been relatively rare (Boucher 1990).

Hydrated lime (calcium hydroxide) has been widely used to prevent piping in earth dams. Rates of application have varied depending on soils and degree of compaction used in construction. Laboratory testing usually indicates that only around 0.5 – 1.0% hydrated lime is required to prevent dispersion, however difficulties with application and mixing necessitate higher rates of application (Moore *et al.* 1985). Moore *et al.* (1985) cite examples of the use of hydrated lime to control piping in earth dams at rates between 0.35% (N.S.W. Australia) and 4% (New Mexico). Elgers (1985), and McElroy (1987) recommend no less than 2% hydrated lime (by weight of the total soil material) to prevent dispersion within dam embankments, while Bell and Maud (1994) suggest that 3% - 4% by mass of hydrated lime should be added to a depth of 0.3m on the upper face of embankments. In alkaline (pH >7.0) soils (most sodic subsoils in Tasmania are neutral or alkaline) the effectiveness of hydrated lime is reduced by the formation of insoluble calcium carbonate (Moore *et al.* 1985), such that gypsum is preferred to hydrated lime. It is important to note that agricultural lime (calcium carbonate) is not a suitable substitute for hydrated lime due to its low solubility (McElroy 1987). Also note that excessive applications of lime may raise soil pH above levels required to sustain vigorous plant growth.

Gypsum (calcium sulphate) is more effective than lime for the treatment of dispersive soils as it increases the electrolyte concentration in the soil solution as well as displacing sodium with calcium within the clay structure (Raine and Loch 2003). Gypsum is less commonly used than hydrated lime in dam construction and other works due to its lower solubility, and higher cost. Elges (1985) recommends that in construction, a minimum of 2% by mass of gypsum be used. Bell and Maud (1994) present a means of calculating the amount of gypsum required to displace excess sodium and bring ESP values within desired limits (normally < 5). Be aware that application of excessive amounts of gypsum may cause soil salinity to temporarily rise beyond the desired level for plant growth.

**NOTE:**

- Use of gypsum in Tasmania is covered under the Fertiliser Act 1993, which has established the allowable limit for cadmium and lead at 10 mg/kg and 5 mg/kg for mercury.
- Gypsum is usually imported into Tasmania from Victoria or South Australia, which have different standards for allowable heavy metal content.
- Purchasers of gypsum should check with suppliers to ensure that gypsum imported into Tasmania is compliant with current regulations.

Alum (aluminium sulphate) has been effectively used to prevent dam failure and protect embankments from erosion. Application rates are not well established. Limited data suggests mixtures of 0.6 – 1.0% (25% solution of aluminium sulphate) (Bell and Bruyn 1997, McElroy 1987) to 1.5% (Ouhadi, and Goodarzi 2006) of the total dry weight of soil may be appropriate. Alum is however highly acidic (pH 4-5), and thus alum treated soils will need to be capped with topsoil in order to establish vegetation (Ryker 1987). Soil testing is required to establish appropriate application rates for Tasmanian soils.

Long chain polyacrylamides have been shown to increase aggregate stability, reduce dispersion and maintain infiltration rates in dispersive soils (Levy *et al.* 1992, Raine and Loch 2003). However the effect is highly variable between various polyacrylamide products and the chemical and physical properties of the soil. The benefit of polyacrylamides is generally short due to their rapid degradation (Raine and Loch 2003). Further advice and laboratory testing should be conducted before using polyacrylamides to protect earth dams from piping failure.

Note that appropriate application rates for gypsum, hydrated lime, alum and polyacrylamides have not been established for dispersive soils in Tasmania. Extensive laboratory assessment of materials used for the construction of dams or embankments is required before locally relevant 'rules of thumb' can be established for the use of these products.

## 4.5 SAND BLOCKS AND SAND BARRIERS

Sand filters were first developed to prevent piping in earth dams. Sand filters prevent dam failure by trapping entrained sand and silt, blocking the exit of the tunnel and preventing further tunnel development (Sherard *et al.* 1977). Following the work of Sherard *et al.* (1977), Richley (1992 and 2000) developed the use of sand blocks to prevent tunnel erosion during installation of an optical fibre cable in highly dispersive soils near Campania, Tasmania. The sand blocks work slightly differently to the sand filters in that they allow the free water to rise to the surface through the sand. The use of sand blocks has recently been modified by Hardie *et al.*, (2007) to prevent re-initiation of tunnel erosion along an optical fibre cable near Dunalley. Modifications to the original technique developed by Richley (1992 and 2000) include (Figure 14 &15);

- Upslope curved extremities to prevent the structure from being by-passed.
- Geotextile on the downslope wall to prevent collapse or removal of sand following settlement or erosion.
- Application of gypsum (around 5% by weight) to ensure infiltrating water contains sufficiently electrolyte to prevent further dispersion.
- Earth mound upslope of the structure to prevent run-on entering the sand blocks.


Figure 15. (a) Installation of sandblock perpendicular to a service trench. Note securing of geotextile to the optical fibre cable to prevent water flowing past the sand block. (b) Sandblock before final topsoiling.

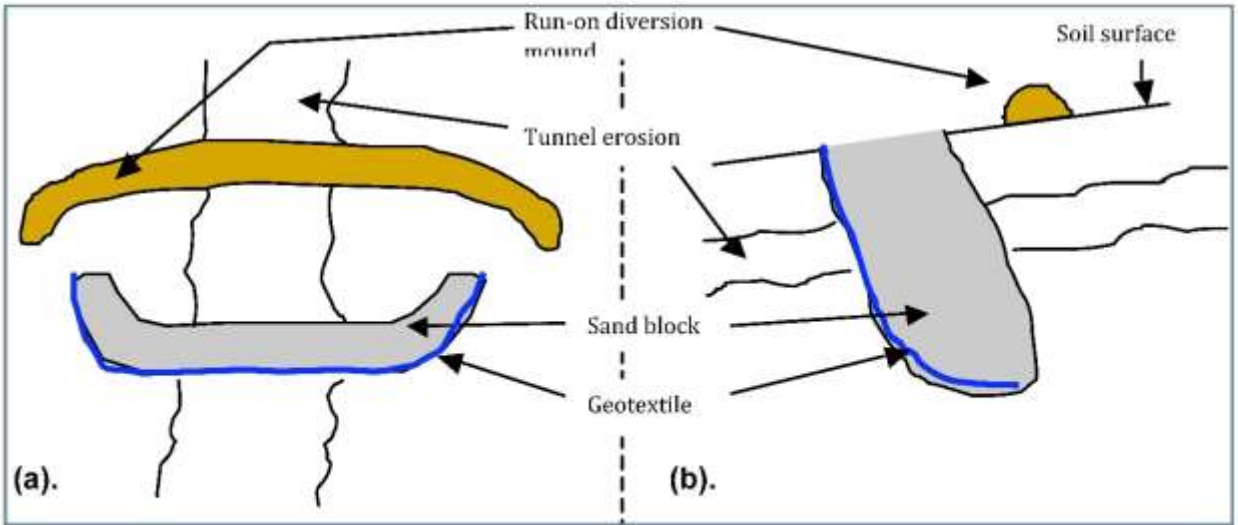



Figure 14. Modified sand block design. (a) plan view, (b) cross section view. The depth of the sand block is determined by the depth of dispersive soils or tunnel erosion. The span length of the structure is determined by the width of the tunnelling.

## 4.6 USE OF TOPSOIL / BURIAL AND REVEGETATION

Topsoil or burial of exposed dispersive soils reduces the likelihood of subsoil dispersion and initiation of tunnel erosion by;

- Providing a source of salt to increase the electrolyte content of infiltration water.
- Preventing desiccation and subsoil cracking.
- Promoting even infiltration.
- Providing a protective cover from raindrop impact.
- Providing a suitable medium for revegetation.

Topsoil minimises the interaction between water and dispersive clays by providing both a physical and chemical barrier. Topsoil also reduces soil desiccation and development of surface cracks (Sorensen 1995). It is suggested that exposed dispersive subsoils be covered with at least 150mm of non dispersive topsoil and sown with an appropriate mix of grass species. In some cases it will be necessary to protect the topsoil from erosion with 'jute' cloth or similar product.

