



DEVELOPMENT APPLICATION

PDPLANPMTD-2025/056183

PROPOSAL: Dwelling

LOCATION: 7 Intrigue Court, Tranmere

RELEVANT PLANNING SCHEME: Tasmanian Planning Scheme - Clarence

ADVERTISING EXPIRY DATE: 22 December 2025

The relevant plans and documents can be inspected at the Council offices, 38 Bligh Street, Rosny Park, during normal office hours until 22 December 2025. In addition to legislative requirements, plans and documents can also be viewed at www.ccc.tas.gov.au during these times.

Any person may make representations about the application to the Chief Executive Officer, by writing to PO Box 96, Rosny Park, 7018 or by electronic mail to clarence@ccc.tas.gov.au. Representations must be received by Council on or before 22 December 2025.

To enable Council to contact you if necessary, would you please also include a day time contact number in any correspondence you may forward.

Any personal information submitted is covered by Council's privacy policy, available at www.ccc.tas.gov.au or at the Council offices.

Clarence City Council



APPLICATION FOR DEVELOPMENT / USE OR SUBDIVISION

The personal information on this form is required by Council for the development of land under the Land Use Planning and Approvals Act 1993. We will only use your personal information for this and other related purposes. If this information is not provided, we may not be able to deal with this matter. You may access and/or amend your personal information at any time. How we use this information is explained in our **Privacy Policy**, which is available at www.ccc.tas.gov.au or at Council offices.

Proposal:

Location:
Address.....
Suburb/Town Postcode

Current Owners/s:
Applicant:

Personal Information Removed

Tax Invoice for application fees to be in the name of: (if different from applicant)

Estimated cost of development

Is the property on the Tasmanian Heritage Register? Yes No

(if yes, we recommend you discuss your proposal with Heritage Tasmania prior to lodgement as exemptions may apply which may save you time on your proposal)

If you had pre-application discussions with a Council Officer, please give their name

Current Use of Site:

Does the proposal involve land administered or owned by the Crown or Council?

Yes

No

Declaration:

- *I have read the Certificate of Title and Schedule of Easements for the land and am satisfied that this application is not prevented by any restrictions, easements or covenants.*
- *I authorise the provision of a copy of any documents relating to this application to any person for the purposes of assessment or public consultation. I agree to arrange for the permission of the copyright owner of any part of this application to be obtained. I have arranged permission for Council's representatives to enter the land to assess this application*
- *I declare that, in accordance with Section 52 of the Land Use Planning and Approvals Act 1993, that I have notified the owner of the intention to make this application. Where the subject property is owned or controlled by Council or the Crown, their signed consent is attached. Where the application is submitted under Section 43A, the owner's consent is attached.*
- *I declare that the information in this declaration is true and correct.*

Acknowledgement:

- *I 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 consultation; 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.*

Applicant's
Signature:

**Personal Information
Removed**

Date 08.10.25

**PLEASE REFER TO THE DEVELOPMENT/USE AND SUBDIVISION CHECKLIST
ON THE FOLLOWING PAGES TO DETERMINE WHAT DOCUMENTATION MUST
BE SUBMITTED WITH YOUR APPLICATION.**

Documentation required:

1. **MANDATORY DOCUMENTATION**

This information is required for the application to be valid. An application lodged without these items is unable to proceed.

- Details of the location of the proposed use or development.
- A copy of the current Certificate of Title, Sealed Plan, Plan or Diagram and Schedule of Easements and other restrictions for each parcel of land on which the use or development is proposed.
- Full description of the proposed use or development.
- Description of the proposed operation.
May include where appropriate: staff/student/customer numbers; operating hours; truck movements; and loading/unloading requirements; waste generation and disposal; equipment used; pollution, including noise, fumes, smoke or vibration and mitigation/management measures.
- Declaration the owner has been notified if the applicant is not the owner.
- Crown or Council consent (if publically-owned land).
- Any reports, plans or other information required by the relevant zone or code.
- Fees prescribed by the Council.

Application fees (please phone 03 6217 9550 to determine what fees apply). An invoice will be emailed upon lodgement.

2. **ADDITIONAL DOCUMENTATION**

In addition to the mandatory information required above, Council may, to enable it to consider an application, request further information it considers necessary to ensure that the proposed use or development will comply with any relevant standards and purpose statements in the zone, codes or specific area plan, applicable to the use or development.

- Site analysis plan and site plan**, including where relevant:
 - *Existing and proposed use(s) on site.*
 - *Boundaries and dimensions of the site.*
 - *Topography, including contours showing AHD levels and major site features.*
 - *Natural drainage lines, watercourses and wetlands on or adjacent to the site.*
 - *Soil type.*
 - *Vegetation types and distribution, and trees and vegetation to be removed.*
 - *Location and capacity of any existing services or easements on/to the site.*
 - *Existing pedestrian and vehicle access to the site.*
 - *Location of existing and proposed buildings on the site.*
 - *Location of existing adjoining properties, adjacent buildings and their uses.*
 - *Any natural hazards that may affect use or development on the site.*
 - *Proposed roads, driveways, car parking areas and footpaths within the site.*
 - *Any proposed open space, communal space, or facilities on the site.*
 - *Main utility service connection points and easements.*
 - *Proposed subdivision lot boundaries.*

Clarence City Council

DEVELOPMENT/USE OR SUBDIVISION CHECKLIST



- Where it is proposed to erect buildings, **detailed plans** with dimensions at a scale of 1:100 or 1:200 showing:
 - *Internal layout of each building on the site.*
 - *Private open space for each dwelling.*
 - *External storage spaces.*
 - *Car parking space location and layout.*
 - *Major elevations of every building to be erected.*
 - *Shadow diagrams of the proposed buildings and adjacent structures demonstrating the extent of shading of adjacent private open spaces and external windows of buildings on adjacent sites.*
 - *Relationship of the elevations to natural ground level, showing any proposed cut or fill.*
 - *Materials and colours to be used on rooves and external walls.*
- Where it is proposed to erect buildings, a plan of the proposed **landscaping** showing:
 - *Planting concepts.*
 - *Paving materials and drainage treatments and lighting for vehicle areas and footpaths.*
 - *Plantings proposed for screening from adjacent sites or public places.*
- Any additional reports, plans or other information required by the relevant zone or code.

This list is not comprehensive for all possible situations. If you require further information about what may be required as part of your application documentation, please contact Council's Planning Officers on (03) 6217 9550 who will be pleased to assist.

SEARCH OF TORRENS TITLE

VOLUME 141047	FOLIO 10
EDITION 6	DATE OF ISSUE 26-Jul-2025

SEARCH DATE : 22-Sep-2025

SEARCH TIME : 03.01 PM

DESCRIPTION OF LAND

City of CLARENCE

Lot 10 on Sealed Plan [141047](#)

Derivation : Part of 100 Acres, 40 Acres, 60 Acres & Gtd to J Gibson, W B Garth, & M Lackey respectively

Prior CT [139061/200](#)

SCHEDULE 1

[N270224](#) TRANSFER to RICHARD WAYNE BARNES and JEREMY TODD
PRICE Registered 26-Jul-2025 at 12.01 PM

SCHEDULE 2

Reservations and conditions in the Crown Grant if any

[SP141047](#) COVENANTS in Schedule of Easements

[SP141047](#) FENCING PROVISION in Schedule of Easements

[SP 138800](#) FENCING PROVISION in Schedule of Easements

[C469834](#) AGREEMENT pursuant to Section 71 of the Land Use Planning and Approvals Act 1993 Registered 17-Jul-2003 at 12.06 PM

[E421408](#) MORTGAGE to Australia and New Zealand Banking Group Limited Registered 26-Jul-2025 at 12.02 PM

UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

SCHEDULE OF EASEMENTS	Registered Number 141047
NOTE: THE SCHEDULE MUST BE SIGNED BY THE OWNERS & MORTGAGEES OF THE LAND AFFECTED. SIGNATURES MUST BE ATTESTED.	

PAGE 1 OF 3 PAGE/S

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.

Lot 12 on the plan is:-

Subject to a Pipeline Easement (as herein defined) for the CLARENCE CITY COUNCIL over the Pipeline Easement ~~2.00~~^{3.00} wide within such lot.

Lots 14, 15, 16, 17, 18 and 19 on the plan are each:-

Subject to a right of drainage for the CLARENCE CITY COUNCIL over such part of the drainage easement 3.00 wide shown on the plan within such lot.

Lot 19 on the plan is:-

Subject to a right of drainage (for the CLARENCE CITY COUNCIL and appurtenant to lot 401^{and 20} on Sealed Plan No. 139056) over the drainage easement 2.50 wide shown on the plan within such lot.


Lot 402 on the plan is:-

Together with a right of drainage over the drainage easement "A" shown on the plan.

Pipeline Easement means:-

The right to lay, use and maintain pipes of such size and number as may be required together with such valves, fittings and ancillary items as may be necessary through the strip of land marked pipeline easement on the plan together with the right with or without workers surveyors and others and to inspect, maintain, repair, cleanse or replace such pipes, valves, fittings and ancillary items doing as little damage as possible to the said strip of land.

(USE ANNEXURE PAGES FOR CONTINUATION)

SUBDIVIDER: Gregory James Carr (as personal representative of Albert James Carr) FOLIO REF: 139057/200 SOLICITOR & REFERENCE: Page Seager (JWH:20928)	PLAN SEALED BY: Clarence City Council DATE: <u>20 September 2004</u> SD 2004/39 REF NO.
 CORPORATE SECRETARY CLARENCE CITY COUNCIL	
NOTE: The Council Delegate must sign the Certificate for the purposes of identification.	

<p>ANNEXURE TO SCHEDULE OF EASEMENTS</p> <p>PAGE 2 OF 3 PAGES</p>	<p>Registered Number</p> <p>141047</p>
<p>SUBDIVIDER: Gregory James Carr (as personal representative of Albert James Carr) FOLIO REFERENCE: 139057/200</p>	

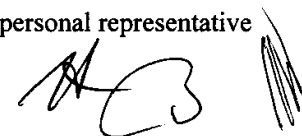
COVENANTS:-

The owner of each lot shown on the plan covenants with the Vendor (GREGORY JAMES CARR as personal representative of ALBERT JAMES CARR) and with the owner for the time being of every other lot shown on the plan to the intent that the burden of these covenants may run with and bind the covenantor's lot and every part thereof and that the benefit thereof shall be annexed to and devolve with each and every part of every other lot shown on the plan to observe the following stipulations:-

1. Not to erect more than one dwelling on such lot. Such dwelling to be for the occupation of one family.
2. Not to permit any dwelling on such lot to be divided into units for separate occupations.
3. ~~Any dwelling erected~~ ^{Not to erect other than a dwelling to} on such lot shall be used for residential purposes only and no business or trade shall be permitted on such lot PROVIDED THAT the letting of the whole of any dwelling erected on such lot shall not be in contravention of this stipulation.
4. Not to erect or permit to be erected on such lot any advertising signs of any type whatsoever PROVIDED THAT a sign indicating that such lot is for sale shall be permitted for a limited period.
5. Not to use reflective materials in the construction of any dwelling on such lot nor to erect any shed or outbuilding of anything but non-reflective materials.
6. ~~Any residential building erected~~ ^{Not to erect other than a residential building} on such lot shall be of a general brick or masonry construction but the use of timber or non-masonry materials used as in-fill panels shall be permitted PROVIDED THAT these latter materials shall not exceed thirty percent (30%) of the total external wall area.
7. No galvanised iron or other reflective material shall be used for the construction of the roof of any dwelling or other structure on such lot.
8. Not without the prior approval of the CLARENCE CITY COUNCIL to chop, lop, damage or remove any tree or trees from such lot.
9. Not to further subdivide such lot (provided that this stipulation shall not apply to a boundary adjustment).
10. ~~Any dwelling erected~~ ^{Not to erect not having} on such lot shall have a minimum floor area of not less than 160 square metres which area shall not include patios, garages or car ports.

FENCING PROVISION:-

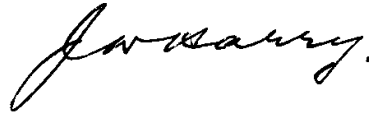
In respect of the lots shown on the plan the Vendor (GREGORY JAMES CARR as personal representative of ALBERT JAMES CARR) shall not be required to fence.

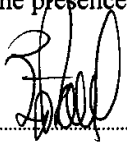


NOTE: Every annexed page must be signed by the parties to the dealing or where the party is a corporate body be signed by the persons who have attested the affixing of the seal of that body to the dealing.

ANNEXURE TO SCHEDULE OF EASEMENTS PAGE 3 OF 3 PAGES	Registered Number 141047
SUBDIVIDER: Gregory James Carr (as personal representative of Albert James Carr) FOLIO REFERENCE: 139057/200	

Signed by GREGORY JAMES CARR by his Attorney John William Harry under Power of Attorney registered no PA2512, who certifies that he has not received any notice of revocation thereof in the presence of:-



Witness: 

Name: **Emma Paul**

Address: **Clerk to Page Seager, Lawyers**

Occupation: **162 Macquarie Street**

HOBART

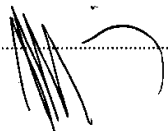
We, TASMANIAN PERPETUAL TRUSTEES LIMITED (ACN 009 475 629), as mortgagee, hereby consent to the within dealing.

THE COMMON SEAL of)
TASMANIAN PERPETUAL)
TRUSTEES LIMITED (ACN 009 475)
629) was hereunto affixed in the presence)
 of:)





Authorised Officer

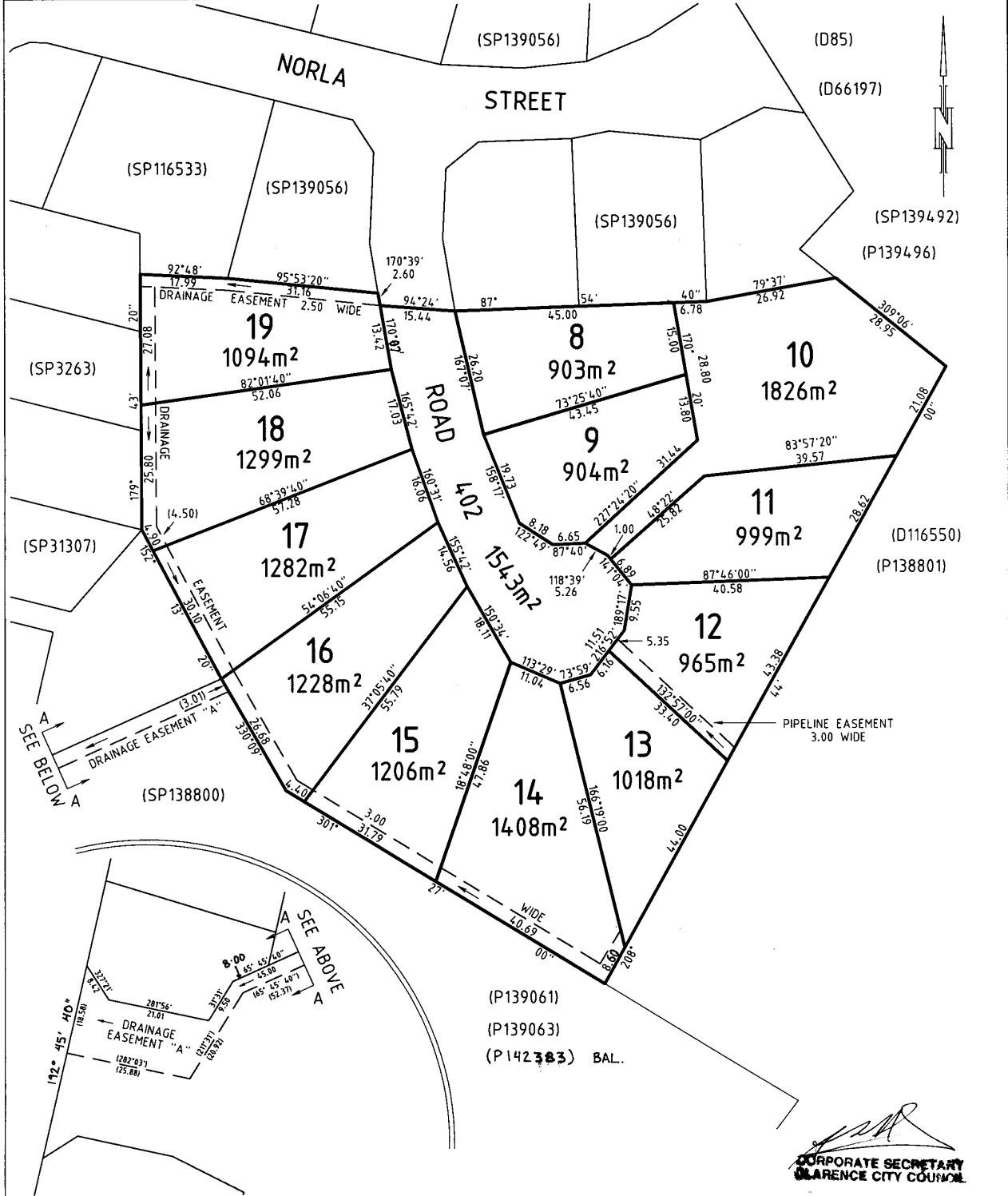


Secretary

NOTE: Every annexed page must be signed by the parties to the dealing or where the party is a corporate body be signed by the persons who have attested the affixing of the seal of that body to the dealing.

OWNER GREGORY JAMES CARR	PLAN OF SURVEY BY SURVEYOR C.M.Terry of PEACOCK, DARCEY & ANDERSON PTY LTD AUTHORISED SURVEYORS 127 BATHURST STREET, HOBART	Registered Number SP141047
FOLIO REFERENCE C.T.139061-200		APPROVED EFFECTIVE FROM 20 OCT 2004 <i>Alice Kawa</i> Recorder of Titles
GRANTEE PART OF 100 ACRES LOCATED TO JOHN GIBSON	LOCATION CITY OF CLARENCE	SCALE 1: 750 LENGTHS IN METRES Surveyors Ref E661C

MAPSHEET MUNICIPAL CODE No (5224-24) 107	LAST UPI No EZQ85	LAST PLAN No P139061	ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN
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[Signature]
CORPORATE SECRETARY
CLARENCE CITY COUNCIL



**WILSON
HOMES**

Direction to submit a Development Application

This document confirms the direction from JEREMY TODD PRICE & RICHARD WAYNE BARNES, owner of 7 INTRIGUE COURT, TRANMERE TAS to Wilson Homes Tasmania Pty Limited to act as their agent within the meaning of the *Land Use Planning and Approvals Act 1993* (Tasmania).

Signature

19-9-2025

Date of signature

Signature

19-9-2025

Date of signature

Important Owner Confirmation

The owners acknowledge that Wilson Homes will incur non-refundable fees to third parties that are likely to exceed the proposal acceptance fee already paid, including but not limited to:

- Structural engineering fees
 - Hydraulic engineering fees
 - Development application fees
 - Overlay reports
 - Arborist reports
 - Bushfire reports
 - Farm management reports; and
 - Dispersive soil reports
- depending on the requirements of your council.

The owners acknowledge that in the unlikely event that they do not proceed to a contract, these fees will be payable by the owners to Wilson Homes.

Signature

19-9-2025

Date of signature

Signature

19-9-2025

Date of signature

**LOVE
BEING**
home

1300 595 050
wilsonhomes.com.au

Southern Head Office 250 Murray Street, Hobart Tasmania
Northern Head Office Level 1, 78-96 Wellington Street, Launceston Tasmania

Wilson Homes Tasmania Pty Ltd. ABN: 96 126 636 897. BLN: 963880604. TAS Architect Registration No: 1036

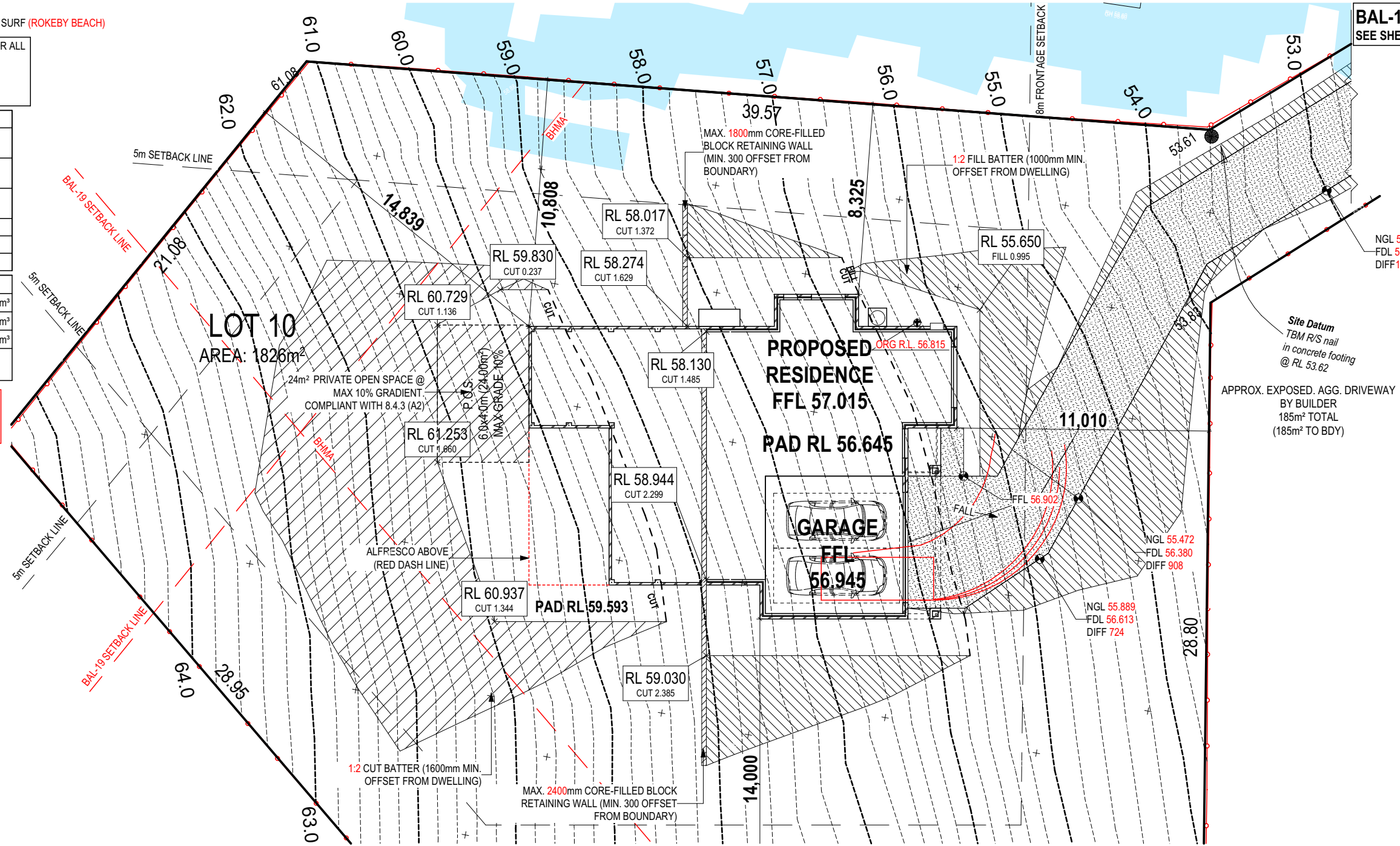
ZONE: 8.0 GENERAL RESIDENTIAL
 0.600km DISTANCE FROM BREAKING SURF (ROKEBY BEACH)

REFER TO SHEET 1 (COVER SHEET) FOR ALL BUILDING INFORMATION REGARDING:
 - SUSTAINABILITY REQUIREMENTS
 - SITE CLASSIFICATION
 - GENERAL BUILDING INFORMATION

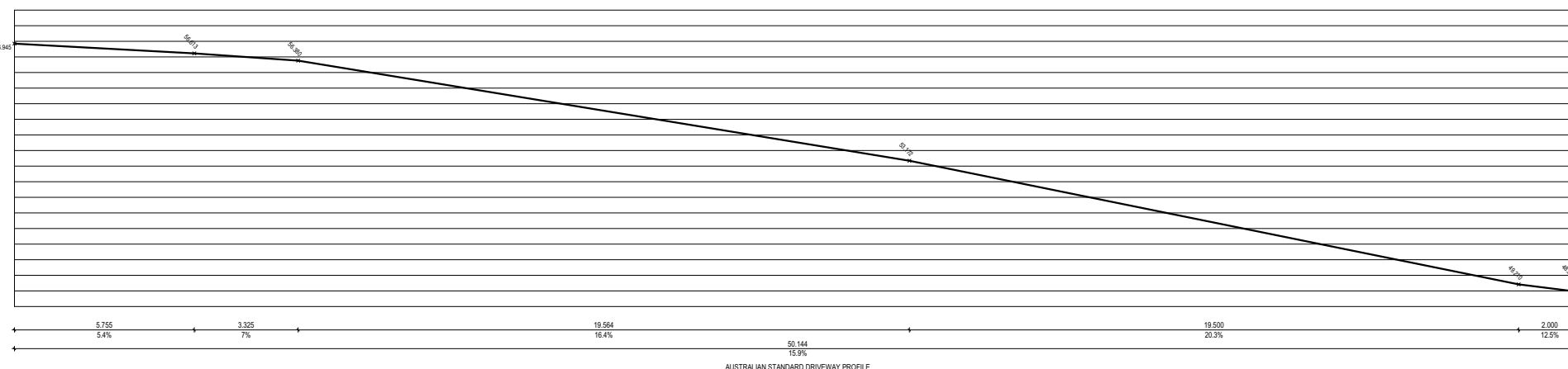
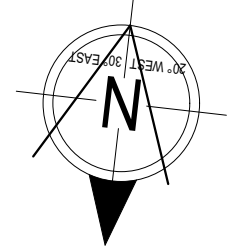
WIND CLASSIFICATION	N3
WITHIN 1 KM. OF BREAKING SALT WATER	NO
WITHIN 100 M. OF SALT WATER	NO
MINIMUM AHD FLOOR LEVEL APPLICABLE	NO
SURVEY AREA	NEW
LATITUDE	0° 00' 00" S
LONGITUDE	0° 00' 00" E

APPROX. IMPORT/EXPORT FILL	
CUT VOLUME	337.74m³
FILL VOLUME	47.71m³
DIFFERENCE	290.03m³
TONNAGE: 290.03m³ x 2.25 = 652.57t 653 TONNES OF EXPORT FILL	

LOT SIZE: 1826m²
HOUSE (COVERED AREA): 190.39m²
SITE COVERAGE: 10.43%



BAL-19 BUSHFIRE REQUIREMENTS
 SEE SHEET 1 (COVER SHEET) FOR DETAILS



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THIS PLAN ACCEPTED BY:

 PLEASE NOTE: NO VARIATIONS WILL BE ACCEPTED ON THIS PLAN AFTER SIGNING
 SIGNATURE:

 DATE:



SPECIFICATION:	ELEVATE
COPYRIGHT:	© 2025

REVISION	DRAWN
5 PRELIM PLAN - INITIAL ISSUE	TRV 2025.09.12
6 PRELIM PLANS - RE-SITE & BAL UPDATE	RT2 2025.10.07
7 PRELIM PLANS - COLOUR UPDATE	TRV 2025.10.14
8 PRELIM PLANS - AMENDMENTS	PL1 2025.11.20
9 PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2 2025.12.02

CLIENT:	JEREMY TODD PRICE & RICHARD WAYNE BARNES
ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	SITE PLAN 1:200
SHEET No.:	2 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:200

DO NOT SCALE DRAWINGS. USE FIGURED DIMENSIONS ONLY. CHECK AND VERIFY DIMENSIONS AND LEVELS PRIOR TO THE COMMENCEMENT OF ANY WORK. ALL DISCREPANCIES TO BE REPORTED TO THE DRAFTING OFFICE.
714346

ZONE: 8.0 GENERAL RESIDENTIAL
0.600Km DISTANCE FROM BREAKING SURF (ROKEBY BEACH)

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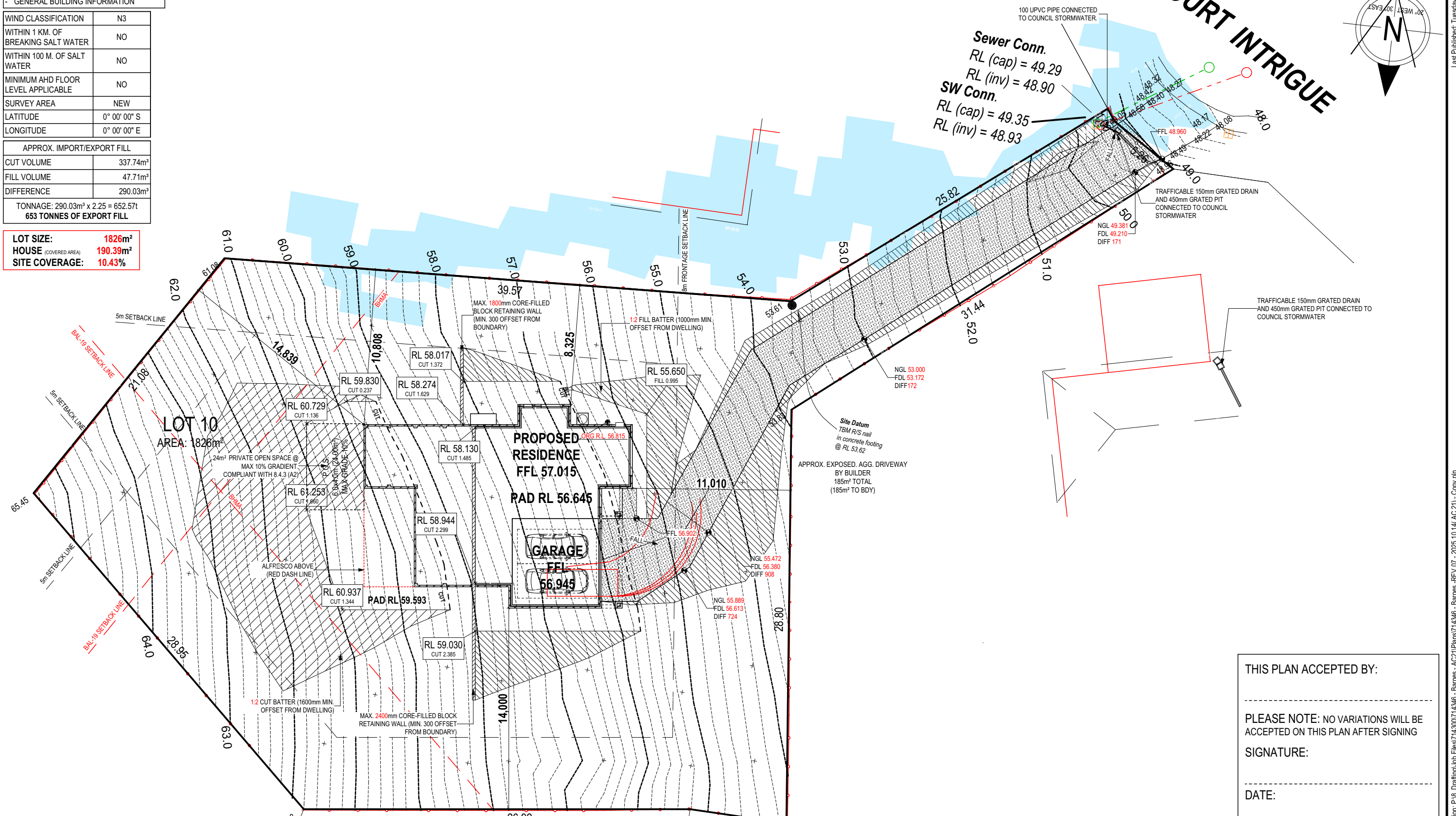
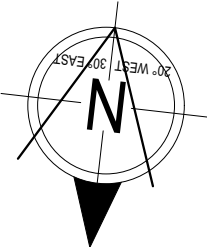
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- GENERAL BUILDING INFORMATION

WIND CLASSIFICATION	N3
WITHIN 1 KM. OF BREAKING SALT WATER	NO
WITHIN 100 M. OF SALT WATER	NO
MINIMUM AHD FLOOR LEVEL APPLICABLE	NO
SURVEY AREA	NEW
LATITUDE	0° 00' 00" S
LONGITUDE	0° 00' 00" E

APPROX. IMPORT/EXPORT FILL	
CUT VOLUME	337.74m³
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DIFFERENCE	290.03m³
TONNAGE: 290.03m³ x 2.25 = 652.57t 653 TONNES OF EXPORT FILL	

LOT SIZE: 1826m²
HOUSE (COVERED AREA): 190.39m²
SITE COVERAGE: 10.43%

COURT INTRIGUE



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THIS PLAN ACCEPTED BY:

PLEASE NOTE: NO VARIATIONS WILL BE ACCEPTED ON THIS PLAN AFTER SIGNING

SIGNATURE:

DATE:



SPECIFICATION:
ELEVATE

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© 2025

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CLIENT:
JEREMY TODD PRICE & RICHARD WAYNE BARNES

ADDRESS:
7 INTRIGUE COURT, TRANMERE TAS

LOT / SECTION / CT:
10 / - / 141047

COUNCIL:
CLARENCE COUNCIL

HOUSE DESIGN:
LAKESIDE

FACADE DESIGN:
BRIGHTON

SHEET TITLE:
SITE PLAN 1:250

HOUSE CODE:
H-WELLKS10LA

FACADE CODE:
F-WELLKS10BRTNA

SHEET No.:
3 / 33

SCALES:
1:250

DO NOT SCALE DRAWINGS. USE FIGURED DIMENSIONS ONLY. CHECK AND VERIFY DIMENSIONS AND LEVELS PRIOR TO THE COMMENCEMENT OF ANY WORK. ALL DISCREPANCIES TO BE REPORTED TO THE DRAFTING OFFICE.

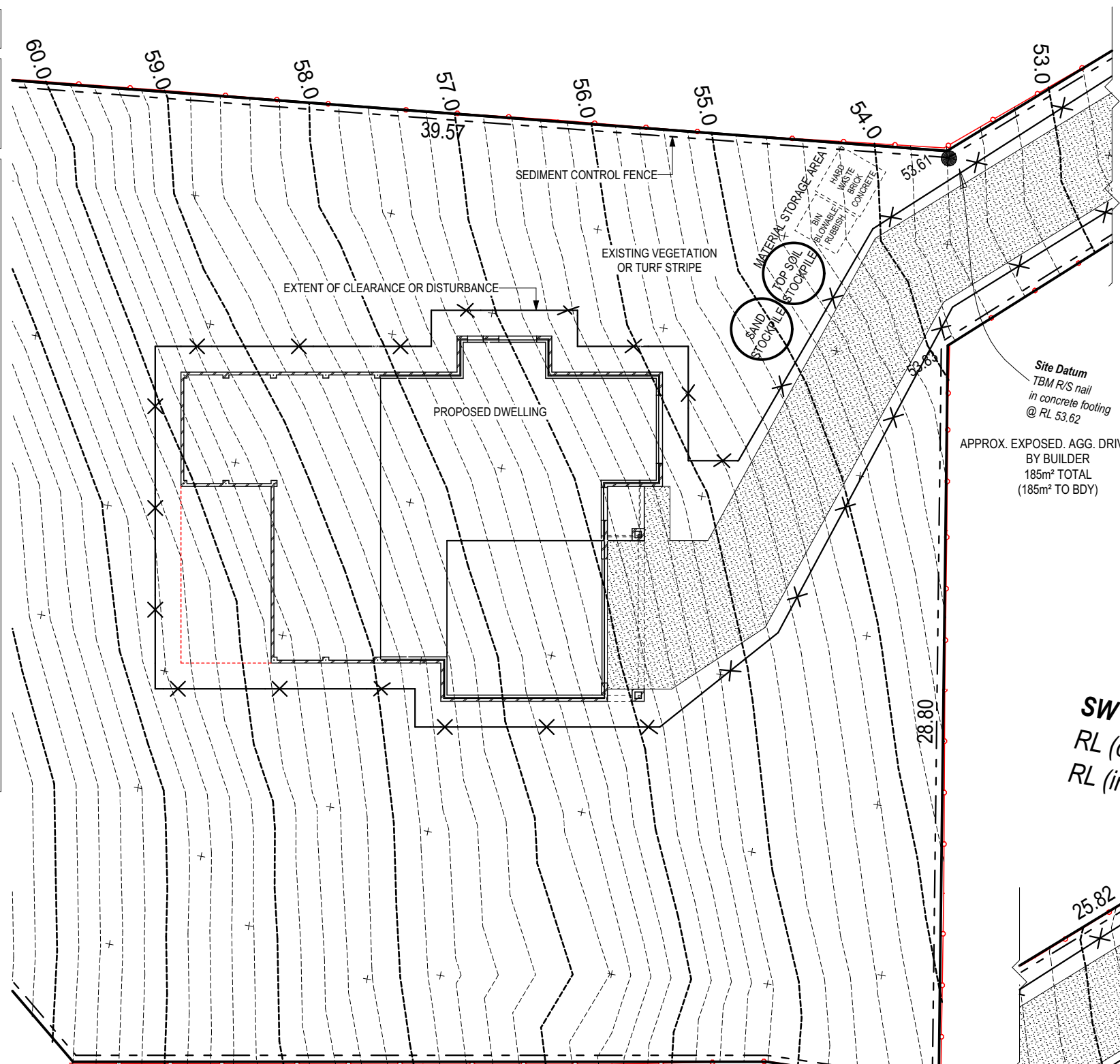
714346

ALL VEGETATION OUTSIDE THE BUILDING ZONE WILL BE MAINTAINED.

OWNER TO STABILISE THE SITE ON COMPLETION OF THE BUILD WITH TURF LAWNS, GRASS SEEDS, NATIVE GROUND COVERS AND/OR MULCH SPREAD TO A DEPTH OF 75-100mm

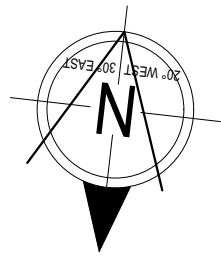
THE FOLLOWING IS A STANDARD APPROACH. SEDIMENT AND EROSION CONTROL MEASURES WILL BE REVIEWED PRIOR TO COMMENCING WORK AND INSTALLED BASED ON THE OUTCOME OF THAT REVIEW.

- NOTES:
1. ALL EROSION AND SEDIMENT CONTROL STRUCTURES TO BE INSPECTED EACH WORKING DAY AND MAINTAINED IN GOOD WORKING ORDER.
 2. ALL GROUND COVER VEGETATION OUTSIDE THE IMMEDIATE BUILDING AREA TO BE PRESERVED DURING THE BUILDING PHASE.
 3. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSTALLED PRIOR TO COMMENCEMENT OF MAJOR EARTHWORKS.
 4. STOCKPILES OF CLAYEY MATERIAL TO BE COVERED WITH AN IMPERVIOUS SHEET.
 5. ROOF WATER DOWNPIPES TO BE CONNECTED TO THE PERMANENT UNDERGROUND STORMWATER DRAINAGE SYSTEM AS SOON AS PRACTICAL AFTER THE ROOF IS LAID.
 6. DIVERSION DRAINS ARE TO BE CONNECTED TO A LEGAL DISCHARGE POINT (COUNCIL STORMWATER SYSTEM, WATERCOURSE OR ROAD DRAIN).
 7. SEDIMENT RETENTION TRAPS INSTALLED AROUND THE INLETS TO THE STORMWATER SYSTEM TO PREVENT SEDIMENT & OTHER DEBRIS BLOCKING THE DRAINS.



ALL RUNOFF AND SEDIMENT CONTROL STRUCTURES WILL BE INSPECTED EACH WORKING DAY AND MAINTAINED IN A FUNCTIONAL CONDITION.

ALL VEGETATION OUTSIDE THE BUILDING ZONE WILL BE MAINTAINED.



