

Contract of Sale of Land

Property:

17 Railway Parade, Seaford VIC 3198

Victorian Statewide Conveyancing Pty Ltd

Level 1

Suite 1, 58-60 Victor Crescent

NARRE WARREN VIC 3805

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Fax: (03) 8794 9072

PO Box 32, Narre Warren VIC 3805

Ref: JG:20250057

Contract of Sale of Land

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IMPORTANT NOTICE TO PURCHASERS – COOLING-OFF

Cooling-off period (Section 31 of the *Sale of Land Act 1962*)

You may end this contract within 3 clear business days of the day that you sign the contract if none of the exceptions listed below applies to you.

You must either give the vendor or the vendor's agent **written** notice that you are ending the contract or leave the notice at the address of the vendor or the vendor's agent to end this contract within this time in accordance with this cooling-off provision.

You are entitled to a refund of all the money you paid EXCEPT for \$100 or 0.2% of the purchase price (whichever is more) if you end the contract in this way.

EXCEPTIONS: the 3-day cooling-off period does not apply if:

- you bought the property at a publicly advertised auction or on the day on which the auction was held; or
- you bought the land within 3 clear business days before a publicly advertised auction was to be held; or
- you bought the land within 3 clear business days after a publicly advertised auction was held; or
- the property is used primarily for industrial or commercial purposes; or
- the property is more than 20 hectares in size and is used primarily for farming; or
- you and the vendor previously signed a contract for the sale of the same land in substantially the same terms; or
- you are an estate agent or a corporate body.

NOTICE TO PURCHASERS OF PROPERTY OFF-THE-PLAN

Off-the-plan sales (Section 9AA(1A) of the *Sale of Land Act 1962*)

You may negotiate with the vendor about the amount of the deposit moneys payable under the contract of sale, up to 10 per cent of the purchase price.

A substantial period of time may elapse between the day on which you sign the contract of sale and the day on which you become the registered proprietor of the lot.

The value of the lot may change between the day on which you sign the contract of sale of that lot and the day on which you become the registered proprietor

Approval

This contract is approved as a standard form of contract under section 53A of the *Estate Agents Act 1980* by the Law Institute of Victoria Limited. The Law Institute of Victoria Limited is authorised to approve this form under the *Legal Profession Uniform Law Application Act 2014*.

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Contract of Sale of Land

The vendor agrees to sell and the purchaser agrees to buy the property, being the land and the goods, for the price and on the terms set out in this contract.

The terms of this contract are contained in the –

- particulars of sale; and
- special conditions, if any; and
- general conditions (which are in standard form: see general condition 6.1)

in that order of priority.

SIGNING OF THIS CONTRACT

WARNING: THIS IS A LEGALLY BINDING CONTRACT. YOU SHOULD READ THIS CONTRACT BEFORE SIGNING IT.

Purchasers should ensure that they have received a section 32 statement from the vendor before signing this contract. In this contract, "section 32 statement" means the statement required to be given by a vendor under section 32 of the *Sale of Land Act 1962*.

The authority of a person signing –

- under power of attorney; or
 - as director of a corporation; or
 - as agent authorised in writing by one of the parties –
- must be noted beneath the signature.

Any person whose signature is secured by an estate agent acknowledges being given by the agent at the time of signing a copy of the terms of this contract.

SIGNED BY THE PURCHASER:

..... on/...../2025

Print names(s) of person(s) signing:

State nature of authority, if applicable:

This offer will lapse unless accepted within [] clear business days (3 clear business days if none specified)

In this contract, "business day" has the same meaning as in section 30 of the *Sale of Land Act 1962*

SIGNED BY THE VENDOR:

..... on/...../2025

Print names(s) of person(s) signing: Bekim Qaniu and Fatime Qaniu

State nature of authority, if applicable:

The **DAY OF SALE** is the date by which both parties have signed this contract.

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Particulars of Sale

Vendor's estate agent

Name: O'Brien Real Estate - Chelsea
Address: 463 Nepean Highway, Chelsea VIC 3196
Email: Dimitris.koptis@obrienrealestate.com.au
Tel: 9772 7077 Mob: 0477074156 Fax: 9772 7022 Ref: Dimitris Koptis

Vendor

Name: Bekim Qaniu and Fatime Qaniu
Address:
ABN/ACN:

Vendor's legal practitioner or conveyancer

Name: Victorian Statewide Conveyancing Pty Ltd
Address: Level 1, Suite 1, 58-60 Victor Crescent, Narre Warren VIC 3805
PO Box 32, Narre Warren VIC 3805
Email: info@victorianstatewide.com.au
Tel: (03) 8790 5488 Mob: Fax: (03) 8794 9072 Ref: 20250057

Purchaser

Name:
Address:
ABN/ACN:
Email:

Purchaser's legal practitioner or conveyancer

Name:
Address:
Email:
Tel: Mob: Fax: Ref:

Land (general conditions 7 and 13)

The land is described in the table below –

Certificate of Title reference	being lot	on plan
Volume 8301 Folio 226	1	LP 47803

If no title or plan references are recorded in the table, the land is as described in the section 32 statement or the register search statement and the document referred to as the diagram location in the register search statement attached to the section 32 statement

The land includes all improvements and fixtures.

Property address

The address of the land is: 17 Railway Parade, Seaford VIC 3198

Goods sold with the land (general condition 6.3(f)) (list or attach schedule)

All fixed floor coverings, light fittings, window furnishings and all fixtures and fittings of a permanent nature

Payment

Price \$
Deposit \$ By (of which has been paid)
Balance \$ payable at settlement

Deposit bond

☐ General condition 15 applies only if the box is checked

Bank guarantee

☐ General condition 16 applies only if the box is checked

GST (general condition 19)

Subject to general condition 19.2, the price includes GST (if any), unless the next box is checked

- ☐ GST (if any) must be paid in addition to the price if the box is checked
- ☐ This sale is a sale of land on which a 'farming business' is carried on which the parties consider meets the requirements of section 38-480 of the GST Act if the box is checked
- ☐ This sale is a sale of a 'going concern' if the box is checked
- ☐ The margin scheme will be used to calculate GST if the box is checked

Settlement (general conditions 17 & 26.2)**is due on**

unless the land is a lot on an unregistered plan of subdivision, in which case settlement is due on the later of:

- the above date; and
- the 14th day after the vendor gives notice in writing to the purchaser of registration of the plan of subdivision.

Lease (general condition 5.1)

- ☒ At settlement the purchaser is entitled to vacant possession of the property unless the box is checked, in which case the property is sold subject to*:

(*only one of the boxes below should be checked after carefully reading any applicable lease or tenancy document)

☐ a lease for a term ending on / /20..... with [.....] options to renew, each of [.....] years

OR

☐ a residential tenancy for a fixed term ending on / /20.....

OR

☒ a periodic tenancy determinable by notice

Terms contract (general condition 30)

- ☐ This contract is intended to be a terms contract within the meaning of the *Sale of Land Act 1962* if the box is checked. (Reference should be made to general condition 30 and any further applicable provisions should be added as special conditions)

Loan (general condition 20)

- ☐ This contract is subject to a loan being approved and the following details apply if the box is checked:

Lender:

Loan amount: no more than

Approval
date:

Building report

- ☐ General condition 21 applies only if the box is checked

Pest report

- ☐ General condition 22 applies only if the box is checked

Special Conditions

Instructions: *It is recommended that when adding special conditions:*

- *each special condition is numbered;*
- *the parties initial each page containing special conditions;*
- *a line is drawn through any blank space remaining on the last page; and*
- *attach additional pages if there is not enough space.*



GC 23 – special condition

For the purposes of general condition 23, the expression “periodic outgoings” does not include any amounts to which section 10G of the Sale of Land Act 1962 applies.



GC 28 – special condition

General condition 28 does not apply to any amounts to which section 10G or 10H of the Sale of Land Act 1962 applies.

General Conditions

Contract signing

1. ELECTRONIC SIGNATURE

- 1.1 In this general condition "electronic signature" means a digital signature or a visual representation of a person's handwritten signature or mark which is placed on a physical or electronic copy of this contract by electronic or mechanical means, and "electronically signed" has a corresponding meaning.
- 1.2 The parties consent to this contract being signed by or on behalf of a party by an electronic signature.
- 1.3 Where this contract is electronically signed by or on behalf of a party, the party warrants and agrees that the electronic signature has been used to identify the person signing and to indicate that the party intends to be bound by the electronic signature.
- 1.4 This contract may be electronically signed in any number of counterparts which together will constitute the one document.
- 1.5 Each party consents to the exchange of counterparts of this contract by delivery by email or such other electronic means as may be agreed in writing.
- 1.6 Each party must upon request promptly deliver a physical counterpart of this contract with the handwritten signature or signatures of the party and all written evidence of the authority of a person signing on their behalf, but a failure to comply with the request does not affect the validity of this contract.

2. LIABILITY OF SIGNATORY

Any signatory for a proprietary limited company purchaser is personally liable for the due performance of the purchaser's obligations as if the signatory were the purchaser in the case of a default by a proprietary limited company purchaser.

3. GUARANTEE

The vendor may require one or more directors of the purchaser to guarantee the purchaser's performance of this contract if the purchaser is a proprietary limited company.

4. NOMINEE

The purchaser may no later than 14 days before the due date for settlement nominate a substitute or additional person to take a transfer of the land, but the named purchaser remains personally liable for the due performance of all the purchaser's obligations under this contract.

Title

5. ENCUMBRANCES

- 5.1 The purchaser buys the property subject to:
 - (a) any encumbrance shown in the section 32 statement other than mortgages or caveats; and
 - (b) any reservations, exceptions and conditions in the crown grant; and
 - (c) any lease or tenancy referred to in the particulars of sale.
- 5.2 The purchaser indemnifies the vendor against all obligations under any lease or tenancy that are to be performed by the landlord after settlement.

6. VENDOR WARRANTIES

- 6.1 The vendor warrants that these general conditions 1 to 35 are identical to the general conditions 1 to 35 in the form of contract of sale of land published by the Law Institute of Victoria Limited and the Real Estate Institute of Victoria Ltd in the month and year set out at the foot of this page.
- 6.2 The warranties in general conditions 6.3 and 6.4 replace the purchaser's right to make requisitions and inquiries.
- 6.3 The vendor warrants that the vendor:
 - (a) has, or by the due date for settlement will have, the right to sell the land; and
 - (b) is under no legal disability; and
 - (c) is in possession of the land, either personally or through a tenant; and
 - (d) has not previously sold or granted any option to purchase, agreed to a lease or granted a pre-emptive right which is current over the land and which gives another party rights which have priority over the interest of the purchaser; and
 - (e) will at settlement be the holder of an unencumbered estate in fee simple in the land; and
 - (f) will at settlement be the unencumbered owner of any improvements, fixtures, fittings and goods sold with the land.
- 6.4 The vendor further warrants that the vendor has no knowledge of any of the following:
 - (a) public rights of way over the land;
 - (b) easements over the land;
 - (c) lease or other possessory agreement affecting the land;
 - (d) notice or order directly and currently affecting the land which will not be dealt with at settlement, other than the usual rate notices and any land tax notices;

- (e) legal proceedings which would render the sale of the land void or voidable or capable of being set aside.
- 6.5 The warranties in general conditions 6.3 and 6.4 are subject to any contrary provisions in this contract and disclosures in the section 32 statement.
- 6.6 If sections 137B and 137C of the *Building Act* 1993 apply to this contract, the vendor warrants that:
 - (a) all domestic building work carried out in relation to the construction by or on behalf of the vendor of the home was carried out in a proper and workmanlike manner; and
 - (b) all materials used in that domestic building work were good and suitable for the purpose for which they were used and that, unless otherwise stated in the contract, those materials were new; and
 - (c) domestic building work was carried out in accordance with all laws and legal requirements, including, without limiting the generality of this warranty, the *Building Act* 1993 and regulations made under the *Building Act* 1993.
- 6.7 Words and phrases used in general condition 6.6 which are defined in the *Building Act* 1993 have the same meaning in general condition 6.6.

7. IDENTITY OF THE LAND

- 7.1 An omission or mistake in the description of the property or any deficiency in the area, description or measurements of the land does not invalidate the sale.
- 7.2 The purchaser may not:
 - (a) make any objection or claim for compensation for any alleged misdescription of the property or any deficiency in its area or measurements; or
 - (b) require the vendor to amend title or pay any cost of amending title.

8. SERVICES

- 8.1 The vendor does not represent that the services are adequate for the purchaser's proposed use of the property and the vendor advises the purchaser to make appropriate inquiries. The condition of the services may change between the day of sale and settlement and the vendor does not promise that the services will be in the same condition at settlement as they were on the day of sale.
- 8.2 The purchaser is responsible for the connection of all services to the property after settlement and the payment of any associated cost.

9. CONSENTS

The vendor must obtain any necessary consent or licence required for the vendor to sell the property. The contract will be at an end and all money paid must be refunded if any necessary consent or licence is not obtained by settlement.

10. TRANSFER & DUTY

- 10.1 The purchaser must prepare and deliver to the vendor at least 7 days before the due date for settlement any paper transfer of land document which is necessary for this transaction. The delivery of the transfer of land document is not acceptance of title.
- 10.2 The vendor must promptly initiate the Duties on Line or other form required by the State Revenue Office in respect of this transaction, and both parties must co-operate to complete it as soon as practicable.

11. RELEASE OF SECURITY INTEREST

- 11.1 This general condition applies if any part of the property is subject to a security interest to which the *Personal Property Securities Act* 2009 (Cth) applies.
- 11.2 For the purposes of enabling the purchaser to search the Personal Property Securities Register for any security interests affecting any personal property for which the purchaser may be entitled to a release, statement, approval or correction in accordance with general condition 11.4, the purchaser may request the vendor to provide the vendor's date of birth to the purchaser. The vendor must comply with a request made by the purchaser under this condition if the purchaser makes the request at least 21 days before the due date for settlement.
- 11.3 If the purchaser is given the details of the vendor's date of birth under general condition 11.2, the purchaser must
 - (a) only use the vendor's date of birth for the purposes specified in general condition 11.2; and
 - (b) keep the date of birth of the vendor secure and confidential.
- 11.4 The vendor must ensure that at or before settlement, the purchaser receives—
 - (a) a release from the secured party releasing the property from the security interest; or
 - (b) a statement in writing in accordance with section 275(1)(b) of the *Personal Property Securities Act* 2009 (Cth) setting out that the amount or obligation that is secured is nil at settlement; or
 - (c) a written approval or correction in accordance with section 275(1)(c) of the *Personal Property Securities Act* 2009 (Cth) indicating that, on settlement, the personal property included in the contract is not or will not be property in which the security interest is granted.
- 11.5 Subject to general condition 11.6, the vendor is not obliged to ensure that the purchaser receives a release, statement, approval or correction in respect of personal property—
 - (a) that—
 - (i) the purchaser intends to use predominantly for personal, domestic or household purposes; and

- (ii) has a market value of not more than \$5000 or, if a greater amount has been prescribed for the purposes of section 47(1) of the *Personal Property Securities Act 2009* (Cth), not more than that prescribed amount; or
- (b) that is sold in the ordinary course of the vendor's business of selling personal property of that kind.
- 11.6 The vendor is obliged to ensure that the purchaser receives a release, statement, approval or correction in respect of personal property described in general condition 11.5 if—
 - (a) the personal property is of a kind that may or must be described by serial number in the Personal Property Securities Register; or
 - (b) the purchaser has actual or constructive knowledge that the sale constitutes a breach of the security agreement that provides for the security interest.
- 11.7 A release for the purposes of general condition 11.4(a) must be in writing.
- 11.8 A release for the purposes of general condition 11.4(a) must be effective in releasing the goods from the security interest and be in a form which allows the purchaser to take title to the goods free of that security interest.
- 11.9 If the purchaser receives a release under general condition 11.4(a) the purchaser must provide the vendor with a copy of the release at or as soon as practicable after settlement.
- 11.10 In addition to ensuring that a release is received under general condition 7.4(a), the vendor must ensure that at or before settlement the purchaser receives a written undertaking from a secured party to register a financing change statement to reflect that release if the property being released includes goods of a kind that are described by serial number in the Personal Property Securities Register.
- 11.11 The purchaser must advise the vendor of any security interest that is registered on or before the day of sale on the Personal Property Securities Register, which the purchaser reasonably requires to be released, at least 21 days before the due date for settlement.
- 11.12 The vendor may delay settlement until 21 days after the purchaser advises the vendor of the security interests that the purchaser reasonably requires to be released if the purchaser does not provide an advice under general condition 11.11.
- 11.13 If settlement is delayed under general condition 11.12 the purchaser must pay the vendor—
 - (a) interest from the due date for settlement until the date on which settlement occurs or 21 days after the vendor receives the advice, whichever is the earlier; and
 - (b) any reasonable costs incurred by the vendor as a result of the delay—
 as though the purchaser was in default.
- 11.14 The vendor is not required to ensure that the purchaser receives a release in respect of the land. This general condition 1.14 applies despite general condition 11.1.
- 11.15 Words and phrases which are defined in the *Personal Property Securities Act 2009* (Cth) have the same meaning in general condition 11 unless the context requires otherwise.

12. BUILDER WARRANTY INSURANCE

The vendor warrants that the vendor will provide at settlement details of any current builder warranty insurance in the vendor's possession relating to the property if requested in writing to do so at least 21 days before settlement.

13. GENERAL LAW LAND

- 13.2 The remaining provisions of this general condition 13 only apply if any part of the land is not under the operation of the *Transfer of Land Act 1958*.
- 13.3 The vendor is taken to be the holder of an unencumbered estate in fee simple in the land if there is an unbroken chain of title starting at least 30 years before the day of sale proving on the face of the documents the ownership of the entire legal and equitable estate without the aid of other evidence.
- 13.4 The purchaser is entitled to inspect the vendor's chain of title on request at such place in Victoria as the vendor nominates.
- 13.5 The purchaser is taken to have accepted the vendor's title if:
 - (a) 21 days have elapsed since the day of sale; and
 - (b) the purchaser has not reasonably objected to the title or reasonably required the vendor to remedy a defect in the title.
- 13.6 The contract will be at an end if:
 - (a) the vendor gives the purchaser a notice that the vendor is unable or unwilling to satisfy the purchaser's objection or requirement and that the contract will end if the objection or requirement is not withdrawn within 14 days of the giving of the notice; and
 - (b) the objection or requirement is not withdrawn in that time.
- 13.7 If the contract ends in accordance with general condition 13.6, the deposit must be returned to the purchaser and neither party has a claim against the other in damages.

- 13.10 General condition 17.1 [settlement] should be read as if the reference to 'registered proprietor' is a reference to 'owner' in respect of that part of the land which is not under the operation of the *Transfer of Land Act 1958*.
-

Money

14. DEPOSIT

- 14.1 The purchaser must pay the deposit:
- (a) to the vendor's licensed estate agent; or
 - (b) if there is no estate agent, to the vendor's legal practitioner or conveyancer; or
 - (c) if the vendor directs, into a special purpose account in an authorised deposit-taking institution in Victoria specified by the vendor in the joint names of the purchaser and the vendor.
- 14.2 If the land sold is a lot on an unregistered plan of subdivision, the deposit:
- (a) must not exceed 10% of the price; and
 - (b) must be paid to the vendor's estate agent, legal practitioner or conveyancer and held by the estate agent, legal practitioner or conveyancer on trust for the purchaser until the registration of the plan of subdivision.
- 14.3 The deposit must be released to the vendor if:
- (a) the vendor provides particulars, to the satisfaction of the purchaser, that either-
 - (i) there are no debts secured against the property; or
 - (ii) if there are any debts, the total amount of those debts together with any amounts to be withheld in accordance with general conditions 24 and 25 does not exceed 80% of the sale price; and
 - (b) at least 28 days have elapsed since the particulars were given to the purchaser under paragraph (a); and
 - (c) all conditions of section 27 of the *Sale of Land Act 1962* have been satisfied.
- 14.4 The stakeholder must pay the deposit and any interest to the party entitled when the deposit is released, the contract is settled, or the contract is ended.
- 14.5 The stakeholder may pay the deposit and any interest into court if it is reasonable to do so.
- 14.6 Where the purchaser is deemed by section 27(7) of the *Sale of Land Act 1962* to have given the deposit release authorisation referred to in section 27(1), the purchaser is also deemed to have accepted title in the absence of any prior express objection to title.
- 14.7 Payment of the deposit may be made or tendered:
- (a) in cash up to \$1,000 or 0.2% of the price, whichever is greater; or
 - (b) by cheque drawn on an authorised deposit-taking institution; or
 - (c) by electronic funds transfer to a recipient having the appropriate facilities for receipt.
- However, unless otherwise agreed:
- (d) payment may not be made by credit card, debit card or any other financial transfer system that allows for any chargeback or funds reversal other than for fraud or mistaken payment, and
 - (e) any financial transfer or similar fees or deductions from the funds transferred, other than any fees charged by the recipient's authorised deposit-taking institution, must be paid by the remitter.
- 14.8 Payment by electronic funds transfer is made when cleared funds are received in the recipient's bank account.
- 14.9 Before the funds are electronically transferred the intended recipient must be notified in writing and given sufficient particulars to readily identify the relevant transaction.
- 14.10 As soon as the funds have been electronically transferred the intended recipient must be provided with the relevant transaction number or reference details.
- 14.11 For the purpose of this general condition 'authorised deposit-taking institution' means a body corporate for which an authority under section 9(3) of the *Banking Act 1959 (Cth)* is in force.

15. DEPOSIT BOND

- 15.1 This general condition only applies if the applicable box in the particulars of sale is checked.
- 15.2 In this general condition "deposit bond" means an irrevocable undertaking to pay on demand an amount equal to the deposit or any unpaid part of the deposit. The issuer and the form of the deposit bond must be satisfactory to the vendor. The deposit bond must have an expiry date at least 45 days after the due date for settlement.
- 15.3 The purchaser may deliver a deposit bond to the vendor's estate agent, legal practitioner or conveyancer within 7 days after the day of sale.
- 15.4 The purchaser may at least 45 days before a current deposit bond expires deliver a replacement deposit bond on the same terms and conditions.

- 15.5 Where a deposit bond is delivered, the purchaser must pay the deposit to the vendor's legal practitioner or conveyancer on the first to occur of:
- (a) settlement;
 - (b) the date that is 45 days before the deposit bond or any replacement deposit bond expires;
 - (c) the date on which this contract ends in accordance with general condition 35.2 [default not remedied] following breach by the purchaser; and
 - (d) the date on which the vendor ends this contract by accepting repudiation of it by the purchaser.
- 15.6 The vendor may claim on the deposit bond without prior notice if the purchaser defaults under this contract or repudiates this contract and the contract is ended. The amount paid by the issuer satisfies the obligations of the purchaser under general condition 15.5 to the extent of the payment.
- 15.7 Nothing in this general condition limits the rights of the vendor if the purchaser defaults under this contract or repudiates this contract, except as provided in general condition 15.6.
- 15.8 This general condition is subject to general condition 14.2 [deposit].

16. BANK GUARANTEE

- 16.1 This general condition only applies if the applicable box in the particulars of sale is checked.
- 16.2 In this general condition:
- (a) "bank guarantee" means an unconditional and irrevocable guarantee or undertaking by a bank in a form satisfactory to the vendor to pay on demand any amount under this contract agreed in writing, and
 - (b) "bank" means an authorised deposit-taking institution under the *Banking Act 1959 (Cth)*.
- 16.3 The purchaser may deliver a bank guarantee to the vendor's legal practitioner or conveyancer.
- 16.4 The purchaser must pay the amount secured by the bank guarantee to the vendor's legal practitioner or conveyancer on the first to occur of:
- (a) settlement;
 - (b) the date that is 45 days before the bank guarantee expires;
 - (c) the date on which this contract ends in accordance with general condition 35.2 [default not remedied] following breach by the purchaser; and
 - (d) the date on which the vendor ends this contract by accepting repudiation of it by the purchaser.
- 16.5 The vendor must return the bank guarantee document to the purchaser when the purchaser pays the amount secured by the bank guarantee in accordance with general condition 16.4.
- 16.6 The vendor may claim on the bank guarantee without prior notice if the purchaser defaults under this contract or repudiates this contract and the contract is ended. The amount paid by the bank satisfies the obligations of the purchaser under general condition 16.4 to the extent of the payment.
- 16.7 Nothing in this general condition limits the rights of the vendor if the purchaser defaults under this contract or repudiates this contract except as provided in general condition 16.6.
- 16.8 This general condition is subject to general condition 14.2 [deposit].

17. SETTLEMENT

- 17.1 At settlement:
- (a) the purchaser must pay the balance; and
 - (b) the vendor must:
 - (i) do all things necessary to enable the purchaser to become the registered proprietor of the land; and
 - (ii) give either vacant possession or receipt of rents and profits in accordance with the particulars of sale.
- 17.2 Settlement must be conducted between the hours of 10.00 am and 4.00 pm unless the parties agree otherwise.
- 17.3 The purchaser must pay all money other than the deposit in accordance with a written direction of the vendor or the vendor's legal practitioner or conveyancer.

18. ELECTRONIC SETTLEMENT

- 18.1 Settlement and lodgement of the instruments necessary to record the purchaser as registered proprietor of the land will be conducted electronically in accordance with the Electronic Conveyancing National Law. This general condition 18 has priority over any other provision of this contract to the extent of any inconsistency.
- 18.2 A party must immediately give written notice if that party reasonably believes that settlement and lodgement can no longer be conducted electronically. General condition 18 ceases to apply from when such a notice is given.
- 18.3 Each party must:
- (a) be, or engage a representative who is, a subscriber for the purposes of the Electronic Conveyancing National Law,
 - (b) ensure that all other persons for whom that party is responsible and who are associated with this transaction are, or engage, a subscriber for the purposes of the Electronic Conveyancing National Law, and

- (c) conduct the transaction in accordance with the Electronic Conveyancing National Law.
- 18.4 The vendor must open the electronic workspace ("workspace") as soon as reasonably practicable and nominate a date and time for settlement. The inclusion of a specific date and time for settlement in a workspace is not of itself a promise to settle on that date or at that time. The workspace is an electronic address for the service of notices and for written communications for the purposes of any electronic transactions legislation.
- 18.5 This general condition 18.5 applies if there is more than one electronic lodgement network operator in respect of the transaction. In this general condition 18.5 "the transaction" means this sale and purchase and any associated transaction involving any of the same subscribers.
To the extent that any interoperability rules governing the relationship between electronic lodgement network operators do not provide otherwise:
 - (a) the electronic lodgement network operator to conduct all the financial and lodgement aspects of the transaction after the workspace locks must be one which is willing and able to conduct such aspects of the transaction in accordance with the instructions of all the subscribers in the workspaces of all the electronic lodgement network operators after the workspace locks;
 - (b) if two or more electronic lodgement network operators meet that description, one may be selected by purchaser's incoming mortgagee having the highest priority but if there is no mortgagee of the purchaser, the vendor must make the selection.
- 18.6 Settlement occurs when the workspace records that:
 - (a) there has been an exchange of funds or value between the exchange settlement account or accounts in the Reserve Bank of Australia of the relevant financial institutions or their financial settlement agents in accordance with the instructions of the parties; or
 - (b) if there is no exchange of funds or value, the documents necessary to enable the purchaser to become registered proprietor of the land have been accepted for electronic lodgement.
- 18.7 The parties must do everything reasonably necessary to effect settlement:
 - (a) electronically on the next business day, or
 - (b) at the option of either party, otherwise than electronically as soon as possible –
 if, after the locking of the workspace at the nominated settlement time, settlement in accordance with general condition 18.6 has not occurred by 4.00 pm, or 6.00 pm if the nominated time for settlement is after 4.00 pm.
- 18.8 Each party must do everything reasonably necessary to assist the other party to trace and identify the recipient of any missing or mistaken payment and to recover the missing or mistaken payment.
- 18.9 The vendor must before settlement:
 - (a) deliver any keys, security devices and codes ("keys") to the estate agent named in the contract,
 - (b) direct the estate agent to give the keys to the purchaser or the purchaser's nominee on notification of settlement by the vendor, the vendor's subscriber or the electronic lodgement network operator;
 - (c) deliver all other physical documents and items (other than the goods sold by the contract) to which the purchaser is entitled at settlement, and any keys if not delivered to the estate agent, to the vendor's subscriber or, if there is no vendor's subscriber, confirm in writing to the purchaser that the vendor holds those documents, items and keys at the vendor's address set out in the contract, and
 give, or direct its subscriber to give, all those documents and items and any such keys to the purchaser or the purchaser's nominee on notification by the electronic lodgement network operator of settlement.

19. GST

- 19.1 The purchaser does not have to pay the vendor any amount in respect of GST in addition to the price if the particulars of sale specify that the price includes GST (if any).
- 19.2 The purchaser must pay to the vendor any GST payable by the vendor in respect of a taxable supply made under this contract in addition to the price if:
 - (a) the particulars of sale specify that GST (if any) must be paid in addition to the price; or
 - (b) GST is payable solely as a result of any action taken or intended to be taken by the purchaser after the day of sale, including a change of use; or
 - (c) the particulars of sale specify that the supply made under this contract is of land on which a 'farming business' is carried on and the supply (or part of it) does not satisfy the requirements of section 38-480 of the GST Act; or
 - (d) the particulars of sale specify that the supply made under this contract is of a going concern and the supply (or a part of it) does not satisfy the requirements of section 38-325 of the GST Act.
- 19.3 The purchaser is not obliged to pay any GST under this contract until a tax invoice has been given to the purchaser.
- 19.4 If the particulars of sale specify that the supply made under this contract is of land on which a 'farming business' is carried on:
 - (a) the vendor warrants that the property is land on which a farming business has been carried on for the period of 5 years preceding the date of supply; and
 - (b) the purchaser warrants that the purchaser intends that a farming business will be carried on after settlement on the property.
- 19.5 If the particulars of sale specify that the supply made under this contract is a 'going concern':
 - (a) the parties agree that this contract is for the supply of a going concern; and

- (b) the purchaser warrants that the purchaser is, or prior to settlement will be, registered for GST; and
 - (c) the vendor warrants that the vendor will carry on the going concern until the date of supply.
- 19.6 If the particulars of sale specify that the supply made under this contract is a 'margin scheme' supply, the parties agree that the margin scheme applies to this contract.
- 19.7 In this general condition:
- (a) 'GST Act' means *A New Tax System (Goods and Services Tax) Act 1999 (Cth)*; and
 - (b) 'GST' includes penalties and interest.

20. LOAN

- 20.1 If the particulars of sale specify that this contract is subject to a loan being approved, this contract is subject to the lender approving the loan on the security of the property by the approval date or any later date allowed by the vendor.
- 20.2 The purchaser may end the contract if the loan is not approved by the approval date, but only if the purchaser:
- (a) immediately applied for the loan; and
 - (b) did everything reasonably required to obtain approval of the loan; and
 - (c) serves written notice ending the contract, together with written evidence of rejection or non-approval of the loan, on the vendor within 2 clear business days after the approval date or any later date allowed by the vendor; and
 - (d) is not in default under any other condition of this contract when the notice is given.
- 20.3 All money must be immediately refunded to the purchaser if the contract is ended.

21. BUILDING REPORT

- 21.1 This general condition only applies if the applicable box in the particulars of sale is checked.
- 21.2 The purchaser may end this contract within 14 days from the day of sale if the purchaser:
- (a) obtains a written report from a registered building practitioner or architect which discloses a current defect in a structure on the land and designates it as a major building defect;
 - (b) gives the vendor a copy of the report and a written notice ending this contract; and
 - (c) is not then in default.
- 21.3 All money paid must be immediately refunded to the purchaser if the contract ends in accordance with this general condition.
- 21.4 A notice under this general condition may be served on the vendor's legal practitioner, conveyancer or estate agent even if the estate agent's authority has formally expired at the time of service.
- 21.5 The registered building practitioner may inspect the property at any reasonable time for the purpose of preparing the report.

22. PEST REPORT

- 22.1 This general condition only applies if the applicable box in the particulars of sale is checked.
- 22.2 The purchaser may end this contract within 14 days from the day of sale if the purchaser:
- (a) obtains a written report from a pest control operator licensed under Victorian law which discloses a current pest infestation on the land and designates it as a major infestation affecting the structure of a building on the land;
 - (b) gives the vendor a copy of the report and a written notice ending this contract; and
 - (c) is not then in default.
- 22.3 All money paid must be immediately refunded to the purchaser if the contract ends in accordance with this general condition.
- 22.4 A notice under this general condition may be served on the vendor's legal practitioner, conveyancer or estate agent even if the estate agent's authority has formally expired at the time of service.
- 22.5 The pest control operator may inspect the property at any reasonable time for the purpose of preparing the report.

23. ADJUSTMENTS

- 23.1 All periodic outgoings payable by the vendor, and any rent and other income received in respect of the property must be apportioned between the parties on the settlement date and any adjustments paid and received as appropriate.
- 23.2 The periodic outgoings and rent and other income must be apportioned on the following basis:
- (a) the vendor is liable for the periodic outgoings and entitled to the rent and other income up to and including the day of settlement; and
 - (b) the land is treated as the only land of which the vendor is owner (as defined in the *Land Tax Act 2005*); and
 - (c) the vendor is taken to own the land as a resident Australian beneficial owner; and
 - (d) any personal statutory benefit available to each party is disregarded in calculating apportionment.
- 23.3 The purchaser must provide copies of all certificates and other information used to calculate the adjustments under general condition 23, if requested by the vendor.

24. FOREIGN RESIDENT CAPITAL GAINS WITHHOLDING

- 24.1 Words defined or used in Subdivision 14-D of Schedule 1 to the *Taxation Administration Act 1953 (Cth)* have the same meaning in this general condition unless the context requires otherwise.

- 24.2 Every vendor under this contract is a foreign resident for the purposes of this general condition unless the vendor gives the purchaser a clearance certificate issued by the Commissioner under section 14-220 (1) of Schedule 1 to the *Taxation Administration Act 1953 (Cth)*. The specified period in the clearance certificate must include the actual date of settlement.
- 24.3 The remaining provisions of this general condition 24 only apply if the purchaser is required to pay the Commissioner an amount in accordance with section 14-200(3) or section 14-235 of Schedule 1 to the *Taxation Administration Act 1953 (Cth)* ("the amount") because one or more of the vendors is a foreign resident, the property has or will have a market value not less than the amount set out in section 14-215 of the legislation just after the transaction, and the transaction is not excluded under section 14-215(1) of the legislation.
- 24.4 The amount is to be deducted from the vendor's entitlement to the contract consideration. The vendor must pay to the purchaser at settlement such part of the amount as is represented by non-monetary consideration.
- 24.5 The purchaser must:
- (a) engage a legal practitioner or conveyancer ("representative") to conduct all the legal aspects of settlement, including the performance of the purchaser's obligations under the legislation and this general condition; and
 - (b) ensure that the representative does so.
- 24.6 The terms of the representative's engagement are taken to include instructions to have regard to the vendor's interests and instructions that the representative must:
- (a) pay, or ensure payment of, the amount to the Commissioner in the manner required by the Commissioner and as soon as reasonably and practicably possible, from moneys under the control or direction of the representative in accordance with this general condition if the sale of the property settles;
 - (b) promptly provide the vendor with proof of payment; and
 - (c) otherwise comply, or ensure compliance, with this general condition;
- despite:
- (d) any contrary instructions, other than from both the purchaser and the vendor; and
 - (e) any other provision in this contract to the contrary.
- 24.7 The representative is taken to have complied with the requirements of general condition 24.6 if:
- (a) the settlement is conducted through an electronic lodgement network; and
 - (b) the amount is included in the settlement statement requiring payment to the Commissioner in respect of this transaction.
- 24.8 Any clearance certificate or document evidencing variation of the amount in accordance with section 14-235(2) of Schedule 1 to the *Taxation Administration Act 1953 (Cth)* must be given to the purchaser at least 5 business days before the due date for settlement.
- 24.9 The vendor must provide the purchaser with such information as the purchaser requires to comply with the purchaser's obligation to pay the amount in accordance with section 14-200 of Schedule 1 to the *Taxation Administration Act 1953 (Cth)*. The information must be provided within 5 business days of request by the purchaser. The vendor warrants that the information the vendor provides is true and correct.
- 24.10 The purchaser is responsible for any penalties or interest payable to the Commissioner on account of late payment of the amount.

25. GST WITHHOLDING

- 25.1 Words and expressions defined or used in Subdivision 14-E of Schedule 1 to the *Taxation Administration Act 1953 (Cth)* or in A *New Tax System (Goods and Services Tax) Act 1999 (Cth)* have the same meaning in this general condition unless the context requires otherwise. Words and expressions first used in this general condition and shown in italics and marked with an asterisk are defined or described in at least one of those Acts.
- 25.2 The purchaser must notify the vendor in writing of the name of the recipient of the *supply for the purposes of section 14-255 of Schedule 1 to the *Taxation Administration Act 1953 (Cth)* at least 21 days before the due date for settlement unless the recipient is the purchaser named in the contract.
- 25.3 The vendor must at least 14 days before the due date for settlement provide the purchaser and any person nominated by the purchaser under general condition 4 with a GST withholding notice in accordance with section 14-255 of Schedule 1 to the *Taxation Administration Act 1953 (Cth)*, and must provide all information required by the purchaser or any person so nominated to confirm the accuracy of the notice.
- 25.4 The remaining provisions of this general condition 25 apply if the purchaser is or may be required to pay the Commissioner an *amount in accordance with section 14-250 of Schedule 1 to the *Taxation Administration Act 1953 (Cth)* because the property is *new residential premises or *potential residential land in either case falling within the parameters of that section, and also if the sale attracts the operation of section 14-255 of the legislation. Nothing in this general condition 25 is to be taken as relieving the vendor from compliance with section 14-255.
- 25.5 The amount is to be deducted from the vendor's entitlement to the contract *consideration and is then taken to be paid to the vendor, whether or not the vendor provides the purchaser with a GST withholding notice in accordance with section 14-255 of Schedule 1 to the *Taxation Administration Act 1953 (Cth)*. The vendor must pay to the purchaser at settlement such part of the amount as is represented by non-monetary consideration.
- 25.6 The purchaser must:
- (a) engage a legal practitioner or conveyancer ("representative") to conduct all the legal aspects of settlement, including the performance of the purchaser's obligations under the legislation and this general condition; and
 - (b) ensure that the representative does so.

- 25.7 The terms of the representative's engagement are taken to include instructions to have regard to the vendor's interests relating to the payment of the amount to the Commissioner and instructions that the representative must:
- (a) pay, or ensure payment of, the amount to the Commissioner in the manner required by the Commissioner and as soon as reasonably and practicably possible, from moneys under the control or direction of the representative in accordance with this general condition on settlement of the sale of the property;
 - (b) promptly provide the vendor with evidence of payment, including any notification or other document provided by the purchaser to the Commissioner relating to payment; and
 - (c) otherwise comply, or ensure compliance, with this general condition;
- despite:
- (d) any contrary instructions, other than from both the purchaser and the vendor; and
 - (e) any other provision in this contract to the contrary.
- 25.8 The representative is taken to have complied with the requirements of general condition 25.7 if:
- (a) settlement is conducted through an electronic lodgement network; and
 - (b) the amount is included in the settlement statement requiring payment to the Commissioner in respect of this transaction.
- 25.9 The purchaser may at settlement give the vendor a bank cheque for the amount in accordance with section 16-30 (3) of Schedule 1 to the *Taxation Administration Act 1953 (Cth)*, but only if:
- (a) so agreed by the vendor in writing; and
 - (b) the settlement is not conducted through an electronic lodgement network.
- However, if the purchaser gives the bank cheque in accordance with this general condition 25.9, the vendor must:
- (c) immediately after settlement provide the bank cheque to the Commissioner to pay the amount in relation to the supply; and
 - (d) give the purchaser a receipt for the bank cheque which identifies the transaction and includes particulars of the bank cheque, at the same time the purchaser gives the vendor the bank cheque.
- 25.10 A party must provide the other party with such information as the other party requires to:
- (a) decide if an amount is required to be paid or the quantum of it, or
 - (b) comply with the purchaser's obligation to pay the amount,
- in accordance with section 14-250 of Schedule 1 to the *Taxation Administration Act 1953 (Cth)*. The information must be provided within 5 business days of a written request. The party providing the information warrants that it is true and correct.
- 25.11 The vendor warrants that:
- (a) at settlement, the property is not new residential premises or potential residential land in either case falling within the parameters of section 14-250 of Schedule 1 to the *Taxation Administration Act 1953 (Cth)* if the vendor gives the purchaser a written notice under section 14-255 to the effect that the purchaser will not be required to make a payment under section 14-250 in respect of the supply, or fails to give a written notice as required by and within the time specified in section 14-255; and
 - (b) the amount described in a written notice given by the vendor to the purchaser under section 14-255 of Schedule 1 to the *Taxation Administration Act 1953 (Cth)* is the correct amount required to be paid under section 14-250 of the legislation.
- 25.12 The purchaser is responsible for any penalties or interest payable to the Commissioner on account of non-payment or late payment of the amount, except to the extent that:
- (a) the penalties or interest arise from any failure on the part of the vendor, including breach of a warranty in general condition 25.11; or
 - (b) the purchaser has a reasonable belief that the property is neither new residential premises nor potential residential land requiring the purchaser to pay an amount to the Commissioner in accordance with section 14-250 (1) of Schedule 1 to the *Taxation Administration Act 1953 (Cth)*.
- The vendor is responsible for any penalties or interest payable to the Commissioner on account of non-payment or late payment of the amount if either exception applies.

Transactional

26. TIME & CO OPERATION

- 26.1 Time is of the essence of this contract.
- 26.2 Time is extended until the next business day if the time for performing any action falls on a day which is not a business day.
- 26.3 Each party must do all things reasonably necessary to enable this contract to proceed to settlement, and must act in a prompt and efficient manner.
- 26.4 Any unfulfilled obligation will not merge on settlement.

27. SERVICE

- 27.1 Any document required to be served by or on any party may be served by or on the legal practitioner or conveyancer for that party.
- 27.2 A cooling off notice under section 31 of the *Sale of Land Act 1962* or a notice under general condition 20 [loan approval], 21 [building report] or 22 [pest report] may be served on the vendor's legal practitioner, conveyancer or estate agent even if the estate agent's authority has formally expired at the time of service.
- 27.3 A document is sufficiently served:
- (a) personally, or
 - (b) by pre-paid post, or
 - (c) in any manner authorized by law or by the Supreme Court for service of documents, including any manner authorised for service on or by a legal practitioner, whether or not the person serving or receiving the document is a legal practitioner, or
 - (d) by email.
- 27.4 Any document properly sent by:
- (a) express post is taken to have been served on the next business day after posting, unless proved otherwise;
 - (b) priority post is taken to have been served on the fourth business day after posting, unless proved otherwise;
 - (c) regular post is taken to have been served on the sixth business day after posting, unless proved otherwise;
 - (d) email is taken to have been served at the time of receipt within the meaning of section 13A of the *Electronic Transactions (Victoria) Act 2000*.
- 27.5 In this contract 'document' includes 'demand' and 'notice', 'serve' includes 'give', and 'served' and 'service' have corresponding meanings.

28. NOTICES

- 28.1 The vendor is responsible for any notice, order, demand or levy imposing liability on the property that is issued or made before the day of sale, and does not relate to periodic outgoings.
- 28.2 The purchaser is responsible for any notice, order, demand or levy imposing liability on the property that is issued or made on or after the day of sale, and does not relate to periodic outgoings.
- 28.3 The purchaser may enter the property to comply with that responsibility where action is required before settlement.

29. INSPECTION

The purchaser and/or another person authorised by the purchaser may inspect the property at any reasonable time during the 7 days preceding and including the settlement day.

30. TERMS CONTRACT

- 30.1 If this is a 'terms contract' as defined in the *Sale of Land Act 1962*:
- (a) any mortgage affecting the land sold must be discharged as to that land before the purchaser becomes entitled to possession or to the receipt of rents and profits unless the vendor satisfies section 29M of the *Sale of Land Act 1962*; and
 - (b) the deposit and all other money payable under the contract (other than any money payable in excess of the amount required to so discharge the mortgage) must be paid to a legal practitioner or conveyancer or a licensed estate agent to be applied in or towards discharging the mortgage.
- 30.2 While any money remains owing each of the following applies:
- (a) the purchaser must maintain full damage and destruction insurance of the property and public risk insurance noting all parties having an insurable interest with an insurer approved in writing by the vendor;
 - (b) the purchaser must deliver copies of the signed insurance application forms, the policies and the insurance receipts to the vendor not less than 10 days before taking possession of the property or becoming entitled to receipt of the rents and profits;
 - (c) the purchaser must deliver copies of any amendments to the policies and the insurance receipts on each amendment or renewal as evidence of the status of the policies from time to time;
 - (d) the vendor may pay any renewal premiums or take out the insurance if the purchaser fails to meet these obligations;
 - (e) insurance costs paid by the vendor under paragraph (d) must be refunded by the purchaser on demand without affecting the vendor's other rights under this contract;
 - (f) the purchaser must maintain and operate the property in good repair (fair wear and tear excepted) and keep the property safe, lawful, structurally sound, weatherproof and free from contaminations and dangerous substances;
 - (g) the property must not be altered in any way without the written consent of the vendor which must not be unreasonably refused or delayed;
 - (h) the purchaser must observe all obligations that affect owners or occupiers of land;
 - (i) the vendor and/or other person authorised by the vendor may enter the property at any reasonable time to inspect it on giving 7 days written notice, but not more than twice in a year.

31. LOSS OR DAMAGE BEFORE SETTLEMENT

- 31.1 The vendor carries the risk of loss or damage to the property until settlement.

- 31.2 The vendor must deliver the property to the purchaser at settlement in the same condition it was in on the day of sale, except for fair wear and tear.
- 31.3 The purchaser must not delay settlement because one or more of the goods is not in the condition required by general condition 31.2, but may claim compensation from the vendor after settlement.
- 31.4 The purchaser may nominate an amount not exceeding \$5,000 to be held by a stakeholder to be appointed by the parties if the property is not in the condition required by general condition 31.2 at settlement.
- 31.5 The nominated amount may be deducted from the amount due to the vendor at settlement and paid to the stakeholder, but only if the purchaser also pays an amount equal to the nominated amount to the stakeholder.
- 31.6 The stakeholder must pay the amounts referred to in general condition 31.5 in accordance with the determination of the dispute, including any order for payment of the costs of the resolution of the dispute.

32. BREACH

A party who breaches this contract must pay to the other party on demand:

- (a) compensation for any reasonably foreseeable loss to the other party resulting from the breach; and
- (b) any interest due under this contract as a result of the breach.

Default

33. INTEREST

Interest at a rate of 2% per annum plus the rate for the time being fixed by section 2 of the *Penalty Interest Rates Act 1983* is payable at settlement on any money owing under the contract during the period of default, without affecting any other rights of the offended party.

34. DEFAULT NOTICE

- 34.1 A party is not entitled to exercise any rights arising from the other party's default, other than the right to receive interest and the right to sue for money owing, until the other party is given and fails to comply with a written default notice.
- 34.2 The default notice must:
 - (a) specify the particulars of the default; and
 - (b) state that it is the offended party's intention to exercise the rights arising from the default unless, within 14 days of the notice being given -
 - (i) the default is remedied; and
 - (ii) the reasonable costs incurred as a result of the default and any interest payable are paid.

35. DEFAULT NOT REMEDIED

- 35.1 All unpaid money under the contract becomes immediately payable to the vendor if the default has been made by the purchaser and is not remedied and the costs and interest are not paid.
- 35.2 The contract immediately ends if:
 - (a) the default notice also states that unless the default is remedied and the reasonable costs and interest are paid, the contract will be ended in accordance with this general condition; and
 - (b) the default is not remedied and the reasonable costs and interest are not paid by the end of the period of the default notice.
- 35.3 If the contract ends by a default notice given by the purchaser:
 - (a) the purchaser must be repaid any money paid under the contract and be paid any interest and reasonable costs payable under the contract; and
 - (b) all those amounts are a charge on the land until payment; and
 - (c) the purchaser may also recover any loss otherwise recoverable.
- 35.4 If the contract ends by a default notice given by the vendor:
 - (a) the deposit up to 10% of the price is forfeited to the vendor as the vendor's absolute property, whether the deposit has been paid or not; and
 - (b) the vendor is entitled to possession of the property; and
 - (c) in addition to any other remedy, the vendor may within one year of the contract ending either:
 - (i) retain the property and sue for damages for breach of contract; or
 - (ii) resell the property in any manner and recover any deficiency in the price on the resale and any resulting expenses by way of liquidated damages; and
 - (d) the vendor may retain any part of the price paid until the vendor's damages have been determined and may apply

that money towards those damages; and

(e) any determination of the vendor's damages must take into account the amount forfeited to the vendor.

35.5 The ending of the contract does not affect the rights of the offended party as a consequence of the default.

GUARANTEE and INDEMNITY

I/We, ...of

and of

being the **Sole Director / Directors** of ACN

(called the "Guarantors") IN CONSIDERATION of the Vendor selling to the Purchaser at our request the Land described in this Contract of Sale for the price and upon the terms and conditions contained therein **DO** for ourselves and our respective executors and administrators **JOINTLY AND SEVERALLY COVENANT** with the said Vendor and their assigns that if at any time default shall be made in payment of the Deposit Money or residue of Purchase Money or interest or any other moneys payable by the Purchaser to the Vendor under this Contract or in the performance or observance of any term or condition of this Contract to be performed or observed by the Purchaser I/we will immediately on demand by the Vendor pay to the Vendor the whole of the Deposit Money, residue of Purchase Money, interest or other moneys which shall then be due and payable to the Vendor and indemnify and agree to keep the Vendor indemnified against all loss of Deposit Money, residue of Purchase Money, interest and other moneys payable under the within Contract and all losses, costs, charges and expenses whatsoever which the Vendor may incur by reason of any default on the part of the Purchaser. This Guarantee shall be a continuing Guarantee and Indemnity and shall not be released by:-

- (a) any neglect or forbearance on the part of the Vendor in enforcing payment of any of the moneys payable under the within Contract;
- (b) the performance or observance of any of the agreements, obligations or conditions under the within Contract;
- (c) by time given to the Purchaser for any such payment performance or observance;
- (d) by reason of the Vendor assigning his, her or their rights under the said Contract; and
- (e) by any other thing which under the law relating to sureties would but for this provision have the effect of releasing me/us, my/our executors or administrators.

IN WITNESS whereof the parties hereto have set their hands and seals

this day of 20.....

SIGNED SEALED AND DELIVERED by the said)
)
Print Name.....)
.....

in the presence of:) Director (Sign)
)
Witness.....)

SIGNED SEALED AND DELIVERED by the said)
)
Print Name.....)
.....

in the presence of:) Director (Sign)
)
Witness.....)

SECTION 32 STATEMENT

PURSUANT TO DIVISION 2 OF PART II
SECTION 32 OF THE SALE OF LAND ACT 1962 (VIC)

Vendor:	Bekim Qaniu and Fatime Qaniu
Property:	17 Railway Parade, Seaford VIC 3198



VENDORS REPRESENTATIVE

Victorian Statewide Conveyancing Pty Ltd
PO Box 32, Narre Warren VIC 3805
Tel: 87905488
Fax: 87949072

Email: info@victorianstatewide.com.au

Ref: JG:20250057

32A FINANCIAL MATTERS

Information concerning any rates, taxes, charges or other similar outgoings AND any interest payable on any part of them is contained in the attached certificate/s and as follows-

Any further amounts (including any proposed Owners Corporation Levy) for which the Purchaser may become liable as a consequence of the purchase of the property are as follows:-

None to the vendors knowledge

Their total does not exceed \$4,000.00 per annum

At settlement the rates will be adjusted between the parties, so that they each bear the proportion of rates applicable to their respective periods of occupancy in the property.

32A(b) The particulars of any Charge (whether registered or not) over the land imposed by or under an Act to secure an amount due under that Act, including the amount owing under the charge are as follows:-

Not Applicable

. Commercial and Industrial Property Tax

1. The land is tax reform scheme land within the meaning of the Commercial and Industrial Property Tax Reform Act 2024.

Yes ☐ No ☒

2. The AVPCC number is;

3. The Entry Date of the land was;

32B INSURANCE

(a) Where the Contract does not provide for the land to remain at the risk of the Vendor, particulars of any policy of insurance maintained by the Vendor in respect of damage to or destruction of the land are as follows: -

Not Applicable

(b) Where there is a residence on the land which was constructed within the preceding six years, and section 137B of the *Building Act 1993* applies, particulars of the required insurance are as follows:-

Not Applicable

32C LAND USE

(a) RESTRICTIONS

Information concerning any easement, covenant or similar restriction affecting the land (whether registered or unregistered) is as follows:-

- Easements affecting the land are as set out in the attached copies of title.
- Covenants affecting the land are as set out in the attached copies of title.
- Other restrictions affecting the land are as attached.
- Particulars of any existing failure to comply with the terms of such easement, covenant and/or restriction are as follows:-

To the best of the Vendor's knowledge there is no existing failure to comply with the terms of any easement, covenant or similar restriction affecting the land. The Purchaser should note that there may be sewers, drains, water pipes, underground and/or overhead electricity cables, underground and/or overhead telephone cables and underground gas pipes laid outside any registered easements and which are not registered or required to be registered against the Certificate of Title.

(b) BUSHFIRE

This land is in a designated bushfire- prone area within the meaning of the regulations made under the *Building Act 1993*.

(c) ROAD ACCESS

There is access to the Property by Road.

(d) PLANNING

Planning Scheme: Frankston City Council Planning Scheme
Responsible Authority: Frankston City Council
Zoning: GRZ - General Residential Zone
Planning Overlay/s: N/A

Planning Permit 99/2019/P/D attached together with copies of relevant drawing and reports.

32D NOTICES

- (a) Particulars of any Notice, Order, Declaration, Report or recommendation of a Public Authority or Government Department or approved proposal directly and currently affecting the land of which the Vendor might reasonably be expected to have knowledge are:- none to the Vendors knowledge however the Vendor has no means of knowing all decisions of the Government and other authorities unless such decisions have been communicated to the Vendor
- (b) The Vendor is not aware of any Notices, Property Management Plans, Reports or Orders in respect of the land issued by a Government Department or Public Authority in relation to livestock disease or contamination by agricultural chemicals affecting the ongoing use of the land for agricultural purposes.
- (c) Particulars of any Notice of intention to acquire served under Section 6 of the *Land Acquisition and Compensation Act, 1986* are: Not Applicable.

32E BUILDING PERMITS

Particulars of any Building Permit issued under the *Building Act 1993* during the past seven years (where there is a residence on the land):-

No such Building Permit has been granted to the Vendors knowledge.

32F OWNERS CORPORATION

The Land is NOT affected by an Owners Corporation within the meaning of the *Owners Corporation Act 2006*.

32G GROWTH AREAS INFRASTRUCTURE CONTRIBUTION (GAIC)

(1) The land, in accordance with a work-in-kind agreement (within the meaning of Part 9B of the *Planning and Environment Act 1987* is NOT –

- land that is to be transferred under the agreement.
- land on which works are to be carried out under the agreement (other than Crown land).
- land in respect of which a GAIC is imposed

32H SERVICES

Service	Status
Electricity supply	Connected
Gas supply	Connected
Water supply	Connected
Sewerage	Connected
Telephone services	Not Connected

Connected indicates that the service is provided by an authority and operating on the day of sale. The Purchaser should be aware that the Vendor may terminate their account with the service provider before settlement, and the purchaser will have to have the service reconnected.

32I TITLE

Attached are the following documents concerning Title:

1. Register Search Statement Volume 8301 Folio 226
2. Plan of Subdivision LP47803

DATE OF THIS STATEMENT

	/		/20	
--	---	--	-----	--

Name of the Vendor

Bekim Qaniu and Fatime Qaniu

Signature/s of the Vendor

x

The Purchaser acknowledges being given a duplicate of this statement signed by the Vendor before the Purchaser signed any contract.

DATE OF THIS ACKNOWLEDGMENT

	/		/20	
--	---	--	-----	--

Name of the Purchaser

Signature/s of the Purchaser

x

IMPORTANT NOTICE - ADDITIONAL DISCLOSURE REQUIREMENTS

Undischarged mortgages – S32A(a)

Where the land is to be sold subject to a mortgage (registered or unregistered) which is not to be discharged before the purchaser becomes entitled to possession or receipt of rents and profits, then the vendor must provide an additional statement including the particulars specified in Schedule 1 of the *Sale of Land Act 1962*.

Terms contracts – S32A(d)

Where the land is to be sold pursuant to a terms contract which obliges the purchaser to make two or more payments to the vendor after execution of the contract and before the vendor is entitled to a conveyance or transfer, then the vendor must provide an additional statement containing the information specified in Schedule 2 of the *Sale of Land Act 1962*.

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The Victorian Government acknowledges the Traditional Owners of Victoria and pays respects to their ongoing connection to their Country, History and Culture. The Victorian Government extends this respect to their Elders, past, present and emerging.

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 08301 FOLIO 226

Security no : 124121152683E

Produced 13/01/2025 11:52 AM

LAND DESCRIPTION

Lot 1 on Plan of Subdivision 047803.
PARENT TITLE Volume 05432 Folio 398
Created by instrument B200660 05/05/1961

REGISTERED PROPRIETOR

Estate Fee Simple
Joint Proprietors
BEKIM QANIU
FATIME QANIU both of 3 GLYNDA STREET DANDENONG VIC 3175
AW168590X 17/10/2022

ENCUMBRANCES, CAVEATS AND NOTICES

MORTGAGE AW693733W 31/03/2023
AUSTRALIA AND NEW ZEALAND BANKING GROUP LTD

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan or imaged folio set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE LP047803 FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

-----END OF REGISTER SEARCH STATEMENT-----

Additional information: (not part of the Register Search Statement)

ADMINISTRATIVE NOTICES

NIL

eCT Control 16165A AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED
Effective from 31/03/2023

DOCUMENT END



Imaged Document Cover Sheet

The document following this cover sheet is an imaged document supplied by LANDATA®, Secure Electronic Registries Victoria.

Document Type	Plan
Document Identification	LP047803
Number of Pages (excluding this cover sheet)	1
Document Assembled	13/01/2025 11:53

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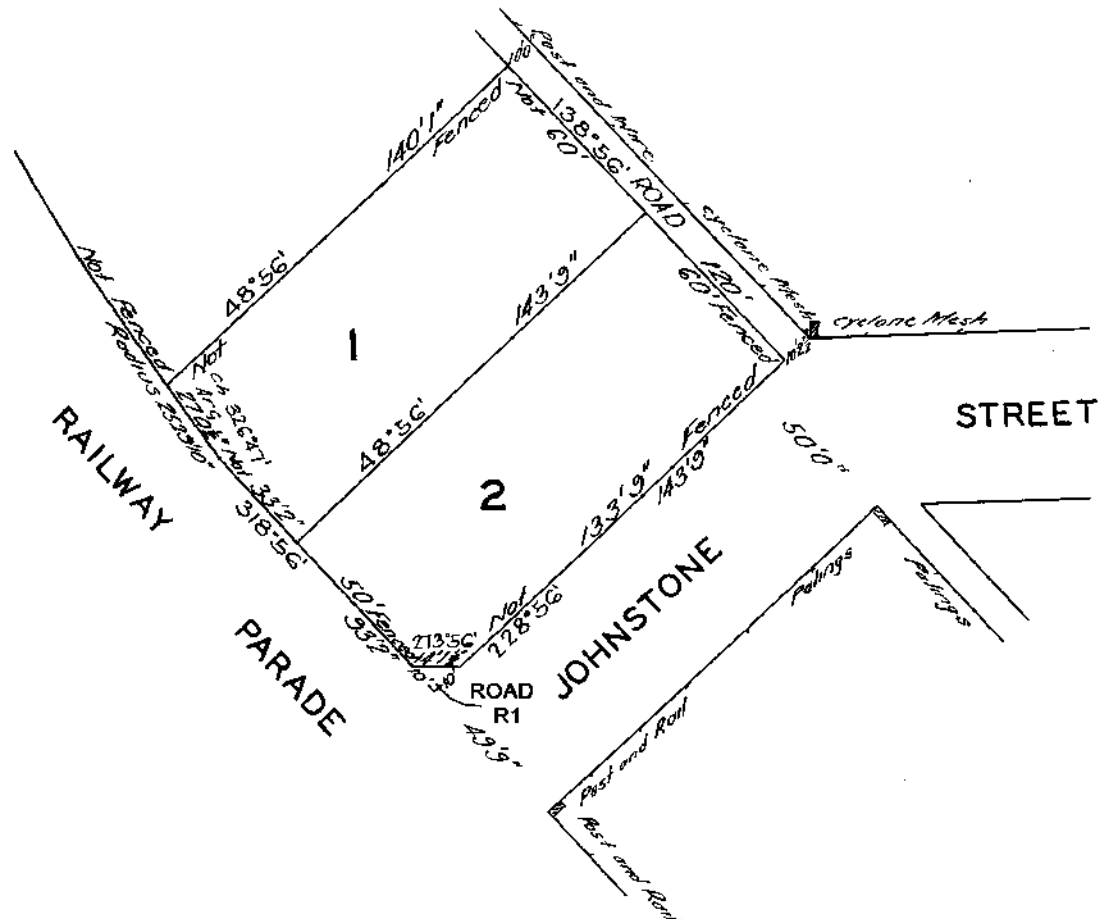
The document is invalid if this cover sheet is removed or altered.

PLAN MAY BE LODGED 14/ 6 /61

PARISH OF LYNDBURST

R1 = BROWN

THE LAND COLOURED BROWN IS
APPROPRIATED OR SET APART
FOR EASEMENTS OF WAY AND DRAINAGE





Rate and Valuation Notice 2024-2025

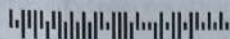


Rates and charges for the period
1 July 2024 to 30 June 2025

Page 1 of 4

Tax Invoice

ABN 49 454 768 065



Bekim Qaniu and Fatime Qaniu
3 Glynda Street
DANDENONG VIC 3175

Notice date: 23/08/2024

Frankston City Council
PO Box 490
FRANKSTON VIC 3199
Phone: 1300 322 322
info@frankston.vic.gov.au
frankston.vic.gov.au

Assessment No./Ref No. 0004804 9

Ward: Kananook



031
1029923
R7_5609

Property details	Date of valuation:
17 Railway Parade, Seaford 3198 Lot 1 LP 47803	01/01/2024
Australian Valuation Property Classification Code: 110 : Detached Dwelling	Site Value (SV): \$720,000 *Capital Improved Value (CIV): \$880,000 Net Annual Value (NAV): \$44,000 Valuation Effective Date: 01/07/2024

*Council uses Capital Improved Value (Land value plus any improvements) for rating purposes

Financial details	Declared on:
General Rate Municipal Charge Garbage Charge 120L @\$462.30 Green Waste @\$168.10	3 June 2024
0.00198187 cents in \$ on \$880,000	\$1,744.05 \$182.75 \$462.30 \$168.10

If you're experiencing payment difficulty, and require a payment plan, please refer to page 3 of this notice for further information.

Victorian Government charges

Fire Services Category - Residential \$132.00 + (0.00008700 X \$880,000) \$208.55
Garbage Charges Include the State Government Imposed Landfill Levy



To register for email notices visit:
frankston.enotices.com.au
eNotice Reference No:AFBC1F34EN

This notice does not include any adjustments/payments made after 13/03/2024
Interest is charged at 10 per cent per annum on all overdue payments --
The maximum rate of interest is fixed by the Minister.

ARREARS (if any)	1st INSTALMENT	2nd INSTALMENT	3rd INSTALMENT	4th INSTALMENT	TOTAL DUE
	\$692.75	\$691.00	\$691.00	\$691.00	\$2,765.75
Due immediately:	Due 30/09/2024	Due 30/11/2024	Due 28/02/2025	Due 31/05/2025	
By application only, nine monthly direct debit payments visit: frankston.vic.gov.au	30/09/2024 \$309.75 31/10/2024 \$307.00 02/12/2024 \$307.00	02/01/2025 \$307.00 31/01/2025 \$307.00 28/02/2025 \$307.00	31/03/2025 \$307.00 30/04/2025 \$307.00 02/06/2025 \$307.00	31/03/2025 \$307.00 30/04/2025 \$307.00 02/06/2025 \$307.00	If you paid by direct debit last year your direct debit will automatically continue. If you want to cancel this direct debit, please notify Council in writing.

How to pay

 Online Using a Visa, Mastercard or debit card via Council's website. Visit: frankston.vic.gov.au	 BPAY Contact your participating financial institution to pay from your cheque, savings or credit card account. Visit: bpay.com.au Billier Code: 1966 Ref: 00048049	 Phone or Post Billpay Using a Visa, Mastercard or debit card. Phone: 1300 721 138 Ref: 00048049 or By Post Billpay: 13 16 16 Billpay Code: 0760 Ref: 00048049	 Centrelink Deducted from your Centrelink payments. Learn more: centrelink.gov.au CRN: 555014543H Ref: 00048049	 Direct Debit By application to council only, for more information please visit: frankston.vic.gov.au	 Mail Attach cheque or money order to the remittance slip on the back of this notice and post to: Frankston City Council PO Box 490 Frankston 3199 Receipts not issued for mail payments	 In Person By cash, cheque, money order, EFTPOS or Credit Card (Visa or Mastercard). Present this notice with payment at any Frankston Council Customer Service Centre. Find your nearest location: frankston.vic.gov.au
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Victorian Statewide Conveyancing Pty
Ltd
E-mail: jo@victorianstatewide.com.au

Statement for property:
LOT 1 17 RAILWAY PARADE
SEAFORD 3198
1 LP 47803

REFERENCE NO.	YOUR REFERENCE	DATE OF ISSUE	CASE NUMBER
51C//10010/120	20250057	13 JANUARY 2025	48380297

1. Statement of Fees Imposed

The property is classified as a serviced property with respect to charges which as listed below in the Statement of Fees.

(a) By Other Authorities

Parks Victoria - Parks Service Charge	01/01/2025 to 31/03/2025	\$21.79
Melbourne Water Corporation Total Service Charges	01/01/2025 to 31/03/2025	\$30.52

(b) By South East Water

Water Service Charge	01/01/2025 to 31/03/2025	\$22.58
Sewerage Service Charge	01/01/2025 to 31/03/2025	\$98.05
Subtotal Service Charges		\$172.94

TOTAL UNPAID BALANCE \$172.94

- Financial Updates (free service) are only available online please go to (type / copy the complete address shown below): <https://secureapp.southeastwater.com.au/PropertyConnect/#/order/info/update>

* Please Note: if usage charges appear above, the amount shown includes one or more of the following:

Water Usage, Recycled Water Usage, Sewage Disposal, Fire Service Usage and Trade Waste Volumetric Fees.

Interest may accrue on the South East Water charges listed in this statement if they are not paid by the due date as set out in the bill.

- The total annual service fees and volumetric fees for water usage and sewerage disposal for each class of property are set out at www.southeastwater.com.au.
- Updates of rates and other charges will only be provided for up to six months from the date of this statement.
- If this property has recently been subdivided from a "parent" title, there may be service or other charges owing on the "parent" which will be charged to this property, once sold, that do not appear on this statement.

AUTHORISED OFFICER:



LARA SALEMBIER
GENERAL MANAGER
CUSTOMER EXPERIENCE

South East Water
Information Statement Applications
PO Box 2268, Seaford, VIC 3198

You must contact us to see if there are any such charges as they may be charged to this property on sale and should therefore be adjusted with the owner of the parent title beforehand.

- If the property is sold, the vendor is liable to pay all fees incurred in relation to the property until the vendor gives South East Water a Notice of Disposition of Land required by the Water (General) Regulations 2021, please include the Reference Number set out above in that Notice.
- Fees relating to the property may change from year-to-year in accordance with the Essential Service Commission's Price Determination for South East Water.
- Every fee referred to above is a charge against the property and will be recovered from a purchaser of the property if it is not paid by the vendor.
- Information about when and how outstanding fees may be paid, collected and recovered is set out in the Essential Services Commission's Customer Service Code, Urban Water Businesses.
- If this Statement only sets out rates and fees levied by Parks Victoria and Melbourne Water, the property may not be connected to South East Water's works. To find out whether the property is, or could be connected upon payment of the relevant charges, or whether it is separately metered, telephone 131 694.
- For a new connection to our water or sewer services, fees / charges will be levied.

2. Encumbrance Summary

Where available, the location of sewers is shown on the attached plan. Please ensure where manholes appear, that they remain accessible at all times "DO NOT COVER". Where driveways/paving is proposed to be constructed over easements for water supply/sewerage purposes, or within 1 metre of a South East Water asset, the owner will be responsible for all costs associated with any demolition and or re-instatement works, necessary to allow maintenance and or repair of the asset effected. Where changes to the surface levels requires maintenance shafts/holes to be altered, all works must be carried out by South East Water approved contractors only. For information call 131694. For all other works, prior consent is required from south East Water for any construction over easements for water supply/sewerage purposes, or within 1 metre of a South East Water asset.

To assist in identifying if the property is connected to South East Waters sewerage system, connected by a shared, combined or encroaching drain, it is recommended you request a copy of the Property Sewerage Plan. A copy of the Property Sewerage Plan may be obtained for a fee at www.southeastwater.com.au Part of the Property Sewerage Branch servicing the property may legally be the property owners responsibility to maintain not South East Waters. Refer to Section 11 of South East Waters Customer Charter to determine if this is the case. A copy of the Customer Charter can be found at www.southeastwater.com.au. When working in proximity of drains, care must be taken to prevent infiltration of foreign material and or ground water into South East Waters sewerage system. Any costs associated with rectification works will be charged to the property owner.

Information available at Melbourne Water indicates that this property is not subject to flooding from Melbourne Water's drainage system, based on a flood level that has a probability of occurrence of 1% in any one year.

ENCUMBRANCE ENQUIRY EMAIL infostatements@sew.com.au

If no plan is attached to this Statement, South East Water is not aware of any works belonging to South East Water being present on the property.

If a plan is attached to this Statement, it indicates the nature of works belonging to South East Water, their approximate location, and the approximate location of any easement relating to those works.

Important Warnings

AUTHORISED OFFICER:

A handwritten signature in black ink, appearing to read "Lara Salembier".

LARA SALEMBIER
GENERAL MANAGER
CUSTOMER EXPERIENCE

South East Water
Information Statement Applications
PO Box 2268, Seaford, VIC 3198

The map base for any attached plan is not created by South East Water which cannot and does not guarantee the accuracy, adequacy or completeness of any information in the plan, especially the exact location of any of South East Water's works, which may have changes since the attached plan was prepared. Their location should therefore be proven by hand before any works are commenced on the land.

Unless South East Water's prior written approval is obtained, it is an offence to cause any structure to be built or any filling to be placed on a South East Water easement or within 1 metre laterally of any of its works or to permit any structure to be built above or below any such area.

Any work that requires any South East Water manhole or maintenance shaft to be altered may only be done by a contractor approved by South East Water at the property owner's cost.

If the owner builds or places filling in contravention of that requirement, the owner will be required to pay the cost of any demolition or re-instatement of work that South East Water considers necessary, in order to maintain, repair or replace its asset.

This Statement does not include any information about current or outstanding consent issued for plumbing works on at the property.

3. Disclaimer

This Statement does not contain all the information about the property that a prospective purchaser may wish to know. Accordingly, appropriate enquiries should be made of other sources and information.

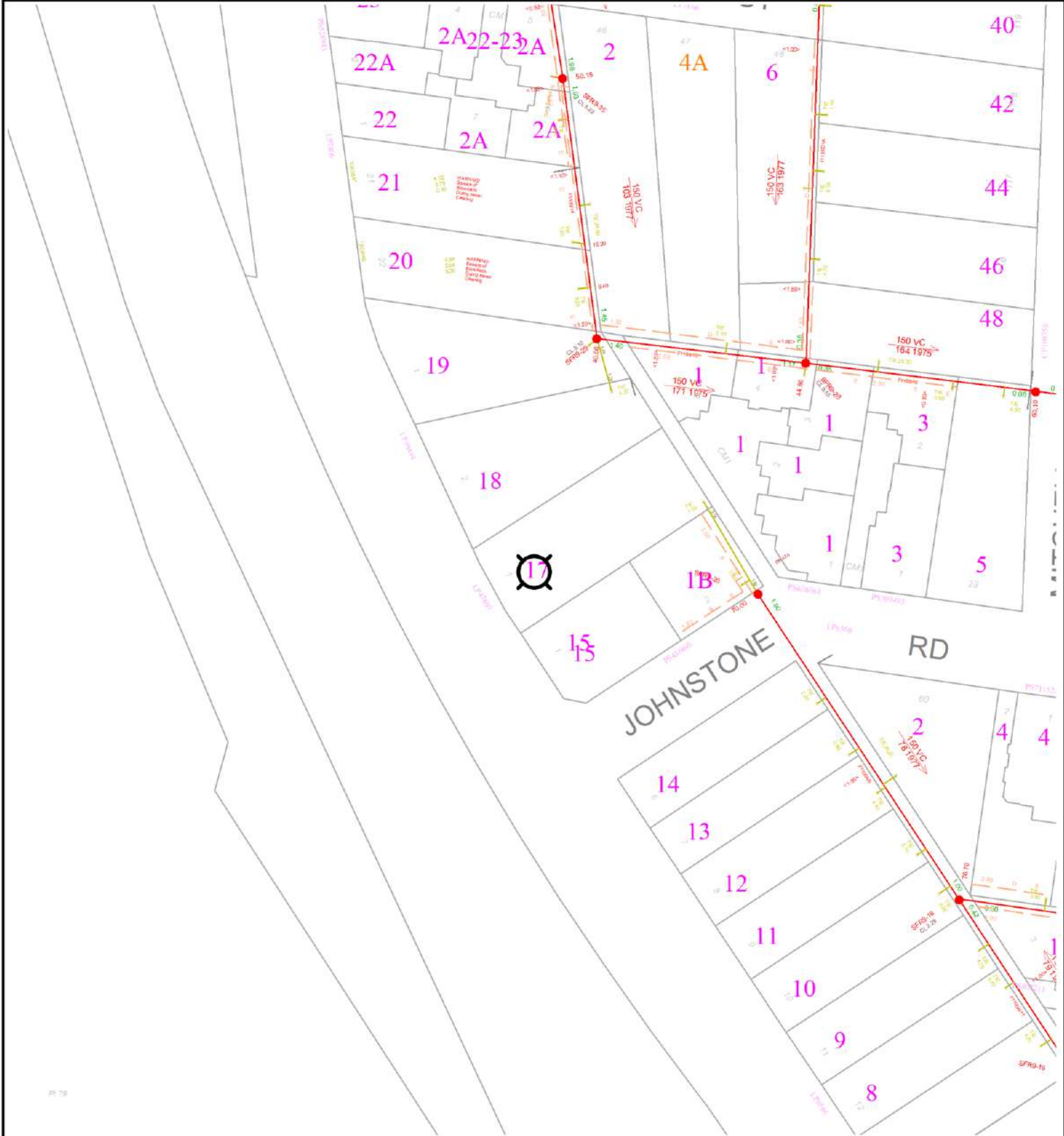
South East Water has prepared the information in this Statement with due care and diligence. It cannot and does not accept liability for any loss or damage arising from reliance on the information given, beyond the extent set out in section 155 of the Water Act 1989 and sections 18 and 29 of the Australian Consumer Law.

AUTHORISED OFFICER:

A handwritten signature in black ink, appearing to read 'Lara Salembier'.

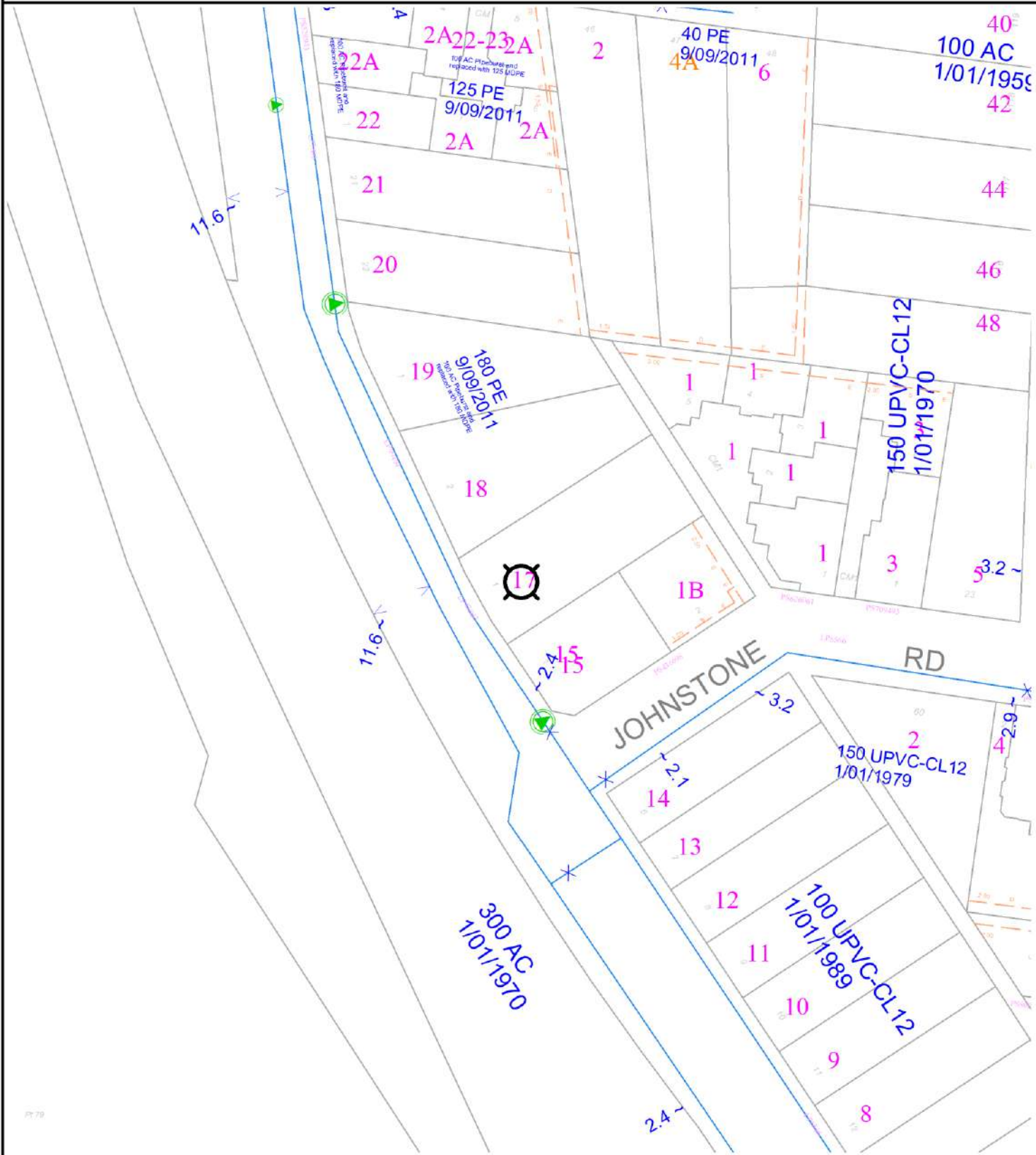
LARA SALEMBIER
GENERAL MANAGER
CUSTOMER EXPERIENCE

South East Water
Information Statement Applications
PO Box 2268, Seaford, VIC 3198



WARNING: This plan is issued solely for the purpose of assisting you in identifying South East Water's and Melbourne Water's specified assets through further investigation only. It is not to be used for any other purpose, including to identify any other assets, property boundaries or dimensions. Accordingly, the location of all assets should be proven by hand on site prior to the commencement of any work. (Refer to attached letter for further details). Assets labelled AC may contain asbestos and therefore works on these assets must be undertaken in accordance with OH&S Regulations. Abandoned and currently unused assets are shown in orange.

	Title/Road Boundary		Subject Property		Maintenance Hole
	Proposed Title/Road		Sewer Main & Property Connections		Inspection Shaft
	Easement		Direction of Flow		Offset from Boundary
Melbourne Water Assets					
	Sewer Main		Underground Drain		Natural Waterway
	Maintenance Hole		Channel Drain		Underground Drain M.H.



WARNING: This plan is issued solely for the purpose of assisting you in identifying South East Water's and Melbourne Water's specified assets through further investigation only. It is not to be used for any other purpose, including to identify any other assets, property boundaries or dimensions. Accordingly, the location of all assets should be proven by hand on site prior to the commencement of any work. (Refer to attached letter for further details). Assets labelled AC may contain asbestos and therefore works on these assets must be undertaken in accordance with OH&S Regulations. Abandoned and currently unused assets are shown in orange.

LEGEND

— Title/Road Boundary

--- Proposed Title/Road

--- Easement



Subject Property



Water Main Valve

Water Main & Services



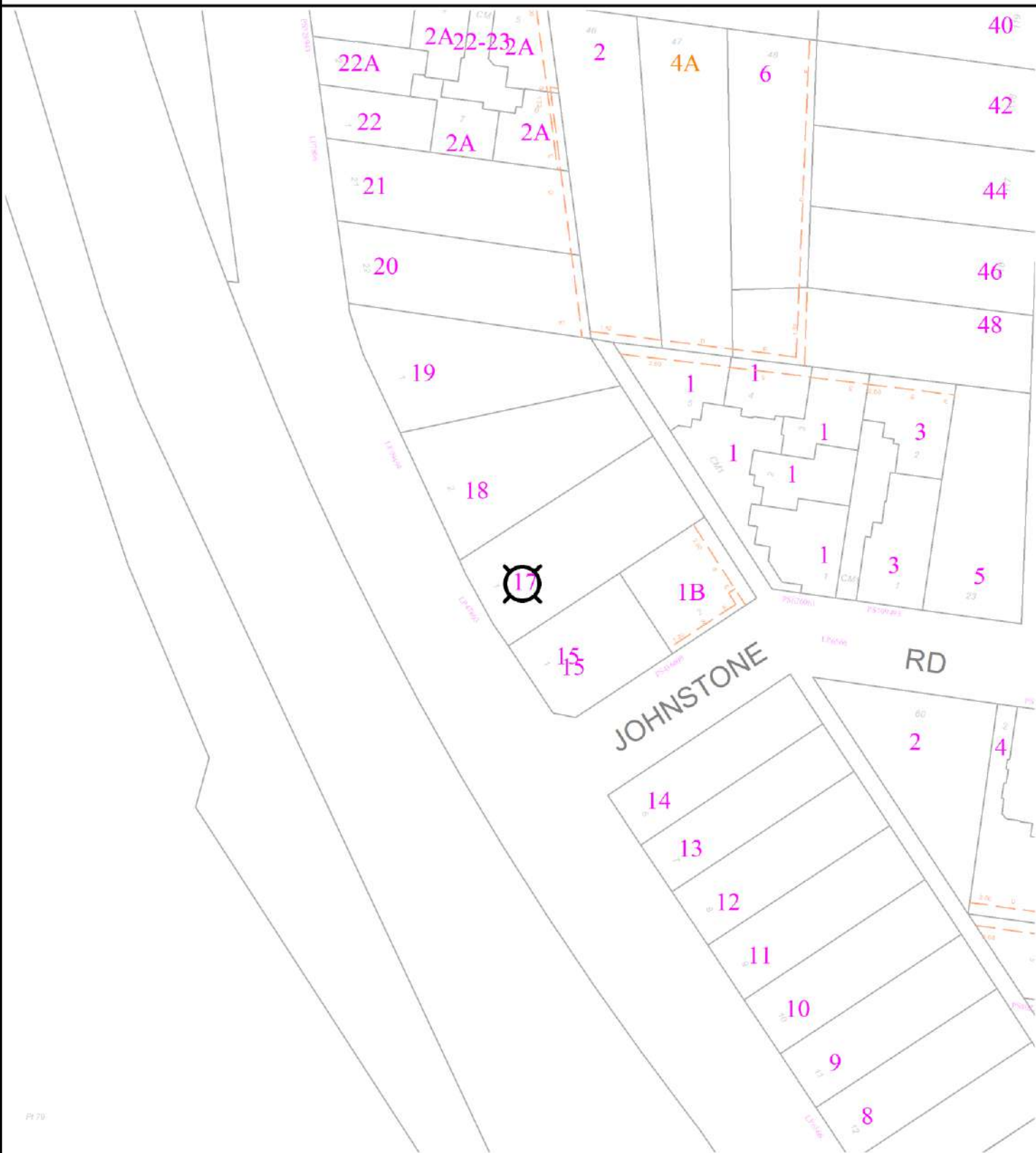
Hydrant



Fireplug/Washout



~ 1.0 Offset from Boundary



WARNING: This plan is issued solely for the purpose of assisting you in identifying South East Water's and Melbourne Water's specified assets through further investigation only. It is not to be used for any other purpose, including to identify any other assets, property boundaries or dimensions. Accordingly, the location of all assets should be proven by hand on site prior to the commencement of any work. (Refer to attached letter for further details). Assets labelled AC may contain asbestos and therefore works on these assets must be undertaken in accordance with OH&S Regulations. Abandoned and currently unused assets are shown in orange.

LEGEND

— Title/Road Boundary

- - - - - Proposed Title/Road

- - - - - Easement



Subject Property



Recycled Water Main Valve

Recycled Water Main & Services



Hydrant



Fireplug/Washout



Offset from Boundary



Frankston City Council
PO Box 490
Frankston, Vic 3199

Phone: 1300 322 322
info@frankston.vic.gov.au
frankston.vic.gov.au



Sabiha Harun 03 9784 1939

29 October 2024

B Qaniu
3 Glynda Street
DANDENONG VIC 3175

Dear B Qaniu,

Planning Permit 99/2019/P/D

Proposal Extension of Time - To construct three (3) double storey dwellings on a lot

Address 17 Railway Parade, Seaford 3198

I refer to your recent request for an extension of time to the above planning permit and advise that Council has approved a two (2) year time extension to the commencement and completion to Planning Permit 99/2019/P/D.

Planning Permit 99/2019/P/D now expires if either of the following circumstances apply:

- If the development has not been commenced by 18 November 2026
- If the development has not been completed by 18 November 2028

Please note: Given the substantial time that has passed since the permit was approved it is very unlikely that any further extensions will be granted unless substantial action is undertaken to act on the permit (e.g. commencement of the development).

Yours sincerely,

Sharon

Sabiha Harun
Para Planner



PLANNING PERMIT

FORM 4 Section 63 & 86

PERMIT NUMBER:	99/2019/P
RESPONSIBLE AUTHORITY:	Frankston City Council
PLANNING SCHEME:	Frankston Planning Scheme
ADDRESS OF THE LAND:	17 Railway Parade, Seaford 3198
THE PERMIT ALLOWS:	To construct three (3) double storey dwellings on a lot

THE FOLLOWING CONDITIONS APPLY TO THIS PERMIT:

- 1 Before the development starts, amended plans to the satisfaction of the Responsible Authority must be submitted to and approved by the Responsible Authority. When approved, the plans will be endorsed and will then form part of the permit. The plans must be drawn to scale with dimensions and three copies must be provided. The plans must be generally in accordance with the plans submitted with the application (Seaford #1 prepared by KC2 Design Pty Ltd, Sheets TP001- TP007, TP101-TP104, TP201, TP301-TP307, Revision A dated 06/6/2019), but modified to show:
 - (a) Relocate the door to the garage of Dwelling 3, 500mm to the north by widening the garage together with any consequential internal changes required to the dwelling.
 - (b) Relocate the internal storage within the garage of Dwelling 3 to the southern wall.
 - (c) Finished floor levels (ffl) for each dwelling on all elevations.
 - (d) Provision of external screening on the window of Bedroom 3, Dwelling 1 in accordance with Standard B22: Overlooking.
 - (e) The pedestrian gate to dwelling 3 clearly identified as being the entry to the dwelling.
 - (f) All trees growing on the site and on the adjoining properties within 3m of the boundaries must be clearly illustrated on all relevant plans this must include canopy width, trunk location and be clearly labeled in accordance with the report by Tree Logic- 6 May 2019 and state whether the tree is to be retained or removed.
 - (g) The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for all retained trees and the location of tree protection fencing and/or ground systems must be clearly illustrated on all relevant plans (including ground floor).
 - (h) Notation of all relevant plans that the existing natural ground level (NGL) within each of the neighbouring TPZs that extend into the site must be maintained and not be altered by excavations throughout all development phases.
 - (i) Tree protection conditions noted in accordance with Conditions 6 and 7.
 - (j) A landscape plan in accordance with Condition 3.
 - (k) Any changes required by the plans approved in Condition 15.
 - (l) A note that Johnstone Lane will be constructed and sealed in accordance with Condition 15 and 16.
 - (m) The location and type of all outdoor lighting to the rear lane.

Date Issued: **18 November 2020**

Signature for the
Responsible Authority



PLANNING PERMIT

PERMIT NUMBER: 99/2019/P

Conditions Continued –

- (n) A notation that waste collection is to be undertaken for all dwellings from Railway Parade.

No Alteration or Changes

- 2 The development as shown on the endorsed plans must not be altered without the prior written consent of the Responsible Authority.

Landscaping

- 3 Before the commencement of buildings and works, a landscape plan generally in accordance with the submitted Landscape Plan prepared by Justin Hutchinson (30.05.2019- No. 2842 Rev. A) must be submitted to and approved by the Responsible Authority. When approved, the plan will be endorsed and will then form part of the permit. The plan must be drawn to scale with dimensions and three copies must be provided. The plan must be modified to show:
- (a) Deletion of the Silver Banksia from the front setback of Dwelling 3 and replacement with two more suitably formed trees (such as the proposed Froznam Pears).
- 4 The landscaping as shown on the endorsed landscape plan must be carried out and completed to the satisfaction of the Responsible Authority before the occupation of the development and/or commencement of the use or at such later date as is approved by the Responsible Authority in writing.
- 5 The landscaping shown on the endorsed plans must be maintained to the satisfaction of the Responsible Authority, including that any dead, diseased or damaged trees are to be replaced.

Prior to Occupation

- 6 Tree protection must be carried out in accordance with the Australian Standard AS 4970-2009 Protection of trees on development sites and the Tree Protection Management Plan to the satisfaction of the Responsible Authority.

The following radial tree protection zones (TPZ) apply to the following trees:

- Tree 12 (neighbouring Manna Gum)- 6.6m
 - Neighbouring small trees to NW- 1.5m each (mulch only)
 - Road reserve trees- 1.5m each (finishing at paved surfacing)
- 7 Prior to the commencement of the development (including demolition and any initial site preparation Tree Protection Fencing (TPF) must be erected at the applicable TPZs. The TPF must comprise temporary fencing panels (min 1.8m height) and held in place with concrete feet. All tree protection must be to the satisfaction of the Responsible Authority and include:
- (a) Coarse mulch laid to a depth of 75mm (excluding road reserve/ street trees).
- (b) No vehicular or pedestrian access.
- (c) The existing soil level must not be altered either by fill or excavation.
- (d) The soil must not be compacted or the soil's drainage changed.
- (e) No fuels (or the like), materials, equipment or machinery are to be stored.
- (f) No trenching to lay underground services.

Date Issued: **18 November 2020**

Signature for the
Responsible Authority _____



PLANNING PERMIT

PERMIT NUMBER: 99/2019/P

Conditions Continued –

- (g) Any tree pruning (including to roots) must be carried out by a professional arborist and in accordance with Australian Standard AS 4373-2007 Pruning of Amenity Trees.

Note: where TPF is impractical, formalized ground protection must be installed. Ground protection must comprise strapped timber rumble boards installed over the previously installed layer of mulch.

The tree protection fence must remain in place for the duration of building and works to the satisfaction of the Responsible Authority

Drainage

- 8 The development must provide a Stormwater Detention System with a volume capable of retarding the 10 year ARI flow from the development site back to a 5 year ARI pre-development value to the satisfaction of the Responsible Authority.
- 9 Prior to commencement of development construction detailed design plans and drainage computations of the internal stormwater drainage system including the method of connection to the existing Council drainage infrastructure are to be submitted and approved to the satisfaction of the Responsible Authority.
- 10 Water Sensitive Urban Design principles (WSUD) are to be incorporated into the drainage design, which may include but not be limited to the following components or a combination thereof:
- (a) On-site stormwater detention and rainwater tanks.
 - (b) Soil percolation.
 - (c) Stormwater harvesting and re-use of stormwater for garden watering, toilet flushing, or similar.
 - (d) On-site 'bio-treatment' to reduce dissolved contaminants and suspended solids.
- 11 Stormwater drainage outfall is to be constructed to the satisfaction of the responsible authority.
- 12 Vehicle crossings shall be constructed to Frankston City Council's standards and specifications to the satisfaction of the Responsible Authority.
- 13 All disused vehicle crossings shall be removed and the area reinstated to kerb and channel and landscaped to the satisfaction of the responsible authority.
- 14 Prior to occupation of the dwellings hereby permitted by this permit starts, areas set aside for parking vehicles, loading bays, access lanes and paths as shown on the endorsed plans must be:
- (a) Constructed to the satisfaction of the Responsible Authority;
 - (b) Properly formed to such levels that they can be used in accordance with the plans;
 - (c) Surfaced with an all-weather sealcoat; and
 - (d) Drained and maintained to the satisfaction of the Responsible Authority.

Car spaces, access lanes and driveways must be kept available for these purposes at all times.

Laneway

- 15 Before the development starts, plans for the access to the garage for Dwelling 3 and the construction of Johnstone Lane to service the development must be submitted to and approved by the Responsible

Date Issued: **18 November 2020**

Signature for the
Responsible Authority _____



PLANNING PERMIT

PERMIT NUMBER: 99/2019/P

Conditions Continued –

Authority. When approved, the plans will be endorsed and will then form part of the permit. The plans must show:

- (a) How grade transition from the existing constructed section of the lane is achieved to the garage of Dwelling 3.
 - (b) The construction and sealing of the new section of Johnstone Lane directly abutting the site up to the edge of the Tree Protection Zone of Tree 12.
 - (c) Details of how the new section of the lane will integrate with the existing section including any changes required to the existing section of the laneway.
 - (d) Measures to address sightlines for the access to the development at 1 Johnstone Street with any required 'giveaway' line to be positioned in the lane and any convex mirror located within the boundaries of the review site.
- 16 Prior to the occupation the applicant must undertake all works required by Condition 15 to the satisfaction of the responsible authority.
- 17 Where the development involves work on or access to Council controlled land including roads, reserves and right of way, the owner, operator and their agents under this permit must at all times take adequate precautions to maintain works to the highest public safety standards, to the satisfaction of the Responsible Authority.

Precautions must include, appropriate signage to AS 1743 Road Works Signing Code of Practice, the provision of adequate barricading of works, including trenches of Service Authorities and any other road openings, sufficient to ensure public safety.

All relevant permits must be obtained from Council for works within the existing road reserves, in addition to the planning permit.

Construction Management Plan

- 18 Prior to the commencement of works, a Construction Management Plan must be prepared, submitted to, and approved by the Responsible Authority. Once approved (endorsed), the plans will form part of this permit and must be implemented to the satisfaction of the Responsible Authority. The plan must provide for, but is not limited to:
- (a) How access to the units at 1 Johnstone Street will be retained during construction.
 - (b) Protection of the 1 Johnstone Street owners corporation assets during construction.

The Construction Management Plan must be complied with at all times to the satisfaction of the responsible authority.

Urban Design

- 19 All works on or facing the boundaries of adjoining properties must be finished and surface cleaned to a standard that is well presented to neighbouring properties in a manner to the satisfaction of the Responsible Authority.
- 20 Mailboxes shall be provided to the proposed dwellings to the satisfaction of the Responsible Authority and Australia Post.

Date Issued: **18 November 2020**

Signature for the
Responsible Authority _____



PLANNING PERMIT

PERMIT NUMBER: 99/2019/P

Conditions Continued –

- 21 All plumbing work, sewer pipes etc. (except for spouting and stormwater pipes) associated with the new dwellings shall be concealed from general view.
- 22 Outdoor lighting must be provided, designed, baffled and located to the satisfaction of the Responsible Authority to prevent any adverse effect on neighbouring land.

Completion of Buildings and Works

- 23 Once the development has started it must be continued and completed to the satisfaction of the Responsible Authority.

Permit Expiry

- 24 This permit as it relates to development (buildings and works) will expire if one of the following circumstances applies:
 - (a) The development is not started within two (2) years of the issue date of this permit.
 - (b) The development is not completed within four (4) years of the issue date of this permit.

In accordance with section 69 of the *Planning and Environment Act 1987*, an application may be submitted to the responsible authority for an extension of the periods referred to in this condition.

Date Issued: **18 November 2020**

Signature for the
Responsible Authority _____

IMPORTANT INFORMATION ABOUT THIS PERMIT

WHAT HAS BEEN DECIDED?

The Responsible Authority has issued a permit.

(Note: This is not a permit granted under Division 5 or 6 of Part 4 of the **Planning and Environment Act 1987**.)

CAN THE RESPONSIBLE AUTHORITY AMEND THIS PERMIT?

The Responsible Authority may amend this permit under Division 1A of Part 4 of the **Planning and Environment Act 1987**.

WHEN DOES A PERMIT BEGIN?

A permit operates:

- from the date specified in the permit, or
- if no date is specified, from:
 - (i) the date of the decision of the Victorian Civil & Administrative Tribunal, if the permit was issued at the direction of the Tribunal, or
 - (ii) the date on which it was issued, in any other case.

WHEN DOES A PERMIT EXPIRE?

1. A permit for the development of land expires if: -
 - the development or any stage of it does not start within the time specified in the permit, or
 - the development requires the certification of a plan of subdivision or consolidation under the **Subdivision Act 1988** and the plan is not certified within two years of the issue of the permit, unless the permit contains a different provision; or
 - the development or any stage is not completed within the time specified in the permit, or if no time is specified, within two years after the issue of the permit or in the case of a subdivision or consolidation within 5 years of the certification of the plan or subdivision or consolidation under the **Subdivision Act 1988**.
2. A permit for the use of land expires if -
 - the use does not start within the time specified in the permit, or if no time is specified, within two years after the issue of the permit, or
 - the use is discontinued for a period of two years.
3. A permit for the development and use of land expires if -
 - the development or any stage of it does not start within the time specified in the permit; or
 - the development or any stage of it is not completed within the time specified in the permit, or if no time is specified, within two years after the issue of the permit; or
 - the use does not start within the time specified in the permit, or, if no time is specified, within two years after the completion of the development, or
 - the use is discontinued for a period of two years.
4. If a permit for the use of land or the development and use of land or relating to any of the circumstances mentioned in Section 6A(2) of the **Planning and Environment Act 1987**, or to any combination of use, development or any of those circumstances requires the certification of a plan under the **Subdivision Act 1988**, unless the permit contains a different provision -
 - the use or development of any stage is to be taken to have started when the plan is certified; and
 - the permit expires if the plan is not certified within two years of the issue of the permit.
5. The expiry of a permit does not affect the validity of anything done under the permit before the expiry.

WHAT ABOUT APPEALS?

- The person who applied for the permit may apply for a review of any condition in the permit unless it was granted at the direction of the Victorian Civil & Administrative Tribunal, in which case no right of review exists.
- An application for review must be lodged within 60 days after the permit was issued, unless a notice of decision to grant a permit has been issued previously, in which case the application for review must be lodged within 60 days after the giving of that notice.
- An application for review is lodged with the Victorian Civil & Administrative Tribunal.
- An application for review must be made on an Application for Review form which can be obtained from the Victorian Civil & Administrative Tribunal, and be accompanied by the applicable fee.
- An application for review must state the grounds upon which it is based.
- An application for review must also be served on the Responsible Authority.
- Details about applications for review and the fees payable can be obtained from the Victorian Civil & Administrative Tribunal.

Application for review forms and guides are available at www.vcat.vic.gov.au , Ground Floor 55 King Street Melbourne or by contacting VCAT customer service on (03) 9628-9777.

(LAST PAGE OF PERMIT)

GEOTECHNICAL SITE CLASSIFICATION REPORT

PROPOSED UNIT DEVELOPMENT
PROJECT: 2240433-1
17 RAILWAY PARADE, SEAFORD



Date of Fieldwork	22 February 2024
Site Classification (in accordance with AS2870-2011)	P (due to demolition)
Underlying Geology	Quaternary Sand Deposits (0-20mm)
Wind Classification (in accordance with AS4055-2021)	N1
Bushfire Attack Level (BAL) (in accordance with AS3959-2018)	LOW (please refer to Section 3)

Report prepared for: **E&U Bafto Corporation**
23 February 2024

Proudly Affiliated With



ResCom Consulting Engineers Pty Ltd.
1 Woodbine Court, Wantima South.
ACN 617 439 951.

1. INTRODUCTION

ResCom Consulting Engineers (RCCE) have been engaged to conduct a limited appropriate field investigation at this site, to determine the current ground and subsurface conditions for the proposed articulated brick veneer development. The objectives are the identification, measurement and assessment of the following:

- site classification;
- presence and depth of fill;
- strengths of foundation strata;
- level and quantity of groundwater;
- suitable footing systems;
- minimum founding depths.

This report outlines footing recommendations to satisfy AS2870-2011 Residential Slabs and Footings, in accordance with NCC 2022.

This report is only applicable for the subject site and type of building detailed herein. If the location or type of construction is modified, RCCE must be contacted, as revised recommendations may be required.

2. FIELDWORK

Two (2) Boreholes were drilled and disturbed samples collected, to provide information on subsurface soil profiles. Cohesive strengths were field tested and observed densities of non-cohesive soils were noted as appropriate.

The approximate locations of the boreholes are shown on the Borehole Location Plan.

The Engineering Logs are attached and form part of this report. The soil descriptions in the Engineering Logs, are in accordance with AS1726-2017 Geotechnical Site Investigations.

2.1 Site Geology

GeoVic on-line geological mapping and relevant Geological Survey of Victoria maps, indicate this site to be located within an area of **Quaternary Sand Deposits**.

In general, the anticipated subsurface conditions have been encountered during this site investigation and are considered to be consistent with the geological maps.

2.2 Climatic Zone and Soil Suction Profile

In accordance with AS2870-2011 Figures D1/D2 & Table 2.5, this site is located within climatic zone:

- Zone 2 - Depth of design suction change (H_s) is 1.8m.

2.3 Site Description

At the time of this investigation, the site had a slight slope and was occupied (the existing structures are proposed to be demolished). The vegetation consisted of large and immature tree/s and shrub/s on this and adjoining sites.

3. BUSHFIRE ATTACK LEVEL (BAL)

At the time of investigation, an assessment of this site and the surrounding terrain was carried out to determine the Bushfire Attack Level (BAL).

In accordance with Section 2 Determining the Bushfire Attack Level (BAL), Clause 2.2 Simplified Procedure (Method 1) and Table 2.4.2 of AS3959-2018 Construction of Buildings in Bushfire-Prone Areas, this site is rated:

- **BAL LOW.** The risk is considered to be **VERY LOW**.
There is insufficient risk to warrant any specific construction requirements, but there is still some risk. The risk is very low and radiant heat on the building is not significant enough to warrant specific construction requirements; however ember attack may still occur.
If you are in a designated BPA and your bushfire attack level is **BAL LOW**, you must still construct to a minimum **BAL 12.5**.

The BAL Assessment Report can be found in this report.

4. WIND SPEED ANALYSIS

At the time of investigation, an assessment of this site and the surrounding terrain was carried out to determine the Wind Classification Design Speed.

Based on calculations in accordance with AS4055-2021 Wind Loads for Housing, the Ultimate Limit State ($V_{h,u}$) Design Gust Wind Speed for this site has been determined as:

- **N1 (34m/sec).**

Refer to Section 1.2 of AS4055-2021, for applicable conditions (geometric limits).

If wind loads are determined using AS4055-2021, design parameters shall be derived from AS4055-2021 only. Where wind loads are determined using AS/NZS 1170.2, design parameters in that Standard only must be used.

5. SITE CLASSIFICATION

Site Classification is based on the expected ground surface movement and the depth to which this movement extends. This site has been classified in accordance with AS 2870-2011, Clauses 2.1.2 and 2.1.3 using the techniques and principles specified in Clauses 2.2, 2.3, 2.4 and 2.5.

Please note that Site Classification may require consideration of factors beyond the boundaries of the subject site.

In accordance with AS 2870-2011, this site is classified **CLASS P**.

This site has been classified **P** due to:

- soil disturbance caused by the removal of existing tree/s;
- soil disturbance caused by the removal of existing structure/s and footings;

This classification was determined by taking into consideration the area geology, soil profile encountered, the climatic zone of the area and any potential abnormal moisture conditions.

In accordance with AS2870-2011 Table 2.3, it is estimated that the characteristic surface movement (y_s) will be in the range of **0 to 20mm (Class S)**.

6. FOOTING RECOMMENDATIONS

Based on the Site Classification, and in accordance with AS2870-2011, standard design footing systems may not be considered on this site. The footings must be designed by an experienced structural engineer. The designer should refer to the recommendations below to finalise the footing design.

The following recommendations assume that aspects of site drainage, paving, and landscaping are taken into consideration and implemented in accordance with Footing and Foundations Society Practice Notes (2013) "Guide to Foundation Maintenance for Reactive Soils" and CSIRO Building Technology File (BTF) 18 "Foundation Maintenance and Footing Performance: A Homeowner's Guide".

6.1 Slab

6.1.1 Slab Preparation

Any topsoil, grass roots, organic matter, surface rubbish, or other deleterious material shall be removed from the area on which the slab is to rest (a minimum scrape of 100mm is recommended). The building area may then be levelled by spreading fill under the slab panel areas and internal beams.

Slab panels, non load-bearing internal beams or ribs and load-support thickenings may be founded on natural soil, controlled fill or rolled fill.

Load-bearing edge beams and any load-bearing internal beams are to be founded on natural soil or controlled fill only. This fill shall continue past the edge of the building by at least 1m and shall be retained or battered beyond this point by a slope not steeper than 1:2. Any load-bearing beams shall not be founded on rolled fill.

6.1.2 Stiffened Raft Slab

Edge beams should be taken through any poorly compacted surface fill and founded at least 100mm into the natural loose to medium dense sand, where an allowable bearing capacity of 100kPa will be achieved.

Please refer to bolded notes at the end of this report.

This footing system must be designed by a structural engineer familiar with this form of construction and with reference to the relevant requirements of AS2870-2011.

6.1.3 Waffle Raft Slab

The depth of fill, including any existing fill, placed under the slab shall not exceed 300mm. Any fill must be compacted in accordance with the requirements of AS2870-2011, Clause 6.4.2. If this is not the case, engineer designed piers/piles will be required. The edge beams must be founded onto the natural loose to medium dense sand, where an allowable bearing capacity of 100kPa will be achieved.

Please refer to bolded notes at the end of this report.

This footing system must be designed by a structural engineer familiar with this form of construction and with reference to the relevant requirements of AS2870-2011.

7. BORED PIERS

Bored piers may be required due to:

- Depth of fill;

Bored piers should be founded at a minimum depth of 0.6m into the underlying natural **loose to medium dense** sand founding material.

Soil	Allowable End Bearing (kPa)
filling/sand	0
loose to medium dense sand	100

The bases of all pier excavations must be clean and free of all loose material, and the concrete poured as soon as practicable upon completion of boring/excavation.

8. SCREW-IN PILES

8.1 Pile System

The structure could also be supported on screw-in piles. The screw-in piles should be designed in accordance with Appendix G6 of AS2870-2011.

8.2 Design Actions

Screw-in piles should be designed for all imposed vertical and lateral loads from the supported residential construction plus load due to swelling or shrinking of the foundation, and including loads imposed during installation. For sites with deep fill, the effect of negative skin friction should be considered.

8.3 Minimum Depth

The installed depth of the screw-in piles should not be less than $1.25H_s$. Final pile lengths should be determined by the design engineer. Alternatively, a test screw-in could be placed in order to determine final depths and capacities.

8.4 Design Strength

Screw-in piles should satisfy the following requirements:

- The design strength should be in accordance with AS2159.
- The design strength of the pile in compression and bending should consider the effective supported length of the shaft. The freestanding portion of the pile above ground is unsupported. The pile may effectively be unsupported in a soft or loose soil layer, or dry clay soil with shrinkage cracks.
- If a screw-in pile is to resist bending actions, the shaft should be embedded into the pile cap or footing sufficient to generate the required resistance.

8.5 Pre-Boring

Some difficulties may be experienced with pile driving due to the presence of underground obstructions and therefore allowance should be made for relocating some piles or for pre-boring pile locations. It is critical for future performance of the piles that the pre-boring does not create an oversized hole that allows surface water to ingress into the foundation. The maximum pre-bore diameter that should be used is 90% of the minimum pile diameter.

The installation of piles should not create voids or permeable paths that could allow water ingress to reactive clay foundations.

9. SITE SPECIFIC POTENTIAL CONSTRUCTION DIFFICULTIES

9.1 Groundwater and Soft Soils

The potential presence of groundwater within soil horizons may lead to construction difficulties.

Due to the nature of soils on this site, the surface may become soft and boggy during wet weather.

Surface filling or natural sands may cause collapse of side of excavations.

Drilling bored piers in sand may cause collapse of the piers, therefore screw-in piles are recommended.

10. GENERAL AND SITE MAINTENANCE RECOMMENDATIONS

10.1 Surface Drainage

Surface drainage of the site shall be controlled from the start of site preparation and construction. The drainage system shall be completed by the finish of construction of the building, in accordance with AS2870-2011 Clause 5.6.3.

Surface drainage shall be designed and constructed to avoid water ponding against or near the building. 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, and shaped to prevent ponding of water. Where filling is placed adjacent to the building, the filling shall be compacted and graded to ensure drainage of water away from the building.

The subfloor space for buildings with suspended floors should be graded or drained to prevent ponding where this may affect the performance of the footing system.

The roof water should be diverted away from the footing as soon as the roof is constructed by using temporary pipes, if necessary. The surface water should also be provided by constructing surface gutters or grading the surface to divert the water away from the footing.

All surface drainage recommendations should be maintained for the economic life of the building.

10.2 Subsurface Drainage

The base of trenches shall be sloped away from the building. Trenches shall be backfilled with clay in the top 300mm within 1.5m of the building. The clay used for backfilling shall be compacted.

Where pipes pass under the footing system, the trench shall be backfilled full depth with clay to act as a barrier to the ingress of water beneath the footing system. Alternatively, a plastic membrane across the cross-section of the trench, taped to the pipe and keyed into the sides and base of the trench may be used.

Subsurface drains to remove groundwater shall not be placed within 1.5m of the building unless designed in accordance with engineering principles.

10.3 Existing Services

Any new footings to be constructed adjacent to existing underground services (eg. sewers, stormwater drains, etc..) should be deepened or supported on bored piers/piles below the invert level of the angle of repose in the natural, undisturbed soils.

10.4 Masonry Articulation

Foundation movement may be a cause of visible cracks in buildings and/or brickwork. It is essential to provide flexibility of the structure by considering full height openings (doors and windows) or masonry articulation joints at suitable spacings.

The articulation of masonry as deemed necessary by the design engineer, shall comply with the requirements of Technical Note 61 published by the Cement and Concrete Associations of Australia (TN 61. (1.6)).

10.5 Concrete Shrinkage Cracking

Surface cracking of concrete slabs is common (and expected) as the concrete cures. This cracking can continue for up to 18 months, and has no effect on the long-term structural integrity or performance of the slab.

The time of attachment of floor coverings and the selection of the adhesive for them should take into account the moisture in the concrete floor and its possible effect on adhesion. Concrete floors can take a considerable time to dry (three to nine months).

Floor coverings and their adhesives can be damaged by moisture in the concrete and by the shrinkage that occurs as the concrete dries. The time of fixing of floor coverings and the selection of the adhesive should take these factors into account.

10.6 Long Term Foundation Maintenance

Homeowners should be made aware of their responsibilities regarding the ongoing maintenance of the building and site. Guidance to the Homeowner is available in a document published by the CSIRO: Building Technology File 18 (formerly known as Information Sheet 10-91), entitled: Foundation Maintenance and Footing Performance: A Homeowner's Guide. This document may be obtained from CSIRO Publishing (www.publish.csiro.au). It is suggested that a copy be given to the new Homeowner by the builder. Site maintenance after occupation, becomes part of the owner's accepted responsibilities.

The appropriate site drainage, paving, landscaping and foundation maintenance should be implemented as soon as possible after completion of construction of the building.

11. CONDITIONS AND LIMITATIONS

This report has been exclusively prepared for the benefit of our client, and it may not be relied upon for any other purpose without the prior written consent of RCCE.

No responsibility for this report will be taken by RCCE if it is altered in any way, or not reproduced in full.

The client has a responsibility to investigate the previous land use of the site, that may be relevant to the condition of the soil profile or proposed building works (e.g. previous buildings, locations of filled excavations, grubbed out large trees, etc.). If at a later time it is found that the information previously provided to RCCE was incorrect, incomplete and/or if at any time the soil conditions are found to differ from those reported, RCCE should be contacted immediately for further site assessment.

This report is based on the conditions of the site at the time of testing. In subsurface investigations, the soil profiles encountered may differ significantly between test points and sample intervals and at locations other than where observations, explorations or investigations have been carried out. Whilst the utmost application of professional observation, knowledge and experience is taken to foresee possible variations in the soil profile across the site, it is not possible that these are comprehensive, particularly in the determination of the depth of fill across the site. This applies especially in the presence of undetected filled excavations or natural depressions (filled swimming pools, drainage ditches, dams, creek channels, grubbed-out trees etc.). Therefore, if it is found during construction that for any reason the soil profile differs considerably to that described in this report, RCCE must be contacted immediately for further site investigation and/or amendment of the report. Thus any conclusions drawn in this report have some level of uncertainty because of the inherent variations that can exist at any site. RCCE accepts no responsibility and shall not be liable for any consequence of changed or unanticipated surface or subsurface conditions.

The recommendations in this report are valid for a maximum period of twelve (12) months, provided that the site conditions do not change significantly prior to construction. In accordance with AS2870-2011 Clause 2.5.2, the recommendations may become invalid if additional controlled or uncontrolled filling is placed, or if the site is cut by more than 500mm. Other changes to the site which may render this report invalid include, but are not limited to; changes to the design and/or construction methods proposed, planting of trees on the subject site or neighbouring properties, abnormal weather conditions, or failure of plumbing or drainage on or adjacent to the subject site.

If fees for this and any associated documentation are not paid in full, RCCE reserves the right to disclaim any documentation relevant to this project in its entirety. This report will remain the property of RCCE and may be withdrawn unless payment is received.

Soil and drilling depths are given to a tolerance of +/- 100mm.

Should the subsurface conditions encountered during construction vary from those described in this report, RCCE must be advised of these variations to provide comment or inspect the site as necessary. The use of standard footings as presented in AS2870-2011 is only applicable to building with loadings and a construction style similar to that of a residential dwelling as described in section 3.1 of AS2870-2011.

This report is not a detailed geotechnical investigation. It complies with the requirements of AS2870-2011 and is limited to the items required under Clause 2.2.2(a).

The presence of variable filling should be expected, due to backfill from tree removal, removal of footings from previous structures, service trenches, etc.. Deeper founding depths and/or suspended slab panels may be required.

This report has been issued as final, despite the existing structures which are to be demolished. It is recommended that an additional site investigation be undertaken post-demolition, to assess the extent of soil disturbance due to demolition works (unless supported on piles). This should occur once the existing structures have been demolished and the site has been cleared.



Andre Merheb
B.Eng (Honours), MIEAust
admin@rcce.com.au
9468 5232

For and on behalf of





12. BAL ASSESSMENT REPORT

The Bushfire Attack Level (BAL) for this site has been calculated based on the house siting details provided. Should the house siting be modified, an updated BAL assessment may be required.

Step 1. Determine Relevant Fire Danger Index (FDI).

Victorian Alpine Areas	50
Victorian General (excluding alpine areas)	100

Step 2. Vegetation Classification.

	North	South	East	West
Vegetation Type	Forest	Forest	Forest	Forest
	Woodland	Woodland	Woodland	Woodland
	Shrubland	Shrubland	Shrubland	Shrubland
	Scrub	Scrub	Scrub	Scrub
	Mallee/Mulga	Mallee/Mulga	Mallee/Mulga	Mallee/Mulga
	Rainforest	Rainforest	Rainforest	Rainforest
	Grassland	Grassland	Grassland	Grassland
	Excludable	Excludable	Excludable	Excludable

Step 3. Distance to Classified Vegetation.

	North	South	East	West
Distance from the property boundary to vegetation	>100m	>100m	>100m	>100m

Step 4. Effective Slope of Land Under Classified Vegetation.

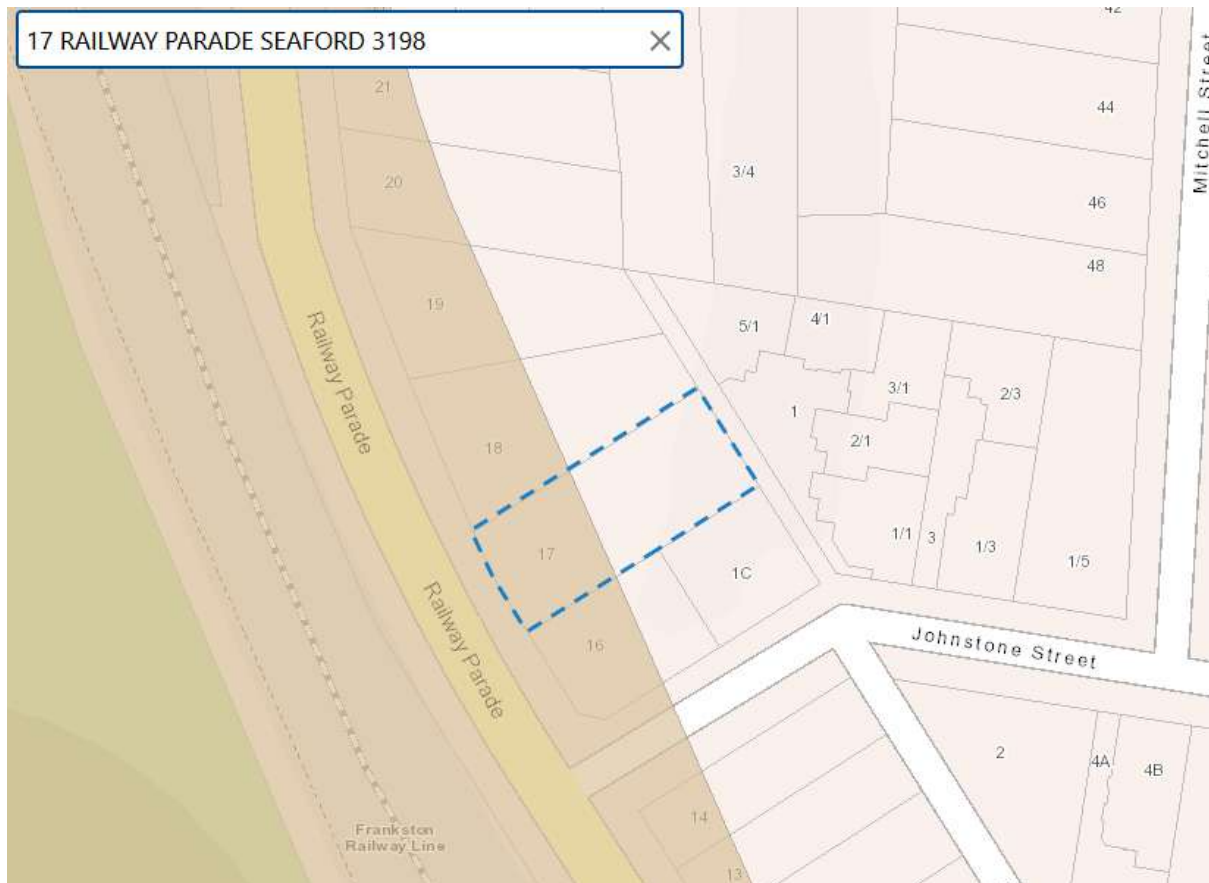
	North	South	East	West
Flat/Upslope	Yes	Yes	Yes	Yes
Downslope	>0-5°	>0-5°	>0-5°	>0-5°
	>5-10°	>5-10°	>5-10°	>5-10°
	>10-15°	>10-15°	>10-15°	>10-15°
	>15-20°	>15-20°	>15-20°	>15-20°

Step 5. Determination of Bushfire Attack Level (BAL).

Using the inputs from Step 2, 3 & 4 the corresponding BAL can be determined.

BAL: **LOW**

Comments/Notes: If you are in a designated BPA and your bushfire attack level is BAL LOW, you must still construct to a minimum BAL 12.5.



13. BOREHOLE LOCATION PLAN



14. ENGINEERING LOGS

Borehole 1					
Depth (mm)	Texture / Density	Soil Description	Moisture	Allowable Bearing at up to 100mm embedment (kPa)	Notes
0					
200	Poorly Compacted	Fill ; silt and sand containing gravel	moist	0	Drilling Method: Mechanical Auger. No groundwater encountered.
3000	Loose to Medium Dense	Silty SAND ; brown, grey	moist	100	
		Terminated			

Borehole 2					
Depth (mm)	Texture / Density	Soil Description	Moisture	Allowable Bearing at up to 100mm embedment (kPa)	Notes
0					
300	Poorly Compacted	Fill ; silt and sand containing gravel	moist	0	Drilling Method: Hand Auger. No groundwater encountered.
1200	Loose to Medium Dense	Silty SAND ; brown, grey	moist	100	
		Terminated			



Frankston City Council

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ABN: 49 454 768 065

Application Number 156/2024/LP
Enquiries Michelle Thompson
Telephone 1300 322 322
Customer Reference

22 May 2024

Creative House Plans
48 Bona Vista Rise
CLYDE NORTH VIC 3978

Application No 156/2024/LP
Address 17 Railway Parade, Seaford
Lot/Plan Lot 1 LP 47803

As requested, please find attached the **location of your stormwater discharge point which is to be constructed via outfall drain and to be connect to existing pit within the laneway as per the Approved drainage plans dated 28 October 2021, Project No. 2014OM, Sheet No's C01-05, Revision 02 & 03.**

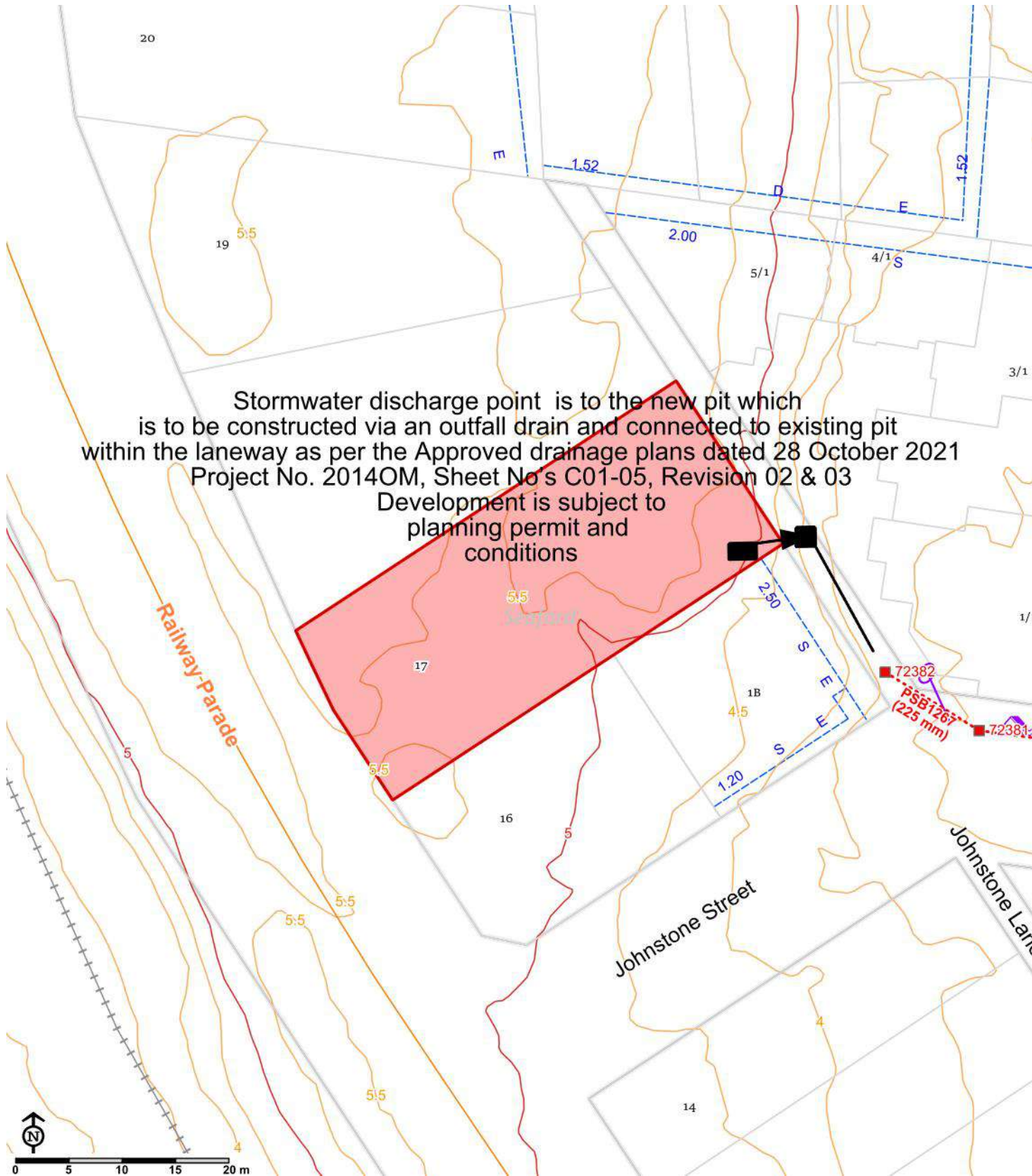
Council provides stormwater point of discharge to accommodate a single dwelling with of no more than 40% site coverage. It is advised that development of this site with a greater site coverage than 40% will require the provision of a Stormwater Detention System with a volume capable of retarding the 10-year ARI flow from the development site back to a 5-year ARI pre-development value. Water Sensitive Urban Design principles (WSUD) can be incorporated into the drainage design to reduce the site outflow to the required 5-year ARI pre-development value.

Where a site is subject to a Planning Permit for development, the discharge location may be subject to alteration. All Planning Permit conditions must be complied with to the satisfaction of the Engineering Services Manager

If you have further questions, please contact Michelle Thompson from the Engineering Services department on 1300 322 322

Kind regards,

Michelle Thompson
TECHNICAL SUPPORT OFFICER
ENGINEERING SERVICES



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Projection: # GDA94 / MGA zone 55

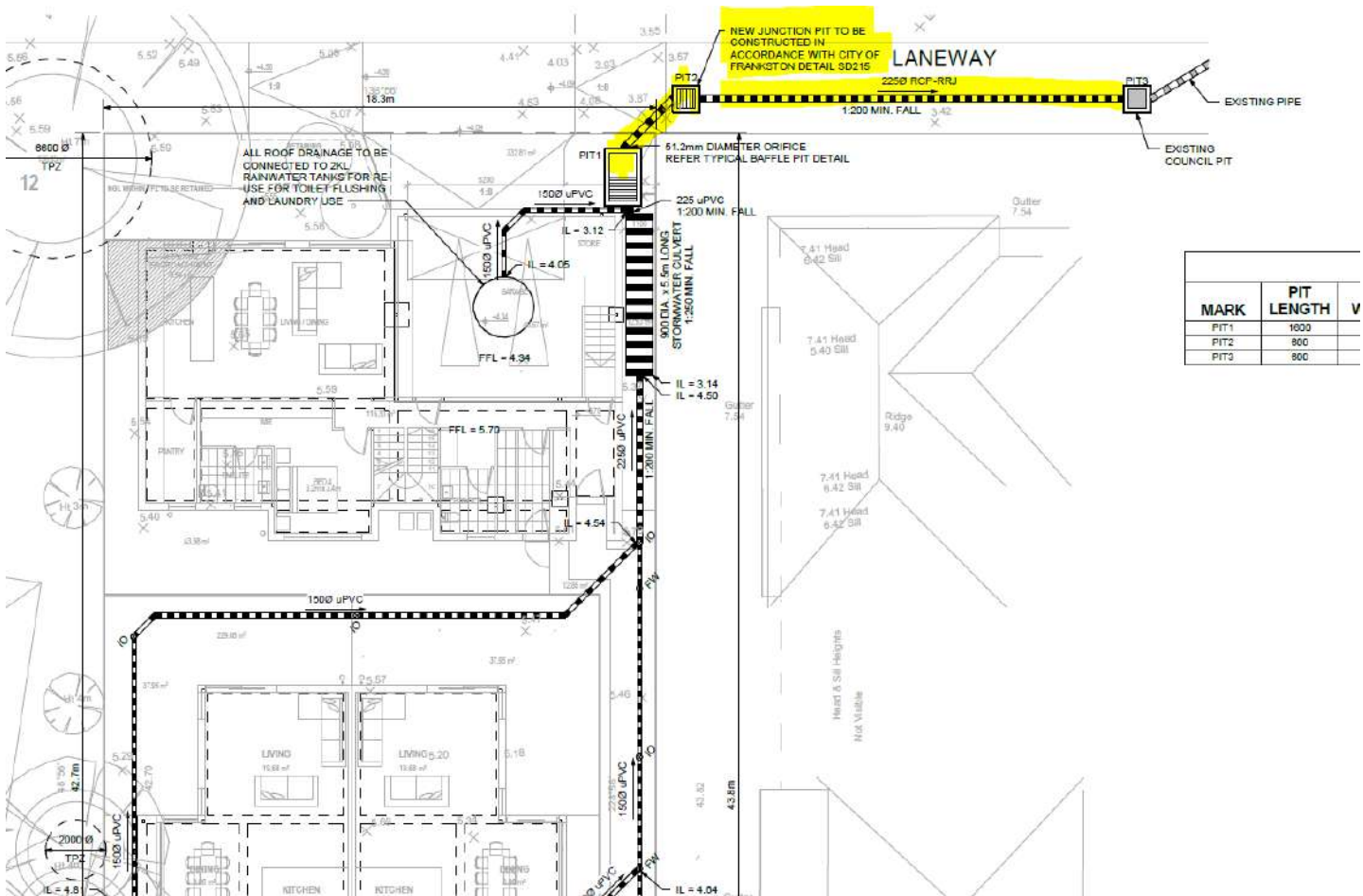
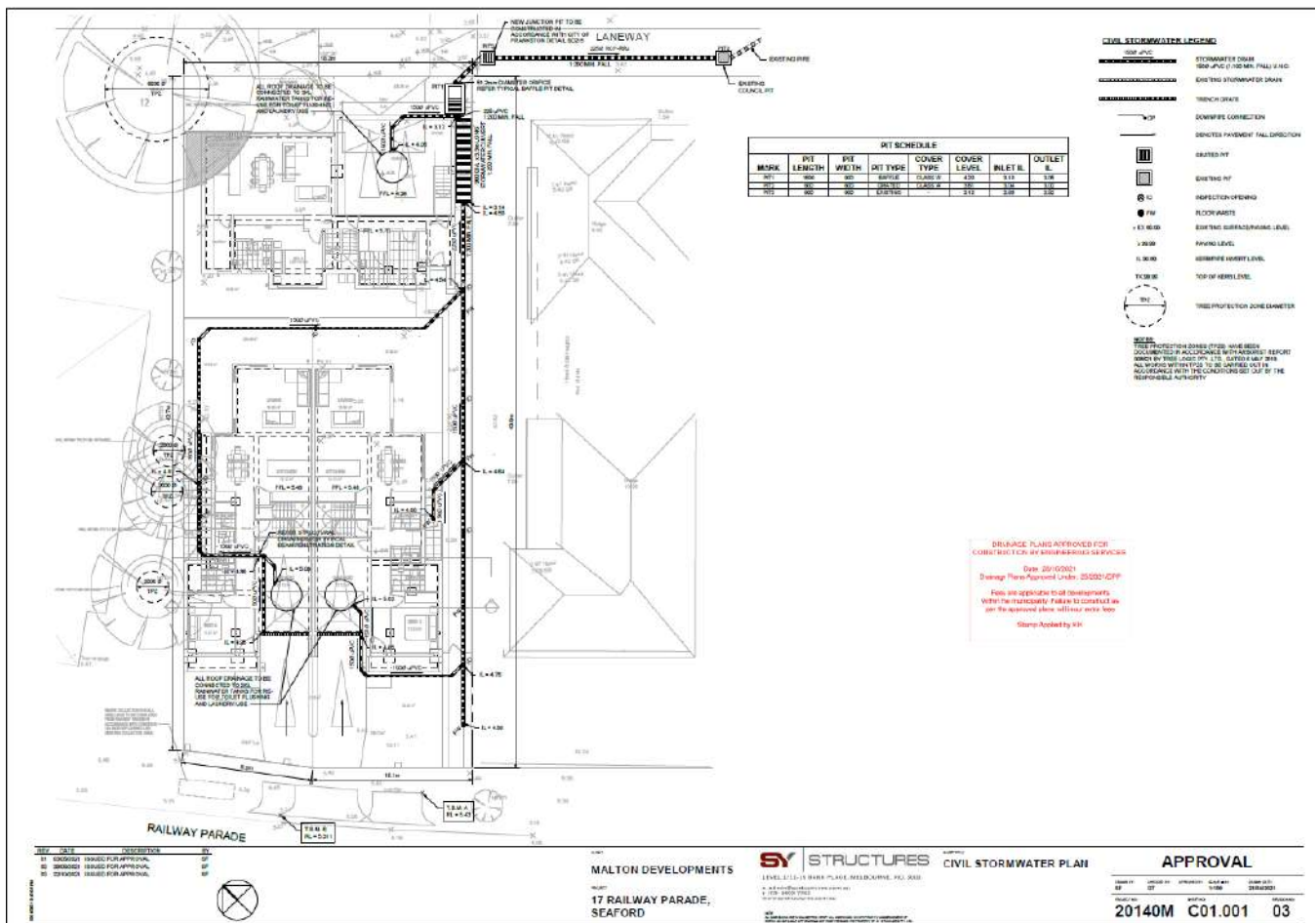
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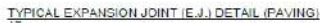
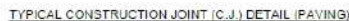
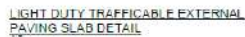
Date Printed: 22/05/2024

Time Printed: 12:51 PM

Issued by: Michelle Thompson



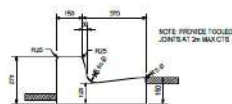




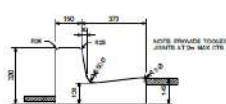
Stamp Applied by K-H

CIVIL TYPICAL CONCRETE PAVING SLAB DETAILS

APPROVAL				
APPROVED BY	DATE	APPROVED BY	DATE	APPROVED BY
GP	01	GP	01	GP
20140M	C02.200	02		



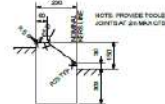
TYPICAL KERB AND GUTTER (KG)
1-10



TYPICAL BARRIER KERB AND GUTTER (BK)
1-10



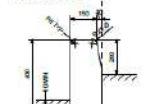
TYPICAL MODIFIED LAYBACK KERB (MLBK)
DETAIL
1-10



TYPICAL MOUNTABLE KERB (MK) DETAIL
1-10



TYPICAL KERB ONLY (KO)
1-10



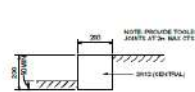
TYPICAL BARRIER KERB (BK)
1-10



TYPICAL MOUNTABLE KERB AND GUTTER
KERB (MKG) DETAIL
1-10



TYPICAL ROAD PAVING TO KERB AND
GUTTER DETAIL
1-10



TYPICAL EDGE STRIP (ES)
1-10



TYPICAL OPEN CONCRETE INVERT (CI)
1-10

DRAINAGE PLANS APPROVED FOR
 CONSTRUCTION BY ENGINEERING
 SERVICES
 Date: 25/04/2021
 Drainage Plans Approved Under: 15/02/2019
 These are applicable to all developments
 within the municipality. Failure to construct in
 accordance with the approved plans will incur a fine.
 Stamp Approved by RH

REV	DATE	DESCRIPTION	BY
01	25/04/2021	ISSUED FOR APPROVAL	SP
02	25/04/2021	ISSUED FOR APPROVAL	SP

CLIENT
MALTON DEVELOPMENTS
 PROJECT
 17 RAILWAY PARADE,
 SEAFORD

SY STRUCTURES
 1. CIVIL 17/18/19 ROAD PLANS (MILK, KERB, MK, MKG)
 2. CIVIL 17/18/19 ROAD PLANS (MILK, KERB, MK, MKG)
 3. CIVIL 17/18/19 ROAD PLANS (MILK, KERB, MK, MKG)
 4. CIVIL 17/18/19 ROAD PLANS (MILK, KERB, MK, MKG)
 5. CIVIL 17/18/19 ROAD PLANS (MILK, KERB, MK, MKG)
 6. CIVIL 17/18/19 ROAD PLANS (MILK, KERB, MK, MKG)
 7. CIVIL 17/18/19 ROAD PLANS (MILK, KERB, MK, MKG)
 8. CIVIL 17/18/19 ROAD PLANS (MILK, KERB, MK, MKG)
 9. CIVIL 17/18/19 ROAD PLANS (MILK, KERB, MK, MKG)
 10. CIVIL 17/18/19 ROAD PLANS (MILK, KERB, MK, MKG)

CIVIL TYPICAL KERB
 DETAILS

APPROVAL

DESIGNER	CHECKED	APPROVED BY	SCALE	DATE
SP	SP	SP	1:10	25/04/2021
20140M	C02.400	02		

Nationwide House Energy Rating Scheme

NatHERS Certificate No. MTXXW74WIY

Generated on 29 May 2024 using FirstRate5: 5.3.2b (3.21)

Property

Address 1, 17 Railway Parade, Seaford, VIC, 3198
Lot/DP Lot 1
NCC Class* Class 1a
Type New Home

Plans

Main plan 23-24/1S/29.05.24
Prepared by Creative House Plans

Construction and environment

Assessed floor area (m²)*		Exposure type
Conditioned*	142.4	suburban
Unconditioned*	29.7	NatHERS climate zone
Total	172.1	62 Moorabbin Airport
Garage	21	



Accredited assessor

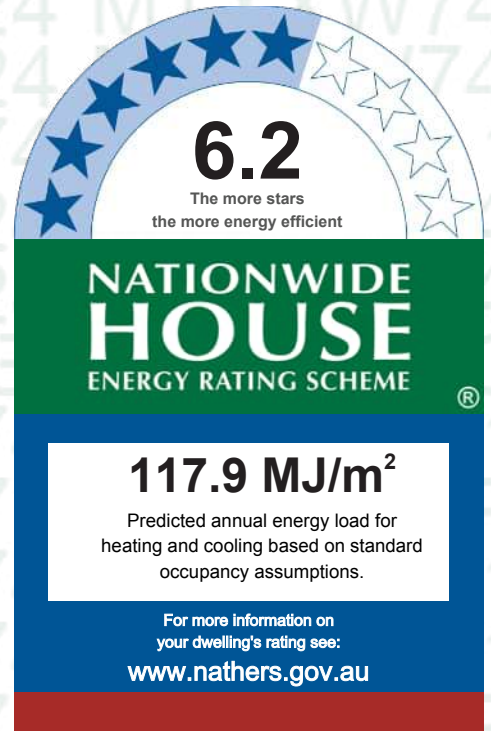
Name Amy Gedge
Business name Arrow Energy Ratings
Email amy@arrowenergyratings.com.au
Phone 0412808258
Accreditation No. DMN/21/2022
Assessor Accrediting Organisation
Design Matters National
Declaration of interest Declaration completed: no conflicts

National Construction Code (NCC) requirements

The NCC's requirements for NatHERS-rated houses are detailed in 3.12.0(a)(i) and 3.12.5 of the NCC Volume Two. For apartments the requirements are detailed in J0.2 and J5 to J8 of the NCC Volume One.

