NOTICE OF PROPOSED DEVELOPMENT

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

SITE:
22 OAK STREET, PRIMROSE SANDS

PROPOSED DEVELOPMENT:
DWELLING

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 20th October 2025.**

Any person may make representation in relation to the proposal by letter or electronic mail (sorell.council@sorell.tas.gov.au) addressed to the General Manager. Representations must be received no later than **Monday 20th October 2025.**

APPLICATION NO: **5.2025.240.1**
DATE: **03/10/2025**

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

Full description of Proposal:	*Use:* Domestic *Development:* New home *Large or complex proposals should be described in a letter or planning report.*
Design and construction cost of proposal:	$ 315,000

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

Location of proposed works:	Street address: 22 Oak Street Suburb: Primrose Sands Postcode: 7173 Certificate of Title(s) Volume: 5525 Folio: 40

Current Use of Site	Vacant land

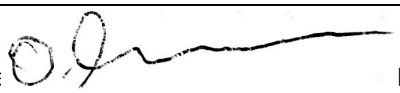
Current Owner/s:	Name(s) James Cairns and Jordan Smith

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. • 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. • 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. • 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. • I/we declare that the information in this application is true and correct. *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: 09/09/2025

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*). Please note: • If General Manager consent if required, please first complete the General Manager consent application form available on our website www.sorell.tas.gov.au • If the application involves Crown land you will also need a letter of consent. • 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 administration of land at _____ declare that I have given permission for the making of this application for _____

Signature of General Manager, Minister or Delegate:	Signature: ..... Date: .....

CERTIFICATE OF TITLE

LAND TITLES ACT 1980

TASMANIA

TORRENS TITLE

VOLUME	FOLIO
5525	40
EDITION	DATE OF ISSUE
4	09-Jan-2023
Page 1	of 1

I certify that the person described in Schedule 1 is the registered proprietor of an estate in fee simple (or such other estate or interest as is set forth in that Schedule) in the land within described subject to such exceptions, encumbrances, interests and entries specified in Schedule 2 and to any additional entries in the Folio of the Register.

Recorder of Titles

RECORDER OF TITLES TASMANIA

DESCRIPTION OF LAND

Parish of CARLTON, Land District of PEMBROKE
Lot 40 on Sealed Plan 5525
Derivation : Part of Lot 31145 - Gtd. to E.J. Kennedy.
Prior CT 3415/54

SCHEDULE 1

M923918 TRANSFER to JAMES ALEXANDER CAIRNS and JORDAN ELLEN SMITH Registered 02-Dec-2021 at noon

SCHEDULE 2

Reservations and conditions in the Crown Grant if any
SP 5525 FENCING COVENANT in Schedule of Easements
SP 5525 COUNCIL NOTIFICATION under Section 468(12) of the Local Government Act 1962
SP 5525 EASEMENTS in Schedule of Easements

FOLIO PLAN

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

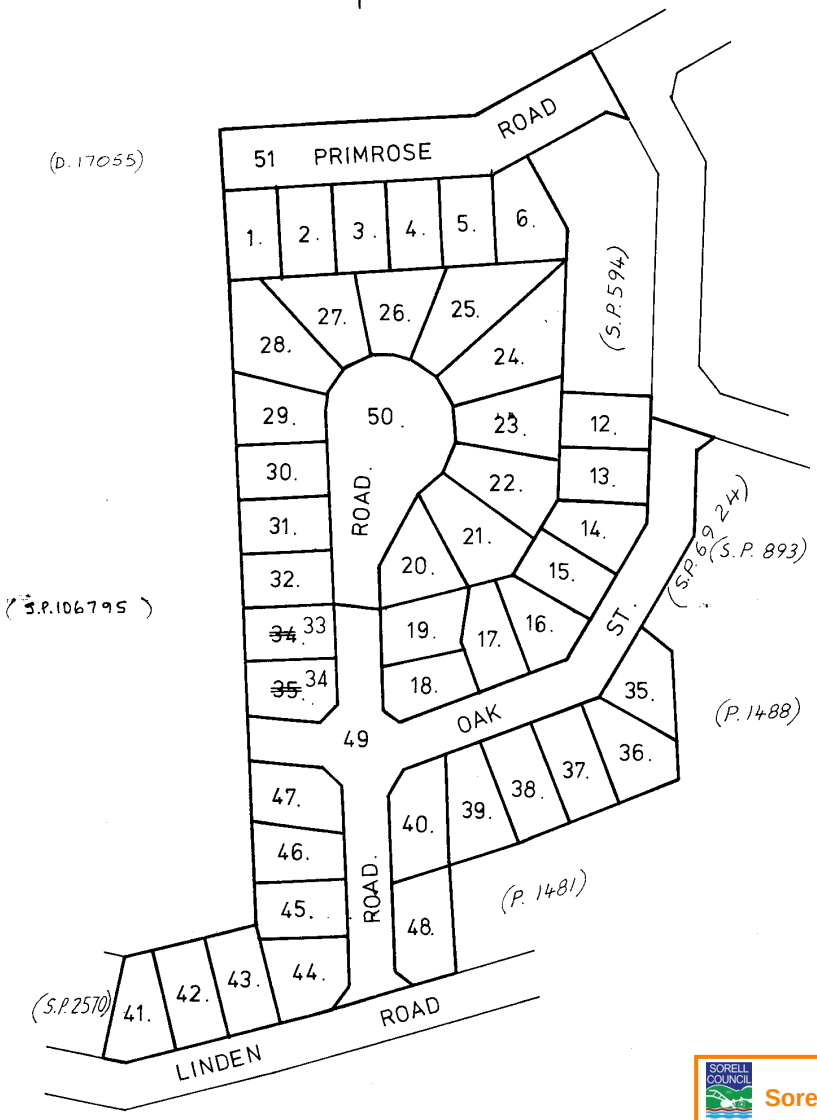
Owner: B. S. SIMMONDS.	PLAN OF SURVEY by Surveyor J. B. MEDBURY of land situated in the LAND DISTRICT OF PEMBROKE PARISH OF CARLTON SCALE 1:1500	Registered Number: S.P.5525
Title Reference: C T 3365–86		Effective from 6-8-74
Grantee: PART OF LOT 31145, 1072 ACRES, EDMUND JOHN KENNEDY PUR.		P/1 Recorder of Titles

LENGTHS ARE IN METRES

SEE INSIDE FIELD NOTES FOR REPEG. OF LOT 34

OF LOT 34.

(P17785)



Sorell Council

Development Application: 5.2025.240.1 - Development Application - 22 Oak Street, Primrose Sands - P1.pdf

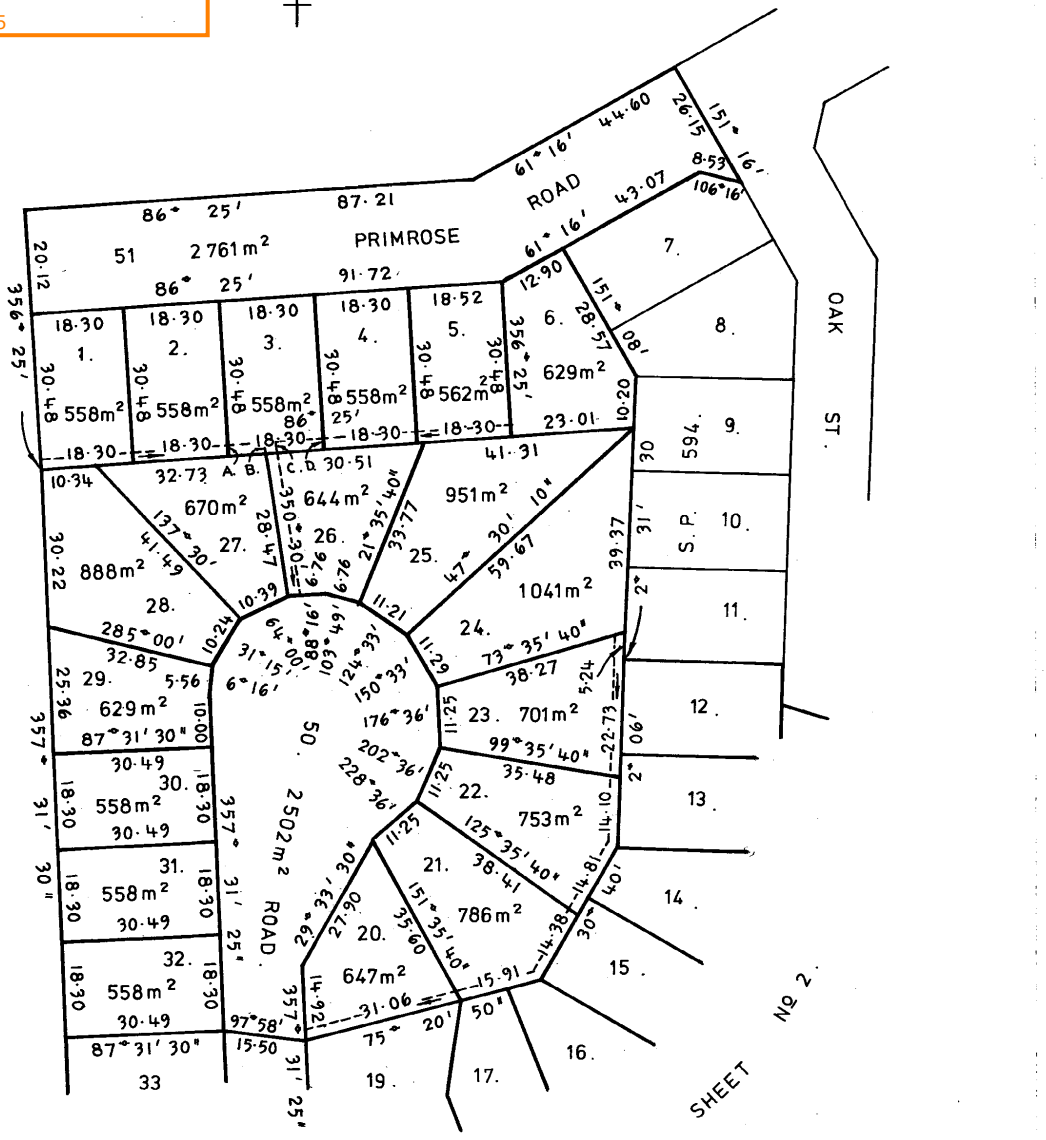
Plans Reference: P1

Date Received: 09/09/2025

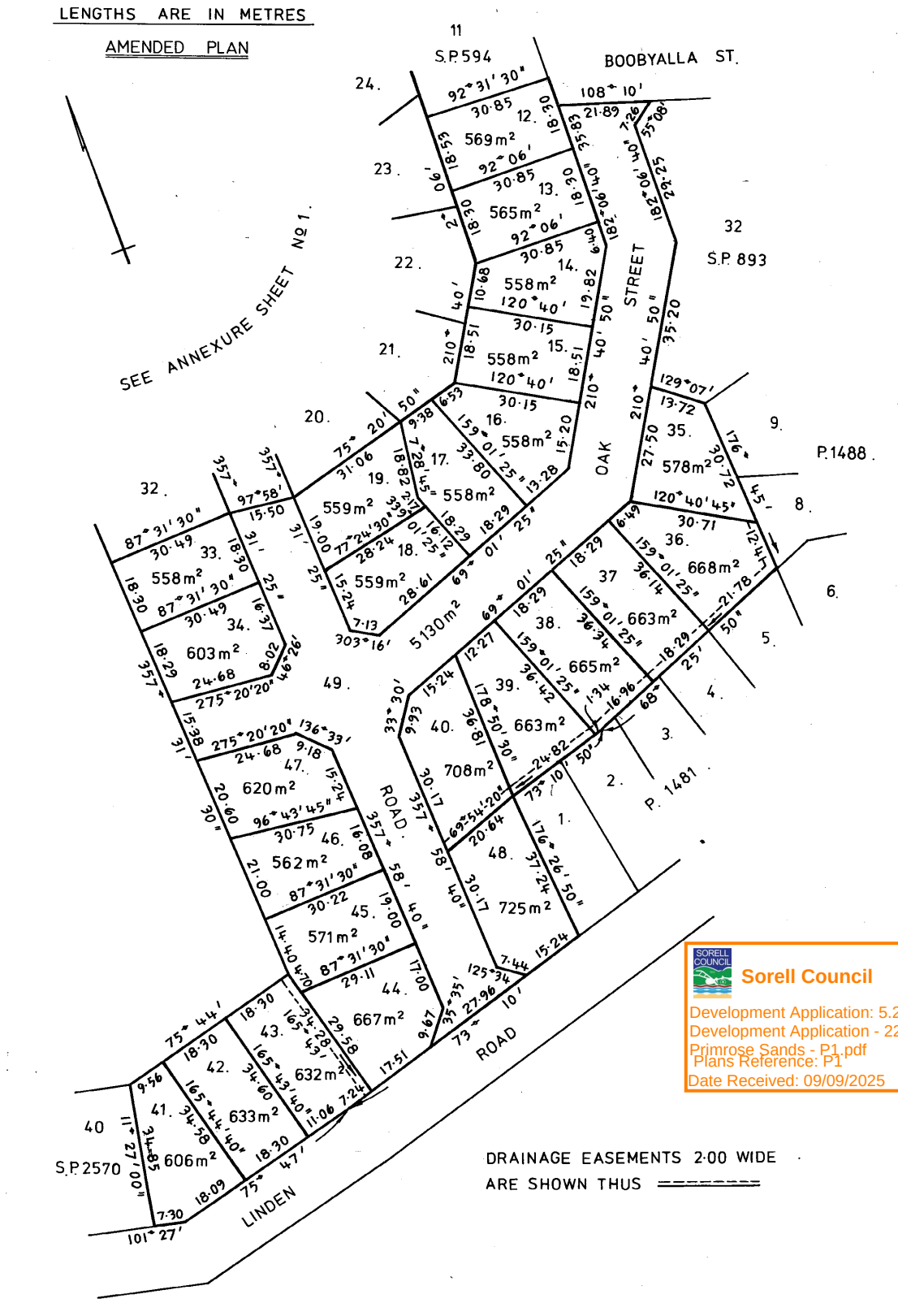
ANNEXURE SHEET No. 1 (of 2 annexures) to plan by Surveyor	This sheet contains detailed drawings of parcels shown on the index plan to which it is attached, which plan is verified by my certificate dated and that certificate extends to the detail shown on this sheet.	Registered Number: S.P.5525
Signed for the purposes of identification	Surveyor	
Council Clerk	Owner: B. S. SIMMONDS Title Reference: C.T. 3365–86	SCALE 1 : 750