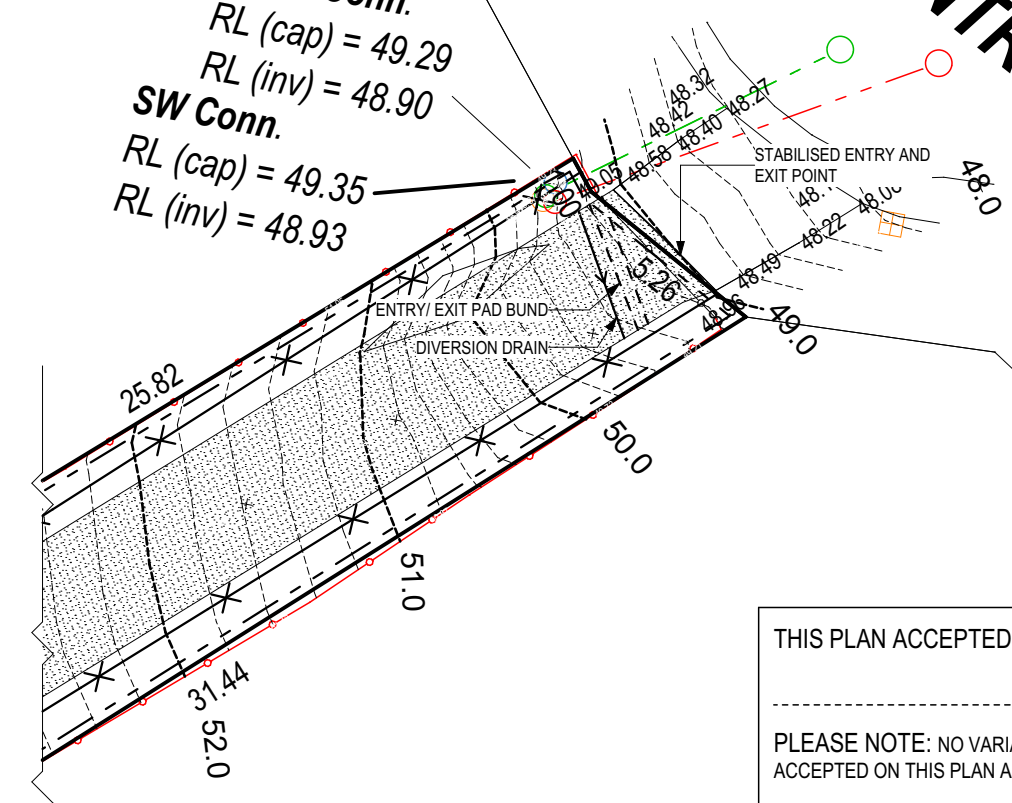
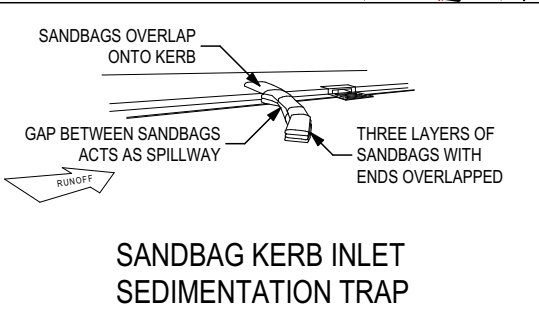
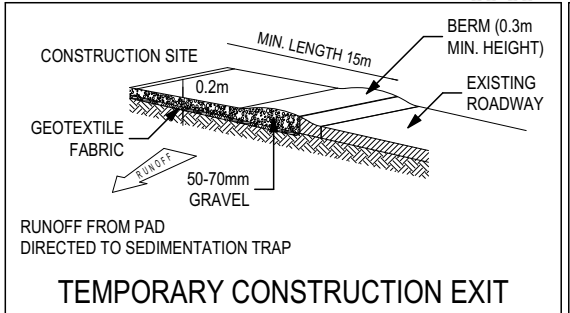
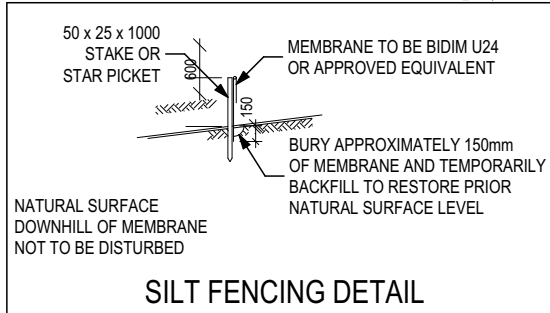
Site Datum
TBM R/S nail
in concrete footing
@ RL 53.62

APPROX. EXPOSED. AGG. DRIVEWAY
BY BUILDER
185m² TOTAL
(185m² TO BDY)

Sewer Conn.
RL (cap) = 49.29
RL (inv) = 48.90

SW Conn.
RL (cap) = 49.35
RL (inv) = 48.93

COURT INTRIGUE



THIS PLAN ACCEPTED BY:

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SIGNATURE:

DATE:

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5 PRELIM PLAN - INITIAL ISSUE	TRV 2025.09.12
6 PRELIM PLANS - RE-SITE & BAL UPDATE	RT2 2025.10.07
7 PRELIM PLANS - COLOUR UPDATE	TRV 2025.10.14
8 PRELIM PLANS - AMENDMENTS	PL1 2025.11.20
9 PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2 2025.12.02

CLIENT:	JEREMY TODD PRICE & RICHARD WAYNE BARNES
ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	SOIL & WATER MANAGEMENT PLAN
SHEET No.:	4 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:200

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714346

REFER TO SHEET 1 (COVER SHEET) FOR ALL BUILDING INFORMATION REGARDING:
 - SUSTAINABILITY REQUIREMENTS
 - SITE CLASSIFICATION
 - GENERAL BUILDING INFORMATION

BAL-19 BUSHFIRE REQUIREMENTS
 SEE SHEET 1 (COVER SHEET) FOR DETAILS

TOTAL FLOOR AREAS

ALFRESCO	24.01
BALCONY	8.71
GARAGE	39.23
LIVING	84.57
LIVING (FIRST FLOOR)	192.21
PORCH	3.01
SUBFLOOR	63.58
TOTAL	415.32 m²

ALL GROUND FLOOR BULKHEAD AND SQUARE SET OPENING FRAMES TO BE 2455 ABOVE FFL UNLESS NOTED OTHERWISE

ALL GROUND FLOOR INTERNAL DOORS TO BE 2340 HIGH UNLESS NOTED OTHERWISE (EXCLUDES CAVITY SLIDING DOORS)

REFER TO WINDOW & DOOR SCHEDULES FOR FULL DETAILS OF ALL WINDOWS AND DOORS

FINAL WINDOW AND EXTERIOR DOOR LOCATIONS MAY BE ADJUSTED ON SITE TO SUIT BRICKWORK GAUGE

ALL STAIR TREADS TO PROVIDE A MINIMUM SLIP RESISTANCE TO MEET NCC REQUIREMENTS

UNLESS NOTED OTHERWISE ALL ROOMS ARE REFERENCED AS FOLLOWS:



FLOOR PLAN LEGEND

- HS / WS HOB SPOUT / WALL SPOUT
- [Symbol] FACE BRICK / COMMON BRICK
- [Symbol] RENDER
- [Symbol] SOUND INSULATION
- AJ BRICK ARTICULATION JOINT
- 3D DENOTES DRAWER SIDE
- [Symbol] MECHANICAL VENTILATION
- L.B.W LOAD BEARING WALL
- PB PLASTERBOARD
- FC FIBRE CEMENT
- [Symbol] THIS DOOR OPENS FIRST
- [Symbol] SMOKE ALARM
- # LIFT OFF HINGE
- † WATER POINT
- [Symbol] FLOOR WASTE
- [Symbol] CLEAN OUT POINT
- [Symbol] GAS BAYONET



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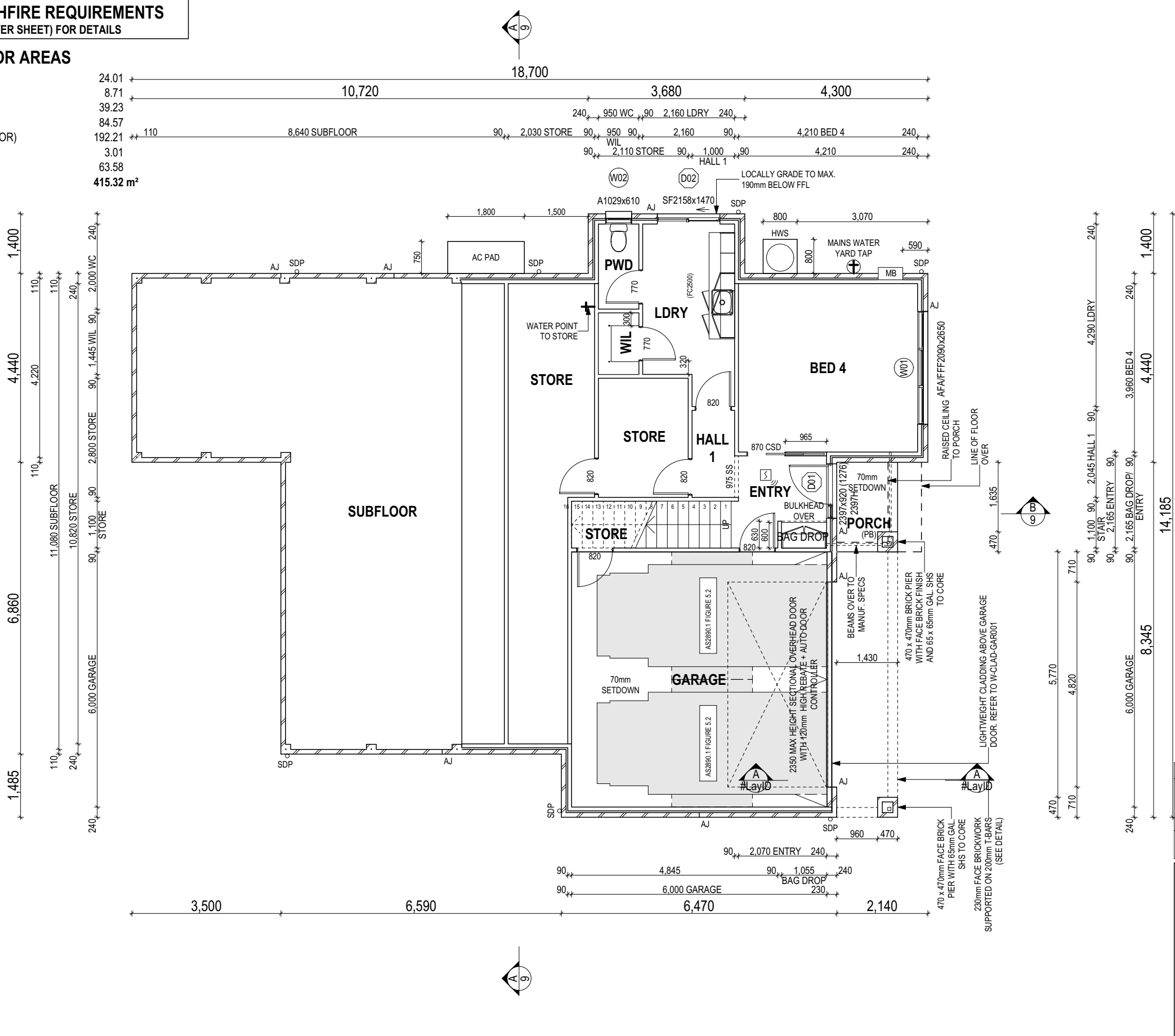
CLIENT:	JEREMY TODD PRICE & RICHARD WAYNE BARNES
ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	GROUND FLOOR PLAN
SHEET No.:	5 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:100

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PROVIDE AND INSTALL SINGLE PHASE REVERSE CYCLE AIR CONDITIONING SYSTEM. NUMBER AND POSITIONING OF OUTLETS AND THE FINAL LOCATION OF THE RETURN AIR GRILLE WILL BE DETERMINED ON SITE BY THE AIR CONDITIONING CONTRACTOR AND IS SUBJECT TO TRUSS LAYOUT AND ANY OTHER CONSTRUCTION CONSTRAINTS.

FRAME MANUFACTURER TO PROVIDE CLEARANCE FOR PASSAGE OF FAN COIL UNIT FROM RETURN AIR OPENING TO FINAL FAN COIL LOCATION.

SHAMPOO RECESS SIZE	STRUCTURAL DIMENSIONS	
	WIDTH	HEIGHT
"SMALL"	470 x 380mm	548mm
"MEDIUM"	800 x 380mm	878mm
"LARGE"	1500 x 380mm	1578mm

REFER WILSON HOMES' DETAIL G-WETA-TILE01 FOR FURTHER DETAIL PRIOR TO INSTALLATION.

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SIGNATURE:

DATE:

REFER TO SHEET 1 (COVER SHEET) FOR ALL BUILDING INFORMATION REGARDING:
 - SUSTAINABILITY REQUIREMENTS
 - SITE CLASSIFICATION
 - GENERAL BUILDING INFORMATION

BAL-19 BUSHFIRE REQUIREMENTS
 SEE SHEET 1 (COVER SHEET) FOR DETAILS

TOTAL FLOOR AREAS

ALFRESCO	24.01
BALCONY	8.71
GARAGE	39.23
LIVING	84.57
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415.32 m²	

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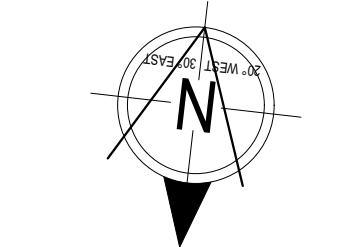
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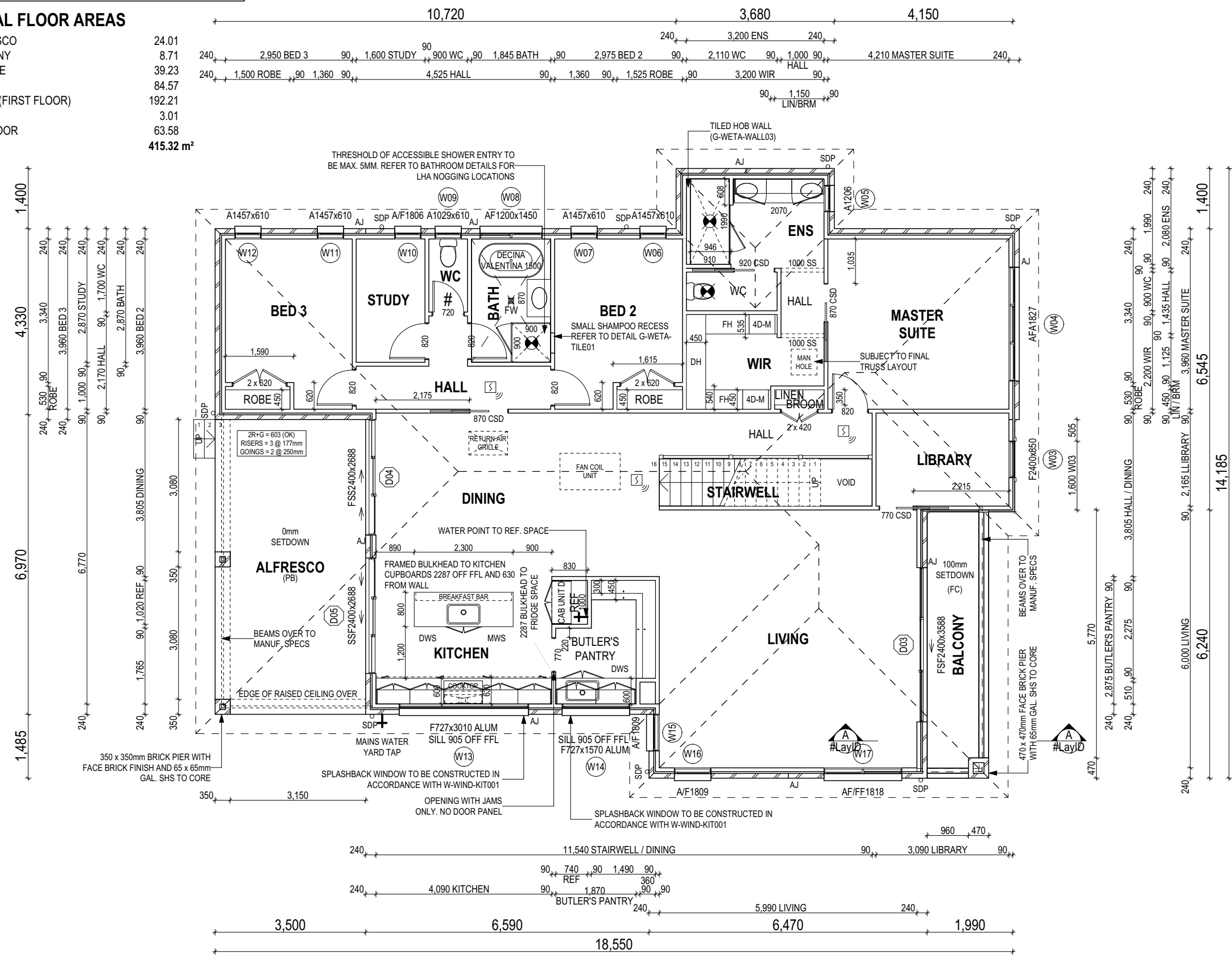
ALL STAIR TREADS TO PROVIDE A MINIMUM SLIP RESISTANCE TO MEET NCC REQUIREMENTS

UNLESS NOTED OTHERWISE ALL ROOMS ARE REFERENCED AS FOLLOWS:



FLOOR PLAN LEGEND

- HS / WS HOB SPOUT / WALL SPOUT
- FACE BRICK / COMMON BRICK
- RENDER
- SOUND INSULATION
- AJ BRICK ARTICULATION JOINT
- 3D DENOTES DRAWER SIDE
- MECHANICAL VENTILATION
- L.B.W LOAD BEARING WALL
- PB PLASTERBOARD
- FC FIBRE CEMENT
- THIS DOOR OPENS FIRST
- SMOKE ALARM
- # LIFT OFF HINGE
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- FLOOR WASTE
- CLEAN OUT POINT
- GAS BAYONET



PROVIDE AND INSTALL SINGLE PHASE REVERSE CYCLE AIR CONDITIONING SYSTEM. NUMBER AND POSITIONING OF OUTLETS AND THE FINAL LOCATION OF THE RETURN AIR GRILLE WILL BE DETERMINED ON SITE BY THE AIR CONDITIONING CONTRACTOR AND IS SUBJECT TO TRUSS LAYOUT AND ANY OTHER CONSTRUCTION CONSTRAINTS.

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SHAMPOO RECESS SIZE	WIDTH	HEIGHT
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ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

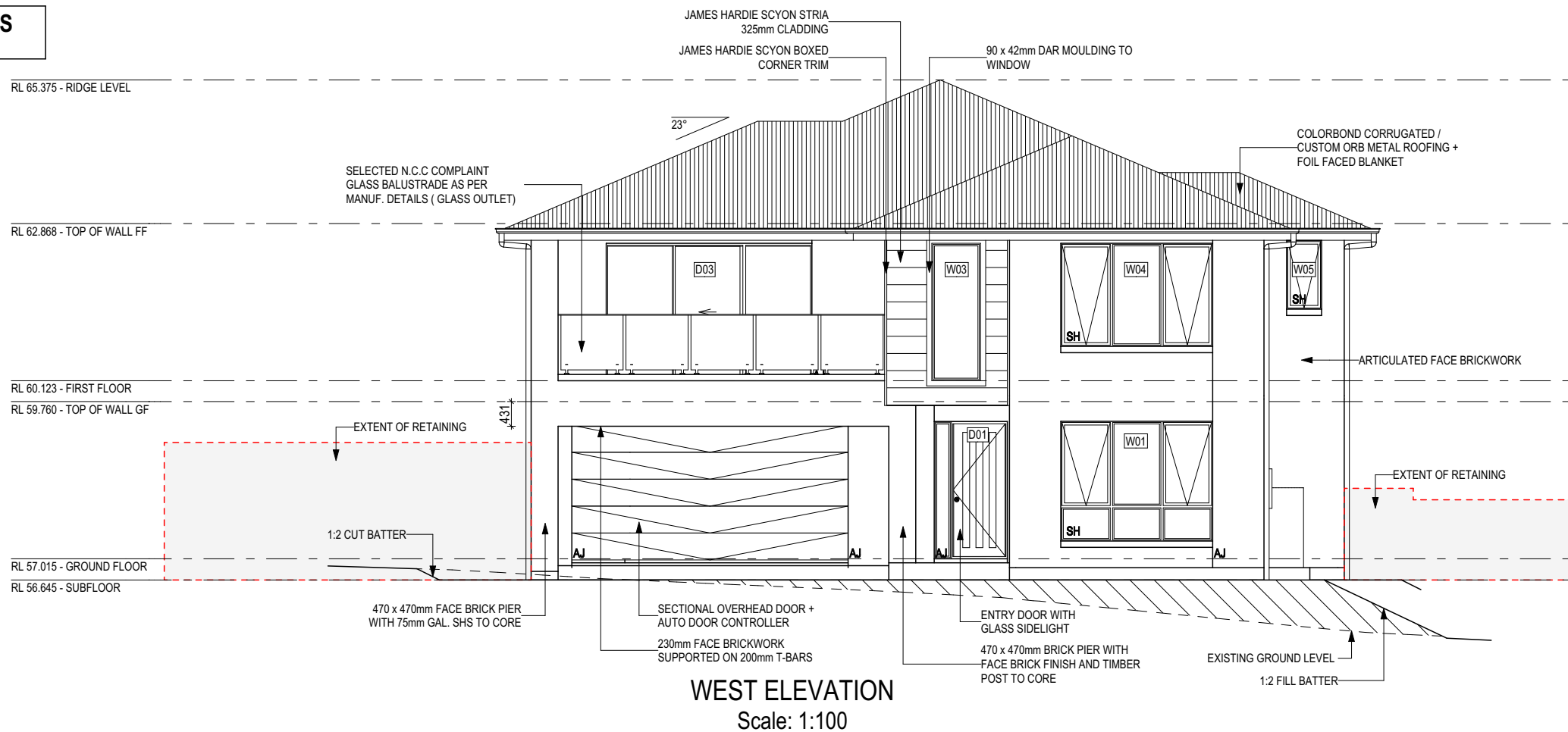
HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	FIRST FLOOR PLAN
SHEET No.:	6 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:100

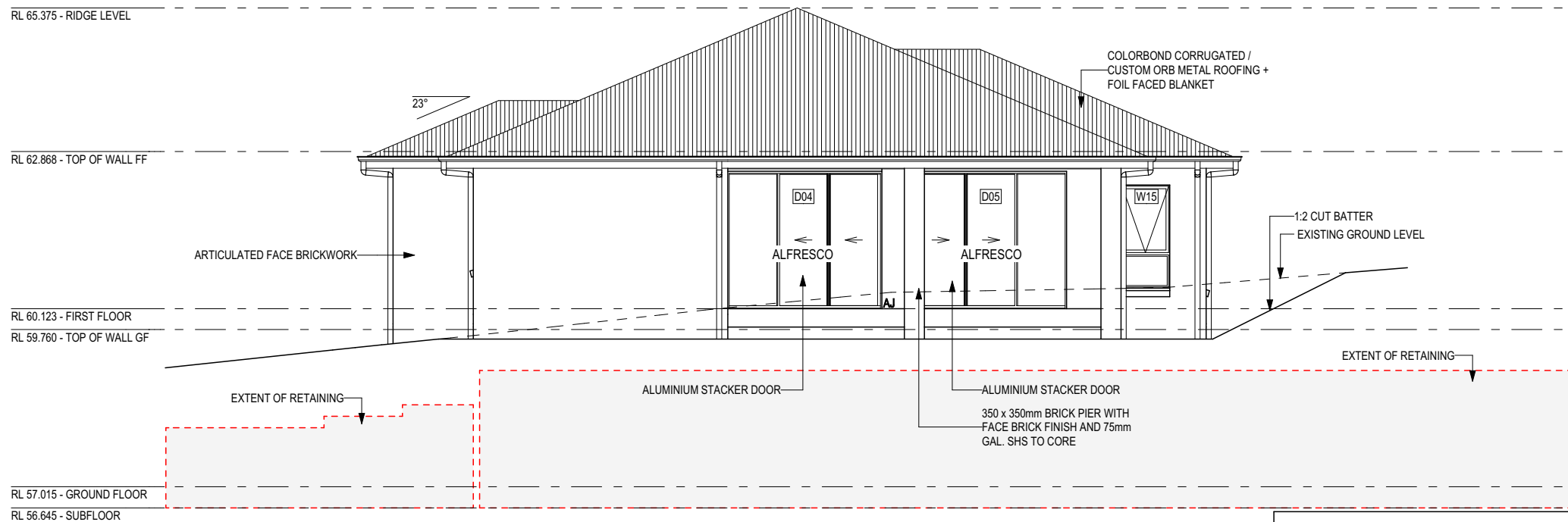
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BAL-19 BUSHFIRE REQUIREMENTS
SEE SHEET 1 (COVER SHEET) FOR DETAILS



WEST ELEVATION
Scale: 1:100



EAST ELEVATION
Scale: 1:100

GLASS TYPE LEGEND

CLEAR	OBSCURE

WINDOW TYPE LEGEND

AWNING	DOUBLE HUNG	FIXED	LOUVRE	SLIDING

REFER TO SHEET 1 (COVER SHEET) FOR ALL BUILDING INFORMATION REGARDING:
- SUSTAINABILITY REQUIREMENTS
- SITE CLASSIFICATION
- GENERAL BUILDING INFORMATION

SH = SNAP HEADER SILL

FIRST FLOOR WINDOW OPENINGS TO BE RESTRICTED AS REQUIRED BY THE NCC

BEDROOM WINDOW OPENINGS ABOVE 2m OFF THE SURFACE BENEATH TO BE RESTRICTED AS REQUIRED BY NCC 11.3.7 (VOLUME TWO)

ROOMS OTHER THAN BEDROOM WINDOW OPENINGS ABOVE 4m OFF THE SURFACE BENEATH TO BE RESTRICTED AS REQUIRED BY NCC 11.3.7 (VOLUME TWO)

REFER TO THE FOLLOWING DETAILS:
BRICK COURSING W-BRIC-001

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7 PRELIM PLANS - COLOUR UPDATE	TRV 2025.10.14
8 PRELIM PLANS - AMENDMENTS	PL1 2025.11.20
9 PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2 2025.12.02

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ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

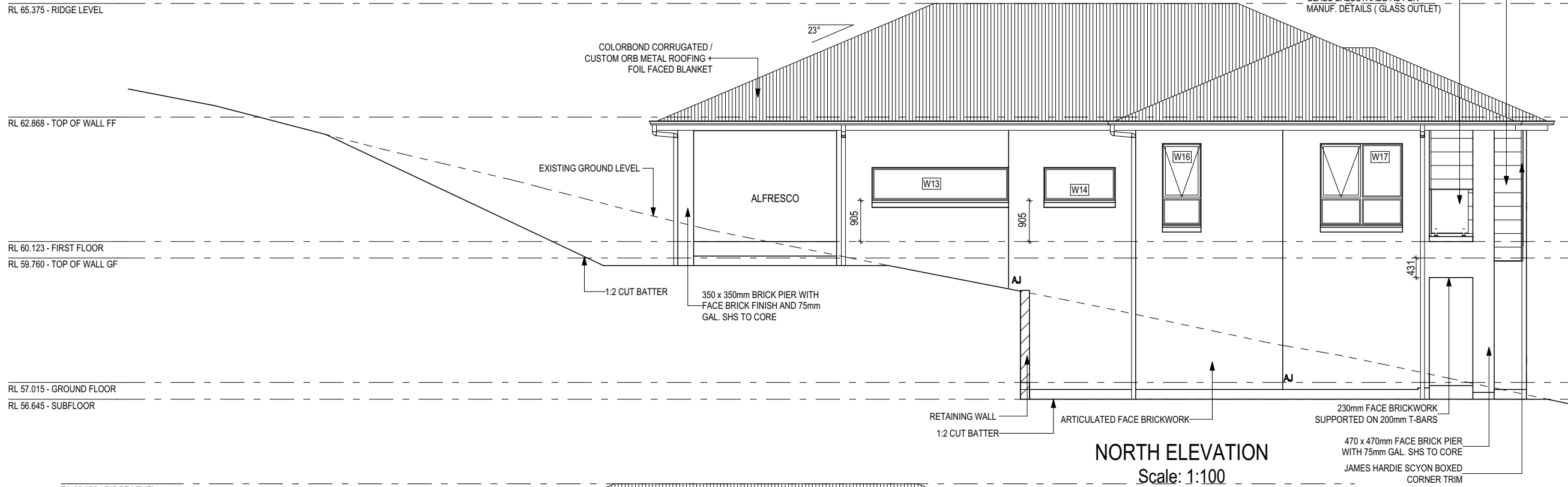
HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	ELEVATIONS
SHEET No.:	7 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:100

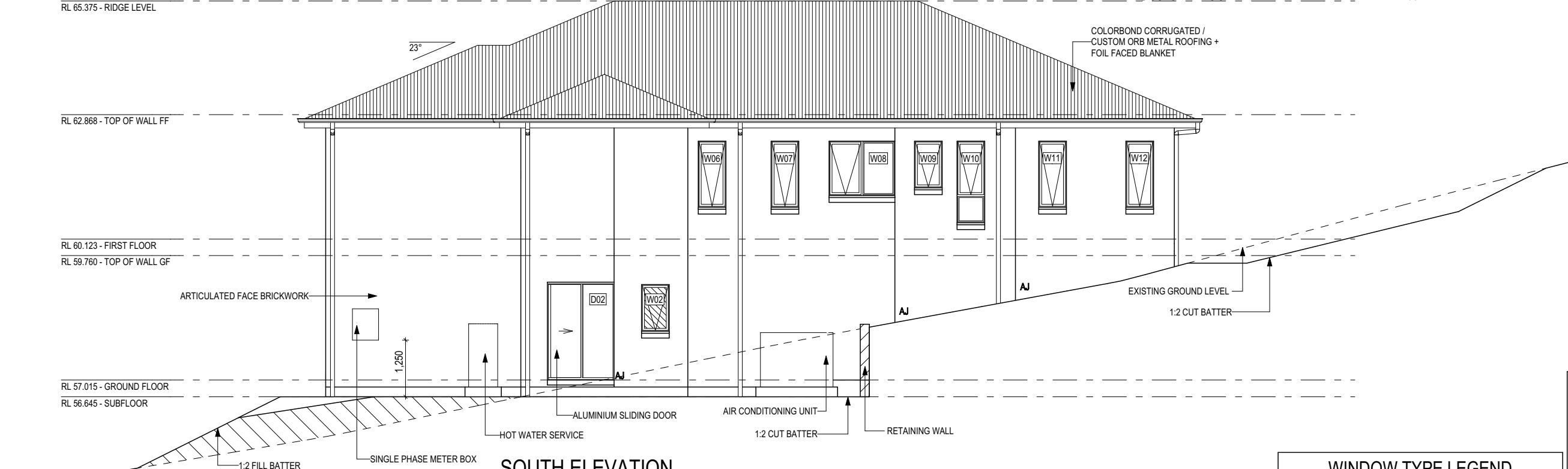
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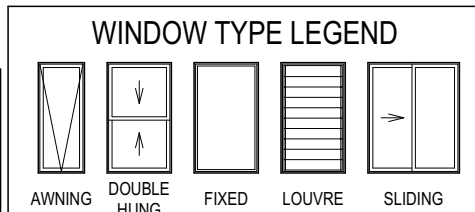
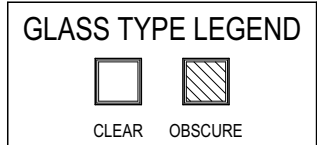
BAL-19 BUSHFIRE REQUIREMENTS
SEE SHEET 1 (COVER SHEET) FOR DETAILS



NORTH ELEVATION
Scale: 1:100



SOUTH ELEVATION
Scale: 1:100



REFER TO SHEET 1 (COVER SHEET) FOR ALL BUILDING INFORMATION REGARDING:
- SUSTAINABILITY REQUIREMENTS
- SITE CLASSIFICATION
- GENERAL BUILDING INFORMATION

SH = SNAP HEADER SILL

FIRST FLOOR WINDOW OPENINGS TO BE RESTRICTED AS REQUIRED BY THE NCC

BEDROOM WINDOW OPENINGS ABOVE 2m OFF THE SURFACE BENEATH TO BE RESTRICTED AS REQUIRED BY NCC 11.3.7 (VOLUME TWO)

ROOMS OTHER THAN BEDROOM WINDOW OPENINGS ABOVE 4m OFF THE SURFACE BENEATH TO BE RESTRICTED AS REQUIRED BY NCC 11.3.7 (VOLUME TWO)

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CLIENT:
JEREMY TODD PRICE & RICHARD WAYNE BARNES

ADDRESS:
7 INTRIGUE COURT, TRANMERE TAS

LOT / SECTION / CT:
10 / - / 141047

COUNCIL:
CLARENCE COUNCIL

HOUSE DESIGN:
LAKESIDE

FACADE DESIGN:
BRIGHTON

SHEET TITLE:
ELEVATIONS

SHEET No.:
8 / 33

HOUSE CODE:
H-WELLKS10LA

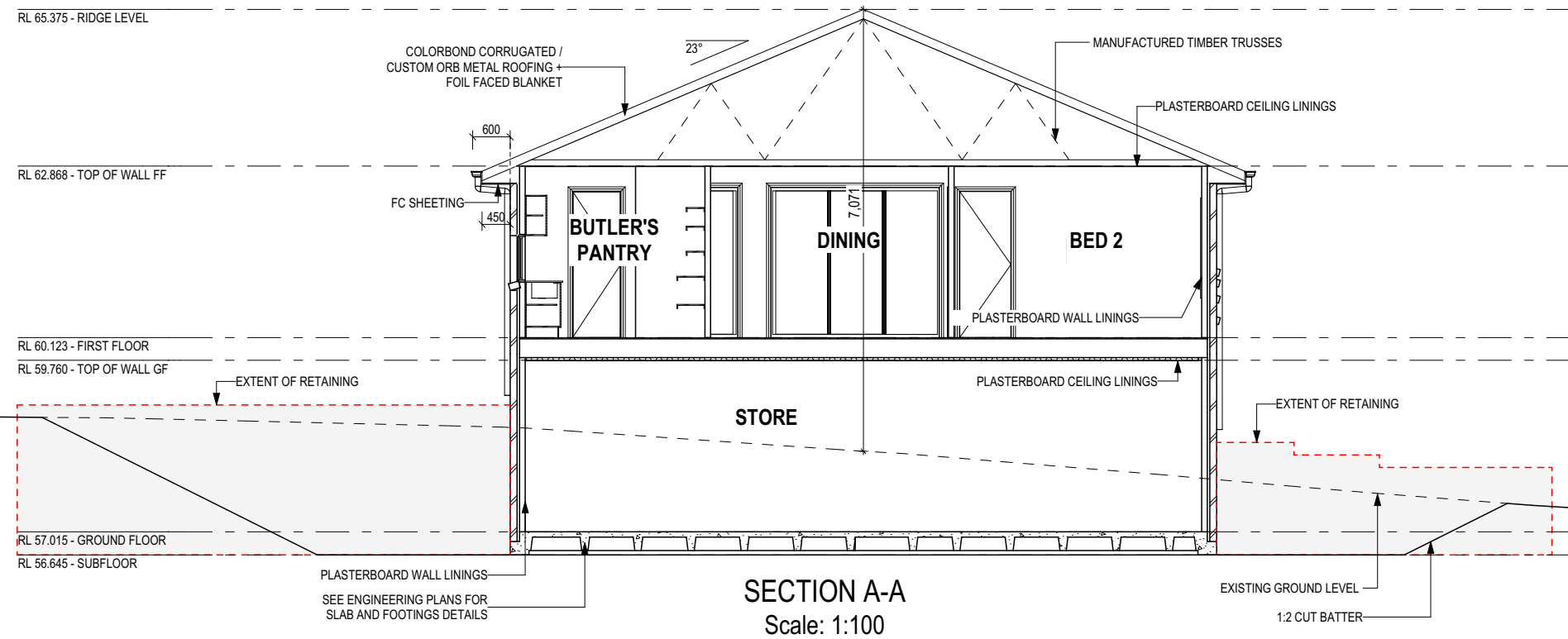
FACADE CODE:
F-WELLKS10BRTNA

SCALES:
1:100

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BAL-19 BUSHFIRE REQUIREMENTS
SEE SHEET 1 (COVER SHEET) FOR DETAILS



SECTION A-A
Scale: 1:100

REFER TO SHEET 1 (COVER SHEET) FOR ALL BUILDING INFORMATION REGARDING:
- SUSTAINABILITY REQUIREMENTS
- SITE CLASSIFICATION
- GENERAL BUILDING INFORMATION

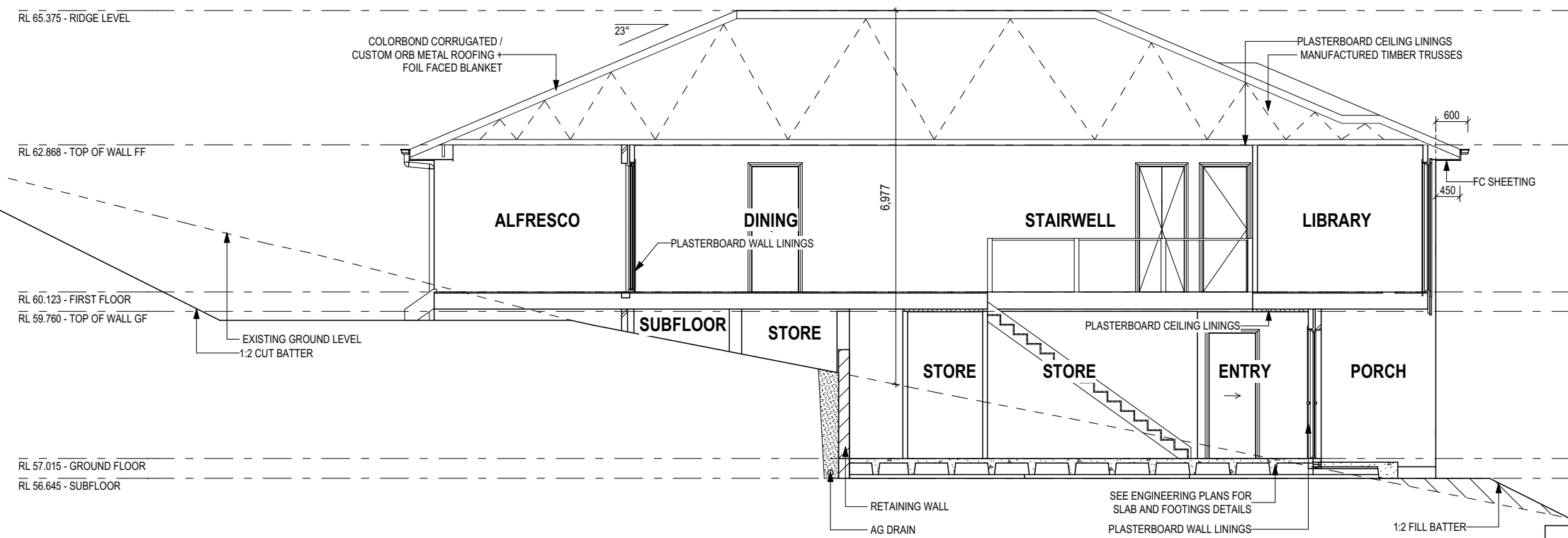
SH = SNAP HEADER SILL

FIRST FLOOR WINDOW OPENINGS TO BE RESTRICTED AS REQUIRED BY THE NCC

BEDROOM WINDOW OPENINGS ABOVE 2m OFF THE SURFACE BENEATH TO BE RESTRICTED AS REQUIRED BY NCC 11.3.7 (VOLUME TWO)

ROOMS OTHER THAN BEDROOM WINDOW OPENINGS ABOVE 4m OFF THE SURFACE BENEATH TO BE RESTRICTED AS REQUIRED BY NCC 11.3.7 (VOLUME TWO)

REFER TO THE FOLLOWING DETAILS:
BRICK COURSING W-BRIC-001



SECTION B-B
Scale: 1:100

GLASS TYPE LEGEND

CLEAR (square with diagonal lines) OBSCURE (square with diagonal lines)

WINDOW TYPE LEGEND

AWNING (triangle pointing up) DOUBLE HUNG (square with vertical lines) FIXED (square) LOUVRE (square with horizontal lines) SLIDING (square with horizontal lines and arrow)

THIS PLAN ACCEPTED BY:

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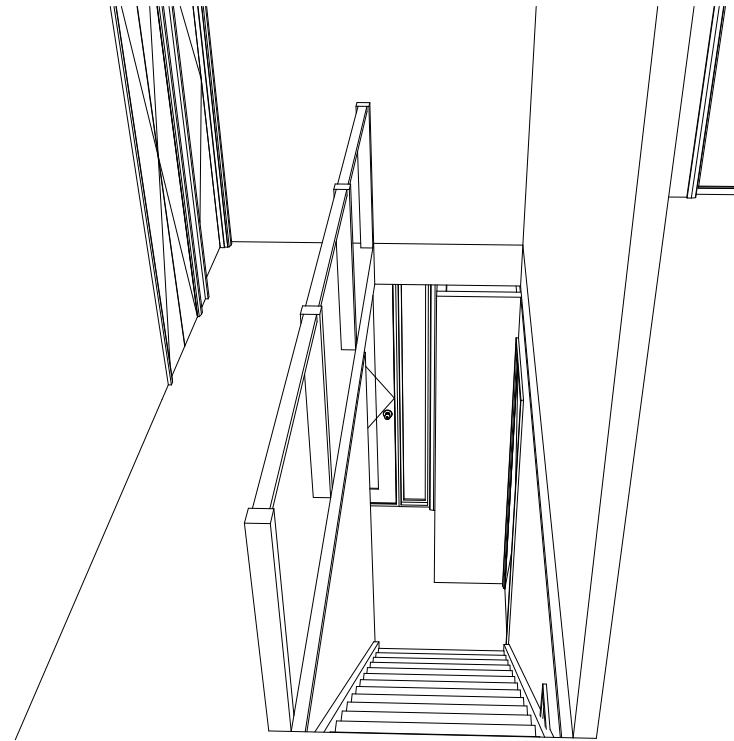
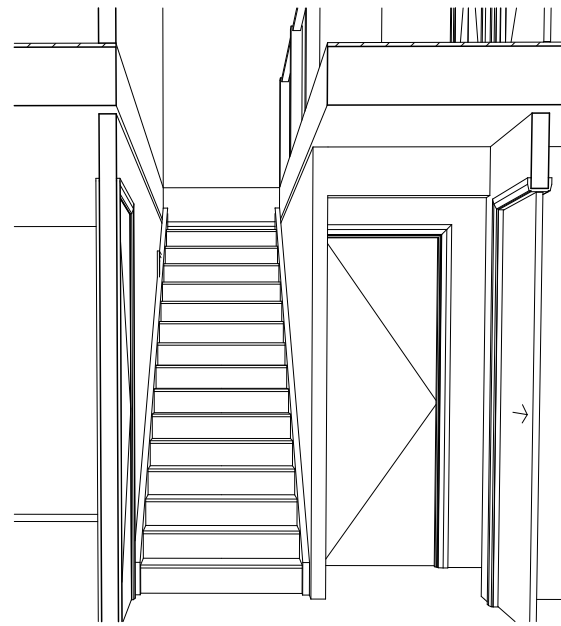
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COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	SECTIONS
SHEET No.:	9 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:100

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ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	STAIRCASE 3D VIEWS
SHEET No.:	10 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	

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WINDOW SCHEDULE

0.3 ASSUME LOOKING FROM OUTSIDE 1.2 ASSUME LOOKING FROM INSIDE

ID	CODE*	ROOM	HEIGHT	WIDTH	PERIMETER	AREA (m ²)	FRAME TYPE	BAL RATING	SILL TYPE	ORIENT.	GLAZING AREA (m ²)	GLAZING TYPE	ADDITIONAL INFORMATION*
W01	AFA/FFF2090x2650	BED 4	2,090	2,650	9,480	5.54	ALUMINIUM	BAL-19	SNAP HEADER	W	4.50	CLEAR, DOUBLE GLAZED	BP 600, MP 883-883/883-883
W02	A1029x610	PWD	1,029	610	3,278	0.63	ALUMINIUM	BAL-19	ANGLED	S	0.44	SATINLITE, DOUBLE GLAZED, TOUGHENED	
W03	F2400x850	LIBRARY	2,400	850	6,500	2.04	ALUMINIUM	BAL-19	NONE	W	1.81	CLEAR, DOUBLE GLAZED	
W04	AFA1827	MASTER SUITE	1,800	2,650	8,900	4.77	ALUMINIUM	BAL-19	SNAP HEADER	W	3.93	CLEAR, DOUBLE GLAZED	MP 883-883
W05	A1206	ENS	1,200	610	3,620	0.73	ALUMINIUM	BAL-19	SNAP HEADER	W	0.52	CLEAR, DOUBLE GLAZED	
W06	A1457x610	BED 2	1,457	610	4,134	0.89	ALUMINIUM	BAL-19	ANGLED	S	0.64	CLEAR, DOUBLE GLAZED	
W07	A1457x610	BED 2	1,457	610	4,134	0.89	ALUMINIUM	BAL-19	ANGLED	S	0.64	CLEAR, DOUBLE GLAZED	
W08	AF1200x1450	BATH	1,200	1,450	5,300	1.74	ALUMINIUM	BAL-19	ANGLED	S	1.38	CLEAR, DOUBLE GLAZED	MP 725
W09	A1029x610	WC	1,029	610	3,278	0.63	ALUMINIUM	BAL-19	ANGLED	S	0.44	CLEAR, DOUBLE GLAZED	
W10	A/F1806	STUDY	1,800	610	4,820	1.10	ALUMINIUM	BAL-19	ANGLED	S	0.80	CLEAR, DOUBLE GLAZED	BP 600
W11	A1457x610	BED 3	1,457	610	4,134	0.89	ALUMINIUM	BAL-19	ANGLED	S	0.64	CLEAR, DOUBLE GLAZED	
W12	A1457x610	BED 3	1,457	610	4,134	0.89	ALUMINIUM	BAL-19	ANGLED	S	0.64	CLEAR, DOUBLE GLAZED	
W13	F727x3010	KITCHEN	727	3,010	7,474	2.19	ALUMINIUM	BAL-19	ANGLED	N	1.92	CLEAR, DOUBLE GLAZED	
W14	F727x1570	BUTLER'S PANTRY	727	1,570	4,594	1.14	ALUMINIUM	BAL-19	ANGLED	N	0.98	CLEAR, DOUBLE GLAZED	
W15	A/F1809	LIVING	1,800	850	5,300	1.53	ALUMINIUM	BAL-19	ANGLED	E	1.19	CLEAR, DOUBLE GLAZED	BP 600
W16	A/F1809	LIVING	1,800	850	5,300	1.53	ALUMINIUM	BAL-19	ANGLED	N	1.19	CLEAR, DOUBLE GLAZED	BP 600
W17	AF/FF1818	LIVING	1,800	1,810	7,220	3.26	ALUMINIUM	BAL-19	ANGLED	N	2.65	CLEAR, DOUBLE GLAZED	BP 600, MP 905/905
						30.39							24.31

NOTE:
Provide BAL-19 rated aluminium windows and external glass sliding doors in lieu of standard.
Provide flyscreens with corrosion resistant mesh to all opening window sashes only.

Window Manufacturer: Dowell Windows			
No BAL / BAL 12.5			
Window Type	WERS Code	U Value	SHGC
Sliding Window	DOW-022-003	2.9	0.64
Awning Window	DOW-005-001	3.9	0.58
Fixed External Window	DOW-038-001	3.03	0.71
Sliding Door	DAR-034-001	3.97	0.63
Stacking Door	DAR-034-001	3.97	0.63
Hinged Door	DOW-017-001	4.1	0.55
Bi-Fold Door	DOW-020-001	4.1	0.54
BAL 19			
Window Type	WERS Code	U Value	SHGC
Sliding Window	TND-034-001	3.1	0.61
Awning Window	STG-001-066	3.91	0.54
Fixed External Window	DOW-038-005	3.02	0.66
Sliding Door	AUW-009-009	4.03	0.58
Stacking Door	AUW-009-009	4.03	0.58
Hinged Door	GRN-009-001	4.25	0.53
Bi-Fold Door	DOW-020-001	4.1	0.54
BAL 29			
Window Type	WERS Code	U Value	SHGC
Sliding Window	TND-034-001	3.1	0.61
Awning Window	STG-001-066	3.91	0.54
Fixed External Window	DOW-038-005	3.02	0.66
Sliding Door	AMJ-007-005	4.03	0.59
Stacking Door	AMJ-007-005	4.03	0.59
Hinged Door	GRN-009-001	4.29	0.53

NOTE:
Windows supplied MUST HAVE Uw better and or equal to stated figures and SHGC within +/- 5% of stated figures. Restricted windows to have their openability restricted as per N.C.C 11.3.6.