The suitability of planting trees in tunnel affected areas is influenced by the amount of annual rainfall and frequency of soil cracking resulting from desiccation. Boucher (1995) recommends the preferred option for revegetation of reclaimed tunnel erosion is a widely spaced tree cover in association with a combination of perennial and annual pastures, rather than a dense stand of trees or pasture alone. Experience in Tasmania suggests that in low rainfall areas, or areas in which existing trees or shrubs cause soil drying and cracking, the preferred option for revegetating tunnel affected land is a dense healthy pasture. In high rainfall areas, dense plantings of trees have been successfully used to repair or stabilise tunnel erosion for example Colclough (1973) successfully used Pinus radiata to stabilise tunnel-gully affected land in a moderate rainfall area near Tea Tree, Tasmania.

# 5.0 ACTIVITIES THAT INCREASE THE RISK OF EROSION ON DISPERSIVE SOILS

## ACTIVITIES THAT INCREASE RISK OF INITIATING TUNNEL EROSION, INCLUDE:

- Removal of topsoil.
- Soil excavation or expose of subsoils to rainfall.
- Supply of services via trenches.
- Construction of roads and culverts in dispersive subsoils.
- Installation of sewage and grey water disposal systems in dispersive subsoils.
- Dam construction from dispersive soils.

## OPTIONS FOR REDUCING THE RISK OF TUNNEL EROSION DURING CONSTRUCTION AND DEVELOPMENT WORKS ON DISPERSIVE SOILS INCLUDE,

- Where possible do not remove or disturb topsoil or vegetation.
- Ensure that dispersive subsoils are covered with an adequate layer of topsoil.
- Avoid construction techniques that result in exposure of dispersive subsoils.
- Use alternatives to 'cut and fill' construction such as pier and post foundations.
- Where possible avoid the use of trenches for the supply of services ie water & power.
- If trenches must be used, ensure that repacked spoil is properly compacted, treated with gypsum and topsoiled.
- Consider alternative trenching techniques that do not expose dispersive subsoils.
- Ensure runoff from hard areas is not discharged into areas with dispersive soils.
- If necessary create safe areas for discharge of runoff.
- If possible do not excavate culverts and drains in dispersive soils.
- Consider carting non-sodic soil to create appropriate road surfaces and drains without the need for excavation.
- Ensure that culverts and drains excavated into dispersive subsoils are capped with non-dispersive clays mixed with gypsum, topsoiled and vegetated.
- Avoid use of septic trench waste disposal systems; consult your local council about the use of alternative above ground treatment systems.
- Where possible do not construct dams with dispersive soils, or in areas containing dispersive soils.
- If dams are to be constructed from dispersive clays, ensure you consult an experienced, qualified civil engineer to conduct soil tests before commencing construction.
- Construction of dams from dispersive soils is usually possible, using one or a combination of: precise compaction, chemical amelioration, capping with non-dispersive clays, sand filters and adequate topsoiling.

With all forms of construction on dispersive soils, ensure you obtain advice and support from a suitably experienced and qualified engineer or soil professional before commencing work.

# Foundation Maintenance and Footing Performance:
## A Homeowner's Guide

CSIRO

BTF 18
replaces
Information
Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

### Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870, the Residential Slab and Footing Code.

### Causes of Movement

**Settlement due to construction**
There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

**Erosion**
All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

**Saturation**
This is particularly a problem in clay soils. Saturation creates a bog-like suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume – particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

**Seasonal swelling and shrinkage of soil**
All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

**Shear failure**
This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.
- In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

**GENERAL DEFINITIONS OF SITE CLASSES**

| Class | Foundation |
|---|---|
| A | Most sand and rock sites with little or no ground movement from moisture changes |
| S | Slightly reactive clay sites with only slight ground movement from moisture changes |
| M | Moderately reactive clay or silt sites, which can experience moderate ground movement from moisture changes |
| H | Highly reactive clay sites, which can experience high ground movement from moisture changes |
| E | Extremely reactive sites, which can experience extreme ground movement from moisture changes |
| A to P | Filled sites |
| P | Sites which include soft soils, such as soft clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soils subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise |

**Tree root growth**
Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

## Unevenness of Movement

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

## Effects of Uneven Soil Movement on Structures

**Erosion and saturation**
Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpends).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

**Seasonal swelling/shrinkage in clay**
Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring.

Trees can cause shrinkage and damage


As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

**Movement caused by tree roots**
In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

**Complications caused by the structure itself**
Most forces that the soil causes to be exerted on structures are vertical – i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

**Effects on full masonry structures**
Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

**Effects on framed structures**
Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation cause a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

**Effects on brick veneer structures**
Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

## Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem.
Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

- Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.
- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

## Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870.

AS 2870 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

## Prevention/ Cure

**Plumbing**
Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

**Ground drainage**
In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the stormwater collection system is usually an easy solution.

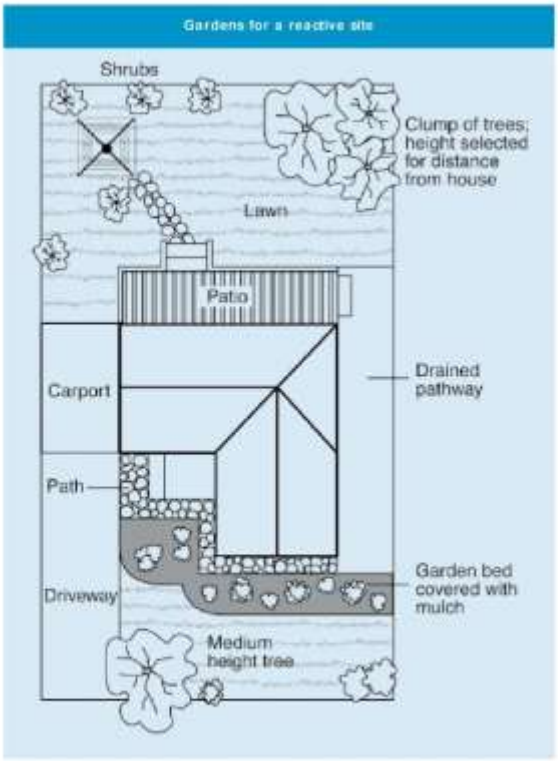
It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

**Protection of the building perimeter**
It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving

**CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS**

| Description of typical damage and required repair | Approximate crack width limit (see Note 3) | Damage category |
|---|---|---|
| Hairline cracks | <0.1 mm | 0 |
| Fine cracks which do not need repair | <1 mm | 1 |
| Cracks noticeable but easily filled. Doors and windows stick slightly | <5 mm | 2 |
| Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired | 5–15 mm (or a number of cracks 3 mm or more in one group) | 3 |
| Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted | 15–25 mm but also depend on number of cracks | 4 |




should extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

**Condensation**
In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

***Warning:*** Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

**The garden**
The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

**Existing trees**
Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

**Information on trees, plants and shrubs**
State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

**Excavation**
Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

## Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

**This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.**



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# CERTIFICATE OF QUALIFIED PERSON – ASSESSABLE ITEM

**Section 321**

**Form 55**

To: Dan Hunter *Owner /Agent*

[redacted] *Address*

[redacted] [redacted] *Suburb/postcode*

## Qualified person details:

Qualified person: Kris Taylor

Address: 445 Macquarie Street

Hobart 7004

Phone No: 0476 595 889

Fax No:

Licence No: NA

Email address: office@envirotechtas.com.au

Qualifications and Insurance details: Bachelor of Science with Honours in Geology. Lloyd's Underwriters: soil and rock mechanics, soil and rock testing

*(description from Column 3 of the Director's Determination - Certificates by Qualified Persons for Assessable Items*

Speciality area of expertise: Geo-technical Reports

*(description from Column 4 of the Director's Determination - Certificates by Qualified Persons for Assessable Items)*

## Details of work: Geotechnical Site Investigation

Address: 150 Greens Road

Orielton 7172

Lot No: 1

Certificate of title No: 171025/1

The assessable item related to this certificate: Geotechnical Site Investigation written in accordance with AS1726 by a geotechncial practitioner with appropriate experience, training and qualifications.*

*(description of the assessable item being certified)*
*Assessable item includes –*
- *a material;*
- *a design*
- *a form of construction*
- *a document*
- *testing of a component, building system or plumbing system*
- *an inspection, or assessment, performed*

## Certificate details:

Certificate type: Geotechnical including landslide risk assessment in accordance with "Practice Note Guidelines for Landslide Risk Management 2007" published by the Australian Geomechanics Society.*

*(description from Column 1 of Schedule 1 of the Director's Determination - Certificates by Qualified Persons for Assessable Items n)*

This certificate is in relation to the above assessable items, at any stage, as part of – *(tick one)*

- (•) building work, plumbing work or plumbing installation or demolition work

OR

- ( ) a building, temporary structure or plumbing installation

In issuing this certificate the following matters are relevant –

| | |
|---|---|
| Documents: | Enviro-Tech Consultants Pty. Ltd. 2026. Geotechnical Site Investigation for a Proposed Shed, 150 Greens Road - Orielton. Unpublished report for Dan Hunter by Enviro-Tech Consultants Pty. Ltd., 24/04/2026. |
| Relevant calculations: | |
| References: | - AS1726-2017 Geotechnical Site Investigations |

*Substance of Certificate:* *(what it is that is being certified)*

- An assessment of:
- Foundations for proposed building structures.*

*Scope and/or Limitations*

The Geotechnical Site Investigation applies to the Site and Project Area as inspected and does not account for future alteration to foundation conditions as a result of earth works, drainage condition changes or variations in site maintenance which are not included within the provided plans.