LENGTHS ARE IN METRES

AMENDED PLAN



ANNEXURE SHEET No. 2 (of 2 annexures) to plan by Surveyor	This sheet contains detailed drawings of parcels shown on the index plan to which it is attached, which plan is verified by my certificate dated and that certificate extends to the detail shown on this sheet.	Registered Number: S.P.5525
Signed for the purposes of identification	Surveyor	
Council Clerk	Owner: B S SIMMONDS Title Reference: C.T. 3365–86	SCALE 1 : 750



(7)

SCHEDULE OF EASEMENTS PLAN NO. S.P.5525

NOTE:—The Town Clerk or Council Clerk must sign the certificate on the back page for the purpose of identification.

The Schedule must be signed by the owners and mortgagees of the land affected. Signatures should be attested.

This is the Schedule of Easements attached to the plan of Forty six lots comprising part of the land in Certificate of Title Volume 3365 Folio 86

EASEMENTS

Rights of Drainage

Each lot on the plan is together with such rights of drainage over the drainage easements shewn on the plan as may be necessary to drain the stormwater and other surplus water from such lot.

Each lot on the plan is subject to such rights of drainage over the drainage easements (if any) shewn on the plan as passing through such lot as may be necessary to drain the stormwater and other surplus water from any other lot on the plan.

The direction of the flow of water through the drainage easements shewn on the plan is indicated by arrows.

Lots 1 2 3 A - C and 26 and 43 are subject to a right of drainage (appurtenant to the balance of the land in Certificate of Title 3365 Folio 86 ~~over the drainage easement shown passing through those lots~~ at the date of acceptance hereof excluding the lots in the plan) over the drainage easements shown passing through those lots.

FENCING COVENANT

The owner of each Lot on the Plan covenants with the Vendor (Brian Spode Simmonds) that the Vendor shall not be required to fence.

No ~~easements or~~ profits a prendre are created to benefit or burden any Lot shown on the Plan

SIGNED by RADMILLO PETAR RAJIC as Mortgagee in the presence of:

Rajic

C Lilleythan
Law Clerk
Hobart

SIGNED by EDWARD ALFRED CREESE and HAROLD NEVILLE CREESE in the presence of:

H.N. Creese

C Lilleythan
Law Clerk
Hobart

SIGNED by BRIAN SPODE SIMMONDS Registered Proprietor of the land comprised in Certificate of Title Volume 3365 Folio 86 in the presence of:

B.S. Simmonds

Certified correct for the purposes of "The Real Property Act 1962" as amended.

CREESE CRISP & CREESE

Solicitors for the Registered Proprietor

This is the schedule of easements attached to the plan of .....

Lots 26 and 27 to 51 ..... comprising part of the land in

C.T. 3365-86 .....
(Insert Title Reference)

Sealed by ..... on 16 May ..... 19 74.

..... *Council Clerk/Town Clerk*

56158

NEAThouse
sustainably built NEAT built

Agent Authorisation

We, James Cairns and Jordan Smith, do hereby authorise Owen Thomson (Neathouse Tasmania Pty Ltd) to act as our agent in submission of Planning, Building and/or Plumbing Applications to Sorell Council and Pitt and Sherry (building surveyors) for the purpose of constructing a new dwelling at 22 Oak Street, Primrose Sands, TAS.

Signed

James Cairns

Jordan Smith

Date 9/9/25

PO Box 3205 West Hobart TAS 7000
www.neathouse.com.au
ph. 0409 334774
ABN 12 618 291 482

NEAThouse
sustainably built NEAT built

09/09/2025

Regarding submission of Planning Application at 22 Oak Street, Primrose Sands TAS

To Whom It May Concern,

The proposal for a new dwelling at the above address has been conscientiously designed with regard to the Planning Scheme. However, a portion of the proposed house is sited outside of the setbacks in the Scheme. The following two issues have made it necessary to encroach on these setbacks:

1. The house design needs to have sufficient width (east-west) to receive adequate sunlight
2. The block of land is narrow, at only 20m width between the parallel east and west boundaries, making it highly restrictive.

It is noted that the house design is modest in scale at 110m2.

Yours sincerely,

Owen Thomson

Director

Neathouse Tasmania Pty Ltd

PO Box 3205 West Hobart TAS 7000
www.neathouse.com.au
ph. 0409 334774
ABN 12 618 291 482

GEOTECH 25-067a

ROCK SOLID GEOTECHNICS PTY LTD
Peter Hofto
163 Orielton Road
Orielton
TAS 7172

Ph 0417 960 769
peter@rocksolidgeotechnics.com.au

4/9/2025

GEOTECHNICAL ASSESSMENT / CLASSIFICATION
PROPOSED RESIDENTIAL DEVELOPMENT

22 Oak Street, Primrose Sands

CLIENT: James Jordan 0457284163 jacjespenn@gmail.com

CONTENTS

SUMMARY

James Jordan has proposed a residential development at 22 Oak Street, Primrose Sands. The site for the proposed residence is underlain by deep, reactive clay subsoils.

The site is classified as Class 'P' in accordance with AS2870. The Class 'P' classification is due to the onsite wastewater Land Application Area being immediately upslope from the proposed residence. Foundations on sites with a Class 'P' classification should be designed by a structural engineer experienced in the design of residential footings. The reactivity of the site aligns with a Class 'H2' site.

Suitable, engineer designed upslope site drainage should be installed prior to the commencement of construction. This is particularly important as the onsite wastewater system will be sited upslope from the residence.

The following Wind Load Classifications (AS4055-2012: Wind Loads for Housing) are appropriate.

• Terrain Category Classification	TC2	Open Terrain
• Shielding Classification	NS	No Shielding
• Topographic Classification	T2	
• Wind Load Classification	N3	

INVESTIGATION

The Tasmanian Geological Survey 1:50000 Geological Atlas "*Sorell*" indicates that the site is underlain by Jurassic dolerite.

A site investigation was completed on Monday 20 May, 2025. This included the mechanical augering of three test holes to assess the site for foundation conditions and onsite wastewater (4WD mounted SAMPLA25 mechanical auger with 100mm diameter solid flight augers). The locations of the auger holes are marked on Figure 1.

The vacant block lies on the southeastern corner of Oak Street and Norfolk Crescent. The block slopes at approximately 6-7 degrees to the south. The site is covered in grass and is devoid of trees. An open stormwater drain runs down the eastern side of Norfolk Crescent (available for SW runoff from the site).

The profile encountered in Test Hole #1 consisted of:

0.00 – 0.40m	SAND: fine grained, greyish brown, trace rootlets - TOPSOIL / LOAM
0.40 – 0.70m	sandy CLAY: medium to high plasticity, greyish brown, 20-25% fine to medium grained sand, MOIST, Bearing Capacity 230kPa
0.70 – 2.10m	CLAY: high plasticity, olive brown, some fine to medium grained sand, MOIST, Bearing Capacity 170kPa
2.10m+	Hole terminated at required depth – 2.10m.

The profile encountered in Test Hole #2 consisted of:

0.00 – 0.40m	SAND: fine grained, greyish brown, trace rootlets - TOPSOIL / LOAM
0.40 – 0.70m	sandy CLAY: medium to high plasticity, greyish brown, 20-25% fine to medium grained sand, MOIST, Bearing Capacity 230kPa
0.70 – 2.10m	CLAY: high plasticity, olive brown, some fine to medium grained sand, MOIST, Bearing Capacity 170kPa
2.10m+	Hole terminated at required depth – 2.10m.

Groundwater was not encountered in any of the holes.

Plate 1 - Block looking to the southeast from the corner of Oak Street and Norfolk Crescent.