EXTERIOR DOOR SCHEDULE

0.1 ASSUME LOOKING FROM OUTSIDE

ID	CODE*	ROOM	HEIGHT	WIDTH	AREA (m ²)	FRAME TYPE	BAL RATING	SILL TYPE	ORIENT.	GLAZING TYPE	DOOR TYPE	ADDITIONAL INFORMATION*
D01	2397x920	ENTRY	2,397	1,276	3.06	ALUMINIUM	BAL-19	SNAP HEADER	W	CLEAR	SWINGING	1 x FIXED SIDELIGHT
D02	SF2158x1470	LDRY	2,158	1,470	3.17	ALUMINIUM	BAL-19	SNAP HEADER	S	CLEAR, TOUGHENED	SLIDING	ALI VIEW SECURITY SCREEN
D03	FSF2400x3588	LIVING	2,400	3,588	8.61	ALUMINIUM	BAL-19	SNAP HEADER	W	CLEAR, TOUGHENED	SLIDING	
D04	FSS2400x2688	DINING	2,400	2,688	6.45	ALUMINIUM	BAL-19	SNAP HEADER	E	CLEAR, TOUGHENED	STACKER	
D05	SSF2400x2688	DINING	2,400	2,688	6.45	ALUMINIUM	BAL-19	SNAP HEADER	E	CLEAR, TOUGHENED	STACKER	
					27.74 m²							

INTERIOR DOOR SCHEDULE

NOTE: INTERNAL DOORS TO WET AREAS WITH MECHANICAL VENTILATION TO BE UNDERCUT 20mm

QTY	CODE	TYPE	HEIGHT	WIDTH	GLAZING	ADDITIONAL INFORMATION
2	1000 SS	SQUARE SET OPENING	2,455	1,000	N/A	
1	2 x 420	SWINGING	2,340	840	N/A	
2	2 x 620	SWINGING	2,340	1,240	N/A	
1	720	SWINGING	2,340	720	N/A	LIFT-OFF HINGES
3	770	SWINGING	2,340	770	N/A	
1	770 CSD	CAVITY SLIDING	2,340	770	N/A	
10	820	SWINGING	2,340	820	N/A	
3	870 CSD	CAVITY SLIDING	2,340	870	N/A	
1	920 CSD	CAVITY SLIDING	2,340	920	N/A	
1	975 SS	SQUARE SET OPENING	2,455	975	N/A	

PICTURE / TV RECESS & SQUARE SET WINDOW SCHEDULE

QTY	TYPE	HEIGHT	WIDTH	AREA (m ²)
-----	------	--------	-------	------------------------

SINGLE GLAZING U.N.O. REFER TO GENERAL NOTES FOR FURTHER DETAIL AND REQUIREMENTS.
REFER TO SHEET 1 (COVER SHEET) FOR ALL BUILDING INFORMATION REGARDING:
- SUSTAINABILITY REQUIREMENTS
- SITE CLASSIFICATION
- GENERAL BUILDING INFORMATION

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BAL-19 BUSHFIRE REQUIREMENTS
SEE SHEET 1 (COVER SHEET) FOR DETAILS

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6 PRELIM PLANS - RE-SITE & BAL UPDATE	RT2 2025.10.07	
7 PRELIM PLANS - COLOUR UPDATE	TRV 2025.10.14	
8 PRELIM PLANS - AMENDMENTS	PL1 2025.11.20	
9 PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2 2025.12.02	

CLIENT:
JEREMY TODD PRICE & RICHARD WAYNE BARNES
ADDRESS:
7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:
10 / - / 141047
COUNCIL:
CLARENCE COUNCIL

HOUSE DESIGN:
LAKESIDE
FACADE DESIGN:
BRIGHTON
SHEET TITLE:
WINDOW & DOOR SCHEDULES

HOUSE CODE:
H-WELLKS10LA
FACADE CODE:
F-WELLKS10BRTNA
SHEET No.:
11 / 33

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NATURAL LIGHT AND VENTILATION

ROOM	AREA (m2)	WINDOW ID	LIGHT REQUIRED (m2)	LIGHT ACHIEVED (m2)	VENTILATION REQ'D (m2)	VENTILATION ACH'D (m2)
OPEN KITCHEN/ LIVING/ DINING	73.99 m ²	W13, W15, W16, W17, D03, D04, D05	7.40 m ²	19.67 m ²	3.70 m ²	13.67 m ²
MASTER SUITE	16.67 m ²	W04	1.67 m ²	3.93 m ²	0.83 m ²	2.96 m ²
BED 2	11.59 m ²	W06, W07	1.16 m ²	2.02 m ²	0.58 m ²	1.62 m ²
BED 3	11.50 m ²	W11, W12	1.15 m ²	2.56 m ²	0.58 m ²	1.62 m ²
BED 4	16.67 m ²	W01	1.67 m ²	4.50 m ²	0.83 m ²	2.44 m ²
LIBRARY	6.69 m ²	W03	0.67 m ²	1.81 m ²	0.33 m ²	
STUDY	4.59 m ²	W10	0.46 m ²	0.64 m ²	0.23 m ²	0.66 m ²

PART 10.5.1 LIGHT: Minimum 10% of the floor area of a habitable room required (natural light)

PART 10.6 VENTILATION: Minimum 5% of the floor area of a habitable room required. (An exhaust fan may be used for sanitary compartment, laundry or bathroom provided contaminated air discharges directly to the outside of the building by way of ducts).

BAL-19 BUSHFIRE REQUIREMENTS
SEE SHEET 1 (COVER SHEET) FOR DETAILS

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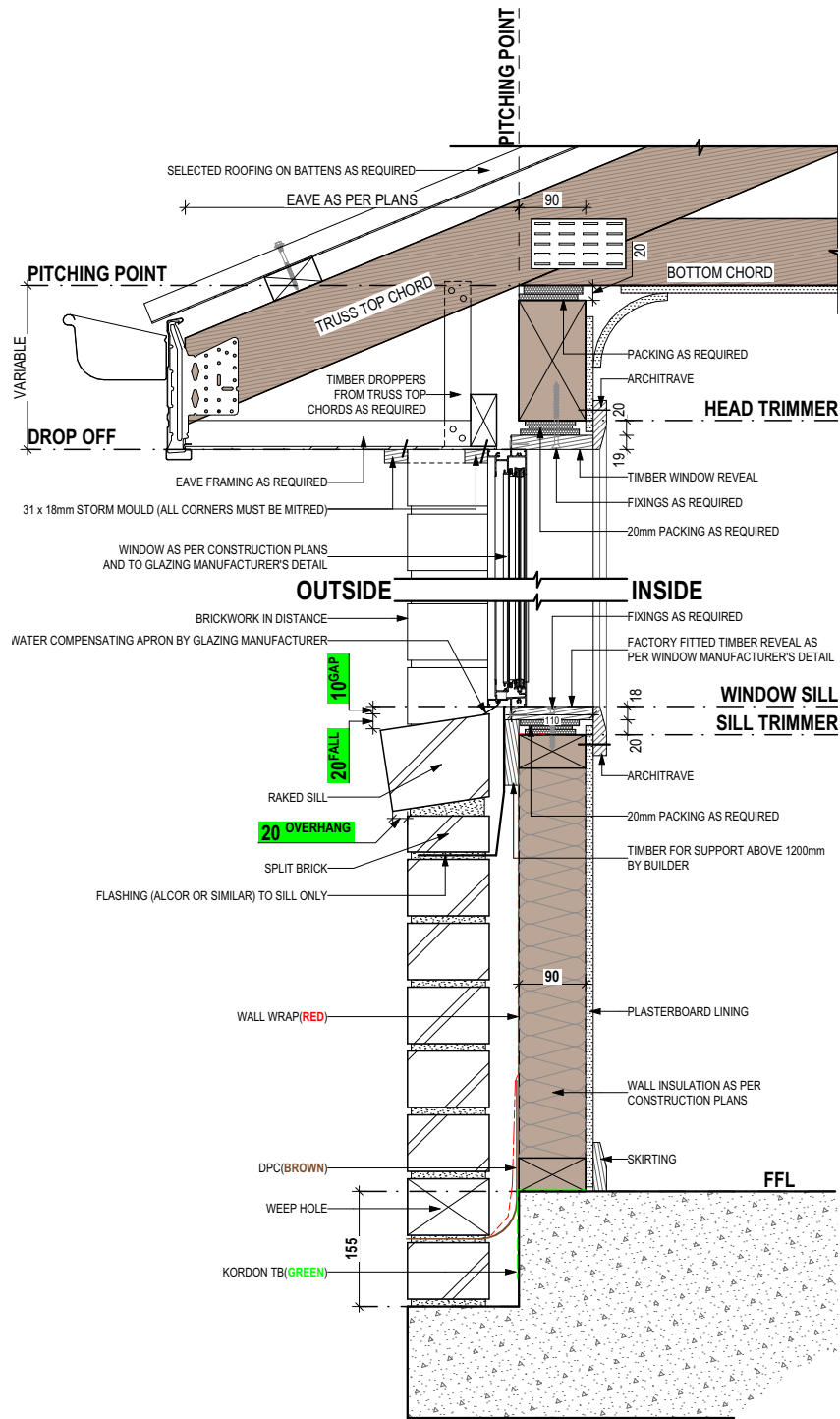
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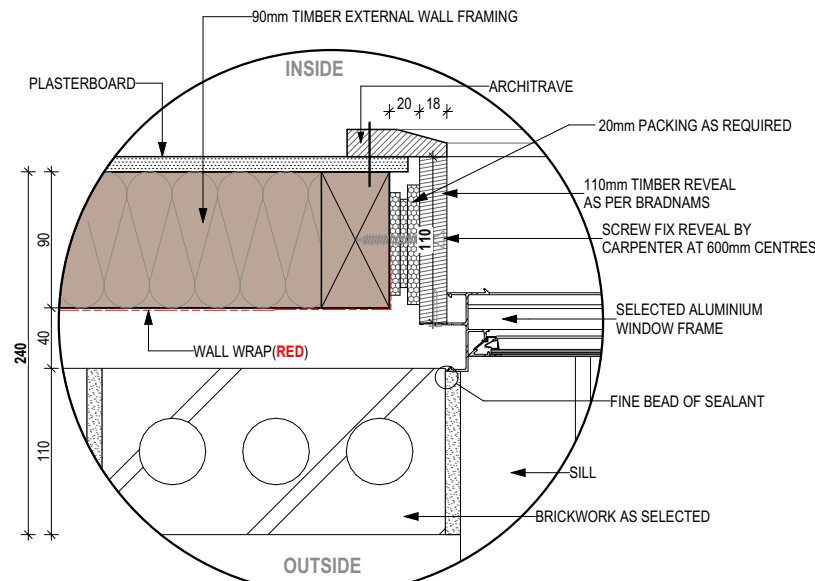
HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	CALCULATIONS
SHEET No.:	12 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	

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SECTIONS
SCALE: 1:10



DETAILS
SCALE: 1:5

STANDARD BRICK								STANDARD BRICK																
BRICKWORK DIMENSIONS				Bricks per m ² in wall = 48.5 approx.				all dimensions in mm				BRICKWORK DIMENSIONS				Bricks per m ² in wall = 48.5 approx.				all dimensions in mm				
FORMAT SIZE: 240x120x86mm		MANUFACTURING SIZE: 230x110x76mm		VERTICAL GAUGE: 7 Courses to 600mm				FORMAT SIZE: 240x120x86mm		MANUFACTURING SIZE: 230x110x76mm		VERTICAL GAUGE: 7 Courses to 600mm												
NO. OF BRICKS	LENGTH	OPENING	HEIGHT	NO. OF BRICKS	LENGTH	OPENING	HEIGHT	NO. OF BRICKS	LENGTH	OPENING	HEIGHT	NO. OF BRICKS	LENGTH	OPENING	HEIGHT	NO. OF BRICKS	LENGTH	OPENING	HEIGHT	NO. OF BRICKS	LENGTH	OPENING	HEIGHT	
1	230	250	86	26	6230	6250	2229	11	2630	2650	943	36' 1/2	8630										3086	
1 1/2	350	370		26 1/2	6350	6370		11 1/2	2750	2770		36 1/2	8750										3172	
2	470	490	172	27	6470	6490	2314	12	2870	2890	1029	37	8870										3257	
2 1/2	590	610		27 1/2	6590	6610		12 1/2	2990	3010		37 1/2	8990										3343	
3	710	730	257	28	6710	6730	2400	13	3110	3130	1114	38	9110										3429	
3 1/2	830	850		28 1/2	6830	6850		13 1/2	3230	3250		38 1/2	9230										3514	
4	950	970	343	29	6950	6970	2486	14	3350	3370	1200	39	9350										3600	
4 1/2	1070	1090		29 1/2	7070	7090		14 1/2	3470	3490		39 1/2	9470										3686	
5	1190	1210	429	30	7190	7210	2572	15	3590	3610	1286	40	9590										3772	
5 1/2	1310	1330		30 1/2	7310	7330		15 1/2	3710	3730		40 1/2	9710										3857	
6	1430	1450	514	31	7430	7450	2657	16	3830	3850	1372	41	9830										3943	
6 1/2	1550	1570		31 1/2	7550	7570		16 1/2	3950	3970		41 1/2	9950										4029	
7	1670	1690	600	32	7670	7690	2743	17	4070	4090	1457	42	10070										4114	
7 1/2	1790	1810		32 1/2	7790	7810		17 1/2	4190	4210		42 1/2	10190										4200	
8	1910	1930	686	33	7910	7930	2829	18	4310	4330	1543	43	10310										4286	
8 1/2	2030	2050		33 1/2	8030	8050		18 1/2	4430	4450		43 1/2	10430										4372	
9	2150	2170	772	34	8150	8170	2914	19	4550	4570	1629	44	10550										4457	
9 1/2	2270	2290		34 1/2	8270	8290		19 1/2	4670	4690		44 1/2	10670										4543	
10	2390	2410	857	35	8390	8400	3000	20	4790	4810	1714	45	10790										4629	
									20 1/2	4910	4930		45 1/2	10910										4714
									21	5030	5050	1800	46	11030										4800
									21 1/2	5150	5170		46 1/2	11150										4886
									22	5270	5290	1886	47	11270										4972
									22 1/2	5390	5410		47 1/2	11390										5057
									23	5510	5530	1972	48	11510										5143
									23 1/2	5630	5650		48 1/2	11630										5229
									24	5750	5770	2057	49	11750										5314
									24 1/2	5870	5890		49 1/2	11870										5400
									25	5990	6010	2143	50	11990										5486
									25 1/2	6110	6130		50	12110										5572

NOT OFTEN REQUIRED. IF NEEDED ADD 20 TO LENGTH.

THIS PLAN ACCEPTED BY:

PLEASE NOTE: NO VARIATIONS WILL BE ACCEPTED ON THIS PLAN AFTER SIGNING

SIGNATURE:

DATE:

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7 PRELIM PLANS - COLOUR UPDATE	TRV 2025.10.14
8 PRELIM PLANS - AMENDMENTS	PL1 2025.11.20
9 PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2 2025.12.02

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COUNCIL:	CLARENCE COUNCIL

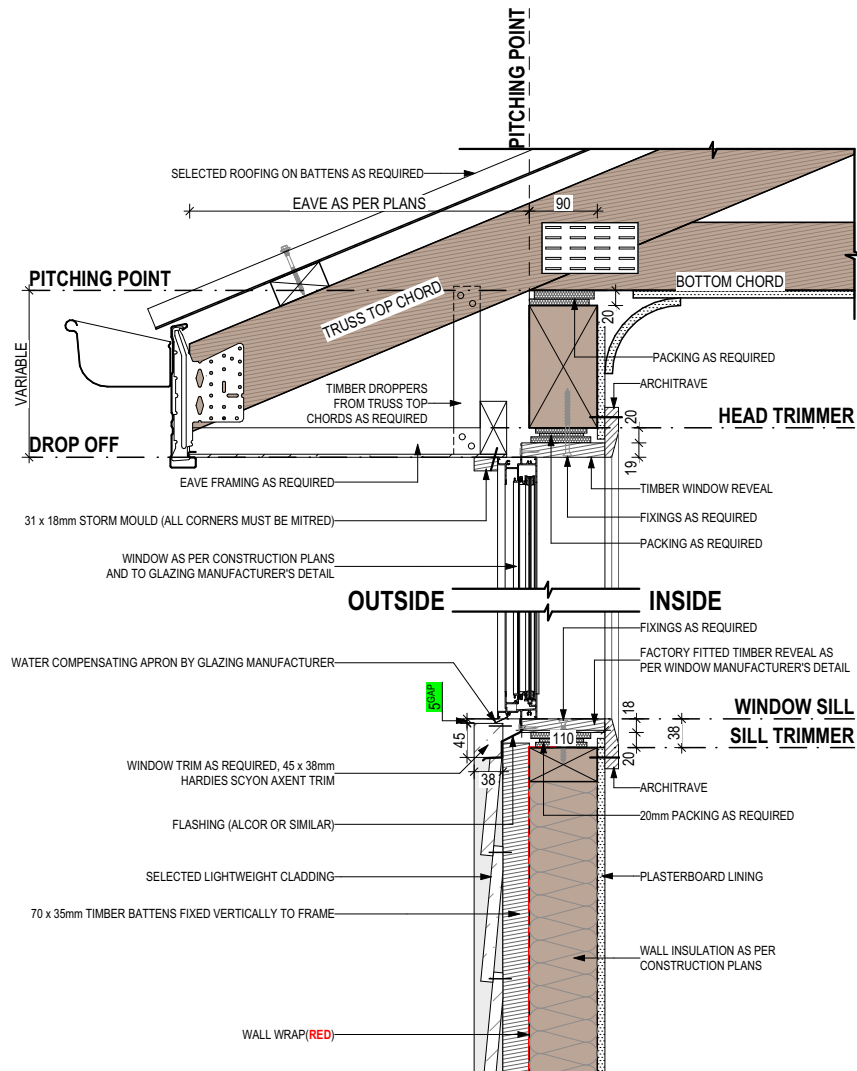
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FACADE DESIGN:	BRIGHTON
SHEET TITLE:	DETAILS - FACE BRICKWORK
SHEET No.:	13 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	

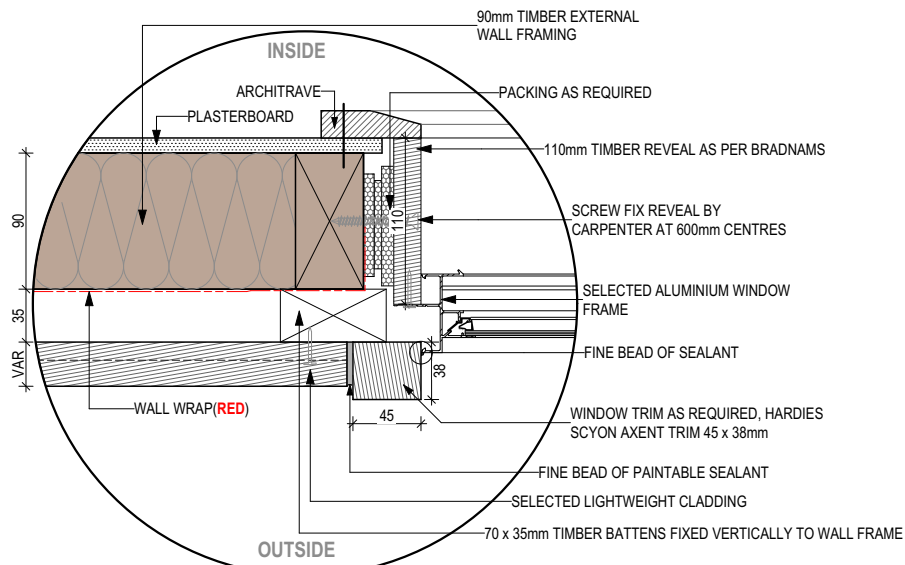
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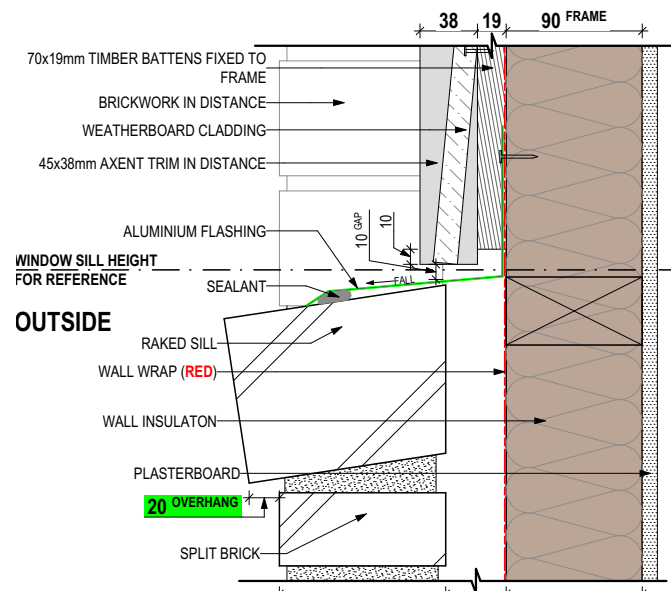
REFER TO W-CLAD-001 & W-CLAD-002 FOR FULL DETAIL



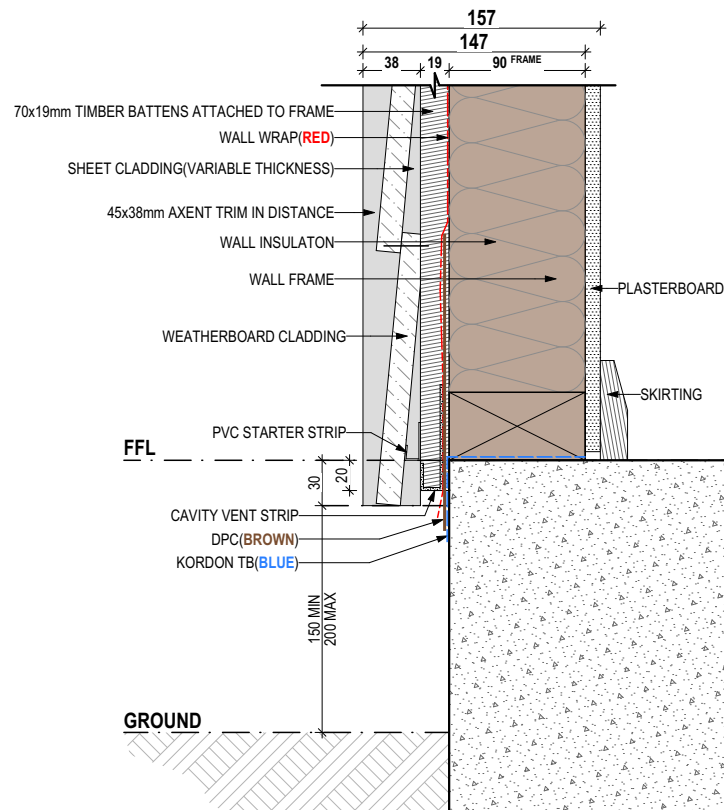
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SCALE: 1:10



DETAILS
SCALE: 1:5

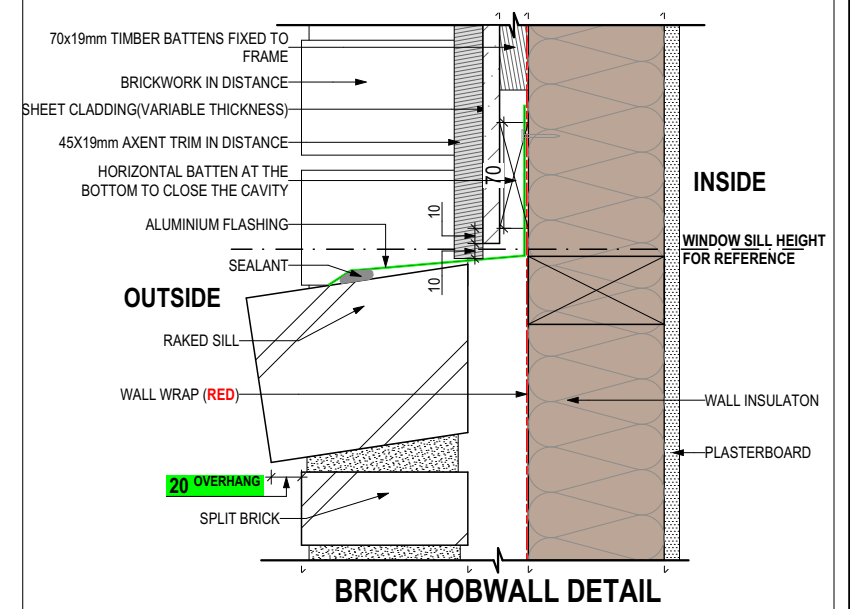


BRICK HOBWALL DETAIL 02
SCALE: 1:5

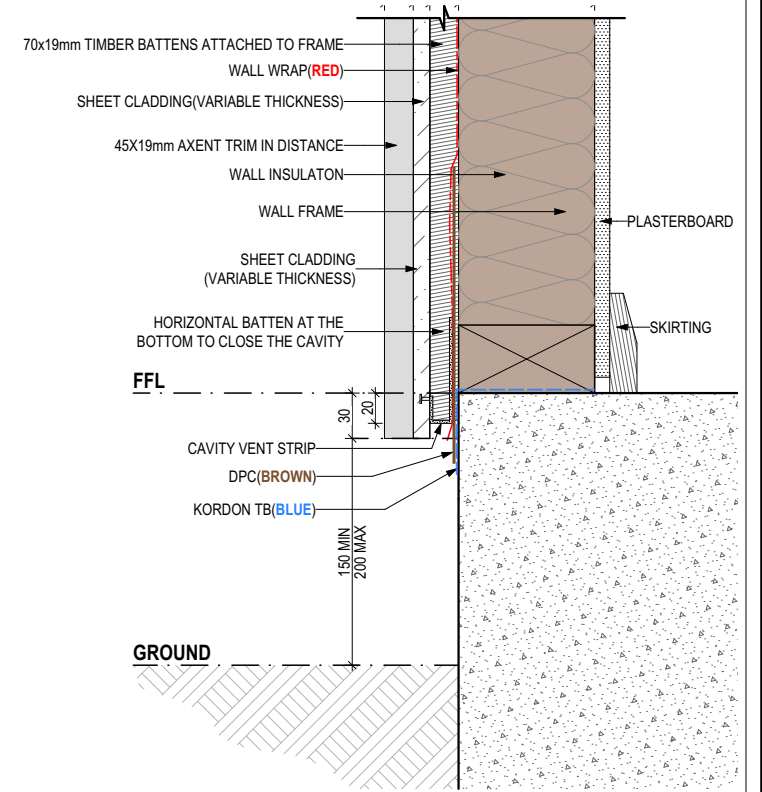


EDGE BEAM DETAIL
SCALE: 1:5

SHEET CLADDING



BRICK HOBWALL DETAIL



EDGE BEAM DETAIL

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9 PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2 2025.12.02

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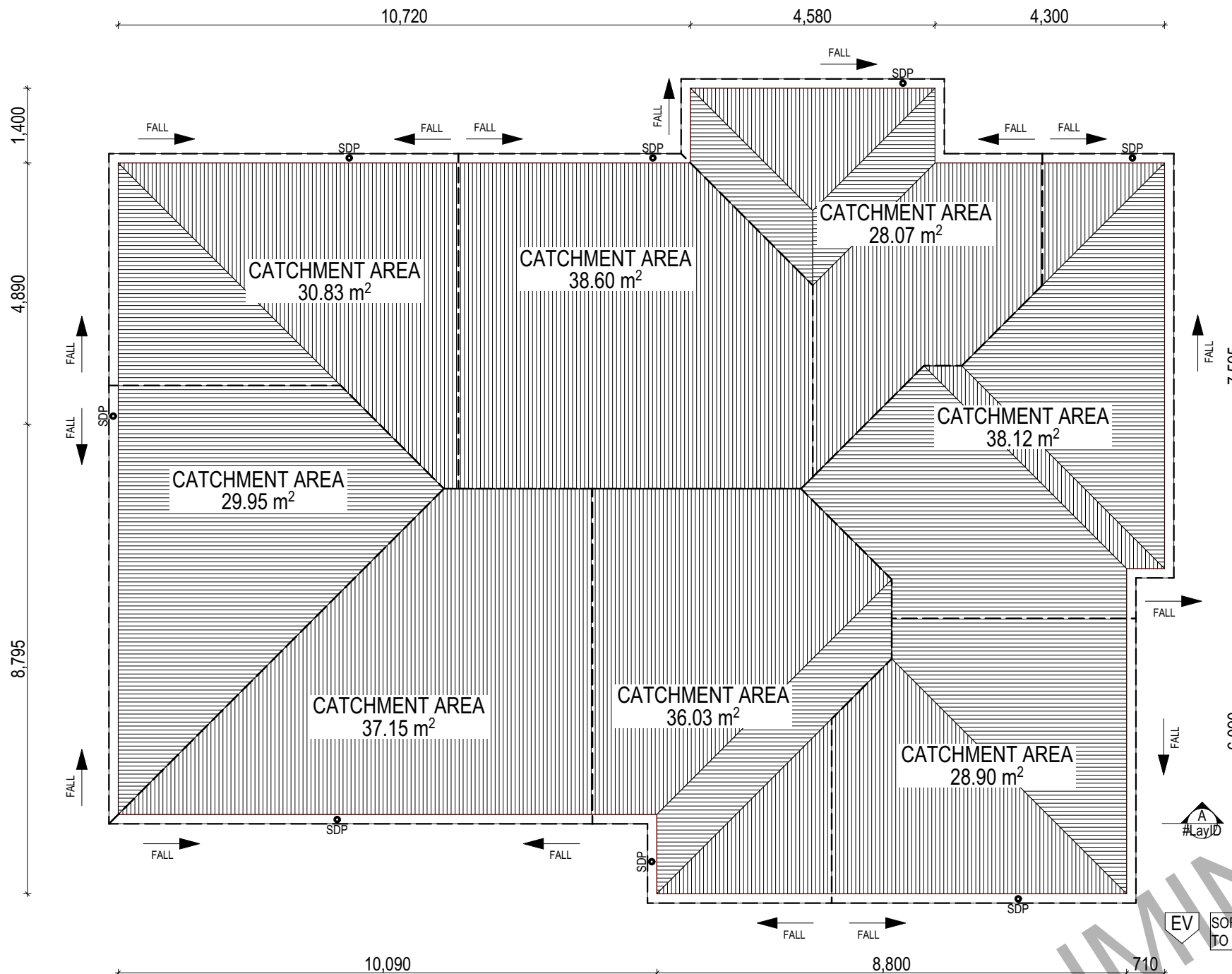
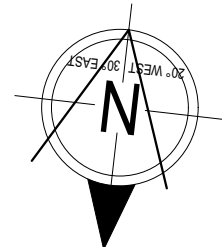
HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	DETAILS - CLADDING
SHEET No.:	14 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
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WHERE DOWNPIPES ARE FURTHER THAN 1.2m AWAY FROM VALLEY REFER TO N.C.C. 7.3.5(2)

POSITION AND QUALITY OF DOWNPIPES ARE NOT TO BE ALTERED WITHOUT CONSULTATION WITH DESIGNER.

AREA'S SHOWN ARE SURFACE AREAS/ CATCHMENT AREAS, NOT PLAN AREAS

Roofing Data		
	255.33	Flat Roof Area (excluding gutter and slope factor) (m ²)
	277.38	Roof Surface Area (includes slope factor, excludes gutter) (m ²)
Downpipe roof calculations (as per AS/NZA3500.3:2021)		
Ah	267.65	Area of roof catchment (including 115mm Slotted Quad Gutter) (m ²)
Ac	323.86	Ah x Catchment Area Multiplier for slope (Table 3.4.3.2 from AS/NZS 3500.3:2021) (1.21 for 23° pitch) (m ²)
Ae	6300	Cross sectional area of 57 x 115 Slotted Quad Gutter (mm ²)
DRI	86	Design Rainfall Intensity (determined from Table E1 from AS/NZS 3500.3:2021)
Acdp	64	Catchment area per Downpipe (determined from Figure 3.5(A) from AS/NZS 3500.3:2021) (m ²)
Required Downpipes	5.09	Ac / Acdp
Downpipes Provided	8	

EV SOFFIT EAVE VENT PROPOSED LOCATION TO BE MIN. 1M FROM CORNER JOINT

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6 PRELIM PLANS - RE-SITE & BAL UPDATE	RT2 2025.10.07
7 PRELIM PLANS - COLOUR UPDATE	TRV 2025.10.14
8 PRELIM PLANS - AMENDMENTS	PL1 2025.11.20
9 PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2 2025.12.02

CLIENT:	JEREMY TODD PRICE & RICHARD WAYNE BARNES
ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	ROOF DRAINAGE PLAN
SHEET No.:	15 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:100








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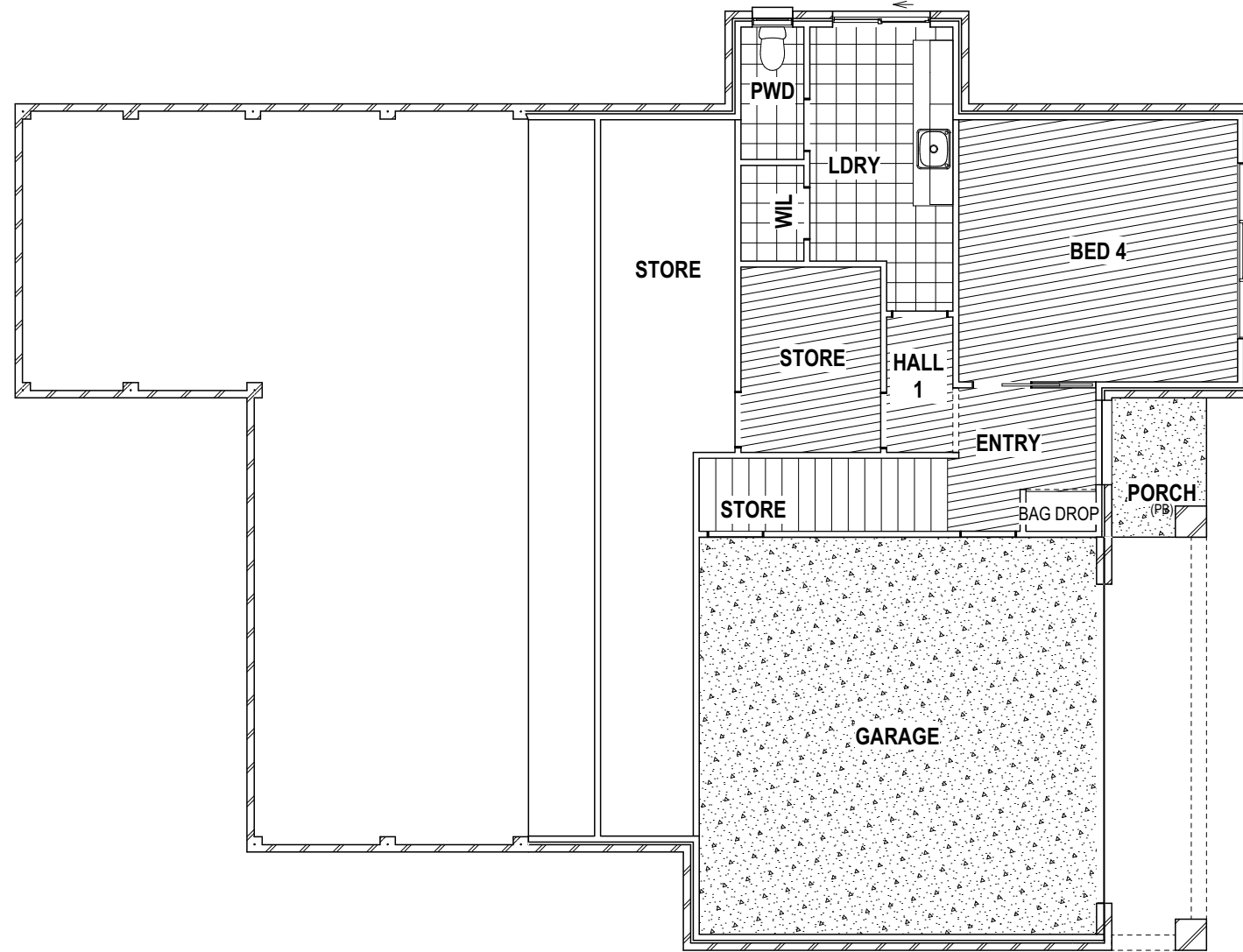
714346

REFER TO SHEET 1 (COVER SHEET) FOR ALL BUILDING INFORMATION REGARDING:
 - SUSTAINABILITY REQUIREMENTS
 - SITE CLASSIFICATION
 - GENERAL BUILDING INFORMATION

FLOOR TILES SHOWN ON PLAN DO NOT INDICATE THE SIZE OR JOINT LOCATIONS OF THE ACTUAL FLOOR TILES.
 TIMBER FLOORING SHOWN ON PLAN DOES NOT INDICATE THE BOARD SIZE OR DIRECTION OF THE ACTUAL FLOORING.

COVERINGS LEGEND

-  NO COVERING
-  COVER GRADE CONCRETE
-  CARPET
-  LAMINATE
-  TILE (STANDARD WET AREAS)
-  TILE (UPGRADED AREAS)
-  DECKING



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SIGNATURE:

DATE:

BAL-19 BUSHFIRE REQUIREMENTS
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CLIENT:	JEREMY TODD PRICE & RICHARD WAYNE BARNES
ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	FLOOR COVERINGS
SHEET No.:	16 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:100








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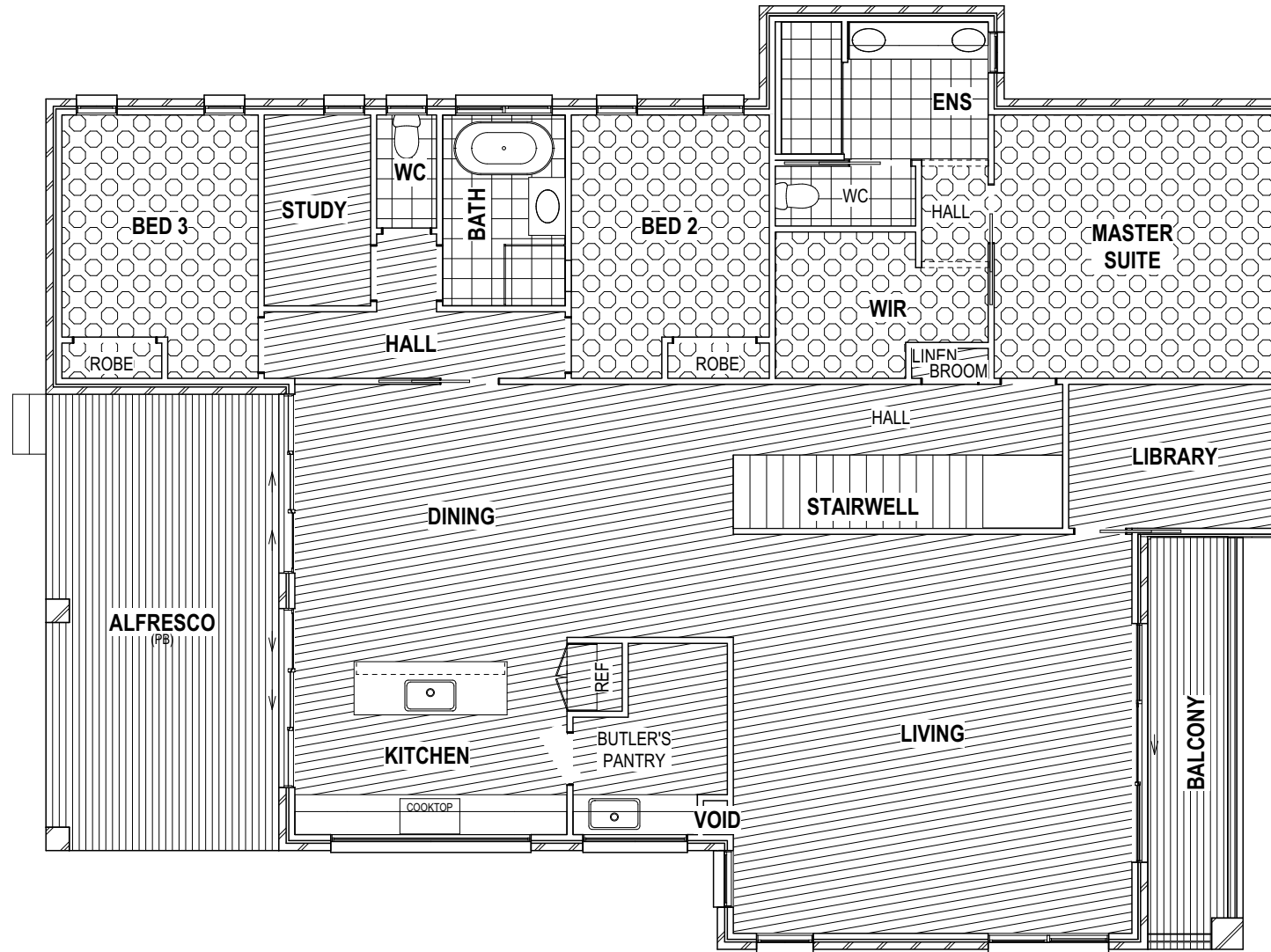
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 TIMBER FLOORING SHOWN ON PLAN DOES NOT INDICATE THE BOARD SIZE OR DIRECTION OF THE ACTUAL FLOORING.