***This report contains soil classification information prepared in accordance with AS2870 as well as AS2870 extracts which may be used as general guidance for plumbing design. The hydraulic designer is to use their own judgment in the application of this information and this report must be read in in conjunction with hydraulic plans for the proposed development.**

**I certify the matters described in this certificate.**

| | *Signed:* | *Certificate No:* | *Date:* |
|---|---|---|---|
| Qualified person: |  | | 24/04/2026 |

GENERAL INFORMATION

| | |
|---|---|
| Land Title Reference | 171025/1 |
| Building Class | 10a |
| Property Zone | RURAL LIVING |
| Wind Classification | T.B.C. |
| Soil Classification (AS 2870) | CLASS T.B.C |
| Climate Zone (NCC 3.12) | NA |
| Alpine Area (900m above AHD) - | NA |
| BAL Rating (AS3959) | TBC |
| Heritage Building | NO |
| Flood Prone Area | NO |
| Coastal Ingress Area | NO |
| Coastal Erosion Area | NO |
| Corrosion Environment | Moderate |

OTHER CONSULTANTS

| | |
|---|---|
| Structural Engineer | T.B.C |
| Geological Report (Soil) | T.B.C |
| Energy Assessment | T.B.C |
| Waste Water Report | NA |
| Bushfire Assessment | TBC |
| Natural Value Assessment | TBC |
| Civil Engineer | NA |
| Mechanical Engineer | NA |
| Electrical Engineer | NA |
| Site Survey | NA |
| Hydrologist Report | NA |
| Contaminated Site Survey | NA |

AREA SCHEDULE *(All measurements in m2)*

| | |
|---|---|
| Site Plan | 30490 m2 |
| Existing Residence | 272.0m2 |
| Residence (Ground Floor) | NA |
| Residence (First Floor) | NA |
| Alfresco Area | NA |
| Verandah Area | NA |
| Porch (Laundry) | NA |
| Detached Office / Study | NA |
| Porch | NA |
| Decking Area | NA |
| Balcony (existing) | NA |
| Existing Shed / Outbuilding | 121m2 |
| Residential Shed / Outbuilding | 180m2 |

Drawing Schedule:

| Sheet number | Sheet name |
|---|---|
| 01 | COVER PAGE |
| 02 | SITE PLAN-OVERALL |
| 03 | SITE PLAN |
| 04 | SITE DRAINAGE PLAN |
| 05 | SHED FLOOR PLAN |
| 06 | SHED PLUMBING PLAN |
| 07 | SHED ROOF PLAN |
| 08 | SHED ELEVATIONS |
| 09 | SHADOW DIAGRAMS |

# PROPOSED SHED

## 150 Greens Road
## Orielton TAS 7172

Sorell Council

Development Application:5.2026.61.1 - Response to Request For Information 150 Greens Road, Orielton P3.pdf

Plan Reference:P3
Date received:22/06/2026

ISLAND LIFE DESIGNERS
BUILDING SERVICES PROVIDER
LICENCE No. 456943679
CONTACT: nick@islandlifedesigners.com

General Notes
The Builder shall check all dimensions and levels on site prior to construction.
Notify any errors, discrepancies or omissions to the building designer.
Drawings shall not be used for construction purposes until issued for construction.
Do not scale drawings.
All boundaries and contours subject to survey

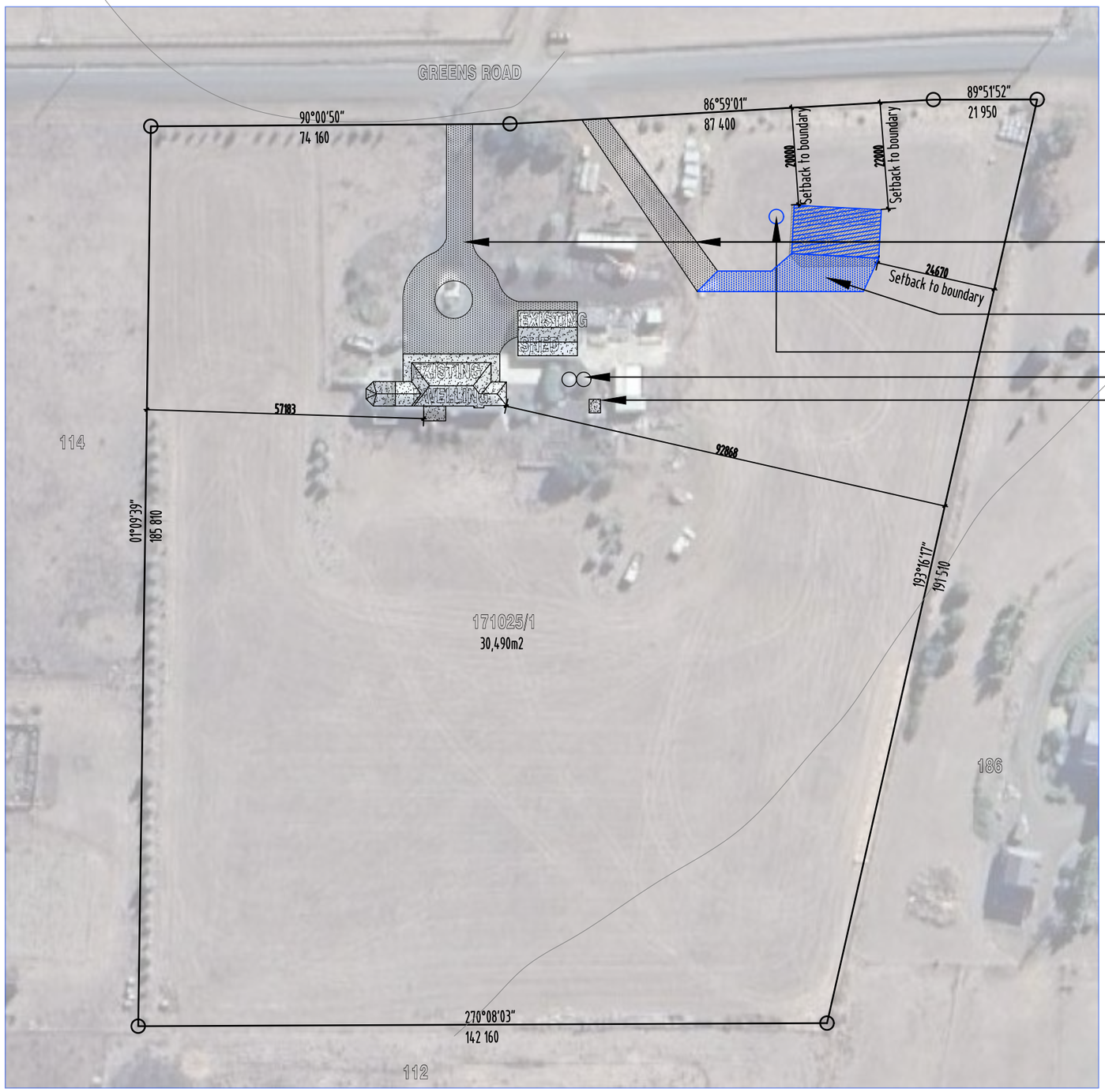
| notes | revision |
|---|---|
| Shed adjustments as per RFI | 1 |

stage
- [ ] sketch design
- [ ] design development
- [ ] contract documentation
- [x] DA
- [ ] BA
- [ ] construction drawings