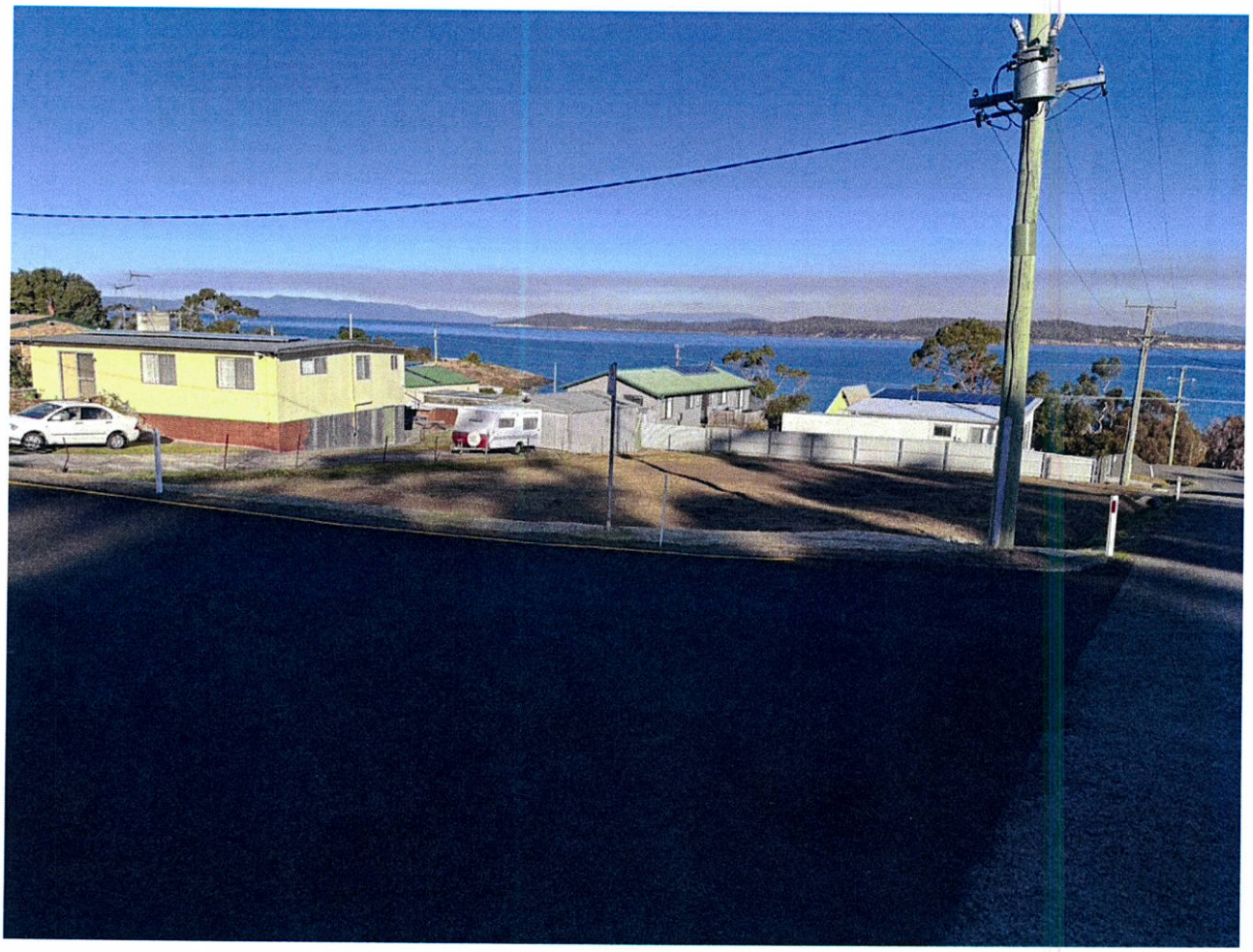
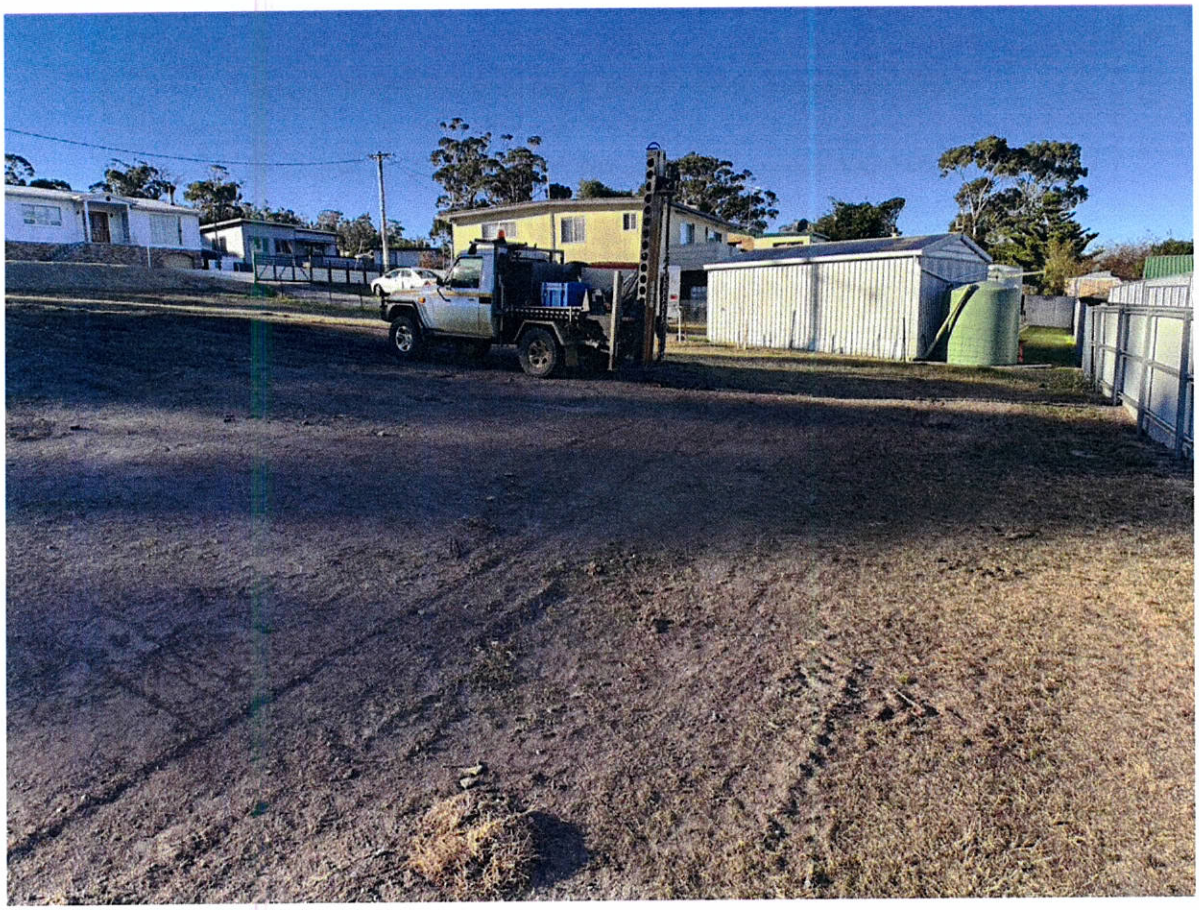


Plate 2 – Test Hole #1 - looking to the northeast from Norfolk Crescent.



CONDITIONS OF INVESTIGATION

This report remains the property of Rock Solid Geotechnics Pty. Ltd. (RSG). It must not be reproduced in part or full, or used for any other purpose without written permission of this company. The investigations have been conducted, & the report prepared, for the sole use of the client or agent mentioned on the cover page. Where the report is to be used for any other purpose RSG accepts no responsibility for such other use. The Forms 55 and 35 are not transferable to another body without consultation (reissue) from RSG. The information in this report is current and suitable for use for a period of two years from the date of production of the report, after which time it cannot be used for Building or Development Application.

This report should not be used for submission for Building or Development Application until RSG has been paid in full for its production. RSG accepts no liability for the contents of this report until full payment has been received.

The results & interpretation of conditions presented in this report are current at the time of the investigation only. The investigation has been conducted in accordance with the specific client's requirements &/or with their servants or agent's instructions.

This report contains observations & interpretations based often on limited subsurface evaluation. Where interpretative information or evaluation has been reported, this information has been identified accordingly & is presented based on professional judgement. RSG does not accept responsibility for variations between interpreted conditions & those that may be subsequently revealed by whatever means.

Due to the possibility of variation in subsurface conditions & materials, the characteristics of materials can vary between sample & observation sites. RSG takes no responsibility for changed or unexpected variations in ground conditions that may affect any aspect of the project. The classifications in this report are based on samples taken from specific sites. The information is not transferable to different sites, no matter how close (ie. if the development site is moved from the original assessment site an additional assessment will be required).

It is recommended to notify the author should it be revealed that the sub-surface conditions differ from those presented in this report, so additional assessment & advice may be provided.

Investigations are conducted to standards outlined in Australian Standards:

- AS1726-1993: Geotechnical Site Investigations
- AS2870-2011: Residential Slabs and Footings
- AS4055-2012: Wind Loads for Housing
- AS1547-2012: Onsite Domestic Wastewater Management

& as specified in 'Guidelines for Geotechnical Assessment of Subdivisions and Recommended Code of Practise for Site Classification to AS2870 in Tasmania' - Institute of Engineers, Tasmanian Division.

All new developments should subject to strict site maintenance. Attention is drawn to the enclosed information reproduced with the permission from Standards Australia:

- CSIRO Information Sheet No. BTF18 – 'Guide to home-owners on foundation maintenance & footing performance'.

Additional site care and maintenance is recommended for any site with a Class "H" or "E" classification. Compliance with Appendix B of AS2870 is recommended. Attention is drawn to the information available from Standards Australia:

- Sections 5.5 and 6.6 of AS2870 – additional requirements for Class H and E Sites.
- Appendix B of AS2870 – Performance Requirements and Foundation Maintenance.
- Appendix C of AS2870 – Classification of Damage.

Any assessment that has included an onsite wastewater system design will require a further site visit once the system has been installed if a "Certificate of Completion" is required (to verify that the system has been installed as per RSG's design & the council issued Special Plumbing Permit). An additional fee applies for the site visit & issuing the certificate.

RSG is not responsible for the correct installation of wastewater systems. Any wastewater installation is the sole responsibility of the owner/agent and certified plumber. Any variation to the wastewater design must be approved by RSG, and an amended Special Plumbing Permit obtained from the relevant council. The registered plumber must obtain a copy and carefully follow the details in the council issued Special Plumbing Permit. A "Certificate of Completion" will be based on surface visual inspection only, to verify the location of the system. All underground plumbing works are the responsibility of the certified plumber.

PETER HOFTO
ROCK SOLID GEOTECHNICS PTY LTD

22 OAK STREET
PRIMROSE SANDS

GDA94 MGA55 : 555166E, 5250152N 1:425 **Disclaimer and Copyright Notice**

CERTIFICATE OF QUALIFIED PERSON – ASSESSABLE ITEM

Section 321

Form 55

To: Mr James Jordan *Owner /Agent*

Address

jacjespenn@gmail.com *Suburb/postcode*

Qualified person details:

Qualified person: Peter Hofto - Rock Solid Geotechnics P/L

Address: 163 Orielton Road

Orielton 7172

Phone No: 0417960769

Fax No:

Licence No:

Email address: peter@rocksolidgeotechnics.com.au

Qualifications and Insurance details: BSc (Hons) – Geology / Geophysics
PI Insurance – Lloyds Underwriting
PL Insurance – CGU Insurance Lt

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

Speciality area of expertise: Geotechnical Assessments

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

Details of work:

Address: 22 Oak Street, Primrose Sands

Lot No:

Certificate of title No:

The assessable item related to this certificate: Geotechnical Assessment – Foundations

(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 Assessment

(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:	
Relevant calculations:	AS2870
References:	

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

Scope and/or Limitations

I certify the matters described in this certificate.

Qualified person:	*Signed:*	*Certificate No:*	*Date:*
		GEOTECH 25-067a	4/9/2025

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
1	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.

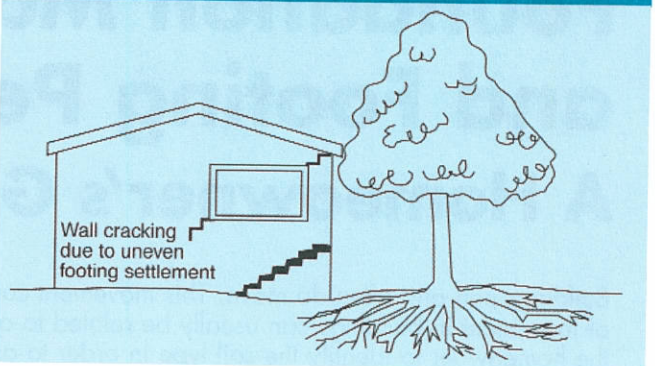
Seasonal swelling/shrinkage in clay

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.

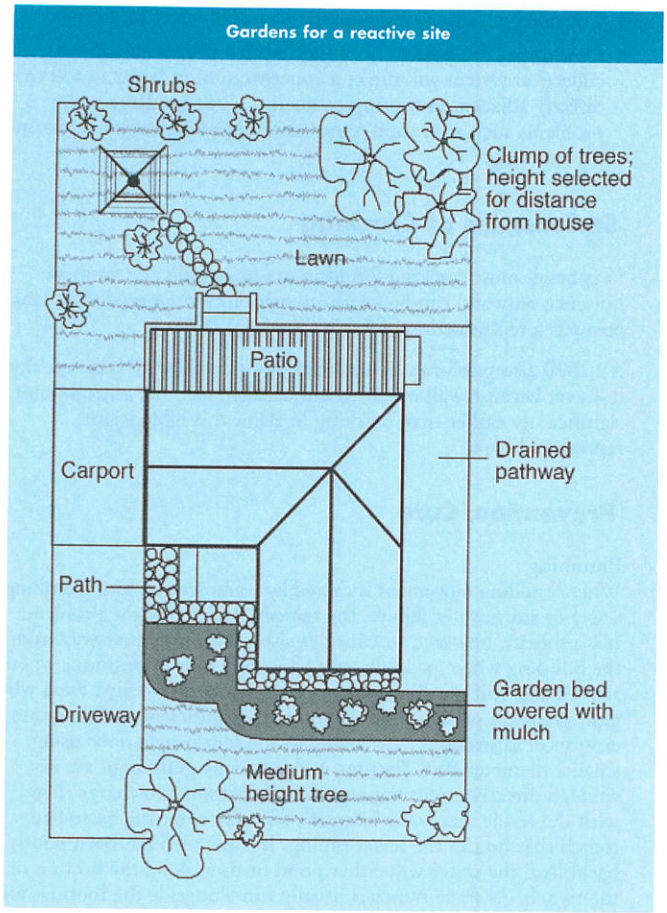
It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

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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APPENDIX 3

ONSITE WASTEWATER ASSESSMENT / SYSTEM DESIGN – 22 Oak Street, Primrose Sands

Below find the assessment to determine of the type and size of wastewater treatment system, and the allocation of a Land Application Area (LAA) for a proposed new, 3-bedroom residence at 22 Oak Street, Primrose Sands. This assessment should be read in conjunction with Site & Soil Evaluation Report (GEOTECH 25-067a) - enclosed.

The vacant block lies on the southeastern corner of Oak Street and Norfolk Crescent. The block slopes at approximately 6-7 degrees to the south. The site is covered in grass and is devoid of trees. An open stormwater drain runs down the eastern side of Norfolk Crescent (available for SW runoff from the site).

Plate 3 – Test Hole #3 - looking to the east from Norfolk Crescent.