In NCC 2019, these requirements include minimum star ratings and separate heating and cooling load limits that need to be met by buildings and apartments through the NatHERS assessment. Requirements additional to the NatHERS assessment that must also be satisfied include, but are not limited to: insulation installation methods, thermal breaks, building sealing, water heating and pumping, and artificial lighting requirements. The NCC and NatHERS Heating and Cooling Load Limits (Australian Building Codes Board Standard) are available at www.abcb.gov.au.

State and territory variations and additions to the NCC may also apply.



Thermal performance

Heating	Cooling
98.8	19.1
MJ/m²	MJ/m²

About the rating

NatHERS software models the expected thermal energy loads using information about the design and construction, climate and common patterns of household use. The software does not take into account appliances, apart from the airflow impacts from ceiling fans.

Verification

To verify this certificate, scan the QR code or visit <https://www.fr5.com.au/QRCodeLanding?PublicId=MTXXW74WIY> When using either link, ensure you are visiting www.FR5.com.au.





Certificate Check

Ensure the dwelling is designed and then built as per the NatHERS Certificate. While you need to check the accuracy of the whole Certificate, the following spot check covers some important items impacting the dwelling’s rating.

Genuine certificate

Does this Certificate match the one available at the web address or QR code in the verification box on the front page?
Does the set of NatHERS-stamped plans for the dwelling have a Certificate number on the stamp that matches this Certificate?

Ceiling penetrations*

Does the ‘number’ and ‘type’ of ceiling penetrations (e.g. downlights, exhaust fans, etc) shown on the stamped plans or installed, match what is shown in this Certificate?

Windows

Does the installed window meet the substitution tolerances (SHGC and U-value) and window type, of the window shown on this Certificate? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

Apartment entrance doors

Does the ‘External Door Schedule’ show apartment entrance doors? Please note that an “external door” between the modelled dwelling and a shared space, such as an enclosed corridor or foyer, should not be included in the assessment (because it overstates the possible ventilation) and would invalidate the Certificate.

Exposure*

Has the appropriate exposure level (terrain) been applied? For example, it is unlikely that a ground-floor apartment is “exposed” or a top floor high-rise apartment is “protected”.

Provisional* values

Have provisional values been used in the assessment and, if so, noted in “additional notes” below?

Additional Notes

Window and glazed door *type and performance*

Default* windows

				Substitution tolerance ranges	
Window ID	Window description	Maximum U-value*	SHGC*	SHGC lower limit	SHGC upper limit
No Data Available					

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
ECO-109-01 A	Eco EcoTech Aluminium Sliding Door DG 4-12-4	3.76	0.62	0.59	0.65
ECO-101-01 A	Eco EcoTech Aluminium Awning Window DG 4-12-4	3.51	0.59	0.56	0.62
ECO-111-01 A	EcoEcoTech Standard Al Casement Window DG 4-12-4	3.69	0.53	0.5	0.56

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Kitchen/Living	ECO-109-01 A	Living Door	2400	2400	sliding	45.0	NE	No

* Refer to glossary.



Kitchen/Living	ECO-101-01 A	Living	2400	900	awning	60.0	NW	No
Kitchen/Living	ECO-101-01 A	Living	2400	900	awning	60.0	NW	No
Kitchen/Living	ECO-101-01 A	Opening 14	2400	900	awning	60.0	NE	No
Kitchen/Living	ECO-101-01 A	Meals	2400	2700	awning	20.0	NW	No
Bed 4	ECO-101-01 A	Bed 4	2400	2700	awning	20.0	SW	No
Laundry	ECO-111-01 A	Laundry Door	2340	820	casement	100.0	NW	No
Bed 1	ECO-101-01 A	Bed 1	1400	3000	awning	10.0	SW	No
Bed 1 WIR	ECO-101-01 A	Bed 1 WIR	1400	900	awning	90.0	NW	No
WC	ECO-101-01 A	WC	1200	900	awning	90.0	NW	No
Bath	ECO-101-01 A	Bath	1400	900	awning	90.0	NW	No
Bed 3	ECO-101-01 A	Bed 3	1400	2700	awning	10.0	NE	No
Bed 2	ECO-101-01 A	Bed 2	1400	2500	awning	10.0	NE	No

Roof window type and performance value

Default* roof windows

				Substitution tolerance ranges	
Window ID	Window description	Maximum U-value*	SHGC*	SHGC lower limit	SHGC upper limit
No Data Available					

Custom* roof windows

				Substitution tolerance ranges	
Window ID	Window description	Maximum U-value*	SHGC*	SHGC lower limit	SHGC upper limit
No Data Available					

Roof window schedule

Location	Window ID	Window no.	Opening %	Area (m²)	Orientation	Outdoor shade	Indoor shade
No Data Available							

Skylight type and performance

Skylight ID	Skylight description
No Data Available	

Skylight schedule

Location	Skylight ID	Skylight No.	Skylight shaft length (mm)	Area (m²)	Orient-ation	Outdoor shade	Diffuser	Skylight shaft reflectance
No Data Available								

External door schedule

Location	Height (mm)	Width (mm)	Opening %	Orientation
Entry	2340	1020	100.0	SW
Garage	2400	2735	100.0	SW

* Refer to glossary.

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	1 - Linear Weather Boards FC	0.5	Medium	Glass fibre batt: R2.0 (R2.0)	No
2	1 - Brick Veneer	0.5	Medium	Glass fibre batt: R2.0 (R2.0)	No
3	1 - Parti wall	0.5	Medium	Glass fibre batt: R2.0 (R2.0); Glass fibre batt: R2.0 (R2.0)	No
4	1 - Brick Veneer Garage	0.5	Medium		No
5	1 - Parti wall	0.5	Medium		No
6	FR5 - 75mm Expanded Polystyrene Clad	0.5	Medium	Glass fibre batt: R2.0 (R2.0)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Entry	1	2700	1285	SW	1175	Yes
Entry	2	2700	1170	SE	0	Yes
Entry	2	2700	175	NE	0	Yes
Entry	2	2700	110	SE	0	Yes
Stairs	3	2700	2100	SE	0	No
Kitchen/Living	3	2700	8400	SE	0	No
Kitchen/Living	2	2700	4715	NE	0	Yes
Kitchen/Living	2	2700	4320	NW	0	Yes
Kitchen/Living	2	2700	1355	NE	0	Yes
Kitchen/Living	2	2700	4080	NW	0	Yes
Bed 4	1	2700	2985	SW	1150	Yes
Bed 4	2	2700	3770	NW	0	Yes
Bed 4 Ensuite	2	2700	1745	NE	0	Yes
Bed 4 Ensuite	2	2700	1700	NW	0	Yes
Powder	2	2700	2010	NW	0	Yes
Laundry	2	2700	1680	NW	0	Yes
Garage	4	2786	3500	SW	800	Yes
Garage	5	2786	6000	SE	0	No
Stairs/Landing	3	2550	2100	SE	0	No
Bed 1	1	1750	3652	SW	550	Yes
Bed 1	6	800	3652	SW	550	Yes
Bed 1	3	2550	4290	SE	0	No
Bed 1 Ensuite	3	2550	1600	SE	0	No
Bed 1 WIR	1	1750	2308	SW	550	No
Bed 1 WIR	6	800	2308	SW	550	No
Bed 1 WIR	6	2550	672	NW	484	No

Bed 1 WIR	1	1750	4118	NW	550	No
Bed 1 WIR	6	800	4118	NW	550	No
WC	6	2550	950	NW	484	No
Bath	6	2550	2750	NW	484	No
Bed 3	6	2550	3008	NE	550	Yes
Bed 3	6	2550	3580	NW	484	No
Bed 2	3	2550	4080	SE	0	No
Bed 2	6	2550	2952	NE	550	Yes

Internal wall type

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	143	
2	1 - Internal Garage Wall	25.7	Glass fibre batt: R2.0 (R2.0)

Floor type

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Entry	FR5 - CSOG: Slab on Ground	8.8	Enclosed	R0.0	Carpet
Entry	FR5 - CSOG: Slab on Ground	1.6	Enclosed	R0.0	Carpet
Linen	FR5 - CSOG: Slab on Ground	0.6	Enclosed	R0.0	Carpet
Stairs	FR5 - CSOG: Slab on Ground	6.2	Enclosed	R0.0	Carpet
Kitchen/Living	FR5 - CSOG: Slab on Ground	10.6	Enclosed	R0.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	20.4	Enclosed	R0.0	Carpet
Kitchen/Living	FR5 - CSOG: Slab on Ground	14.8	Enclosed	R0.0	Carpet
Bed 4	FR5 - CSOG: Slab on Ground	3.1	Enclosed	R0.0	Carpet
Bed 4	FR5 - CSOG: Slab on Ground	8.2	Enclosed	R0.0	Carpet
Bed 4 Ensuite	FR5 - CSOG: Slab on Ground	3	Enclosed	R0.0	Tiles
Bed 4 Ensuite	FR5 - CSOG: Slab on Ground	2.1	Enclosed	R0.0	Tiles
Powder	FR5 - CSOG: Slab on Ground	2.5	Enclosed	R0.0	Tiles
Laundry	FR5 - CSOG: Slab on Ground	2.1	Enclosed	R0.0	Tiles
Garage	FR5 - CSOG: Slab on Ground	21	Enclosed	R0.0	none
Stairs/Landing	FR5 - Timber Lined	11.3	Enclosed	R0.0	Carpet
Bed 1	FR5 - Timber Lined	15.3	Enclosed	R2.0	Carpet
Bed 1	FR5 - Timber Lined	1.3	Enclosed	R0.0	Carpet
Bed 1 Ensuite	FR5 - Timber Lined	4.7	Enclosed	R2.0	Tiles
Bed 1 WIR	FR5 - Timber Lined	10.5	Enclosed	R0.0	Carpet
WC	FR5 - Timber Lined	1.7	Enclosed	R0.0	Tiles
Bath	FR5 - Timber Lined	5	Enclosed	R0.0	Tiles
Bed 3	FR5 - Timber Lined	10	Enclosed	R0.0	Carpet
Bed 2	FR5 - Timber Lined	12	Enclosed	R0.0	Carpet

Ceiling type

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
Entry	FR5 - Timber Lined	R0.0	No
Entry	Plasterboard	R3.5	Yes
Linen	FR5 - Timber Lined	R0.0	No
Stairs	FR5 - Timber Lined	R0.0	No
Kitchen/Living	FR5 - Timber Lined	R0.0	No
Kitchen/Living	Plasterboard	R3.5	Yes
Kitchen/Living	FR5 - Timber Lined	R0.0	No
Bed 4	FR5 - Timber Lined	R0.0	No
Bed 4	FR5 - Timber Lined	R0.0	No
Bed 4	Plasterboard	R3.5	Yes
Bed 4 Ensuite	FR5 - Timber Lined	R0.0	No
Bed 4 Ensuite	Plasterboard	R3.5	Yes
Bed 4 Ensuite	FR5 - Timber Lined	R0.0	No
Powder	FR5 - Timber Lined	R0.0	No
Laundry	FR5 - Timber Lined	R0.0	No
Garage	FR5 - Timber Lined	R0.0	No
Garage	FR5 - Timber Lined	R2.0	No
Stairs/Landing	Plasterboard	R3.5	Yes
Bed 1	Plasterboard	R3.5	Yes
Bed 1	Plasterboard	R3.5	Yes
Bed 1 Ensuite	Plasterboard	R3.5	Yes
Bed 1 WIR	Plasterboard	R3.5	Yes
WC	Plasterboard	R3.5	Yes
Bath	Plasterboard	R3.5	Yes
Bed 3	Plasterboard	R3.5	Yes
Bed 2	Plasterboard	R3.5	Yes

Ceiling penetrations*

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Entry	3	Downlights	75	Sealed
Kitchen/Living	10	Downlights	75	Sealed
Kitchen/Living	1	Exhaust Fans	200	Sealed
Bed 4	2	Downlights	75	Sealed
Bed 4 Ensuite	1	Downlights	75	Sealed
Bed 4 Ensuite	1	Exhaust Fans	250	Sealed
Powder	1	Downlights	75	Sealed
Powder	1	Exhaust Fans	250	Sealed
Laundry	1	Downlights	75	Sealed
Stairs/Landing	2	Downlights	75	Sealed
Bed 1	4	Downlights	75	Sealed



Bed 1 Ensuite	1	Downlights	75	Sealed
Bed 1 Ensuite	1	Exhaust Fans	250	Sealed
Bed 1 WIR	3	Downlights	75	Sealed
WC	1	Downlights	75	Sealed
WC	1	Exhaust Fans	250	Sealed
Bath	1	Downlights	75	Sealed
Bath	1	Exhaust Fans	250	Sealed
Bed 3	2	Downlights	75	Sealed
Bed 2	2	Downlights	75	Sealed

Ceiling fans

Location	Quantity	Diameter (mm)
No Data Available		

Roof type

Construction	Added insulation (R-value)	Solar absorptance	Roof shade
Framed:Flat - Flat Framed (Metal Deck)	0.0	0.6	Dark
Cont:Attic-Continuous	0.0	0.6	Dark



Explanatory Notes

About this report

A NatHERS rating is a comprehensive, dynamic computer modelling evaluation of a home, using the floorplans, elevations and specifications to estimate an energy load. It addresses the building layout, orientation and fabric (i.e. walls, windows, floors, roofs and ceilings), but does not cover the water or energy use of appliances or energy production of solar panels.

Ratings are based on a unique climate zone where the home is located and are generated using standard assumptions, including occupancy patterns and thermostat settings. The actual energy consumption of a home may vary significantly from the predicted energy load, as the assumptions used in the rating will not match actual usage patterns. For example, the number of occupants and personal heating or cooling preferences will vary.

While the figures are an indicative guide to energy use, they can be used as a reliable guide for comparing different dwelling designs and to demonstrate that the design meets the energy efficiency requirements in the National Construction Code. Homes that are energy efficient use less energy, are warmer on cool days, cooler on hot days and cost less to run. The higher the star rating the more thermally efficient the dwelling is.

Accredited assessors

To ensure the NatHERS Certificate is of a high quality, always use an accredited or licenced assessor. NatHERS accredited assessors are members of a professional body called an Assessor Accrediting Organisation (AAO).

Australian Capital Territory (ACT) licensed assessors may only produce assessments for regulatory purposes using software for which they have a licence endorsement. Licence endorsements can be confirmed on the ACT licensing register

AAOs have specific quality assurance processes in place, and continuing professional development requirements, to maintain a high and consistent standard of assessments across the country. Non-accredited assessors do not have this level of quality assurance or any ongoing training requirements.

Any questions or concerns about this report should be directed to the assessor in the first instance. If the assessor is unable to address these questions or concerns, the AAO specified on the front of this certificate should be contacted.

Disclaimer

The format of the NatHERS Certificate was developed by the NatHERSAdministrator. However the content of each individual certificate is entered and created by the assessor to create a NatHERS Certificate. It is the responsibility of the assessor who prepared this certificate to use NatHERS accredited software correctly and follow the NatHERS Technical Notes to produce a NatHERS Certificate.

The predicted annual energy load in this NatHERS Certificate is an estimate based on an assessment of the building by the assessor. It is not a prediction of actual energy use, but may be used to compare how other buildings are likely to perform when used in a similar way. Information presented in this report relies on a range of standard assumptions (both embedded in NatHERS accredited software and made by the assessor who prepared this report), including assumptions about occupancy, indoor air temperature and local climate.

Not all assumptions that may have been made by the assessor while using the NatHERS accredited software tool are presented in this report and further details or data files may be available from the assessor.

Glossary

Annual energy load	the predicted amount of energy required for heating and cooling, based on standard occupancy assumptions.
Assessed floor area	the floor area modelled in the software for the purpose of the NatHERS assessment. Note, this may not be consistent with the floor area in the design documents.
Ceiling penetrations	features that require a penetration to the ceiling, including downlights, vents, exhaust fans, rangehoods, chimneys and flues. Excludes fixtures attached to the ceiling with small holes through the ceiling for wiring, e.g. ceiling fans; pendant lights, and heating and cooling ducts.
Conditioned	a zone within a dwelling that is expected to require heating and cooling based on standard occupancy assumptions. In some circumstances it will include garages.
Custom windows	windows listed in NatHERS software that are available on the market in Australia and have a WERS (Window Energy Rating Scheme) rating.
Default windows	windows that are representative of a specific type of window product and whose properties have been derived by statistical methods.
Entrance door	these signify ventilation benefits in the modelling software and must not be modelled as a door when opening to a minimally ventilated corridor in a Class 2 building.
Exposure category - exposed	terrain with no obstructions e.g. flat grazing land, ocean-frontage, desert, exposed high-rise unit (usually above 10 floors).
Exposure category - open	terrain with few obstructions at a similar height e.g. grasslands with few well scattered obstructions below 10m, farmland with scattered sheds, lightly vegetated bush blocks, elevated units (e.g. above 3 floors).
Exposure category - suburban	terrain with numerous, closely spaced obstructions below 10m e.g. suburban housing, heavily vegetated bushland areas.
Exposure category - protected	terrain with numerous, closely spaced obstructions over 10 m e.g. city and industrial areas.
Horizontal shading feature	provides shading to the building in the horizontal plane, e.g. eaves, verandahs, pergolas, carports, or overhangs or balconies from upper levels.

* Refer to glossary.

National Construction Code (NCC) Class	the NCC groups buildings by their function and use, and assigns a classification code. NatHERS software models NCC Class 1, 2 or 4 buildings and attached Class 10a buildings. Definitions can be found at www.abcb.gov.au .
Opening Percentage	the openability percentage or operable (moveable) area of doors or windows that is used in ventilation calculations.
Provisional value	an assumed value that does not represent an actual value. For example, if the wall colour is unspecified in the documentation, a provisional value of 'medium' must be modelled. Acceptable provisional values are outlined in the NatHERS Technical Note and can be found at www.nathers.gov.au
Reflective wrap (also known as foil)	can be applied to walls, roofs and ceilings. When combined with an appropriate airgap and emissivity value, it provides insulative properties.
Roof window	for NatHERS this is typically an operable window (i.e. can be opened), will have a plaster or similar light well if there is an attic space, and generally does not have a diffuser.
Shading device	a device fixed to windows that provides shading e.g. window awnings or screens but excludes eaves.
Shading features	includes neighbouring buildings, fences, and wing walls, but excludes eaves.
Solar heat gain coefficient (SHGC)	the fraction of incident solar radiation admitted through a window, both directly transmitted as well as absorbed and subsequently released inward. SHGC is expressed as a number between 0 and 1. The lower a window's SHGC, the less solar heat it transmits.
Skylight (also known as roof lights)	for NatHERS this is typically a moulded unit with flexible reflective tubing (light well) and a diffuser at ceiling level.
U-value	the rate of heat transfer through a window. The lower the U-value, the better the insulating ability.
Unconditioned	a zone within a dwelling that is assumed to not require heating and cooling based on standard occupancy assumptions.
Vertical shading features	provides shading to the building in the vertical plane and can be parallel or perpendicular to the subject wall/window. Includes privacy screens, other walls in the building (wing walls), fences, other buildings, vegetation (protected or listed heritage trees).

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	Bekim & Fatime Qaniu
Rated Address	17 Railway Parade Seaford
Accredited Rater	Amy Gedge
Date	29/05/2024
Reference	0017RAIL-1

Energy Usage

Type	Energy MJ/m²
Total	117.9
Heating	98.8
Cooling	19.1

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	142.4
Unconditioned Room Area	29.7
Garage Area	21.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Entry	10.5	dayTime	Y
Linen	0.6	dayTime	Y
Stairs	6.2	dayTime	Y
Kitchen/Living	45.8	kitchen	Y
Bed 4	11.3	bedroom	Y
Bed 4 Ensuite	5.1	nightTime	Y
Powder	2.5	dayTime	Y
Laundry	2.1	unconditioned	N
Garage	21.0	garage	N
Stairs/Landing	11.3	dayTime	Y
Bed 1	16.5	bedroom	Y

Bed 1 Ensuite	4.7	nightTime	Y
Bed 1 WIR	10.5	nightTime	Y
WC	1.7	unconditioned	N
Bath	5.0	unconditioned	N
Bed 3	10.0	bedroom	Y
Bed 2	12.0	bedroom	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Linear Weather Boards FC	2.0	0	29.2
Brick Veneer	2.0	0	72.4
Internal Plasterboard Stud Wall	0.0	0	143.3
Parti wall	4.0	0	59.1
Brick Veneer Garage	0.0	0	9.8
Parti wall	0.0	0	16.7
Internal Garage Wall	2.0	0	25.7
75mm Expanded Polystyrene Clad	3.9	0	43.5

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
CSOG: Slab on Ground	0.0	0.0	encl	105.0
Timber Lined	0.0	0.0	encl	51.8
Timber Lined	2.0	0.0	encl	20.0

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Ceil: Ceiling	0.0	0.0	71.9
Framed:Flat - Flat Framed (Metal Deck)	3.5	0.0	33.1
Cont:Attic-Continuous	3.5	0.0	71.8

Windows

Type	U-Value	SHGC	Area (m²)
ECO-109-01 A Eco EcoTech Aluminium Sliding Door DG 4-12-4	3.76	0.62	5.76
ECO-101-01 A Eco EcoTech Aluminium Awning Window DG 4-12-4	3.51	0.59	34.52
ECO-111-01 A EcoEcoTech Standard Al Casement Window DG 4-12-4	3.69	0.53	1.92

Window Directions

Direction	Area (m²)
NE	15.2
NW	16.3
SW	10.7

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	6	0
Downlight	34	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Powder (Z012)	445.0	1109.0	4.1	10.2
Bed 1 WIR (Z004)	86.1	905.1	14.5	152.5
Bed 1 (Z003)	62.7	1035.3	17.3	285.6
Bed 4 (Z014)	106.3	1195.8	18.4	207.0
Linen (Z009)	129.7	81.1	0.3	0.2
Bed 2 (Z017)	26.2	315.4	24.6	296.8
Kitchen/Living (Z010)	96.4	4413.6	34.7	1588.7
Bed 3 (Z016)	64.5	647.5	19.3	193.3
Stairs (Z008)	135.6	845.7	0.2	1.4
Bed 4 Ensuite (Z013)	55.5	281.7	0.8	4.2
Entry (Z001)	240.4	2514.8	6.8	71.0
Bed 1 Ensuite (Z018)	33.0	155.9	3.8	17.9
Stairs/Landing (Z002)	141.7	1599.0	8.2	92.2

Nationwide House Energy Rating Scheme

NatHERS Certificate No. 57TLGUTDXK

Generated on 29 May 2024 using FirstRate5: 5.3.2b (3.21)

Property

Address 2, 17 Railway Parade, Seaford, VIC, 3198
Lot/DP Lot 1
NCC Class* Class 1a
Type New Home

Plans

Main plan 23-24/1S/29.05.24
Prepared by Creative House Plans

Construction and environment

Assessed floor area (m²)*		Exposure type
Conditioned*	135.5	suburban
Unconditioned*	30.9	NatHERS climate zone
Total	166.4	62 Moorabbin Airport
Garage	21	



Accredited assessor

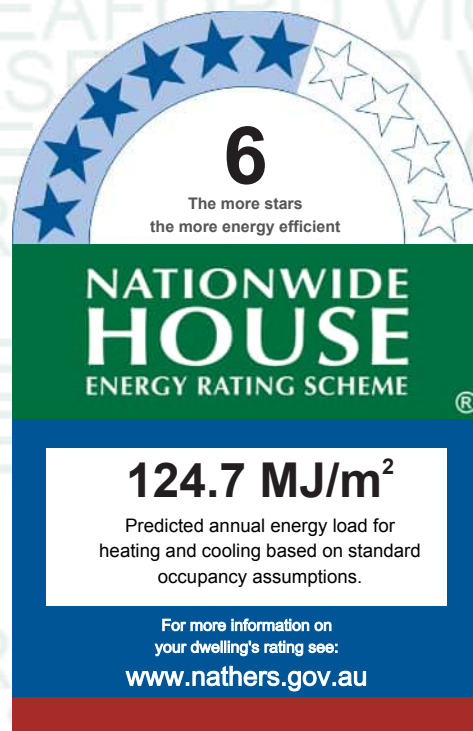
Name Amy Gedge
Business name Arrow Energy Ratings
Email amy@arrowenergyratings.com.au
Phone 0412808258
Accreditation No. DMN/21/2022
Assessor Accrediting Organisation
Design Matters National
Declaration of interest Declaration completed: no conflicts

National Construction Code (NCC) requirements

The NCC's requirements for NatHERS-rated houses are detailed in 3.12.0(a)(i) and 3.12.5 of the NCC Volume Two. For apartments the requirements are detailed in J0.2 and J5 to J8 of the NCC Volume One.

In NCC 2019, these requirements include minimum star ratings and separate heating and cooling load limits that need to be met by buildings and apartments through the NatHERS assessment. Requirements additional to the NatHERS assessment that must also be satisfied include, but are not limited to: insulation installation methods, thermal breaks, building sealing, water heating and pumping, and artificial lighting requirements. The NCC and NatHERS Heating and Cooling Load Limits (Australian Building Codes Board Standard) are available at www.abcb.gov.au.

State and territory variations and additions to the NCC may also apply.



Thermal performance

Heating	Cooling
108.5	16.2
MJ/m²	MJ/m²

About the rating

NatHERS software models the expected thermal energy loads using information about the design and construction, climate and common patterns of household use. The software does not take into account appliances, apart from the airflow impacts from ceiling fans.

Verification

To verify this certificate, scan the QR code or visit <https://www.fr5.com.au/QRCodeLanding?PublicId=57TLGUTDXK> When using either link, ensure you are visiting www.FR5.com.au.





Certificate Check

Ensure the dwelling is designed and then built as per the NatHERS Certificate. While you need to check the accuracy of the whole Certificate, the following spot check covers some important items impacting the dwelling’s rating.

Genuine certificate

Does this Certificate match the one available at the web address or QR code in the verification box on the front page?
Does the set of NatHERS-stamped plans for the dwelling have a Certificate number on the stamp that matches this Certificate?

Ceiling penetrations*

Does the ‘number’ and ‘type’ of ceiling penetrations (e.g. downlights, exhaust fans, etc) shown on the stamped plans or installed, match what is shown in this Certificate?

Windows

Does the installed window meet the substitution tolerances (SHGC and U-value) and window type, of the window shown on this Certificate? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

Apartment entrance doors

Does the ‘External Door Schedule’ show apartment entrance doors? Please note that an “external door” between the modelled dwelling and a shared space, such as an enclosed corridor or foyer, should not be included in the assessment (because it overstates the possible ventilation) and would invalidate the Certificate.

Exposure*

Has the appropriate exposure level (terrain) been applied? For example, it is unlikely that a ground-floor apartment is “exposed” or a top floor high-rise apartment is “protected”.

Provisional* values

Have provisional values been used in the assessment and, if so, noted in “additional notes” below?

Additional Notes

Note: Custom windows have been used as one window type - worst case scenario.

The non-reflective wraps do not appear in the wall description but have been modelled in the energy calculation all the same as air gaps.

Insulate internal walls to garage R2.0.

External wall insulation excludes garage external walls.

Ceiling insulation excludes garage ceiling.

Window and glazed door *type and performance*

Default* windows

				Substitution tolerance ranges	
Window ID	Window description	Maximum U-value*	SHGC*	SHGC lower limit	SHGC upper limit
No Data Available					

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
ECO-101-01 A	Eco EcoTech Aluminium Awning Window DG 4-12-4	3.51	0.59	0.56	0.62
ECO-109-01 A	Eco EcoTech Aluminium Sliding Door DG 4-12-4	3.76	0.62	0.59	0.65



ECO-111-01 A	EcoEcoTech Standard Al Casement Window DG 4-12-4	3.69	0.53	0.5	0.56
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Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Kitchen/Living	ECO-101-01 A	Meals	2400	2700	awning	20.0	SE	No
Kitchen/Living	ECO-101-01 A	Opening 14	2400	900	awning	60.0	NE	No
Kitchen/Living	ECO-101-01 A	Living	2400	900	awning	60.0	SE	No
Kitchen/Living	ECO-101-01 A	Living	2400	900	awning	60.0	SE	No
Kitchen/Living	ECO-109-01 A	Living Door	2400	2400	sliding	45.0	NE	No
Bed 4	ECO-101-01 A	Bed 4	2400	2700	awning	20.0	SW	No
Laundry	ECO-111-01 A	Laundry Door	2340	820	casement	100.0	SE	No
Bed 1	ECO-101-01 A	Bed 1	1400	3500	awning	10.0	SW	No
Bed 1 WIR	ECO-101-01 A	Bed 1 WIR	1400	900	awning	90.0	SE	No
WC	ECO-101-01 A	Bed 1 Ensuite	1400	900	awning	90.0	NE	No
Bed 2	ECO-101-01 A	Bed 2	1400	2700	awning	10.0	NE	No

Roof window *type and performance value*

Default* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
No Data Available					

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
No Data Available					

Roof window *schedule*

Location	Window ID	Window no.	Opening %	Area (m²)	Orientation	Outdoor shade	Indoor shade
No Data Available							

Skylight *type and performance*

Skylight ID	Skylight description
No Data Available	

Skylight *schedule*

Location	Skylight ID	Skylight No.	Skylight shaft length (mm)	Area (m²)	Orient-ation	Outdoor shade	Diffuser	Skylight shaft reflectance
No Data Available								

* Refer to glossary.



External door *schedule*

Location	Height (mm)	Width (mm)	Opening %	Orientation
Entry	2340	1020	100.0	SW
Garage	2400	2735	100.0	SW

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	1 - Brick Veneer	0.5	Medium	Glass fibre batt: R2.5 (R2.5)	No
2	1 - Brick Veneer	0.5	Medium	Glass fibre batt: R2.0 (R2.0)	No
3	1 - Linear Weather Boards FC	0.5	Medium	Glass fibre batt: R2.0 (R2.0)	No
4	1 - Parti wall	0.5	Medium	Glass fibre batt: R2.0 (R2.0);Glass fibre batt: R2.0 (R2.0)	No
5	1 - Parti wall	0.5	Medium		No
6	1 - Brick Veneer Garage	0.5	Medium		No
7	FR5 - 75mm Expanded Polystyrene Clad	0.5	Medium	Glass fibre batt: R2.0 (R2.0)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Entry	1	2400	895	SE	0	Yes
Entry	2	2700	110	NW	0	Yes
Entry	2	2700	175	NE	0	Yes
Entry	2	2700	1170	NW	0	Yes
Entry	3	2700	1285	SW	1175	Yes
Stairs	4	2700	2100	NW	0	No
Kitchen/Living	2	2700	4080	SE	0	Yes
Kitchen/Living	2	2700	2002	NE	0	Yes
Kitchen/Living	2	2700	4320	SE	0	Yes
Kitchen/Living	2	2700	4715	NE	0	Yes
Kitchen/Living	4	2700	8400	NW	0	No
Bed 4	2	2700	3770	SE	0	Yes
Bed 4	3	2700	2985	SW	1150	Yes
Bed 4 Ensuite	2	2700	1700	SE	0	Yes
Bed 4 Ensuite	2	2700	1085	NE	0	Yes
Powder	2	2700	1009	SE	0	Yes
Laundry	2	2700	1680	SE	0	Yes
Garage	5	2786	6000	NW	0	No
Garage	6	2786	3500	SW	800	Yes
Stairs/Landing	7	2550	2206	SE	565	Yes
Stairs/Landing	4	2550	2100	NW	0	No

* Refer to glossary.

Bed 1	4	2550	4290	NW	0	No
Bed 1	7	800	3652	SW	550	No
Bed 1	3	1750	4151	SW	550	Yes
Bath	4	2550	1600	NW	0	No
Bed 1 WIR	7	800	4118	NW	550	No
Bed 1 WIR	3	1750	1699	SE	550	No
Bed 1 WIR	7	2550	609	SE	516	No
Bed 1 WIR	7	800	2308	SW	550	No
Bed 1 WIR	3	1750	1868	SW	552	No
WC	7	2550	3598	SE	501	No
WC	7	2550	1863	NE	552	Yes
Bed 2	7	2550	3338	SE	553	Yes
Bed 2	7	2550	4153	NE	550	Yes
Bed 2	4	2550	3344	NW	0	No

Internal wall type

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	121.8	
2	1 - Internal Garage Wall	25.7	Glass fibre batt: R2.0 (R2.0)

Floor type

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Entry	FR5 - CSOG: Slab on Ground	2.2	Enclosed	R0.0	Carpet
Entry	FR5 - CSOG: Slab on Ground	8.4	Enclosed	R0.0	Carpet
Entry	FR5 - CSOG: Slab on Ground	1.6	Enclosed	R0.0	Carpet
Linen	FR5 - CSOG: Slab on Ground	0.6	Enclosed	R0.0	Carpet
Stairs	FR5 - CSOG: Slab on Ground	6.2	Enclosed	R0.0	Carpet
Kitchen/Living	FR5 - CSOG: Slab on Ground	10.6	Enclosed	R0.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	34	Enclosed	R0.0	Carpet
Kitchen/Living	FR5 - CSOG: Slab on Ground	3.8	Enclosed	R0.0	Carpet
Bed 4	FR5 - CSOG: Slab on Ground	3.2	Enclosed	R0.0	Carpet
Bed 4	FR5 - CSOG: Slab on Ground	8	Enclosed	R0.0	Carpet
Bed 4 Ensuite	FR5 - CSOG: Slab on Ground	2.9	Enclosed	R0.0	Tiles
Bed 4 Ensuite	FR5 - CSOG: Slab on Ground	2.2	Enclosed	R0.0	Tiles
Powder	FR5 - CSOG: Slab on Ground	1.3	Enclosed	R0.0	Tiles
Powder	FR5 - CSOG: Slab on Ground	0.6	Enclosed	R0.0	Tiles
Laundry	FR5 - CSOG: Slab on Ground	3.2	Enclosed	R0.0	Tiles
Garage	FR5 - CSOG: Slab on Ground	21	Enclosed	R0.0	none
Stairs/Landing	FR5 - Timber Lined	1.5	Enclosed	R2.0	Carpet
Stairs/Landing	FR5 - Timber Lined	10	Enclosed	R0.0	Carpet
Bed 1	FR5 - Timber Lined	15	Enclosed	R2.0	Carpet

Bed 1	FR5 - Timber Lined	2.8	Enclosed	R0.0	Carpet
Bath	FR5 - Timber Lined	3.9	Enclosed	R2.0	Tiles
Bed 1 WIR	FR5 - Timber Lined	4.3	Enclosed	R0.0	Carpet
WC	FR5 - Timber Lined	6.7	Enclosed	R0.0	Tiles
Bed 2	FR5 - Timber Lined	13.9	Enclosed	R0.0	Carpet

Ceiling type

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
Entry	FR5 - Timber Lined	R0.0	No
Entry	Plasterboard	R5.0	Yes
Entry	FR5 - Timber Lined	R0.0	No
Entry	FR5 - Timber Lined	R0.0	No
Entry	Plasterboard	R5.0	Yes
Linen	FR5 - Timber Lined	R0.0	No
Stairs	FR5 - Timber Lined	R0.0	No
Kitchen/Living	FR5 - Timber Lined	R0.0	No
Kitchen/Living	Plasterboard	R5.0	Yes
Kitchen/Living	FR5 - Timber Lined	R0.0	No
Bed 4	FR5 - Timber Lined	R0.0	No
Bed 4	FR5 - Timber Lined	R0.0	No
Bed 4	Plasterboard	R5.0	Yes
Bed 4 Ensuite	FR5 - Timber Lined	R0.0	No
Bed 4 Ensuite	Plasterboard	R5.0	Yes
Bed 4 Ensuite	FR5 - Timber Lined	R0.0	No
Powder	FR5 - Timber Lined	R0.0	No
Powder	Plasterboard	R5.0	Yes
Laundry	Plasterboard	R5.0	Yes
Garage	FR5 - Timber Lined	R2.0	No
Garage	FR5 - Timber Lined	R0.0	No
Stairs/Landing	Plasterboard	R5.0	Yes
Stairs/Landing	Plasterboard	R5.0	Yes
Bed 1	Plasterboard	R5.0	Yes
Bed 1	Plasterboard	R5.0	Yes
Bath	Plasterboard	R5.0	Yes
Bed 1 WIR	Plasterboard	R5.0	Yes
WC	Plasterboard	R5.0	Yes
Bed 2	Plasterboard	R5.0	Yes

Ceiling penetrations*

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Entry	4	Downlights	75	Sealed



Kitchen/Living	10	Downlights	75	Sealed
Kitchen/Living	1	Exhaust Fans	200	Sealed
Bed 4	2	Downlights	75	Sealed
Bed 4 Ensuite	1	Downlights	75	Sealed
Bed 4 Ensuite	1	Exhaust Fans	250	Sealed
Powder	1	Downlights	75	Sealed
Powder	1	Exhaust Fans	250	Sealed
Laundry	1	Downlights	75	Sealed
Stairs/Landing	3	Downlights	75	Sealed
Bed 1	4	Downlights	75	Sealed
Bath	1	Downlights	75	Sealed
Bath	1	Exhaust Fans	250	Sealed
Bed 1 WIR	1	Downlights	75	Sealed
WC	1	Downlights	75	Sealed
WC	1	Exhaust Fans	250	Sealed
Bed 2	2	Downlights	75	Sealed

Ceiling fans

Location	Quantity	Diameter (mm)
No Data Available		

Roof type

Construction	Added insulation (R-value)	Solar absorptance	Roof shade
Framed:Flat - Flat Framed (Metal Deck)	0.0	0.6	Dark
Cont:Attic-Continuous	0.0	0.6	Dark

* Refer to glossary.



Explanatory Notes

About this report

A NatHERS rating is a comprehensive, dynamic computer modelling evaluation of a home, using the floorplans, elevations and specifications to estimate an energy load. It addresses the building layout, orientation and fabric (i.e. walls, windows, floors, roofs and ceilings), but does not cover the water or energy use of appliances or energy production of solar panels.

Ratings are based on a unique climate zone where the home is located and are generated using standard assumptions, including occupancy patterns and thermostat settings. The actual energy consumption of a home may vary significantly from the predicted energy load, as the assumptions used in the rating will not match actual usage patterns. For example, the number of occupants and personal heating or cooling preferences will vary.

While the figures are an indicative guide to energy use, they can be used as a reliable guide for comparing different dwelling designs and to demonstrate that the design meets the energy efficiency requirements in the National Construction Code. Homes that are energy efficient use less energy, are warmer on cool days, cooler on hot days and cost less to run. The higher the star rating the more thermally efficient the dwelling is.

Accredited assessors

To ensure the NatHERS Certificate is of a high quality, always use an accredited or licenced assessor. NatHERS accredited assessors are members of a professional body called an Assessor Accrediting Organisation (AAO).

Australian Capital Territory (ACT) licensed assessors may only produce assessments for regulatory purposes using software for which they have a licence endorsement. Licence endorsements can be confirmed on the ACT licensing register

AAOs have specific quality assurance processes in place, and continuing professional development requirements, to maintain a high and consistent standard of assessments across the country.

Non-accredited assessors do not have this level of quality assurance or any ongoing training requirements.

Any questions or concerns about this report should be directed to the assessor in the first instance. If the assessor is unable to address these questions or concerns, the AAO specified on the front of this certificate should be contacted.

Disclaimer

The format of the NatHERS Certificate was developed by the NatHERS Administrator. However the content of each individual certificate is entered and created by the assessor to create a NatHERS Certificate. It is the responsibility of the assessor who prepared this certificate to use NatHERS accredited software correctly and follow the NatHERS Technical Notes to produce a NatHERS Certificate.

The predicted annual energy load in this NatHERS Certificate is an estimate based on an assessment of the building by the assessor. It is not a prediction of actual energy use, but may be used to compare how other buildings are likely to perform when used in a similar way. Information presented in this report relies on a range of standard assumptions (both embedded in NatHERS accredited software and made by the assessor who prepared this report), including assumptions about occupancy, indoor air temperature and local climate.

Not all assumptions that may have been made by the assessor while using the NatHERS accredited software tool are presented in this report and further details or data files may be available from the assessor.

Glossary

Annual energy load	the predicted amount of energy required for heating and cooling, based on standard occupancy assumptions.
Assessed floor area	the floor area modelled in the software for the purpose of the NatHERS assessment. Note, this may not be consistent with the floor area in the design documents.
Ceiling penetrations	features that require a penetration to the ceiling, including downlights, vents, exhaust fans, rangehoods, chimneys and flues. Excludes fixtures attached to the ceiling with small holes through the ceiling for wiring, e.g. ceiling fans; pendant lights, and heating and cooling ducts.
Conditioned	a zone within a dwelling that is expected to require heating and cooling based on standard occupancy assumptions. In some circumstances it will include garages.
Custom windows	windows listed in NatHERS software that are available on the market in Australia and have a WERS (Window Energy Rating Scheme) rating.
Default windows	windows that are representative of a specific type of window product and whose properties have been derived by statistical methods.
Entrance door	these signify ventilation benefits in the modelling software and must not be modelled as a door when opening to a minimally ventilated corridor in a Class 2 building.
Exposure category - exposed	terrain with no obstructions e.g. flat grazing land, ocean-frontage, desert, exposed high-rise unit (usually above 10 floors).
Exposure category - open	terrain with few obstructions at a similar height e.g. grasslands with few well scattered obstructions below 10m, farmland with scattered sheds, lightly vegetated bush blocks, elevated units (e.g. above 3 floors).
Exposure category - suburban	terrain with numerous, closely spaced obstructions below 10m e.g. suburban housing, heavily vegetated bushland areas.
Exposure category - protected	terrain with numerous, closely spaced obstructions over 10 m e.g. city and industrial areas.
Horizontal shading feature	provides shading to the building in the horizontal plane, e.g. eaves, verandahs, pergolas, carports, or overhangs or balconies from upper levels.

* Refer to glossary.

National Construction Code (NCC) Class	the NCC groups buildings by their function and use, and assigns a classification code. NatHERS software models NCC Class 1, 2 or 4 buildings and attached Class 10a buildings. Definitions can be found at www.abcb.gov.au .
Opening Percentage	the openability percentage or operable (moveable) area of doors or windows that is used in ventilation calculations.
Provisional value	an assumed value that does not represent an actual value. For example, if the wall colour is unspecified in the documentation, a provisional value of 'medium' must be modelled. Acceptable provisional values are outlined in the NatHERS Technical Note and can be found at www.nathers.gov.au
Reflective wrap (also known as foil)	can be applied to walls, roofs and ceilings. When combined with an appropriate airgap and emissivity value, it provides insulative properties.
Roof window	for NatHERS this is typically an operable window (i.e. can be opened), will have a plaster or similar light well if there is an attic space, and generally does not have a diffuser.
Shading device	a device fixed to windows that provides shading e.g. window awnings or screens but excludes eaves.
Shading features	includes neighbouring buildings, fences, and wing walls, but excludes eaves.
Solar heat gain coefficient (SHGC)	the fraction of incident solar radiation admitted through a window, both directly transmitted as well as absorbed and subsequently released inward. SHGC is expressed as a number between 0 and 1. The lower a window's SHGC, the less solar heat it transmits.
Skylight (also known as roof lights)	for NatHERS this is typically a moulded unit with flexible reflective tubing (light well) and a diffuser at ceiling level.
U-value	the rate of heat transfer through a window. The lower the U-value, the better the insulating ability.
Unconditioned	a zone within a dwelling that is assumed to not require heating and cooling based on standard occupancy assumptions.
Vertical shading features	provides shading to the building in the vertical plane and can be parallel or perpendicular to the subject wall/window. Includes privacy screens, other walls in the building (wing walls), fences, other buildings, vegetation (protected or listed heritage trees).

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	Bekim & Fatime Qaniu
Rated Address	17 Railway Parade Seaford
Accredited Rater	Amy Gedge
Date	29/05/2024
Reference	0017RAIL-2

Energy Usage

Type	Energy MJ/m²
Total	124.7
Heating	108.5
Cooling	16.2

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	135.5
Unconditioned Room Area	30.9
Garage Area	21.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Entry	12.2	dayTime	Y
Linen	0.6	dayTime	Y
Stairs	6.2	dayTime	Y
Kitchen/Living	48.4	kitchen	Y
Bed 4	11.3	bedroom	Y
Bed 4 Ensuite	5.1	nightTime	Y
Powder	1.9	dayTime	Y
Laundry	3.2	unconditioned	N
Garage	21.0	garage	N
Stairs/Landing	11.5	dayTime	Y
Bed 1	17.9	bedroom	Y

Bath	3.9	dayTime	Y
Bed 1 WIR	4.3	nightTime	Y
WC	6.7	unconditioned	N
Bed 2	13.9	bedroom	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Brick Veneer	2.5	0	2.1
Brick Veneer	2.0	0	69.7
Linear Weather Boards FC	2.0	0	25.0
Internal Plasterboard Stud Wall	0.0	0	122.0
Parti wall	4.0	0	57.3
Internal Garage Wall	2.0	0	25.7
Parti wall	0.0	0	16.7
Brick Veneer Garage	0.0	0	9.8
75mm Expanded Polystyrene Clad	3.9	0	48.3

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
CSOG: Slab on Ground	0.0	0.0	encl	109.8
Timber Lined	2.0	0.0	encl	20.5
Timber Lined	0.0	0.0	encl	37.7

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Framed:Flat - Flat Framed (Metal Deck)	5.0	0.0	52.5
Ceil: Ceiling	0.0	0.0	57.4
Cont:Attic-Continuous	5.0	0.0	58.1

Windows

Type	U-Value	SHGC	Area (m²)
ECO-101-01 A Eco EcoTech Aluminium Awning Window DG 4-12-4	3.51	0.59	30.64
ECO-109-01 A Eco EcoTech Aluminium Sliding Door DG 4-12-4	3.76	0.62	5.76
ECO-111-01 A EcoEcoTech Standard Al Casement Window DG 4-12-4	3.69	0.53	1.92

Window Directions

Direction	Area (m²)
SE	14.0
NE	13.0
SW	11.4

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	5	0
Downlight	31	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bed 1 WIR (Z005)	129.0	556.3	20.8	89.8
Bed 2 (Z015)	30.3	419.9	27.2	377.2
Entry (Z001)	254.3	3107.4	4.5	55.5
Stairs (Z012)	145.3	906.5	0.3	1.7
Stairs/Landing (Z002)	120.8	1384.1	6.0	68.9
Bed 4 (Z006)	107.9	1214.7	26.0	292.4
Bed 1 (Z004)	54.3	970.4	14.8	265.0
Kitchen/Living (Z010)	107.7	5216.5	25.0	1208.2
Bath (Z016)	236.5	922.9	7.4	28.9
Bed 4 Ensuite (Z007)	49.3	250.0	0.8	4.2
Powder (Z008)	504.2	964.4	1.0	1.9
Linen (Z011)	136.5	85.4	0.2	0.1

Nationwide House Energy Rating Scheme

NatHERS Certificate No. AGCQFTLB6N

Generated on 29 May 2024 using FirstRate5: 5.3.2b (3.21)

Property

Address 3, 17 Railway Parade, Seaford, VIC, 3198
Lot/DP Lot 1
NCC Class* Class 1a
Type New Home

Plans

Main plan 23-24/1S/29.05.24
Prepared by Creative House Plans

Construction and environment

Assessed floor area (m²)*		Exposure type
Conditioned*	149.4	suburban
Unconditioned*	60	NatHERS climate zone
Total	209.4	62 Moorabbin Airport
Garage	42.9	



Accredited assessor

Name Amy Gedge
Business name Arrow Energy Ratings
Email amy@arrowenergyratings.com.au
Phone 0412808258
Accreditation No. DMN/21/2022
Assessor Accrediting Organisation Design Matters National
Declaration of interest Declaration completed: no conflicts

National Construction Code (NCC) requirements

The NCC's requirements for NatHERS-rated houses are detailed in 3.12.0(a)(i) and 3.12.5 of the NCC Volume Two. For apartments the requirements are detailed in J0.2 and J5 to J8 of the NCC Volume One.

In NCC 2019, these requirements include minimum star ratings and separate heating and cooling load limits that need to be met by buildings and apartments through the NatHERS assessment. Requirements additional to the NatHERS assessment that must also be satisfied include, but are not limited to: insulation installation methods, thermal breaks, building sealing, water heating and pumping, and artificial lighting requirements. The NCC and NatHERS Heating and Cooling Load Limits (Australian Building Codes Board Standard) are available at www.abcb.gov.au.

State and territory variations and additions to the NCC may also apply.



Thermal performance

Heating	Cooling
102.1	22.1
MJ/m²	MJ/m²

About the rating

NatHERS software models the expected thermal energy loads using information about the design and construction, climate and common patterns of household use. The software does not take into account appliances, apart from the airflow impacts from ceiling fans.

Verification

To verify this certificate, scan the QR code or visit <https://www.fr5.com.au/QRCodeLanding?PublicId=AGCQFTLB6N> When using either link, ensure you are visiting www.FR5.com.au.





Certificate Check

Ensure the dwelling is designed and then built as per the NatHERS Certificate. While you need to check the accuracy of the whole Certificate, the following spot check covers some important items impacting the dwelling’s rating.

Genuine certificate

Does this Certificate match the one available at the web address or QR code in the verification box on the front page?
Does the set of NatHERS-stamped plans for the dwelling have a Certificate number on the stamp that matches this Certificate?

Ceiling penetrations*

Does the ‘number’ and ‘type’ of ceiling penetrations (e.g. downlights, exhaust fans, etc) shown on the stamped plans or installed, match what is shown in this Certificate?

Windows

Does the installed window meet the substitution tolerances (SHGC and U-value) and window type, of the window shown on this Certificate? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

Apartment entrance doors

Does the ‘External Door Schedule’ show apartment entrance doors? Please note that an “external door” between the modelled dwelling and a shared space, such as an enclosed corridor or foyer, should not be included in the assessment (because it overstates the possible ventilation) and would invalidate the Certificate.

Exposure*

Has the appropriate exposure level (terrain) been applied? For example, it is unlikely that a ground-floor apartment is “exposed” or a top floor high-rise apartment is “protected”.

Provisional* values

Have provisional values been used in the assessment and, if so, noted in “additional notes” below?

Additional Notes

Note: Custom windows have been used as one window type - worst case scenario.

The non-reflective wraps do not appear in the wall description but have been modelled in the energy calculation all the same as air gaps.

Insulate internal walls to garage, laundry, powder & bath R2.5.

External wall insulation excludes garage external walls.

Ceiling insulation excludes garage ceiling.

Window and glazed door *type and performance*

Default* windows

				Substitution tolerance ranges	
Window ID	Window description	Maximum U-value*	SHGC*	SHGC lower limit	SHGC upper limit
No Data Available					

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
ECO-111-03 A	EcoEcoTech Standard Al Casement Window DG 4-12Ar-4	3.59	0.53	0.5	0.56
ECO-101-03 A	Eco EcoTech Aluminium Awning Window DG 4-12Ar-4	3.4	0.59	0.56	0.62



ECO-109-03 A	Eco EcoTech Aluminium Sliding Door DG 4-12Ar-4	3.64	0.62	0.59	0.65
ECO-101-04 A	Eco EcoTech Aluminium Awning Window DG 4ET-12Ar-4	2.77	0.5	0.48	0.53
ECO-115-03 A	EcoEcoTech Aluminium Fixed Window DG 4-12Ar-4	3.07	0.64	0.61	0.67

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Laundry	ECO-111-03 A	Laundry Door	2340	820	casement	100.0	SW	No
Powder	ECO-101-03 A	Powder	2400	900	awning	60.0	SW	No
Bed 4	ECO-101-03 A	Bed 4	2400	2400	awning	30.0	SW	No
Bed 4 Ensuite	ECO-101-03 A	Ensuite	2400	900	awning	60.0	SW	No
Kitchen/Living	ECO-109-03 A	Living Door	2400	2400	sliding	45.0	NE	No
Kitchen/Living	ECO-101-04 A	Kitchen	2400	900	awning	60.0	NE	No
Kitchen/Living	ECO-101-04 A	Living	2400	2700	awning	20.0	NE	No
Pantry	ECO-101-03 A	Pantry	2400	900	awning	60.0	SW	No
Stairs/Landing	ECO-115-03 A	Stairs	2100	1800	fixed	0.0	SW	No
Bed 1	ECO-101-03 A	Bed 1	1400	2700	awning	10.0	NE	No
Bed 1 WIR	ECO-101-03 A	Bed 1 WIR	1400	900	awning	90.0	NW	No
Bed 3	ECO-101-03 A	Bed 3	1400	2700	awning	10.0	NE	No
Bed 2	ECO-101-03 A	Bed 2	2100	2400	awning	30.0	SW	No

Roof window *type and performance value*

Default* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
No Data Available					

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
No Data Available					

Roof window *schedule*

Location	Window ID	Window no.	Opening %	Area (m²)	Orientation	Outdoor shade	Indoor shade
No Data Available							

Skylight *type and performance*

Skylight ID	Skylight description
No Data Available	

* Refer to glossary.



Skylight *schedule*

Location	Skylight ID	Skylight No.	Skylight shaft length (mm)	Area (m²)	Orient-ation	Outdoor shade	Diffuser	Skylight shaft reflectance
No Data Available								

External door *schedule*

Location	Height (mm)	Width (mm)	Opening %	Orientation
Entry	2340	920	100.0	SW
Garage	2408	4800	100.0	NE

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	1 - Brick Veneer	0.5	Medium	Glass fibre batt: R2.5 (R2.5)	No
2	1 - Linear Weather Boards FC	0.5	Medium	Glass fibre batt: R2.5 (R2.5)	No
3	FR5 - Concrete Block Solid/Core Filled	0.5	Medium		No
4	1 - Brick Veneer Garage	0.5	Medium		No
5	FR5 - 75mm Expanded Polystyrene Clad	0.5	Medium	Glass fibre batt: R2.5 (R2.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Entry	1	2700	1570	SW	1176	Yes
Entry	1	2700	3195	SE	0	Yes
Laundry	1	2700	2332	SW	0	Yes
Laundry	1	2700	1090	SE	980	Yes
Powder	1	2700	1780	SW	0	Yes
Powder	1	2700	1010	NW	0	Yes
Stairs	2	2700	2090	SW	0	Yes
Bed 4	1	2700	3185	SW	0	Yes
Bed 4	1	2700	1010	SE	0	Yes
Bed 4	1	2700	1010	NW	0	Yes
Bed 4 Ensuite	1	2700	2390	SW	0	Yes
Kitchen/Living	1	2700	8282	NE	0	Yes
Kitchen/Living	1	2700	4930	NW	0	Yes
Pantry	1	2700	1675	SW	0	Yes
Pantry	1	2700	3385	NW	0	Yes
Garage	3	1360	7180	SW	0	No
Garage	4	2700	5980	SE	0	Yes
Garage	3	1360	5980	SE	0	No
Garage	4	4060	7180	NE	0	Yes
Garage	4	4060	1050	NW	0	Yes

* Refer to glossary.



Garage	3	1360	4930	NW	0	No
Stairs/Landing	5	2550	2090	SW	550	Yes
Bed 1	5	2550	4585	NE	550	No
Bed 1	5	2550	4160	NW	550	No
Bed 1 WIR	5	2550	2885	SW	550	Yes
Bed 1 WIR	5	2550	2060	NW	550	No
Bed 1 Ensuite	5	2550	2690	SW	550	Yes
Bath	5	2550	3400	NE	550	No
Bed 3	5	2550	3110	SE	550	No
Bed 3	5	2550	3667	NE	550	No
Bed 2	5	2550	3867	SW	550	Yes
Bed 2	5	2550	3110	SE	550	No

Internal wall type

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	47.5	Glass fibre batt: R2.5 (R2.5)
2	FR5 - Internal Plasterboard Stud Wall	119.5	
3	1 - Internal Garage Wall	32.7	Glass fibre batt: R2.5 (R2.5)

Floor type

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Entry	FR5 - CSOG: Slab on Ground	6.2	Enclosed	R0.0	Carpet
Entry	FR5 - CSOG: Slab on Ground	9.1	Enclosed	R0.0	Carpet
Laundry	FR5 - CSOG: Slab on Ground	4.2	Enclosed	R0.0	Tiles
Laundry	FR5 - CSOG: Slab on Ground	2.4	Enclosed	R0.0	Tiles
Powder	FR5 - CSOG: Slab on Ground	2	Enclosed	R0.0	Tiles
Powder	FR5 - CSOG: Slab on Ground	1.8	Enclosed	R0.0	Tiles
Stairs	FR5 - CSOG: Slab on Ground	5	Enclosed	R0.0	Carpet
Bed 4	FR5 - CSOG: Slab on Ground	13.4	Enclosed	R0.0	Carpet
Bed 4	FR5 - CSOG: Slab on Ground	3.2	Enclosed	R0.0	Carpet
Bed 4 Ensuite	FR5 - CSOG: Slab on Ground	4.3	Enclosed	R0.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	2.8	Enclosed	R0.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	10.8	Enclosed	R0.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	11.6	Enclosed	R0.0	Carpet
Kitchen/Living	FR5 - CSOG: Slab on Ground	15.6	Enclosed	R0.0	Carpet
Pantry	FR5 - CSOG: Slab on Ground	5.7	Enclosed	R0.0	Tiles
Garage	FR5 - CSOG: Slab on Ground	28	Enclosed	R0.0	none
Garage	FR5 - CSOG: Slab on Ground	14.9	Enclosed	R0.0	none
Stairs/Landing	FR5 - Timber Lined	1.7	Enclosed	R2.0	Carpet
Stairs/Landing	FR5 - Timber Lined	9.3	Enclosed	R2.0	Carpet
Linen	FR5 - Timber Lined	1	Enclosed	R2.0	Carpet

Bed 1	FR5 - Timber Lined	19.1	Enclosed	R2.0	Carpet
Bed 1 WIR	FR5 - Timber Lined	5.9	Enclosed	R2.0	Carpet
Bed 1 Ensuite	FR5 - Timber Lined	5.5	Enclosed	R2.0	Tiles
Bath	FR5 - Timber Lined	3	Enclosed	R2.0	Timber (Mountain ash)
Bath	FR5 - Timber Lined	3.8	Enclosed	R2.0	Timber (Mountain ash)
Bed 3	FR5 - Timber Lined	0.8	Enclosed	R2.0	Carpet
Bed 3	FR5 - Timber Lined	9.7	Enclosed	R2.0	Carpet
Bed 2	FR5 - Timber Lined	12	Enclosed	R2.0	Carpet

Ceiling type

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
Entry	Plasterboard	R6.0	Yes
Entry	FR5 - Timber Lined	R2.0	No
Laundry	FR5 - Timber Lined	R2.0	No
Laundry	Plasterboard	R6.0	Yes
Powder	FR5 - Timber Lined	R2.0	No
Powder	Plasterboard	R6.0	Yes
Stairs	FR5 - Timber Lined	R2.0	No
Bed 4	FR5 - Timber Lined	R2.0	No
Bed 4	Plasterboard	R6.0	Yes
Bed 4 Ensuite	FR5 - Timber Lined	R2.0	No
Kitchen/Living	FR5 - Timber Lined	R2.0	No
Kitchen/Living	FR5 - Timber Lined	R2.0	No
Kitchen/Living	Plasterboard	R6.0	Yes
Kitchen/Living	FR5 - Timber Lined	R2.0	No
Kitchen/Living	Plasterboard	R6.0	Yes
Kitchen/Living	FR5 - Timber Lined	R2.0	No
Pantry	Plasterboard	R6.0	Yes
Garage	FR5 - Timber Lined	R2.0	No
Garage	Plasterboard	R0.0	No
Garage	FR5 - Timber Lined	R2.0	No
Stairs/Landing	Plasterboard	R6.0	Yes
Stairs/Landing	Plasterboard	R6.0	Yes
Linen	Plasterboard	R6.0	Yes
Bed 1	Plasterboard	R6.0	Yes
Bed 1 WIR	Plasterboard	R6.0	Yes
Bed 1 Ensuite	Plasterboard	R6.0	Yes
Bath	Plasterboard	R6.0	Yes



Bath	Plasterboard	R6.0	Yes
Bed 3	Plasterboard	R6.0	Yes
Bed 3	Plasterboard	R6.0	Yes
Bed 2	Plasterboard	R6.0	Yes

Ceiling penetrations*

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Entry	3	Downlights	75	Sealed
Laundry	2	Downlights	75	Sealed
Powder	1	Downlights	75	Sealed
Bed 4	4	Downlights	75	Sealed
Bed 4 Ensuite	1	Downlights	75	Sealed
Bed 4 Ensuite	1	Exhaust Fans	250	Sealed
Kitchen/Living	8	Downlights	75	Sealed
Kitchen/Living	1	Exhaust Fans	200	Sealed
Pantry	2	Downlights	75	Sealed
Stairs/Landing	2	Downlights	75	Sealed
Bed 1	4	Downlights	75	Sealed
Bed 1 WIR	1	Downlights	75	Sealed
Bed 1 Ensuite	1	Downlights	75	Sealed
Bed 1 Ensuite	1	Exhaust Fans	250	Sealed
Bath	2	Downlights	75	Sealed
Bath	1	Exhaust Fans	250	Sealed
Bed 3	2	Downlights	75	Sealed
Bed 2	2	Downlights	75	Sealed

Ceiling fans

Location	Quantity	Diameter (mm)
No Data Available		

Roof type

Construction	Added insulation (R-value)	Solar absorptance	Roof shade
Framed:Flat - Flat Framed (Metal Deck)	0.0	0.6	Dark
Framed:Flat - Flat Framed (Metal Deck)	0.0	0.5	Medium
Cont:Attic-Continuous	0.0	0.6	Dark



Explanatory Notes

About this report

A NatHERS rating is a comprehensive, dynamic computer modelling evaluation of a home, using the floorplans, elevations and specifications to estimate an energy load. It addresses the building layout, orientation and fabric (i.e. walls, windows, floors, roofs and ceilings), but does not cover the water or energy use of appliances or energy production of solar panels.

Ratings are based on a unique climate zone where the home is located and are generated using standard assumptions, including occupancy patterns and thermostat settings. The actual energy consumption of a home may vary significantly from the predicted energy load, as the assumptions used in the rating will not match actual usage patterns. For example, the number of occupants and personal heating or cooling preferences will vary.

While the figures are an indicative guide to energy use, they can be used as a reliable guide for comparing different dwelling designs and to demonstrate that the design meets the energy efficiency requirements in the National Construction Code. Homes that are energy efficient use less energy, are warmer on cool days, cooler on hot days and cost less to run. The higher the star rating the more thermally efficient the dwelling is.

Accredited assessors

To ensure the NatHERS Certificate is of a high quality, always use an accredited or licenced assessor. NatHERS accredited assessors are members of a professional body called an Assessor Accrediting Organisation (AAO).

Australian Capital Territory (ACT) licensed assessors may only produce assessments for regulatory purposes using software for which they have a licence endorsement. Licence endorsements can be confirmed on the ACT licensing register

AAOs have specific quality assurance processes in place, and continuing professional development requirements, to maintain a high and consistent standard of assessments across the country. Non-accredited assessors do not have this level of quality assurance or any ongoing training requirements.

Any questions or concerns about this report should be directed to the assessor in the first instance. If the assessor is unable to address these questions or concerns, the AAO specified on the front of this certificate should be contacted.

Disclaimer

The format of the NatHERS Certificate was developed by the NatHERS Administrator. However the content of each individual certificate is entered and created by the assessor to create a NatHERS Certificate. It is the responsibility of the assessor who prepared this certificate to use NatHERS accredited software correctly and follow the NatHERS Technical Notes to produce a NatHERS Certificate.

The predicted annual energy load in this NatHERS Certificate is an estimate based on an assessment of the building by the assessor. It is not a prediction of actual energy use, but may be used to compare how other buildings are likely to perform when used in a similar way. Information presented in this report relies on a range of standard assumptions (both embedded in NatHERS accredited software and made by the assessor who prepared this report), including assumptions about occupancy, indoor air temperature and local climate.

Not all assumptions that may have been made by the assessor while using the NatHERS accredited software tool are presented in this report and further details or data files may be available from the assessor.

Glossary

Annual energy load	the predicted amount of energy required for heating and cooling, based on standard occupancy assumptions.
Assessed floor area	the floor area modelled in the software for the purpose of the NatHERS assessment. Note, this may not be consistent with the floor area in the design documents.
Ceiling penetrations	features that require a penetration to the ceiling, including downlights, vents, exhaust fans, rangehoods, chimneys and flues. Excludes fixtures attached to the ceiling with small holes through the ceiling for wiring, e.g. ceiling fans; pendant lights, and heating and cooling ducts.
Conditioned	a zone within a dwelling that is expected to require heating and cooling based on standard occupancy assumptions. In some circumstances it will include garages.
Custom windows	windows listed in NatHERS software that are available on the market in Australia and have a WERS (Window Energy Rating Scheme) rating.
Default windows	windows that are representative of a specific type of window product and whose properties have been derived by statistical methods.
Entrance door	these signify ventilation benefits in the modelling software and must not be modelled as a door when opening to a minimally ventilated corridor in a Class 2 building.
Exposure category - exposed	terrain with no obstructions e.g. flat grazing land, ocean-frontage, desert, exposed high-rise unit (usually above 10 floors).
Exposure category - open	terrain with few obstructions at a similar height e.g. grasslands with few well scattered obstructions below 10m, farmland with scattered sheds, lightly vegetated bush blocks, elevated units (e.g. above 3 floors).
Exposure category - suburban	terrain with numerous, closely spaced obstructions below 10m e.g. suburban housing, heavily vegetated bushland areas.
Exposure category - protected	terrain with numerous, closely spaced obstructions over 10 m e.g. city and industrial areas.
Horizontal shading feature	provides shading to the building in the horizontal plane, e.g. eaves, verandahs, pergolas, carports, or overhangs or balconies from upper levels.

* Refer to glossary.

National Construction Code (NCC) Class	the NCC groups buildings by their function and use, and assigns a classification code. NatHERS software models NCC Class 1, 2 or 4 buildings and attached Class 10a buildings. Definitions can be found at www.abcb.gov.au .
Opening Percentage	the openability percentage or operable (moveable) area of doors or windows that is used in ventilation calculations.
Provisional value	an assumed value that does not represent an actual value. For example, if the wall colour is unspecified in the documentation, a provisional value of 'medium' must be modelled. Acceptable provisional values are outlined in the NatHERS Technical Note and can be found at www.nathers.gov.au
Reflective wrap (also known as foil)	can be applied to walls, roofs and ceilings. When combined with an appropriate airgap and emissivity value, it provides insulative properties.
Roof window	for NatHERS this is typically an operable window (i.e. can be opened), will have a plaster or similar light well if there is an attic space, and generally does not have a diffuser.
Shading device	a device fixed to windows that provides shading e.g. window awnings or screens but excludes eaves.
Shading features	includes neighbouring buildings, fences, and wing walls, but excludes eaves.
Solar heat gain coefficient (SHGC)	the fraction of incident solar radiation admitted through a window, both directly transmitted as well as absorbed and subsequently released inward. SHGC is expressed as a number between 0 and 1. The lower a window's SHGC, the less solar heat it transmits.
Skylight (also known as roof lights)	for NatHERS this is typically a moulded unit with flexible reflective tubing (light well) and a diffuser at ceiling level.
U-value	the rate of heat transfer through a window. The lower the U-value, the better the insulating ability.
Unconditioned	a zone within a dwelling that is assumed to not require heating and cooling based on standard occupancy assumptions.
Vertical shading features	provides shading to the building in the vertical plane and can be parallel or perpendicular to the subject wall/window. Includes privacy screens, other walls in the building (wing walls), fences, other buildings, vegetation (protected or listed heritage trees).

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	Bekim & Fatime Qaniu
Rated Address	17 Railway Parade Seaford
Accredited Rater	Amy Gedge
Date	29/05/2024
Reference	0017RAIL-3

Energy Usage

Type	Energy MJ/m²
Total	124.2
Heating	102.1
Cooling	22.1

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	149.4
Unconditioned Room Area	60.0
Garage Area	42.9
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Entry	15.2	dayTime	Y
Laundry	6.5	unconditioned	N
Powder	3.7	unconditioned	N
Stairs	5.0	dayTime	Y
Bed 4	16.6	bedroom	Y
Bed 4 Ensuite	4.3	nightTime	Y
Kitchen/Living	40.8	kitchen	Y
Pantry	5.7	dayTime	Y
Garage	42.9	garage	N
Stairs/Landing	11.0	dayTime	Y
Linen	1.0	dayTime	Y

Bed 1	19.1	bedroom	Y
Bed 1 WIR	5.9	nightTime	Y
Bed 1 Ensuite	5.5	nightTime	Y
Bath	6.8	unconditioned	N
Bed 3	10.5	bedroom	Y
Bed 2	12.0	bedroom	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Brick Veneer	2.5	0	99.5
Internal Plasterboard Stud Wall	2.5	0	47.4
Linear Weather Boards FC	2.5	0	5.6
Internal Plasterboard Stud Wall	0.0	0	119.4
Internal Garage Wall	2.5	0	32.7
Concrete Block Solid/Core Filled	0.0	0	24.6
Brick Veneer Garage	0.0	0	49.6
75mm Expanded Polystyrene Clad	4.4	0	90.8

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
CSOG: Slab on Ground	0.0	0.0	encl	140.8
Timber Lined	2.0	0.0	encl	71.8

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Framed:Flat - Flat Framed (Metal Deck)	6.0	0.0	41.6
Ceil: Ceiling	0.0	0.0	71.2
Framed:Flat - Flat Framed (Metal Deck)	0.0	0.0	28.0
Cont:Attic-Continuous	6.0	0.0	71.8

Windows

Type	U-Value	SHGC	Area (m²)
ECO-111-03 A EcoEcoTech Standard Al Casement Window DG 4-12Ar-4	3.59	0.53	1.92
ECO-101-03 A Eco EcoTech Aluminium Awning Window DG 4-12Ar-4	3.40	0.59	26.10
ECO-109-03 A Eco EcoTech Aluminium Sliding Door DG 4-12Ar-4	3.64	0.62	5.76
ECO-101-04 A Eco EcoTech Aluminium Awning Window DG 4ET-12Ar-4	2.77	0.50	8.64
ECO-115-03 A EcoEcoTech Aluminium Fixed Window DG 4-12Ar-4	3.07	0.64	3.78

Window Directions

Direction	Area (m²)
SW	23.0

NE	22.0
NW	1.3

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	4	0
Downlight	35	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bed 4 (Z011)	47.9	794.3	5.6	93.7
Linen (Z005)	228.4	225.9	13.1	13.0
Pantry (Z024)	415.5	2356.0	15.2	86.4
Bed 1 (Z019)	30.8	587.9	18.0	344.1
Bed 3 (Z006)	65.5	684.9	41.3	432.5
Bed 2 (Z007)	67.6	813.3	32.4	389.8
Kitchen/Living (Z010)	90.4	3689.9	37.2	1520.3
Bed 1 WIR (Z020)	64.7	384.3	15.1	90.0
Bed 4 Ensuite (Z025)	124.4	530.8	12.6	53.8
Entry (Z001)	216.4	3297.8	3.4	52.1
Stairs/Landing (Z004)	168.8	1853.8	44.6	489.3
Stairs (Z012)	239.2	1197.1	1.1	5.7
Bed 1 Ensuite (Z021)	39.7	220.2	5.9	32.8

GENERAL NOTES

- INTELLECTUAL PROPERTY AND USE OF THIS DOCUMENT
- This document has been prepared for the exclusive use of the client of Creative House Plans (the designer), for the purpose expressly notified to the designer. Any other person who uses or relies on these plans without the designer's written consent does so at their own risk and no responsibility is accepted by the designer for such use and/or reliance.
 - This document is to be read in conjunction with all drawings, details and information provided by the consultants named herein, and with any other written instructions issued in the course of the contract.
 - A building permit is required prior to the commencement of these works. The release of this document is conditional on the client obtaining the required building permit.

MATERIALS AND TRADE PRACTICES

- All materials, construction and work practices shall comply with but not be limited to the current issue of NCC 2022 01-05-23, National Construction Code 2022 Building Code Of Australia Vol. 2 (hereafter referred to as BCA), and all relevant current Australian Standards referred to therein.
- Work and site management practices shall comply with all relevant laws and by-laws.
- If any performance solution is proposed, it shall be assessed and approved by the [relevant building surveyor/building certifier] as meeting BCA performance requirements prior to implementation or installation.
- Installation of all services shall comply with the respective supply authority's requirements.

MEASUREMENTS

- Figured dimensions take precedence over scaled dimensions.
- All measurements are in millimetres, unless noted otherwise.
- Unless noted otherwise, dimensions on floor plans, sections and external elevations represent timber framing and structural members, not finished linings/cladding.
- Window sizes are nominal only. Actual size may vary according to manufacturer.
- The builder and subcontractors shall check and verify all dimensions, setbacks, levels, specifications, and all other relevant documentation prior to the commencement of any works. Report all discrepancies to the designer for clarification.

SITE CLASSIFICATIONS & PROPERTY INFORMATION

- Site Classification as Class "P"
- Wind Speed Class : N1
- BAL Level : Low
- Refer Soil Report No : 2240435-1
- By ResCom Dated: 23-02-24

SUPPLEMENTARY NOTES

SITE PROTECTION DURING THE CONSTRUCTION PERIOD

- Protective outriggers, fences, awnings, hoarding, barricades and the like shall be installed where necessary to guard against danger to life or property or when required by the relevant building surveyor and/or council.
- Where required by council, the builder shall construct a temporary crossing placed over the footpath.
- All practicable measures shall be implemented to minimise waste to landfill. The builder may use a construction waste recovery service, or sort and transport recyclable materials to the appropriate registered recycler. Materials shall not be burned on site.
- A site management plan shall be implemented from the commencement of works, to control sediment run-off in accordance with [insert relevant state/council guidelines or regulation]. Silt fences shall be provided to the low side of the allotment and around all soil stockpiles and storm water inlet pits/sumps and 'silt stop' filter bags or equivalent shall be placed over all storm water entry pits. Erosion control fabric shall be placed over garden beds to prevent surface erosion.
- Dust-creating material shall be kept sprayed with water so as to prevent any nuisance from dust.
- Waste materials shall not be placed in any street, road or right of way.
- Earthworks (unretained) shall not exceed 2m.
- Cut and fill batters shall comply with BCA Table 3.2.1.

PROTECTION OF THE BUILDING FABRIC

- The builder shall take all steps necessary to ensure the stability and general water tightness of all new and/or existing structures during all works.
- Windows, doors and service penetrations shall be flashed all around.
- All pliable membranes shall be installed to comply and be in accordance with BCA 10.8.1
- Gutters and drainage shall be supplied and installed in accordance with AS3500.3.
- Anti-ponding devices/boards shall be installed according to BCA 7.3.5.
- Dampcourses with weepholes and cavity flashings shall be installed in accordance with AS4773.2.
- Surfaces around the perimeter of a residential slab shall fall away from that slab by not less than 50mm over the first 1m. Where not stipulated in the geotechnical report, freeboard shall be not less than 50mm from an impermeable surface or 150mm from a permeable surface.
- Subfloor vents shall be located >600mm from corners and be installed below bearers. Such vents shall provide a rate per 1000mm run of external or internal cross walls of:
 - 7,500mm² clear ventilation where particle board flooring is used; or
 - 6,000mm² for other subfloor types.
- [Where a building other than detached class 10 is located in a termite-prone area] the building shall be provided with a termite management system compliant with AS3660.1 or AS3660.2.
- In saline or industrial environments, masonry units, mortar, and all built-in components shall comply with the durability requirements of Table 4.1 of AS4773.1, Part 1: Design.
- Building tie-downs shall be appropriate for the site wind classification and provided in accordance with BCA 5.6.6.
- Corrosion protection shall be suited to the site context and provided for built-in structural steel members such as steel lintels, shelf angles, connectors, accessories (other than wall ties) in accordance with Table 4.1 of AS4773.1 Masonry in Small Buildings, Part 1: Design.
- Sheet roofing shall be protected from corrosion in a manner appropriate to the site context, in accordance with BCA Table 7.2.2a.
- Single leaf masonry walls shall be weatherproofed per BCA 5.7.6.
- [In climate zones 6, 7 and 8] Unless excluded by BCA 10.8.3(2) roofs shall be provided with ventilation openings per BCA 10.8.3.
- External waterproofing for on flat roofs, roof terraces, balconies and terraces and other similar horizontal surfaces located above internal spaces of a building shall comply with BCA H2D8.
- Waterproofing of wet areas - being bathrooms, showers, shower rooms, laundries, sanitary compartments and the like - shall be provided in accordance with BCA 10.2.
- Balcony waterproofing shall be installed in accordance with AS4654.1 & AS4654.2.

GLAZING

- Glazed units shall be installed in accordance with BCA 8.3.2.
- Fully framed glazing installed in the perimeter of buildings shall comply with BCA 8.3.3.
- Glass - including, but not limited to, windows, doors, screens, panels, splashbacks and barriers - shall comply with BCA 3.3.3.
- Glazing subject to human impact shall comply with BCA 8.4.

FOOTINGS

- Footings shall not, under any circumstance, encroach over title boundaries or easement lines.
- Where concrete stumps are to be used, these shall be:
 - 100 x 100mm (1x 5mm HD wire) if up to 1400mm long
 - 100 x 100mm (2x 5mm HD wires) if 1401mm to 1800mm long
 - 125 x 125mm (2x 5mm HD wires) if 1801mm to 3000mm long.
- 100mm x 100mm stumps that exceed 1200mm above ground level shall be braced where no perimeter base brickwork is provided.
- All concrete footings shall be founded at a depth to a minimum required bearing capacity and/or in accordance with recommendations contained in soil report (or otherwise at engineer's discretion).

STORMWATER & SEWERS

- 100mm dia. Class 6 UPVC stormwater line min grade 1:100 shall be connected to the legal point of discharge to the relevant authority's approval. Provide inspection openings at 9m centres and at each change of direction.
- Covers to underground stormwater drains shall be not less than:
 - 100mm under soil
 - 50mm under paved or concrete areas
 - 100mm under unreinforced concrete or paved driveways
 - 75mm under reinforced concrete driveways
- The builder and subcontractor shall ensure that all stormwater drains, sewer pipes and the like are located at a sufficient distance from any buildings, footing and/or slab edge beams so as to prevent general moisture penetration, dampness, weakening and undermining of any building and its footing system.

SAFETY OF BUILDING USERS

- Where stairs, ramps and balustrades are to be constructed, these shall comply with all provisions of BCA 11.2.
- Other than spiral stairs:
 - Risers shall be 190mm max and 115mm min
 - Goings shall be 355mm max and 240mm min
 - 2r+g shall be 700mm max and 550mm min
 - There shall be less than 125mm gap between open treads.
- All treads, landings and the like shall have a slip resistance classification of P3 or R10 for dry surface conditions and P4 or R11 for wet surface conditions, or a nosing strip with a slip-resistance classification of P3 for dry surface conditions and P4 for wet surface conditions.
- Barriers shall be provided where it is possible to fall 1m or more from the level of the trafficable surface to the surface beneath. Such barriers (other than tensioned wire barriers) shall be:
 - 1000mm min above finished stair level (FSL) of balconies, landings etc; and
 - 865mm min above FSL of stair nosing or ramp; and
 - vertical, with gaps of no more than 125mm.
- Where the floor below a bedroom window is 2m or more above the surface beneath, the window shall comply with BCA Clause 11.3.7.
- Where the floor below a window other than in a bedroom is 4m or more above the surface beneath, the window shall comply with BCA Clause 11.3.8.
- Where a bedroom window is 2m or more above the surface beneath, or it is possible to fall 4m or more from the level of any trafficable surface to the surface beneath, any horizontal element within a barrier between 150mm and 760mm above the floor shall not facilitate climbing.
- Handrails shall be continuous, with tops set >865mm vertically above stair nosing and floor surface of ramps.
- Wire barriers shall comply with BCA 11.3.4 and 11.3.6.
- A glass barrier or window serving as a barrier shall comply with BCA H1D8.
- Class 1 buildings with air permeability of not more than 5 m³/hr.m² at 50 Pa shall be provided with a mechanical ventilation system complying with H6V3. Inward-opening swing doors to fully enclosed sanitary compartments shall comply with BCA Clause 10.4.2.
- Flooring in wet areas, laundry and kitchen shall be slip resistant.
- Door hardware shall be installed 900mm - 1100mm above the finished floor.
- There shall be a level transition between abutting internal surfaces (a maximum vertical tolerance of 5mm between abutting surfaces is allowable provided the lip is rounded or bevelled).

SERVICES

- Solar collector panel locations are indicative only. Location and size are dependent on manufacturer's/installer's recommendation.
- Ductwork for heating and cooling systems shall comply with AS4254 & AS/NZS 4859.1 in accordance with climate zone requirements set down in BCA Table 3.

TIMBER FRAMING

- Standard timber roofing and wall framing shall be provided in accordance with AS1684 (Residential Timber-Framed Construction) and all relevant supplements.

ELECTRICAL

- Smoke detectors shall be fitted where none are present, or where existing are non-compliant with AS3786.
- New smoke detectors shall be interconnected; mains-powered; and located and installed per BCA 9.5.2 and 9.5.4.
- In a Class 10a private garage, an alternative alarm may be installed per BCA 9.5.1(b).
- Light switches shall be positioned in a consistent location 900mm - 1100mm above the finished floor level; horizontally aligned with the door handle at the entrance to a room.
- Power points shall not be installed lower than 300mm above finished floor level.
- All electrical penetrations shall be sealed using material appropriate to the rating of the cable and/or device.
- Only stamped IC4-rated downlights shall be installed and insulation shall not be penetrated for downlights.
- Ductwork for exhaust fans and heating and cooling systems shall comply with AS4254 & AS/NZS 4859.1 in accordance with climate zone requirements set down in BCA 13.7.4.
- Exhaust from a bathroom, sanitary compartment or laundry shall be discharged directly via an insulated shaft or R1 insulated ducting to outdoor air. Minimum flow rates shall be:
 - 40 l/s for kitchen & laundry
 - 25 l/s for bathroom or sanitary compartment.
- An exhaust system that is not run continuously and is serving a bathroom or sanitary compartment that is not ventilated in accordance with BCA 10.6.2(a) shall be interlocked with the room's light switch; and include a 10 minute run-on timer.
- Exhaust fans, rangehoods and the like shall be installed with self-closing dampers.

BUILDING THERMAL PERFORMANCE

- Works shall be constructed in accordance with the stamped plans endorsed by, accredited thermal performance assessor, without alteration.
- The NatHERS energy rating contains inbuilt assumptions about the integrity of the building fabric with regards insulation, draughtproofing and glazing. Works shall comply with the following measures, to ensure that the as-built performance corresponds to that modelled in the energy rating.
 - Insulation as per thermal performance Report shall be installed in accordance with BCA 13.2.2
 - Insulation shall be installed tight and continuous, without gaps and cracks, hard up against internal linings (including subfloor). There shall be no air gap between an internal lining and insulation. Junctions between internal and external walls shall be insulated.
 - Insulation shall not be crushed or compressed.
 - Box gutters and manhole covers shall be insulated to the same R-value as the roof, using insulation batts or blanket or closed-cell foam.
 - Downlights shall be stamped as IC4 rated, airtight and covered by insulation.
 - [In climate zones 6, 7 and 8] a vapour permeable layer shall be installed per manufacturer's instructions in all new external walls. The material shall be overlapped and fully taped on the external side to ensure a tight seal. All penetrations in the membrane shall be sealed, ensuring that the material covers gaps between studs and doors and window frames. Any flashing around windows shall be taped over the building wrap.
 - Where a foil-backed membrane is used, timber battens shall be used to minimise thermal conduction.
 - All trades shall be instructed to replace any insulation they have removed in the course of their work and to tape any cuts/penetrations in building wrap. All penetrations shall be caulked using a fit-for-purpose flexible sealant.
 - Caulking products shall be appropriate for the intended application.
 - Where it is not possible to insulate under an existing timber floor, gaps between floorboards shall be sealed before applying finishes or coverings.
 - External doors and windows shall be draughtproofed per BCA 13.4.4 using a durable, fit-for-purpose seal.
 - Cavity slider pockets shall be sealed before installation, either by wrapping with vapour permeable membrane, or by screwing plaster securely to the frame and applying a silicon bead.
 - Conditioned Class 1 and unconditioned Class 10a spaces shall be separated by insulation. Any openings between such spaces shall be weather-stripped.
 - Window sizes nominated are nominal. Actual size may vary minimally according to manufacturer; however, opening styles, overall size, U-value and SHGC values are inbuilt into the energy rating and may not be altered without the express approval of the project's energy rater.
 - Glazed doors and windows shall be N1 wind rated, weather-stripped and flashed all around.

AREA ANALYSIS

	Proposed Unit 1	Proposed Unit 2	Proposed Unit
Ground Floor	96.56 m ²	101.65 m ²	113.76 m ²
First Floor	81.43 m ²	66.35 m ²	81.58 m ²
Porch	5.61 m ²	5.60 m ²	1.20 m ²
Garage	22.74 m ²	22.74 m ²	46.68 m ²
TOTAL	206.34m ² OR	196.34m ² OR	196.54m ² OR
	22.21 SQ	21.13 SQ	21.16 SQ



6.2

MTXXW74WIY 29 May 2024

Assessor Amy Gedge

Accreditation No. DMN/21/2022

Address 1, 17 Railway Parade Seaford VIC 3198

117.9

www.nathers.gov.au

https://www.fr5.com.au/QRCodeLanding?PublicId=MTXXW74WIY

6

57TLGUTDXK 29 May 2024

Assessor Amy Gedge

Accreditation No. DMN/21/2022

Address 2, 17 Railway Parade Seaford VIC 3198

124.7

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AGCQFTLB6N 29 May 2024

Assessor Amy Gedge

Accreditation No. DMN/21/2022

Address 3, 17 Railway Parade Seaford VIC 3198

124.2

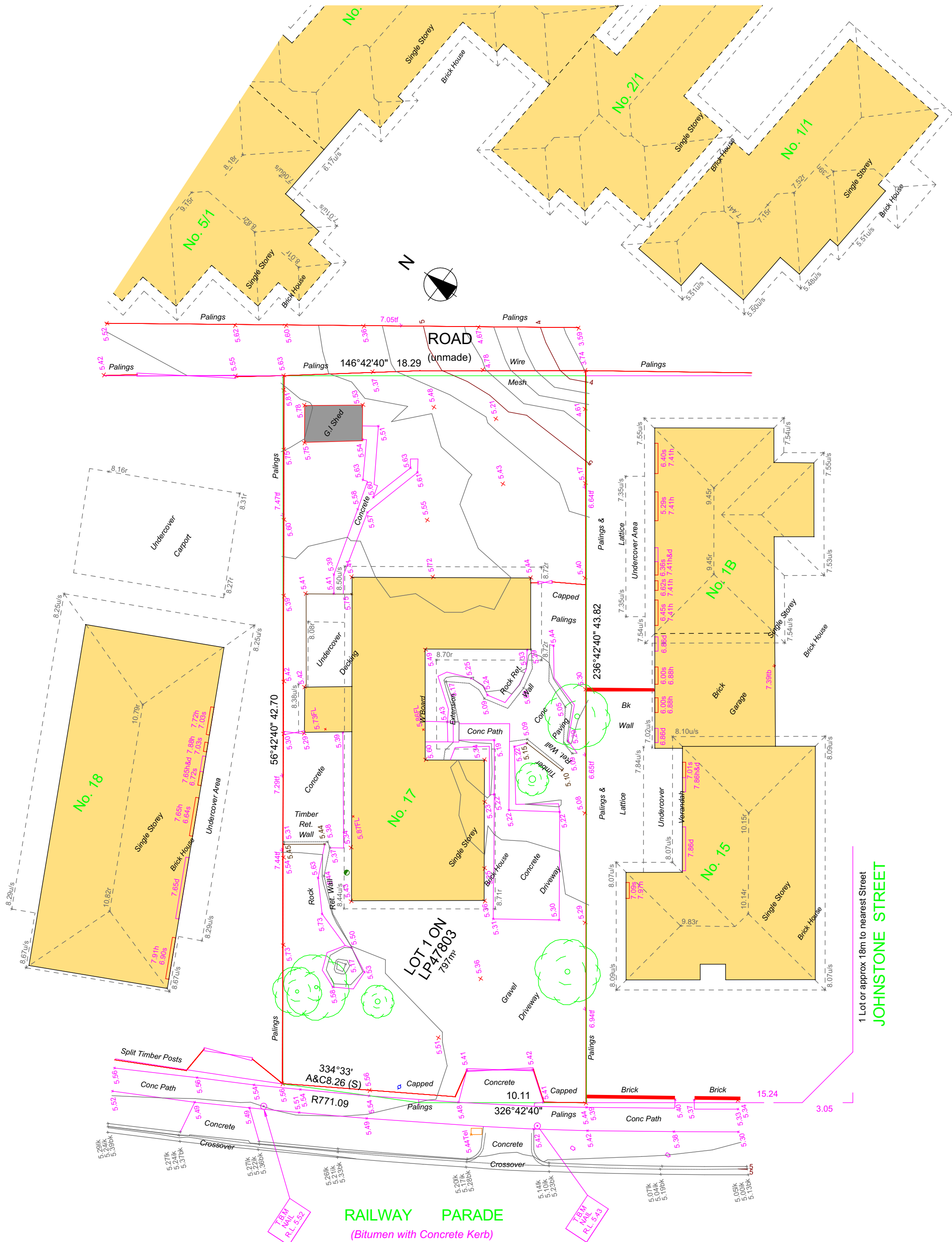
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https://www.fr5.com.au/QRCodeLanding?PublicId=AGCQFTLB6N

RevId	Description	Date
A	Energy Rating Details Added	20-05-24



Aerial Photograph 11-01-24



1 Lot or approx 18m to nearest Street
JOHNSTONE STREET

6.2

NATIONWIDE HOUSE

117.9

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NATIONWIDE HOUSE

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NATIONWIDE HOUSE

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The Site Cut indicated is approximately only. The Builder Shall Assess and adjust the cuts as necessary to accommodate construction variables such as:

- Site Drainage (To comply with AS 3500 & NCC 3.1.2)
- Slab forming/boxing System
- Termite Treatment/Control System
- Proposed Landscape Features Including finishedlevels, Backfilling, Pavement Depths,Cross Falls for Drainage etc. Grade surface away from house footings (Minimum 1:20)

The Height of the slab-on-ground, above external finished surfaces must be not less than 100mm above the finished Ground level in Low rainfall Intensity areas or sandy, Well drained areas or, 50mm Above Impermeable (Paved or Concrete) areas) that slope away from the Building or 150mm in any other case (To comply with NCC 3.1.2.2)

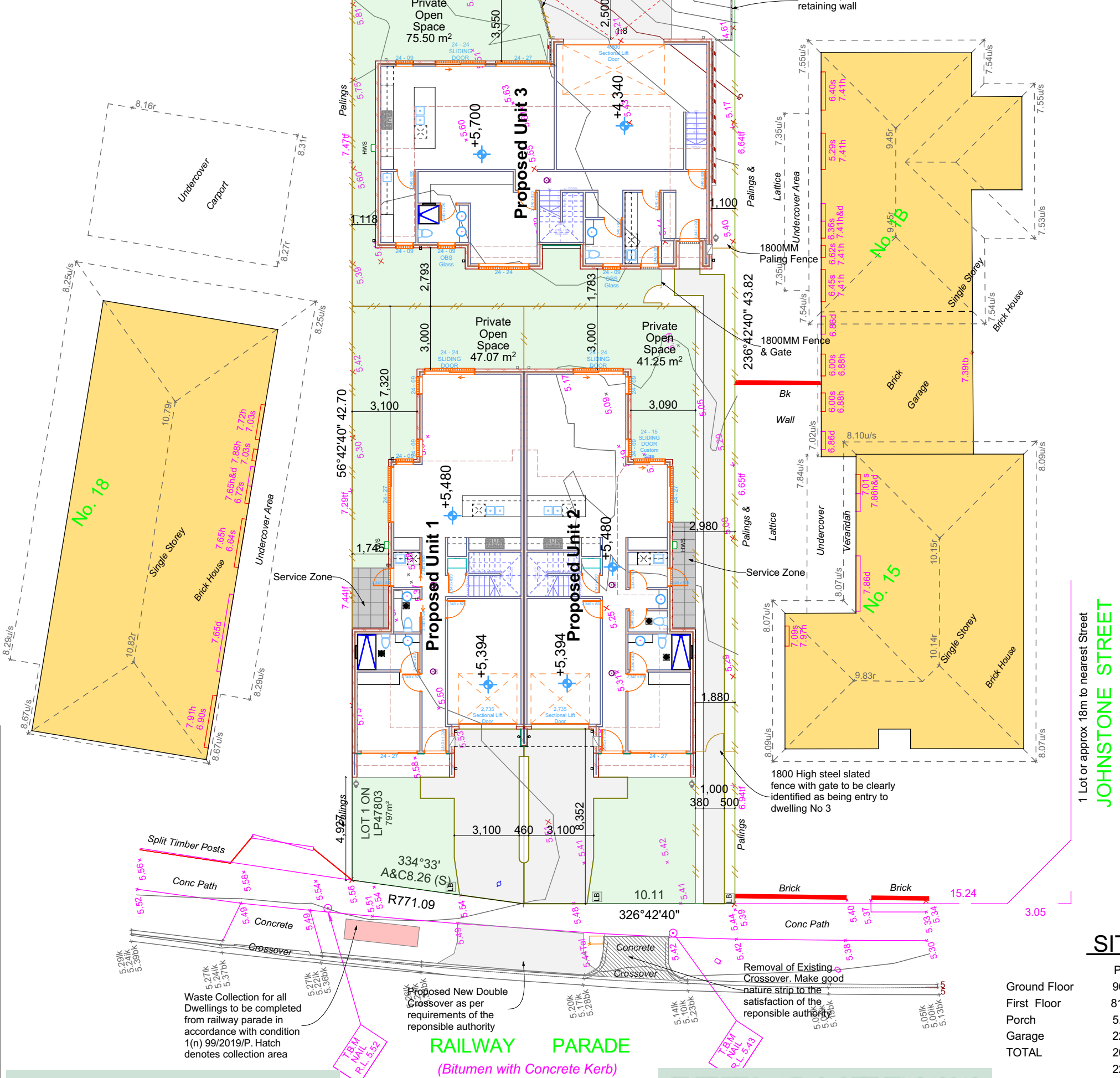
Site Cuts should allow for 100mm Top soil Backfill to Landscape areas unless noted otherwise.

However, Cuts are to be minimised to limit the need for excessive Backfill.

On Sites where landscaped areas require in excess of 100mm Backfill, Clean excavated material may be used in 150mm compacted layers with 100mm of F.G.L

Backfill under slabs shall be to Engineer Design/Details

All Site cuts are to have cross fall to provide positive drainage. The toe of every cut Batter to be provide with 90mm uPVC Slotted Aggi Drain connected to stormwater system via a silt pit protected by Gravel Filters.



MTXXW74WY 29 May 2024

6.2 **NATIONWIDE HOUSE ENERGY RATING SCHEME**

117.9 **MJ/m²**

Assessor: Amy Gedge
Accreditation No.: DMN/21/2022
Address: 1, 17 Railway Parade, Seaford VIC 3198

<https://www.fr5.com.au/QRCodeLanding?PublicId=MTXW74WY>

SITE LAYOUT GROUND FLOOR
Scale 1:200

57TLGUTDXK 29 May 2024

6 **NATIONWIDE HOUSE ENERGY RATING SCHEME**

124.7 **MJ/m²**

Assessor: Amy Gedge
Accreditation No.: DMN/21/2022
Address: 2, 17 Railway Parade, Seaford VIC 3198

<https://www.fr5.com.au/QRCodeLanding?PublicId=57TLGUTDXK>

Site Area	797m2
Site Coverage Total	416.54m² OR 52.3% OF SITE
Drive & Path Total	102 m² OR 12.8% OF SITE
Permeability Total	278.46m² OR 34.9% OF SITE

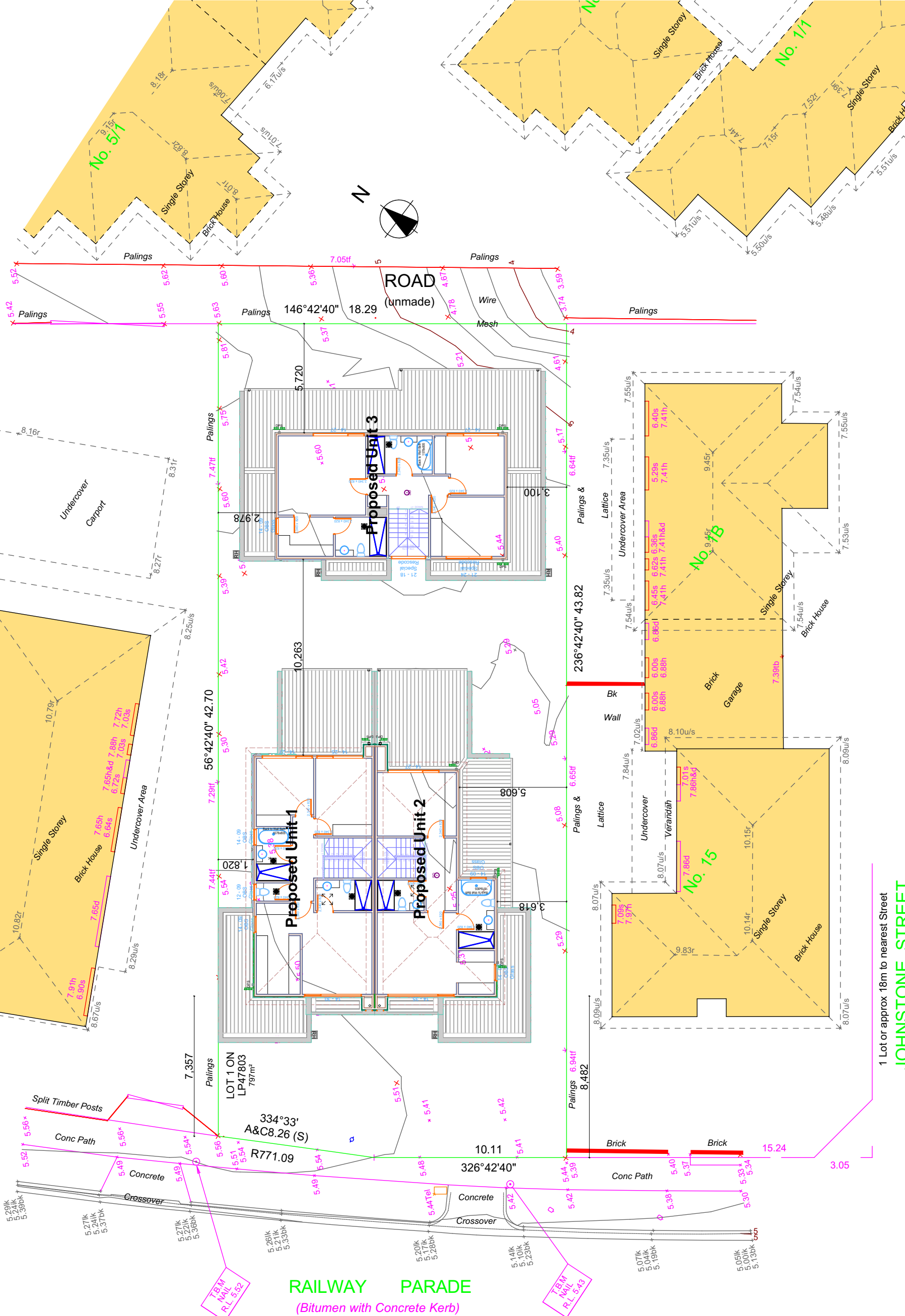
SITE AREA ANALYSIS

	Proposed Unit 1	Proposed Unit 2	Proposed Unit 2
Ground Floor	96.56 m²	101.65 m²	113.76 m²
First Floor	81.43 m²	66.35 m²	81.58 m²
Porch	5.61 m²	5.60 m²	1.20 m²
Garage	22.74 m²	22.74 m²	46.68 m²
TOTAL	206.34m² OR 22.21 SQ	196.34m² OR 21.13 SQ	196.54m² OR 21.16 SQ

1 Lot or approx 18m to nearest Street
JOHNSTONE STREET

Notes

- Site Drainage shall comply with NCC 3.1.2 'Drainage' and AS3500 National Plumbing Drainage Code
- Sites should be drained so that water cannot pond against or near the house. The ground immediately adjacent to the house should be graded to fall 50mm over the first metre. Where this is Impractical, use A.G.Drains adjacent to footings where the ground falls towards the building.
- Agricultural (AG) cut-off drains must be installed at the base of all excavations and along the high side of a sloping site and be connected to the storm water drainage system via a 300mm x 300mm silt pit
- AG drains must be laid a minimum of 400mm into the soil and 100mm below any adjacent footing or pavement
- Contractor to connect to Existing Legal Point of Discharge to the standard & satisfaction of the responsible authority. Contractor to confirm location & depth of legal point of discharge prior to construction to ensure design intent is achievable
- Stormwater Drains are indicative only. Drainer may connect to LPD at their discretion.
- Downpipes shall be minimum 100mm x 50mm, must not be located more than 12m apart and securely fixed to walls with approved brackets at maximum 2.2m centres
- Small Immature trees located in Nature strip or adjoining properties may affect the structure of the building if allowed to grow in excess of 6m in Height. It is recommended that the owner monitors the tree(s) growth & restrict their height to 6M max.
- A rainwater tank installed in a new Class 1 building in order to comply with the requirements of the building regulations must: be installed in such a way that it receives the rainfall from a minimum catchment area of 50 square metres;and have a minimum capacity of 2000 litres; and be connected to all toilets in the building for the purpose of sanitary flushing.



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6 **NATIONWIDE HOUSE ENERGY RATING SCHEME**

124.2 **MJ/m²**

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Accreditation No.: DMN/21/2022
Address: 3, 17 Railway Parade, Seaford VIC 3198

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SITE LAYOUT FIRST FLOOR
Scale 1:200

Drawing Ref: Jobs/23-24/1S

Date:29/05/2024

1:100 unless shown otherwise on A3:



Revision: A

DRAWING NO.
WD03

Sanitary Compartment Notes

- Where there is no window to W/C, Mechanical Ventilation Must be provided with a minimum 35Ltr per Second clean Air simultaneously with Artificial Light Source.
 - Exhaust Fan

- Removable Hinges are to be provided to all W/C without a minimum 1.2m clear space between the toilet Pan and the closest part of the doorway.

General Electrical Notes

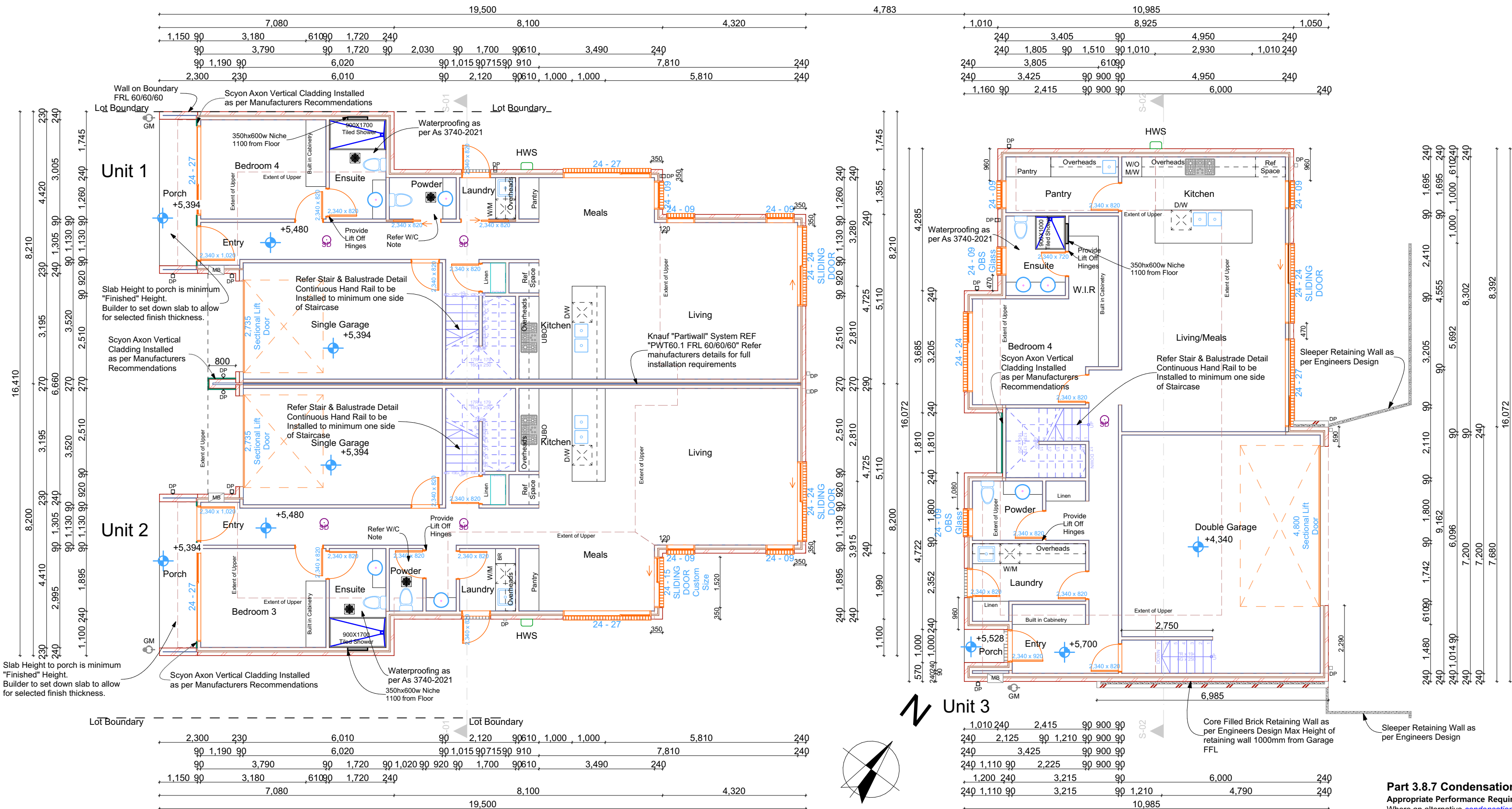
All Light Fittings are to be Energy Saving type - (CFLs) Compact Florescent Lamp & Downlights are to be of (LED) Light Emitting Diode Type

Artificial Lighting Requirements

Max 5W/m² Class 1 Building
Max 4W/m² Verandah, Balcony or the like attached to a Class 1
Max 3W/m² in a Class 10A
Building associated with a Class 1

Artificial Lighting Around the perimeter of a building must:
A) Be controlled by a daylight Sensor
B) Have an average light source efficiency of not less than 40 Lumens per Watt

Smoke Detector - Where there is more than one, Smoke detectors must be interconnected



FRL
LB 60/60/60
From both sides

SYSTEM DESCRIPTION
Side 1:

- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and Fire Barrier
- Insulation (refer to table)

Fire Barrier:

- 1 x 25mm SHAFTLINER™ MOULDSTOP between 25mm H-studs @ 600mm centres

Side 2:

- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber framing and Fire Barrier
- Insulation (refer to table)

Scan QR Code for full Installation Details of Knauf Partwall Incl Full Junction Details

6.2
NATIONWIDE ENERGY RATING SCHEME

MTXXW74WIY 29 May 2024

Assessor Amy Gedge
Accreditation No. DMN/21/2022

Address 1, 17 Railway Parade
Seaford VIC 3198

117.9
stars

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6
NATIONWIDE ENERGY RATING SCHEME

57TLGUTDXK 29 May 2024

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Address 2, 17 Railway Parade
Seaford VIC 3198

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<https://www.fr5.com.au/QRCodeLanding?PublicId=57TLGUTDXK>

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NATIONWIDE ENERGY RATING SCHEME

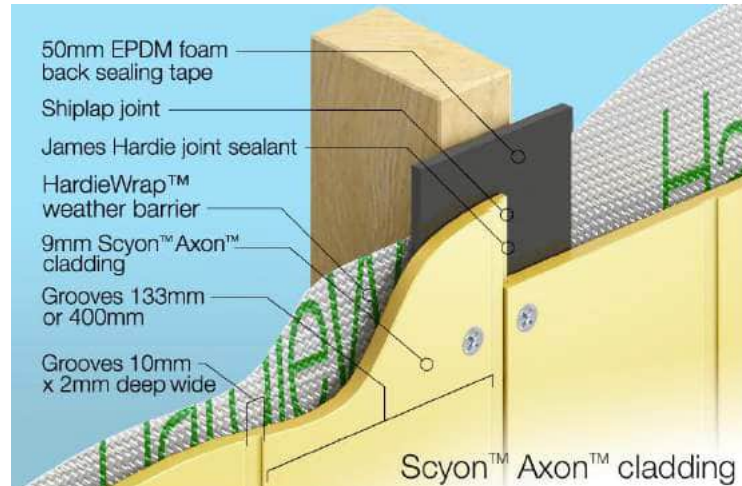
AGCQFTLB6N 29 May 2024

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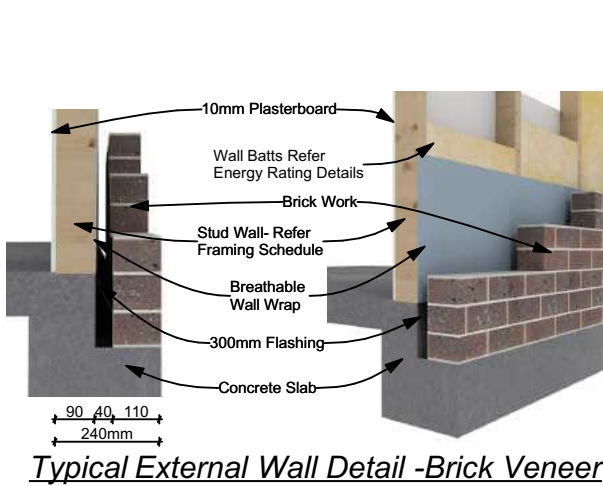
Address 3, 17 Railway Parade
Seaford VIC 3198

124.2
stars

<https://www.fr5.com.au/QRCodeLanding?PublicId=AGCQFTLB6N>



Scyon Axon Installation Details
Scan QR Code for full Installation Details



Part 3.9.2.4 Handrails

- (a)Handrails to a stairway or ramp must—
(i)be located along at least one side of the stairway flight or ramp; and
(ii)be located along the full length of the stairway flight or ramp, except in the case where a handrail is associated with a barrier the handrail may terminate where the barrier terminates; and
(iii)have the top surface of the handrail not less than 885 mm vertically above the nosings of the stair treads or the floor surface of the ramp (see Figure 3.9.2.4); and
(iv)be continuous and have no obstruction on or above them that will tend to break a handhold, except for newel posts, ball type stanchions, or the like.

Part 3.8.7 Condensation management

- Appropriate Performance Requirements**
Where an alternative *condensation* management system is proposed as a *Performance Solution* to that described in **Part 3.8.7**, that proposal must comply with:
(a)*Performance Requirement P2.4.7*; and
(b)the relevant *Performance Requirements* determined in accordance with **A2.2(3)** and **A2.4(3)** as applicable.
3.8.7.1 Application
Compliance with this Acceptable Construction Practice satisfies *Performance Requirement P2.4.7*.
3.8.7.2 Pliable building membrane
(a)Where a *pliable building membrane* is installed in an *external wall*, it must:
(i)comply with AS/NZS 4200.1; and
(ii)be installed in accordance with AS 4200.2; and
(iii)be a vapour permeable membrane for *climate zones* 6, 7 and 8; and
(iv)be located on the exterior side of the primary insulation layer of wall assemblies that form the external envelope of a building.
(b)Except for single skin masonry or single skin concrete, where a *pliable building membrane* is not installed in an *external wall*, the primary *water control layer* must be separated from *water sensitive materials* by a drained cavity.
3.8.7.3 Flow rate and discharge of exhaust systems
(a)An exhaust system installed in a kitchen, bathroom, *sanitary compartment* or laundry must have a minimum flowrate of:
(i)25 L/s for a bathroom or *sanitary compartment*; and
(ii)40 L/s for a kitchen or laundry.
(b)Exhaust from a bathroom, *sanitary compartment*, or laundry must be discharged:
(i)directly or via a shaft or duct to *outdoor air*; or
(ii)to a roof space that is ventilated in accordance with **3.8.7.4**.
3.8.7.4 Ventilation of roof spaces
(a)Where an exhaust system covered by **3.8.7.3** discharges into a roof space, the roof space must be ventilated *to outdoor air* through evenly distributed openings.
(b)Openings *required* by (a) must have a total unobstructed area of 1/300 of the respective ceiling area if the roof pitch is more than 22°, or 1/150 of the respective ceiling area if the roof pitch is not more than 22°. (c)30% of the total unobstructed area *required* by (b) must be located not more than 900 mm below the ridge or highestpoint of the roof space, measured vertically, with the remaining *required* area provided by eave vents.



Creative
house plans

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Elvir Bafto DP-AD 17703 DBU-20052
Address: 2B Desmond Court BEACONSFIELD VIC 3807
P 0422 422 448 | E mail@baftocorp.com.au |
W www.creativehph.com.au

CLIENT : BEKIM QANIU & FATIME QANIU

SITE ADDRESS : Lot 1 No 17 Railway Parade SEAFORD 3198

PROJECT :
3 Double Storey Dwellings

DRAWING TITLE :
Ground Floor Plan

Drawn by: [Name]
Checked by: [Name]
Approved by: [Name]

Drawing Ref: Jobs/23-24/1S

Date:29/05/2024

1:100 unless shown
otherwise on A3:



Revision: A

DRAWING NO.
WD04

Sanitary Compartment Notes

- Where there is no window to W/C, Mechanical Ventilation Must be provided with a minimum 35Ltr per Second clean Air simultaneously with Artificial Light Source.
- Exhaust Fan

- Removable Hinges are to be provided to all W/C without a minimum 1.2m clear space between the toilet Pan and the closest part of the doorway.

General Electrical Notes

All Light Fittings are to be Energy Saving type - (CFLs) Compact Florescent Lamp & Downlights are to be of (LED) Light Emitting Diode Type

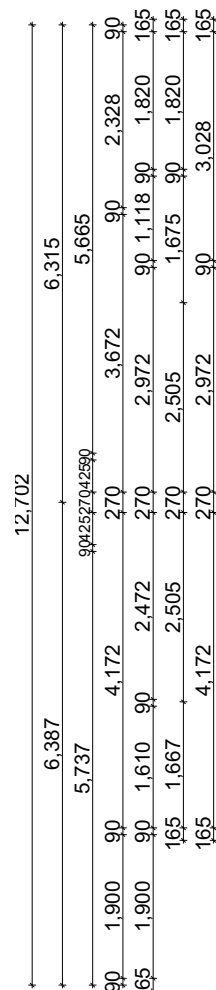
Artificial Lighting Requirements

Max 5W/m² Class 1 Building
Max 4W/m² Verandah, Balcony or the like attached to a Class 1
Max 3W/m² in a Class 10A
Building associated with a Class 1

Artificial Lighting Around the perimeter of a building must:

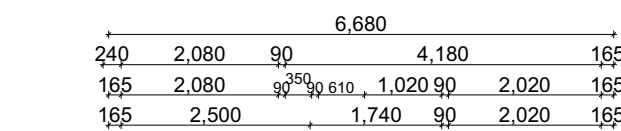
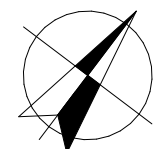
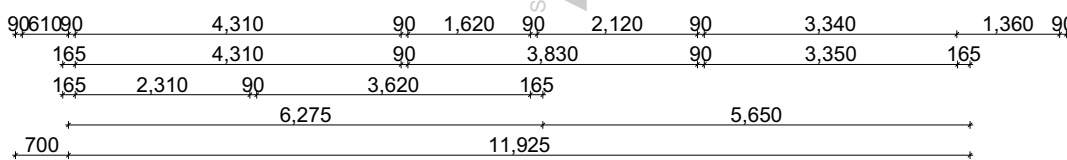
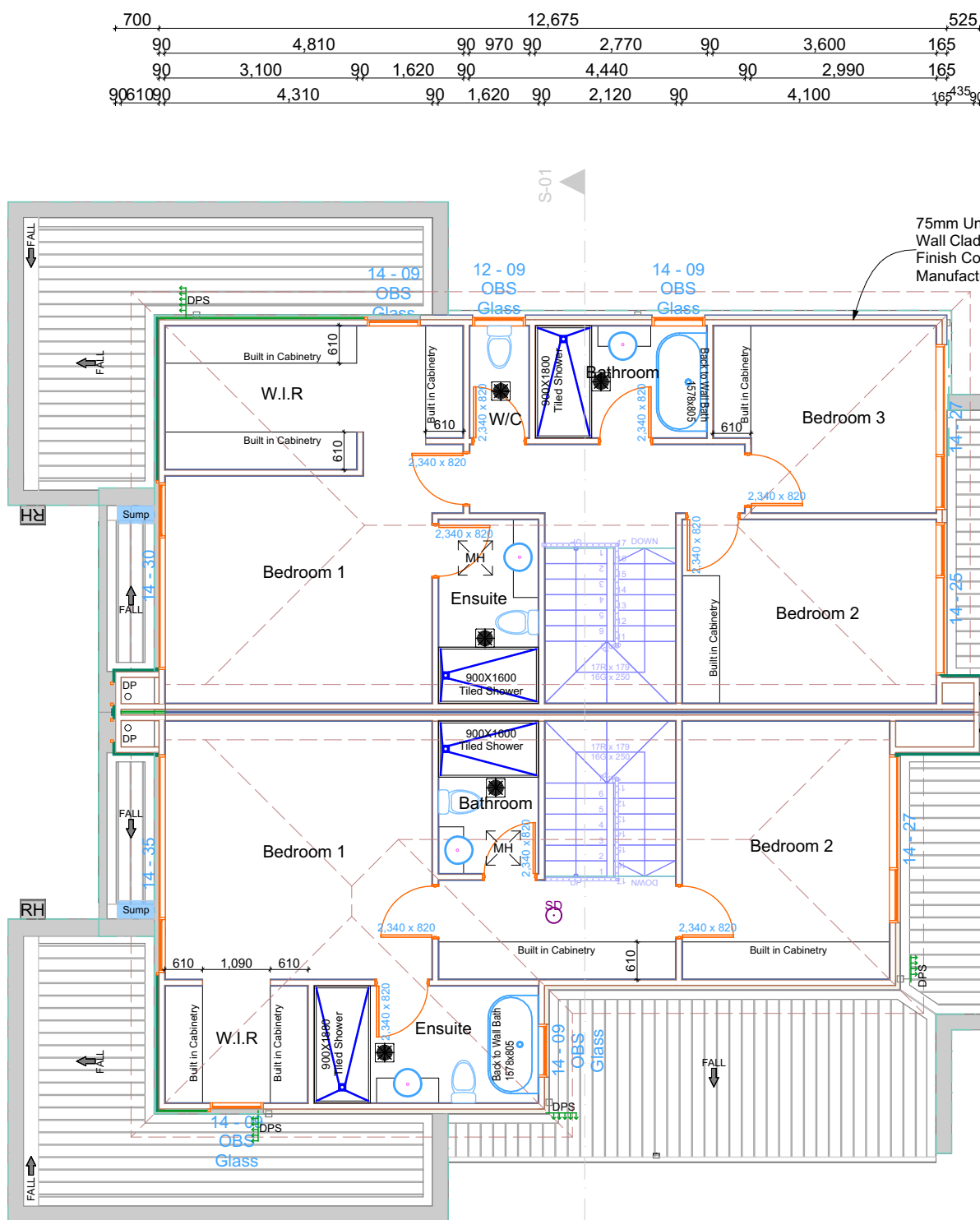
- A) Be controlled by a daylight Sensor
- B) Have an average light source efficiency of not less than 40 Lumens per Watt

Smoke Detector - Where there is more than one, Smoke detectors must be interconnected

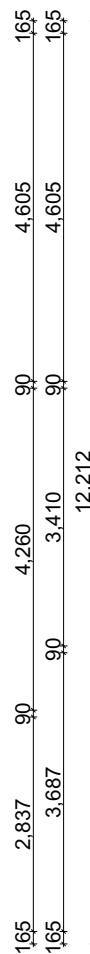
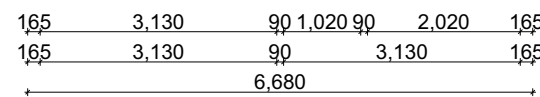


Unit 1

Unit 2



Unit 3



FRL
LB 60/60/60
From both sides

SYSTEM DESCRIPTION

Side 1:

- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and Fire Barrier
- Insulation (refer to table)

Fire Barrier:

- 1 x 25mm SHAFTLINER™ MOULDSTOP between 25mm H-studs @ 600mm centres

Side 2:

- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber framing and Fire Barrier
- Insulation (refer to table)

Scan QR Code for full Installation Details of Knauf Partwall Incl Full Junction Details

6.2
NATIONWIDE
HOUSE
ENERGY RATING SCHEME
117.9
star

Assessor
Accreditation No.
Address
1, 17 Railway Parade
Seaford
VIC 3198
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XW74WIY

MTXW74WIY 29 May 2024
Assessor Amy Gedge
Accreditation No. DMN/21/2022

Scyon™ Axon™ cladding

6
NATIONWIDE
HOUSE
ENERGY RATING SCHEME
124.7
star

Assessor
Accreditation No.
Address
2, 17 Railway Parade
Seaford
VIC 3198
https://www.fr5.com.au/QRCodeLanding?PublicId=57TL
GUTDXK

57TLGUTDXK 29 May 2024
Assessor Amy Gedge
Accreditation No. DMN/21/2022

Scyon™ Axon™ cladding

6
NATIONWIDE
HOUSE
ENERGY RATING SCHEME
124.2
star

Assessor
Accreditation No.
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QFTLB6N

AGCQFTLB6N 29 May 2024
Assessor Amy Gedge
Accreditation No. DMN/21/2022

75mm UNITEX Uni-Base Board
Light Weight Wall Cladding System

Unitex Render
Installation Details
Scan QR Code for full Installation Details

Part 3.8.7 Condensation management
Appropriate Performance Requirements
Where an alternative *condensation* management system is proposed as a *Performance Solution* to that described in **Part 3.8.7**, that proposal must comply with:-
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(b) the relevant *Performance Requirements* determined in accordance with **A2.2(3)** and **A2.4(3)** as applicable.

3.8.7.1 Application
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(b) Openings *required* by (a) must have a total unobstructed area of 1/300 of the respective ceiling area if the roof pitch is more than 22°, or 1/150 of the respective ceiling area if the roof pitch is not more than 22°.
(c) 30% of the total unobstructed area *required* by (b) must be located not more than 900 mm below the ridge or highest point of the roof space, measured vertically, with the remaining *required* area provided by eave vents.

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W www.creativehp.com.au

CLIENT : BEKIM QANIU & FATIME QANIU

SITE ADDRESS : Lot 1 No 17 Railway Parade SEAFORD 3198

PROJECT :
3 Double Storey Dwellings

DRAWING TITLE :
First Floor Plan

Drawing Ref: Jobs/23-24/1S

Date: 29/05/2024

1:100 unless shown otherwise on A3:

Design Matters Member

Revision: A

DRAWING NO.
WD05

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Part 3.8.7 Condensation management

3.8.7.3 Flow rate and discharge of exhaust systems

(a)An exhaust system installed in a kitchen, bathroom, *sanitary compartment* or laundry must have a minimum flowrate of-

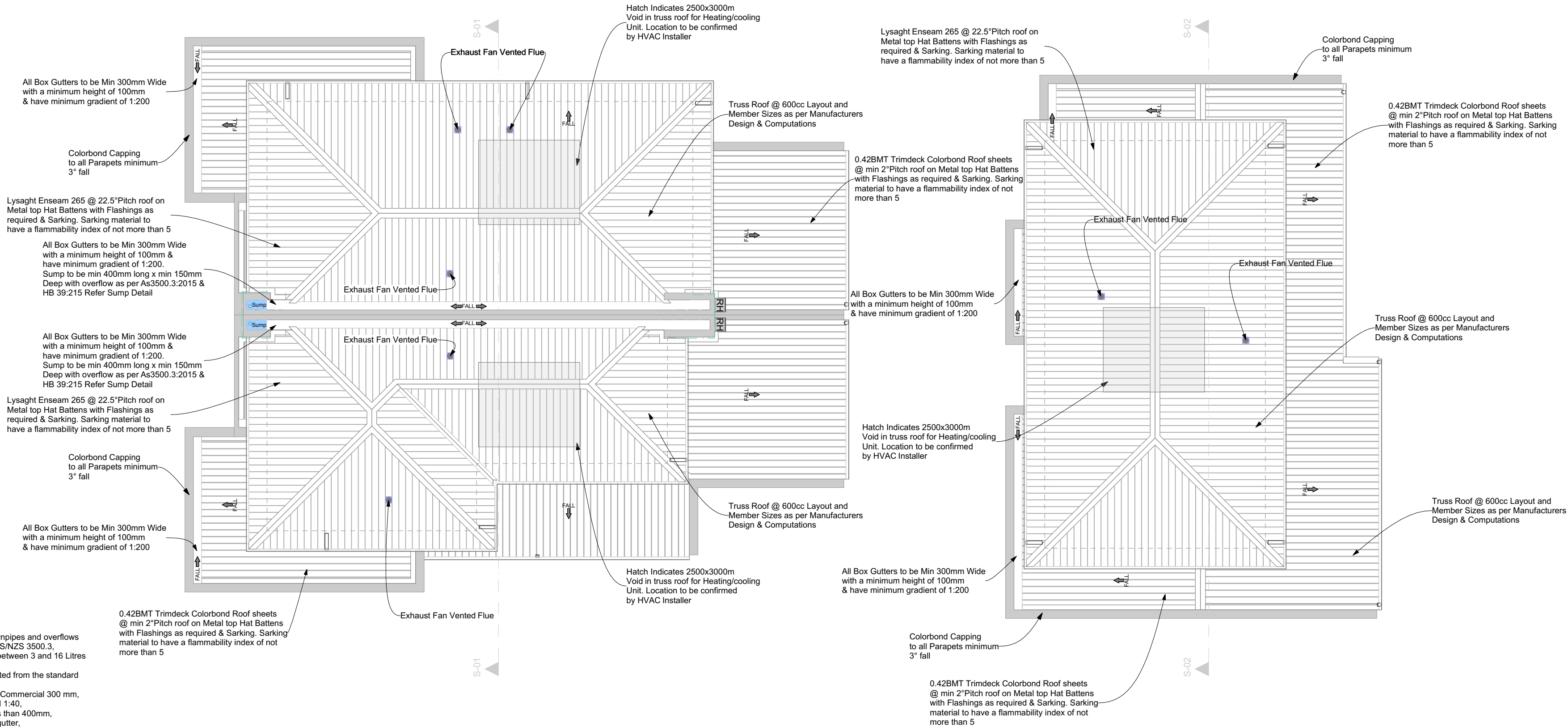
(i)25 L/s for a bathroom or *sanitary compartment*; and

(ii)40 L/s for a kitchen or laundry.