PROJECT NAME : Proposed Shed
CLIENT : Dan Hunter
SITE : 150 Greens Road Orielton TAS 7172
DRAWING TITLE : Cover Page
REVISION NO. 1
DRAWING NO 01
SCALE As noted on A3 paper size
DRAWN BY : M.S.
CHECKED BY : Nicholas Young
PROJECT NO. 26-003
Plot Date: 19.06.2026

150 Greens Road,Orielton TAS 7172
Site Area: 30,490m2
Existing Site Cover (Dwelling+Shed+Greenhouse) 393m2= 1.28%
Proposed Site Cover Existing Dwelling 272m2 + Existing Shed 115m2+Existing Greenhouse 6m2+Proposed Shed 180m2= 573m2
Total Site Cover: 573m2 = 1.87%

PROPOSED
EXISTING




**Sorell Council**

Development Application:5.2026.61.1 - Response to Request For Information 150 Greens Road, Orielton P3.pdf

Plan Reference:P3
Date received:22/06/2026

## Site Plan-Overall
scale: 1:1000 @A3

Scale 1:1000
0 10 20 50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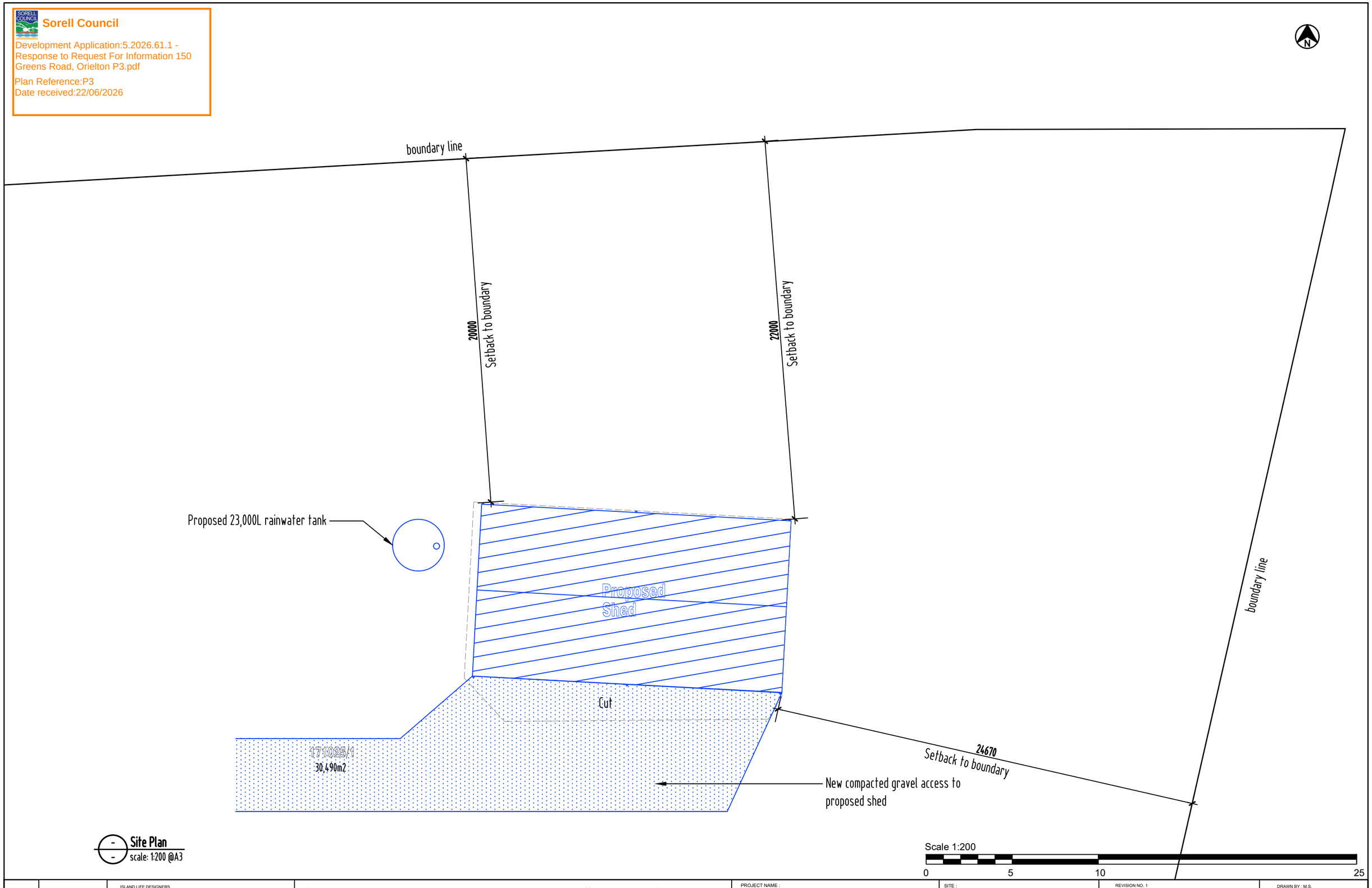
| notes | revision |
|---|---|
| Shed adjustments as per RFI | 1 |

stage
- [ ] sketch design
- [ ] design development
- [ ] contract documentation
- [x] DA
- [ ] BA
- [ ] construction drawings

PROJECT NAME : Proposed Shed
CLIENT : Dan Hunter
SITE : 150 Greens Road Orielton TAS 7172
DRAWING TITLE : Site Plan-Overall
REVISION NO. 1
DRAWING NO 02
SCALE As noted on A3 paper size
DRAWN BY : M.S.
CHECKED BY : Nicholas Young
PROJECT NO. 26-003
Plot Date: 19.06.2026




## Site Plan
scale: 1:200 @A3

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| notes | revision |
|---|---|
| Shed adjustments as per RFI | 1 |

stage
- [ ] sketch design
- [ ] design development
- [ ] contract documentation
- [x] DA
- [ ] BA
- [ ] construction drawings

PROJECT NAME : Proposed Shed
CLIENT : Dan Hunter
SITE : 150 Greens Road Orielton TAS 7172
DRAWING TITLE : Site Plan
REVISION NO. 1
DRAWING NO 03
SCALE As noted on A3 paper size
DRAWN BY : M.S.
CHECKED BY : Nicholas Young
PROJECT NO. 26-003
Plot Date: 19.06.2026

**NEW PIPEWORK**

SEWER DN100 uPVC
SUB SOIL DRAINAGE ø90
STORMWATER DN100 uPVC
COLD WATER DN20

**SYMBOLS**

INSPECTION OPENING
FLOOR WASTE GULLY
OVERFLOW RELIEF GULLY
ISOLATION VALVE IN BOX
DROPPER/ RISER
GRATED PIT (DETAILS BY CIVIL)
WATER TAP