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-  COVER GRADE CONCRETE
-  CARPET
-  LAMINATE
-  TILE (STANDARD WET AREAS)
-  TILE (UPGRADED AREAS)
-  DECKING



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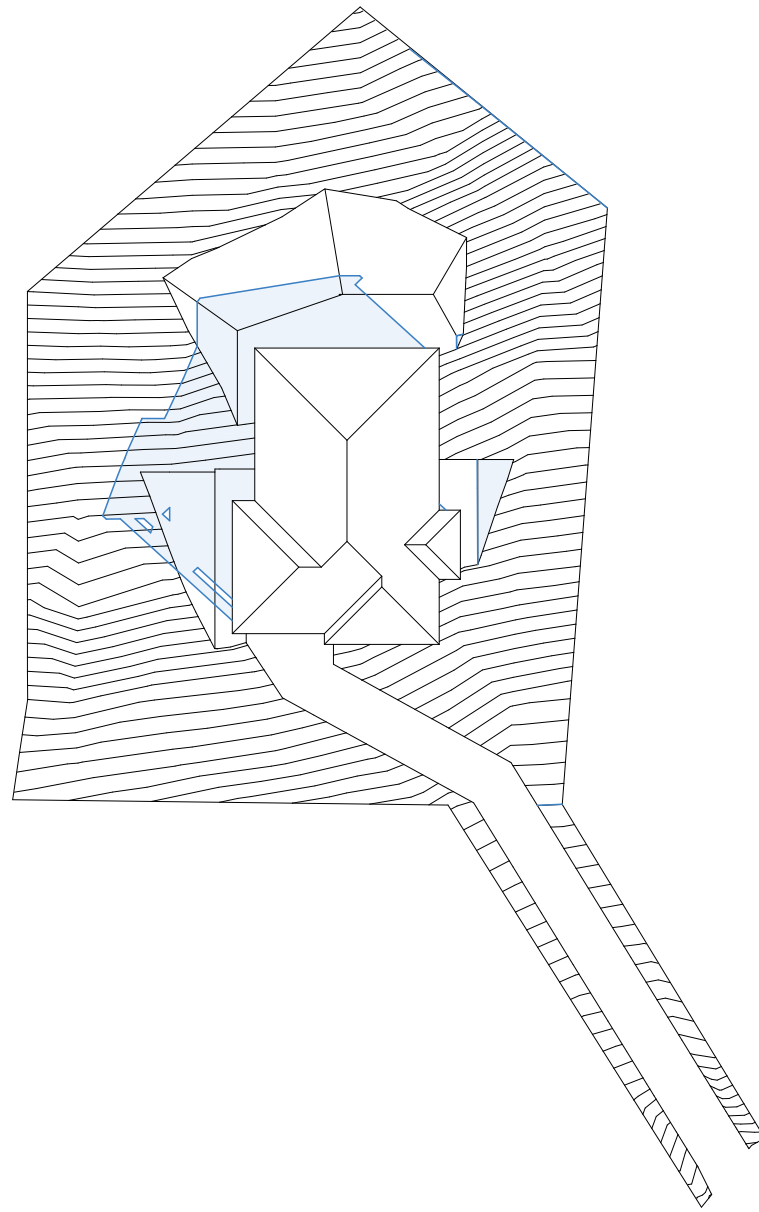
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CLIENT:
JEREMY TODD PRICE & RICHARD WAYNE BARNES
 ADDRESS:
7 INTRIGUE COURT, TRANMERE TAS
 LOT / SECTION / CT:
10 / - / 141047
 COUNCIL:
CLARENCE COUNCIL

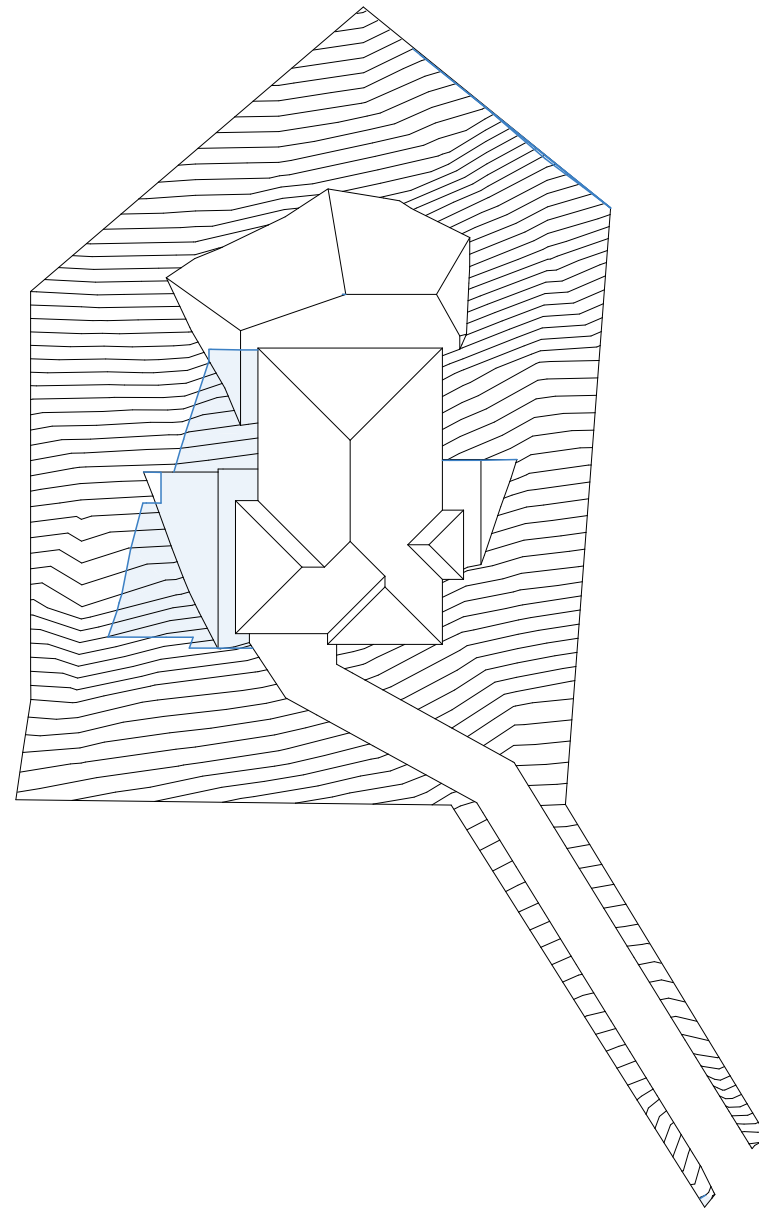
HOUSE DESIGN:
LAKESIDE
 FACADE DESIGN:
BRIGHTON
 SHEET TITLE:
FLOOR COVERINGS 2

HOUSE CODE:
H-WELLKS10LA
 FACADE CODE:
F-WELLKS10BRTNA
 SHEET No.:
17 / 33
 SCALES:
1:100

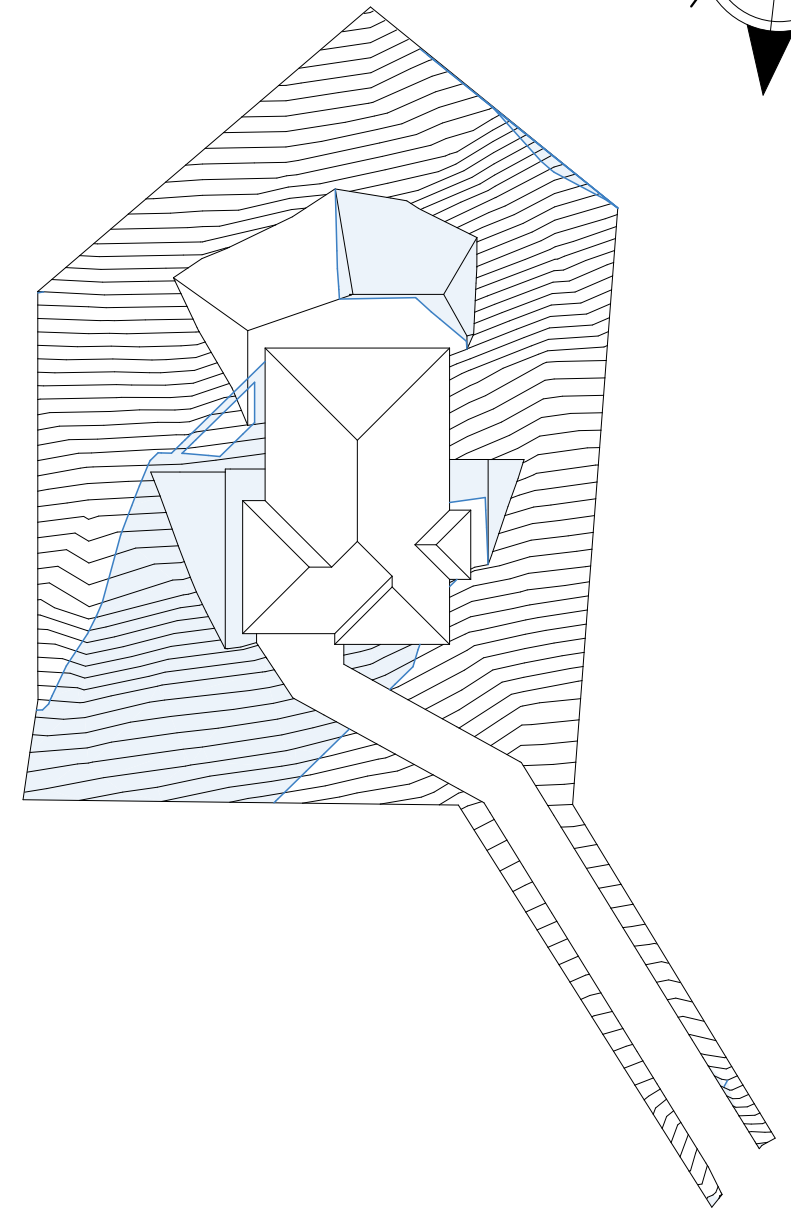
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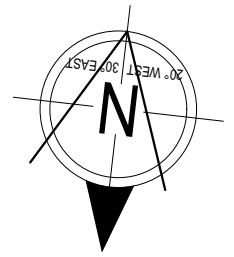
JUNE 21 - 0900



JUNE 21 - 1200



JUNE 21 - 1500



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COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	SHADOW DIAGRAMS - JUNE 21
SHEET No.:	18 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:500

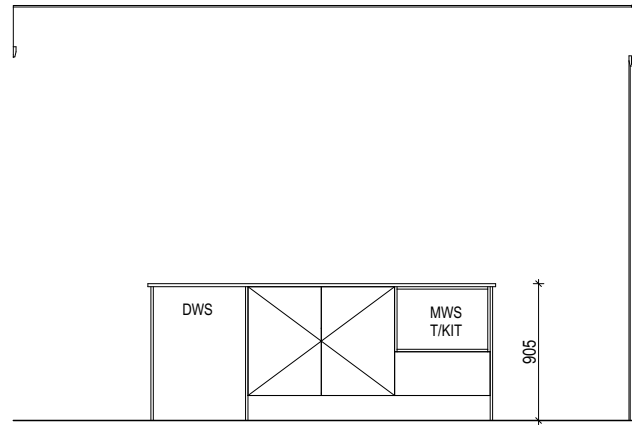
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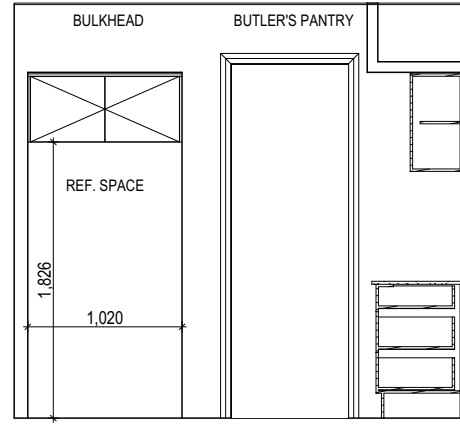
BAL-19 BUSHFIRE REQUIREMENTS
SEE SHEET 1 (COVER SHEET) FOR DETAILS

REFER TO SHEET 1 (COVER SHEET) FOR ALL BUILDING INFORMATION REGARDING:
- SUSTAINABILITY REQUIREMENTS
- SITE CLASSIFICATION
- GENERAL BUILDING INFORMATION

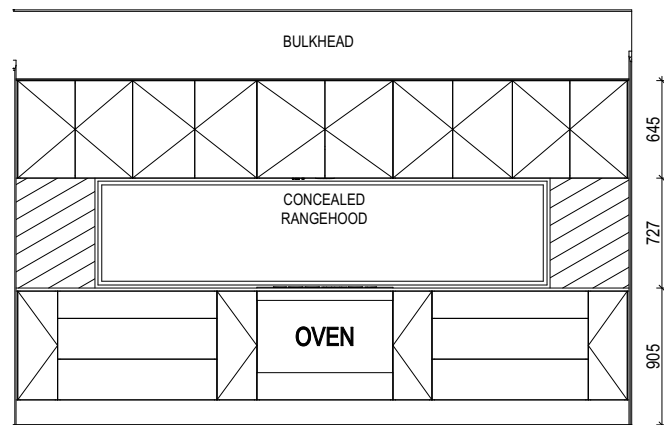
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ELEVATION A
Scale: 1:50



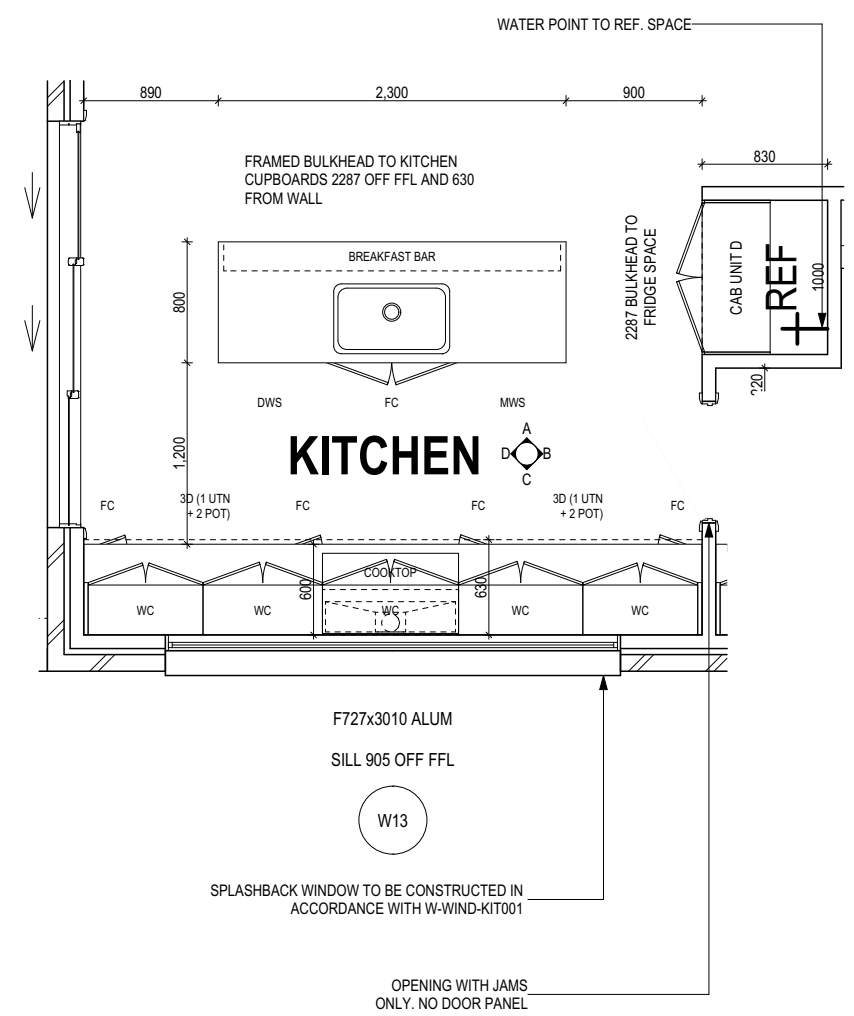
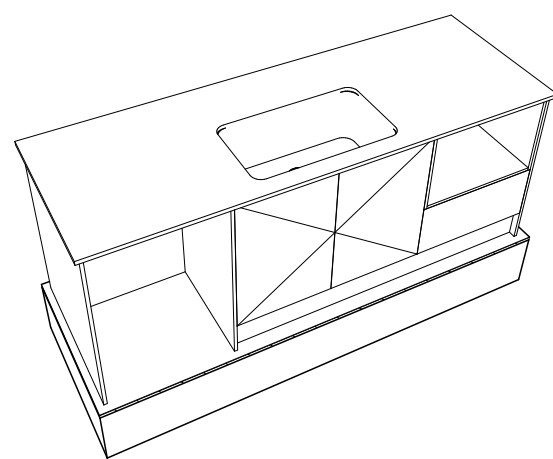
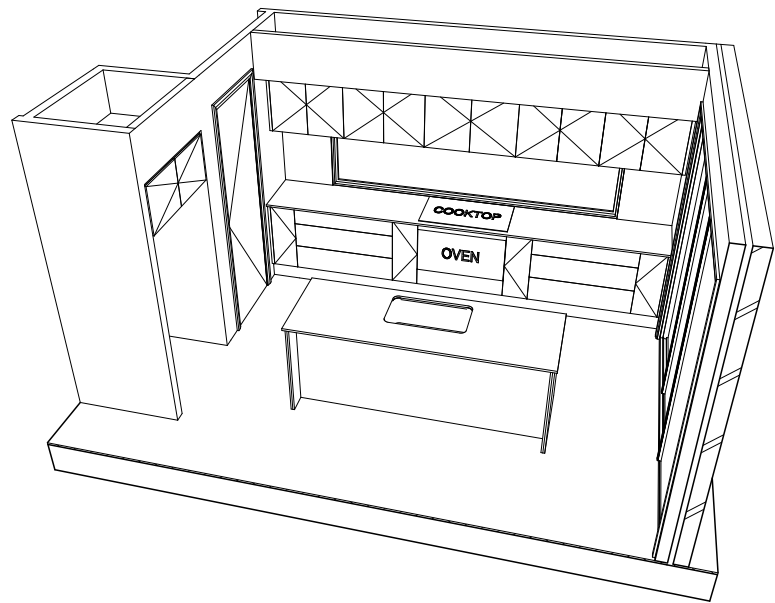
ELEVATION B
Scale: 1:50



ELEVATION C
Scale: 1:50



ELEVATION D
Scale: 1:50



KITCHEN PLAN
Scale: 1:50

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ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	KITCHEN DETAILS
SHEET No.:	19 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:50

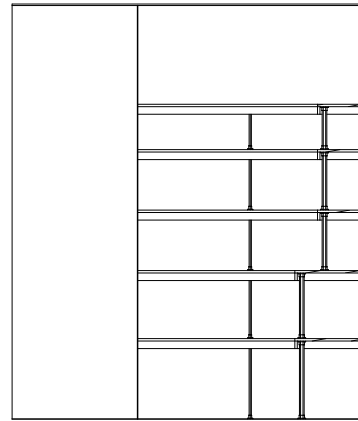
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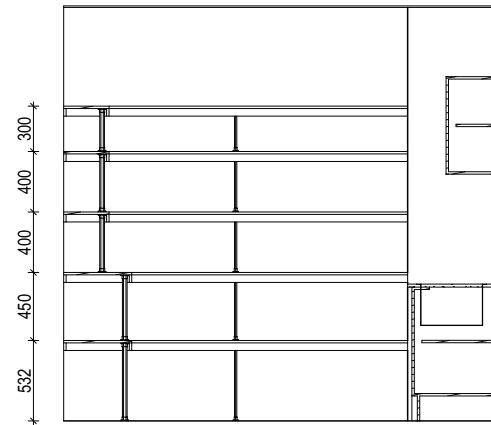
BAL-19 BUSHFIRE REQUIREMENTS
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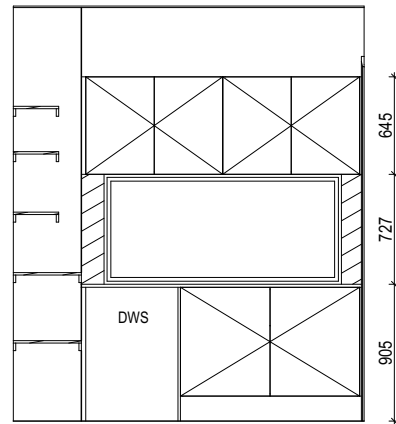
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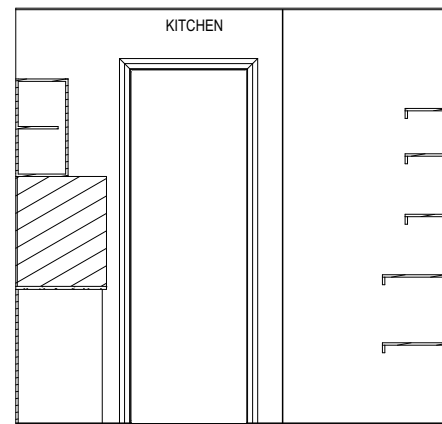
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Scale: 1:50



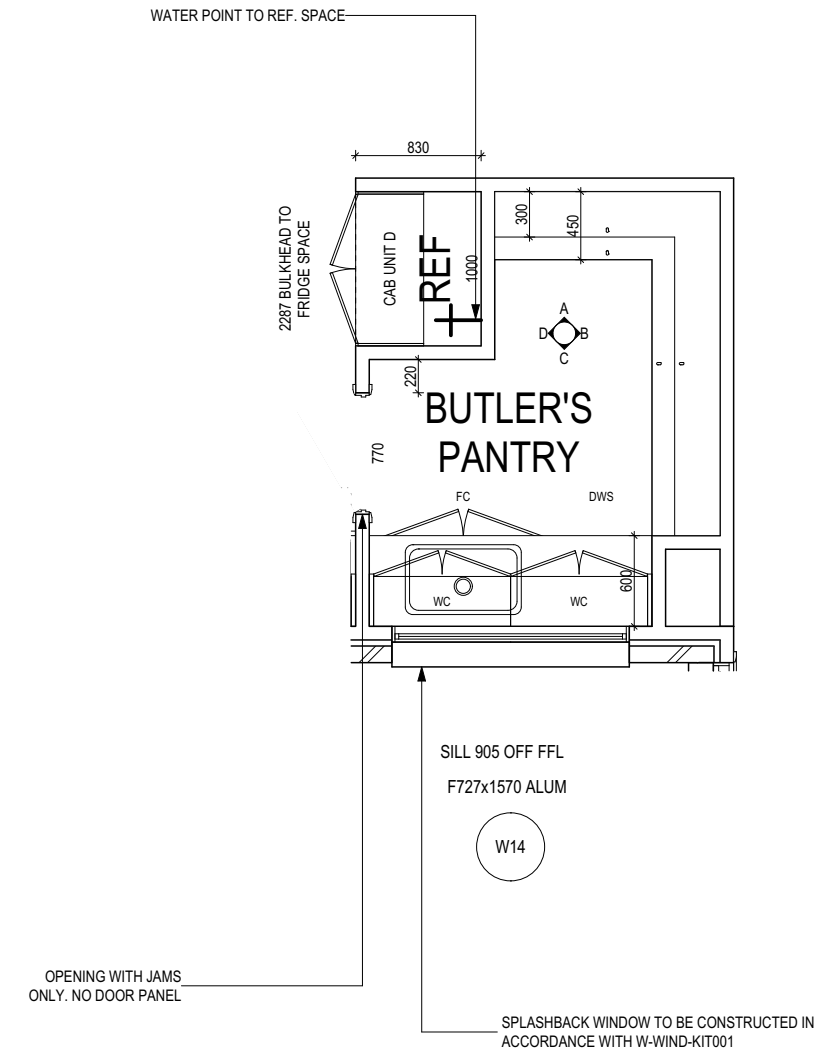
ELEVATION B
Scale: 1:50



ELEVATION C
Scale: 1:50



ELEVATION D
Scale: 1:50



BUTLER'S PANTRY PLAN
Scale: 1:50

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ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	BUTLER'S PANTRY DETAILS
SHEET No.:	20 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:50

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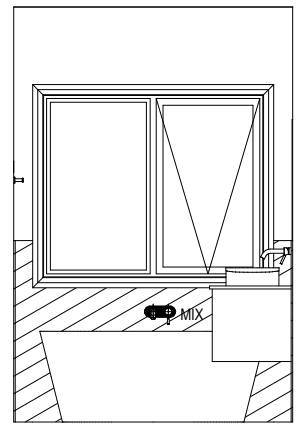
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BAL-19 BUSHFIRE REQUIREMENTS
SEE SHEET 1 (COVER SHEET) FOR DETAILS

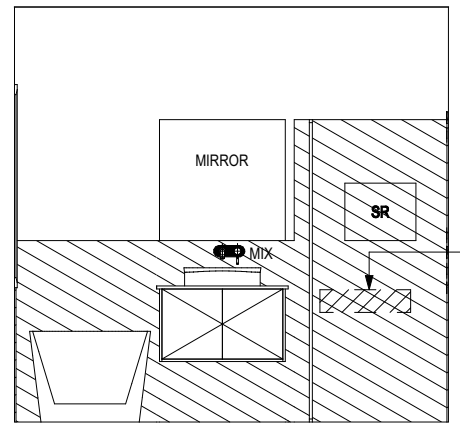
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- GENERAL BUILDING INFORMATION

DETAILS DEPICTED ON THIS SHEET ARE A REPRESENTATION ONLY

REFER TO THE FOLLOWING DETAILS:
VANITY DETAILS G-VANI-001
WINDOW OVER BATH HOB D-WIND-ALU001
STANDARD BATH HOB D-WETA-BATH003
WET AREA TILING LAYOUTS D-WETA-TILE002
SQUARE SET WINDOWS G-WIND-SSET02
FULL HEIGHT TILING D-LINI-WETA



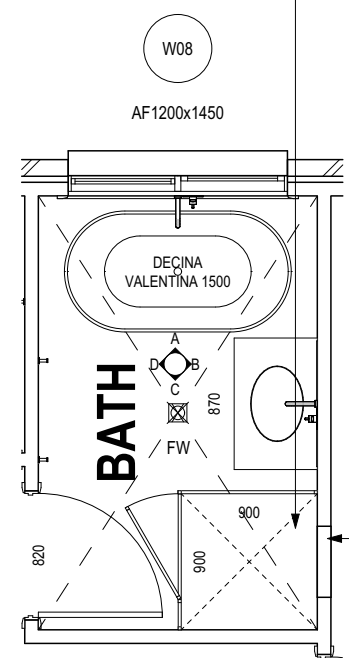
ELEVATION A
Scale: 1:50



ELEVATION B
Scale: 1:50

600 x 150 NOGGINGS . 800-810 HEIGHT (CTR LINE), OFFSET 250mm FROM WALL

THRESHOLD OF ACCESSIBLE SHOWER ENTRY TO BE MAX. 5MM. REFER TO BATHROOM DETAILS FOR LHA NOGGING LOCATIONS

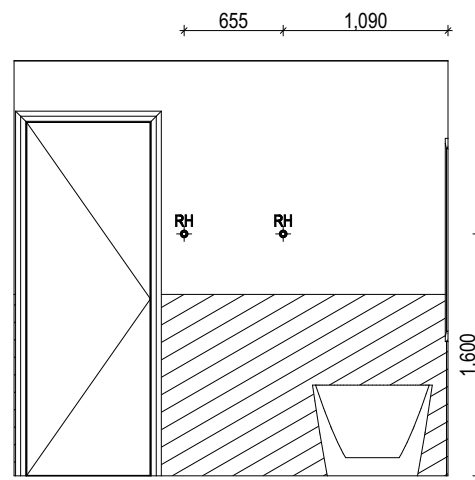


BATHROOM PLAN
Scale: 1:50

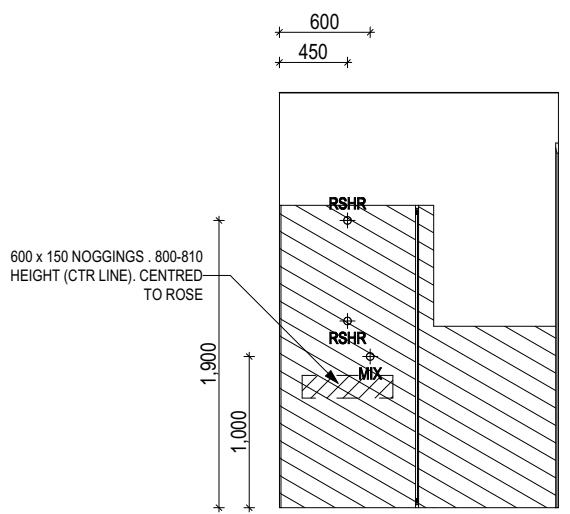
SMALL SHAMPOO RECESS REFER TO DETAIL G-WETA-TILE01

LEGEND

RSHR	RAIL SHOWER
ROSE	SHOWER ROSE
ELBW	SHOWER ELBOW CONNECTION
MIX	MIXER TAP
HT	HOT TAP
CT	COLD TAP
HS	HOB SPOUT
WS	WALL SPOUT
SC	STOP COCK
TRH	TOILET ROLL HOLDER
TR-S	TOWEL RAIL - SINGLE
TR-D	TOWEL RAIL - DOUBLE
TL	TOWEL LADDER
TH	TOWEL HOLDER
TR	TOWEL RACK
TMB	TUMBLER HOLDER
RNG	TOWEL RING
RH	ROBE HOOK
SHLF	SHELF
SR	SHAMPOO RECESS
SOAP	SOAP HOLDER



ELEVATION D
Scale: 1:50



ELEVATION C
Scale: 1:50

600 x 150 NOGGINGS . 800-810 HEIGHT (CTR LINE), CENTRED TO ROSE

SHAMPOO RECESS SIZE	WIDTH	HEIGHT
"SMALL"	470 x 380mm	548mm
"MEDIUM"	800 x 380mm	878mm
"LARGE"	1500 x 380mm	1578mm

REFER WILSON HOMES' DETAIL G-WETA-TILE01 FOR FURTHER DETAIL PRIOR TO INSTALLATION.

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COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	BATHROOM DETAILS
SHEET No.:	21 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:50

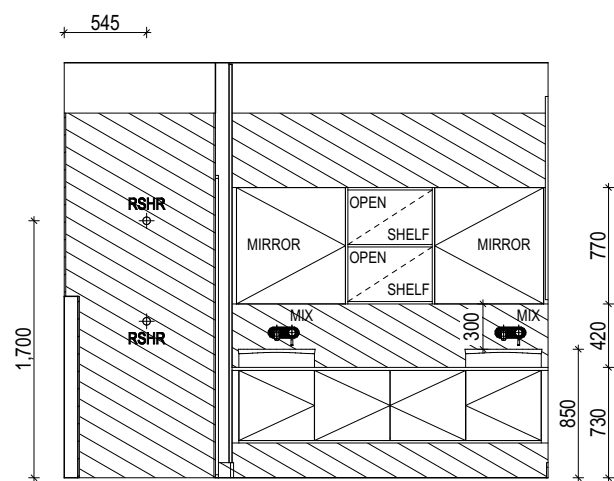
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714346

BAL-19 BUSHFIRE REQUIREMENTS
SEE SHEET 1 (COVER SHEET) FOR DETAILS

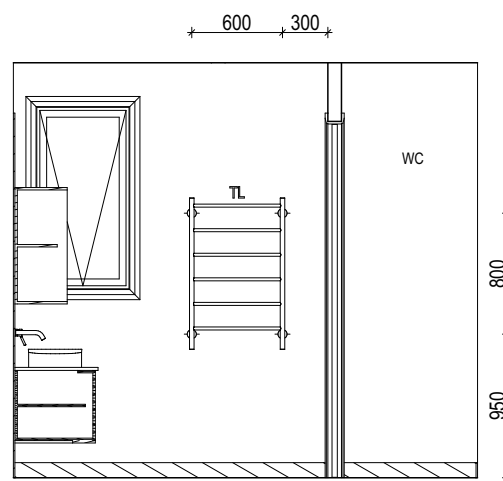
REFER TO SHEET 1 (COVER SHEET) FOR ALL BUILDING INFORMATION REGARDING:
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- SITE CLASSIFICATION
- GENERAL BUILDING INFORMATION

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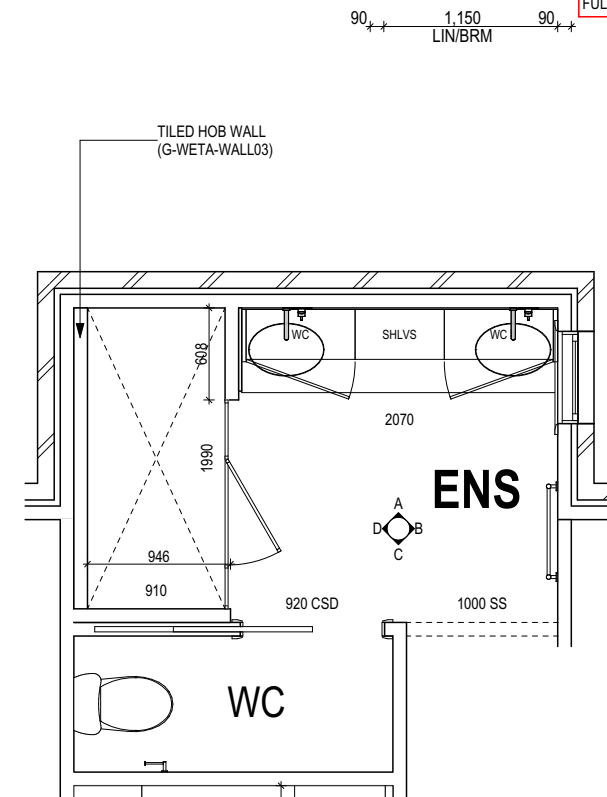
REFER TO THE FOLLOWING DETAILS:
VANITY DETAILS G-VANI-001
WINDOW OVER BATH HOB D-WIND-ALU001
STANDARD BATH HOB D-WETA-BATH003
WET AREA TILING LAYOUTS D-WETA-TILE002
SQUARE SET WINDOWS G-WIND-SSET02
FULL HEIGHT TILING D-LINI-WETA



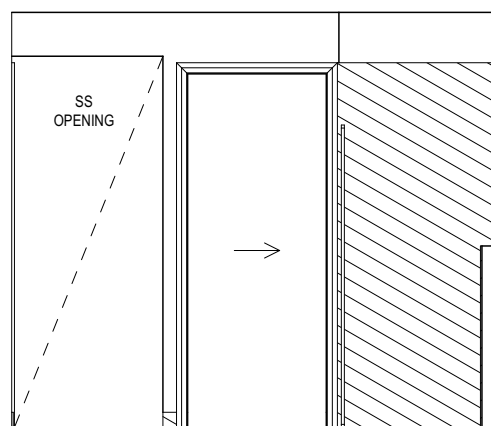
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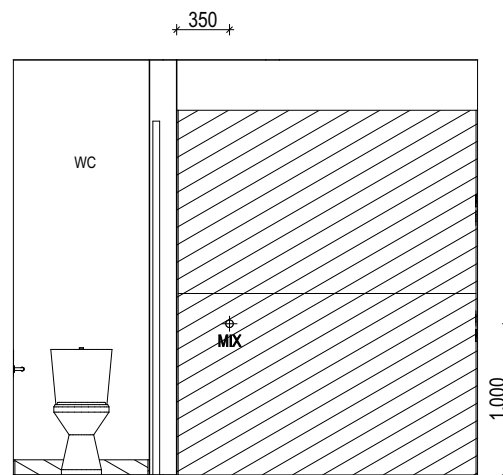
ELEVATION B
Scale: 1:50



ENSUITE PLAN
Scale: 1:50



ELEVATION C
Scale: 1:50



ELEVATION D
Scale: 1:50

LEGEND

- RSHR RAIL SHOWER
- ROSE SHOWER ROSE
- ELBW SHOWER ELBOW CONNECTION
- MIX MIXER TAP
- HT HOT TAP
- CT COLD TAP
- HS HOB SPOUT
- WS WALL SPOUT
- SC STOP COCK
- TRH TOILET ROLL HOLDER
- TR-S TOWEL RAIL - SINGLE
- TR-D TOWEL RAIL - DOUBLE
- TL TOWEL LADDER
- TH TOWEL HOLDER
- TR TOWEL RACK
- TMB TUMBLER HOLDER
- RNG TOWEL RING
- RH ROBE HOOK
- SHLF SHELF
- SR SHAMPOO RECESS
- SOAP SOAP HOLDER

SHAMPOO RECESS SIZE	WIDTH	HEIGHT
"SMALL"	470 x 380mm	548mm
"MEDIUM"	800 x 380mm	878mm
"LARGE"	1500 x 380mm	1578mm

REFER WILSON HOMES' DETAIL G-WETA-TILE01 FOR FURTHER DETAIL PRIOR TO INSTALLATION.

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SIGNATURE:

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7 PRELIM PLANS - COLOUR UPDATE	TRV 2025.10.14
8 PRELIM PLANS - AMENDMENTS	PL1 2025.11.20
9 PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2 2025.12.02

CLIENT:	JEREMY TODD PRICE & RICHARD WAYNE BARNES
ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	ENSUITE PLAN
SHEET No.:	22 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:50

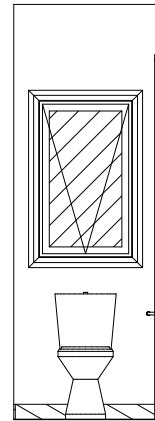
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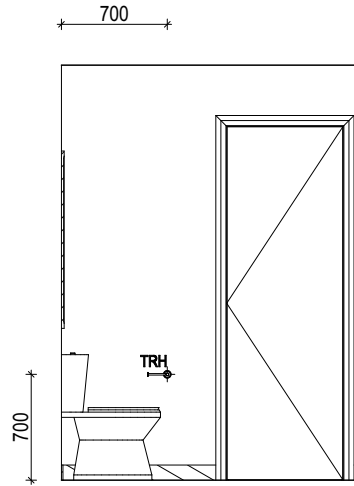
BAL-19 BUSHFIRE REQUIREMENTS
SEE SHEET 1 (COVER SHEET) FOR DETAILS

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- GENERAL BUILDING INFORMATION

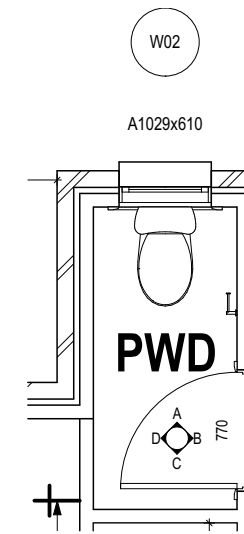
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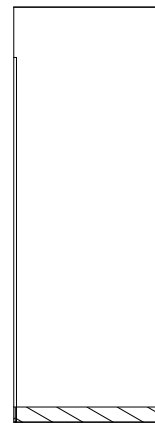
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Scale: 1:50



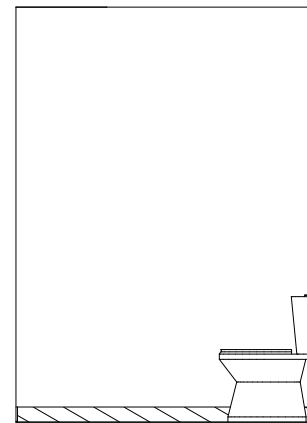
ELEVATION B
Scale: 1:50



POWDER ROOM PLAN
Scale: 1:50



ELEVATION C
Scale: 1:50



ELEVATION D
Scale: 1:50

LEGEND

- RSHR RAIL SHOWER
- ROSE SHOWER ROSE
- ELBW SHOWER ELBOW CONNECTION
- MIX MIXER TAP
- HT HOT TAP
- CT COLD TAP
- HS HOB SPOUT
- WS WALL SPOUT
- SC STOP COCK
- TRH TOILET ROLL HOLDER
- TR-S TOWEL RAIL - SINGLE
- TR-D TOWEL RAIL - DOUBLE
- TL TOWEL LADDER
- TH TOWEL HOLDER
- TR TOWEL RACK
- TMB TUMBLER HOLDER
- RNG TOWEL RING
- RH ROBE HOOK
- SHLF SHELF
- SR SHAMPOO RECESS
- SOAP SOAP HOLDER

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9 PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2 2025.12.02

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ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	POWDER ROOM DETAILS
SHEET No.:	23 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:50

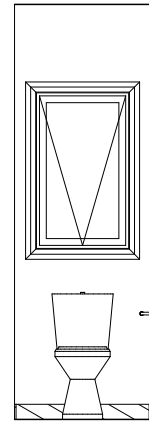
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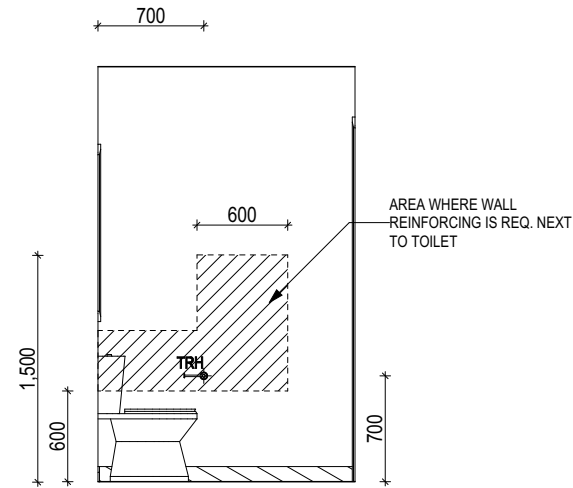
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- GENERAL BUILDING INFORMATION

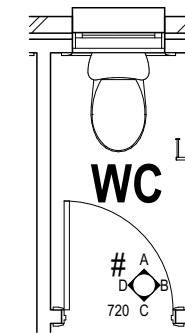
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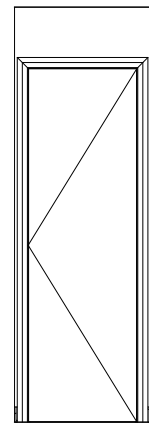
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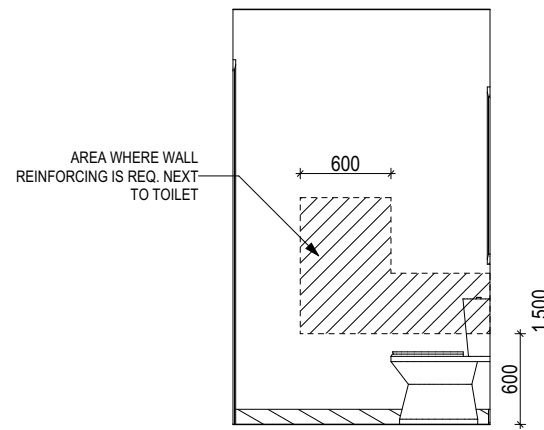
WC PLAN
Scale: 1:50

LEGEND

- RSHR RAIL SHOWER
- ROSE SHOWER ROSE
- ELBW SHOWER ELBOW CONNECTION
- MIX MIXER TAP
- HT HOT TAP
- CT COLD TAP
- HS HOB SPOUT
- WS WALL SPOUT
- SC STOP COCK
- TRH TOILET ROLL HOLDER
- TR-S TOWEL RAIL - SINGLE
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- TR TOWEL RACK
- TMB TUMBLER HOLDER
- RNG TOWEL RING
- RH ROBE HOOK
- SHLF SHELF
- SR SHAMPOO RECESS
- SOAP SOAP HOLDER



ELEVATION C
Scale: 1:50



ELEVATION D
Scale: 1:50

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7 PRELIM PLANS - COLOUR UPDATE	TRV 2025.10.14
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ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	WC DETAILS 1

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SHEET No.:	24 / 33
SCALES:	1:50

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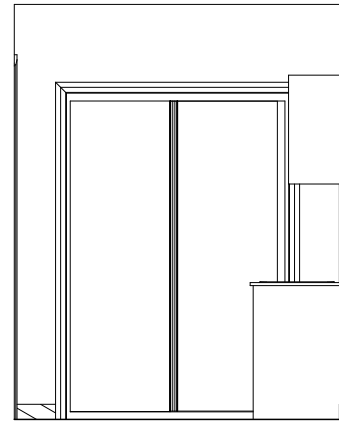
714346

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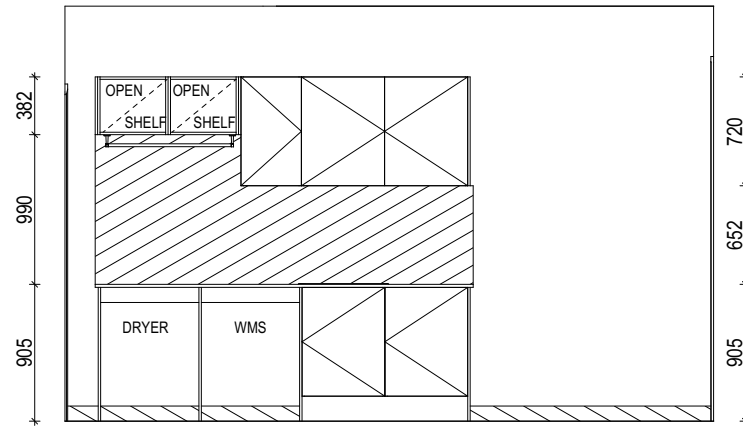
BAL-19 BUSHFIRE REQUIREMENTS
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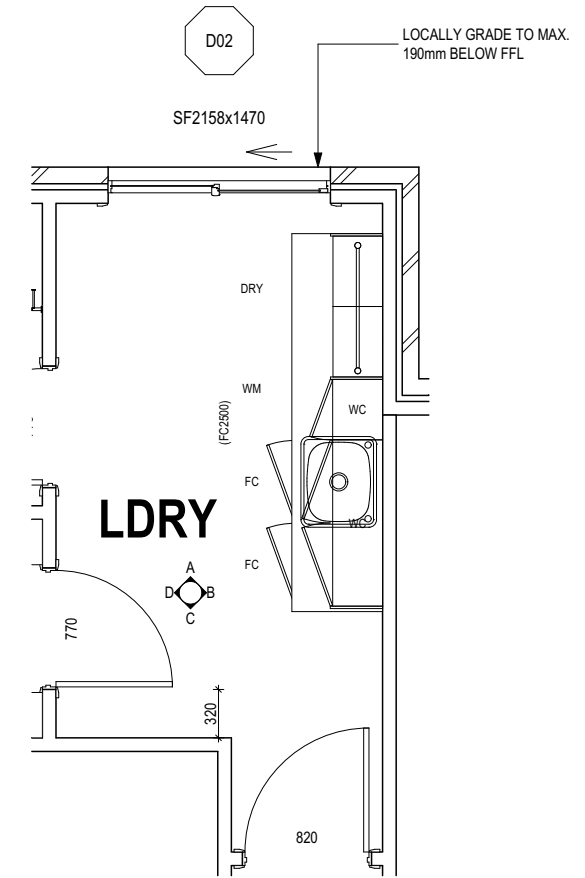
FIRST FLOOR WINDOW OPENINGS TO BE RESTRICTED AS REQUIRED BY THE NCC