(b)Exhaust from a bathroom, *sanitary compartment*, or laundry must be discharged-

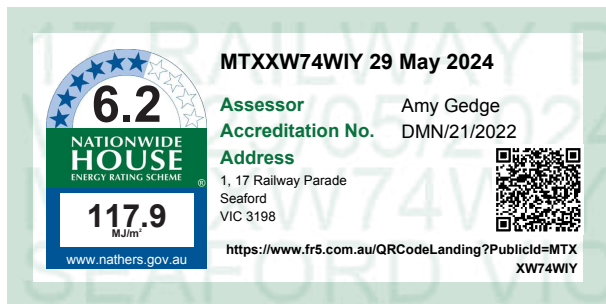
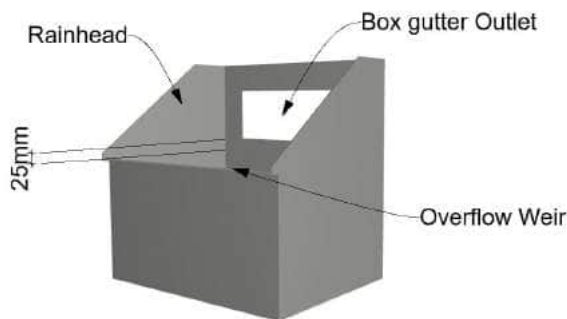
(i)directly or via a shaft or duct to *outdoor air*; or

(ii)to a roof space that is ventilated in accordance with 3.8.7.4.



Box Gutter Notes

- The depth of box gutters and sizing of sumps, rainheads, downpipes and overflows must be designed using the general methods specified in the AS/NZS 3500.3.
- The maximum design flow per downpipe can only be plotted between 3 and 16 Litres per second.
- 100mm x 50mm downpipes are not an option that can be plotted from the standard for use with a sump.
- The minimum width of any box gutter: Domestic 200 mm and Commercial 300 mm.
- Grade of box gutters can be plotted at 1:200, 1:150, 1:100 and 1:40.
- Length of a sump with a side overflow device shall not be less than 400mm.
- The width of any sump shall be equal to the width of the box gutter.
- Rainheads shall be left open above the overflow weir, inverted pops, Ned Kelly slots, round holes and vertical chutes or ducts are not deemed-to-satisfy solutions.
- Overflow devices must discharge to the atmosphere and be clear of neighbouring properties and public areas.
- Box gutters must be straight without a change of direction and discharge at the downstream end without a change in direction (i.e. not to the side).
- The box gutter sole width must not be reduced towards the outlet without a proportional increase in depth, the width of the gutter must not reduce to less than the minimum width at which it was designed (i.e. if designed at 200 mm sole width, gutter must not reduce to less than 200mm in width).
- Sumps and rainheads must be fixed and fully sealed to the box gutter.
- All box gutters must incorporate provision for expansion; where the distance between fixed points exceeds 6 metres; and at appropriate intervals for the material and situation as prescribed by the standard.
- No part of the outlet is above the sole of the sump or rainhead, and
- Lap joints of box gutters to have 25mm laps sealed and fastened in the direction of fall.



Typical Rainhead Detail with Overflow



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CLIENT : BEKIM QANIU & FATIME QANIU

SITE ADDRESS : Lot 1 No 17 Railway Parade SEAFORD 3198

PROJECT :
3 Double Storey Dwellings

DRAWING TITLE :
Roof Plan

Drawing Ref: Jobs/23-24/1S

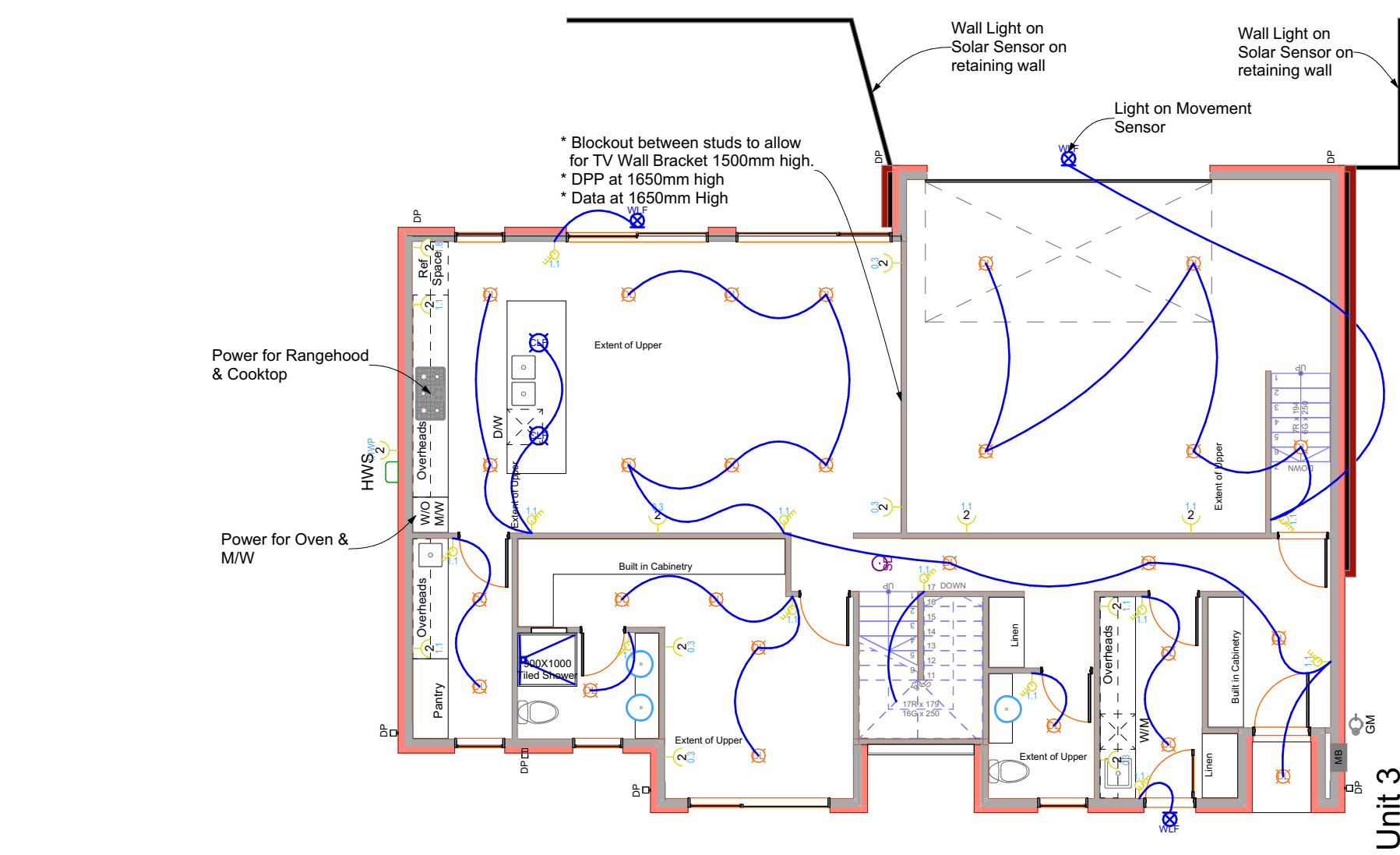
Date:29/05/2024

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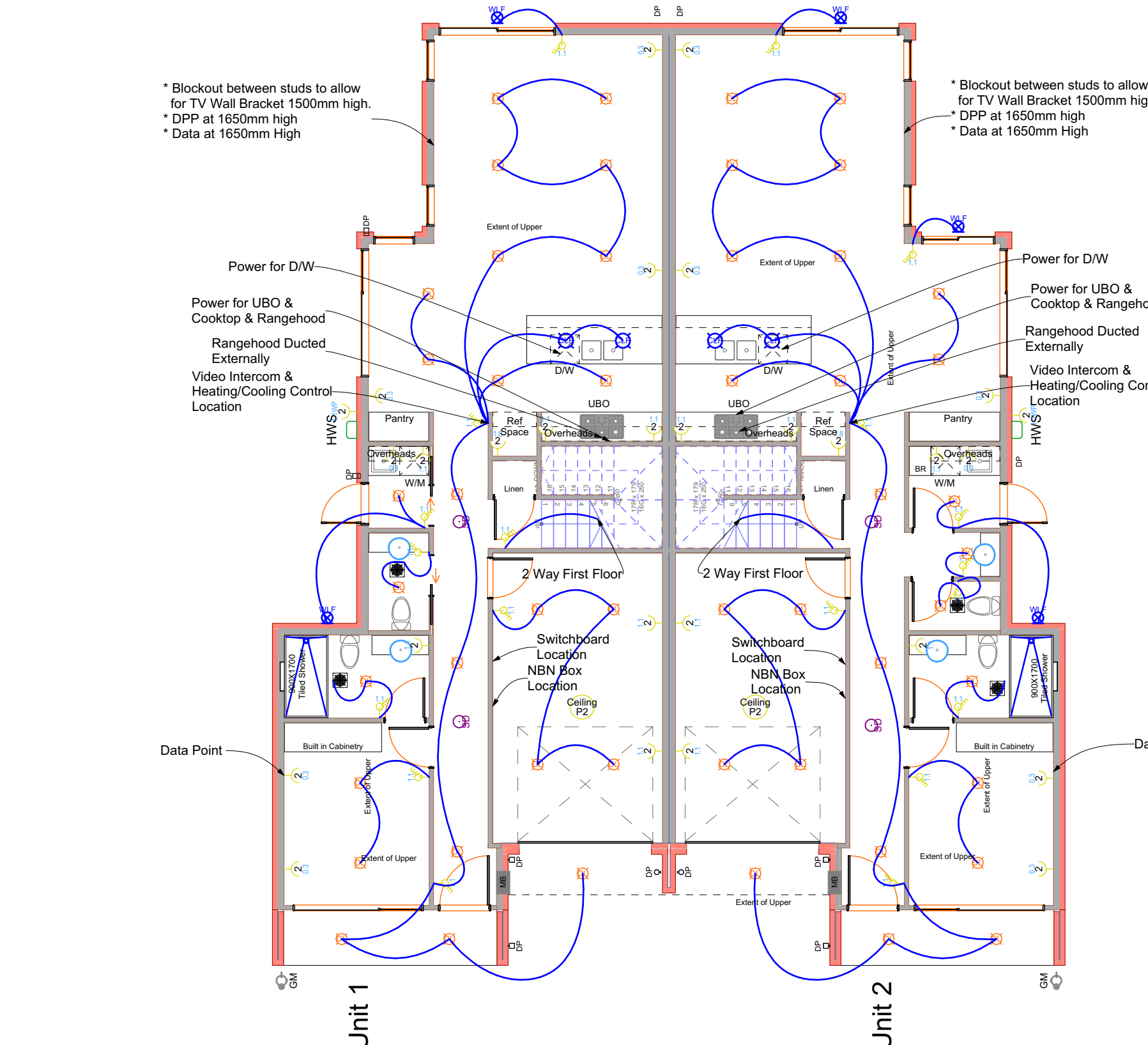
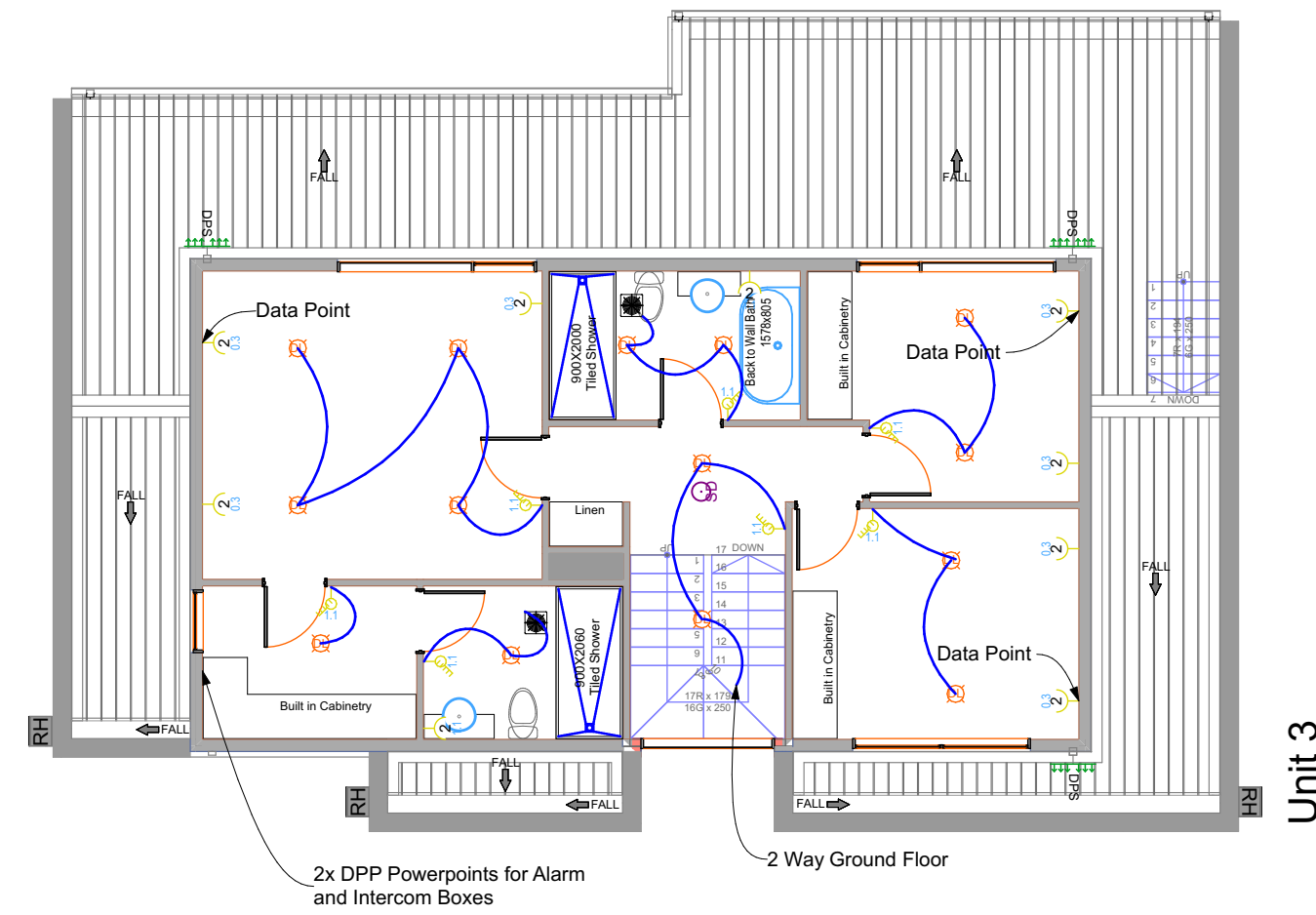


Revision: A

DRAWING NO.
WD06



POWER LEGEND	
	300mm Single Power Point
	300mm Double Power Point
	300mm Double Power Point Water Proof
	1100mm Double Power Point
	1100mm Double Power Point Water Proof
	1800mm Double Power Point
	Double Power Point Ceiling Mounted
	400mm Data Point
	1500mm Data Point
	400mm TV Point
	1500mm TV Point
	Wall Switch Point
	Smoke Detector
LIGHTING LEGEND	
	Light Point Batten with Shade Cowl
	10W LED Downlight
	Ceiling Light Fixture
	Wall Light Fixture
	Wall Light Batten
	Single Fluro Light
	Double Fluro Light
	Ceiling Fan
	Ceiling Exhaust Fan
	Ceiling Speaker



ELECTRICAL NOTES

- * Electrician to allow Power for Heating & Cooling system. Electrician to liaise with HVAC installer for requirements
- * Allow for Light in Roof Space within 1m of Man hole
- * NBN box to be located in garage
- * Electrician to allow and Install Telstra lead in Conduits
- * Power for Dishwasher & Microwave if applicable to be installed in adjacent cabinet with 50mm hole drilled through at rear of cabinet for cable.

MTXXW74WIY 29 May 2024

Assessor Amy Gedge
Accreditation No. DMN/21/2022
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https://www.frs.com.au/QRCodeLanding?PublicId=MTXW74WIY

57TLGUTDXK 29 May 2024

Assessor Amy Gedge
Accreditation No. DMN/21/2022
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https://www.frs.com.au/QRCodeLanding?PublicId=57TLGUTDXK

Sanitary Compartment Notes

- Where there is no window to W/C, Mechanical Ventilation Must be provided with a minimum 35Ltr per Second clean Air simultaneously with Artificial Light Source.
• Exhaust Fan
- Removable Hinges are to be provided to all W/C without a minimum 1.2m clear space between the toilet Pan and the closest part of the doorway.

General Electrical Notes

All Light Fittings are to be Energy Saving type - (CFLs) Compact Florescent Lamp & Downlights are to be of (LED) Light Emitting Diode Type

Artificial Lighting Requirements

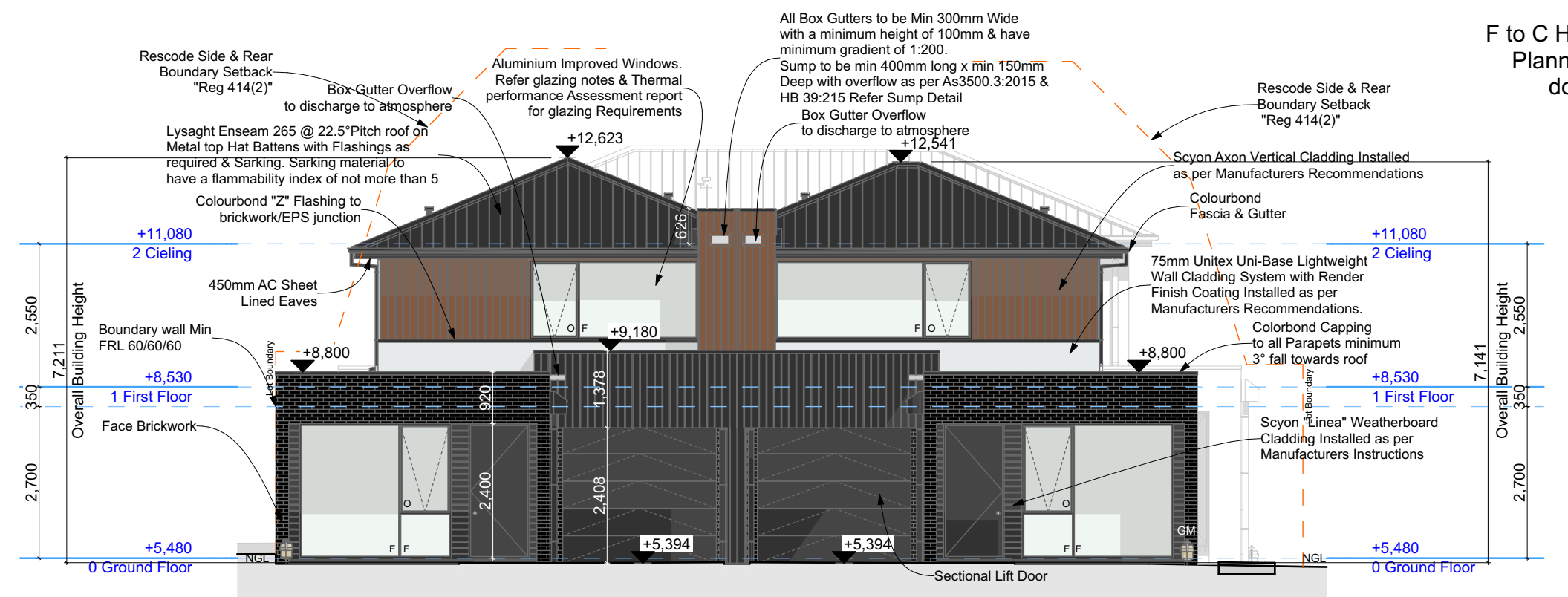
Max 5W/m² Class 1 Building
Max 4W/m² Verandah, Balcony or the like attached to a Class 1
Max 3W/m² in a Class 10A Building associated with a Class 1

Artificial Lighting Around the perimeter of a building must:

A) Be controlled by a daylight Sensor
B) Have an average light source efficiency of not less than 40 Lumens per Watt

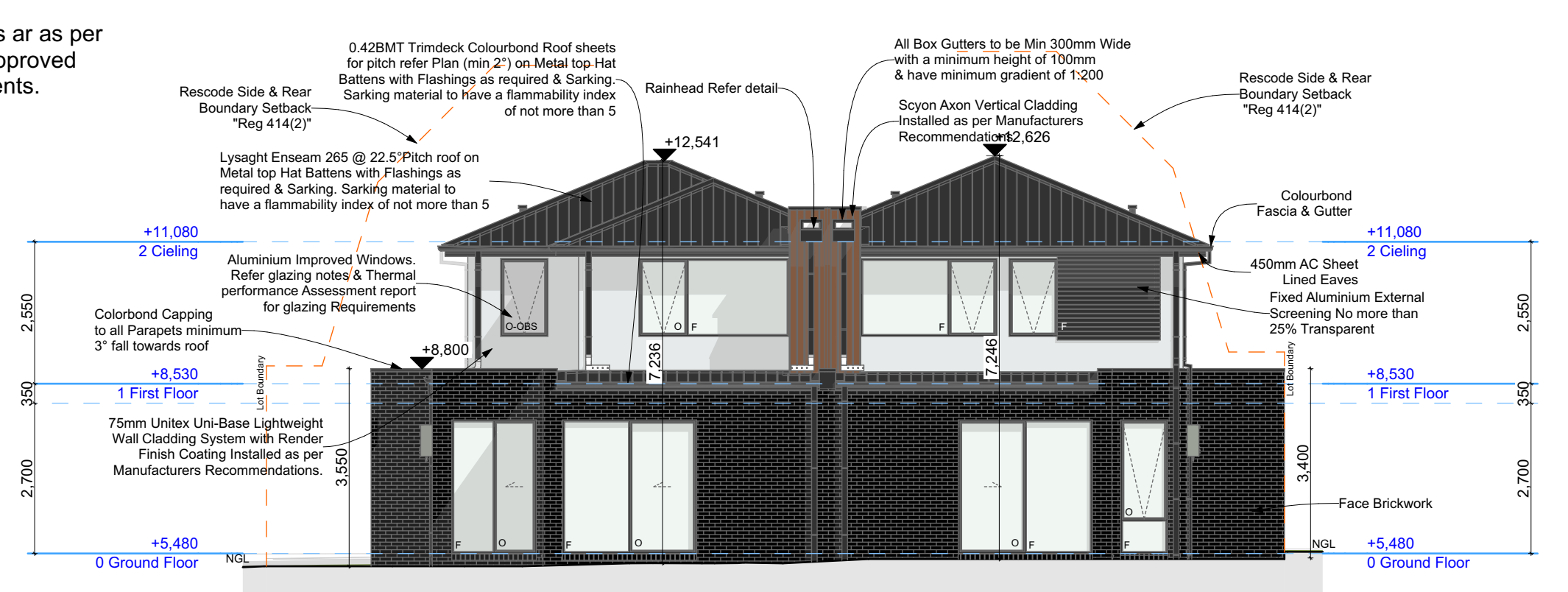
• Smoke Detector - Where there is more than one, Smoke detectors must be interconnected





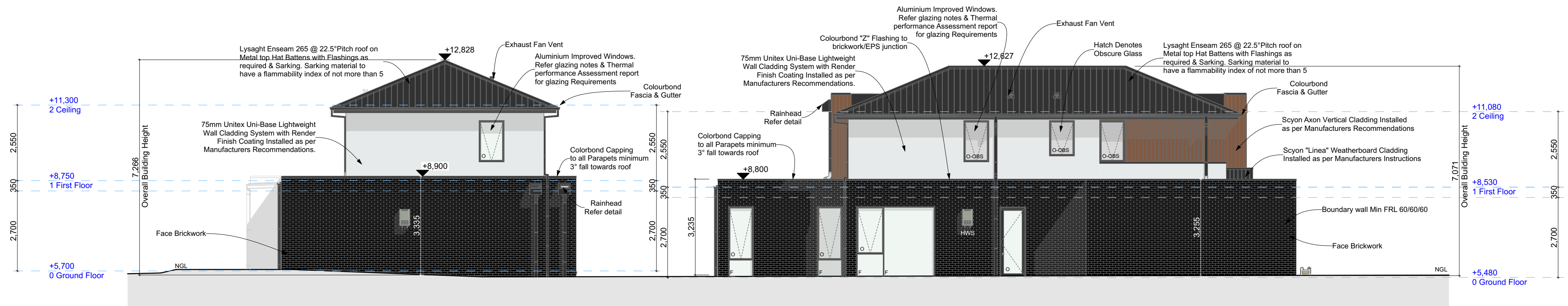
South West Elevation Unit 1 & Unit 2

1:100



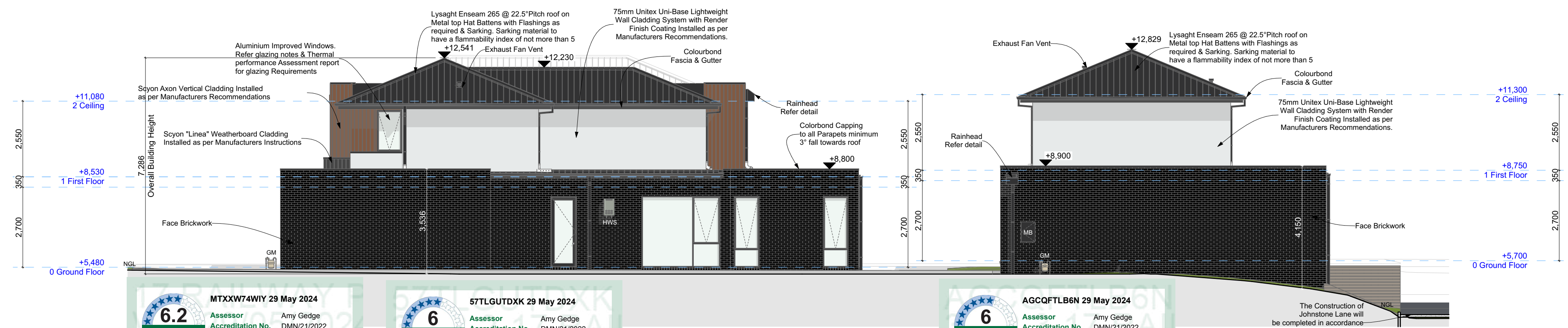
North East Elevation Unit 2 & Unit 1

1:100



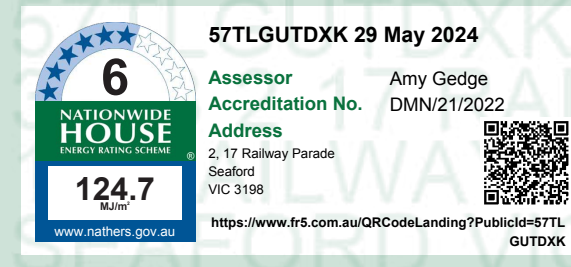
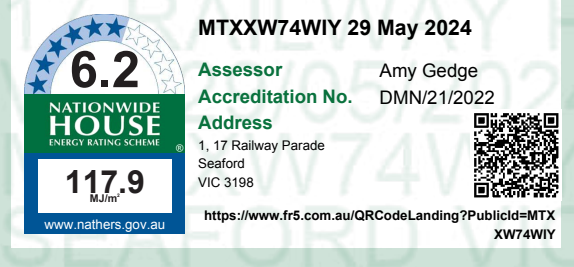
North West Elevation Unit 3 and Unit 1

1:100



South East Elevation Unit 2 & Unit 3

1:100



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CLIENT: BEKIM QANIU & FATIME QANIU

SITE ADDRESS: Lot 1 No 17 Railway Parade SEAFORD 3198

PROJECT:
3 Double Storey Dwellings

DRAWING TITLE:
Elevations

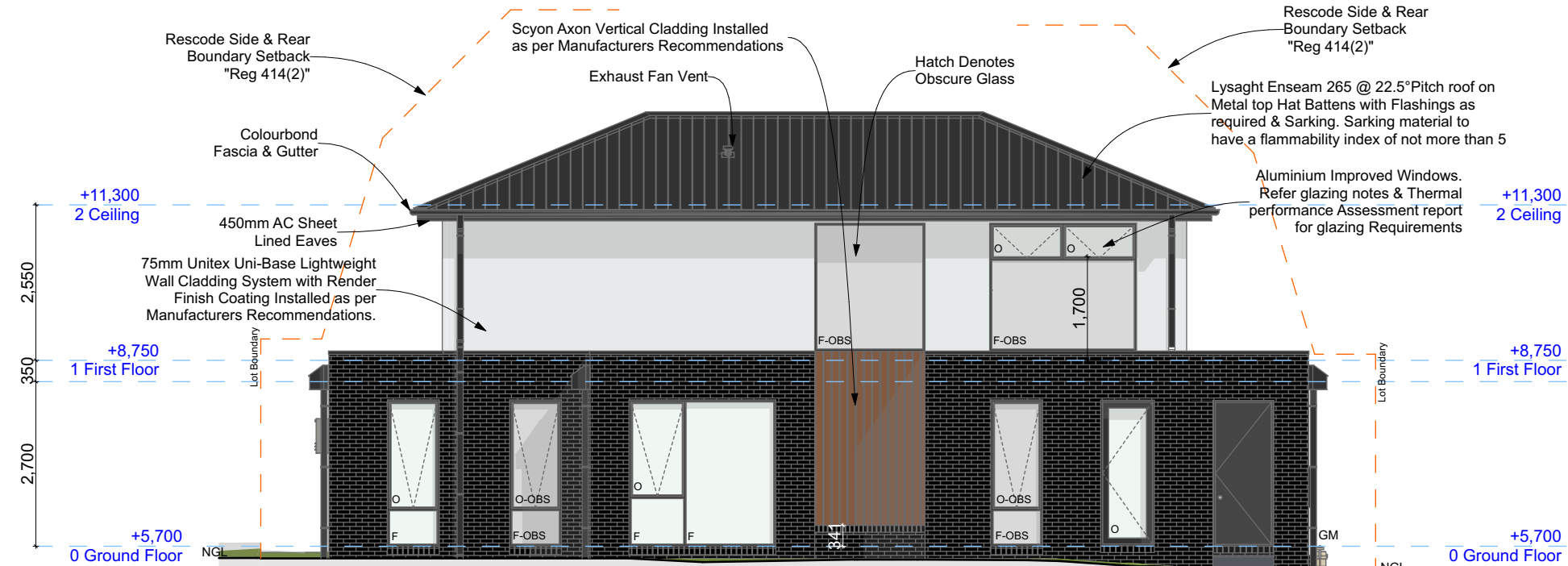
Drawing Ref: Jobs/23-24/1S

Date: 29/05/2024
1:100 unless shown
otherwise on A3:



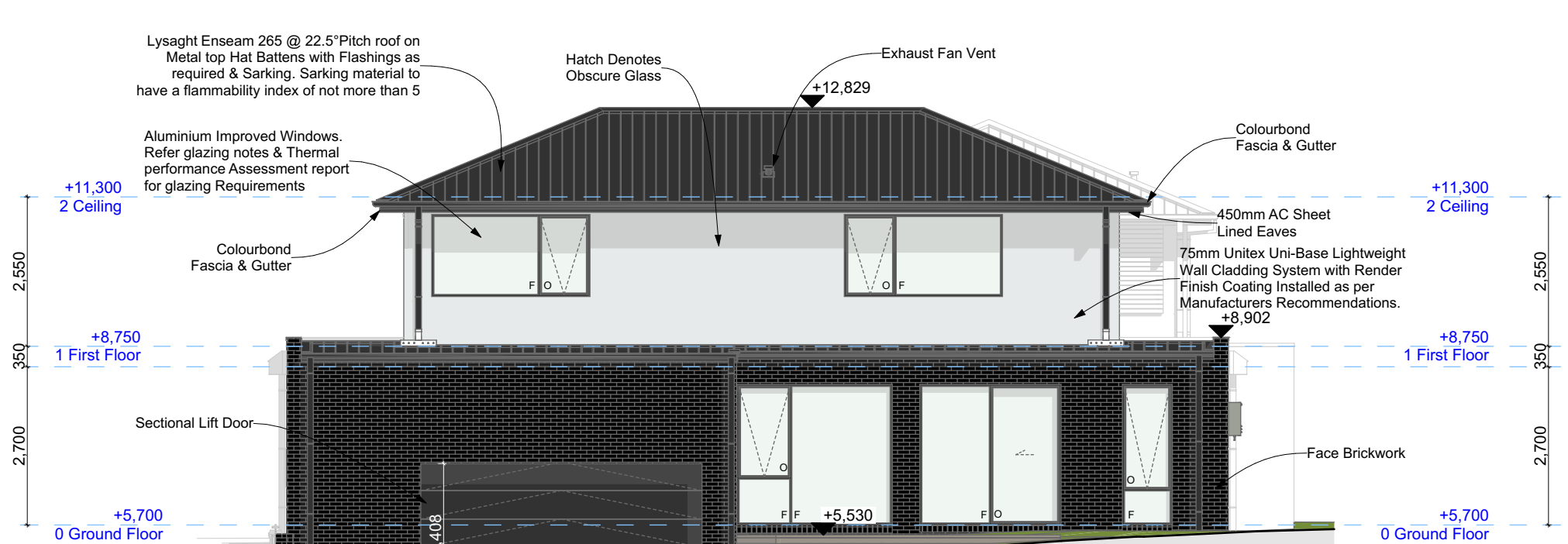
Revision: A

DRAWING NO.
WD08



South West Elevation Unit 3

1:100



North East Elevation Unit 3

1:100

<u>Timber Framing Specification</u>					
Single Storey/Upper Storey					
Member	Stress Grade	Size	Max Spacing	Max Span	Note:
Bottom Plates	MgP10	90x45			Untrenched
Top Plates	MgP10	90x45			Untrenched
External Ribbon Plate	MgP10	90x35			All Load Bearing Walls
Wall Studs	MgP10	90x35	600cc		
Lower Storey of a Double Storey					
Bottom Plates	MgP10	90x45			Untrenched
Top Plates	MgP10	2x90x45			Untrenched
Wall Studs	MgP10	90x45	450cc		All Load Bearing Walls
General Specifications					
External Jamb Studs	MgP10	90x45		1200	
	MgP10	2x90x45		2700	
	LVL	2x90x45		2700+	
Internal Jamb Studs	MgP10	90x45			
Lintels	Refer Span Tables and Engineering				
Noggings	Merch	70x35	1350cc		
Wall Bracing	Refer Engineering				
Roof Battens	F8	50x25	335cc		

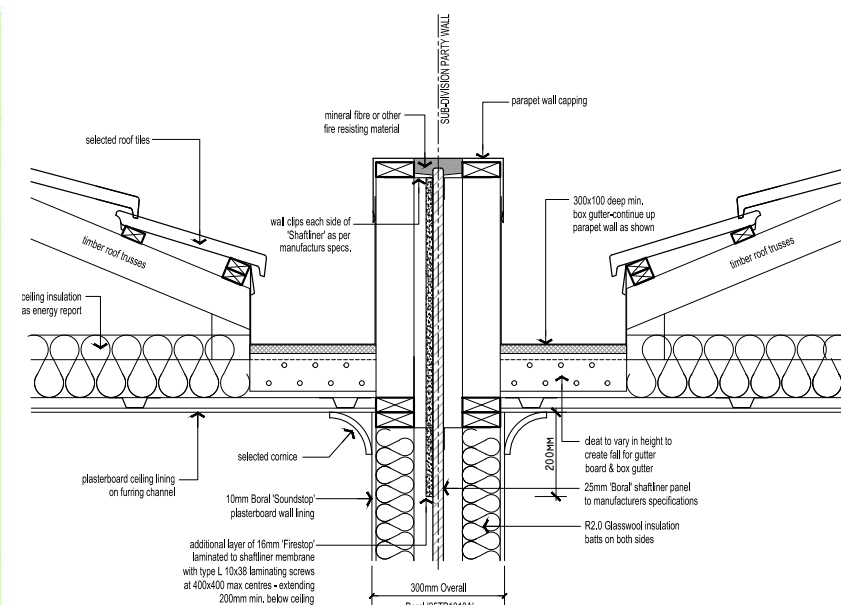
Notes:

1. All work to be carried out in strict accordance with AS1684 "Residential Timber Framed Construction" and Supplementary Tables.
2. Truss Roofs and/or Floor Trusses to be designed and installed as per Manufacturers Recommendations.

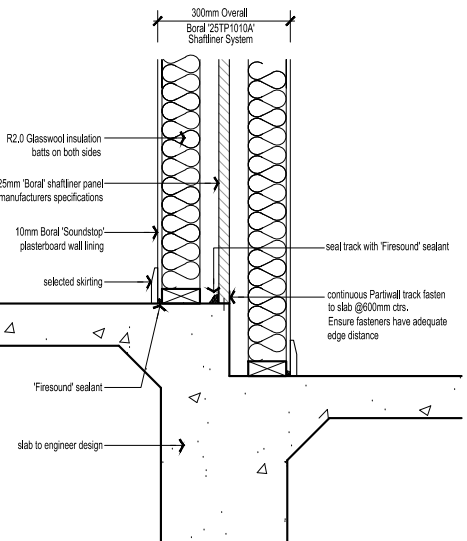
HOUSE ENERGY RATING				
Dwelling Address:	UNIT 1, 17 Railway Parade, Seaford			
Report By:	Amy Gedghe	Accreditation:	DMN/21/2022	
DWELLING ENERGY RATING CHECKS				
★★★★★				6.2
Climate Zone:	62	Moorabbin Airport		
Heating Load Limit:	115	Heating Load Actual:	98.8	
Cooling Load Limit:	24	Cooling Load Actual:	19.1	
ENERGY ASSESSMENT REPORT				
EXTERNAL WALLS	Type	Insulation Added		
	BRICK VENEER (MEDIUM)	R2.0 (EX GARAGE)		
	RENDERED 75MM EPS (MEDIUM)	R2.0		
	JH AXON CLAD (MEDIUM)	R2.0		
INTERNAL WALLS	PARTWALL	R2.0		
	GARAGE	R2.0		
GROUND FLOOR	SLAB ON GROUND	NIL		
FIRST FLOOR	TIMBER JOISTS OVER GARAGE	NIL		
ROOF / CEILING	METAL CLAD (DARK)	R3.5 (EX GARAGE)		
WINDOWS (COLOUR: MEDIUM)				
WERS CODE	DESCRIPTION	U Value	SHGC	
ECO-109-01	Al Slid Door D5 4-12-4	3.76	0.62	
ECO-101-01	Al Awning Window D6 4-12-4	3.51	0.59	
ECO-101-01	Al Casement Window D6 4-12-4	3.69	0.53	
SELF CLOSING EXHAUST FANS (INCLUDING IXL'S AND RANGEHOOD)				
RECESSED DOWNLIGHTS ARE TO BE SEALED (EITHER BY FITTING OR APPROVED COVER)				
SEAL ALL EXTERNAL DOORS, WINDOWS, GAPS, CRACKS, PLENUM PENETRATIONS ETC				
MINIMUM 2000L RAINWATER TANK CONNECTED TO ALL SANITARY FLUSHING SYSTEMS				
(MINIMUM ROOF RATCHMENT 5000L OR AN APPROVED SLARING HOT WATER SYSTEM)				

HOUSE ENERGY RATING			
Dwelling Address: UNIT 7, 17 Railway Parade, Seaford		Report By: Amy Gedge Accreditation: DMN/21/2022	
DWELLING ENERGY RATING ACHIEVES			
★★★★★		6.0	
Climate Zone:	62	Moorabbin Airport	
Heating Load Limit:	115	Heating Load Actual:	108.5
Cooling Load Limit:	24	Cooling Load Actual:	16.2
ENERGY ASSESSMENT REPORT			
EXTERNAL WALLS	Type	Insulation Added	
	BRICK VENEER (MEDIUM)	R2.0 (EX GARAGE)	
	RENDERED 75MM EPS (MEDIUM)	R2.0	
	JH AXON CLAD (MEDIUM)	R2.0	
	PARTWALL	R2.0	
INTERNAL WALLS	GARAGE	R2.0	
GROUND FLOOR	SLAB ON GROUND	NIL	
FIRST FLOOR	TIMBER JOISTS OVER GARAGE	R2.0	
ROOF / CEILING	METAL CLAD (DARK)	R5.0 (EX GARAGE)	
WINDOWS (COLOUR: MEDIUM)			
VERBS CODE	DESCRIPTION	U Value	SHGC
ECO-109-01	Al Sliding Door DG 4-12-4	3.76	0.62
ECO-101-01	Al Awning Window DG 4-12-4	3.51	0.59
ECO-101-01	Al Casement Window DG 4-12-4	3.69	0.53
SELF CLOSING EXHAUST FANS (INCLUDING KIL'S AND RANGEHOOD)			
CLOSED DOWNLIGHTS ARE TO BE SEALED (EITHER BY FITTING OR APPROVED COVER)			
SEAL ALL EXTERNAL DOORS, WINDOWS, GAPS, CRACKS, PLUMBING PENETRATIONS ETC			
MINIMUM 2000L RAINWATER TANK CONNECTED TO ALL SANITARY FLUSHING SYSTEMS			
(MINIMUM ROOF CATCHMENT 5000L OR APPROVED) OR HOT WATER SYSTEM			

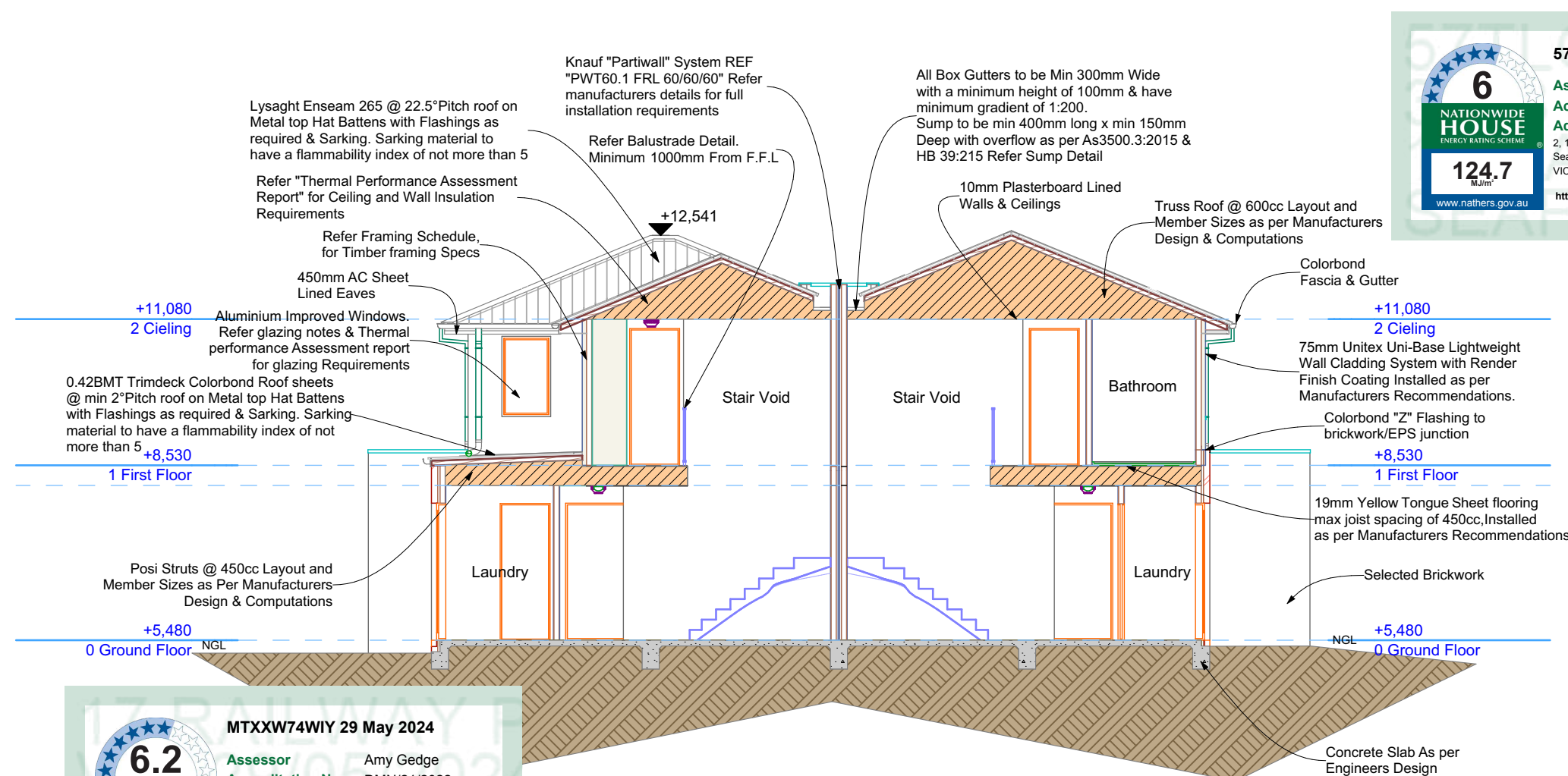
HOUSE ENERGY RATING				
Dwelling Address:	UNIT 3, 7 Railway Parade, Seaford			
Report By:	Amey Gedde	Accreditation:	DMN/21/2022	
DWELLING ENERGY RATING ADVISORY				
★★★★★ 6.0				
Climate Zone:	62	Moorabbin Airport		
Heating Load Limit:	115	Heating Load Actual:	102.1	
Cooling Load Limit:	216	Cooling Load Actual:	22.1	
ENERGY ASSESSMENT REPORT				
EXTERNAL WALLS	Type BRICK VENEER (MEDIUM) RENDERED 75MM EPS (MEDIUM) JI AXON CLAD (MEDIUM) GARAGE, LAUNDRY, POWDER & BATH SLAB ON GROUND TIMBER JOISTS OVER LOWER ROOF / CEILING METAL CLAD (DARK)			Insulation Added R2.5 (EX GARAGE) R2.5 R2.5 R2.5 NIL R2.0 (EX GARAGE)
INTERNAL WALLS				
GROUND FLOOR				
FIRST FLOOR				
WINDOWS (COLOUR: MEDIUM)				
WERS CODE	DESCRIPTION	U Value	SHGC	
ECO-III-03	Al Casement Window DG 4-12Ar-4	3.59	0.53	
ECO-101-03	Al Awning Window DG 4-12Ar-4	3.40	0.59	
ECO-109-03	Al Sliding Door DG 4-12Ar-4	3.64	0.62	
ECO-101-04	Al Awning Window DG 4-12Ar-4 (kitchen/living)	2.77	0.50	
ECO-115-03	Al Fixed Window DG 4-12Ar-4	3.07	0.64	
SELF CLOSING EXHAUST FANS (INCLUDING KIL'S AND RANGEHOOD) RECESSED DOWNLIGHTS ARE TO BE SEALED (EITHER BY FITTING OR APPROVED COVER) SEAL ALL EXTERNAL DOORS, WINDOWS, GAPS, CRACKS, PLUMBING PENETRATIONS ETC MINIMUM 7000L RAINWATER TANK CONNECTED TO ANY SANITARY FLUSHING SYSTEMS MINIMUM ROOF CATCHMENT SIMULATED APPROVED HOT WATER SYSTEMS				



ROOF PARAPET DETAIL A

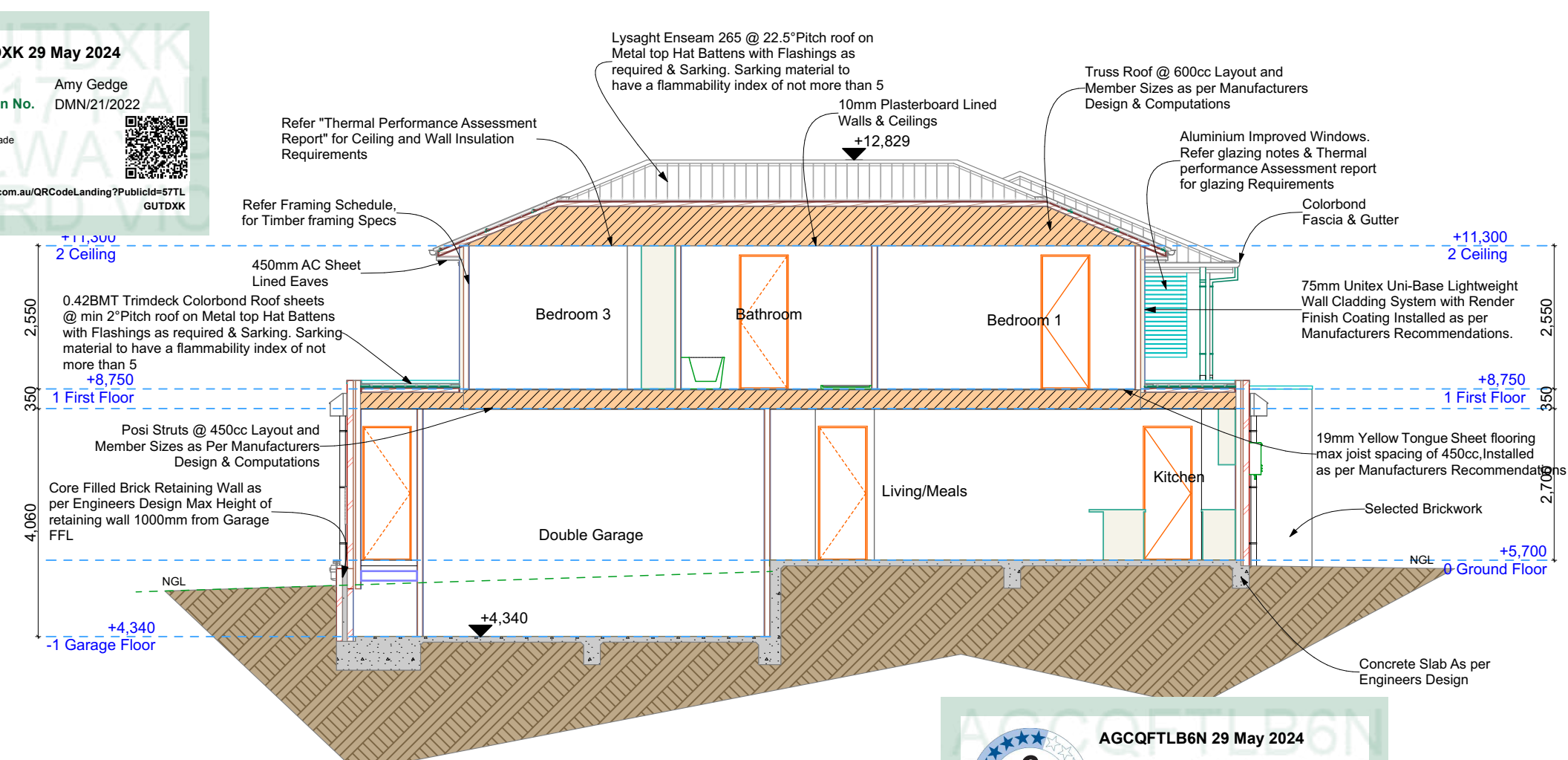


STEP IN SLAB DETAIL B



Building Section Unit 2 & Unit 1

1:100



Building Section Unit 3

1:100

FRL
LB 60/60/60
From both sides

SYSTEM DESCRIPTION

Side 1:

- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and Fire Barrier
- Insulation (refer to table)

Fire Barrier:

- 1 x 25mm SHAFTLINER™ MOULDSTOP between 25mm H-studs @ 600mm centres

Side 2:

- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber framing and Fire Barrier
- Insulation (refer to table)

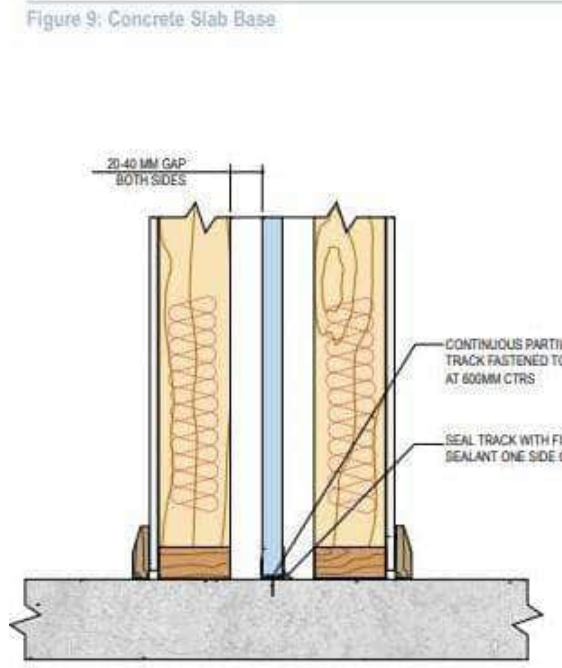


Figure 9: Concrete Slab Base

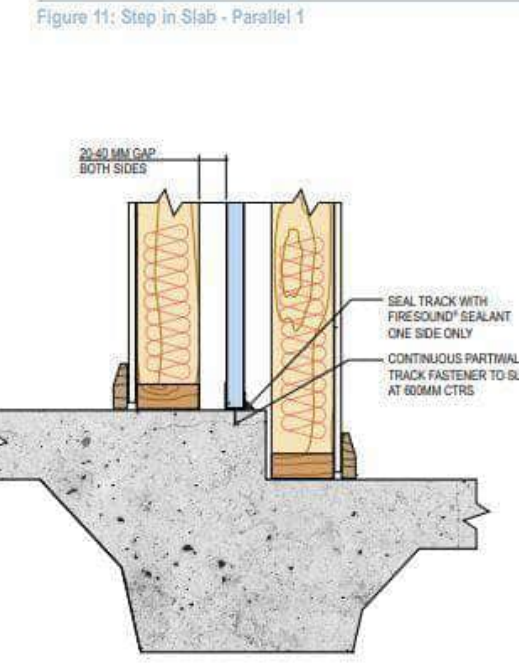


Figure 11: Step in Slab - Parallel 1

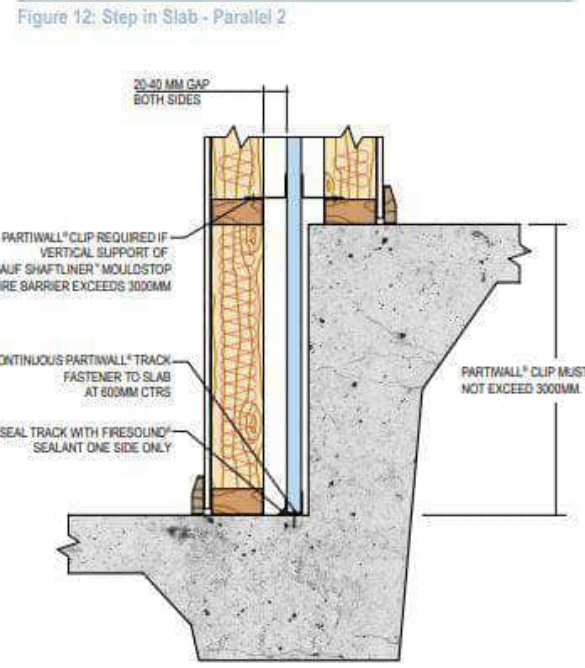


Figure 12: Step in Slab - Parallel 2

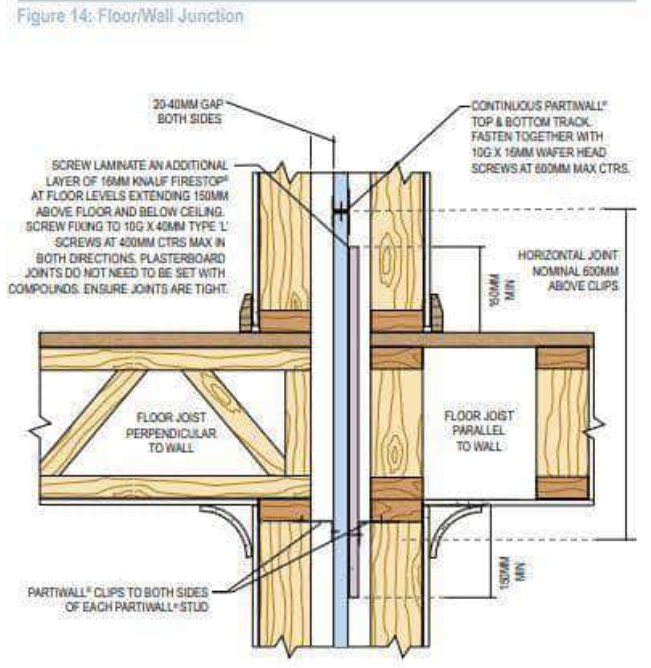


Figure 14: Floor/Wall Junction

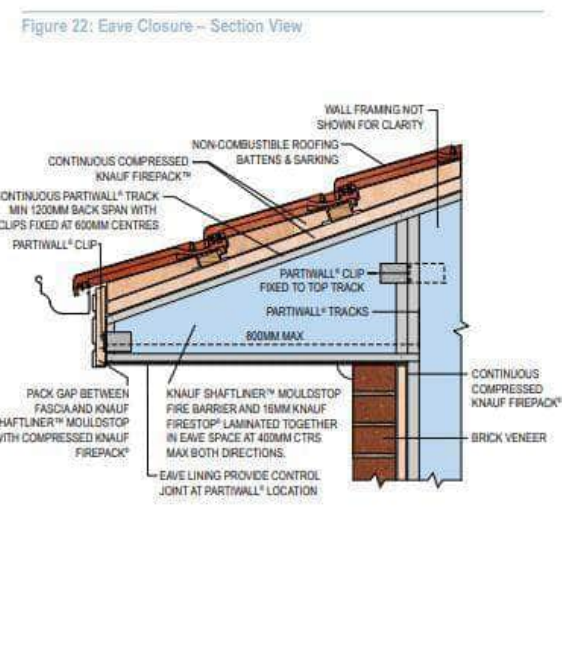


Figure 22: Eave Closure - Section View



Scan QR Code for full Installation Details of Knauf Partwall Incl Full Junction Details

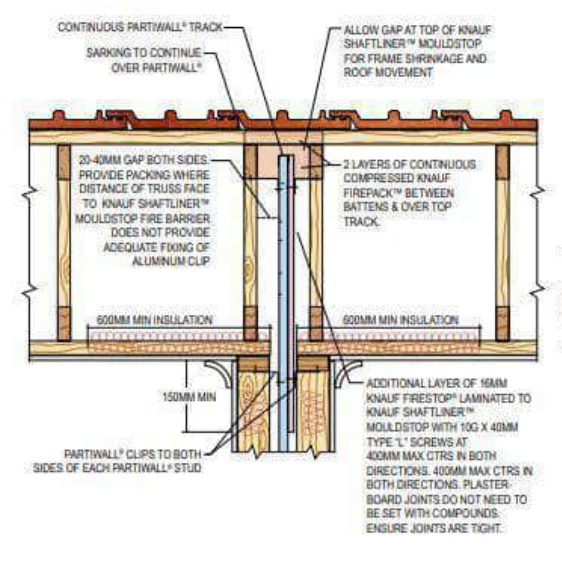


Figure 15: Pitched Roof Junction

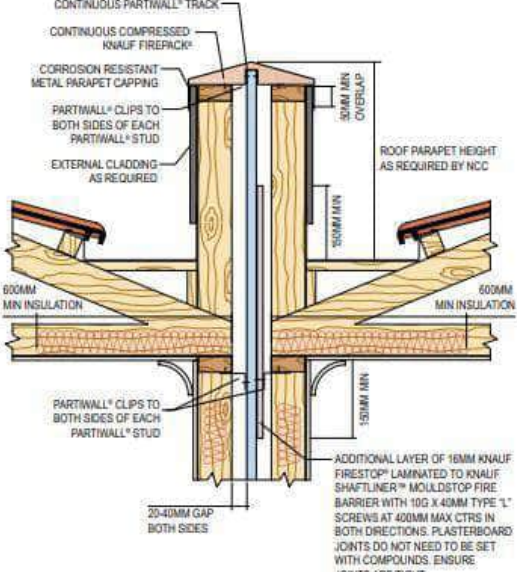


Figure 16: Parapet Roof Junction

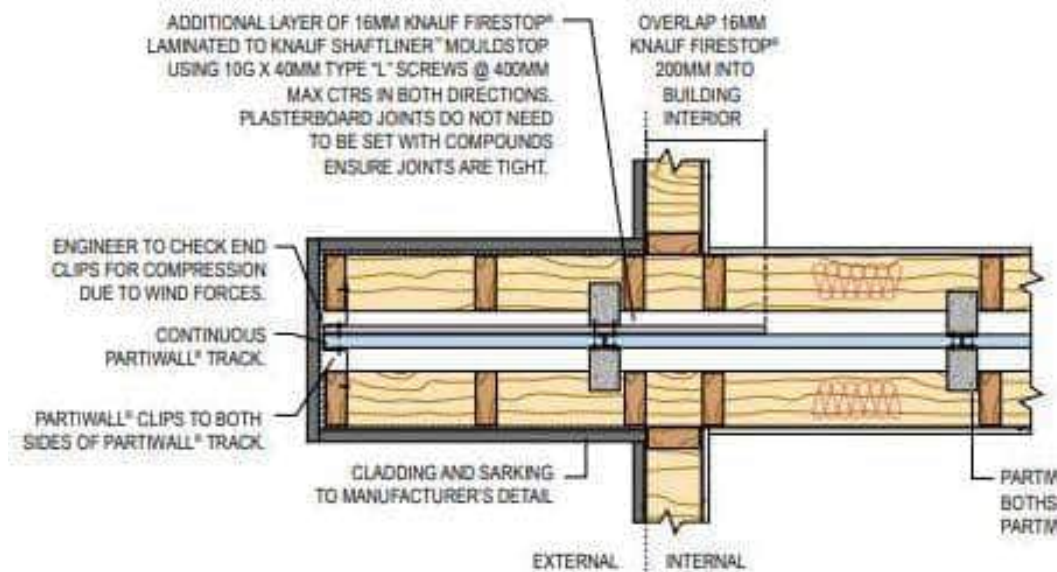


Figure 29: External to internal PARTWALL - Plan View

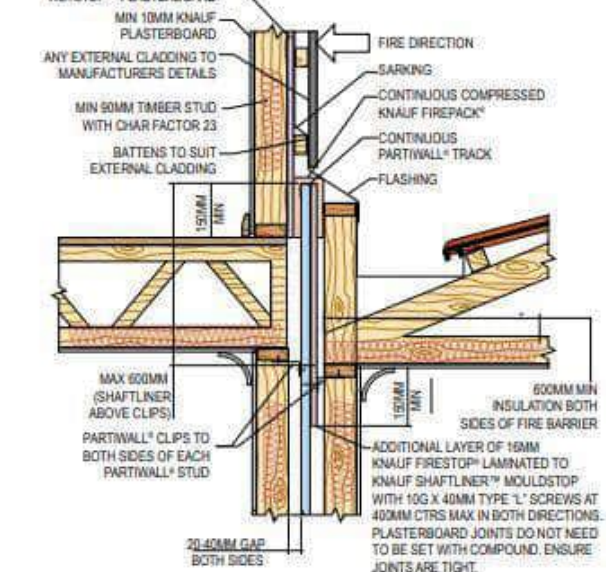


Figure 24: OUTWALL Vertical Transition - Any Cladding

Exposed Stringer

Riser
Min 115mm
Max 190mm

Tread (Going)
Min 240mm
Max 355mm

Concealed Stringer

Scan QR code full Full NCC Stair details and Figures

NCC Part11.2 Stairway Construction

(1) A stairway must be designed to take loading forces in accordance with AS/NZS 1170.1 and must have—

a) not more than 18 and not less than 2 risers in each flight; and

b) goings (G), risers (R) and a slope relationship quantity (2R + G) in accordance with Table 11.2.2a, except as permitted by (2) and (3); and

c) constant goings and risers throughout each flight, except as permitted by (3) and (4), and the dimensions of goings (G) and risers (R) in accordance with (1), (2) and (3) are considered constant if the variation between

i) adjacent risers, or between adjacent goings, is not more than 5 mm; and

ii) the largest and smallest riser within a flight, or the largest and smallest going within a flight, is not more than 10mm; and

d) risers which do not have any openings that would allow a 125 mm sphere to pass through between the treads; and

e) treads of solid construction (not mesh or other perforated material) if the stairway is more than 10 m high or connects more than 3 storeys.

(2) In the case of a stairway serving only non-habitable rooms, such as attics, storerooms and the like that are not used on a regular or daily basis—

a) the going (G), riser (R) and slope relationship quantity (2R + G) in accordance with Table 11.2.2a may be substituted with those in Table 11.2.2b; and

b) need not comply with (1)(d).

(3) In the case of a stairway with winders—

a) a maximum of 3 consecutive winders in lieu of a quarter landing in a flight and a maximum of 6 consecutive winders in lieu of a half landing in a flight; and

b) the going (G) of all winders in lieu of a quarter or half landing may vary from the going of the straight treads within the same flight provided that the going (G) of such winders is constant.

(4) The point of measurement of the going (G) in the slope relationship quantity (2R + G) for tapered treads and treads in spiral stairways as described in Table 11.2.2a (see Figure 11.2.2a, Figure 11.2.2b and Figure 11.2.2c) must be—

a) for tapered treads, other than treads in a spiral stairway—

i) not more than 1 m in width, the middle of the unobstructed width of the stairway (see Figure 11.2.2b); and

ii) more than 1 m in width, 400 mm from the unobstructed width of each side of the stairway (see Figure 11.2.2c); and

b) for treads in spiral stairways, the point seven tenths of the unobstructed width from the face of the centre pole or support towards the handrail side (see Figure 11.2.2d and Figure 11.2.2e).

(5) Riser and going dimensions must be measured in accordance with Figure 11.2.2f.

Table 11.2.2a Riser and going dimensions (mm)

Stair type	Riser (R) (see Figure 11.2.2f)		Going (G) (see Figure 11.2.2f)		Slope relationship (2R+G)	
	Max	Min	Max	Min	Max	Min
Stairs (other than spiral)	190	115	355	240	700	550
Spiral	220	140	370	210	680	590

Table 11.2.2b Riser and going dimensions (mm) — stairways serving non-habitable rooms used infrequently

Riser (R)		Going (G)		Slope relationship (2R+G)	
Max	Min	Max	Min	Max	Min
225	130	355	215	700	540

Window Notes

- All windows where the floor level is higher than 2m above the surface beneath require the affected window to be fitted with either a device to restrict the window opening, or a suitable screen, so a 125 mm diameter sphere (representing the size of a young child's head) cannot pass through. The device or screen must also be able to withstand an outward horizontal force of 250 N.
- All Window sizes are nominal only. Actual sizes will vary according to each Manufacturer. Sizes noted on these plans are not to be used for stud openings, Manufacturer is to supply stud opening schedules to Builder/Carpenter.
- Obscure & Safety Glass as noted on plans and hatched on elevations.
- All glazing to refer to NatHERS certificate for minimum U & SHGC Values

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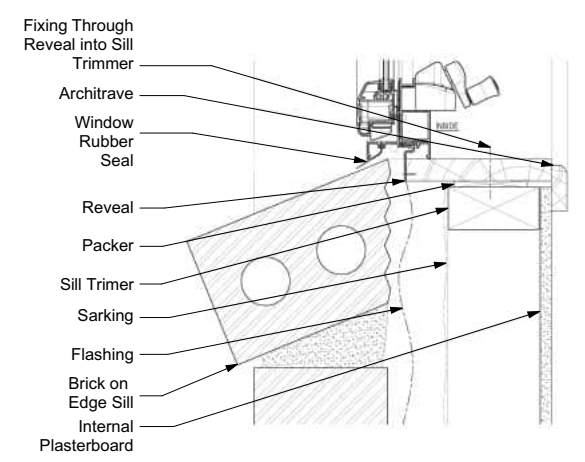
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Assessor Amy Gedge
Accreditation No. DMN/21/2022
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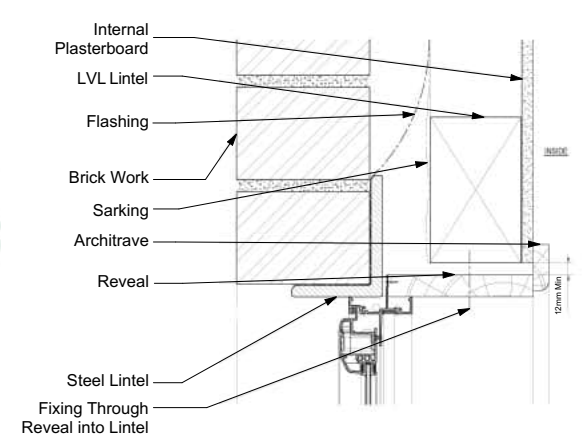
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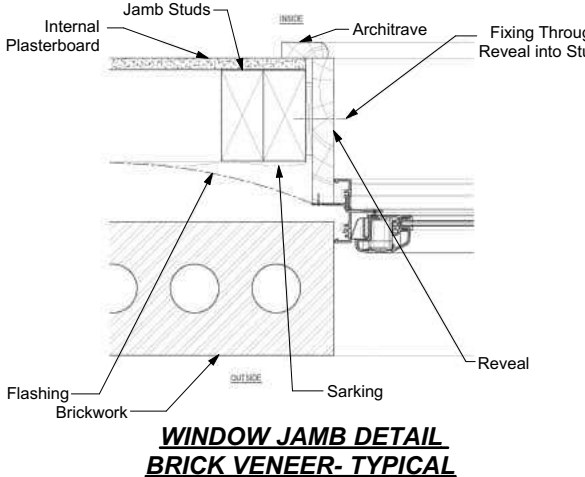
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WINDOW SILL DETAIL BRICK VENEER-TYPICAL



WINDOW HEAD DETAIL BRICK VENEER-TYPICAL



WINDOW JAMB DETAIL BRICK VENEER-TYPICAL

BAL 12.5 CONSTRUCTION SUMMARY

Refer Section 5 As3959-2009 for Detailed Bal 12.5 Construction Methods and additional construction options

SUBFLOOR SUPPORTS No Special Construction Requirements	EXTERNAL WINDOWS - All Openings must be screened internally or externally with corrosion resistant metal screens with max aperture of 2mm. - Exposed external window hardware to be made from metal. - Minimum 4mm Grad A Safety Glass for all Glazing within 400mm of ground window frames less than 400mm from the ground or other structure to be made from Bushfire-Resisting Timber, Timber with a Density of 650kg/m³ or greater or metal.
FLOORS No Special Construction Requirements	EXTERNAL DOORS - All side hung doors must be of solid Bushfire resisting timber min 35mm thickness for the first 400mm above ground Level. - Side hung doors shall be tight fitting to the door frame. - Side hung doors shall have weather strips and draught excluders and seals fitted. - Glass sliding doors as per window requirements excluding the need for screens to the openable portion. - Panel lift, tilt doors or side-hung doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3mm. - Roller doors shall have guide tracks with a maximum gap no greater than 3mm and shall be fitted with a nylon brush that is in contact with the door (see Figure D4, Appendix D).
EXTERNAL WALLS Parts of Walls less than 400mm Above Ground or Decks to be of Non-Combustible Material, 6mm Fibre Cement Clad or Bushfire Resistant/Naturally Resistant Timber	ROOFS - Must be of Non Combustible tiles or sheets - All roofs must be fully sarked with a flammability index of not more than 5
VENTS & WEEPHOLES Vents & Weepholes in external walls shall be screened with a mesh with a maximum aperture of 2mm, made of corrosion resistant steel, Bronze or Aluminum, except where the vents and Weepholes are less than 3mm or are located in an external wall of a subfloor space.	

AS3740- Internal Waterproofing as it applies to Melbourne Class 1 Buildings

AS3740 – Internal Wet areas Waterproofing as it applies to Melbourne, Class 1 buildings

Structure Movement and Waterproofing

Generally movement in the wall and floor structure is caused by contraction, expansion or settlement. Anticipation that structural movement will occur from frame, masonry and panel movement, particularly at joints, which should be catered for in the design. The waterproofing should cover the structural movement, preventing water damage to substrate, adjoining walls, or flooring. Providing a secure 'envelope' to protect the wet area.

1. Materials

Materials used in the construction and waterproofing of bathrooms and laundries must be suitable for purpose.

Membranes

Liquid applied waterproofing membranes refer to Class ii and Class iii membranes and approved to requirements of AS4858
Liquid applied membranes must be adequately cured for their intended use.

Water-resistant Substrates

Concrete AS3600, Fibre Cement Sheet AS2908.2, Water-resistant Plasterboard sheeting AS2588, Masonry AS3700 and Structural Plywood AS2269 for use on walls and floors to comply with Australian Standards. Particle board flooring is no longer allowable as a substrate under the N.C.C 2022 or AS 3740:2021

Water-resistant Surface materials

Product surfaces deemed to be water resistant for walls and floors include; Thermosetting laminated sheet AS2924.1, Pre-decorated fibre cement sheeting AS2908.2, Water-resistant flexible sheet (vinyl or linoleum) and tiles used in conjunction with water-resistant Substrates (above), plus Sanitary Grade acrylic wall linings.

Preformed Shower Bases and enclosures

Materials used in the manufacture of prefinished shower bases and enclosures must render the finished product waterproof.

Sealants, Adhesives and Sheet Fastenings

All products need to be compatible with adjacent materials, mould-resistant, waterproof and appropriately flexible.

2. Installation

These notes outline the details for installation of waterproof and water-resistant materials in bathrooms and laundries.

Shower Floor Falls

Category 1 -Fall to the floor waste in a shower area, the minimum shall be 1:80 both Enclosed and Unclosed shower areas
Category 2 -Floor waste is installed adjacent to a shower area. Minimum fall shall be 1:80
Category 3 -Bathroom outside of the enclosed shower withno floor waste in the wet area. No requirements for fall and water shall be retained inside the wet area.

Preformed Shower Bases

Installation of preformed shower bases need to be adequately supported to prevent distortion or cracking and be sufficiently recessed into the wall to allow the water-resistant surface materials to pass down inside the perimeter rebate.

Edge detail for baths with showers over them

Baths with an integral vertical upstand lip along the side of the bath walls require to be recessed to enable the junction to be waterproofed. Baths without an integral edge require full waterproofing of the walls and floor area around and under the bath.

Baths and Spas

Installation of baths and spas need to be adequately supported to prevent distortion or cracking and be sufficiently recessed into the wall to allow the water-resistant surface materials to pass down inside the rim.

Perimeter Flashing

A junction where waterproofing to waterproofing surfaces meet, the waterproofing is to be continuous across the junction and incorporate an appropriate bond breaker. Where the perimeter flashing to wall/floor surfaces they should be continuously sealed (usually with bond breaker), having the vertical leg a minimum of 25mm above the finished tile level or 150mm above the substructure (except doorways) and horizontal leg a minimum width of 40mm. A water stop with a vertical leg finishing flush with the finished floor level is to be installed at floor level openings. Protecting water migrating to non-wet areas. Where the shower rose is ceiling mounted it shall be applied to the junctions and terminate to the full height of the wall.

Vertical flashing for shower wall junctions

Vertical flashing can be external or internal, with a requirement to terminate a minimum of 1800mm above the finished floor level.

Penetrations in Shower Areas

Typical penetrations like taps, shower nozzles, recess soap holder etc. are to be waterproofed by sealing with proprietary flange system or sealant.

Shower Area Step Down

The highest finished floor level in the shower area is to be stepped down lower than the finished floor level outside the shower. Figure 4.8.2(c)

Shower Area Hob Construction

Suitable materials for the hob construction. Installation starts with all gaps, joints and intersections of the hob substrate to be made flush before application of the membrane system. Figure 4.6.2

Enclosed Shower Area without Hobs or set-down

At the extremity of the shower area:
* Where a shower screen is to be installed a water stop is to be installed with a vertical leg finishing a minimum of 5mm above the finished floor level
*Where the water stop meets the wall, the junction is to be waterproofed.

Shower Area unenclosed

Unenclosed showers are to have a water stop installed with the vertical leg finishing flush with the finished surface of the floor, having junctions waterproofed, in two scenarios:

* When the shower device restricts splashing (shower screen), it is advisable to have a membrane installed below and above the screed to fall.
*When a shower has no restricting splashing (example disabled shower) the water stop is required to be a minimum of 1500mm from the wall connection of the shower rose.

Bond Breaker Application

Installation of bond breakers of liquid applied membranes should be included at all wall/floor, hob/wall, and movement joints where the membrane is bonded to the substrate.

Class II Membranes: (medium extensibility) Either the membrane will not bond to the tape or the tape will have elastic properties similar to the membrane. Minimum bond breaker tape to bridge joint opening up to 5mm is 35mm.

Class III Membranes (high extensibility) allow the membrane to have even thickness. Minimum bond breaker tape to bridge joint opening up to 5mm is 12mm Figure 4.10

Vertical membrane termination

The liquid applied membrane is to be applied over the floor substrate and up the vertical face of the wall:

*Showers with hobs and step downs a minimum height of 150mm above the finished floor level
* Hobless Showers, a minimum height of 150mm above the finished floor level

Termination to Drainage flange

The drainage flange is to be installed with the waterproofing membrane termination into the flange to provide a waterproof connection. Figures 4.3.1(b)

Termination to Drainage Channel

The waterproof drainage should be continuous, with the liquid applied membrane covering the drainage channel, with a minimum horizontal termination of 50mm on the horizontal surface. Figures 4.3.2

Inspection and Acceptance Test

On completion of the installation of a membrane system, inspection and acceptance testing must be conducted. In addition to the visual inspection, either the dry film thickness test (DFT) by non-destructive means or a controlled water test for a minimum of 24 hours duration is required.

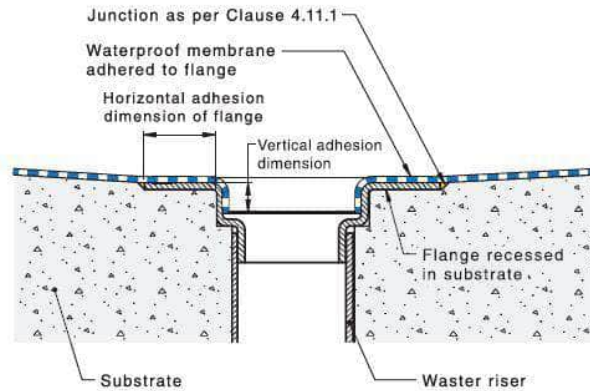


Figure 4.3.1(B) — Typical membrane termination at leak control flange with down leg

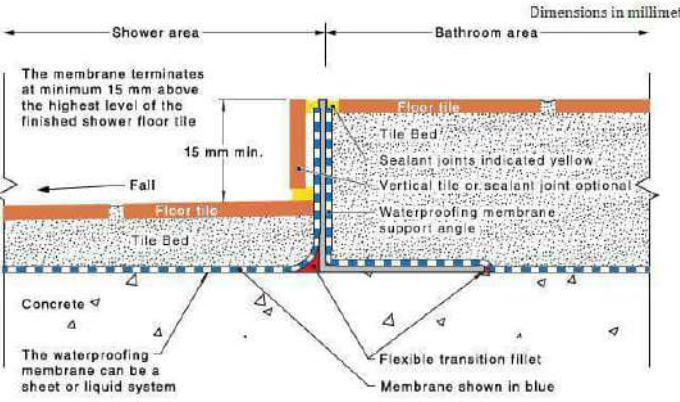


Figure 4.8.2(C) — Step-down shower waterstop and cover angle

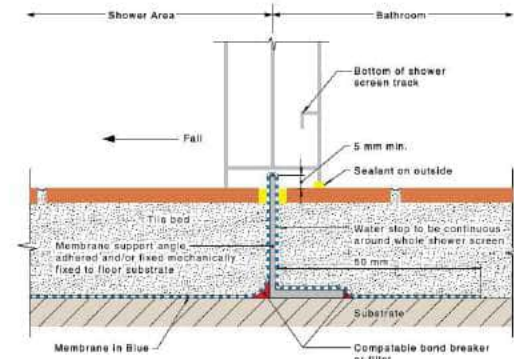


Figure 4.8.2(D) — Shower waterstop and cover angle

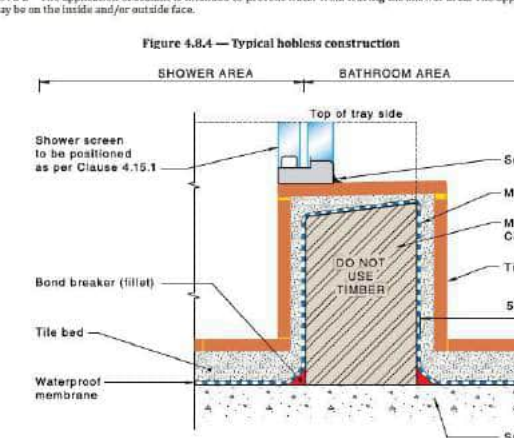


Figure 4.8.4 — Typical hobless construction

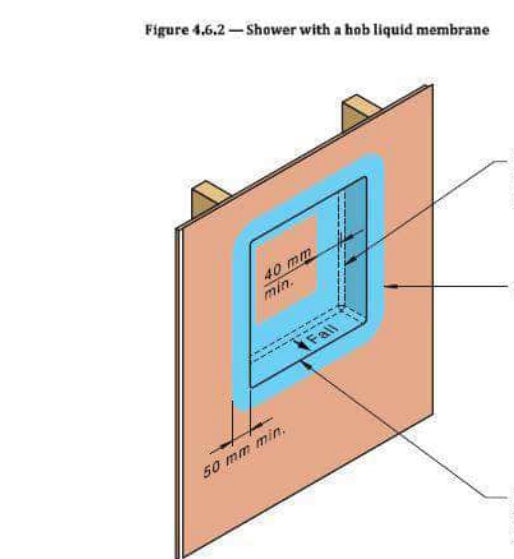


Figure 4.6.2 — Shower with a hob liquid membrane

Figure 4.12.4 — Niche in shower wall framework

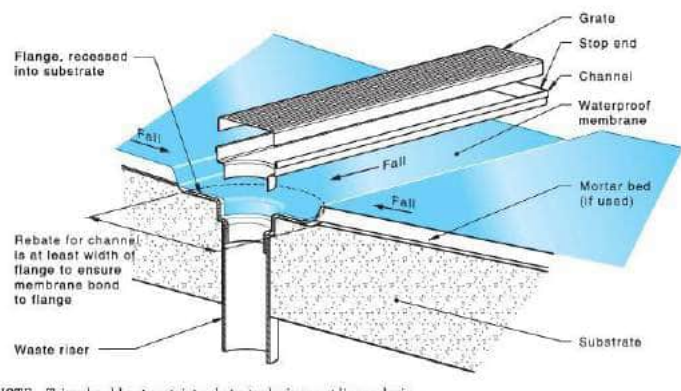


Figure 4.3.2 — Linear drain single outlet centrally located

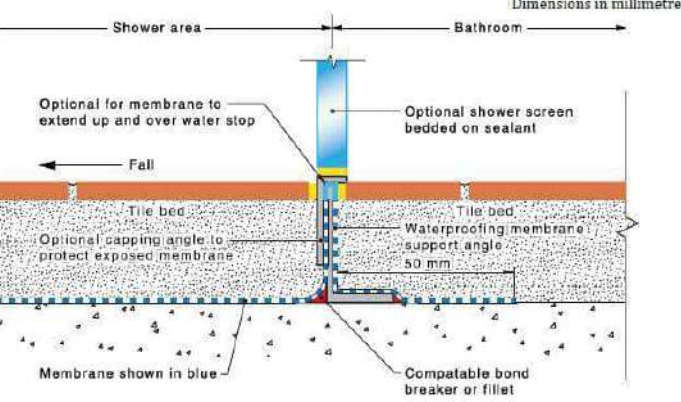


Figure 4.8.2(D) — Shower waterstop and cover angle

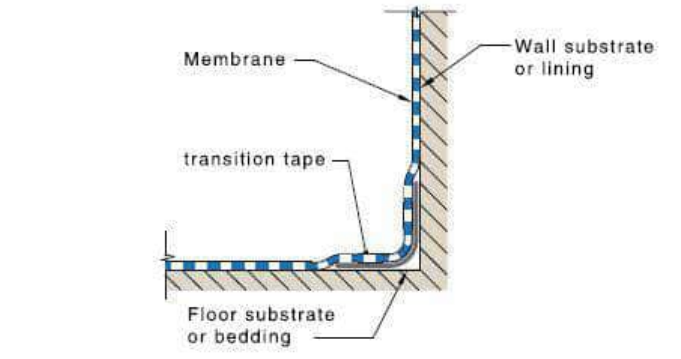


Figure 4.10 — Typical transition tape details

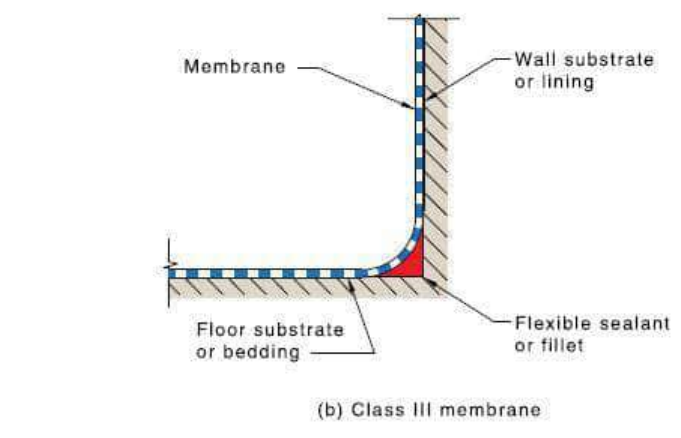


Figure 4.13.3(D) — Insert bath — Tile surround

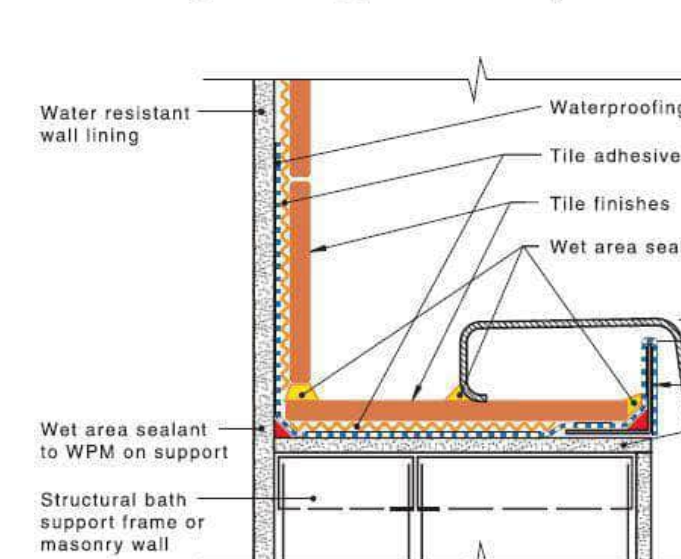


Figure 4.13.3(E) — Shower over bath — Insert bath — Bath compartment wall

Figure 4.13.6 — Spa and bath compartment detail at bath face

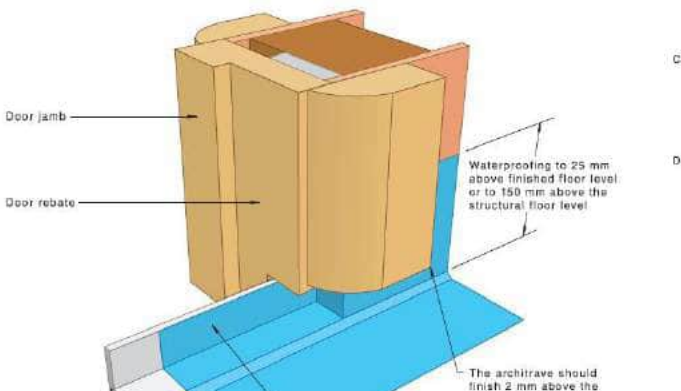


Figure 4.9.1(A) — Example of liquid waterproofing at door opening framework

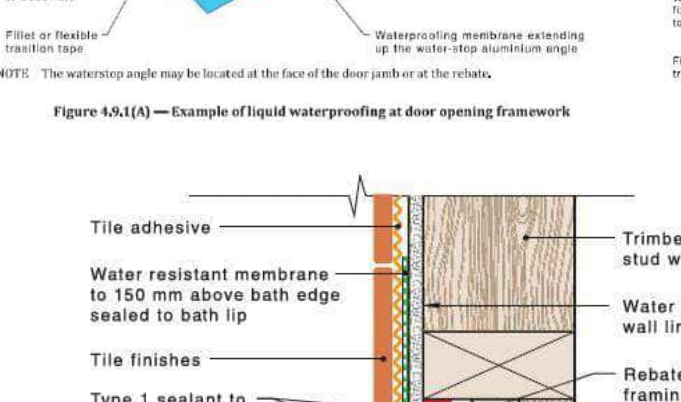


Figure 4.9.1(B) — Waterproofing at door opening cavity slider

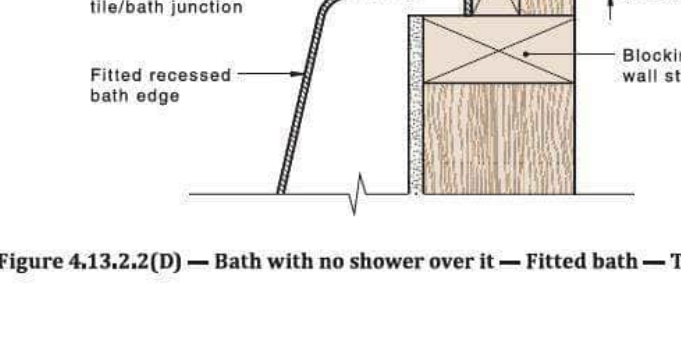


Figure 4.13.2.2(D) — Bath with no shower over it — Fitted bath — Timber-framed wall

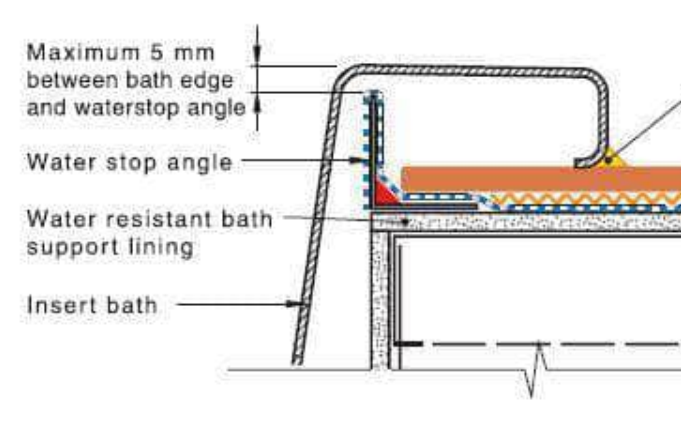


Figure 4.13.3(E) — Shower over bath — Insert bath — Bath compartment wall

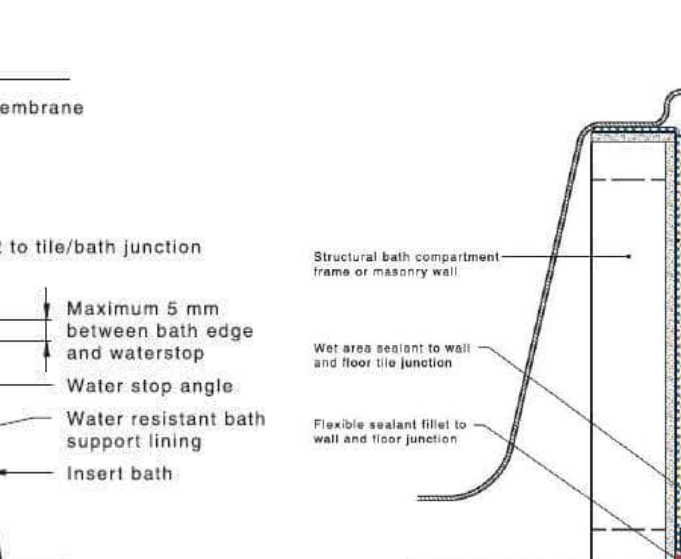


Figure 4.13.6 — Spa and bath compartment detail at bath face

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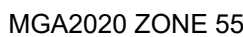
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LEGEND	
	Light Pole
	Electricity Pole
	Electricity Pole
	Electricity Pit
ES	Electricity Substation
Te	Telecomm. Pit
	Telecomm. Pillar
	Gas Valve
	Gas Meter
SP	Sewer Vent
	Sewer Vent
SU	Sewer Unclassified
	Sewer Inspection Shaft
	Stop Valve
	Fire Plug
	Fire Hydrant
	Water Meter
	Water Tap
	Sink
WU	Water Unclassified
DD	Drainage Pit
SEP	Side Entry Pit
	Grated Pit
JP	Junct Pit
	Unclassified Pit
	Sign
	Letterbox
	Bollard
	Bin
	Top of Fence
	Floor Level
FL	Floor Level
	Top of Kerb
	Bottom of Kerb
	Invert of Kerb
	Lip of Kerb
	Edge of Bitumen
	Ridge
	Underside of Gutter
	Eave line
	Partial Wall
hw	habitable window
	non habitable window
	Window Head
	Window Sill
	Door Height
	Top of Building
	Top of Wall

CERTIFICATION BY SURVEYOR I, Myles Sewell, of Unit 2/85 Salmon Street, Port Melbourne VIC 3207, certify that this plan has been prepared from a survey made under my direction and supervision in accordance with the Surveying Act 2004 and completed on 28/03/24, that this plan is accurate and correctly represents the adopted boundaries and that the survey accuracy accords with that required by regulation 7 (1) of the Surveying (Cadastral Surveys) Regulations 2015. Date: 09/04/24					NOTES AHD LEVELS VIDE LYNDHURST PM 43 R.L = 2.602 BUILDING LINES SHOWN DASHED APPROXIMATE ONLY AND HAVE BEEN ESTIMATED BASED ON AERIAL IMAGERY AS DIRECT MEASUREMENT COULD NOT BE ACHIEVED. DIMENSIONS SHOWN (S) ARE BASED ON SURVEY AND VARY FROM TITLE. CONTOURS SHOWN AT 0.25 METRE INTERVALS					TITLE DESCRIPTION CERTIFICATE OF TITLE: Vol. 8301 Fol. 226 LAST PLAN REF: LOT 1 ON LP47803 PARISH: LYNDHURST CROWN ALLOTMENT: 79 (PART)					<				
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PROPOSED THREE NEW DOUBLE STOREY DWELLINGS

LOT 1, NO. 17 RAILWAY PARADE, SEAFORD

GENERAL

1. PRIOR TO THE COMMENCEMENT OF WORK CONTRACTOR/BUILDER SHALL :

- 1.1. READ THESE DRAWINGS IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER ENGINEER/CONSULTANT'S DRAWINGS, SPECIFICATIONS AND ALL OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE WORKS.
- 1.2. ENSURE THAT THE WORKS CAN BE CONSTRUCTED AS DESIGNED. IF THE WORK CANNOT BE CARRIED OUT AS SHOWN THE PROJECT ENGINEER IS TO BE NOTIFIED IMMEDIATELY.
- 1.3. REFER ANY DISCREPANCIES OR UNFORESEEN CHANGE OF SITE CONDITIONS TO THE RELEVANT SUPERINTENDENT, ENGINEER OR/AND ARCHITECT BEFORE PROCEEDING WITH THE WORKS ON SITE, AND NOTIFY ALL VARIATIONS ARISING FROM THE CLARIFICATION/ ADJUSTMENTS OF THE DISCREPANCIES (IF ANY) TO ALL PARTIES.
- 1.4. CONFIRM ALL RELEVANT DIMENSIONS FROM THE ARCHITECT'S DRAWINGS OR FROM SITE. ENGINEER'S DRAWINGS MUST NOT BE SCALED.
- 1.5. SETOUT AND CHECK ALL LEVELS AND MEASUREMENTS ON SITE.
- 1.6. REVIEW AND CHECK ALL PROPOSED MEMBER SIZE AND MATERIALS SHOWN IN ENGINEERING DRAWINGS.
- 1.7. OBTAIN ALL RELEVANT AND NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.
- 1.8. ALLOW MINIMUM 48 HOURS NOTICE FOR ALL ENGINEERING INSPECTIONS IN ANY STAGE OF WORKS.
- 1.9. SEEK FOR ENGINEERS, ARCHITECT AND CLIENT'S WRITTEN APPROVAL PRIOR TO PROVIDING ANY SUBSTITUTIONS.
- 1.10. CHECK THAT ENGINEERING DRAWINGS BEING USED FOR PROCUREMENT, FABRICATION AND BUILD ON SITE ARE THE LATEST REVISION AND 'ISSUED FOR CONSTRUCTION'.
- 1.11. VERIFY ALL LOCATION, SIZE AND DEPTH OF ALL EXISTING SERVICES. CONTRACTOR MUST ALLOW FOR RELOCATION OF EXISTING SERVICES (IF REQUIRED) AND SHALL MAKE ALL APPLICATIONS AND PAY ALL FEES RELEVANT TO THE APPLICABLE AUTHORITY. NOTE THIS OFFICE MAY NOT BE IN POSSESSION OF ALL INFORMATION DETAILING EXISTING SERVICES AT THE TIME OF ISSUE.

2. DURING CONSTRUCTION OF WORK CONTRACTOR/BUILDER SHALL:

- 2.1. IT IS THE CONTRACTORS RESPONSIBILITY TO MAINTAIN THE STRUCTURE IN A STABLE CONDITION AND ENSURE THAT NO PART OF THE STRUCTURE IS OVERSTRESSED UNDER CONSTRUCTION ACTIVITIES. AS4801 AND THE REQUIREMENTS OF ALL RELEVANT AUTHORITIES ARE TO BE COMPLIED WITH.
- 2.2. ADEQUATELY DRAIN THE SITE DURING ALL STAGES OF CONSTRUCTION. ALL WATER RUN-OFF SHALL BE CONTROLLED AT ALL TIMES INCLUDING SURFACE DRAINAGE, BUILDING RUN-OFF, AC CONDENSERS, HW OVERFLOW, WATER TANKS AND ADJOINING PROPERTIES. TEMPORARY DOWNPINES ARE RECOMMENDED TO COLLECT WATER FROM THE ROOFED AREAS.
- 2.3. REINSTATE ANY PAVEMENT, FOOTPATHS, DRIVEWAYS, ROADWAYS, KERBS, R.O.W.'S , NATURE STRIP OR EXISTING FEATURES OR ASSETS DAMAGED DURING THE COURSE OF THE CONSTRUCTION AND MAKE GOOD TO THE SATISFACTION OF THE CLIENT AND RELEVANT AUTHORITIES' STANDARDS AND SPECIFICATIONS. BUILDER/CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY RECTIFICATION REQUIRED ON SITE.
- 2.4. REINSTATE ALL NATURE STRIPS AND LAWN AREAS OUTSIDE PRIVATE PROPERTY WITH TOP SOIL AND SEEDED.
- 2.5. 2.4. DOCUMENT THE PROJECT CONSTRUCTION METHOD AND 'AS BUILT' CONDITIONS FOR FUTURE MAINTENANCE AND DEMOLITION AT THE END OF THE LIFE OF THE STRUCTURE.
3. ALL DIMENSIONS ARE IN MILLIMETERS OR METERS UNLESS NOTICED OTHERWISE (U.N.O.).
4. SITES SHOULD BE DRAINED SO THAT WATER CANNOT POND AGAINST OR NEAR THE HOUSE. THE GROUND IMMEDIATELY ADJACENT TO THE HOUSE SHOULD BE GRADED AWAY TO FALL 50mm OVER THE FIRST METER. WHERE THIS IS IMPRACTICABLE (IE: ON SEVERE SLOPING SITES) USE A.G. DRAINS ADJACENT TO FOOTINGS WHERE THE GROUND FALLS TOWARDS THE BUILDING. (REFER TO DETAILS BELOW).
5. BUILDER/CONTRACTOR SHALL REFER AND APPLY THESE NOTES AND DETAILS IN ANY SUBSEQUENT ENGINEERING INSTRUCTIONS, U.N.O.
6. CONSTRUCTION METHODS AND TEMPORARY WORKS ARE RESPONSIBILITY OF THE RELEVANT CONTRACTOR.
7. MATERIAL AND WORKMANSHIP ARE TO BE IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS, SAA CODES, BUILDING CODE, BCA/NCC REQUIREMENTS UNLESS OTHERWISE NOTED IN THE PROJECT SPECIFICATION.
8. NOMINATION OF PROPRIETARY PRODUCTS DOES NOT INDICATE EXCLUSIVE PREFERENCE. SIMILAR ALTERNATIVE ITEMS CAN BE USED IF APPROVED BY ENGINEER. PROPRIETARY PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS AND DETAILS.
13. REFER ARCHITECTURAL DRAWINGS FOR ALL FINISHES.
14. ALL WATERPROOFING TO ARCHITECTS DETAILS.
15. BUILDER/CONTRACTOR SHALL REMOVE ANY WASTE/SURPLUS MATERIAL OFF SITE AND IMPLEMENT SOIL AND WATER MANAGEMENT PROCEDURE TO AVOID EROSION, CONTAMINATION AND SEDIMENTATION OF THE SITE SURROUNDING AREAS AND DRAINAGE SYSTEMS.
16. THE STRUCTURAL WORK SHOWN ON THESE DRAWINGS HAS BEEN DESIGNED FOR THE FOLLOWING LIVE LOADS:
 - 16.1. FLOOR= 1.5kPa
 - 16.2. ROOF= THE GREATER OF 0.25kPa OR (1.8/A + 0.12)
 - 16.3. BALCONY= 2kPa
 - 16.4. GARAGE= 2.5kPa
17. XSTRUCT ACCEPTS NO RESPONSIBILITY FOR THE WORKS COMPLETED ON SITE UNLESS THE WORKS ARE INSPECTED AND APPROVED BY THE ENGINEER FROM THIS OFFICE DURING CONSTRUCTION.
18. THE DESIGN/DRAWINGS ARE PART OF THE BUILDING CONTRACT ENTERED INTO BY THE CLIENT. ANY SUBSTITUTION OR AMENDMENT CONDUCTED ON SITE WILL VOID THE CERTIFIED DESIGN. ANY DEFECT OR DEVIATION FROM THE CONTRACT DOCUMENTS THAT REQUIRES ASSESSMENT AND DETERMINATION OF CORRECTIVE MEASURES BY THE ENGINEER SHALL BE UNDERTAKEN AT THE CONTRACTOR'S EXPENSE.

DEMOLITION NOTES

1. THE CONTRACTOR MUST TAKE ALL NECESSARY PRECAUTIONS BEFORE AND DURING DEMOLITION WORKS. WORK TO BE UNDERTAKEN STRICTLY IN ACCORDANCE WITH AS 2601 'DEMOLITION OF STRUCTURES'.
2. THE WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE DEMOLITION CONTRACTOR'S SAFE WORK METHOD STATEMENT IN A SEQUENCE THAT MAINTAINS THE STRUCTURE IN A SAFE AND STABLE CONDITION AT ALL TIMES.
3. PRIOR TO WORKS COMMENCING THE DEMOLITION CONTRACTOR SHALL CARRY OUT AN INVESTIGATION OF THE BUILDING AND SITE AND ADVISE OF ANY MATTERS RELATING TO HAZARDOUS MATERIALS, INTERFERENCE OF SERVICES OR OTHER MATTERS WHICH MAY INFLUENCE THE PROPOSED DEMOLITION PROCEDURES.
4. ALL ELECTRICAL CABLES AND OTHER SERVICES IN THE VICINITY OF PROPOSED DEMOLITION SHALL BE DISCONNECTED PRIOR TO THE COMMENCEMENT OF DEMOLITION WORKS.
5. THE WORK SITE SHALL BE FULLY HOARDED TO PREVENT UNAUTHORISED PUBLIC ACCESS.
6. NOTICES DISPLAYING 'DANGER DEMOLITION WORK IN PROGRESS' OR SIMILAR ARE TO BE FIXED TO THE HOARDING.
7. NO WALL, CHIMNEY OR OTHER SIMILAR STRUCTURE SHALL BE LEFT UNSUPPORTED IN SUCH A DANGEROUS CONDITION IT MAY COLLAPSE DUE TO WIND OR VIBRATIONS.
8. PROTECTIVE OUTRIGGERS SHALL BE INSTALLED WHERE NECESSARY TO GUARD AGAINST DANGER TO LIFE OR PROPERTY.
9. ALL ASBESTOS ON SITE SHALL BE REMOVED BY AN ACCREDITED ASBESTOS REMOVALIST REGISTERED WITH THE OCCUPATION HEALTH AND SAFETY AUTHORITIES.
10. THE DEMOLISHER MUST NOT CARRY OUT ANY WORKS ON OVER OR IN THE AIR SPACE OF AN ADJOINING PROPERTY WITHOUT THE PRIOR APPROVAL.

PREPARATION OF SUB-BASE FOR SLABS ON GROUND

1. CLEAR AREA UNDER SLAB OF ALL TOP SOIL CONTAINING HUMUS AND VEGETABLE MATTER 100mm MIN.
2. PROVIDE FILL UNDER SLAB WHERE REQUIRED TO PRODUCE FINISHED LEVELS AS SHOWN ON PLANS.
3. FILLING USED IN THE CONSTRUCTION OF A SLAB, EXCEPT WHERE THE SLAB IS SUSPENDED, SHALL CONSIST OF CONTROLLED FILL OR ROLLED FILL AS FOLLOWS:
 - (a) CONTROLLED FILL IS MATERIAL THAT HAS BEEN PLACED AND COMPACTED IN LAYERS BY COMPACTION EQUIPMENT WITH A DEFINED MOISTURE RANGE TO A DEFINED DENSITY REQUIREMENT. EXCEPT AS PROVIDED BELOW, CONTROLLED FILL SHALL BE PLACED IN ACCORDANCE WITH AS3798. SAND FILL UP TO 0.8m DEEP, WELL COMPACTED IN NOT MORE THAN 0.3m THICK LAYERS BY A VIBRATING PLATE OR VIBRATING ROLLER SHALL BE DEEMED TO COMPLY WITH THIS REQUIREMENT. A SATISFACTORY TEST FOR SAND FILL NOT CONTAINING GRAVEL SIZED MATERIAL IS THE ACHIEVEMENT OF A BLOW COUNT OF 7 OR MORE PER 0.3m USING THE PENETROMETER TEST DESCRIBED IN AS1289-3.3.
 - (b) NON-SAND FILL UP TO 0.4m DEEP, WELL COMPACTED IN NOT MORE THAN 0.15 M LAYERS BY A MECHANICAL ROLLER SHALL BE DEEMED TO COMPLY WITH THIS REQUIREMENT. CLAY FILL SHALL BE MOIST DURING COMPACTION.
 - (b) ROLLED FILL CONSISTS OF MATERIAL COMPACTED IN LAYERS BY REPEATED ROLLING WITH AN EXCAVATOR. ROLLED FILL SHALL NOT EXCEED 0.6m COMPACTED IN LAYERS NOT MORE THAN 0.3m THICK FOR SAND MATERIAL OR 0.3m COMPACTED IN LAYERS NOT MORE THAN 0.15m THICK FOR OTHER MATERIAL.
4. A 50mm MIN. BASE COURSE OF PACKING SAND SHALL BE SPREAD OVER THE SUB-BASE AND TO BE THOROUGHLY ROLLED AND COMPACTED TO A SMOOTH LEVEL SURFACE. THE SAND SHALL BE MOISTENED PRIOR TO THE PLACEMENT OF A 0.2mm POLYTHENE MEMBRANE IN 3600mm MIN. WIDE SHEETS LAPPED 150mm AND JOINED WITH 75mm WIDE PRESSURE SENSITIVE TAPE. THE TAPE SHALL BE LAID UNDER ALL SLABS AND WALLS IN CONTACT WITH THE GROUND.
5. THE TOTAL FILL BENEATH THE SLAB PANELS MUST NOT EXCEED THAT SPECIFIED ABOVE, IE. THE SUM OF EXISTING FILL PLUS ANY NEW FILLING PLACED TOGETHER MUST NOT EXCEED 600mm MAX. (ROLLED), 800mm MAX. (CONTROLLED) NOTE EXISTING FILL MUST SATISFY COMPACTION REQUIREMENTS OUTLINED ABOVE.

DRAINAGE NOTES

1. DRAINAGE DESIGN IS IN ACCORDANCE WITH AS3500 - 2021.
2. ALL SURFACE DRAINAGE WORKS SHALL BE INSTALLED IN ACCORDANCE WITH CLAUSE 5.6.3 DRAINAGE REQUIREMENTS OF AS 2870-2011, WHEREIN FOR BUILDINGS ON MODERATELY, HIGHLY AND REACTIVE SITES:
 - 2.1. SURFACE DRAINAGE SHALL BE CONTROLLED THROUGHOUT CONSTRUCTION AND BE COMPLETED BY THE FINISH OF CONSTRUCTION.
 - 2.1.2. WHERE PIPES PASS UNDER THE FOOTING SYSTEMS, CLAY PLUGS ARE ADOPTED TO PREVENT THE INGRESS OF WATER.
 - 2.1.3. THE BASE OF TRENCHES SHALL SLOPE AWAY FROM THE BUILDING.
3. FOR BUILDINGS ON HIGHLY AND REACTIVE SITES, DRAINER SHALL PROVIDE DRAINAGE ARTICULATION TO ALL STORMWATER, SANITARY PLUMBING DRAINS AND DISCHARGE PIPES IN ACCORDANCE WITH CLAUSE 5.6.4 PLUMBING REQUIREMENTS, WHEREIN FLEXIBLE JOINTS IMMEDIATELY OUTSIDE BUILDING AND COMMENCING WITHIN 1m OF THE BUILDING PERIMETER ARE REQUIRED TO ACCOMMODATE THE REQUIRED DIFFERENTIAL MOVEMENT BASE ON THE SOIL CLASSIFICATION, REFER TABLE 'MIN. REQUIREMENTS FOR EXPANSION AND ALLOWABLE IN FITTINGS. REFER TO TABLE BELOW.

MINIMUM REQUIREMENT FOR EXPANSION/FLEXI JOINTS (IF REQUIRED)			
SITE CLASS	DESIGN Ys MOVEMENT (mm)	MIN. EXPANSION JOINT CAPACITY REQUIREMENT	ALLOWABLE ROTATION
E	Ys >75	150mm	15°
H2	60<Ys ≤ 75	90mm	15°
H1	40<Ys ≤ 60	50mm	15°
M	Ys<40	MIN. 25mm LAGGING THROUGH FOOTING	N/A

TREE EFFECT NOTE

1. TREE EFFECTS ARE TAKEN INTO CONSIDERATION IN THE DESIGNS (IDENTIFIED AT THE TIME OF SOIL INVESTIGATION).
2. BUILDER TO REMOVE ALL TREES AND TREE ROOTS/MATERIAL OVER THE PROPOSED BUILDING AREA;
3. ANY SOFT OR LOOSE MATERIAL THAT DOES NOT RESPOND TO COMPACTION SHOULD BE EXCAVATED TO ACHIEVE A FIRM BASE, BACKFILL HOLES WITH NON POROUS MATERIAL, COMPACTED IN 150mm MAXIMUM LAYERS.
4. THERE ARE SIGNIFICANT TREES IN THE VICINITY OF THE PROPOSED WORKS. WE HAVE ATTEMPTED TO ACCOUNT FOR THEIR EFFECTS BY DESIGNING FOR A GREATER SOIL MOVEMENT THAN WOULD OTHERWISE OCCUR, HOWEVER, DUE TO THE COMPLEX TREE ROOT GEOMETRY, VARIABLE MOISTURE EXTRACTION BY THE TREE AND THE DIFFICULTY IN PREDICTING FUTURE TREE GROWTH, A PRECISE DESIGN FOR THE EFFECTS OF TREES IS OUTSIDE CURRENT KNOWLEDGE. THE OWNER MUST BE AWARE THAT ALTHOUGH PRECAUTIONS HAVE BEEN TAKEN FOR THE EFFECTS OF TREES IN OUR DESIGN, SOME DISTORTION MUST BE ACCEPTED. ENGINEERS ARE NOT EXPERTS IN TREE GROWTH AND CANNOT BE EXPECTED TO KNOW THE ANTICIPATED GROWTH AND MATURE HEIGHT OF TREES.
5. AT THE TIME OF SLAB DESIGN, NO TREES WERE CONSIDERED WITHIN LANDSCAPE AND NATURE STRIP. IF SITE CONDITIONS ARE TO BE CHANGED DUE TO THE INTRODUCTION OF NEW TREES, THIS OFFICE IS TO BE CONTACTED TO REVIEW THE SLAB DESIGN PRIOR TO CONSTRUCTION.

FOOTING AND SLAB NOTES

1. FOOTING AND SLAB DESIGNS SHOULD BE READ IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS, CIVIL DRAINAGE DESIGN AND SOIL REPORT RELEVANT TO THIS SITE.
2. ALL WORKS, DESIGN AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 2870.
3. ALL EXCAVATION SHALL :
 - 3.1. BE INSPECTED ON SITE BY THE RELEVANT AUTHORITY AND THIS OFFICE MUST BE NOTIFIED IMMEDIATELY IF THE SITE CONDITIONS VARIED FROM THOSE DESCRIBED IN THE SOIL REPORT.
 - 3.2. BE FREE OF WATER AND STABLE.
 - 3.3. NOT AFFECT SURROUNDING PROPERTIES AND SERVICES.
4. FOOTING SHALL BE FOUNDED IN MATERIALS AND DEPTH NOMINATED ON THESE DRAWINGS OR, WHEN NOT ON THE DRAWINGS, AS SHOWN IN THE SITE GEOTECHNICAL REPORT.
5. FOUNDING INTERFERED WITH, OR NOT INVOLVED AND APPROVED BEFORE LYING MEMBRANES, FIXING REINFORCEMENT AND ORDERING CONCRETE.
6. IF THE NEW FOOTING CONSTRUCTED TO ADJACENT EXISTING FOOTING IS LESS OR EQUAL TO 1000mm, THIS OFFICE SHOULD BE CONTACTED FOR FURTHER ADVICE.
7. PROVIDE MEMBRANE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS, AS 2870, AND NCC.
- 7.1. MEMBRANE TO BE LAPPED 200MIN AND TAPED AT JOINTS ON MAX 50mm COMPACTED QUARRY PRODUCT (IF REQUIRED).
- 7.2. MEMBRANE TO BE TAPED AT PENETRATIONS TO ENSURE A COMPLETE VAPOUR BARRIER IS PROVIDED. TO PREVENT PUNCTURING OR DAMAGE A PLASTIC PLATE CAN BE PLACED UNDER REINFORCEMENT SUPPORTS.
- 7.3. MEMBRANE TO EXTEND UNDER AND TO THE SIDES OF ALL SLABS, BEAMS AND THICKENINGS.
- 7.4. TWO LAYERS OF POLYETHYLENE MEMBRANE ARE REQUIRED FOR STRIP FOOTINGS AND BEAMS BELOW FINISHED GROUND LEVEL GREATER THAN 700mm DEEP TYPICAL U.N.O.
8. PERCHED GROUND WATER MAY OCCUR DURING HIGH PERIODS OF RAINFALL WHICH CAN LEAD TO CONSTRUCTION DIFFICULTIES. IF THIS SITUATION IS ENCOUNTERED ONSITE THIS OFFICE IS TO BE CONTACTED TO PROVIDE CONFIRMATION OF FOOTING DESIGN AND ALTERNATIVE CONSTRUCTION METHODS THAT MAY BE REQUIRED.
9. ANY OVER EXCAVATION SHALL BE BACK FILLED WITH BLINDING CONCRETE GRADE N20.
10. LOCATE FOOTING CENTRALLY UNDER WALLS AND COLUMNS (U.N.O.)
11. ADEQUATE CONSTRUCTION METHODS, TECHNIQUES AND EQUIPMENT SHALL BE USED FOR BACKFILLING TO AVOID DIFFERENTIAL SOIL PRESSURE AND PREVENT STRUCTURES OVERSTRESS AND DAMAGE.
12. USE APPROPRIATE FLEXIBLE BEDDING MORTAR FOR BRITTLE FLOOR COVERING WHERE BRITTLE AREA IS GREATER THAN 16m² (eg. CERAMIC TILES), ALTERNATIVELY IF FLEXIBLE ADHESIVE TO BE USED FOR LAYING OF TILES, MINIMUM 90 DAYS WAITING PERIOD IS REQUIRED AFTER SLAB HAS BEEN POURED.
13. TERMITES PROTECTION SHALL BE PROVIDED AS REQUIRED BY THE AUSTRALIAN STANDARDS AS 3990 AND THE LOCAL STATUTORY AUTHORITY.
14. THIS OFFICE MUST BE CONTACTED FOR FURTHER ADVICE IF ANY ADDITIONAL HEATING SYSTEMS ARE REQUIRED WITHIN THE SLAB. SLAB THICKNESS MUST BE INCREASED TO A MIN 125mm.
15. OWNERS SHALL MAINTAIN THE SLAB AS NOTED IN APPENDIX B OF AS2870 AND IN THE CSIRO PUBLICATION 'BT136 FOUNDATION MAINTENANCE AND FOOTING PERFORMANCE - A HOMEOWNERS GUIDE'. IT IS THE BUILDERS RESPONSIBILITY TO ENSURE THE OWNER IS INFORMED OF THESE REQUIREMENTS.
16. FOUNDATION MATERIALITY TO BE APPROVED BEFORE POURING CONCRETE FOR A SAFE BEARING CAPACITY OF:
 - 16.1. 50kPa- WAFFLE SLAB
 - 16.2. 100kPa- STRIP AND PAD FOOTING
 - 16.3. 100kPa- RAFT SLAB BEAMS
 - 16.4. 250kPa- BORED PIERS
 - 16.5. FOR SCREW PILES BASED ON TEST PILE
17. THE BUILDER SHALL BE RESPONSIBLE FOR MAINTAINING ANY EXCAVATION IN A STABLE CONDITION WITHOUT ANY DEFECTS OR HAZARDS TO SURROUNDING PROPERTY OR GROUND SERVICES. THIS INCLUDES OBTAINING ALL NECESSARY APPROVALS FOR SHORING SYSTEMS AND THEIR EXPECTED DURATION ON SITE. STABILITY OF EXCAVATION TO BE RE-ASSESSED IF DELAYS GREATER THAN THREE DAYS OCCUR.
18. FOOTING MUST NOT UNDERMINE EXISTING FOOTING OR BE UNDERMINED BY PROPOSED EXCAVATION.

OCCUPATIONAL, HEALTH AND SAFETY

1. FOR ALL WORKS CONDUCTED ON THIS PROJECT, THE BUILDER SHALL HAVE ALL APPROPRIATE AND SUFFICIENT SAFETY MEASURES AND PROCEDURES IN PLACE.
2. DEEP TRENCHES MAY EXIST ON THIS SITE. BUILDER TO ENSURE NECESSARY SAFETY MEASURES ARE TAKEN TO PREVENT FALL AND TRIPPING HAZARDS ARE ELIMINATED.
3. FOR LARGE EXCAVATIONS (greater than 6000mm), BUILDER TO ENSURE SEAT PLATES/ANGLES TO STEEL COLUMNS FOR MAJOR BEAMS AND LINTELS ARE INSTALLED FOR SAFER CONNECTION, BOLTING AND SITE WELDING.
4. ADEQUATE PROPPING MAY BE REQUIRED FOR ANY RETAINING/LOAD BEARING WALLS ON BOUNDARIES. TEMPORARY SHORING MAY BE REQUIRED.
5. PROVISIONS SHALL BE MADE FOR APPROPRIATE DISTANCE FOR ROOF BATTENS/RAFTERS TO PROVIDE A SAFE WORKING PLATFORM DURING ROOF INSTALLATION AND WORKING AT HEIGHTS.
6. OWNER MAY NEED TO BE AWARE OF APPROPRIATE MEASURES TO DEAL WITH HAZARDOUS MATERIALS SUCH AS ASBESTOS WHICH STILL CAN BE FOUND IN SERVICE PITS.
7. IF A CRANE IS REQUIRED, THE BUILDER IS TO PROVIDE ADEQUATE SAFETY MEASURES FOR CRANE USAGE AROUND POWER LINES.
8. IF ANY DIGGING IS REQUIRED OUTSIDE OF SITE BOUNDARIES, INFORMATION REGARDING EXISTING COUNCIL ASSETS NEED TO BE SOUGHT FROM 'DIAL BEFORE YOU DIG'.
9. THE SAFETY CONCERNS AND HAZARDS IDENTIFIED ABOVE REPRESENT COMMONLY OCCURRING RISKS. THE LIST DOES NOT COVER THE FULL RANGE OF RISK AVOIDANCE MEASURES REQUIRED.

WELDING AND BOLTING

1. ALL WELDING SHALL BE IN ACCORDANCE WITH AS 1554 AND CURRENT CODES OF PRACTICE. ALL FILLET WELDS SHALL BE AT LEAST 6mm FILLET CONTINUOUS FOR THE FULL CONTACT OF THE MEMBER, UNLESS OTHERWISE NOTED. BUTT WELDS MUST DEVELOP THE FULL TENSILE STRENGTH OF THE MEMBER UNLESS OTHERWISE NOTED. ALL WELDING SHALL BE CATEGORY "SP", UNLESS OTHERWISE NOTED.
2. BOLTING SYMBOL EXAMPLE: 2M 10 - 4.5/5
 - (2) NUMBER OF BOLTS
 - (M10) DIAMETER IN mm
 - (4.6) STRENGTH GRADE
 - (S) SNUG TIGHT (BOLTING PROCEDURE)
3. ALL BOLTS SHALL BE HIGH TENSILE TO AS 1252, USED IN CONFORMITY WITH AS 4100. U.N.O. COMMERCIAL GRADE BOLTS DENOTED: M20 4.6/5 HIGH TENSILE BOLT FULLY TENSIONED: M20 8.8/7B HIGH TENSILE BOLTS IN BEARING, BUT TENSIONED: M20 8.8/7B HIGH TENSILE BOLT TO SNUG TIGHT: M20 8.8/5
4. ALL BOLTS SHALL BE HOT DIP GALVANIZED.
5. WHERE FULLY TENSIONED BOLTS ARE REQUIRED, TENSIONING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF AS 4100 USED IN CONFORMITY WITH AS 1252. ALL BOLT HOLES SHALL BE 2mm LARGER THAN THE NOMINAL BOLT DIAMETER, UNLESS OTHERWISE NOTED. ALL CLEATS TO BE 10mm THICK UNLESS OTHERWISE NOTED. HIGH TENSILE BOLTS SHALL NEVER BE WELDED.
6. PROVIDE 2-M20 8.8/5 BOLTS TO ALL STRUCTURAL STEEL CONNECTIONS UNLESS NOTED OTHERWISE.

A	CONSTRUCTION ISSUE	10.09.24	
P1	PRELIMINARY REVISION	24.07.24	
No.	REVISION	DATE	



CONTRACTOR MUST DIAL 1100 TO CONFIRM LOCATION OF EXISTING SERVICES AND COMPLY WITH ANY AUTHORITY REQUIREMENTS REGARDING EXISTING SERVICES PRIOR TO COMMENCEMENT OF ANY WORKS.

REINFORCEMENT

1. ALL REINFORCEMENT SHALL BE SUPPORTED IN ITS CORRECT POSITION SO AS NOT TO BE DISPLACED DURING CONCRETING ON APPROVED BAR CHAIRS AT 1.0m MAX CRS BOTH WAYS. WHERE REQUIRED PROVIDE SUPPORT BARS N16 AT 1.0m MAX CRS.
2. REINFORCEMENT IS SHOWN DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
3. BAR NOTATION GIVES THE FOLLOWING INFORMATION IN THIS ORDER: NO. OF BARS, TYPE, BAR SIZE (mm), SPACING (mm), LAYER. E.G. 2-N16-250-B(L)
4. REINFORCEMENT SHALL BE EVENLY DISTRIBUTED OVER THE WIDTHS SHOWN (U.N.O.).
5. ALL REINFORCEMENT FOR ANY ONE POUR SHALL BE COMPLETELY PLACED AND TIED PRIOR TO INSPECTION BY THE ENGINEER OR ARCHITECT. NO CONCRETE SHALL BE POURED UNTIL REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY RELEVANT BUILDER INSPECTOR.
6. ALL REINFORCEMENT AND INSERTS SHALL BE SUPPORTED AND HELD IN THE DESIGN LOCATION BY APPROVED CHAIRS, SPACERS OR TIES. BAR CHAIRS SHALL BE PLACES AT MINIMUM 1000mm CENTRES IN TWO DIRECTIONS (U.N.O.)
7. TRENCH MESH IN BEAMS TO BE LAID CONTINUOUSLY WITH EACH LAYER BEING LAPPED FOR ITS FULL WIDTH AT INTERSECTIONS AND FOR A MINIMUM OF 500mm AT SPLICES. THE TRENCH MESH SHALL BE OVERLAPPED BY THE WIDTH OF THE FABRIC AT T & L JUNCTIONS.
8. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN. WELDING OF REINFORCEMENT WILL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS.
9. REINFORCEMENT TO BE CLEAN TO ENSURE ADEQUATE BOND WITH CONCRETE.
10. PROVIDE 2N12 x 1200 LONG TOP BARS DIAGONALLY ACROSS RE-ENTRANT CORNERS OF SLABS, TIED UNDER TOP FABRIC (TYPICAL).
11. CLEAR COVER TO FACE OF ALL REINFORCEMENT AND CONCRETE STRENGTH SHALL CONFORM TO THE FOLLOWING TABLE U.N.O. ON THE DRAWINGS.

EXPOSURE CONDITIONS	COVER (mm)		
	Fc=25	Fc=32	Fc=40
1. SURFACES OF MEMBERS IN CONTACT WITH THE GROUND (A) SURFACES PROTECTED BY DAMP PROOF MEMBRANE (B) UNPROTECTED SURFACES	30	30	30
2. SURFACES OF MEMBERS IN INTERIOR ENVIRONMENTS (I.E. FULLY ENCLOSED WITHIN A BUILDING)	25	25	25
3. SURFACES OF MEMBERS IN ABOVE GROUND EXTERIOR ENVIRONMENTS.	60	40	30

12. LAP REINFORCEMENT ONLY AT LOCATIONS SHOWN ON THE DRAWINGS OR AS APPROVED. UNLESS NOTED OTHERWISE, LAP ALL BARS AS TABULATED BELOW:
(LAP LENGTH SHOWN IN BRACKETS APPLIED TO HORIZONTAL BARS WITH MORE THAN 300mm OF CONCRETE CAST BELOW THE BAR)

BAR SIZE	MIN LAP LENGTH (mm)
N12	625 (800)
N16	850 (1125)
N20	1100 (1450)
N24	1400 (1800)
N28	1700 (2200)
N32	2000 (2600)
N34	2200 (2825)

13. FABRIC SHALL BE LAPPED SUCH THAT THE TWO OUTERMOST WIRES OF ONE SHEET OVERLAP THE TWO OUTERMOST WIRES OF THE OTHER SHEET BY 25mm MINIMUM.
14. FOR EVERY 100mm EXTRA INCREASE IN WIDTH FOR EXTERNAL AND INTERNAL BEAMS, PROVIDE 1N16 BAR TOP AND BOTTOM.

CONCRETE

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600, AS 2870, AS 3610, AS 1379, AS 1478, AS 3582, AS 5100 AND AS3972.
3. ALL CONCRETE SHALL BE GRADE 25MPa - 100mm SLUMP (U.N.O.).
4. CONCRETE SHALL BE CURED BY AN APPROVED METHOD FOR AT LEAST 7 DAYS AFTER PLACEMENTS.
5. CONCRETE SHALL BE COMPACTED USING MECHANICAL VIBRATOR, TO GIVE A MAXIMUM COMPACTION AND AVOID ANY SEGREGATION OF THE CONCRETE.
6. HOLES, CHASES OR PIPES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL NOT BE PLACED IN CONCRETE MEMBERS WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.CONDUITS, PIPES AND THE LIKE SHALL NOT BE PLACED WITHIN THE CONCRETE COVER.
3. CONCRETE SLABS AND BEAMS ARE TO BE POURED TOGETHER (U.N.O.).
4. SIZE OF CONCRETE ELEMENTS DOES NOT INCLUDE THICKNESS OF APPLIED FINISH.CONCRETE SIZES MUST NOT BE REDUCED OR HOLED IN ANY WAY WITHOUT THE ENGINEER APPROVAL.
5. THE BEAM DEPTH IS WRITTEN FIRST ON THE DRAWING AND INCLUDES SLAB THICKNESS (IF ANY). CONCRETE TO BE KEPT FREE OF SUPPORTING BRICKWORK BY TWO LAYERS OF A SUITABLE MEMBRANE (MALTHOID, ETC.), OR AS DIRECTED BY THE ENGINEER. VERTICAL FACES OF CONCRETE TO BE KEPT FREE BY 10mm THICKNESS OF BITUMINOUS CANITE.
7. WHERE WALLS ARE NON-LOAD BEARING AT EITHER HORIZONTAL OR VERTICAL FACES THEY SHALL BE SEPARATED FROM CONCRETE OR BRICKWORK BY 10mm THICK CANITE.
8. LOCATION AND DETAILS OF CONSTRUCTION JOINTS (IF NOT SHOWN ON PLAN) SHALL BE TO FUTURE DETAIL APPROVED BY THE ENGINEER.
9. SAW JOINTS SHALL BE MADE AT A TIME APPROPRIATE TO THE CONCRETE MIX AND CLIMATIC CONDITIONS.
10. WHERE SLABS AND BEAMS ARE TO SUPPORT BRICKWORK OVER, FORMWORK AND PROPS MUST BE REMOVED BEFORE THE COMMENCEMENT OF BRICKWORK.
11. AS A GENERAL POLICY, XSTRUCT DO NOT RECOMMEND THE USE OF POLISHED CONCRETE. THE OWNER SHOULD BE MADE AWARE BY THE BUILDING DESIGNER AND BUILDER THAT CONCRETE IS A NATURAL MATERIAL AND THE POSSIBILITY OF SURFACE CRACK FORMATION MAY OCCUR AND CANNOT BE GUARANTEED EITHER IN THE SHORT OR LONG TERM, WE HIGHLY RECOMMEND CURING THE SLAB USING AN APPROVED CURING SPRAYED MEMBRANE.
12. WHEN NEW FOOTING IS SUBMITTED FOR THE ADJACENT STRUCTURES OF NEIGHBOURING BUILDING AT BOUNDARY, A MINIMUM OF 10mm THICK "ABLEFLEX" (OR APPROVED EQUIVALENT) MUST BE PLACED BETWEEN STRUCTURES (UNLESS OTHERWISE NOTED ON ENGINEERING DRAWINGS TYPICAL).
13. FORMWORK SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH AS3610. FORMWORK SHALL REMAIN IN POSITION FOR A MINIMUM OF 28 DAYS AFTER POURING OF CONCRETE UNLESS WRITTEN APPROVAL BY THE ERECTION ENGINEER/ CONTRACTOR STATING ADEQUATE CURING HAS BEEN OBTAINED.
14. ALL SERVICES PENETRATIONS PASSING THROUGH FIRE SEPARATED AREAS SHALL BE PROVIDED WITH FIRE STOP COLLARS COMPATIBLE WITH THE REQUIRED FIRE RATING.
15. ADMIXTURES SHALL NOT BE USED IF THEY HAVE A DETRIMENTAL EFFECT ON THE MECHANICAL PROPERTIES OF THE CONCRETE. WHERE SPRAYED WATER RETENTION MEMBRANE COMPOUNDS ARE USED THEY SHALL COMPLY WITH AS 3759.
16. ALL CONCRETE MEMBERS AND REINFORCEMENT MUST BE LOCATED TO WITHIN THE REQUIRED TOLERANCES SPECIFIED IN AS3600 SECTION 17.
17. CAMBER TO BEAMS AND SLABS SHALL BE 2.6mm FOR EVERY 1m OF SPAN UNDO.
18. MINIMUM STRIPPING TIMES FOR CONCRETE ELEMENTS SHALL BE AS FOLLOWS:
 - 18.1. WALLS AND COLUMNS - 3 DAYS PROVIDED THAT CURING IS MAINTAINED FOR A FURTHER 7 DAYS.
- 18.2. BEAMS AND SLABS - 7 DAYS, PROVIDED THAT THE FULL SELF WEIGHT AND ANY SUPERIMPOSED LOADS ARE BACK-PROPPED AND CURING IS MAINTAINED FOR A FURTHER 7 DAYS (NOT REQUIRED FOR SLABS ON GROUND).
19. SLABS AND FOOTINGS WITH CONCRETE SURFACE EXPOSED TO SALINE OR ACID SULFATE SOILS WITH MAGNESIUM CONTENT MORE THAN 1000ppm OR MORE, THE FOOTINGS AND SLAB SHALL BE ISOLATED FROM THE SOIL IN ACCORDANCE WITHAS2870.
20. THE CONCRETE SHALL BE TRANSPORTED, PLACED, COMPACTED AND CURED IN ACCORDANCE WITH GOOD BUILDING PRACTICE.