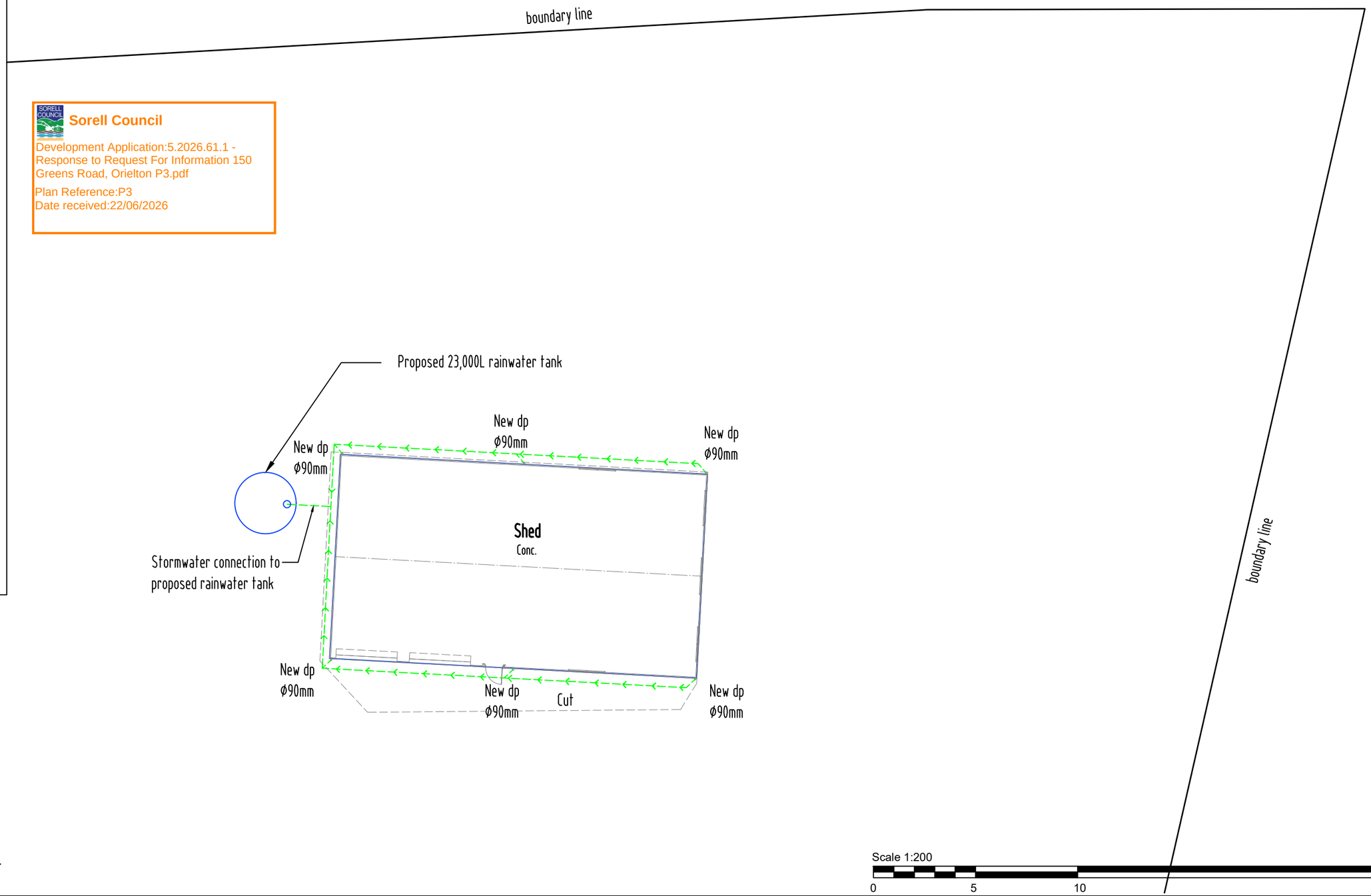
**ABBREVIATIONS**

| | |
|---|---|
| V | VENT PIPE |
| IO | INSPECTION OPENING |
| FWG | FLOOR WASTE GULLY |
| IOS | INSPECTION OPENING SHAFT |
| ORG | ORVERFLOW RELIEF GULLY |
| IV | ISLOLATION VALVE IN BOX |
| D/R | DROPPER/ RISER |
| Bth | BATH |
| Shr | SHOWER |
| B | BASIN |
| S | SINK |
| Tr | TROUGH |
| WC | WATER CLOSET |
| FWG | FLOOR WASTE GULLY |
| HWC | HOT WATER CYLINDER |
| IV | ISOLATION VALVE |
| PLV | PRESSURE LIMITING VALVE |
| CWM | COLD WATER METER |
| GD | GRATED DRAIN |
| GP | GRATED PIT |
| RP | ROD POINT |
| IS | INSPECTION SHAFT |

NOTE:
ALL WORKS MUST BE IN ACCORDANCE WITH THE CURRENT:
- N.C.C., AS3500.2 & AS3500.3
- WATER SERVICES ASSOCIATION OF AUSTALIA CODES(WSAA)
- LOCAL COUNCIL REQUIREMENTS
- TASWATER TECHNICAL STANDARDS
- ANY RELEVANT STANDARDS / MANUFACTURERS SPECIFICATIONS

REFER TO ROOF PLAN FOR ROOF CATCHMENT AREAS






## Site Drainage Plan

scale: 1:200 @A3

Scale 1:200

0 5 10 25

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BUILDING SERVICES PROVIDER
LICENCE No. 456943679
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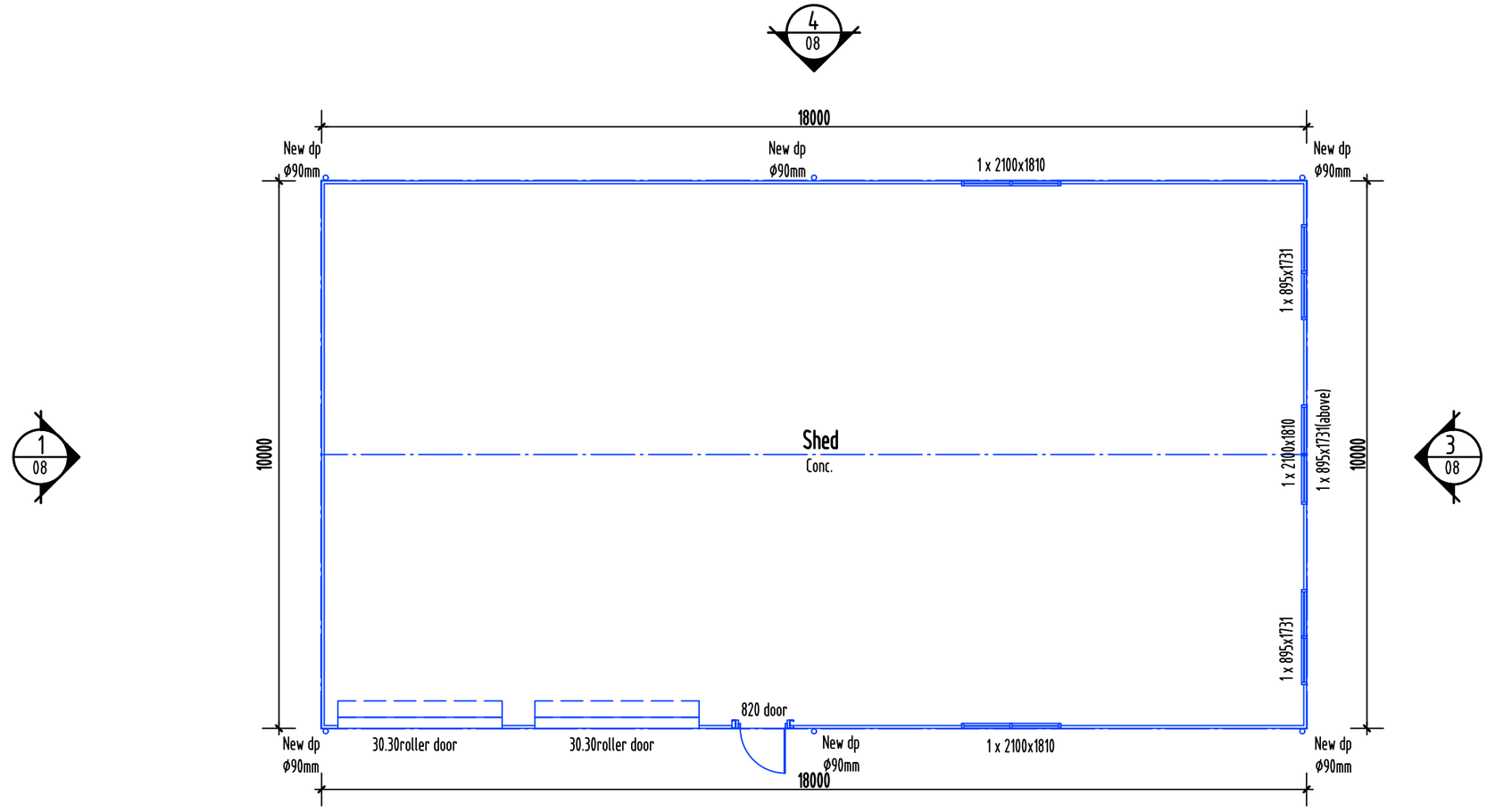
| notes | revision |
|---|---|
| Shed adjustments as per RFI | 1 |

stage
- sketch design
- design development
- contract documentation
- [x] DA
- BA
- construction drawings

PROJECT NAME : Proposed Shed
CLIENT : Dan Hunter
SITE : 150 Greens Road Orielton TAS 7172
DRAWING TITLE : Site Drainage Plan
REVISION NO. 1
DRAWING NO 04
SCALE As noted on A3 paper size
DRAWN BY : M.S.
CHECKED BY : Nicholas Young
PROJECT NO. 26-003
Plot Date: 19.06.2026




AREAS

| | |
|---|---|
| Shed: | 180.00m2 |
| TOTAL FLOOR AREA: | 180.00m2 |

## Shed Floor Plan

scale 1:100@A3

Scale 1:100

0 1 2 3 4 5 10

**Sorell Council**

Development Application:5.2026.61.1 - Response to Request For Information 150 Greens Road, Orielton P3.pdf

Plan Reference:P3

Date received:22/06/2026

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| notes | revision |
|---|---|
| Shed adjustments as per RFI | 1 |

stage
- [ ] sketch design
- [ ] design development
- [ ] contract documentation
- [x] DA
- [ ] BA
- [ ] construction drawings

PROJECT NAME :
Proposed Shed

CLIENT :
Dan Hunter

SITE :
150 Greens Road
Orielton TAS 7172

DRAWING TITLE :
Proposed Shed plan

REVISION NO. 1

DRAWING NO 05

SCALE As noted on A3 paper size

DRAWN BY : M.S.