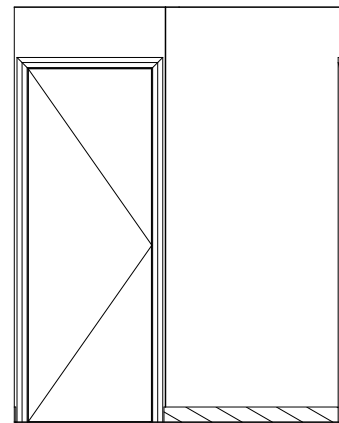
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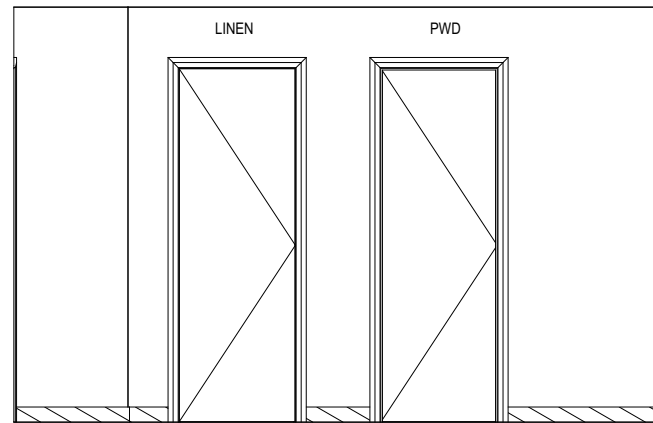
ELEVATION B
Scale: 1:50



LAUNDRY PLAN
Scale: 1:50



ELEVATION C
Scale: 1:50



ELEVATION D
Scale: 1:50

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ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	LAUNDRY DETAILS
SHEET No.:	25 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:50

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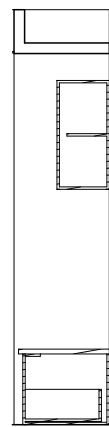
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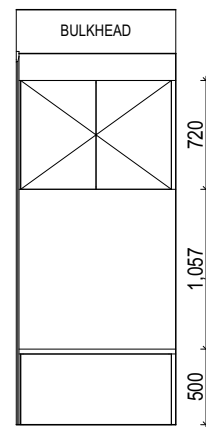
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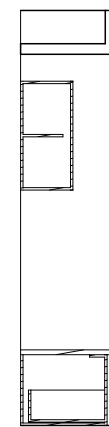
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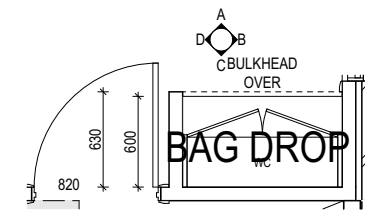
ELEVATION B
Scale: 1:50



ELEVATION C
Scale: 1:50



ELEVATION D
Scale: 1:50



BAG DROP PLAN
Scale: 1:50

LEGEND

- RSHR RAIL SHOWER
- ROSE SHOWER ROSE
- ELBW SHOWER ELBOW CONNECTION
- MIX MIXER TAP
- HT HOT TAP
- CT COLD TAP
- HS HOB SPOUT
- WS WALL SPOUT
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- RH ROBE HOOK
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- SOAP SOAP HOLDER

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LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	BAG DROP DETAILS
SHEET No.:	26 / 33

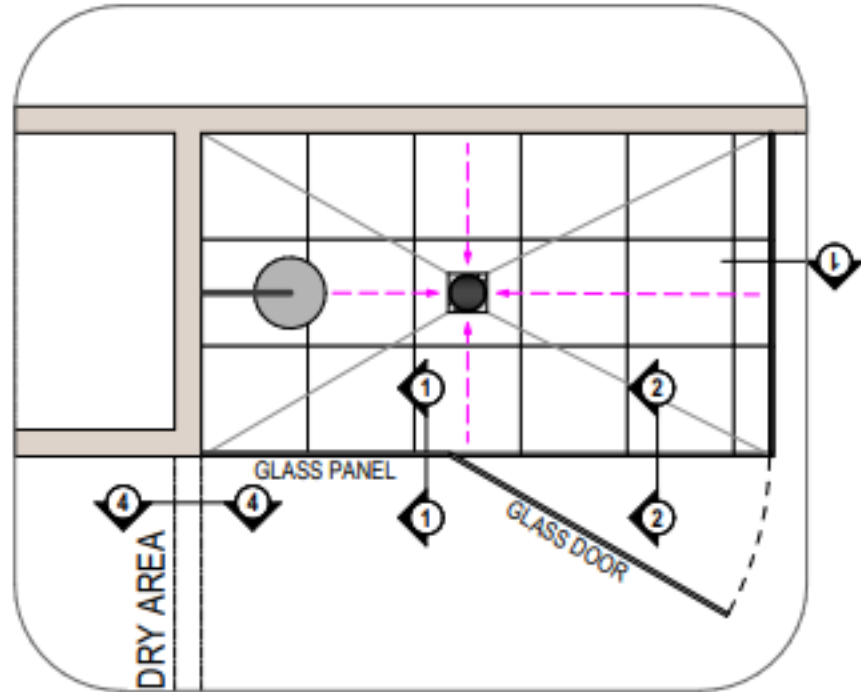
HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
SCALES:	1:50

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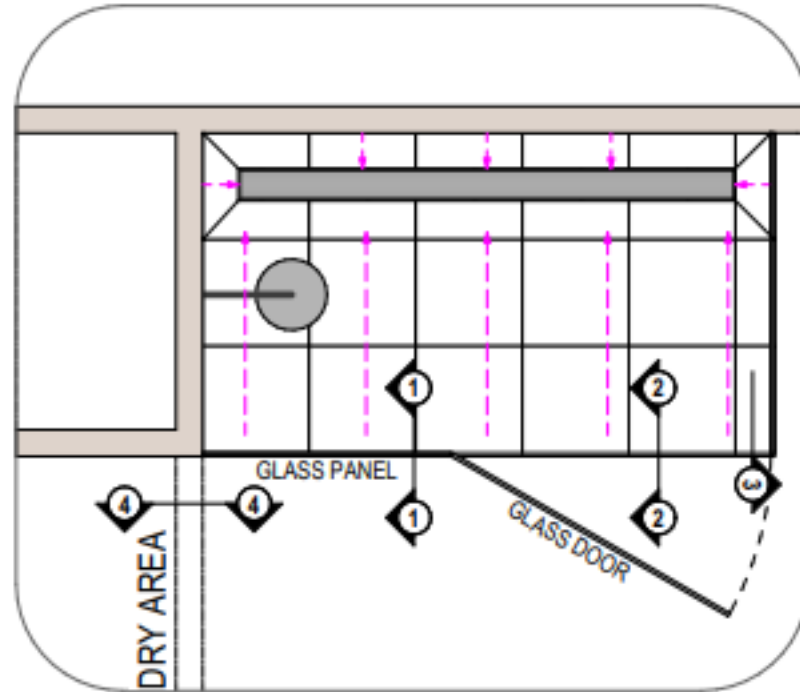
714346

STANDARD SHOWER & WATERPROOFING DETAIL

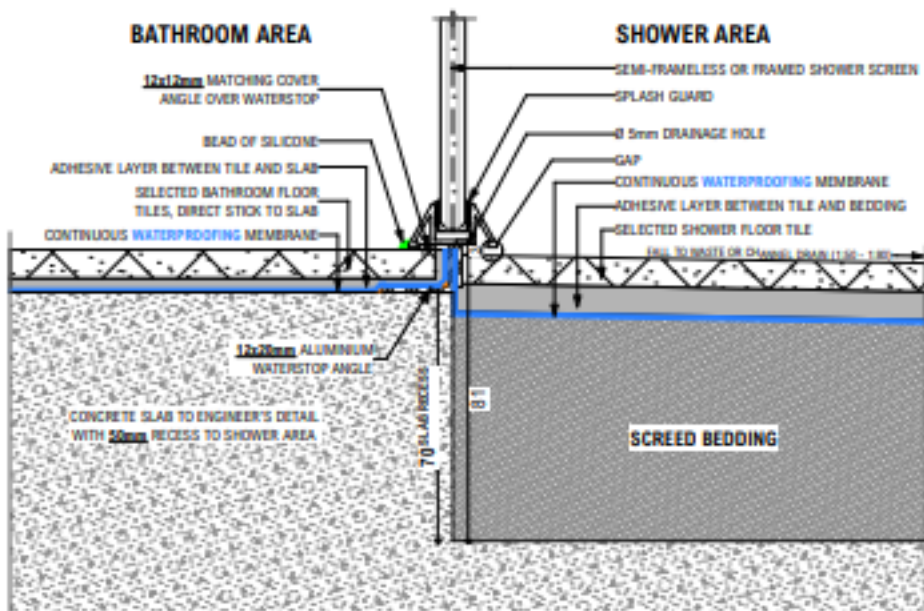
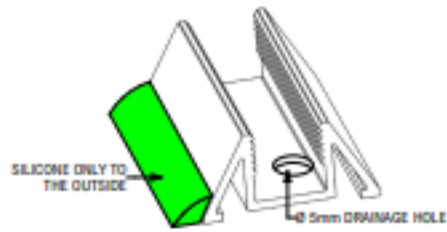
- ALL PLANS ARE DIAGRAMMATIC, REFER TO THE CONSTRUCTION PLANS FOR THE BATHROOM & SHOWER LAYOUTS.
 - DO NOT SILICONE THE BOTTOM OF THE FRAME ON THE SHOWER SIDE.



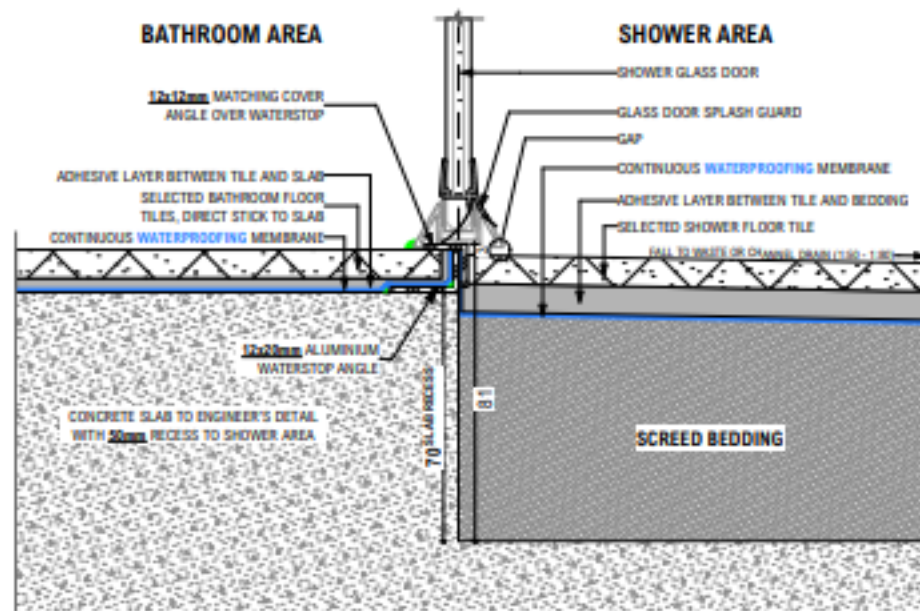
PLAN VIEW 1
(STANDARD FW)
SCALE: 1:20



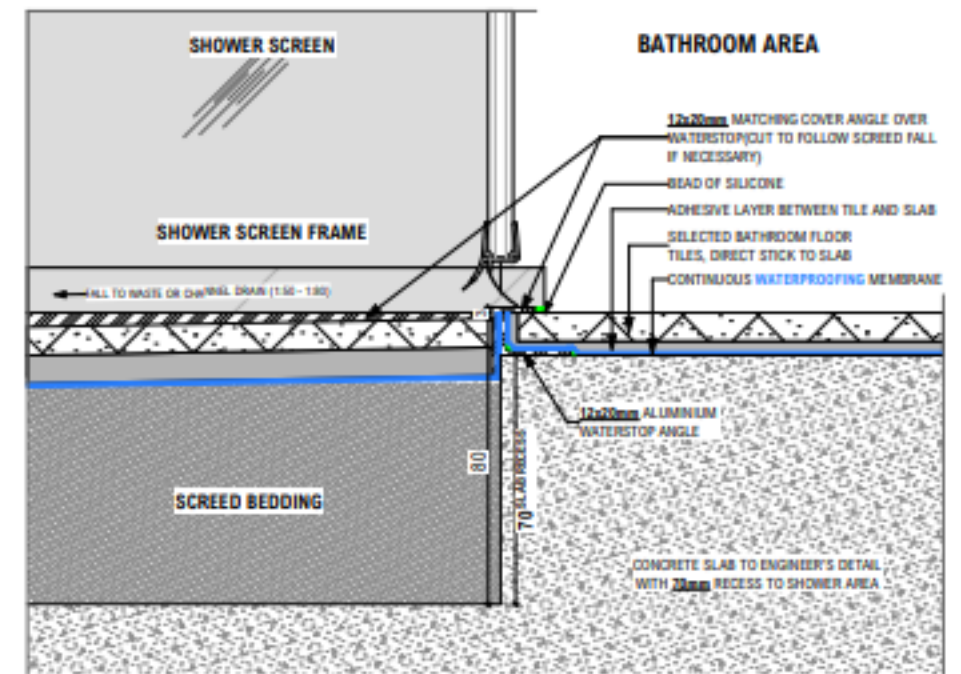
PLAN VIEW 2
(CHANNEL DRAIN)
SCALE: 1:20



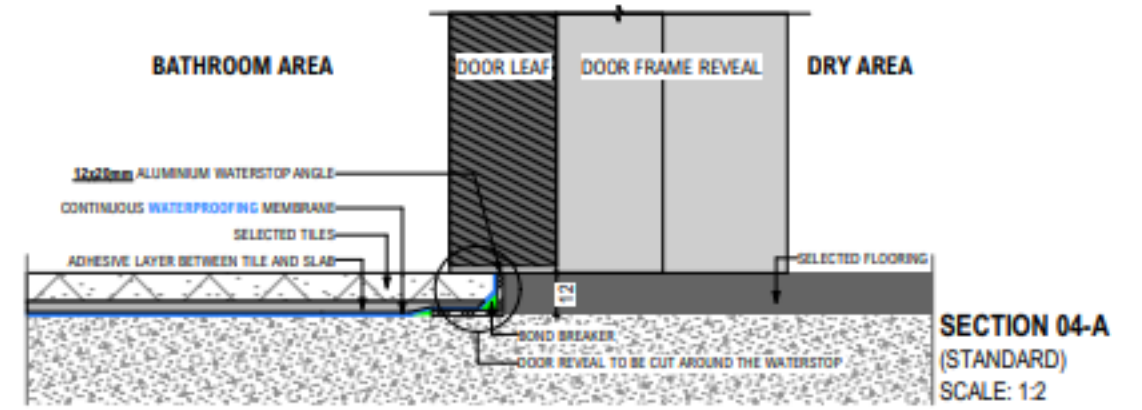
SECTION 01 - THROUGH GLASS SCREEN
SCALE: 1:2



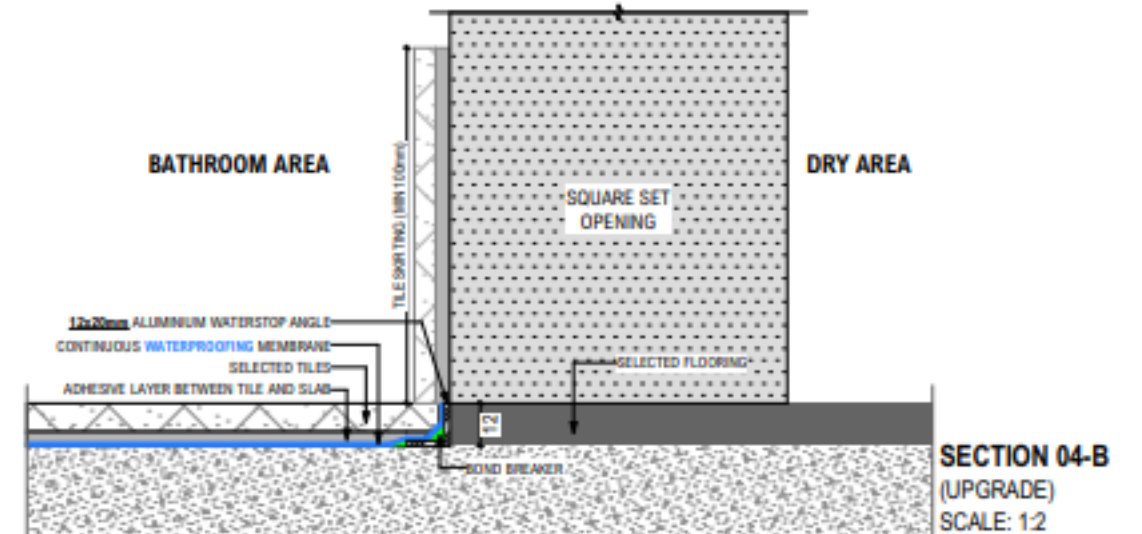
SECTION 02 - THROUGH GLASS DOOR
SCALE: 1:2



SECTION 03 - THROUGH GLASS SCREEN
SCALE: 1:2



SECTION 04-A
(STANDARD)
SCALE: 1:2



SECTION 04-B
(UPGRADE)
SCALE: 1:2

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5 PRELIM PLAN - INITIAL ISSUE	TRV 2025.09.12
6 PRELIM PLANS - RE-SITE & BAL UPDATE	RT2 2025.10.07
7 PRELIM PLANS - COLOUR UPDATE	TRV 2025.10.14
8 PRELIM PLANS - AMENDMENTS	PL1 2025.11.20
9 PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2 2025.12.02

CLIENT:	JEREMY TODD PRICE & RICHARD WAYNE BARNES
ADDRESS:	7 INTRIGUE COURT, TRANMERE TAS
LOT / SECTION / CT:	10 / - / 141047
COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	STANDARD SHOWER & WATERPROOFIN
SHEET No.:	27 / 33

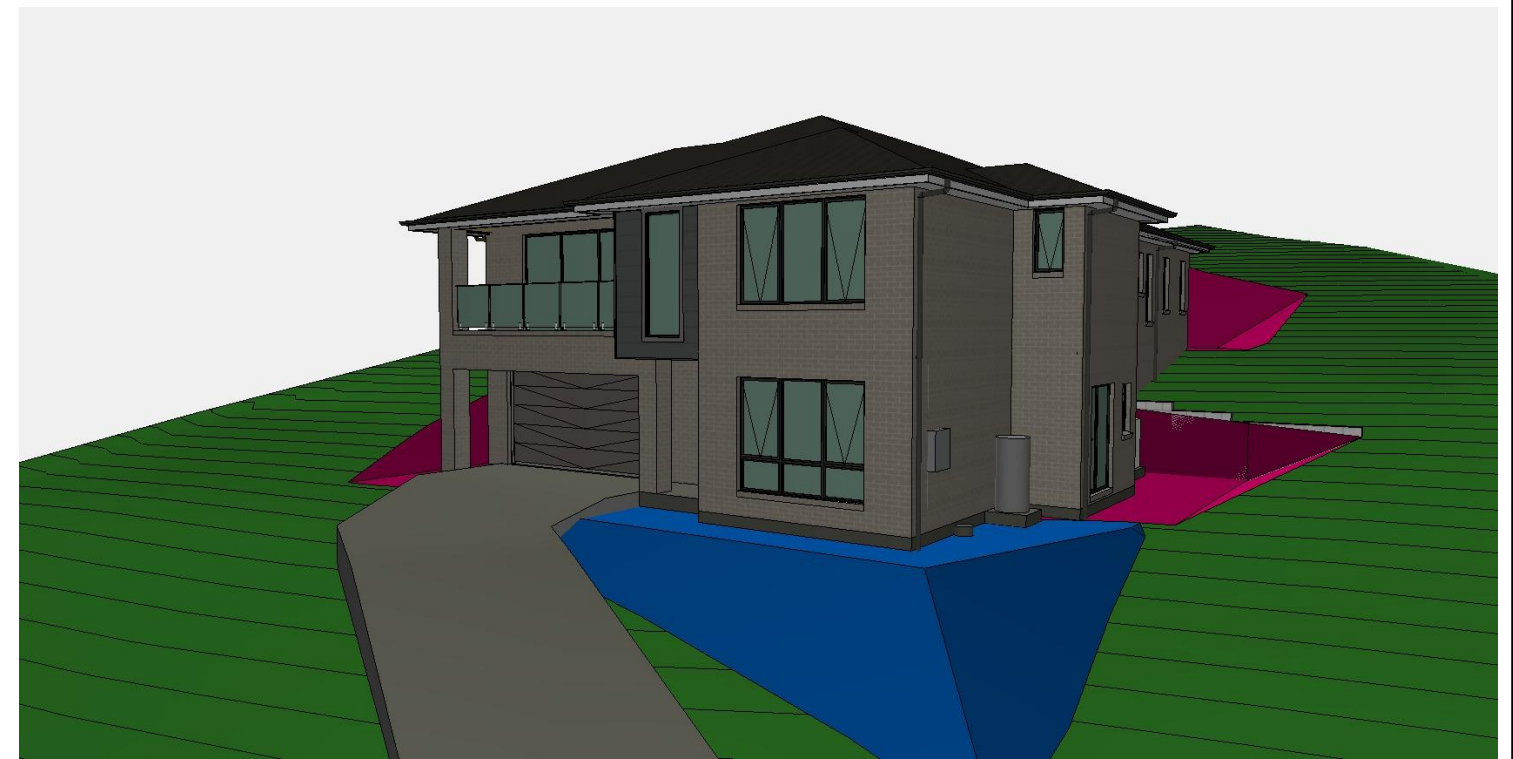
HOUSE CODE:	H-WELLKS10LA
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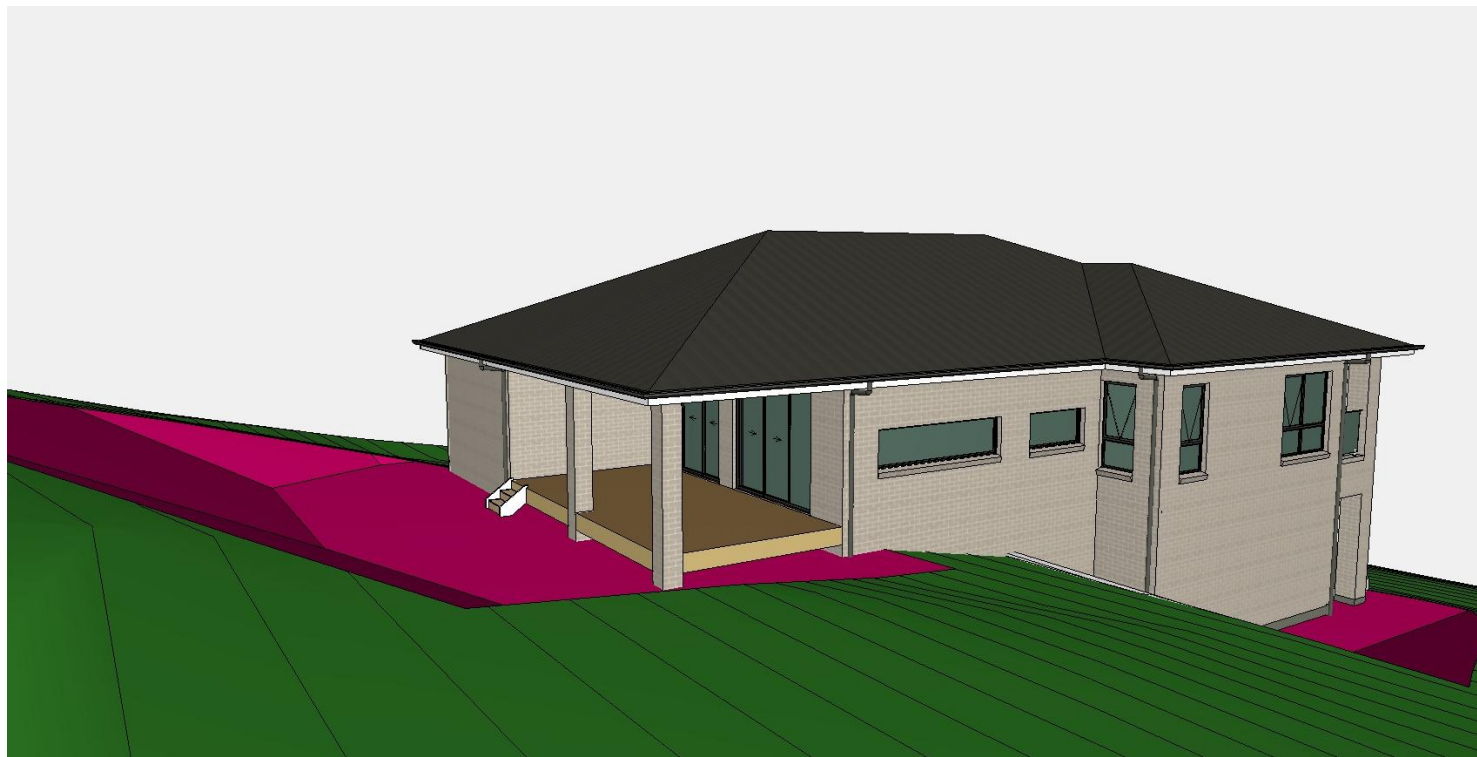
714346



FRONT LEFT 3D



FRONT RIGHT 3D



REAR LEFT 3D



REAR RIGHT 3D

NOTE: SITE LEVELS AND SETBACKS SHOWN ARE INDICATIVE ONLY AND SUBJECT TO A FINAL CONTOUR SURVEY AND REGISTERED REPORTS BEING COMPLETED. 3D IMAGES ARE FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE.

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HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	3D VIEWS
SHEET No.:	28 / 33

HOUSE CODE:	H-WELLKS10LA
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GENERAL

- BUILDER TO VERIFY ALL DIMENSIONS AND LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK
- ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE NATIONAL CONSTRUCTION CODE (N.C.C.)
- INTERNAL DIMENSIONS ARE TO WALL FRAMING ONLY AND DO NOT INCLUDE WALL LININGS

SITE WORKS

- CUT AND FILL BATTERS ARE INDICATIVE ONLY. BATTER TO COMPLY WITH THE N.C.C. TABLE 3.2.1
- ALL CUTS AND FFL'S SHOWN (DA DRAWINGS) ARE SUBJECT TO ENGINEERING ADVICE ONCE A SATISFACTORY SOIL TEST HAS BEEN RECEIVED AND REVIEWED
- ALL EMBANKMENTS THAT ARE LEFT EXPOSED MUST BE STABILISED WITH VEGETATION OR SIMILAR TO PREVENT EROSION
- EMBANKMENTS CANNOT EXCEED 2.0m IN HEIGHT WITHOUT THE AID OF RETAINING WALLS OR OTHER APPROVED TYPES OF SOIL RETAINING METHODS
- ALL UNPROTECTED EMBANKMENTS MUST COMPLY WITH THE SLOPE RATIOS FOR SOIL TYPE IN TABLE 3.2.1 OF THE N.C.C.

SOIL TYPE / CLASSIFICATION	EMBANKMENT OF SLOPE	
	COMPACTED FILL	CUT
STABLE ROCK (A)	3 : 3	8 : 1
SAND (A)	1 : 2	1 : 2
SILT (P)	1 : 4	1 : 4
FIRM CLAY	1 : 2	1 : 1
SOFT CLAY	NOT SUITABLE	2 : 3
SOFT SOILS (P)	NOT SUITABLE	NOT SUITABLE

MASONRY

- ALL MASONRY TO BE CONSTRUCTED IN ACCORDANCE WITH AS3700
- EXTERNAL WALLS TO BE 110mm BRICKWORK UNLESS NOTED OTHERWISE
- MORTAR MIXED @ 1:1:6 CEMENT:LIME:SAND UNLESS STATED OTHERWISE BY ENGINEER
- DAMP-PROOF COURSE IN ALL PERIMETER WALLS CUT INTO EXTERNAL WALLS BELOW FLOOR LEVEL WITH WEEP HOLES @ 1200 CTRS IN ACCORDANCE WITH AS2904
- VERTICAL ARTICULATION JOINTS TO BE PROVIDED @ 6m MAX. CTRS FOR UNREINFORCED MASONRY WALLS EXCEPT WHERE BUILT ON CLASS A OR S SOIL AND SPACED AS PER AS3700 SECTION 12.6.4. WILSON HOMES REQUEST THAT @ 5M CTRS.
- WHERE NECESSARY, STEEL LINTELS ARE TO BE PROVIDED IN ACCORDANCE WITH AS4100 AND AS3700a

TIMBER FRAMING

- ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT N.C.C.
- ALL TIMBER FRAMING TO BE CARRIED OUT IN ACCORDANCE WITH AS1684
- MGP10 PINE FRAMING OR F17 SOLID AND FINGER JOINED FRAMING TO ALL STRUCTURAL COMPONENTS. 90 x 35mm FRAMING TO INTERNAL AND EXTERNAL WALLS. TIMBER COMPOSITE ENGINEERED ROOF TRUSSES WITH HARDWOOD AND MGP COMPONENTS
- GALVANISED WALL TIES TO MASONRY @ 450 CTRS HORIZONTALLY AND 600 CTRS VERTICALLY, WITH SPACING REDUCED BY 50% AROUND OPENINGS

BRACING / LINTELS

- WALL BRACING AS PER AS1684-2 2021 AND AS1170 WIND LOADS
- WALL BRACING AS SHOWN ON PLAN IS A MINIMUM ONLY. BUILDER TO PROVIDE ADDITIONAL BRACING TO SUIT THE CONSTRUCTION OF WALL FRAMES IN ACCORDANCE WITH GOOD BUILDING PRACTICE.
- PLYWOOD BRACING IN ACCORDANCE WITH AS1684
- 65 x 19mm HW DIAGONAL TIMBER BRACING CHECKED INTO STUDS AND FIXED IN ACCORDANCE WITH AS1684

TIMBER LINTELS FOR SINGLE (OR UPPER STORY) TO BE F17 HARDWOOD AS FOLLOWS:
 0 - 1500 120 x 35
 1500 - 2400 140 x 35
 2400 - 2700 190 x 35

TIEDOWN AND FIXING CONNECTIONS TO COMPLY WITH AS1684

STEEL LINTELS FOR SINGLE (OR UPPER STOREY) TO BE AS FOLLOWS:
 0 - 2700 90 x 90 x 6 EA
 2700 - 3200 100 x 100 x 8 EA
 3200 - 4000 150 x 90 x 8 EA

***LINTELS REQUIRE 150mm BEARING EITHER SIDE OF OPENING**

ALL LINTEL SIZES SHOWN ARE SUBJECT TO ENGINEERS DETAILS

CONCRETE

- CONCRETE FOOTING AND SLABS TO BE IN ACCORDANCE WITH AS2870
- CONCRETE TO BE MANUFACTURED TO COMPLY WITH AS3600 AND:
 - HAVE A STRENGTH @ 28 DAYS OF NOT LESS THAN 25Mpa (N25 GRADE)
 - HAVE A 20mm NOMINAL AGGREGATE SIZE
 - HAVE A NOMINAL 80mm SLUMP
- CONCRETE SLAB TO BE LAID OVER 0.2mm POLYTHENE MEMBRANE, 50mm WELL BEDDED SAND AND MINIMUM COMPACTED FCR (20mm)
- SLAB THICKNESS AND REINFORCEMENT TO BE AS PER ENGINEERS DESIGN

DRAINAGE / WATER

- DRAINAGE TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH AS3500 AND LOCAL AUTHORITY
- STORMWATER PIPES TO BE UPVC CLASS HD
- SEWER PIPES TO BE UPVC CLASS SH
- PROVIDE Ø20mm K2 POLYETHYLENE WATER RETICULATION
- TYPE B STOP VALVE TO BE LOCATED ADJACENT TO ENTRY
- BACKFILL ALL TRENCHES BENEATH VEHICLE PAVEMENT AND SLABS ON GRADE TO FULL DEPTH WITH 20 FCR
- PROVIDE OVERFLOW RELIEF GULLY WITH TAP OVER. INVERT LEVEL TO BE 150 MIN. BELOW LOWEST SANITARY DRAINAGE POINT.
- CUT AND BATTER ARE INDICATIVE. BATTER TO COMPLY WITH CURRENT N.C.C. TABLE 3.2.1
- AG DRAIN REQUIRED AROUND PERIMETER OF DWELLING FOR ALL CLASS M, H, E SITES. LOCATE AG DRAIN NOT CLOSER THAN 1.5m FROM FOOTINGS IN ACCORDANCE WITH AS2870 SECTION 5.6
- PROVIDE SURFACE DRAINAGE IN ACCORDANCE WITH AS2870 SECTION 5.6.3
- PROVIDE FLEXIBLE JOINTS IN ALL DRAINAGE EMERGING FROM UNDERNEATH OR ATTACHED TO BUILDING IN ACCORDANCE WITH AS2870 SECTION 5.6.4 FOR ALL CLASS H AND E SITES. REFER TO GEOTECH FOR FURTHER INFORMATION
- DOWNPIPES AND GUTTERS DESIGNED IN ACCORDANCE WITH AS/NZS 3500.3

Plumbing to AS3500	
ITEM	PIPE SIZE
ORG	DN100- TAP OVER
KITCHEN SINK	DN50
LAUNDRY TROUGH	DN50
SHOWER	DN50
BASIN	DN40
BATH	DN40
WC	DN100
VENT PIPE	DN50
ORG TO BE 150mm LOWER THAN LOWEST FIXTURE AND 75mm ABOVE FGL	
Minimum grades of discharge pipes	
Size of graded section of pipe DN	Minimum Grade %
40	2.50
50	2.50
65	2.50
80	1.65
100	1.65
125	1.25
150	1.00

WINDOWS

- WINDOWS TO BE ALUMINIUM FRAMED SLIDING UNLESS NOTED OTHERWISE
- ALL WINDOWS TO BE FABRICATED AND INSTALLED IN ACCORDANCE WITH AS1288 AND AS2047 TO SPECIFIC WIND SPEED AS PER ENGINEERS REPORT
- ALL OPENING WINDOWS TO COMPLY WITH N.C.C. 8 REQUIREMENTS
- AS PER N.C.C. 11.3.6 ALL BEDROOM WINDOWS WHERE THE LOWEST OPENABLE PORTION OF THE WINDOW IS WITHIN 1.7m OF FFL AND THE FFL IS 2m OR MORE ABOVE NGL, REQUIRE A PERMANENTLY FIXED DEVICE RESTRICTING ANY OPENINGS OF THE WINDOW OR SCREEN SO THAT A 125mm SPHERE CANNOT PASS THROUGH; AND RESISTING OUTWARDS HORIZONTAL ACTION OF 250N AGAINST THE WINDOW. WHERE THE DEVICE OR SCREEN CAN BE REMOVED, UNLOCKED OR OVER-RIDDEN, THE DEVICE OR SCREEN MUST HAVE A CHILD RESISTANT RELEASE MECHANISM INSTALLED AND BARRIER BELOW THE WINDOW THAT IS 865mm HIGH ABOVE FFL AND RESTRICTS ANY OPENING WITHIN THE BARRIER SO THAT A 125mm SPHERE CANNOT PASS THROUGH, AND HAS NO HORIZONTAL OR NEAR HORIZONTAL ELEMENTS BETWEEN 150mm AND 760mm FROM FFL.
- GLAZING INSTALLED IN AREAS WITH HIGH POTENTIAL FOR HUMAN IMPACT TO COMPLY WITH N.C.C. PART 8.4

WET AREAS

- WALLS TO WET AREAS TO BE FINISHED WITH WET AREA PLASTERBOARD
- COMPLIANCE WITH N.C.C. PART 10.2 AND AS3740
- ALL UNENCLOSED SHOWERS ABOVE BATHS TO HAVE MINIMUM 900mm SHOWER SCREEN OR FLOORWASTE WITHIN 1500mm OF SHOWER CONNECTION AS PER AS3740
- WHERE RAKED CEILINGS EXIST, IT IS HIGHLY RECOMMENDED THAT SUITABLE SPACING BETWEEN SARKING AND BULK INSULATION EXISTS. (NO CONTACT BETWEEN PRODUCTS). THE BUILDER IS TO ENSURE ADEQUATE SIZED TIMBER IS USED TO ENSURE THIS SEPARATION IS PROVIDED.
- IN STANDARD ROOF SPACES, IT IS HIGHLY RECOMMENDED TO PROVIDE SEPARATION BETWEEN SARKING AND CEILING INSULATION AROUND THE BUILDING PERIMETER, TO ENSURE AIRFLOW FROM EAVE VENTS IS MAINTAINED
- IT IS HIGHLY RECOMMENDED THAT ALL LIGHTWEIGHT CLADDING IS BATTENED OUT FROM STUDS (METAL / FC SHEET / TIMBER)

ELECTRICAL

- EXHAUST FAN TO COMPLY WITH CURRENT N.C.C. PART 10.6.2 SECTION C
- EXHAUST FANS TO BE SEALED AND DUCTED TO OUTSIDE OF DWELLING IN ACCORDANCE WITH NCC VOL 2, PART 10.8.2 AND 10.8.3
- IF VENTING OCCURS DIRECTLY THROUGH WALLS/ROOF ADJACENT TO FAN, THEN UNIT REQUIRES SELF CLOSING BAFFLES TO BE CLASSIFIED AS A SEALED UNIT
- ELECTRICIAN IS TO ENSURE THAT ALL GPO'S IN WET AREAS MEET ALL STANDARD AND CODE REQUIREMENTS - ALL GPO'S TO BE 300mm FROM FFL UNLESS NOTED OTHERWISE

ROOFING

- ROOF TO BE COLORBOND 'CUSTOM ORB' METALDECK UNLESS NOTED OTHERWISE. PROVIDED AND INSTALLED IN ACCORDANCE WITH AS1562.1 (IF TILED REFER TO AS2050)
- PREFABRICATED ROOF TRUSSES TO BE SUPPLIED AND INSTALLED TO MANUFACTURERS SPECIFICATIONS. TRUSS MANUFACTURER TO CONFIRM LINTEL SIZES.

STAIRCASES / BALUSTRADES / HANDRAILS

STAIR TREADS 240mm MIN. - 355mm MAX.
 STAIR RISERS 115mm MIN. - 190mm MAX.

- HANDRAIL REQUIRED WHERE CHANGE OF LEVEL BETWEEN FLOOR / LANDINGS > 1m AS PER CURRENT N.C.C. 11.3.5
- NO GAPS IN STAIRCASES OR BALUSTRADE TO BE GREATER THAN 125mm
- BALUSTRADE REQUIRED WHERE LEVEL OF LANDING OR DECK IS GREATER THAN 1000mm ABOVE ADJACENT GROUND LEVEL
- BALUSTRADE TO BE MINIMUM 1000mm ABOVE FFL (INCLUDING ANY FLOOR COVERINGS)
- DOORS OPENING OUTWARDS EXTERNALLY MUST OPEN TO A LANDING (MIN. 750mm WIDE) WHERE THE DIFFERENCE IN LEVELS IS GREATER THAN 570mm
- NON-SLIP TREADS TO ALL TREADS AND TO COMPLY WITH N.C.C. 11.2.4
- WHERE LANDINGS ARE NOT NOMINATED TO EXTERNAL DOORS, OPERATING DOOR LEAFS ARE TO BE SCREWED FIXED SHUT, OR PROVIDED WITH A FORMED FCR LANDING NOMINALLY 180mm BELOW FLOOR LEVEL.