STRUCTURAL TIMBERWORK

1. ALL TIMBER FRAMING IS TO BE IN ACCORDANCE WITH AS 1684-2010 RESIDENTIAL TIMBER FRAMED CONSTRUCTION, AS1720 SAA TIMBER ENGINEERING CODE.
2. ALL TIMBER STRESS GRADES NOMINATED SHALL BE IN ACCORDANCE WITH THE RELEVANT CODES AND MEANS THE STRUCTURAL QUALITY OF A TIMBER SECTION (REFER TO AS 1720).
3. TIMBER MEMBERS NOT MARKED TO CONFORM WITH AS1684.2.
4. TIMBER SIZES AND BRACING NOT NOMINATED IN THESE DRAWINGS SHALL BE IN ACCORDANCE WITH AS1684 OR THE ARCHITECTURAL DRAWINGS. ANY DISCREPANCY SHOULD BE REFERRED TO THE ENGINEER AND ARCHITECT.
5. TIMBER MUST BE STRAIGHT AND FREE FROM SIGNIFICANT DEFECTS INCLUDING BUT NOT LIMITED TO: WHITE ANT, BORER, SAP, LOOSE KNOTS, WARP, FRACTURES AND HOLES.
6. TIMBER SHALL BE STORED AND HANDLED SO AS NOT TO BE DETRIMENTAL TO THEIR PERFORMANCE OR DAMAGE THEM. REFER APPENDIX H AS 1684-2:201.
7. ALL TIMBER SHALL BE DRY, IE: LESS THAN 15% MOISTURE CONTENT AT THE TIME OF CONSTRUCTION AND SHALL BE PROTECTED AND/OR TREATED AS NOTED.
8. ALL TIMBER BEAMS AND LINTELS ARE TO BEAR ON DOUBLE STUDS (ONE JAMB AND ONE BEARING STUD), UNLESS OTHERWISE NOTED.
9. BEAMS/STUDS HAVING MORE THAN 1 MEMBER TO BE NAIL LAMINATED TOGETHER IN ACCORDANCE WITH AS 1684-2010 AND AS 1328.
10. NAILS TO COMPLY WITH AS 2334. NAIL PENETRATION TO OTHER TIMBER MEMBER, SHALL BE 10 TIMES THE NAIL DIAMETER WHEN DRIVEN INTO THE SIDE GRAIN AND MIN. 15 TIMES THE NAIL DIAMETER WHEN DRIVEN INTO THE GRAIN END.
11. ALL EXPOSED TIMBER TREATMENT MUST BE IN ACCORDANCE WITH EXPOSURE CLASSIFICATION AS1684.2 TABLE B1, MINIMUM H3 TREATED OR DURABLE SPECIES TO BE ADOPTED TYPICAL U.N.O.
12. ALL PROPRIETARY FIXINGS SHALL BE INSTALLED TO DEVELOP THEIR MAXIMUM CAPACITY AS PER MANUFACTURERS' SPECIFICATIONS AND DETAILS.
13. ALL TIMBER FRAMEWORK SHALL BE ADEQUATELY TIED TO RESIST UPLIFT AND RACKING FORCES IN ACCORDANCE WITH AS 1684.
14. METAL FIXINGS SHALL BE COMPATIBLE WITH TIMBER GLUES AND PRESERVATIVE TREATMENT.
15. NO PENETRATIONS OR CHASES OTHER THAN THOSE NOMINATED ON THIS DRAWINGS SHALL BE MADE IN TIMBER MEMBERS WITHOUT PRIOR APPROVAL OF ENGINEER FROM THIS OFFICE.
16. PROVIDE SOLID BLOCKING (45 WIDE x D-25 DEEP) SECURELY NAILED TO JOISTS/RAFTERS (D=DEPTH OF JOIST/RAFTER) AT 1800 MAX. CRS.
17. ALL BRICKWORK LINTELS TO ARCHITECTS DETAILS. ALL BRICKWORK LINTELS TO COMPLY WITH F.3.3.3.5 OF B.C.A 2012 VOLUME 2.
18. ALL BEAMS/GIRDER & HIP TRUSSES TO BE SUPPORTED ON DOUBLE STUDS EACH END (U.N.O.)
19. BUILDER TO SUPPLY MANUFACTURERS TRUSS LAYOUT TO THIS OFFICE FOR APPROVAL PRIOR TO CONSTRUCTION. TRUSS DESIGN MUST BE IN ACCORDANCE WITH AS1720 AND AS1684. TRUSS FABRICATOR/BUILDER IS RESPONSIBLE FOR PROVIDING ADEQUATE ROOF/WALL BRACING TO ENSURE STABILITY OF THE STRUCTURE IN ACCORDANCE TO AS1684.
20. ALL TRUSSES & WALL FRAMES TO MANUFACTURER'S DESIGN & DETAILS.
21. TRUSS MANUFACTURERS MUST CHECK ASSUMPTIONS MADE FOR GIRDER TRUSSES ON ROOF FRAMING LAYOUT PLAN ON THIS DRAWINGS (IF APPLICABLE), IF ANY DISCREPANCIES ARE NOTED THIS OFFICE MUST BE CONTACTED IMMEDIATELY PRIOR TO PROCUREMENT, FABRICATION AND CONSTRUCTION.
22. ALL INTERNAL WALLS TO BE NON-LOAD BEARING (TYPICAL) UNLESS HATCHED OTHERWISE ON PLANS.

BRICKWORK/BLOCKWORK

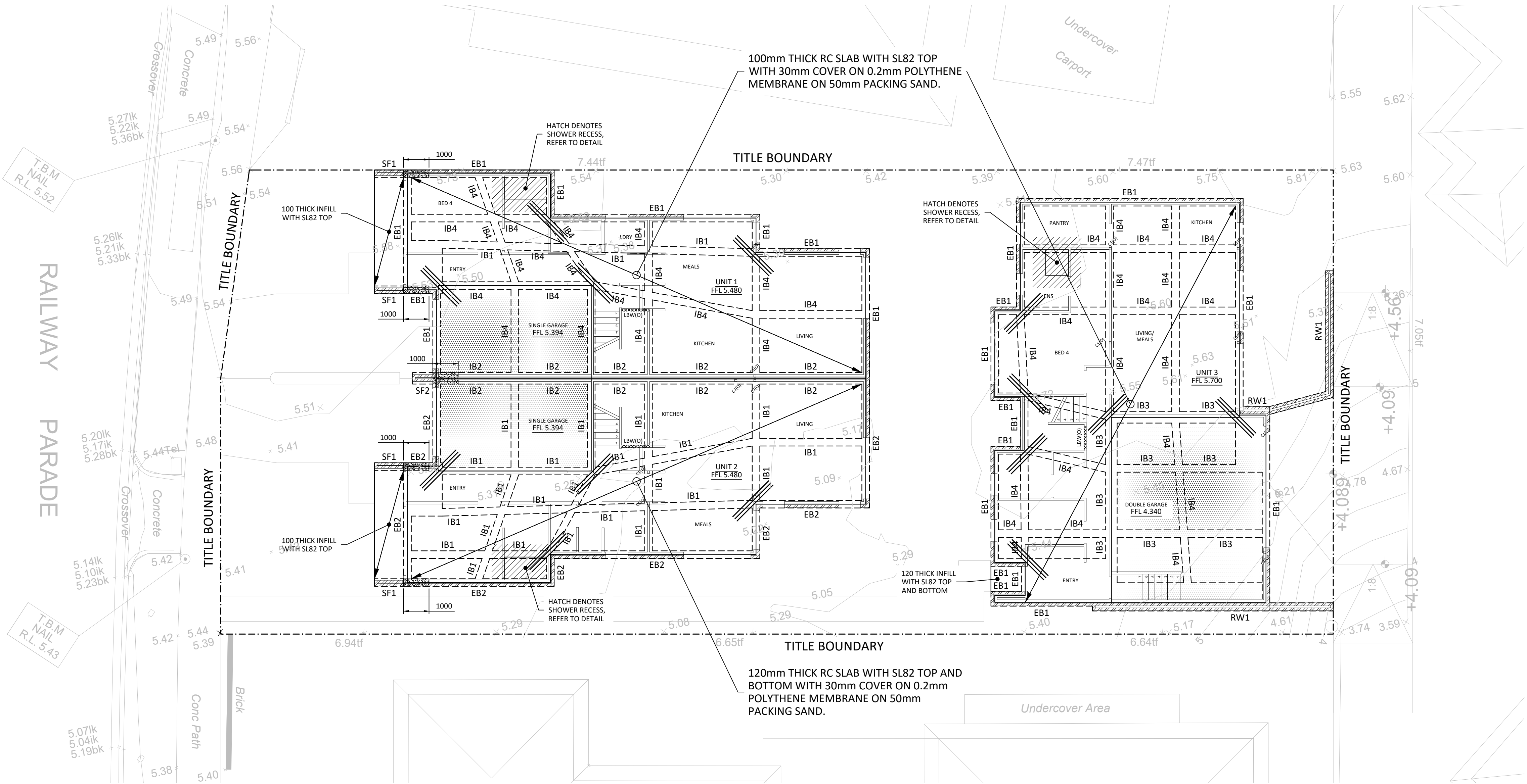
1. ALL MASONRY CONSTRUCTIONS TO COMPLY WITH THE SAA MASONRY CODE AS 3700.
2. THE UNCONFINED COMPRESSIVE STRENGTH FOR CLAY BRICK UNIT TO BE MIN. OF 30MPa AND COMPRESSIVE STRENGTH OF BLOCK (CONCRETE MASONRY) TO BE A MIN. OF 20MPa
3. ALL CLAY BRICKS SHALL COMPLY WITH AS 1225.
4. WALL CAVITY TO BE 50mm (U.N.O.).
5. THE MORTAR MIX FOR UNREINFORCED MASONRY (BRICKWORK) SHALL BE 1:1:6, AND FOR REINFORCED MASONRY 1:0.25:3 SHALL BE USED WITHOUT THE APPROVAL OF THE ENGINEER.
6. FOR NON-LOAD BEARING WALLS SEE NOTES IN THE CONCRETE SECTION.
7. ARTICULATION (OR EXPANSION) JOINT SPACING MUST BE IN ACCORDANCE WITH AS4773.1 - 2015, AS4773.2 - 2015 & TECHNICAL NOTE 61 (AUG 2008) FOR ARTICULATED WALLING (U.N.O.).
8. ARTICULATION JOINTS SHALL BE POSITIONED AS INDICATED ON THIS DRAWINGS AND/OR IN THE ARCHITECTURAL PLANS.
9. ALL WALL TIES MUST BE GALVANIZED AND COMPLY WITH AS 2699. OTHER CONNECTORS, TIES, BED JOINT MESH, SHALL COMPLY WITH AS 2975.
10. BUILDER/CONTRACTOR SHALL REMOVE ALL FORMWORK AND PROPS AFTER THE SPECIES CURING TIME TO SUPPORT BRICKWORK OVER SUSPENDED REINFORCED CONCRETE ELEMENTS.
11. ALL BLOCKWORK AND ITS TESTING SHALL COMPLY WITH THE CURRENT A.S. 3700 SAA MASONRY CODE.
12. ALL BED AND PERPENDICULAR JOINTS SHALL BE SOLIDLY FILLED WITH MORTAR, WITHOUT FURROWING, TO A NOMINAL THICKNESS OF 10mm.
13. WHERE SLAB BEARS ON MASONRY, USE TWO LAYERS OF MALTHOID OR EQUIVALENT, MINIMUM 120mm BEARING.
14. 'CLEAN OUT' OPENINGS SHALL BE PROVIDED AT THE BASE OF ALL CORES TO BE CORE FILLED. ADDITIONAL 'CLEAN OUT' OPENINGS ARE REQUIRED AT ALL HORIZONTAL BREAKS IN CONSTRUCTION.
15. MORTAR FINS PROTRUDING FROM JOINTS SHALL BE REMOVED BEFORE GROUTING CORES.
16. GROUT SHALL NOT BE POURED INTO CORES FROM ANY HEIGHT GREATER THAN 1000mm. STOP POUR 50mm BELOW TOP OF BLOCK TO PROVIDE KEY FOR THE FOLLOWING POUR. RODDING OR OTHER APPROVED MEANS SHALL BE USED TO ENSURE PROPER COMPACTION OF GROUT IN CORES.
17. WHERE R.C. BEAMS OR STEEL BEAMS BEAR ON BRICKWORK, 230mm MIN BEARING IS REQUIRED.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL SHALL BE GRADE 250 FOR HOT ROLLED PLATES, GRADE 300PLUS FOR UB, UC, PFC, ANGLES. PLATES GRADE 300 FOR WB, WC, GRADE 350 FOR SHS, CHS TO AS 1163, AS 1594, AS 3678 AND AS 3679 UNLESS NOTED OTHERWISE ON THE DRAWINGS. ALL STRUCTURAL STEEL IS TO BE PROVIDED WITH ACRS CERTIFICATION PRIOR TO FABRICATION TO ENSURE COMPLIANCE WITH AUSTRALIAN STANDARDS AND REGULATIONS.
2. SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW OF CONFORMING WITH DESIGN INTENT BEFORE FABRICATION COMMENCES. ALLOW FIVE WORKING DAYS FOR OUR REVIEW.
3. CLEATS, CONNECTIONS, HOLES, LINTELS AND OTHER MISCELLANEOUS STEEL WORK SHALL BE PROVIDED AS REQUIRED BY THE ARCHITECTURAL OR OTHER CONSULTANTS DRAWINGS OR SPECIFICATIONS.
4. ALL STEELWORK EXPOSED TO THE EXTERNAL ENVIRONMENT OR INTERNAL WET/HUMID ENVIRONMENTS SHALL BE HOT-DIPPED GALVANISED WITH ZINC COATING TO MEET THE REQUIREMENTS OF AS4680. IF STEEL WELDED SECTIONS ARE TO BE GALVANISED, ENSURE TUBE IS NOT SEALED AT BOTH ENDS, UNLESS OTHERWISE NOTED. PLATES, MEMBERS WHICH ARE NEITHER GALVANISED OR FIRE-SPRAYED REQUIRE CLASS 1 SURFACE CLEANING & A PRIME-COAT 75 MICRONS (ALKYD PAINT OR SIMILAR) IN ADDITION TO ANY TOP-COAT NOTED BY THE ARCHITECT.
5. GALVANISED STEELWORK THAT IS SITE WELDED OR SUSTAINS ANY OTHER KIND OF SURFACE DAMAGE IS TO BE PREPARED TO AS 1627:2 CLASS 3 AND PRIMED WITH 2 COATS

FOOTING & SLAB PLAN

SCALE 1:100



DRAFTING LEGEND

- TIMBER STUD WALL
- BRICKWORK WALL
- DENOTES SLAB STEPDOWN
- DENOTES INTERNAL RIB TO MATCH EXTERNAL RIB PROPERTIES (SEE SLAB SCHEDULE)
- DENOTES 3-N12 CRACK CONTROL BARS 2000mm LONG TIED TO UNDERSIDE OF SLAB MESH
- C1 COLUMN OVER
- LOAD BEARING WALL OVER
- RW1 REFER TO BRICKWALL RETAINING WALL, REFER TO DETAIL AND TABLE

FOOTING LEGEND

- EB1 300 WIDE x 400 DEEP EDGE BEAM, WITH 3-N12 BOTTOM. IF DEEPEMED REBATE IS REQUIRED, REFER TO DETAIL.
- IB1 300 WIDE x 400 DEEP INTERNAL BEAM, WITH 3-N12 TOP AND BOTTOM.
- EB2 300 WIDE x 400 DEEP EDGE BEAM, WITH 3-N12 TOP AND BOTTOM. IF DEEPEMED REBATE IS REQUIRED, REFER TO DETAIL.
- IB2 450 WIDE x 400 DEEP INTERNAL BEAM, WITH 4-N12 TOP AND BOTTOM, REFER TO DETAIL.
- IB3 450 WIDE x 400 DEEP INTERNAL BEAM, WITH 4-N12 TOP AND BOTTOM, REFER TO DETAIL.
- IB4 300 WIDE x 400 DEEP INTERNAL BEAM, WITH 3-N12 BOTTOM, REFER TO DETAIL.
- SF1 300 WIDE x 400 DEEP STRIP FOOTING WITH 3-L11TM TOP AND BOTTOM, FOUNDED 100mm INTO SILTY SAND WITH POLYETHYLENE MEMBRANE.
- SF2 450 WIDE x 400 DEEP STRIP FOOTING WITH 4-L11TM TOP AND BOTTOM, FOUNDED 100mm INTO SILTY SAND WITH POLYETHYLENE MEMBRANE.

ALL EXTERNAL AND INTERNAL BEAMS MUST BE FOUND 100mm INTO NATURAL SILTY SAND AS NOTED IN THE SOIL REPORT. BLINDING CONCRETE MAY BE USED TO ACHIEVE FOUNDING REQUIREMENTS. THIS FOUNDING REQUIREMENT IS NOT REQUIRED IF THE BEAM IS FOUNDED ON BORED PIERS.

A	CONSTRUCTION ISSUE	10.09.24
P1	PRELIMINARY REVISION	24.07.24
No.	REVISION	DATE



CONTRACTOR MUST DIAL 1100 TO CONFIRM LOCATION OF EXISTING SERVICES AND COMPLY WITH ANY AUTHORITY REQUIREMENTS REGARDING EXISTING SERVICES PRIOR TO COMMENCEMENT OF ANY WORKS.

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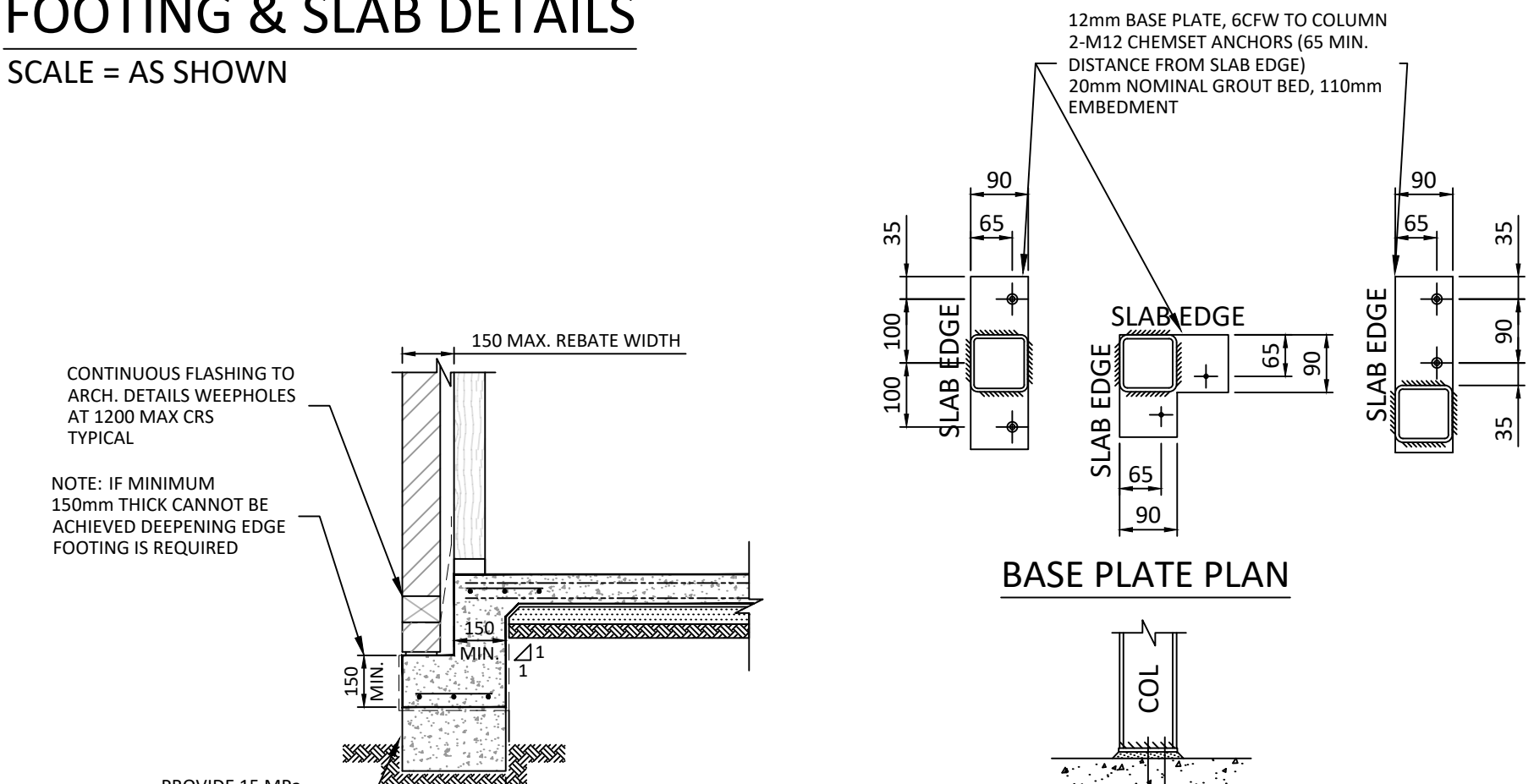


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CLIENT:	CREATIVE HOUSE PLANS	DESIGNED:	YD	DRAWN:	ED	DATE:	24.07.24
DRAWING TITLE:	FOOTING & SLAB PLAN	PAGE No:	S1	SCALE:	1:100	- A1	
PROJECT TITTLE:	PROPOSED THREE NEW DOUBLE STOREY DWELLINGS	DRAWING NO.:	1685	REVISION:	A		
PROJECT ADDRESS:	LOT 1, NO.17 RAILWAY PARADE, SEAFORD						

FOOTING & SLAB DETAILS

SCALE = AS SHOWN

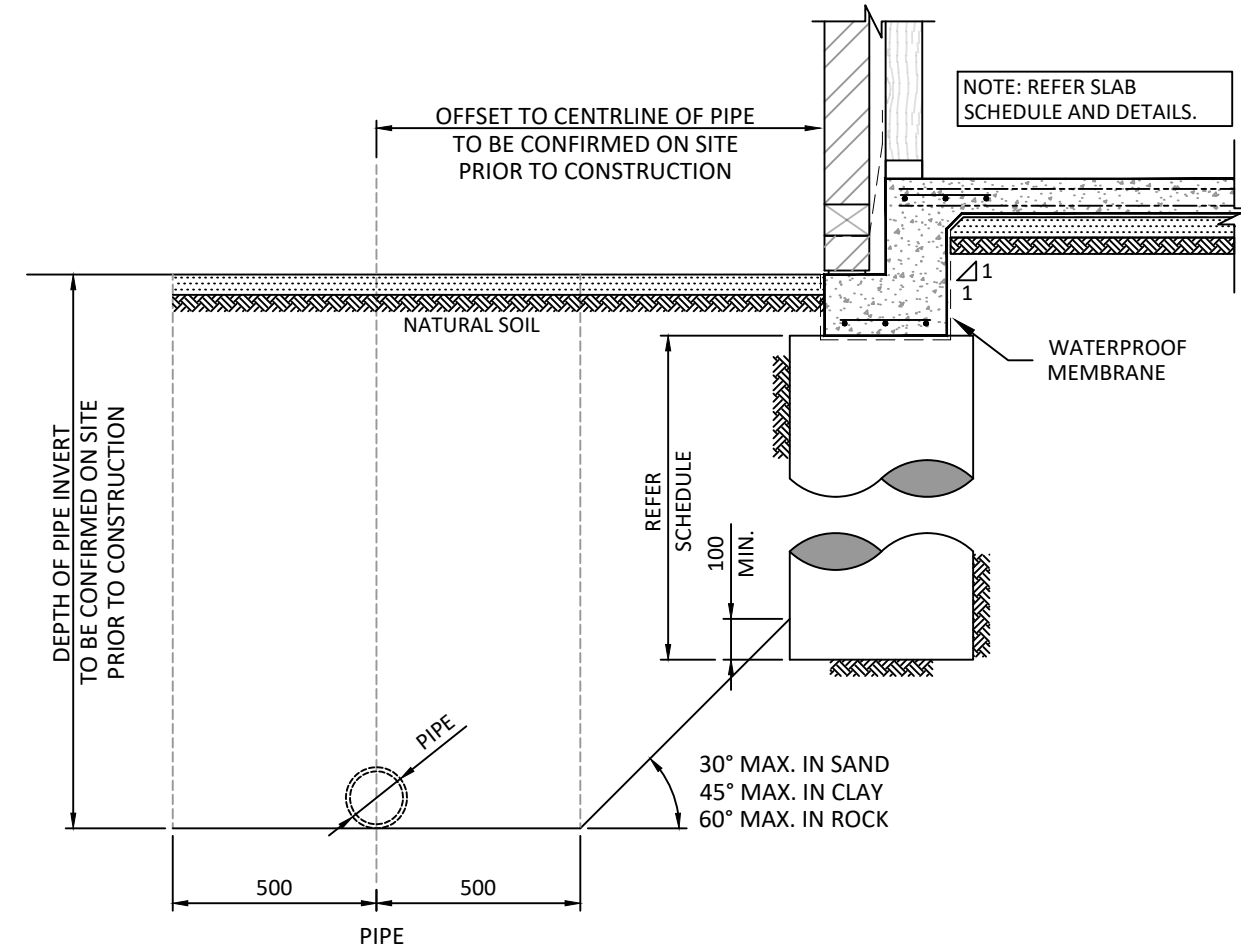


TYPICAL EXTERNAL BEAM DETAIL

SCALE = NTS

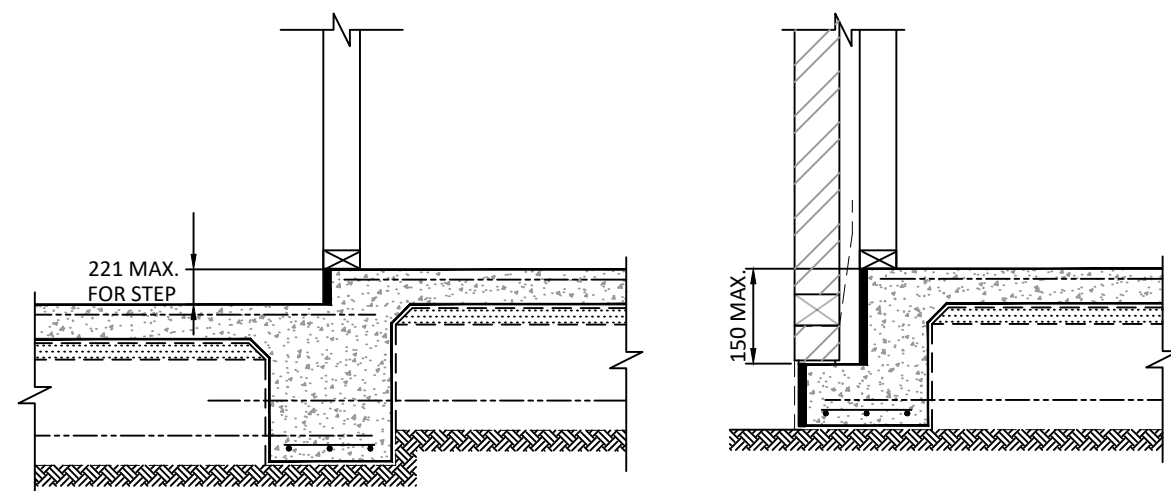
COLUMB BASE CONNECTION DETAIL

FOR INTERNAL COLUMN BASE PLATE BOLTS TO BE LOCATED ON THE CENTER OF THE BASE PLATE
SCALE = NTS



ANGLE OF REPOSE DETAL (TYPICAL)

SCALE = NTS



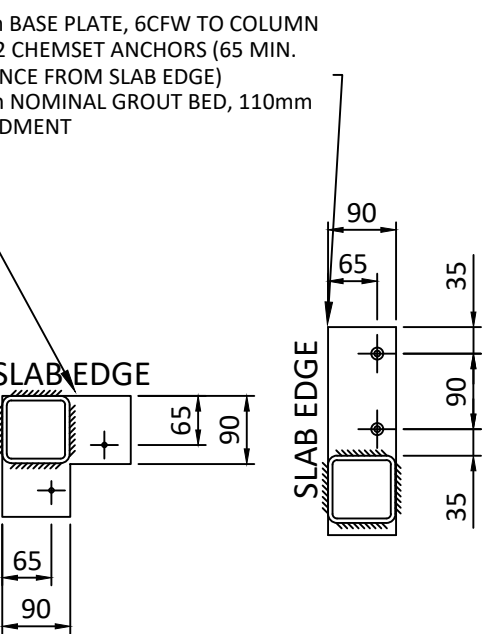
BRICK AND FRAME (25mm MAX) OVERHANG RECTIFICATION DETAIL (TYP.)- GROUT OPTION

IMPORTANT NOTES:

- THE EDGES OF THE EXISTING CONCRETE SLAB ARE TO BE SCABBLED THEN CLEANED TO PROVIDE A COARSE SURFACE TO ACCEPT THE NON-SHRINK GROUT.
- APPLY A BONDCRETE PRODUCT TO THE SURFACE OF THE CONCRETE TO RECEIVE THE NON-SHRINK GROUT IN ACCORDANCE WITH MANUFACTURERS SPECIFICATION.
- WHILE THE SLURRY MIX IS STILL WET, PROVIDE HIGH-STRENGTH NON-SHRINK GROUT (SUCH AS LANKO 702 DURABED OR SIMILAR APPROVED) TO BENEATH THE OVERHANG, AND INSTALL IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS. THE THICKNESS OF THE GROUT MUST BE CONSISTENT WITH THE OVERHANG AND GROUT MUST BE AT LEAST 150mm DEEP.

IMPORTANT ADDITIONAL NOTES FOR ALL RECTIFICATION DETAIL OPTIONS:

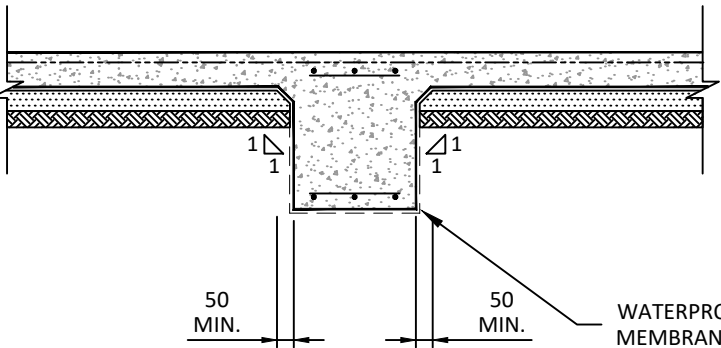
- THE DESIGN SHOULD BE READ IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS DOCUMENTATION FOR THIS SPECIFIC SITE.
- BUILDER TO ADVISE THIS OFFICE IF THE EXISTING STRUCTURE VARIES FROM THESE SPECIFICATIONS.
- REFER TO EXTERNAL EDGE BEAM TYPICAL DETAIL FOR SLAB, FOOTING AND REINFORCEMENT SPECIFICATIONS.
- REFER SLAB AND FOOTING PLAN FOR FOOTING FOUNDING SPECIFICATIONS.
- BUILDER TO CONTACT THIS OFFICE IF THERE IS COLUMN OVERHANG FOR FURTHER ADVICE.
- BUILDER TO ENSURE ADEQUATE WATER PROOF MEMBER IS INSTALLED TO AVOID ANY POTENTIAL MOISTURE DAMAGES TO THE FRAMING ITEMS.
- DO NOT SCALE DIMENSIONS FROM DRAWING.
- BRICK VENEER CAVITY WIDTH/WALL TIES TO BE AS PER BCA REQUIREMENTS.
- BOTTOM PLATE TO BE FIXED TO CONCRETE SLAB IN ACCORDANCE WITH TIMBER FRAMING MANUAL BUILDER TO INFORM THIS OFFICE IF GREATER THAN 3.4kN/m BRACING WALL IS INSTALLED ON WALL OVER.



BASE PLATE PLAN

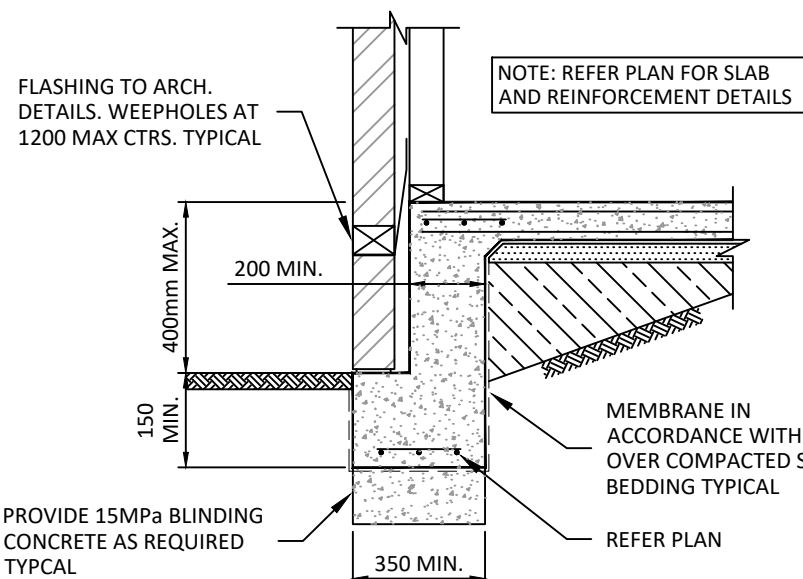
PRYDA FULL STIRRUP POST (PSF) ON CONCRETE SLAB/FOOTING DETAIL

DETAIL SHOWN FOR A 90x90 POST, WHICH IS ALSO APPLICABLE FOR 115SQ, 125SQ, 135SQ & 180SQ POST
SCALE = NTS



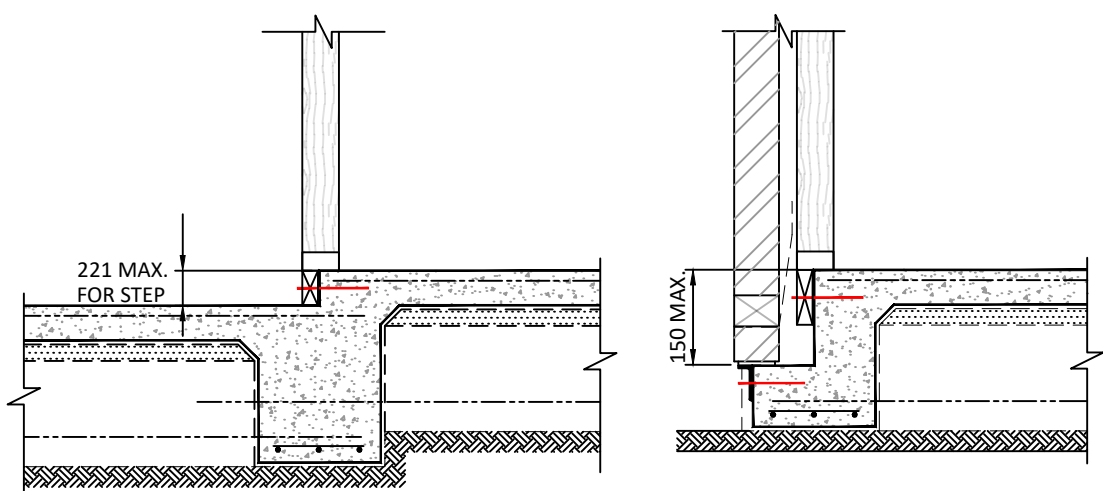
TYPICAL INTERNAL RIB DETAIL

SCALE = NTS



EXTERNAL RIB DEEPENED REBATE DETAIL (400mm MAX)

SCALE = NTS



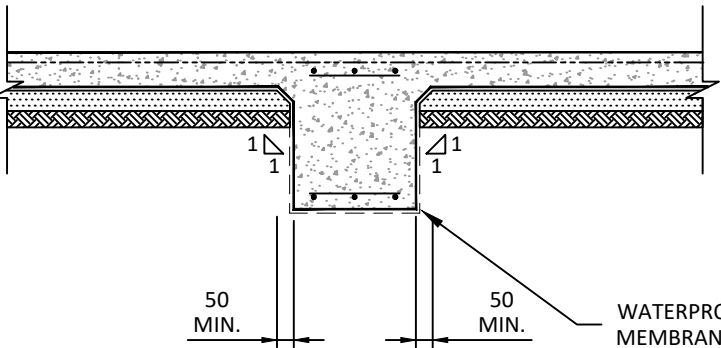
BRICK AND FRAME (45mm MAX) OVERHANG RECTIFICATION DETAIL (TYP.) - TIMBER OPTION

IMPORTANT NOTES:

- FOR STUD OVERHANG (45mm MAX.):
 - PROVIDE 120x45 H3 TREATED F5 PINE TIMBER BEAM FOR STUD OVERHANG (MAX 45mm)
 - M10 GALVANISED BOLTS CHEMSET 502 (OR EQUIVALENT) AT 400 CRS, CENTRALLY THROUGH TIMBER BEAM 150mm (MIN.) INTO EXISTING SLAB.
- FOR STUD OVERHANG AT STEPDOWN (45mm MAX.):
 - PROVIDE 120x45 H3 TREATED F5 PINE TIMBER BEAM FOR STUD OVERHANG (MAX 45mm) - ALTERNATIVE IF STEPDOWN IS LESS THAN 100mm PROVIDE 90x45 H3 TREATED F5 PINE TIMBER BEAM. M10 GALVANISED BOLTS CHEMSET 502 (OR EQUIVALENT) AT 400 CRS, CENTRALLY THROUGH TIMBER BEAM 150mm (MIN.) INTO EXISTING SLAB.
- FOR FRAME OVERHANG (75mm MAX.):
 - GALVANISED 75 x 100 x 8 UA TO BE GROUND FLUSH WITH BRICK/TIMBER BOTTOM PLATE FACE (COLD GALVANISE GROUND EDGE) TYPICAL U.N.O
 - M12 GALVANISED BOLTS CHEMSET 502 (OR EQUIVALENT) AT 400 CRS, CENTRALLY THROUGH ANGLE 150mm (MIN.) INTO EXISTING SLAB.
- A MINIMUM OF 2 CHEMSET BOLTS AT 100 CRS ARE REQUIRED CENTRALLY UNDER ALL POINT LOAD AND GIRDER TRUSS LOAD LOCATIONS.
- ALL CHEMSET BOLTS TO BE EMBEDDED INTO EXISTING FOOTING/SLAB IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS, DYNABOLTS ARE NOT PERMITTED. MINIMUM OF ONE BOLT TO BE INSTALLED 100 FROM EACH END OF RECTIFICATION MEMBER.
- LONGER LENGTH OF RECTIFICATION MEMBER TO BE VERTICAL AND FIXED AGAINST THE FACE OF SLAB/FOOTING.

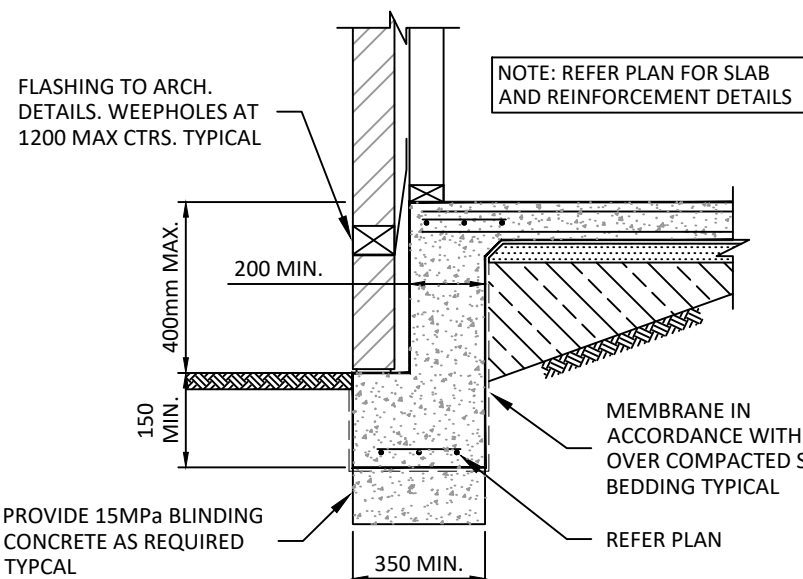
PRYDA FULL STIRRUP POST (PSF) ON CONCRETE SLAB/FOOTING DETAIL

DETAIL SHOWN FOR A 90x90 POST, WHICH IS ALSO APPLICABLE FOR 115SQ, 125SQ, 135SQ & 180SQ POST
SCALE = NTS



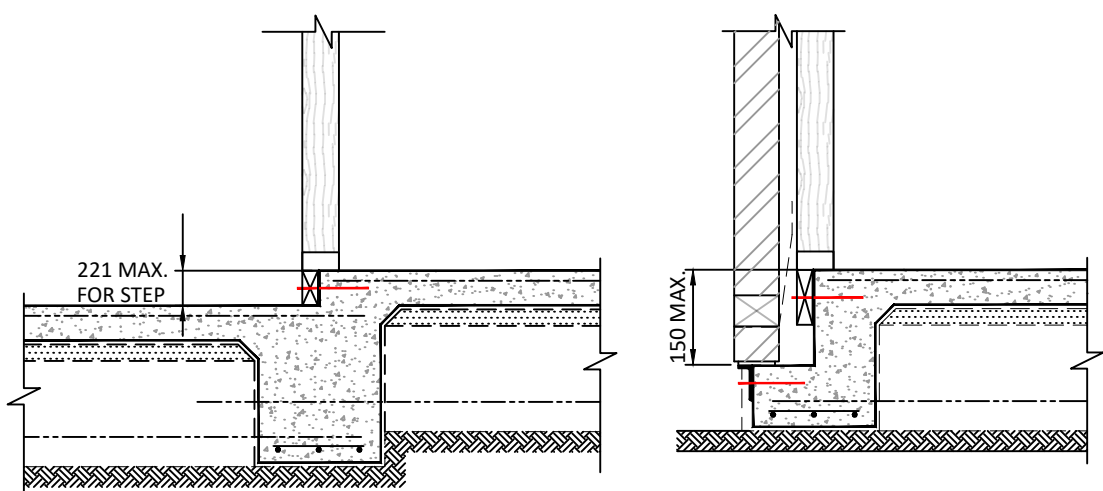
TYPICAL INTERNAL RIB DETAIL

SCALE = NTS



EXTERNAL RIB DEEPENED REBATE DETAIL (400mm MAX)

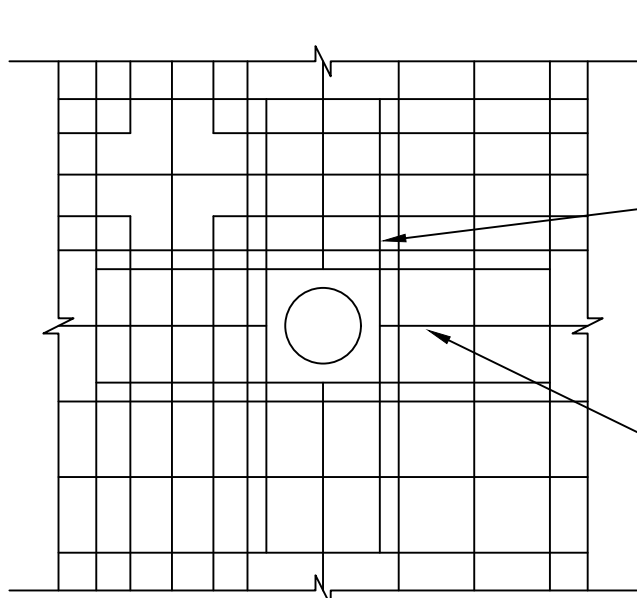
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BRICK AND FRAME (45mm MAX) OVERHANG RECTIFICATION DETAIL (TYP.) - TIMBER OPTION

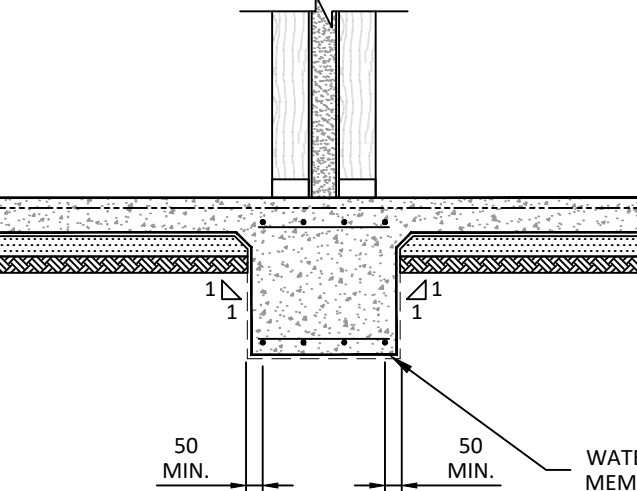
IMPORTANT NOTES:

- FOR STUD OVERHANG (45mm MAX.):
 - PROVIDE 120x45 H3 TREATED F5 PINE TIMBER BEAM FOR STUD OVERHANG (MAX 45mm)
 - M10 GALVANISED BOLTS CHEMSET 502 (OR EQUIVALENT) AT 400 CRS, CENTRALLY THROUGH TIMBER BEAM 150mm (MIN.) INTO EXISTING SLAB.
- FOR STUD OVERHANG AT STEPDOWN (45mm MAX.):
 - PROVIDE 120x45 H3 TREATED F5 PINE TIMBER BEAM FOR STUD OVERHANG (MAX 45mm) - ALTERNATIVE IF STEPDOWN IS LESS THAN 100mm PROVIDE 90x45 H3 TREATED F5 PINE TIMBER BEAM. M10 GALVANISED BOLTS CHEMSET 502 (OR EQUIVALENT) AT 400 CRS, CENTRALLY THROUGH TIMBER BEAM 150mm (MIN.) INTO EXISTING SLAB.
- FOR FRAME OVERHANG (75mm MAX.):
 - GALVANISED 75 x 100 x 8 UA TO BE GROUND FLUSH WITH BRICK/TIMBER BOTTOM PLATE FACE (COLD GALVANISE GROUND EDGE) TYPICAL U.N.O
 - M12 GALVANISED BOLTS CHEMSET 502 (OR EQUIVALENT) AT 400 CRS, CENTRALLY THROUGH ANGLE 150mm (MIN.) INTO EXISTING SLAB.
- A MINIMUM OF 2 CHEMSET BOLTS AT 100 CRS ARE REQUIRED CENTRALLY UNDER ALL POINT LOAD AND GIRDER TRUSS LOAD LOCATIONS.
- ALL CHEMSET BOLTS TO BE EMBEDDED INTO EXISTING FOOTING/SLAB IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS, DYNABOLTS ARE NOT PERMITTED. MINIMUM OF ONE BOLT TO BE INSTALLED 100 FROM EACH END OF RECTIFICATION MEMBER.
- LONGER LENGTH OF RECTIFICATION MEMBER TO BE VERTICAL AND FIXED AGAINST THE FACE OF SLAB/FOOTING.



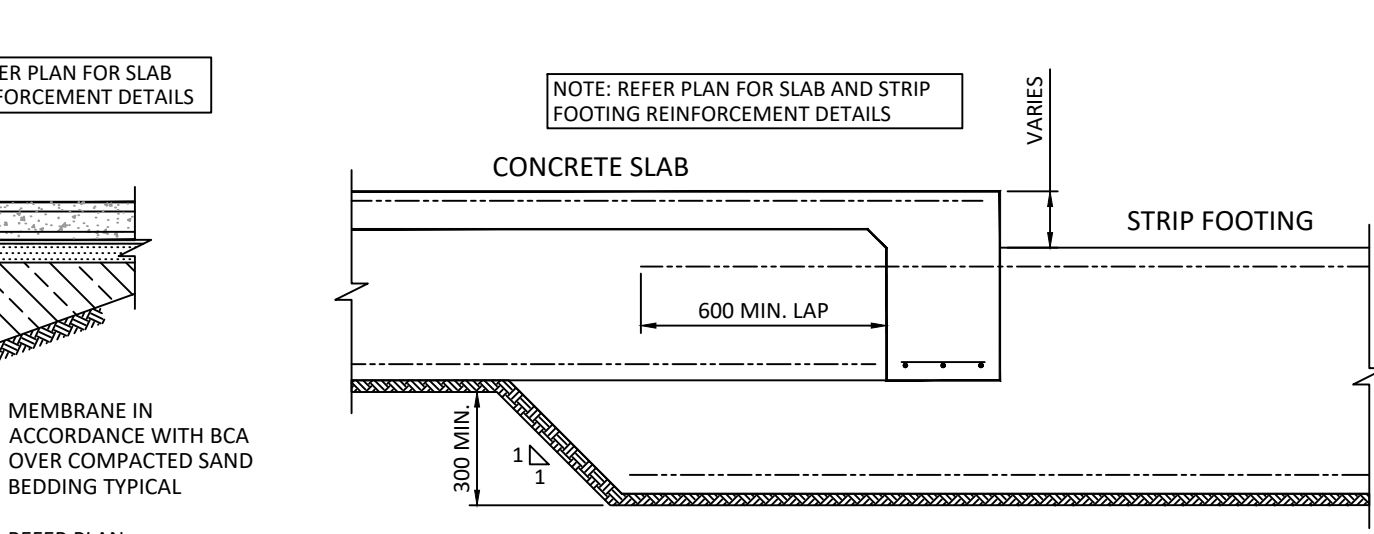
SLAB PENETRATION DETAIL

SCALE = NTS



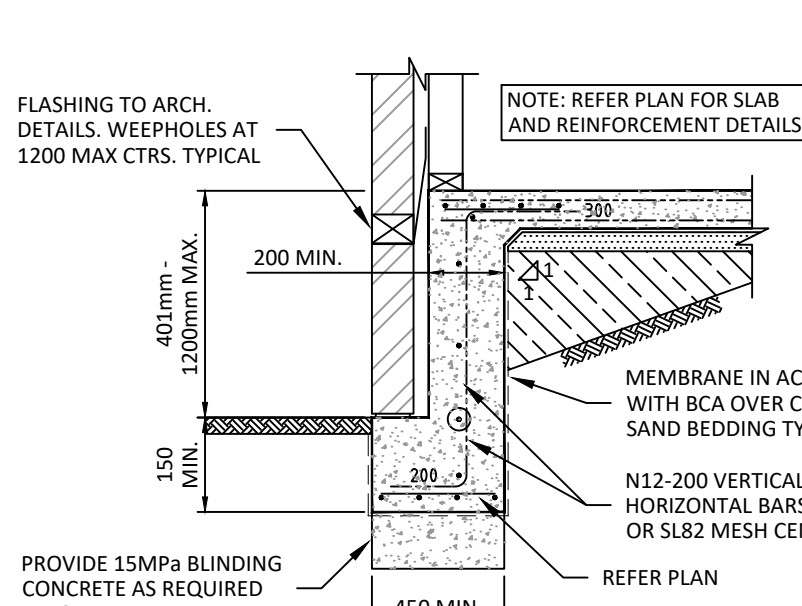
PARTY WALL FOOTING DETAIL - IB2

SCALE = NTS



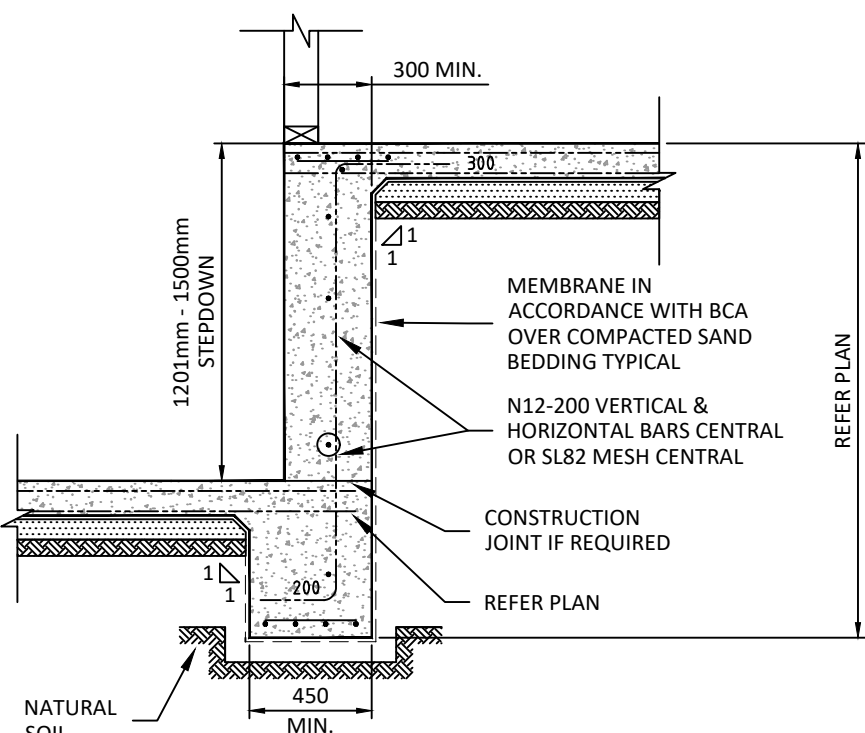
TYPICAL STRIP FOOTING TO SLAB EDGE BEAM CONNECTION DETAIL

SCALE = NTS

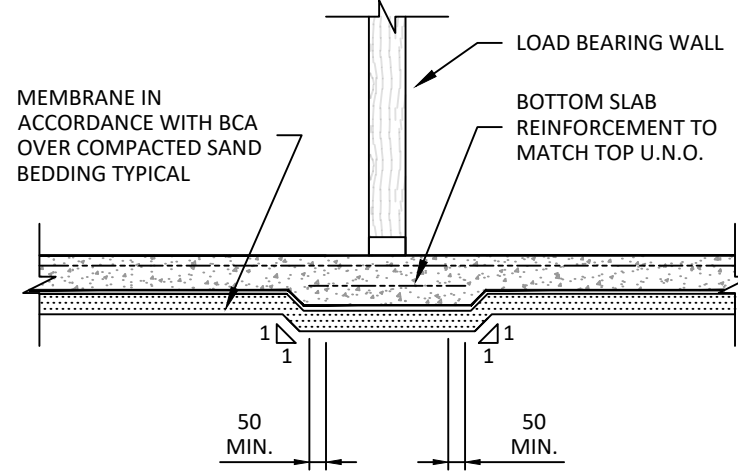


EXTERNAL RIB DEEPENED REBATE DETAIL (401mm - 1200mm MAX)

SCALE = NTS

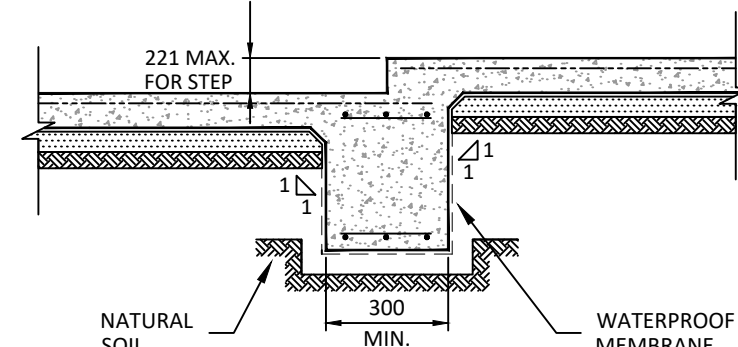


INTERNAL BEAM STEPDOWN DETAIL - IB3

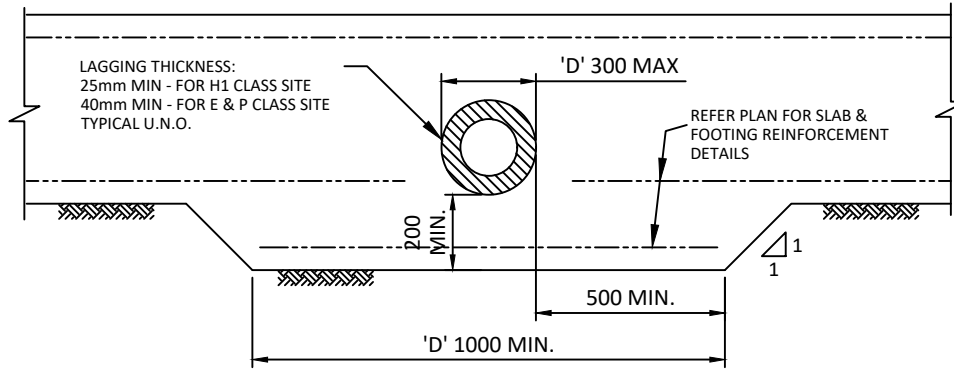


LOAD BEARING WALL ON SLAB DETAIL

SCALE = NTS

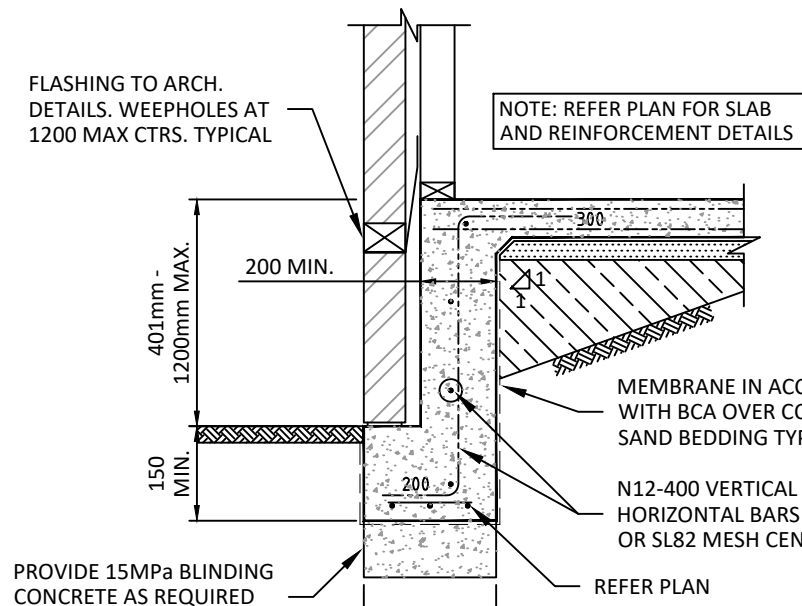


STEPDOWN DETAIL AT GARAGE/PORCH



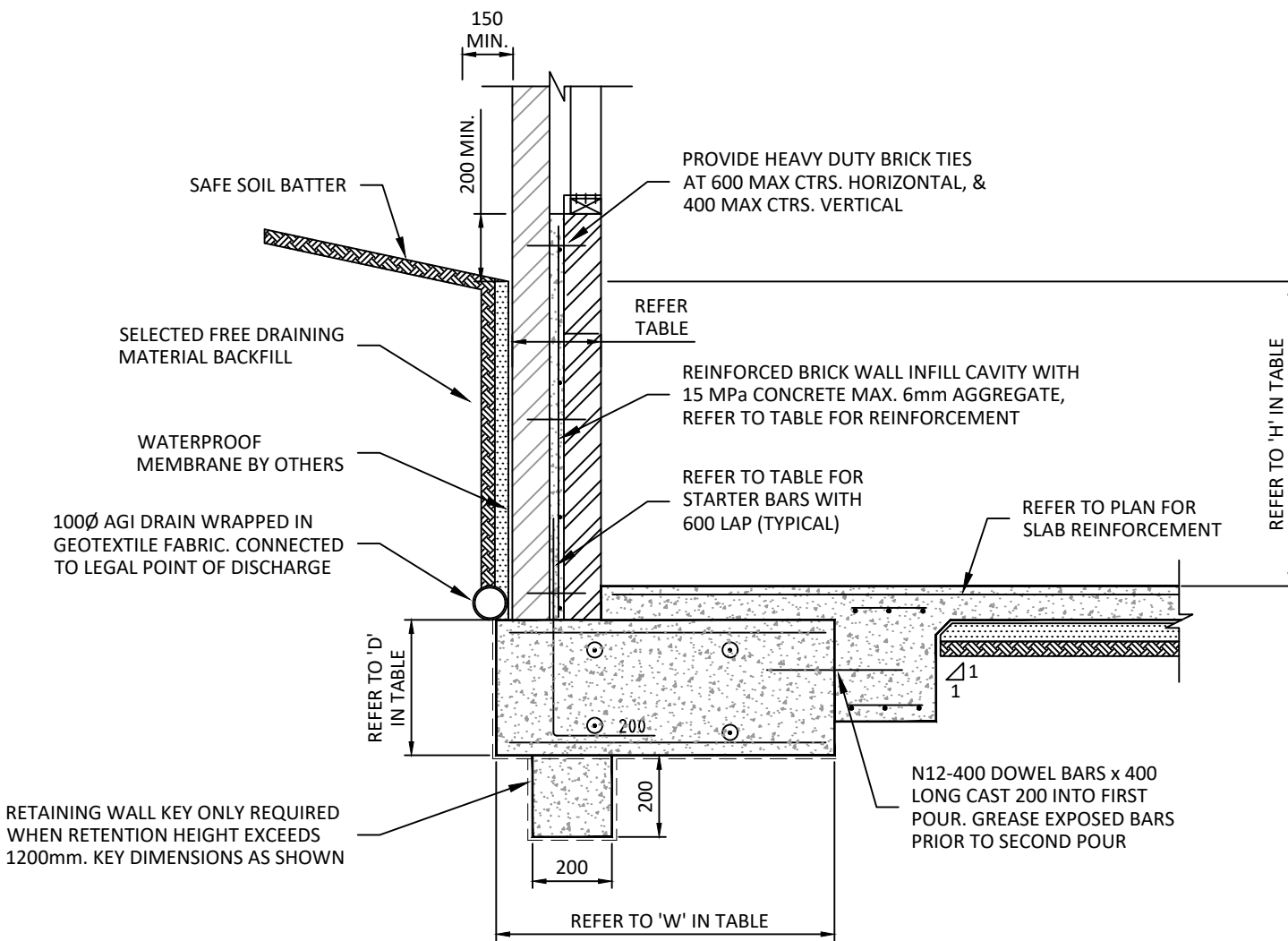
PENETRATION THROUGH FOOTING DETAIL

SCALE = NTS



EXTERNAL RIB DEEPENED REBATE DETAIL (401mm - 1200mm MAX)

SCALE = NTS



BRICKWALL RETAINING WALL TABLE									
MAX RETAINING WALL HEIGHT 'h' (mm)	BRICK WALL THINCKNESS & REINFORCEMENT			FOOTING SIZES & REINFORCEMENT					MINIMUM FOOTING BEARING CAPACITY
	MIN. BRICKWALL THICKNESS (mm)	VERTICAL BARS	HORIZONTAL BARS	MIN. FOOTING WIDTH 'W'(mm)	MIN. FOOTING DEPTH 'D'(mm)	STARTER BARS	FOOTING TRENCH MESH OR FABRIC (TOP & BOTTOM)		
0-600	300	N12-400 CTRS.	N12-400 CTRS.	800	600	N12-400 CTRS.	SL82	SL82	100 kPa
601-1200	300	N12-400 CTRS.	N12-400 CTRS.	1400	600	N12-400 CTRS.	SL82	SL82	100 kPa

BRICKWALL RETAINING WALL DETAIL AND NOTES - RW1

WALL DESIGN FOR MAX SURCHARGE LOAD OF 5.0kPa
SCALE = NTS

SAFETY-IN-DESIGN-REVIEW

XSTRUCT CONSULTING ENGINEERS HAS CONDUCTED A PRELIMINARY SAFETY-IN-DESIGN REVIEW OF THE DESIGN SHOWN ON THESE DRAWINGS. IT IS SUMMARIZED IN THE TABLE BELOW. THE REVIEW IS BASED GENERALLY ON THE PROCEDURE OUTLINED IN THE SAFE WORK AUSTRALIA PUBLICATION "SAFE DESIGN OF STRUCTURES CODE OF PRACTICE" (JULY 2012)

THE DESIGN HAS NOT BEEN REVIEWED WITH A CONTRACTOR/BUILDER AT THE TIME OF ISSUE FOR TENDER OR CONSTRUCTION. CONSTRUCTION METHODS VARY BETWEEN CONTRACTORS SO IT IS NOT POSSIBLE FOR XSTRUCT CONSULTING ENGINEERS TO PERFORM AN EXHAUSTIVE SAFETY-IN-DESIGN OR SAFETY-IN-CONSTRUCTION REVIEW. ONCE APPOINTED, THE CONTRACTOR IS REQUIRED TO UNDERTAKE A THOROUGH REVIEW OF THE DESIGN WITH THEIR SUB-CONTRACTORS TO IDENTIFY SAFETY RISKS DURING CONSTRUCTION AND DURING THE LIFE OF THE BUILDING.

CONTRACTORS ARE RESPONSIBLE FOR ENGAGING AN ERECTION ENGINEER AT THEIR OWN COST TO REVIEW THEIR PROPOSED ERECTION PROGRAMS/SEQUENCE AND TO DESIGN AND CERTIFY THE TEMPORARY FRAMING TO SUPPORT STRUCTURAL ELEMENTS.

CONTRACTORS SHALL PROVIDE DOCUMENTATION THAT OUTLINE HOW THE PROJECT WAS BUILT SO THAT THE DEMOLITION CONTRACTOR CAN ADEQUATELY EVALUATE RISKS DURING DEMOLITION PLANNING AT THE END OF THE LIFE OF THE BUILDING.

CATEGORY	SAFETY IN REVIEW COMMENTS
CONSTRUCTION OR IN-SERVICE LOADS DESIGNED FOR	- THE DESIGN ALLOWS FOR A 2.5 TONNE SCISSOR LIFT TO BE DRIVEN ON SUSPENDED CONCRETE STRUCTURE. THE CONTRACTOR SHALL MAINTAIN A 1m EXCLUSION ZONE AROUND SCISSOR LIFTS. - PIERS/PILES TO BASEMENT WALLS HAVE BEEN DESIGN TO SUPPORT TEMPORARY SOIL LOADS AND A SURCHARGE FOR GROUND LOADING. IF THE CONSTRUCTION OF THE GROUND SLAB IS EXPECTED TO BE DELAYED OR TAKE LONGER THAN THREE (3) MONTHS THEN IT IS RECOMMENDED THAT THE SHORING STRUCTURE BE PROPER OR THE DESIGN AMENDED. - IF CONTRACTOR-DESIGNED BUILDING MAINTENANCE/CLEANING SYSTEMS ARE PROPOSED THAT IMPOSE LOADS ON THE STRUCTURE, THE CONTRACTOR SHALL SUPPLY LOADS AND FIXING LOCATIONS TO XSTRUCT SO THAT WE CAN CONFIRM THAT THE STRUCTURE CAN SUPPORT THE LOADS. - THE FOOTINGS FOR THIS STRUCTURE HAVE NOT BEEN DESIGNED TO SUPPORT CRANE LOADING. IF REQUIRED, THE CONTRACTOR SHOULD CONTACT XSTRUCT TO DESIGN THE STRUCTURE TO SUPPORT SUCH LOADS OR ENGAGE AN INDEPENDANT ENGINEER.
LOCATION OF UNDERGROUND AND ABOVE GROUND SERVICES	- XSTRUCT CARRIED OUT A BEFORE-YOU-DIG-AUSTRALIA REVIEW DURING THE DESIGN PHASE. THE CONTRACTOR SHALL UNDERTAKE A REVIEW OF THEIR OWN TO VERIFY SERVICES ENTERING THE PROPERTY AND IN PROXIMITY TO THE BOUNDARY IN THE STREET/SURROUNDING THE PROPERTY. - BEFORE-YOU-DIG-AUSTRALIA DOES NOT CONFIRM THE LAYOUT OF SERVICES WITHIN THE SITE. THE CONTRACTOR SHALL ALLOW TO ENGAGE A SERVICES LOCATION CONTRACTOR TO CONDUCT A SURVEY OF ALL SERVICES ON THE SITE. - THE LOCATION OF EXISTING SERVICES SHOWN ON XSTRUCT DRAWINGS IS APPROXIMATE ONLY. SUBMIT THE SURVEY RESULTS TO XSTRUCT FOR REVIEW TO CONFIRM DESIGN ASSUMPTIONS.
EXCAVATIONS	- BATTER SLOPES SHALL BE IN ACCORDANCE WITH GEOTECHNICAL RECOMMENDATIONS AND SHALL BE INSPECTED BY THE GEOTECHNICAL ENGINEER TO CONFIRM ADEQUACY (INCLUDING REVIEW OF PROPOSED DURATION OF BATTER). - EXCAVATIONS GREATER THAN 1m DEEP REQUIRE SHORING AND SHALL NOT BE ACCESSED BY PERSONNEL WITHOUT APPROPRIATE CONFINED SPACE TRAINING. - PROVIDE BARRIERS TO ALL EXCAVATIONS TO PREVENT FALLS. - ENSURE MEASURES TO PROTECT ADJACENT PROPERTY/STRUCTURES ARE FOLLOWED STRICTLY IN ACCORDANCE WITH THESE DRAWINGS. IF IN DOUBT, CONTACT XSTRUCT. - CONTACT XSTRUCT AND THE GEOTECHNICAL ENGINEER IF GROUND WATER IS ENCOUNTERED DURING EXCAVATION.
OR	
VERIFICATION OF SOIL CONDITIONS	THE GEOTECHNICAL INVESTIGATION WAS BASED ON A LIMITED SURVEY VIA BORE HOLES IN DISCRETE LOCATIONS AROUND THE SITE (REFER TO THE GEOTECHNICAL REPORT REFERENCED ON THESE DRAWINGS). THE CONTRACTOR SHALL HAVE THE SOIL DESIGN PARAMETERS VERIFIED DURING EXCAVATION. ALLOW TO ENGAGE THE GEOTECHNICAL ENGINEER TO CONDUCT A REVIEW OF THE SOIL DURING CLEARING/EXCAVATION OF THE SITE.
FINISHES TO STEELWORK	WHILE THE FINISHES TO STEELWORK ARE TO THE ARCHITECT'S SPECIFICATION, THE CONTRACTOR SHALL CONFIRM THE FINISHES OF EXTERNAL EXPOSED STEELWORK OR CONNECTION OF DISSIMILAR METALS ARE SUITABLE TO AVOID THE ONSET OF CORROSION. CORROSION OF ELEMENTS THAT CANNOT BE READILY INSPECTED CAN LEAD TO STRUCTURAL DEFECTS OR COLLAPSE DURING THE LIFE OF THE STRUCTURE. CONDUCT A REVIEW OF EXPOSED STEELWORK WITH THE ARCHITECT.
BALUSTRADES	STRUCTURAL GLASS IN BALUSTRADES OR SKYLIGHTS SHALL BE DESIGNED WITH ADEQUATE REDUNDANCY TO ENSURE THAT A BREAKAGE DOES NOT LEAD TO COLLAPSE OF PART OF THE BARRIER WHILE IT IS EXPERIENCING LOADS.
MODIFICATION OF EXISTING STRUCTURES	- OUR DESIGN HAS BEEN BASED ON A REVIEW OF VISIBLE STRUCTURE PRIOR TO THE REMOVAL OF FINISHES. THE BUILDER SHALL USE THEIR EXPERIENCE DURING DEMOLITION TO DETERMINE WHETHER UNCOVERED ELEMENTS ARE STRUCTURAL PRIOR TO PROCEEDING WITH DEMOLITION. - OPENING UP FACADES IN EXISTING STRUCTURES CAN CREATE DOMINANT OPENINGS IN BUILDINGS THAT SIGNIFICANTLY INCREASE THE WIND LOADS ON WALLS AND ROOFS. OPENINGS SHALL BE COVERED WITH TEMPORARY PROTECTION TO PREVENT THIS FROM OCCURRING, CONTRACTOR TO ALLOW TO DESIGN AND INSTALL THIS TYPE OF PROTECTION FOR STRUCTURE.
BASEMENTS	STORMWATER INGRESS INTO EASEMENT VIA DRIVEWAY RAMP IS TO BE AVOIDED USING 300mm HIGH FREEBOARD ABOVE ROAD CROSSOVER AS A PASSIVE PROTECTION MEASURE. RAMP GRADIENTS TO MAINTAIN COMPLIANCE WITH CARPARK STANDARDS.



CONTRACTOR MUST DIAL 1100 TO CONFIRM LOCATION OF EXISTING SERVICES AND COMPLY WITH ANY AUTHORITY REQUIREMENTS REGARDING EXISTING SERVICES PRIOR TO COMMENCEMENT OF ANY WORKS.

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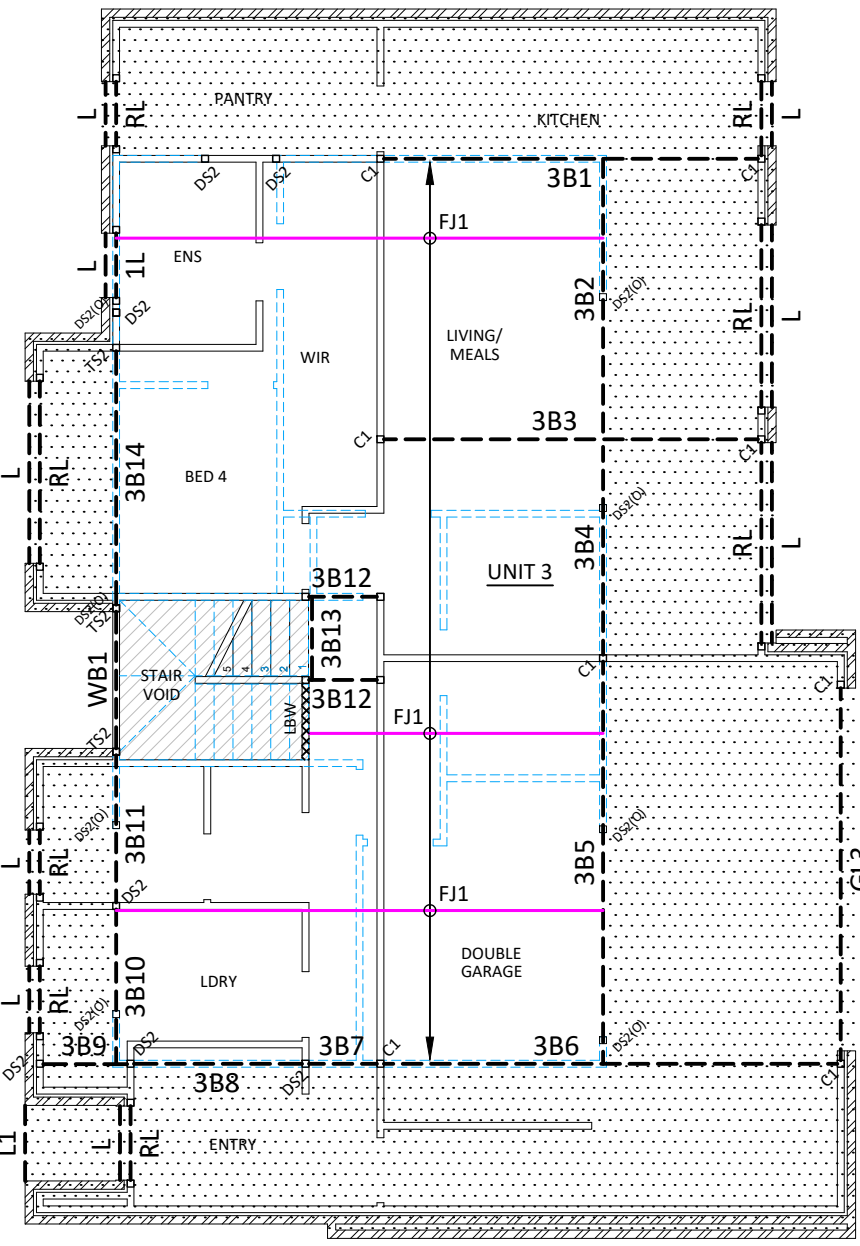
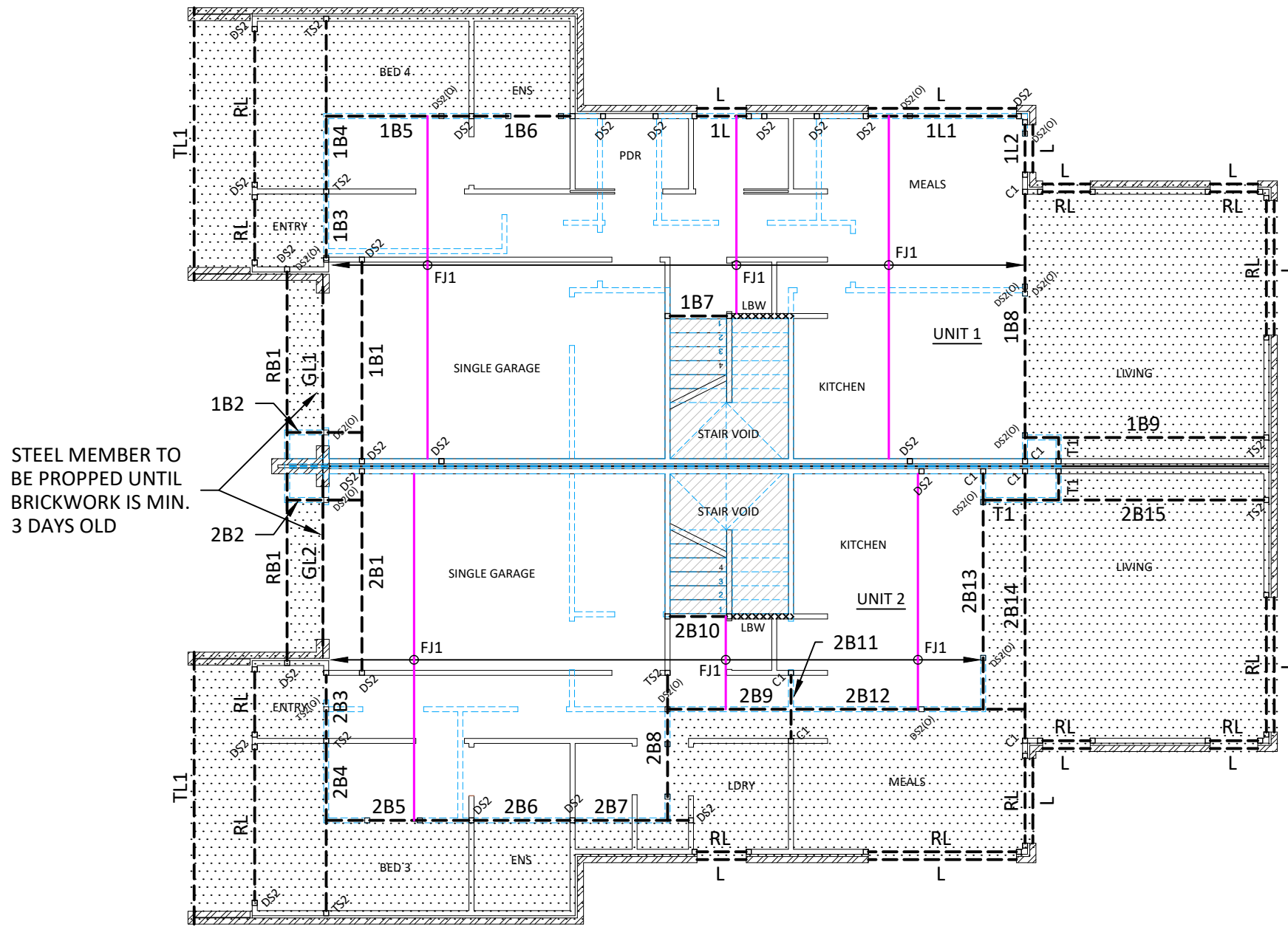


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CLIENT:	CREATIVE HOUSE PLANS	DESIGNED:	DRAWN:	DATE:
DRAWING TITLE:	FOOTING & SLAB DETAILS	YD	ED	24.07.24
PROJECT TITLE:	PROPOSED THREE NEW DOUBLE STOREY DWELLINGS	PAGE No:	SCALE:	
PROJECT ADDRESS:	LOT 1, NO.17 RAILWAY PARADE, SEAFORD	S2	AS SHOWN - A1	
		DRAWING NO.:	REVISION:	
		1685	A	

GROUND FLOOR FRAMING PLAN

SCALE 1:100



MEMBER SCHEDULE - UNIT 1

MEMBER	SECTION TYPE	REMARKS/ CONNECTIONS
1B1	2/290x42 SMART LVL 15	NAIL LAMINATED
1B2	2/140x42 SMART LVL 15	NAIL LAMINATED
1B3	2/120x42 SMART LVL 15	NAIL LAMINATED
1B4	2/300x58 SMART LVL 15	NAIL LAMINATED
1B5	2/240x42 SMART LVL 15	NAIL LAMINATED
1B6	2/190x42 SMART LVL 15	NAIL LAMINATED
1B7	120x42 SMART LVL 15	
1B8	250 PFC	
1B9	2/300x58 SMART LVL 15	NAIL LAMINATED
1L1	2/290x42 SMART LVL 15	NAIL LAMINATED
1L2	2/120x42 SMART LVL 15	NAIL LAMINATED
RB1	290x42 SMART LVL 15	
GL1	150x8 (V) x 200x8 (H)	T LINTEL, MIN. 110mm END BEARING REQUIRED, REFER TO DETAIL
TL1	250x12 (V) x 200x10 (H)	T LINTEL, MIN. 200mm END BEARING REQUIRED, REFER TO DETAIL
T1	2/120x42 SMART LVL 15	NAIL LAMINATED
FJ1	300 DEEP FLOOR JOISTS @ 450 CTRS	REFER TO MANUFACTURER'S SPECIFICATIONS
DS2	2/90x45 F17 KD HW	
TS2	3/90x45 F17 KD HW	
C1/SC1	89x89x6 SHS	
1L	FLOOR LINTEL	REFER TO TABLE
RL	ROOF LINTEL	REFER TO TABLE
L	BRICK LINTEL	REFER TO TABLE

MEMBER SCHEDULE - UNIT 2

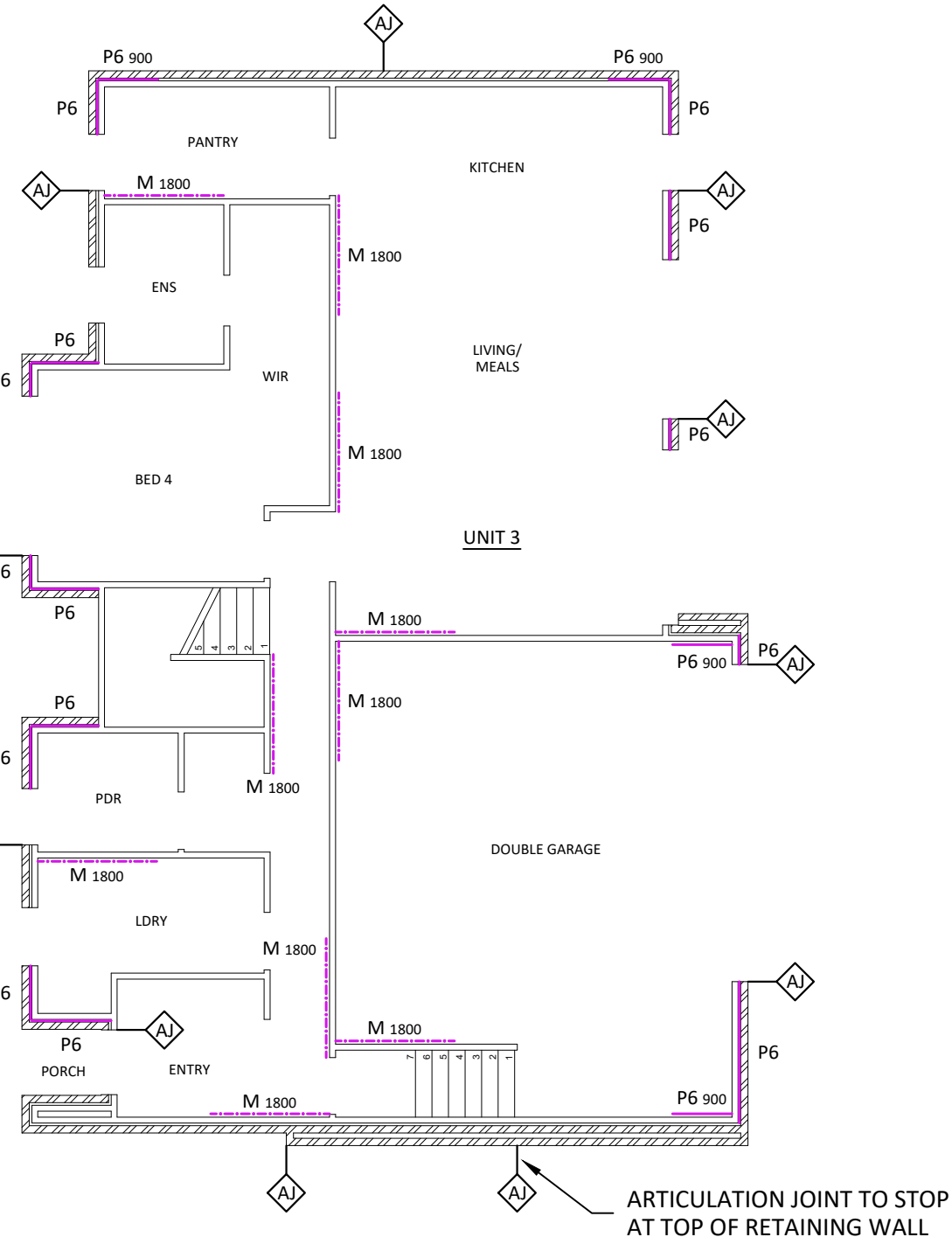
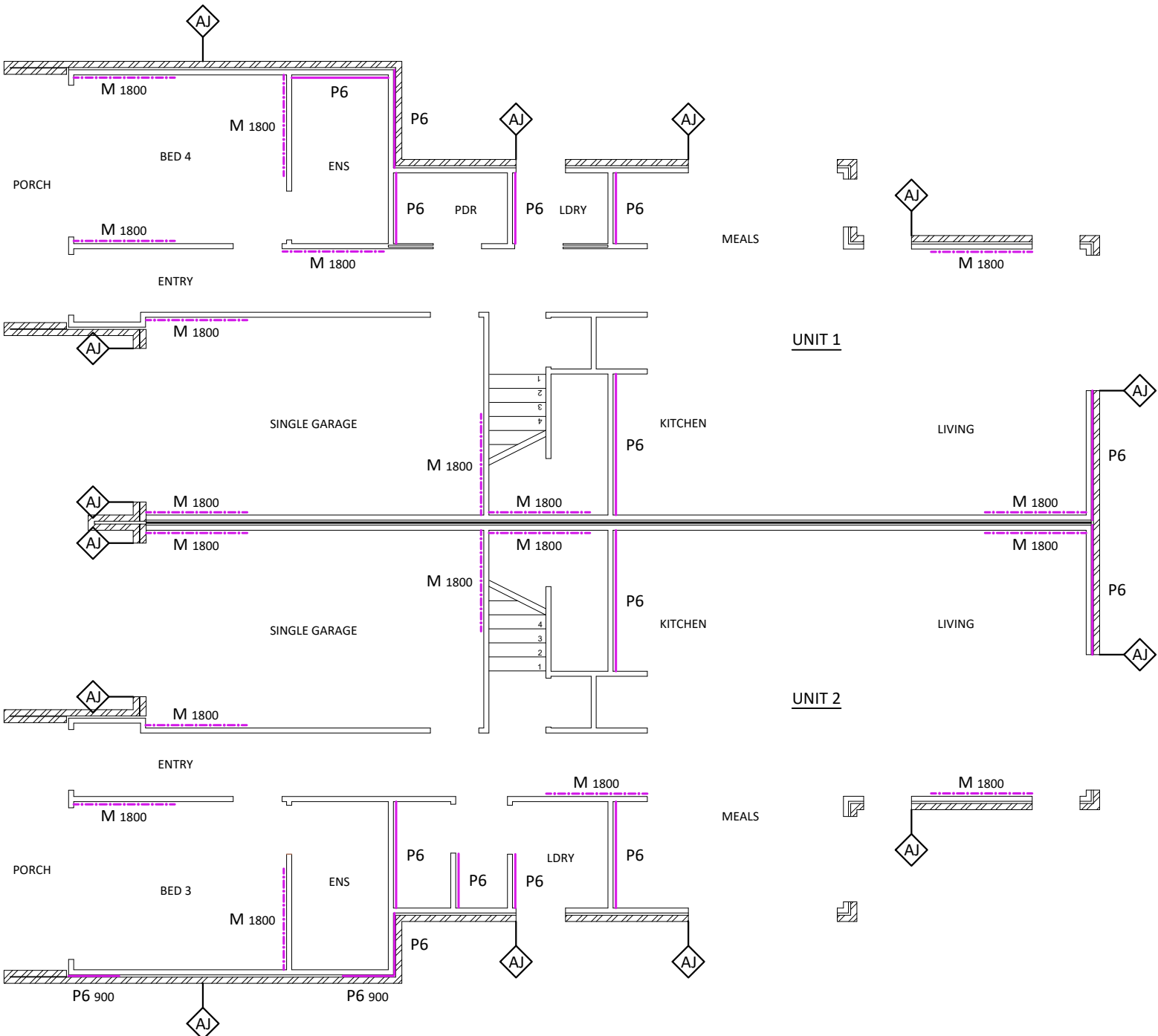
MEMBER	SECTION TYPE	REMARKS/ CONNECTIONS
2B1	2/290x42 SMART LVL 15	NAIL LAMINATED
2B2	2/140x42 SMART LVL 15	NAIL LAMINATED
2B3	2/140x42 SMART LVL 15	NAIL LAMINATED
2B4	2/300x58 SMART LVL 15	NAIL LAMINATED
2B5	2/240x42 SMART LVL 15	NAIL LAMINATED
2B6	2/190x42 SMART LVL 15	NAIL LAMINATED
2B7	2/290x42 SMART LVL 15	NAIL LAMINATED
2B8	2/300x58 SMART LVL 15	NAIL LAMINATED
2B9	2/190x42 SMART LVL 15	NAIL LAMINATED
2B10	120x42 SMART LVL 15	
2B11	200 PFC	
2B12	250 PFC	
2B13	200 PFC	
2B14	250 PFC	
2B15	2/300x58 SMART LVL 15	NAIL LAMINATED
RB1	290x42 SMART LVL 15	
GL2	150x8 (V) x 200x8 (H)	T LINTEL, MIN. 110mm END BEARING REQUIRED, REFER TO DETAIL
TL1	250x12 (V) x 200x10 (H)	T LINTEL, MIN. 200mm END BEARING REQUIRED, REFER TO DETAIL
T1	2/120x42 SMART LVL 15	NAIL LAMINATED
FJ1	300 DEEP FLOOR JOISTS @ 450 CTRS	REFER TO MANUFACTURER'S SPECIFICATIONS
DS2	2/90x45 F17 KD HW	
TS2	3/90x45 F17 KD HW	
C1/SC1	89x89x6 SHS	
RL	ROOF LINTEL	REFER TO TABLE
L	BRICK LINTEL	REFER TO TABLE

MEMBER SCHEDULE - UNIT 3

MEMBER	SECTION TYPE	REMARKS/ CONNECTIONS
3B1	300 PFC	
3B2	200 PFC	
3B3	310 UB 46	
3B4	2/300x42 SMART LVL 15	NAIL LAMINATED
3B5	300 PFC	
3B6	250 UC 89	
3B7	2/120x42 SMART LVL 15	NAIL LAMINATED
3B8	2/190x42 SMART LVL 15	NAIL LAMINATED
3B9	2/190x42 SMART LVL 15	NAIL LAMINATED
3B10	2/240x42 SMART LVL 15	NAIL LAMINATED
3B11	2/190x42 SMART LVL 15	NAIL LAMINATED
3B12	2/120x42 SMART LVL 15	NAIL LAMINATED
3B13	120x42 SMART LVL 15	NAIL LAMINATED
3B14	2/300x58 SMART LVL 15	WIND BEAM, NAIL LAMINATED
WB1	2/300x42 SMART LVL 15	NAIL LAMINATED
GL3	230 PFC + 150x90 (V) x 10 UA	PFC & ANGLE, REFER TO DETAIL
L1	150 x 100 x 10 UA	ANGLE LINTEL FOR BRICKWORK
FJ1	300 DEEP FLOOR JOISTS @ 450 CTRS	REFER TO MANUFACTURER'S SPECIFICATIONS
DS2	2/90x45 F17 KD HW	
TS2	3/90x45 F17 KD HW	
C1/SC1	89x89x6 SHS	
1L	FLOOR LINTEL	REFER TO TABLE
RL	ROOF LINTEL	REFER TO TABLE
L	BRICK LINTEL	REFER TO TABLE

GROUND FLOOR BRACING PLAN

SCALE 1:100



ARTICULATION JOINT TO STOP AT TOP OF RETAINING WALL

ANGLE LINTEL TABLE (L)		
ANGLE LINTEL SPAN (mm)	BRICK HEIGHT	
	800mm MAX.	3200mm MAX.
0 - 900	100 x 100 x 6 EA	100 x 100 x 8 EA
901 - 1600	100 x 100 x 6 EA	100 x 100 x 10 EA
1601 - 2100	100 x 100 x 6 EA	150 x 100 x 10 UA
2101 - 2600	150 x 100 x 10 UA	150 x 100 x 10 UA + 50 x 10 EXT. PL
2601 - 3100	150 x 100 x 10 UA	150 x 100 x 12 UA + 75 x 12 EXT. PL
3101 - 3600	150 x 100 x 12 UA	N/A

NOTES:
1. ANGLE LINTEL TO EACH MASONRY SKIN TYPICAL
2. SET ANGLES WITH LONG LEG VERTICAL TYPICAL U.N.O.
3. HOT DIP GALVANISED TO ALL EXPOSED ANGLE LINTELS TYPICAL

TIMBER ROOF LINTEL SCHEDULE (RL)	
SPAN (mm)	SECTION
0 - 1200	2 - 90 * 45 F17 KD HW OR 2 - 90 * 45 HYPSPAN
1201 - 1800	150 * 35 F17 KD HW OR 200 * 35 HYPSPAN
1801 - 2400	240 * 45 F17 KD HW OR 240 * 45 HYPSPAN
2401 - 3000	2 - 240 * 35 F17 KD HW OR 2 - 240 * 35 HYPSPAN
3001 - 3700	2 - 290 x 45 F17 KD HW OR 2 - 300 * 45 HYPSPAN

NOTES:
1.METAL ROOF-FOR MAXIMUM LOAD WIDTH OF 6.0m (FOR UNIFORM DISTRIBUTED LOAD ONLY)

1st FLOOR TIMBER LINTEL SCHEDULE (1L)	
SPAN (mm)	SECTION
900	140 * 45 F7 KD PINE
1200	190 x 35 F7 KD PINE
1800	190 x 45 F17 KD HW
2400	2 - 240 x 35 F17 KD HW OR 2 - 240 * 35 HYPSPAN
3000	2 - 290 x 45 F17 KD HW OR 2 - 240 * 45 HYPSPAN

NOTES:
1.SUPPORTING METAL ROOF-LOAD WIDTH OF 5.0m MAX,
2.FIRST FLOOR LOAD WITH OF 3.0m MAX

FRAMING LEGEND	
	BRICKWORK UNDER
	TIMBER WALL FROM FIRST FLOOR
	HATCH DENOTES LOWER ROOF
	LOAD BEARING WALL (LBW)

BRACING LEGEND	
	3kN/m CAPACITY METAL STRAPPING - REFER TO TYPICAL DETAILS
	6kN/m CAPACITY PLYWOOD BRACING - REFER TO TYPICAL DETAILS
	ARTICULATION JOINT LOCATION

IMPORTANT BRACING NOTES:	
- WIND RATING - N1 - MAXIMUM DESIGN GUST WIND SPEED FOR THIS SITE IS 34M/S - WIND SPEED CALCULATION (VH) FOR USE IN ULTIMATE LIMIT STATE DESIGN ONLY, CALCULATED IN ACCORDANCE WITH THE LIMITATIONS AS IN AS4055, SECTION 2.1.	
ALTERNATIVE BRACING METHODS ARE PERMITTED AS LONG AS THEIR CAPACITIES ARE EQUIVALENT TO WHAT IS SPECIFIED IN THESE DRAWINGS. INSTALLATION OF ALL BRACING UNITS MUST BE IN ACCORDANCE WITH THE RESIDENTIAL TIMBER FRAMED CONSTRUCTION MANUALS, AS1684.2 2010.	

A	CONSTRUCTION ISSUE	10.09.24	
P1	PRELIMINARY REVISION	24.07.24	
No.	REVISION	DATE	

CONTRACTOR MUST DIAL 1100 TO CONFIRM LOCATION OF EXISTING SERVICES AND COMPLY WITH ANY AUTHORITY REQUIREMENTS REGARDING EXISTING SERVICES PRIOR TO COMMENCEMENT OF ANY WORKS.

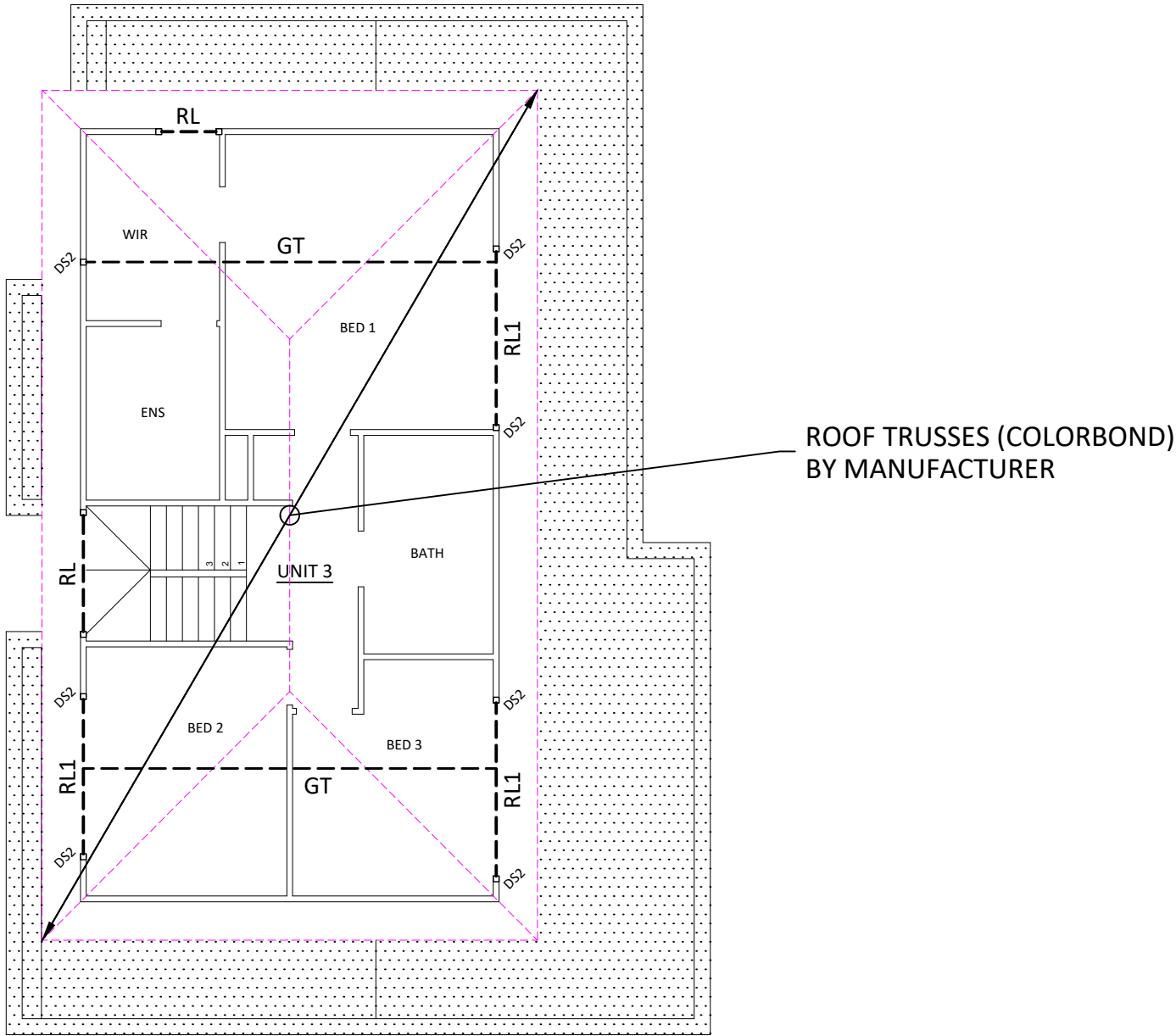
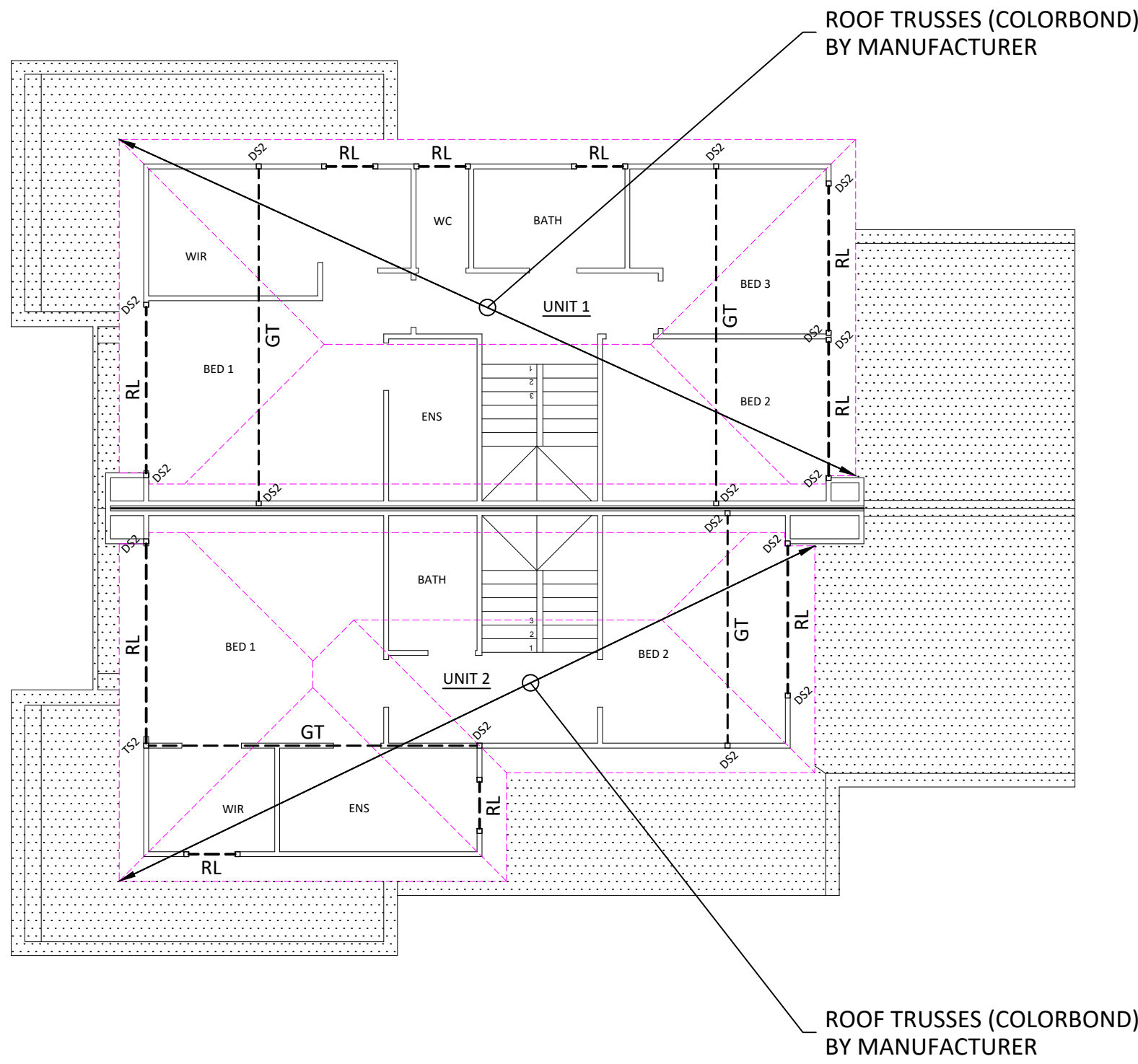
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CLIENT:	CREATIVE HOUSE PLANS	DESIGNED:	YD	DRAWN:	ED	DATE:	24.07.24
DRAWING TITLE:	FRAMING AND BRACING DESIGN	PAGE No:	S3	SCALE:	1:100	- A1	
PROJECT TITLE:	PROPOSED THREE NEW DOUBLE STOREY DWELLINGS	DRAWING NO.:	1685	REVISION:	A		
PROJECT ADDRESS:	LOT 1, NO.17 RAILWAY PARADE, SEAFORD						

ROOF FRAMING PLAN

SCALE 1:100

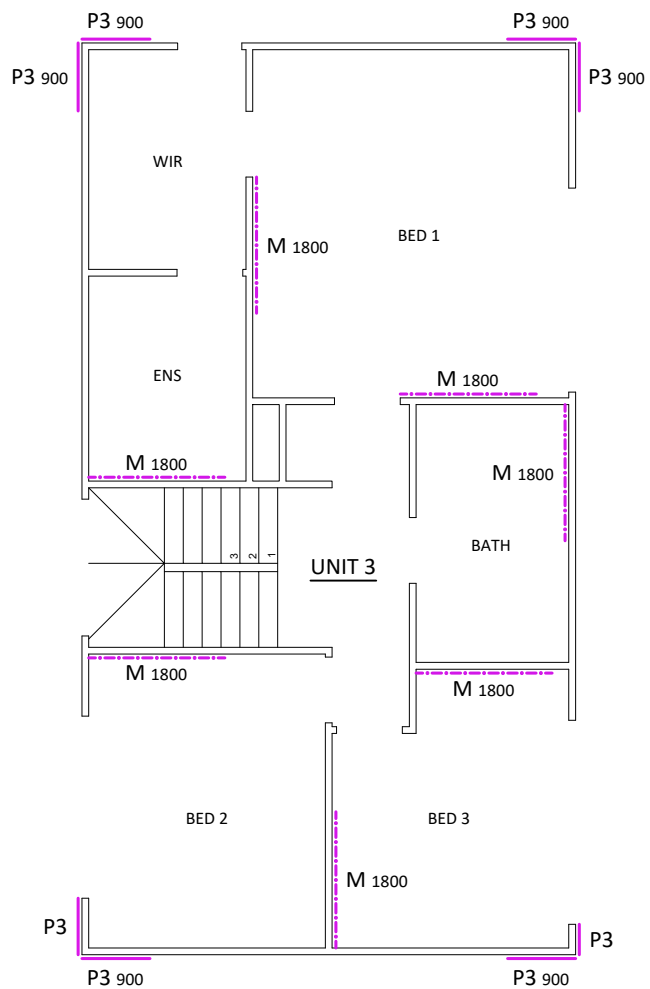
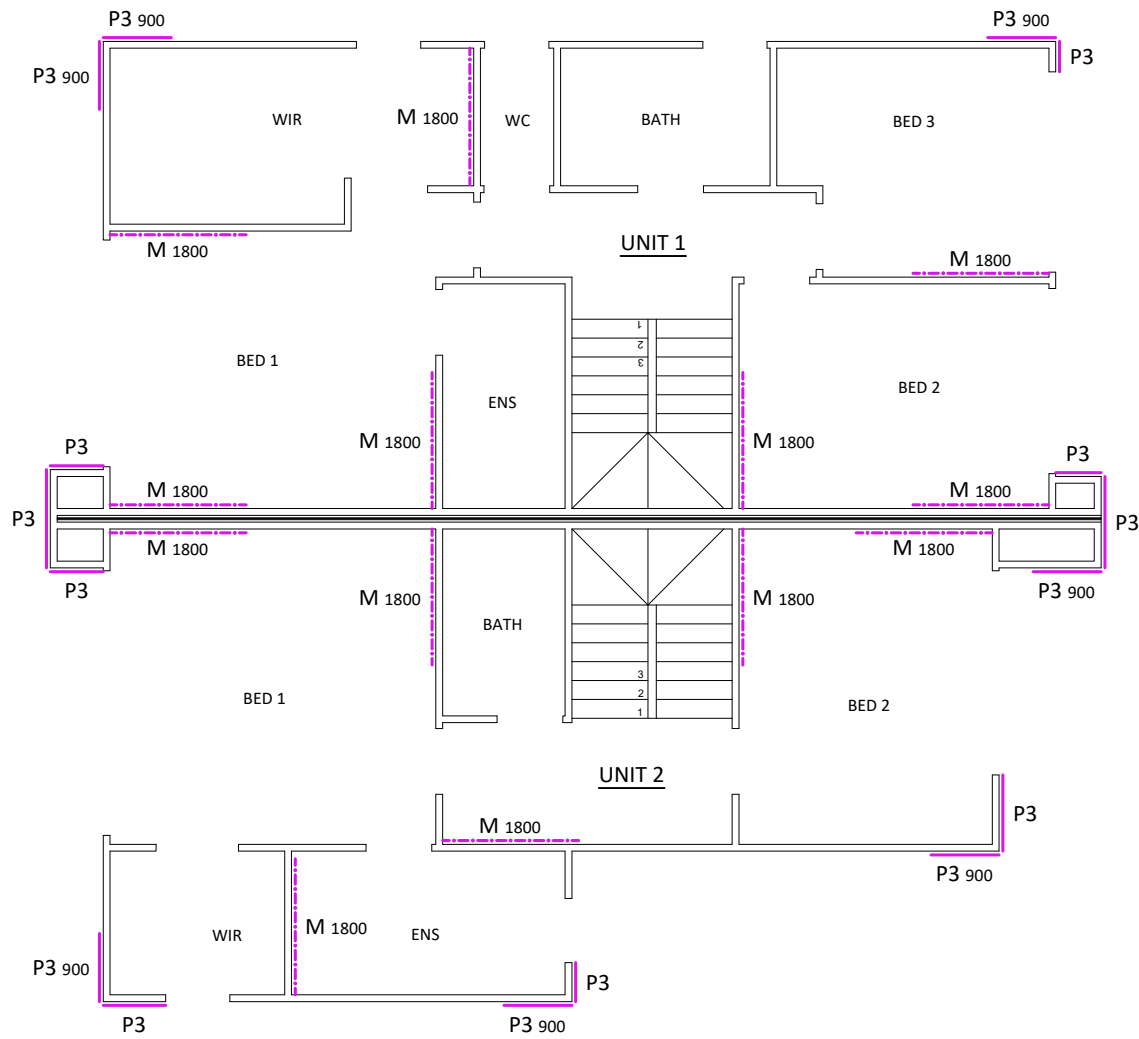


MEMBER SCHEDULE

MEMBER	SECTION TYPE	REMARKS/ CONNECTIONS
RL1	240x42 SMART LVL 15	
RL	ROOF LINTEL	REFER TO TABLE
DS2	2/90x45 F17 KD HW	
TS2	3/90x45 F17 KD HW	
GT	GIRDER TRUSS	LOCATIONS ASSUMED. IF DIFFERENT, THIS OFFICE IS TO BE CONTACTED

FIRST FLOOR BRACING PLAN

SCALE 1:100



ANGLE LINTEL TABLE (L)		
ANGLE LINTEL SPAN (mm)	BRICK HEIGHT	
	800mm MAX.	3200mm MAX.
0 - 900	100 x 100 x 6 EA	100 x 100 x 8 EA
901 - 1600	100 x 100 x 6 EA	100 x 100 x 10 EA
1601 - 2100	100 x 100 x 6 EA	150 x 100 x 10 UA
2101 - 2600	150 x 100 x 10 UA	150 x 100 x 10 UA + 50 x 10 EXT. PL
2601 - 3100	150 x 100 x 10 UA	150 x 100 x 12 UA + 75 x 12 EXT. PL
3101 - 3600	150 x 100 x 12 UA	N/A

NOTES:
1. ANGLE LINTEL TO EACH MASONRY SKIN TYPICAL
2. SET ANGLES WITH LONG LEG VERTICAL TYPICAL U.N.O.
3. HOT DIP GALVANISED TO ALL EXPOSED ANGLE LINTELS TYPICAL

TIMBER ROOF LINTEL SCHEDULE (RL)	
SPAN (mm)	SECTION
0 - 1200	2 - 90 * 45 F17 KD HW OR 2 - 90 * 45 HYPSPAN OR 200 * 35 F17 KD HW
1201 - 1800	240 * 45 F17 KD HW OR 240 * 45 HYPSPAN
1801 - 2400	2 - 240 x 35 F17 KD HW OR 2 - 240 * 35 HYPSPAN
2401 - 3000	2 - 290 x 45 F17 KD HW OR 2 - 300 * 45 HYPSPAN
3001 - 3700	

NOTES:
1.METAL ROOF-FOR MAXIMUM LOAD WIDTH OF 6.0m (FOR UNIFORM DISTRIBUTED LOAD ONLY)

1st FLOOR TIMBER LINTEL SCHEDULE (1L)	
SPAN (mm)	SECTION
900	140 * 45 F7 KD PINE
1200	190 x 35 F7 KD PINE
1800	190 x 45 F17 KD HW
2400	2 - 240 x 35 F17 KD HW OR 2 - 240 * 35 HYPSPAN
3000	2 - 290 x 45 F17 KD HW OR 2 - 240 * 45 HYPSPAN

NOTES:
1.SUPPORTING METAL ROOF-LOAD WIDTH OF 5.0m MAX,
2.FIRST FLOOR LOAD WITH OF 3.0m MAX

FRAMING LEGEND	
	HATCH DENOTES LOWER ROOF

BRACING LEGEND	
M	3kN/m CAPACITY METAL STRAPPING - REFER TO TYPICAL DETAILS
P3	6kN/m CAPACITY PLYWOOD BRACING - REFER TO TYPICAL DETAILS

A	CONSTRUCTION ISSUE	10.09.24	
P1	PRELIMINARY REVISION	24.07.24	
No.	REVISION	DATE	



CONTRACTOR MUST DIAL 1100 TO CONFIRM LOCATION OF EXISTING SERVICES AND COMPLY WITH ANY AUTHORITY REQUIREMENTS REGARDING EXISTING SERVICES PRIOR TO COMMENCEMENT OF ANY WORKS.

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IMPORTANT BRACING NOTES:

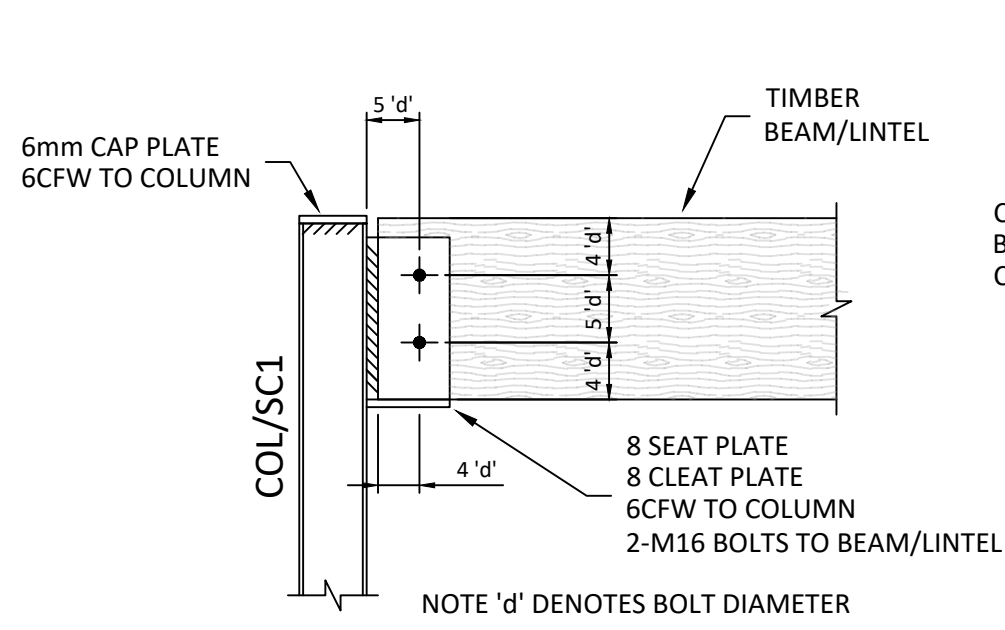
- WIND RATING - N1
- MAXIMUM DESIGN GUST WIND SPEED FOR THIS SITE IS 34M/S
- WIND SPEED CALCULATION (VH) FOR USE IN ULTIMATE LIMIT STATE DESIGN ONLY, CALCULATED IN ACCORDANCE WITH THE LIMITATIONS AS IN AS4055, SECTION 2.1.

ALTERNATIVE BRACING METHODS ARE PERMITTED AS LONG AS THEIR CAPACITIES ARE EQUIVALENT TO WHAT IS SPECIFIED IN THESE DRAWINGS. INSTALLATION OF ALL BRACING UNITS MUST BE IN ACCORDANCE WITH THE RESIDENTIAL TIMBER FRAMED CONSTRUCTION MANUALS, AS1684.2 2010.

CLIENT:	CREATIVE HOUSE PLANS	DESIGNED:	YD	DRAWN:	ED	DATE:	24.07.24
DRAWING TITLE:	ROOF FRAMING AND FIRST FLOOR BRACING PLAN	PAGE No:	S4	SCALE:	AS SHOWN - A1		
PROJECT TITLE:	PROPOSED THREE NEW DOUBLE STOREY DWELLINGS	DRAWING NO.:	1685	REVISION:	A		
PROJECT ADDRESS:	LOT 1, NO.17 RAILWAY PARADE, SEAFORD						

FRAMING DETAILS

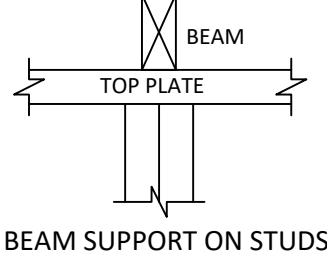
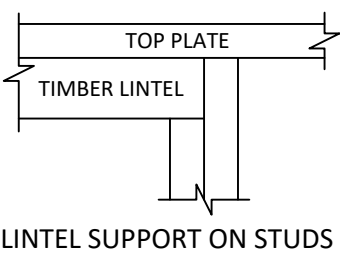
SCALE = AS SHOWN



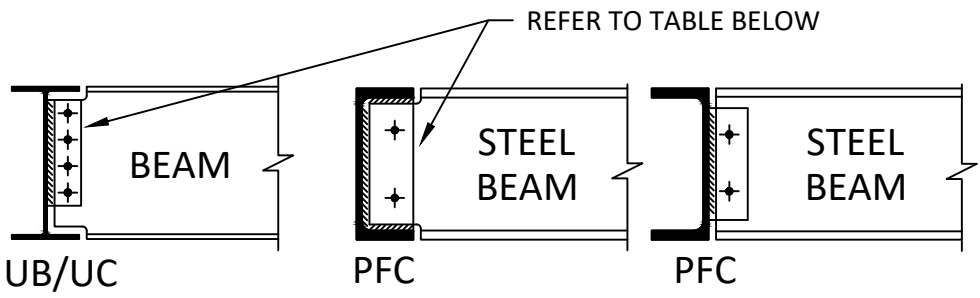
TIMBER BEAM/LINTEL TO COLUMN CONNECTION DETAILS

SCALE = NTS

ALL STUDS SHALL BE NAIL LAMINATED IN ACCORDANCE WITH AS1684.2	DS1	DS2	DS3	DS4	TS1	TS2	TS3	QS1	QS2
	90x45	90x45	70x45	120x45	90x45	90x45	70x45	90x45	90x45
	MGP10	F17 KD HW	F17 KD HW	MGP10	MGP10	F17 KD HW	F17 KD HW	MGP10	F17 KD HW
NO. OF BEARING STUD	1	1	1	1	1	1	1	2	2
NO. OF JAMB STUD	1	1	1	1	2	2	2	2	2
NO. OF BEARING STUD	2	2	2	2	3	3	3	4	4



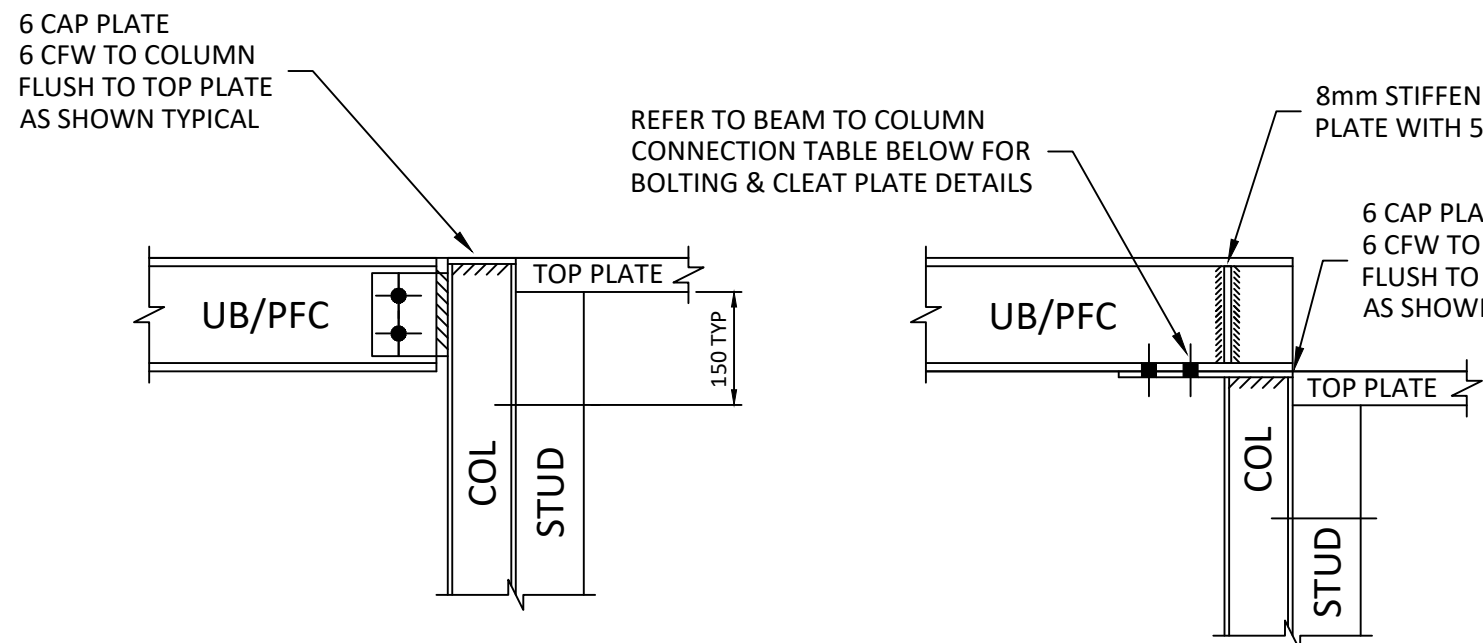
TIMBER STUDS SCHEDULE



BEAM TO BEAM CONNECTION INFORMATION		
MEMBER SIZE	BOLTS REQUIRED	CLEAT/CAP PLATE THICKNESS
UPTO 200UB/PFC	2-M16 8.8/5 BOLTS	10mm
UPTO 250UB & 250PFC	3-M20 8.8/5 BOLTS	10mm
UPTO 410UB	4-M20 8.8/5 BOLTS	12mm
NOTES: • THIS TABLE IS APPLICABLE TO ALL STEEL BEAM TO COLUMN CONNECTION TYPICAL (U.N.O. ON DETAILS). • ALL WELDING TO BE 6mm CFW TYPICAL (U.N.O. ON DETAILS). • LEVEL OF TOP PLATES ARE INDICATIVE ONLY. NUMBER OF TOP PLATES MAY VARY. • BUILDER/CONTRACTOR TO CONFIRM HEIGHT OF LINTEL & CLEAT PLATE TO SUIT WINDOW/DOOR OPENING. • BOLT TO BOLT DISTANCE MIN 2.5d _{dia} • BOLT TO EDGE DISTANCE MIN 2d _{dia}		

STEEL BEAM TO STEEL BEAM CONNECTION INFORMATION

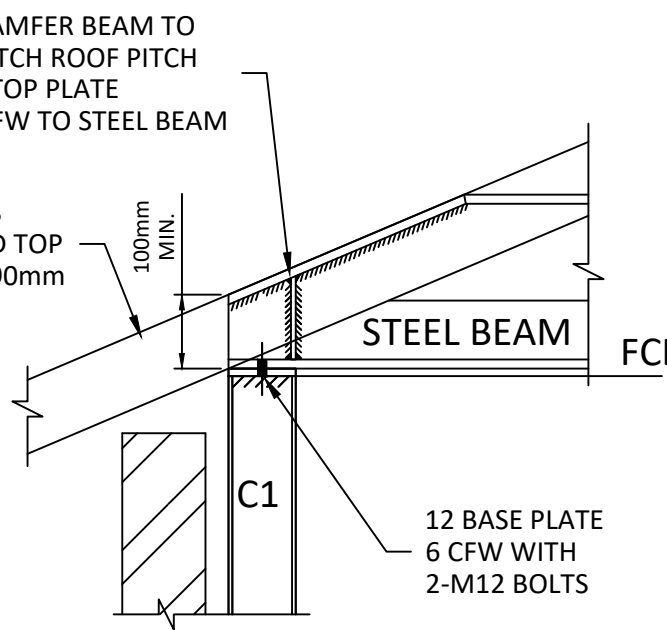
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BEAM TO COL/BEAM CONNECTION INFORMATION		
MEMBER SIZE	BOLTS REQUIRED	CLEAT/CAP PLATE THICKNESS
UPTO 200UB/PFC	2-M16 8.8/5 BOLTS	10mm
UPTO 250UB & 250PFC	3-M20 8.8/5 BOLTS	10mm
UPTO 410UB	4-M20 8.8/5 BOLTS	12mm
NOTES: • THIS TABLE IS APPLICABLE TO ALL STEEL BEAM TO COLUMN CONNECTION TYPICAL (U.N.O. ON DETAILS). • ALL WELDING TO BE 6mm CFW TYPICAL (U.N.O. ON DETAILS). • LEVEL OF TOP PLATES ARE INDICATIVE ONLY. NUMBER OF TOP PLATES MAY VARY. • BUILDER/CONTRACTOR TO CONFIRM HEIGHT OF LINTEL & CLEAT PLATE TO SUIT WINDOW/DOOR OPENING. • BOLT TO BOLT DISTANCE MIN 2.5d _{dia} • BOLT TO EDGE DISTANCE MIN 2d _{dia}		

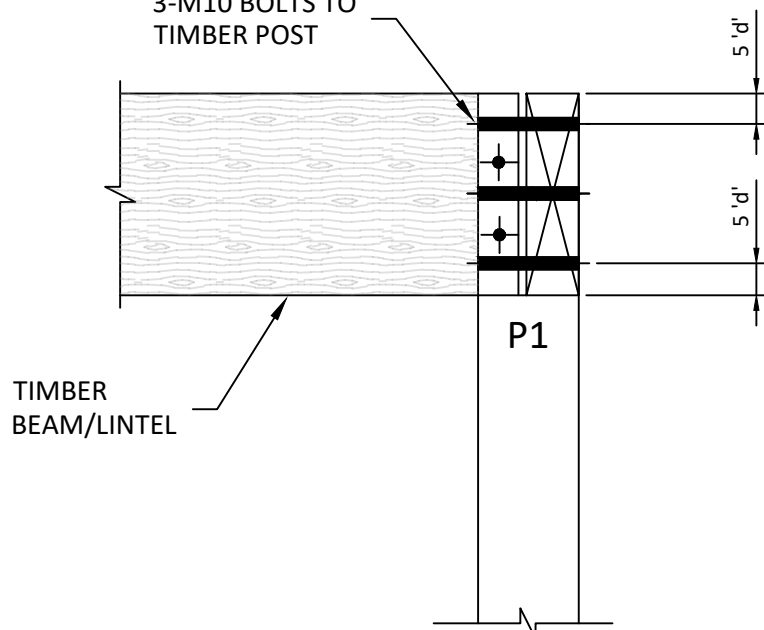
STEEL BEAM TO STEEL BEAM CONNECTION INFORMATION

SCALE = NTS



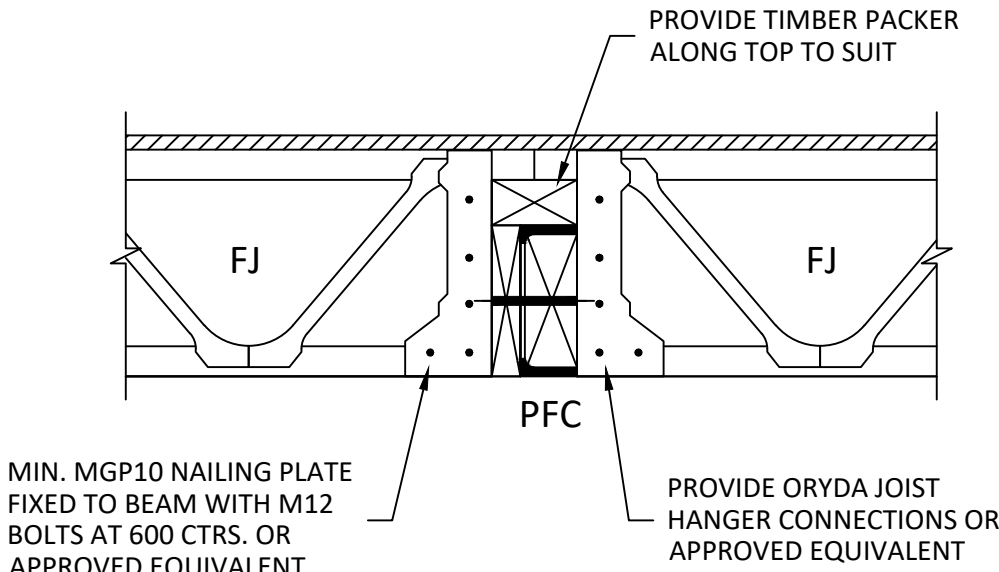
STEEL BEAM CHAMFER DETAIL

SCALE = NTS

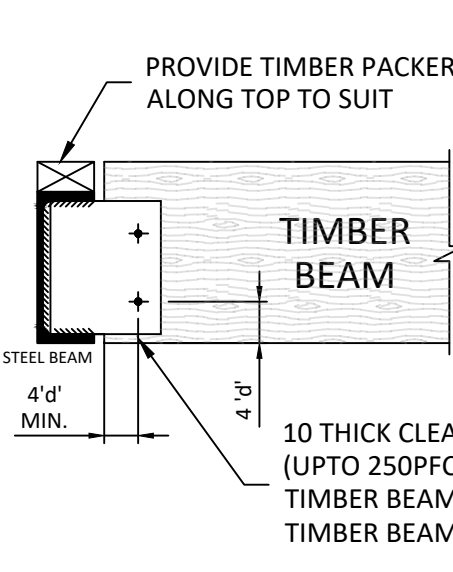


TIMBER BEAM TO TIMBER POST CONNECTION DETAIL

SCALE = NTS

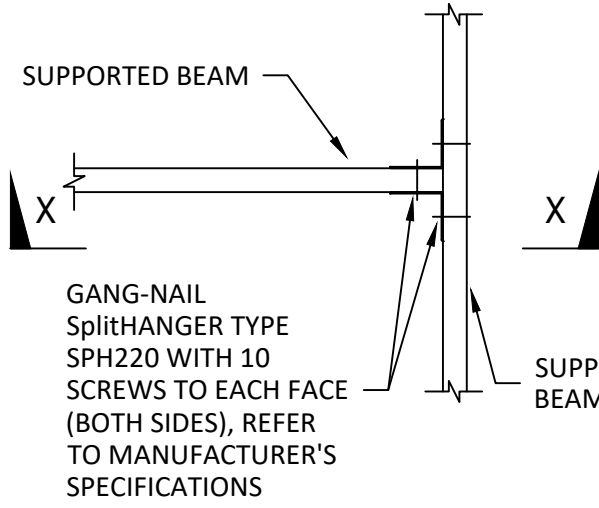
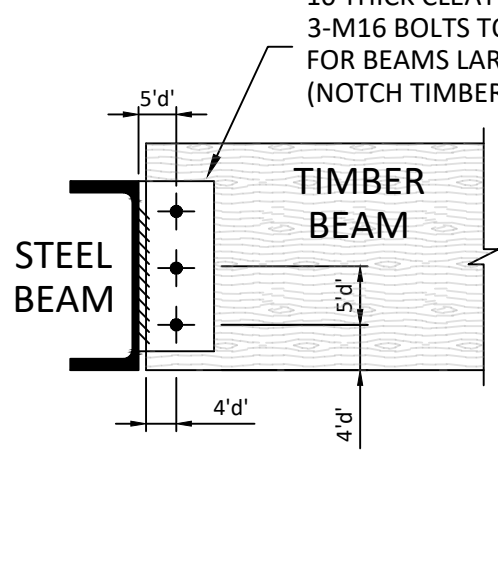


FLOOR JOIST TO PFC DETAIL

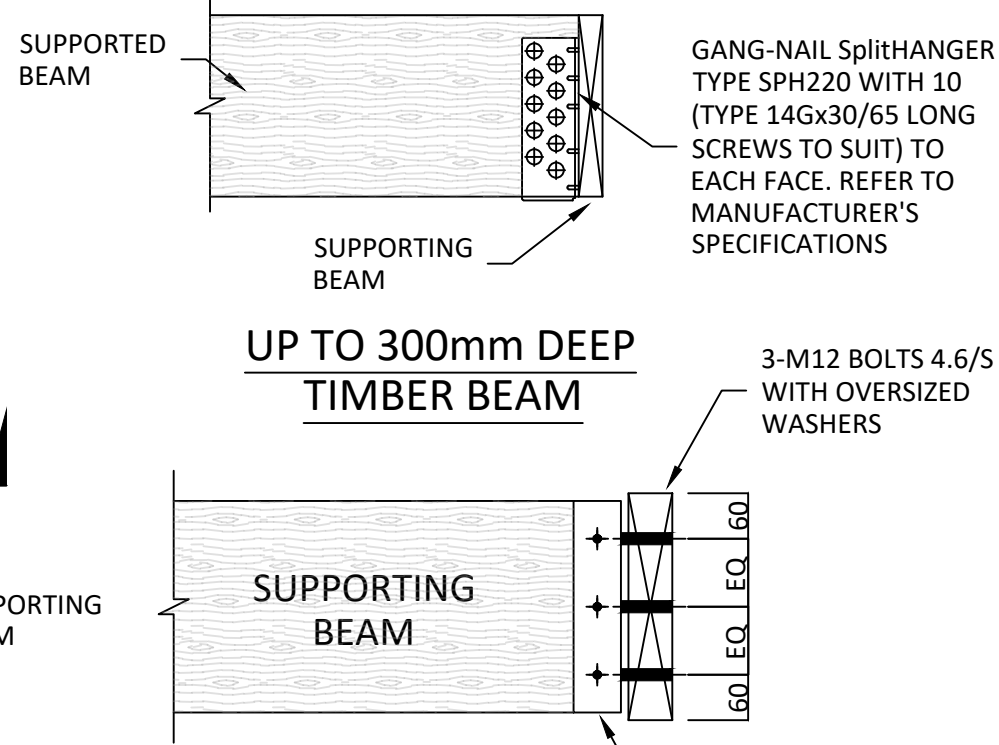


TIMBER BEAM TO STEEL BEAM CONNECTION DETAILS

SCALE = NTS



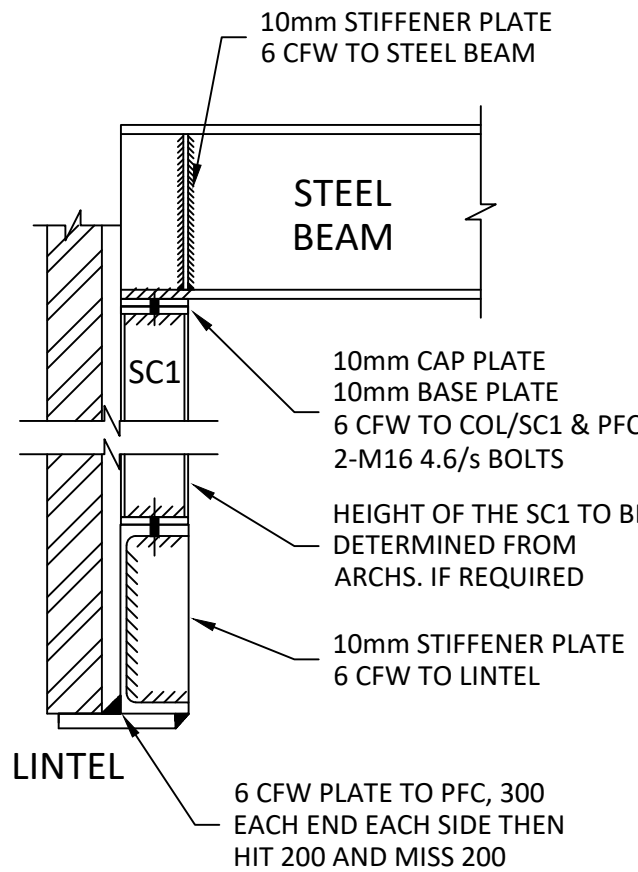
PLAN VIEW



SECTION X-X

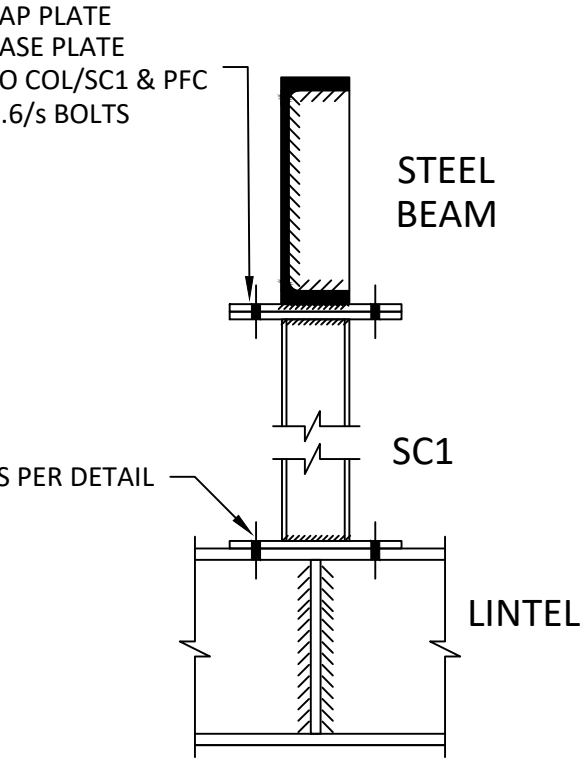
TIMBER TO TIMBER BEAM CONNECTION DETAIL

SCALE = NTS

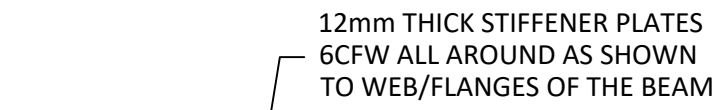


STUB COLUMN TO STEEL BEAM CONNECTION DETAIL - PFC

SCALE = 1:10

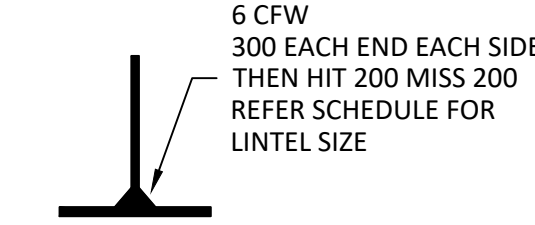


SECTION A-A



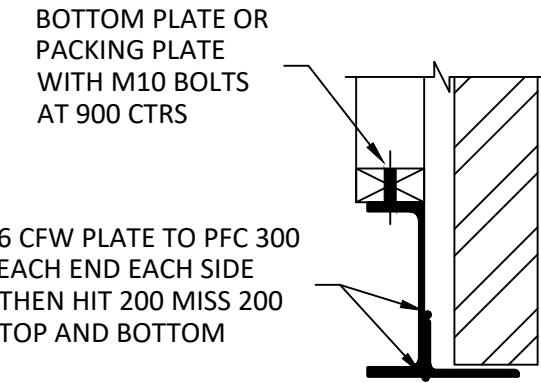
STEEL BEAM PENETRATION DETAIL (IF REQUIRED)

SCALE = NTS



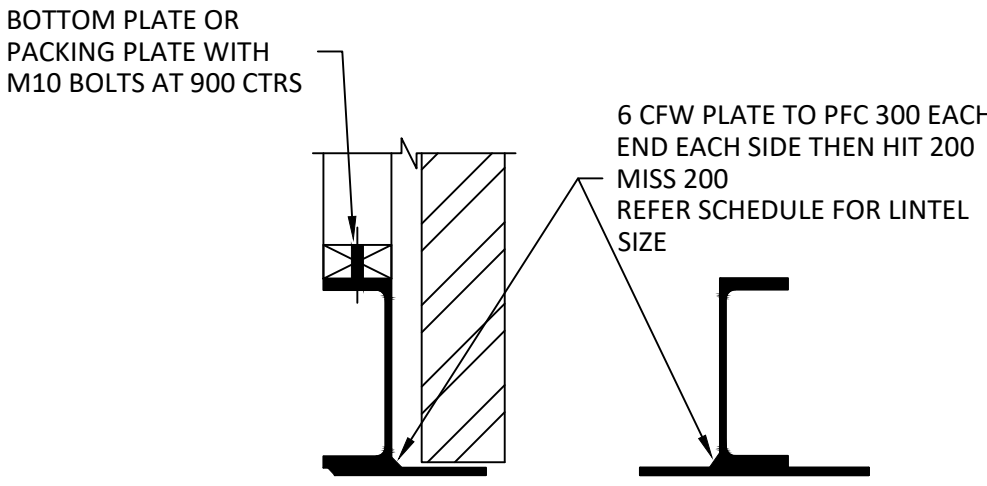
T LINTEL DETAIL

SCALE = 1:10



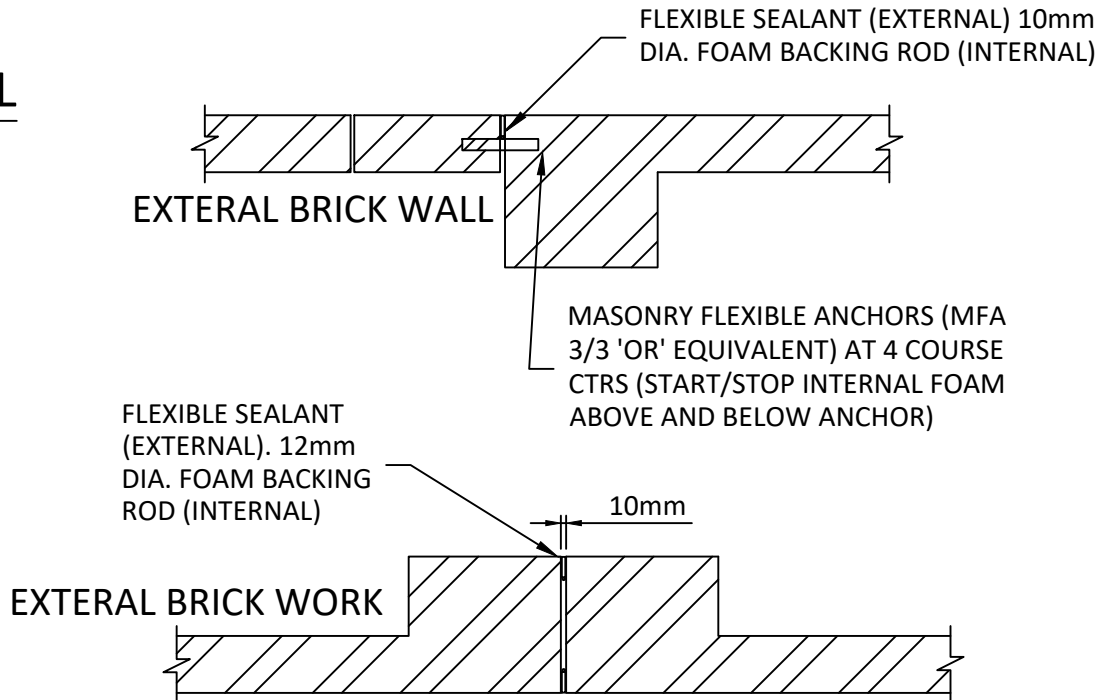
PFC/ANGLE LINTEL DETAIL

SCALE = NTS



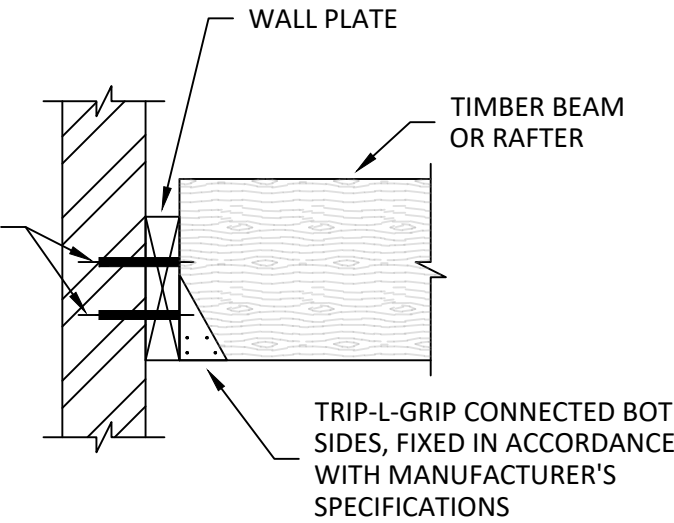
PFC/PLATE LINTEL DETAIL

SCALE = NTS



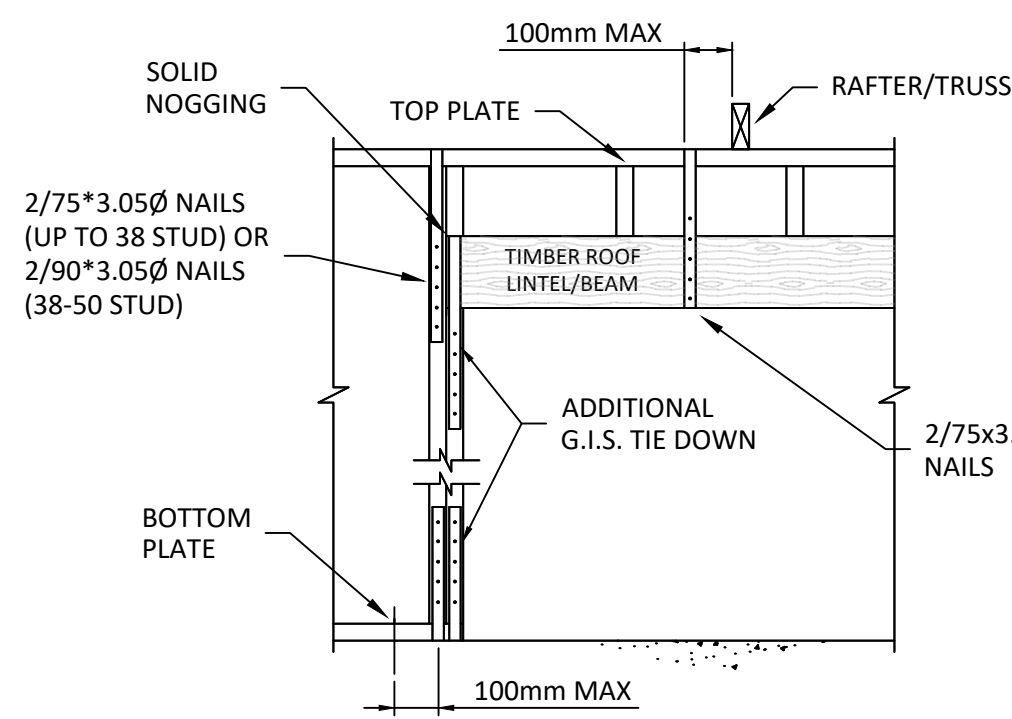
ENGAGED BRICK PIER ARTICULATION JOINT DETAILS

SCALE = NTS



TIMBER BEAM TO BRICKWALL CONNECTION DETAIL

SCALE = 1:10



TIMBER BEAM/LINTEL TIE DOWN DETAIL

SCALE = NTS

- ADOPTED IN LIEU OF ABOVE SPECIFICATION AND IT MUST BE IN ACCORDANCE WITH AS1684.2-2010
- REFER TO TRUSS MANUFACTURER FOR TIE-DOWN FIXING ON ROOF BATTENS AND RAFTERS/TRUSSES
- TIMBER MEMBERS ASSUMED TO BE JD4 GROUP OR STRONGER
- HOUSE ASSUMED TO HAVE A MAXIMUM WIDTH OF 12m
- STUDS ASSUMED TO BE AS 450 MAX. CTRS.
- THE TOP PLATE SHALL BE FIXED OR TIED TO THE LINTEL WITHIN 100mm OF EACH RAFTER/TRUSS, OR THE RAFTER/TRUSS FIXED DIRECTLY TO THE LINTEL WITH A FIXING OF EQUIVALENT TIE-DOWN REQUIRED FOR THE RAFTER/TRUSS
- G.I.S. MEANS 30 * 0.8 GALVANISED IRON STRAP

A	CONSTRUCTION ISSUE	10.09.24	
P1	PRELIMINARY REVISION	24.07.24	
No.	REVISION	DATE	



CONTRACTOR MUST DIAL 1100 TO CONFIRM LOCATION OF EXISTING SERVICES AND COMPLY WITH ANY AUTHORITY REQUIREMENTS REGARDING EXISTING SERVICES PRIOR TO COMMENCEMENT OF ANY WORKS.