CHECKED BY : Nicholas Young

PROJECT NO. 26-003

Plot Date: 19.06.2026

## NEW PIPEWORK

SEWER DN100 uPVC — S —
SUB SOIL DRAINAGE ø90 — — —
STORMWATER DN100 uPVC — — —
COLD WATER DN20 — W — —

## SYMBOLS

INSPECTION OPENING
FLOOR WASTE GULLY
OVERFLOW RELIEF GULLY
ISOLATION VALVE IN BOX
DROPPER/ RISER
GRATED PIT (DETAILS BY CIVIL)
WATER TAP

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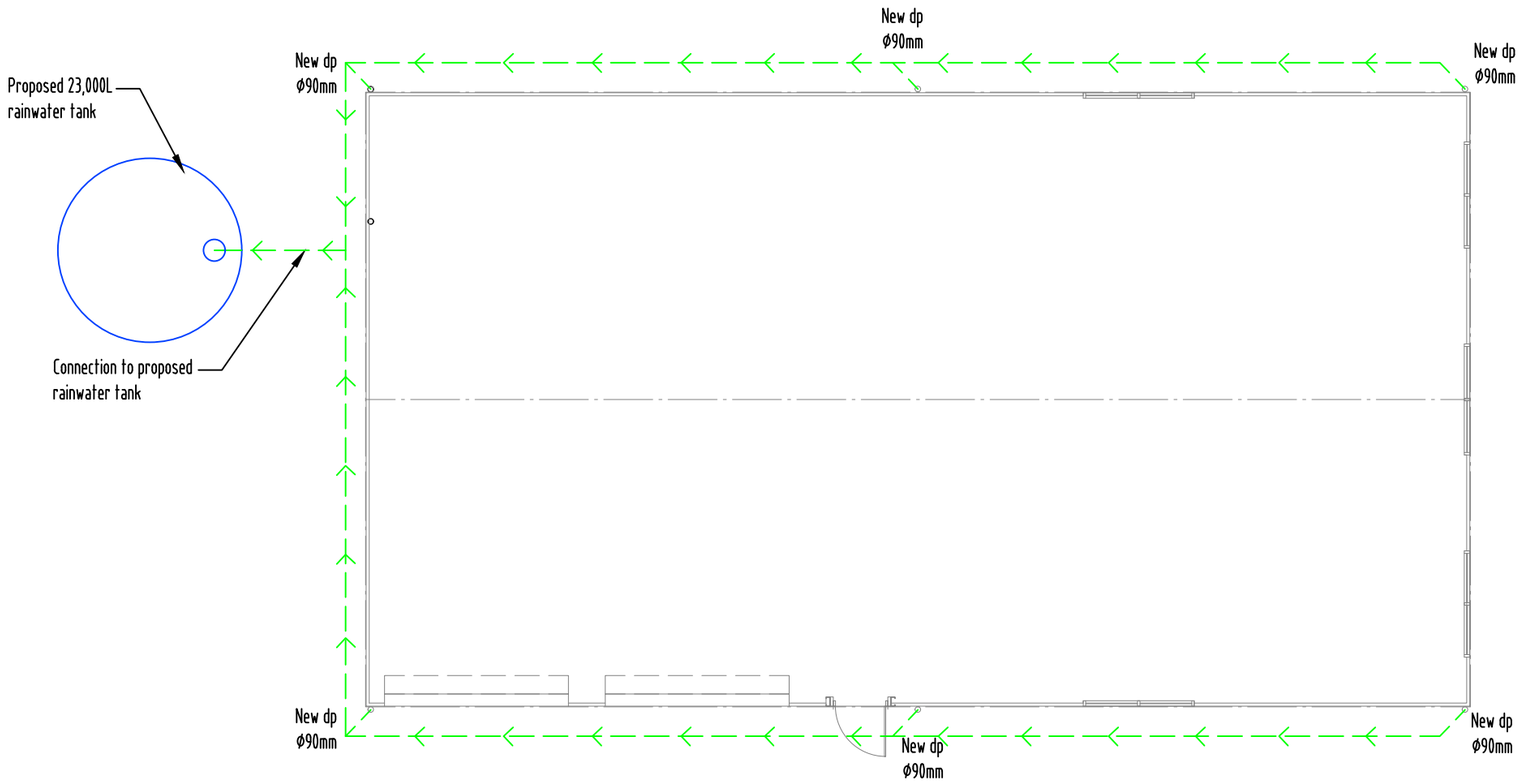
| Bth | BATH |
| Shr | SHOWER |
| B | BASIN |
| S | SINK |
| Tr | TROUGH |
| WC | WATER CLOSET |
| FWG | FLOOR WASTE GULLY |
| HWC | HOT WATER CYLINDER |
| IV | ISOLATION VALVE |
| PLV | PRESSURE LIMITING VALVE |
| CWM | COLD WATER METER |
| GD | GRATED DRAIN |
| GP | GRATED PIT |
| RP | ROD POINT |
| IS | INSPECTION SHAFT |




## Shed Plumbing Plan

scale 1:100@A3

NOTE:
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- N.C.C., AS3500.2 & AS3500.3
- WATER SERVICES ASSOCIATION OF AUSTALIA CODES(WSAA)
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- TASWATER TECHNICAL STANDARDS
- ANY RELEVANT STANDARDS / MANUFACTURERS SPECIFICATIONS

REFER TO ROOF PLAN FOR ROOF CATCHMENT AREAS



Scale 1:100

0 1 2 3 4 5 10


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| notes | revision |
|---|---|
| Shed adjustments as per RFI | 1 |

stage
- [ ] sketch design
- [ ] design development
- [ ] contract documentation
- [x] DA
- [ ] BA
- [ ] construction drawings

PROJECT NAME : Proposed Shed
CLIENT : Dan Hunter
SITE : 150 Greens Road Orielton TAS 7172
DRAWING TITLE : Shed Plumbing plan
REVISION NO. 1
DRAWING NO 06
SCALE As noted on A3 paper size
DRAWN BY : M.S.
CHECKED BY : Nicholas Young
PROJECT NO. 26-003
Plot Date: 19.06.2026