WOOD HEATERS

- ALL WOOD HEATERS ARE TO COMPLY WITH MANUFACTURERS SPECIFICATION AND N.C.C. PART 12.4

FIRE SAFETY

- SMOKE ALARMS TO BE MAINS POWERED AND INSTALLED AS PER AS3786. LOCATIONS AS PER N.C.C. 9.5
- SMOKE ALARMS TO BE INTERCONNECTED WHERE THERE IS MORE THAN ONE ALARM
- INSTALLATION OF WOOD HEATERS TO COMPLY WITH AS2918. PROVIDE LOCAL AUTHORITIES WITH INSULATION AND COMPLIANCE CERTIFICATES

THIS PLAN ACCEPTED BY:

PLEASE NOTE: NO VARIATIONS WILL BE ACCEPTED ON THIS PLAN AFTER SIGNING
SIGNATURE:

DATE:

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WET AREA NOTES

VESSELS OR AREA WHERE THE FIXTURE IS INSTALLED	FLOORS AND HORIZONTAL SURFACES	WALLS	WALL JUNCTIONS AND JOINTS	PENETRATIONS
ENCLOSED SHOWER WITH HOB	WATERPROOF ENTIRE ENCLOSED SHOWER AREA INCLUDING HOB.	WATERPROOF TO NOT LESS THAN 150mm ABOVE THE SHOWER FLOOR SUBSTRATE OR NOT LESS THAN 25mm ABOVE THE MAXIMUM RETAINED WATER LEVEL WHICH EVER IS THE GREATER WITH THE REMAINDER BEING WATERPROOF TO A HEIGHT OF NOT LESS THAN 1800mm ABOVE THE FINISHED FLOOR LEVEL.	WATERPROOF INTERNAL AND EXTERNAL CORNERS AND HORIZONTAL JOINTS WITHIN A HEIGHT OF 1800mm ABOVE THE FLOOR LEVEL WITH NOT LESS THAN 40mm WIDTH EITHER SIDE OF THE JUNCTION.	WATERPROOF ALL PENETRATIONS.
ENCLOSED SHOWER WITHOUT HOB	WATERPROOF ENTIRE ENCLOSED SHOWER AREA, INCLUDING WATERSTOP.	WATERPROOF TO NOT LESS THAN 150mm ABOVE THE SHOWER FLOOR SUBSTRATE WITH THE REMAINDER BEING WATERPROOF TO A HEIGHT OF NOT LESS THAN 1800mm ABOVE THE FINISHED FLOOR LEVEL.	WATERPROOF INTERNAL AND EXTERNAL CORNERS AND HORIZONTAL JOINTS WITHIN A HEIGHT OF 1800mm ABOVE THE FLOOR LEVEL WITH NOT LESS THAN 40mm WIDTH EITHER SIDE OF THE JUNCTION.	WATERPROOF ALL PENETRATIONS.
ENCLOSED SHOWER WITH STEPDOWN	WATERPROOF ENTIRE ENCLOSED SHOWER AREA INCLUDING THE STEPDOWN.	WATERPROOF TO NOT LESS THAN 150mm ABOVE THE SHOWER FLOOR SUBSTRATE OR NOT LESS THAN 25mm ABOVE THE MAXIMUM RETAINED WATER LEVEL WHICHEVER IS THE GREATER WITH THE REMAINDER BEING WATERPROOF TO A HEIGHT OF NOT LESS THAN 1800mm ABOVE THE FINISHED FLOOR LEVEL.	WATERPROOF INTERNAL AND EXTERNAL CORNERS AND HORIZONTAL JOINTS WITHIN A HEIGHT OF 1800mm ABOVE THE FLOOR LEVEL WITH NOT LESS THAN 40mm WIDTH EITHER SIDE OF THE JUNCTION.	WATERPROOF ALL PENETRATIONS.
ENCLOSED SHOWER WITH PRE-FORMED SHOWER BASE	N/A	WATERPROOF TO A HEIGHT OF NOT LESS THAN 1800mm ABOVE FINISHED FLOOR LEVEL.	WATERPROOF INTERNAL AND EXTERNAL CORNERS AND HORIZONTAL JOINTS WITHIN A HEIGHT OF 1800mm ABOVE THE FLOOR LEVEL WITH NOT LESS THAN 40mm WIDTH EITHER SIDE OF THE JUNCTION.	WATERPROOF ALL PENETRATIONS.
UNENCLOSED SHOWERS	WATERPROOF ENTIRE UNCLOSED SHOWER AREA.	WATERPROOF TO NOT LESS THAN 150mm ABOVE THE SHOWER FLOOR SUBSTRATE OR NOT LESS THAN 25mm ABOVE THE MAXIMUM RETAINED WATER LEVEL WHICH EVER IS THE GREATER WITH THE REMAINDER BEING WATERPROOF TO A HEIGHT OF NOT LESS THAN 1800mm ABOVE THE FINISHED FLOOR LEVEL.	WATERPROOF INTERNAL AND EXTERNAL CORNERS AND HORIZONTAL JOINTS WITHIN A HEIGHT OF 1800mm ABOVE THE FLOOR LEVEL WITH NOT LESS THAN 40mm WIDTH EITHER SIDE OF THE JUNCTION.	WATERPROOF ALL PENETRATIONS.
AREAS OUTSIDE THE SHOWER AREA FOR CONCRETE AND COMPRESSED FIBRE CEMENT SHEET FLOORING	WATER RESISTANT TO ENTIRE FLOOR.	N/A	WATERPROOF ALL WALL/FLOOR JUNCTIONS. WHERE A FLASHING IS USED THE HORIZONTAL LEG MUST BE NOT LESS THAN 40mm.	N/A
AREAS OUTSIDE THE SHOWER AREA FOR TIMBER FLOORS INCLUDING PARTICLEBOARD, PLYWOOD AND OTHER TIMBER BASED FLOORING MATERIALS	WATERPROOF ENTIRE FLOOR.	N/A	WATERPROOF ALL WALL/FLOOR JUNCTIONS. WHERE A FLASHING IS USED THE HORIZONTAL LEG MUST BE NOT LESS THAN 40mm.	N/A
AREAS ADJACENT TO BATHS AND SPAS FOR CONCRETE AND COMPRESSED FIBRE CEMENT SHEET FLOORING.	WATER RESISTANT TO ENTIRE FLOOR.	WATERPROOF TO A HEIGHT OF NOT LESS THAN 150mm ABOVE THE VESSEL AND EXPOSED SURFACES BELOW THE VESSEL LIP TO FLOOR LEVEL.	WATERPROOF EDGES OF THE VESSEL AND JUNCTION OF BATH ENCLOSURE WITH FLOOR. WHERE THE LIP OF THE BATH IS SUPPORTED BY A HORIZONTAL SURFACE, THIS MUST BE WATERPROOF FOR SHOWERS OVER BATH AND WATER RESISTANT FOR ALL OTHER CASES.	WATERPROOF ALL TAP AND SPOUT PENETRATIONS WHERE THEY OCCUR IN A HORIZONTAL SURFACE.
AREAS ADJACENT TO BATHS AND SPAS (SEE NOTE 1) FOR TIMBER FLOORS INCLUDING PARTICLEBOARD, PLYWOOD AND OTHER TIMBER BASED FLOORING MATERIALS.	WATERPROOF ENTIRE FLOOR.	WATERPROOF TO A HEIGHT OF NOT LESS THAN 150mm ABOVE THE VESSEL AND EXPOSED SURFACES BELOW THE VESSEL LIP TO FLOOR LEVEL.	WATERPROOF EDGES OF THE VESSEL AND JUNCTION OF BATH ENCLOSURE WITH FLOOR. WHERE THE LIP OF THE BATH IS SUPPORTED BY A HORIZONTAL SURFACE, THIS MUST BE WATERPROOF FOR SHOWERS OVER BATH AND WATER RESISTANT FOR ALL OTHER CASES.	WATERPROOF ALL TAP AND SPOUT PENETRATIONS WHERE THEY OCCUR IN A HORIZONTAL SURFACE.
INSERTED BATHS	N/A FOR FLOOR UNDER BATH. ANY SHELF AREA ADJOINING THE BATH OR SPA MUST BE WATERPROOF AND INCLUDE A WATERSTOP UNDER THE VESSEL LIP.	N/A FOR WALL UNDER BATH. WATERPROOF TO NOT LESS THAN 150mm ABOVE THE LIP OF THE BATH.	N/A FOR WALL UNDER BATH. WATERPROOF TO NOT LESS THAN 150mm ABOVE THE LIP OF BATH OR SPA.	WATERPROOF ALL TAP AND SPOUT PENETRATIONS WHERE THEY OCCUR IN A HORIZONTAL SURFACE.
WALLS ADJOINING OTHER VESSELS (EG. SINKS, LAUNDRY TUBS AND BASINS)	N/A	WATERPROOF TO A HEIGHT OF NOT LESS THAN 150mm ABOVE THE VESSEL IF THE VESSEL IS WITHIN 75mm OF THE WALL.	WHERE THE VESSEL IS FIXED TO A WALL, WATERPROOF EDGES FOR EXTENT OF VESSEL.	WATERPROOF ALL TAP AND SPOUT PENETRATIONS WHERE THEY OCCUR IN A HORIZONTAL SURFACE.
LAUNDRIES AND WCS	WATER RESISTANT TO ENTIRE FLOOR.	WATERPROOF ALL WALL/FLOOR JUNCTIONS TO NOT LESS THAN 25mm ABOVE THE FINISHED FLOOR LEVEL, SEALED TO FLOOR.	WATERPROOF ALL WALL/FLOOR JUNCTIONS. WHERE A FLASHING IS USED THE HORIZONTAL LEG MUST BE NOT LESS THAN 40mm.	N/A

THE ABOVE INFORMATION IS FOR GENERAL GUIDANCE AND IS INDICATIVE ONLY. WATERPROOFING INSTALLERS TO COMPLY WITH ALL CURRENT CODES OF LEGISLATION WHICH TAKE PRECEDENCE OVER THIS SPECIFICATION.

WET AREA WAERPROOFING BY LICENSED AND ACCREDITED INSTALLER. CERTIFICATION TO BE PROVIDED TO BUILDING SURVEYOR. CONTRACTOR OR BUILDER TO DETERMINE THE APPROPRIATE WATERPROOFING IN ACCORDANCE WITH AS3740 PART 10.2 OF N.C.C AND TO NOTIFY THE BUILDING SURVEYOR FOR INSPECTION ARRANGEMENTS DURING INSTALLATION.

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ENERGY EFFICIENCY - GENERAL

STATED R VALUES ARE FOR ADDITIONAL INSULATION REQUIRED AND ARE NOT RT VALUES (TOTAL SYSTEM VALUE)

WAFFLE POD ALLOWANCES:
 - REFER TO ENERGY CERTIFICATION

INSULATION TO BE INSTALLED TO MANUFACTURERS SPECIFICATIONS AND ANY RELEVANT STANDARDS

X-POD ALLOWANCE
 - REFER TO ENERGY CERTIFICATION

BULK INSULATION IS NOT TO BE COMPRESSED AS THIS REDUCES THE EFFECTIVE R RATING

CLEARANCE IS REQUIRED FOR UNCOMPRESSED INSTALLATION OF BULK INSULATION & TIMBERS SHOULD BE SIZED ACCORDINGLY
 210mm FOR R4.1 BULK INSULATION
 210mm FOR R5.0 BULK INSULATION
 260mm FOR R6.0 BULK INSULATION
 THESE DIMENSIONS ARE NOMINAL AND MAY VARY DEPENDING ON THE TYPE OF INSULATION TO BE INSTALLED

N.C.C 2022 TAS PART H6

IN TASMANIA, FOR NCC PART H6 REFER TO NCC 2019 AMENDMENT 1 PART 2.6; FOR NCC PART 13.1 REFER TO NCC 2019 PART 3.12.

N.C.C 2019 3.12.0 (A)

PERFORMANCE REQUIREMENT P2.6.1 FOR THE THERMAL PERFORMANCE OF THE BUILDING IS SATISFIED BY COMPLYING WITH:

3.12.3.4 - EXHAUST FANS

AN EXHAUST FAN MUST BE FITTED WITH A SEALING DEVICE SUCH AS A SELF CLOSE DAMPER, FILTER OR THE LIKE WHEN SERVING:

- (a) A CONDITIONED SPACE; OR
- (b) A HABITABLE ROOM IN THE CLIMATE ZONES 4, 5, 6, 7 OR 8.

3.12.3.5 - CONSTRUCTION OF ROOF, WALLS AND FLOORS

(a) ROOFS, EXTERNAL WALLS, EXTERNAL FLOORS AND AN OPENING SUCH AS A WINDOW FRAME, DOOR FRAME, ROOF LIGHT FRAME OR THE LIKE MUST BE CONSTRUCTED TO MINIMISE AIR LEAKAGE IN ACCORDANCE WITH (b) WHEN FORMING PART OF THE EXTERNAL FABRIC OF:

- (i) A CONDITIONED SPACE; OR
 - (ii) A HABITABLE ROOM IN CLIMATE ZONE 4, 5, 6, 7 OR 8.
- (b) CONSTRUCTION REQUIRED BY (a) MUST BE:
- (i) ENCLOSED BY AN INTERNAL LINING SYSTEM THAT ARE CLOSE FITTING AT CEILING, WALL AND FLOOR JUNCTIONS; OR
 - (ii) SEALED BY CAULKING, SKIRTING, ARCHITRAVES, CORNICES OR THE LIKE.

3.12.3.6 - EVAPORATIVE COOLERS

AN EVAPORATIVE COOLER MUST BE FITTED WITH A SELF CLOSING DAMPER OR THE LIKE WHEN SERVING:

- (a) A HEATED SPACE; OR
- (b) A HABITABLE ROOM IN CLIMATE ZONES 4, 5, 6, 7 OR 8.

3.12.5.5 - ARTIFICIAL LIGHTING

(a) LAMP POWER DENSITY OR ILLUMINATION POWER DENSITY OF AN ARTIFICIAL LIGHT, EXCLUDING HEATING THAT EMITS LIGHT, MUST NOT EXCEED THE ALLOWANCE OF:

- (i) 5W/m² IN A CLASS 1 BUILDING
- (ii) 4W/m² ON A VERANDAH, BALCONY OR THE LIKE ATTACHED TO A CLASS 1 BUILDING (NOT EXCLUDING EAVE PERIMETER LIGHTS);
- (iii) 3W/m² IN A CLASS 10A BUILDING ASSOCIATED WITH A CLASS 1 BUILDING.

(b) THE ILLUMINATION POWER DENSITY ALLOWANCE IN (a) MAY BE INCREASED BY DIVIDING IT BY THE ILLUMINATION POWER DENSITY ADJUSTMENT FACTOR FOR A CONTROL DEVICE AS PER N.C.C TABLE 3.12.5.3.

3.12.3 - FOR BUILDING SEALING

3.12.3.1 - CHIMNEYS AND FLUES

THE CHIMNEY OR FLUE OF AN OPEN SOLID FUEL BURNING APPLIANCE MUST BE PROVIDED WITH A DAMPER OR FLAP THAT CAN BE CLOSED TO SEAL THE CHIMNEY OR FLUE.

3.12.3.2 - ROOF LIGHTS

(a) A ROOF LIGHT MUST BE SEALED, OR CAPABLE OF BEING SEALED WHEN SERVING:

- (i) A CONDITIONED SPACE; OR
- (ii) A HABITABLE ROOM IN CLIMATE ZONES 4, 5, 6, 7 OR 8

(b) A ROOF LIGHT REQUIRED BY (a) TO BE SEALED, OR CAPABLE OF BEING SEALED MUST BE CONSTRUCTED WITH:

- (i) AN IMPERFORATE CEILING DIFFUSER OR THE LIKE INSTALLED AT A CEILING OR INTERNAL LINING LEVEL; OR
- (ii) A WATERPROOF SEAL; OR
- (iii) A SHUTTER SYSTEM READILY OPERATED MANUALLY, MECHANICALLY OR ELECTRONICALLY BY THE OCCUPANT.

3.12.0.1 - EXTERNAL WINDOWS AND DOORS

(a) A SEAL TO RESTRICT AIR INFILTRATION MUST BE FITTED TO EACH OF AN EXTERNAL DOOR, OPENABLE WINDOW AND OTHER SUCH OPENING:

- (I) WHEN SERVING A CONDITIONED SPACE; OR
 - (II) IN CLIMATE ZONES 4, 5, 6, 7 OR 8, WHEN SERVING A HABITABLE ROOM.
- (b) A WINDOW COMPLYING WITH THE MAXIMUM AIR INFILTRATION RATES SPECIFIED IN AS2047 NEED NOT COMPLY WITH (a).
- (c) A SEAL REQUIRED BY (a)
- (i) FOR THE BOTTOM EDGE OF AN INTERNAL SWING DOOR, MUST BE A DRAFT PROTECTION DEVICE; AND
 - (ii) FOR THE OTHER EDGES OF AN EXTERNAL SWING DOOR OR THE EDGES OF AN OPENABLE WINDOW OR OTHER SUCH OPENING, MAY BE A FOAM OR RUBBER COMPRESSIBLE STRIP, FIBROUS SEAL OR THE LIKE.

THIS PLAN ACCEPTED BY:

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SIGNATURE:

DATE:



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CLIENT: JEREMY TODD PRICE & RICHARD WAYNE BARNES	
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HOUSE DESIGN: LAKESIDE	HOUSE CODE: H-WELLKS10LA
FACADE DESIGN: BRIGHTON	FACADE CODE: F-WELLKS10BRTNA
SHEET TITLE: WET AREA & ENERGY EFFICIENCY NOTES	SHEET No.: 30 / 33

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Requirements for Building In Bushfire Hazard Areas
 Building Act 2016
 Directors Determination - Bushfire Hazard Areas
 V1.1, dated 08 April 2021

Deemed-to-Satisfy Requirements (Part 2.3)

2.3.1 Design and construction
 (1) Building work in a bushfire-prone area must be designed and constructed in accordance with either:
 (a) AS 3959-2018; or
 (b) Standard for Steel Framed Construction in Bushfire Areas published by the National Association of Steel Framed Housing Inc. (NASH), as appropriate for a BAL determined for that site using table 2.6 of AS 3959.
 (2) Subclause (1)(a) is only applicable to the following:
 (a) a Class 1, 2 or 3 building; or
 (b) a Class 10a building or deck associated with a Class 1, 2 or 3 building.
 (3) Subclause (1)(b) is only applicable to the following:
 (a) a Class 1 building; or
 (b) a Class 10a building or deck associated with a Class 1 building.
 (4) Despite subsection (1) permissible, variations from requirements specified in 1(a) and 1(b) are as specified in Table 1.
 (5) Despite subsections (1) and (4), performance requirements for buildings subject to BAL 40 or BAL Flame Zone (BAL-FZ) are not satisfied by compliance with subsections (1) or (4).

2.3.2 Property Access
 (1) A new building in a bushfire-prone area must be provided with property access to the building area and the firefighting water point, accessible by a carriageway, designed and constructed as specified in subclause (4).
 (2) For an addition or alteration to an existing building in a bushfire-prone area, if there is no property access available property access must be provided to the building area and the firefighting water point accessible by a carriageway as specified in subclause (4).
 (3) An addition or alteration to an existing building in a bushfire-prone area must not restrict any existing property access to the building area or to water supply for firefighting.
 (4) Vehicular access from a public road to a building must:
 (a) comply with the property access requirements specified in Table 2;
 (b) include access from a public road to within 90 metres of the furthest part of the building measured as a hose lay; and
 (c) include access to the hardstand area for the firefighting water point.

2.3.3 Water Supply for Fire fighting
 (1) A new building constructed in a bushfire-prone area, must be provided with a water supply dedicated for fire fighting purposes as specified in Table 3A or Table 3B.
 (2) For an addition or alteration to an existing building in a bushfire-prone area, if there is no water supply for firefighting available the building must be provided with a water supply dedicated for firefighting purposes which complies with the requirements specified in Table 3A or Table 3B.

2.3.4 Hazard Management Areas
 (1) A new building, and an existing building in the case of an addition or alteration to a building, in a bushfire-prone area must be provided with a hazard management area.
 (2) The hazard management area must comply with the requirements specified in Table 4.
 (3) The hazard management area for a particular BAL must have the minimum dimensions required for the separation distances specified for that BAL in Table 2.6 of AS 3959.
 (4) The hazard management area must be established and maintained such that fuels are reduced sufficiently, and other hazards are removed such that the fuels and other hazards do not significantly contribute to the bushfire attack.

2.3.5 Bushfire emergency plan
 (1) An emergency plan must be provided for:
 (a) a new building;
 (b) an existing building in the case of an addition or alteration to a building;
 (c) an existing building in the case of a change of building class;
 (d) a building associated with the use, handling, generation or storage of a hazardous chemical or explosive; in a bushfire-prone area.
 (2) A bushfire emergency plan must comply with the requirements specified in Table 5.

7. Interpretation of Tables
 (1) For the purposes of the deemed-to-satisfy provisions in clause 2.3 of this Determination, Tables 1, 2, 3A, 3B, 4, and 5 must be complied with in the following way:
 (a) for a particular element specified in column 1, the corresponding requirement specified in column 2 must be complied with.

Table 1 - Construction Requirements & Construction Variations

Column 1	Column 2
ELEMENT	REQUIREMENT
A. Straw Bale Construction	May be used in exposures up to and including BAL 19.
B. Shielding provisions under Section 3.5 of AS3959-2018	To reduce construction requirements due to shielding, building plans must include suitable detailed elevations or plans that demonstrate that the requirements of Section 3.5 of the Standard can be met. Comment: Application of Section 3.5 of the Standard cannot result in and assessment of BAL-LOW.

Table 2 - Requirements for Property Access

Column 1	Column 2
ELEMENT	REQUIREMENT
A. Property access length is less than 30 metres; or access is not for a fire appliance to access a water connection point.	There are no specified design and construction requirements.
B. Property access length is 30 metres or greater; or access for a fire appliance to a water connection point.	The following design and construction requirements apply to property access: (1) All-weather construction; (2) Load capacity of at least 20 tonnes, including for bridges and culverts; (3) Minimum carriageway widths of 4 metres; (4) Minimum vertical clearance of 4 metres; (5) Minimum horizontal clearance of 0.5 metres from the edge of the carriageway; (6) Cross falls of less than 3° (1.20 or 5%); (7) Dips less than 7° (1.8 or 12.5%) entry and exit angle; (8) Curves with a minimum inner radius of 10 metres; (9) Maximum gradient of 15° (1.3.5 or 28%) for sealed roads, and 10° (1.5.5 or 18%) for unsealed roads; and (10) Terminate with a turning area for fire appliances provided by one of the following: (a) A turning circle with a minimum inner radius of 10 metres; (b) A property access encircling the building; or (c) A hammerhead "T" or "Y" turning head 4 metres wide and 8 metres long.
C. Property access length is 200 metres or greater.	The following design and construction requirements apply to property access: (1) The Requirements for B above; and (2) Passing bays of 2 metres additional carriageway width and 20 metres length provided every 200 metres.
D. Property access length is greater than 30 metres, and access is provided to 3 or more properties.	The following design and construction requirements apply to property access: (1) Complies with Requirements for B above; and (2) Passing bays of 2 metres additional carriageway width and 20 metres length must be provided every 100 metres.

Table 3A - Reticulated Water Supply for Firefighting

Column 1	Column 2
ELEMENT	REQUIREMENT
A. Distance between building area to be protected and water supply	The following requirements apply: (1) The building area to be protected must be located within 120 metres of a fire hydrant; and (2) The distance must be measured as a hose lay, between the water connection point and the furthest part of the building area.
B. Design criteria for fire hydrants	The following requirements apply: (1) Fire hydrant system must be designed and constructed in accordance with TasWater Supplement to Water Supply Code of Australia WSA 03 - 2011-3.1 MRWA Edition 2.0; and (2) Fire hydrants are not installed in parking areas.
C. Hardstand	A hardstand area for fire appliances must be provided: (1) no more than three metres from the hydrant, measured as a hose lay; (2) No closer than six metres from the building area to be protected; (3) With a minimum width of three metres constructed to the same standard as the carriageway; and (4) Connected to the property access by a carriageway equivalent to the standard of the property access

Table 3B - Static Water Supply for Firefighting

Column 1	Column 2
ELEMENT	REQUIREMENT
A. Distance between building area to be protected and water supply	The following requirements apply: (a) The building area to be protected must be located within 90 metres of the water connection point of a static water supply; and (b) The distance must be measured as a hose lay, between the water connection point and the furthest part of the building area.
B. Static Water Supplies	A static water supply: (a) May have a remotely located offtake connected to the static water supply; (b) May be a supply for combined use (fire fighting and other uses) but the specified minimum quantity of fire fighting water must be available at all times; (c) Must be a minimum of 10,000 litres per building area to be protected. This volume of water must not be used for any other purpose including fire fighting sprinkler or spray systems; (d) Must be metal, concrete or lagged by non-combustible materials if above ground; and (e) If a tank can be located so it is shielded in all directions in compliance with Section 3.5 of AS 3959-2018, the tank may be constructed of any material provided that the lowest 400 mm of the tank exterior is protected by: (i) metal; (ii) non-combustible material; or (iii) fibre-cement a minimum of 6 mm thickness.
C. Fittings, pipework and accessories (including stands and tank supports)	Fittings and pipework associated with a water connection point for a static water supply must: (a) Have a minimum nominal internal diameter of 50mm; (b) Be fitted with a valve with a minimum nominal internal diameter of 50mm; (c) Be metal or lagged by non-combustible materials if above ground; (d) Where buried, have a minimum depth of 300mm (e) Provide a DIN or NEN standard forged Storz 65 mm coupling fitted with a suction washer for connection to fire fighting equipment; (f) Ensure the coupling is accessible and available for connection at all times; (g) Ensure the coupling is fitted with a blank cap and securing chain (minimum 220 mm length); (h) Ensure underground tanks have either an opening at the top of not less than 250 mm diameter or a coupling compliant with this Table; and (i) Where a remote offtake is installed, ensure the offtake is in a position that is: (i) Visible; (ii) Accessible to allow connection by fire fighting equipment; (iii) At a working height of 450 - 600mm above ground level; and (iv) Protected from possible damage, including damage by vehicles.
D. Signage for static water connections	(1) The water connection point for a static water supply must be identified by a sign permanently fixed to the exterior of the assembly in a visible location. The sign must: (a) comply with water tank signage requirements within AS 2304; or (b) comply with the TFS Water Supply Signage Guideline.
E. Hardstand	A hardstand area for fire appliances must be provided: (a) No more than three metres from the water connection point, measured as a hose lay (including the minimum water level in dams, swimming pools and the like); (b) No closer than six metres from the building area to be protected; (c) With a minimum width of three metres constructed to the same standard as the carriageway; and (d) Connected to the property access by a carriageway equivalent to the standard of the property access.

Table 4 - Requirements for Hazard Management Area

Column 1	Column 2
ELEMENT	REQUIREMENT
A. Hazard management areas for new buildings on lots provided with a BAL at the time of subdivision.	A new building must: (a) Be located on the lot so as to be provided with a HMA no smaller than the required separation distances for the BAL determined at the time of the subdivision; and (b) Have a HMA established in accordance with a certified bushfire hazard management plan.
B. Hazard management areas for new buildings on lots not provided with a BAL at the time of subdivision.	A new building must: (a) Be located on the lot so as to be provided with a HMA no smaller than the separation distances required for BAL 29; and (b) Have an HMA established in accordance with a certified bushfire hazard management plan.
C. Hazard management areas for alterations or additions to buildings.	An alteration or addition to a building must: (a) Be located on the lot so as to be provided with a HMA which: (i) Has the separation distances required for the BAL assessed for the construction of the existing building; or (ii) In the case of a building without an existing BAL assessment, is no smaller than the separation distances required for BAL 29; and (b) Have an HMA established in accordance with a certified bushfire hazard management plan.
D. Hazard management areas for new buildings and additions and alterations to buildings classified as an accommodation building BCA Class 1b, BCA Class 2, or BCA Class 3, other than communal residence for persons with a disability, a respite centre or a residential aged care facility or similar.	A new building or an alteration or addition must: (a) Be located on the lot so as to be provided with HMAs no smaller than the separation distances required for BAL 12.5; and (b) have a HMA established in accordance with a certified bushfire hazard management plan.
E. Hazard management areas for new buildings and additions and alterations to existing buildings classified as vulnerable use as defined in the relevant planning scheme.	A new building or an addition or alteration including change of use must: (a) be located on the lot so as to be provided with HMAs no smaller than the separation distances required for BAL 12.5; and (b) have a HMA established in accordance with a certified bushfire hazard management plan.
F. Hazard management areas for new buildings or additions and alterations to buildings associated with the use, handling, generation or storage of a hazardous chemical or explosive.	A new building or an alteration or addition, including change of use, for a building determined as a hazardous use must: (a) Be located on the lot so as to be provided with a HMA no smaller than the required separation distances for the BAL determined in the certified bushfire hazard management plan; and (b) Have a HMA established in accordance with a certified bushfire hazard management plan.

Table 5 - Requirements for Emergency Planning

Column 1	Column 2
ELEMENT	REQUIREMENT
A. Bushfire emergency plans	An emergency plan must be developed for the site which is: (a) Consistent with TFS Bushfire Emergency Planning Guidelines; and (b) Approved by TFS or a person accredited by the TFS.

THIS PLAN ACCEPTED BY:

PLEASE NOTE: NO VARIATIONS WILL BE ACCEPTED ON THIS PLAN AFTER SIGNING
 SIGNATURE:

DATE:

THIS DWELLING IS BEING CONSTRUCTED IN A BAL-19 AREA
 RESTRICTIONS FOR CONSTRUCTION METHODS/MATERIALS APPLY. REFER TO NOTES

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COUNCIL:	CLARENCE COUNCIL

HOUSE DESIGN:	LAKESIDE
FACADE DESIGN:	BRIGHTON
SHEET TITLE:	BUILDING ACT BUSHFIRE HAZARD AREAS
SHEET No.:	31 / 33

HOUSE CODE:	H-WELLKS10LA
FACADE CODE:	F-WELLKS10BRTNA
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AS3959 (2018)

All specifications are per AS3959 (2018) and Wilson Homes request. Other materials and options may be available, refer to AS3959 for full list of compliant materials.

6.1 GENERAL

A building assessed in Section 2 as being BAL - 19 shall comply with Section 3 and Clauses 6.2 to 6.8.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 6.2 to 6.8 (see Clause 3.8).

NOTE: BAL - 19 is primarily concerned with protection from ember attack, and radiant heat greater than 12.5 kW/m² up to and including 19 kW/m².

6.2 SUBFLOOR SUPPORTS

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with -

- (a) a wall that complies with Clause 6.4; OR
- (b) a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium; OR
- (c) a combination of Items (a) and (b).

NOTE: This requirement applies to the subject building only and not to verandas, decks, steps, ramps and landings (see Clause 6.7)

C6.2 Combustible materials stored in the subfloor space may be ignited by embers and cause and impact to the building.

6.3 FLOORS

6.3.1 GENERAL

This Standard does not provide construction requirements for concrete slabs on the ground.

6.3.2 ELEVATED FLOORS

6.3.2.1 ENCLOSED SUBFLOOR SPACE

This standard does not provide construction requirements for elevated floors, including bearers and joists and flooring, where the subfloor space is enclosed with

- (a) a wall that complies with Clause 6.4; OR
- (b) a mesh perforated sheet with a maximum aperture of 2mm, made of corrosion resistant steel, bronze or aluminium; OR
- (c) a combination of Items (a) and (b) above.

6.3.2.2 UNENCLOSED SUBFLOOR SPACE

Where the subfloor space is unenclosed, the bearers, joists and flooring, less than 400mm above finished ground level, shall be one of the following -

- (a) Materials that comply with the following:

- (i) Bearers and joists shall be -
 - (A) non-combustible; OR
 - (B) bushfire-resisting timber (see Appendix F); OR
 - (C) a combination of Items (A) and (B) above.
- (ii) Flooring shall be -
 - (A) non-combustible; OR
 - (B) bushfire-resisting timber (see Appendix F); OR
 - (C) timber (other than bushfire-resisting timber),

particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; OR

- (D) a combination of any Items (A), (B) or (C) above.

- OR
- (b) A system complying with AS1530.8.1

This standard does not provide construction requirements for elements of elevated floors, including bearers, joists and flooring, if the underside of the element is 400mm or more above finished ground level.

6.4.1 WALLS

The exposed components of an external wall that is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar fittings having an angle of less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D) shall be as follows:

- (a) Non-combustible material including, the following provided the thickness is 90mm:
 - (i) Full masonry or masonry veneer walls with an outer leaf of clay, concrete, calcium silicate or natural stone.
 - (ii) Precast or in situ walls of concrete or aerated concrete.
 - (iii) Earth wall including mud brick. OR
- (b) Timber logs of a species with a density of 680kg/m³ or greater at a 12 percent moisture content; of a minimum nominal overall thickness of 90mm and a minimum thickness of 70mm (see Clause 3.11); and gauge planed. OR
- (c) Cladding that is fixed externally to a timber-framed or a steel-framed wall that is sarked on the outside of the frame and is -
 - (i) non-combustible material; OR
 - (ii) fibre cement a minimum of 6mm in thickness; OR
 - (iii) bushfire-resisting timber (see Appendix F); OR
 - (iv) a timber species as specified in Paragraph E1, Appendix E; or
 - (v) a combination of any of Items (i), (ii), (iii) or (iv) above. OR
- (d) A combination of any items (a), (b) or (c) above.

This standard does not provide construction requirements for exposed components of an external wall that are 400mm or more from the ground or 400mm or more above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the wall (see Figure D3, Appendix D).

6.4.2 JOINTS

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed.

6.4.3 VENTS AND WEEPHOLES

Except for exclusions provided in Clause 3.6, vents and weepholes in external walls shall be screened with a mesh made of corrosion-resistant steel, bronze or aluminium.

6.5.1 BUSHFIRE SHUTTERS

Where fitted, bushfire shutters shall comply with Clause 3.7 and be made from -

- (a) non-combustible material; OR
- (b) a timber species as specified in Paragraph E1, Appendix E; OR
- (c) bushfire-resisting timber (see Appendix F); OR
- (d) a combination of Items (a), (b) and (c) above.

6.5.2 SCREENS FOR WINDOWS AND DOORS

Where fitted, screens for windows and doors shall have a mesh or perforated sheet made of corrosion-resistant steel, bronze or aluminium.

The frame supporting the mesh or perforated sheet shall be made from -

- (a) metal; OR
- (b) bushfire-resisting timber (see Appendix F);
- (c) a timber species as specified in Paragraph E2, Appendix E.

6.5.3 WINDOWS AND SIDELIGHTS

Window assemblies shall:

- (a) be completely protected by a bushfire shutter that complies with Clause 3.7 and clause 6.5.1; OR
- (b) Be completely protected externally by screens that conform with Clause 3.6 and Clause 5.5.2.
- (c) Conform with the following:
 - (i) Frame material For window assemblies less than 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the window frame (see Figure D3, Appendix D), window frames and window joinery shall be made from:
 - (A) Bushfire-resisting timber (see Appendix F) OR
 - (B) A timber species as specified in Paragraph E2, Appendix F); OR
 - (C) Metal. OR
 - (D) Metal-reinforced uPVC. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.
 - There are no specific restrictions on frame material for all other windows.
 - (ii) Hardware There are no specific restrictions on hardware for windows.
 - (iii) Glazing Where glazing is less than 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the window frame (see Figure D3, Appendix D), this glazing shall be Grade A safety glass a minimum of 4mm in thickness or glass blocks with no restriction on glazing methods.

NOTE: Where double-glazed assemblies are used above, the requirements apply to the external pane of the glazed assembly only. For all other glazing, annealed glass may be used in accordance with AS 1288.

- (iv) Seals and weather strips There are no specific requirements for seals and weather strips at this BAL level.
- (v) Screens The openable portions of windows shall be screened internally or externally with screens that conform with Clause 3.6 and Clause 6.5.2. Where annealed glass is used, both the fixed and openable portions of the window shall be screened externally with screens that conform with clause 6.5.2.

C6.5.3(c), screening of the openable portions of all windows is required in all BAL's to prevent the entry of embers to the building when the window is open. For Item (c)(v), screening of the openable and fixed portions of some windows is required to reduce the effects of radiant heat on some types of glass. If the screening is required to reduce the effects of radiant heat on glass, and has to be externally fixed.

For Item (c)(v), If the screening is required only to prevent the entry of embers, the screening may be fitted externally or internally.

6.5.4 DOORS SIDE-HUNG EXTERNAL DOORS (including French Doors, Panel Fold and Bi-fold Doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall -

- (a) Be completely protected by bushfire shutters that comply with Clause 3.7 and Clause 6.5.1.
- OR
- (b) Be protected externally by screens that comply with Clause 3.6 and Clause 6.5.2.
- OR
- (c) conform with the following:
 - (i) Door panel material Materials shall be -
 - (A) non combustible; OR
 - (B) solid timber, laminated timber or reconstituted timber door, having a minimum thickness of 35mm for the first 400mm above the threshold; OR
 - (C) hollow core, solid timber, laminated timber or reconstituted timber with a non-combustible kickplate on the outside for the first 400mm above the threshold; OR
 - (D) for fully framed glazed door panels, the framing is made from metal or bushfire resisting timber (see Appendix F), or a timber species as specified in Paragraph E2, Appendix E or uPVC.
 - (ii) Door frame material Door frames material shall be:
 - (A) Bushfire-resisting timber (see Appendix F). OR
 - (B) a timber species as specified in Paragraph E2 of Appendix E;

OR

- (C) Metal. OR
- (D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.
- (iii) Hardware There are no specific requirements for hardware at this BAL level.
- (iv) Glazing Where doors incorporate glazing, the glazing shall be toughened glass a minimum of 5mm in thickness.
- (v) Seals and weather strips Weather strips, draft excluders or draft seals shall be installed.
- (vi) Screens There are no specific requirements for hardware at this BAL level.
- (vii) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.

6.5.5 DOORS-SLIDING DOORS

Sliding doors shall:

- (a) Be completely protected by bushfire shutters that comply with Clause 3.7 and Clause 6.5.1.
- OR
- (b) Be completely protected externally by screens that comply with Clause 3.6 and Clause 6.5.2.
- OR
- (c) conform with the following:
 - (i) Frame material The material for door frames, including fully framed glazed doors, shall be -
 - (A) Bushfire-resisting timber (see Appendix F). OR
 - (B) a timber species as specified in Paragraph E2 of Appendix E; OR
 - (C) Metal. OR
 - (D) Metal-reinforced uPVC. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.
 - (ii) Hardware There are no specific requirements for hardware at this BAL level.
 - (iii) Glazing Where doors incorporate glazing, the glazing shall be toughened glass a minimum of 5mm in thickness,
 - (iv) Seals and weather strips There are no specific requirements for hardware at this BAL level.
 - (v) Screens There are no specific requirements for hardware at this BAL level.
 - (vi) Sliding panels Sliding panels shall be tight-fitting in the frames.

6.5.6 DOORS-VEHICLE ACCESS DOORS (GARAGE DOORS)

The following apply to vehicle access doors:

- (a) The lower portion of a vehicle access door that is within 400mm of the ground when the door is closed (see Figure D4, Appendix D) shall be made from -
 - (i) non combustible material; OR
 - (ii) bushfire-resisting timber (see Appendix F); OR
 - (iii) fibre-cement sheet, a minimum of 6mm in thickness; OR
 - (iv) a timber species as specified in Paragraph E1, Appendix E; OR
 - (v) a combination of any Items (i), (ii) or (iv) above.
- (b) All vehicle access doors shall be fitted with suitable weather strips, draught seals or brushes. Door assemblies fitted with guide tracks do not need edge gap protection.
- NOTES:
 - 1 Refer to AS/NZS 4505 for door types.
 - 2 Gaps of door edges or building elements should be protected as per Section 3.
- C6.5.6(b) These guide tracks do not provide a direct passage for embers into the building.
- (c) Weather strips, draught excluders, draught seals or brushes to protect edge gaps or thresholds shall be manufactured from materials having a flammability index not exceeding five.
- (d) Vehicle access doors with ventilation slots shall be protected in accordance with Clause 3.6.

6.6.1 ROOFS - GENERAL

The following apply to all types of roofs and roofing systems:

- (a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.
- (b) The roof/wall junction shall be sealed, or otherwise protected in accordance with Clause 3.6.
- (c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet conforming with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium.
- (d) Only evaporative coolers manufactured in accordance with AS/NZS 60335.2.98 shall be used. Evaporative coolers with an internal damper to prevent the entry of embers into the roof space need to be screened externally.

6.6.2 TILED ROOFS

Tiled roofs shall be fully sarked. The sarking shall -

- (a) be located on top of the roof framing, except that the roof battens may be fixed above the sarking;
- (b) cover the entire roof area including ridges and hips; and
- (c) extend into gutters and valleys.

6.6.3 SHEET ROOFS

Sheet roofs shall--

- (a) be fully sarked in accordance with Clause 6.6.2, except that foil-backed insulation blankets may be installed over the battens; and
 - (b) have any gaps sealed at the fascia or wall line and at valleys, hips and ridges by -
 - (i) a mesh or perforated sheet that conforms with Clause 3.6 and that is made of corrosion-resistant steel, bronze or aluminium; or
 - (ii) mineral wool; or
 - (iii) other non-combustible material; or
 - (iv) a combination of any of Items (i), (ii) or (iii) above.
- C6.6.3 - Sarking is used as a secondary form of ember protection for the roof space to account for minor gaps that may develop in sheet roofing.

6.6.4 VERANDA, CARPORT AND AWNING ROOFS

The following apply to veranda, carport and awning roofs:

- (a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 6.6.1, to 6.6.6.
 - (b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] complying with Clause 6.4 shall have a non-combustible roof covering, except where the roof covering is a translucent or transparent material.
- NOTE: There is no requirement to line the underside of a veranda, carport or awning roof that is separated from the main roof space

6.6.5 ROOF PENETRATIONS

The following apply to roof penetrations:

- (a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors shall be sealed. The material used to seal the penetration shall be non-combustible.
 - (b) Openings in vented roof lights, roof ventilators or vent pipes shall conform with Clause 3.6 and be made of corrosion-resistant steel, bronze or aluminium.
- This requirement does not apply to a room sealed gas appliance.
- NOTE: A gas appliance designed such that air for combustion does not enter from, or combustion products enter into, the room which the appliance is located.
- In the case of gas appliance flues, ember guards shall not be fitted.
- NOTE: AS/NZS 5601 contains requirements for gas appliance flue systems and cowls. Advice can be obtained from manufacturers and State and Territory gas technical regulators.
- (c) All overhead glazing shall be Grade A safety glass complying with AS 1288.
 - (d) Glazed elements in roof lights and skylights may be of polymer, provided a Grade A safety glass diffuser, complying with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass of minimum 4 mm in thickness shall be used in the outer pane of the IGU.
 - (e) Flashing elements of tubular skylights may be of a fire-retardant material, provided the roof integrity is maintained by an under-flashing of a material having a flammability index not exceeding five.
 - (f) Evaporative cooling units shall be fitted with non-combustible butterfly closers as close as practicable to the roof level, or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium.
 - (g) Eaves lighting shall be adequately sealed and not compromise the performance of the element.

6.6.6 EAVES LININGS, FASCIAS AND GABLES

The following apply to eaves linings, fascias and gables:

- (a) Gables shall comply with Clause 6.4.
 - (b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in Clause 6.6.5.
 - (c) Eaves ventilation openings shall be fitted with ember guards in accordance with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium
- Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.

This standard does not provide construction requirements for fascias, bargeboards and eaves linings.

6.6.7 GUTTERS AND DOWNPIPES

This Standard does not provide material requirements for-

- (a) gutters, with the exception of box gutters; and
- (b) downpipes.

If installed, gutter and valley leaf guards shall be non-combustible. Box gutters shall be non-combustible and flashed at the junction with the roof with noncombustible material.

6.7.1 VERANDAS, DECKS, STEPS AND LANDINGS - GENERAL

Decking may be spaced.

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

C6.7.7 - Spaced decking is nominally spaced at 3 mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0 - 5 mm during service. It should be noted that recent research studies have shown that gaps at 5 mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacings of 10 mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

6.7.2 ENCLOSED SUBFLOOR SPACES OF VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

6.7.2.1 Materials to enclose a subfloor space

This standard does not provide construction requirements for the materials used to enclose a subfloor space except where those materials are less than 400mm from the ground.

Where the materials used to enclose a subfloor space are less than 400mm from the ground, they shall conform with Clause 6.4.

6.7.2.2 Supports

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

6.7.2.3 Framing

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

6.7.2.4 Decking, stair treads and the trafficable surfaces of ramps and landings

This standard does not provide construction requirements for decking, stair treads and the trafficable surfaces and landings that are more than 300mm from a glazed element.

Decking, stair treads and the trafficable surfaces of ramps and landings less than 300mm (measured horizontally at deck level) from glazed elements that are less than 400mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from -

- (a) of non-combustible material; or
- (b) of bushfire-resisting timber (see Appendix F); or
- (c) a timber species as specified in Paragraph E1, Appendix E; or
- (d) uPVC; or
- (e) a combination of Items (a), (b), (c) or (d).

6.7.3 UNENCLOSED SUBFLOOR SPACES OF VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

6.7.3.1 Supports

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

6.7.3.2 Framing

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

6.7.3.3 Decking, stair treads and the trafficable surfaces of ramps and landings

This Standard does not provide construction requirements for deshing, stair treads and the trafficable surfaces of ramps and landings that are more than 300mm from a glazed element.

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- (a) non-combustible material; or
- (b) of bushfire-resisting timber (see Appendix F); or
- (c) a timber species as specified in Paragraph E1, Appendix E; or
- (d) a combination of any of Items (a), (b), or (c).

6.7.4 BALUSTRADES, HANDRAILS OR OTHER BARRIERS

This Standard does not provide construction requirements for balustrades, handrails and other barriers.

5.7.5 VERANDA POSTS

Verandah Posts -

- (a) Shall be timber mounted on galvanised mounted shoes or stirrups with a clearance of no less than 75mm above adjacent ground level; or
- (b) if less than 400mm (measured vertically) from the surface of the deck or ground (see Fig D2, Appendix D) shall be made from -
 - (i) non-combustible material; or
 - (ii) bushfire-resisting timber (see Appendix F); or
 - (iii) a timbers species as specified in Paragraph E1, Appendix E; or
 - (iv) a combination of any of items (a) or (b).

6.8 WATER AND GAS SUPPLY PIPES

Above-ground, exposed water and gas supply pipes shall be metal.

External gas pipes and fittings above ground shall be of steel or copper construction having a minimum wall thickness in accordance with gas regulations or 0.9mm whichever is the greater. The metal pipe shall extend a minimum of 400mm within the building and 100mm below ground.

NOTE: Refer to State and Territory gas regulations, AS/NZS 5601.1 and AS/NZS 4645.1.

C6.8 Concern is raised for the protection of bottled gas installations. Location, shielding and venting of the gas bottles needs to be considered.