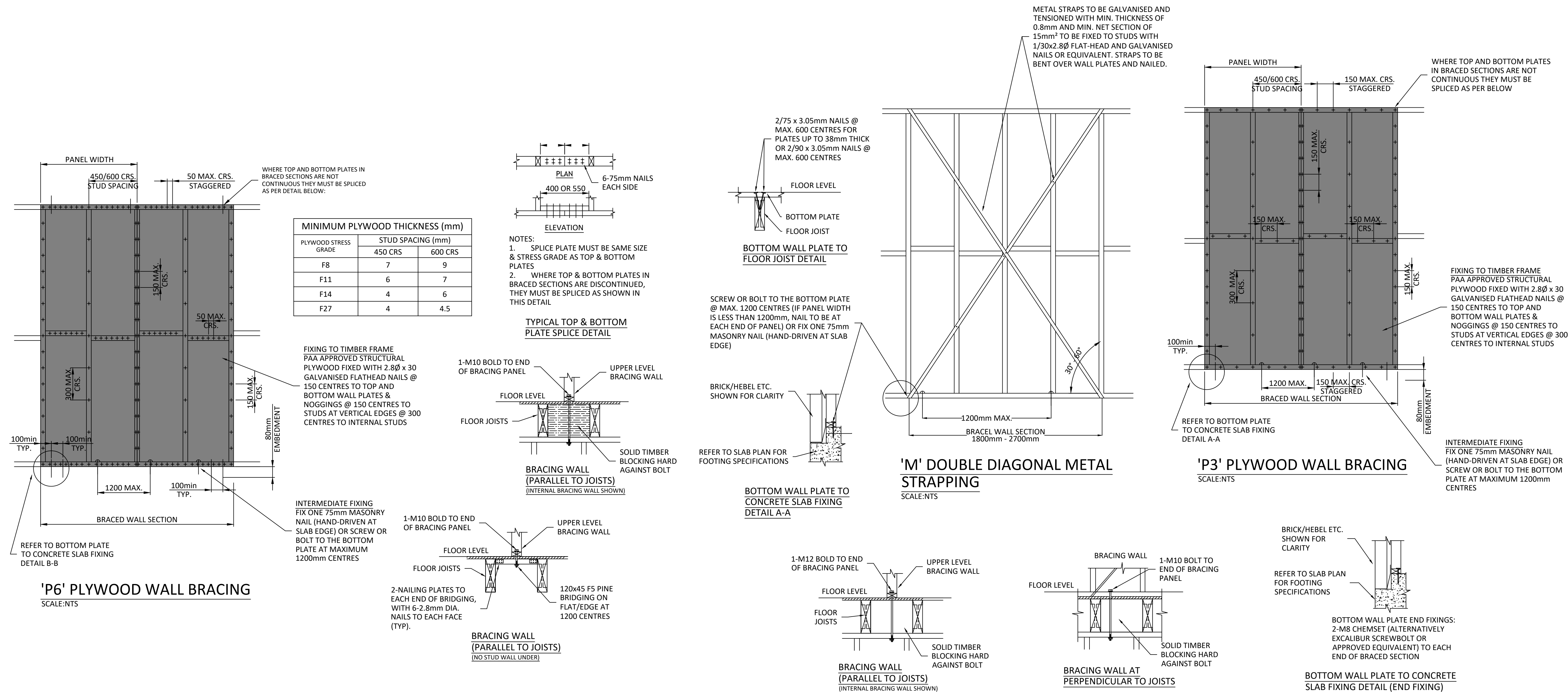
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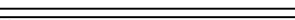
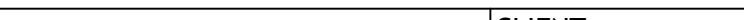


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CLIENT:	CREATIVE HOUSE PLANS	DESIGNED:	DRAWN:	DATE:
DRAWING TITLE:	FRAMING DETAILS	YD	ED	24.07.24
PROJECT TITTLE:	PROPOSED THREE NEW DOUBLE STOREY DWELLINGS	PAGE No:	SCALE:	
PROJECT ADDRESS:	LOT 1, NO.17 RAILWAY PARADE, SEAFORD	S5	AS SHOWN - A1	
		DRAWING NO.:	REVISION:	
		1685	A	

SCALE = AS SHOWN



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										YD ED		24.07.24		
A	CONSTRUCTION ISSUE	10.09.24	CONTRACTOR MUST DIAL 1100 TO CONFIRM LOCATION OF EXISTING SERVICES AND COMPLY WITH ANY AUTHORITY REQUIREMENTS REGARDING EXISTING SERVICES PRIOR TO COMMENCEMENT OF ANY WORKS.					DRAWING TITLE: BRACING DETAILS		PAGE No:	SCALE:			
P1	PRELIMINARY REVISION	24.07.24						PROJECT TITLE: PROPOSED THREE NEW DOUBLE STOREY DWELLINGS		S6	AS SHOWN - A1			
No.	REVISION	DATE						PROJECT ADDRESS: LOT 1, NO.17 RAILWAY PARADE, SEAFORD		DRAWING NO.:		1685	REVISION:	A

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(1B1) 2 / 290mm x 42mm Smart LVL15* (Oregon) (Single span)		
Bending:	$M(dI)^* = 4.89\text{kNm (+ve)} < \phi M(dI) = 6.53\text{kNm}$, $M^* = 6.68\text{kNm (+ve)} < \phi M = 10.60\text{kNm}$	OK (0.75,0.63)	
Shear:	$V(dI)^* = 10.45\text{kN} < \phi V(dI) = 36.93\text{kN}$, $V^* = 14.14\text{kN} < \phi V = 51.84\text{kN}$	OK (0.28,0.27)	
Deflection:	$\delta DL = L/1058$ (3mm), $\delta \Psi s.LL = L/2604$ (1mm), $\delta Total = L/752$ (5mm), 1kN mid. $\delta = 0.4\text{mm}$	OK	
Reactions:	(1 End) $Rdl.max = 4.09\text{kN}$, $Rll.max = 6.15\text{kN}$, $R.max^* = 14.14\text{kN}$ (1 End) $Rdl.min = 1.18\text{kN}$, $Rll.min = 2.45\text{kN}$, $R.min^* = 5.10\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	3600 mm	Lay.t (Top) = 3600 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	1.62 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
------------------	---------------------	------------------	--

Uniform dead loads

Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m =	0.23 kN/m
Wall dead load (wdl) =	kPa *	450 mm +	kN/m =	0.00 kN/m
Other dead load (wdl) =	kPa *	mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.15 kN/m
				$\Sigma wdl = 0.37 \text{ kN/m}$

Uniform live loads

Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m =	0.68 kN/m
Partitions (wll) =	kPa *	450 mm +	kN/m =	0.00 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to	1 members	$\Sigma wll = 1.00 \text{ kN/m}$

Point loads

Dead load (pdl) =	3.94 kN	DL	LL	Position =	470 mm from LHS
Live load (pll) =	5.01 kN	1B2	3.9	5.0 : L L	ing PL at support =
		Σ	3.9	5.0	N (Y)es,(N)o

Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	1.35 kN/m	$M(dI + \Psi l.II)^* =$	4.89 kNm (Max at 904mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	1.95 kN/m	$M^* =$	6.68 kNm (Max at 979mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	9.23 kN	$V(dI + \Psi l.II)^* =$	10.45 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	12.24 kN	$V^* =$	14.14 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 290mm x 42mm Smart LVL15*	Area (A) =	24360 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	1177 x10 ³ mm ³
Design depth (dD) =	290 mm	Stiffness (Ix) =	170.7 x10 ⁶ mm ⁴
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3

$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	30.41 For top comp. edge restrained - Cl 3.2.3.2(a)	$f'b =$	46.9 MPa
$k12d = 200 / (S1 * pbd)^2 =$	0.219 for $pbd * S1 \geq 20$ - Cl 3.2.4	$f's =$	4.2 MPa
$k12 = 1.5 - 0.05 * pb * S1 =$	0.253 for $pb * S1 \geq 20$ - Cl 3.2.4	Material constant (pbd) =	0.99 (rbd=0.25)
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pb) =	0.92 (rb=0.82)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12 * f'b * Zx =$	6.53 kNm	Duration factor (k1) =	0.80
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	10.60 kNm	Moisture factor (k4) =	1.00
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	36.93 kN	Temp. factor (k6) =	1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	51.84 kN	Sharing factor (k9) =	1.00

Deflections

		Duration factor ($j2$) =	2.0
$Ireq'd j2.(DL + \Psi l.LL) (L/300) =$	48.4 x10 ⁶ mm ⁴	$j2.(DL + \Psi l.LL) =$	3.4 mm
$Ireq'd \Psi s.LL (12mm) =$	19.7 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$	1.4 mm
$Ireq'd Total (L/250) =$	56.7 x10 ⁶ mm ⁴	$\delta Total =$	4.8 mm
		1kN midspan $\delta =$	0.4 mm
			Span / 1058
			Span / 2604
			Span / 752

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(1B2) 2 / 140mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 3.36\text{kNm (+ve)} < \phi M(dI) = 8.04\text{kNm}$, $M^* = 5.01\text{kNm (+ve)} < \phi M = 11.28\text{kNm}$	OK (0.42,0.44)
Shear:	$V(dI)^* = 7.94\text{kN} < \phi V(dI) = 17.83\text{kN}$, $V^* = 12.24\text{kN} < \phi V = 25.03\text{kN}$	OK (0.45,0.49)
Deflection:	$\delta DL = L/421$ (3mm), $\delta \Psi s.LL = L/1393$ (1mm), $\delta Total = L/323$ (4mm), 1kN mid. $\delta = 0.2\text{mm}$	OK
Reactions:	(Each end) $RdI = 3.94\text{kN}$, $RlI = 5.01\text{kN}$, $R^* = 12.24\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1400 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3600 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	5.04 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3600 mm +	kN/m = 1.80 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	3000 mm +	kN/m = 1.20 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.07 kN/m
		$\Sigma wdl =$	4.42 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3600 mm +	kN/m = 5.40 kN/m
Partitions (wll) =	0.25 kPa *	3000 mm +	kN/m = 0.75 kN/m
Alternate point live load =	1.80 kN	Distr. to	1 members
		$\Sigma wll =$	6.15 kN/m

Point loads			
Dead load (pdl) =	1.69 kN	DL	LL
Live load (pll) =	1.40 kN	Large	1.7 1.4 : L L
		Σ	1.7 1.4
		Position =	700 mm from LHS
		ing PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	8.99 kN/m	$M(dI + \Psi l.II)^* =$	3.36 kNm (Max at 700mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	14.53 kN/m	$M^* =$	5.01 kNm (Max at 700mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	3.29 kN	$V(dI + \Psi l.II)^* =$	7.94 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	4.13 kN	$V^* =$	12.24 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 140mm x 42mm Smart LVL15	Area (A) =	11760 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	274 x10 ³ mm ³
Design depth (dD) =	140 mm	Stiffness (Ix) =	19.2 x10 ⁶ mm ⁴
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	7.47 For top comp. edge restrained - Cl 3.2.3.2(a)		
$k12d =$	1.000 for $pbd * S1 \leq 10$ - Cl 3.2.4	$f'b =$	54.1 MPa
$k12 =$	1.000 for $pb * S1 \leq 10$ - Cl 3.2.4	$f's =$	4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	1.07 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	8.04 kNm	Material constant (pb) =	1.01 (rb=0.60)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	11.28 kNm	Duration factor (k1) =	0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	17.83 kN	Moisture factor (k4) =	1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	25.03 kN	Temp. factor (k6) =	1.00
		Sharing factor (k9) =	1.00
		Size modifier (mod.b) =	1.00
		Size modifier (mod.s) =	1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	13.7 x10 ⁶ mm ⁴	$j2.(DL + \Psi l.LL) =$	3.3 mm
Ireq'd $\Psi s.LL$ (L/300) =	4.1 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$	1.0 mm
Ireq'd Total (L/250) =	14.9 x10 ⁶ mm ⁴	$\delta Total =$	4.3 mm
		1kN midspan $\delta =$	0.2 mm
			Span / 421
			Span / 1393
			Span / 323

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(1B3) 2 / 120mm x 42mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 1.27\text{kNm (+ve)} < \phi M(dI) = 5.41\text{kNm}$, $M^* = 1.61\text{kNm (+ve)} < \phi M = 7.85\text{kNm}$	OK (0.23,0.21)	
Shear:	$V(dI)^* = 7.10\text{kN} < \phi V(dI) = 15.28\text{kN}$, $V^* = 8.99\text{kN} < \phi V = 21.45\text{kN}$	OK (0.46,0.42)	
Deflection:	$\delta DL = L/807$ (1mm), $\delta \Psi s.LL = L/3124$ (0mm), $\delta Total = L/641$ (2mm), 1kN mid. $\delta = 0.2\text{mm}$	OK	
Reactions:	(1 End) $Rdl.max = 3.56\text{kN}$, $Rll.max = 3.14\text{kN}$, $R.max^* = 8.99\text{kN}$ (1 End) $Rdl.min = 2.01\text{kN}$, $Rll.min = 1.86\text{kN}$, $R.min^* = 5.20\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1200 mm	Lay.t (Top) = 1200 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	0.54 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
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Uniform dead loads

Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m =	0.23 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m =	1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m =	1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.06 kN/m
				$\Sigma wdl =$ 3.24 kN/m

Uniform live loads

Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m =	0.68 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m =	1.00 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to	1 members	$\Sigma wll =$ 3.00 kN/m

Point loads

Dead load (pdl) =	1.69 kN	DL	LL		Position =	50 mm from LHS
Live load (pll) =	1.40 kN	Large	1.7	1.4 : L L	ing PL at support =	N (Y)es,(N)o
		Σ	1.7	1.4		

Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	6.58 kN/m	$M(dI + \Psi l.II)^* =$	1.27 kNm (Max at 579mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	8.38 kN/m	$M^* =$	1.61 kNm (Max at 579mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	3.29 kN	$V(dI + \Psi l.II)^* =$	7.10 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	4.13 kN	$V^* =$	8.99 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 120mm x 42mm Smart LVL15	Area (A) =	10080 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	202 x10 ³ mm ³
Design depth (dD) =	120 mm	Stiffness (Ix) =	12.1 x10 ⁶ mm ⁴
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3

$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	11.29 For top comp. edge restrained - Cl 3.2.3.2(a)		
$k12d = 1.5 - 0.05 * pbd * S1 =$	0.889 for $10 \leq pbd * S1 \leq 20$ - Cl 3.2.4	$f'b =$	55.7 MPa
$k12 = 1.5 - 0.05 * pb * S1 =$	0.919 for $10 \leq pb * S1 \leq 20$ - Cl 3.2.4	$f's =$	4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	1.08 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12 * f'b * Zx =$	5.41 kNm	Material constant (pb) =	1.03 (rb=0.56)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	7.85 kNm	Duration factor (k1) =	0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	15.28 kN	Moisture factor (k4) =	1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	21.45 kN	Temp. factor (k6) =	1.00
		Sharing factor (k9) =	1.00
		Size modifier (mod.b) =	1.00
		Size modifier (mod.s) =	1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	4.5 x10 ⁶ mm ⁴	$j2.(DL + \Psi l.LL) =$	1.5 mm
Ireq'd $\Psi s.LL$ (L/300) =	1.2 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$	0.4 mm
Ireq'd Total (L/250) =	4.7 x10 ⁶ mm ⁴	$\delta Total =$	1.9 mm
		1kN midspan $\delta =$	0.2 mm
			Span / 807
			Span / 3124
			Span / 641

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(1B4) 2 / 300mm x 58mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 17.50\text{kNm (+ve)} < \phi M(dI) = 20.66\text{kNm}$, $M^* = 22.81\text{kNm (+ve)} < \phi M = 31.69\text{kNm}$	OK (0.85,0.72)	
Shear:	$V(dI)^* = 16.76\text{kN} < \phi V(dI) = 52.76\text{kN}$, $V^* = 21.82\text{kN} < \phi V = 74.05\text{kN}$	OK (0.32,0.29)	
Deflection:	$\delta_{DL} = L/524$ (6mm), $\delta_{\Psi s.LL} = L/2032$ (2mm), $\delta_{Total} = L/417$ (7mm), 1kN mid. $\delta = 0.2\text{mm}$	OK	
Reactions:	(1 End) $R_{dl.max} = 9.25\text{kN}$, $R_{ll.max} = 7.15\text{kN}$, $R_{max}^* = 21.82\text{kN}$ (1 End) $R_{dl.min} = 8.14\text{kN}$, $R_{ll.min} = 5.88\text{kN}$, $R_{min}^* = 18.59\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	3100 mm	Lay.t (Top) = 3100 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	1.40 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m = 0.23 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.21 kN/m
		$\Sigma w_{dl} =$	3.38 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m = 0.68 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma w_{ll} =$ 1.68 kN/m
Point loads			
Dead load (pdl) =	6.90 kN	DL 6.9	LL 7.8 : L L
Live load (pll) =	7.83 kN	Σ 6.9	7.8
		Position =	1300 mm from LHS
		ing PL at support =	N (Y)es,(N)o
Short term LL factor (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
Long term LL factor (Ψ_{lu}) =	0.40	(Ψ_{lp}) =	0.60
$w_{dl}^* = 1.2 \cdot w_{dl} + 1.5 \cdot \Psi_{lu} \cdot w_{ll} =$	5.07 kN/m	$M(dI + \Psi_{l.II})^* =$	17.50 kNm (Max at 1300mm)
$w^* = 1.2 \cdot w_{dl} + 1.5 \cdot w_{ll} =$	6.57 kN/m	$M^* =$	22.81 kNm (Max at 1300mm)
$p_{dl}^* = 1.2 \cdot p_{dl} + 1.5 \cdot \Psi_{lp} \cdot p_{ll} =$	15.34 kN	$V(dI + \Psi_{l.II})^* =$	16.76 kN
$p^* = 1.2 \cdot p_{dl} + 1.5 \cdot p_{ll} =$	20.04 kN	$V^* =$	21.82 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 300mm x 58mm Smart LVL15	Area (A) =	34800 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	1740 x10 ³ mm ³
Design depth (dD) = 300 mm	Stiffness (Ix) =	261.0 x10 ⁶ mm ⁴
Design width (dW) = 58 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 \cdot dD/dW \cdot (\text{Lay.t}/dD)^{0.5} =$	20.78 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k_{12d} = 200/(S1 \cdot p_{bd})^2 =$	0.471 for $p_{bd} \cdot S1 \geq 20$ - Cl 3.2.4	$f'_b =$ 46.5 MPa
$k_{12} = 1.5 - 0.05 \cdot p_b \cdot S1 =$	0.515 for $10 \leq p_b \cdot S1 \leq 20$ - Cl 3.2.4	$f'_s =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 0.99 (rbd=0.25)
$\phi M(dI) = \phi \cdot (k_1=0.57) \cdot k_4 \cdot k_6 \cdot k_9 \cdot k_{12d} \cdot f'_b \cdot Z_x =$	20.66 kNm	Material constant (pb) = 0.95 (rb=0.52)
$\phi M = \phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z_x =$	31.69 kNm	Duration factor (k_1) = 0.80
$\phi V(dI) = \phi \cdot (k_1=0.57) \cdot k_4 \cdot k_6 \cdot f'_s \cdot (2/3 \cdot A) =$	52.76 kN	Moisture factor (k_4) = 1.00
$\phi V = \phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot f'_s \cdot (2/3 \cdot A) =$	74.05 kN	Temp. factor (k_6) = 1.00
		Sharing factor (k_9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor (j_2) =	2.0
Ireq'd $j_2 \cdot (DL + \Psi_{l.II})$ (L/300) =	149.4 x10 ⁶ mm ⁴	< Critical $j_2 \cdot (DL + \Psi_{l.II})$ = 5.9 mm
Ireq'd $\Psi_{s.LL}$ (L/300) =	38.5 x10 ⁶ mm ⁴	$\Psi_{s.\delta LL} =$ 1.5 mm
Ireq'd Total (L/250) =	156.6 x10 ⁶ mm ⁴	$\delta_{Total} =$ 7.4 mm
	1kN midspan $\delta =$	0.2 mm
		Span / 524
		Span / 2032
		Span / 417

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(1B5) 2 / 240mm x 42mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 9.65\text{kNm (+ve)} < \phi M(dI) = 21.24\text{kNm}$, $M^* = 14.32\text{kNm (+ve)} < \phi M = 29.81\text{kNm}$	OK (0.45,0.48)	
Shear:	$V(dI)^* = 16.90\text{kN} < \phi V(dI) = 30.57\text{kN}$, $V^* = 24.53\text{kN} < \phi V = 42.90\text{kN}$	OK (0.55,0.57)	
Deflection:	$\delta DL = L/362$ (7mm), $\delta \Psi s.LL = L/1348$ (2mm), $\delta Total = L/285$ (9mm), 1kN mid. $\delta = 0.2\text{mm}$	OK	
Reactions:	(1 End) $Rdl.max = 9.13\text{kN}$, $Rll.max = 9.05\text{kN}$, $R.max^* = 24.53\text{kN}$ (1 End) $Rdl.min = 6.90\text{kN}$, $Rll.min = 7.83\text{kN}$, $R.min^* = 20.04\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	2600 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3100 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	8.06 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3100 mm +	kN/m = 1.55 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.12 kN/m
		$\Sigma wdl =$	4.62 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3100 mm +	kN/m = 4.65 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma wll =$ 5.65 kN/m
Point loads			
Dead load (pdl) =	4.02 kN	Position =	2020 mm from LHS
Live load (pll) =	2.19 kN	ing PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	8.94 kN/m	$M(dI + \Psi l.II)^* =$	9.65 kNm (Max at 1470mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	14.02 kN/m	$M^* =$	14.32 kNm (Max at 1429mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	6.80 kN	$V(dI + \Psi l.II)^* =$	16.90 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	8.11 kN	$V^* =$	24.53 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 240mm x 42mm Smart LVL15	Area (A) =	20160 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	806 x10 ³ mm ³
Design depth (dD) = 240 mm	Stiffness (Ix) =	96.8 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	9.78 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d =$	1.000 for $pbd * S1 \leq 10$ - Cl 3.2.4	$f'b =$ 48.6 MPa
$k12 =$	1.000 for $pb * S1 \leq 10$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 1.01 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	21.24 kNm	Material constant (pb) = 0.96 (rb=0.60)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	29.81 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	30.57 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	42.90 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

Ireq'd j2.(DL+ Ψ l.LL) (L/300) =	80.2 x10 ⁶ mm ⁴	< Critical	Duration factor (j2) =	2.0
Ireq'd Ψ s.LL (L/300) =	21.5 x10 ⁶ mm ⁴		j2.(DL+ Ψ l.LL) =	7.2 mm
Ireq'd Total (L/250) =	84.7 x10 ⁶ mm ⁴		Ψ s. δ LL =	1.9 mm
			δ Total =	9.1 mm
			1kN midspan δ =	0.2 mm
				Span / 362
				Span / 1348
				Span / 285

TIMBER FLOOR BEAM V5.10

Xstruct

Beam: (1B6) 2 / 190mm x 42mm Smart LVL15 (Oregon) (Single span)
Bending: $M(dI)^* = 5.12\text{kNm (+ve)} < \phi M(dI) = 13.94\text{kNm}$, $M^* = 7.82\text{kNm (+ve)} < \phi M = 19.56\text{kNm}$ OK (0.37,0.40)
Shear: $V(dI)^* = 10.34\text{kN} < \phi V(dI) = 24.20\text{kN}$, $V^* = 15.93\text{kN} < \phi V = 33.96\text{kN}$ OK (0.43,0.47)
Deflection: $\delta DL = L/526$ (3mm), $\delta \Psi s.LL = L/1536$ (1mm), $\delta Total = L/392$ (5mm), 1kN mid. $\delta = 0.2\text{mm}$ OK
Reactions: (1 End) $Rdl.max = 4.81\text{kN}$, $Rll.max = 6.20\text{kN}$, $R.max^* = 15.93\text{kN}$
(1 End) $Rdl.min = 4.58\text{kN}$, $Rll.min = 6.20\text{kN}$, $R.min^* = 14.79\text{kN}$
Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category = 1 (1) House, (2) Primary building elements, (3) Important
House = N (Y)es,(N)o Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) = 1800 mm Lay.t (Top) = 450 mm
Centres (cts) = 3100 mm
Span type = S (S)ingle,(D)ouble

Loadings

Floor area (A) = 5.58 m² Live load type = N (N)ormal, (S)torage, (M)anual
AS/NZS 1170.0 - Table 4.1

Uniform dead loads

Floor dead load (wdl) = 0.50 kPa * 3100 mm + kN/m = 1.55 kN/m
Wall dead load (wdl) = 0.50 kPa * 2700 mm + kN/m = 1.35 kN/m
Other dead load (wdl) = 0.40 kPa * 4000 mm + kN/m = 1.60 kN/m
Include S.Wt = Y (Y)es,(N)o S.Wt = 0.10 kN/m
 $\Sigma wdl = 4.60\text{ kN/m}$

Uniform live loads

Floor live load (wll) = 1.50 kPa * 3100 mm + kN/m = 4.65 kN/m
Partitions (wll) = 0.25 kPa * 4000 mm + kN/m = 1.00 kN/m
Alternate point live load = 1.80 kN Distr. to 1 members $\Sigma wll = 5.65\text{ kN/m}$

Point loads

Dead load (pdl) = 1.11 kN Small DL LL : 2*L | 2*L Position = 1085 mm from LHS
Live load (pll) = 2.80 kN Σ 1.1 2.8 at support = N (Y)es,(N)o

Short term LL factor (Ψsu) = 0.70 (Ψsp) = 1.00
Long term LL factor (Ψlu) = 0.40 (Ψlp) = 0.60
 $wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll = 8.90\text{ kN/m}$ $M(dI + \Psi l.II)^* = 5.12\text{ kNm (Max at 1072mm)}$
 $w^* = 1.2 * wdl + 1.5 * wll = 13.99\text{ kN/m}$ $M^* = 7.82\text{ kNm (Max at 1057mm)}$
 $pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll = 3.85\text{ kN}$ $V(dI + \Psi l.II)^* = 10.34\text{ kN}$
 $p^* = 1.2 * pdl + 1.5 * pll = 5.53\text{ kN}$ $V^* = 15.93\text{ kN}$

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 190mm x 42mm Smart LVL15 Area (A) = 15960 mm²
Description = LVL15 seasoned softwood Section modulus (Zx) = 505 x10³ mm³
Design depth (dD) = 190 mm Stiffness (Ix) = 48.0 x10⁶ mm⁴
Design width (dW) = 42 mm Modulus of elasticity (E) = 15300 MPa - Cl 8.3

$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} = 8.70$ For top comp. edge restrained - Cl 3.2.3.2(a)
 $k12d = 1.000$ for $pbd * S1 \leq 10$ - Cl 3.2.4
 $k12 = 1.000$ for $pbd * S1 \leq 10$ - Cl 3.2.4

Strength reduction factor (ϕ) = 0.95 Table 2.1
 $\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx = 13.94\text{ kNm}$ Material constant (pbd) = 1.04 (rbd=0.25)
 $\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx = 19.56\text{ kNm}$ Material constant (pb) = 0.97 (rb=0.67)
Duration factor (k1) = 0.80
 $\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) = 24.20\text{ kN}$ Moisture factor (k4) = 1.00
Temp. factor (k6) = 1.00
 $\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) = 33.96\text{ kN}$ Sharing factor (k9) = 1.00
Size modifier (mod.b) = 1.00
Size modifier (mod.s) = 1.00

Deflections

Duration factor ($j2$) = 2.0
 $Ireq'd j2.(DL + \Psi l.LL) (L/300) = 27.4 \times 10^6\text{ mm}^4$ < Critical $j2.(DL + \Psi l.LL) = 3.4\text{ mm}$ Span / 526
 $Ireq'd \Psi s.LL (L/300) = 9.4 \times 10^6\text{ mm}^4$ $\Psi s.\delta LL = 1.2\text{ mm}$ Span / 1536
 $Ireq'd Total (L/250) = 30.6 \times 10^6\text{ mm}^4$ $\delta Total = 4.6\text{ mm}$ Span / 392
1kN midspan $\delta = 0.2\text{ mm}$

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(1B7) 120mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 0.61\text{kNm (+ve)} < \phi M(dI) = 3.04\text{kNm}$, $M^* = 0.91\text{kNm (+ve)} < \phi M = 4.27\text{kNm}$	OK (0.20,0.21)
Shear:	$V(dI)^* = 2.23\text{kN} < \phi V(dI) = 7.64\text{kN}$, $V^* = 3.31\text{kN} < \phi V = 10.73\text{kN}$	OK (0.29,0.31)
Deflection:	$\delta DL = L/1067$ (1mm), $\delta \Psi s.LL = L/2039$ (1mm), $\delta Total = L/701$ (2mm), 1kN mid. $\delta = 0.3\text{mm}$	OK
Reactions:	(Each end) $RdI = 0.51\text{kN}$, $RlI = 1.80\text{kN}$, $R^* = 3.31\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1100 mm	Lay.t (Top) = 450 mm
Centres (cts) =	1800 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	1.98 m ²	Live load type = N (N)ormal, (S)torage, (M)anual
		AS/NZS 1170.0 - Table 4.1

Uniform dead loads

Floor dead load (wdl) =	0.50 kPa *	1800 mm +	kN/m =	0.90 kN/m
Wall dead load (wdl) =	kPa *	mm +	kN/m =	0.00 kN/m
Other dead load (wdl) =	kPa *	mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.03 kN/m
			$\Sigma wdl =$	0.93 kN/m

Uniform live loads

Floor live load (wll) =	1.50 kPa *	1800 mm +	kN/m =	2.70 kN/m
Partitions (wll) =	kPa *	1800 mm +	kN/m =	0.00 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to 1 members	$\Sigma wll =$	3.27 kN/m

Point loads

Dead load (pdl) =	kN	Position = 550 mm from LHS
Live load (pll) =	kN	Shear using PL at support = N (Y)es,(N)o

Short term LL factor (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
Long term LL factor (Ψ_{lu}) =	0.40	(Ψ_{lp}) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi_{lu} * wll =$	4.06 kN/m	$M(dI + \Psi_{lI})^* =$	0.61 kNm (Max at 550mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	6.03 kN/m	$M^* =$	0.91 kNm (Max at 550mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi_{lp} * pll =$	0.00 kN	$V(dI + \Psi_{lI})^* =$	2.23 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	0.00 kN	$V^* =$	3.31 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	120mm x 42mm Smart LVL15	Area (A) =	5040 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	101 x10 ³ mm ³
Design depth (dD) =	120 mm	Stiffness (Ix) =	6.0 x10 ⁶ mm ⁴
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3

$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	6.92 For top comp. edge restrained - Cl 3.2.3.2(a)
$k12d =$	1.000 for $pbd * S1 \leq 10$ - Cl 3.2.4
$k12 =$	1.000 for $pb * S1 \leq 10$ - Cl 3.2.4

Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	1.08 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12 * f'b * Zx =$	3.04 kNm	Material constant (pb) =	1.01 (rb=0.81)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	4.27 kNm	Duration factor (k1) =	0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	7.64 kN	Moisture factor (k4) =	1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	10.73 kN	Temp. factor (k6) =	1.00
		Sharing factor (k9) =	1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	1.7 x10 ⁶ mm ⁴	$j2.(DL + \Psi l.LL) =$	1.0 mm
Ireq'd $\Psi s.LL$ (L/300) =	0.9 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$	0.5 mm
Ireq'd Total (L/250) =	2.2 x10 ⁶ mm ⁴	$\delta Total =$	1.6 mm
		1kN midspan $\delta =$	0.3 mm

STEEL MEMBER V5.14

Xstruct

Section:	(1B8) 250x90PFC (G300)	
Bending:	$M_x^* = 32.6 \text{ kNm} < \phi M_b(4500, \alpha_m=1.30) = 73.7 \text{ kNm}$, $\phi M_b(\alpha_m=1) = 56.7 \text{ kNm}$	OK (0.44)
	No minor bending	
Shear:	$V_x^* = 0.022 \text{ kN} < \phi V_{vm} = 345.6 \text{ kN}$ (Web area full depth)	OK (0.00)
	No minor shear	
Compression:	No compression	
Tension:	No tension	
Torsion:	No torsion	

Deflection: $\delta DL = L/1127$ (4mm), $\delta \Psi_s.LL = L/2461$ (2mm), $\delta Total = L/773$ (6mm) at 2400mm from LHS OK

Bending & Shear at 2650mm from LHS (Max +ve M) - Section 5 Max. restraint (2.5% flange force) = 3.5 kN

(M* to include first order amplification as required - Cl 4.4.2)

Analysis values = X (M)anual, (L)eft, Position (X) from analysis, (R)ight, (C)ritical

Refer to the analysis output

Analysis Axis = X (X),(Y)

Major bending (M_x^*) =	32.6 kNm	Minor bending (M_y^*) =	0 kNm
Minor bending (M_y^*) =	0.000 kNm	Torsion (M_z^*) =	0 kNm
Shear Force (V_x^*) =	0.022 kN	Shear Force (V_y^*) =	0 kN
Shear Force (V_y^*) =	0.000 kN	Span / Segment Length (L) =	4500 mm
Effective length factor (ke) =	Calc	Moment modification factor (α_m) =	1.30
ke = (kt=1.00)*(kl=1.00)*(kr=1.00) =	1.00 (From Le Tab)		
Effective length (Le = L*ke) =	4500 mm		
ϕ =	0.9 Table 3.4		
ϕM_{sx} =	113.7 kNm	Bending (x) =	OK (0.44)
$\phi M_{bx}(\alpha_m=1)$ =	56.7 kNm	Shear =	OK (0.00)
ϕM_{bx} =	73.7 kNm		
ϕM_{syL} =	23.9 kNm	ϕM_{syR} =	24.0 kNm
ϕV_v =	345.6 kN		
ϕV_{vm} =	345.6 kN	Ix =	45.1 x10 ⁶ mm ⁴
ϕM_z =	2.68 kNm	S.Wt =	0.355 kN/m

Compression - Section 6 (No compression)

Axial compression (N_c^*) =	0.0 kN	Axial compression (N_c^*) =	0 kN
Major axis length (Lx) =	10000 mm	Eff. X length factor (kex) =	1.00
Minor axis length (Ly) =	1500 mm	Eff. Y length factor (key) =	1.00
Braced or Sway member =	S (B)raccd, (S)way		
ϕN_s =	1220.4 kN	Major axis effective length (Lex) =	10000 mm
$\phi N_{cx}(kex=1.00)$ =	527.7 kN	Minor axis effective length (Ley) =	1500 mm
In-Plane $\phi N_{cx}(kex=1.00)$ =	527.7 kN		
$\phi N_{cy}(key=1.00)$ =	926.9 kN		
In-Plane $\phi N_{cy}(key=1.00)$ =	926.9 kN		
ϕN_c =	527.7 kN		

Tension - Section 7 (No tension)

Axial tension (N_t^*) =	0.0 kN	Axial tension (N_t^*) =	0 kN
kt =	1.00 Table 7.3.2		
ϕN_t =	1220.4 kN		

Combined

ϕM_{rxt} =	113.7 kNm	ϕM_{ixt} =	113.7 kNm	ϕM_{oxt} =	73.7 kNm
ϕM_{rxc} =	113.7 kNm	ϕM_{ixc} =	113.7 kNm	ϕM_{oxc} =	73.7 kNm
ϕM_{ryt} =	23.9 kNm	ϕM_{iyc} =	23.9 kNm	ϕM_{tx} =	73.7 kNm
ϕM_{ryc} =	23.9 kNm			ϕM_{cx} =	73.7 kNm

ANALYSIS V5.05

Xstruct

Geometry for (1B8): Steel Simple Beam

Description = 250x90PFC (G300)
Span (L) = 4800 mm
Span type = S (Simple),(E)xt,(I)nt,(C)ant,(P)rop,(F)ixed,(O)ther
Material type = S (Timber),(S)teel,(C)onc.,(SC)comp. steel,(O)ther

Ix = 45.1 x10⁶ mm⁴
Axis = X (X),(Y)
Ag = 4520 mm²
Density = 78.6 kN/m³
E = 200000 MPa

Loading

Uniform loads (kN/m)				Point loads (kN)			
Uniform loads	UDL	Partial 1	Partial 2	Point loads	PL 1	PL 2	PL 3
Dead load (wdl) =	3.65			Dead load (pdl) =	6.68	3.38	
Live load (wll) =	1.93			Live load (pll) =	4.35	2.80	
Start from LHS (mm) =	0			Pos. from LHS (mm) =	380	3000	
End from LHS (mm) =	4800			Ultimate load (p*) =	14.53	8.26	0.00
S.Wt =	0.36	kN/m					
Ultimate load (w*) =	7.70	0.00	0.00				
Live Load type =	Floor (Steel)			Include S.Wt =		Y (Yes),(N)o	
Short term LL (Ψsu) =	0.70	(Ψsp) =	1.00	Strength loadcase =		C (Dead Only),(C)omb.	
Long term LL (Ψlu) =	0.40	(Ψlp) =	0.60				
Actual LL (Ψsa) =	0.81	(Ψla) =	0.48				

	DL	LL
1B9	5.0	2.9 : L L
Large	1.7	1.4 : L L
Σ	6.7	4.3

Results at 2650mm from LHS (Max +ve M)

Position of result (x) = 2650 mm

1.20*G+1.50*Q analysed							
	Left	At x	Right	Max	At	Min	At
Rdl	17.03		12.26				
Rll	9.69		6.73				
R*	34.96		24.80				
M*	0.00	32.62	0.00	32.62	2650	0.00	0
V*	34.96	0.02	-24.80	34.96	0		
δdl	0.00	4.21	0.00	4.26	2400	0.00	0
δll	0.00	2.37	0.00	2.39	2400	0.00	0
δdl+Ψs*δll	0.00	6.13	0.00	6.21	2400	0.00	0

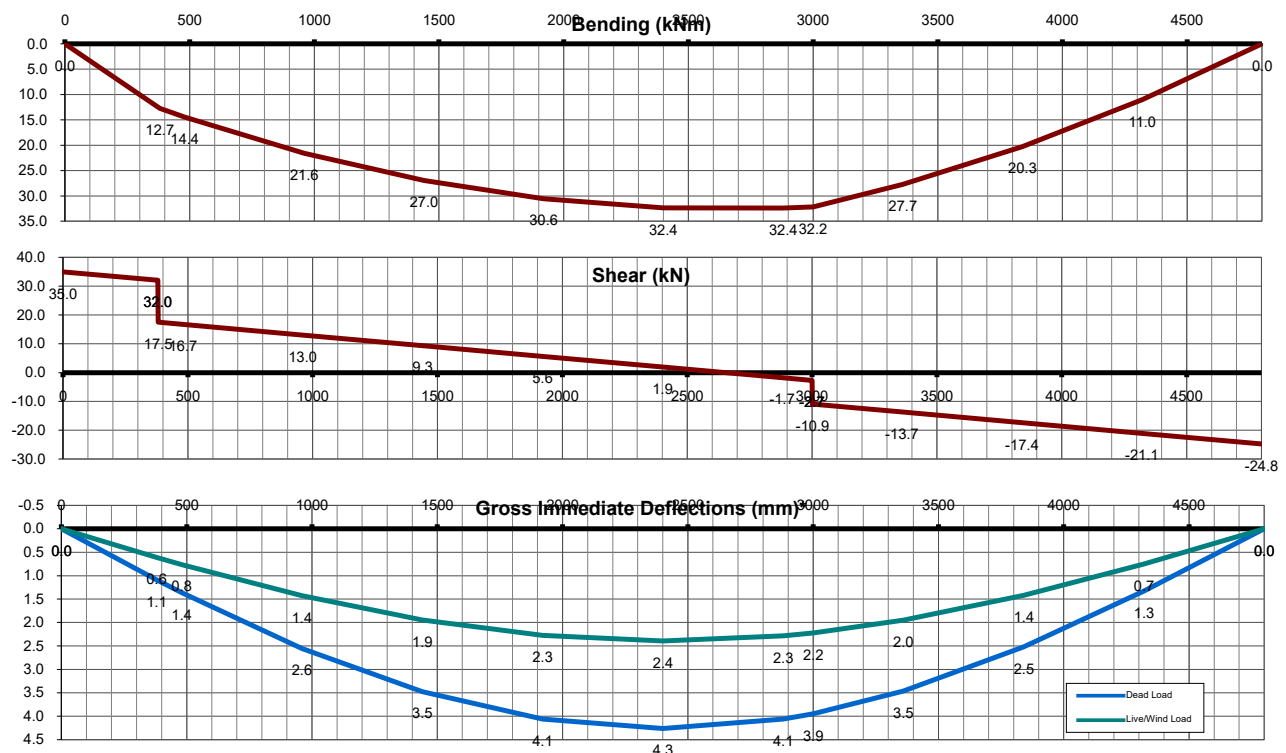
	DL	LL
Large	3.4	2.8 : 2*L 2*L
Σ	3.4	2.8

	Units	
	kN	
	kN	
	kNm	
	kN	
Span /		
	mm	1127
	mm	2005
	mm	773

δPlI/δTot.II = 0.382

Graphs

* Deflections are Gross Ig immediate - assessment of long term effects to be considered



TIMBER ROOF BEAM V5.10

Xstruct

Beam:	(1B9) 2 / 300mm x 58mm Smart LVL15 (Oregon) (Single span)		
Bending:	M(dl)* = 6.40kNm (+ve) < ϕM(dl) = 14.89kNm, M* = 8.79kNm (+ve) < ϕM = 26.13kNm		OK (0.43,0.34)
	Mw* = 0.00kNm (-ve) < ϕMw = 30.94kNm		OK (0.00)
Shear:	V(dl)* = 6.92kN < ϕV(dl) = 52.76kN, V* = 10.95kN < ϕV = 87.01kN		OK (0.13,0.13)
	Vw* = 2.82kN < ϕVw = 92.57kN		OK (0.03)
Deflection:	δDL = L/932 (5mm) , δΨs.LL = L/4858 (1mm), δWLs = L/6821 (-1mm)		OK
Reactions:	(1 End) Rdl.max = 4.98kN, Rll.max = 2.95kN, Rwl.max* = -1.79kN, R.dn.max* = 10.40kN, R.up.max* = -2.70kN (Down)		
	(1 End) Rdl.min = 4.26kN, Rll.min = 1.65kN, Rwl.min* = -1.79kN, R.dn.min* = 7.59kN, R.up.min* = -2.05kN (Down)		

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category = 1 (1) House, (2) Primary building elements, (3) Important House = N (Y)es, (N)o
Span (L) = 4300 mm Edge restrained (down) = C (T)ension, (C)ompression, (B)oth
Centres (cts) = 900 mm Lay.t (Top) = 4300 mm
Span type = S (S)ingle, (D)ouble

Loadings

Roof area (A) =	3.87 m ²	Apply wind reduction =	Y (Y)es,(N)o
LL = 1.8/A+0.12 ≥ 0.25 =	0.59 kPa	Roof reduction (Ka) =	1.00 AS/NZS 1170.2, Table 5.4
		Ratio Ws/Wu =	0.68 (Refer wind analysis)

Uniform dead loads

Roof dead load (wdl) =	0.40 kPa *	900 mm +		kN/m =	0.36 kN/m
Other dead load (wdl) =	0.50 kPa *	2700 mm +		kN/m =	1.35 kN/m
Include S.Wt =	Y (Yes,(N)o			S.Wt =	0.21 kN/m
				$\Sigma wdl =$	1.92 kN/m

Uniform live loads

Roof live load (wl) =	0.59 kPa *	900 mm +		kN/m =	0.53 kN/m
Other live load (wl) =		900 mm +		kN/m =	0.00 kN/m
Alternate point live load =	1.40 kN (critical)	Distr. to	1 members	Σwl =	0.65 kN/m

Uniform wind loads

Ult. wind load (Wu) =	0.84 kPa *	900 mm	
Cp,e =	0.9	Cp,i =	0.2
			Σwwl* = -0.83 kN/m (up)

Point loads

Dead load (pdl) =	1.00 kN	T1	DL	LL	WLU	- : L L -	tion =	600 mm from LHS
Live load (pll) =	1.80 kN	Σ	1.0	1.8	0.0		port =	Y (Yes),(N)o
Wind load (pwl*) =	kN (-ve up)							
w(dl)* = 1.35*wdl =	2.59 kN/m				M(dl)* =			6.40 kNm (Max at 2077mm)
w* = 1.2*wdl + 1.5*wl =	3.28 kN/m				M* =			8.79 kNm (Max at 1984mm)
w.up* = 0.9*wdl + wwI*	-0.90 kN/m (down)				Mw.dn* =			0.00 kNm
p(dl)* = 1.35*pdl =	1.35 kN				V(dl)* =			6.92 kN
p* = 1.2*pdl+1.5*pll =	3.90 kN				V* =			10.95 kN
p.up* = 0.9*pdl + pwl* =	-0.90 kN (down)				Vw.up* =			2.82 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 300mm x 58mm Smart LVL15	Area (A) =	34800 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	1740 x10 ³ mm ³
Design depth (dD) = 300 mm	Stiffness (Ix) =	261.0 x10 ⁶ mm ⁴
Design width (dW) = 58 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
S1d = 1.25*dD/dW*(Lay.t/dD) ^{0.5} =	24.48 For top comp. edge restrained - Cl 3.2.3.2(a)	
S1ud = 1.25*dD/dW*(Lay.t/dD) ^{0.5} =	24.48 For top comp. edge restrained - Cl 3.2.3.2(a)	
k12d = 200/(S1d*pbD) ² =	0.340 for pbD*S1d ≥ 20 - Cl 3.2.4	
k12 = 200/(S1d*pb) ² =	0.361 for pb*S1d ≥ 20 - Cl 3.2.4	f'b = 46.5 MPa
k12u = 200/(S1u*pbu) ² =	0.402 for pbu*S1u ≥ 20 - Cl 3.2.4	f's = 4.2 MPa
Strength reduction factor (φ) =	0.95 Table 2.1	Material constant (pbD) = 0.99 (rbD=0.25)
φM(dI) = φ*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	14.89 kNm	Material constant (pb) = 0.96 (rb=0.42)
φM = φ*k1*k4*k6*k9*k12*f'b*Zx =	26.13 kNm	Stress reversal (pbu) = 0.91 (rbu=1.00)
φMw = φ*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	30.94 kNm	Duration factor (k1) = 0.94 (Live)
φV(dI) = φ*(k1=0.57)*k4*k6*f's*(2/3*A) =	52.76 kN	Moisture factor (k4) = 1.00
φV = φ*k1*k4*k6*f's*(2/3*A) =	87.01 kN	Temp. factor (k6) = 1.00
φVw = φ*(k1=1)*k4*k6*f's*(2/3*A) =	92.57 kN	Sharing factor (k9) = 1.00
	Size modifier (mod.b & s) =	1.00 & 1.00

Deflections

Duration factor (j2) =		2.0	
Ireq'd j2.(DL+ψI.LL) (L/300) =	84.0 x10 ⁶ mm ⁴	< Critical	Span / 932
Ireq'd `LL (L/240) =	12.9 x10 ⁶ mm ⁴	δDL=	4.6 mm
Ireq'd WLs (L/180) =	6.9 x10 ⁶ mm ⁴	δψs.LL =	0.9 mm
		δWLs =	-0.6 mm
			Span / 6821

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(1L1) 2 / 290mm x 42mm Smart LVL15* (Oregon) (Single span)		
Bending:	$M(dI)^* = 9.99\text{kNm (+ve)} < \phi M(dI) = 28.84\text{kNm}$, $M^* = 14.80\text{kNm (+ve)} < \phi M = 41.65\text{kNm}$	OK (0.35,0.36)	
Shear:	$V(dI)^* = 16.03\text{kN} < \phi V(dI) = 36.93\text{kN}$, $V^* = 23.48\text{kN} < \phi V = 51.84\text{kN}$	OK (0.43,0.45)	
Deflection:	$\delta DL = L/600$ (5mm), $\delta \Psi s.LL = L/2193$ (1mm), $\delta Total = L/471$ (6mm), 1kN mid. $\delta = 0.2\text{mm}$	OK	
Reactions:	(1 End) $Rdl.max = 8.55\text{kN}$, $Rll.min = 8.81\text{kN}$, $R.max^* = 23.48\text{kN}$ (1 End) $Rdl.min = 6.61\text{kN}$, $Rll.min = 7.76\text{kN}$, $R.min^* = 19.57\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	2700 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3100 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	8.37 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3100 mm +	kN/m = 1.55 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	2700 mm +	kN/m = 1.08 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.15 kN/m
		$\Sigma wdl =$	4.13 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3100 mm +	kN/m = 4.65 kN/m
Partitions (wll) =	0.25 kPa *	2700 mm +	kN/m = 0.68 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma wll =$ 5.33 kN/m
Point loads			
Dead load (pdl) =	4.02 kN	GT DL LL Σ 4.0 2.2 : L L	Position = 700 mm from LHS
Live load (pll) =	2.19 kN		ing PL at support = N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	8.15 kN/m	$M(dI + \Psi l.II)^* =$	9.99 kNm (Max at 1134mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	12.94 kN/m	$M^* =$	14.80 kNm (Max at 1187mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	6.80 kN	$V(dI + \Psi l.II)^* =$	16.03 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	8.11 kN	$V^* =$	23.48 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 290mm x 42mm Smart LVL15*	Area (A) =	24360 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	1177 x10 ³ mm ³
Design depth (dD) = 290 mm	Stiffness (Ix) =	170.7 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	10.75 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 * pbd * S1 =$	0.965 for $10 \leq pbd * S1 \leq 20$ - Cl 3.2.4	$f'b =$ 46.9 MPa
$k12 = 1.5 - 0.05 * pb * S1 =$	0.994 for $10 \leq pb * S1 \leq 20$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 0.99 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	28.84 kNm	Material constant (pb) = 0.94 (rb=0.61)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	41.65 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	36.93 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	51.84 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

Ireq'd j2.(DL+ Ψ l.LL) (L/300) =	85.4 x10 ⁶ mm ⁴	< Critical	Duration factor (j2) =	2.0	
Ireq'd Ψ s.LL (L/300) =	23.4 x10 ⁶ mm ⁴		j2.(DL+ Ψ l.LL) =	4.5 mm	Span / 600
Ireq'd Total (L/250) =	90.6 x10 ⁶ mm ⁴		Ψ s. δ LL =	1.2 mm	Span / 2193
			δ Total =	5.7 mm	Span / 471
			1kN midspan δ =	0.2 mm	

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(1L2) 2 / 120mm x 42mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 1.49\text{kNm (+ve)} < \phi M(dI) = 5.74\text{kNm}$, $M^* = 1.93\text{kNm (+ve)} < \phi M = 8.30\text{kNm}$	OK (0.26,0.23)	
Shear:	$V(dI)^* = 5.38\text{kN} < \phi V(dI) = 15.28\text{kN}$, $V^* = 7.00\text{kN} < \phi V = 21.45\text{kN}$	OK (0.35,0.33)	
Deflection:	$\delta DL = L/886$ (1mm), $\delta \Psi s.LL = L/2926$ (0mm), $\delta Total = L/680$ (1mm), 1kN mid. $\delta = 0.1\text{mm}$	OK	
Reactions:	(1 End) $Rdl.max = 2.45\text{kN}$, $Rll.min = 2.71\text{kN}$, $R.max^* = 7.00\text{kN}$ (1 End) $Rdl.min = 1.95\text{kN}$, $Rll.min = 2.29\text{kN}$, $R.min^* = 5.79\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1000 mm	Lay.t (Top) = 1000 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	0.45 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m = 0.23 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	2700 mm +	kN/m = 1.08 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.06 kN/m
		$\Sigma wdl =$	2.72 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m = 0.68 kN/m
Partitions (wll) =	0.25 kPa *	2700 mm +	kN/m = 0.68 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to 1 members	$\Sigma wll =$ 3.60 kN/m

Point loads			
Dead load (pdl) =	1.69 kN	Large	DL 1.7 LL 1.4 : L L
Live load (pll) =	1.40 kN	Σ	1.7 1.4
		Position =	647 mm from LHS
		ing PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	6.50 kN/m	$M(dI + \Psi l.II)^* =$	1.49 kNm (Max at 647mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	8.66 kN/m	$M^* =$	1.93 kNm (Max at 647mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	3.29 kN	$V(dI + \Psi l.II)^* =$	5.38 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	4.13 kN	$V^* =$	7.00 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 120mm x 42mm Smart LVL15	Area (A) =	10080 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	202 x10 ³ mm ³
Design depth (dD) = 120 mm	Stiffness (Ix) =	12.1 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	10.31 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 * pbd * S1 =$	0.943 for $10 \leq pbd * S1 \leq 20$ - Cl 3.2.4	$f'b =$ 55.7 MPa
$k12 = 1.5 - 0.05 * pb * S1 =$	0.972 for $10 \leq pb * S1 \leq 20$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 1.08 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	5.74 kNm	Material constant (pb) = 1.03 (rb=0.60)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	8.30 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	15.28 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	21.45 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	4.1 x10 ⁶ mm ⁴	< Critical $j2.(DL + \Psi l.LL) =$ 1.1 mm
Ireq'd $\Psi s.LL$ (L/300) =	1.2 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$ 0.3 mm
Ireq'd Total (L/250) =	4.4 x10 ⁶ mm ⁴	$\delta Total =$ 1.5 mm
	1kN midspan $\delta =$	0.1 mm
		Span / 886
		Span / 2926
		Span / 680

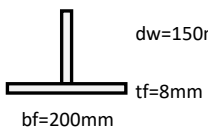
T LINTEL V5.03

Xstruct

Geometry: (GL1) 150mm x 8mm Pl. Vert., 200mm x 8mm Pl. Horz.
Design: $M^* = 8.8 \text{ kNm} < \phi M_b(3000, \alpha_m = 1.13) = 12.8 \text{ kNm}$
Deflection: $\delta_{DL} = L/703$ (4mm), $\delta_{\Psi s.LL} = L/5535$ (1mm), $\delta_{Total} = L/624$ (5mm)
Reactions: (Each end) $R_{dl} = 7.9 \text{ kN}$, $R_{ll} = 1.4 \text{ kN}$, $R^* = 11.7 \text{ kN}$

OK (0.69)
OK

Geometry

Span = L_e =	3000 mm	α_m =	1.13	$t_w = 8 \text{ mm}$
Vertical web		Horizontal flange		$d_w = 150 \text{ mm}$
Web thickness (t_w) =	8 mm	Flange thickness (t_f) =	8 mm	
Web depth (d_w) =	150 mm	Flange width (b_f) =	200 mm	
Yield strength =	250 MPa	Yield strength =	250 MPa	

Loading

Live load type = N (N)ormal, (S)torage, (M)annual AS/NZS 1170.0 - Table 4.1				
Uniform dead loads				
Roof dead load (w_{dl}) =	0.40 kPa *	3000 mm +	kN/m =	1.20 kN/m
Floor dead load (w_{dl}) =	0.50 kPa *	2700 mm +	kN/m =	1.35 kN/m
Wall dead load (w_{dl}) =	2.10 kPa *	1200 mm +	kN/m =	2.52 kN/m
Other dead load (w_{dl}) =	kPa *	mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es, (N)o		S.Wt =	0.22 kN/m
			Σw_{dl} =	5.29 kN/m
Uniform live loads				
Roof live load (w_{ll}) =	0.32 kPa *	3000 mm +	kN/m =	0.96 kN/m
Floor live load (w_{ll}) =	kPa *	mm +	kN/m =	0.00 kN/m
Other live load (w_{ll}) =	kPa *	mm +	kN/m =	0.00 kN/m
			Σw_{ll} =	0.96 kN/m
Point loads				
Dead load (P_{dl}) =	kN	Position =	1500 mm from LHS	
Live load (P_{ll}) =	kN			
Horizontal loads				
Wall height (w_{cts}) =	0 mm	Ratio W_s/W_u =	0.68	
Ult. inward wind load (W_u) =	0.84 kPa			
c_{pe} =	0.7	c_{pi} =	0.2	$wwl^* =$ 0.00 kN/m
Short term LL (Ψ_{su}) =	0.70	$(\Psi_{sp}) =$	1.00	
$w^* = 1.2 * w_{dl} + 1.5 * w_{ll} =$	7.79 kNm	$R_{dl} = w_{dl} * L/2 + p_{dl} * (L - pos)/L =$	7.9 kN	
$p^* = 1.2 * p_{dl} + 1.5 * p_{ll} =$	0.00 kNm	$R_{ll} = w_{ll} * L/2 + p_{ll} * (L - pos)/L =$	1.4 kN	
$M^* =$	8.8 kNm	$R^* = 1.2 * R_{dl} + 1.5 * R_{ll} =$	11.7 kN	

Properties

(Max at 1500mm)

Area =	2800 mm ²	Warping constant (I_w) =	0 mm ⁶ - CI H4
Stiffness (I_x) =	6.5 x10 ⁶ mm ⁴	Torsional constant (J) =	59.7 x10 ³ mm ⁴
Stiffness (I_y) =	5.34 x10 ⁶ mm ⁴	Elastic section modulus (Z_t) =	54.4 x10 ³ mm ³
Elastic modulus (E) =	200000 MPa - CI 1.4	Elastic section modulus (Z_b) =	172.7 x10 ³ mm ³
Shear modulus (G) =	80000 MPa - CI 1.4	Min. elastic section modulus (Z_{min}) =	54.4 x10 ³ mm ³
Elastic (y_{top}) =	120 mm	Plastic section modulus (S) =	96.2 x10 ³ mm ³
Plastic ($y_{p.top}$) =	151 mm	Eff. elastic section mod.(Compact) (Z_c) =	81.6 x10 ³ mm ³ - CI 5.2.3

Capacity - CI 5.6.1.2

Web $\lambda_s = d_w/t_w * \sqrt{f_{yw}/250} =$	18.8 < 22, Non-compact	CI 5.2.2	$\lambda_{sy} = 22$
$Z_{ex} = Z_{min} + [(\lambda_{sy} - \lambda_s) / (\lambda_{sy} - \lambda_{sp})] * (Z_c - Z_{min}) =$	60.7 x10 ³ mm ³ - CI 5.2.4		$\lambda_{sp} = 8$
$\phi =$	0.9 Table 3.4		
$M_{sx} =$	15.2 kNm	$\phi M_{sx} =$	13.7 kNm
$M_{oa} =$	37.9 kNm	$\alpha_s =$	0.826
		$\beta_x =$	-93.9
		$\alpha_m =$	1.13
$\phi M_{bx} = \alpha_m * \alpha_s * \phi M_{sx} \leq \phi M_{sx} =$			
	12.8 kNm - CI 5.6.1.1(1)		

Deflections

Ireq'd DL ($L/500$) =	4.6 x10 ⁶ mm ⁴	< Critical	$\delta_{DL} =$	4.3 mm	Span / 703
Ireq'd $\Psi_{s.LL}$ ($L/360$) =	0.4 x10 ⁶ mm ⁴		$\Psi_{s.LL} =$	0.5 mm	Span / 5535
Ireq'd $W_{Ls.h}$ ($L/250$) =	0.0 x10 ⁶ mm ⁴		$\delta_{W_{Ls.h}} =$	0.0 mm	Span / -
Ireq'd ($DL + \Psi_{s.LL}$) ($L/360$) =	3.8 x10 ⁶ mm ⁴		$\delta_{Total} =$	4.8 mm	Span / 624
			1kN midspan $\delta =$	0.4 mm	

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(2B1) 2 / 290mm x 42mm Smart LVL15* (Oregon) (Single span)		
Bending:	$M(dI)^* = 4.89\text{kNm (+ve)} < \phi M(dI) = 6.53\text{kNm}$, $M^* = 6.68\text{kNm (+ve)} < \phi M = 10.60\text{kNm}$	OK (0.75,0.63)	
Shear:	$V(dI)^* = 10.45\text{kN} < \phi V(dI) = 36.93\text{kN}$, $V^* = 14.14\text{kN} < \phi V = 51.84\text{kN}$	OK (0.28,0.27)	
Deflection:	$\delta DL = L/1058$ (3mm), $\delta \Psi s.LL = L/2604$ (1mm), $\delta Total = L/752$ (5mm), 1kN mid. $\delta = 0.4\text{mm}$	OK	
Reactions:	(1 End) $Rdl.max = 4.09\text{kN}$, $Rll.max = 6.15\text{kN}$, $R.max^* = 14.14\text{kN}$ (1 End) $Rdl.min = 1.18\text{kN}$, $Rll.min = 2.45\text{kN}$, $R.min^* = 5.10\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	3600 mm	Lay.t (Top) = 3600 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	1.62 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m = 0.23 kN/m
Wall dead load (wdl) =	kPa *	450 mm +	kN/m = 0.00 kN/m
Other dead load (wdl) =	kPa *	mm +	kN/m = 0.00 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.15 kN/m
		$\Sigma wdl =$	0.37 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m = 0.68 kN/m
Partitions (wll) =	kPa *	450 mm +	kN/m = 0.00 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to 1 members	$\Sigma wll =$ 1.00 kN/m
Point loads			
Dead load (pdl) =	3.94 kN	2B2 DL 3.9 LL 5.0 : L L	Position = 470 mm from LHS
Live load (pll) =	5.01 kN	Σ 3.9 5.0	ing PL at support = N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	1.35 kN/m	$M(dI + \Psi l.II)^* =$	4.89 kNm (Max at 904mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	1.95 kN/m	$M^* =$	6.68 kNm (Max at 979mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	9.23 kN	$V(dI + \Psi l.II)^* =$	10.45 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	12.24 kN	$V^* =$	14.14 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 290mm x 42mm Smart LVL15*	Area (A) =	24360 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	1177 x10 ³ mm ³
Design depth (dD) = 290 mm	Stiffness (Ix) =	170.7 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	30.41 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d = 200 / (S1 * pbd)^2 =$	0.219 for $pbd * S1 \geq 20$ - Cl 3.2.4	$f'b =$ 46.9 MPa
$k12 = 1.5 - 0.05 * pb * S1 =$	0.253 for $pb * S1 \geq 20$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 0.99 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	6.53 kNm	Material constant (pb) = 0.92 (rb=0.82)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	10.60 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	36.93 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	51.84 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor ($j2$) =	2.0
$Ireq'd j2.(DL + \Psi l.LL) (L/300) =$	48.4 x10 ⁶ mm ⁴	$j2.(DL + \Psi l.LL) =$ 3.4 mm
$Ireq'd \Psi s.LL (12mm) =$	19.7 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$ 1.4 mm
$Ireq'd Total (L/250) =$	56.7 x10 ⁶ mm ⁴	$\delta Total =$ 4.8 mm
	1kN midspan $\delta =$	0.4 mm
		Span / 1058
		Span / 2604
		Span / 752

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(2B2) 2 / 140mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 3.36\text{kNm (+ve)} < \phi M(dI) = 8.04\text{kNm}$, $M^* = 5.01\text{kNm (+ve)} < \phi M = 11.28\text{kNm}$	OK (0.42,0.44)
Shear:	$V(dI)^* = 7.94\text{kN} < \phi V(dI) = 17.83\text{kN}$, $V^* = 12.24\text{kN} < \phi V = 25.03\text{kN}$	OK (0.45,0.49)
Deflection:	$\delta_{DL} = L/421$ (3mm), $\delta_{\Psi s.LL} = L/1393$ (1mm), $\delta_{Total} = L/323$ (4mm), 1kN mid. $\delta = 0.2\text{mm}$	OK
Reactions:	(Each end) $R_{dI} = 3.94\text{kN}$, $R_{II} = 5.01\text{kN}$, $R^* = 12.24\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1400 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3600 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	5.04 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3600 mm +	kN/m = 1.80 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	3000 mm +	kN/m = 1.20 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.07 kN/m
		$\Sigma w_{dl} =$	4.42 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3600 mm +	kN/m = 5.40 kN/m
Partitions (wll) =	0.25 kPa *	3000 mm +	kN/m = 0.75 kN/m
Alternate point live load =	1.80 kN	Distr. to	1 members
		$\Sigma w_{ll} =$	6.15 kN/m

Point loads			
Dead load (pdl) =	1.69 kN	DL	LL
Live load (pll) =	1.40 kN	Large	1.7 1.4 : L L
		Σ	1.7 1.4
		Position =	700 mm from LHS
		ing PL at support =	N (Y)es,(N)o
Short term LL factor (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
Long term LL factor (Ψ_{lu}) =	0.40	(Ψ_{lp}) =	0.60
$w_{dl}^* = 1.2 \cdot w_{dl} + 1.5 \cdot \Psi_{lu} \cdot w_{ll} =$	8.99 kN/m	$M(dI + \Psi_{l.II})^* =$	3.36 kNm (Max at 700mm)
$w^* = 1.2 \cdot w_{dl} + 1.5 \cdot w_{ll} =$	14.53 kN/m	$M^* =$	5.01 kNm (Max at 700mm)
$p_{dl}^* = 1.2 \cdot p_{dl} + 1.5 \cdot \Psi_{lp} \cdot p_{ll} =$	3.29 kN	$V(dI + \Psi_{l.II})^* =$	7.94 kN
$p^* = 1.2 \cdot p_{dl} + 1.5 \cdot p_{ll} =$	4.13 kN	$V^* =$	12.24 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 140mm x 42mm Smart LVL15	Area (A) =	11760 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	274 x10 ³ mm ³
Design depth (dD) =	140 mm	Stiffness (Ix) =	19.2 x10 ⁶ mm ⁴
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S_1 = 1.25 \cdot dD/dW \cdot (\text{Lay.t}/dD)^{0.5} =$	7.47 For top comp. edge restrained - Cl 3.2.3.2(a)		
$k_{12d} =$	1.000 for $p_{bd} \cdot S_1 \leq 10$ - Cl 3.2.4	$f'_b =$	54.1 MPa
$k_{12} =$	1.000 for $p_b \cdot S_1 \leq 10$ - Cl 3.2.4	$f'_s =$	4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	1.07 (rbd=0.25)
$\phi M(dI) = \phi \cdot (k_1=0.57) \cdot k_4 \cdot k_6 \cdot k_9 \cdot k_{12d} \cdot f'_b \cdot Z_x =$	8.04 kNm	Material constant (pb) =	1.01 (rb=0.60)
$\phi M = \phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z_x =$	11.28 kNm	Duration factor (k_1) =	0.80
$\phi V(dI) = \phi \cdot (k_1=0.57) \cdot k_4 \cdot k_6 \cdot f'_s \cdot (2/3 \cdot A) =$	17.83 kN	Moisture factor (k_4) =	1.00
$\phi V = \phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot f'_s \cdot (2/3 \cdot A) =$	25.03 kN	Temp. factor (k_6) =	1.00
		Sharing factor (k_9) =	1.00
		Size modifier (mod.b) =	1.00
		Size modifier (mod.s) =	1.00

Deflections

		Duration factor (j_2) =	2.0
Ireq'd $j_2 \cdot (DL + \Psi_{l.II})$ (L/300) =	13.7 x10 ⁶ mm ⁴	$j_2 \cdot (DL + \Psi_{l.II}) =$	3.3 mm
Ireq'd $\Psi_{s.LL}$ (L/300) =	4.1 x10 ⁶ mm ⁴	$\Psi_{s.LL} =$	1.0 mm
Ireq'd Total (L/250) =	14.9 x10 ⁶ mm ⁴	$\delta_{Total} =$	4.3 mm
		1kN midspan $\delta =$	0.2 mm

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(2B3) 2 / 140mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 4.21\text{kNm (+ve)} < \phi M(dI) = 6.83\text{kNm}$, $M^* = 5.18\text{kNm (+ve)} < \phi M = 9.86\text{kNm}$	OK (0.62,0.53)
Shear:	$V(dI)^* = 9.00\text{kN} < \phi V(dI) = 17.83\text{kN}$, $V^* = 11.16\text{kN} < \phi V = 25.03\text{kN}$	OK (0.50,0.45)
Deflection:	$\delta_{DL} = L/430$ (3mm), $\delta_{\Psi s.LL} = L/1816$ (1mm), $\delta_{Total} = L/348$ (3mm), 1kN mid. $\delta = 0.1\text{mm}$	OK
Reactions:	(Each end) $R_{dI} = 4.80\text{kN}$, $R_{II} = 3.60\text{kN}$, $R^* = 11.16\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1200 mm	Lay.t (Top) = 1200 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	0.54 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m = 0.23 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.07 kN/m
		$\Sigma w_{dl} =$	3.25 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m = 0.68 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to 1 members	$\Sigma w_{ll} =$ 3.00 kN/m

Point loads

Dead load (pdl) =	5.71 kN	Position =	600 mm from LHS																
Live load (pll) =	3.59 kN	support =	N (Y)es,(N)o																
<table><tr><td></td><td>DL</td><td>LL</td><td></td></tr><tr><td>Large</td><td>1.7</td><td>1.4</td><td>: L L</td></tr><tr><td>GT</td><td>4.0</td><td>2.2</td><td>: L L</td></tr><tr><td>Σ</td><td>5.7</td><td>3.6</td><td></td></tr></table>					DL	LL		Large	1.7	1.4	: L L	GT	4.0	2.2	: L L	Σ	5.7	3.6	
	DL	LL																	
Large	1.7	1.4	: L L																
GT	4.0	2.2	: L L																
Σ	5.7	3.6																	
Short term LL factor (Ψ_{su}) =		1.00																	
Long term LL factor (Ψ_{lu}) =		0.60																	
$w_{dl}^* = 1.2 \cdot w_{dl} + 1.5 \cdot \Psi_{lu} \cdot w_{ll} =$	6.59 kN/m	$M(dI + \Psi_{lu} \cdot ll)^* =$	4.21 kNm (Max at 600mm)																
$w^* = 1.2 \cdot w_{dl} + 1.5 \cdot w_{ll} =$	8.39 kN/m	$M^* =$	5.18 kNm (Max at 600mm)																
$p_{dl}^* = 1.2 \cdot p_{dl} + 1.5 \cdot \Psi_{lu} \cdot p_{ll} =$	10.09 kN	$V(dI + \Psi_{lu} \cdot ll)^* =$	9.00 kN																
$p^* = 1.2 \cdot p_{dl} + 1.5 \cdot p_{ll} =$	12.24 kN	$V^* =$	11.16 kN																

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 140mm x 42mm Smart LVL15	Area (A) =	11760 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	274 x10 ³ mm ³
Design depth (dD) = 140 mm	Stiffness (Ix) =	19.2 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S_1 = 1.25 \cdot dD/dW \cdot (\text{Lay.t}/dD)^{0.5} =$	12.20 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k_{12d} = 1.5 - 0.05 \cdot p_{bd} \cdot S_1 =$	0.850 for $10 \leq p_{bd} \cdot S_1 \leq 20$ - Cl 3.2.4	$f'_b =$ 54.1 MPa
$k_{12} = 1.5 - 0.05 \cdot p_b \cdot S_1 =$	0.875 for $10 \leq p_b \cdot S_1 \leq 20$ - Cl 3.2.4	$f'_s =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 1.07 (rbd=0.25)
$\phi M(dI) = \phi \cdot (k_1=0.57) \cdot k_4 \cdot k_6 \cdot k_9 \cdot k_{12d} \cdot f'_b \cdot Z_x =$	6.83 kNm	Material constant (pb) = 1.03 (rb=0.47)
$\phi M = \phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z_x =$	9.86 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi \cdot (k_1=0.57) \cdot k_4 \cdot k_6 \cdot f'_s \cdot (2/3 \cdot A) =$	17.83 kN	Moisture factor (k4) = 1.00
$\phi V = \phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot f'_s \cdot (2/3 \cdot A) =$	25.03 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor (j_2) =	2.0
Ireq'd $j_2 \cdot (DL + \Psi_{lu} \cdot LL)$ (L/300) =	13.4 x10 ⁶ mm ⁴	< Critical $j_2 \cdot (DL + \Psi_{lu} \cdot LL) =$ 2.8 mm
Ireq'd $\Psi_{s.LL}$ (L/300) =	3.2 x10 ⁶ mm ⁴	$\Psi_{s.LL} =$ 0.7 mm
Ireq'd Total (L/250) =	13.8 x10 ⁶ mm ⁴	$\delta_{Total} =$ 3.4 mm
	1kN midspan $\delta =$	0.1 mm

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(2B4) 2 / 300mm x 58mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 17.40\text{kNm (+ve)} < \phi M(dI) = 21.35\text{kNm}$, $M^* = 23.00\text{kNm (+ve)} < \phi M = 32.86\text{kNm}$	OK (0.82,0.70)	
Shear:	$V(dI)^* = 16.09\text{kN} < \phi V(dI) = 52.76\text{kN}$, $V^* = 21.18\text{kN} < \phi V = 74.05\text{kN}$	OK (0.30,0.29)	
Deflection:	$\delta DL = L/552$ (5mm), $\delta \Psi s.LL = L/1960$ (2mm), $\delta Total = L/431$ (7mm), 1kN mid. $\delta = 0.1\text{mm}$	OK	
Reactions:	(1 End) $Rdl.max = 8.62\text{kN}$, $Rll.min = 7.23\text{kN}$, $R.max^* = 21.18\text{kN}$ (1 End) $Rdl.min = 8.10\text{kN}$, $Rll.min = 6.54\text{kN}$, $R.min^* = 19.53\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	3000 mm	Lay.t (Top) = 3000 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	1.35 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m = 0.23 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.21 kN/m
		$\Sigma wdl =$	3.38 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m = 0.68 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma wll =$ 1.68 kN/m

Point loads			
Dead load (pdl) =	6.56 kN	2B5	DL 6.6 LL 8.7 : L L
Live load (pll) =	8.75 kN	Σ	6.6 8.7
		Position =	1618 mm from LHS
		ing PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	5.07 kN/m	$M(dI + \Psi l.II)^* =$	17.40 kNm (Max at 1618mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	6.57 kN/m	$M^* =$	23.00 kNm (Max at 1618mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	15.75 kN	$V(dI + \Psi l.II)^* =$	16.09 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	20.99 kN	$V^* =$	21.18 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 300mm x 58mm Smart LVL15	Area (A) =	34800 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	1740 x10 ³ mm ³
Design depth (dD) =	300 mm	Stiffness (Ix) =	261.0 x10 ⁶ mm ⁴
Design width (dW) =	58 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	20.45 For top comp. edge restrained - Cl 3.2.3.2(a)		
$k12d = 200 / (S1 * pbd)^2 =$	0.487 for $pbd * S1 \geq 20$ - Cl 3.2.4	$f'b =$	46.5 MPa
$k12 = 1.5 - 0.05 * pb * S1 =$	0.534 for $10 \leq pb * S1 \leq 20$ - Cl 3.2.4	$f's =$	4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	0.99 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12 * f'b * Zx =$	21.35 kNm	Material constant (pb) =	0.95 (rb=0.55)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	32.86 kNm	Duration factor (k1) =	0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	52.76 kN	Moisture factor (k4) =	1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	74.05 kN	Temp. factor (k6) =	1.00
		Sharing factor (k9) =	1.00
		Size modifier (mod.b) =	1.00
		Size modifier (mod.s) =	1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	141.9 x10 ⁶ mm ⁴	$j2.(DL + \Psi l.LL) =$	5.4 mm
Ireq'd $\Psi s.LL$ (L/300) =	39.9 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$	1.5 mm
Ireq'd Total (L/250) =	151.6 x10 ⁶ mm ⁴	$\delta Total =$	7.0 mm
		1kN midspan $\delta =$	0.1 mm
			Span / 552
			Span / 1960
			Span / 431

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(2B5) 2 / 240mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 10.05 \text{ kNm (+ve)} < \phi M(dI) = 21.24 \text{ kNm}$, $M^* = 15.44 \text{ kNm (+ve)} < \phi M = 29.81 \text{ kNm}$	OK (0.47,0.52)
Shear:	$V(dI)^* = 13.54 \text{ kN} < \phi V(dI) = 30.57 \text{ kN}$, $V^* = 20.99 \text{ kN} < \phi V = 42.90 \text{ kN}$	OK (0.44,0.49)
Deflection:	$\delta_{DL} = L/376$ (7mm), $\delta_{\Psi s.LL} = L/1139$ (2mm), $\delta_{Total} = L/283$ (9mm), 1kN mid. $\delta = 0.2 \text{ mm}$	OK
Reactions:	(Each end) $R_{dI} = 6.56 \text{ kN}$, $R_{II} = 8.75 \text{ kN}$, $R^* = 20.99 \text{ kN}$	

Geometry (House member affecting $\leq 25 \text{ m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	2600 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3100 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	8.06 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3100 mm +	kN/m = 1.55 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.12 kN/m
		$\Sigma w_{dl} =$	4.62 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3100 mm +	kN/m = 4.65 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma w_{ll} =$ 5.65 kN/m
Point loads			
Dead load (pdl) =	1.11 kN	Position =	1300 mm from LHS
Live load (ppl) =	2.80 kN	Shear using PL at support =	N (Y)es,(N)o
Short term LL factor (Ψ_{su}) =	1.00		
Long term LL factor (Ψ_{lu}) =	0.60		
$w_{dl}^* = 1.2 * w_{dl} + 1.5 * \Psi_{lu} * w_{ll}$	10.05 kNm (Max at 1300mm)		
$w^* = 1.2 * w_{dl} + 1.5 * w_{ll}$	14.02 kN/m	$M^* =$	15.44 kNm (Max at 1300mm)
$p_{dl}^* = 1.2 * p_{dl} + 1.5 * \Psi_{lp} * p_{ll}$	3.85 kN	$V(dI + \Psi_{l.II})^* =$	13.54 kN
$p^* = 1.2 * p_{dl} + 1.5 * p_{ll}$	5.53 kN	$V^* =$	20.99 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 240mm x 42mm Smart LVL15	Area (A) =	20160 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	806 x10 ³ mm ³
Design depth (dD) = 240 mm	Stiffness (Ix) =	96.8 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S_1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	9.78 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k_{12d} =$	1.000 for $p_{bd} * S_1 \leq 10$ - Cl 3.2.4	$f'_b =$ 48.6 MPa
$k_{12} =$	1.000 for $p_b * S_1 \leq 10$ - Cl 3.2.4	$f'_s =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 1.01 (rbd=0.25)
$\phi M(dI) = \phi * (k_1=0.57) * k_4 * k_6 * k_9 * k_{12d} * f'_b * Z_x =$	21.24 kNm	Material constant (pb) = 0.96 (rb=0.64)
$\phi M = \phi * k_1 * k_4 * k_6 * k_9 * k_{12} * f'_b * Z_x =$	29.81 kNm	Duration factor (k_1) = 0.80
$\phi V(dI) = \phi * (k_1=0.57) * k_4 * k_6 * f'_s * (2/3 * A) =$	30.57 kN	Moisture factor (k_4) = 1.00
$\phi V = \phi * k_1 * k_4 * k_6 * f'_s * (2/3 * A) =$	42.90 kN	Temp. factor (k_6) = 1.00
		Sharing factor (k_9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

Ireq'd j2.(DL+ $\Psi_{l.II}$.(L/300) =	77.2 x10 ⁶ mm ⁴	< Critical	Duration factor (j_2) =	2.0	
Ireq'd $\Psi_{s.LL}$ (L/300) =	25.5 x10 ⁶ mm ⁴		$j_2.(DL + \Psi_{l.II}.LL) =$	6.9 mm	Span / 376
Ireq'd Total (L/250) =	85.5 x10 ⁶ mm ⁴		$\Psi_{s.\delta LL} =$	2.3 mm	Span / 1139
			$\delta_{Total} =$	9.2 mm	Span / 283
			1kN midspan $\delta =$	0.2 mm	

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(2B6) 2 / 190mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 3.61\text{kNm (+ve)} < \phi M(dI) = 13.94\text{kNm}$, $M^* = 5.67\text{kNm (+ve)} < \phi M = 19.56\text{kNm}$	OK (0.26,0.29)
Shear:	$V(dI)^* = 8.01\text{kN} < \phi V(dI) = 24.20\text{kN}$, $V^* = 12.59\text{kN} < \phi V = 33.96\text{kN}$	OK (0.33,0.37)
Deflection:	$\delta DL = L/706$ (3mm), $\delta \Psi s.LL = L/2446$ (1mm), $\delta Total = L/548$ (3mm), 1kN mid. $\delta = 0.2\text{mm}$	OK
Reactions:	(Each end) $RdI = 4.14\text{kN}$, $RlI = 5.09\text{kN}$, $R^* = 12.59\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1800 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3100 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	5.58 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3100 mm +	kN/m = 1.55 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.10 kN/m
		$\Sigma wdl =$	4.60 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3100 mm +	kN/m = 4.65 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma wll =$ 5.65 kN/m
Point loads			
Dead load (pdl) =	kN	Position =	900 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll$ =	8.90 kN/m	$M(dI + \Psi l.II)^* =$	3.61 kNm (Max at 900mm)
$w^* = 1.2 * wdl + 1.5 * wll$ =	13.99 kN/m	$M^* =$	5.67 kNm (Max at 900mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll$ =	0.00 kN	$V(dI + \Psi l.II)^* =$	8.01 kN
$p^* = 1.2 * pdl + 1.5 * pll$ =	0.00 kN	$V^* =$	12.59 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 190mm x 42mm Smart LVL15	Area (A) =	15960 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	505 x10 ³ mm ³
Design depth (dD) = 190 mm	Stiffness (Ix) =	48.0 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	8.70 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d =$	1.000 for $pbd * S1 \leq 10$ - Cl 3.2.4	$f'b =$ 50.9 MPa
$k12 =$	1.000 for $pb * S1 \leq 10$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 1.04 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	13.94 kNm	Material constant (pb) = 0.98 (rb=0.61)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	19.56 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	24.20 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	33.96 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	20.4 x10 ⁶ mm ⁴	< Critical $j2.(DL + \Psi l.LL) =$ 2.6 mm
Ireq'd $\Psi s.LL$ (L/300) =	5.9 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$ 0.7 mm
Ireq'd Total (L/250) =	21.9 x10 ⁶ mm ⁴	$\delta Total =$ 3.3 mm
	1kN midspan $\delta =$	0.2 mm
		Span / 706
		Span / 2446
		Span / 548

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(2B7) 2 / 290mm x 42mm Smart LVL15* (Oregon) (Single span)		
Bending:	$M(dI)^* = 8.26 \text{ kNm (+ve)} < \phi M(dI) = 28.84 \text{ kNm}$, $M^* = 11.74 \text{ kNm (+ve)} < \phi M = 41.70 \text{ kNm}$	OK (0.29,0.28)	
Shear:	$V(dI)^* = 19.63 \text{ kN} < \phi V(dI) = 36.93 \text{ kN}$, $V^* = 27.40 \text{ kN} < \phi V = 51.84 \text{ kN}$	OK (0.53,0.53)	
Deflection:	$\delta DL = L/942$ (2mm), $\delta \Psi s.LL = L/3444$ (1mm), $\delta Total = L/740$ (3mm), 1kN mid. $\delta = 0.1 \text{ mm}$	OK	
Reactions:	(1 End) $Rdl.max = 10.38 \text{ kN}$, $Rll.max = 9.97 \text{ kN}$, $R.max^* = 27.40 \text{ kN}$ (1 End) $Rdl.min = 6.39 \text{ kN}$, $Rll.min = 7.04 \text{ kN}$, $R.min^* = 18.22 \text{ kN}$		
Geometry	(House member affecting $\leq 25 \text{ m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	2100 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3100 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	6.51 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3100 mm +	kN/m = 1.55 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4100 mm +	kN/m = 1.64 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.15 kN/m
		$\Sigma wdl =$	4.69 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3100 mm +	kN/m = 4.65 kN/m
Partitions (wll) =	0.25 kPa *	4100 mm +	kN/m = 1.03 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma wll =$ 5.68 kN/m
Point loads			
Dead load (pdl) =	6.92 kN	2B8* DL LL	Position = 1655 mm from LHS
Live load (pll) =	5.09 kN	Σ 6.9 5.1 : L L	ing PL at support = N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	9.03 kN/m	$M(dI + \Psi l.II)^* =$	8.26 kNm (Max at 1352mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	14.14 kN/m	$M^* =$	11.74 kNm (Max at 1289mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	12.88 kN	$V(dI + \Psi l.II)^* =$	19.63 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	15.94 kN	$V^* =$	27.40 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 290mm x 42mm Smart LVL15*	Area (A) =	24360 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	1177 x10 ³ mm ³
Design depth (dD) = 290 mm	Stiffness (Ix) =	170.7 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	10.75 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 * pbd * S1 =$	0.965 for $10 \leq pbd * S1 \leq 20$ - Cl 3.2.4	$f'b =$ 46.9 MPa
$k12 = 1.5 - 0.05 * pb * S1 =$	0.995 for $10 \leq pb * S1 \leq 20$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 0.99 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	28.84 kNm	Material constant (pb) = 0.94 (rb=0.63)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	41.70 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	36.93 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	51.84 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor ($j2$) =	2.0
Ireq'd j2.(DL+ Ψ l.LL) (L/300) =	54.4 x10 ⁶ mm ⁴	< Critical $j2.(DL + \Psi l.LL) =$ 2.2 mm
Ireq'd $\Psi s.LL$ (L/300) =	14.9 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$ 0.6 mm
Ireq'd Total (L/250) =	57.7 x10 ⁶ mm ⁴	$\delta Total =$ 2.8 mm
	1kN midspan $\delta =$	0.1 mm
		Span / 942
		Span / 3444
		Span / 740

TIMBER MEMBER V5.12

Xstruct

Beam:	(2B8) 2 / 300mm x 58mm Smart LVL15 (Oregon)	
Bending:	$M^* = 13.26\text{kNm} < \phi M(0.80) = 36.32\text{kNm}$	OK (0.36)
Shear:	$V^* = 0.03\text{kN} < \phi V(0.80) = 74.05\text{kN}$	OK (0.00)
Axial:	No compression, No tension	
Combined:	Refer below	OK (0.36)
Deflection:	$\delta\text{DL} = L/911$ (3mm), $\delta\psi\text{s.LL} = L/4053$ (1mm), $\delta\text{Total} = L/744$ (3mm), 1kN mid. $\delta = 0.1\text{mm}$	OK

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member) **Warning - Dead load only case must be checked**

Category =	1 (1) House, (2) Primary building elements, (3) Important	
Span (L) =	2600 mm	
Strong axis eff. length (Lax) =	450 mm	Edge restrained = C (T)ension, (C)omp.
Weak axis eff. length (Lay) =	2600 mm, (C)ont	Bending (Layb) = 2600 mm
Effective length factor (g13) =	1.00	Studs in framing = 0.9, Restrained both ends in pos. = 1.0, Other cases - Table 3.2
Checked dead load only case =	N (Y)es,(N)o	

Bending & shear at 1640mm from LHS (Max +ve M)

Analysis values =	X (M)anual, (L)eft, Position (X) from analysis, (R)ight, (C)ritical	
Refer to the analysis output for comb.		
Major bending (Mx*) =	13.3 kNm	
Minor bending (My*) =	0.0 kNm	Minor bending (My*) = 0.00 kNm
Shear Force (V*) =	0.0 kN	
Duration (k1) =	0.80 Floor	Compression (Nc*) = 0.00 kN
Long term LL factor (ψ) =	0.53	Tension (Nt*) = 0.00 kN

Bending and Shear Capacity - Cl 3.2 & Cl 3.2.5

Member = 2 / 300mm x 58mm Smart LVL15	Area (A) =	34800 mm²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	1740 x10³ mm³
Design depth (dD) = 300 mm	Section modulus (Zy) =	336 x10³ mm³
Design width (dW) = 58 mm	Stiffness (Ix) =	261.0 x10⁶ mm⁴
Strength red. factor (ϕ) = 0.95 Table 2.1	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
S1=1.25*dD/dW*(Layb/dD) ^{0.5} =	19.03 for comp. edge restrained - Cl 3.2.3.2	
S1y=1.25*dW/dD*(Lax/dW) ^{0.5} =	0.67 for comp. edge restrained	
k12d = 1.5-0.05*pb*d*S1d =	0.556 for 10 ≤ pb*d*S1 ≤ 20 - Cl 3.2.4	
k12 = 1.5-0.05*pb*S =	0.590 - 10 ≤ pb*S1 ≤ 20 - Cl 3.2.4	f'b = 46.5 MPa
k12y =	1.000 for pb*Sy ≤ 10 - Cl 3.2.4	f's = 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 0.99 (rbd=0.25)
ϕM(dl) = ϕ*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	24.40 kNm	Material constant (pb) = 0.96 (rb=0.45)
ϕM = ϕ*k1*k4*k6*k9*k12*f'b*Zx =	36.32 kNm	Duration factor (k1) = 0.80
ϕV(dl) = ϕ*(k1=0.57)*k4*k6*f's*(2/3*A) =	52.76 kN	Factor (k4) = 1.00
ϕV = ϕ*k1*k4*k6*f's*(2/3*A) =	74.05 kN	Temp. factor (k6) = 1.00
ϕMy(dl) = ϕ*(k1=0.57)*k4*k6*k9*k12y*f'b*Zy =	8.48 kNm	Sharing factor (k9) = 1.00
ϕMy = ϕ*k1*k6*k9*k12y*f'b*Zy =	11.90 kNm	Size modifier (mod.b) = 1.00
Capacity - Cl 3.3 & Cl 3.4	Size modifier (mod.s) =	1.00

$S3x = \min(g13 \cdot L/dD \text{ \& } Lax/dD) =$	1.5	$k12cx =$	1.000 for $pc \cdot S3x \leq 10$ - Cl 3.3.3
$S4y = \min(g13 \cdot L \text{ \& } Lay)/dW =$	44.8	$k12cy =$	0.082 for $pc \cdot S4y \geq 20$ - Cl 3.3.3
Critical S =	44.8	$k12d =$	0.082 for $pc \cdot S \geq 20$ - Cl 3.3.3
		$k12 =$	0.082 for $pc \cdot S \geq 20$ - Cl 3.3.3

Strength reduction factor (ϕ) =	0.95 Table 2.1	Lay =	2600 mm
$\phi Nc(dl) = \phi \cdot (k1=0.57) \cdot k4 \cdot k6 \cdot k12cd \cdot f'c \cdot A =$	60.0 kN	$f'c =$	39.0 MPa
$\phi Nc = \phi \cdot k1 \cdot k4 \cdot k6 \cdot k12c \cdot f'c \cdot A =$	84.3 kN	$f't =$	26.7 MPa
$\phi Nt(dl) = \phi \cdot (k1=0.57) \cdot k4 \cdot k6 \cdot f't \cdot A =$	503.5 kN	Temp. factor (k6) =	1.00
$\phi Nt = \phi \cdot k1 \cdot k4 \cdot k6 \cdot f't \cdot A =$	706.7 kN	Size modifier (mod.c) =	1.00
Combined - Cl 3.5.1 & Cl 3.5.2 & Appendix E5		Size modifier (mod.t) =	1.00

Comp./Bending	Minor buckling =	0.13	Tension/Bending	Tension edge =	0.22
	Major buckling =	0.36		Comp. edge =	0.36

Deflections (From Analysis)

	Duration factor ($j2$) = 2.0	$\psi\text{s} = 0.90$
Instantaneous $\delta\text{DL} =$	1.0 mm at 1320mm from LHS	Span / 2484
Live load $\delta\text{LL} =$	0.7 mm at 1320mm from LHS	Span / 3651
Permanent $\delta\text{DL} = j2 \cdot (\delta\text{DL} + \psi\text{s} \cdot \delta\text{LL}) =$	2.9 mm	Span / 911
Short term $\psi\text{s} \cdot \delta\text{LL} =$	0.6 mm	Span / 4053

ANALYSIS V5.05

Xstruct

Geometry for (2B8): Timber Simple Beam

Description = 2 / 300mm x 58mm Smart LVL15
Span (L) = 2600 mm
Span type = S (Simple),(E)xt,(I)nt,(C)ant,(P)rop,(F)ixed,(O)ther
Material type = T (Timber),(S)teel,(C)onc.,(SC)comp. steel,(O)ther
House = N (Yes),(N)o

Ix = 261 x10⁶ mm⁴
Axis = X (X),(Y)
Ag = 34800 mm²
Density = 6 kN/m³
E = 15300 MPa

Loading

Uniform loads (kN/m)				Point loads (kN)			
Uniform loads	UDL	Partial 1	Partial 2	Point loads	PL 1	PL 2	PL 3
Dead load (wdl) =	3.09			Dead load (pdl) =	0.56	0.56	8.04
Live load (wll) =	1.58			Live load (pll) =	1.40	1.40	4.90
Start from LHS (mm) =	0			Pos. from LHS (mm) =	380	1320	1990
End from LHS (mm) =	2600			Ultimate load (p*) =	2.77	2.77	16.99
S.Wt =	0.21	kN/m					
Ultimate load (w*) =	6.33	0.00	0.00				
Live Load type =	Floor (Timber)			Include S.Wt =	Y (Yes),(N)o		
Short term LL (Ψsu) =	0.70	(Ψsp) =	1.00	Strength loadcase =	C (Dead Only),(C)omb.		
Long term LL (Ψlu) =	0.40	(Ψlp) =	0.60				
Actual LL (Ψsa) =	0.90	(Ψla) =	0.53				

Results at 1640mm from LHS (Max +ve M)

1.20*G+1.50*Q analyse							289	4.0	2.7 : L L	
	Left	At x	Right	Max	At	Mir	Σ	8.0	4.9	
Rdl	6.92		10.80		DL	LL				kN
Rll	5.09		6.72		Small	0.6	1.4 : L L			kN
R*	15.94		23.04		Σ	0.6	1.4			kN
M*	0.00	13.26	0.00	13.26	1640	0.00	0			kNm
V*	15.94	0.03	-23.04	23.04	2600					kN
δdl	0.00	0.99	0.00	1.05	1320	0.00	0			mm
δll	0.00	0.38	0.00	0.71	1320	0.00	0			mm
δdl+ψs*δll	0.00	1.34	0.00	1.69	1320	0.00	0			mm
										Span /
										2484
										3651
										1540

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(2B9) 2 / 190mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 3.71\text{kNm (+ve)} < \phi M(dI) = 13.94\text{kNm}$, $M^* = 5.10\text{kNm (+ve)} < \phi M = 19.56\text{kNm}$	OK (0.27,0.26)
Shear:	$V(dI)^* = 6.45\text{kN} < \phi V(dI) = 24.20\text{kN}$, $V^* = 8.88\text{kN} < \phi V = 33.96\text{kN}$	OK (0.27,0.26)
Deflection:	$\delta DL = L/523$ (4mm), $\delta \Psi s.LL = L/2819$ (1mm), $\delta Total = L/441$ (5mm), 1kN mid. $\delta = 0.3\text{mm}$	OK
Reactions:	(Each end) $RdI = 4.02\text{kN}$, $RlI = 2.70\text{kN}$, $R^* = 8.88\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	2300 mm	Lay.t (Top) = 450 mm
Centres (cts) =	900 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	2.07 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	900 mm +	kN/m = 0.45 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.10 kN/m
		$\Sigma wdl =$	3.50 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	900 mm +	kN/m = 1.35 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma wll =$ 2.35 kN/m
Point loads			
Dead load (pdl) =	kN	Position =	1150 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$w dl^* = 1.2 * w dl + 1.5 * \Psi lu * w ll$	5.60 kN/m	$M (dl + \Psi l.II)^* =$	3.71 kNm (Max at 1150mm)
$w^* = 1.2 * w dl + 1.5 * w ll$	7.72 kN/m	$M^* =$	5.10 kNm (Max at 1150mm)
$p dl^* = 1.2 * p dl + 1.5 * \Psi lp * p ll$	0.00 kN	$V (dl + \Psi l.II)^* =$	6.45 kN
$p^* = 1.2 * p dl + 1.5 * p ll$	0.00 kN	$V^* =$	8.88 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 190mm x 42mm Smart LVL15	Area (A) =	15960 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	505 x10 ³ mm ³
Design depth (dD) = 190 mm	Stiffness (Ix) =	48.0 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	8.70 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d =$	1.000 for $pbd * S1 \leq 10$ - Cl 3.2.4	$f'b =$ 50.9 MPa
$k12 =$	1.000 for $pbd * S1 \leq 10$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 1.04 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	13.94 kNm	Material constant (pb) = 1.00 (rb=0.46)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	19.56 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	24.20 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	33.96 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	27.6 x10 ⁶ mm ⁴	< Critical $j2.(DL + \Psi l.LL) =$ 4.4 mm
Ireq'd $\Psi s.LL$ (L/300) =	5.1 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$ 0.8 mm
Ireq'd Total (L/250) =	27.2 x10 ⁶ mm ⁴	$\delta Total =$ 5.2 mm
	1kN midspan $\delta =$	0.3 mm
		Span / 523
		Span / 2819
		Span / 441

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(2B10) 120mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 0.61\text{kNm (+ve)} < \phi M(dI) = 3.04\text{kNm}$, $M^* = 0.91\text{kNm (+ve)} < \phi M = 4.27\text{kNm}$	OK (0.20,0.21)
Shear:	$V(dI)^* = 2.23\text{kN} < \phi V(dI) = 7.64\text{kN}$, $V^* = 3.31\text{kN} < \phi V = 10.73\text{kN}$	OK (0.29,0.31)
Deflection:	$\delta DL = L/1067$ (1mm), $\delta \Psi s.LL = L/2039$ (1mm), $\delta Total = L/701$ (2mm), 1kN mid. $\delta = 0.3\text{mm}$	OK
Reactions:	(Each end) $RdI = 0.51\text{kN}$, $RlI = 1.80\text{kN}$, $R^* = 3.31\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1100 mm	Lay.t (Top) = 450 mm
Centres (cts) =	1800 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	1.98 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	1800 mm +	kN/m = 0.90 kN/m
Wall dead load (wdl) =	kPa *	mm +	kN/m = 0.00 kN/m
Other dead load (wdl) =	kPa *	mm +	kN/m = 0.00 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.03 kN/m
		$\Sigma wdl =$	0.93 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	1800 mm +	kN/m = 2.70 kN/m
Partitions (wll) =	kPa *	1800 mm +	kN/m = 0.00 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to 1 members	$\Sigma wll =$ 3.27 kN/m
Point loads			
Dead load (pdl) =	kN	Position =	550 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	4.06 kN/m	$M(dI + \Psi l.II)^* =$	0.61 kNm (Max at 550mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	6.03 kN/m	$M^* =$	0.91 kNm (Max at 550mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	0.00 kN	$V(dI + \Psi l.II)^* =$	2.23 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	0.00 kN	$V^* =$	3.31 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	120mm x 42mm Smart LVL15	Area (A) =	5040 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	101 x10 ³ mm ³
Design depth (dD) =	120 mm	Stiffness (Ix) =	6.0 x10 ⁶ mm ⁴
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	6.92 For top comp. edge restrained - Cl 3.2.3.2(a)		
$k12d =$	1.000 for $pbd * S1 \leq 10$ - Cl 3.2.4	$f'b =$	55.7 MPa
$k12 =$	1.000 for $pb * S1 \leq 10$ - Cl 3.2.4	$f's =$	4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	1.08 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12 * f'b * Zx =$	3.04 kNm	Material constant (pb) =	1.01 (rb=0.81)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	4.27 kNm	Duration factor ($k1$) =	0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	7.64 kN	Moisture factor ($k4$) =	1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	10.73 kN	Temp. factor ($k6$) =	1.00
		Sharing factor ($k9$) =	1.00
		Size modifier (mod.b) =	1.00
		Size modifier (mod.s) =	1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	1.7 x10 ⁶ mm ⁴	$j2.(DL + \Psi l.LL) =$	1.0 mm
Ireq'd $\Psi s.LL$ (L/300) =	0.9 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$	0.5 mm
Ireq'd Total (L/250) =	2.2 x10 ⁶ mm ⁴	$\delta Total =$	1.6 mm
		1kN midspan $\delta =$	0.3 mm
			Span / 1067
			Span / 2039
			Span / 701

STEEL FLOOR BEAM V5.06

Xstruct

Member: (2B11) 200x75PFC (G300)
Bending: $M^*(\max) = 13.9 \text{ kNm} < \phi M_b(1200, \alpha_m = 1.30) = 59.7 \text{ kNm}$ OK (0.23)
(Single span)
Shear: $V_{\max} = 25.4 \text{ kN} < \phi V_w = 207.4 \text{ kN}$ (Web area full depth) OK (0.12)
Deflection: $\delta_{DL} = L/6619$ (0mm), $\delta_{\Psi s.LL} = L/8066$ (0mm), $\delta_{\text{Total}} = L/3635$ (0mm), 1kN mid. $\delta = 0.0 \text{ mm}$ OK
Precamber: Not required
Reactions: (Each end) $R_{dl} = 10.2 \text{ kN}$, $R_{ll} = 8.8 \text{ kN}$, $R^* = 25.4 \text{ kN}$

Geometry

Span (L) = 1200 mm Eff. Len. (Le) = 1200 mm
Centres (cts) = 450 mm $\alpha_m.t = 1.30$
Design at = M mm from LHS, (M)ax, (S)eg
Span type = S (S)ingle, (D)ouble
Effective length (Le) = 1200 mm
 $\alpha_m = 1.30$

Loadings

Floor area = 0.5 m² Live load type = N (N)ormal, (S)torage, (M)annual
Apply reduction = N (Y)es, (N)o AS/NZS 1170.0 - Table 4.1
Floor reduction (Ψ_a) = 1.00 AS/NZS 1170.1 - Cl 3.4.2

Uniform dead loads

Floor dead load (wdl) = 0.50 kPa * 450 mm + kN/m = 0.23 kN/m
Wall dead load (wdl) = 0.50 kPa * 2700 mm + kN/m = 1.35 kN/m
Other dead load (wdl) = 0.40 kPa * 1800 mm + kN/m = 0.72 kN/m
Include S.Wt = Y (Y)es, (N)o S.Wt = 0.23 kN/m
 $\Sigma w_{dl} = 2.52 \text{ kN/m}$

Uniform live loads

	DL	LL
Floor live load (wll) = 1.50 kPa	2B9 4.0	2.7 : L L
Partitions (wll) = 0.25 kPa	2B12 13.3	11.3 : L L
	Σ 17.3	14.0

Alternate point live load = 1.80 kN (critical) Distr. to 1 members $\Sigma w_{ll} = 3.00 \text{ kN/m}$

Point loads

Dead load (pdl) = 17.3 kN Position = 600 mm from LHS
Live load (pll) = 14.0 kN Shear using PL at support = N (Y)es, (N)o
Short term LL factor (Ψ_{su}) = 0.70 (Ψ_{sp}) = 1.00
 $w^* = 1.2 * w_{dl} + 1.5 * w_{ll} = 7.53 \text{ kN/m}$ $M^* = 13.9 \text{ kNm}$ (Max at 600mm)
 $p^* = 1.2 * p_{dl} + 1.5 * p_{ll} = 41.79 \text{ kN}$ $V^* = 25.4 \text{ kN}$

Capacity

Description = 200x75PFC (G300)	Warping constant (I_w) =	10.5 x10 ⁹ mm ⁶
Flange yield (fyf) = 300 MPa	Torsional constant (J) =	105 x10 ³ mm ⁴
Web yield (fyw) = 320 MPa	Effective section mod. (Zex) =	221 x10 ³ mm ³
Area (Ag) = 2920 mm ²	Effective section mod. (Zey) =	46.7 x10 ³ mm ³
Stiffness (Ix) = 19.1 x10 ⁶ mm ⁴	Elastic modulus (E) =	200000 MPa - Cl 1.4
Stiffness (Iy) = 1.65 x10 ⁶ mm ⁴	Shear modulus (G) =	80000 MPa - Cl 1.4
$\phi = 0.9$ Table 3.4		
$M_{sx} = \min(fyf, fyw) * Z_{ex} = 66.3 \text{ kNm}$ - Cl 5.2.1	$\phi M_{sx} = 59.7 \text{ kNm}$	$\phi M_{sy} = 12.6 \text{ kNm}$ - Cl 5.2.1
Positive: $M_{oa.p} = 227.1 \text{ kNm}$ $\alpha_{s.t} = 0.879$	$\alpha_m.t = 1.30$	$\phi M_{bx.p} = 59.7 \text{ kNm}$ (= ϕM_{sx})
Negative: $M_{oa.n} = \text{N.A.}$		

Deflections

Ireq'd DL (L/360) = 1.0 x10⁶ mm⁴ $\delta_{DL} = 0.2 \text{ mm}$ Span / 6619
Ireq'd $\Psi s.LL$ (L/360) = 0.9 x10⁶ mm⁴ $\Psi s.\delta_{LL} = 0.1 \text{ mm}$ Span / 8066
Ireq'd (DL+ $\Psi s.LL$) (L/250) = 1.3 x10⁶ mm⁴ < Critical $\delta_{\text{Total}} = 0.3 \text{ mm}$ Span / 3635
Max. precamber (0.3%*span) = 4 mm Min. precamber = 15 mm
Preamber 80% of $\delta_{DL} = 0 \text{ mm}$ Adopted precamber = 0 mm
1kN midspan $\delta = 0.0 \text{ mm}$

STEEL FLOOR BEAM V5.06

Xstruct

Member:	(2B12) 250x90PFC (G300)	
Bending:	$M^*(\max) = 46.2 \text{ kNm} < \phi M_b(450, \alpha_m = 1.00) = 113.7 \text{ kNm}$ (Single span)	OK (0.41)
Shear:	$V_{\max} = 42.4 \text{ kN} < \phi V_{vm} = 345.6 \text{ kN}$ (Web area full depth)	OK (0.12)
Deflection:	$\delta_{DL} = L/1109$ (4mm), $\delta \Psi_{s,LL} = L/1785$ (2mm), $\delta_{Total} = L/684$ (6mm), 1kN mid. $\delta = 0.2 \text{ mm}$	OK
Precamber:	Not required	
Reactions:	(1 End) $R_{dl,\max} = 18.0 \text{ kN}$, $R_{ll,\max} = 13.9 \text{ kN}$, $R_{\max}^* = 42.4 \text{ kN}$ (1 End) $R_{dl,\min} = 13.3 \text{ kN}$, $R_{ll,\min} = 11.3 \text{ kN}$, $R_{\min}^* = 32.9 \text{ kN}$	

Geometry

Span (L) =	4200 mm	Eff. Len. (Le) =	450 mm
Centres (cts) =	2200 mm	$\alpha_m.t =$	1.00
Design at =	M mm from LHS, (M)ax, (S)eg		
Span type =	S (S)ingle, (D)ouble		
Effective length (Le) =	450 mm		
$\alpha_m =$	1.00		

Loadings

Floor area =	9.2 m ²	Live load type =	N (N)ormal, (S)torage, (M)annual
Apply reduction =	N (Y)es, (N)o		AS/NZS 1170.0 - Table 4.1
Floor reduction (Ψ_a) =	1.00 AS/NZS 1170.1 - Cl 3.4.2		

Uniform dead loads

Floor dead load (wdl) =	0.50 kPa *	2200 mm +	kN/m =	1.10 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m =	1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m =	1.60 kN/m
Include S.Wt =	Y (Y)es, (N)o		S.Wt =	0.36 kN/m
			$\Sigma w_{dl} =$	4.41 kN/m

Uniform live loads

Floor live load (wll) =	1.50 kPa	GT 4.0 2.2 : L L	kN/m =	3.30 kN/m
Partitions (wll) =	0.25 kPa	2B13* 8.8 4.9 : L L	kN/m =	1.00 kN/m
Alternate point live load =	1.80 kN	Σ 12.8 7.1	kN/m =	1.00 kN/m
		Distr. to 1 members	$\Sigma w_{ll} =$	4.30 kN/m

Point loads

Dead load (pdl) =	12.8 kN	Position =	2865 mm from LHS
Live load (pll) =	7.1 kN	Shear using PL at support =	N (Y)es, (N)o

Short term LL factor (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
$w^* = 1.2 * w_{dl} + 1.5 * w_{ll} =$	11.74 kN/m	$M^* =$	46.2 kNm (Max at 2805mm)
$p^* = 1.2 * p_{dl} + 1.5 * p_{ll} =$	26.02 kN	$V^* =$	42.4 kN

Capacity

Description = 250x90PFC (G300)		Warping constant (Iw) =		35.9 x10 ⁹ mm ⁶	
Flange yield (fyf) = 300 MPa		Torsional constant (J) =		248 x10 ³ mm ⁴	
Web yield (fyw) = 320 MPa		Effective section mod. (Zex) =		421 x10 ³ mm ³	
Area (Ag) = 4520 mm ²		Effective section mod. (Zey) =		88.7 x10 ³ mm ³	
Stiffness (Ix) = 45.1 x10 ⁶ mm ⁴		Elastic modulus (E) =		200000 MPa - Cl 1.4	
Stiffness (Iy) = 3.64 x10 ⁶ mm ⁴		Shear modulus (G) =		80000 MPa - Cl 1.4	
ϕ = 0.9 Table 3.4					
M _{sx} = min(fyf,fyw)*Z _{ex} = 126.3 kNm - Cl 5.2.1		ϕM _{sx} =	113.7 kNm	ϕM _{sy} =	23.9 kNm - Cl 5.2.1
Positive: Moa.p = 3622.2 kNm α _s .t = 1.000		α _m .t = 1.00		ϕM _{bx.p} =	113.7 kNm
Negative: Moa.n = N.A.					