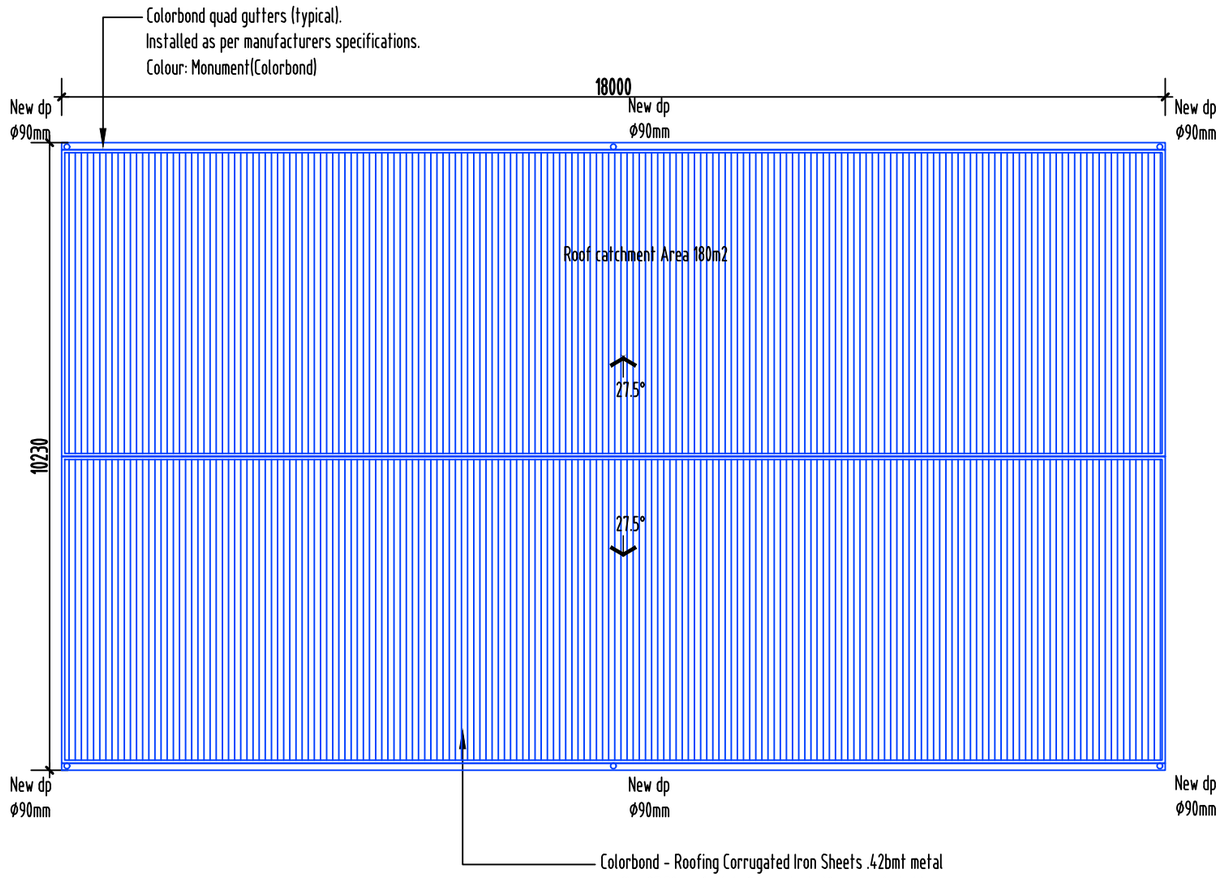
GUTTER OVERFLOW
AS PER HP REF. (2022) 7.4.4 ACCEPTABLE CONTINUOUS OVERFLOW MEASURE - CONTROLLED FRONT BEAD HEIGHT WITH THE FRONT BEAD OF THE GUTTER INSTALLED A MINIMUM OF 10 MM BELOW THE TOP OF THE FASCIA.

7.4.5 DOWNPIPES - SIZE AND INSTALLATION
DOWNPIPES MUST -
(A) NOT SERVE MORE THAN 12m OF GUTTER LENGTH FOR EACH DOWNPIPE; AND
(B) BE LOCATED AS CLOSE AS POSSIBLE TO VALLEY GUTTERS;

3.5.3 GUTTERS AND DOWNPIPES
90ø DOWNPIPE & MIN. MEDIUM RECTANGULAR SPECIFIED FROM THE N.C.C.
DOWNPIPE QUANTITIES ARE BASED ON MAX. 207.16m2 PLAN AREA

50MM M6 11 X 50 EPDM SEAL TO COMPLY WITH AS3566 OR REFER TO AS3566 FOR ALTERNATIVES.
COLORBOND FIXINGS
50MM M6 11 X 50 EPDM SEAL TO COMPLY WITH AS3566 OR REFER TO AS3566 FOR ALTERNATIVES.

EAVE LINING
EXTERNAL FIBRE-CEMENT SHEETS SHALL BE TO AS/NZS 2908.2 - 2000 OR ISO 8336 - 1993E, AND BE FIXED TO HP REF. (2022) TABLE 7.5.5 AND HP REF. (2022) FIGURE 7.5.5, AND HP REF. (2022) 7.5.5 (b)




## Shed Roof Plan
scale 1:100@A3

Sorell Council
Development Application:5.2026.61.1 - Response to Request For Information 150 Greens Road, Orielton P3.pdf
Plan Reference:P3
Date received:22/06/2026

Scale 1:100
0 1 2 3 4 5 10

ISLAND LIFE DESIGNERS
BUILDING SERVICES PROVIDER
LICENCE No. 456943679
CONTACT: nick@islandlifedesigners.com

General Notes
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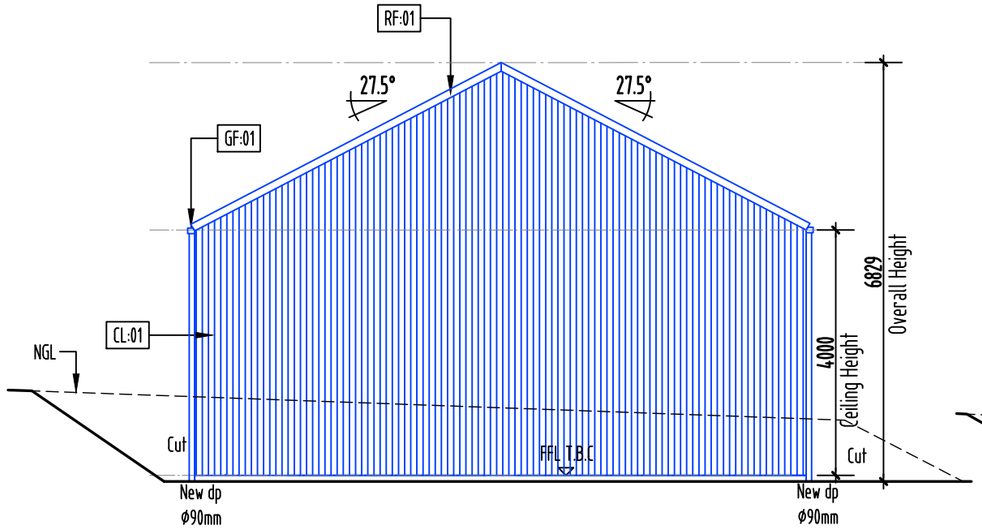
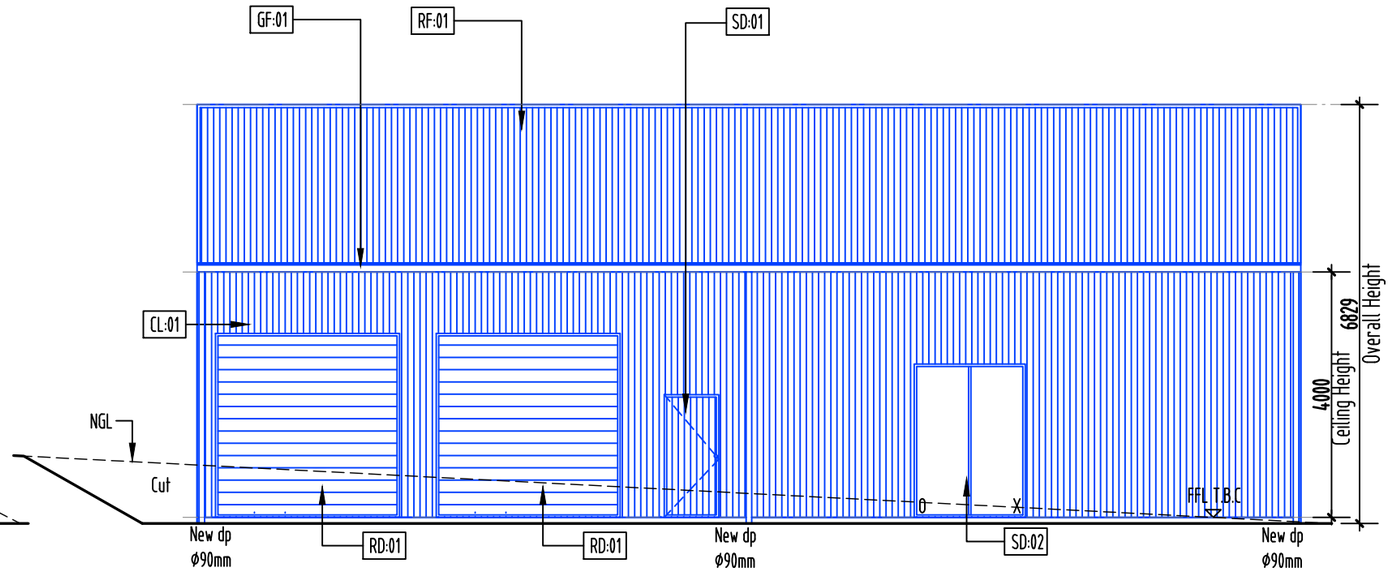
| notes | revision |
|---|---|
| Shed adjustments as per RFI | 1 |

stage
- [ ] sketch design
- [ ] design development
- [ ] contract documentation
- [x] DA
- [ ] BA
- [ ] construction drawings