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8	PRELIM PLANS - AMENDMENTS	PL1	2025.11.20
9	PRELIM PLANS - AMENDED DRIVEWAY GRADIENT	RT2	2025.12.02

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JEREMY TODD PRICE & RICHARD WAYNE BARNES

ADDRESS:
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LOT / SECTION / CT:
10 / - / 141047

COUNCIL:
CLARENCE COUNCIL

HOUSE DESIGN:
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FACADE DESIGN:
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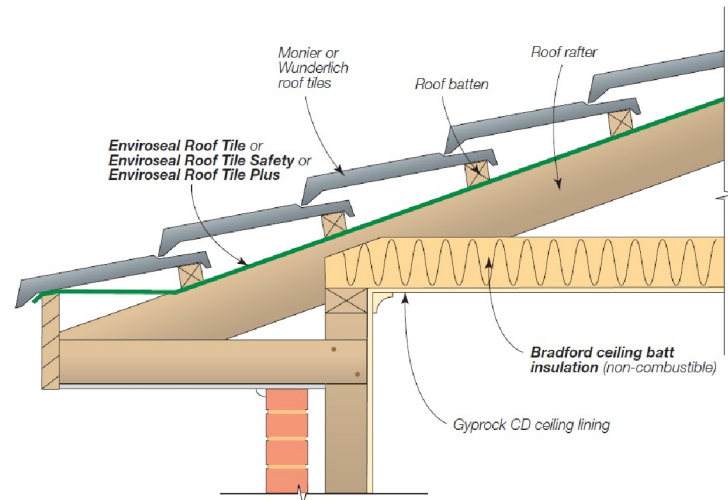
SHEET TITLE:
BAL 19 NOTES

SHEET

Rafter Spacing	Product
Up to and including 600mm	EnviroSeal™ Roof Tile or EnviroSeal™ Roof Tile Plus
Over 600mm	EnviroSeal™ Roof Tile Safety

Figure 5.1. Tiled Roofs

- Install EnviroSeal roof tile sarking on top of the roof framing and below the roof battens.
- For further fixing details contact CSR technical support.



Application	Product
Sarking	EnviroSeal™ Resiwrap
Foil faced insulation blanket	Bradford Anticon™
Gap seal	Bradford Fireseal BAL 12.5 - 40 Blanket

Figure 5.2.1. Fascia Detail – Metal Roof (BAL12.5-40)

- Install EnviroSeal Resiwrap to the entire roof area over the top of the battens.
- Immediately above the fascia install BAL12.5 – 40 Blanket extending up the roof and over the first batten. Compress with the roof sheeting.
- For further fixing details contact CSR technical support.

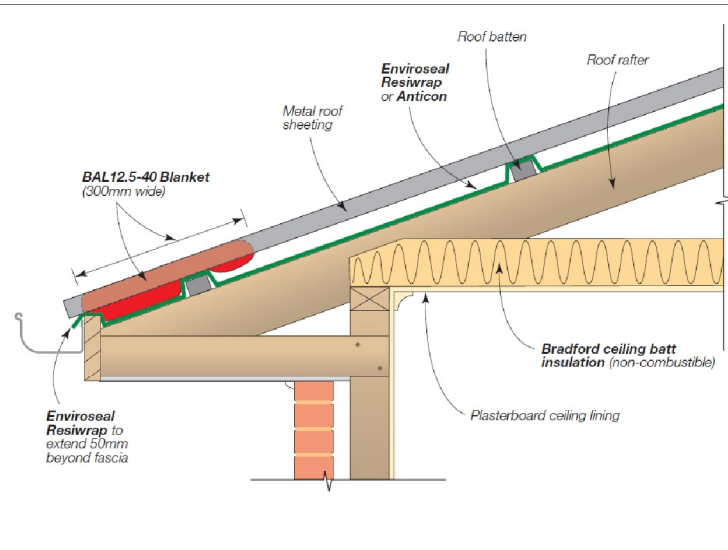


Figure 5.2.2. Valley Detail – Steel Roof (BAL-12.5 – BAL-40)

- Install EnviroSeal Resiwrap to the entire roof area over the top of the battens.
- BAL12.5 – 40 Blanket to be laid over the top of the sarking extending into the valley gutter. Compress with roof sheeting.
- For further fixing details contact CSR technical support.

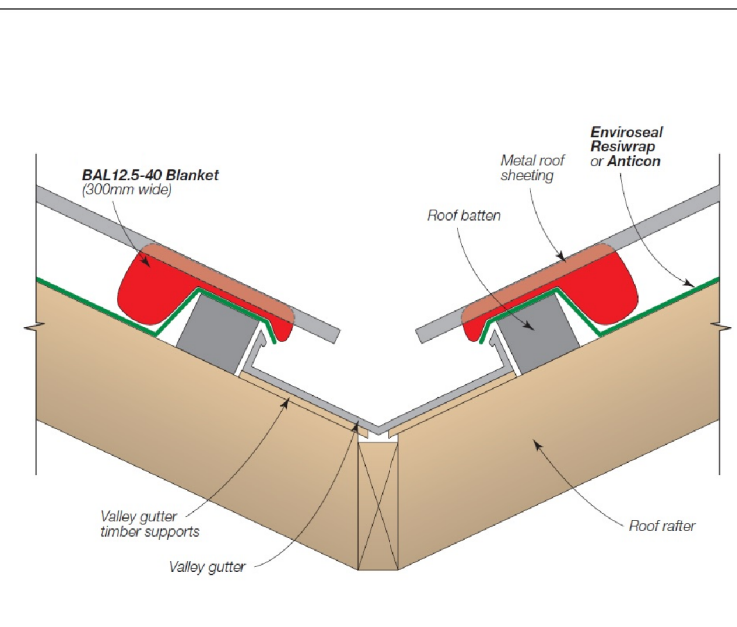


Figure 5.2.3. Barge Detail – Steel Roof (BAL-12.5 – BAL-40)

- Install EnviroSeal Resiwrap to the entire roof area over the top of the battens.
- At barge install BAL12.5 – 40 Blanket and compress with roof sheeting.
- For further fixing details contact CSR technical support.

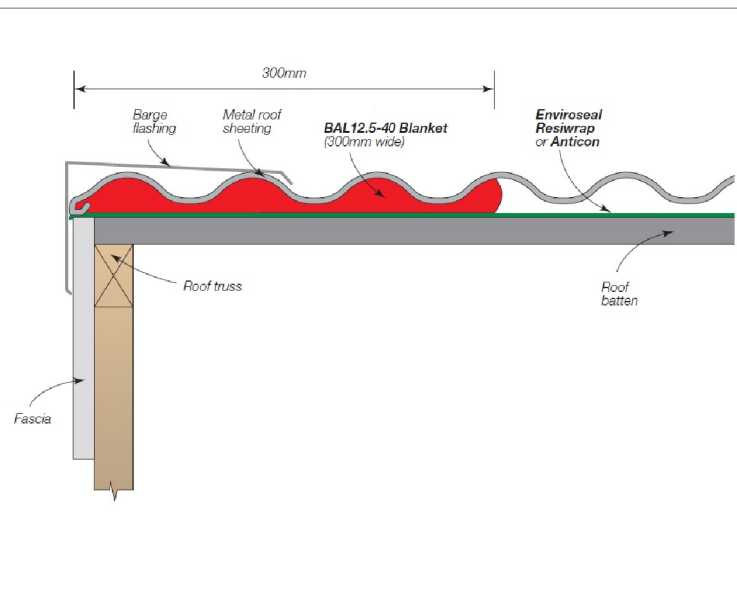
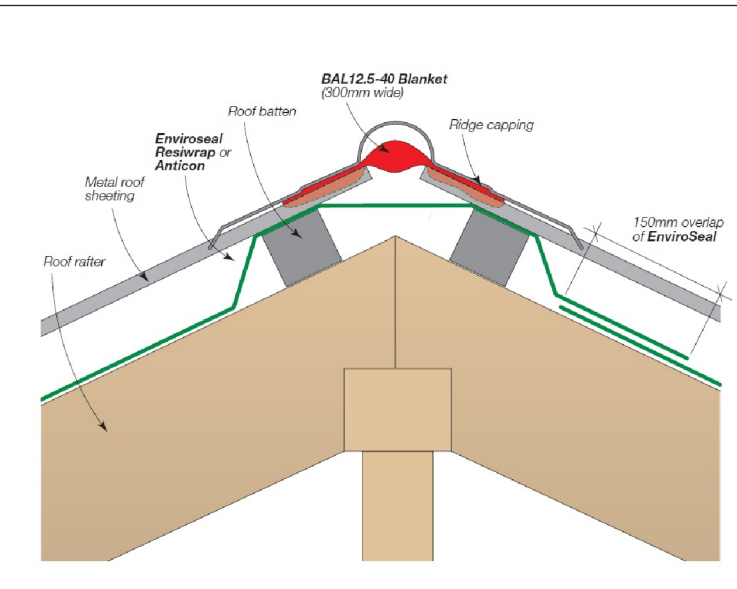


Figure 5.2.4. Hip/Ridge Detail – Steel Roof (BAL-12.5 – BAL-40)

- Install EnviroSeal Resiwrap to the entire roof area over the top of the battens.
- At the ridge/hip lay BAL12.5 – 40 Blanket over the gap between the roof sheets and compress with the ridge capping to the roof profile.
- For further fixing details contact CSR technical support.



Details for the purpose of bushfire proofing only. To be printed in colour.

Images sourced from Bradfords "Bushfire Roofing System", Published 04/11.

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714346

7 Intrigue Court, Tranmere TAS 7018

FLOOD HAZARD REPORT

12/06/2025



Prepared for – Richard Barnes



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Document Information

Title	Client	Doc number	Date	Approved By	Revision
7 Intrigue Court, Tranmere TAS 7018 FLOOD HAZARD REPORT	Richard Barnes	CLZ-FLA- 0002	12/06/2025	Janitha Senavirthna	01



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1 Introduction

This report presents a Flood Hazard Assessment undertaken by Ceyloz Pty Ltd on behalf of Mr. Richard Barnes for the proposed residential development at 7 Intrigue Court, Tranmere TAS 7018. The property, identified by land title 141047/10, is located within the jurisdiction of the Clarence City Council.

The proposed development includes the construction of a 312.88 m² residential dwelling and associated driveway access. As the site is subject to a Flood-Prone Area Overlay, this assessment has been prepared in accordance with the requirements of the Tasmanian Planning Scheme, specifically Clause 12.6.1 P1.2 of the Flood Prone Areas Hazard Code.

The purpose of this report is to evaluate the potential flood risks associated with the development and to provide technical recommendations to ensure that the proposal aligns with planning requirements and minimises risk to people, property, and the environment. The following sections detail the methodology, modelling assumptions, flood risk analysis, and conclusions of the assessment.



FIGURE 1 : SITE LOCATION



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1.1 Project Scope

The subject site is currently vacant land and is proposed to be developed into a two-storey residential dwelling. According to Clarence City Council's flood-prone area mapping, a portion of the lot is identified as being subject to overland flow inundation during major storm events, particularly within the lower-lying areas.

The development application seeks approval for the construction of a 4-bedroom dwelling, which includes a TV room, study area, and a double garage. The proposed driveway access is located within the area currently affected by the flood-prone overlay, necessitating a detailed assessment to confirm the potential flood impacts and ensure compliance with the relevant planning provisions.

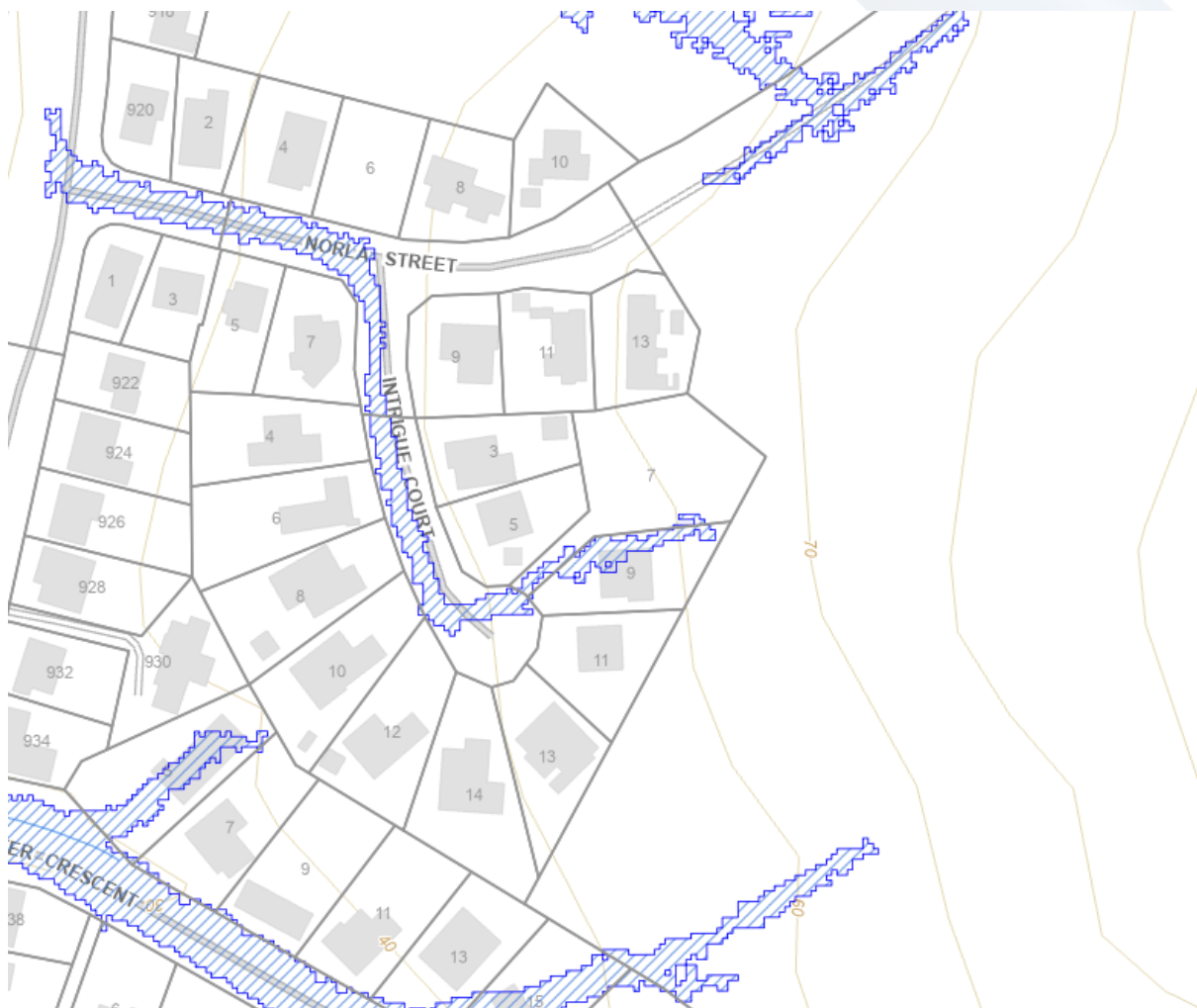


FIGURE 2: FLOOD PRONE ARE OVERLAY

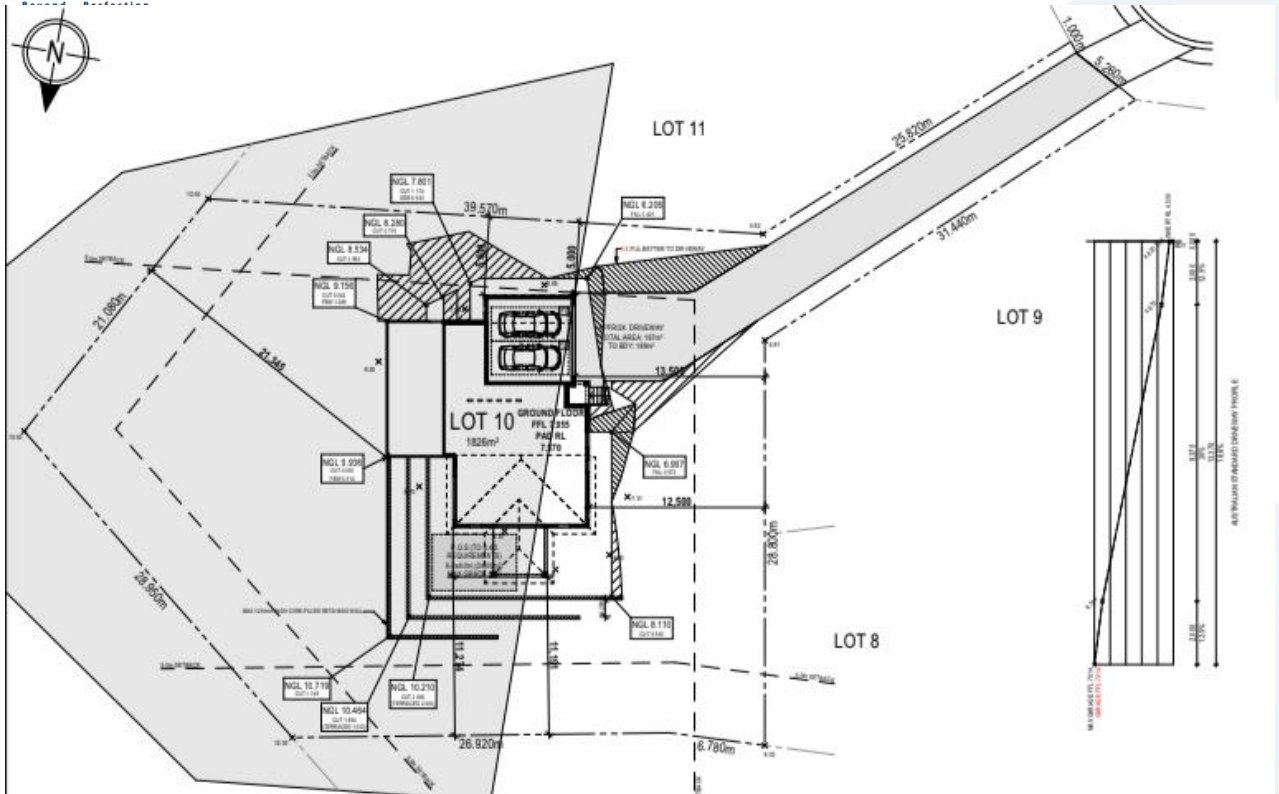


FIGURE 3: PROPOSED RESIDENTIAL HOUSE LAYOUT

2 Site Topography & Catchment

The project site is situated on the eastern side of Intrigue Court, with the upper portion of the property forming part of the local catchment that extends up to the crest of the adjacent hill, as illustrated in Figure 4. This elevated terrain contributes to surface runoff, directing overland flows toward the lower sections of the site during significant rainfall events. However, the impact on the property is only to the top side of the sub-catchment area as the surface run-off flowing from east to west.

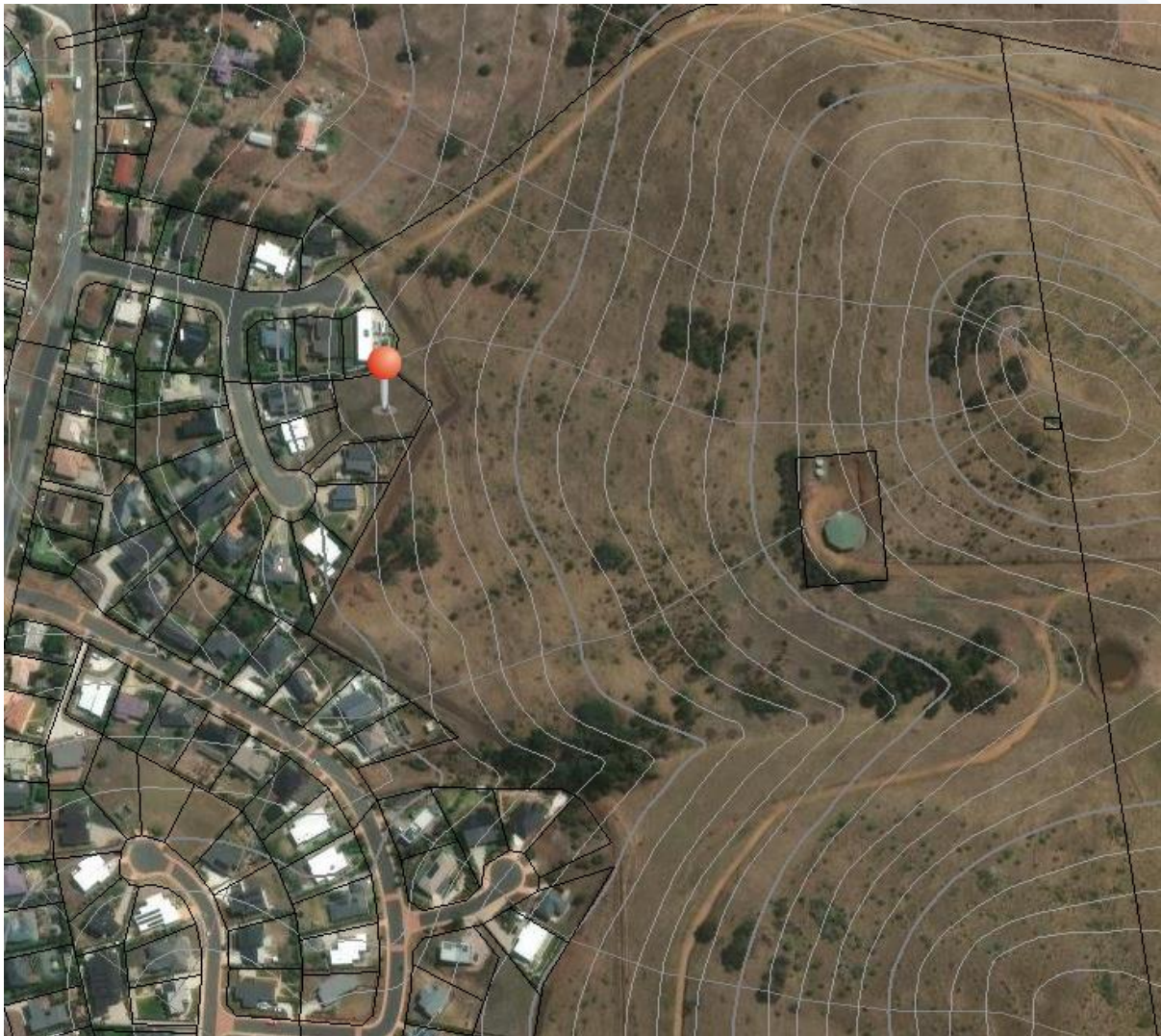


FIGURE 4 CATCHMENT AREA

This region features moderate to steep slopes, averaging approximately 18%, which are likely to contribute to increased surface runoff rates. These gradients may also intensify erosion processes,

potentially impacting downstream flow regimes and sediment transport dynamics within the local catchment.

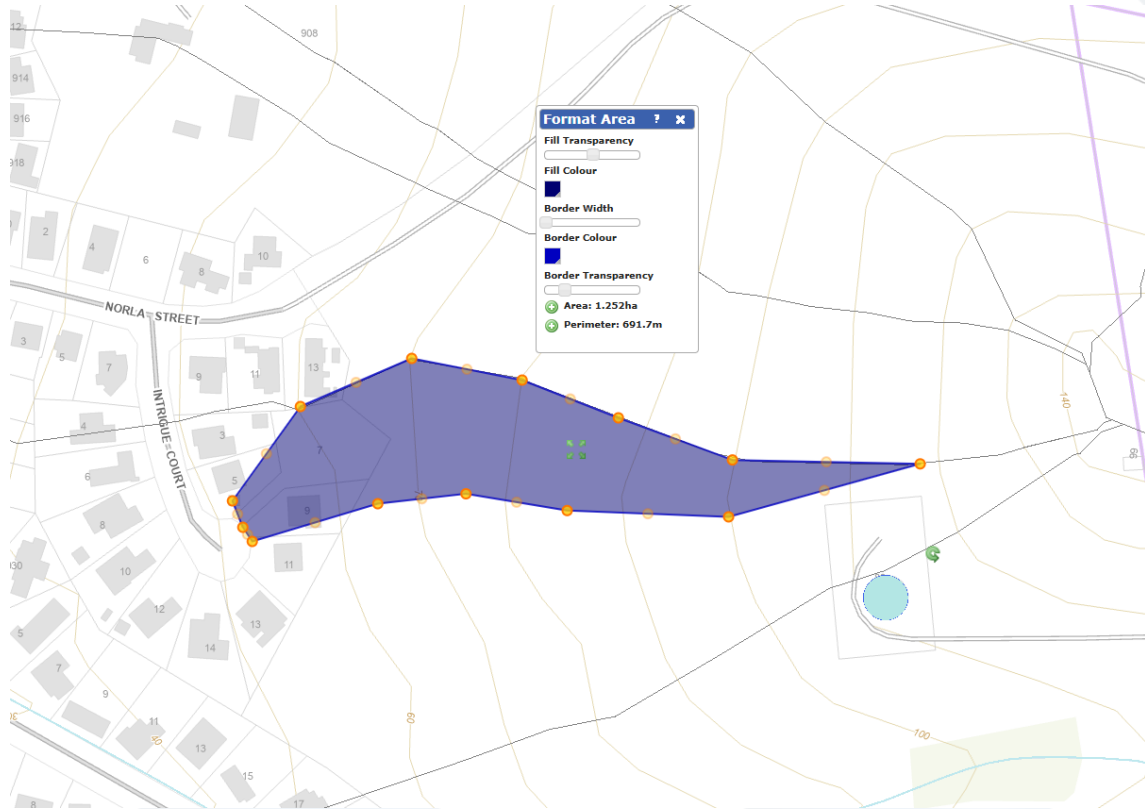


FIGURE 5: CATCHMENT AREA



3 Flood Assessment Model

3.1 Site Specific Data

The flood hazard assessment for 7 Intrigue Court, Tranmere, was undertaken using a comprehensive range of data sources to ensure the accuracy and reliability of the analysis. Key data inputs included:

Bureau of Meteorology (BoM):

Hydrological and meteorological data from BoM provided critical inputs on rainfall intensity, frequency, and duration, as well as climatic conditions relevant to the site. These datasets were essential in defining design storm events, including the 1% AEP with climate change adjustments, and in understanding broader rainfall-runoff behaviour within the region.

ELVIS (Elevation and Depth – Foundation Spatial Data):

High-resolution elevation data obtained from the ELVIS platform was used to generate a detailed topographic model of the site and the surrounding catchment. This data informed the identification of slopes, drainage paths, and potential areas of surface water accumulation—key parameters required for accurate flood modelling.

Spatial Reference Data:

Spatial datasets relating to land use, soil characteristics, vegetation cover, and existing drainage infrastructure were incorporated to reflect the site's unique geographical and hydrological context. This information was used to assign hydrologic response parameters such as initial and continuing loss rates, and to assess the influence of catchment characteristics on flood behaviour.

By integrating these datasets, the assessment provided a robust evaluation of potential flood risks under both historical and future scenarios. The analysis supports the identification of appropriate design controls and informs mitigation measures to ensure the proposed development is resilient to flood hazards and compliant with the Tasmanian Planning Scheme.

3.2 Hydrological Parameters

3.2.1 Design Parameters

Table 1 below outlines the hydrological parameters adopted for the catchment, following best practice guidelines.

Catchment Area (ha)	Initial Loss Perv/Imp (mm)	Continuing Loss Perv/Imp (mm/hr)	Manning's N (Pervious)	Manning's N (Impervious)	Manning's N (Rural Residential)	Non-linearity factor
1.252	15/1	3.8/0.0	0.045	0.02	0.045	-0.285

TABLE 1 DESIGN PARAMETERS

3.2.2 Climate Change Increase

The potential impact of climate change on design flood levels under existing catchment conditions was assessed in accordance with ARR2019 recommendations. To represent projected future conditions, the Year 2100 RCP8.5 climate scenario was adopted. This scenario reflects a high greenhouse gas concentration pathway and is widely used for conservative flood planning purposes.

A 16.3% increase in rainfall intensity was applied to the 1% AEP design storm ensembles, consistent with ARR2019 guidance for the Southern Slopes (Tasmania) region. This adjustment enables a more accurate estimation of future flood risks and supports the development of mitigation strategies that account for long-term climatic variability.

3.2.3 Design Rainfall Event

In accordance with the Tasmanian Planning Scheme 2021, flood events are required to be modelled for a 1% Annual Exceedance Probability (AEP), which is equivalent to a 100-year Average Recurrence Interval (ARI), to ensure protection over the lifespan of the proposed development. This assessment therefore incorporates the 1% AEP design storm with climate change (1% AEP + CC) scenario, applying a 16.3% increase in rainfall intensity as per ARR2019 guidance for the Southern Slopes (Tasmania) region.

To capture the influence of storm variability, each selected duration of the 1% AEP design storm was simulated using 10 temporal patterns obtained from the ARR Data Hub. This approach aligns with ARR2019 recommendations, which discourage the use of a single average pattern to avoid unrealistic overestimation or underestimation of peak flows.

The hydrologic simulations were carried out to identify the critical storm duration that would yield the most significant runoff impact. The results were summarised using a box-and-whisker plot (Figure 6), which showed that the 6-hour (360-minute) storm duration produced the highest median peak discharge across all scenarios. Accordingly, the 6-hour, 1% AEP + CC storm was selected as the critical design event for subsequent hydraulic modelling and flood risk analysis.

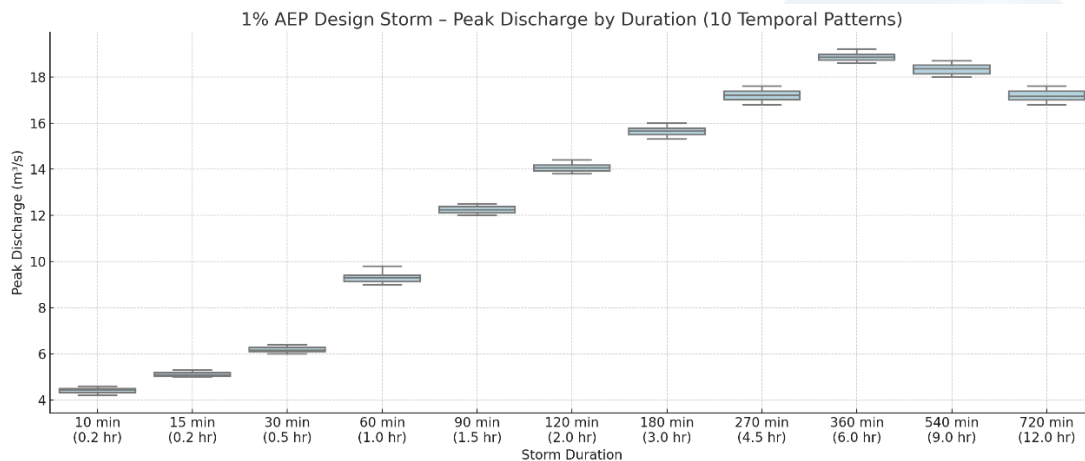


FIGURE 6 CRITICAL STORM DURATION-BOX-WHISKER PLOT

3.2.4 Hydraulic Modelling

The hydraulic assessment focused on evaluating overland flow behaviour within the subject site at 7 Intrigue Court, Tranmere. A 2D hydraulic model was developed using HEC-RAS version 6.5, employing a rain-on-grid approach to simulate surface runoff and flow distribution across the local catchment.

The model incorporated a 1.0-meter computational grid, generated from a high-resolution LiDAR-derived Digital Elevation Model (DEM), and adjusted to reflect the finalised site layout and design levels. The critical discharge from the 1% AEP + CC 6-hour design storm was applied directly as spatially distributed rainfall across the catchment.

To reflect spatial variations in land cover and surface resistance, Manning’s ‘n’ roughness coefficients were assigned to different surface types within the model domain. The hydraulic solver dynamically resolved flow paths based on terrain slope, catchment shape, and applied rainfall hyetographs derived from ARR2019 data.

This methodology allowed for detailed simulation of overland flow pathways, far exceeding the spatial resolution and accuracy of conventional hydrologic-hydraulic modelling. A post-processing filter was

applied to exclude minor or isolated shallow flows, ensuring that the resulting inundation extents captured meaningful flood behaviour and provided a reliable basis for assessing flood risk impacts on the proposed development.

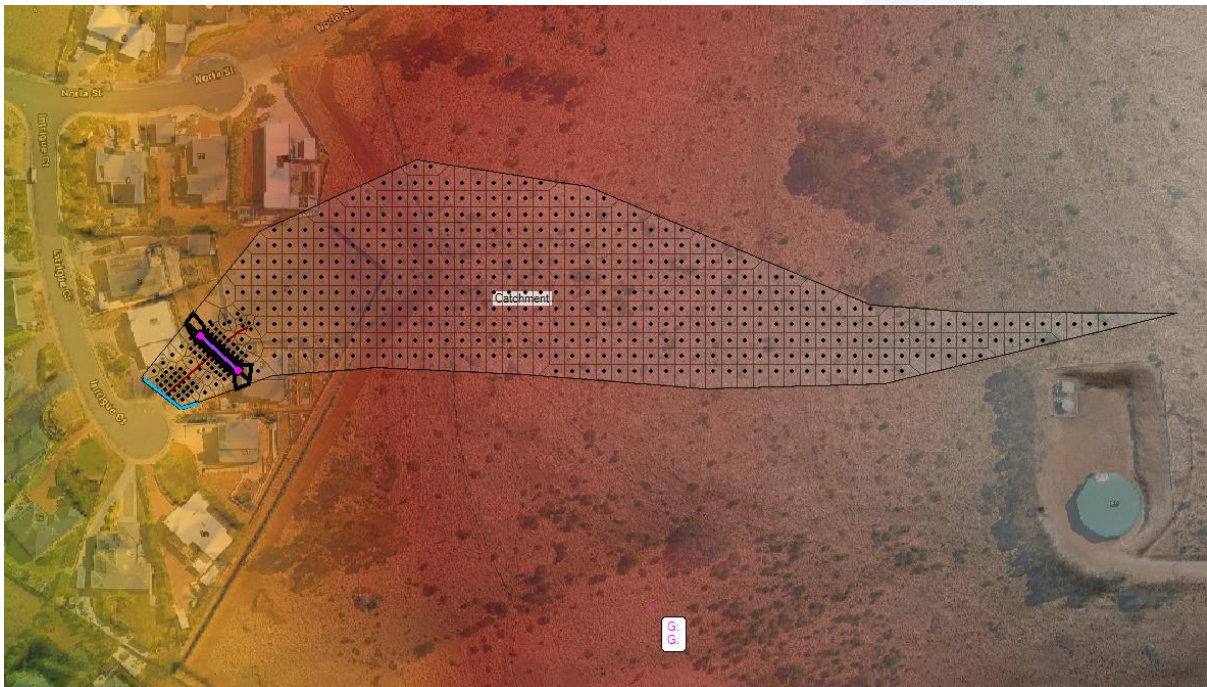


FIGURE 7 HEC RAS CATCHMENT GRID

4 Flood Hazard Assessment

4.1 Flood Hazard Analysis



FIGURE 8 FIGURE 8 HEC RAS MODEL

The 6-hour critical design storm event was applied to the 2D HEC-RAS hydraulic model to assess surface runoff and overland flow characteristics across the site under the 1% AEP + climate change (CC) scenario.

The modelling results indicate that surface runoff over the proposed driveway access is negligible, with flood depths also remaining minimal across the development footprint. These outcomes align with the Clarence City Council's flood-prone area mapping, which identifies only a marginal portion of the lot as subject to potential inundation.

The simulation confirms that the proposed development, including the driveway location, will not be adversely impacted by overland flow or contribute to off-site flood risk under design storm conditions.

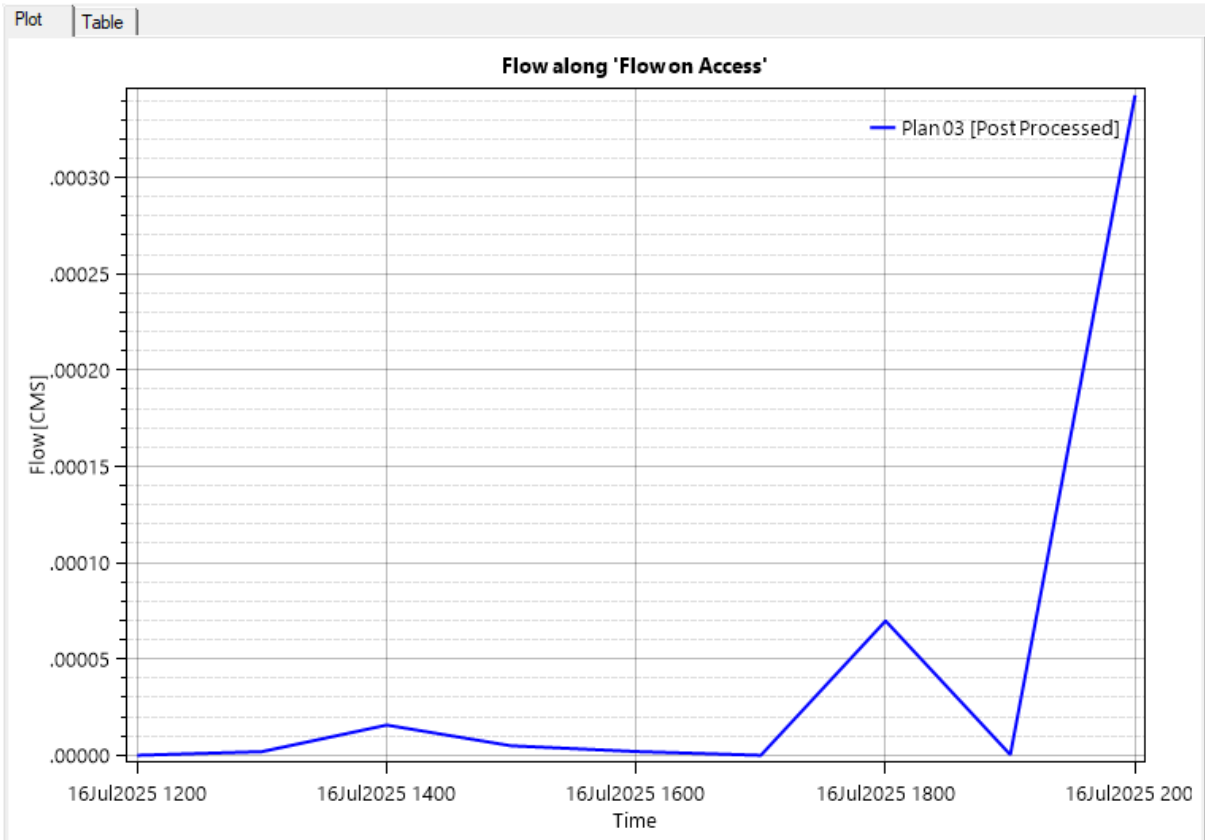


FIGURE 9 TIME VS FLOW ACROSS THE PROPERTY ACCESS-6HR EVENT



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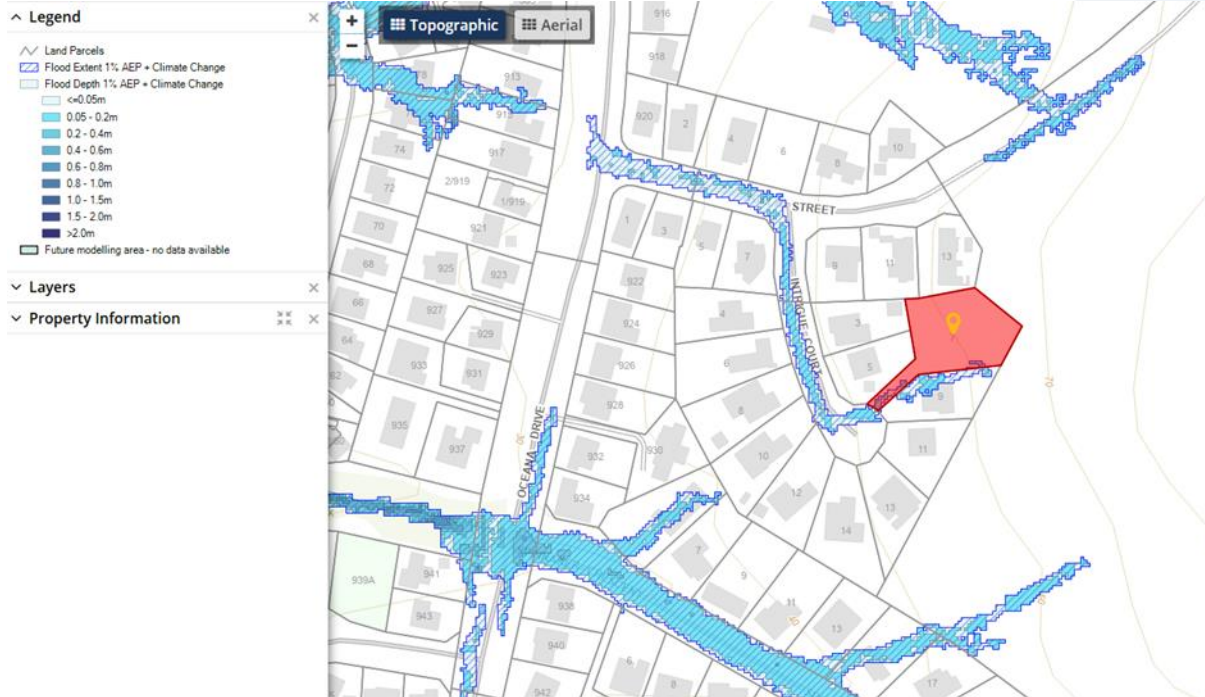


FIGURE 10 CITY OF CLARENCE FLOOD MAP FOR 1% AEP (ANNUAL EXCEEDANCE PROBABILITY) + CC



5 Conclusion

A detailed flood hazard assessment was undertaken for the proposed residential development at 7 Intrigue Court, Tranmere, to evaluate potential flood risks in accordance with the Tasmanian Planning Scheme 2021 and Clause 12.6.1 P1.2 of the Flood Prone Areas Hazard Code.

Hydrologic and hydraulic modelling was conducted using ARR2019 design rainfall data, with a 6-hour 1% AEP storm event including climate change (CC) adopted as the critical design scenario. A 2D HEC-RAS model was developed using a 1.0 m LiDAR-derived Digital Elevation Model (DEM) to simulate overland flow paths and surface water behaviour under design conditions.

The modelling results indicate:

Negligible surface runoff and minimal flood depths over the proposed development footprint, including the driveway.

Simulated flood depths were generally less than 0.05 m, consistent with the Clarence City Council flood mapping, which identifies depths in the range of 0.05 m to 0.2 m along the overland flow path.

Furthermore, the proposed driveway access is to be constructed with concrete paving over the identified overland flow path. This treatment is considered erosion-resistant and satisfies the relevant requirements of the Flood Prone Areas Hazard Code, ensuring that safe access can be maintained during a 1% AEP flood event.

Based on the outcomes of this assessment, the proposed development is not expected to be adversely impacted by flooding and is considered compliant with the applicable planning scheme provisions. No specific flood mitigation measures are required beyond adherence to standard stormwater and construction best practices

6 Limitation

Scope of Assessment:

This flood hazard assessment has been prepared solely for the proposed development at 7 Intrigue Court, Tranmere, and addresses flood risks associated with overland flow paths as identified in the Clarence City Council (CCC) Flood Hazard mapping. The scope of this report does not extend to evaluating the impact of upstream or downstream developments beyond the subject site boundaries. It also does not consider regional catchment-scale flood influences or interactions with underground drainage infrastructure.

Assumptions:



It is assumed that the available LiDAR topography, CCC flood mapping, rainfall data from ARR2019, and site-specific development plans accurately represent existing conditions at the time of assessment. It is also presumed that any existing or approved surrounding developments have been subjected to appropriate planning and engineering review to ensure their compatibility with local flood behaviour.

Review and Applicability:

This assessment reflects the site conditions, available data, and regulatory framework at the time of reporting. Should there be future changes in land use, catchment characteristics, or updated planning requirements, it is recommended that this report be reviewed and revised accordingly to ensure continued compliance and relevance.

Usage of Report:

This report must be considered and used in its entirety. Use of portions of this document in isolation or for purposes other than those explicitly outlined—without the prior written approval of Ceyloz Pty Ltd—is not permitted.

Responsibility:

Ceyloz Pty Ltd does not accept responsibility for the accuracy or completeness of data and documents provided by third parties, including but not limited to base topographic data, site plans, and council mapping, which were used in the preparation of this flood hazard assessment.