Deflections ($\delta \pm 2.5\%$ with off-centre PL)

Ireq'd DL (L/360) =	14.6 x10 ⁶ mm ⁴	$\delta_{DL} =$	3.8 mm	Span / 1109
Ireq'd $\Psi_{s,LL}$ (L/360) =	9.1 x10 ⁶ mm ⁴	$\Psi_{s,\delta_{LL}} =$	2.4 mm	Span / 1785
Ireq'd (DL+ $\Psi_{s,LL}$) (L/250) =	16.5 x10 ⁶ mm ⁴	$\delta_{Total} =$	6.1 mm	Span / 684
	< Critical			
Max. precamber (0.3%*span) =	13 mm	Min. precamber =	15 mm	
Precamber 80% of $\delta_{DL} =$	3 mm	Adopted precamber =	0 mm	
1kN midspan $\delta =$			0.2 mm	

STEEL MEMBER V5.14

Xstruct

Section:	(2B13) 200x75PFC (G300)	
Bending:	$M_x^* = 18.9 \text{ kNm} < \phi M_b(4500, \alpha_m=1.30) = 33.8 \text{ kNm}$, $\phi M_b(\alpha_m=1) = 26.0 \text{ kNm}$	OK (0.56)
	No minor bending	
Shear:	$V_x^* = 0.019 \text{ kN} < \phi V_{vm} = 207.4 \text{ kN}$ (Web area full depth)	OK (0.00)
	No minor shear	
Compression:	No compression	
Tension:	No tension	
Torsion:	No torsion	

Deflection: $\delta DL = L/903$ (5mm), $\delta \Psi_s.LL = L/1967$ (2mm), $\delta Total = L/619$ (7mm) at 2150mm from LHS OK

Bending & Shear at 2165mm from LHS (Max +ve M) - Section 5 Max. restraint (2.5% flange force) = 2.5 kN

(M* to include first order amplification as required - Cl 4.4.2)

Analysis values = (M) anual, (L) eft, Position (X) from analysis, (R) ight, (C) ritical

Refer to the analysis output

Analysis Axis = (X),(Y)

Major bending (M_x^*) =	18.9 kNm	Minor bending (M_y^*) =	0 kNm
Minor bending (M_y^*) =	0.000 kNm	Torsion (M_z^*) =	0 kNm
Shear Force (V_x^*) =	0.019 kN	Shear Force (V_y^*) =	0 kN
Shear Force (V_y^*) =	0.000 kN	Span / Segment Length (L) =	4500 mm
Effective length factor (ke) =	Calc	Moment modification factor (α_m) =	1.30
ke = (kt=1.00)*(kl=1.00)*(kr=1.00) =	1.00 (From Le Tab)		
Effective length (Le = L*ke) =	4500 mm		
ϕ =	0.9 Table 3.4	Bending (x) =	OK (0.56)
ϕM_{sx} =	59.7 kNm	Shear =	OK (0.00)
$\phi M_{bx}(\alpha_m=1)$ =	26.0 kNm		
ϕM_{bx} =	33.8 kNm	ϕM_{syR} =	13.3 kNm
ϕM_{syL} =	12.6 kNm		
ϕV_v =	207.4 kN	lx =	19.1 x10 ⁶ mm ⁴
ϕV_{vm} =	207.4 kN	S.Wt =	0.230 kN/m
ϕM_z =	1.42 kNm		

Compression - Section 6 (No compression)

Axial compression (N_c^*) =	0.0 kN	Axial compression (N_c^*) =	0 kN
Major axis length (Lx) =	10000 mm	Eff. X length factor (kex) =	1.00
Minor axis length (Ly) =	1500 mm	Eff. Y length factor (key) =	1.00
Braced or Sway member =	S (B) raced, (S) way	Major axis effective length (Lex) =	10000 mm
ϕN_s =	788.4 kN	Minor axis effective length (Ley) =	1500 mm
$\phi N_{cx}(kex=1.00)$ =	252.5 kN		
In-Plane $\phi N_{cx}(kex=1.00)$ =	252.5 kN		
$\phi N_{cy}(key=1.00)$ =	540.8 kN		
In-Plane $\phi N_{cy}(key=1.00)$ =	540.8 kN		
ϕN_c =	252.5 kN		

Tension - Section 7 (No tension)

Axial tension (N_t^*) =	0.0 kN	Axial tension (N_t^*) =	0 kN
kt =	1.00 Table 7.3.2		
ϕN_t =	788.4 kN		

Combined

ϕM_{rxt} =	59.7 kNm	ϕM_{ixt} =	59.7 kNm	ϕM_{oxt} =	33.8 kNm
ϕM_{rxc} =	59.7 kNm	ϕM_{ixc} =	59.7 kNm	ϕM_{oxc} =	33.8 kNm
ϕM_{ryt} =	12.6 kNm	ϕM_{iyc} =	12.6 kNm	ϕM_{tx} =	33.8 kNm
ϕM_{ryc} =	12.6 kNm			ϕM_{cx} =	33.8 kNm

Geometry for (2B13): Steel Simple Beam

Description = 200x75PFC (G300)
Span (L) = 4300 mm
Span type = S (S)imple,(E)xt,(I)nt,(C)ant,(P)rop,(F)ixed,(O)ther
Material type = S (T)imber,(S)teel,(C)onc.,(SC)omp. steel,(O)ther

Ix = 19.1 x10⁶ mm⁴
Axis = X (X),(Y)
Ag = 2920 mm²
Density = 78.6 kN/m³
E = 200000 MPa

Loading

Uniform loads (kN/m)				Point loads (kN)			
Uniform loads	UDL	Partial 1	Partial 2	Point loads	PL 1	PL 2	PL 3
Dead load (wdl) =	3.09			Dead load (pdl) =	1.69	2.69	
Live load (wll) =	1.58			Live load (pll) =	1.40	3.20	
Start from LHS (mm) =	0			Pos. from LHS (mm) =	950	3750	
End from LHS (mm) =	4300			Ultimate load (p*) =	4.13	8.03	
S.Wt =	0.23	kN/m					
Ultimate load (w*) =	6.35	0.00	0.00	Include S.Wt =		Y (Yes,(N)o	
				Strength loadcase =		C (Dead Only,(C)omb.	
Live Load type =	Floor (Steel)						
Short term LL (Ψsu) =	0.70	(Ψsp) =	1.00				
Long term LL (Ψlu) =	0.40	(Ψlp) =	0.60				
Actual LL (Ψsa) =	0.80	(Ψla) =	0.47				

	DL	LL
Large	1.7	1.4 : L L
T1	1.0	1.8 : L L
Σ	2.7	3.2

Results at 2165mm from LHS (Max +ve M)

Position of result (x) = 2165 mm

	Left	At x	Right	Max	At	Min	At	Units
Rdl	8.80		9.86					kN
Rll	4.90		6.50					kN
R*	17.90		21.57					kN
M*	0.00	18.85	0.00	18.85	2165	0.00	0	kNm
V*	17.90	0.02	-21.57	21.57	4300			kN
δdl	0.00	4.76	0.00	4.76	2150	0.00	0	mm
δll	0.00	2.74	0.00	2.74	2150	0.00	0	mm
δdl+Ψs*δll	0.00	6.95	0.00	6.95	2150	0.00	0	mm

1.20*G+1.50*Q analysed

	DL	LL
Large	1.7	1.4 : L L
Σ	1.7	1.4

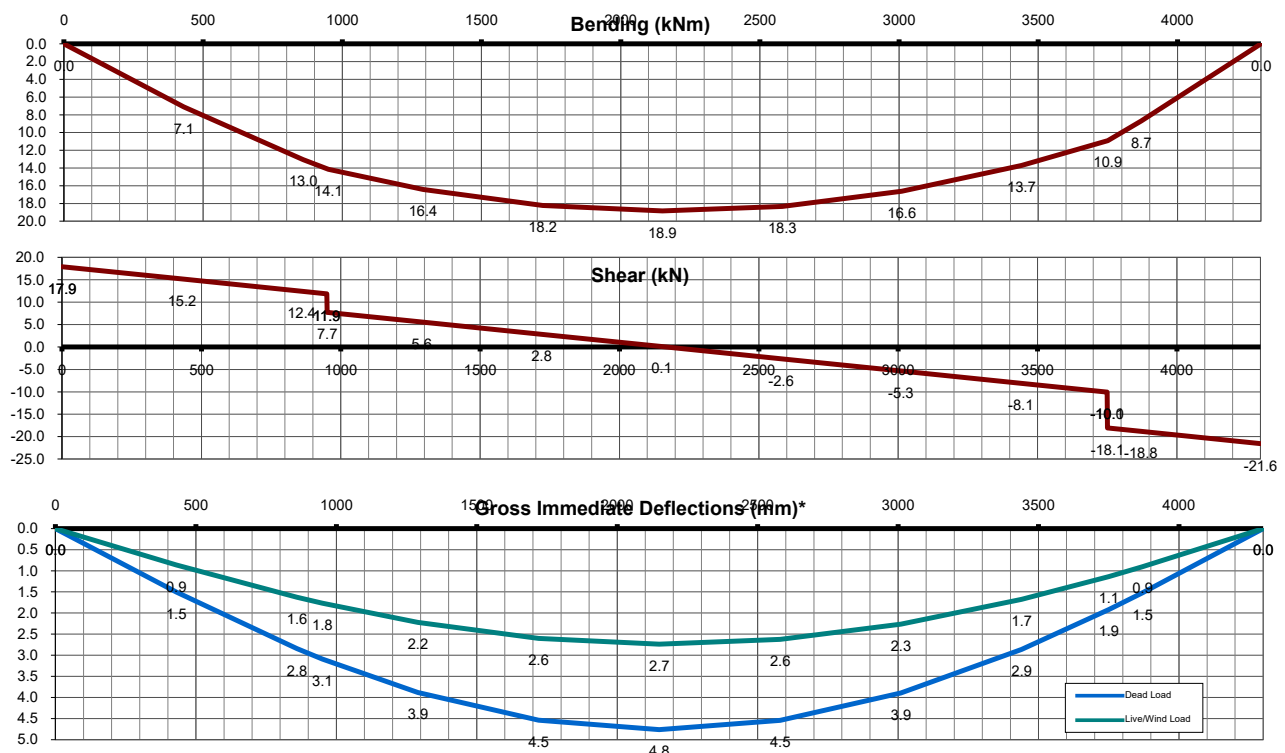
Span /

903
1570
619

δPlI/δTot.II = 0.328

Graphs

* Deflections are Gross Ig immediate - assessment of long term effects to be considered



STEEL MEMBER V5.14

Xstruct

Section:	(2B14) 250x90PFC (G300)	
Bending:	$M_x^* = 24.0 \text{ kNm} < \phi M_b(4500, \alpha_m=1.30) = 73.7 \text{ kNm}$, $\phi M_b(\alpha_m=1) = 56.7 \text{ kNm}$	OK (0.32)
	No minor bending	
Shear:	$V_x^* = 0.009 \text{ kN} < \phi V_{vm} = 345.6 \text{ kN}$ (Web area full depth)	OK (0.00)
	No minor shear	
Compression:	No compression	
Tension:	No tension	
Torsion:	No torsion	

Deflection: $\delta DL = L/1605$ (3mm), $\delta \Psi_s.LL = L/2558$ (2mm), $\delta Total = L/986$ (5mm) at 2400mm from LHS OK

Bending & Shear at 1240mm from LHS (Max +ve M) - Section 5 Max. restraint (2.5% flange force) = 2.5 kN

(M* to include first order amplification as required - Cl 4.4.2)

Analysis values = X (M) anual, (L) eft, Position (X) from analysis, (R) ight, (C) ritical

Refer to the analysis output

Analysis Axis = X (X),(Y)

Major bending (M_x^*) =	24.0 kNm	Minor bending (M_y^*) =	0 kNm
Minor bending (M_y^*) =	0.000 kNm	Torsion (M_z^*) =	0 kNm
Shear Force (V_x^*) =	0.009 kN	Shear Force (V_y^*) =	0 kN
Shear Force (V_y^*) =	0.000 kN	Span / Segment Length (L) =	4500 mm
Effective length factor (ke) =	Calc	Moment modification factor (α_m) =	1.30
ke = (kt=1.00)*(kl=1.00)*(kr=1.00) =	1.00 (From Le Tab)		
Effective length (Le = L*ke) =	4500 mm		
ϕ =	0.9 Table 3.4		
ϕM_{sx} =	113.7 kNm	Bending (x) =	OK (0.32)
$\phi M_{bx}(\alpha_m=1)$ =	56.7 kNm	Shear =	OK (0.00)
ϕM_{bx} =	73.7 kNm		
ϕM_{syL} =	23.9 kNm	ϕM_{syR} =	24.0 kNm
ϕV_v =	345.6 kN		
ϕV_{vm} =	345.6 kN	Ix =	45.1 x10 ⁶ mm ⁴
ϕM_z =	2.68 kNm	S.Wt =	0.355 kN/m

Compression - Section 6 (No compression)

Axial compression (N_c^*) =	0.0 kN	Axial compression (N_c^*) =	0 kN
Major axis length (Lx) =	10000 mm	Eff. X length factor (kex) =	1.00
Minor axis length (Ly) =	1500 mm	Eff. Y length factor (key) =	1.00
Braced or Sway member =	S (B) raced, (S) way		
ϕN_s =	1220.4 kN	Major axis effective length (Lex) =	10000 mm
$\phi N_{cx}(kex=1.00)$ =	527.7 kN	Minor axis effective length (Ley) =	1500 mm
In-Plane $\phi N_{cx}(kex=1.00)$ =	527.7 kN		
$\phi N_{cy}(key=1.00)$ =	926.9 kN		
In-Plane $\phi N_{cy}(key=1.00)$ =	926.9 kN		
ϕN_c =	527.7 kN		

Tension - Section 7 (No tension)

Axial tension (N_t^*) =	0.0 kN	Axial tension (N_t^*) =	0 kN
kt =	1.00 Table 7.3.2		
ϕN_t =	1220.4 kN		

Combined

ϕM_{rxt} =	113.7 kNm	ϕM_{ixt} =	113.7 kNm	ϕM_{oxt} =	73.7 kNm
ϕM_{rxc} =	113.7 kNm	ϕM_{ixc} =	113.7 kNm	ϕM_{oxc} =	73.7 kNm
ϕM_{ryt} =	23.9 kNm	ϕM_{iyc} =	23.9 kNm	ϕM_{tx} =	73.7 kNm
ϕM_{ryc} =	23.9 kNm			ϕM_{cx} =	73.7 kNm

Geometry for (2B14): Steel Simple Beam

Description = 250x90PFC (G300)
Span (L) = 4800 mm
Span type = S (Simple),(E)xt,(I)nt,(C)ant,(P)rop,(F)ixed,(O)ther
Material type = S (Timber),(S)teel,(C)onc.,(SC)comp. steel,(O)ther

I_x = 45.1 ×10⁶ mm⁴
Axis = X (X),(Y)
A_g = 4520 mm²
Density = 78.6 kN/m³
E = 200000 MPa

Loading

Uniform loads (kN/m)				Point loads (kN)			
Uniform loads	UDL	Partial 1	Partial 2	Point loads	PL 1	PL 2	PL 3
Dead load (wdl) =	0.98			Dead load (pdl) =	17.99	5.98	
Live load (wll) =	0.65			Live load (pll) =	13.87	4.75	
Start from LHS (mm) =	0			Pos. from LHS (mm) =	518	4265	
End from LHS (mm) =	4800			Ultimate load (p*) =	42.39	14.30	0.00
S.Wt =	0.36	kN/m					
Ultimate load (w*) =	2.58	0.00	0.00				
Live Load type =	Floor (Steel)			Include S.Wt =	Y (Yes),(N)o		
Short term LL (Ψ _{su}) =	0.70	(Ψ _{sp}) =	1.00	Strength loadcase =	C (Dead Only),(C)omb.		
Long term LL (Ψ _{lu}) =	0.40	(Ψ _{lp}) =	0.60				
Actual LL (Ψ _{sa}) =	0.93	(Ψ _{la}) =	0.55				

DL

LL

2B12 18.0 13.9 : M|M

Σ 18.0 13.9

Results at 1240mm from LHS (Max +ve M)

Position of result (x) = 1240 mm

1.20*G+1.50*Q analysed

	Left	At x	Right	Max	At	Min	LL	At	Units
Rdl	19.92		10.46			DL	LL		kN
Rll	14.46		7.28			2B15 5.0 2.9 : L L			kN
R*	45.60		23.47			T1 1.0 1.8 : L L			kN
M*	0.00	23.95	0.00	23.95	1240	0.00	0		kNm
V*	45.60	0.01	-23.47	45.60	0				kN
δdl	0.00	2.36	0.00	2.99	2400	0.00	0		mm
δll	0.00	1.62	0.00	2.03	2400	0.00	0		mm
δdl+Ψ _s *δll	0.00	3.86	0.00	4.87	2400	0.00	0		mm

Span /

1605

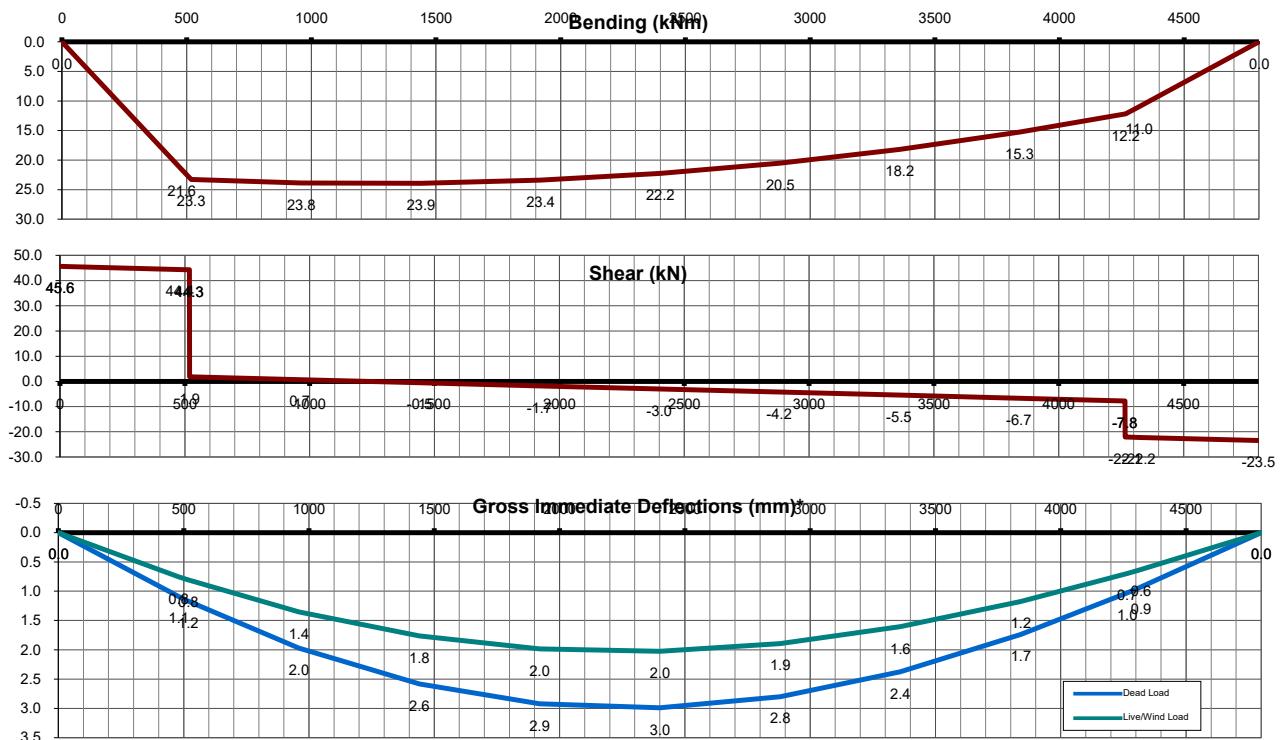
2369

986

δPll/δTot.ll = 0.754

Graphs

* Deflections are Gross Ig immediate - assessment of long term effects to be considered



T LINTEL V5.03

Xstruct

Geometry: (GL2) 150mm x 8mm Pl. Vert., 200mm x 8mm Pl. Horz.
Design: $M^* = 8.8 \text{ kNm} < \phi M_b(3000, \alpha_m = 1.13) = 12.8 \text{ kNm}$
Deflection: $\delta_{DL} = L/703$ (4mm), $\delta_{\Psi s, LL} = L/5535$ (1mm), $\delta_{Total} = L/624$ (5mm)
Reactions: (Each end) $R_{dl} = 7.9 \text{ kN}$, $R_{ll} = 1.4 \text{ kN}$, $R^* = 11.7 \text{ kN}$

OK (0.69)
OK

Geometry

Span = $L_e =$ 3000 mm $\alpha_m =$ 1.13

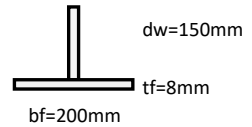
tw=8mm

Vertical web

Web thickness (tw) = 8 mm
Web depth (dw) = 150 mm
Yield strength = 250 MPa

Horizontal flange

Flange thickness (tf) = 8 mm
Flange width (bf) = 200 mm
Yield strength = 250 MPa



Loading

Live load type = N (N)ormal, (S)torage, (M)annual
AS/NZS 1170.0 - Table 4.1

Uniform dead loads

Roof dead load (wdl) =	0.40 kPa *	3000 mm +	kN/m =	1.20 kN/m
Floor dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m =	1.35 kN/m
Wall dead load (wdl) =	2.10 kPa *	1200 mm +	kN/m =	2.52 kN/m
Other dead load (wdl) =	kPa *	mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es, (N)o		S.Wt =	0.22 kN/m
			$\Sigma wdl =$	5.29 kN/m

Uniform live loads

Roof live load (wll) =	0.32 kPa *	3000 mm +	kN/m =	0.96 kN/m
Floor live load (wll) =	kPa *	mm +	kN/m =	0.00 kN/m
Other live load (wll) =	kPa *	mm +	kN/m =	0.00 kN/m
			$\Sigma wll =$	0.96 kN/m

Point loads

Dead load (Pdl) = kN
Live load (PlI) = kN
Position = 1500 mm from LHS

Horizontal loads

Wall height (wcts) =	0 mm	Ratio $W_s/W_u =$	0.68
Ult. inward wind load (W_u) =	0.84 kPa		
cpe =	0.7	cpi =	0.2
Short term LL (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
$w^* = 1.2 * wdl + 1.5 * wll =$	7.79 kNm	$R_{dl} = wdl * L/2 + p_{dl} * (L - pos)/L =$	7.9 kN
$p^* = 1.2 * pdl + 1.5 * plI =$	0.00 kNm	$R_{ll} = wll * L/2 + plI * (L - pos)/L =$	1.4 kN
$M^* =$	8.8 kNm	$R^* = 1.2 * R_{dl} + 1.5 * R_{ll} =$	11.7 kN

Properties

(Max at 1500mm)

Area =	2800 mm ²	Warping constant (I_w) =	0 mm ⁶ - CI H4
Stiffness (I_x) =	6.5 x10 ⁶ mm ⁴	Torsional constant (J) =	59.7 x10 ³ mm ⁴
Stiffness (I_y) =	5.34 x10 ⁶ mm ⁴	Elastic section modulus (Z_t) =	54.4 x10 ³ mm ³
Elastic modulus (E) =	200000 MPa - CI 1.4	Elastic section modulus (Z_b) =	172.7 x10 ³ mm ³
Shear modulus (G) =	80000 MPa - CI 1.4	Min. elastic section modulus (Z_{min}) =	54.4 x10 ³ mm ³
Elastic (y_{top}) =	120 mm	Plastic section modulus (S) =	96.2 x10 ³ mm ³
Plastic ($y_{p, top}$) =	151 mm	Eff. elastic section mod.(Compact) (Z_c) =	81.6 x10 ³ mm ³ - CI 5.2.3

Capacity - CI 5.6.1.2

Web $\lambda_s = dw/tw * \sqrt{f_y w/250} =$	18.8 < 22, Non-compact	CI 5.2.2	$\lambda_{sy} =$ 22
$Z_{ex} = Z_{min} + [(\lambda_{sy} - \lambda_s) / (\lambda_{sy} - \lambda_{sp}) * (Z_c - Z_{min})] =$	60.7 x10 ³ mm ³ - CI 5.2.4		$\lambda_{sp} =$ 8
$\phi =$	0.9 Table 3.4		
$M_{sx} =$	15.2 kNm	$\phi M_{sx} =$	13.7 kNm
$M_{oa} =$	37.9 kNm	$\alpha_s =$	0.826
		$\beta_x =$	-93.9
		$\alpha_m =$	1.13
	$\phi M_{bx} = \alpha_m * \alpha_s * \phi M_{sx} \leq \phi M_{sx} =$		12.8 kNm - CI 5.6.1.1(1)

Deflections

Ireq'd DL ($L/500$) =	4.6 x10 ⁶ mm ⁴	< Critical	$\delta_{DL} =$	4.3 mm	Span / 703
Ireq'd $\Psi_{s, LL}$ ($L/360$) =	0.4 x10 ⁶ mm ⁴		$\Psi_{s, \delta_{LL}} =$	0.5 mm	Span / 5535
Ireq'd $W_{Ls, h}$ ($L/250$) =	0.0 x10 ⁶ mm ⁴		$\delta_{W_{Ls, h}} =$	0.0 mm	Span / -
Ireq'd ($DL + \Psi_{s, LL}$) ($L/360$) =	3.8 x10 ⁶ mm ⁴		$\delta_{Total} =$	4.8 mm	Span / 624
			1kN midspan $\delta =$	0.4 mm	

TIMBER ROOF BEAM V5.10

Xstruct

Beam:	(RL1) 240mm x 42mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dl)^* = 1.87\text{kNm (+ve)} < \phi M(dl) = 8.49\text{kNm}$, $M^* = 3.35\text{kNm (+ve)} < \phi M = 14.61\text{kNm}$	OK (0.22,0.23)	
	$Mw^* = 1.06\text{kNm (-ve)} < \phi Mw = 15.26\text{kNm}$	OK (0.07)	
Shear:	$V(dl)^* = 7.50\text{kN} < \phi V(dl) = 15.28\text{kN}$, $V^* = 12.06\text{kN} < \phi V = 25.20\text{kN}$	OK (0.49,0.48)	
	$Vw^* = 1.63\text{kN} < \phi Vw = 26.81\text{kN}$	OK (0.06)	
Deflection:	$\delta DL = L/925$ (3mm), $\delta \Psi s.LL = L/2726$ (1mm), $\delta WLs = L/1703$ (-2mm)	OK	
Reactions:	(1 End) $Rdl.max = 5.32\text{kN}$, $Rll.max = 3.46\text{kN}$, $Rwl.max^* = -3.37\text{kN}$, $R.dn.max^* = 11.58\text{kN}$, $R.up.max^* = -1.42\text{kN}$ (Down)		
	(1 End) $Rdl.min = 1.78\text{kN}$, $Rll.min = 1.53\text{kN}$, $Rwl.min^* = -3.37\text{kN}$, $R.dn.min^* = 4.43\text{kN}$, $R.up.min^* = 1.77\text{kN}$		

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	House =	N (Y)es,(N)o
Span (L) =	2700 mm	Edge restrained (down) =	C (T)ension,(C)ompression,(B)oth
Centres (cts) =	2700 mm	Lay.t (Top) =	900 mm
Span type =	S (S)ingle,(D)ouble		

Loadings

Roof area (A) =	7.29 m^2	Apply wind reduction =	Y (Y)es,(N)o
LL = $1.8/A + 0.12 \geq 0.25$ =	0.37 kPa	Roof reduction (Ka) =	1.00 AS/NZS 1170.2, Table 5.4
		Ratio Ws/Wu =	0.68 (Refer wind analysis)

Uniform dead loads

Roof dead load (wdl) =	0.40 kPa *	2700 mm +	kN/m =	1.08 kN/m
Other dead load (wdl) =	kPa *	2700 mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.06 kN/m
			Σwdl =	1.14 kN/m

Uniform live loads

Roof live load (wll) =	0.37 kPa *	2700 mm +	kN/m =	0.99 kN/m
Other live load (wll) =	kPa *	2700 mm +	kN/m =	0.00 kN/m
Alternate point live load =	1.40 kN (critical)	Distr. to	1 members	Σwll = 1.04 kN/m

Uniform wind loads

Ult. wind load (Wu) =	0.84 kPa *	2700 mm		
Cp,e =	0.9	Cp,i =	0.2	$\Sigma ww^* = -2.49$ kN/m (up)

Point loads

Dead load (pdl) =	4.02 kN	DL	4.0	2.2	-7.8	: L L L	tion =	2540 mm from LHS
Live load (pll) =	2.19 kN	Extra	0.0	0.0	7.8	:	port =	Y (Y)es,(N)o
Wind load (pwl*) =	kN	Σ	4.0	2.2	0.0			
$w(dl)^* = 1.35 * wdl$	1.54 kN/m						$M(dl)^* =$	1.87 kNm (Max at 1559mm)
$w^* = 1.2 * wdl + 1.5 * wll$	2.92 kN/m						$M^* =$	3.35 kNm (Max at 1514mm)
$w.up^* = 0.9 * wdl + wwl^*$	1.47 kN/m (up)						$Mw.up^* =$	1.06 kNm (Max at 1204mm)
$p(dl)^* = 1.35 * pdl$	5.43 kN						$V(dl)^* =$	7.50 kN
$p^* = 1.2 * pdl + 1.5 * pll$	8.11 kN						$V^* =$	12.06 kN
$p.up^* = 0.9 * pdl + pwl^*$	-3.62 kN (down)						$Vw.up^* =$	1.63 kN

Bending and Shear capacity - CI 3.2.1 & CI 3.2.5

Member =	240mm x 42mm Smart LVL15	Area (A) =	10080 mm^2
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	403 $\times 10^3 \text{mm}^3$
Design depth (dD) =	240 mm	Stiffness (Ix) =	48.4 $\times 10^6 \text{mm}^4$
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - CI 8.3
$S1d = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	13.83	For top comp. edge restrained - CI 3.2.3.2(a)	
$S1u = (dD / dW)^{1.35} * (Lay.t / dD)^{0.25} =$	14.64	For top tension edge restrained in uplift - CI 3.2.3.2(a)	
$k12d = 1.5 - 0.05 * pbd * S1d =$	0.800	for $10 \leq pbd * S1d \leq 20$ - CI 3.2.4	
$k12 = 1.5 - 0.05 * pb * S1d =$	0.834	for $10 \leq pb * S1d \leq 20$ - CI 3.2.4	
$k12u = 1.5 - 0.05 * pbu * S1u =$	0.819	for $10 \leq pbu * S1u \leq 20$ - CI 3.2.4	
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	1.01 (rbd=0.25)
$\phi M(dl) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	8.49 kNm	Material constant (pb) =	0.96 (rb=0.57)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	14.61 kNm	Stress reversal (pbu) =	0.93 (rbu=1.00)
$\phi Mw = \phi * (k1=1) * k4 * k6 * k9 * k12u * f'b * Zx =$	15.26 kNm	Duration factor (k1) =	0.94 (Live)
$\phi V(dl) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	15.28 kN	Moisture factor (k4) =	1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	25.20 kN	Temp. factor (k6) =	1.00
$\phi Vw = \phi * (k1=1) * k4 * k6 * f's * (2/3 * A) =$	26.81 kN	Sharing factor (k9) =	1.00
		Size modifier (mod.b & s) =	1.00 & 1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL+\Psi LL)$ (L/300) =	15.7 $\times 10^6 \text{mm}^4$	$\delta DL =$	2.9 mm
Ireq'd ΨLL (L/240) =	4.3 $\times 10^6 \text{mm}^4$	$\delta \Psi s.LL =$	1.0 mm
Ireq'd WLs (L/180) =	5.1 $\times 10^6 \text{mm}^4$	$\delta WLs =$	-1.6 mm
			Span / 925
			Span / 2726
			Span / 1703

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(3B4) 2 / 300mm x 42mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 15.08\text{kNm (+ve)} < \phi M(dI) = 30.42\text{kNm}$, $M^* = 21.71\text{kNm (+ve)} < \phi M = 43.92\text{kNm}$	OK (0.50,0.49)	
Shear:	$V(dI)^* = 19.67\text{kN} < \phi V(dI) = 38.21\text{kN}$, $V^* = 28.80\text{kN} < \phi V = 53.63\text{kN}$	OK (0.51,0.54)	
Deflection:	$\delta DL = L/426$ (7mm), $\delta \Psi s.LL = L/1562$ (2mm), $\delta Total = L/335$ (9mm), 1kN mid. $\delta = 0.2\text{mm}$	OK	
Reactions:	(1 End) $Rdl.max = 10.38\text{kN}$, $Rll.max = 10.90\text{kN}$, $R.max^* = 28.80\text{kN}$ (1 End) $Rdl.min = 8.72\text{kN}$, $Rll.min = 9.82\text{kN}$, $R.min^* = 25.20\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	2900 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3300 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	9.57 m ²	Live load type =	N (N)ormal, (S)torage, (M)annual AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3300 mm +	kN/m = 1.65 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.15 kN/m
		$\Sigma wdl =$	4.75 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3300 mm +	kN/m = 4.95 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma wll =$ 5.95 kN/m

Point loads			
Dead load (pdl) =	5.32 kN	Position =	1900 mm from LHS
Live load (pll) =	3.46 kN	Shear using PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =			0.60
$wdl^* = 1.2 \cdot wdl + 1.5 \cdot \Psi lu \cdot wll =$	14.63 kN/m	$M^* =$	15.08 kNm (Max at 1803mm)
$w^* = 1.2 \cdot wdl + 1.5 \cdot wll =$	14.63 kN/m	$M^* =$	21.71 kNm (Max at 1723mm)
$pdl^* = 1.2 \cdot pdl + 1.5 \cdot \Psi lp \cdot pll =$	9.50 kN	$V(dI + \Psi l.II)^* =$	19.67 kN
$p^* = 1.2 \cdot pdl + 1.5 \cdot pll =$	11.58 kN	$V^* =$	28.80 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 300mm x 42mm Smart LVL15	Area (A) =	25200 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	1260 x10 ³ mm ³
Design depth (dD) = 300 mm	Stiffness (Ix) =	189.0 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 \cdot dD/dW \cdot (Lay.t/dD)^{0.5} =$	10.94 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 \cdot pbd \cdot S1 =$	0.958 for $10 \leq pbd \cdot S1 \leq 20$ - Cl 3.2.4	$f'b =$ 46.5 MPa
$k12 = 1.5 - 0.05 \cdot pb \cdot S1 =$	0.986 for $10 \leq pb \cdot S1 \leq 20$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 0.99 (rbd=0.25)
$\phi M(dI) = \phi \cdot (k1=0.57) \cdot k4 \cdot k6 \cdot k9 \cdot k12 \cdot f'b \cdot Zx =$	30.42 kNm	Material constant (pb) = 0.94 (rb=0.59)
$\phi M = \phi \cdot k1 \cdot k4 \cdot k6 \cdot k9 \cdot k12 \cdot f'b \cdot Zx =$	43.92 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi \cdot (k1=0.57) \cdot k4 \cdot k6 \cdot f's \cdot (2/3 \cdot A) =$	38.21 kN	Moisture factor (k4) = 1.00
$\phi V = \phi \cdot k1 \cdot k4 \cdot k6 \cdot f's \cdot (2/3 \cdot A) =$	53.63 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor ($j2$) =	2.0
Ireq'd $j2 \cdot (DL + \Psi l.LL)$ (L/300) =	133.1 x10 ⁶ mm ⁴	< Critical $j2 \cdot (DL + \Psi l.LL) =$ 6.8 mm
Ireq'd $\Psi s.LL$ (L/300) =	36.3 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$ 1.9 mm
Ireq'd Total (L/250) =	141.1 x10 ⁶ mm ⁴	$\delta Total =$ 8.7 mm
	1kN midspan $\delta =$	0.2 mm

STEEL FLOOR BEAM V5.06

Xstruct

Member:	(3B2) 200x75PFC (G300)	
Bending:	$M^*(\max) = 37.6 \text{ kNm} < \phi M_b(450, \alpha_m = 1.00) = 59.7 \text{ kNm}$ (Single span)	OK (0.63)
Shear:	$V_{\max} = 33.8 \text{ kN} < \phi V_{wm} = 207.4 \text{ kN}$ (Web area full depth)	OK (0.16)
Deflection:	$\delta_{DL} = L/756$ (5mm), $\delta \Psi_s.LL = L/951$ (4mm), $\delta_{\text{Total}} = L/421$ (9mm), 1kN mid. $\delta = 0.3 \text{ mm}$	OK
Precamber:	Not required	
Reactions:	(Each end) $R_{dl} = 11.8 \text{ kN}$, $R_{ll} = 13.0 \text{ kN}$, $R^* = 33.8 \text{ kN}$	

Geometry

Span (L) =	3800 mm	Eff. Len. (Le) =	450 mm
Centres (cts) =	3300 mm	$\alpha_m.t =$	1.00
Design at =	M mm from LHS, (M)ax, (S)eg		
Span type =	S (S)ingle, (D)ouble		
Effective length (Le) =	450 mm		
$\alpha_m =$	1.00		

Loadings

Floor area =	12.5 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
Apply reduction =	N (Y)es, (N)o		AS/NZS 1170.0 - Table 4.1
Floor reduction (Ψ_a) =	1.00 AS/NZS 1170.1 - Cl 3.4.2		
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3300 mm +	kN/m = 1.65 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es, (N)o	S.Wt =	0.23 kN/m
		$\Sigma wdl =$	4.83 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa * Ψ_a *	3300 mm +	kN/m = 4.95 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma wll =$ 5.95 kN/m
Point loads			
Dead load (pdl) =	5.3 kN	Position =	1900 mm from LHS
Live load (pll) =	3.5 kN	Shear using PL at support =	N (Y)es, (N)o
Short term LL factor (Ψ_{su}) =	0.7	$(\Psi_{sp}) =$	1.00
$w^* = 1.2 * wdl + 1.5 * wll =$	14.7	DL LL	5.3 3.5 : M M
$p^* = 1.2 * pdl + 1.5 * pll =$	11.56 kN	Σ	5.3 3.5
		$M^* =$	37.6 kNm (Max at 1900mm)
		$V^* =$	33.8 kN

Capacity

Description = 200x75PFC (G300)	Warping constant (I_w) =	10.5 x10 ⁹ mm ⁶
Flange yield (fyf) = 300 MPa	Torsional constant (J) =	105 x10 ³ mm ⁴
Web yield (fyw) = 320 MPa	Effective section mod. (Zex) =	221 x10 ³ mm ³
Area (Ag) = 2920 mm ²	Effective section mod. (Zey) =	46.7 x10 ³ mm ³
Stiffness (Ix) = 19.1 x10 ⁶ mm ⁴	Elastic modulus (E) =	200000 MPa - Cl 1.4
Stiffness (Iy) = 1.65 x10 ⁶ mm ⁴	Shear modulus (G) =	80000 MPa - Cl 1.4
$\phi =$ 0.9 Table 3.4		
$M_{sx} = \min(fyf, fyw) * Z_{ex} =$ 66.3 kNm - Cl 5.2.1	$\phi M_{sx} =$ 59.7 kNm	$\phi M_{sy} =$ 12.6 kNm - Cl 5.2.1
Positive: $M_{oa.p} =$ 1334.7 kNm $\alpha_{s.t} =$ 1.000	$\alpha_m.t =$ 1.00	$\phi M_{bx.p} =$ 59.7 kNm
Negative: $M_{oa.n} =$ N.A.		

Deflections

Ireq'd DL (L/360) =	9.1 x10 ⁶ mm ⁴	$\delta_{DL} =$	5.0 mm	Span / 756
Ireq'd $\Psi_s.LL$ (L/360) =	7.2 x10 ⁶ mm ⁴	$\Psi_s.\delta_{LL} =$	4.0 mm	Span / 951
Ireq'd (DL+ $\Psi_s.LL$) (L/250) =	11.3 x10 ⁶ mm ⁴	$\delta_{\text{Total}} =$	9.0 mm	Span / 421
	< Critical			
Max. precamber (0.3%*span) =	11 mm	Min. precamber =	15 mm	
Precamber 80% of $\delta_{DL} =$	4 mm	Adopted precamber =	0 mm	
		1kN midspan $\delta =$	0.3 mm	

STEEL FLOOR BEAM V5.06

Xstruct

Member: (3B3) 310UB46.2 (G300)
Bending: $M^*(\max) = 97.1 \text{ kNm} < \phi M_b(5000, \alpha_m = 1.30) = 126.9 \text{ kNm}$ OK (0.77)
(Single span)
Shear: $V_{\max} = 53.5 \text{ kN} < \phi V_{wm} = 355.4 \text{ kN}$ (Web area full depth) OK (0.15)
Deflection: $\delta_{DL} = L/1171$ (4mm), $\delta \Psi_{s,LL} = L/1437$ (3mm), $\delta_{Total} = L/645$ (8mm), 1kN mid. $\delta = 0.1 \text{ mm}$ OK
Precamber: Not required
Reactions: (1 End) $R_{dl, \max} = 22.0 \text{ kN}$, $R_{ll, \max} = 18.1 \text{ kN}$, $R_{\max} = 53.5 \text{ kN}$
(1 End) $R_{dl, \min} = 18.4 \text{ kN}$, $R_{ll, \min} = 14.2 \text{ kN}$, $R_{\min} = 43.5 \text{ kN}$

Geometry

Span (L) = 5000 mm Eff. Len. (Le) = 5000 mm
Centres (cts) = 450 mm $\alpha_m t = 1.30$
Design at = M mm from LHS, (M)ax, (S)eg
Span type = S (S)ingle, (D)ouble
Effective length (Le) = 5000 mm
 $\alpha_m = 1.30$

Loadings

Floor area = 2.3 m² Live load type = N (N)ormal, (S)torage, (M)annual
Apply reduction = N (Y)es, (N)o AS/NZS 1170.0 - Table 4.1
Floor reduction (Ψ_a) = 1.00 AS/NZS 1170.1 - Cl 3.4.2

Uniform dead loads

Floor dead load (wdl) = 0.50 kPa * 450 mm + kN/m = 0.23 kN/m
Wall dead load (wdl) = 0.50 kPa * 2700 mm + kN/m = 1.35 kN/m
Other dead load (wdl) = 0.40 kPa * 4000 mm + kN/m = 1.60 kN/m
Include S.Wt = Y (Y)es, (N)o S.Wt = 0.47 kN/m
 $\Sigma wdl = 3.64 \text{ kN/m}$

Uniform live loads

Floor live load (wll) = 1.50 kPa * Ψ_a * 450 mm + kN/m = 0.68 kN/m
Partitions (wll) = 0.25 kPa * 4000 mm + kN/m = 1.00 kN/m
Alternate point live load = 1.80 kN Distr. to 1 members $\Sigma wll = 1.68 \text{ kN/m}$

Point loads

Dead load (pdl) = 22.2 kN Position = 2900 mm from LHS
Live load (pll) = 23.9 kN Shear using PL at support = N (Y)es, (N)o
Short term LL factor (Ψ_{su}) = 0.70

	DL	LL	
3B2	11.8	13.0	L L
3B4	10.4	10.9	R R
Σ	22.2	23.9	

 $\Psi_{sp} = 1.00$
 $w^* = 1.2 * wdl + 1.5 * wll = 6.88$ $M^* = 97.1 \text{ kNm}$ (Max at 2900mm)
 $p^* = 1.2 * pdl + 1.5 * pll = 62.55 \text{ kN}$ $V^* = 53.5 \text{ kN}$

Capacity

Description = 310UB46.2 (G300) Warping constant (I_w) = $197 \times 10^9 \text{ mm}^6$
Flange yield (f_yf) = 300 MPa Torsional constant (J) = $233 \times 10^3 \text{ mm}^4$
Web yield (f_yw) = 320 MPa Effective section mod. (Z_{ex}) = $729 \times 10^3 \text{ mm}^3$
Area (A_g) = 5930 mm² Effective section mod. (Z_{ey}) = $163 \times 10^3 \text{ mm}^3$
Stiffness (I_x) = $100.0 \times 10^6 \text{ mm}^4$ Elastic modulus (E) = 200000 MPa - Cl 1.4
Stiffness (I_y) = $9.01 \times 10^6 \text{ mm}^4$ Shear modulus (G) = 80000 MPa - Cl 1.4
 $\phi = 0.9$ Table 3.4
 $M_{sx} = \min(f_yf, f_yw) * Z_{ex} = 218.7 \text{ kNm}$ - Cl 5.2.1 $\phi M_{sx} = 196.8 \text{ kNm}$ $\phi M_{sy} = 44.0 \text{ kNm}$ - Cl 5.2.1
Positive: $M_{oa.p} = 156.0 \text{ kNm}$ $\alpha_s t = 0.496$ $\alpha_m t = 1.30$ $\phi M_{bx.p} = 126.9 \text{ kNm}$
Negative: $M_{oa.n} = \text{N.A.}$

Deflections ($\delta \pm 2.5\%$ with off-centre PL)

Ireq'd DL (L/360) = $30.7 \times 10^6 \text{ mm}^4$ $\delta_{DL} = 4.3 \text{ mm}$ Span / 1171
Ireq'd $\Psi_{s,LL}$ (L/360) = $25.1 \times 10^6 \text{ mm}^4$ $\Psi_{s, \delta_{LL}} = 3.5 \text{ mm}$ Span / 1437
Ireq'd (DL+ $\Psi_{s,LL}$) (L/250) = $38.7 \times 10^6 \text{ mm}^4$ < Critical $\delta_{Total} = 7.7 \text{ mm}$ Span / 645
Max. precamber (0.3%*span) = 15 mm Min. precamber = 15 mm
Preamber 80% of δ_{DL} = 3 mm Adopted precamber = 0 mm
1kN midspan $\delta = 0.1 \text{ mm}$

STEEL FLOOR BEAM V5.06

Xstruct

Member: (3B1) 300x90PFC (G300)
Bending: $M^*(\max) = 61.8 \text{ kNm} < \phi M_b(5000, \alpha_m = 1.30) = 84.2 \text{ kNm}$ OK (0.73)
(Single span)
Shear: $V_{\max} = 36.6 \text{ kN} < \phi V_{wm} = 414.7 \text{ kN}$ (Web area full depth) OK (0.09)
Deflection: $\delta_{DL} = L/1231$ (4mm), $\delta \Psi_{s,LL} = L/1713$ (3mm), $\delta_{Total} = L/716$ (7mm), 1kN mid. $\delta = 0.2 \text{ mm}$ OK
Precamber: Not required
Reactions: (1 End) $R_{dl, \max} = 15.8 \text{ kN}$, $R_{ll, \max} = 11.7 \text{ kN}$, $R_{\max} = 36.6 \text{ kN}$
(1 End) $R_{dl, \min} = 13.9 \text{ kN}$, $R_{ll, \min} = 9.7 \text{ kN}$, $R_{\min} = 31.2 \text{ kN}$

Geometry

Span (L) = 5000 mm Eff. Len. (Le) = 5000 mm
Centres (cts) = 450 mm $\alpha_m.t = 1.30$
Design at = M mm from LHS, (M)ax, (S)eg
Span type = S (S)ingle, (D)ouble
Effective length (Le) = 5000 mm
 $\alpha_m = 1.30$

Loadings

Floor area = 2.3 m² Live load type = N (N)ormal, (S)torage, (M)annual
Apply reduction = N (Y)es, (N)o AS/NZS 1170.0 - Table 4.1
Floor reduction (Ψ_a) = 1.00 AS/NZS 1170.1 - Cl 3.4.2

Uniform dead loads

Floor dead load (wdl) = 0.50 kPa * 450 mm + kN/m = 0.23 kN/m
Wall dead load (wdl) = 0.50 kPa * 2700 mm + kN/m = 1.35 kN/m
Other dead load (wdl) = 0.40 kPa * 4000 mm + kN/m = 1.60 kN/m
Include S.Wt = Y (Y)es, (N)o S.Wt = 0.40 kN/m
 $\Sigma wdl = 3.58 \text{ kN/m}$

Uniform live loads

Floor live load (wll) = 1.50 kPa * Ψ_a * 450 mm + kN/m = 0.68 kN/m
Partitions (wll) = 0.25 kPa * 4000 mm + kN/m = 1.00 kN/m
Alternate point live load = 1.80 kN Distr. to 1 members $\Sigma wll = 1.68 \text{ kN/m}$

Point loads

Dead load (pdl) = 11.8 kN Position = 2900 mm from LHS
Live load (pll) = 13.0 kN Shear using PL at support = N (Y)es, (N)o
Short term LL factor (Ψ_{su}) = 0.9

	DL	LL
3B2	11.8	13.0
Σ	11.8	13.0

 $\Psi_{sp} = 1.00$
 $w^* = 1.2 * wdl + 1.5 * wll = 6.06 \text{ kN/m}$ $M^* = 61.8 \text{ kNm}$ (Max at 2900mm)
 $p^* = 1.2 * pdl + 1.5 * pll = 33.76 \text{ kN}$ $V^* = 36.6 \text{ kN}$

Capacity

Description = 300x90PFC (G300) Warping constant (I_w) = $58.1 \times 10^9 \text{ mm}^6$
Flange yield (f_yf) = 300 MPa Torsional constant (J) = $304 \times 10^3 \text{ mm}^4$
Web yield (f_{yw}) = 320 MPa Effective section mod. (Z_{ex}) = $564 \times 10^3 \text{ mm}^3$
Area (A_g) = 5110 mm² Effective section mod. (Z_{ey}) = $82.3 \times 10^3 \text{ mm}^3$
Stiffness (I_x) = $72.4 \times 10^6 \text{ mm}^4$ Elastic modulus (E) = 200000 MPa - Cl 1.4
Stiffness (I_y) = $4.04 \times 10^6 \text{ mm}^4$ Shear modulus (G) = 80000 MPa - Cl 1.4
 $\phi = 0.9$ Table 3.4
 $M_{sx} = \min(f_yf, f_{yw}) * Z_{ex} = 169.2 \text{ kNm}$ - Cl 5.2.1 $\phi M_{sx} = 152.3 \text{ kNm}$ $\phi M_{sy} = 22.2 \text{ kNm}$ - Cl 5.2.1
Positive: $M_{oa.p} = 96.0 \text{ kNm}$ $\alpha_s.t = 0.425$ $\alpha_m.t = 1.30$ $\phi M_{bx.p} = 84.2 \text{ kNm}$
Negative: $M_{oa.n} = \text{N.A.}$

Deflections ($\delta \pm 2.5\%$ with off-centre PL)

Ireq'd DL ($L/360$) = $21.2 \times 10^6 \text{ mm}^4$ $\delta_{DL} = 4.1 \text{ mm}$ Span / 1231
Ireq'd $\Psi_{s,LL}$ ($L/360$) = $15.2 \times 10^6 \text{ mm}^4$ $\Psi_{s, \delta_{LL}} = 2.9 \text{ mm}$ Span / 1713
Ireq'd (DL+ $\Psi_{s,LL}$) ($L/250$) = $25.3 \times 10^6 \text{ mm}^4$ < Critical $\delta_{Total} = 7.0 \text{ mm}$ Span / 716
Max. precamber (0.3%*span) = 15 mm Min. precamber = 15 mm
Preamber 80% of δ_{DL} = 3 mm Adopted precamber = 0 mm
1kN midspan $\delta = 0.2 \text{ mm}$

STEEL FLOOR BEAM V5.06

Xstruct

Member:	(3B5) 300x90PFC (G300)	
Bending:	$M^*(\max) = 70.4 \text{ kNm} < \phi M_b(450, \alpha_m=1.00) = 152.3 \text{ kNm}$ (Single span)	OK (0.46)
Shear:	$V_{\max}=52.4 \text{ kN} < \phi V_{vm} = 414.7 \text{ kN}$ (Web area full depth)	OK (0.13)
Deflection:	$\delta_{DL} = L/1020$ (5mm), $\delta \Psi_{s.LL} = L/1292$ (4mm), $\delta_{Total} = L/570$ (9mm), 1kN mid. $\delta = 0.2 \text{ mm}$	OK
Precamber:	Not required	
Reactions:	(1 End) $R_{dl.\max} = 18.9 \text{ kN}$, $R_{ll.\max} = 19.8 \text{ kN}$, $R_{\max}^* = 52.4 \text{ kN}$ (1 End) $R_{dl.\min} = 16.3 \text{ kN}$, $R_{ll.\min} = 18.0 \text{ kN}$, $R_{\min}^* = 46.5 \text{ kN}$	

Geometry

Span (L) =	5400 mm	Eff. Len. (Le) =	450 mm
Centres (cts) =	3300 mm	$\alpha_m.t =$	1.00
Design at =	M mm from LHS, (M)ax, (S)eg		
Span type =	S (S)ingle, (D)ouble		
Effective length (Le) =	450 mm		
$\alpha_m =$	1.00		

Loadings

Floor area =	17.8 m ²	Live load type =	N (N)ormal, (S)torage, (M)annual
Apply reduction =	N (Y)es, (N)o		AS/NZS 1170.0 - Table 4.1
Floor reduction (Ψ_a) =	1.00 AS/NZS 1170.1 - Cl 3.4.2		

Uniform dead loads

Floor dead load (wdl) =	0.50 kPa *	3300 mm +	kN/m =	1.65 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m =	1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4500 mm +	kN/m =	1.80 kN/m
Include S.Wt =	Y (Y)es, (N)o		S.Wt =	0.40 kN/m
			$\Sigma w_{dl} =$	5.20 kN/m

Uniform live loads

Floor live load (wll) =	1.50 kPa * Ψ_a *	3300 mm +	kN/m =	4.95 kN/m
Partitions (wll) =	0.25 kPa *	4500 mm +	kN/m =	1.13 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma w_{ll} =$	6.08 kN/m

Point loads

Dead load (pdl) =	7.1 kN	Position =	1700 mm from LHS
Live load (pll) =	5.0 kN	Support =	N (Y)es, (N)o
Short term LL factor (Ψ_{su}) =	0	(Ψ_{sp}) =	1.00
$w^* = 1.2 * w_{dl} + 1.5 * w_{ll} =$	15.35 kN/m	$M^* =$	70.4 kNm (Max at 2372mm)
$p^* = 1.2 * pdl + 1.5 * pll =$	16.01 kN	$V^* =$	52.4 kN

Capacity

Description = 300x90PFC (G300)	Warping constant (I_w) =	58.1 x10 ⁹ mm ⁶
Flange yield (fyf) = 300 MPa	Torsional constant (J) =	304 x10 ³ mm ⁴
Web yield (fyw) = 320 MPa	Effective section mod. (Zex) =	564 x10 ³ mm ³
Area (Ag) = 5110 mm ²	Effective section mod. (Zey) =	82.3 x10 ³ mm ³
Stiffness (Ix) = 72.4 x10 ⁶ mm ⁴	Elastic modulus (E) =	200000 MPa - Cl 1.4
Stiffness (Iy) = 4.04 x10 ⁶ mm ⁴	Shear modulus (G) =	80000 MPa - Cl 1.4
$\phi =$ 0.9 Table 3.4		
$M_{sx} = \min(fyf, fyw) * Z_{ex} =$ 169.2 kNm - Cl 5.2.1	$\phi M_{sx} =$ 152.3 kNm	$\phi M_{sy} =$ 22.2 kNm - Cl 5.2.1
Positive: $M_{oa.p} =$ 4823.0 kNm $\alpha_s.t =$ 1.000	$\alpha_m.t =$ 1.00	$\phi M_{bx.p} =$ 152.3 kNm
Negative: $M_{oa.n} =$ N.A.		

Deflections ($\delta \pm 2.5\%$ with off-centre PL)

Ireq'd DL (L/360) =	25.6 x10 ⁶ mm ⁴	$\delta_{DL} =$	5.3 mm	Span / 1020
Ireq'd $\Psi_{s.LL}$ (L/360) =	20.2 x10 ⁶ mm ⁴	$\Psi_{s.\delta_{LL}} =$	4.2 mm	Span / 1292
Ireq'd (DL+ $\Psi_{s.LL}$) (L/250) =	31.8 x10 ⁶ mm ⁴	$\delta_{Total} =$	9.5 mm	Span / 570
	< Critical			
Max. precamber (0.3%*span) =	16 mm	Min. precamber =	15 mm	
Precamber 80% of $\delta_{DL} =$	4 mm	Adopted precamber =	0 mm	
		1kN midspan $\delta =$	0.2 mm	

STEEL FLOOR BEAM V5.06

Xstruct

Member: (3B6) 250UC72.9 (G300)

Bending: $M^*(\max) = 110.9 \text{ kNm} < \phi M_b(6000, \alpha_m = 1.30) = 238.9 \text{ kNm}$ OK (0.46)
(Single span)

Shear: $V_{\max} = 48.7 \text{ kN} < \phi V_{wm} = 377.5 \text{ kN}$ (Web area full depth) OK (0.13)

Deflection: $\delta_{DL} = L/907$ (7mm), $\delta \Psi_{s,LL} = L/1257$ (5mm), $\delta_{Total} = L/527$ (11mm), 1kN mid. $\delta = 0.2 \text{ mm}$ OK

Precamber: Not required

Reactions: (1 End) $R_{dl,\max} = 21.5 \text{ kN}$, $R_{ll,\max} = 15.3 \text{ kN}$, $R_{\max} = 48.7 \text{ kN}$
(1 End) $R_{dl,\min} = 20.9 \text{ kN}$, $R_{ll,\min} = 14.6 \text{ kN}$, $R_{\min} = 46.9 \text{ kN}$

Geometry

Span (L) = 6000 mm Eff. Len. (Le) = 6000 mm
Centres (cts) = 450 mm $\alpha_m.t = 1.30$

Design at = M mm from LHS, (M)ax, (S)eg
Span type = S (S)ingle, (D)ouble
Effective length (Le) = 6000 mm
 $\alpha_m = 1.30$

Loadings

Floor area = 2.7 m² Live load type = N (N)ormal, (S)torage, (M)annual
Apply reduction = N (Y)es, (N)o AS/NZS 1170.0 - Table 4.1
Floor reduction (Ψ_a) = 1.00 AS/NZS 1170.1 - Cl 3.4.2

Uniform dead loads

Floor dead load (wdl) = 0.50 kPa * 450 mm + kN/m = 0.23 kN/m
Wall dead load (wdl) = 0.50 kPa * 2700 mm + kN/m = 1.35 kN/m
Other dead load (wdl) = 0.40 kPa * 4000 mm + kN/m = 1.60 kN/m
Include S.Wt = Y (Y)es, (N)o S.Wt = 0.73 kN/m
 $\Sigma w_{dl} = 3.91 \text{ kN/m}$

Uniform live loads

Floor live load (wll) = 1.50 kPa * Ψ_a * 450 mm + kN/m = 0.68 kN/m
Partitions (wll) = 0.25 kPa * 4000 mm + kN/m = 1.00 kN/m
Alternate point live load = 1.80 kN Distr. to 1 members $\Sigma w_{ll} = 1.68 \text{ kN/m}$

Point loads

Dead load (pdl) = 18.9 kN Position = 2900 mm from LHS
Live load (pll) = 19.8 kN Shear using PL at support = N (Y)es, (N)o

Short term LL factor (Ψ_{su}) = 1.00 (Ψ_{sp}) = 1.00

	DL	LL
3B5	18.9	19.8
Σ	18.9	19.8

$w^* = 1.2 * w_{dl} + 1.5 * w_{ll} = 7.26 \text{ kN/m}$ $M^* = 110.9 \text{ kNm}$ (Max at 2900mm)
 $p^* = 1.2 * p_{dl} + 1.5 * p_{ll} = 52.43 \text{ kN}$ $V^* = 48.7 \text{ kN}$

Capacity

Description = 250UC72.9 (G300) Warping constant (I_w) = $557 \times 10^9 \text{ mm}^6$
Flange yield (f_yf) = 300 MPa Torsional constant (J) = $586 \times 10^3 \text{ mm}^4$
Web yield (f_{yw}) = 320 MPa Effective section mod. (Z_{ex}) = $986 \times 10^3 \text{ mm}^3$
Area (A_g) = 9320 mm² Effective section mod. (Z_{ey}) = $454 \times 10^3 \text{ mm}^3$
Stiffness (I_x) = $114.0 \times 10^6 \text{ mm}^4$ Elastic modulus (E) = 200000 MPa - Cl 1.4
Stiffness (I_y) = $38.80 \times 10^6 \text{ mm}^4$ Shear modulus (G) = 80000 MPa - Cl 1.4
 $\phi = 0.9$ Table 3.4
 $M_{sx} = \min(f_yf, f_{yw}) * Z_{ex} = 295.8 \text{ kNm}$ - Cl 5.2.1 $\phi M_{sx} = 266.2 \text{ kNm}$ $\phi M_{sy} = 122.6 \text{ kNm}$ - Cl 5.2.1
Positive: $M_{oa.p} = 405.8 \text{ kNm}$ $\alpha_{s.t} = 0.690$ $\alpha_m.t = 1.30$ $\phi M_{bx.p} = 238.9 \text{ kNm}$
Negative: $M_{oa.n} = \text{N.A.}$

Deflections ($\delta \pm 2.5\%$ with off-centre PL)

Ireq'd DL (L/360) = $45.3 \times 10^6 \text{ mm}^4$ $\delta_{DL} = 6.6 \text{ mm}$ Span / 907
Ireq'd $\Psi_{s,LL}$ (L/360) = $32.7 \times 10^6 \text{ mm}^4$ $\Psi_{s,\delta_{LL}} = 4.8 \text{ mm}$ Span / 1257
Ireq'd (DL+ $\Psi_{s,LL}$) (L/250) = $54.1 \times 10^6 \text{ mm}^4$ < Critical $\delta_{Total} = 11.4 \text{ mm}$ Span / 527

Max. precamber (0.3%*span) = 18 mm Min. precamber = 15 mm
Preamber 80% of δ_{DL} = 5 mm Adopted precamber = 0 mm

1kN midspan $\delta = 0.2 \text{ mm}$

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(3B7) 2 / 120mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 0.89\text{kNm (+ve)} < \phi M(dI) = 5.74\text{kNm}$, $M^* = 1.16\text{kNm (+ve)} < \phi M = 8.29\text{kNm}$	OK (0.16,0.14)
Shear:	$V(dI)^* = 3.56\text{kN} < \phi V(dI) = 15.28\text{kN}$, $V^* = 4.64\text{kN} < \phi V = 21.45\text{kN}$	OK (0.23,0.22)
Deflection:	$\delta DL = L/1432$ (1mm), $\delta \Psi s.LL = L/4935$ (0mm), $\delta Total = L/1110$ (1mm), 1kN mid. $\delta = 0.1\text{mm}$	OK
Reactions:	(Each end) $RdI = 1.62\text{kN}$, $RlI = 1.80\text{kN}$, $R^* = 4.64\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1000 mm	Lay.t (Top) = 1000 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	0.45 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m = 0.23 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.06 kN/m
		$\Sigma wdl =$	3.24 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m = 0.68 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to 1 members	$\Sigma wll =$ 3.60 kN/m
Point loads			
Dead load (pdl) =	kN	Position =	500 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	7.12 kN/m	$M(dI + \Psi l.II)^* =$	0.89 kNm (Max at 500mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	9.28 kN/m	$M^* =$	1.16 kNm (Max at 500mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	0.00 kN	$V(dI + \Psi l.II)^* =$	3.56 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	0.00 kN	$V^* =$	4.64 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 120mm x 42mm Smart LVL15	Area (A) =	10080 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	202 x10 ³ mm ³
Design depth (dD) = 120 mm	Stiffness (Ix) =	12.1 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	10.31 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 * pbd * S1 =$	0.943 for $10 \leq pbd * S1 \leq 20$ - Cl 3.2.4	$f'b =$ 55.7 MPa
$k12 = 1.5 - 0.05 * pb * S1 =$	0.971 for $10 \leq pb * S1 \leq 20$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 1.08 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	5.74 kNm	Material constant (pb) = 1.03 (rb=0.58)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	8.29 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	15.28 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	21.45 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	2.5 x10 ⁶ mm ⁴	< Critical $j2.(DL + \Psi l.LL) =$ 0.7 mm
Ireq'd $\Psi s.LL$ (L/300) =	0.7 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$ 0.2 mm
Ireq'd Total (L/250) =	2.7 x10 ⁶ mm ⁴	$\delta Total =$ 0.9 mm
	1kN midspan $\delta =$	0.1 mm

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(3B8) 2 / 190mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 3.26\text{kNm (+ve)} < \phi M(dI) = 6.72\text{kNm}$, $M^* = 4.26\text{kNm (+ve)} < \phi M = 9.96\text{kNm}$	OK (0.49,0.43)
Shear:	$V(dI)^* = 5.67\text{kN} < \phi V(dI) = 24.20\text{kN}$, $V^* = 7.40\text{kN} < \phi V = 33.96\text{kN}$	OK (0.23,0.22)
Deflection:	$\delta_{DL} = L/588$ (4mm), $\delta_{\Psi s.LL} = L/3955$ (1mm), $\delta_{Total} = L/512$ (4mm), 1kN mid. $\delta = 0.3\text{mm}$	OK
Reactions:	(Each end) $R_{dI} = 3.76\text{kN}$, $R_{dII} = 1.93\text{kN}$, $R^* = 7.40\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	2300 mm	Lay.t (Top) = 2300 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	1.04 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m = 0.23 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.10 kN/m
		$\Sigma w_{dl} =$	3.27 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m = 0.68 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma w_{ll} =$ 1.68 kN/m
Point loads			
Dead load (pdl) =	kN	Position =	1150 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	N (Y)es,(N)o
Short term LL factor (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
Long term LL factor (Ψ_{lu}) =	0.40	(Ψ_{lp}) =	0.60
$w_{dl}^* = 1.2 * w_{dl} + 1.5 * \Psi_{lu} * w_{ll} =$	4.93 kN/m	$M(dI + \Psi_{l.II})^* =$	3.26 kNm (Max at 1150mm)
$w^* = 1.2 * w_{dl} + 1.5 * w_{ll} =$	6.44 kN/m	$M^* =$	4.26 kNm (Max at 1150mm)
$p_{dl}^* = 1.2 * p_{dl} + 1.5 * \Psi_{lp} * p_{ll} =$	0.00 kN	$V(dI + \Psi_{l.II})^* =$	5.67 kN
$p^* = 1.2 * p_{dl} + 1.5 * p_{ll} =$	0.00 kN	$V^* =$	7.40 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 190mm x 42mm Smart LVL15	Area (A) =	15960 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	505 x10 ³ mm ³
Design depth (dD) = 190 mm	Stiffness (Ix) =	48.0 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	19.67 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k_{12d} = 200 / (S1 * p_{bd})^2 =$	0.482 for $p_{bd} * S1 \geq 20$ - Cl 3.2.4	$f'_b =$ 50.9 MPa
$k_{12} = 1.5 - 0.05 * p_b * S1 =$	0.509 for $10 \leq p_b * S1 \leq 20$ - Cl 3.2.4	$f'_s =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 1.04 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k_{12d} * f'_b * Zx =$	6.72 kNm	Material constant (pb) = 1.01 (rb=0.39)
$\phi M = \phi * k1 * k4 * k6 * k9 * k_{12} * f'_b * Zx =$	9.96 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f'_s * (2/3 * A) =$	24.20 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f'_s * (2/3 * A) =$	33.96 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor (j_2) =	2.0
Ireq'd $j_2.(DL + \Psi_{l.II}) (L/300) =$	24.5 x10 ⁶ mm ⁴	< Critical $j_2.(DL + \Psi_{l.II}) =$ 3.9 mm
Ireq'd $\Psi_{s.LL} (L/300) =$	3.6 x10 ⁶ mm ⁴	$\Psi_{s.\delta LL} =$ 0.6 mm
Ireq'd Total (L/250) =	23.4 x10 ⁶ mm ⁴	$\delta_{Total} =$ 4.5 mm
	1kN midspan $\delta =$	0.3 mm

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(3B10) 2 / 240mm x 42mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 8.49\text{kNm (+ve)} < \phi M(dI) = 21.24\text{kNm}$, $M^* = 12.02\text{kNm (+ve)} < \phi M = 29.81\text{kNm}$	OK (0.40,0.40)	
Shear:	$V(dI)^* = 15.93\text{kN} < \phi V(dI) = 30.57\text{kN}$, $V^* = 22.87\text{kN} < \phi V = 42.90\text{kN}$	OK (0.52,0.53)	
Deflection:	$\delta DL = L/538$ (4mm), $\delta \Psi s.LL = L/1976$ (1mm), $\delta Total = L/423$ (5mm), 1kN mid. $\delta = 0.1\text{mm}$	OK	
Reactions:	(1 End) $Rdl.max = 8.42\text{kN}$, $Rll.min = 8.51\text{kN}$, $R.max^* = 22.87\text{kN}$ (1 End) $Rdl.min = 6.39\text{kN}$, $Rll.min = 7.19\text{kN}$, $R.min^* = 18.46\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	2100 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3300 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	6.93 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3300 mm +	kN/m = 1.65 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	3500 mm +	kN/m = 1.40 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.12 kN/m
		$\Sigma wdl =$	4.52 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3300 mm +	kN/m = 4.95 kN/m
Partitions (wll) =	0.25 kPa *	3500 mm +	kN/m = 0.88 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma wll =$ 5.83 kN/m
Point loads			
Dead load (pdl) =	5.32 kN	Position =	650 mm from LHS
Live load (pll) =	3.46 kN	ing PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	8.92 kN/m	$M(dI + \Psi l.II)^* =$	8.49 kNm (Max at 720mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	14.16 kN/m	$M^* =$	12.02 kNm (Max at 797mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	9.50 kN	$V(dI + \Psi l.II)^* =$	15.93 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	11.58 kN	$V^* =$	22.87 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 240mm x 42mm Smart LVL15	Area (A) =	20160 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	806 x10 ³ mm ³
Design depth (dD) =	240 mm	Stiffness (Ix) =	96.8 x10 ⁶ mm ⁴
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	9.78 For top comp. edge restrained - Cl 3.2.3.2(a)		
$k12d =$	1.000 for $pbd * S1 \leq 10$ - Cl 3.2.4	$f'b =$	48.6 MPa
$k12 =$	1.000 for $pb * S1 \leq 10$ - Cl 3.2.4	$f's =$	4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	1.01 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	21.24 kNm	Material constant (pb) =	0.96 (rb=0.59)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	29.81 kNm	Duration factor (k1) =	0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	30.57 kN	Moisture factor (k4) =	1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	42.90 kN	Temp. factor (k6) =	1.00
		Sharing factor (k9) =	1.00
		Size modifier (mod.b) =	1.00
		Size modifier (mod.s) =	1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	54.0 x10 ⁶ mm ⁴	$j2.(DL + \Psi l.LL) =$	3.9 mm
Ireq'd $\Psi s.LL$ (L/300) =	14.7 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$	1.1 mm
Ireq'd Total (L/250) =	57.2 x10 ⁶ mm ⁴	$\delta Total =$	5.0 mm
		1kN midspan $\delta =$	0.1 mm
			Span / 538
			Span / 1976
			Span / 423

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(3B9) 2 / 190mm x 42mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 2.90\text{kNm (+ve)} < \phi M(dI) = 10.65\text{kNm}$, $M^* = 3.72\text{kNm (+ve)} < \phi M = 15.79\text{kNm}$	OK (0.27,0.24)	
Shear:	$V(dI)^* = 19.52\text{kN} < \phi V(dI) = 24.20\text{kN}$, $V^* = 25.06\text{kN} < \phi V = 33.96\text{kN}$	OK (0.81,0.74)	
Deflection:	$\delta DL = L/1440$ (1mm), $\delta \Psi s.LL = L/4973$ (0mm), $\delta Total = L/1117$ (1mm), 1kN mid. $\delta = 0.0\text{mm}$	OK	
Reactions:	(1 End) $Rdl.max = 9.33\text{kN}$, $Rll.max = 9.24\text{kN}$, $R.max^* = 25.06\text{kN}$ (1 End) $Rdl.min = 3.02\text{kN}$, $Rll.min = 2.86\text{kN}$, $R.min^* = 7.91\text{kN}$		
Geometry	(House member affecting $\leq 25\text{m}^2$ or secondary building member)		

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1200 mm	Lay.t (Top) = 1200 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	0.54 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m = 0.23 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m = 1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.10 kN/m
		$\Sigma wdl =$	3.27 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m = 0.68 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m = 1.00 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to 1 members	$\Sigma wll =$ 3.00 kN/m

Point loads

Dead load (pdl) =	8.42 kN	Position =	1050 mm from LHS
Live load (pll) =	8.51 kN	Shear using PL at support =	N (Y)es,(N)o
Short term LL factor (Ψ_{su}) =	1.00		
Long term LL factor (Ψ_{lu}) =	0.60		
$wdl^* = 1.2 \cdot wdl + 1.5 \cdot \Psi_{lu} \cdot wll =$	2.90 kN/m (Max at 935mm)		
$w^* = 1.2 \cdot wdl + 1.5 \cdot wll =$	8.42 kN/m	$M^* =$	3.72 kNm (Max at 939mm)
$pdl^* = 1.2 \cdot pdl + 1.5 \cdot \Psi_{lp} \cdot pll =$	17.76 kN	$V(dI + \Psi_{l.II})^* =$	19.52 kN
$p^* = 1.2 \cdot pdl + 1.5 \cdot pll =$	22.87 kN	$V^* =$	25.06 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 190mm x 42mm Smart LVL15	Area (A) =	15960 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	505 x10 ³ mm ³
Design depth (dD) = 190 mm	Stiffness (Ix) =	48.0 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 \cdot dD/dW \cdot (Lay.t/dD)^{0.5} =$	14.21 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 \cdot pbd \cdot S1 =$	0.764 for $10 \leq pbd \cdot S1 \leq 20$ - Cl 3.2.4	$f'b =$ 50.9 MPa
$k12 = 1.5 - 0.05 \cdot pb \cdot S1 =$	0.807 for $10 \leq pb \cdot S1 \leq 20$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 1.04 (rbd=0.25)
$\phi M(dI) = \phi \cdot (k1=0.57) \cdot k4 \cdot k6 \cdot k9 \cdot k12 \cdot f'b \cdot Zx =$	10.65 kNm	Material constant (pb) = 0.97 (rb=0.67)
$\phi M = \phi \cdot k1 \cdot k4 \cdot k6 \cdot k9 \cdot k12 \cdot f'b \cdot Zx =$	15.79 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi \cdot (k1=0.57) \cdot k4 \cdot k6 \cdot f's \cdot (2/3 \cdot A) =$	24.20 kN	Moisture factor (k4) = 1.00
$\phi V = \phi \cdot k1 \cdot k4 \cdot k6 \cdot f's \cdot (2/3 \cdot A) =$	33.96 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor ($j2$) =	2.0
Ireq'd $j2 \cdot (DL + \Psi_{l.II})$ (L/300) =	10.0 x10 ⁶ mm ⁴	< Critical $j2 \cdot (DL + \Psi_{l.II})$ = 0.8 mm
Ireq'd $\Psi s.LL$ (L/300) =	2.9 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$ 0.2 mm
Ireq'd Total (L/250) =	10.7 x10 ⁶ mm ⁴	$\delta Total =$ 1.1 mm
	1kN midspan $\delta =$	0.0 mm

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(3B11) 2 / 190mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 7.88\text{kNm (+ve)} < \phi M(dI) = 13.94\text{kNm}$, $M^* = 10.93\text{kNm (+ve)} < \phi M = 19.56\text{kNm}$	OK (0.57,0.56)
Shear:	$V(dI)^* = 12.75\text{kN} < \phi V(dI) = 24.20\text{kN}$, $V^* = 18.51\text{kN} < \phi V = 33.96\text{kN}$	OK (0.53,0.54)
Deflection:	$\delta DL = L/361$ (5mm), $\delta \Psi s.LL = L/1352$ (1mm), $\delta Total = L/285$ (6mm), 1kN mid. $\delta = 0.2\text{mm}$	OK
Reactions:	(Each end) $RdI = 6.71\text{kN}$, $RlI = 6.97\text{kN}$, $R^* = 18.51\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1800 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3300 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	5.94 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3300 mm +	kN/m = 1.65 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	3500 mm +	kN/m = 1.40 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.10 kN/m
		$\Sigma wdl =$	4.50 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3300 mm +	kN/m = 4.95 kN/m
Partitions (wll) =	0.25 kPa *	3500 mm +	kN/m = 0.88 kN/m
Alternate point live load =	1.80 kN	Distr. to	1 members
		$\Sigma wll =$	5.83 kN/m

Point loads			
Dead load (pdl) =	5.32 kN	DL	LL
Live load (pll) =	3.46 kN	RL1 5.3 3.5 : M M	
		Σ 5.3 3.5	
		Position =	900 mm from LHS
		ing PL at support =	N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	8.89 kN/m	$M(dI + \Psi l.II)^* =$	7.88 kNm (Max at 900mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	14.13 kN/m	$M^* =$	10.93 kNm (Max at 900mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	9.50 kN	$V(dI + \Psi l.II)^* =$	12.75 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	11.58 kN	$V^* =$	18.51 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 190mm x 42mm Smart LVL15	Area (A) =	15960 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	505 x10 ³ mm ³
Design depth (dD) =	190 mm	Stiffness (Ix) =	48.0 x10 ⁶ mm ⁴
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	8.70 For top comp. edge restrained - Cl 3.2.3.2(a)		
$k12d =$	1.000 for $pbd * S1 \leq 10$ - Cl 3.2.4	$f'b =$	50.9 MPa
$k12 =$	1.000 for $pb * S1 \leq 10$ - Cl 3.2.4	$f's =$	4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	1.04 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	13.94 kNm	Material constant (pb) =	0.99 (rb=0.54)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	19.56 kNm	Duration factor ($k1$) =	0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	24.20 kN	Moisture factor ($k4$) =	1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	33.96 kN	Temp. factor ($k6$) =	1.00
		Sharing factor ($k9$) =	1.00
		Size modifier (mod.b) =	1.00
		Size modifier (mod.s) =	1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	39.9 x10 ⁶ mm ⁴	$j2.(DL + \Psi l.LL) =$	5.0 mm
Ireq'd $\Psi s.LL$ (L/300) =	10.7 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$	1.3 mm
Ireq'd Total (L/250) =	42.1 x10 ⁶ mm ⁴	$\delta Total =$	6.3 mm
		1kN midspan $\delta =$	0.2 mm
			Span / 361
			Span / 1352
			Span / 285

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(3B13) 120mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 0.63\text{kNm (+ve)} < \phi M(dI) = 3.04\text{kNm}$, $M^* = 0.93\text{kNm (+ve)} < \phi M = 4.27\text{kNm}$	OK (0.21,0.22)
Shear:	$V(dI)^* = 2.30\text{kN} < \phi V(dI) = 7.64\text{kN}$, $V^* = 3.38\text{kN} < \phi V = 10.73\text{kN}$	OK (0.30,0.32)
Deflection:	$\delta DL = L/1026$ (1mm), $\delta \Psi s.LL = L/2039$ (1mm), $\delta Total = L/683$ (2mm), 1kN mid. $\delta = 0.3\text{mm}$	OK
Reactions:	(Each end) $RdI = 0.57\text{kN}$, $RlI = 1.80\text{kN}$, $R^* = 3.38\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1100 mm	Lay.t (Top) = 450 mm
Centres (cts) =	2000 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	2.20 m ²	Live load type = N (N)ormal, (S)torage, (M) anual
		AS/NZS 1170.0 - Table 4.1

Uniform dead loads

Floor dead load (wdl) =	0.50 kPa *	2000 mm +	kN/m =	1.00 kN/m
Wall dead load (wdl) =	kPa *	2000 mm +	kN/m =	0.00 kN/m
Other dead load (wdl) =	kPa *	mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.03 kN/m
			$\Sigma wdl =$	1.03 kN/m

Uniform live loads

Floor live load (wll) =	1.50 kPa *	2000 mm +	kN/m =	3.00 kN/m
Partitions (wll) =	kPa *	2000 mm +	kN/m =	0.00 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to 1 members	$\Sigma wll =$	3.27 kN/m

Point loads

Dead load (pdl) =	kN	Position = 550 mm from LHS
Live load (pll) =	kN	Shear using PL at support = N (Y)es,(N)o

Short term LL factor (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
Long term LL factor (Ψ_{lu}) =	0.40	(Ψ_{lp}) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi_{lu} * wll =$	4.18 kN/m	$M(dI + \Psi_{lI})^* =$	0.63 kNm (Max at 550mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	6.15 kN/m	$M^* =$	0.93 kNm (Max at 550mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi_{lp} * pll =$	0.00 kN	$V(dI + \Psi_{lI})^* =$	2.30 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	0.00 kN	$V^* =$	3.38 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 120mm x 42mm Smart LVL15	Area (A) =	5040 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	101 x10 ³ mm ³
Design depth (dD) = 120 mm	Stiffness (Ix) =	6.0 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3

$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	6.92 For top comp. edge restrained - Cl 3.2.3.2(a)
$k12d =$	1.000 for $pbd * S1 \leq 10$ - Cl 3.2.4
$k12 =$	1.000 for $pb * S1 \leq 10$ - Cl 3.2.4

Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	1.08 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12 * f'b * Zx =$	3.04 kNm	Material constant (pb) =	1.01 (rb=0.80)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	4.27 kNm	Duration factor (k1) =	0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	7.64 kN	Moisture factor (k4) =	1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	10.73 kN	Temp. factor (k6) =	1.00
		Sharing factor (k9) =	1.00
		Size modifier (mod.b) =	1.00
		Size modifier (mod.s) =	1.00

Deflections

		Duration factor (j2) =		2.0	
Ireq'd j2.(DL+Ψl.LL) (L/300) =	1.8 x10 ⁶ mm ⁴	< Critical	j2.(DL+Ψl.LL) =	1.1 mm	Span / 1026
Ireq'd Ψs.LL (L/300) =	0.9 x10 ⁶ mm ⁴		Ψs.δLL =	0.5 mm	Span / 2039
Ireq'd Total (L/250) =	2.2 x10 ⁶ mm ⁴		δTotal =	1.6 mm	Span / 683
		1kN midspan δ =		0.3 mm	

TIMBER FLOOR BEAM V5.10

Xstruct

Beam: (3B12) 2 / 120mm x 42mm Smart LVL15 (Oregon) (Single span)
Bending: $M(dI)^* = 0.83\text{kNm (+ve)} < \phi M(dI) = 5.74\text{kNm}$, $M^* = 1.12\text{kNm (+ve)} < \phi M = 8.35\text{kNm}$ OK (0.14,0.13)
Shear: $V(dI)^* = 5.25\text{kN} < \phi V(dI) = 15.28\text{kN}$, $V^* = 7.36\text{kN} < \phi V = 21.45\text{kN}$ OK (0.34,0.34)
Deflection: $\delta DL = L/1568$ (1mm), $\delta \Psi s.LL = L/4293$ (0mm), $\delta Total = L/1149$ (1mm), 1kN mid. $\delta = 0.1\text{mm}$ OK
Reactions: (1 End) $Rdl.max = 1.74\text{kN}$, $Rll.max = 3.51\text{kN}$, $R.max^* = 7.36\text{kN}$
(1 End) $Rdl.min = 1.23\text{kN}$, $Rll.min = 1.89\text{kN}$, $R.min^* = 4.32\text{kN}$
Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category = 1 (1) House, (2) Primary building elements, (3) Important
House = N (Y)es,(N)o Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) = 1000 mm Lay.t (Top) = 1000 mm
Centres (cts) = 2000 mm
Span type = S (S)ingle,(D)ouble

Loadings

Floor area (A) = 2.00 m² Live load type = N (N)ormal, (S)torage, (M)anual
AS/NZS 1170.0 - Table 4.1

Uniform dead loads

Floor dead load (wdl) = 0.50 kPa * 2000 mm + kN/m = 1.00 kN/m
Wall dead load (wdl) = 0.50 kPa * 2700 mm + kN/m = 1.35 kN/m
Other dead load (wdl) = kPa * mm + kN/m = 0.00 kN/m
Include S.Wt = Y (Y)es,(N)o S.Wt = 0.06 kN/m
 $\Sigma wdl = 2.41\text{ kN/m}$

Uniform live loads

Floor live load (wll) = 1.50 kPa * 2000 mm + kN/m = 3.00 kN/m
Partitions (wll) = kPa * 2000 mm + kN/m = 0.00 kN/m
Alternate point live load = 1.80 kN (critical) Distr. to 1 members $\Sigma wll = 3.60\text{ kN/m}$

Point loads

Dead load (pdl) = 0.57 kN 3B13 DL 0.6 LL 1.8 : L | L Position = 50 mm from LHS
Live load (pll) = 1.80 kN Σ 0.6 1.8 ing PL at support = N (Y)es,(N)o

Short term LL factor (Ψsu) = 0.70 (Ψsp) = 1.00
Long term LL factor (Ψlu) = 0.40 (Ψlp) = 0.60
 $wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll = 6.13\text{ kN/m}$ $M(dI + \Psi l.II)^* = 0.83\text{ kNm (Max at 481mm)}$
 $w^* = 1.2 * wdl + 1.5 * wll = 8.29\text{ kN/m}$ $M^* = 1.12\text{ kNm (Max at 480mm)}$
 $pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll = 2.30\text{ kN}$ $V(dI + \Psi l.II)^* = 5.25\text{ kN}$
 $p^* = 1.2 * pdl + 1.5 * pll = 3.38\text{ kN}$ $V^* = 7.36\text{ kN}$

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 120mm x 42mm Smart LVL15 Area (A) = 10080 mm²
Description = LVL15 seasoned softwood Section modulus (Zx) = 202 x10³ mm³
Design depth (dD) = 120 mm Stiffness (Ix) = 12.1 x10⁶ mm⁴
Design width (dW) = 42 mm Modulus of elasticity (E) = 15300 MPa - Cl 8.3

$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} = 10.31$ For top comp. edge restrained - Cl 3.2.3.2(a)
 $k12d = 1.5 - 0.05 * pbd * S1 = 0.943$ for $10 \leq pbd * S1 \leq 20$ - Cl 3.2.4 $f'b = 55.7\text{ MPa}$
 $k12 = 1.5 - 0.05 * pb * S1 = 0.977$ for $10 \leq pb * S1 \leq 20$ - Cl 3.2.4 $f's = 4.2\text{ MPa}$
Material constant (pbd) = 1.08 (rbd=0.25)
Material constant (pb) = 1.01 (rb=0.72)
Duration factor (k1) = 0.80
Moisture factor (k4) = 1.00
Temp. factor (k6) = 1.00
Sharing factor (k9) = 1.00
Size modifier (mod.b) = 1.00
Size modifier (mod.s) = 1.00

Deflections

Duration factor ($j2$) = 2.0
 $Ireq'd j2.(DL + \Psi l.LL) (L/300) = 2.3 \times 10^6\text{ mm}^4$ < Critical $j2.(DL + \Psi l.LL) = 0.6\text{ mm}$ Span / 1568
 $Ireq'd \Psi s.LL (L/300) = 0.8 \times 10^6\text{ mm}^4$ $\Psi s.\delta LL = 0.2\text{ mm}$ Span / 4293
 $Ireq'd Total (L/250) = 2.6 \times 10^6\text{ mm}^4$ $\delta Total = 0.9\text{ mm}$ Span / 1149
1kN midspan $\delta = 0.1\text{ mm}$

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(3B14) 2 / 300mm x 58mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 12.29\text{kNm (+ve)} < \phi M(dI) = 43.85\text{kNm}$, $M^* = 19.42\text{kNm (+ve)} < \phi M = 61.55\text{kNm}$	OK (0.28,0.32)
Shear:	$V(dI)^* = 14.89\text{kN} < \phi V(dI) = 52.76\text{kN}$, $V^* = 23.54\text{kN} < \phi V = 74.05\text{kN}$	OK (0.28,0.32)
Deflection:	$\delta_{DL} = L/615$ (5mm), $\delta_{\Psi s.LL} = L/2093$ (2mm), $\delta_{Total} = L/475$ (7mm), 1kN mid. $\delta = 0.2\text{mm}$	OK
Reactions:	(Each end) $R_{dI} = 7.60\text{kN}$, $R_{II} = 9.61\text{kN}$, $R^* = 23.54\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	3300 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3300 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	10.89 m ²	Live load type =	N (N)ormal, (S)torage, (M)anual
			AS/NZS 1170.0 - Table 4.1
Uniform dead loads			
Floor dead load (wdl) =	0.50 kPa *	3300 mm +	kN/m = 1.65 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m = 1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	3500 mm +	kN/m = 1.40 kN/m
Include S.Wt =	Y (Y)es,(N)o	S.Wt =	0.21 kN/m
		$\Sigma w_{dl} =$	4.61 kN/m
Uniform live loads			
Floor live load (wll) =	1.50 kPa *	3300 mm +	kN/m = 4.95 kN/m
Partitions (wll) =	0.25 kPa *	3500 mm +	kN/m = 0.88 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma w_{ll} =$ 5.83 kN/m
Point loads			
Dead load (pdl) =	kN	Position =	900 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	N (Y)es,(N)o
Short term LL factor (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
Long term LL factor (Ψ_{lu}) =	0.40	(Ψ_{lp}) =	0.60
$w_{dl}^* = 1.2 * w_{dl} + 1.5 * \Psi_{lu} * w_{ll} =$	9.03 kN/m	$M(dI + \Psi_{l.II})^* =$	12.29 kNm (Max at 1650mm)
$w^* = 1.2 * w_{dl} + 1.5 * w_{ll} =$	14.27 kN/m	$M^* =$	19.42 kNm (Max at 1650mm)
$p_{dl}^* = 1.2 * p_{dl} + 1.5 * \Psi_{lp} * p_{ll} =$	0.00 kN	$V(dI + \Psi_{l.II})^* =$	14.89 kN
$p^* = 1.2 * p_{dl} + 1.5 * p_{ll} =$	0.00 kN	$V^* =$	23.54 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 300mm x 58mm Smart LVL15	Area (A) =	34800 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	1740 x10 ³ mm ³
Design depth (dD) = 300 mm	Stiffness (Ix) =	261.0 x10 ⁶ mm ⁴
Design width (dW) = 58 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S_1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	7.92 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k_{12d} =$	1.000 for $p_{bd} * S_1 \leq 10$ - Cl 3.2.4	$f'_b =$ 46.5 MPa
$k_{12} =$	1.000 for $p_b * S_1 \leq 10$ - Cl 3.2.4	$f'_s =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 0.99 (rbd=0.25)
$\phi M(dI) = \phi * (k_1=0.57) * k_4 * k_6 * k_9 * k_{12d} * f'_b * Z_x =$	43.85 kNm	Material constant (pb) = 0.94 (rb=0.61)
$\phi M = \phi * k_1 * k_4 * k_6 * k_9 * k_{12} * f'_b * Z_x =$	61.55 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k_1=0.57) * k_4 * k_6 * f'_s * (2/3 * A) =$	52.76 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k_1 * k_4 * k_6 * f'_s * (2/3 * A) =$	74.05 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

		Duration factor (j2) =	2.0	
Ireq'd j2.(DL+Ψl.LL) (L/300) =	127.3 x10 ⁶ mm ⁴	< Critical j2.(DL+Ψl.LL) =	5.4 mm	Span / 615
Ireq'd Ψs.LL (L/300) =	37.4 x10 ⁶ mm ⁴	Ψs.δLL =	1.6 mm	Span / 2093
Ireq'd Total (L/250) =	137.3 x10 ⁶ mm ⁴	δTotal =	6.9 mm	Span / 475
		1kN midspan δ =	0.2 mm	

PFC & ANGLE V5.06

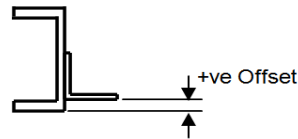
Xstruct

Geometry: (GL3) 230x75PFC (G300) + 150x90(v)x10UA (flush bottom)
Design: $M^* = 24.1 \text{ kNm} < \phi M_b(2500, \alpha_m = 1.13) = 94.7 \text{ kNm}$ OK (0.25)
Deflection: $\delta_{DL} = L/857$ (6mm), $\delta_{\Psi s.LL} = L/12427$ (0mm), $\delta_{Total} = L/802$ (6mm), 1kN mid. $\delta = 0.3 \text{ mm}$ OK
Reactions: (Each End) $R_{dl} = 14.3 \text{ kN}$, $R_{ll} = 1.4 \text{ kN}$, $R^* = 19.3 \text{ kN}$

Geometry

Warning - Torsional rotation to be verified (not considered)

Span (L) = 5000 mm Effective length (Le) = 2500 mm - Cl 5.6.3
 $\alpha_m = 1.13$
Design at = M mm from LHS, (M)ax, (S)eg
Effective length (Le) = 2500 mm
 $\alpha_m = 1.13$
PFC = 230x75PFC (G300)
Angle = 150x90(v)x10UA
Long leg vertical = N (Y)es,(N)o
Offset from bottom = 0 mm (flush bottom)



Loading

Live load type = N (N)ormal, (S)torage, (M)annual
AS/NZS 1170.0 - Table 4.1

Uniform dead loads

Roof dead load (wdl) =	0.40 kPa *	1700 mm +	kN/m =	0.68 kN/m
Floor dead load (wdl) =	kPa *	mm +	kN/m =	0.00 kN/m
Wall dead load (wdl) =	kPa *	mm +	kN/m =	0.00 kN/m
Other dead load (wdl) =	2.10 kPa *	2200 mm +	kN/m =	4.62 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.42 kN/m
			$\Sigma w_{dl} =$	5.72 kN/m

Uniform live loads

Roof live load (wll) =	0.33 kPa *	1700 mm +	kN/m =	0.56 kN/m
Floor live load (wll) =	1.50 kPa *	0 mm +	kN/m =	0.00 kN/m
Other live load (wll) =	kPa *	mm +	kN/m =	0.00 kN/m
			$\Sigma w_{ll} =$	0.56 kN/m

Point loads

Dead load (pdl) = kN Position = 2500 mm from LHS
Live load (pll) = kN

Short term LL factor (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
$w^* = 1.35 * w_{dl} =$	7.73 kN/m	$R_{dl} =$	14.3 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	0.00 kN/m	$R_{ll} =$	1.4 kN
Max M^* at =	2500 mm	$R^* =$	19.3 kN
$M^* =$	24.1 kNm		

Properties - Combined

Area (Ag) =	5400 mm ²	Warping constant (Iw) =	0.0 mm ⁶ (App. H4)
Yield ($f_{yc} = \min(f_{yf}, f_{yw}, f_{fy})$) =	300 MPa	Torsional constant (J) =	181.0 x10 ³ mm ⁴
Stiffness (Ix) =	39.9 x10 ⁶ mm ⁴	Elastic modulus (Zt) =	259.9 x10 ³ mm ³
Stiffness (Iy) =	13.73 x10 ⁶ mm ⁴	Elastic modulus (Zb) =	522.7 x10 ³ mm ³
Elastic (y.top) =	153.6 mm	Min. elastic modulus (Zmin) =	259.9 x10 ³ mm ³
Elastic (x.left) =	82.0 mm	Plastic modulus (S) =	490.9 x10 ³ mm ³
Plastic (yp.top) =	198.6 mm	Effective modulus (Zex) =	389.9 x10 ³ mm ³
Elastic modulus (E) =	200000 MPa - Cl 1.4		
Shear modulus (G) =	80000 MPa - Cl 1.4	$\phi =$	0.9 Table 3.4

Capacity - Cl 5.6.1.1

$M_{sx} = f_{yc} * Z_{ex} =$	117.0 kNm - Cl 5.2.1	$\phi M_{sx} =$	105.3 kNm	
$M_{oa} =$	250.6 kNm	$\alpha_s =$	0.796	$\alpha_m = 1.13$
		$\phi M_{bx} = \alpha_m * \alpha_s * \phi M_{sx} \leq \phi M_{sx} =$	94.7 kNm	

Deflections

Ireq'd DL (10mm max) =	23.3 x10 ⁶ mm ⁴	$\delta_{DL} =$	5.8 mm	Span / 857
Ireq'd $\Psi s.LL$ (10mm max) =	1.6 x10 ⁶ mm ⁴ < Critical	$\Psi s.\delta_{LL} =$	0.4 mm	Span / 12427
Ireq'd (DL+ $\Psi s.LL$) (10mm max) =	24.9 x10 ⁶ mm ⁴ < Critical	$\delta_{Total} =$	6.2 mm	Span / 802
		1kN midspan $\delta =$	0.3 mm	

SLEEPER WALLS V5.10

Xstruct

Wall: (RW1 500) 600mm high, 5.0kPa surcharge (Drained)
Loads: Surcharge = 5.00kPa, Drained
Steel Upright: 100UC14.8 (G300) (Galv.)
 $M^* = 1.21\text{kNm} < \phi M = 21.43\text{kNm}$, $V^* = 4.92\text{kN} < \phi V_{vm} = 83.81\text{kN}$ OK (0.06,0.06)
 $\delta(dI)=ht/12597$ (0.0mm), $\delta(dI+\psi I.II)=ht/5341$ (0.1mm) OK
Timber Upright: Not Applicable

Footing: $M^*o = 6.77\text{kNm} < \phi M_r = 7.08\text{kNm}$ OK (0.96)
Sleepers: 75mm x 200mm F7 KD Pine** (Weak) (Single layer sleepers)
 $M(dI)^* = 0.34\text{kNm} < \phi M(dI) = 1.35\text{kNm}$, $M^* = 0.33\text{kNm} < \phi M = 1.35\text{kNm}$ OK (0.25,0.25)
Critical sleeper layer is 3 from top of sleeper wall bending about weak axis
 $\delta(dI)=L/845$ (1.4mm) on layer 3, $\delta(dI+\psi I.II)=L/589$ (2.0mm) on layer 3 OK

Geometry

Pier depth/diameter ratio = 3.6

Wall assumed fully drained

Geometry Retaining height must be a multiple of the sleeper vertical dimension (600mm)
Retaining height (ht) = 600 mm
Post centres (cts) = 1200 mm
Upright = S (T)imber,(S)teel,(B)oth
Concrete sleepers = N (Y)es,(N)o
Risk class = B (A),(B),(C) - Moderate damage and loss of services - Table 1.1
Backfill type = 1 Class(1), Class(2), (U)ncontrolled, (I)n-situ - Table 5.1(A)

Soil parameters (behind wall)
Internal friction (ϕ) = 25 ° ($0^\circ \leq \phi \leq 45^\circ$)
Incline (β) = 0 ° ($0^\circ \leq \beta \leq 45^\circ$) 1 in 0.0
Soil weight (γ_s) = 23.0 kN/m³
Cohesion (c) = 0 kPa

Footing - Cohesionless
Total footing depth (d) = 1600 mm (From surface)
Ignore top (ig) = 0 mm
Footing diameter (dia) = 450 mm
Soil cohesion (cf) = 0 kPa (0 for cohesionless)
Soil internal friction (ϕ_f) = 25 ° ($0^\circ < \phi \leq 45^\circ$)
Design $cf^* = cf * \Phi_{uc} (=0.7)$ = 0.0 kPa insitu material
Design $\phi_f^* = \phi_f * \Phi_{uc} (=0.85)$ = 21.3 ° insitu material
Soil weight (γ_{sf}) = 23.0 kN/m³
Live Load duration = Permanent
Long term LL factor (ψ_l) = 1.00 AS 1170.0 Table 4.1
Duration factor (k_1) = 0.57

Sleepers Minor axis bending
Sleeper depth (dSD) = 75 mm (Horz. dimension)
Sleeper width (dSW) = 200 mm (Vert. dimension)
Max number of layers = 3 (600mm high)

Design loads - Appendix J & Section 4 - AS4678

Min. surcharge = 5.0 kPa - Table 4.1
Water height (hw) = 0.0 mm (Drained)
Surcharge (s) = 5.0 kPa

Dead only factor = 1.35 (1.35)
Earth factor = 1.25 (1.25)
Live load factor = 1.50 (1.50 - 0.0 for stabilising effect)
Stabilising factor = 0.80 AS4678 - Appendix J2

Additional upright overturning

Thrust (V_a) = 0.00 kN/upright
Overturning (M_a) = 0.00 kNm/upright
Load factor = 1.50
Long term LL factor (ψ_{lo}) = 0.40
 $V_a^* = 0.00$ kN/upright
 $M_a^* = 0.00$ kNm/upright
(Thrust/moment applied at the top of the wall)

Material design factors - Section 5

$\Phi_{uc} = 0.90$ $c^* = c * \Phi_{uc} = 0.0$ kPa CI 5.2.1
 $\Phi_{uo} = 0.95$ $\phi^* = 23.9$ ° CI 5.2.2 $\phi^* = 0.417$ rad
Design factor (Φ_n) = 1.00 Table 5.2
 $K_a = 0.423$ (Rankine) Depth of tension zone = 0 mm
 $K_p = 2.362$ (Rankine) Acting soil height (h_a) = 600 mm

SLEEPER WALLS V5.10

Design moment in upright (about top of footing, per m of wall)

	Pressure kPa	Thrust kN/m	Thrust* kN/m	Lever arm mm	Mw kNm/m	Mw* kNm/m	Comments
Soil = $Ka \cdot \gamma_s \cdot ha$ =	5.84	1.75	2.19	200	0.35	0.44	(At wall base)
Surcharge = $Ka \cdot s$ =	2.12	1.27	1.91	300	0.38	0.57	Max. pressure at base
Additional =		0.00	0.00	600	0.00	0.00	Uniform pressure dist.
Total =		3.02	4.10		0.73	1.01	
Total thrust (Vw) =	3.02 kN/m				Total moment (Mw) =	0.73 kNm/m	
Total ult. thrust (Vw*) =	4.10 kN/m				Total ult. moment (Mw*) =	1.01 kNm/m	
Total ult. thrust (Vw*/Φn) =	4.10 kNm/m				Total ult. moment (Mw*/Φn) =	1.01 kNm/m	
					Ultimate factor =	1.38	

Sleeper design - AS1720.1 Section 3

Double sleepers at layer =	0 (Single layer sleepers)		
Double sleepers laminated =	N (Y)es,(N)o		
Total layers =	3		
Critical layer for design =	3	Critical layer for design =	3
Critical layer centroid depth =	500	Critical layer centroid depth =	500 mm
w(dl)* =	1.89 kN/m	w* =	1.85 kN/m
M(dl)*/Φn =	0.34 kNm/m	M*/Φn =	0.33 kNm/m
Description =	75mm x 200mm F7 KD Pine	Area (A) =	15000 mm ²
Design depth (dD) =	75 mm	Section modulus (Zy) =	188 x10 ³ mm ³
Design width (dW) =	200 mm	Stiffness (Iy) =	7.0 x10 ⁶ mm ⁴
		Modulus of elasticity (E) =	7900 MPa
Capacity factor (φ) =	0.7 Table 2.1 - Category 2		
Duration factor (k1) =	0.57	Moisture factor (k4) =	1.00
Stability factor (k12) =	1.00	Temp. factor (k6) =	1.00
f'b =	18.0 MPa	Sharing factor (k9) =	1.00
φM(dl) = φ*(k1=0.57)*k4*k6*k9*k12*f'b*Z =	1.35 kNm	Size modifier (mod.b) =	1.00
φM = φ*k1*k4*k6*k9*k12*f'b*Z =	1.35 kNm	OK (0.25)	
j2 =	3.00	OK (0.25)	
Deflection horizontal j2*δ(dl) =	1.4 mm	span / 845	At layer 3
δ(II) =	0.6 mm	span / 1943	At layer 1
Long term deflection horizontal δ(dl+ψl. II) =	2.0 mm	span / 589	At layer 3

Steel upright design - AS4100 Section 5

V* = Vw*.*cts/Φn =	4.92 kN		
M* = Mw*.*cts/Φn =	1.21 kNm		
Description =	100UC14.8 (G300)	Capacity factor (φ) =	0.9 Table 3.4
Flange yield (fyf) =	320 MPa	Warping constant (Iw) =	2.3 x10 ⁹ mm ⁶
Area (Ag) =	1890 mm ²	Torsional constant (J) =	34.9 x10 ³ mm ⁴
Stiffness (Ix) =	3.18 x10 ⁶ mm ⁴	Effective section mod. (Zex) =	74.4 x10 ³ mm ³
Shear modulus (G) =	80000 MPa - Cl 1.4	Effective section mod. (Zey) =	34.4 x10 ³ mm ³
		Modulus of elasticity (Es) =	200000 MPa - Cl 1.4
Msx =	23.8 kNm - Cl 5.2	φMsx =	21.4 kNm
φVv = φVu =	83.8 kN		OK (0.06)
φVvm =	83.8 kN	φVvm = φVv	OK (0.06)
Deflection horizontal at top δ(dl) =	0.0 mm	ht / 12597	
δ(LL) =	0.1 mm	ht / 9271	
δ(II) (other) =	0.0 mm	ht / 0	
Total δ(II) =	0.1 mm	ht / 9271	
Total deflection horizontal δ(dl+ψl. II) =	0.1 mm	ht / 5341	

SLEEPER WALLS V5.10

Timber upright design - AS1720.1 Section 3 (Not Applicable)

Licensee: Xstruct

Footing design [ASD] - Cohesionless

Shear included in footing

Footing geometry

Total footing depth (d) =	1600 mm
Ignore depth (ig) =	0 mm
Design depth (D=d-ig) =	1600 mm
Rotation depth (rD=D-D*(1-1/√2)) =	1131 mm
Footing diameter (dia) =	450 mm

Upright reactions

V* =	4.92 kN
M* =	1.21 kNm

Overturning moment

$$M^*O = M^* + V^* \cdot (ig + rD) = 6.77 \text{ kNm}$$

Soil parameters (footing)

Internal friction (ϕ^*) =	0.4 rad
Ka =	0.47 (Rankine)
Kp =	2.14 (Rankine)

$$\phi Mr = (Kp - Ka) \cdot \gamma_{sf} \cdot dia \cdot D^3 / 10 = 7.1 \text{ kNm} \quad \text{OK (0.96)}$$

Horizontal bearing

Equiv. $Kp - Ka = K^* = (Kp - Ka) \cdot (Mo^* / \phi Mr) =$	1.60
Ult. bearing BP* (hinge) = $K^* \cdot \gamma \cdot 0.707 \cdot D =$	41.6 kPa (Horizontal)
Ult. bearing BP* (base) = $K^* \cdot \gamma \cdot D =$	58.8 kPa (Horizontal)

SLEEPER WALLS V5.10

Xstruct

Wall: (RW1 1000) 1000mm high, 5.0kPa surcharge (Drained)
Loads: Surcharge = 5.00kPa, Drained
Steel Upright: 150UC23.4 (G300) (Galv.)
 $M^* = 2.89\text{kNm} < \phi M = 50.69\text{kNm}$, $V^* = 7.41\text{kN} < \phi V_{vm} = 160.22\text{kN}$ OK (0.06,0.05)
 $\delta(dI) = ht/9703$ (0.1mm), $\delta(dI + \psi I.II) = ht/5345$ (0.2mm) OK
Timber Upright: Not Applicable

Footing: $M^*o = 13.37\text{kNm} < \phi M_r = 13.82\text{kNm}$ OK (0.97)
Sleepers: 75mm x 200mm F7 KD Pine** (Weak) (Single layer sleepers)
 $M(dI)^* = 0.24\text{kNm} < \phi M(dI) = 1.35\text{kNm}$, $M^* = 0.23\text{kNm} < \phi M = 1.35\text{kNm}$ OK (0.17,0.17)
Critical sleeper layer is 5 from top of sleeper wall bending about weak axis
 $\delta(dI) = L/1584$ (0.5mm) on layer 5, $\delta(dI + \psi I.II) = L/1276$ (0.6mm) on layer 5 OK

Geometry

Pier depth/diameter ratio = 4.4

Wall assumed fully drained

Geometry Retaining height must be a multiple of the sleeper vertical dimension (1000mm)
Retaining height (ht) = 1000 mm
Post centres (cts) = 800 mm
Upright = S (T)imber, (S)teel, (B)oth
Concrete sleepers = N (Y)es, (N)o
Risk class = B (A),(B),(C) - Moderate damage and loss of services - Table 1.1
Backfill type = 1 Class(1), Class(2), (U)ncontrolled, (I)n-situ - Table 5.1(A)

Soil parameters (behind wall)
Internal friction (ϕ) = 25 ° ($0^\circ \leq \phi \leq 45^\circ$)
Incline (β) = 0 ° ($0^\circ \leq \beta \leq 45^\circ$) 1 in 0.0
Soil weight (γ_s) = 23.0 kN/m³
Cohesion (c) = 0 kPa

Footing - Cohesionless
Total footing depth (d) = 2000 mm (From surface)
Ignore top (ig) = 0 mm
Footing diameter (dia) = 450 mm
Soil cohesion (cf) = 0 kPa (0 for cohesionless)
Soil internal friction (ϕ_f) = 25 ° ($0^\circ < \phi \leq 45^\circ$)
Design $cf^* = cf * \phi_{uc} (=0.7)$ = 0.0 kPa insitu material
Design $\phi_f^* = \phi_f * \phi_{uc} (=0.85)$ = 21.3 ° insitu material
Soil weight (γ_{sf}) = 23.0 kN/m³
Live Load duration = Permanent
Long term LL factor (ψ_l) = 1.00 AS 1170.0 Table 4.1
Duration factor (k_1) = 0.57

Sleepers Minor axis bending
Sleeper depth (dSD) = 75 mm (Horz. dimension)
Sleeper width (dSW) = 200 mm (Vert. dimension)
Max number of layers = 5 (1000mm high)

Design loads - Appendix J & Section 4 - AS4678

Min. surcharge = 5.0 kPa - Table 4.1
Water height (hw) = 0.0 mm (Drained)
Surcharge (s) = 5.0 kPa

Dead only factor = 1.35 (1.35)
Earth factor = 1.25 (1.25)
Live load factor = 1.50 (1.50 - 0.0 for stabilising effect)
Stabilising factor = 0.80 AS4678 - Appendix J2

Additional upright overturning

Thrust (V_a) = 0.00 kN/upright
Overturning (M_a) = 0.00 kNm/upright
Load factor = 1.50
Long term LL factor (ψ_{lo}) = 0.40
 $V_a^* = 0.00$ kN/upright
 $M_a^* = 0.00$ kNm/upright
(Thrust/moment applied at the top of the wall)

Material design factors - Section 5

$\phi_{uc} = 0.90$ $c^* = c * \phi_{uc} = 0.0$ kPa CI 5.2.1
 $\phi_{uo} = 0.95$ $\phi^* = 23.9$ ° CI 5.2.2 $\phi^* = 0.417$ rad
Design factor (ϕ_n) = 1.00 Table 5.2
 $K_a = 0.423$ (Rankine) Depth of tension zone = 0 mm
 $K_p = 2.362$ (Rankine) Acting soil height (h_a) = 1000 mm

SLEEPER WALLS V5.10

Design moment in upright (about top of footing, per m of wall)

	Pressure kPa	Thrust kN/m	Thrust* kN/m	Lever arm mm	Mw kNm/m	Mw* kNm/m	Comments
Soil = $Ka \cdot \gamma_s \cdot ha$ =	9.74	4.87	6.09	333	1.62	2.03	(At wall base)
Surcharge = $Ka \cdot s$ =	2.12	2.12	3.18	500	1.06	1.59	Max. pressure at base
Additional =		0.00	0.00	1000	0.00	0.00	Uniform pressure dist.
Total =		6.99	9.26		2.68	3.62	
Total thrust (Vw) =	6.99 kN/m				Total moment (Mw) =	2.68 kNm/m	
Total ult. thrust (Vw*) =	9.26 kN/m				Total ult. moment (Mw*) =	3.62 kNm/m	
Total ult. thrust (Vw*/Φn) =	9.26 kNm/m				Total ult. moment (Mw*/Φn) =	3.62 kNm/m	
					Ultimate factor =	1.35	

Sleeper design - AS1720.1 Section 3

Double sleepers at layer =	0 (Single layer sleepers)		
Double sleepers laminated =	N (Y)es,(N)o		
Total layers =	5		
Critical layer for design =	5	Critical layer for design =	5
Critical layer centroid depth =	900	Critical layer centroid depth =	900 mm
w(dl)* =	2.94 kN/m	w* =	2.83 kN/m
M(dl)*/Φn =	0.24 kNm/m	M*/Φn =	0.23 kNm/m
Description =	75mm x 200mm F7 KD Pine	Area (A) =	15000 mm ²
Design depth (dD) =	75 mm	Section modulus (Zy) =	188 x10 ³ mm ³
Design width (dW) =	200 mm	Stiffness (Iy) =	7.0 x10 ⁶ mm ⁴
		Modulus of elasticity (E) =	7900 MPa
Capacity factor (φ) =	0.7 Table 2.1 - Category 2		
Duration factor (k1) =	0.57	Moisture factor (k4) =	1.00
Stability factor (k12) =	1.00	Temp. factor (k6) =	1.00
f'b =	18.0 MPa	Sharing factor (k9) =	1.00
φM(dl) = φ*(k1=0.57)*k4*k6*k9*k12*f'b*Z =	1.35 kNm	Size modifier (mod.b) =	1.00
φM = φ*k1*k4*k6*k9*k12*f'b*Z =	1.35 kNm	OK (0.17)	
j2 =	3.00	OK (0.17)	
Deflection horizontal j2*δ(dl) =	0.5 mm	span / 1584	At layer 5
δ(II) =	0.1 mm	span / 6559	At layer 1
Long term deflection horizontal δ(dl+ψl. II) =	0.6 mm	span / 1276	At layer 5

Steel upright design - AS4100 Section 5

V* = Vw*.*cts/Φn =	7.41 kN		
M* = Mw*.*cts/Φn =	2.89 kNm		
Description =	150UC23.4 (G300)	Capacity factor (φ) =	0.9 Table 3.4
Flange yield (fyf) =	320 MPa	Warping constant (Iw) =	21.1 x10 ⁹ mm ⁶
Area (Ag) =	2980 mm ²	Torsional constant (J) =	50.2 x10 ³ mm ⁴
Stiffness (Ix) =	12.6 x10 ⁶ mm ⁴	Effective section mod. (Zex) =	176 x10 ³ mm ³
Shear modulus (G) =	80000 MPa - Cl 1.4	Effective section mod. (Zey) =	73.5 x10 ³ mm ³
		Modulus of elasticity (Es) =	200000 MPa - Cl 1.4
Msx =	56.3 kNm - Cl 5.2	φMsx =	50.7 kNm OK (0.06)
φVv = φVu =	160.2 kN		
φVvm =	160.2 kN	φVvm = φVv	OK (0.05)
Deflection horizontal at top δ(dl) =	0.1 mm	ht / 9703	
δ(LL) =	0.1 mm	ht / 11902	
δ(II) (other) =	0.0 mm	ht / 0	
Total δ(II) =	0.1 mm	ht / 11902	
Total deflection horizontal δ(dl+ψl. II) =	0.2 mm	ht / 5345	

SLEEPER WALLS V5.10

Timber upright design - AS1720.1 Section 3 (Not Applicable)

Licensee: Xstruct

Footing design [ASD] - Cohesionless

Shear included in footing

Footing geometry

Total footing depth (d) =	2000 mm
Ignore depth (ig) =	0 mm
Design depth (D=d-ig) =	2000 mm
Rotation depth (rD=D-D*(1-1/√2)) =	1414 mm
Footing diameter (dia) =	450 mm

Upright reactions

V* =	7.41 kN
M* =	2.89 kNm

Overturning moment

$$M^*O = M^* + V^* \cdot (ig + rD) = 13.37 \text{ kNm}$$

Soil parameters (footing)

Internal friction (ϕ^*) =	0.4 rad
Ka =	0.47 (Rankine)
Kp =	2.14 (Rankine)

$$\phi Mr = (Kp - Ka) \cdot \gamma_{sf} \cdot dia \cdot D^3 / 10 = 13.8 \text{ kNm} \quad \text{OK (0.97)}$$

Horizontal bearing

Equiv. $Kp - Ka = K^* = (Kp - Ka) \cdot (Mo^* / \phi Mr) =$	1.62
Ult. bearing $BP^* (\text{hinge}) = K^* \cdot \gamma \cdot 0.707 \cdot D =$	52.5 kPa (Horizontal)
Ult. bearing $BP^* (\text{base}) = K^* \cdot \gamma \cdot D =$	74.3 kPa (Horizontal)

SLEEPER WALLS V5.10

Wall: (RW1 1500) 1500mm high, 5.0kPa surcharge (Drained)
Loads: Surcharge = 5.00kPa, Drained
Steel Upright: 150UC23.4 (G300) (Galv.)
 $M^* = 8.34\text{kNm} < \phi M = 50.69\text{kNm}$, $V^* = 14.77\text{kN} < \phi V_{vm} = 160.22\text{kN}$ OK (0.16,0.09)
 $\delta(dI)=ht/1917$ (0.8mm), $\delta(dI+\psi I.II)=ht/1242$ (1.2mm) OK
Timber Upright: Not Applicable

Footing: $M^*o = 34.44\text{kNm} < \phi M_r = 35.99\text{kNm}$ OK (0.96)
Sleepers: 75mm x 200mm F5 KD Pine** (Weak) (Single layer sleepers)
 $M(dI)^* = 0.36\text{kNm} < \phi M(dI) = 1.05\text{kNm}$, $M^* = 0.34\text{kNm} < \phi M = 1.05\text{kNm}$ OK (0.34,0.33)
Critical sleeper layer is 8 from top of sleeper wall bending about weak axis
 $\delta(dI)=L/830$ (1.0mm) on layer 8, $\delta(dI+\psi I.II)=L/725$ (1.1mm) on layer 8 OK

Geometry

Pier depth/diameter ratio = 4.2

Wall assumed fully drained

Geometry Error - Retaining height must be a multiple of the sleeper vertical dimension (1400mm)
Retaining height (ht) = 1500 mm
Post centres (cts) = 800 mm
Upright = S (T)imber,(S)teel,(B)oth
Concrete sleepers = N (Y)es,(N)o
Risk class = B (A),(B),(C) - Moderate damage and loss of services - Table 1.1
Backfill type = 1 Class(1), Class(2), (U)ncontrolled, (I)n-situ - Table 5.1(A)

Soil parameters (behind wall)
Internal friction (ϕ) = 25 ° ($0^\circ \leq \phi \leq 45^\circ$)
Incline (β) = 0 ° ($0^\circ \leq \beta \leq 45^\circ$) 1 in 0.0
Soil weight (γ_s) = 23.0 kN/m³
Cohesion (c) = 0 kPa

Footing - Cohesionless
Total footing depth (d) = 2500 mm (From surface)
Ignore top (ig) = 0 mm
Footing diameter (dia) = 600 mm
Soil cohesion (cf) = 0 kPa (0 for cohesionless)
Soil internal friction (ϕ_f) = 25 ° ($0^\circ < \phi \leq 45^\circ$)
Design $cf^*=cf*\phi_{uc}(=0.7)$ = 0.0 kPa insitu material
Design $\phi_f^*=\phi_f*\phi_{uc}(=0.85)$ = 21.3 ° insitu material
Soil weight (γ_{sf}) = 23.0 kN/m³
Live Load duration = Permanent
Long term LL factor (ψ_l) = 1.00 AS 1170.0 Table 4.1
Duration factor (k_1) = 0.57

Sleepers Minor axis bending
Sleeper depth (dSD) = 75 mm (Horz. dimension)
Sleeper width (dSW) = 200 mm (Vert. dimension)
Max number of layers = 8 (1600mm high)

Design loads - Appendix J & Section 4 - AS4678

Min. surcharge = 5.0 kPa - Table 4.1
Water height (hw) = 0.0 mm (Drained)
Surcharge (s) = 5.0 kPa
Dead only factor = 1.35 (1.35)
Earth factor = 1.25 (1.25)
Live load factor = 1.50 (1.50 - 0.0 for stabilising effect)
Stabilising factor = 0.80 AS4678 - Appendix J2
Additional upright overturning
Thrust (V_a) = 0.00 kN/upright
Overturning (M_a) = 0.00 kNm/upright
Load factor = 1.50
Long term LL factor (ψ_{lo}) = 0.40
 $V_a^* = 0.00$ kN/upright
 $M_a^* = 0.00$ kNm/upright
(Thrust/moment applied at the top of the wall)

Material design factors - Section 5

$\phi_{uc} = 0.90$ $c^*=c*\phi_{uc} = 0.0$ kPa CI 5.2.1
 $\phi_{uo} = 0.95$ $\phi^* = 23.9$ ° CI 5.2.2 $\phi^* = 0.417$ rad
Design factor (ϕ_n) = 1.00 Table 5.2
 $K_a = 0.423$ (Rankine) Depth of tension zone = 0 mm
 $K_p = 2.362$ (Rankine) Acting soil height (h_a) = 1500 mm

SLEEPER WALLS V5.10

Design moment in upright (about top of footing, per m of wall)

	Pressure kPa	Thrust kN/m	Thrust* kN/m	Lever arm mm	Mw kNm/m	Mw* kNm/m	Comments
Soil = $Ka \cdot \gamma_s \cdot ha$ =	14.61	10.96	13.70	500	5.48	6.85	(At wall base)
Surcharge = $Ka \cdot s$ =	2.12	3.18	4.76	750	2.38	3.57	Max. pressure at base
Additional =		0.00	0.00	1500	0.00	0.00	Uniform pressure dist.
Total =		14.13	18.46		7.86	10.42	
Total thrust (Vw) =	14.13 kN/m				Total moment (Mw) =	7.86 kNm/m	
Total ult. thrust (Vw*) =	18.46 kN/m				Total ult. moment (Mw*) =	10.42 kNm/m	
Total ult. thrust (Vw*/Φ_n) =	18.46 kNm/m				Total ult. moment (Mw*/Φ_n) =	10.42 kNm/m	
					Ultimate factor =	1.33	

Sleeper design - AS1720.1 Section 3

Double sleepers at layer =	0 (Single layer sleepers)		
Double sleepers laminated =	N (Y)es,(N)o		
Total layers =	8		
Critical layer for design =	8	Critical layer for design =	8
Critical layer centroid depth =	1500	Critical layer centroid depth =	1500 mm
w(dl)* =	4.52 kN/m	w* =	4.29 kN/m
M(dl)*/ Φ_n =	0.36 kNm/m	M*/ Φ_n =	0.34 kNm/m
Description =	75mm x 200mm F5 KD Pine	Area (A) =	15000 mm ²
Design depth (dD) =	75 mm	Section modulus (Zy) =	188 x10 ³ mm ³
Design width (dW) =	200 mm	Stiffness (Iy) =	7.0 x10 ⁶ mm ⁴
		Modulus of elasticity (E) =	6900 MPa
Capacity factor (ϕ) =	0.7 Table 2.1 - Category 2	Moisture factor (k4) =	1.00
Duration factor (k1) =	0.57	Temp. factor (k6) =	1.00
Stability factor (k12) =	1.00	Sharing factor (k9) =	1.00
f'b =	14.0 MPa	Size modifier (mod.b) =	1.00
$\phi M(dl) = \phi \cdot (k1=0.57) \cdot k4 \cdot k6 \cdot k9 \cdot k12 \cdot f'b \cdot Z =$	1.05 kNm	OK (0.34)	
$\phi M = \phi \cdot k1 \cdot k4 \cdot k6 \cdot k9 \cdot k12 \cdot f'b \cdot Z =$	1.05 kNm	OK (0.33)	
j2 =	3.00		
Deflection horizontal j2* $\delta(dl)$ =	1.0 mm	span / 830	At layer 8
$\delta(II) =$	0.1 mm	span / 5729	At layer 1
Long term deflection horizontal $\delta(dl+\psi \cdot II) =$	1.1 mm	span / 725	At layer 8

Steel upright design - AS4100 Section 5

V* = Vw* . *cts/ Φ_n =	14.77 kN		
M* = Mw* . *cts/ Φ_n =	8.34 kNm		
Description =	150UC23.4 (G300)	Capacity factor (ϕ) =	0.9 Table 3.4
Flange yield (fyf) =	320 MPa	Warping constant (Iw) =	21.1 x10 ⁹ mm ⁶
Area (Ag) =	2980 mm ²	Torsional constant (J) =	50.2 x10 ³ mm ⁴
Stiffness (Ix) =	12.6 x10 ⁶ mm ⁴	Effective section mod. (Zex) =	176 x10 ³ mm ³
Shear modulus (G) =	80000 MPa - Cl 1.4	Effective section mod. (Zey) =	73.5 x10 ³ mm ³
		Modulus of elasticity (Es) =	200000 MPa - Cl 1.4
Msx =	56.3 kNm - Cl 5.2	$\phi Msx =$	50.7 kNm OK (0.16)
$\phi Vv = \phi Vu =$	160.2 kN		
$\phi Vvm =$	160.2 kN	$\phi Vvm = \phi Vv$	OK (0.09)
Deflection horizontal at top $\delta(dl) =$	0.8 mm	ht / 1917	
$\delta(LL) =$	0.4 mm	ht / 3527	
$\delta(II)$ (other) =	0.0 mm	ht / 0	
Total $\delta(II) =$	0.4 mm	ht / 3527	
Total deflection horizontal $\delta(dl+\psi \cdot II) =$	1.2 mm	ht / 1242	

SLEEPER WALLS V5.10

Timber upright design - AS1720.1 Section 3 (Not Applicable)

Licensee: Xstruct

Footing design [ASD] - Cohesionless

Shear included in footing

Footing geometry

Total footing depth (d) =	2500 mm
Ignore depth (ig) =	0 mm
Design depth (D=d-ig) =	2500 mm
Rotation depth (rD=D-D*(1-1/√2)) =	1768 mm
Footing diameter (dia) =	600 mm

Upright reactions

V* =	14.77 kN
M* =	8.34 kNm

Overturning moment

$$M^*O = M^* + V^* \cdot (ig + rD) = 34.44 \text{ kNm}$$

Soil parameters (footing)

Internal friction (ϕ^*) =	0.4 rad
Ka =	0.47 (Rankine)
Kp =	2.14 (Rankine)

$$\phi Mr = (Kp - Ka) \cdot \gamma sf \cdot dia \cdot D^3 / 10 = 36.0 \text{ kNm} \quad \text{OK (0.96)}$$

Horizontal bearing

Equiv. $Kp - Ka = K^* = (Kp - Ka) \cdot (Mo^* / \phi Mr) =$	1.60
Ult. bearing BP* (hinge) = $K^* \cdot \gamma \cdot 0.707 \cdot D =$	64.9 kPa (Horizontal)
Ult. bearing BP* (base) = $K^* \cdot \gamma \cdot D =$	91.8 kPa (Horizontal)

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(3B2 (Alt)) 2 / 400mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 25.87\text{kNm (+ve)} < \phi M(dI) = 45.02\text{kNm}$, $M^* = 37.51\text{kNm (+ve)} < \phi M = 65.27\text{kNm}$	OK (0.57,0.57)
Shear:	$V(dI)^* = 22.48\text{kN} < \phi V(dI) = 48.26\text{kN}$, $V^* = 33.70\text{kN} < \phi V = 67.74\text{kN}$	OK (0.47,0.50)
Deflection:	$\delta DL = L/466$ (8mm), $\delta \Psi s.LL = L/1706$ (2mm), $\delta Total = L/366$ (10mm), 1kN mid. $\delta = 0.2\text{mm}$	OK
Reactions:	(Each end) $RdI = 11.78\text{kN}$, $RlI = 13.04\text{kN}$, $R^* = 33.70\text{kN}$	

Geometry (House member affecting > 25m² or primary building member)

Category =	2 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	3800 mm	Lay.t (Top) = 450 mm
Centres (cts) =	3300 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	12.54 m ²	Live load type = N (N)ormal, (S)torage, (M)anual
		AS/NZS 1170.0 - Table 4.1

Uniform dead loads

Floor dead load (wdl) =	0.50 kPa *	3300 mm +	kN/m =	1.65 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m =	1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	4000 mm +	kN/m =	1.60 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.20 kN/m
			$\Sigma wdl =$	4.80 kN/m

Uniform live loads

Floor live load (wll) =	1.50 kPa *	3300 mm +	kN/m =	4.95 kN/m
Partitions (wll) =	0.25 kPa *	4000 mm +	kN/m =	1.00 kN/m
Alternate point live load =	1.80 kN	Distr. to 1 members	$\Sigma wll =$	5.95 kN/m

Point loads

Dead load (pdl) =	5.32 kN	Position = 1900 mm from LHS
Live load (pll) =	3.46 kN	Shear using PL at support = N (Y)es,(N)o
Short term LL factor (Ψsu) =	0.70	(Ψsp) = 1.00
Long term LL factor (Ψlu) =	0.40	(Ψlp) = 0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi lu * wll =$	9.33 kN/m	$M(dI + \Psi l.II)^* = 25.87\text{ kNm (Max at 1900mm)}$
$w^* = 1.2 * wdl + 1.5 * wll =$	14.69 kN/m	$M^* = 37.51\text{ kNm (Max at 1900mm)}$
$pdl^* = 1.2 * pdl + 1.5 * \Psi lp * pll =$	9.50 kN	$V(dI + \Psi l.II)^* = 22.48\text{ kN}$
$p^* = 1.2 * pdl + 1.5 * pll =$	11.58 kN	$V^* = 33.70\text{ kN}$

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

DL	5.3	3.5	: M M
LL	5.3	3.5	
Σ			

Member = 2 / 400mm x 42mm Smart LVL15	Area (A) =	33600 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	2240 x10 ³ mm ³
Design depth (dD) = 400 mm	Stiffness (Ix) =	448.0 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3

$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	12.63 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 * pbd * S1 =$	0.891 for $10 \leq pbd * S1 \leq 20$ - Cl 3.2.4	$f'b = 44.0\text{ MPa}$
$k12 = 1.5 - 0.05 * pb * S1 =$	0.920 for $10 \leq pb * S1 \leq 20$ - Cl 3.2.4	$f's = 4.2\text{ MPa}$
Strength reduction factor (ϕ) =	0.9 Table 2.1	Material constant (pbd) = 0.96 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	45.02 kNm	Material constant (pb) = 0.92 (rb=0.56)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	65.27 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	48.26 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	67.74 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor ($j2$) =	2.0
$Ireq'd j2.(DL + \Psi l.LL) (L/300) =$	288.5 x10 ⁶ mm ⁴	< Critical $j2.(DL + \Psi l.LL) =$
$Ireq'd \Psi s.LL (12mm) =$	83.2 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$
$Ireq'd Total (L/250) =$	306.1 x10 ⁶ mm ⁴	$\delta Total =$
	1kN midspan $\delta =$	0.2 mm

STEEL COLUMN V5.07

Xstruct

Member:	(C1) 89 x 6.0 SHS (G350)# (Cap plate connection)	
Compression:	$N_c^* = 66.2 \text{ kN} < \phi N_c = 203.8 \text{ kN}$	OK (0.32)
Bending:	$M_x^* = 2.9 \text{ kNm} < \phi M_b(4000, \alpha_m=1.75) = 17.8 \text{ kNm}$ No minor bending	OK (0.17)
Combined:	In-plane = 0.49, Out-of-plane = 0.49	OK (0.49)

Geometry

Column length (L) =	4000 mm	L = L _b = L _x = L _y =	Y (Y)es,(N)o
Compression:			
Major axis length (L _x) =	4000 mm		
Minor axis length (L _y) =	4000 mm		
Effective length X factor (k _{ex}) =	1.00 Fig 4.6.3.2		
Effective length Y factor (k _{ey}) =	1.00 Fig 4.6.3.2	Holes =	0 mm ² (axial reduction only)
Bending:			
Bending length (L _b) =	4000 mm	Eff. length L _{ex} (4000,1.00) =	4000 mm
Bending effective length factor (k _e) =	1.00 Cl 5.6.3	Eff. length L _{ey} (4000,1.00) =	4000 mm
Moment modification factor (α _m) =	1.75 Cl 5.6.1.1(a)	Eff. length L _{eb} (4000,1.00) =	4000 mm

Loadings

S.Wt =	0.15 kN/m (excluded)		
Dead load comp. (N _{dl}) =	35.2 kN	DL	LL
Live load comp. (N _{ll}) =	16.0 kN	3B6 20.9 14.6 : R R	
N _c * = 1.2*N _{dl} +1.5*N _{ll} =	66.2 kN	GL3 14.3 1.4 : L L	
		Σ 35.2 16.0	
		δbx = cm/(1-N*/Nomx) =	1.00 and δby = 1.00
Beam End Connection (For moment) =	C (C)ap,(F)ace,(M)anual,(L)oadng		
Major axis M _x * = δbx.N _c *(D/2) =	2.9 kNm		
Minor axis M _y * = δby.M _y * =	0.0 kNm - App. E	Minor bending (M _y *) =	0.0 kNm
D =	89 mm (Bending about the strong axis only)		

Capacity

Section doubly symmetric

Description =	89 x 6.0 SHS (G350)#	Warping constant (I _w) =	0 x10 ⁹ mm ⁶
Flange yield (f _{yf}) =	350 MPa	Torsional constant (J) =	3550 x10 ³ mm ⁴
Web yield (f _{yw}) =	350 MPa	Effective section mod. (Z _{ex}) =	56.6 x10 ³ mm ³
Area (A _g) =	1870 mm ²	Effective section mod. (Z _{ey}) =	56.6 x10 ³ mm ³
Stiffness (I _x) =	2.06 x10 ⁶ mm ⁴	Elastic modulus (E) =	200000 MPa - Cl 1.4
Stiffness (I _y) =	2.06 x10 ⁶ mm ⁴	Shear modulus (G) =	80000 MPa - Cl 1.4
r _x =	33.2 mm	α _b =	-0.5 (Comp.)
r _y =	33.2 mm	Net area (A _n) =	1870 mm ²
Compression - Section 6		Nomx = π ² *E*I _x /(k _{ex} *L _x) ² =	254 kN - Cl 4.6.2
		Nomy = π ² *E*I _y /(k _{ey} *L _y) ² =	254 kN
φ =	0.9 Table 3.4	φN _s = φ*k _f *A _n *f _y =	589.1 kN - Cl 6.2.1
α _{cx} (L _{ex}) =	0.346	φN _{cx} = φN _s *α _{cx} =	203.8 kN - Cl 6.3.3
α _{cx1} (k _{ex} =1, L _{ex} =L _x) =	0.346	φN _{cy} = φN _s *α _{cy} =	203.8 kN - Cl 6.3.3
α _{cy} (L _{ey}) =	0.346	φN _c =	203.8 kN
α _{cy1} (k _{ey} =1, L _{ey} =L _y) =	0.346	φN _{cx1} = φN _s *α _{cx1} =	203.8 kN - Cl 8.4.2.2
		φN _{cy1} = φN _s *α _{cy1} =	203.8 kN - Cl 8.4.2.2
Bending - Section 5			
φ =	0.9 Table 3.4	φM _{sy} =	17.8 kNm
M _{sx} = min(f _{yf} ,f _{yw})*Z _{ex} =	19.8 kNm - Cl 5.2.1	φM _{sx} =	17.8 kNm
M _{oa} =	268.7 kNm α _s = 0.996	α _m = 1.75	φM _{bx} (α _m =1) = 17.8 kNm
Combined - Section 8			
Uniaxial bending about major axis - φM _{rx} = φM _{sx} *(1-N _c */φN _s) =		15.8 kNm - Cl 8.3.2	OK (0.19)
In-plane capacity - φM _{ix} = φM _{sx} *(1-N _c */φN _{cx1}) =		12.0 kNm - Cl 8.4.2.2	OK (0.24)
Out-of-plane capacity - φM _{ox} = φM _{bx} *(1-N _c */φN _{cy}) =		12.0 kNm - Cl 8.4.4.1	OK (0.24)
In-plane member ratio = M _x */φM _{sx} + N _c */φN _{cx1} =		0.49	OK (0.49)
In-plane member ratio = M _y */φM _{sy} + N _c */φN _{cy1} =		0.32	OK (0.32)
Out-of-plane member ratio = M _x */φM _{bx} + N _c */φN _{cy} =		0.49	OK (0.49)
φM _{cx} = min(φM _{ox} & φM _{ix}) =		12.0 kNm - Cl 8.4.5	
φM _{iy} = φM _{sy} *(1-N _c */φN _{cy1}) =		12.0 kNm - Cl 8.4.2.2	
Biaxial bending ratio = (M _x */φM _{cx}) ^{1.4} + (M _y */φM _{iy}) ^{1.4} =		0.14 Cl 8.4.5	OK (0.14)
Biaxial section ratio = N _c */φN _s + M _x */φM _{sx} + M _y */φM _{sy} =		0.28	OK (0.28)

RETAINING WALLS V5.06

Xstruct

Wall:	(RW2 600) 600mm retaining ht., 300mm thick (With key)	
Loads:	Surcharge = 5.00kPa, Drained	
Footing:	800mm long (overall), 0mm overhang (behind wall), 600mm deep	
Stability:	$M^*o = 5.8\text{kNm} < \phi Mr = 7.1\text{kNm}$	OK (0.81)
Sliding:	$V^*slide = 12.6\text{kN} < \phi Vr = 19.9\text{kN}$	OK (0.63)
Wall:	$M^*wall = 1.0\text{kNm}$, $V^*wall = 4.1\text{kN}$, Design factor $\Phi n = 1.0$	
Bearing:	Max. bearing pressure = 49kPa < Allowable = 150kPa	OK (0.33)

Geometry

Wall assumed fully drained

Retaining height (z) =	600 mm (= Wall height)
Risk class =	B (A),(B),(C) - Moderate damage and loss of services - Table 1.1
Backfill type =	1 Class(1), Class(2), (U)ncontrolled, (I)n-situ - Table 5.1(A)

Soil parameters	
Internal friction (ϕ) =	25 ° ($0^\circ \leq \phi \leq 45^\circ$)
Incline (β) =	0 ° ($0^\circ \leq \beta \leq 45^\circ$) 1 in 0.0
Soil weight (γ) =	23.0 kN/m ³
Cohesion (c) =	0 kPa
Friction coefficient (μ) =	0.443 (-1 to ignore sliding)

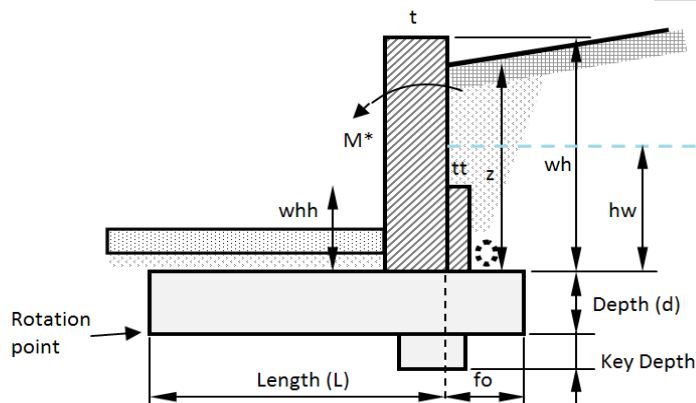
Use passive =	Y (Y)es,(N)o
Manual Kp value =	0.00 0 for default
Soil depth to Ignore =	0 mm (for passive)

Allowable bearing = 150 kPa

Slab overlay (ts) =	mm
Soil overlay (tsl) =	mm

Wall	
Wall thickness (t) =	300 mm
Wall height (wh) =	600 mm (= Retaining height)
Add'l thickness (tt) =	mm (behind wall)
Add'l th. height (whh) =	mm
Add'l th. on soil side =	Y (Y)es,(N)o
Wall Wt (Wwt) =	25 kN/m ³

Footing	
Footing depth (d) =	600 mm
End thickness (d2) =	0 mm (0 = no taper)
Footing length (L) =	800 mm excluding overhang
Overhang (fo) =	0 mm additional to length
Key depth (key) =	200 mm (sliding only)
Key length (klen) =	200 mm
Key position from heel/back (kpos) =	0 mm (to face)



Design loads - Appendix J - AS4678 & Section 4

Surcharge Min. =	5.0 kPa min. (Table 4.1)	Additional Loads at top of wall:	
Surcharge (S) =	5.0 kPa	Overturning (Ma) =	0.00 kNm/m
Water height (hw) =	0 mm (over footing, 0=no water)	Thrust (Va) =	0.00 kN/m
Earth factor =	1.25 (1.25)	Load factor =	1.50
Water pressure =	1.00 (1.00)	Ma* =	0.00 kNm/m
Live load factor =	1.50 (1.50 - 0.0 for stabilising effect)	Va* =	0.00 kN/m
Stabilising factor (ϕs) =	0.80 AS 4678 - Appendix J2	(Moment/Thrust about top wall)	
		Additional dead load (Pv) =	0.00 kN/m

Material design factors - Section 5

Φ_{uc} =	0.90	$c^* = c^* \Phi_{uc}$ =	0 kPa	CI 5.2.1	
Φ_{uo} =	0.95	ϕ^* =	23.9 °	CI 5.2.2	$\phi^* = 0.417$ rad
Design factor (Φn) =	1.00 Table 5.2				
	Ka =	0.423	Depth of tension zone =	0 mm	
	Kp =	2.362	Acting soil height (ha) =	600 mm	

RETAINING WALLS V5.06

Design Moment in wall (about top of footing, per m of wall)

	Pressure kPa	Thrust kN/m	Thrust* kN/m	Lever arm mm	Mw kNm/m	Mw* kNm/m	Comments
Soil = $K_a \cdot \gamma \cdot h_a$ =	5.84	1.75	2.19	200	0.35	0.44	(At wall base) Max. pressure at base
Water = None =	0.00	0.00	0.00	0	0.00	0.00	Max. pressure at base
Surcharge = $K_a \cdot S$ =	2.12	1.27	1.91	300	0.38	0.57	Uniform pressure dist.
Additional =		0.00	0.00	600	0.00	0.00	
Total		3.02	4.10		0.73	1.01	

Total thrust (Vw) = 3.02 kN/m
 Total ult. thrust (Vw*) = 4.10 kN/m
 Total ult. design thrust (Vw/Φn) = 4.10 kN/m
 Total moment (Mw) = 0.73 kNm/m
 Total ult. moment (Mw*) = 1.01 kNm/m
 Total ult. design moment (Mw*/Φn) = 1.01 kNm/m

Overturning (Limit mode U2) (about base of footing, per m of wall)

Depth for rotation (deff) = 600 mm (Footing depth)

	Pressure kPa	Thrust kN/m	Thrust* kN/m	Lever arm mm	Mo kNm/m	Mo* kNm/m	Comments
Soil = $K_a \cdot \gamma \cdot (h_a + deff)$ =	11.69	7.01	8.77	400	2.80	3.51	(At footing base) Max. pressure at base
Water = None =	0.00	0.00	0.00	0	0.00	0.00	Max. pressure at base
Surcharge = $K_a \cdot S$ =	2.12	2.54	3.81	600	1.52	2.29	Uniform pressure dist.
Additional =		0.00	0.00	1200	0.00	0.00	
Total		9.55	12.58		4.33	5.79	

Total thrust = 9.55 kN/m
 Total ult. thrust = 12.58 kN/m
 Total moment (Mo) = 4.33 kNm/m
 Total ult. moment (Mo*) = 5.79 kNm/m
 Total ult. (Mo*/Φn) = 5.79 kNm/m

Restoring (Limit mode U2) (about base of footing, per m of wall)

	Force kN/m	Lever arm mm	Mr kNm/m	øMr kNm/m	Ecc mm	Mb kNm/m	
Footing =	11.52	324	3.73	2.98	0	0.00	
Soil overlay =	0.00	174	0.00	0.00	150	0.00	
Slab overlay =	0.00	174	0.00	0.00	150	0.00	
Wall =	4.50	574	2.58	2.06	-250	-1.13	
Lower wall (back) =	0.00	724	0.00	0.00	-400	0.00	Using Wwt-Soil dentity (γ)
Soil behind wall =	0.00	724	0.00	0.00	-400	0.00	
Dead load (Pv) =	0.00	574	0.00	0.00	-250	0.00	
Tapered =	0.00	0	0.00	0.00	400	0.00	
Key =	1.00	624	0.62	0.50	-300	-0.30	
Passive pressure =			1.96	1.56			
Total	17.02		8.89	7.11		-1.43	