The profile encountered in Test Hole #3 consisted of:

0.00 – 0.50m	SAND: fine grained, greyish brown, trace rootlets - TOPSOIL / LOAM
0.50 – 0.80m	sandy CLAY: medium to high plasticity, greyish brown, 20-25% fine to medium grained sand, MOIST, Bearing Capacity 230kPa
0.80 – 1.55m	sandy CLAY: medium to high plasticity, olive brown, 20% fine to medium grained sand, MOIST, Bearing Capacity 200kPa
1.55 – 2.10m	sandy CLAY: medium plasticity, light brown / yellowish brown, 30% fine to medium grained sand, MOIST, Bearing Capacity 260kPa
2.10m+	Hole terminated at required depth – 2.10m.

Groundwater was not encountered in any of the holes.

The site is classified as Class 6 (CLAY), with an Indicative Permeability of <0.06m/d.

COMPLIANCE WITH THE 2016 DIRECTOR'S GUIDELINES FOR ONSITE WASTEWATER

Compliance Table Directors Guidelines for OSWM		
Acceptable Solutions	**Performance Criteria**	**Compliance achieved by**
5.1 To ensure sufficient land is available for sustainable onsite wastewater management for buildings.		
A1 A new dwelling must be provided with a LAA that complies with Table 3.	P1 A new dwelling must be provided with a LAA that meets all of the following: a) The LAA is sized in accordance with the requirements of AS/NZS 1547; and b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	Cannot comply with A1 130m² of LAA/bedroom or 390m² for a 3-bedroom residence on this site. Design Complies with P3. See Risk Assessment
7. Standards for Wastewater Land Application Areas		
A1 Horizontal separation distance from a building to a LAA must comply with one of the following: a) be no less than 6m; b) be no less than: (i) 3m from an upslope boundary or level building; (ii) If primary treated effluent to be no less than 4m plus 1m for every degree of average gradient from a downslope building; (iii) If secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a downslope building.	P1 The LAA is located so that the risk of wastewater reducing the bearing capacity of a building's foundations is acceptably low.	Complies with A1 LAA > 3m from upslope residence. LAA upslope from residence. Setback required; 2m + (0.25m x 7°) = 3.75m

A2 Horizontal separation distance from downslope surface water to a LAA must comply with (a) or (b) (a) be no less than 100m; or (b) be no less than the following: (i) if primary treated effluent 15m plus 7m for every degree of average gradient to downslope surface water; or (ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient to down slope surface water.	P2 Horizontal separation distance from downslope surface water to a LAA must comply with all of the following: a) Setbacks must be consistent with AS/NZS 1547 Appendix R; b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	Complies with A2 LAA >100m from downslope surface water.
A3 Horizontal separation distance from a property boundary to a LAA must comply with either of the following: (a) be no less than 40m from a property boundary; or (b) be no less than: (i) 1.5m from an upslope or level property boundary; & (ii) If primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or (iii) If secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary.	P3 Horizontal separation distance from a property boundary to a LAA must comply with all of the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	Complies with A3. 7-degree slope. Setback requirement; 1.5m + (1m x 7°) = 8.5m
A4 Horizontal separation distance from a downslope bore, well or similar water supply to a LAA must be no less than 50m and not be within the zone of influence of the bore whether up or down gradient.	P4 Horizontal separation distance from a downslope bore, well or similar water supply to a LAA must comply with all of the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 demonstrates that the risk is acceptable.	Complies with A4 No known potable water bores in the vicinity of the site.
A5 Vertical separation distance between groundwater & a LAA must be no less than: (a) 1.5m if primary treated effluent; or (b) 0.6m if secondary treated effluent	P5 Vertical separation distance between groundwater and a LAA must comply with the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 that demonstrates that the risk is acceptable.	Complies with A5 Groundwater not encountered.
A6 Vertical separation distance between a limiting layer & a LAA must be no less than: (a) 1.5m if primary treated effluent; or (b) 0.5m if secondary treated effluent.	P6 Vertical setback must be consistent with AS/NZS1547 Appendix R.	Complies with A6 Limiting layer not encountered.
A7 Nil	P7 A wastewater treatment unit must be located a sufficient distance from buildings or neighbouring properties so that emissions (odour, noise or aerosols) from the unit do not create an environmental nuisance to the residents of those properties.	Complies with P7

RISK ASSESSMENT

Each identified environmental aspect is subject to a qualitative risk analysis based on likelihood and consequences of environmental impact. The risk analysis matrix is as follows:

LIKELIHOOD	***CONSEQUENCES***				
	Catastrophic 1	Major 2	Moderate 3	Minor 4	Insignificant 5
A (almost certain)	Extreme	Extreme	High	High	Medium
B (likely)	Extreme	Extreme	High	High	Medium
C (possible)	Extreme	Extreme	High	Medium	Low
D (unlikely)	Extreme	High	Medium	Low	Low
E (rare)	High	Medium	Low	Low	Low

Criteria for the five categories of likelihood:

Almost certain: An environmental health impact is expected to occur in most circumstances.

Likely: An environmental health impact will probably occur in most circumstances
Possible: An environmental health impact could occur.

Unlikely: An environmental health impact could occur but is not expected.

Rare: An environmental health impact would occur only in exceptional circumstances.

Criteria for determining consequence to environmental health from an on-site wastewater management issue:

Catastrophic: Widespread, irreparable environmental damage; loss of human life or long-term human health effects; serious litigation; over $1 million to manage consequences.

Major: Widespread, medium to long term impact; moderate human health impacts requiring medical treatment; major breach of legal requirements (prosecution); $50,000 to $1 million to manage consequences.

Moderate: Localised medium to long term impact; minor and reversible human health impacts treatable with first aid; moderate breach of legal requirements with fine (EIN/prosecution); $5,000 to $50,000 to manage consequences.

Minor: Localised short to medium term impact; no injury to people; minor breach of legal requirements (eg. legal notice, EIN); $1000 to $5,000 to manage consequences.

Insignificant: Limited impact to a local area but no long-term effects; concern or complaints from neighbours; no injury to people; minor technical nonconformity but no legal nonconformity; less than $1000 cost to manage consequences.

Conducting a risk analysis results in the allocating of a risk level of *extreme*, *high*, *moderate* or *low* for each environmental aspect. Environmental health aspects with an *extreme* or *high* risk are *significant*, that is, they have or can have a significant environmental impact.

Defined risks are – Restricted available land for wastewater disposal.

The defined site constraint items of specific concern (as defined in Table R1) FOR THE ABOVE DEFINED RISK are:

- A, D, J

A Microbial quality of effluent.
Risk is groundwater or surface pollution contamination.

- Effluent is secondary treated in an AWTS and disposed of in a retained sand bed. This is the lowest risk level available on the Constraint scale defined in Table R2.
- Groundwater not encountered. Likelihood groundwater pollution unlikely.
- Possibility of surface water contamination – Unlikely. Consequence - Minor.
- Low risk level.

D Slope.
Risks are off-site export of effluent, erosion

- Effluent to be secondary treated in an AWTS and disposed of in a retained sand bed. This is the lowest risk level available on the Constraint scale defined in Table R2.
- Risk of treated wastewater not being retained on-site – Unlikely due to the raised sand bed LAA. Consequence - Minor.
- Low risk level.

J Application method.
Risks are off-site export of effluent and surface water pollution.

- Subsurface application in sand bed (subsurface dripline irrigation). This is the lowest risk level available on the Constraint scale defined in Table R2.
- Risk of treated wastewater not being retained on-site – Unlikely. Consequence - Minor.
- Low risk level.

The risk assessment identifies several, linked risks for wastewater application on this site. These risks will be mitigated / reduced to an acceptable level by secondary treating the wastewater effluent in an AWTS and irrigating the LAA via subsurface driplines in a Raised Sand Bed. There is low risk of wastewater effluent exiting the site.

WASTEWATER SYSTEM DESIGN:

It is proposed to secondary treat the effluent in an Aerated Wastewater Treatment System (AWTS), and to apply the effluent into a Raised Sand Bed Land Application Area (LAA) (to be constructed).

The LAA / Raised Sand Bed will need to be a minimum of 120m^2 in area, based on the following calculations:

3-bedroom residence	5-person design loading
Tank water	120 litres / person / day
Wastewater load	600 litres / day
Design Irrigation Rate (DIR)	5mm/day (secondary treated effluent into sand bed)
Size of the LAA / Raised Sand Beds	600/5 = 120m^2

The AWTS will collect all the residential wastewater. The secondary treated effluent will then be disposed of through subsurface drip-line irrigation in the sand filled bed. A minimum of 600mm depth of sandy fill will need to be added to the site – over the entire LAA. The 120m^2 of LAA is conditional on adding a minimum of 600mm of sand to the site. Without 600mm of sand added to the site the development cannot proceed.

The bed will be irrigated utilising shallow subsurface, pressure compensating drip-lines, spaced at 600mm intervals. The LAA will be covered with topsoil and planted with grass.

Timber (treated pine 200mm x 75mm) retaining walls will be installed, and should be lined with "Fortecon" plastic or a similar waterproof membrane to assist with retaining the sand and to prevent sideways seepage of the effluent.

There is very limited available land for the LAA when setback distances are considered. If the system requires remediation in the future, it will be necessary to remove the sand fill and to reinstall the LAA.

It is recommended to utilize as little water as possible on this site to reduce the volume of effluent requiring disposal. Installing low volume water fixtures (toilets, taps and shower heads, and a low volume front loading washing machine) is recommended, and it is further recommended not to have a bath in the residence.

A minimum 3.75m setback from the LAA to the residence is required.

The LAA (Raised Sand Bed) should be constructed as per the following specifications:

- Establishment and maintenance of a minimum of 120m^2 of irrigation area.
- The area will consist of sub-surface irrigation under designated lawn in the 120m^2, retained terraced bed.
- Subsurface drainage should be installed through the base of the retaining structures to permit subsurface seepage of water and to stop the build up of water behind the retaining structure.

- A 300mm thick 'Apron' of sandy fill should be installed downslope from the lower, southern retaining wall, battered down to natural ground. Water tolerant plants and grass should be planted in the sand 'Apron' to encourage the uptake of any excess water seepage.

- Landscaping of the irrigation area is to be maintained in good order at all times. Such maintenance includes the mowing of the lawn.

- The irrigation areas are not to be used for growing vegetables.

- An approved warning sign is to be clearly positioned to inform occupants that reclaimed effluent is used for irrigation.

- The current topsoil of the LAA should be scoured / ripped to a minimum depth of 200mm.

- Gypsum should be added to the site at a rate of 1kg/m^2.

- The terraced bed should be constructed, with a minimum of 600mm of sandy fill added to the site. The retained walls should be lined with Fortecon plastic.

- The sand should meet or closely conform to the requirements of Clause N3.3.2 of AS/NZS 1547:2012 - the sand must be of medium grain size in the range of 0.25-1.0mm, and be free of clay, limestone, and organic matter.

- The drip lines should be placed 100mm into the sandy fill.

- The drip lines must be rated for use with wastewater (pressure compensated), and organized to cover the entire 120m^2 LAA @ 600mm spacings.

- The sandy topsoil fill should be grassed down.

- A Vacuum Breaker Valve should be provided at the high point of the LAA, and placed in a valve box to enable inspection.

- A Flush Valve should be provided for the LAA, with piping returning the flush water to the treatment plant. The Flush Valve will be installed in a valve box to allow inspection and servicing.