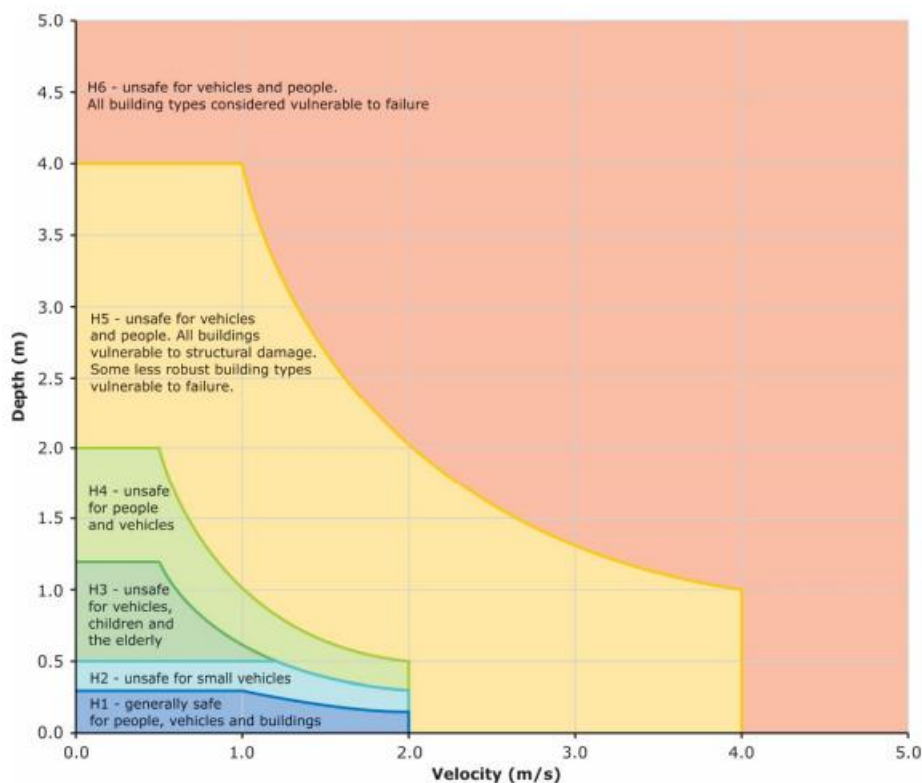
7 Appendix

Appendix A: Combined flood hazard curves

Flood hazard represents the potential for harm or situations that could lead to property damage or loss of life. It is commonly assessed based on flow depth and flow velocity, which are critical factors in determining the severity of flooding.

According to the Australian Rainfall and Runoff guidelines (Ball et al., 2016), flood hazard classification curves are provided to relate the vulnerability of the community to floodwaters. These curves, depicted in figure below, categorize flood hazard into different levels, from H1 to H6, each indicating varying degrees of risk.

Several appendices within this Stormwater System Management Plan refer to these flood hazard ratings, which help in understanding and managing the potential impacts of flooding on the community.



FOUNDATION CLASSIFICATION



7 INTRIGUE COURT - TRANMERE PROPOSED DWELLING

Client: Richard Barnes

Certificate of Title: 141047/10

Investigation Date: 29/05/2025

Refer to this Report As

Enviro-Tech Consultants Pty. Ltd. 2025. Foundation Classification Report for a Proposed Dwelling, 7 Intrigue Court - Tranmere. Unpublished report for Richard Barnes by Enviro-Tech Consultants Pty. Ltd., 29/05/2025.

Report Distribution

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

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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 which has been conducted which is not in line with the Site plans will not be 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.

Investigation Summary

Site Classification

In accordance with AS2870 – 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:

PROPOSED CUT with sub slab CLAY FILLING to 0.6m:

CLASS P due to filling and notwithstanding the problematic soil conditions observed/proposed at the Site, the soil would be classified as Class H1

PROPOSED CUT with sub slab GRAVEL FILLING to 0.6m:

CLASS P due to filling and notwithstanding the problematic soil conditions observed/proposed at the Site, the soil would be classified as Class M

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 distinctly weathered dolerite bedrock (with an allowable bearing capacity of 400 kPa). Depths to bedrock beneath the 0.6m thick filling is up to 1.8m and cuts will intercept dolerite bedrock.

Wind Load Classification

The AS 4055-2021 Wind loads for Housing classification is summarised.

Region:	A
Terrain category:	TC1
Shielding Classification:	PS
Topographic Classification:	T1
Wind Classification:	N3
Design Wind Gust Speed ($V_{h,u}$) m/s	50

I recommend that during construction, I and/or the design engineer are notified of any major variation in the foundation conditions as predicted in this report.



Kris Taylor, BSc (hons)

Environmental & Engineering Geologist

Site Investigation

The Site investigation is summarised in Table 1.

Table 1 Summary of Site Investigation

Client	Richard Barnes
Project Address	7 Intrigue Court - Tranmere
Council	Clarence
Planning Scheme	Tasmanian Planning Scheme
Inundation, Erosion or Landslip Overlays	Low Landslip Hazard Code
Proposed	Dwelling
Investigation	Fieldwork was carried out by an Engineering Geologist on the 29/5/2025
Site Topography	The building site has a strong slope of approximately 22% (12°) to the southwest
Site Drainage	The site receives overland flow runoff directly from the northeast.
Soil Profiling	Two investigation holes were excavated from surface level around the proposed dwelling (Appendix A):
Investigation Depths	The target excavation depth was estimated at 1.5 m. Borehole BH01 was direct push sampled to 0.6 m and borehole BH02 was direct push sampled to 1.2 m (both ending in DOLERITE). Borehole logs and photos are presented in Appendix B & C.
Soil moisture and groundwater	Recovered soil at the site was moist at the time of the investigation. Groundwater was encountered at 0.3 m below ground surface.
Geology	According to 1:25,000 Mineral Resources Tasmania geological mapping (accessed through The LIST), the geology comprises of: Jurassic Dolerite and related rocks

Soil Profiles

The geology of the site has been documented and described according to Australian Standard AS1726 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 Sandy CLAY	TOPSOIL: Silty Sandy CLAY, black, well sorted, medium plasticity, fine to medium grained sand, trace roots, 5 % roots, F-VSt	CI	0-0.1 DS@0.0	0-0.3
2	CLAY	SOIL & COBBLES: CLAY with sand, trace gravel, very dark grey, high plasticity, medium to coarse grained sand; angular gravel; 10% DOLERITE cobbles, F-VSt	CH	0.1-0.3 DS@0.2	0.3-0.5 DS@0.4
3	CLAY	SOIL & COBBLES: CLAY with sand, trace gravel, olive brown, high plasticity, medium to coarse grained sand; angular gravel; 5% DOLERITE cobbles, St-VSt	CH		0.5-0.9 DS@0.8
4	Silty CLAY	SOIL & COBBLES: Silty CLAY with gravel, trace sand, yellowish brown, mottled reddish yellow, medium plasticity, medium to coarse grained sand; angular gravel; 10% DOLERITE cobbles, VSt	CI		0.9-1.1 DS@1.0
5	DOLERITE	Extremely Weathered DOLERITE Bedrock		0.3-0.5	
6	DOLERITE	Distinctly Weathered DOLERITE Bedrock, VH (rock strenght inferred from BH01,0.5)		0.5-0.6 PL@0.5 REF	1.1-1.2 REF

Consistency¹ 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

Density² 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.

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.

Planning and Building Regulations (TPS)

Landslip Overlay Overview

The proposed building and works fall within the LIST Landslip Hazard Overlay (low hazard band) as presented in Appendix 1. Landslide hazard reporting requirements are presented in Table 3.

Table 3 Landslip Hazard Reporting Requirements Framework

Council	Clarence
Planning Scheme	Tasmanian Planning Scheme
Planning Scheme Code	C15.0 Landslip Hazard Code
Landslip Hazard Band	Low and Medium
Landslip Planning Map Component	Launceston Group slide susceptibility, source (large and small) (Low Hazard) and Launceston Group slide susceptibility - runout (Medium Hazard)
Proposed Development Is Exempt From Planning	No
Significant Works	Yes*
Critical Use, Vulnerable Use or Hazardous Use	No
Subdivision that creates a new road or extends an existing road in a medium landslip overlay	No
Development Code to Be Addressed	C15.6.1 Building and works within a landslip hazard area
Additional Information Required for Footing System	NO
Planning Report Requirements	Landslip Hazard Report with an accompanying Geotechnical Site Investigation report prepared using the methodology of the Practice Note Guidelines for Landslide Risk Management 2007 by a geotechnical practitioner
Modelling Timeframe	Building design life
Directors Determination Reporting Requirements	Preliminary to any Building Works
Certificate of Likely Compliance	Preliminary to any Building Works
Site Classification Requirements	Class P unless otherwise determined in a Site Classification report
Reporting Guideline Requirement	Australian Geomechanics Society - Landslide Risk Management Guidelines

*An assumption is made, that if an assessment is to be made based on the 2016 Building Act, regardless of whether significant works are proposed in the low overlay or not, the proposal is exempt from planning.

Planning Exemption

The Site is within a low landslip hazard band and the proposed development involves building work that requires authorisation under the Building Act 2016. In accordance with Clause C15.4.1(d) of the Landslip Hazard Code, such development is exempt from this code.

Notwithstanding the exemption, a site-specific geotechnical assessment has been undertaken by a qualified practitioner in accordance with the Practice Note Guidelines for Landslide Risk Management (2007), confirming that the proposed works represent a tolerable risk to life and property. This satisfies the relevant provisions under the Director's Determination and supports approval under the Building Act.

Directors Determination Objectives

As proposed works at the Site are considered significant works, the Directors Determination - Landslip Hazard Areas directly applies and therefore the building surveyor must ensure:

- that the proposed works considers the AS 2870 site classification, any further geotechnical site investigation (low) and any relevant landslip management plan; and
- that the proposed works can achieve and maintain a tolerable risk for the intended life of the building including significant work and the installations for the management and disposal of stormwater, sewage, water storage overflow or other wastewater, will not cause or contribute to landslip movement on the site or adjacent land; and
- that sufficient information has been provided in this report for the design of the footing system

Given the proposed development is in the low hazard overlay, an AS 2870 foundation classification report is the minimum requirement.

Proposed development

The proposed development involves construction of a two-storey slab-on-ground building with a garage and requiring excavation (cuts) of up to 1.1 m in depth and placement of fill up to 0.6 m in height.

We assume significant works are proposed at the Site, which may include:

- Excavation equal to or greater than 1m in depth, including temporary excavations for the installation or maintenance of services or pipes;
- Removal, redirection, or introduction of drainage for surface or groundwater;

Investigation Objectives

Landslip Hazard Report with an accompanying Geotechnical Site Investigation report prepared using the methodology of the Practice Note Guidelines for Landslide Risk Management 2007 by a geotechnical practitioner.

Scope of Works

The Site has been investigated with remote sensing, a Site Walk over, soil coring and dynamic cone penetrometer (DCP) testing.

Desktop Investigation

Other than the discovery of deep gouged into the landscape due to tunnel erosion from uncontrolled drainage, there is no evidence of deep or shallow seated slope instability at the Site. Dispersive soil management measures are presented within this report.

Site Investigation Findings

Extremely to distinctly weathered Jurassic dolerite bedrock has been encountered at a depth of between 0.3 and 1.1 m within the building envelope. Soil above the bedrock comprises medium to high plasticity clay soils which are severely dispersive.

Geotechnical Hazard Assessment

Given the presence of the shallow competent bedrock, and as the proposed building is to be founded on bedrock, there is a low risk of slope instability associated with the proposed building, works and use.

Director's Determination – Landslip Hazard Areas v1.1 (2021)**Assurance that works will not cause or contribute to landslip**

The proposed slab-on-ground dwelling is to be founded on shallow, extremely to distinctly weathered Jurassic dolerite bedrock at depths of 0.3–1.1 m, which provides a stable founding surface.

Surface soils are dispersive but are of limited thickness and are being managed via engineered drainage improvements.

The proposed excavation, filling, and stormwater infrastructure have been designed not to contribute to landslip movement on the Site or adjacent land.

Tunnel erosion from historical uncontrolled runoff is being mitigated by appropriate drainage controls as part of the design.

Assurance that the proposed work will maintain tolerable risk

The risk associated with the proposed building work has been assessed as low and tolerable for the intended use and design life of the structure.

The geotechnical assessment concludes there is no evidence of deep or shallow-seated instability, and the design measures (including stormwater control and shallow bedrock founding) ensure the long-term stability of the development.

Accordingly, the development meets the tolerable risk threshold required under the guidelines and the Determination.

DRAFT

Recommendations

General

For Class P Sites, the designer should be a qualified engineer experienced in the design of footing systems for buildings.

Dispersive soils

Findings

The results presented in Appendix D indicate:

- Soi collected from Layer 1 is slightly dispersive (Emerson Class 3).
- Layer 2, 3 and 4 comprise Emerson Class 1 category soils which are considered severely dispersive

Site specific recommendations

- Although there is no indication that surface water runoff will be channelised onto the Site from upslope, it is still recommended that precautions are put in place to manage dispersive soils on the Site.
- The concrete core retaining wall will be critical to prevent any potential tunnel development.
- It is important that ALL retaining walls are constructed directly onto bedrock to reduce the risk of tunnel undermining.
- Drainage cloth is critical behind retaining walls to ensure effective packing of soils to reduce tunnel development.
- All surfaces need to be either impervious to prevent water ingress (particularly around the building) or constructed with gypsum stabilised soil beneath imported loam topsoil.
- Measures must be put in place to ensure that water does not to move beneath pavement. Particularly at the toe of cuts or retaining walls.

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

Plumbing

Refer to hydraulic design drawings for detailed plumbing advice and requirements. Refer to Table 4 to assess soil movement (Ys) around pipework for different depth ranges.

Table 4 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
Dwelling	BH01 BH02	YES		0-0.1	0.1-0.5	0.5-1.1	1.1-1.7	1.7-3

* The Iss calculation depth has been modified based on the proposed cut and fill (see 'Footing Minimum Target Depths').

^Allowance is made for 0.6m of CLAY FILL with an average Iss value of 5.

Class M

When pipework service trench basset falls within Class M depth range as shown in Table 4, and all plumbing recommendations herein have been implemented, all stormwater and sanitary plumbing drains should have fittings set at their midposition during installation to allow 0.5ys movement in any direction. Pipe wrappings can be used at critical points.

AS3500.2:2021 Appendix G of AS3500.2:2021 should be referred for general advice.

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

It is recommended that a large (~8 tone) excavator equipped with a rock breaker is required to distinctly weathered bedrock.

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 (AS2870 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 or FCR FILL 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 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 AS3798 'Earthworks for Residential and Commercial Developments'.
- Before placing fill for landscaping, all topsoil should be removed from the filled area.

- Ideally, the fill should be free draining and placed to prevent water ponding. The fill should be placed in layers no greater than 150mm height and suitably compacted.

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

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.

Unless otherwise stated in an engineering report, fill or loose, soft, low bearing capacity soil should either be removed from the building pad, or otherwise footings or piers should ideally be established to the base of this material to support the proposed structure.

Earthworks should be carried out in accordance with AS3798 'Earthworks for Residential and Commercial Developments'. Unsuitable materials in structural fill are listed in AS2870 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.

Bored Pier Impediments - Obstructions

There were no obvious impediments to auguring such as cobbles or boulders obstructions.

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 practises from the CSIRO BTF 18 Foundation Maintenance and Footing Performance: A Homeowner's Guide are presented in Appendix G of this report along with Australian Geoguide (LR8) Hillside Construction Practice (Appendix H).



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 (AS2870 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.

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Appendix A Mapping

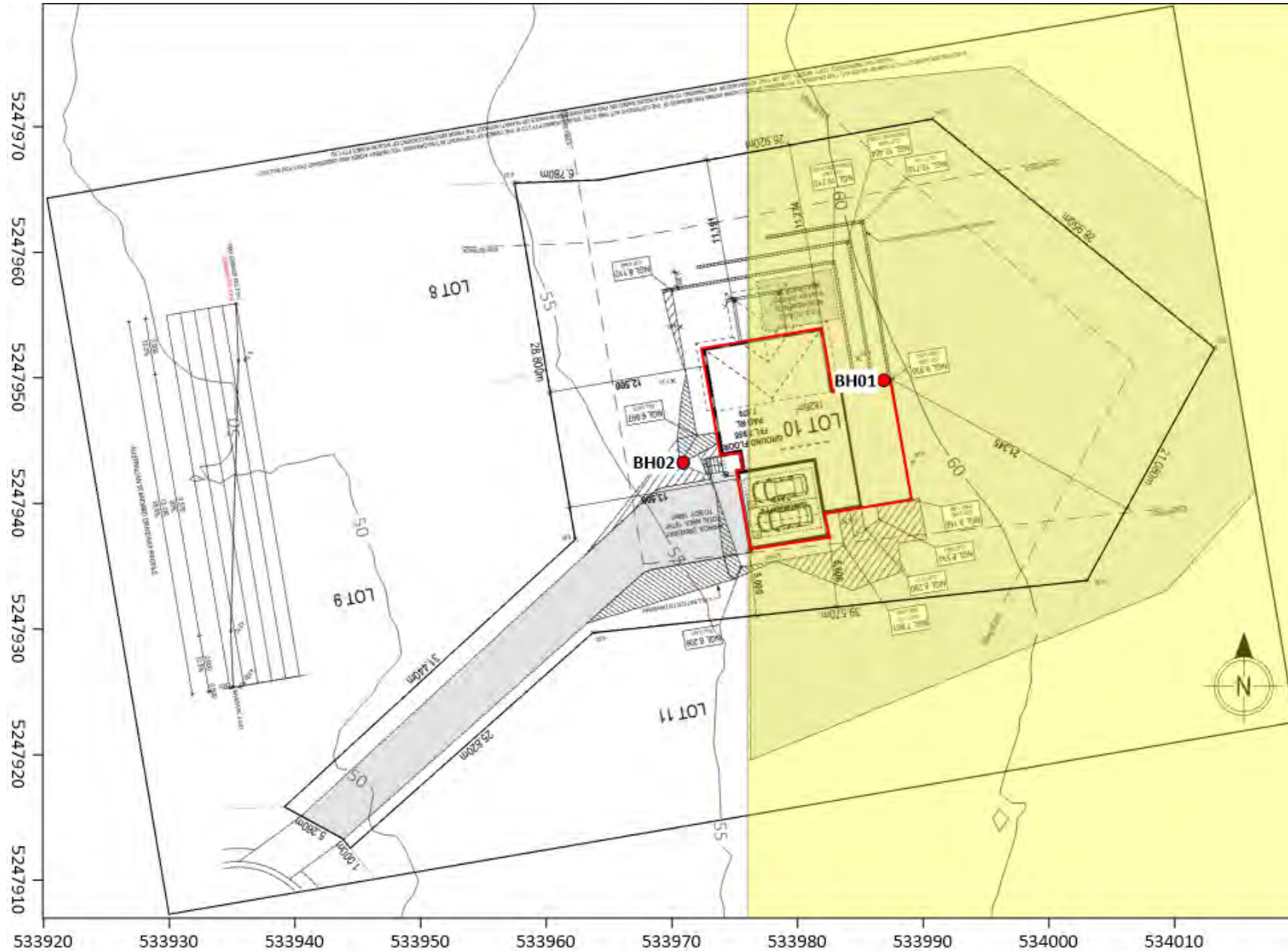



Figure 1 Site Borehole Locations

Appendix B Borehole Logs

		ASSESSMENT: Foundation Classification				Borehole : BH01										
		STRUCTURE: Dwelling				DATE TESTED: 29/05/2025										
Positioning: GDA94 & mAHD		EASTING: 533987		ACCURACY		LOGGED BY: M. Scalisi										
		NORTHING: 5247950		HORIZ: 1m		VERT: ~0.1m		ELEVATION: 59.2								
LOCATION: 7 Intrigue Court - Tranmere					EQUIPMENT: AMS Powerprobe 9120 RAP											
CLIENT: Environmental Specialist and Ecologist					ESTIMATED GROUND m (m AHD):											
DEPTH (m)	GRAPHIC	DESCRIPTION	DENSITY CONSIST. STRENGTH	LAYER	ELEVATION (mAHD)	MOISTURE		SAMPLE TEST	Cu (kPa)	UCS (kg/cm ²)	(ISu MPa)					
						Index %	Well				N ₆₀	N ₁₀₀	N ₁₅₀	NDCP/100mm		
0.0	CI	TOPSOIL: Silty Sandy CLAY, black, well sorted, medium plasticity, fine to medium grained sand, trace roots, 5 % roots	firm	1												
	CH	SOIL & COBBLES: CLAY with sand, trace gravel, very dark grey, high plasticity, medium to coarse grained sand	stiff to very stiff	2	59.0	Moist	19	DS								
		Extremely Weathered DOLERITE Bedrock dark greyish brown		5	58.8											
0.5		Distinctly Weathered DOLERITE Bedrock brownish yellow	very high	6	58.6			PL	IS 50		3.01 MPa					REF
Direct Push Sampler Refusal on Distinctly Weathered DOLERITE Bedrock End of borehole at 0.6m 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 penetrometer, FV(Ømm): downhole field vane, U50: undisturbed 50mm sample, REF: DCP refusal																

LOCATION: 7 Intrigue Court - Tranmere
CLIENT: Environmental Specialist and Ecologist

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

DEPTH (m)	GRAPHIC	DESCRIPTION	DENSITY CONSIST. STRENGTH	LAYER	ELEVATION (mAHD)	MOISTURE		SAMPLE TEST	Cu (kPa)	UCS (kg/cm ²)	(ISu MPa)			
						Index %	Well				N _{SPT}	N _{DCP/100mm}		
0.0	CI	TOPSOIL: Silty Sandy CLAY, black, well sorted, medium plasticity, fine to medium grained sand, trace roots, 5 % roots	firm to very stiff	1	55.5	Moist								
55.3														
0.5		CH	SOIL & COBBLES: CLAY with sand, trace gravel, very dark grey, high plasticity, medium to coarse grained sand	firm	2	55.1	Wet	28	DS	PP	0.5			
						54.9								
1.0	CI	SOIL & COBBLES: CLAY with sand, trace gravel, olive brown, high plasticity, medium to coarse grained sand	stiff to very stiff	3	54.7	Slightly Moist	24	DS	PP	2.1				
					54.5									
		Distinctly Weathered DOLERITE Bedrock brownish yellow		6	54.3									
		Direct Push Sampler Refusal on Distinctly Weathered DOLERITE Bedrock												
		End of borehole at 1.2m depth.												

GROUNDWATER: Encountered at 0.3 m Below Ground Surface

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 penetrometer; FV(Ømm): downhole field vane; U50: undisturbed 50mm sample; REF: DCP refusal

Appendix C Core Photographs

BH01



BH02



*** 1 metre core tray length**

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Appendix D Geotechnical 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 Dispersion (Emerson aggregate test)

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

- Soi collected from Layer 1 is slightly dispersive (Emerson Class 3).
- Layer 2, 3 and 4 comprise Emerson Class 1 category soils which are considered severely dispersive

Table 5 Summary of the Emerson class results.

Layer	Soil	Depth	Sample ID	Emersion Class	Date Tested	Water	pH
1	Silty Sandy CLAY	0	BH01 0.0	Class 3	2/05/2025	DI 16°C	7.06
2	CLAY	0.2	BH01 0.2	Class 1	2/05/2025	DI 16°C	7.21
3	CLAY	0.8	BH02 0.8	Class 1	2/05/2025	DI 16°C	7.99
4	Silty CLAY	1	BH02 1.0	Class 1	2/05/2025	DI 16°C	7.84

Rock Point Load Testing

Rock samples collected from the Project Area were tested using a digital rock point load tester which has been manufactured in accordance with AS 4133.4.1. The 'lump' sample method and calculation have been used in the tests.

A dolerite rock sample was collected from BH01 near the building pad within the Project Area. The Dolerite is inferred to have a very high rock strength based on interpretation of the point load testing results (Table 6).

Table 6 Point load index testing results.

	Units	BH01
Depth	m	0.500
Layer		6
Test	MPa (IS50)	3.014
Index		VH

Appendix E 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 9 should be referred to where only 50kPa 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 9.

Table 7 Soil characteristic surface movements and recommended footing minimum target depths based on a 1.1m cut (estimated based on BH01 profile) and 0.6m clay fill near BH02.

Footing design parameters	BH01	BH02
Ys Calculation Depth	-1.1m (cut)~	0.6m (fill ISS: 5.5)~
Surface movement Ys (mm)	0	60
Soil reactivity class	A	H1
Base of problem soil layer (m)*	-	-
Layer at base of problem soil*	-	-
Pier/Footing minimum target depth (m)#	>0.1~	>1.8~
Pier/footing minimum target layer#	6	6
Allowable bearing capacity at min target depth (kPa) #	400	400

- 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).

Table 8 Soil characteristic surface movements and recommended footing minimum target depths based on a 1.1m cut (estimated based on BH01 profile) and 0.6m crushed rock/gravel fill near BH02.

Footing design parameters	BH01	BH02
Ys Calculation Depth	-1.1m (cut)~	0.6m (fill ISS: 0)~
Surface movement Ys (mm)	0	35
Soil reactivity class	A	M
Base of problem soil layer (m)*	-	-
Layer at base of problem soil*	-	-
Pier/Footing minimum target depth (m)#	>0.1~	>1.8~
Pier/footing minimum target layer#	6	6
Allowable bearing capacity at min target depth (kPa) #	400	400

- 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 AS2870. 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 9.

Table 9 Soil allowable bearing capacities and problematic ground conditions.

Depth below investigation surface (m)	Allowable Bearing Capacity (kPa)	
	BH01	BH02
0	120*	130*
0.1	160	120
0.2	210	130
0.3	DOLERITE	100
0.4	DOLERITE	110
0.5	DOLERITE	130
0.6		170
0.7		180
0.8		200
0.9		230
1		260
1.1		DOLERITE
1.2		REF

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.

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Appendix F 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/m ²	0.2 – 0.5 kg/m ²
Class 2	0.5 kg/m ²	1.0 kg/m ²
Class 1	1.0 kg/m ²	1.5 kg/m ²

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.

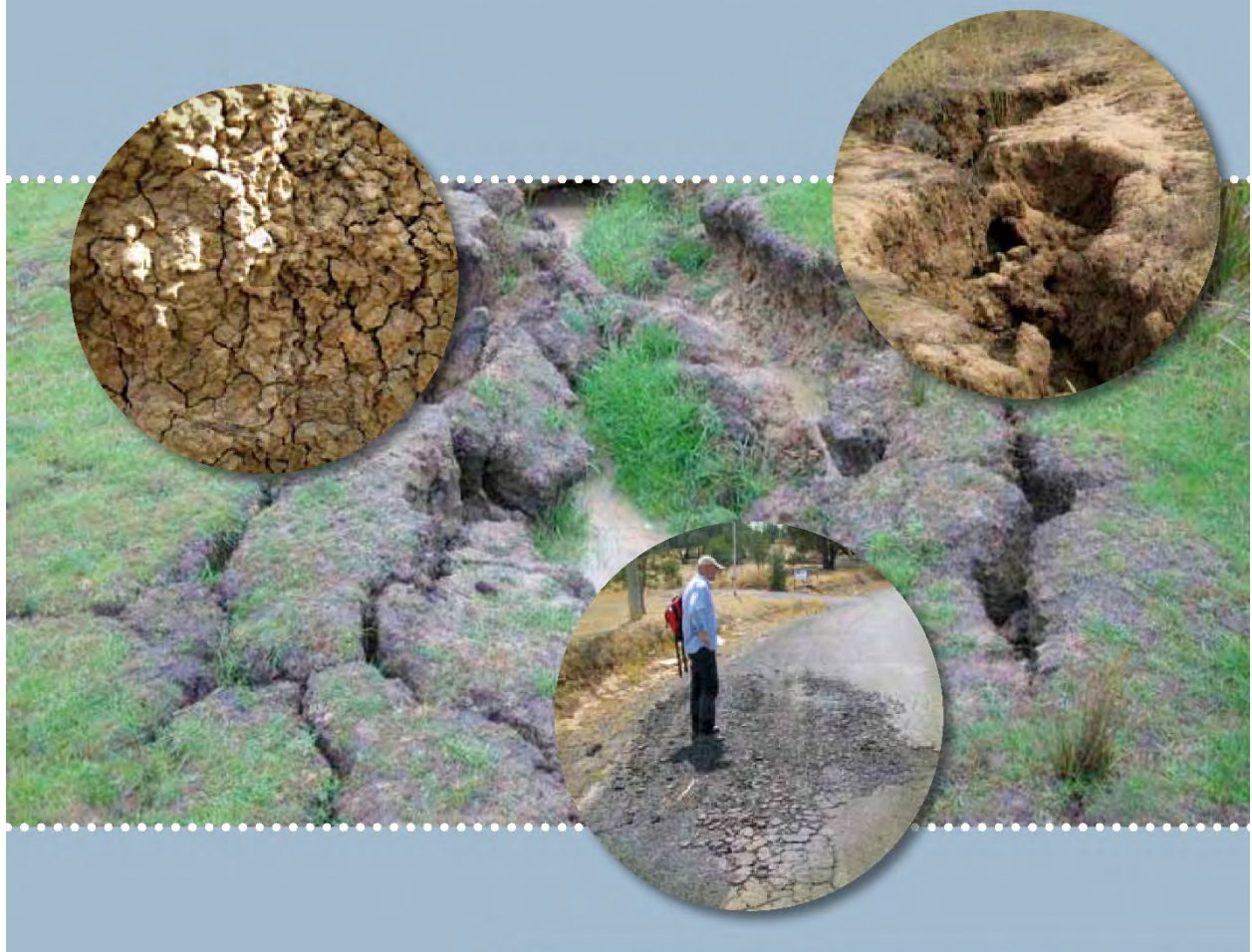
Runoff from pavements and other impervious surfaces must either be captured and redirected into detention tanks for controlled redistribution.

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.

DISPERSIVE SOILS *and* *their* MANAGEMENT



Technical Reference Manual

Sustainable Land Use
Department of Primary Industries and Water



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.



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.

4.3 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 sufficient 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/cm² pressure compared to 9.3 kg/cm² for a sheepsfoot roller (Sorensen 1995).

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.

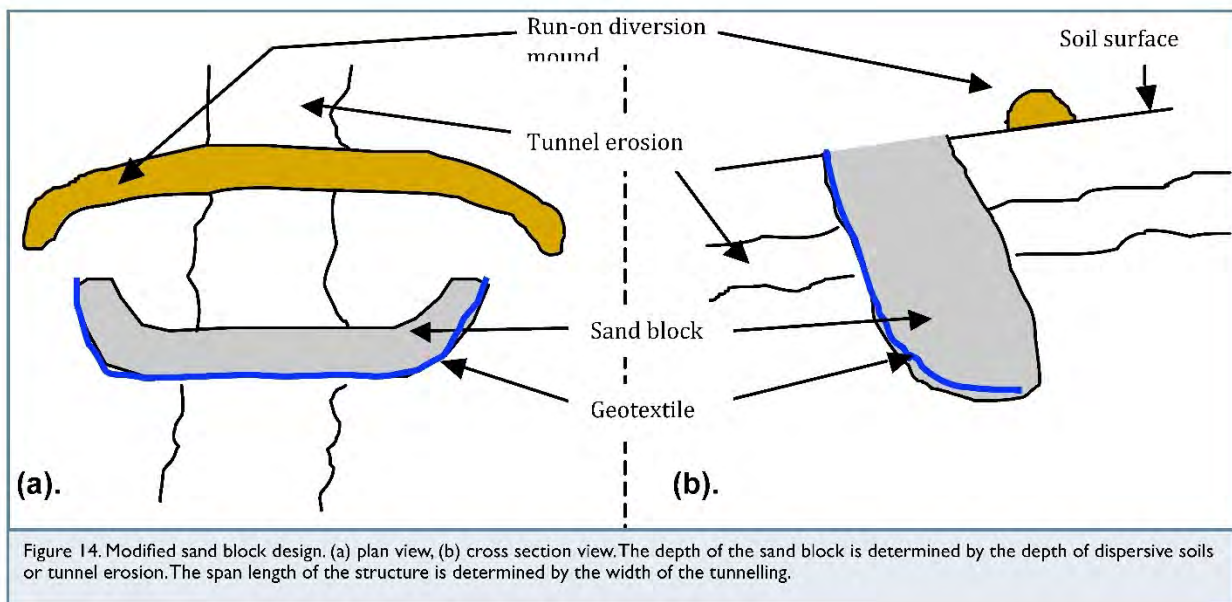


Figure 14. Modified sand block design. (a) plan view, (b) cross section view. The depth of the sand block is determined by the depth of dispersive soils or tunnel erosion. The span length of the structure is determined by the width of the tunnelling.

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 perpend).

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.



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.

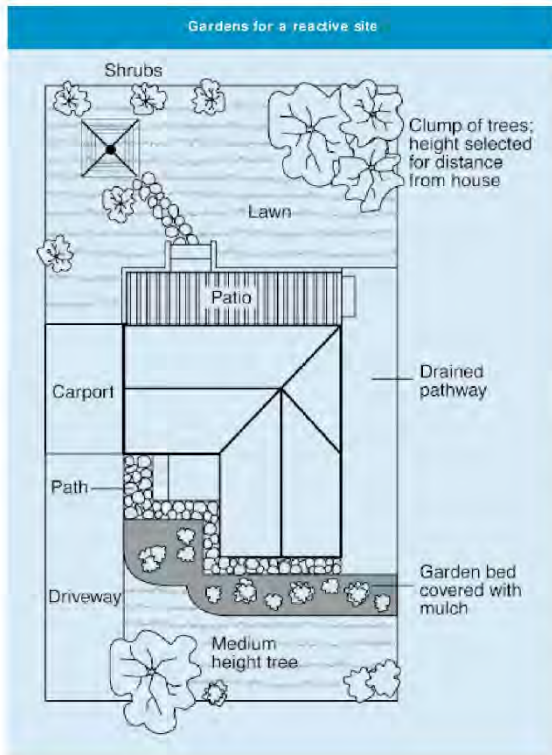
It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

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.

The information in this and other issues in the series was derived from various sources and was believed to be correct when published.

The information is advisory. It is provided in good faith and not claimed to be an exhaustive treatment of the relevant subject.

Further professional advice needs to be obtained before taking any action based on the information provided.

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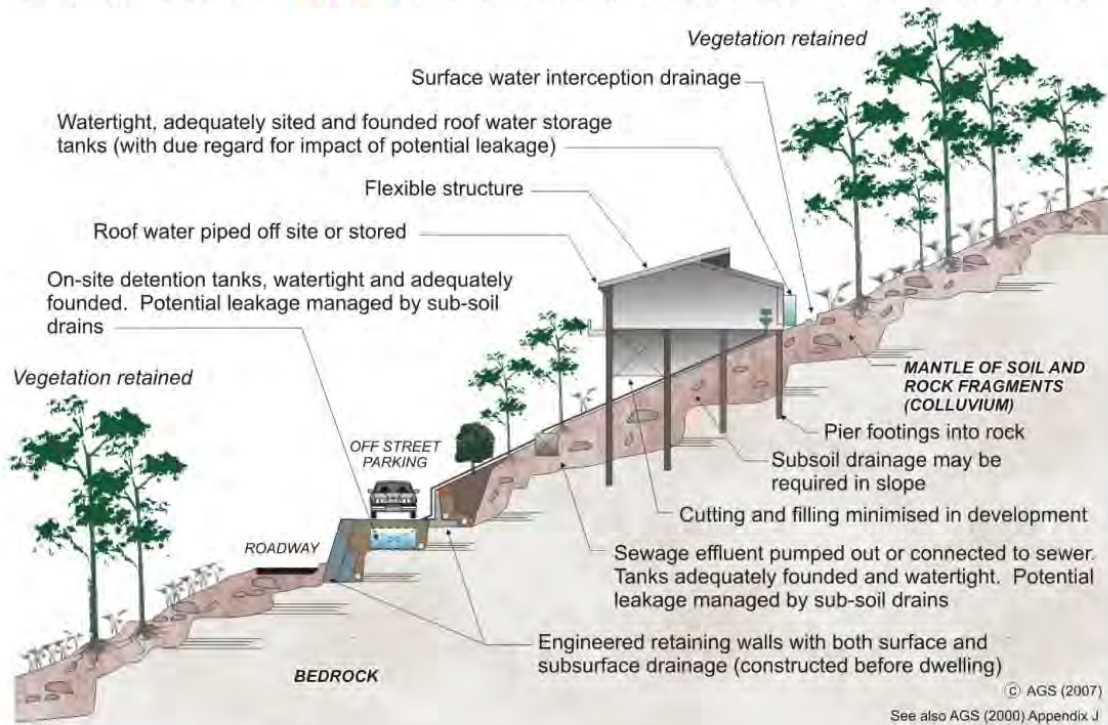
Appendix H Examples of Good Hillside Construction (AGS LRM LR8)

AUSTRALIAN GEOGUIDE LR8 (CONSTRUCTION PRACTICE)

HILLSIDE CONSTRUCTION PRACTICE

Sensible development practices are required when building on hillsides, particularly if the hillside has more than a low risk of instability (GeoGuide LR7). Only building techniques intended to maintain, or reduce, the overall level of landslide risk should be considered. Examples of good hillside construction practice are illustrated below.

EXAMPLES OF GOOD HILLSIDE CONSTRUCTION PRACTICE



WHY ARE THESE PRACTICES GOOD?

Roadways and parking areas - are paved and incorporate kerbs which prevent water discharging straight into the hillside (GeoGuide LR5).

Cuttings - are supported by retaining walls (GeoGuide LR6).

Retaining walls - are engineer designed to withstand the lateral earth pressures and surcharges expected, and include drains to prevent water pressures developing in the backfill. Where the ground slopes steeply down towards the high side of a retaining wall, the disturbing force (see GeoGuide LR6) can be two or more times that in level ground. Retaining walls must be designed taking these forces into account.

Sewage - whether treated or not is either taken away in pipes or contained in properly founded tanks so it cannot soak into the ground.

Surface water - from roofs and other hard surfaces is piped away to a suitable discharge point rather than being allowed to infiltrate into the ground. Preferably, the discharge point will be in a natural creek where ground water exits, rather than enters, the ground. Shallow, lined, drains on the surface can fulfil the same purpose (GeoGuide LR5).

Surface loads - are minimised. No fill embankments have been built. The house is a lightweight structure. Foundation loads have been taken down below the level at which a landslide is likely to occur and, preferably, to rock. This sort of construction is probably not applicable to soil slopes (GeoGuide LR3). If you are uncertain whether your site has rock near the surface, or is essentially a soil slope, you should engage a geotechnical practitioner to find out.

Flexible structures - have been used because they can tolerate a certain amount of movement with minimal signs of distress and maintain their functionality.

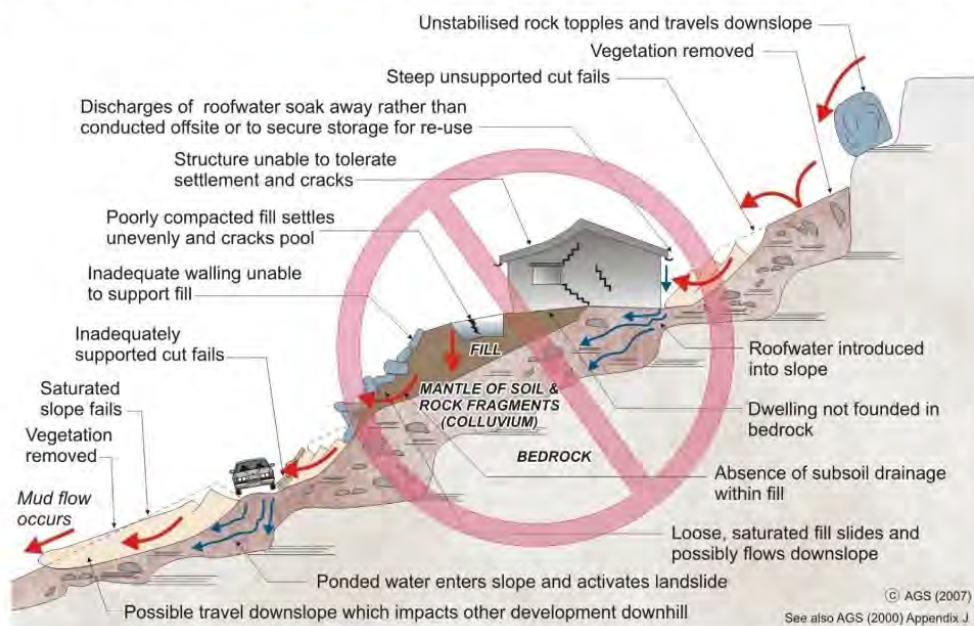
Vegetation clearance - on soil slopes has been kept to a reasonable minimum. Trees, and to a lesser extent smaller vegetation, take large quantities of water out of the ground every day. This lowers the ground water table, which in turn helps to maintain the stability of the slope. Large scale clearing can result in a rise in water table with a consequent increase in the likelihood of a landslide (GeoGuide LR5). An exception may have to be made to this rule on steep rock slopes where trees have little effect on the water table, but their roots pose a landslide hazard by dislodging boulders.

Possible effects of ignoring good construction practices are illustrated on page 2. Unfortunately, these poor construction practices are not as unusual as you might think and are often chosen because, on the face of it, they will save the developer, or owner, money. You should not lose sight of the fact that the cost and anguish associated with any one of the disasters illustrated, is likely to more than wipe out any apparent savings at the outset.

ADOPT GOOD PRACTICE ON HILLSIDE SITES

AUSTRALIAN GEOGUIDE LR8 (CONSTRUCTION PRACTICE)

EXAMPLES OF **POOR** HILLSIDE CONSTRUCTION PRACTICE



WHY ARE THESE PRACTICES POOR?

Roadways and parking areas - are unsurfaced and lack proper table drains (gutters) causing surface water to pond and soak into the ground.

Cut and fill - has been used to balance earthworks quantities and level the site leaving unstable cut faces and added large surface loads to the ground. Failure to compact the fill properly has led to settlement, which will probably continue for several years after completion. The house and pool have been built on the fill and have settled with it and cracked. Leakage from the cracked pool and the applied surface loads from the fill have combined to cause landslides.

Retaining walls - have been avoided, to minimise cost, and hand placed rock walls used instead. Without applying engineering design principles, the walls have failed to provide the required support to the ground and have failed, creating a very dangerous situation.

A heavy, rigid, house - has been built on shallow, conventional, footings. Not only has the brickwork cracked because of the resulting ground movements, but it has also become involved in a man-made landslide.

Soak-away drainage - has been used for sewage and surface water run-off from roofs and pavements. This water soaks into the ground and raises the water table (GeoGuide LR5). Subsoil drains that run along the contours should be avoided for the same reason. If felt necessary, subsoil drains should run steeply downhill in a chevron, or herring bone, pattern. This may conflict with the requirements for effluent and surface water disposal (GeoGuide LR9) and if so, you will need to seek professional advice.

Rock debris - from landslides higher up on the slope seems likely to pass through the site. Such locations are often referred to by geotechnical practitioners as "debris flow paths". Rock is normally even denser than ordinary fill, so even quite modest boulders are likely to weigh many tonnes and do a lot of damage once they start to roll. Boulders have been known to travel hundreds of metres downhill leaving behind a trail of destruction.

Vegetation - has been completely cleared, leading to a possible rise in the water table and increased landslide risk (GeoGuide LR5).

DON'T CUT CORNERS ON HILLSIDE SITES - OBTAIN ADVICE FROM A GEOTECHNICAL PRACTITIONER

More information relevant to your particular situation may be found in other Australian GeoGuides:

- GeoGuide LR1 - Introduction
- GeoGuide LR2 - Landslides
- GeoGuide LR3 - Landslides in Soil
- GeoGuide LR4 - Landslides in Rock
- GeoGuide LR5 - Water & Drainage
- GeoGuide LR6 - Retaining Walls
- GeoGuide LR7 - Landslide Risk
- GeoGuide LR9 - Effluent & Surface Water Disposal
- GeoGuide LR10 - Coastal Landslides
- GeoGuide LR11 - Record Keeping

The Australian GeoGuides (LR series) are a set of publications intended for property owners; local councils; planning authorities; developers; insurers; lawyers and, in fact, anyone who lives with, or has an interest in, a natural or engineered slope, a cutting, or an excavation. They are intended to help you understand why slopes and retaining structures can be a hazard and what can be done with appropriate professional advice and local council approval (if required) to remove, reduce, or minimise the risk they represent. The GeoGuides have been prepared by the [Australian Geomechanics Society](#), a specialist technical society within Engineers Australia, the national peak body for all engineering disciplines in Australia, whose members are professional geotechnical engineers and engineering geologists with a particular interest in ground engineering. The GeoGuides have been funded under the Australian governments' National Disaster Mitigation Program.