Total force (Wt) = 17.02 kN/m
 Total bearing overturning (Mb) = -1.43 kNm/m
 Total restoring (Mr) = 8.89 kNm/m
 Total ult. Restoring (ø(0.80)*Mr) = 7.11 kNm/m OK (0.81)

RETAINING WALLS V5.06

Xstruct

Sliding (Limit mode U1)

Sliding ($V \cdot \text{slide} / \Phi_n$) =	12.58 kN/m at base	
Passive resistance of footing and key (R_p) =	17.38 kN/m	
Sliding resistance ($R_s = \mu \cdot W_t$) =	7.54 kN/m	
Total resistance $\phi V_r = \phi_s(0.80) \cdot (R_p + R_s)$ =	19.94 kN/m	OK (0.63)

Bearing

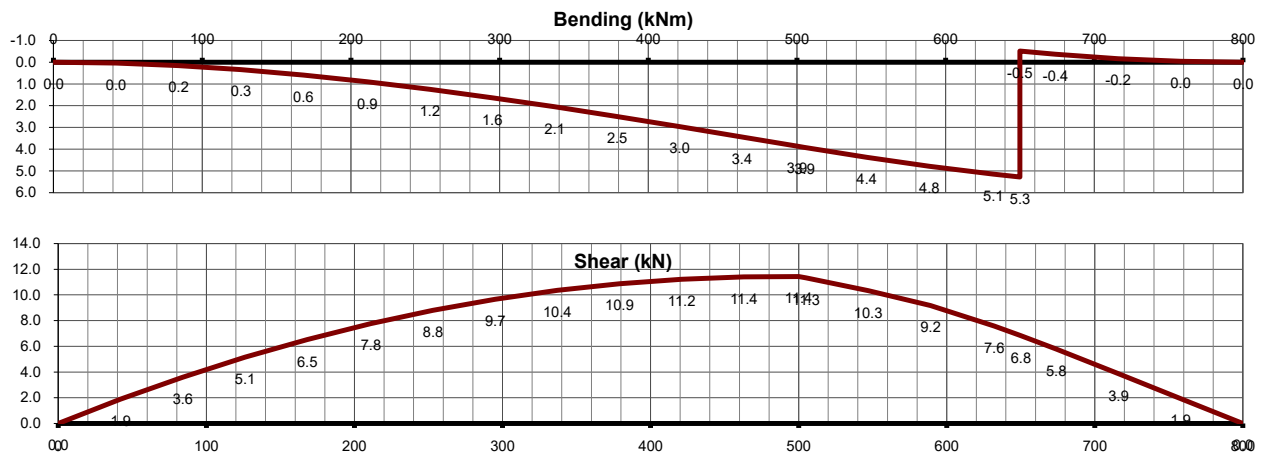
Total (W_t) =	17.02 kN/m	
Overturning moment ($Mot = Mo + Mb$) =	2.90 kNm/m	
Ecc = Mot / W_t =	171 mm	
Minimum bearing pressure (q_{min}) =	0.0 kPa	
Maximum bearing pressure (q_{max}) =	49.5 kPa	OK (0.33)
Centroid from left/front edge of footing (y) =	229 mm	(688mm of footing under pressure)

Design Moment and Shear in footing due to bearing (per m of wall)

Manual force position =	400 mm (from left/front edge of footing)
Equivalent load factor =	1.34

	Moment* kNm/m	Shear* kN/m	Lever arm mm	Position mm
Front face of wall =	3.9	11.4	338	500
Centre of wall (from the left) =	5.3	6.8	772	650
Centre of wall (from the right) =	-0.5	6.8	76	650
Back face of wall (soil side) =	0.0	0.0	-	800
Max. moment (+ve) =	5.3	6.8	-	650
Max. moment (-ve) =	-0.5	6.8	-	650
Max. shear =	3.9	11.4	-	500
Manual position =	2.7	11.1	-	400

Graphs (Footing)



RETAINING WALLS V5.06

Xstruct

Wall:	(RW2 1200) 1000mm retaining ht., 300mm thick (No key)	
Loads:	Surcharge = 5.00kPa, Drained	
Footing:	1300mm long (overall), 1000mm overhang (behind wall), 600mm deep	
Stability:	$M^*o = 12.4\text{kNm} < \phi Mr = 21.0\text{kNm}$	OK (0.59)
Sliding:	$V^*slide = 20.7\text{kN} < \phi Vr = 25.3\text{kN}$	OK (0.82)
Wall:	$M^*wall = 3.6\text{kNm}$, $V^*wall = 9.3\text{kN}$, Design factor $\Phi n = 1.0$	
Bearing:	Max. bearing pressure = 72kPa < Allowable = 150kPa	OK (0.48)

Geometry

Wall assumed fully drained

Retaining height (z) =	1000 mm (= Wall height)
Risk class =	B (A),(B),(C) - Moderate damage and loss of services - Table 1.1
Backfill type =	1 Class(1), Class(2), (U)ncontrolled, (I)n-situ - Table 5.1(A)

Soil parameters	
Internal friction (ϕ) =	25 ° ($0^\circ \leq \phi \leq 45^\circ$)
Incline (β) =	0 ° ($0^\circ \leq \beta \leq 45^\circ$) 1 in 0.0
Soil weight (γ) =	23.0 kN/m ³
Cohesion (c) =	0 kPa
Friction coefficient (μ) =	0.443 (-1 to ignore sliding)

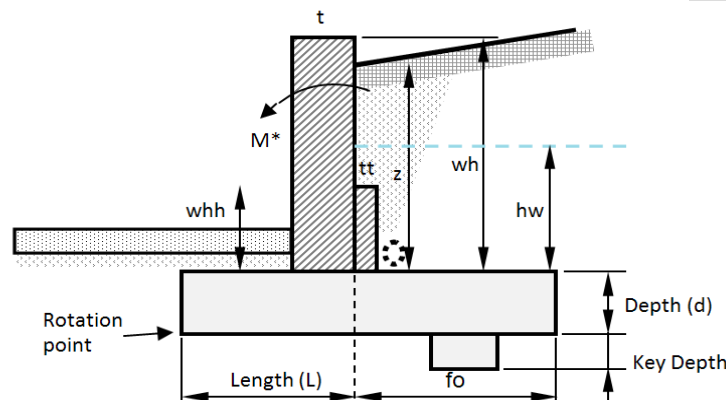
Use passive =	Y (Y)es,(N)o
Manual Kp value =	0.00 0 for default
Soil depth to ignore =	0 mm (for passive)

Allowable bearing = 150 kPa

Slab overlay (ts) =	mm
Soil overlay (tsl) =	mm

Wall	
Wall thickness (t) =	300 mm
Wall height (wh) =	1000 mm (= Retaining height)
Add'l thickness (tt) =	mm (behind wall)
Add'l th. height (whh) =	mm
Add'l th. on soil side =	Y (Y)es,(N)o
Wall Wt (Wwt) =	25 kN/m ³

Footing	
Footing depth (d) =	600 mm
End thickness (d2) =	0 mm (0 = no taper)
Footing length (L) =	300 mm excluding overhang
Overhang (fo) =	1000 mm additional to length
Key depth (key) =	0 mm (sliding only)
Key length (klen) =	0 mm
Key position from heel/back (kpos) =	0 mm (to face)



Design loads - Appendix J - AS4678 & Section 4

Surcharge Min. =	5.0 kPa min. (Table 4.1)	Additional Loads at top of wall:	
Surcharge (S) =	5.0 kPa	Overturning (Ma) =	0.00 kNm/m
Water height (hw) =	0 mm (over footing, 0=no water)	Thrust (Va) =	0.00 kN/m
		Load factor =	1.50
Earth factor =	1.25 (1.25)	Ma* =	0.00 kNm/m
Water pressure =	1.00 (1.00)	Va* =	0.00 kN/m
Live load factor =	1.50 (1.50 - 0.0 for stabilising effect)	(Moment/Thrust about top wall)	
Stabilising factor (ϕ_s) =	0.80 AS 4678 - Appendix J2	Additional dead load (Pv) =	0.00 kN/m

Material design factors - Section 5

Φ_{uc} =	0.90	$c^* = c^* \Phi_{uc}$ =	0 kPa	CI 5.2.1	
Φ_{uo} =	0.95	ϕ^* =	23.9 °	CI 5.2.2	$\phi^* = 0.417$ rad
Design factor (Φn) =	1.00 Table 5.2				
	Ka =	0.423	Depth of tension zone =	0 mm	
	Kp =	2.362	Acting soil height (ha) =	1000 mm	

RETAINING WALLS V5.06

Design Moment in wall (about top of footing, per m of wall)

	Pressure kPa	Thrust kN/m	Thrust* kN/m	Lever arm mm	Mw kNm/m	Mw* kNm/m	Comments
Soil = $K_a \cdot \gamma \cdot h_a$ =	9.74	4.87	6.09	333	1.62	2.03	(At wall base) Max. pressure at base
Water = None =	0.00	0.00	0.00	0	0.00	0.00	Max. pressure at base
Surcharge = $K_a \cdot S$ =	2.12	2.12	3.18	500	1.06	1.59	Uniform pressure dist.
Additional =		0.00	0.00	1000	0.00	0.00	
Total		6.99	9.26		2.68	3.62	

Total thrust (Vw) = 6.99 kN/m
 Total ult. thrust (Vw*) = 9.26 kN/m
 Total ult. design thrust (Vw/Φn) = 9.26 kN/m
 Total moment (Mw) = 2.68 kNm/m
 Total ult. moment (Mw*) = 3.62 kNm/m
 Total ult. design moment (Mw*/Φn) = 3.62 kNm/m

Overturning (Limit mode U2) (about base of footing, per m of wall)

Depth for rotation (deff) = 600 mm (Footing depth)

	Pressure kPa	Thrust kN/m	Thrust* kN/m	Lever arm mm	Mo kNm/m	Mo* kNm/m	Comments
Soil = $K_a \cdot \gamma \cdot (h_a + deff)$ =	15.58	12.47	15.58	533	6.65	8.31	(At footing base) Max. pressure at base
Water = None =	0.00	0.00	0.00	0	0.00	0.00	Max. pressure at base
Surcharge = $K_a \cdot S$ =	2.12	3.39	5.08	800	2.71	4.07	Uniform pressure dist.
Additional =		0.00	0.00	1600	0.00	0.00	
Total		15.85	20.66		9.36	12.38	

Total thrust = 15.85 kN/m
 Total ult. thrust = 20.66 kN/m
 Total moment (Mo) = 9.36 kNm/m
 Total ult. moment (Mo*) = 12.38 kNm/m
 Total ult. (Mo*/Φn) = 12.38 kNm/m

Restoring (Limit mode U2) (about base of footing, per m of wall)

	Force kN/m	Lever arm mm	Mr kNm/m	øMr kNm/m	Ecc mm	Mb kNm/m	
Footing =	18.72	499	9.34	7.47	0	0.00	
Soil overlay =	0.00	-151	0.00	0.00	650	0.00	
Slab overlay =	0.00	-151	0.00	0.00	650	0.00	
Wall =	7.50	-1	-0.01	-0.01	500	3.75	
Lower wall (back) =	0.00	149	0.00	0.00	350	0.00	Using Wwt-Soil dentity (γ)
Soil behind wall =	23.00	649	14.92	11.94	-150	-3.45	
Dead load (Pv) =	0.00	-1	0.00	0.00	500	0.00	
Tapered =	0.00	0	0.00	0.00	650	0.00	
Key =	0.00	1149	0.00	0.00	-650	0.00	
Passive pressure =			1.96	1.56			
Total	49.22		26.20	20.96		0.30	

Total force (Wt) = 49.22 kN/m
 Total bearing overturning (Mb) = 0.30 kNm/m
 Total restoring (Mr) = 26.20 kNm/m
 Total ult. Restoring (ø(0.80)*Mr) = 20.96 kNm/m OK (0.59)

RETAINING WALLS V5.06

Sliding (Limit mode U1)

Sliding ($V \cdot \text{slide} / \Phi_n$) =	20.66 kN/m at base	
Passive resistance of footing and key (R_p) =	9.78 kN/m	
Sliding resistance ($R_s = \mu \cdot W_t$) =	21.80 kN/m	
Total resistance $\phi V_r = \phi_s(0.80) \cdot (R_p + R_s)$ =	25.26 kN/m	OK (0.82)

Bearing

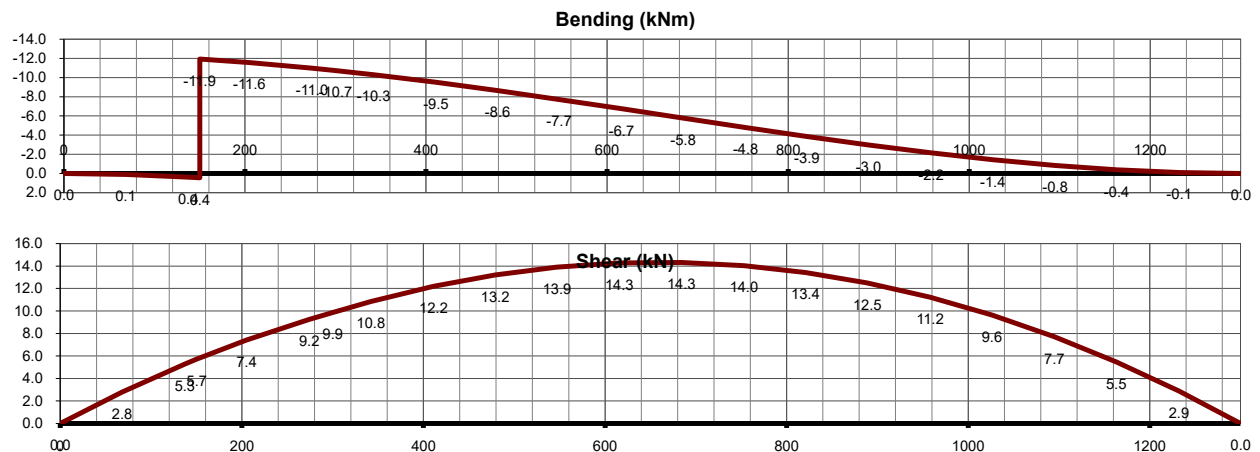
Total (W_t) =	49.22 kN/m	
Overturning moment ($M_o = M_o + M_b$) =	9.66 kNm/m	
Ecc = M_o / W_t =	196 mm	
Minimum bearing pressure ($q_{\min}$) =	3.6 kPa	
Maximum bearing pressure ($q_{\max}$) =	72.2 kPa	OK (0.48)
Centroid from left/front edge of footing (y) =	454 mm	(Entire footing under pressure)

Design Moment and Shear in footing due to bearing (per m of wall)

Manual force position = 650 mm (from left/front edge of footing)
Equivalent load factor = 1.32

	Moment* kNm/m	Shear* kN/m	Lever arm mm	Position mm
Front face of wall =	0.0	0.0	-	0
Centre of wall (from the left) =	0.4	5.7	78	150
Centre of wall (from the right) =	-11.9	5.7	2088	150
Back face of wall (soil side) =	-10.7	9.9	1090	300
Max. moment (+ve) =	0.4	5.7	-	150
Max. moment (-ve) =	-11.9	5.7	-	150
Max. shear =	-5.8	14.3	-	684
Manual position =	-6.3	14.3	-	650

Graphs (Footing)



TIMBER ROOF BEAM V5.10

Xstruct

Beam:	(GT) 450mm x 58mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 8.82\text{kNm (+ve)} < \phi M(dI) = 38.52\text{kNm}$, $M^* = 13.18\text{kNm (+ve)} < \phi M = 64.95\text{kNm}$	OK (0.23,0.20)	
	$Mw^* = 6.76\text{kNm (-ve)} < \phi Mw = 53.65\text{kNm}$	OK (0.13)	
Shear:	$V(dI)^* = 5.43\text{kN} < \phi V(dI) = 39.57\text{kN}$, $V^* = 8.11\text{kN} < \phi V = 65.26\text{kN}$	OK (0.14,0.12)	
	$Vw^* = 4.16\text{kN} < \phi Vw = 69.43\text{kN}$	OK (0.06)	
Deflection:	$\delta DL = L/762$ (9mm), $\delta \Psi s.LL = L/3988$ (2mm), $\delta WLs = L/1159$ (-6mm)	OK	
Reactions:	(Each end) $Rdl = 4.02\text{kN}$, $Rll = 2.19\text{kN}$, $Rwl^* = -7.77\text{kN}$, $R.dn^* = 8.11\text{kN}$, $R.up^* = 4.16\text{kN}$		

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	House =	N (Y)es,(N)o
Span (L) =	6500 mm	Edge restrained (down) =	C (T)ension,(C)ompression,(B)oth
Centres (cts) =	2700 mm	Lay.t (Top) =	900 mm
Span type =	S (S)ingle,(D)ouble		

Loadings

Roof area (A) =	17.55 m ²	Apply wind reduction =	Y (Y)es,(N)o
LL = $1.8/A+0.12 \geq 0.25$ =	0.25 kPa	Roof reduction (Ka) =	0.95 AS/NZS 1170.2, Table 5.4
		Ratio Ws/Wu =	0.68 (Refer wind analysis)

Uniform dead loads

Roof dead load (wdl) =	0.40 kPa *	2700 mm +	kN/m =	1.08 kN/m
Other dead load (wdl) =	kPa *	2700 mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.16 kN/m
			$\Sigma wdl =$	1.24 kN/m

Uniform live loads

Roof live load (wll) =	0.25 kPa *	2700 mm +	kN/m =	0.68 kN/m
Other live load (wll) =	kPa *	2700 mm +	kN/m =	0.00 kN/m
Alternate point live load =	1.40 kN	Distr. to	1 members	$\Sigma wll =$ 0.68 kN/m

Uniform wind loads

Ult. wind load (Wu) =	0.84 kPa *	2700 mm		
Cp,e =	0.9	Cp,i =	0.2	$\Sigma ww^* =$ -2.39 kN/m (up)

Point loads

Dead load (pdl) =	kN	Position =	3250 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	Y (Y)es,(N)o
Wind load (pwl*) =	kN (-ve up)		
$w(dI)^* = 1.35 * wdl$	1.67 kN/m	$M(dI)^* =$	8.82 kNm (Max at 3250mm)
$w^* = 1.2 * wdl + 1.5 * wll$	2.50 kN/m	$M^* =$	13.18 kNm (Max at 3250mm)
$w.up^* = 0.9 * wdl + wwl^*$	1.28 kN/m (up)	$Mw.up^* =$	6.76 kNm (Max at 3250mm)
$p(dI)^* = 1.35 * pdl$	0.00 kN	$V(dI)^* =$	5.43 kN
$p^* = 1.2 * pdl + 1.5 * pll$	0.00 kN	$V^* =$	8.11 kN
$p.up^* = 0.9 * pdl + pwl^*$	0.00 kN	$Vw.up^* =$	4.16 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	450mm x 58mm Smart LVL15	Area (A) =	26100 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	1958 x10 ³ mm ³
Design depth (dD) =	450 mm	Stiffness (Ix) =	440.4 x10 ⁶ mm ⁴
Design width (dW) =	58 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1d = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	13.72	For top comp. edge restrained - Cl 3.2.3.2(a)	
$S1u = (dD / dW)^{1.35} * (Lay.t / dD)^{0.25} =$	18.90	For top tension edge restrained in uplift - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 * pbd * S1d =$	0.846	for $10 \leq pbd * S1d \leq 20$ - Cl 3.2.4	
$k12 = 1.5 - 0.05 * pb * S1d =$	0.865	for $10 \leq pb * S1d \leq 20$ - Cl 3.2.4	$f'b =$ 43.0 MPa
$k12u = 1.5 - 0.05 * pbu * S1u =$	0.671	for $10 \leq pbu * S1u \leq 20$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95	Table 2.1	Material constant (pbd) = 0.95 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	38.52	kNm	Material constant (pb) = 0.93 (rb=0.41)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	64.95	kNm	Stress reversal (pbu) = 0.88 (rbu=1.00)
$\phi Mw = \phi * (k1=1) * k4 * k6 * k9 * k12u * f'b * Zx =$	53.65	kNm	Duration factor (k1) = 0.94 (Live)
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	39.57	kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	65.26	kN	Temp. factor (k6) = 1.00
$\phi Vw = \phi * (k1=1) * k4 * k6 * f's * (2/3 * A) =$	69.43	kN	Sharing factor (k9) = 1.00
			Size modifier (mod.b & s) = 1.00 & 1.00

Deflections

		Duration factor ($j2$) =	2.0
eq'd j2.(DL+ Ψ l.LL) (16mm max) =	234.8 x10 ⁶ mm ⁴	< Critical	$\delta DL =$ 8.5 mm
Ireq'd LL (L/240) =	26.5 x10 ⁶ mm ⁴		$\delta \Psi s.LL =$ 1.6 mm
Ireq'd WLs (L/180) =	68.4 x10 ⁶ mm ⁴		$\delta WLs =$ -5.6 mm
			Span / 762
			Span / 3988
			Span / 1159

TIMBER ROOF BEAM V5.10

Xstruct

Beam:	(RL Large) 190mm x 42mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 1.71 \text{ kNm (+ve)} < \phi M(dI) = 6.01 \text{ kNm}$, $M^* = 3.10 \text{ kNm (+ve)} < \phi M = 10.23 \text{ kNm}$	OK (0.28,0.30)	
	$Mw^* = 1.66 \text{ kNm (-ve)} < \phi Mw = 11.76 \text{ kNm}$	OK (0.14)	
Shear:	$V(dI)^* = 2.28 \text{ kN} < \phi V(dI) = 12.10 \text{ kN}$, $V^* = 4.13 \text{ kN} < \phi V = 19.95 \text{ kN}$	OK (0.19,0.21)	
	$Vw^* = 2.22 \text{ kN} < \phi Vw = 21.23 \text{ kN}$	OK (0.10)	
Deflection:	$\delta DL = L/463$ (6mm), $\delta \Psi s.LL = L/1399$ (2mm), $\delta WLs = L/616$ (-5mm)	OK	
Reactions:	(Each end) $Rdl = 1.69 \text{ kN}$, $Rll = 1.40 \text{ kN}$, $Rwl^* = -3.74 \text{ kN}$, $R.dn^* = 4.13 \text{ kN}$, $R.up^* = 2.22 \text{ kN}$		

Geometry (House member affecting $\leq 25 \text{ m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	House =	N (Y)es,(N)o
Span (L) =	3000 mm	Edge restrained (down) =	C (T)ension,(C)ompression,(B)oth
Centres (cts) =	2700 mm	Lay.t (Top) =	900 mm
Span type =	S (S)ingle,(D)ouble		

Loadings

Roof area (A) =	8.10 m^2	Apply wind reduction =	Y (Y)es,(N)o
LL = $1.8/A + 0.12 \geq 0.25$ =	0.34 kPa	Roof reduction (Ka) =	1.00 AS/NZS 1170.2, Table 5.4
		Ratio Ws/Wu =	0.68 (Refer wind analysis)

Uniform dead loads

Roof dead load (wdl) =	0.40 kPa *	2700 mm +	kN/m =	1.08 kN/m
Other dead load (wdl) =	kPa *	2700 mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.05 kN/m
			Σwdl =	1.13 kN/m

Uniform live loads

Roof live load (wll) =	0.34 kPa *	2700 mm +	kN/m =	0.92 kN/m
Other live load (wll) =	kPa *	2700 mm +	kN/m =	0.00 kN/m
Alternate point live load =	1.40 kN (critical)	Distr. to	1 members	Σwll = 0.93 kN/m

Uniform wind loads

Ult. wind load (Wu) =	0.84 kPa *	2700 mm		
Cp,e =	0.9	Cp,i =	0.2	$\Sigma wwll^* = -2.49 \text{ kN/m (up)}$

Point loads

Dead load (pdl) =	kN	Position =	1500 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	Y (Y)es,(N)o
Wind load (pwl*) =	kN (-ve up)		
$w(dI)^* = 1.35 * wdl$	1.52 kN/m	$M(dI)^* =$	1.71 kNm (Max at 1500mm)
$w^* = 1.2 * wdl + 1.5 * wll$	2.75 kN/m	$M^* =$	3.10 kNm (Max at 1500mm)
$w.up^* = 0.9 * wdl + wwl^*$	1.48 kN/m (up)	$Mw.up^* =$	1.66 kNm (Max at 1500mm)
$p(dI)^* = 1.35 * pdl$	0.00 kN	$V(dI)^* =$	2.28 kN
$p^* = 1.2 * pdl + 1.5 * pll$	0.00 kN	$V^* =$	4.13 kN
$p.up^* = 0.9 * pdl + pwl^*$	0.00 kN	$Vw.up^* =$	2.22 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	190mm x 42mm Smart LVL15	Area (A) =	7980 mm^2
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	253 $\times 10^3 \text{ mm}^3$
Design depth (dD) =	190 mm	Stiffness (Ix) =	24.0 $\times 10^6 \text{ mm}^4$
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1d = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	12.31	For top comp. edge restrained - Cl 3.2.3.2(a)	
$S1u = (dD / dW)^{1.35} * (Lay.t / dD)^{0.25} =$	11.32	For top tension edge restrained in uplift - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 * pbd * S1d =$	0.863	for $10 \leq pbd * S1d \leq 20$ - Cl 3.2.4	
$k12 = 1.5 - 0.05 * pb * S1d =$	0.890	for $10 \leq pb * S1d \leq 20$ - Cl 3.2.4	$f'b = 50.9 \text{ MPa}$
$k12u = 1.5 - 0.05 * pbu * S1u =$	0.962	for $10 \leq pbu * S1u \leq 20$ - Cl 3.2.4	$f's = 4.2 \text{ MPa}$
Strength reduction factor (ϕ) =	0.95	Table 2.1	Material constant (pbd) = 1.04 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	6.01 kNm		Material constant (pb) = 0.99 (rb=0.51)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	10.23 kNm		Stress reversal (pbu) = 0.95 (rbu=1.00)
$\phi Mw = \phi * (k1=1) * k4 * k6 * k9 * k12u * f'b * Zx =$	11.76 kNm		Duration factor (k1) = 0.94 (Live)
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	12.10 kN		Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	19.95 kN		Temp. factor (k6) = 1.00
$\phi Vw = \phi * (k1=1) * k4 * k6 * f's * (2/3 * A) =$	21.23 kN		Sharing factor (k9) = 1.00
			Size modifier (mod.b & s) = 1.00 & 1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL+\Psi.LL)$ (L/300) =	15.5 $\times 10^6 \text{ mm}^4$	$\delta DL =$	6.5 mm
Ireq'd $\Psi.LL$ (L/240) =	4.1 $\times 10^6 \text{ mm}^4$	$\delta \Psi s.LL =$	2.1 mm
Ireq'd WLs (L/180) =	7.0 $\times 10^6 \text{ mm}^4$	$\delta WLs =$	-4.9 mm
			Span / 463
			Span / 1399
			Span / 616

TIMBER ROOF BEAM V5.10

Xstruct

Beam:	(RL Small) 120mm x 42mm Smart LVL15 (Oregon) (Single span)		
Bending:	$M(dI)^* = 0.19\text{kNm (+ve)} < \phi M(dI) = 2.96\text{kNm}$, $M^* = 0.69\text{kNm (+ve)} < \phi M = 5.02\text{kNm}$	OK (0.06,0.14)	
	$Mw^* = 0.19\text{kNm (-ve)} < \phi Mw = 5.34\text{kNm}$	OK (0.04)	
Shear:	$V(dI)^* = 0.75\text{kN} < \phi V(dI) = 7.64\text{kN}$, $V^* = 2.77\text{kN} < \phi V = 12.60\text{kN}$	OK (0.10,0.22)	
	$Vw^* = 0.75\text{kN} < \phi Vw = 13.41\text{kN}$	OK (0.06)	
Deflection:	$\delta DL = L/3200$ (0mm), $\delta \Psi s.LL = L/3173$ (0mm), $\delta WLs = L/4189$ (0mm)	OK	
Reactions:	(Each end) $Rdl = 0.56\text{kN}$, $Rll = 1.40\text{kN}$, $Rwl^* = -1.25\text{kN}$, $R.dn^* = 2.77\text{kN}$, $R.up^* = 0.75\text{kN}$		

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	House =	N (Y)es,(N)o
Span (L) =	1000 mm	Edge restrained (down) =	C (T)ension,(C)ompression,(B)oth
Centres (cts) =	2700 mm	Lay.t (Top) =	900 mm
Span type =	S (S)ingle,(D)ouble		

Loadings

Roof area (A) =	2.70 m ²	Apply wind reduction =	Y (Y)es,(N)o
LL = $1.8/A+0.12 \geq 0.25$ =	0.79 kPa	Roof reduction (Ka) =	1.00 AS/NZS 1170.2, Table 5.4
		Ratio Ws/Wu =	0.68 (Refer wind analysis)

Uniform dead loads

Roof dead load (wdl) =	0.40 kPa *	2700 mm +	kN/m =	1.08 kN/m
Other dead load (wdl) =	kPa *	2700 mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.03 kN/m
			Σwdl =	1.11 kN/m

Uniform live loads

Roof live load (wll) =	0.79 kPa *	2700 mm +	kN/m =	2.12 kN/m
Other live load (wll) =	kPa *	2700 mm +	kN/m =	0.00 kN/m
Alternate point live load =	1.40 kN (critical)	Distr. to	1 members	Σwll = 2.80 kN/m

Uniform wind loads

Ult. wind load (Wu) =	0.84 kPa *	2700 mm		
Cp,e =	0.9	Cp,i =	0.2	$\Sigma wwll^* = -2.49\text{ kN/m (up)}$

Point loads

Dead load (pdl) =	kN	Position =	500 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	Y (Y)es,(N)o
Wind load (pwl*) =	kN (-ve up)		
$w(dI)^* = 1.35 \cdot wdl$	1.50 kN/m	$M(dI)^* =$	0.19 kNm (Max at 500mm)
$w^* = 1.2 \cdot wdl + 1.5 \cdot wll$	5.53 kN/m	$M^* =$	0.69 kNm (Max at 500mm)
$w.up^* = 0.9 \cdot wdl + wwl^*$	1.50 kN/m (up)	$Mw.up^* =$	0.19 kNm (Max at 500mm)
$p(dI)^* = 1.35 \cdot pdl$	0.00 kN	$V(dI)^* =$	0.75 kN
$p^* = 1.2 \cdot pdl + 1.5 \cdot pll$	0.00 kN	$V^* =$	2.77 kN
$p.up^* = 0.9 \cdot pdl + pwl^*$	0.00 kN	$Vw.up^* =$	0.75 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	120mm x 42mm Smart LVL15	Area (A) =	5040 mm ²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	101 x10 ³ mm ³
Design depth (dD) =	120 mm	Stiffness (Ix) =	6.0 x10 ⁶ mm ⁴
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1d = 1.25 \cdot dD/dW^*(Lay.t/dD)^{0.5} =$	9.78	For top comp. edge restrained - Cl 3.2.3.2(a)	
$S1u = (dD/dW)^{1.35} \cdot (Lay.t/dD)^{0.25} =$	6.83	For top tension edge restrained in uplift - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 \cdot pbd \cdot S1d =$	0.971	for $10 \leq pbd \cdot S1d \leq 20$ - Cl 3.2.4	
$k12 =$	1.000	for $pb \cdot S1d \leq 10$ - Cl 3.2.4	
$k12u =$	1.000	for $pbu \cdot S1u \leq 10$ - Cl 3.2.4	
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) =	1.08 (rbd=0.25)
$\phi M(dI) = \phi \cdot (k1=0.57) \cdot k4 \cdot k6 \cdot k9 \cdot k12d \cdot f'b \cdot Zx =$	2.96 kNm	Material constant (pb) =	1.01 (rb=0.76)
$\phi M = \phi \cdot k1 \cdot k4 \cdot k6 \cdot k9 \cdot k12u \cdot f'b \cdot Zx =$	5.02 kNm	Stress reversal (pbu) =	0.99 (rbu=1.00)
$\phi Mw = \phi \cdot (k1=1) \cdot k4 \cdot k6 \cdot k9 \cdot k12u \cdot f'b \cdot Zx =$	5.34 kNm	Duration factor (k1) =	0.94 (Live)
$\phi V(dI) = \phi \cdot (k1=0.57) \cdot k4 \cdot k6 \cdot f's \cdot (2/3 \cdot A) =$	7.64 kN	Moisture factor (k4) =	1.00
$\phi V = \phi \cdot k1 \cdot k4 \cdot k6 \cdot f's \cdot (2/3 \cdot A) =$	12.60 kN	Temp. factor (k6) =	1.00
$\phi Vw = \phi \cdot (k1=1) \cdot k4 \cdot k6 \cdot f's \cdot (2/3 \cdot A) =$	13.41 kN	Sharing factor (k9) =	1.00
		Size modifier (mod.b & s) =	1.00 & 1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL+\Psi.LL)$ (L/300) =	0.6 x10 ⁶ mm ⁴	$\delta DL =$	0.3 mm
Ireq'd $\Psi.LL$ (L/240) =	0.5 x10 ⁶ mm ⁴	$\delta \Psi s.LL =$	0.3 mm
Ireq'd WLs (L/180) =	0.3 x10 ⁶ mm ⁴	$\delta WLs =$	-0.2 mm
			Span / 3200
			Span / 3173
			Span / 4189

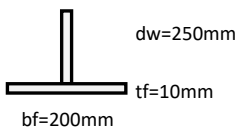
T LINTEL V5.03

Xstruct

Geometry: (TL1) 250mm x 12mm Pl. Vert., 200mm x 10mm Pl. Horz.
Design: $M^* = 25.4 \text{ kNm} < \phi M_b(4900, \alpha_m = 1.13) = 33.4 \text{ kNm}$
Deflection: $\delta_{DL} = L/748$ (7mm), $\delta_{\Psi s.LL} = L/14095$ (0mm), $\delta_{Total} = L/710$ (7mm)
Reactions: (Each end) $R_{dl} = 15.4 \text{ kN}$, $R_{ll} = 1.2 \text{ kN}$, $R^* = 20.7 \text{ kN}$

OK (0.76)
OK

Geometry

Span = L_e =	4900 mm	α_m =	1.13	$t_w = 12 \text{ mm}$
Vertical web		Horizontal flange		
Web thickness (t_w) =	12 mm	Flange thickness (t_f) =	10 mm	
Web depth (d_w) =	250 mm	Flange width (b_f) =	200 mm	
Yield strength =	250 MPa	Yield strength =	250 MPa	

Loading

Live load type = N (N)ormal, (S)torage, (M)annual
AS/NZS 1170.0 - Table 4.1

Uniform dead loads

Roof dead load (w_{dl}) =	0.40 kPa *	900 mm +	kN/m =	0.36 kN/m
Floor dead load (w_{dl}) =	kPa *	mm +	kN/m =	0.00 kN/m
Wall dead load (w_{dl}) =	4.60 kPa *	1200 mm +	kN/m =	5.52 kN/m
Other dead load (w_{dl}) =	kPa *	mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es, (N)o		S.Wt =	0.39 kN/m
				$\Sigma w_{dl} = 6.27 \text{ kN/m}$

Uniform live loads

Roof live load (w_{ll}) =	0.53 kPa *	900 mm +	kN/m =	0.48 kN/m
Floor live load (w_{ll}) =	kPa *	mm +	kN/m =	0.00 kN/m
Other live load (w_{ll}) =	kPa *	mm +	kN/m =	0.00 kN/m
				$\Sigma w_{ll} = 0.48 \text{ kN/m}$

Point loads

Dead load (P_{dl}) =	kN	Position =	2450 mm from LHS
Live load (P_{ll}) =	kN		

Horizontal loads

Wall height (w_{cts}) =	0 mm	Ratio W_s/W_u =	0.68
Ult. inward wind load (W_u) =	0.84 kPa		
c_{pe} =	0.7	c_{pi} =	0.2
Short term LL (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
$w^* = 1.35 * w_{dl}$ =	8.47 kN/m	$R_{dl} = w_{dl} * L/2 + p_{dl} * (L - pos)/L$ =	15.4 kN
$p^* = 1.2 * p_{dl} + 1.5 * p_{ll}$ =	0.00 kN/m	$R_{ll} = w_{ll} * L/2 + p_{ll} * (L - pos)/L$ =	1.2 kN
M^* =	25.4 kNm	$R^* = 1.35 * R_{dl}$ =	20.7 kN

Properties

(Max at 2450mm)

Area =	5000 mm ²	Warping constant (I_w) =	0 mm ⁶ - CI H4
Stiffness (I_x) =	35.9 x10 ⁶ mm ⁴	Torsional constant (J) =	210.7 x10 ³ mm ⁴
Stiffness (I_y) =	6.70 x10 ⁶ mm ⁴	Elastic section modulus (Z_t) =	202.9 x10 ³ mm ³
Elastic modulus (E) =	200000 MPa - CI 1.4	Elastic section modulus (Z_b) =	432.8 x10 ³ mm ³
Shear modulus (G) =	80000 MPa - CI 1.4	Min. elastic section modulus (Z_{min}) =	202.9 x10 ³ mm ³
Elastic (y_{top}) =	177 mm	Plastic section modulus (S) =	364.2 x10 ³ mm ³
Plastic ($y_{p.top}$) =	208 mm	Eff. elastic section mod.(Compact) (Z_c) =	304.4 x10 ³ mm ³ - CI 5.2.3

Capacity - CI 5.6.1.2

Web $\lambda_s = d_w/t_w * \sqrt{f_{yw}/250}$ =	20.8 < 22, Non-compact	CI 5.2.2	$\lambda_{sy} = 22$
$Z_{ex} = Z_{min} + [(\lambda_{sy} - \lambda_s)/(\lambda_{sy} - \lambda_{sp})] * (Z_c - Z_{min})$ =	211.4 x10 ³ mm ³ - CI 5.2.4		$\lambda_{sp} = 8$
ϕ =	0.9 Table 3.4		
M_{sx} =	52.9 kNm	ϕM_{sx} =	47.6 kNm
M_{oa} =	56.8 kNm	α_s =	0.621
$\phi M_{bx} = \alpha_m * \alpha_s * \phi M_{sx} \leq \phi M_{sx}$ =			33.4 kNm - CI 5.6.1.1(1)
		β_x =	-194.0
		α_m =	1.13

Deflections

Ireq'd DL ($L/500$) =	24.0 x10 ⁶ mm ⁴	< Critical	δ_{DL} =	6.6 mm	Span / 748
Ireq'd $\Psi_{s.LL}$ (10mm max) =	1.2 x10 ⁶ mm ⁴		$\Psi_{s.\delta_{LL}}$ =	0.3 mm	Span / 14095
Ireq'd $W_{Ls.h}$ ($L/250$) =	0.0 x10 ⁶ mm ⁴		$\delta_{W_{Ls.h}}$ =	0.0 mm	Span / -
Ireq'd (DL+ $\Psi_{s.LL}$) (10mm max) =	24.8 x10 ⁶ mm ⁴		δ_{Total} =	6.9 mm	Span / 710
		1kN midspan δ =	0.3 mm		

TIMBER FLOOR BEAM V5.10

Xstruct

Beam:	(T1) 2 / 120mm x 42mm Smart LVL15 (Oregon) (Single span)	
Bending:	$M(dI)^* = 0.70\text{kNm (+ve)} < \phi M(dI) = 5.74\text{kNm}$, $M^* = 0.97\text{kNm (+ve)} < \phi M = 8.34\text{kNm}$	OK (0.12,0.12)
Shear:	$V(dI)^* = 2.82\text{kN} < \phi V(dI) = 15.28\text{kN}$, $V^* = 3.90\text{kN} < \phi V = 21.45\text{kN}$	OK (0.18,0.18)
Deflection:	$\delta DL = L/1909$ (1mm), $\delta \Psi s.LL = L/4935$ (0mm), $\delta Total = L/1376$ (1mm), 1kN mid. $\delta = 0.1\text{mm}$	OK
Reactions:	(Each end) $RdI = 1.00\text{kN}$, $RlI = 1.80\text{kN}$, $R^* = 3.90\text{kN}$	

Geometry (House member affecting $\leq 25\text{m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	
House =	N (Y)es,(N)o	Edge restrained = C (T)ension, (C)ompression, (B)oth
Span (L) =	1000 mm	Lay.t (Top) = 1000 mm
Centres (cts) =	450 mm	
Span type =	S (S)ingle,(D)ouble	

Loadings

Floor area (A) =	0.45 m ²	Live load type = N (N)ormal, (S)torage, (M)anual
		AS/NZS 1170.0 - Table 4.1

Uniform dead loads

Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m =	0.23 kN/m
Wall dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m =	1.35 kN/m
Other dead load (wdl) =	0.40 kPa *	900 mm +	kN/m =	0.36 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.06 kN/m
			$\Sigma wdl =$	2.00 kN/m

Uniform live loads

Floor live load (wll) =	1.50 kPa *	450 mm +	kN/m =	0.68 kN/m
Partitions (wll) =	0.25 kPa *	900 mm +	kN/m =	0.23 kN/m
Alternate point live load =	1.80 kN (critical)	Distr. to 1 members	$\Sigma wll =$	3.60 kN/m

Point loads

Dead load (pdl) =	kN	Position = 500 mm from LHS
Live load (pll) =	kN	Shear using PL at support = N (Y)es,(N)o

Short term LL factor (Ψ_{su}) =	0.70	(Ψ_{sp}) =	1.00
Long term LL factor (Ψ_{lu}) =	0.40	(Ψ_{lp}) =	0.60
$wdl^* = 1.2 * wdl + 1.5 * \Psi_{lu} * wll =$	5.63 kN/m	$M(dI + \Psi_{l.II})^* =$	0.70 kNm (Max at 500mm)
$w^* = 1.2 * wdl + 1.5 * wll =$	7.79 kN/m	$M^* =$	0.97 kNm (Max at 500mm)
$pdl^* = 1.2 * pdl + 1.5 * \Psi_{lp} * pll =$	0.00 kN	$V(dI + \Psi_{l.II})^* =$	2.82 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	0.00 kN	$V^* =$	3.90 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member = 2 / 120mm x 42mm Smart LVL15	Area (A) =	10080 mm ²
Description = LVL15 seasoned softwood	Section modulus (Zx) =	202 x10 ³ mm ³
Design depth (dD) = 120 mm	Stiffness (Ix) =	12.1 x10 ⁶ mm ⁴
Design width (dW) = 42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3

$S1 = 1.25 * dD / dW * (Lay.t / dD)^{0.5} =$	10.31 For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 * pbd * S1 =$	0.943 for $10 \leq pbd * S1 \leq 20$ - Cl 3.2.4	$f'b =$ 55.7 MPa
$k12 = 1.5 - 0.05 * pb * S1 =$	0.976 for $10 \leq pb * S1 \leq 20$ - Cl 3.2.4	$f's =$ 4.2 MPa
Strength reduction factor (ϕ) =	0.95 Table 2.1	Material constant (pbd) = 1.08 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	5.74 kNm	Material constant (pb) = 1.02 (rb=0.69)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	8.34 kNm	Duration factor (k1) = 0.80
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	15.28 kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	21.45 kN	Temp. factor (k6) = 1.00
		Sharing factor (k9) = 1.00
		Size modifier (mod.b) = 1.00
		Size modifier (mod.s) = 1.00

Deflections

	Duration factor ($j2$) =	2.0
Ireq'd $j2.(DL + \Psi l.LL)$ (L/300) =	1.9 x10 ⁶ mm ⁴	< Critical $j2.(DL + \Psi l.LL) =$ 0.5 mm
Ireq'd $\Psi s.LL$ (L/300) =	0.7 x10 ⁶ mm ⁴	$\Psi s.\delta LL =$ 0.2 mm
Ireq'd Total (L/250) =	2.2 x10 ⁶ mm ⁴	$\delta Total =$ 0.7 mm
	1kN midspan $\delta =$	0.1 mm
		Span / 1909
		Span / 4935
		Span / 1376

TIMBER ROOF BEAM V5.10

Xstruct

Beam:	(RB1) 290mm x 42mm Smart LVL15* (Oregon) (Single span)		
Bending:	$M(dI)^* = 3.56 \text{ kNm (+ve)} < \phi M(dI) = 11.11 \text{ kNm}$, $M^* = 4.95 \text{ kNm (+ve)} < \phi M = 18.74 \text{ kNm}$	OK (0.32,0.26)	
	$Mw^* = 0.00 \text{ kNm (-ve)} < \phi Mw = 21.10 \text{ kNm}$	OK (0.00)	
Shear:	$V(dI)^* = 4.18 \text{ kN} < \phi V(dI) = 18.47 \text{ kN}$, $V^* = 5.82 \text{ kN} < \phi V = 30.45 \text{ kN}$	OK (0.23,0.19)	
	$Vw^* = 1.22 \text{ kN} < \phi Vw = 32.40 \text{ kN}$	OK (0.04)	
Deflection:	$\delta DL = L/700$ (5mm), $\delta \Psi s.LL = L/3874$ (1mm), $\delta WLs = L/4062$ (-1mm)	OK	
Reactions:	(Each end) $Rdl = 3.10 \text{ kN}$, $Rll = 1.40 \text{ kN}$, $Rwl^* = -1.57 \text{ kN}$, $R.dn^* = 5.82 \text{ kN}$, $R.up^* = -1.22 \text{ kN (Down)}$		

Geometry (House member affecting $\leq 25 \text{ m}^2$ or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important	House =	N (Y)es,(N)o
Span (L) =	3400 mm	Edge restrained (down) =	C (T)ension,(C)ompression,(B)oth
Centres (cts) =	1000 mm	Lay.t (Top) =	900 mm
Span type =	S (S)ingle,(D)ouble		

Loadings

Roof area (A) =	3.40 m^2	Apply wind reduction =	Y (Y)es,(N)o
LL = $1.8/A + 0.12 \geq 0.25$ =	0.65 kPa	Roof reduction (Ka) =	1.00 AS/NZS 1170.2, Table 5.4
		Ratio Ws/Wu =	0.68 (Refer wind analysis)

Uniform dead loads

Roof dead load (wdl) =	0.40 kPa *	1000 mm +	kN/m =	0.40 kN/m
Other dead load (wdl) =	0.50 kPa *	2700 mm +	kN/m =	1.35 kN/m
Include S.Wt =	Y (Y)es,(N)o		S.Wt =	0.07 kN/m
			Σwdl =	1.82 kN/m

Uniform live loads

Roof live load (wll) =	0.65 kPa *	1000 mm +	kN/m =	0.65 kN/m
Other live load (wll) =	kPa *	1000 mm +	kN/m =	0.00 kN/m
Alternate point live load =	1.40 kN (critical)	Distr. to	1 members	Σwll = 0.82 kN/m

Uniform wind loads

Ult. wind load (Wu) =	0.84 kPa *	1000 mm		
Cp,e =	0.9	Cp,i =	0.2	$\Sigma ww^* = -0.92 \text{ kN/m (up)}$

Point loads

Dead load (pdl) =	kN	Position =	1700 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	Y (Y)es,(N)o
Wind load (pwl*) =	kN (-ve up)		
$w(dI)^* = 1.35 * wdl$	2.46 kN/m	$M(dI)^* =$	3.56 kNm (Max at 1700mm)
$w^* = 1.2 * wdl + 1.5 * wll$	3.42 kN/m	$M^* =$	4.95 kNm (Max at 1700mm)
$w.up^* = 0.9 * wdl + wwl^*$	-0.72 kN/m (down)	$Mw.dn^* =$	0.00 kNm
$p(dI)^* = 1.35 * pdl$	0.00 kN	$V(dI)^* =$	4.18 kN
$p^* = 1.2 * pdl + 1.5 * pll$	0.00 kN	$V^* =$	5.82 kN
$p.up^* = 0.9 * pdl + pwl^*$	0.00 kN	$Vw.up^* =$	1.22 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	290mm x 42mm Smart LVL15*	Area (A) =	12180 mm^2
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	589 $\times 10^3 \text{ mm}^3$
Design depth (dD) =	290 mm	Stiffness (Ix) =	85.4 $\times 10^6 \text{ mm}^4$
Design width (dW) =	42 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3
$S1d = 1.25 * dD / dW^* (Lay.t / dD)^{0.5} =$	15.20	For top comp. edge restrained - Cl 3.2.3.2(a)	
$S1ud = 1.25 * dD / dW^* (Lay.t / dD)^{0.5} =$	15.20	For top comp. edge restrained - Cl 3.2.3.2(a)	
$k12d = 1.5 - 0.05 * pbd * S1d =$	0.744	for $10 \leq pbd * S1d \leq 20$ - Cl 3.2.4	
$k12 = 1.5 - 0.05 * pb * S1d =$	0.761	for $10 \leq pb * S1d \leq 20$ - Cl 3.2.4	$f'b = 46.9 \text{ MPa}$
$k12u = 1.5 - 0.05 * pbu * S1u =$	0.805	for $10 \leq pbu * S1u \leq 20$ - Cl 3.2.4	$f's = 4.2 \text{ MPa}$
Strength reduction factor (ϕ) =	0.95	Table 2.1	Material constant (pbd) = 0.99 (rbd=0.25)
$\phi M(dI) = \phi * (k1=0.57) * k4 * k6 * k9 * k12d * f'b * Zx =$	11.11	kNm	Material constant (pb) = 0.97 (rb=0.36)
$\phi M = \phi * k1 * k4 * k6 * k9 * k12 * f'b * Zx =$	18.74	kNm	Stress reversal (pbu) = 0.91 (rbu=1.00)
$\phi Mw = \phi * (k1=1) * k4 * k6 * k9 * k12u * f'b * Zx =$	21.10	kNm	Duration factor (k1) = 0.94 (Live)
$\phi V(dI) = \phi * (k1=0.57) * k4 * k6 * f's * (2/3 * A) =$	18.47	kN	Moisture factor (k4) = 1.00
$\phi V = \phi * k1 * k4 * k6 * f's * (2/3 * A) =$	30.45	kN	Temp. factor (k6) = 1.00
$\phi Vw = \phi * (k1=1) * k4 * k6 * f's * (2/3 * A) =$	32.40	kN	Sharing factor (k9) = 1.00
			Size modifier (mod.b & s) = 1.00 & 1.00

Deflections

		Duration factor ($j2$) =	2.0
Ireq'd j2.(DL+ Ψ l.LL) (L/300) =	36.6 $\times 10^6 \text{ mm}^4$	$\delta DL =$	4.9 mm
Ireq'd LL (L/240) =	5.3 $\times 10^6 \text{ mm}^4$	$\delta \Psi s.LL =$	0.9 mm
Ireq'd WLs (L/180) =	3.8 $\times 10^6 \text{ mm}^4$	$\delta WLs =$	-0.8 mm
			Span / 700
			Span / 3874
			Span / 4062

RETAINING WALLS V5.06

Xstruct

Wall:	(RW1 ALT 500) 1500mm retaining ht., 300mm thick (No key)	
Loads:	Surcharge = 5.00kPa, Drained	
Footing:	1700mm long (overall), 1400mm overhang (behind wall), 600mm deep	
Stability:	$M^*o = 27.8\text{kNm} < \phi Mr = 43.2\text{kNm}$	OK (0.64)
Sliding:	$V^*slide = 35.9\text{kN} < \phi Vr = 36.5\text{kN}$	OK (0.98)
Wall:	$M^*wall = 11.2\text{kNm}$, $V^*wall = 19.8\text{kN}$, Design factor $\Phi n = 0.9$	
Bearing:	Max. bearing pressure = 90kPa < Allowable = 150kPa	OK (0.60)

Geometry

Wall assumed fully drained

Retaining height (z) =	1500 mm (= Wall height)
Risk class =	C (A),(B),(C) - Significant damage or risk to life - Table 1.1
Backfill type =	1 Class(1), Class(2), (U)ncontrolled, (I)n-situ - Table 5.1(A)

Soil parameters	
Internal friction (ϕ) =	25 ° ($0^\circ \leq \phi \leq 45^\circ$)
Incline (β) =	0 ° ($0^\circ \leq \beta \leq 45^\circ$) 1 in 0.0
Soil weight (γ) =	22.0 kN/m ³
Cohesion (c) =	0 kPa
Friction coefficient (μ) =	0.443 (-1 to ignore sliding)

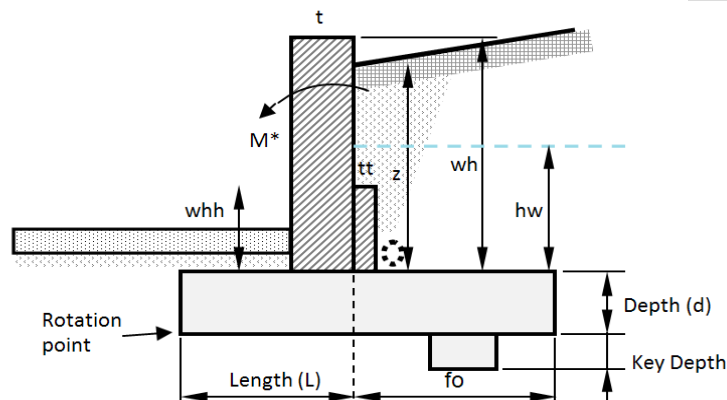
Use passive =	Y (Y)es,(N)o
Manual Kp value =	0.00 0 for default
Soil depth to Ignore =	0 mm (for passive)

Allowable bearing = 150 kPa

Slab overlay (ts) =	mm
Soil overlay (tsl) =	mm

Wall	
Wall thickness (t) =	300 mm
Wall height (wh) =	1500 mm (= Retaining height)
Add'l thickness (tt) =	mm (behind wall)
Add'l th. height (whh) =	mm
Add'l th. on soil side =	Y (Y)es,(N)o
Wall Wt (Wwt) =	25 kN/m ³

Footing	
Footing depth (d) =	600 mm
End thickness (d2) =	0 mm (0 = no taper)
Footing length (L) =	300 mm excluding overhang
Overhang (fo) =	1400 mm additional to length
Key depth (key) =	0 mm (sliding only)
Key length (klen) =	0 mm
Key position from heel/back (kpos) =	0 mm (to face)



Design loads - Appendix J - AS4678 & Section 4

Surcharge Min. =	5.0 kPa min. (Table 4.1)	Additional Loads at top of wall:	
Surcharge (S) =	5.0 kPa	Overturning (Ma) =	0.00 kNm/m
Water height (hw) =	0 mm (over footing, 0=no water)	Thrust (Va) =	0.00 kN/m
		Load factor =	1.50
Earth factor =	1.25 (1.25)	Ma* =	0.00 kNm/m
Water pressure =	1.00 (1.00)	Va* =	0.00 kN/m
Live load factor =	1.50 (1.50 - 0.0 for stabilising effect)	(Moment/Thrust about top wall)	
Stabilising factor (ϕ_s) =	0.80 AS 4678 - Appendix J2	Additional dead load (Pv) =	0.00 kN/m

Material design factors - Section 5

$\Phi_{uc} =$	0.90	$c^* = c^* \Phi_{uc} =$	0 kPa	CI 5.2.1	
$\Phi_{uo} =$	0.95	$\phi^* =$	23.9 °	CI 5.2.2	$\phi^* = 0.417 \text{ rad}$
Design factor (Φn) =	0.90 Table 5.2				
	Ka =	0.423	Depth of tension zone =	0 mm	
	Kp =	2.362	Acting soil height (ha) =	1500 mm	

RETAINING WALLS V5.06

Xstruct

Design Moment in wall (about top of footing, per m of wall)

	Pressure kPa	Thrust kN/m	Thrust* kN/m	Lever arm mm	Mw kNm/m	Mw* kNm/m	Comments
Soil = $Ka \cdot \gamma \cdot ha$ =	13.97	10.48	13.10	500	5.24	6.55	(At wall base) Max. pressure at base
Water = None =	0.00	0.00	0.00	0	0.00	0.00	Max. pressure at base
Surcharge = $Ka \cdot S$ =	2.12	3.18	4.76	750	2.38	3.57	Uniform pressure dist.
Additional =		0.00	0.00	1500	0.00	0.00	
Total		13.66	17.86		7.62	10.12	

Total thrust (Vw) = 13.66 kN/m
Total ult. thrust (Vw*) = 17.86 kN/m
Total ult. design thrust (Vw/Φn) = 19.85 kN/m
Total moment (Mw) = 7.62 kNm/m
Total ult. moment (Mw*) = 10.12 kNm/m
Total ult. design moment (Mw*/Φn) = 11.25 kNm/m

Overturning (Limit mode U2) (about base of footing, per m of wall)

Depth for rotation (deff) = 600 mm (Footing depth)

	Pressure kPa	Thrust kN/m	Thrust* kN/m	Lever arm mm	Mo kNm/m	Mo* kNm/m	Comments
Soil = $Ka \cdot \gamma \cdot (ha + deff)$ =	19.56	20.54	25.68	700	14.38	17.97	(At footing base) Max. pressure at base
Water = None =	0.00	0.00	0.00	0	0.00	0.00	Max. pressure at base
Surcharge = $Ka \cdot S$ =	2.12	4.45	6.67	1050	4.67	7.00	Uniform pressure dist.
Additional =		0.00	0.00	2100	0.00	0.00	
Total		24.99	32.35		19.05	24.98	

Total thrust = 24.99 kN/m
Total ult. thrust = 32.35 kN/m
Total moment (Mo) = 19.05 kNm/m
Total ult. moment (Mo*) = 24.98 kNm/m
Total ult. (Mo*/Φn) = 27.75 kNm/m

Restoring (Limit mode U2) (about base of footing, per m of wall)

	Force kN/m	Lever arm mm	Mr kNm/m	øMr kNm/m	Ecc mm	Mb kNm/m	
Footing =	24.48	648	15.86	12.69	0	0.00	
Soil overlay =	0.00	-202	0.00	0.00	850	0.00	
Slab overlay =	0.00	-202	0.00	0.00	850	0.00	
Wall =	11.25	-52	-0.58	-0.47	700	7.88	
Lower wall (back) =	0.00	98	0.00	0.00	550	0.00	Using Wwt-Soil dentity (γ)
Soil behind wall =	46.20	798	36.87	29.49	-150	-6.93	
Dead load (Pv) =	0.00	-52	0.00	0.00	700	0.00	
Tapered =	0.00	0	0.00	0.00	850	0.00	
Key =	0.00	1498	0.00	0.00	-850	0.00	
Passive pressure =			1.87	1.50			
Total	81.93		54.02	43.21		0.95	

Total force (Wt) = 81.93 kN/m
Total bearing overturning (Mb) = 0.95 kNm/m
Total restoring (Mr) = 54.02 kNm/m
Total ult. Restoring (ø(0.80)*Mr) = 43.21 kNm/m OK (0.64)

RETAINING WALLS V5.06

Sliding (Limit mode U1)

Sliding ($V \cdot \text{slide} / \Phi_n$) =	35.94 kN/m at base	
Passive resistance of footing and key (R_p) =	9.35 kN/m	
Sliding resistance ($R_s = \mu \cdot W_t$) =	36.29 kN/m	
Total resistance $\phi V_r = \phi_s(0.80) \cdot (R_p + R_s)$ =	36.52 kN/m	OK (0.98)

Bearing

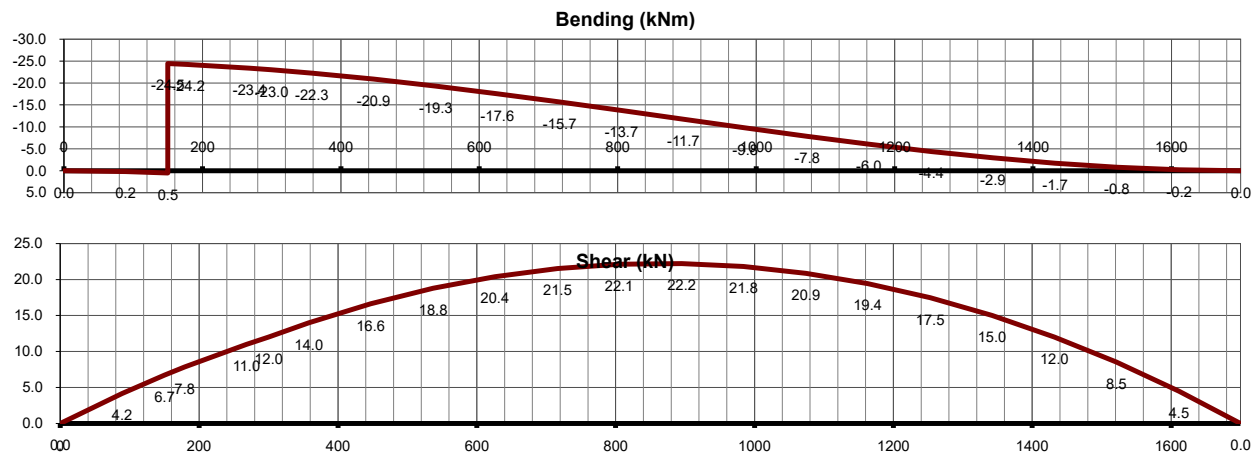
Total (W_t) =	81.93 kN/m	
Overturning moment ($M_o = M_o + M_b$) =	19.99 kNm/m	
Ecc = M_o / W_t =	244 mm	
Minimum bearing pressure ($q_{\min}$) =	6.7 kPa	
Maximum bearing pressure ($q_{\max}$) =	89.7 kPa	OK (0.60)
Centroid from left/front edge of footing (y) =	606 mm	(Entire footing under pressure)

Design Moment and Shear in footing due to bearing (per m of wall)

Manual force position =	850 mm (from left/front edge of footing)
Equivalent load factor =	1.31

	Moment*	Shear*	Lever arm	Position
	kNm/m	kN/m	mm	mm
Front face of wall =	0.0	0.0	-	0
Centre of wall (from the left) =	0.5	6.7	78	150
Centre of wall (from the right) =	-24.5	6.7	3642	150
Back face of wall (soil side) =	-23.0	12.0	1921	300
Max. moment (+ve) =	0.5	6.7	-	150
Max. moment (-ve) =	-24.5	6.7	-	150
Max. shear =	-11.7	22.2	-	895
Manual position =	-12.7	22.2	-	850

Graphs (Footing)



Building Act 1993, Section 238 (1) (a), Building Regulations 2018 Regulation 126: Certificate of Compliance for Proposed Building Work

This certificate is issued to;

Relevant building surveyor:

Postal address:

Email:

This certificate is issued in relation to the proposed building work at;

Number:	Street/Road:	Suburb:
Lot/s:	LP/PS:	Volume:
Folio:	Country: Australia	Sections:

Nature of proposed building work;

Construction of three double storey buildings to Volume 2, NCC 2022

Footing and slab design, framing design, bracing design and retaining wall design

Building Classification; Class 1a (Dwelling), 10a (Garage)

Prescribed class of building work for which this certificate is issued;

Design or part of the design of building work relating to structural matter

Documents setting out the design that is certified by the certificate

<u>Doc #</u>	<u>Doc Date</u>	<u>Rev #</u>	<u>Type of Doc</u>	<u>Pages</u>
1685	10.09.24	A	Drawings	7
1685	10.09.24	A	Computations	74

This design certified by this certificate complies with the following provisions of Building Act 1993, Building Regulations 2018 and NCC

<u>Act, Regulation, or NCC</u>	<u>Section, Regulation, Part, Performance Requirement or other provision</u>
NCC 2022 Volume 2	Parts H1P1, H1D2, H1D3, H2D4, H1D11, H1D12, H2D2
Australian Standards	AS1684.2-2021; AS1684.4-2010; AS1720.1-2010; AS4100-2020; AS2870-2011; AS4055-2021; AS3500.3-2021; AS1170.0-2002; AS1170.1-2002; AS1170.2-2021; AS3600-2018; AS4773.1-2015; AS4773.2-2015; AS3700-2018; AS4678-2002.

I prepared the design, or part of the design, set out in the documents listed above and I certify that the design set out in the documents listed above comply with the provisions set out above. I believe that I hold the required skills, experience and knowledge to issue this certificate and can demonstrate this if requested to do so.

Professional Engineer Yasemin Dilbaz 10.09.24

email: yasemin@xstruct.com.au

Registered areas: Civil

Endorsements: Civil

Registration No: PE0003335



GENERAL NOTES

- INTELLECTUAL PROPERTY AND USE OF THIS DOCUMENT
- This document has been prepared for the exclusive use of the client of Creative House Plans (the designer), for the purpose expressly notified to the designer. Any other person who uses or relies on these plans without the designer's written consent does so at their own risk and no responsibility is accepted by the designer for such use and/or reliance.
 - This document is to be read in conjunction with all drawings, details and information provided by the consultants named herein, and with any other written instructions issued in the course of the contract.
 - A building permit is required prior to the commencement of these works. The release of this document is conditional on the client obtaining the required building permit.
- MATERIALS AND TRADE PRACTICES
- All materials, construction and work practices shall comply with but not be limited to the current issue of NCC 2022 01-05-23, National Construction Code 2022 Building Code Of Australia Vol. 2 (hereafter referred to as BCA), and all relevant current Australian Standards referred to therein.
 - Work and site management practices shall comply with all relevant laws and by-laws.
 - If any performance solution is proposed, it shall be assessed and approved by the [relevant building surveyor/building certifier] as meeting BCA performance requirements prior to implementation or installation.
 - Installation of all services shall comply with the respective supply authority's requirements.

MEASUREMENTS

- Figured dimensions take precedence over scaled dimensions.
- All measurements are in millimetres, unless noted otherwise.
- Unless noted otherwise, dimensions on floor plans, sections and external elevations represent timber framing and structural members, not finished linings/cladding.
- Window sizes are nominal only. Actual size may vary according to manufacturer.
- The builder and subcontractors shall check and verify all dimensions, setbacks, levels, specifications, and all other relevant documentation prior to the commencement of any works. Report all discrepancies to the designer for clarification.

SITE CLASSIFICATIONS & PROPERTY INFORMATION

- Site Classification as Class "P"
- Wind Speed Class : N1
- BAL Level : Low
- Refer Soil Report No : 2240435-1
- By ResCom Dated: 23-02-24

SUPPLEMENTARY NOTES

SITE PROTECTION DURING THE CONSTRUCTION PERIOD

- Protective outriggers, fences, awnings, hoarding, barricades and the like shall be installed where necessary to guard against danger to life or property or when required by the relevant building surveyor and/or council.
- Where required by council, the builder shall construct a temporary crossing placed over the footpath.
- All practicable measures shall be implemented to minimise waste to landfill. The builder may use a construction waste recovery service, or sort and transport recyclable materials to the appropriate registered recycler. Materials shall not be burned on site.
- A site management plan shall be implemented from the commencement of works, to control sediment run-off in accordance with [insert relevant state/council guidelines or regulation]. Silt fences shall be provided to the low side of the allotment and around all soil stockpiles and storm water inlet pits/sumps and 'silt stop' filter bags or equivalent shall be placed over all storm water entry pits. Erosion control fabric shall be placed over garden beds to prevent surface erosion.
- Dust-creating material shall be kept sprayed with water so as to prevent any nuisance from dust.
- Waste materials shall not be placed in any street, road or right of way.
- Earthworks (unretained) shall not exceed 2m.
- Cut and fill batters shall comply with BCA Table 3.2.1.

PROTECTION OF THE BUILDING FABRIC

- The builder shall take all steps necessary to ensure the stability and general water tightness of all new and/or existing structures during all works.
- Windows, doors and service penetrations shall be flashed all around.
- All pliable membranes shall be installed to comply and be in accordance with BCA 10.8.1
- Gutters and drainage shall be supplied and installed in accordance with AS3500.3.
- Anti-ponding devices/boards shall be installed according to BCA 7.3.5.
- Dampcourses with weepholes and cavity flashings shall be installed in accordance with AS4773.2.
- Surfaces around the perimeter of a residential slab shall fall away from that slab by not less than 50mm over the first 1m. Where not stipulated in the geotechnical report, freeboard shall be not less than 50mm from an impermeable surface or 150mm from a permeable surface.
- Subfloor vents shall be located >600mm from corners and be installed below bearers. Such vents shall provide a rate per 1000mm run of external or internal cross walls of:
 - 7,500mm² clear ventilation where particle board flooring is used; or
 - 6,000mm² for other subfloor types.
- [Where a building other than detached class 10 is located in a termite-prone area] the building shall be provided with a termite management system compliant with AS3660.1 or AS3660.2.
- In saline or industrial environments, masonry units, mortar, and all built-in components shall comply with the durability requirements of Table 4.1 of AS4773.1, Part 1: Design.
- Building tie-downs shall be appropriate for the site wind classification and provided in accordance with BCA 5.6.6.
- Corrosion protection shall be suited to the site context and provided for built-in structural steel members such as steel lintels, shelf angles, connectors, accessories (other than wall ties) in accordance with Table 4.1 of AS4773.1 Masonry in Small Buildings, Part 1: Design.
- Sheet roofing shall be protected from corrosion in a manner appropriate to the site context, in accordance with BCA Table 7.2.2a.
- Single leaf masonry walls shall be weatherproofed per BCA 5.7.6.
- [In climate zones 6, 7 and 8] Unless excluded by BCA 10.8.3(2) roofs shall be provided with ventilation openings per BCA 10.8.3.
- External waterproofing for on flat roofs, roof terraces, balconies and terraces and other similar horizontal surfaces located above internal spaces of a building shall comply with BCA H2D8.
- Waterproofing of wet areas - being bathrooms, showers, shower rooms, laundries, sanitary compartments and the like - shall be provided in accordance with BCA 10.2.
- Balcony waterproofing shall be installed in accordance with AS4654.1 & AS4654.2.

GLAZING

- Glazed units shall be installed in accordance with BCA 8.3.2.
- Fully framed glazing installed in the perimeter of buildings shall comply with BCA 8.3.3.
- Glass - including, but not limited to, windows, doors, screens, panels, splashbacks and barriers - shall comply with BCA 3.3.3.
- Glazing subject to human impact shall comply with BCA 8.4.

FOOTINGS

- Footings shall not, under any circumstance, encroach over title boundaries or easement lines.
- Where concrete stumps are to be used, these shall be:
 - 100 x 100mm (1x 5mm HD wire) if up to 1400mm long
 - 100 x 100mm (2x 5mm HD wires) if 1401mm to 1800mm long
 - 125 x 125mm (2x 5mm HD wires) if 1801mm to 3000mm long.
- 100mm x 100mm stumps that exceed 1200mm above ground level shall be braced where no perimeter base brickwork is provided.
- All concrete footings shall be founded at a depth to a minimum required bearing capacity and/or in accordance with recommendations contained in soil report (or otherwise at engineer's discretion).

STORMWATER & SEWERS

- 100mm dia. Class 6 UPVC stormwater line min grade 1:100 shall be connected to the legal point of discharge to the relevant authority's approval. Provide inspection openings at 9m centres and at each change of direction.
- Covers to underground stormwater drains shall be not less than:
 - 100mm under soil
 - 50mm under paved or concrete areas
 - 100mm under unreinforced concrete or paved driveways
 - 75mm under reinforced concrete driveways
- The builder and subcontractor shall ensure that all stormwater drains, sewer pipes and the like are located at a sufficient distance from any buildings, footing and/or slab edge beams so as to prevent general moisture penetration, dampness, weakening and undermining of any building and its footing system.

SAFETY OF BUILDING USERS

- Where stairs, ramps and balustrades are to be constructed, these shall comply with all provisions of BCA 11.2.
- Other than spiral stairs:
 - Risers shall be 190mm max and 115mm min
 - Goings shall be 355mm max and 240mm min
 - 2r+g shall be 700mm max and 550mm min
- There shall be less than 125mm gap between open treads.
- All treads, landings and the like shall have a slip resistance classification of P3 or R10 for dry surface conditions and P4 or R11 for wet surface conditions, or a nosing strip with a slip-resistance classification of P3 for dry surface conditions and P4 for wet surface conditions.
- Barriers shall be provided where it is possible to fall 1m or more from the level of the trafficable surface to the surface beneath. Such barriers (other than tensioned wire barriers) shall be:
 - 1000mm min above finished stair level (FSL) of balconies, landings etc; and
 - 865mm min above FSL of stair nosing or ramp; and
 - vertical, with gaps of no more than 125mm.
- Where the floor below a bedroom window is 2m or more above the surface beneath, the window shall comply with BCA Clause 11.3.7.
- Where the floor below a window other than in a bedroom is 4m or more above the surface beneath, the window shall comply with BCA Clause 11.3.8.
- Where a bedroom window is 2m or more above the surface beneath, or it is possible to fall 4m or more from the level of any trafficable surface to the surface beneath, any horizontal element within a barrier between 150mm and 760mm above the floor shall not facilitate climbing.
- Handrails shall be continuous, with tops set >865mm vertically above stair nosing and floor surface of ramps.
- Wire barriers shall comply with BCA 11.3.4 and 11.3.6.
- A glass barrier or window serving as a barrier shall comply with BCA H1D8.
- Class 1 buildings with air permeability of not more than 5 m³/hr.m² at 50 Pa shall be provided with a mechanical ventilation system complying with H6V3.Inward-opening swing doors to fully enclosed sanitary compartments shall comply with BCA Clause 10.4.2.
- Flooring in wet areas, laundry and kitchen shall be slip resistant.
- Door hardware shall be installed 900mm - 1100mm above the finished floor.
- There shall be a level transition between abutting internal surfaces (a maximum vertical tolerance of 5mm between abutting surfaces is allowable provided the lip is rounded or bevelled).

SERVICES

- Solar collector panel locations are indicative only. Location and size are dependent on manufacturer's/installer's recommendation.
- Ductwork for heating and cooling systems shall comply with AS4254 & AS/NZS 4859.1 in accordance with climate zone requirements set down in BCA Table 3.

TIMBER FRAMING

- Standard timber roofing and wall framing shall be provided in accordance with AS1684 (Residential Timber-Framed Construction) and all relevant supplements.

ELECTRICAL

- Smoke detectors shall be fitted where none are present, or where existing are non-compliant with AS3786.
- New smoke detectors shall be interconnected; mains-powered; and located and installed per BCA 9.5.2 and 9.5.4.
- In a Class 10a private garage, an alternative alarm may be installed per BCA 9.5.1.(b).
- Light switches shall be positioned in a consistent location 900mm - 1100mm above the finished floor level; horizontally aligned with the door handle at the entrance to a room.
- Power points shall not be installed lower than 300mm above finished floor level.
- All electrical penetrations shall be sealed using material appropriate to the rating of the cable and/or device.
- Only stamped IC4-rated downlights shall be installed and insulation shall not be penetrated for downlights.
- Ductwork for exhaust fans and heating and cooling systems shall comply with AS4254 & AS/NZS 4859.1 in accordance with climate zone requirements set down in BCA 13.7.4.
- Exhaust from a bathroom, sanitary compartment or laundry shall be discharged directly via an insulated shaft or R1 insulated ducting to outdoor air. Minimum flow rates shall be:
 - 40 l/s for kitchen & laundry
 - 25 l/s for bathroom or sanitary compartment.
- An exhaust system that is not run continuously and is serving a bathroom or sanitary compartment that is not ventilated in accordance with BCA 10.6.2(a) shall be interlocked with the room's light switch; and include a 10 minute run-on timer.
- Exhaust fans, rangehoods and the like shall be installed with self-closing dampers.

BUILDING THERMAL PERFORMANCE

- Works shall be constructed in accordance with the stamped plans endorsed by, accredited thermal performance assessor, without alteration.
- The NatHERS energy rating contains inbuilt assumptions about the integrity of the building fabric with regards insulation, draughtproofing and glazing. Works shall comply with the following measures, to ensure that the as-built performance corresponds to that modelled in the energy rating.
- Insulation as per thermal performance Report shall be installed in accordance with BCA 13.2.2
- Insulation shall be installed tight and continuous, without gaps and cracks, hard up against internal linings (including subfloor). There shall be no air gap between an internal lining and insulation. Junctions between internal and external walls shall be insulated.
- Insulation shall not be crushed or compressed.
- Box gutters and manhole covers shall be insulated to the same R-value as the roof, using insulation batts or blanket or closed-cell foam.
- Downlights shall be stamped as IC4 rated, airtight and covered by insulation.
- [In climate zones 6, 7 and 8] a vapour permeable layer shall be installed per manufacturer's instructions in all new external walls. The material shall be overlapped and fully taped on the external side to ensure a tight seal. All penetrations in the membrane shall be sealed, ensuring that the material covers gaps between studs and doors and window frames. Any flashing around windows shall be taped over the building wrap.
- Where a foil-backed membrane is used, timber battens shall be used to minimise thermal conduction.
- All trades shall be instructed to replace any insulation they have removed in the course of their work and to tape any cuts/penetrations in building wrap. All penetrations shall be caulked using a fit-for-purpose flexible sealant.
- Caulking products shall be appropriate for the intended application.
- Where it is not possible to insulate under an existing timber floor, gaps between floorboards shall be sealed before applying finishes or coverings.
- External doors and windows shall be draughtproofed per BCA 13.4.4 using a durable, fit-for-purpose seal.
- Cavity slider pockets shall be sealed before installation, either by wrapping with vapour permeable membrane, or by screwing plaster securely to the frame and applying a silicon bead.
- Conditioned Class 1 and unconditioned Class 10a spaces shall be separated by insulation. Any openings between such spaces shall be weather-stripped.
- Window sizes nominated are nominal. Actual size may vary minimally according to manufacturer; however, opening styles, overall size, U-value and SHGC values are inbuilt into the energy rating and may not be altered without the express approval of the project's energy rater.
- Glazed doors and windows shall be N1 wind rated, weather-stripped and flashed all around.

AREA ANALYSIS

	Proposed Unit 1	Proposed Unit 2	Proposed Unit 3
Ground Floor	96.56 m²	101.65 m²	113.76 m²
First Floor	81.43 m²	66.35 m²	81.58 m²
Porch	5.61 m²	5.60 m²	1.20 m²
Garage	22.74 m²	22.74 m²	46.68 m²
TOTAL	206.34m² OR	196.34m² OR	196.54m² OR
	22.21 SQ	21.13 SQ	21.16 SQ



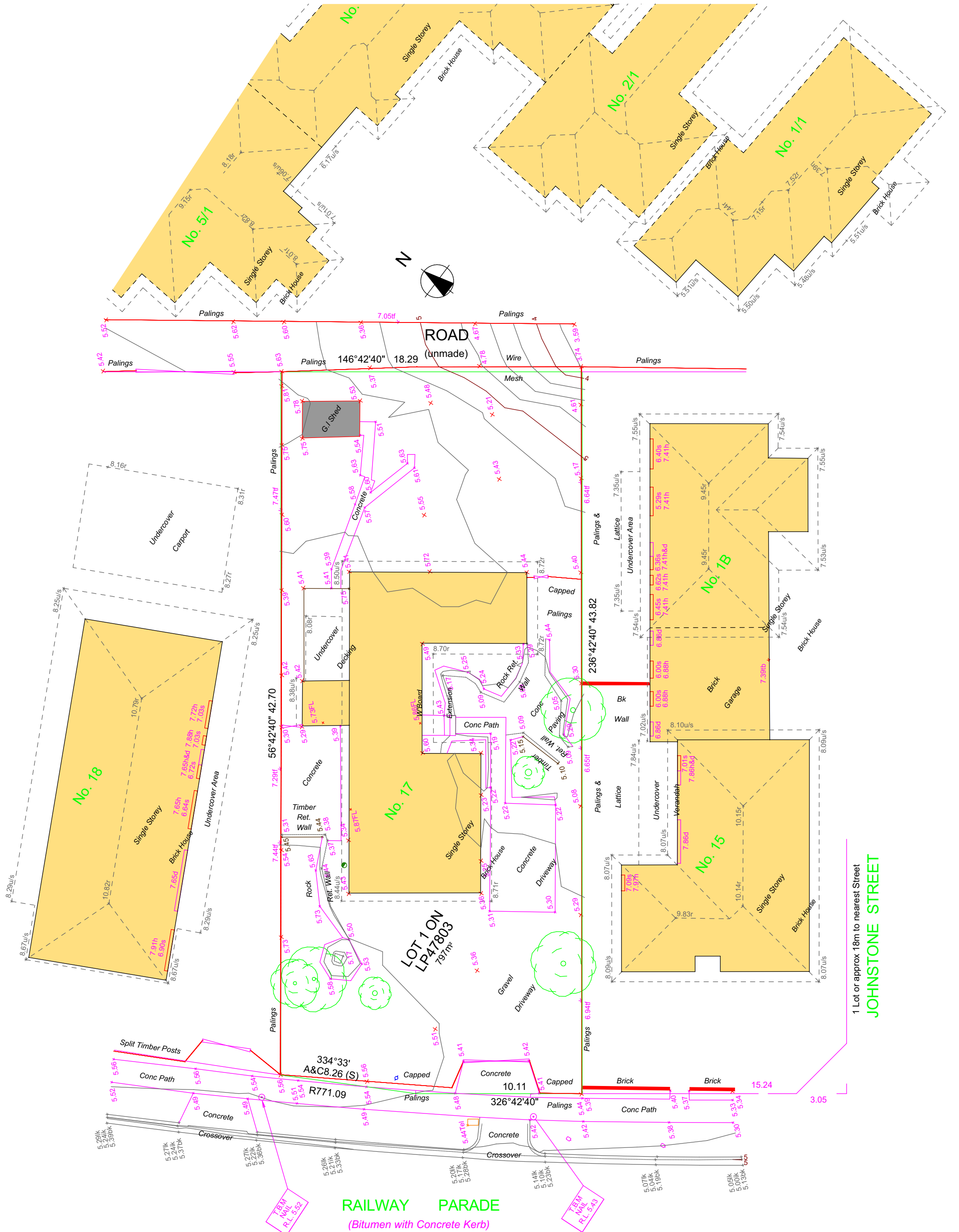
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- WD02. SITE LAYOUT EXISTING
- WD03. SITE LAYOUT POPOSED
- WD04. GROUND FLOOR PLAN
- WD05. FIRST FLOOR PLAN
- WD06. ROOF PLAN
- WD07. ELECTRICAL LAYOUT
- WD08. ELEVATIONS
- WD09. ELEVATIONS & SECTION
- WD10. NOTES
- WD11. WATERPROOFING DETAILS

RevID	Description	Date
A	Energy Rating Details Added	20-05-24
B	Retaining Wall Amendments as per Engin'rs Rcmd	28-07-24



Aerial Photograph 11-01-24



The Site Cut indicated is approximately only. The Builder Shall Assess and adjust the cuts as necessary to accommodate construction variables such as:

- Site Drainage (To comply with AS 3500 & NCC 3.1.2)
- Slab forming/boxing System
- Termite Treatment/Control System
- Proposed Landscape Features Including finishedlevels, Backfilling, Pavement Depths,Cross Falls for Drainage etc. Grade surface away from house footings (Minimum 1:20)

The Height of the slab-on-ground, above external finished surfaces must be not less than 100mm above the finished Ground level in Low rainfall Intensity areas or sandy, Well drained areas or, 50mm Above Impermeable (Paved or Concrete) areas) that slope away from the Building or 150mm in any other case (To comply with NCC 3.1.2.2)

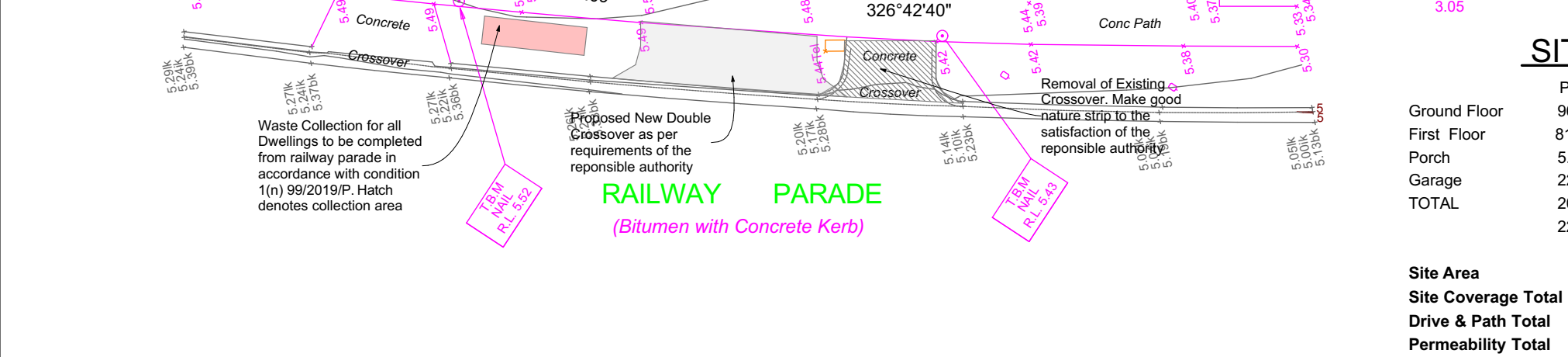
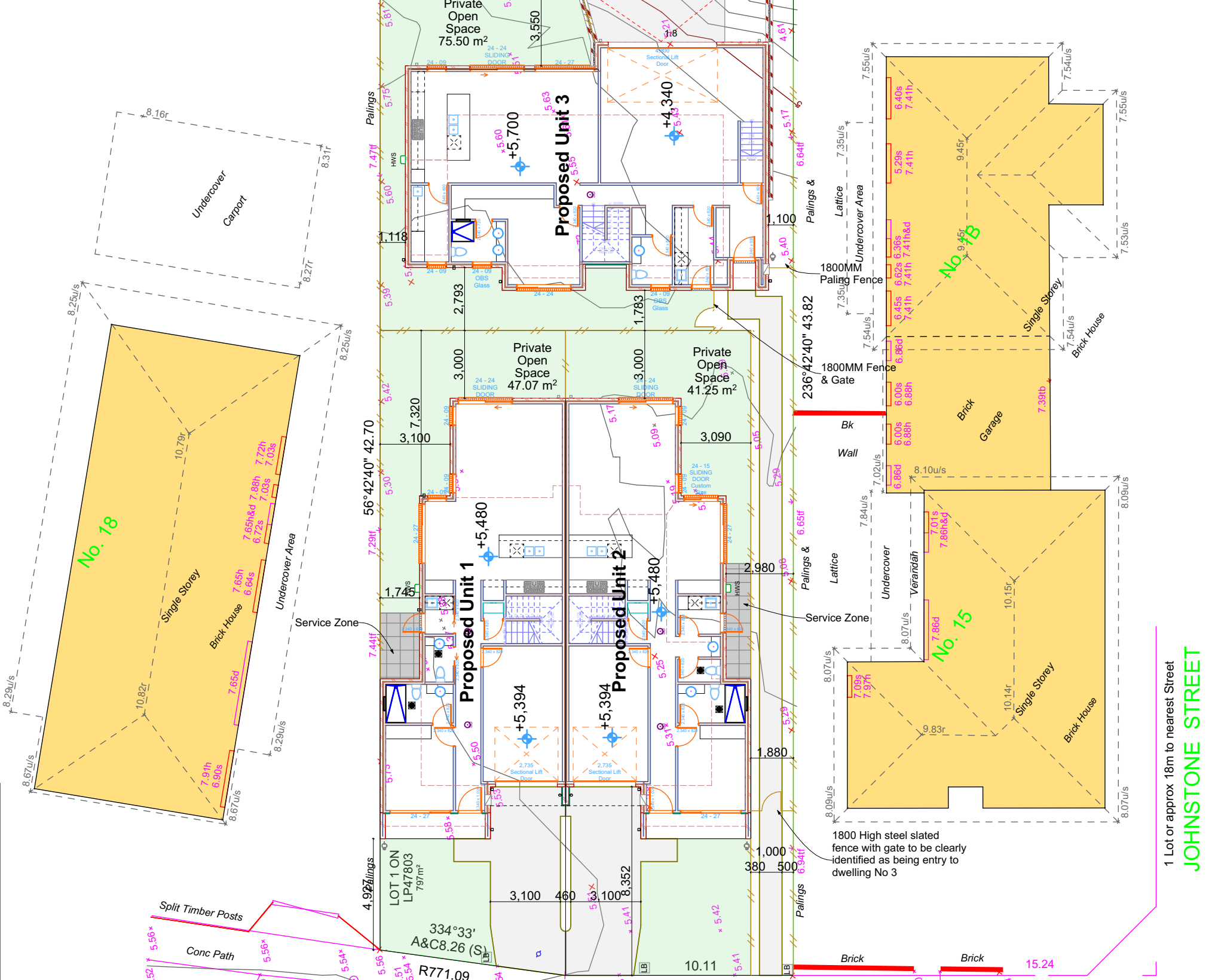
Site Cuts should allow for 100mm Top soil Backfill to Landscape areas unless noted otherwise.

However, Cuts are to be minimised to limit the need for excessive Backfill.

On Sites where landscaped areas require in excess of 100mm Backfill, Clean excavated material may be used in 150mm compacted layers with 100mm of F.G.L

Backfill under slabs shall be to Engineer Design/Details

All Site cuts are to have cross fall to provide positive drainage. The toe of every cut Batter to be provide with 90mm uPVC Slotted Aggi Drain connected to stormwater system via a silt pit protected by Gravel Filters.



SITE LAYOUT GROUND FLOOR
Scale 1:200

Notes

- Site Drainage shall comply with NCC 3.1.2 'Drainage' and AS3500 National Plumbing Drainage Code
- Sites should be drained so that water cannot pond against or near the house. The ground immediately adjacent to the house should be graded to fall 50mm over the first metre. Where this is Impractical, use A.G.Drains adjacent to footings where the ground falls towards the building.
- Agricultural (AG) cut-off drains must be installed at the base of all excavations and along the high side of a sloping site and be connected to the storm water drainage system via a 300mm x 300mm silt pit
- AG drains must be laid a minimum of 400mm into the soil and 100mm below any adjacent footing or pavement
- Contractor to connect to Existing Legal Point of Discharge to the standard & satisfaction of the responsible authority. Contractor to confirm location & depth of legal point of discharge prior to construction to ensure design intent is achievable
- Stormwater Drains are indicative only. Drainer may connect to LPD at their discretion.
- Downpipes shall be minimum 100mm x 50mm, must not be located more than 12m apart and securely fixed to walls with approved brackets at maximum 2.2m centres
- Small Immature trees located in Nature strip or adjoining properties may affect the structure of the building if allowed to grow in excess of 6m in Height. It is recommended that the owner monitors the tree(s) growth & restrict their height to 6M max.
- A rainwater tank installed in a new Class 1 building in order to comply with the requirements of the building regulations must: - be installed in such a way that it receives the rainfall from a minimum catchment area of 50 square metres;and - have a minimum capacity of 2000 litres; and - be connected to all toilets in the building for the purpose of sanitary flushing.

1 Lot or approx 18m to nearest Street
JOHNSTONE STREET

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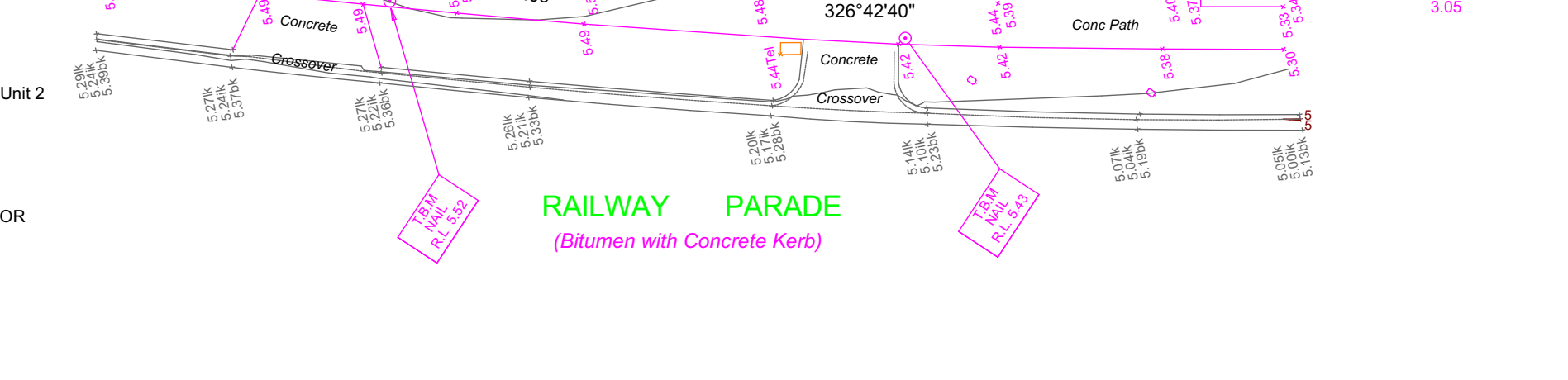
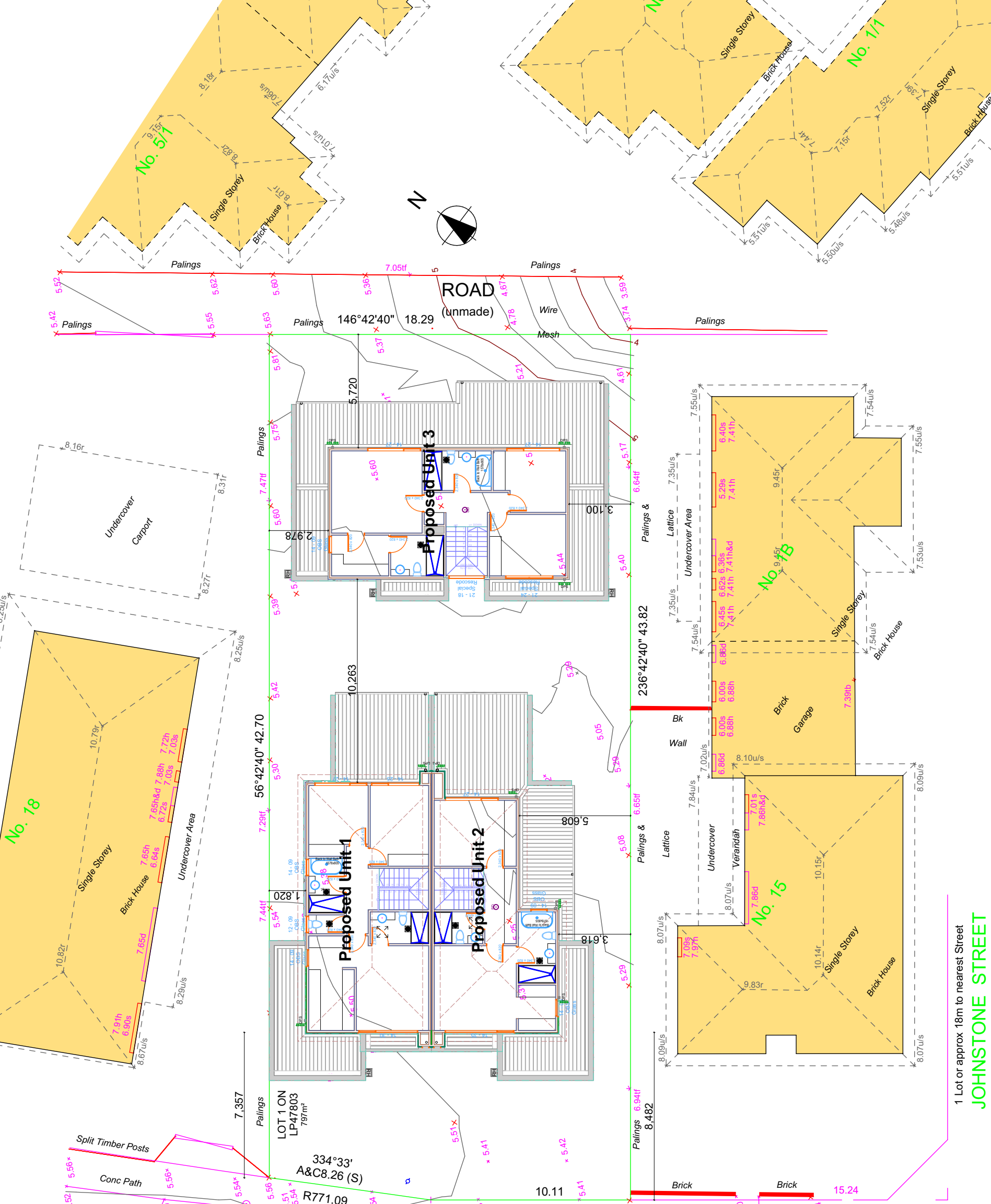
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JOHNSTONE STREET

1 Lot or approx 18m to nearest Street
JOHNSTONE STREET

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JOHNSTONE STREET

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JOHNSTONE STREET

1 Lot or approx 18m to nearest Street
JOHNSTONE STREET



SITE LAYOUT FIRST FLOOR
Scale 1:200

Sanitary Compartment Notes

- Where there is no window to W/C, Mechanical Ventilation Must be provided with a minimum 35Ltr per Second clean Air simultaneously with Artificial Light Source.
 - Exhaust Fan

- Removable Hinges are to be provided to all W/C without a minimum 1.2m clear space between the toilet Pan and the closest part of the doorway.

General Electrical Notes

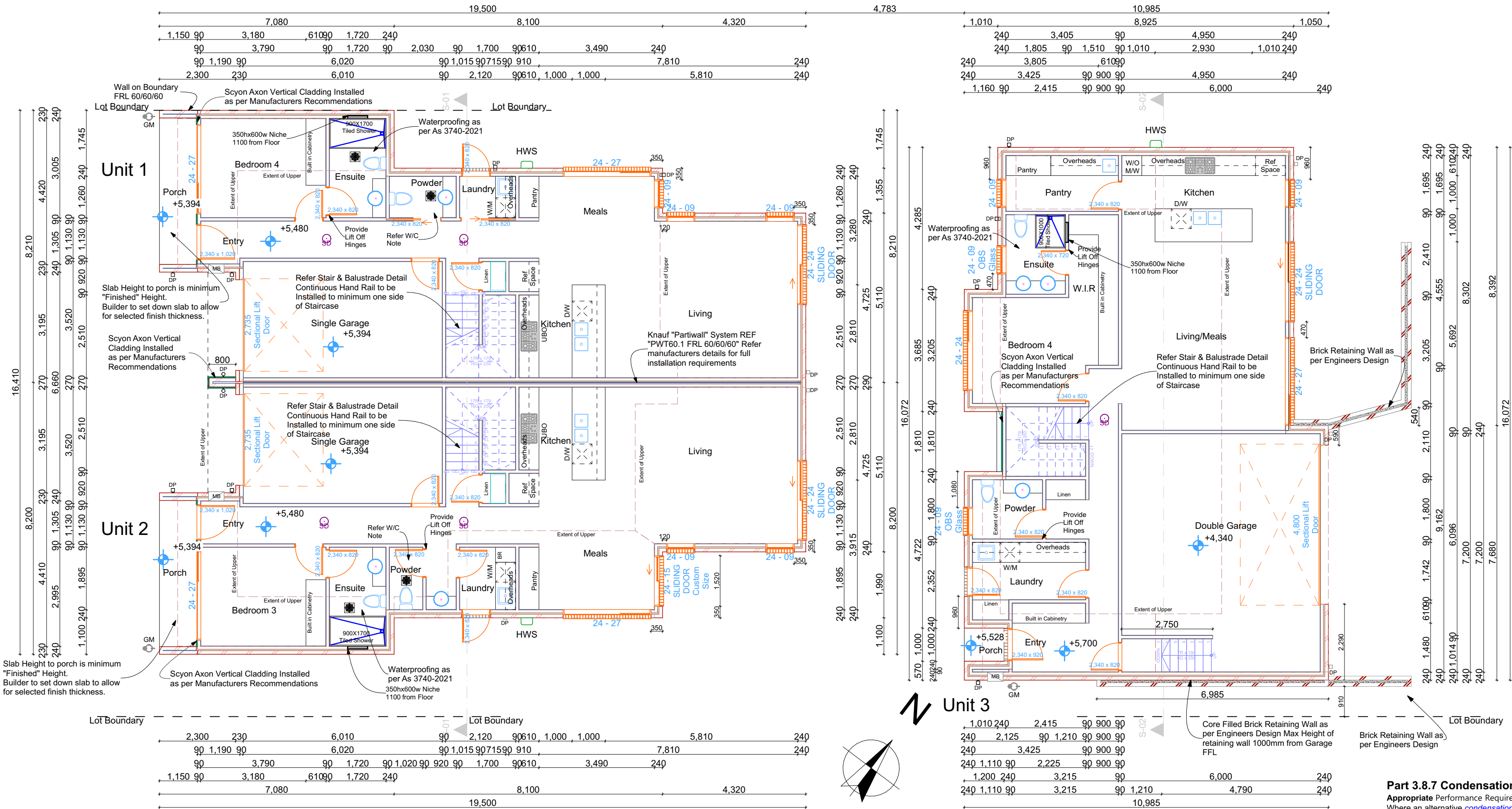
All Light Fittings are to be Energy Saving type - (CFLs) Compact Florescent Lamp & Downlights are to be of (LED) Light Emitting Diode Type

Artificial Lighting Requirements

Max 5W/m² Class 1 Building
Max 4W/m² Verandah, Balcony or the like attached to a Class 1
Max 3W/m² in a Class 10A
Building associated with a Class 1

Artificial Lighting Around the perimeter of a building must:
A) Be controlled by a daylight Sensor
B) Have an average light source efficiency of not less than 40 Lumens per Watt

Smoke Detector - Where there is more than one, Smoke detectors must be interconnected



FRL LB 60/60/60 From both sides

SYSTEM DESCRIPTION

Side 1:

- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and Fire Barrier
- Insulation (refer to table)

Fire Barrier:

- 1 x 25mm SHAFTLINER™ MOULDSTOP between 25mm H-studs @ 600mm centres

Side 2:

- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber framing and Fire Barrier
- Insulation (refer to table)

Scan QR Code for full Installation Details of Knauf Partiwall Incl Full Junction Details

50mm EPDM foam back sealing tape
Shiplap joint
James Hardie joint sealant
HardieWrap™ weather barrier
9mm Scyon™ Axon™ cladding
Grooves 133mm or 400mm
Grooves 10mm x 2mm deep wide

Scyon Axon Installation Details

Scan QR Code for full Installation Details

10mm Plasterboard
Wall Batts Refer Energy Rating Details
Brick Work
Stud Wall- Refer Framing Schedule
Breathable Wall Wrap
300mm Flashing
Concrete Slab

Typical External Wall Detail -Brick Veneer

Part 3.9.2.4 Handrails

(a)Handrails to a stairway or ramp must—
(i)be located along at least one side of the stairway flight or ramp; and
(ii)be located along the full length of the stairway flight or ramp, except in the case where a handrail is associated with a barrier the handrail may terminate where the barrier terminates; and
(iii)have the top surface of the handrail not less than 885 mm vertically above the nosings of the stair treads or the floor surface of the ramp (see Figure 3.9.2.4); and
(iv)be continuous and have no obstruction on or above them that will tend to break a handhold, except for newel posts, ball type stanchions, or the like.

Part 3.8.7 Condensation management

Appropriate Performance Requirements
Where an alternative *condensation* management system is proposed as a *Performance Solution* to that described in **Part 3.8.7**, that proposal must comply with—

(a)*Performance Requirement P2.4.7*; and
(b)the relevant *Performance Requirements* determined in accordance with **A2.2(3)** and **A2.4(3)** as applicable.

3.8.7.1 Application

Compliance with this Acceptable Construction Practice satisfies *Performance Requirement P2.4.7*.

3.8.7.2 Pliable building membrane

(a)Where a *pliable building membrane* is installed in an *external wall*, it must—

(i)comply with AS/NZS 4200.1; and
(ii)be installed in accordance with AS 4200.2; and
(iii)be a vapour permeable membrane for *climate zones* 6, 7 and 8; and
(iv)be located on the primary side of the primary insulation layer of wall assemblies that form the external envelope of a building.

(b)Except for single skin masonry or single skin concrete, where a *pliable building membrane* is not installed in an *external wall*, the primary *water control layer* must be separated from *water sensitive materials* by a drained cavity.

3.8.7.3 Flow rate and discharge of exhaust systems

(a)An exhaust system installed in a kitchen, bathroom, *sanitary compartment* or laundry must have a minimum flowrate of—
(i)25 L/s for a bathroom or *sanitary compartment*; and
(ii)40 L/s for a kitchen or laundry.

(b)Exhaust from a bathroom, *sanitary compartment*, or laundry must be discharged—
(i)directly or via a shaft or duct to *outdoor air*; or
(ii)to a roof space that is ventilated in accordance with **3.8.7.4**.

3.8.7.4 Ventilation of roof spaces

(a)Where an exhaust system covered by **3.8.7.3** discharges into a roof space, the roof space must be ventilated to *outdoor air* through evenly distributed openings.

(b)Openings *required* by (a) must have a total unobstructed area of 1/300 of the respective ceiling area if the roof pitch is more than 22°, or 1/150 of the respective ceiling area if the roof pitch is not more than 22°.

(c)30% of the total unobstructed area *required* by (b) must be located not more than 900 mm below the ridge or highest point of the roof space, measured vertically, with the remaining *required* area provided by eave vents.

Creative house plans
E & U Bafto Corporation Pty Ltd T/As Creative House Plans
ABN 51 295 918 936
Elvir Bafto DP-AD 17703 DBU-20052
Address: 2B Desmond Court BEACONSFIELD VIC 3807
P 0422 422 448 | E mail@baftocorp.com.au |
W www.creativehp.com.au

CLIENT : BEKIM QANIU & FATIME QANIU

SITE ADDRESS : Lot 1 No 17 Railway Parade SEAFORD 3198

PROJECT :
3 Double Storey Dwellings

DRAWING TITLE :
Ground Floor Plan

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Drawing Ref: Jobs/23-24/1S

Date:29/07/2024

1:100 unless shown
otherwise on A3:

REGISTERED
Building Practitioner
Design Matters
Member

Revision: B

DRAWING NO.
WD04

- Where there is no window to W/C, Mechanical Ventilation Must be provided with a minimum 35Ltr per Second clean Air simultaneously with Artificial Light Source.

- Removable Hinges are to be provided to all W/C without a minimum 1.2m clear space between the toilet Pan and the closest part of the doorway.

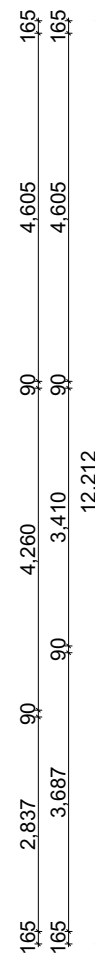
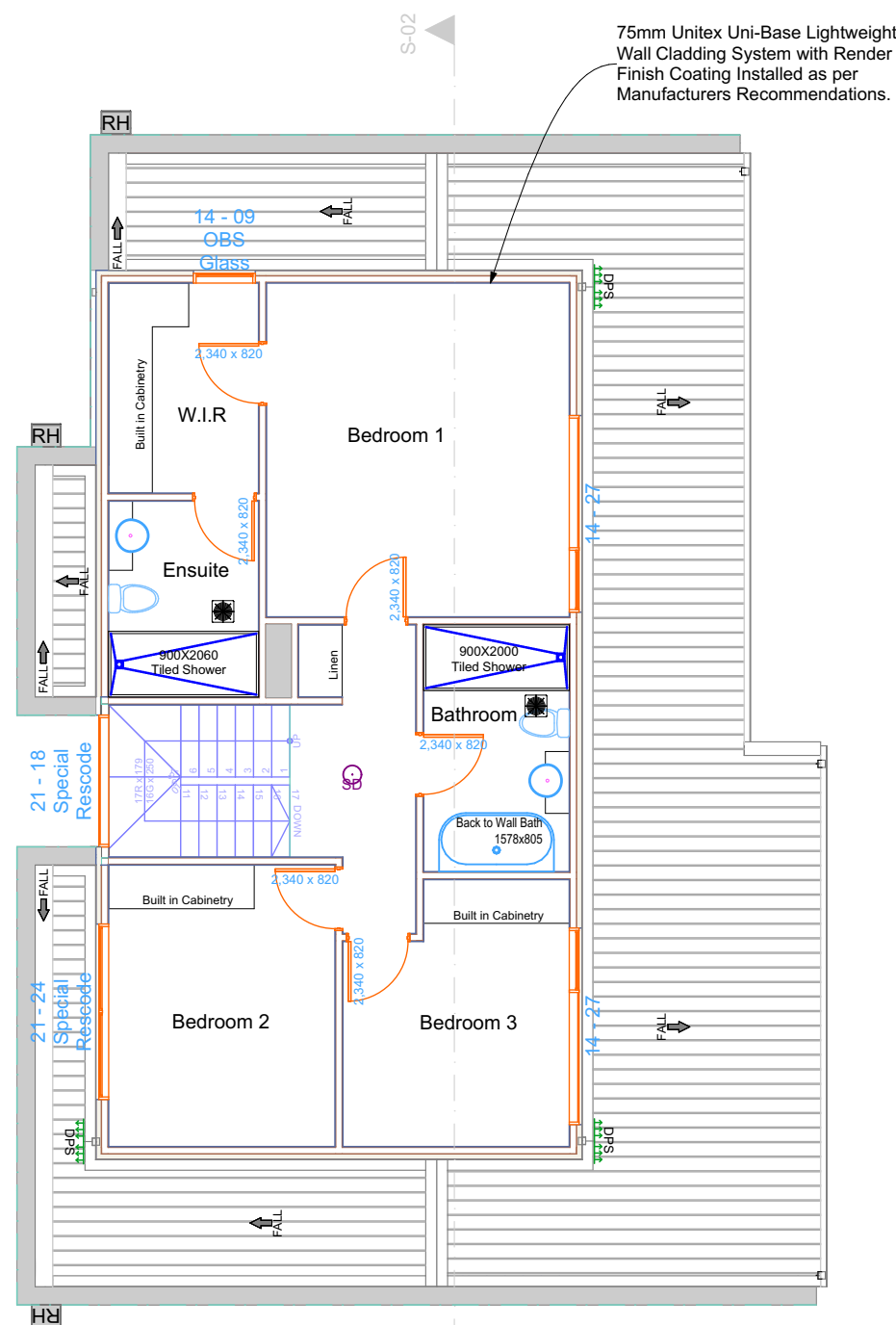
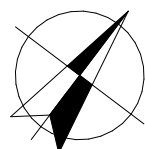
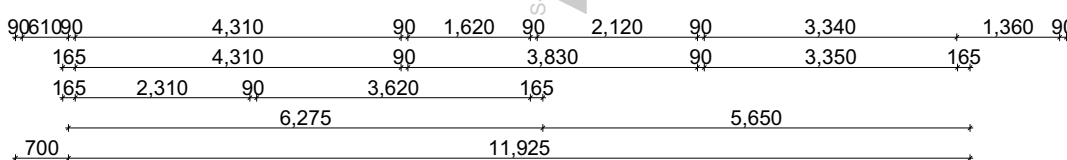
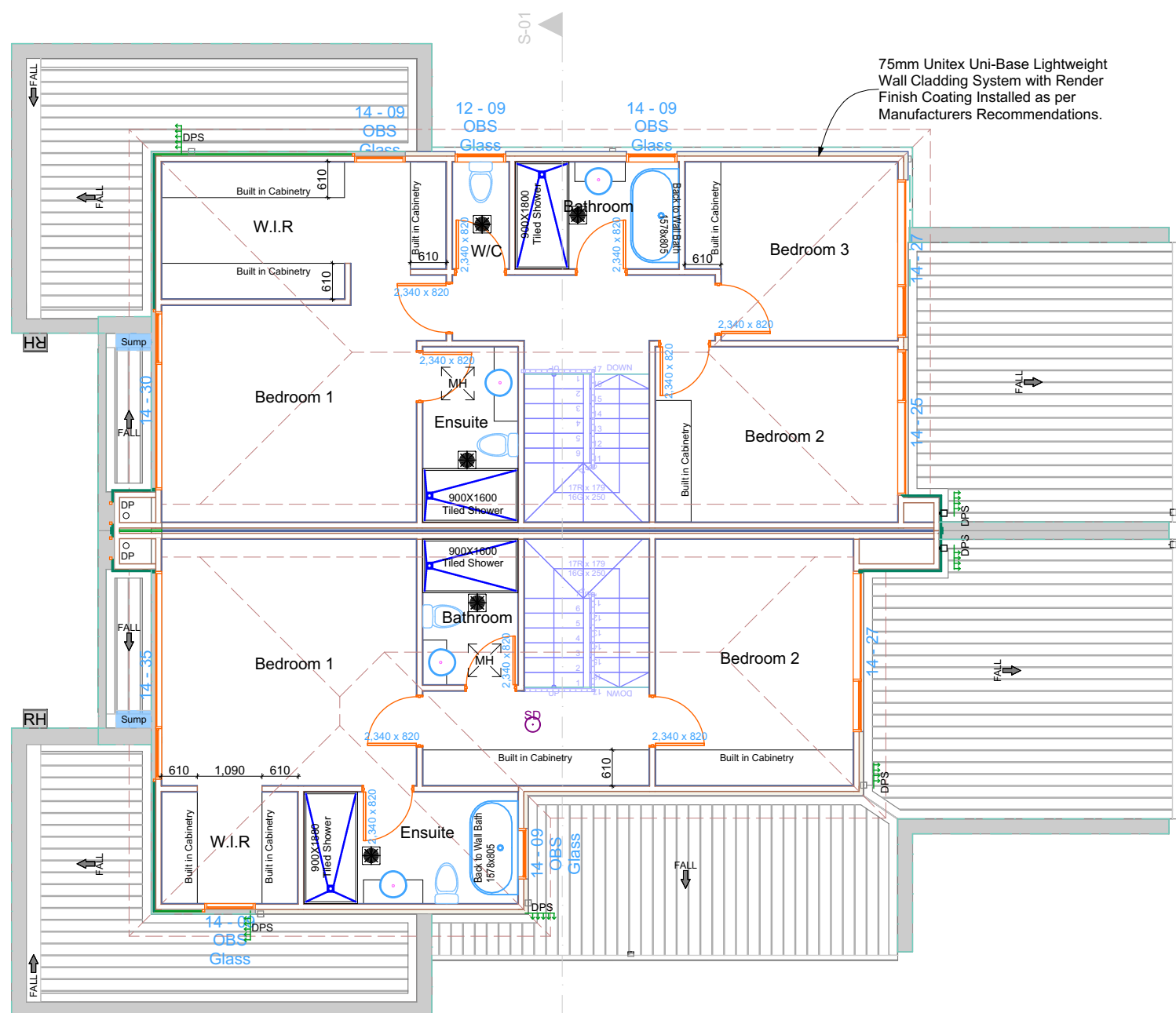
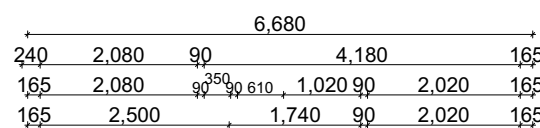
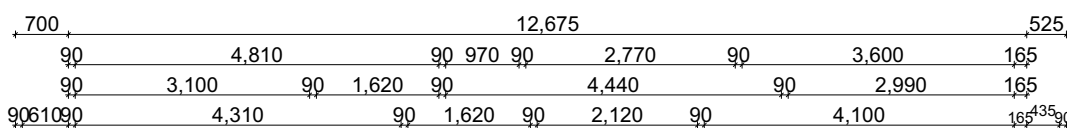
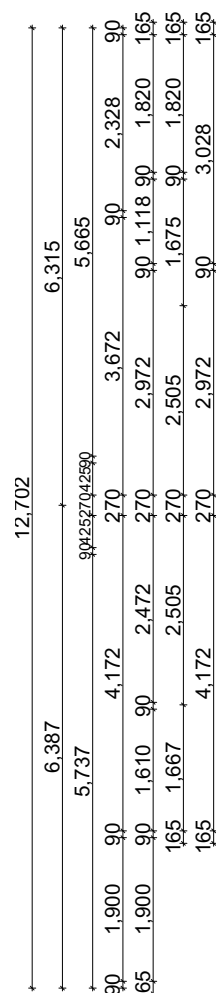
All Light Fittings are to be Energy Saving type - (CFLs) Compact Florescent Lamp & Downlights are to be of (LED) Light Emitting Diode Type

Max 5W/m² Class 1 Building
Max 4W/m² Verandah, Balcony or
the like attached to a Class 1
Max 3W/m² in a Class 10A
Building associated with a Class 1

Artificial Lighting Around the perimeter of a building must:

- A) Be controlled by a daylight Sensor
B) Have an average light source efficiency of not less than 40 Lumens per Watt

SD Smoke Detector - Where there is more than one, Smoke detectors must be interconnected

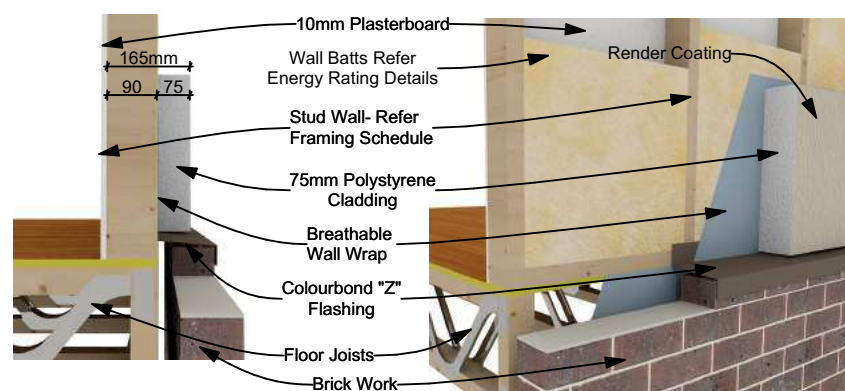


Scan QR Code for full
Installation Details of
Knauf Partiwall Incl Full
Junction Details



Scyon Axon Installation Details

Scan QR Code for full
Installation Details



Must be Installed as per Manufacturers Details to comply with BCA Accreditation # V11/03

75mm UNITEX Uni-Base Board
Light Weight Wall Cladding System



Unitex Render

Installation Details

Scan QR Code for full
Installation Details

Part 3.9.2.4 Handrails

- (a) Handrails to a stairway or ramp must—
 - (i) be located along at least one side of the stairway flight or ramp; and
 - (ii) be located along the full length of the stairway flight or ramp, except in the case where a handrail is associated with a barrier the handrail may terminate where the barrier terminates; and
 - (iii) have the top surface of the handrail not less than 865 mm vertically above the nosings of the stair treads or the floor surface of the ramp (see Figure 3.9.2.4); and
 - (iv) be continuous and have no obstruction on or above them that will tend to break a handhold, except for newel posts, ball type stanchions, or the like.

Appropriate Performance Requirements

Where an alternative *condensation* management system is proposed as a *Performance Solution* to that described in *Part 3.8.7*, that proposal must comply with-

- (a) **Performance Requirement P2.4.7**; and
- (b) the relevant **Performance Requirements** determined in accordance with **A2.2(3)** and **A2.4(3)** as applicable.

3.8.7.1 Application

Compliance with this Acceptable Construction Practice satisfies
Performance Requirement P2.4.7.

3.8.7.2 Pliable building membrane

- (a) Where a *pliable building membrane* is installed in an *external wall*, it must-
- (i) comply with AS/NZS 4200.1; and
 - (ii) be installed in accordance with AS 4200.2; and
 - (iii) be a vapour permeable membrane for *climate zones* 6, 7 and 8; and
 - (iv) be located on the exterior side of the primary insulation layer of wall assemblies that form the external envelope of a building.
- (b) Except for single skin masonry or single skin concrete, where a *pliable building membrane* is not installed in an *external wall*, the primary *water control layer* must be separated from *water sensitive materials* by a *drained cavity*.

3.8.7.3 Flow rate and discharge of exhaust systems

- (a) An exhaust system installed in a kitchen, bathroom, **sanitary compartment** or laundry must have a minimum flowrate of-
- (i) 25 L/s for a bathroom or **sanitary compartment**; and
 - (ii) 40 L/s for a kitchen or laundry.
- (b) Exhaust from a bathroom, **sanitary compartment**, or laundry must be discharged-
- (i) directly or via a shaft or duct to **outdoor air**; or
 - (ii) to a roof space that is ventilated in accordance with **3.8.7.4**.
- 3.8.7.4** *Roof ventilation of roof spaces*

3.8.7.4 Ventilation of roof spaces
(a) Where an exhaust system covers

- space, the roof space must be ventilated **to outdoor air** through evenly distributed openings.
- (b) Openings **required by (a)** must have a total unobstructed area of 1/300 of the respective ceiling area if the roof pitch is more than 22°, or 1/150 of the respective ceiling area if the roof pitch is not more than 22°.
- (c) 30% of the total unobstructed area **required by (b)** must be located not more than 900 mm below the ridge or highpoint of the roof space measured vertically, with the remaining **required** area provided by eave vents.

Part 3.8.7 Condensation management

3.8.7.3 Flow rate and discharge of exhaust systems

(a)An exhaust system installed in a kitchen, bathroom, *sanitary compartment* or laundry must have a minimum flowrate of-

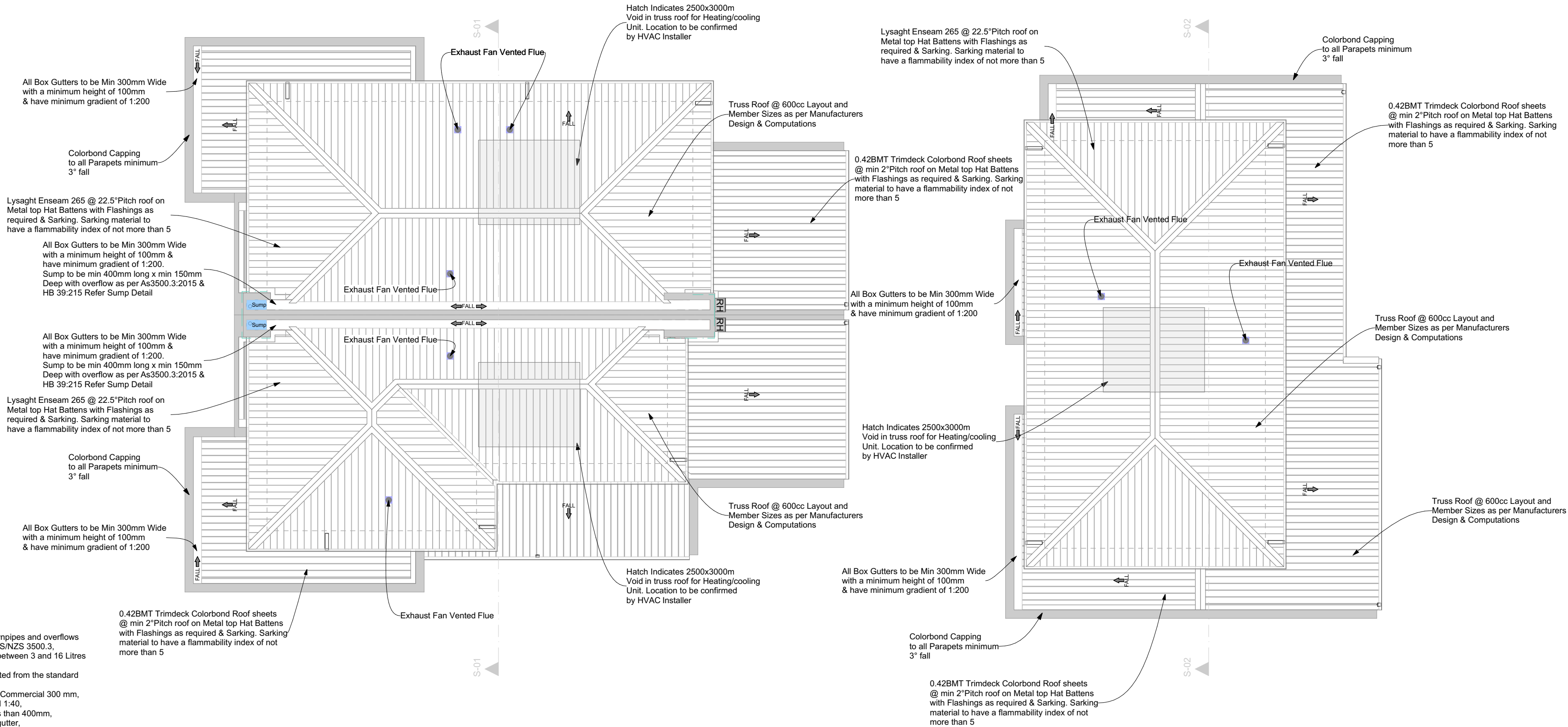
(i)25 L/s for a bathroom or *sanitary compartment*; and

(ii)40 L/s for a kitchen or laundry.

(b)Exhaust from a bathroom, *sanitary compartment*, or laundry must be discharged-

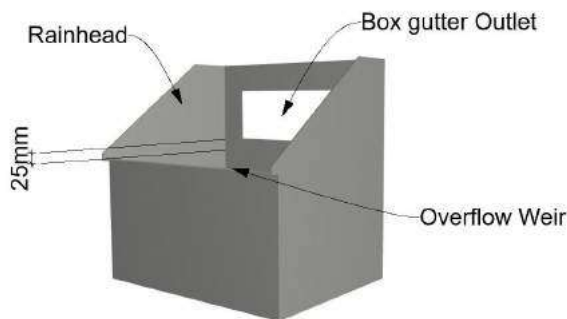
(i)directly or via a shaft or duct to *outdoor air*; or

(ii)to a roof space that is ventilated in accordance with 3.8.7.4.



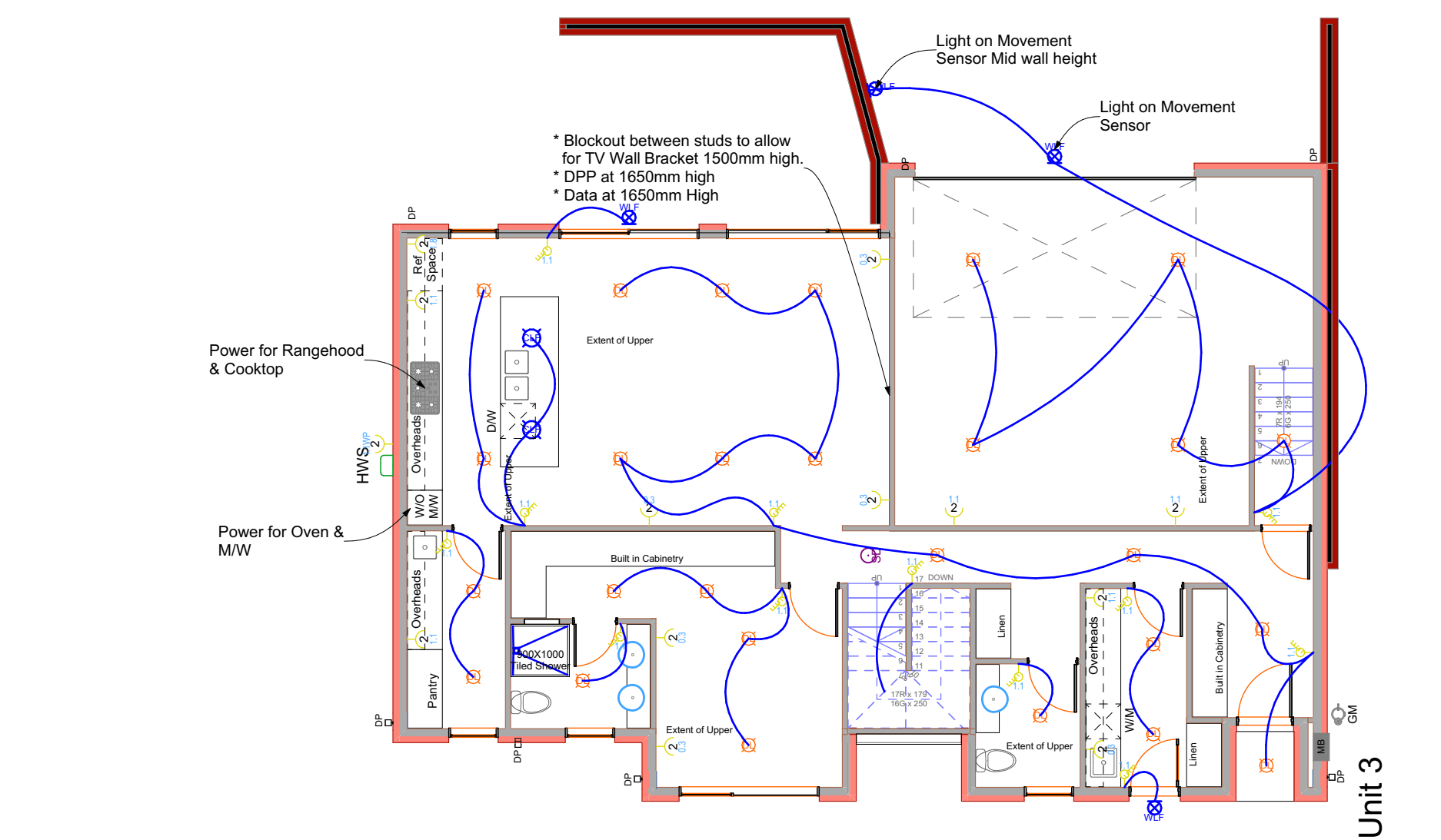
Box Gutter Notes

- The depth of box gutters and sizing of sumps, rainheads, downpipes and overflows must be designed using the general methods specified in the AS/NZS 3500.3.
- The maximum design flow per downpipe can only be plotted between 3 and 16 Litres per second.
- 100mm x 50mm downpipes are not an option that can be plotted from the standard for use with a sump.
- The minimum width of any box gutter: Domestic 200 mm and Commercial 300 mm.
- Grade of box gutters can be plotted at 1:200, 1:150, 1:100 and 1:40.
- Length of a sump with a side overflow device shall not be less than 400mm.
- The width of any sump shall be equal to the width of the box gutter.
- Rainheads shall be left open above the overflow weir, inverted pops, Ned Kelly slots, round holes and vertical chutes or ducts are not deemed-to-satisfy solutions.
- Overflow devices must discharge to the atmosphere and be clear of neighbouring properties and public areas.
- Box gutters must be straight without a change of direction and discharge at the downstream end without a change in direction (i.e. not to the side).
- The box gutter sole width must not be reduced towards the outlet without a proportional increase in depth, the width of the gutter must not reduce to less than the minimum width at which it was designed (i.e. if designed at 200 mm sole width, gutter must not reduce to less than 200mm in width).
- Sumps and rainheads must be fixed and fully sealed to the box gutter.
- All box gutters must incorporate provision for expansion; where the distance between fixed points exceeds 6 metres; and at appropriate intervals for the material and situation as prescribed by the standard.
- No part of the outlet is above the sole of the sump or rainhead, and
- Lap joints of box gutters to have 25mm laps sealed and fastened in the direction of fall.