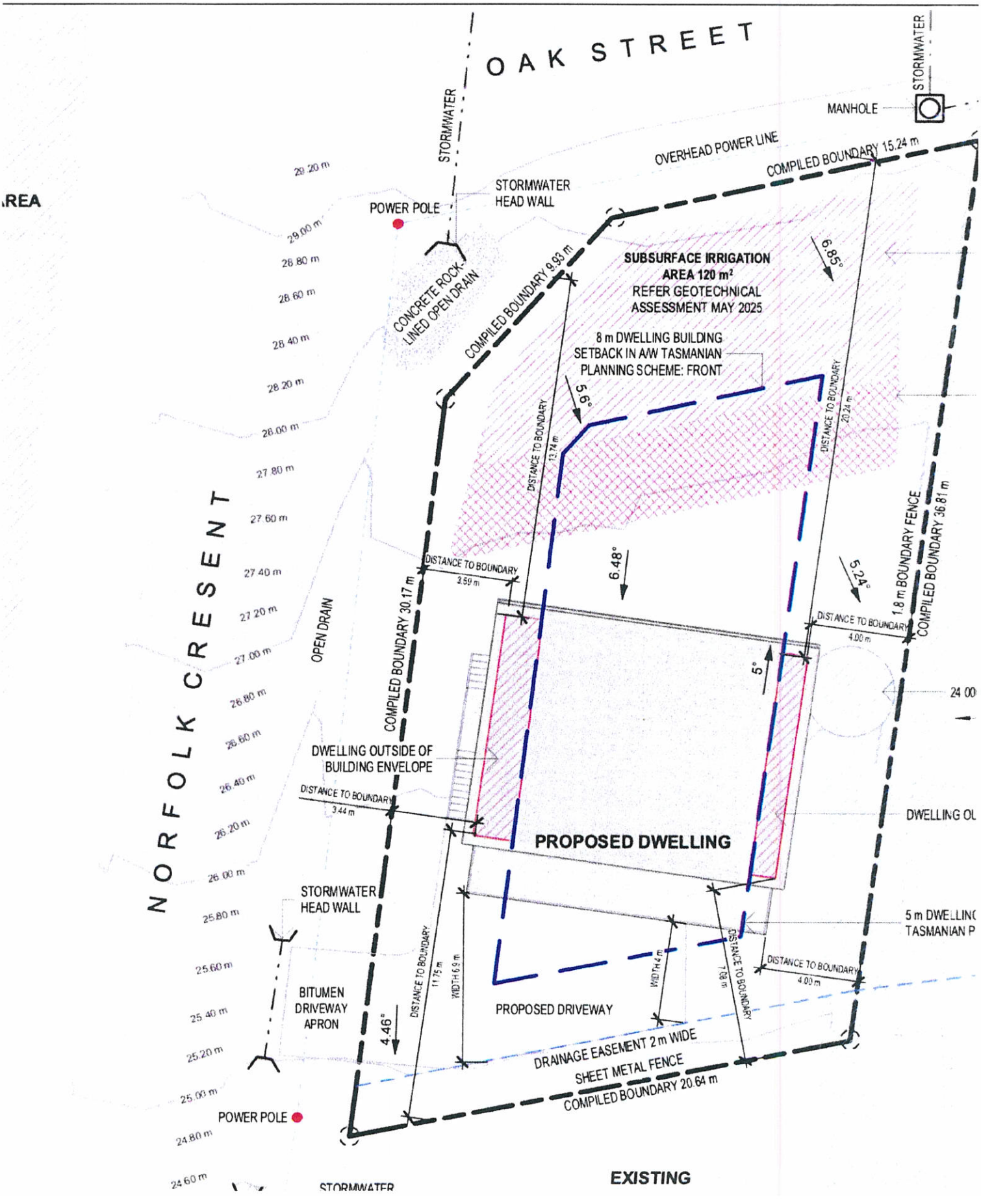
- An inline strainer (150-200 mesh) is to be installed to prevent solids from entering the irrigation system.

- An ag-drain (700mm deep and 300mm wide) should be installed immediately downslope from the sand bed (upslope from the residence), discharging to the open drain on the eastern side of Norfolk Crescent (see plan and cross-section).

- An ag-drain (600mm deep and 300mm wide) should be installed immediately upslope from the sand bed, discharging to the open drain on the eastern side of Norfolk Crescent (see plan and cross-section).

Peter Hofto

Rock Solid Geotechnics Pty Ltd

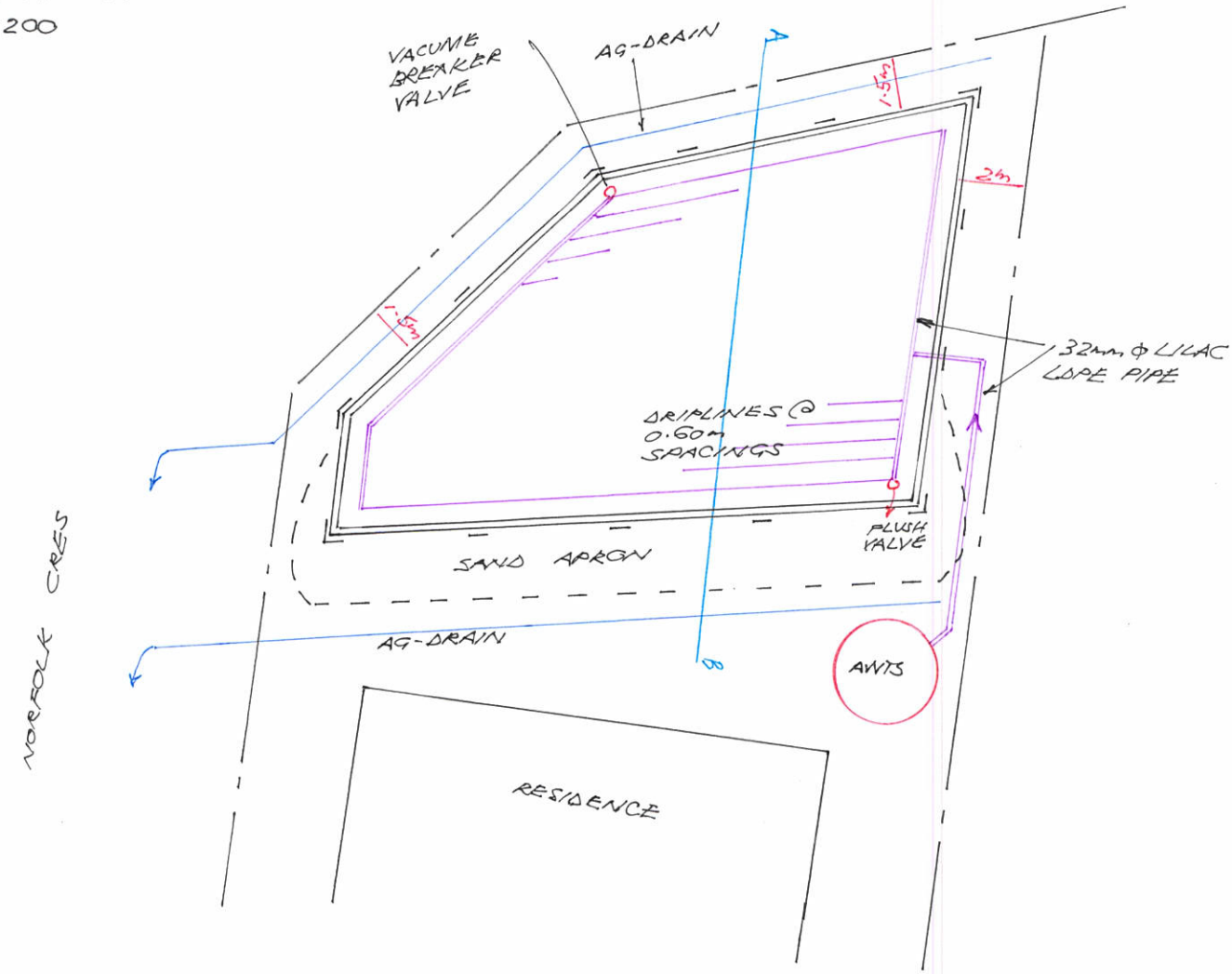

OAK STREET
NORFOLK CRESENT
STORMWATER
MANHOLE
OVERHEAD POWER LINE
COMPILED BOUNDARY 15.24 m
POWER POLE
STORMWATER HEAD WALL
CONCRETE ROCK-LINED OPEN DRAIN
COMPILED BOUNDARY 9.93 m
SUBSURFACE IRRIGATION AREA 120 m²
REFER GEOTECHNICAL ASSESSMENT MAY 2025
8 m DWELLING BUILDING SETBACK IN A/W TASMANIAN PLANNING SCHEME: FRONT
6.85°
5.6°
6.48°
5.24°
5°
4.46°
DISTANCE TO BOUNDARY 13.74 m
DISTANCE TO BOUNDARY 20.24 m
DISTANCE TO BOUNDARY 3.59 m
DISTANCE TO BOUNDARY 4.00 m
COMPILED BOUNDARY 30.17 m
1.8 m BOUNDARY FENCE
COMPILED BOUNDARY 36.81 m
OPEN DRAIN
DWELLING OUTSIDE OF BUILDING ENVELOPE
DISTANCE TO BOUNDARY 3.44 m
PROPOSED DWELLING
STORMWATER HEAD WALL
BITUMEN DRIVEWAY APRON
DISTANCE TO BOUNDARY 11.75 m
WIDTH 6.9 m
PROPOSED DRIVEWAY
WIDTH 4 m
DISTANCE TO BOUNDARY 7.08 m
DISTANCE TO BOUNDARY 4.00 m
DRAINAGE EASEMENT 2 m WIDE
SHEET METAL FENCE
COMPILED BOUNDARY 20.64 m
POWER POLE
EXISTING
29.20 m
29.00 m
28.80 m
28.60 m
28.40 m
28.20 m
28.00 m
27.80 m
27.60 m
27.40 m
27.20 m
27.00 m
26.80 m
26.60 m
26.40 m
26.20 m
26.00 m
25.80 m
25.60 m
25.40 m
25.20 m
25.00 m
24.80 m
24.60 m


1:200
N
OAK STREET
AG DRAIN
1.5m
1.5m
2m
120m²
LAA
SAND AARON
AG-DRAIN
AWTS
RESIDENCE
NORFOLK AVE

N

OAK ST

PLAN AA
1:200



CROSS-SECTION
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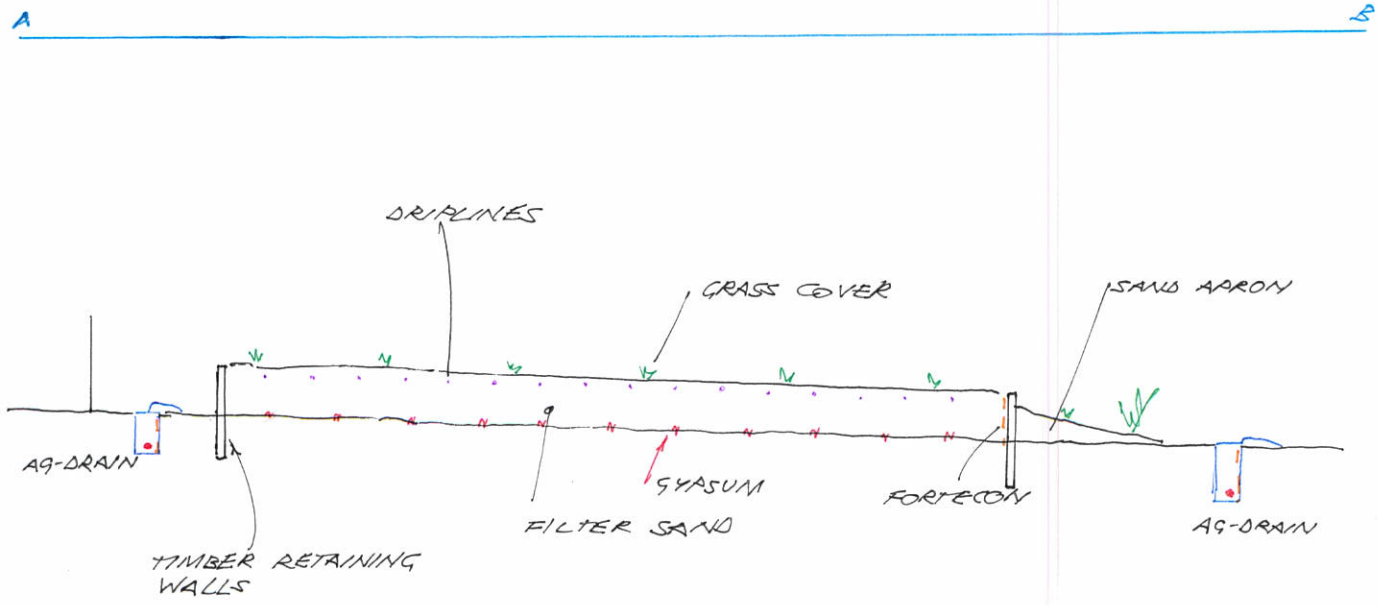
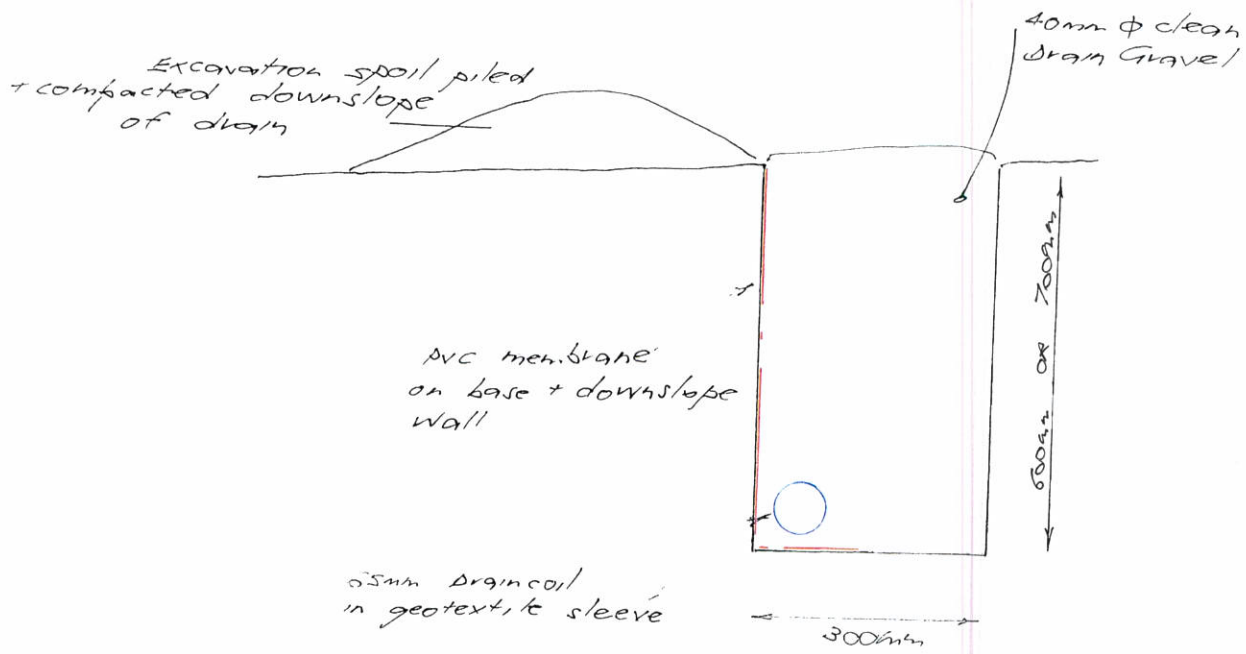