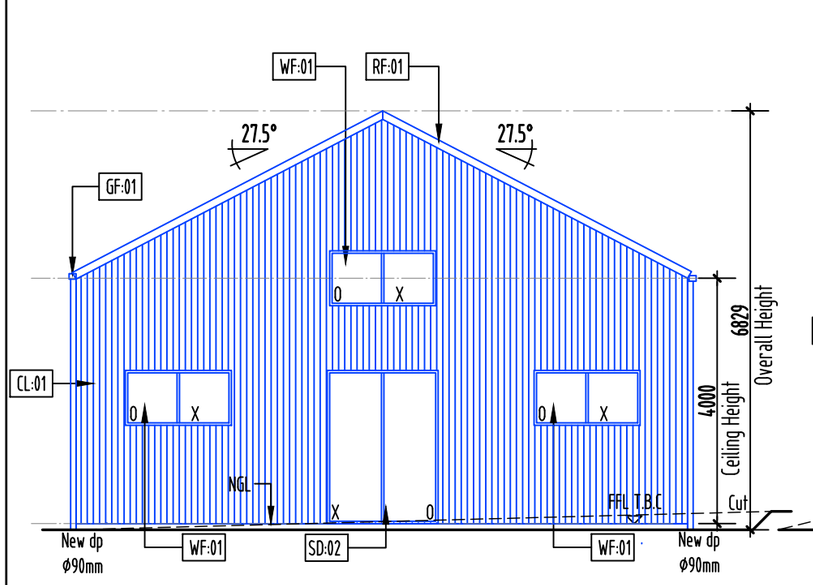
PROJECT NAME : Proposed Shed
CLIENT : Dan Hunter
SITE : 150 Greens Road Orielton TAS 7172
DRAWING TITLE : Roof plan
REVISION NO. 1
DRAWING NO 07
SCALE As noted on A3 paper size
DRAWN BY : M.S.
CHECKED BY : Nicholas Young
PROJECT NO. 26-003
Plot Date: 19.06.2026



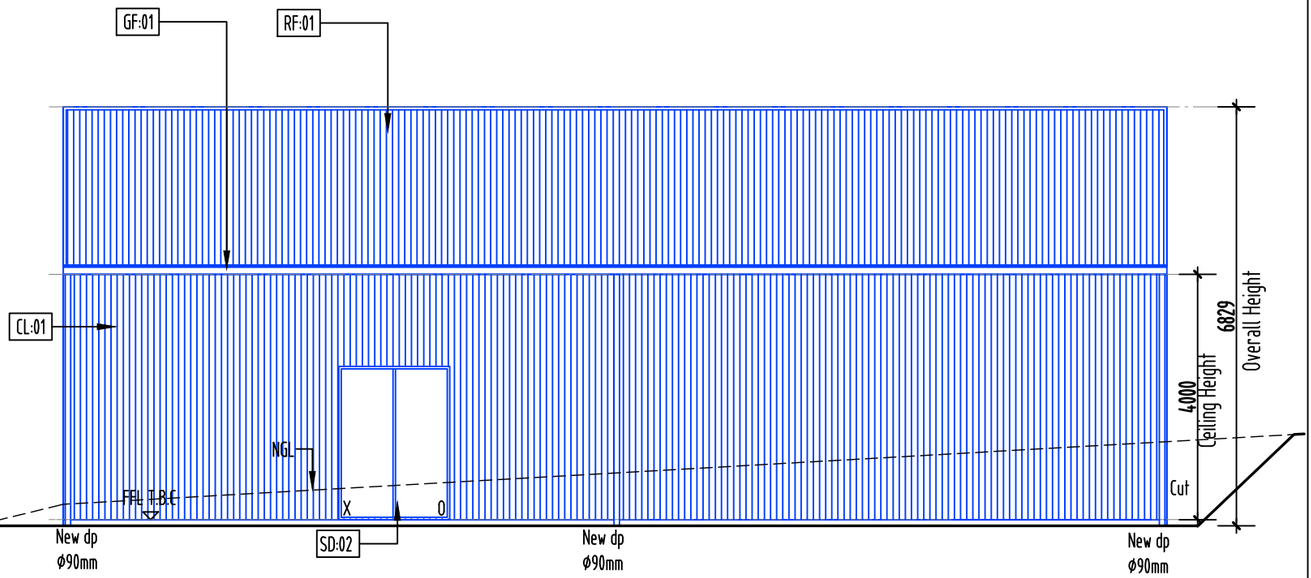

Elevation 1 - West
scale 1:100@A3




Elevation 2 - South
scale 1:100@A3




Elevation 3 - East
scale 1:100@A3




Elevation 4 - North
scale 1:100@A3

## LEGEND & NOTES

DP. Downpipe Ø90 PVC
Colour: Monument(Colorbond)

CL:01 External wall: SteelClad .42bmt Colorbond
Colour: Monument(Colorbond)

RF:01 SteelClad .42bmt Colorbond metal roofing 27.5° roof slope, installed as per manufacturers specifications.
Colour: Monument(Colorbond)

GF:01 Colorbond metal Fascia and Gutter:
Colour: Monument(Colorbond)

RD:01 2x Roller Doors: H3000xW3000
ROW Roller Door
Colour: Monument(Colorbond)

SD:01 Personnel doors: 1x Larnec 2040 x 820 x 35mm - Pre Hung - Colorbond Single Skin
-
P/C Tube Frame Outward Swing Monument
Colour: Monument(Colorbond)

SD:02 Personnel doors: 1x 1x 2100X1810 OX Basalt

WF:01 Powdercoated aluminium window / door frames
Colour: Monument(Colorbond)



Scale 1:100
0 1 2 3 4 5 10

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|---|---|
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stage
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- [ ] design development
- [ ] contract documentation
- [x] DA
- [ ] BA
- [ ] construction drawings

PROJECT NAME : Proposed Shed
CLIENT : Dan Hunter
SITE : 150 Greens Road Orielton TAS 7172
DRAWING TITLE : Shed Elevations
REVISION NO. 1
DRAWING NO 08
SCALE As noted on A3 paper size
DRAWN BY : M.S.
CHECKED BY : Nicholas Young
PROJECT NO. 26-003
Plot Date: 19.06.2026


SUN SHADOW DIAGRAM 21st JUNE-9am
SCALE NTS

SUN SHADOW DIAGRAM 21st JUNE-10am
SCALE NTS

SUN SHADOW DIAGRAM 21st JUNE-11am
SCALE NTS

SUN SHADOW DIAGRAM 21st JUNE-12am
SCALE NTS


SUN SHADOW DIAGRAM 21st JUNE-1pm
SCALE NTS

SUN SHADOW DIAGRAM 21st JUNE-2pm
SCALE NTS

SUN SHADOW DIAGRAM 21st JUNE-3pm
SCALE NTS

Sorell Council

Development Application:5.2026.61.1 - Response to Request For Information 150 Greens Road, Orielton P3.pdf

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|---|---|
| Shed adjustments as per RFI | 1 |

stage
- [ ] sketch design
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- [ ] contract documentation
- [x] DA
- [ ] BA
- [ ] construction drawings

PROJECT NAME :
Proposed Shed

CLIENT :
Dan Hunter

SITE :
150 Greens Road
Orielton TAS 7172

DRAWING TITLE :
Sun Shadow Diagrams

REVISION NO. 1

DRAWING NO 09

SCALE As noted on A3 paper size

DRAWN BY : M.S.

CHECKED BY : Nicholas Young

PROJECT NO. 26-003

Plot Date: 19.06.2026