PLAN

AG - DRAIN



SITE AND SOIL EVALUATION REPORT

Soil Category: (as stated in AS/NZS 1547-2000) 1,…2,…3,…4,…5,…6	Modified Emerson Test Required If Yes, Emerson Class No.	No
Measured or Estimated Soil Permeability (m/d):	<0.06m/d	
Design Loading Rate: (mm/d)	Design Loading Rate (DLR)	5 mm/day – into Sand Bed
Geology:	Jurassic dolerite.	

Slope:	6-7 degrees to the south
Drainage lines / water courses:	Nil
Vegetation:	Grass
Site History: (land use)	Unknown
Aspect:	South
Pre-dominant wind direction:	Northwest to southwest
Site Stability: Will on-site wastewater disposal affect site stability?	No
Is geological advice required?	No
Drainage/Groundwater:	Not encountered
Depth to seasonal groundwater (m):	Not Encountered
Are surface or sub-surface drains required upslope of the land application area	No – roadside drains will suffice.
Primary and Reserve Land Application Area:	
Water Supply:	
☑ Rainwater Tanks	
Date of Site Evaluation:	20/5/2025

APPENDIX 5

ROCK SOLID GEOTECHNICS PTY LTD
Peter Hofto
163 Orielton Rd
Orielton
TAS 7172
0417960769
peter@rocksolidgeotechnics.com.au

James Jordan
jacjespenn@gmail.com

4/9/2025

Loading Certificate for Onsite Wastewater System - 22 Oak Street, Primrose Sands

1 System Capacity: (medium/long term)

- 3-bedroom residence, 5 persons total / 600 litres/day

2 Design Criteria Summary:

- Secondary Treated Effluent — Aerated Wastewater Treatment System (AWTS)
- Soil Category — Class 6 CLAY
- Land Application System — 120m^2 Raised Sand Bed

3 Reserve Area:

- Not available – remediation will require removal and reinstatement of the sand bed.

4 Variation from design flows etc:

- The system should successfully assimilate additional peak loadings which may result from occasional social gatherings provided that this does not exceed use by more than 8 persons in a 24-hour period, or more than 1 temporary resident visitor (ie. up to 6 persons total) for a period not exceeding 2 days. Visitors should be advised of the requirement to minimise time spent in showers, not unduly running taps, and other common sense water conservation measures.

5 Consequences of overloading the system:

- Long term use by more than 5 residents or equivalent may result in overloading of the system, surfacing of effluent, public and environmental health nuisances, pollution of surface water etc.

6 Consequences of under-loading the system:

- The system will work effectively with as few as 1-person in the residence, however long periods of zero occupancy may result in poor functioning of the system when normal use recommences. If the building is left unoccupied for more than one month, it is advised to inform the maintenance contractor.

7 Consequences of lack of operation, maintenance and monitoring attention:

- The AWTS must be maintained by a contracted maintenance provider.

Peter Hofto
Rock Solid Geotechnics Pty Ltd

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

Form 35

To: Mr James Jordan *Owner name*

Address

jacjespenn@gmail.com *Suburb/postcode*

Designer details:

Name: Peter Hofto

Category: Building Services Designer Hydraulic - Restricted

Business name: Rock Solid Geotechnics P/L

Phone No: 0417960769

Business address: 163 Orielton Road

Orielton 7172

Fax No:

Licence No: CC6159I

Email address: peter@rocksolidgeotechnics.com.au

Details of the proposed work:

Owner/Applicant Mr James Jordan

Designer's project reference No. GEOTECH 25-067a

Address: 22 Oak Street, Primrose Sands

Lot No:

Type of work: Building work ☐ Plumbing work X *(X all applicable)*

Description of work:

ONSITE WASTEWATER MANAGEMENT SYSTEM

(new building / alteration / addition / repair / removal / re-erection water / sewerage / stormwater / on-site wastewater management system / backflow prevention / other)

Description of the Design Work (Scope, limitations or exclusions): *(X all applicable certificates)*

Certificate Type:	Certificate	Responsible Practitioner
	☐ Building design	Architect or Building Designer
	☐ Structural design	Engineer or Civil Designer
	☐ Fire Safety design	Fire Engineer
	☐ Civil design	Civil Engineer or Civil Designer
	X Hydraulic design	Building Services Designer
	☐ Fire service design	Building Services Designer
	☐ Electrical design	Building Services Designer
	☐ Mechanical design	Building Service Designer
	Plumbing design	Plumber-Certifier; Architect, Building Designer or Engineer
	☐ Other (specify)	

Deemed-to-Satisfy: X Performance Solution: *(X the appropriate box)*

Other details:

Design documents provided:

The following documents are provided with this Certificate –

Document description:

Drawing numbers:	Prepared by: ROCK SOLID GEOTECHNICS	Date: 4/9/2025
Schedules:	Prepared by:	Date:
Specifications:	Prepared by: ROCK SOLID GEOTECHNICS	Date: 4/9/2025
Computations:	Prepared by: ROCK SOLID GEOTECHNICS	Date: 4/9/2025
Performance solution proposals:	Prepared by:	Date:
Test reports:	Prepared by:	Date:

Standards, codes or guidelines relied on in design process:

AS 1547:2021 On-site domestic wastewater management

Director's Guidelines for Onsite Wastewater Management

Any other relevant documentation:

Attribution as designer:

I Peter Hofto – ROCK SOLID GEOTECHNICS P/L ..... am responsible for the design of that part of the work as described in this certificate;

The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the *Building Act 2016* and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act;

This certificate confirms compliance and is evidence of suitability of this design with the requirements of the National Construction Code.

	Name: (print)	*Signed*	*Date*
Designer:	Peter Hofto		4/9/2025
Licence No:	CC6159I		

Assessment of Certifiable Works: (TasWater)

Note: single residential dwellings and outbuildings on a lot with an existing sewer connection are not considered to increase demand and are not certifiable.

If you cannot check ALL of these boxes, LEAVE THIS SECTION BLANK.

TasWater must then be contacted to determine if the proposed works are Certifiable Works.

I confirm that the proposed works are not Certifiable Works, in accordance with the Guidelines for TasWater CCW Assessments, by virtue that all of the following are satisfied:

- [x] The works will not increase the demand for water supplied by TasWater
- [x] The works will not increase or decrease the amount of sewage or toxins that is to be removed by, or discharged into, TasWater's sewerage infrastructure
- [x] The works will not require a new connection, or a modification to an existing connection, to be made to TasWater's infrastructure
- [x] The works will not damage or interfere with TasWater's works
- [x] The works will not adversely affect TasWater's operations
- [x] The works are not within 2m of TasWater's infrastructure and are outside any TasWater easement
- [x] I have checked the LISTMap to confirm the location of TasWater infrastructure
- [x] If the property is connected to TasWater's water system, a water meter is in place, or has been applied for to TasWater.

Certification:

I .....Peter Hofto – ROCK SOLID GEOTECHNICS P/L..... being responsible for the proposed work, am satisfied that the works described above are not Certifiable Works, as defined within the *Water and Sewerage Industry Act 2008,* that I have answered the above questions with all due diligence and have read and understood the Guidelines for TasWater CCW Assessments.

Note: The Guidelines for TasWater Certification of Certifiable Works Assessments are available at: www.taswater.com.au

	Name: (print)	*Signed*	*Date*
Designer:	Peter Hofto		4/9/2025

22 OAK ST, PRIMROSE SANDS TASMANIA 7173

PROPERTY ID: 5948431
TITLE REFERENCE: 5525/40
LOT SIZE: 671 m²

PLANNING SCHEME OVERLAYS

TASMANIAN PLANNING SCHEME
SORELL
10 Low Density Residential 100%
SOR-S2.0 Sorell Local Provisions Schedule, Specific Area Plan: Southern Beaches On-site Waste Water and Stormwater Management Specific Area Plan 100%
Flood-Prone Areas

SITE COVERAGE

LOT SIZE: 671 m²
DWELLING: 110 m²
DECK AND LANDINGS 32 m²
TOTAL 142 m²

ROOF AREA: 130.3 m²
SITE COVERAGE: 19.4%

SURVEY DATA:
Survey Plus: 8 Amy Street,
Moonah Tas 7009
21 June 2023
Project No.: SP251900-01 A

GEOTECHNICAL DATA:
Rock Solid Geotechnics Pty Ltd
163 Orielton Rd,
Orielton Tas 7172.
24/5/2025

Sorell Council
Development Application: S.2025.240.1 - Response to Request For Information - 22 Oak Street, Primrose Sands - P2.pdf
Plans Reference: P2
Date Received: 29/09/2025

LANDSLIP HAZARD
BUSHFIRE-PRONE AREA
BUILDING ENVELOPE
PROPOSED WATER TANK
PROPOSED DWELLING
DWELLING OUTSIDE OF BUILDING ENVELOPE
DWELLING OUTSIDE OF BUILDING ENVELOPE
FLOOD-PRONE AREA

OAK STREET
NORFOLK CRESENT
LINDEN ROAD

SOURCE: google.com.au

DRAWING LIST

PD01	LOCATION PLAN	24/09/2025
PD02	SITE PLAN	24/09/2025
PD03	DWELLING FLOOR PLAN	24/09/2025
PD04	DWELLING ELEVATIONS 1	24/09/2025
PD05	DWELLING ELEVATIONS 2	24/09/2025

1 A08 LOCATION PLAN
1 : 500

0 m 5 10 15 20 30 40 50 m

N

DRAWINGS TO BE PRINTED & READ IN FULL COLOUR

No.	Description	Date
A	Issue A	02/07/2025
B	Issue B Client corrections	10/07/2025
C	Issue C: reconfigure floor plan	08/08/2025
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E	Issue E: RFIs	24/09/2025

MICHAEL KINSELLA
INTEGRAL DESIGN & DRAFTING SERVICES
ACCREDITED BUILDING PRACTITIONER
ACCREDITATION: CC5699V
ACCREDITED BUSHFIRE PRACTITIONER
ACCREDITATION: BFP-133
BUILDING DESIGNERS ASSOCIATION OF AUSTRALIA

O Thomson

PROPOSED RESIDENCE

22 Oak Street, Primrose Sands Tas 7173

LOCATION PLAN

Project number	2025_019_NH
Date	30 JUNE 2025
Designed by	NEAThouse
Drawn by	KBJ

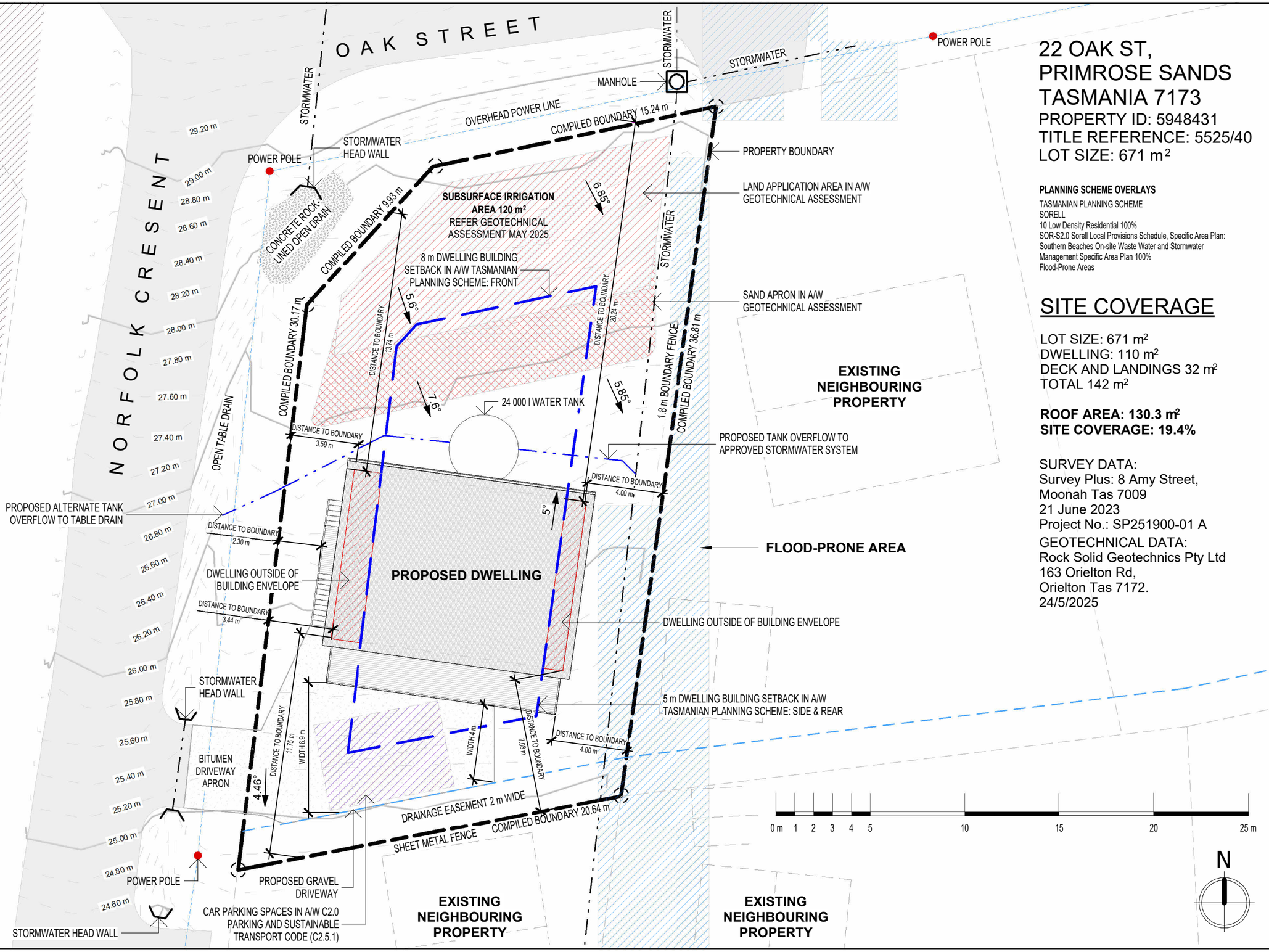
PD01 **ISSUE E**
PD - NOT FOR CONSTRUCTION
Scale As indicated @ A3

INTEGRAL DESIGN & DRAFTING SERVICES * (0403)390-602 * mk@idds.com.au * WEST HOBART, TAS 7000 * ABN: 26 166 056 599

LANDSLIP HAZARD

BUSHFIRE-PRONE AREA

Sorell Council
Development Application: 5.2025.240.1 - Response to Request For Information - 22 Oak Street, Primrose Sands - P2.pdf
Plans Reference: P2
Date Received: 29/09/2025



1 / A08 **SITE PLAN**
1 : 200

22 OAK ST, PRIMROSE SANDS TASMANIA 7173

PROPERTY ID: 5948431
TITLE REFERENCE: 5525/40
LOT SIZE: 671 m²

PLANNING SCHEME OVERLAYS
TASMANIAN PLANNING SCHEME
SORELL
10 Low Density Residential 100%
SOR-S2.0 Sorell Local Provisions Schedule, Specific Area Plan: Southern Beaches On-site Waste Water and Stormwater Management Specific Area Plan 100%
Flood-Prone Areas

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DWELLING: 110 m²
DECK AND LANDINGS 32 m²
TOTAL 142 m²

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Project No.: SP251900-01 A
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ACCREDITATION: BFP-133
BUILDING DESIGNERS ASSOCIATION OF AUSTRALIA

O Thomson

PROPOSED RESIDENCE

22 Oak Street, Primrose Sands Tas 7173

SITE PLAN

Project number	2025_019_NH	PD02	ISSUE E
Date	30 JUNE 2025	PD - NOT FOR CONSTRUCTION	
Designed by	NEAThouse		
Drawn by	KBJ	Scale	As indicated @ A3

INTEGRAL DESIGN & DRAFTING SERVICES * (0403)390-602 * mk@idds.com.au * WEST HOBART, TAS 7000 * ABN: 26 166 056 599

LEGEND

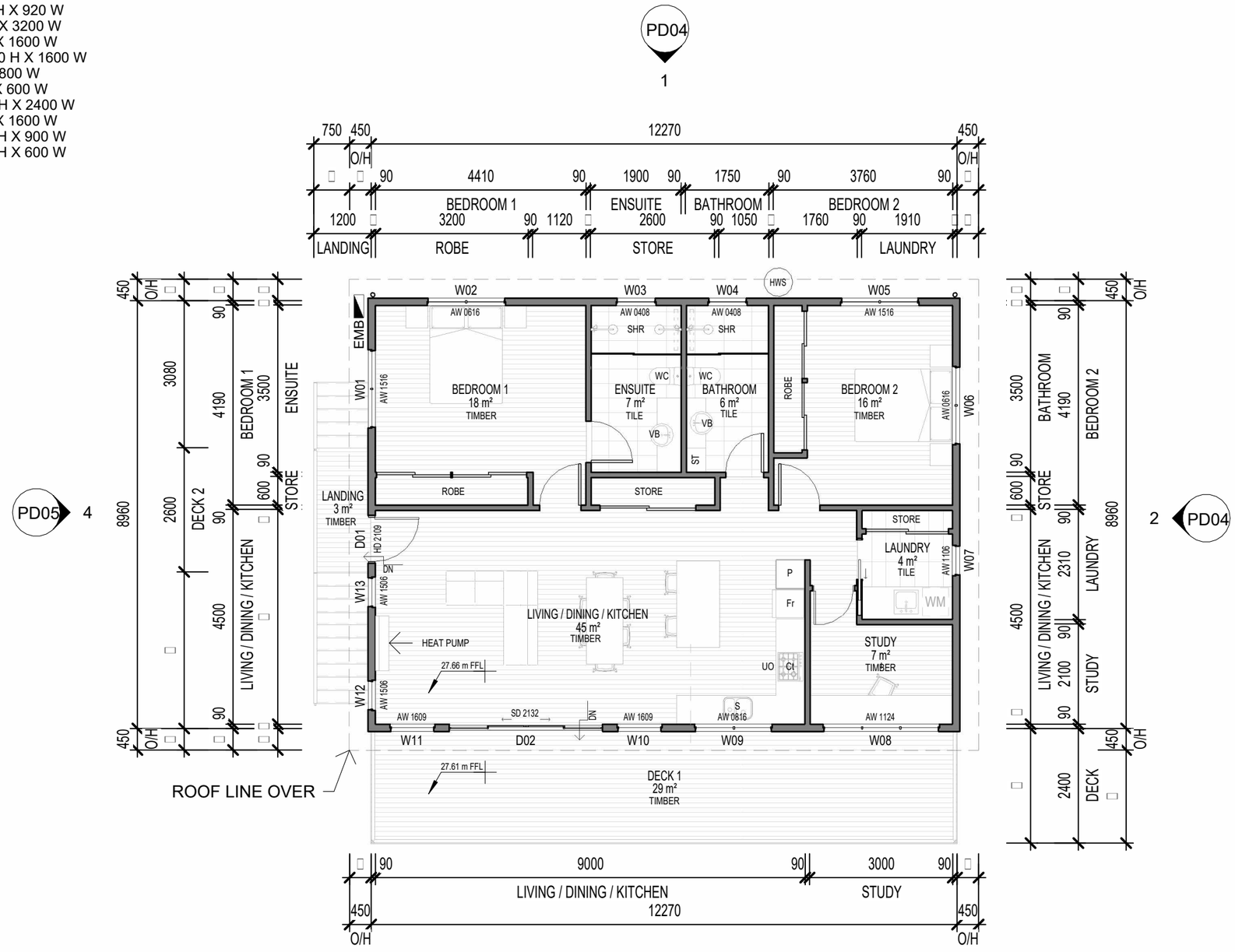
	90mm TIMBER STUD WALL
HD 2109	DOUBLE-GLAZED HINGED ENTRY DOOR 2100 H X 920 W
SD 2132	DOUBLE-GLAZED SLIDING DOOR FXXF 2100 H X 3200 W
AW 0616	DOUBLE-GLAZED AWNING WINDOW AA 600 H X 1600 W
AW 1516	DOUBLE-GLAZED AWNING WINDOW AA/FF 1500 H X 1600 W
AW 0408	DOUBLE-GLAZED AWNING WINDOW A 400 H X 800 W
AW 1106	DOUBLE-GLAZED AWNING WINDOW A 1100 H X 600 W
AW 1124	DOUBLE-GLAZED AWNING WINDOW AAA 1100 H X 2400 W
AW 0816	DOUBLE-GLAZED AWNING WINDOW AA 800 H X 1600 W
AW 1609	DOUBLE-GLAZED AWNING WINDOWS AF 1600 H X 900 W
AW 1506	DOUBLE-GLAZED AWNING WINDOWS AF 1500 H X 600 W
HWS	HOT WATER SERVICE
EMB	ELECTRICITY METER BOX
FFL	FINISHED FLOOR LEVEL

FLOOR AREA

DWELLING	110 m²
DECK 1	29 m²
LANDING	3 m²
TOTAL	142 m²

ROOMS

BATHROOM	6 m²
BEDROOM 1	18.5 m²
BEDROOM 2	15.5 m²
DECK 1	28.8 m²
ENSUITE	6.5 m²
LANDING	3 m²
LAUNDRY	4.3 m²
LIVING / DINING / KITCHEN	44.6 m²
STUDY	6.9 m²



Sorell Council

Development Application: 5.2025.240.1 - Response to Request For Information - 22 Oak Street, Primrose Sands - P2.pdf
Plans Reference: P2
Date Received: 29/09/2025

1 A08 DWELLING FLOOR PLAN

1 : 100

DRAWINGS TO BE PRINTED & READ IN FULL COLOUR

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ACCREDITATION: BFP-133
BUILDING DESIGNERS ASSOCIATION OF AUSTRALIA

O Thomson

PROPOSED RESIDENCE

22 Oak Street, Primrose Sands Tas 7173

DWELLING FLOOR PLAN

Project number	2025_019_NH
Date	30 JUNE 2025
Designed by	NEAThouse
Drawn by	KBJ

PD03 **ISSUE E**

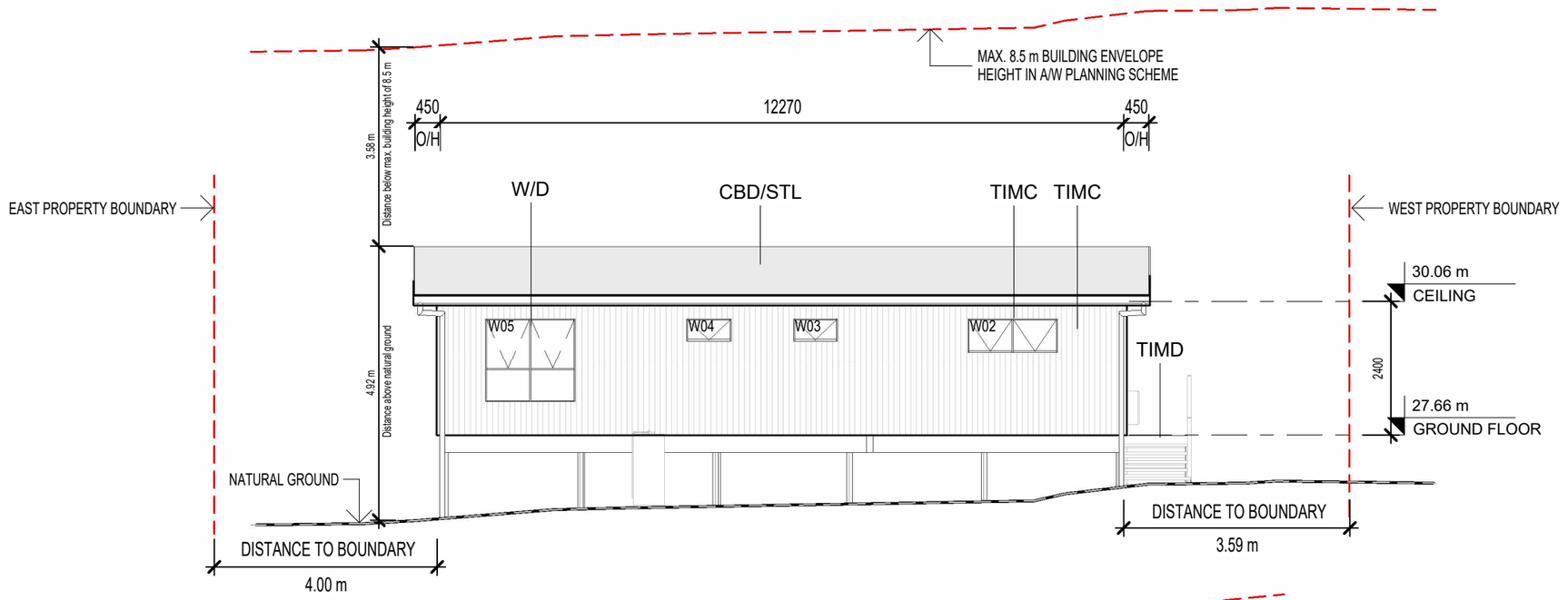
PD - NOT FOR CONSTRUCTION

Scale 1 : 100 @ A3

INTEGRAL DESIGN & DRAFTING SERVICES * (0403)390-602 * mk@idds.com.au * WEST HOBART, TAS 7000 * ABN: 26 166 056 599

FINISHES LEGEND

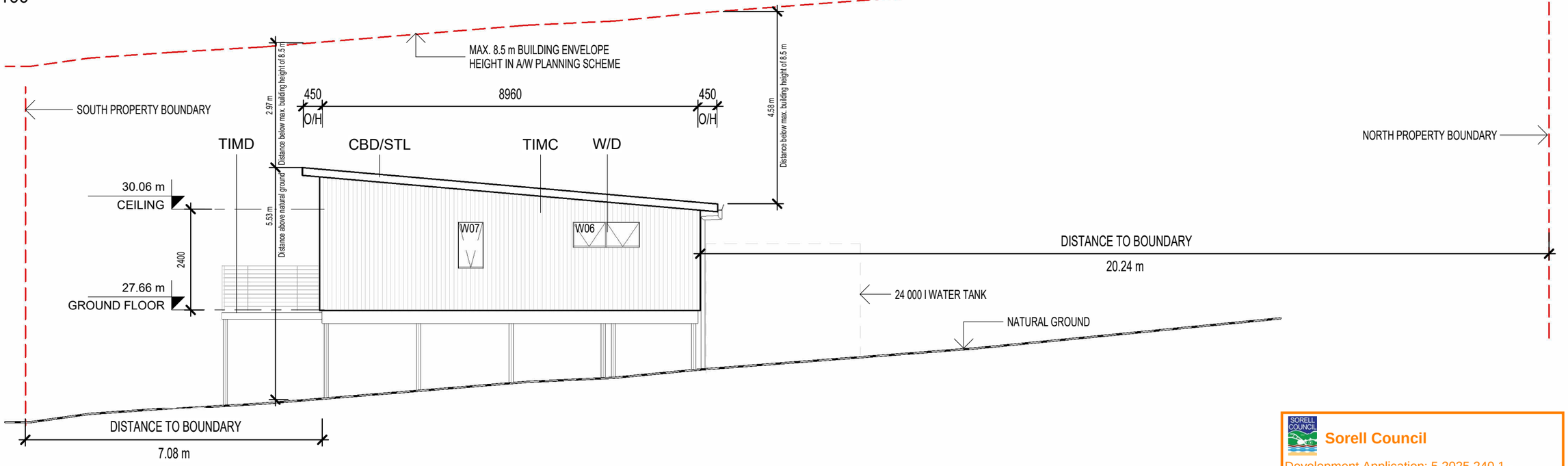
CBD/STL	COLORBOND STEEL CUSTOM ORB ROOF SHEETING IN "MONUMENT" FINISH
TIMC	TIMBER CLADDING IN "SPOTTED GUM" WITH OIL FINISH
TIMD	TIMBER DECKING AS SELECTED
W/D	DOUBLE-GLAZED WINDOWS AND DOORS IN MATT COLORBOND "MONUMENT" FINISH



1 PD03

NORTH ELEVATION

1 : 100



2 PD03

EAST ELEVATION

1 : 100

Sorell Council

Development Application: 5.2025.240.1 - Response to Request For Information - 22 Oak Street, Primrose Sands - P2.pdf
Plans Reference: P2
Date Received: 29/09/2025

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ACCREDITED BUSHFIRE PRACTITIONER
ACCREDITATION: BFP-133
BUILDING DESIGNERS ASSOCIATION OF AUSTRALIA

O Thomson

PROPOSED RESIDENCE

22 Oak Street, Primrose Sands Tas 7173

DWELLING ELEVATIONS 1

Project number	2025_019_NH
Date	30 JUNE 2025
Designed by	NEAThouse
Drawn by	KBJ

PD04 **ISSUE E**

PD - NOT FOR CONSTRUCTION

Scale 1 : 100 @ A3

INTEGRAL DESIGN & DRAFTING SERVICES * (0403)390-602 * mk@idds.com.au * WEST HOBART, TAS 7000 * ABN: 26 166 056 599

FINISHES LEGEND

CBD/STL	COLORBOND STEEL CUSTOM ORB ROOF SHEETING IN "MONUMENT" FINISH
TIMC	TIMBER CLADDING IN "SPOTTED GUM" WITH OIL FINISH
TIMD	TIMBER DECKING AS SELECTED
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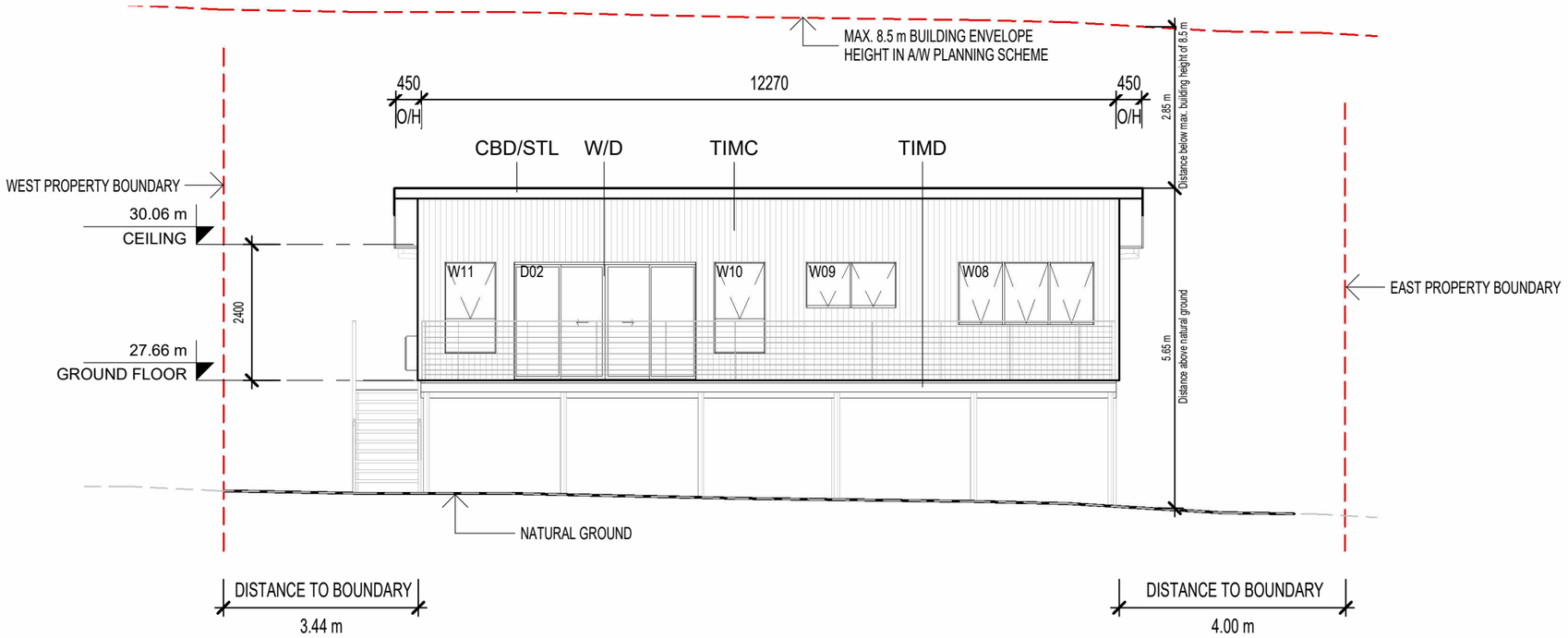
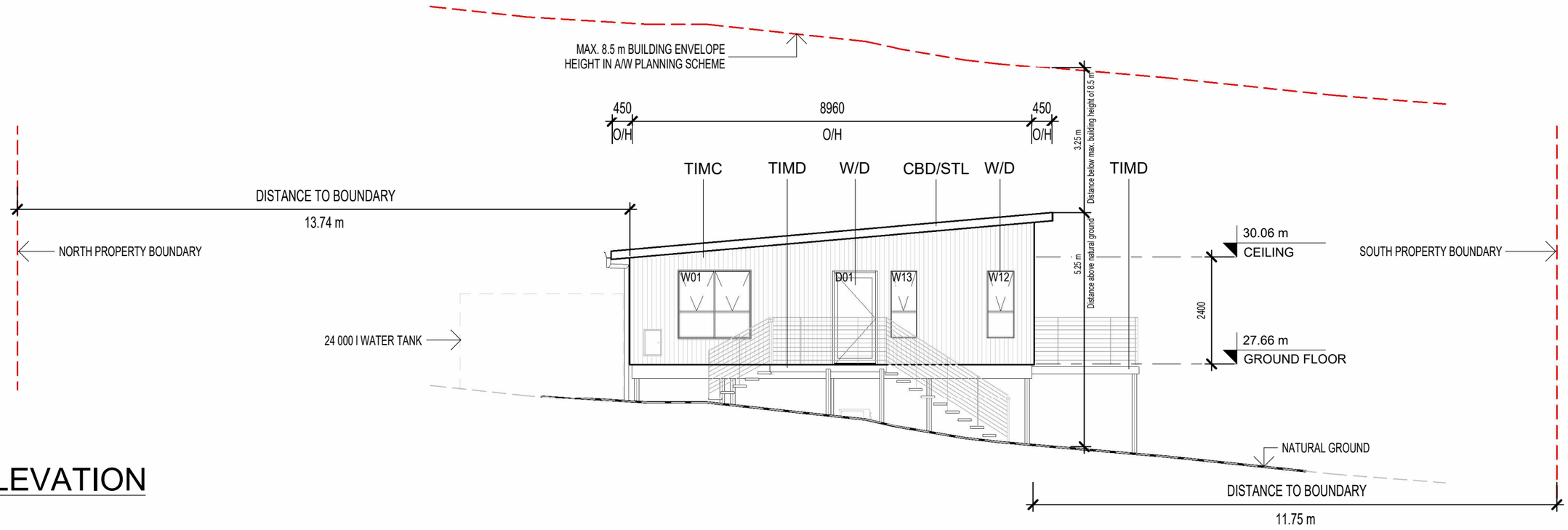


3 PD03

SOUTH ELEVATION

1 : 100



4 A07

WEST ELEVATION

1 : 100

DRAWINGS TO BE PRINTED & READ IN FULL COLOUR

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MICHAEL KINSELLA
INTEGRAL DESIGN & DRAFTING SERVICES
ACCREDITED BUILDING PRACTITIONER
ACCREDITATION: CC5699V
ACCREDITED BUSHFIRE PRACTITIONER
ACCREDITATION: BFP-133
BUILDING DESIGNERS ASSOCIATION OF AUSTRALIA

O Thomson

PROPOSED RESIDENCE

22 Oak Street, Primrose Sands Tas 7173

DWELLING ELEVATIONS 2

Project number	2025_019_NH
Date	30 JUNE 2025
Designed by	NEAThouse
Drawn by	KBJ

PD05 **ISSUE E**

PD - NOT FOR CONSTRUCTION

Scale 1 : 100 @ A3

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