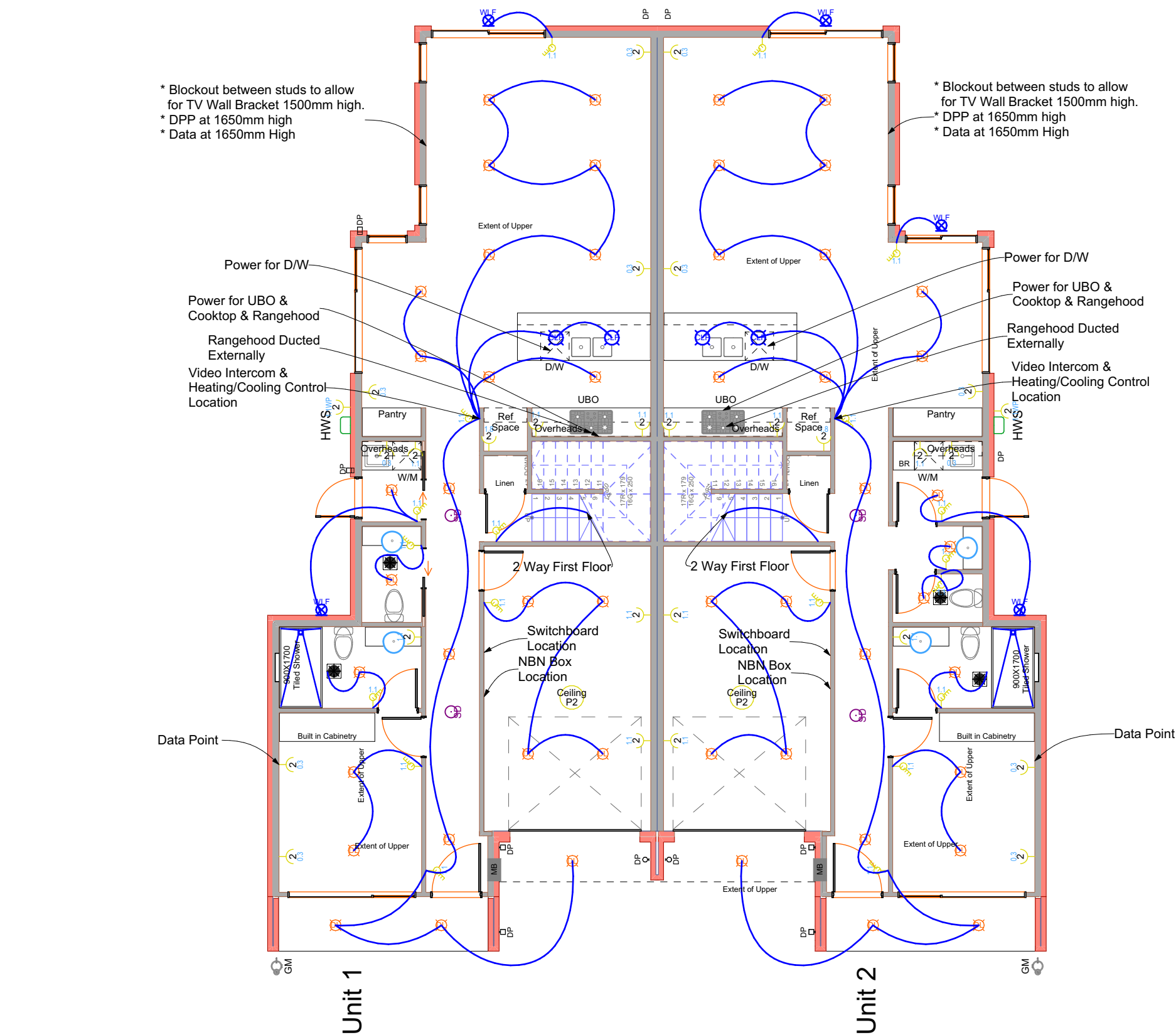
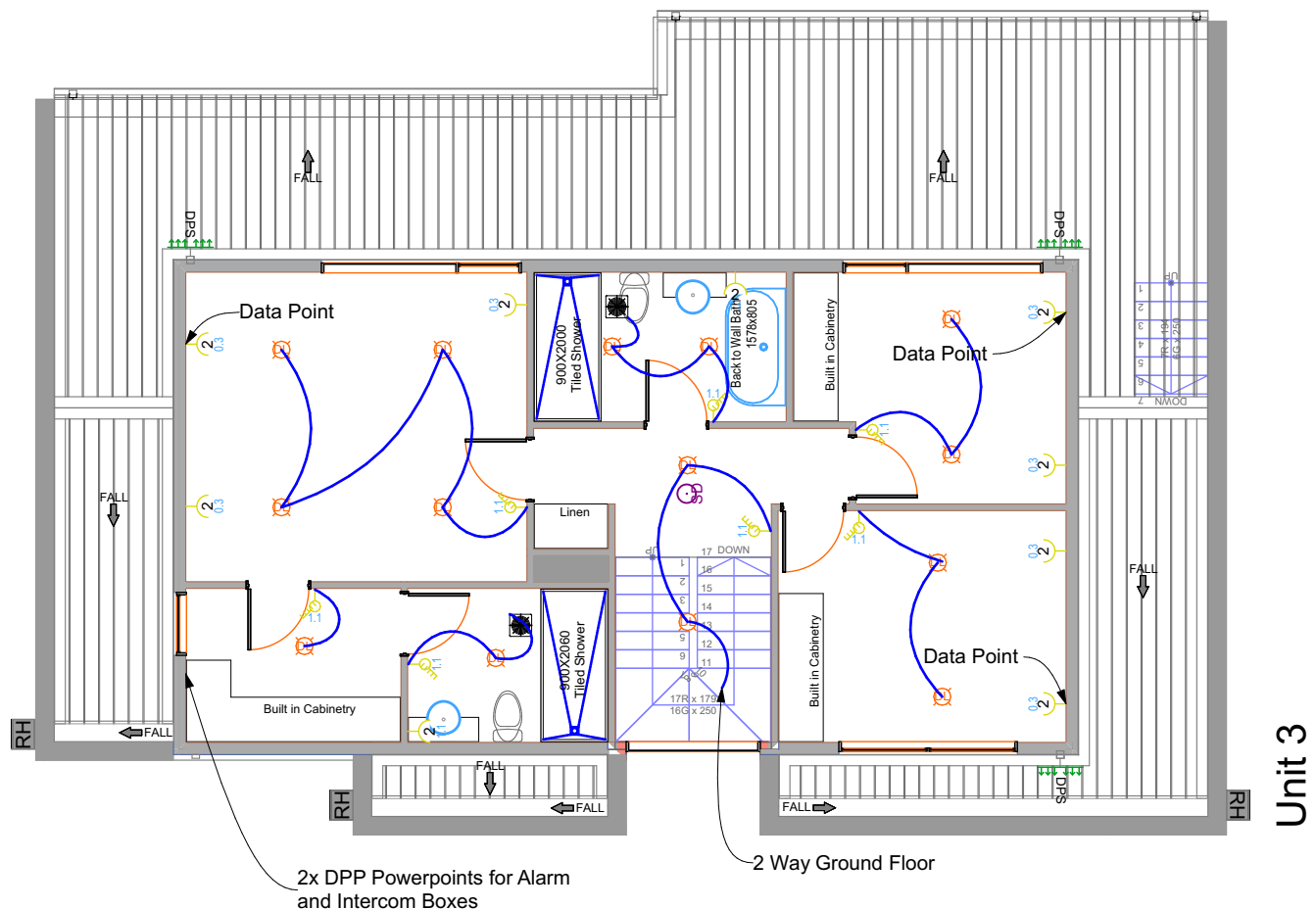


To ensure that adequate overflow provision is made, and any surcharge is accommodated, the overflow weir of the rainhead must be the full width of the rainhead with the height of the weir positioned 25mm below the box gutter sole, and be fully open above the weir at the front of the rainhead.

Typical Rainhead Detail with Overflow



POWER LEGEND	
	300mm Single Power Point
	300mm Double Power Point
	300mm Double Power Point Water Proof
	1100mm Double Power Point
	1100mm Double Power Point Water Proof
	1800mm Double Power Point
	Double Power Point Ceiling Mounted
	400mm Data Point
	1500mm Data Point
	400mm TV Point
	1500mm TV Point
	Wall Switch Point
	Smoke Detector
LIGHTING LEGEND	
	Light Point Batten with Shade Cowl
	10W LED Downlight
	Ceiling Light Fixture
	Wall Light Fixture
	Wall Light Batten
	Single Fluro Light
	Double Fluro Light
	Ceiling Fan
	Ceiling Exhaust Fan
	Ceiling Speaker



ELECTRICAL NOTES

- * Electrician to allow Power for Heating & Cooling system. Electrician to liaise with HVAC installer for requirements
- * Allow for Light in Roof Space within 1m of Man hole
- * NBN box to be located in garage
- * Electrician to allow and Install Telstra lead in Conduits
- * Power for Dishwasher & Microwave if applicable to be installed in adjacent cabinet with 50mm hole drilled through at rear of cabinet for cable.

Sanitary Compartment Notes

- Where there is no window to W/C, Mechanical Ventilation Must be provided with a minimum 35Ltr per Second clean Air simultaneously with Artificial Light Source.
- Exhaust Fan

General Electrical Notes

All Light Fittings are to be Energy Saving type - (CFLs) Compact Fluorescent Lamp & Downlights are to be of (LED) Light Emitting Diode Type

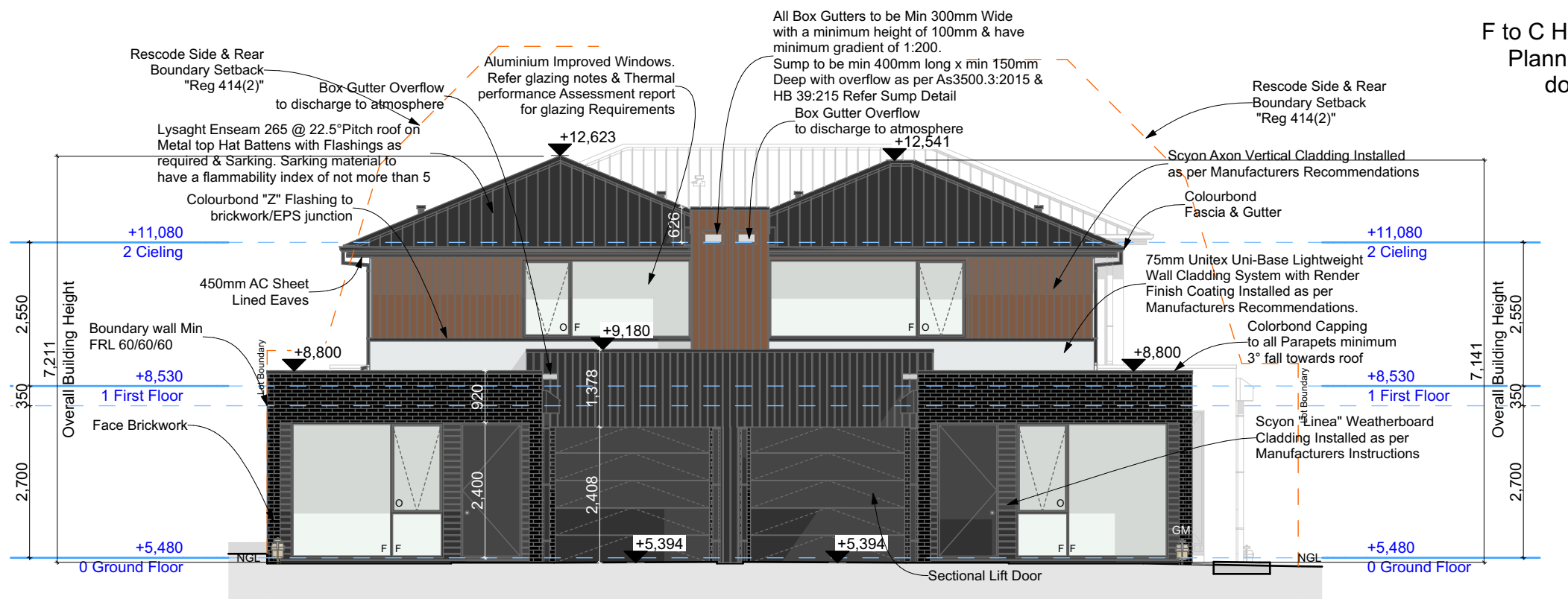
Artificial Lighting Requirements

Max 5W/m² Class 1 Building
Max 4W/m² Verandah, Balcony or the like attached to a Class 1
Max 3W/m² in a Class 10A Building associated with a Class 1

Artificial Lighting Around the perimeter of a building must:
A) Be controlled by a daylight Sensor
B) Have an average light source efficiency of not less than 40 Lumens per Watt

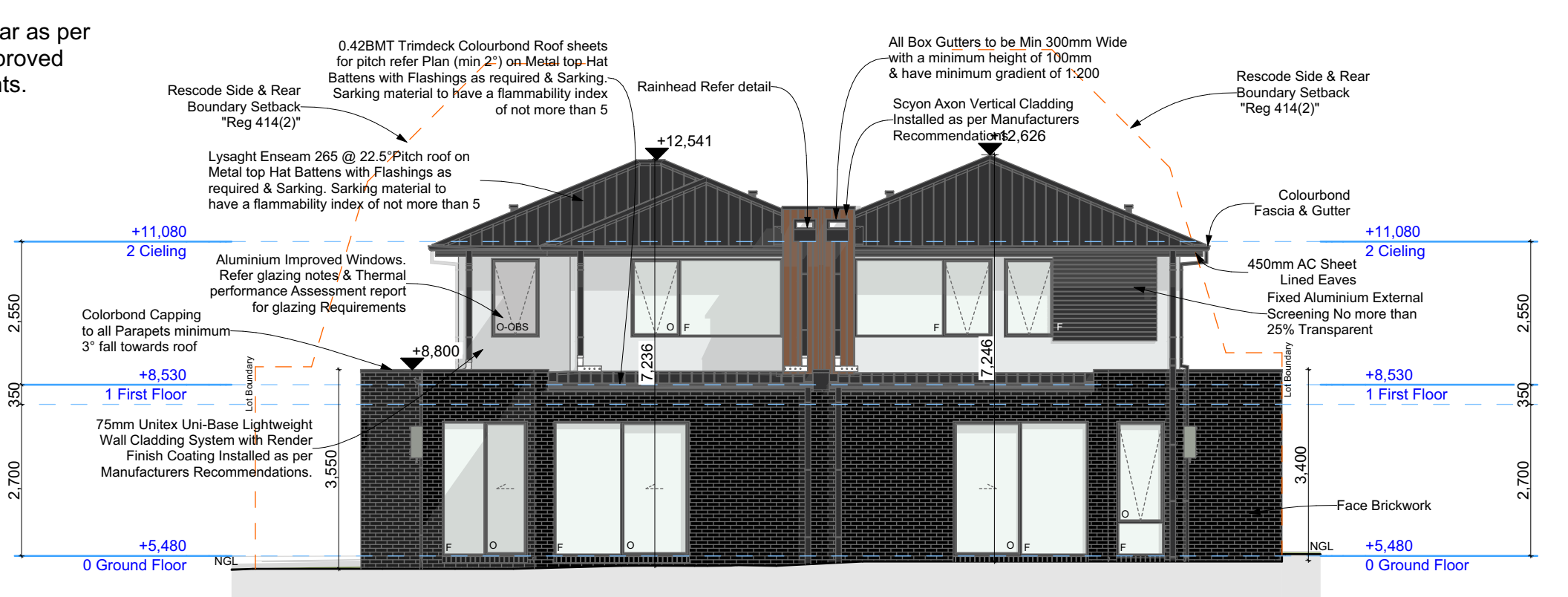
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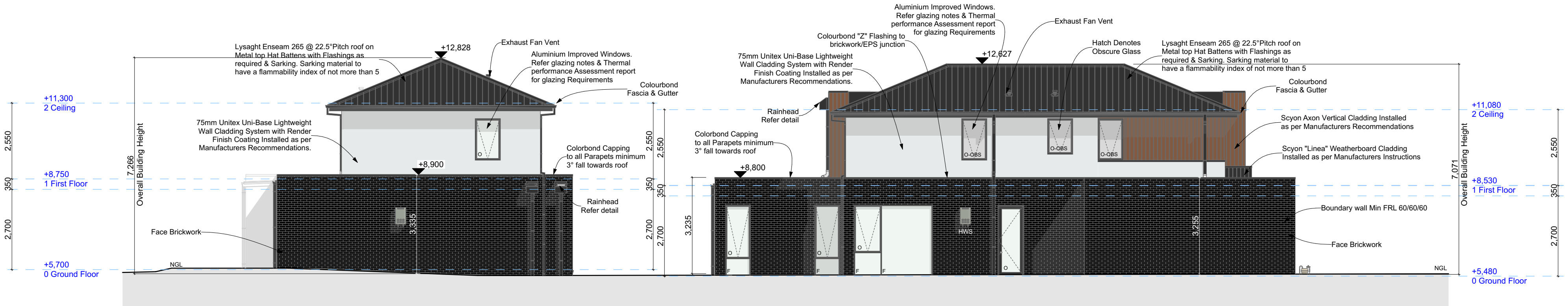
South West Elevation Unit 1 & Unit 2

1:100



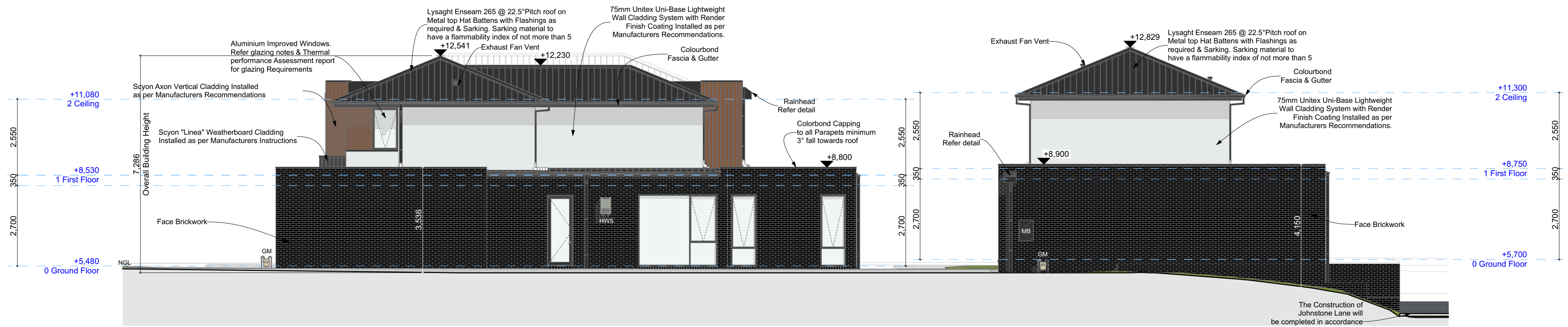
North East Elevation Unit 2 & Unit 1

1:100



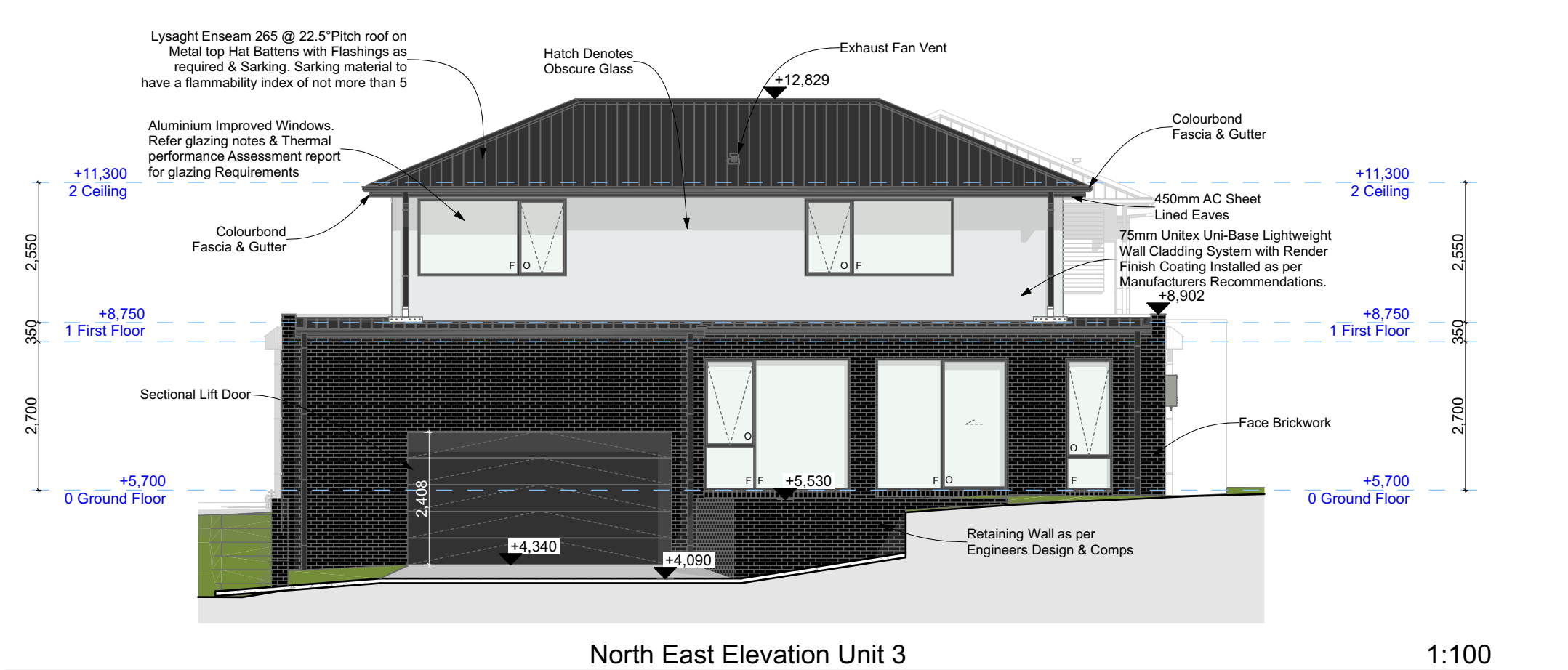
North West Elevation Unit 3 and Unit 1

1:100



South East Elevation Unit 2 & Unit 3

1:100



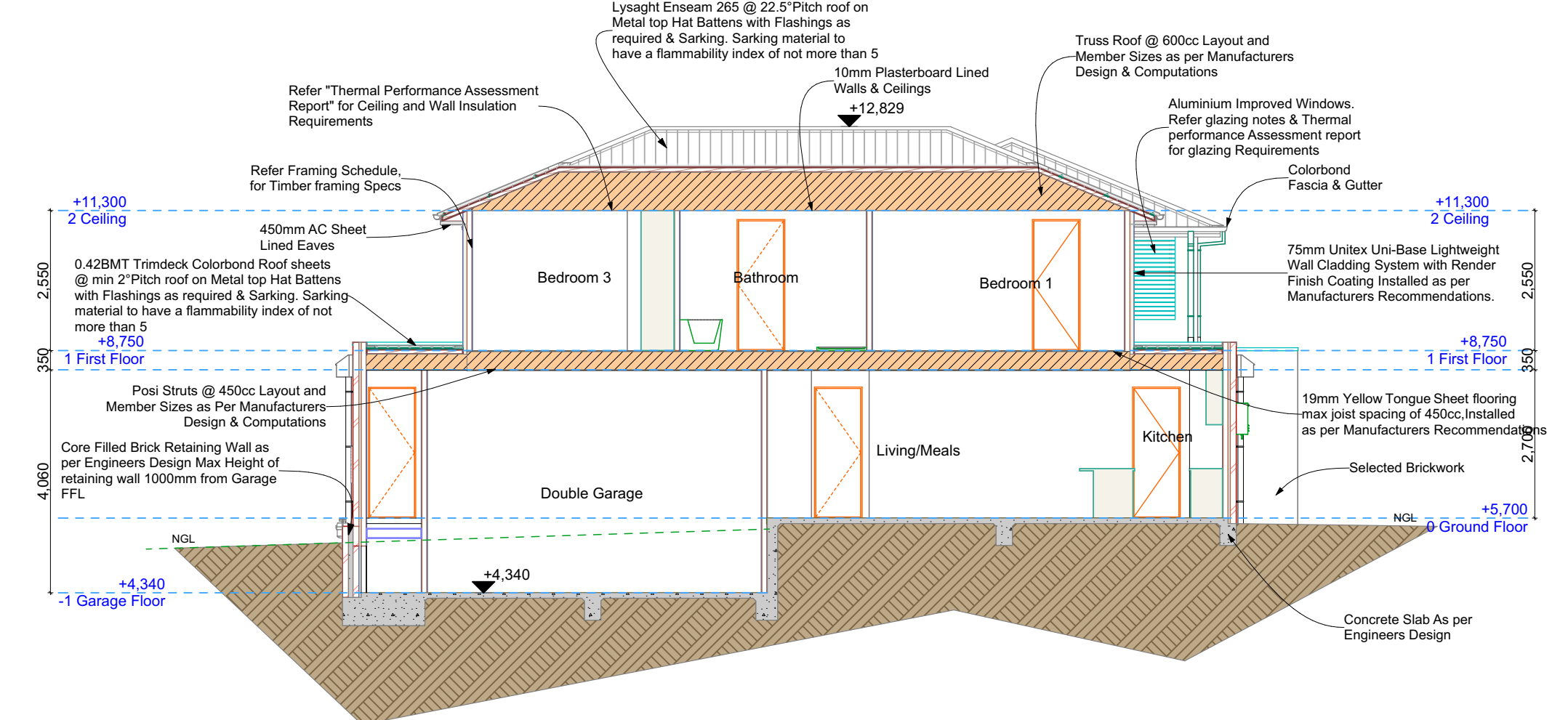
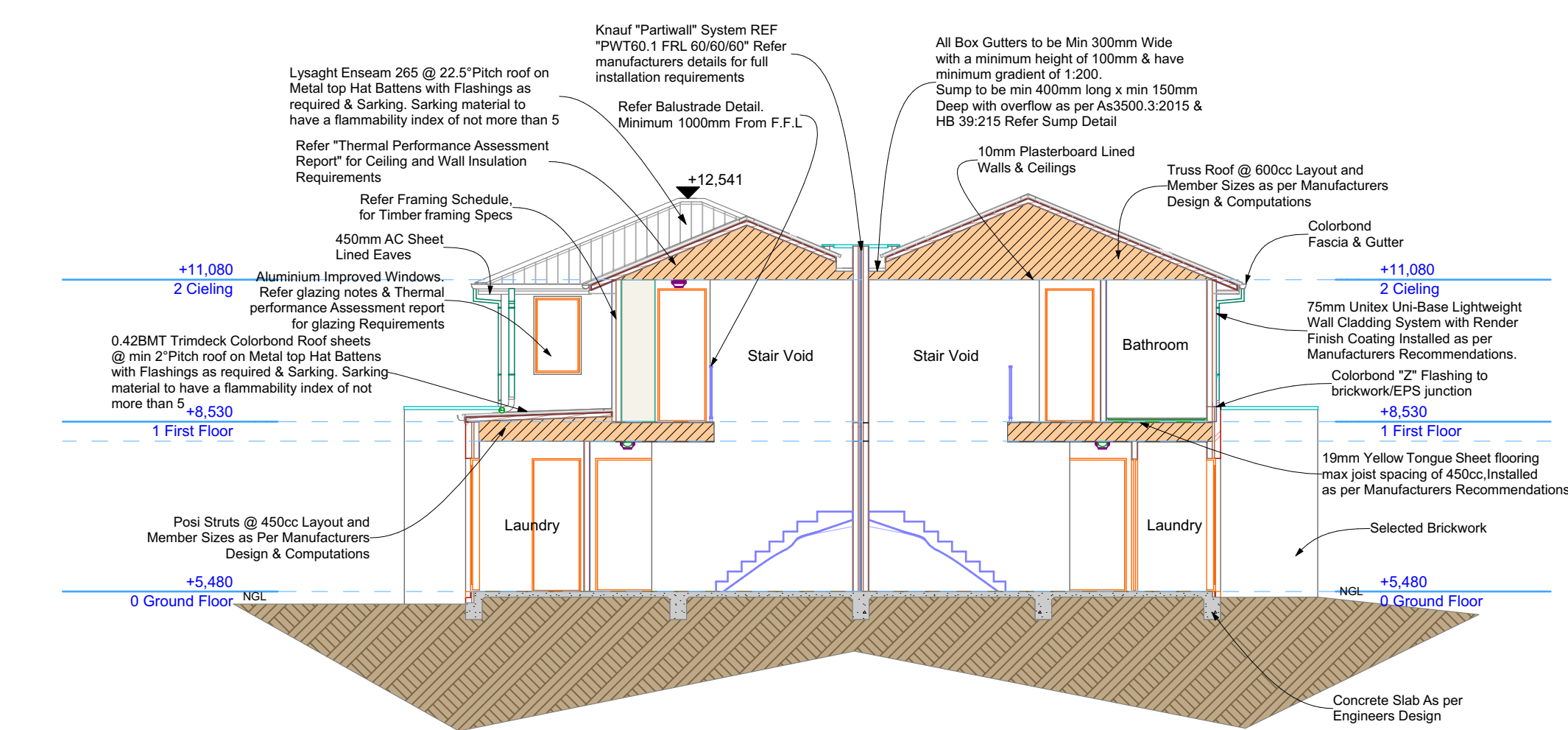
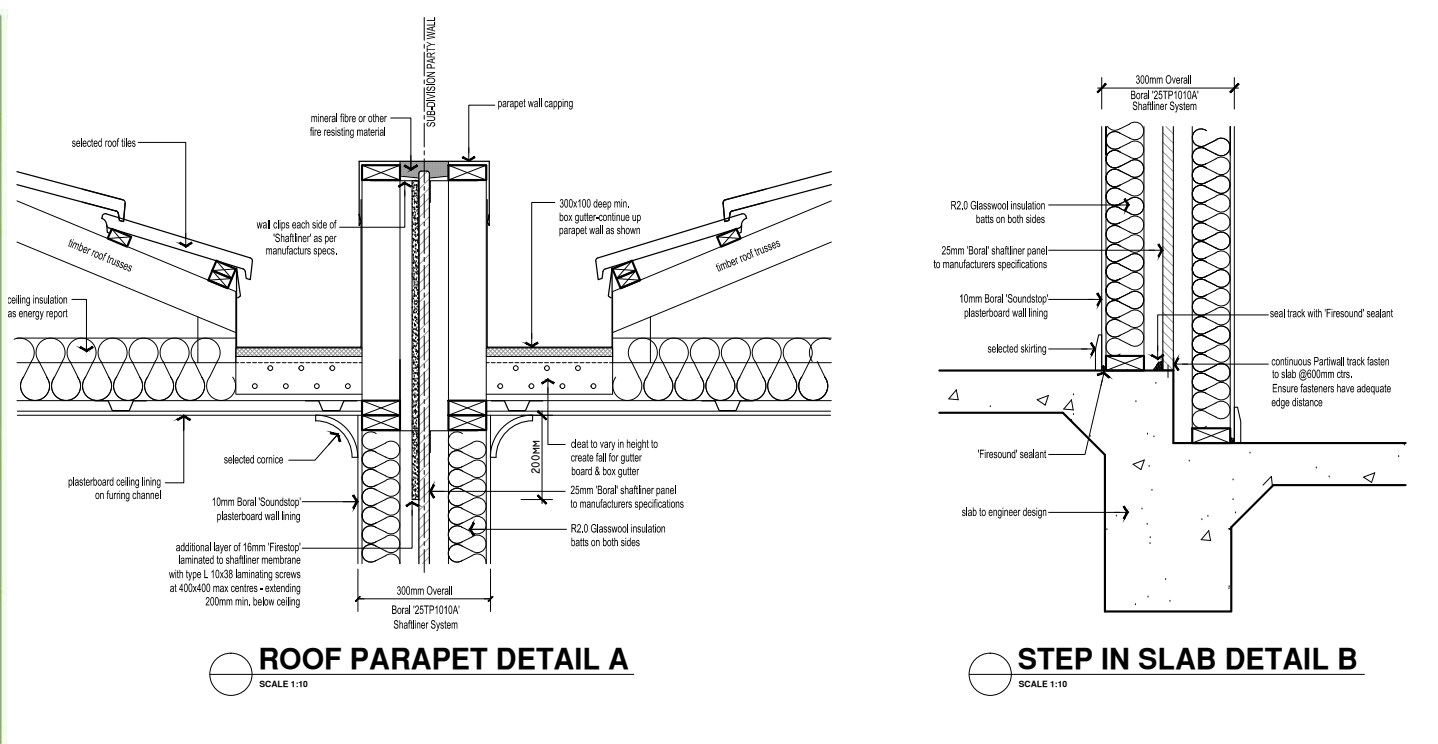
Timber Framing Specification				
Single Storey/Upper Storey				
Member	Stress Grade	Size	Max Spacing	Note:
Bottom Plates	MgP10	90x45		Untrenched
Top Plates	MgP10	90x45		Untrenched
External Ribbon Plate	MgP10	90x35		All Load Bearing Walls
Wall Studs	MgP10	90x35	600cc	
Lower Storey of a Double Storey				
Bottom Plates	MgP10	90x45		Untrenched
Top Plates	MgP10	2x90x45		Untrenched
Wall Studs	MgP10	90x45	450cc	All Load Bearing Walls
General Specifications				
External Jamb Studs	MgP10	90x45	1200	
	MgP10	2x90x45	2700	
	LVL	2x90x45	2700+	
Internal Jamb Studs	MgP10	90x45		
Lintels	Refer Span Tables and Engineering			
Noggings	Merch	70x35	1350cc	
Wall Bracing	Refer Engineering			
Roof Battens	F8	50x25	330cc	

Notes:
1. All work to be carried out in strict accordance with AS1684 "Residential Timber Framed Construction" and supplementary Tables.
2. Truss Roofs and/or Floor Trusses to be designed and installed as per Manufacturers Recommendations.

HOUSE ENERGY RATING				
Dwelling Address:	UNIT 1, 174 Railway Parade	Report By:	Amy Gedge	Accreditation:
DWELLING ENERGY RATING ACHIEVES	★★★★★	DMN/21/2022		
Climate Zone:	62	Moorabbin Airport		
Heating Load Limit:	115	Heating Load Actual:	98.8	
Cooling Load Limit:	24	Cooling Load Actual:	19.1	
ENERGY ASSESSMENT REPORT				
EXTERNAL WALLS	Type: BRICK VENEER (MEDIUM)	Insulation Added: R2.0 (EX GARAGE)		
	RENDERED 75MM EPS (MEDIUM)	R2.0		
	JH AXON CLAD (MEDIUM)	R2.0		
	PARTI WALL	R2.0		
INTERNAL WALLS	GARAGE	R2.0		
GROUND FLOOR	SLAB ON GROUND	NIL		
FIRST FLOOR	TIMBER JOISTS OVER GARAGE	R2.0		
ROOF / CEILING	METAL CLAD (DARK)	R3.5 (EX GARAGE)		
WINDOWS (COLOUR: MEDIUM)	WERS CODE	DESCRIPTION	U Value	SHGC
ECO-109-01	AI Sliding Door DG 4-12-4		3.76	0.62
ECO-101-01	AI Awning Window DG 4-12-4		3.51	0.59
ECO-111-01	AI Casement Window DG 4-12-4		3.89	0.53
SELF CLOSING EXHAUST FANS (INCLUDING IXL'S AND RANGEHOOD) RECESSED DOWNLIGHTS ARE TO BE SEALED (EITHER BY FITTING OR APPROVED COVER)				
SEAL ALL EXTERNAL DOORS, WINDOWS, GAPS, CRACKS, PLUMBING PENETRATIONS ETC				
MINIMUM 2000L RAINWATER TANK CONNECTED TO ALL SANITARY FLUSHING SYSTEMS (MINIMUM ROOF CATCHMENT 50M2) OR AN APPROVED SOLAR HOT WATER SYSTEM.				

HOUSE ENERGY RATING				
Dwelling Address:	UNIT 2, 174 Railway Parade	Report By:	Amy Gedge	Accreditation:
DWELLING ENERGY RATING ACHIEVES	★★★★★	DMN/21/2022		
Climate Zone:	62	Moorabbin Airport		
Heating Load Limit:	115	Heating Load Actual:	108.5	
Cooling Load Limit:	24	Cooling Load Actual:	16.2	
ENERGY ASSESSMENT REPORT				
EXTERNAL WALLS	Type: BRICK VENEER (MEDIUM)	Insulation Added: R2.0 (EX GARAGE)		
	RENDERED 75MM EPS (MEDIUM)	R2.0		
	JH AXON CLAD (MEDIUM)	R2.0		
	PARTI WALL	R2.0		
INTERNAL WALLS	GARAGE	R2.0		
GROUND FLOOR	SLAB ON GROUND	NIL		
FIRST FLOOR	TIMBER JOISTS OVER GARAGE	R2.0		
ROOF / CEILING	METAL CLAD (DARK)	R5.0 (EX GARAGE)		
WINDOWS (COLOUR: MEDIUM)	WERS CODE	DESCRIPTION	U Value	SHGC
ECO-109-01	AI Sliding Door DG 4-12-4		3.76	0.62
ECO-101-01	AI Awning Window DG 4-12-4		3.51	0.59
ECO-111-01	AI Casement Window DG 4-12-4		3.89	0.53
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SEAL ALL EXTERNAL DOORS, WINDOWS, GAPS, CRACKS, PLUMBING PENETRATIONS ETC				
MINIMUM 2000L RAINWATER TANK CONNECTED TO ALL SANITARY FLUSHING SYSTEMS (MINIMUM ROOF CATCHMENT 50M2) OR AN APPROVED SOLAR HOT WATER SYSTEM.				

HOUSE ENERGY RATING				
Dwelling Address:	UNIT 3, 174 Railway Parade	Report By:	Amy Gedge	Accreditation:
DWELLING ENERGY RATING ACHIEVES	★★★★★	DMN/21/2022		
Climate Zone:	62	Moorabbin Airport		
Heating Load Limit:	115	Heating Load Actual:	102.1	
Cooling Load Limit:	24	Cooling Load Actual:	22.1	
ENERGY ASSESSMENT REPORT				
EXTERNAL WALLS	Type: BRICK VENEER (MEDIUM)	Insulation Added: R2.5 (EX GARAGE)		
	RENDERED 75MM EPS (MEDIUM)	R2.5		
	JH AXON CLAD (MEDIUM)	R2.5		
	GARAGE, LAUNDRY, POWDER & BATH	R2.5		
	SLAB ON GROUND	NIL		
INTERNAL WALLS	GARAGE	R2.0		
GROUND FLOOR	TIMBER JOISTS OVER LOWER ROOF / CEILING	R6.0 (EX GARAGE)		
FIRST FLOOR				
ROOF / CEILING				
WINDOWS (COLOUR: MEDIUM)	WERS CODE	DESCRIPTION	U Value	SHGC
ECO-111-03	AI Casement Window DG 4-12Ar-4		3.59	0.53
ECO-101-03	AI Awning Window DG 4-12Ar-4		3.40	0.59
ECO-109-03	AI Sliding Door DG 4-12Ar-4		3.64	0.62
ECO-101-04	AI Awning Window DG 4ET-12Ar-4 (kitchen/living)		2.77	0.50
ECO-115-03	AI Fixed Window DG 4-12Ar-4		3.07	0.64
SELF CLOSING EXHAUST FANS (INCLUDING IXL'S AND RANGEHOOD) RECESSED DOWNLIGHTS ARE TO BE SEALED (EITHER BY FITTING OR APPROVED COVER)				
SEAL ALL EXTERNAL DOORS, WINDOWS, GAPS, CRACKS, PLUMBING PENETRATIONS ETC				
MINIMUM 2000L RAINWATER TANK CONNECTED TO ALL SANITARY FLUSHING SYSTEMS (MINIMUM ROOF CATCHMENT 50M2) OR AN APPROVED SOLAR HOT WATER SYSTEM.				



S-01

Building Section Unit 2 & Unit 1

1:100

S-02

Building Section Unit 3

1:100

FRL
LB 60/60/60
From both sides

SYSTEM DESCRIPTION
Side 1:

- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and Fire Barrier
- Insulation (refer to table)

Fire Barrier:

- 1 x 25mm SHAFTLINER™ MOULDSTOP between 25mm H-studs @ 600mm centres

Side 2:

- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber framing and Fire Barrier
- Insulation (refer to table)

Figure 9: Concrete Slab Base

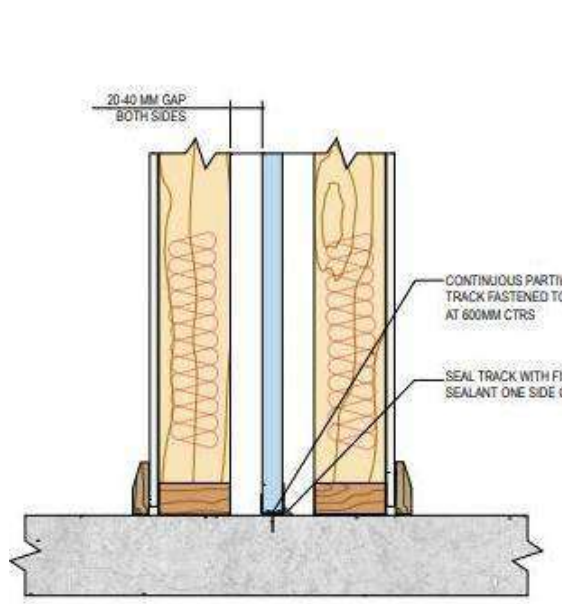


Figure 15: Pitched Roof Junction

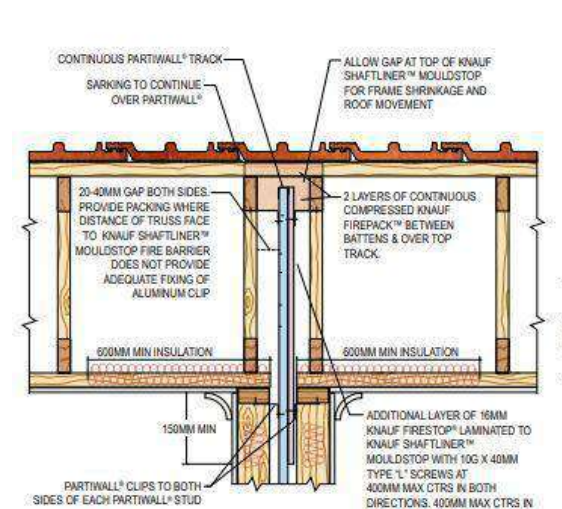


Figure 11: Step in Slab - Parallel 1

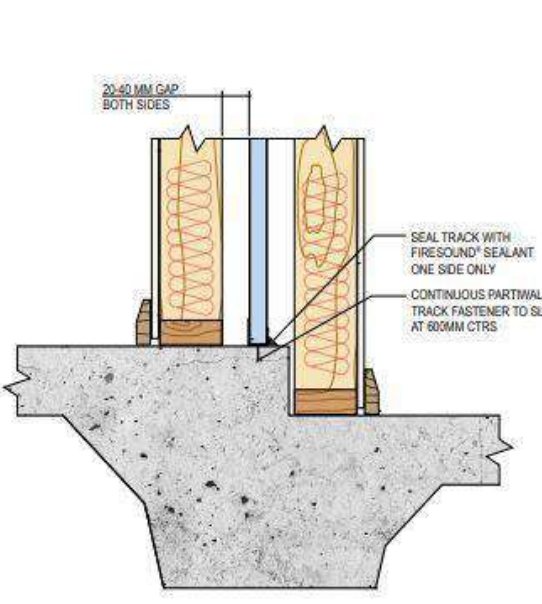


Figure 16: Parapet Roof Junction

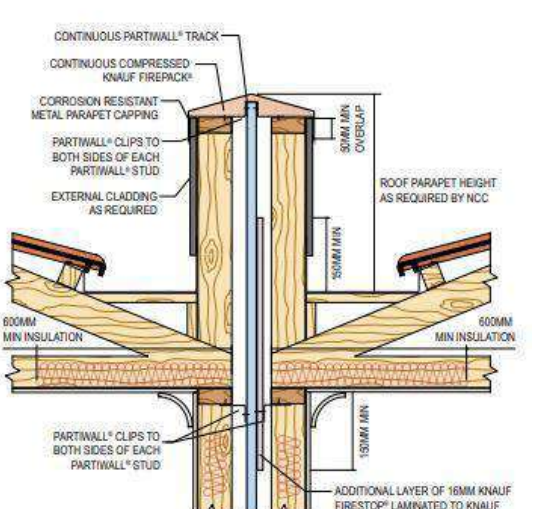


Figure 12: Step in Slab - Parallel 2

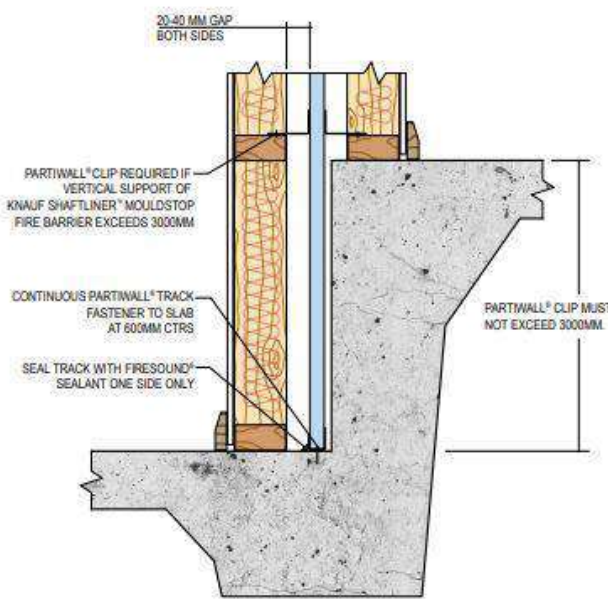


Figure 14: Floor/Wall Junction

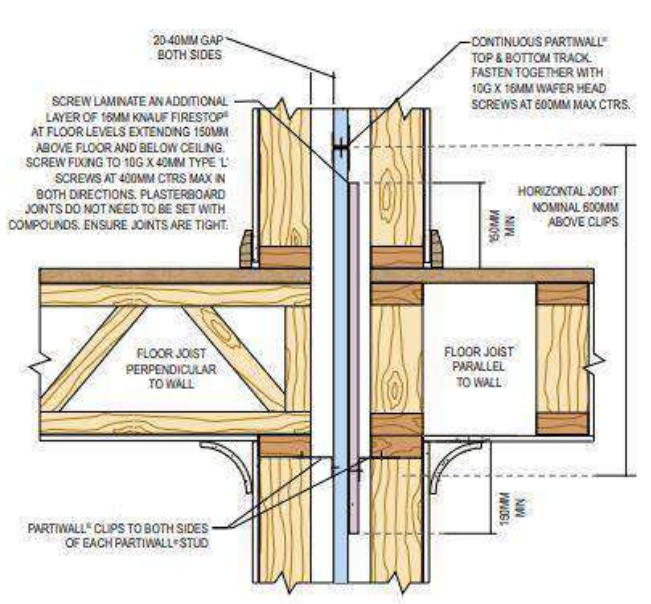
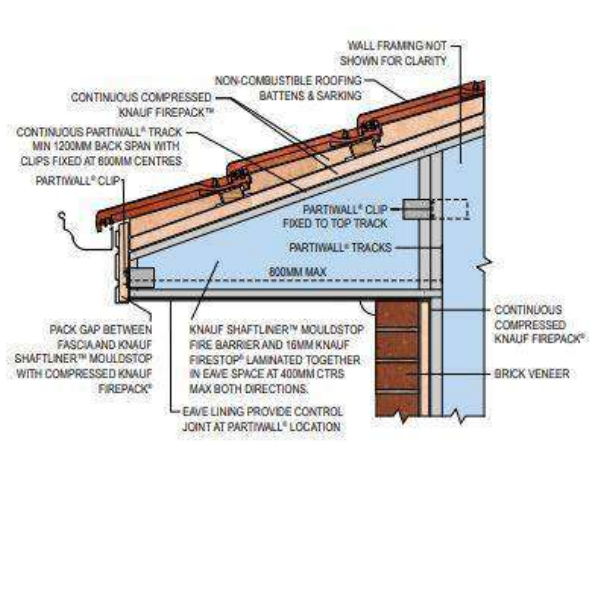


Figure 22: Eave Closure - Section View



Scan QR Code for full Installation Details of Knauf Partwall Incl Full Junction Details

Figure 29: External to Internal PARTWALL - Plan View

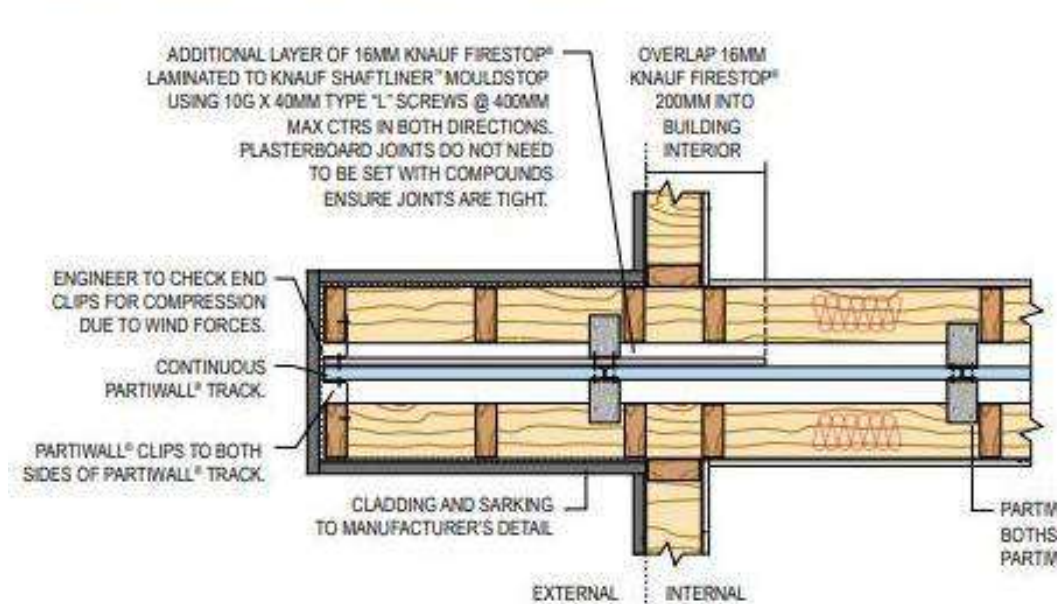
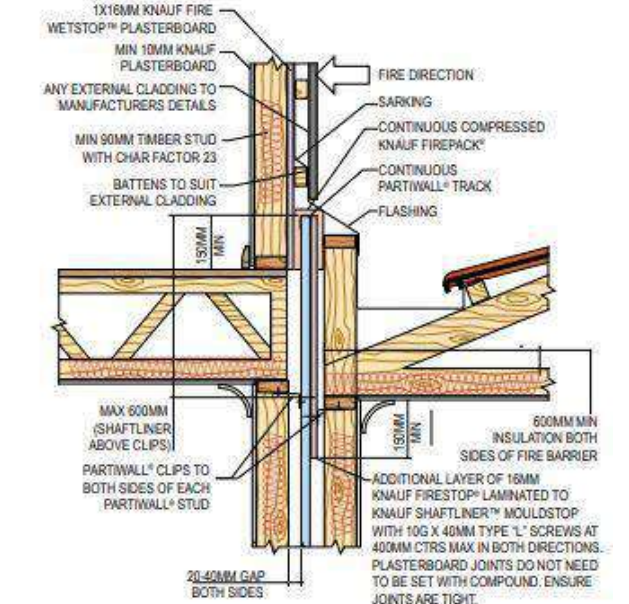


Figure 24: OUTWALL Vertical Transition - Any Cladding



Exposed Stringer

Concealed Stringer

Riser
Min 115mm
Max 190mm

Tread (Going)
Min 240mm
Max 355mm

Scan QR code full Full NCC Stair details and Figures

NCC Part11.2 Stairway Construction

(1) A stairway must be designed to take loading forces in accordance with AS/NZS 1170.1 and must have—

a) not more than 18 and not less than 2 risers in each flight; and

b) goings (G), risers (R) and a slope relationship quantity (2R + G) in accordance with Table 11.2.2a, except as permitted by (2) and (3); and

c) constant goings and risers throughout each flight, except as permitted by (3) and (4), and the dimensions of goings (G) and risers (R) in accordance with (1), (2) and (3) are considered constant if the variation between

i) adjacent risers, or between adjacent goings, is not more than 5 mm; and

ii) the largest and smallest riser within a flight, or the largest and smallest going within a flight, is not more than 10 mm; and

d) risers which do not have any openings that would allow a 125 mm sphere to pass through between the treads; and

e) treads of solid construction (not mesh or other perforated material) if the stairway is more than 10 m high or connects more than 3 storeys.

(2) In the case of a stairway serving only non-habitable rooms, such as attics, storerooms and the like that are not used on a regular or daily basis—

a) the going (G), riser (R) and slope relationship quantity (2R + G) in accordance with Table 11.2.2a may be substituted with those in Table 11.2.2b; and

b) need not comply with (1)(d).

(3) In the case of a stairway with winders—

a) a maximum of 3 consecutive winders in lieu of a quarter landing in a flight and a maximum of 6 consecutive winders in lieu of a half landing in a flight; and

b) the going (G) of all winders in lieu of a quarter or half landing may vary from the going of the straight treads within the same flight provided that the going (G) of such winders is constant.

(4) The point of measurement of the going (G) in the slope relationship quantity (2R + G) for tapered treads and treads in spiral stairways as described in Table 11.2.2a (see Figure 11.2.2a, Figure 11.2.2b and Figure 11.2.2c) must be—

a) for tapered treads, other than treads in a spiral stairway—

i) not more than 1 m in width, the middle of the unobstructed width of the stairway (see Figure 11.2.2b); and

ii) more than 1 m in width, 400 mm from the unobstructed width of each side of the stairway (see Figure 11.2.2c); and

b) for treads in spiral stairways, the point seven tenths of the unobstructed width from the face of the centre pole or support towards the handrail side (see Figure 11.2.2d and Figure 11.2.2e).

(5) Riser and going dimensions must be measured in accordance with Figure 11.2.2f.

Table 11.2.2a Riser and going dimensions (mm)

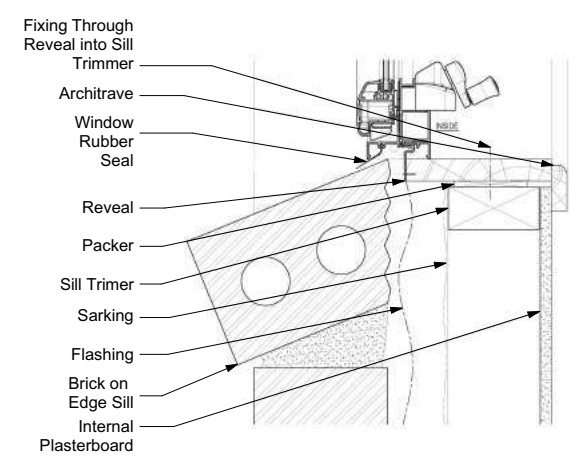
Stair type	Riser (R) (see Figure 11.2.2f)		Going (G) (see Figure 11.2.2f)		Slope relationship (2R+G)	
	Max	Min	Max	Min	Max	Min
Stairs (other than spiral)	190	115	355	240	700	550
Spiral	220	140	370	210	680	590

Table 11.2.2b Riser and going dimensions (mm) — stairways serving non-habitable rooms used infrequently

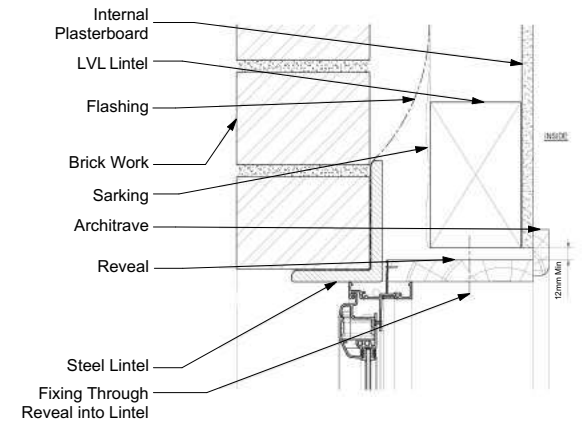
Riser (R)		Going (G)		Slope relationship (2R+G)	
Max	Min	Max	Min	Max	Min
225	130	355	215	700	540

Window Notes

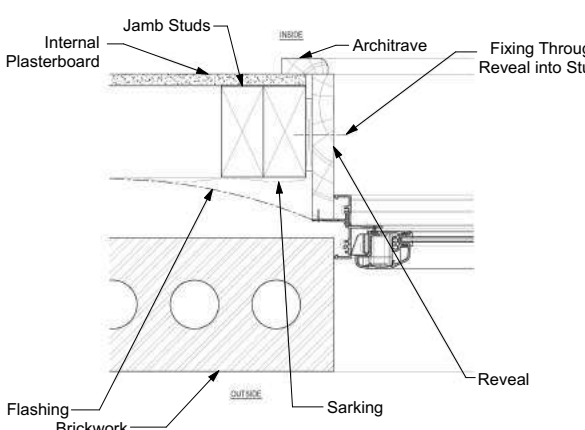
- All windows where the floor level is higher than 2m above the surface beneath require the affected window to be fitted with either a device to restrict the window opening, or a suitable screen, so a 125 mm diameter sphere (representing the size of a young child's head) cannot pass through. The device or screen must also be able to withstand an outward horizontal force of 250 N.
- All Window sizes are nominal only. Actual sizes will vary according to each Manufacturer. Sizes noted on these plans are not to be used for stud openings, Manufacturer is to supply stud opening schedules to Builder/Carpenter.
- Obscure & Safety Glass as noted on plans and hatched on elevations.
- All glazing to refer to NatHERS certificate for minimum U & SHGC Values



WINDOW SILL DETAIL
BRICK VENEER-TYPICAL



WINDOW HEAD DETAIL
BRICK VENEER-TYPICAL



WINDOW JAMB DETAIL
BRICK VENEER-TYPICAL

BAL 12.5 CONSTRUCTION SUMMARY	
Refer Section 5 As3959-2009 for Detailed Bal 12.5 Construction Methods and additional construction options	
SUBFLOOR SUPPORTS No Special Construction Requirements	EXTERNAL WINDOWS • All Openings must be screened internally or externally with corrosion resistant metal screens with max aperture of 2mm. • Exposed external window hardware to be made from metal. • Minimum 4mm Grad A Safety Glass for all Glazing within 400mm of ground window frames less than 400mm from the ground or other structure to be made from Bushfire-Resisting Timber, Timber with a Density of 650Kg/m³ or greater or metal.
FLOORS No Special Construction Requirements	EXTERNAL DOORS • All side hung doors must be of solid Bushfire resisting timber min 35mm thickness for the first 400mm above ground Level. • Side hung doors shall be tight fitting to the door frame. • Side hung doors shall have weather strips and draught excluders and seals fitted. • Glass sliding doors as per window requirements excluding the need for screens to the openable portion. • Panel lift, tilt doors or side-hung doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3mm. • Roller doors shall have guide tracks with a maximum gap no greater than 3mm and shall be fitted with a nylon brush that is in contact with the door (see Figure D4, Appendix D).
EXTERNAL WALLS Parts of Walls less than 400mm Above Ground or Decks to be of Non-Combustible Material, 6mm Fibre Cement Clad or Bushfire Resistant/Naturally Resistant Timber	ROOFS • Must be of Non Combustible tiles or sheets • All roofs must be fully sarked with a flammability index of not more than 5
VENTS & WEEPHOLES Vents & Weepholes in external walls shall be screened with a mesh with a maximum aperture of 2mm, made of corrosion resistant steel, Bronze or Aluminum, except where the vents and Weepholes are less than 3mm or are located in an external wall of a subfloor space.	

AS3740- Internal Waterproofing as it applies to Melbourne Class 1 Buildings

AS3740 – Internal Wet areas Waterproofing as it applies to Melbourne, Class 1 buildings

Structure Movement and Waterproofing

Generally movement in the wall and floor structure is caused by contraction, expansion or settlement. Anticipation that structural movement will occur from frame, masonry and panel movement, particularly at joints, which should be catered for in the design. The waterproofing should cover the structural movement, preventing water damage to substrate, adjoining walls, or flooring. Providing a secure 'envelope' to protect the wet area.

1. Materials

Materials used in the construction and waterproofing of bathrooms and laundries must be suitable for purpose.

Membranes

Liquid applied waterproofing membranes refer to Class ii and Class iii membranes and approved to requirements of AS4858
Liquid applied membranes must be adequately cured for their intended use.

Water-resistant Substrates

Concrete AS3600, Fibre Cement Sheet AS2908.2, Water-resistant Plasterboard sheeting AS2588, Masonry AS3700 and Structural Plywood AS2269 for use on walls and floors to comply with Australian Standards. Particle board flooring is no longer allowable as a substrate under the N.C.C 2022 or AS 3740:2021

Water-resistant Surface materials

Product surfaces deemed to be water resistant for walls and floors include; Thermosetting laminated sheet AS2924.1, Pre-decorated fibre cement sheeting AS2908.2, Water-resistant flexible sheet (vinyl or linoleum) and tiles used in conjunction with water-resistant Substrates (above), plus Sanitary Grade acrylic wall linings.

Preformed Shower Bases and enclosures

Materials used in the manufacture of prefinished shower bases and enclosures must render the finished product waterproof.

Sealants, Adhesives and Sheet Fastenings

All products need to be compatible with adjacent materials, mould-resistant, waterproof and appropriately flexible.

2. Installation

These notes outline the details for installation of waterproof and water-resistant materials in bathrooms and laundries.

Shower Floor Falls

Category 1 -Fall to the floor waste in a shower area, the minimum shall be 1:80 both Enclosed and Unclosed shower areas
Category 2 -Floor waste is installed adjacent to a shower area. Minimum fall shall be 1:80
Category 3 -Bathroom outside of the enclosed shower withno floor waste in the wet area. No requirements for fall and water shall be retained inside the wet area.

Preformed Shower Bases

Installation of preformed shower bases need to be adequately supported to prevent distortion or cracking and be sufficiently recessed into the wall to allow the water-resistant surface materials to pass down inside the perimeter rebate.

Edge detail for baths with showers over them

Baths with an integral vertical upstand lip along the side of the bath walls require to be recessed to enable the junction to be waterproofed. Baths without an integral edge require full waterproofing of the walls and floor area around and under the bath.

Baths and Spas

Installation of baths and spas need to be adequately supported to prevent distortion or cracking and be sufficiently recessed into the wall to allow the water-resistant surface materials to pass down inside the rim.

Perimeter Flashing

A junction where waterproofing to waterproofing surfaces meet, the waterproofing is to be continuous across the junction and incorporate an appropriate bond breaker. Where the perimeter flashing to wall/floor surfaces they should be continuously sealed (usually with bond breaker), having the vertical leg a minimum of 25mm above the finished tile level or 150mm above the substructure (except doorways) and horizontal leg a minimum width of 40mm. A water stop with a vertical leg finishing flush with the finished floor level is to be installed at floor level openings. Protecting water migrating to non-wet areas. Where the shower rose is ceiling mounted it shall be applied to the junctions and terminate to the full height of the wall.

Vertical flashing for shower wall junctions

Vertical flashing can be external or internal, with a requirement to terminate a minimum of 1800mm above the finished floor level.

Penetrations in Shower Areas

Typical penetrations like taps, shower nozzles, recess soap holder etc. are to be waterproofed by sealing with proprietary flange system or sealant.

Shower Area Step Down

The highest finished floor level in the shower area is to be stepped down lower than the finished floor level outside the shower. Figure 4.8.2(c)

Shower Area Hob Construction

Suitable materials for the hob construction. Installation starts with all gaps, joints and intersections of the hob substrate to be made flush before application of the membrane system. Figure 4.6.2

Enclosed Shower Area without Hobs or set-down

At the extremity of the shower area:

* Where a shower screen is to be installed a water stop is to be installed with a vertical leg finishing a minimum of 5mm above the finished floor level

*Where the water stop meets the wall, the junction is to be waterproofed.

Shower Area unenclosed

Unenclosed showers are to have a water stop installed with the vertical leg finishing flush with the finished surface of the floor, having junctions waterproofed, in two scenarios:

* When the shower device restricts splashing (shower screen), it is advisable to have a membrane installed below and above the screed to fall.

*When a shower has no restricting splashing (example disabled shower) the water stop is required to be a minimum of 1500mm from the wall connection of the shower rose.

Bond Breaker Application

Installation of bond breakers of liquid applied membranes should be included at all wall/floor, hob/wall, and movement joints where the membrane is bonded to the substrate.

Class II Membranes: (medium extensibility) Either the membrane will not bond to the tape or the tape will have elastic properties similar to the membrane. Minimum bond breaker tape to bridge joint opening up to 5mm is 35mm.

Class III Membranes (high extensibility) allow the membrane to have even thickness. Minimum bond breaker tape to bridge joint opening up to 5mm is 12mm Figure 4.10

Vertical membrane termination

The liquid applied membrane is to be applied over the floor substrate and up the vertical face of the wall:

*Showers with hobs and step downs a minimum height of 150mm above the finished floor level

* Hobless Showers, a minimum height of 150mm above the finished floor level

Termination to Drainage flange

The drainage flange is to be installed with the waterproofing membrane termination into the flange to provide a waterproof connection. Figures 4.3.1(b)

Termination to Drainage Channel

The waterproof drainage should be continuous, with the liquid applied membrane covering the drainage channel, with a minimum horizontal termination of 50mm on the horizontal surface. Figures 4.3.2

Inspection and Acceptance Test

On completion of the installation of a membrane system, inspection and acceptance testing must be conducted. In addition to the visual inspection, either the dry film thickness test (DFT) by non-destructive means or a controlled water test for a minimum of 24 hours duration is required.

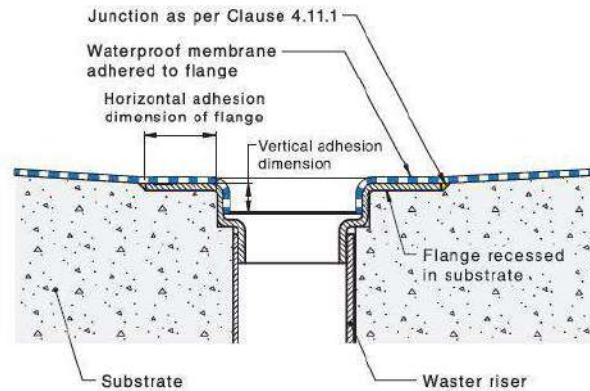


Figure 4.3.1(B) — Typical membrane termination at leak control flange with down leg

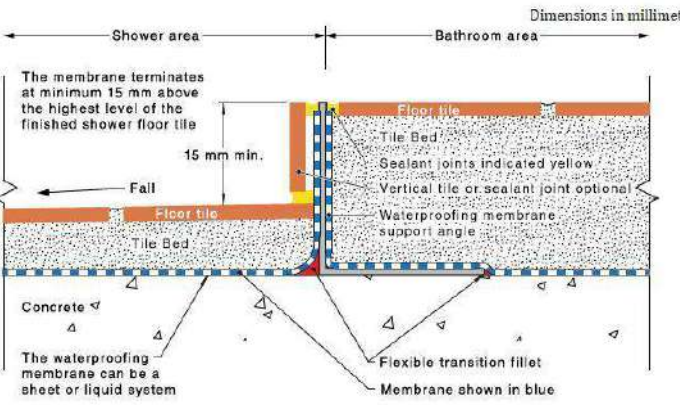
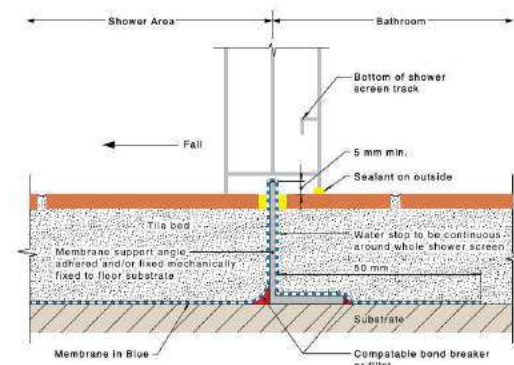
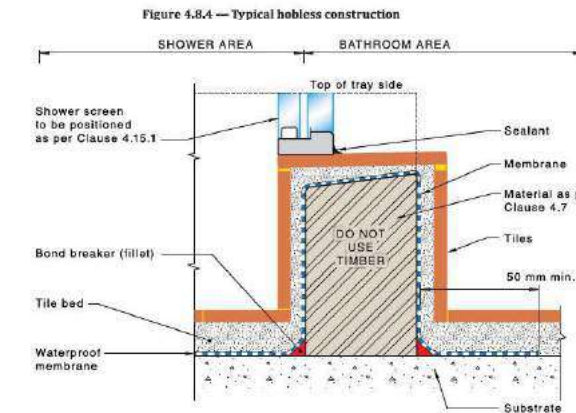


Figure 4.8.2(C) — Step-down shower waterstop and cover angle



NOTE 1: Some shower screen extrusions do not permit the waterstop extending into a rebate. A channel section may be needed to be installed over the waterstop angle with the shower screen placed on top of the channel including return panels.

NOTE 2: The application of sealant is intended to prevent water from leaving the shower area. The application may be on the inside and/or outside face.



NOTE 1: The area outside the shower area should be designated as a Category 3.

NOTE 2: If the area outside the shower area is a Category 2 wet area, consideration should be given to extending the membrane across the whole of the floor.

Figure 4.6.2 — Shower with a hob liquid membrane

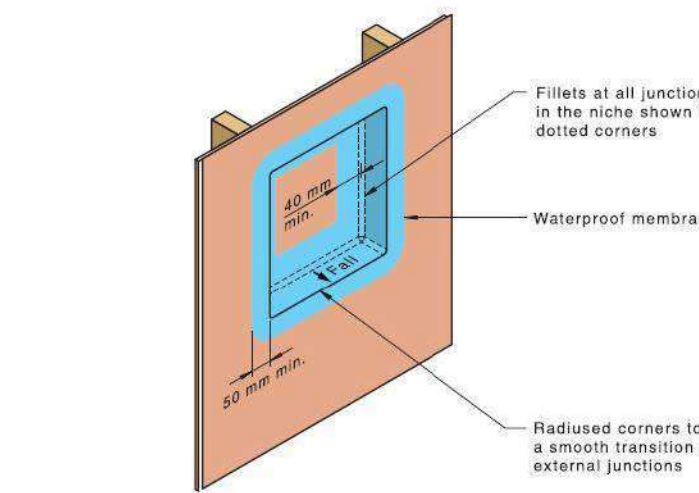
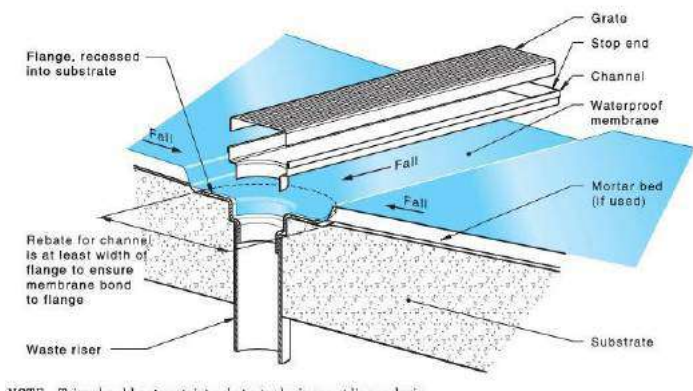


Figure 4.12.4 — Niche in shower wall framework



NOTE: Trim should not restrict substrate drainage at linear drain.

Figure 4.3.2 — Linear drain single outlet centrally located

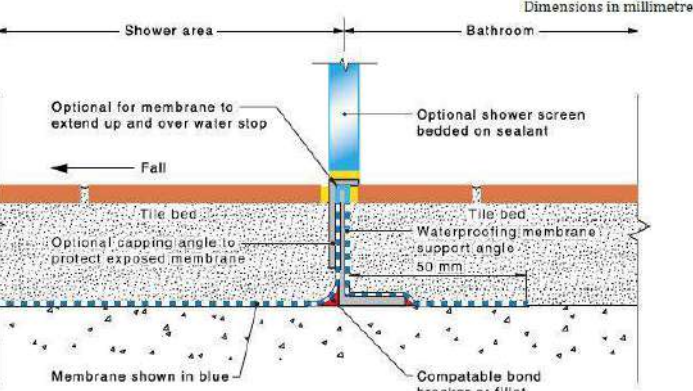
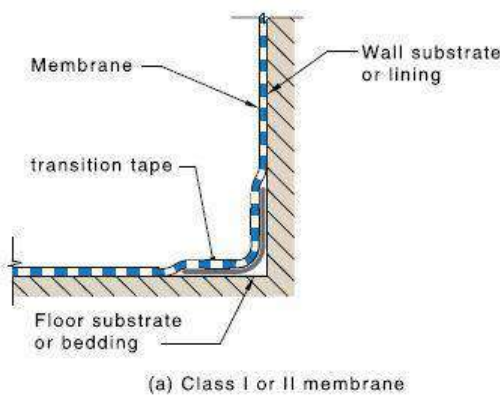
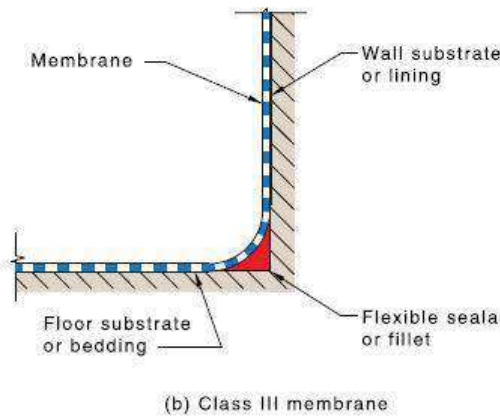


Figure 4.8.2(D) — Shower waterstop and cover angle



(a) Class I or II membrane



(b) Class III membrane

Figure 4.10 — Typical transition tape details

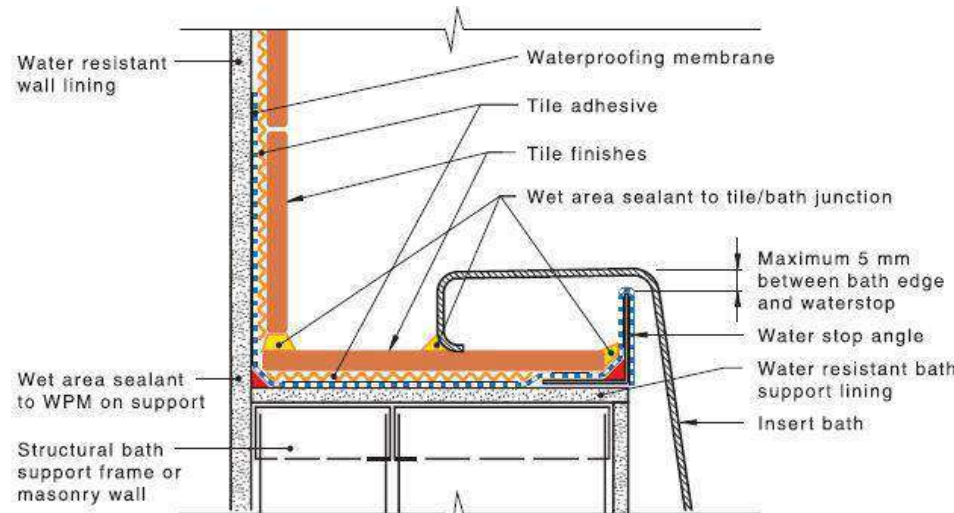


Figure 4.13.3(D) — Insert bath — Tile surround

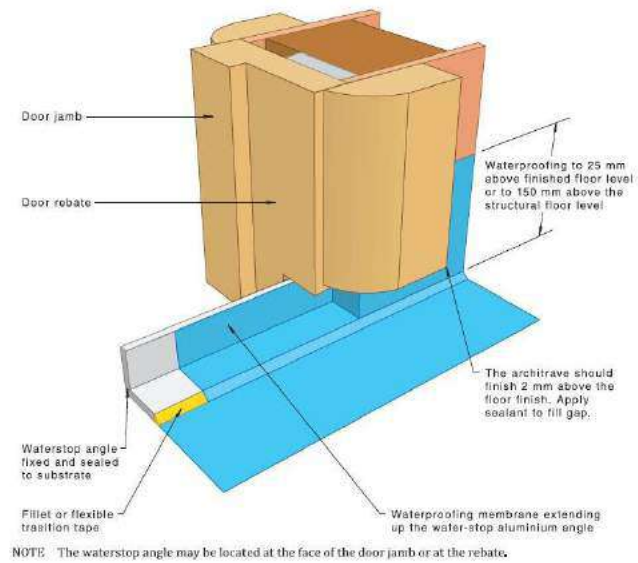


Figure 4.6.1(A) — Example of liquid waterproofing at door opening framework

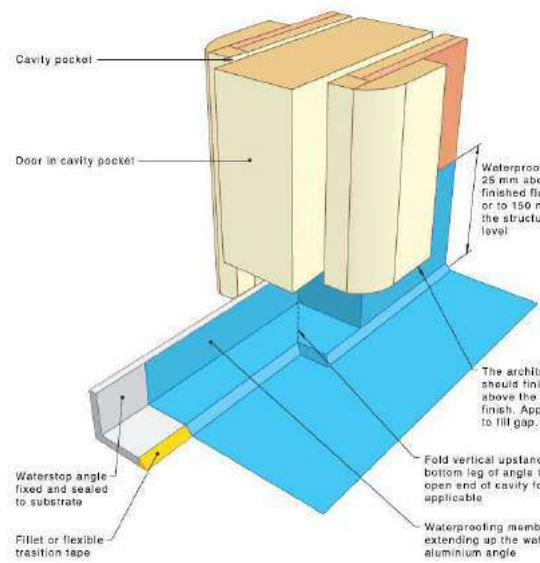


Figure 4.6.1(B) — Waterproofing at door opening cavity slider

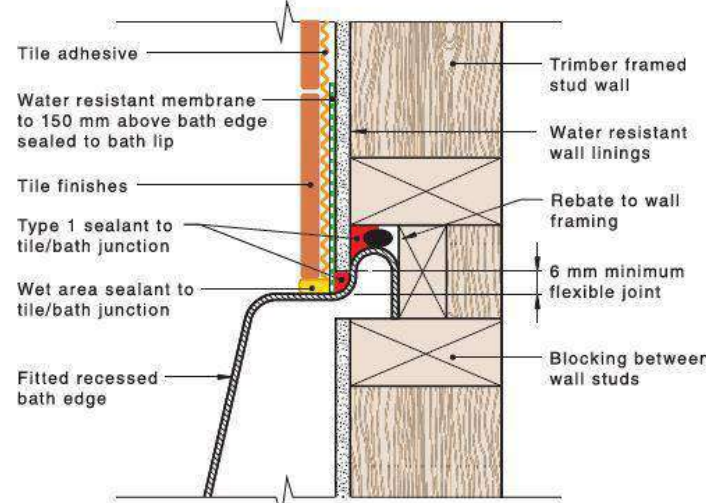


Figure 4.13.2.2(D) — Bath with no shower over it — Fitted bath — Timber-framed wall

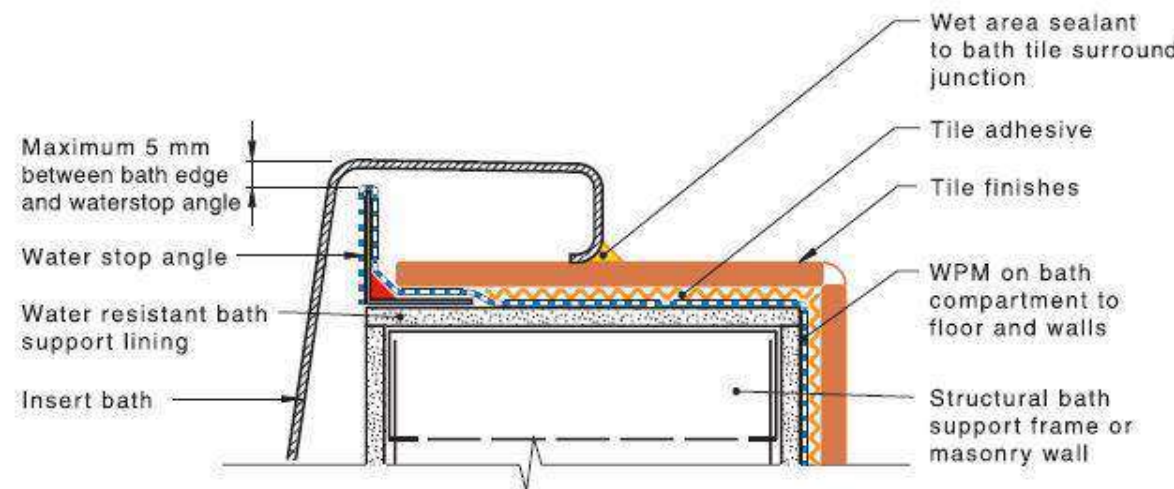


Figure 4.13.3(E) — Shower over bath — Insert bath — Bath compartment wall

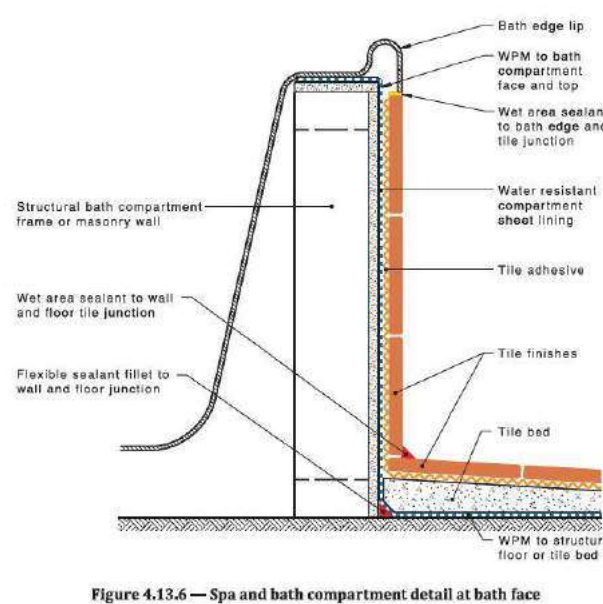


Figure 4.13.6 — Spa and bath compartment detail at bath face

Details

LOT/PLAN NUMBER OR CROWN DESCRIPTION

Lot. 1 LP47803

LOCAL GOVERNMENT (COUNCIL)

Frankston

LEGAL DESCRIPTION

1\LP47803

COUNCIL PROPERTY NUMBER

179627

LAND SIZE

797m² Approx

ORIENTATION

East

FRONTAGE

18.36m Approx

ZONES

GRZ - General Residential Zone

OVERLAYS

N/A

State Electorates

LEGISLATIVE COUNCIL

South-Eastern Metropolitan Region

LEGISLATIVE ASSEMBLY

Carrum District

Schools

CLOSEST PRIVATE SCHOOLS

St Anne's School (1000 m)
John Paul College (3179 m)
SEDA College (Victoria) - Frankston Park Function Centre (4309 m)

CLOSEST PRIMARY SCHOOLS

Seaford Primary School (439 m)

CLOSEST SECONDARY SCHOOLS

Patterson River Secondary College (2819 m)

Burglary Statistics

POSTCODE AVERAGE

1 in 72 Homes

STATE AVERAGE

1 in 76 Homes

COUNCIL AVERAGE

1 in 82 Homes

Council Information - Frankston

PHONE

1300 322 322 (Frankston)

EMAIL

correspondence@frankston.vic.gov.au

WEBSITE

<http://www.frankston.vic.gov.au/>

SITE DIMENSIONS

17 Railway Parade, Seaford Vic 3198



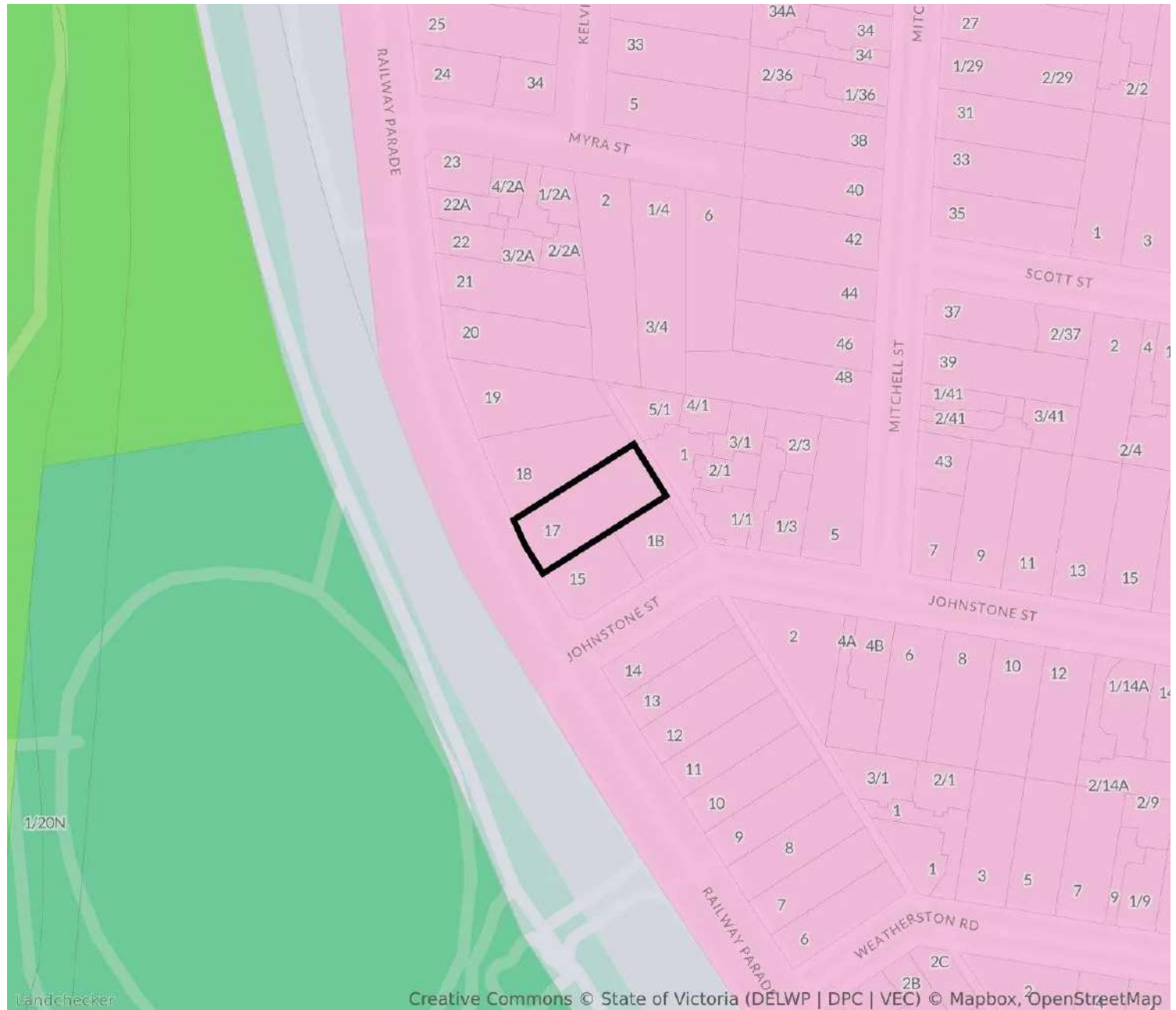
RECENT PLANNING SCHEME AMENDMENTS (LAST 90 DAYS)

17 Railway Parade, Seaford Vic 3198

Status	Code	Date	Description
APPROVED	VC273	18/12/2024	Amendment VC273 makes changes to clause 52.20 to apply to housing development that are wholly or partly funded by the Victorian or Commonwealth governments.
APPROVED	VC272	17/12/2024	The amendment modifies the timeframes at clause 52.10 (Reconstruction After an Emergency) from 5 to 7 years.
APPROVED	VC269	02/12/2024	The amendment makes changes to the VPP and all planning schemes to improve the operation of clause 53.24 Future Homes.
APPROVED	VC263	21/11/2024	Amendment VC263 makes changes to state policy relating to special water supply catchments and water quality, as well as improving references to the Catchment and Land Protection Act 1994 and updating references to policy documents.
APPROVED	VC262	13/11/2024	Amendment VC262 exempts applications to remove, destroy or lop vegetation that comply if a fire prevention notice has been issued under the Fire Rescue Victoria Act 1958.
APPROVED	CI58fran	16/10/2024	The amendment deletes the Public Acquisition Overlay – Schedule 3 (Open space/recreation) (PAO3) from 250 Wedge Road, Skye.

PROPOSED PLANNING SCHEME AMENDMENTS

Status	Code	Date	Description
PROPOSED	C161fran	19/11/2024	The amendment proposes to implement the Frankston Metropolitan Activity Centre Development Contributions Plan (HillPDA, April 2024) and apply the Public Acquisition Overlay to 76 Young Street and 19 Keys Street, Frankston.
PROPOSED	C160fran	24/09/2024	The amendment implements the land use and development directions of the Frankston Metropolitan Activity Centre Structure Plan September 2024 by introducing the Activity Centre Zone, amending the Planning Policy Framework and making associated changes to the Frankston Planning Scheme.
PROPOSED	C148fran	09/09/2024	The amendment proposes the implementation of the land use and development directions of the Frankston City Industrial Strategy (Charter Keck Cramer and Tract, 2024) and Frankston City Industrial Design Guidelines (Tract, 2024).
PROPOSED	C156fran	19/08/2024	The amendment proposes to implement the Biodiversity Action Plan 2021–2036, Urban Forest Action Plan 2020–2040, Integrated Water Action Plan 2016–2026 and Climate Change Strategy 2023–2030 by updating the Municipal Planning Strategy, Planning Policy Framework and Schedule to Clause 72.08 (Background documents).



RIZ - General Residential Zone

To implement the Municipal Planning Strategy and the Planning Policy Framework.

To encourage development that respects the neighbourhood character of the area.

To encourage a diversity of housing types and housing growth particularly in locations offering good access to services and transport.

To allow educational, recreational, religious, community and a limited range of other non-residential uses to serve local community needs in appropriate locations.

VPP 32.08 General Residential Zone

For confirmation and detailed advice about this planning zone, please contact FRANKSTON council on 1300 322 322.

Other nearby planning zones

CIZ - Commercial 1 Zone

GRZ - General Residential Zone

PCRZ - Public Conservation And Resource Zone

PPRZ - Public Park And Recreation Zone

TRZ1 - Transport Zone

OVERLAYS ON THE PROPERTY

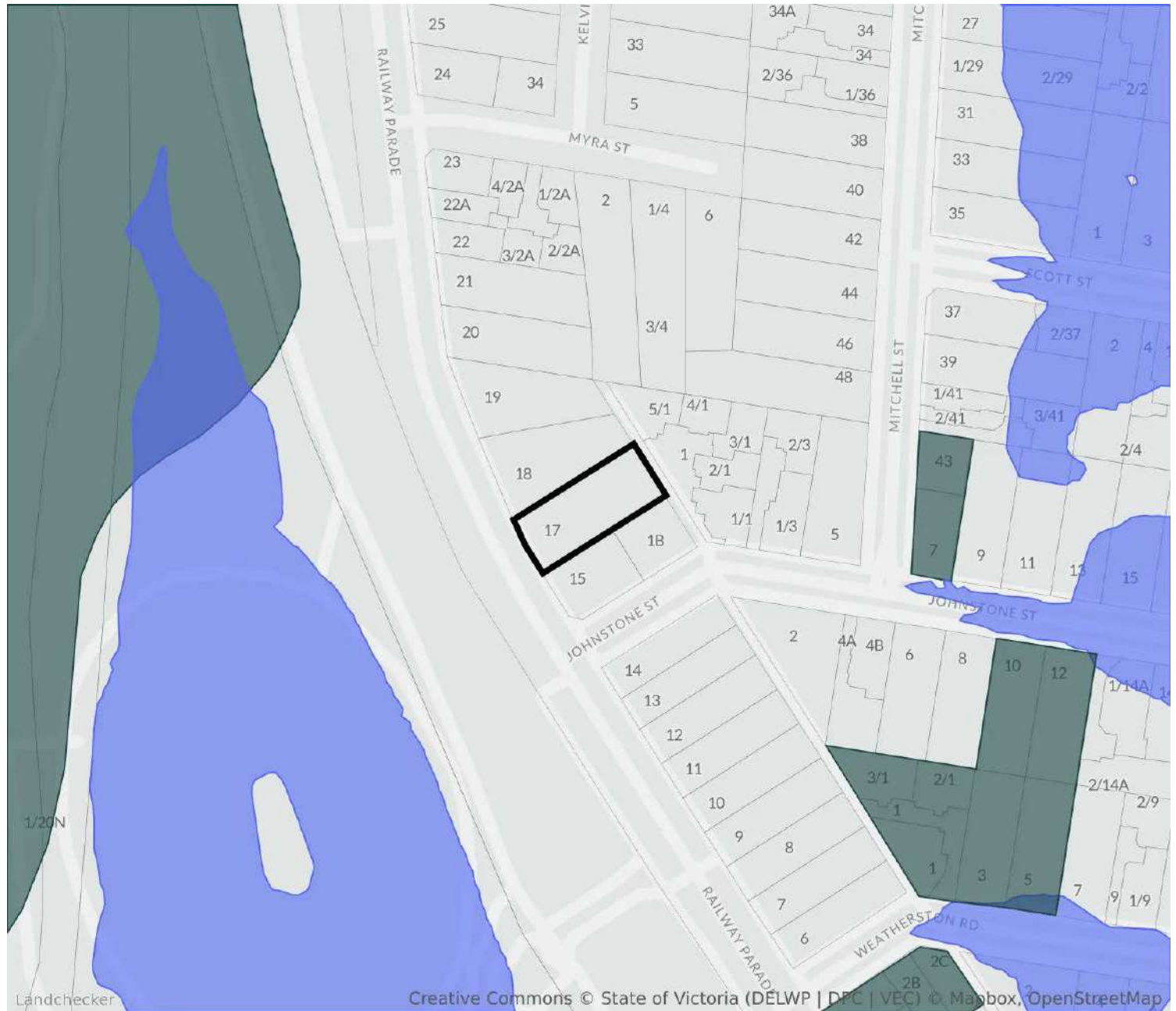
17 Railway Parade, Seaford Vic 3198



There are no overlays for this property

NEARBY OVERLAYS

17 Railway Parade, Seaford Vic 3198



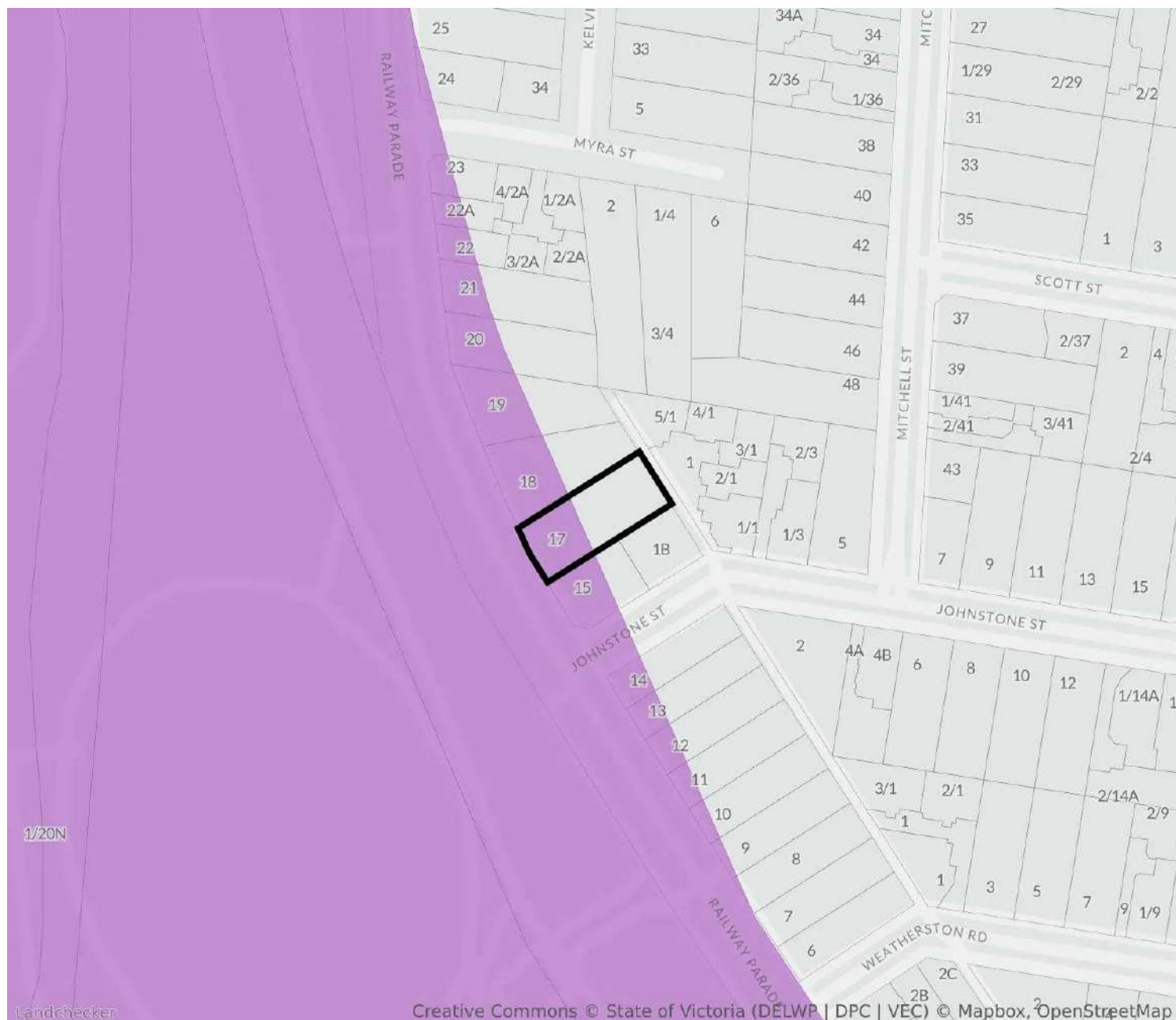
- DDO - Design And Development Overlay**
- ESO - Environmental Significance Overlay**
- LSIO - Land Subject To Inundation Overlay**
- SBO - Special Building Overlay**

For confirmation and detailed advice about this planning overlay, please contact FRANKSTON council on 1300 322 322.

For confirmation and detailed advice about the cultural sensitivity of this property, please contact FRANKSTON council on 1300 322 322.

BUSHFIRE PRONE AREA

17 Railway Parade, Seaford Vic 3198



Bushfire Prone Area

This property is within a zone classified as a bushfire prone area.

For confirmation and detailed advice about the bushfire prone area of this property, please contact FRANKSTON council on 1300 322 322.



The easement displayed is indicative only and may represent a subset of the total easements.

For confirmation and detailed advice about the easement on or nearby this property, please contact FRANKSTON council on 1300 322 322.

PLANNING PERMIT HISTORY

17 Railway Parade, Seaford Vic 3198

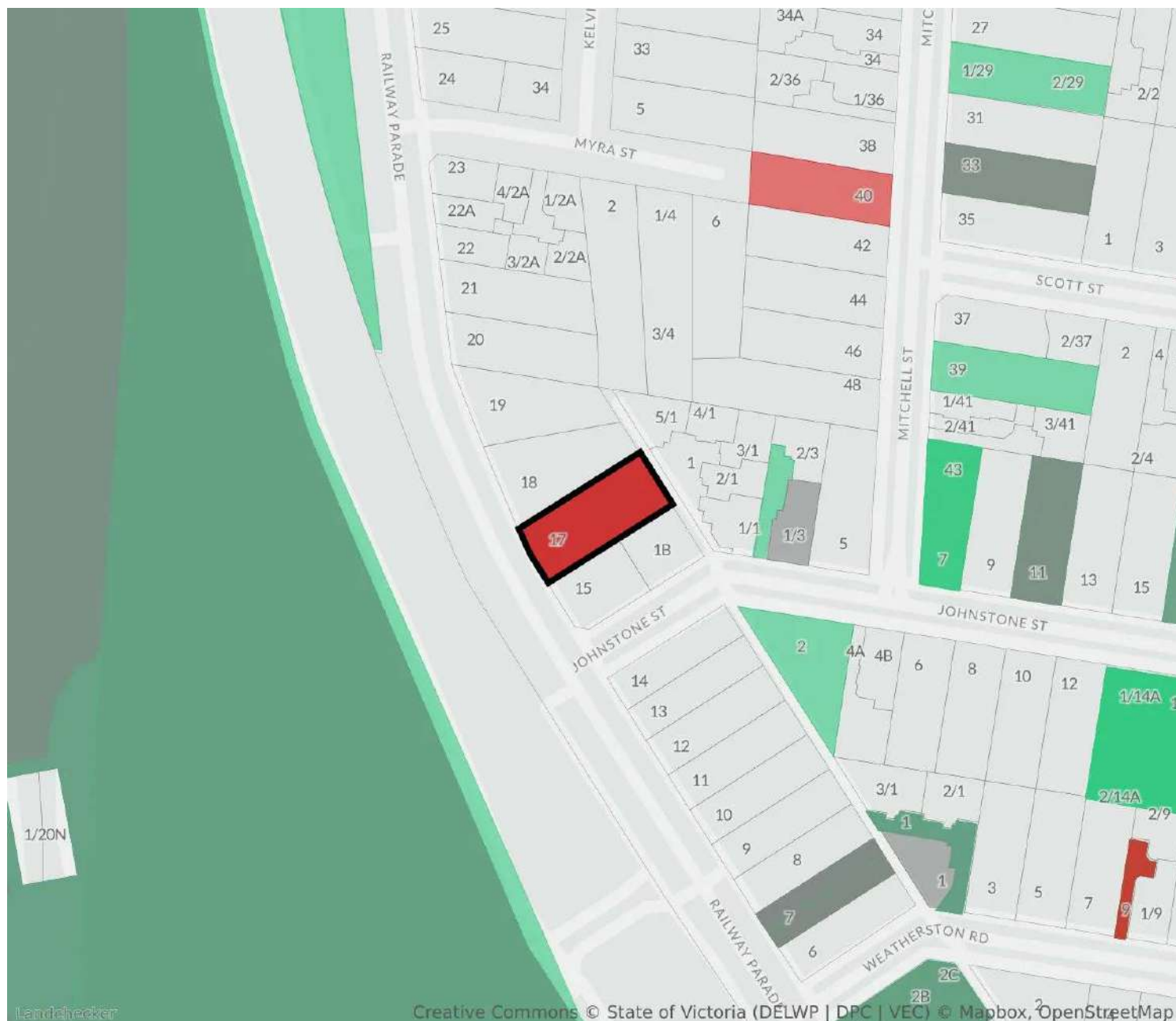


Status	Code	Date	Description
REJECTED	497/2017/P		To construct three (3) double storey dwellings.
OTHER	99/2019/P/A		Condition 1 plans - to construct three (3) double storey dwellings on a lot.
OTHER	99/2019/P/B		Condition 1 plans - to construct three (3) double storey dwellings on a lot.
APPROVED	99/2019/P/C		Extension of time - to construct three (3) double storey dwellings on a lot.

For confirmation and detailed advice about this planning permits, please contact FRANKSTON council on 1300 322 322.

NEARBY PLANNING PERMITS

17 Railway Parade, Seaford Vic 3198



Status	Code	Date	Address	Description
PENDING	622/2024/P	Received 12/07/2024	<u>31 Johnstone Street, Seaford</u>	ePathway
APPROVED	577/2023/P/B		<u>31 Johnstone Street, Seaford</u>	To construct two (2) double-storey dwellings in a general residential zone (grz).
APPROVED	268/2024/P		<u>11 Johnstone Street, Seaford</u>	To subdivide the land into two (2) lots in a general residential zone (r1z) and special building overlay (sbo).
APPROVED	577/2023/P		<u>31 Johnstone Street, Seaford</u>	To construct two (2) double-storey dwellings in a general residential zone (grz).
OTHER	603/2022/P/B		<u>11 Johnstone Street, Seaford</u>	Condition 1 resubmission - to construct two (2) double storey dwellings on a lot in a general residential zone (grz) and to construct buildings and works in a special building overlay (sbo).
OTHER	603/2022/P/A		<u>11 Johnstone Street, Seaford</u>	Condition 1 - to construct two (2) double storey dwellings on a lot in a general residential zone

Status	Code	Date	Address	Description
APPROVED	99/2019/P/C		<u>17 Railway Parade, Seaford</u> <u>17 Railway Parade, Seaford</u>	(grz) and to construct buildings and works in a special building overlay (sbo). Extension of time - to construct three (3) double storey dwellings on a lot.
APPROVED	603/2022/P		<u>11 Johnstone Street, Seaford</u>	To construct two (2) double storey dwellings on a lot in a general residential zone (grz) and to construct buildings and works in a special building overlay (sbo).
OTHER	537/2021/P/A		<u>11 Scott Street, Seaford</u>	Condition 1 - to construct one (1) double storey dwelling in a special building overlay (sbo) and to construct buildings and works within the tree protection zone of a significant tree in a environmental significance overlay schedule 4 (eso4).
APPROVED	795/2021/P		<u>Kananook Creek Reserve 299N</u> <u>Nepean Highway, Seaford</u>	To remove native vegetation under clause 52.17 and 42.01 (environmental significance overlay schedule 1).
OTHER	432/2019/P/G		<u>159 Nepean Highway, Seaford</u>	Condition 17 - construct ten (10) apartments in a three storey building, to construct a building over 7.0 metres in height in a design and development overlay schedule 6 (ddo6) and to create and alter access to a road in a road zone category 1.
APPROVED	432/2019/P/F		<u>159 Nepean Highway, Seaford</u>	Secondary consent - construct ten (10) apartments in a three storey building, to construct a building over 7.0 metres in height in a design and development overlay schedule 6 (ddo6) and to create and alter access to a road in a road zone category 1.
OTHER	432/2019/P/E		<u>159 Nepean Highway, Seaford</u>	Condition 15 - construct ten (10) apartments in a three storey building, to construct a building over 7.0 metres in height in a design and development overlay schedule 6 (ddo6) and to create and alter access to a road in a road zone category 1.
OTHER	432/2019/P/D		<u>159 Nepean Highway, Seaford</u>	Condition 17 - construct ten (10) apartments in a three storey building, to construct a building over 7.0 metres in height in a design and development overlay schedule 6 (ddo6) and to create and alter access to a road in a road zone category 1.
OTHER	432/2019/P/C		<u>159 Nepean Highway, Seaford</u>	Condition 15 - construct ten (10) apartments in a three storey building, to construct a building over 7.0 metres in height in a design and development overlay schedule 6 (ddo6) and to create and alter access to a road in a road zone category 1.
APPROVED	537/2021/P		<u>11 Scott Street, Seaford</u>	To construct one (1) double storey dwelling in a special building overlay (sbo) and to construct buildings and works within the tree protection zone of a significant tree in a environmental significance overlay schedule 4 (eso4).
APPROVED	190/2021/P/B		<u>14 Johnstone Street, Seaford</u>	Section 72 - To subdivide the land into three (3) lots in a General Residential Zone (GRZ) and Special Building Overlay (SBO)
OTHER	139/2021/VS		<u>11 Scott Street, Seaford</u>	To construct one (1) double storey dwelling in a special building overlay (sbo).
APPROVED	432/2019/P/B		<u>159 Nepean Highway, Seaford</u>	Secondary consent - construct ten (10) apartments in a three storey building, to construct a building over 7.0 metres in height in a design and development overlay schedule 6 (ddo6) and to create and alter access to a road in a road zone category 1.

Status	Code	Date	Address	Description
OTHER	99/2019/P/B		<u>17 Railway Parade, Seaford</u> <u>17 Railway Parade, Seaford</u>	Condition 1 plans - to construct three (3) double storey dwellings on a lot.
APPROVED	190/2021/P/A		<u>14 Johnstone Street, Seaford</u>	Section 72 - To subdivide the land into three (3) lots in a General Residential Zone (GRZ) and Special Building Overlay (SBO)
OTHER	68/2021/P/A		<u>166-175 Nepean Highway, Seaford</u>	Condition 1 - business identification signage and buildings and works to an existing supermarket in a commercial 1 zone and to alter access to a road in a road zone category 1.
OTHER	99/2019/P/A		<u>17 Railway Parade, Seaford</u> <u>17 Railway Parade, Seaford</u>	Condition 1 plans - to construct three (3) double storey dwellings on a lot.
APPROVED	380/2019/P/B		<u>14 Johnstone Street, Seaford</u>	Section 72 - To construct one (1) single storey and two (2) double storey dwellings (three (3) dwellings on a lot) in a General Residential Zone (GRZ) and to construct buildings and works in a Special Building Overlay (SBO) This amendment relocates the dwelling 2 front entry (within the SBO)
APPROVED	190/2021/P		<u>14 Johnstone Street, Seaford</u>	To subdivide the land into three (3) lots in a General Residential Zone (GRZ) and Special Building Overlay (SBO)
APPROVED	48/2021/VS		<u>7 Johnstone Street, Seaford</u>	To subdivide the land into two (2) lots in a General Residential Zone (GRZ), Special Building Overlay (SBO) and Environmental Significance Overlay Schedule 4 (ESO4)
APPROVED	13/2019/P/B		<u>Seaford Reserve - R F Miles Recreation Reserve 22R Seaford Road, Seaford</u>	Section 72 - to carry out works within tree protection zone of a native tree in an environmental significance overlay schedule 1 (eso1), to construct a building and to carry out works within the special building overlay (sbo), to carry out works within land subject to inundation overlay (Isio) and removal of native vegetation.
APPROVED	68/2021/P		<u>166-175 Nepean Highway, Seaford</u>	Business identification signage and buildings and works to an existing supermarket in a commercial 1 zone and to alter access to a road in a road zone category 1.
APPROVED	54/2020/P/B		<u>7 Johnstone Street, Seaford</u>	-
OTHER	464/2019/P/A		<u>Kananook Creek Reserve 299N Nepean Highway, Seaford</u>	Condition 1 plans - native vegetation removal and works for construction of a shared user path in an environmental significance overlay schedule 1 (eso1).
APPROVED	185/2020/P		<u>Kananook Creek Reserve 299N Nepean Highway, Seaford</u>	Buildings and works (viewing platform) within 5 metres of native vegetation within the environmental significance overlay schedule 1 (eso1).
OTHER	13/2019/P/A		<u>Seaford Reserve - R F Miles Recreation Reserve 22R Seaford Road, Seaford</u>	Condition 1 - to carry out works within tree protection zone of a native tree in an environmental significance overlay schedule 1 (eso1), to construct a building and to carry out works within the special building overlay (sbo), to carry out works within land subject to inundation overlay (Isio) and removal of native vegetation.
OTHER	59/2020/P		<u>Kananook Creek Reserve 300N Nepean Highway, Frankston</u> <u>Kananook Creek Reserve 299N Nepean Highway, Seaford</u>	To carry out works within the tpz of a native tree under an environmental significance overlay schedule 1 (eso1).
APPROVED	54/2020/P		<u>7 Johnstone Street, Seaford</u>	-

Status	Code	Date	Address	Description
APPROVED	464/2019/P		<u>Kananook Creek Reserve 299N Nepean Highway, Seaford</u>	Native vegetation removal and works for construction of a shared user path in an environmental significance overlay schedule 1 (eso1).
APPROVED	448/2019/P		<u>Seaford Reserve – R F Miles Recreation Reserve 22R Seaford Road, Seaford</u> <u>Seaford Reserve – R F Miles Recreation Reserve 22R Seaford Road, Seaford</u>	To carry out works within tree protection zone of a native tree in an environmental significance overlay schedule 1 (eso1), to construct a building and to carry out works within the special building overlay (sbo), and removal of native vegetation.
APPROVED	432/2019/P		<u>159 Nepean Highway, Seaford</u>	Construct ten (10) apartments in a three storey building, to construct a building over 7.0 metres in height in a design and development overlay schedule 6 (ddo6) and to create and alter access to a road in a road zone category 1.
APPROVED	380/2019/P		<u>14 Johnstone Street, Seaford</u>	-
APPROVED	99/2019/P		<u>17 Railway Parade, Seaford</u>	To construct three (3) double storey dwellings on a lot.
APPROVED	13/2019/P		<u>Seaford Reserve – R F Miles Recreation Reserve 22R Seaford Road, Seaford</u>	To carry out works within tree protection zone of a native tree in an environmental significance overlay schedule 1 (eso1), to construct a building and to carry out works within the special building overlay (sbo), to carry out works within land subject to inundation overlay (lsio) and removal of native vegetation.
APPROVED	2785/1984/P/A		<u>161-162 Nepean Highway, Seaford</u>	Secondary consent – to construct sixteen (16) dwellings.
APPROVED	48/2017/VS		<u>Frankston Railway Station 69V Young Street, Frankston</u>	Building and works associated with the construction of a new VicTrack Aggregation Facility
REJECTED	497/2017/P		<u>17 Railway Parade, Seaford</u> <u>17 Railway Parade, Seaford</u>	To construct three (3) double storey dwellings.
OTHER	476/2016/P/B		<u>17 Johnstone Street, Seaford</u>	Condition 1 plans – the construction of one (1) single storey dwelling to the rear of the existing dwelling (two (2) dwellings).
APPROVED	160/2017/P		<u>159 Nepean Highway, Seaford</u>	To construct eleven (11) dwellings within a three (3) storey building
APPROVED	476/2016/P/A		<u>17 Johnstone Street, Seaford</u>	Section 72 – the construction of one (1) single storey dwelling to the rear of the existing dwelling (two (2) dwellings).
APPROVED	476/2016/P		<u>17 Johnstone Street, Seaford</u>	The construction of one (1) single storey dwelling to the rear of the existing dwelling (two (2) dwellings).
APPROVED	597/2015/P		<u>39 Mitchell Street, Seaford</u>	To construct one (1) single storey & one (1) double storey dwelling (two (2) dwellings).
APPROVED	34/2015/VS		<u>5 Scott Street, Seaford</u>	To construct a single storey dwelling, domestic swimming pool and front fence in a special building overlay.
APPROVED	339/2010/P/A		<u>3 Johnstone Street, Seaford</u>	Secondary consent – To construct two (2) double storey dwellings

For confirmation and detailed advice about this planning permits, please contact FRANKSTON council on 1300 322 322.

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Biggin & Scott Seaford

112 Nepean Highway,
Seaford, VIC 3198

P: 03 9785 3888

ABN: 67286322387



Residential Rental Agreement

for

17 Railway Pde, Seaford VIC 3198

This agreement is between **Bekim Qaniu**
and **Alexandria Jane Schmidt**.

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Residential Rental Agreement of no more than 5 years

Residential Tenancies Act 1997 Section 26(1)

Regulation 10(1)

Part A - General

This agreement is between the residential rental provider (rental provider) and the renter listed on this form.

1. Date of agreement

This is the date the agreement is signed

Wed 30/11/2022

If the agreement is signed by the parties on different days, the date of the agreement is the date the last person signs the agreement.

2. Premises let by the rental provider

Address of premises

17 Railway Pde, Seaford VIC

Postcode 3198

3. Rental provider details

Full name or company
name of rental
provider

Bekim Qaniu

Address (if no agent is
acting for the rental
provider)

Postcode

Phone number

ACN (if applicable)

Email address

Rental provider's agent details (if applicable)

Full name

Biggin & Scott Seaford

Address

112 Nepean Highway, Seaford, VIC

Postcode 3198

Phone number

03 9785 3888

ACN (if applicable)

Email address

Note: The rental provider must notify the renter within 7 days if any of this information changes.

4. Renter details

Each renter that is a party to the agreement must provide their details here.

Full name of **renter 1**

Alexandria Jane Schmidt

Current Address:

Postcode

Phone number:

0432151377

Email:

alexjsch22@yahoo.com

Full name of **renter 2**

Current Address:

Postcode

Phone number:

Email:

Full name of **renter 3**

Current Address:

Postcode

Phone number:

Email:

Full name of **renter 4**

Current Address:

Postcode

Phone number:

Email:

5. Length of the agreement



Fixed term agreement

Start date

Wed 01/02/2023

End date

Mon 31/07/2023

(this is the date the agreement starts
and you may move in)



Periodic agreement
(monthly)

Start date

Note: If a fixed term agreement ends and the renter and rental provider do not enter into a new fixed term agreement, and the renter continues to occupy the premises, a periodic (e.g. month by month) residential rental agreement will be formed.

6. Rent

Rent amount(\$) (payable in advance)	1629.00		
To be paid per	☐ week	☐ fortnight	☒ calendar month
Day rent is to be paid (e.g. each Thursday or the 11th of each month)	1st day of each month		
Date first rent payment due	Wed 01/02/2023		
The rent will be increasing to	\$1629.00	per month	from Wed 01/02/2023

7. Bond

The Renter has paid the bond specified below

Unless the rent is greater than \$900 (per week), the maximum bond is one month's rent. In some cases, the rental provider may ask the Victorian Civil and Administrative Tribunal (VCAT) to increase this limit. The rental provider or their agent must lodge the bond with the Residential Tenancies Bond Authority (RTBA). The bond must be lodged within 10 business days after receiving payment. The RTBA will send the renter a receipt for the bond.

If the renter does not receive a receipt within 15 business days from when they paid the bond, they may — email rtba@justice.vic.gov.au, or call the RTBA on 1300 13 71 64

Rental bond amount(\$)	1521
Bond lodgement date	Thu 01/04/2021
Bond Lodgement No.	15028939

Part B – Standard terms

8. Rental provider's preferred method of rent payment

Note: The rental provider must permit a fee-free (other than the renter's own bank fees) payment method and must allow the renter to use Centrepay or another form of electronic funds transfer.

Note: The renter is entitled to receive a receipt from the rental provider confirming payment of rent.

(Rental provider to tick permitted methods of rent payment)

☐ direct debit	☒ bank deposit	☐ cash	☐ cheque	☐ money order	☐ BPay
☐ other electronic form of payment, including Centrepay					

Payment details (if applicable)

BSB:	083 781
Account:	121 513 005
Account name:	Biggin & Scott Seaford
Bank Reference:	17 Railway

9. Service of notices and other documents by electronic methods

Electronic service of documents must be in accordance with the requirements of the **Electronic Transactions (Victoria) Act 2000**.

Just because someone responds to an email or other electronic communications does not mean they have consented to the service of notices and other documents by electronic methods.

The rental provider and renter must notify the other party in writing if they no longer wish to receive notices or other documents by electronic methods.

The rental provider and renter must immediately notify the other party in writing if their contact details change.

9.1 Does the rental provider agree to the service of notices and other documents by electronic methods such as email?

The rental provider must complete this section before giving the agreement to the renter.
(Rental provider to tick as appropriate)

☒ Yes

Cara Robertson: seafordrentals@bigginscott.com.au

☐ No

9.2 Does the renter agree to the service of notices and other documents by electronic methods such as email?

(Renter to tick as appropriate)

Renter 1 ☒ Yes

Alexandria Jane Schmidt: alexjsch22@yahoo.com

☐ No

Renter 2 ☐ Yes

☐ No

Renter 3 ☐ Yes

☐ No

Renter 4 ☐ Yes

☐ No

10. Urgent repairs

- The rental provider must ensure that the rental property is provided and maintained in good repair.
- If there is a need for an urgent repair, the renter should notify the rental provider in writing.

For further information on seeking repairs see **Part D** (below).

Details of person the renter should contact for an urgent repair
(rental provider to insert details)

Emergency contact name

Biggin & Scott Seaford

Emergency phone number

03 9785 3888

Emergency email address

seaford@bigginscott.com.au

11. Professional cleaning

The rental provider must not require the renter to arrange professional cleaning or cleaning to a professional standard at the end of the tenancy unless —

- professional cleaning or cleaning to a professional standard was carried out to the rented premises immediately before the start of the tenancy and the renter was advised that professional cleaning or cleaning to a professional standard had been carried out to those premises immediately before the start of the tenancy; or
- professional cleaning or cleaning to a professional standard is required to restore the rented premises to the same condition they were in immediately before the start of the tenancy, having regard to the condition report and taking into account fair wear and tear.

The renter must have all or part of the rented premises professionally cleaned, or pay the cost of having all or part of the rented premises professional cleaned, if professional cleaning becomes required to restore the premises to the condition they were in immediately before the start of the tenancy, having regard to the condition report and taking into account fair wear and tear.

12. Owners corporation

Do owners corporation rules apply to the premises?

If yes, the rental provider must attach a copy of the rules to this agreement.

(Rental provider to tick as appropriate)

☒ No

☐ Yes

13. Condition report

The renter must be given 2 copies of the condition report (or one emailed copy) on or before the date the renter moves into the rented premises.

(rental provider to tick as appropriate)

☒ The condition report has been provided

☐ The condition report will be provided to the renter on or before the date the agreement starts

14 Electrical safety activities

- (a) The rental provider must ensure an electrical safety check of all electrical installations, appliances and fittings provided by a rental provider in the rented premises is conducted every 2 years by a licensed or registered electrician and must provide the renter with the date of the most recent safety check, in writing, on request of the renter.
 - (b) If an electrical safety check of the rented premises has not been conducted within the last two years at the time the renter occupies the premises, the rental provider must arrange an electrical safety check as soon as practicable.
-

15 Gas safety activities

This safety-related activity only applies if the rented premises contains any appliances, fixtures or fittings which use or supply gas.

- (a) The rental provider must ensure that a gas safety check of all gas installations and fittings in the rented premises is conducted every 2 years by a licensed or registered gasfitter and must provide the renter with the date of the most recent safety check, in writing, on request of the renter.
 - (b) If a gas safety check has not been conducted within the last two years at the time the renter occupies the premises, the rental provider must arrange a gas safety check as soon as practicable.
-

16 Smoke alarm safety activities

- (a) The rental provider must ensure that:
 - i. any smoke alarm is correctly installed and in working condition; and
 - ii. any smoke alarm is tested according to the manufacturer's instructions at least once every 12 months, and
 - iii. the batteries in each smoke alarm are replaced as required.
- (b) The rental provider must immediately arrange for a smoke alarm to be repaired or replaced as an urgent repair if they are notified by the renter that it is not in working order.
Note: Repair or replacement of a hard-wired smoke alarm must be undertaken by a suitably qualified person.
- (c) The rental provider, on or before the occupation date, must provide the renter with the following information in writing:
 - i. information about how each smoke alarm in the rented premises operates;
 - ii. information about how to test each smoke alarm in the rented premises;
 - iii. information about the renter's obligations to not tamper with any smoke alarms and to report if a smoke alarm in the rented premises is not in working order.
- (d) The renter must give written notice to the rental provider as soon as practicable after becoming aware that a smoke alarm in the rented premises is not in working order.

Note: Regulations made under the **Building Act 1993** require smoke alarms to be installed in all residential buildings.

17 Swimming pool barrier safety activities

These safety-related activities only apply if the rented premises contains a swimming pool.

- (a) The rental provider must ensure that the swimming pool barrier is maintained in good repair.

- (b) The renter must give written notice to the rental provider as soon as practicable after becoming aware that the swimming pool barrier is not in working order.
 - (c) The rental provider must arrange for a swimming pool barrier to be immediately repaired or replaced as an urgent repair if they are notified by the renter that it is not in working order.
 - (d) The rental provider must provide the renter with a copy of the most recent certificate of swimming pool barrier compliance issued under the **Building Act 1993** on the request of the renter.
-

18 Relocatable pool safety activities

These safety-related activities only apply if a relocatable swimming pool is erected, or is intended to be erected, on the rented premises.

- (a) The renter must not erect a relocatable swimming pool without giving written notice to the rental provider before erecting the pool.
- (b) The renter must obtain any necessary approvals before erecting a relocatable swimming pool.

Note: Regulations made under **Building Act 1993** apply to any person erecting a relocatable swimming pool. This safety-related activity only applies to swimming pools or spas that hold water deeper than 300 mm.

19 Bushfire prone area activities

This safety-related activity only applies if the rented premises is in a bushfire prone area and is required to have a water tank for bushfire safety.

If the rented premises is in a designated bushfire prone area under section 192A of the **Building Act 1993** and a water tank is required for firefighting purposes, the rental provider must ensure the water tank and any connected infrastructure is maintained in good repair as required.

The water tank must be full and clean at the commencement of the agreement.

Part D – Rights and obligations

This is a summary of selected rights and obligations of **renters** and **rental providers** under the Act.

Any reference to VCAT refers to the Victorian Civil and Administrative Tribunal.

For more information, visit consumer.vic.gov.au/renting.

20. Use of the premises

The renter:

- is entitled to quiet enjoyment of the premises. The rental provider may only enter the premises in accordance with the Act; and
- must not use the premises for illegal purposes; and
- must not cause a nuisance or interfere with the reasonable peace, comfort or privacy of neighbours; and
- must avoid damaging the premises and common areas. Common areas include hallways, driveways, gardens and stairwells. Where damage occurs, the renter must notify the rental provider in writing; and
- must keep the premises reasonably clean.

21. Condition of the premises

The rental provider:

- must ensure that the premises comply with the rental minimum standards, and is vacant and reasonably clean when the renter moves in; and
- must maintain the premises in good repair and in a fit condition for occupation; and
- agrees to do all the safety-related maintenance and repair activities set out in **Part C** of the agreement.

The renter:

- The renter must follow all safety-related activities set out in **Part C** of the agreement and not remove, deactivate or otherwise interfere with the operation of prescribed safety devices on the premises.

22. Modifications

The renter:

- may make some modifications without seeking the rental provider's consent. These modifications are listed on the Consumer Affairs Victoria website; and
- must seek the rental provider's consent before installing any other fixtures or additions; and
- may apply to VCAT if they believe that the rental provider has unreasonably refused consent for a modification mentioned in the Act; and
- at the end of the agreement, must restore the premises to the condition it was in before they moved in (excluding fair wear and tear). This includes removing all modifications, unless the parties agree they do not need to be removed.

The rental provider:

- must not unreasonably refuse consent for certain modifications.

A list of the modifications that the rental provider cannot unreasonably refuse consent for is available on the Consumer Affairs Victoria website consumer.vic.gov.au/renting.

23. Locks

- The rental provider must ensure the premises has:
 - locks to secure all windows capable of having a lock, and
 - has deadlocks (a deadlock is a deadlatch with at least one cylinder) for external doors that are able to be secured with a functioning deadlock; and
 - meets the rental minimum standards for locks and window locks.
- External doors which are not able to be secured with a functioning deadlock must at least be fitted with a locking device that—
 - is operated by a key from the outside; and
 - may be unlocked from the inside with or without a key
- The renter must obtain consent from the rental provider to change a lock in the master key system.
- The rental provider must not unreasonably refuse consent for a renter seeking to change a lock in the master key system.
- The rental provider must not give a key to a person excluded from the premises under a:
 - a family violence intervention order; or
 - a family violence safety notice; or
 - a recognised non-local DVO; or
 - personal safety intervention order.

24. Repairs

- Only a suitably qualified person may do repairs—both urgent and non-urgent

25. Urgent repairs

Section 3(1) of the Act defines **urgent repairs**. Refer to the Consumer Affairs Victoria website for the full list of urgent repairs and for more information, visit consumer.vic.gov.au/urgentrepairs.

Urgent repairs include failure or breakdown of any essential service or appliance provided for hot water, cooking, heating or laundering supplied by the rental provider.

The rental provider must carry out urgent repairs after being notified. A renter may arrange for urgent repairs to be done if the renter has taken reasonable steps to arrange for the rental provider to immediately do the repairs and the rental provider has not carried out the repairs.

If the renter has arranged for urgent repairs, the renter may be reimbursed directly by the rental provider for the reasonable cost of repairs up to \$2500.

The renter may apply to VCAT for an order requiring the rental provider to carry out urgent repairs if—

- (a) the renter cannot meet the cost of the repairs; or
- (b) the cost of repairs is more than \$2500; or
- (c) the rental provider refuses to pay the cost of repairs if it is carried out by the renter.

26. Non-urgent repairs

- The renter must notify the rental provider, in writing, as soon as practicable of —
 - damage to the premises; and
 - a breakdown of facilities, fixtures, furniture or equipment supplied by the rental provider.
- The rental provider must carry out non-urgent repairs in reasonable time.
- The renter may apply to VCAT for an order requiring the rental provider to do the repairs if the rental provider has not carried out the repairs within 14 days of receiving notice of the need for repair.

27. Assignment or sub-letting

The renter:

- The renter must not assign (transfer to another person) or sub-let the whole or any part of the premises without the written consent of the rental provider. The rental provider may give the renter notice to vacate if the renter assigns or sub-lets the premises without consent.

The rental provider:

- cannot unreasonably withhold consent to assign or sub-let the premises; and
- must not demand or receive a fee or payment for consent, other than any reasonable expenses incurred by the assignment.

28. Rent

- The rental provider must give the renter at least 60 days written notice of a proposed rent increase
- Rent cannot be increased more than once every 12 months.
- If the rental provider or agent does not provide a receipt for rent, then renter may request a receipt.
- The rental provider must not increase the rent under a fixed term agreement unless the agreement provides for an increase by specifying the amount of increase or the method of calculating the rent increase.

29. Access and entry

- The rental provider may enter the premises—
 - at any time, if the renter has agreed within the last 7 days; and
 - to do an inspection, but not more than once every 6 months; and
 - to comply with the rental provider's duties under the Act; and
 - to show the premises or conduct an open inspection to sell, rent or value the premises; and
 - to take images or video for advertising a property that is for sale or rent; and
 - if they believe the renter has failed to follow their duties under the Act; and
 - to do a pre-termination inspection where the renter has applied to have the agreement terminated because of family violence or personal violence.
- The renter must allow entry to the premises where the rental provider has followed proper procedure.
- The renter is entitled to a set amount of compensation for each sales inspection.

30. Pets

- The renter must seek consent from the rental provider before keeping a pet on the premises.
- The rental provider must not unreasonably refuse a request to keep a pet.

31. Additional terms (if any)

List any additional terms to this agreement. The terms listed must not exclude, restrict or modify any of the rights and duties included in the Act.

Additional terms must also comply with the Australian Consumer Law (Victoria). For example, they cannot be unfair terms, which will have no effect. Contact Consumer Affairs Victoria on 1300 558 181 for further information or visit consumer.vic.gov.au/products-and-services/business-practices/contracts/unfair-contract-terms.

32. Residential Tenancy Database

In accord with Section 439 (1) of the Act Biggin & Scott Seaford will, within 14 days of receipt of a written request, provide a copy of any listing located on a residential tenancy database used by Biggin & Scott Seaford subject to the Act.

33. Rental Provider Obligations

The Rental Provider may issue a notice to vacate in accord with the Act during the term of this Agreement and the Renter must vacate the Premises at the expiration of the notice period given in the notice to vacate. The Rental Provider or Biggin & Scott Seaford may during the last month of the term of this Agreement place a 'to let' notice on the Premises. The Rental Provider or Biggin & Scott Seaford may put on the Premises a notice or notices 'for sale' or 'auction' at any time during the term of this Agreement.

The Rental Provider must not increase the Rental more than once in every 12 months.

Unless this Agreement is specified in Item 5 of Part A to be for a fixed term the Rental Provider may, in accord with the provisions of Section 44 of the Act, increase the Rental by giving the Renter at least 60 day's notice of the increase.

This Agreement may only be amended in writing signed by the Rental Provider and the Renter.

Where the Premises form part of a building, the Rental Provider has the right to make and/or alter rules and regulations for the Premises and the Renter will be bound by such rules and regulations of the Act.

34. Availability of Premises

Biggin & Scott Seaford will use its best endeavours so that the Premises are available on the Commencement Date.

35. Payment of Services

The Renter shall pay all charges in respect of the consumption of water, electricity, gas, oil, national broadband network ("NBN") and telephone where the Premises are separately metered for these services as stipulated in the Act.

It is the Renter's responsibility to turn the main switch off to allow the power to be connected as required by the electricity provider. No claim shall be made against the Rental Provider or Biggin & Scott Seaford should the power not be connected at the commencement of this Agreement.

The Renter acknowledges that all arrangements for connection of a telephone line or national broadband network ("NBN") connection to the Premises shall be at the cost of the Rental Provider.

36. Contents Insurance

The Renter is not required to take out any insurance. Notwithstanding this, the Renter acknowledges that any insurance policy of the Rental Provider does not provide cover for the personal possessions of the Renter. It is strongly recommended that the Renter should take out contents insurance to adequately cover those possessions.

37. Use of Premises

The Renter shall only use the Premises for residential purposes unless the prior written consent of the Rental Provider has been obtained for any other use. The Rental Provider may impose reasonable terms and conditions on giving any consent. Any other use may be subject to council or other approval and any costs associated with such approvals will be the responsibility of the Renter. The Renter must not permit any short term or long term letting or licencing the use and/or occupation of any part of the Premises without the prior

written consent of the Rental Provider. Any request for consent must be made in writing to Biggin & Scott Seaford.

38. No Representations

The Renter acknowledges that no promise, representation, warranty or undertaking has been given by the Rental Provider or Biggin & Scott Seaford in relation to the suitability of the Premises for the purposes of the Renter otherwise than as provided in this Agreement. Without limiting Item 21 of Part D of this Agreement, the Rental Provider must ensure that the Premises comply with the rental minimum standards (as set out in Schedule 4 of the Residential Tenancies Regulations 2021), and further that the Premises are vacant and reasonably clean when the Renter moves in.

39. Condition Report

The Renter must be given 2 copies of the Condition Report (or one emailed copy) on or before the date the Renter moves into the Premises.

The Renter acknowledges having received before entering into occupation of the Premises two copies of the Condition Report signed by or on behalf of the Rental Provider as well as a written statement setting out the rights and duties of the Rental Provider and Renter under a tenancy agreement ('Renting a Home - A Guide for Renters'). The Renter acknowledges that the Condition Report provided at the commencement of the tenancy must be signed and returned to Biggin & Scott Seaford within 5 business days after entering into occupation of the Premises. If the Condition Report is not returned, the copy held by Biggin & Scott Seaford will be accepted as conclusive evidence of the state of repair or general condition of the Premises, at the commencement of this Agreement.

40. No Promise of Renewal

The Renter acknowledges that no promise, representation or warranty has been given by the Rental Provider or Biggin & Scott Seaford in relation to any further renewal of this Agreement. Without limiting the generality of clause 5 in Part A of this Agreement, the Renter acknowledges that if this Agreement is specified in Part A, Item 5 of this Agreement as being for a fixed period, then it shall commence on the Commencement Date and end on the Expiry Date.

41. Rental Provider Termination

The Renter acknowledges that the Rental Provider may require possession of the Premises at the termination of this Agreement and may issue a notice to vacate in accord with the Act requiring vacant possession on the expiry of this Agreement.

42. Lost Keys

The Renter is responsible for the replacement of any lost key, auto remote control and the provision of any additional key and any locksmith's charge where any key is mislaid or lost. Biggin & Scott Seaford does not guarantee that it holds a spare set of keys to the Premises at its offices.

43. Extra Keys

The Renter acknowledges that should the Renter wish to order any extra key, auto remote control or other access device for the Premises it will be at the expense of the Renter. The Renter acknowledges that copies of all keys/auto remote controls and access devices must be returned to Biggin & Scott Seaford at the end of the tenancy without reimbursement.

44. Floor Protection

If the Premises include polished floorboards/floating floor, it shall be the responsibility of the Renter to fit floor protectors to all items of furniture to protect the floorboards from scratching. Stiletto shoes must not be worn at any time by any occupant and/or invitee of the Renter throughout the tenancy to prevent indentation being caused to the floors.

45. Changing Locks

The Renter may change any lock security alarm code and/or other security device at the Premises. If the Renter changes any lock security alarm code and/or other security device, the Renter must give the Rental Provider or Biggin & Scott Seaford a duplicate key and/or new security alarm code and/or other access device as soon as practicable.

46. Comply with Insurance

Subject to the Renter having been provided with a copy of any insurance policy maintained by the Rental

Provider, the Renter must not knowingly do or allow anything to be done at the Premises that may invalidate any insurance policy or result in the premium being increased above the normal rate. For the avoidance of doubt the Rental Provider is responsible for payment of insurance, and nothing in this clause requires the Renter to take out or pay for any insurance.

47. No Invalidating Insurance

The Renter shall not do or allow anything to be done which would invalidate any insurance policy on the Premises or increase the premium including (but not limited to) the storage of flammable liquids or the use of any kerosene or oil burning heater at the Premises. For the avoidance of doubt the Rental Provider is responsible for payment of insurance, and nothing in this clause requires the Renter to take out or pay for any insurance.

48. Protection Against Damage

The Renter must take reasonable measures so that anyone that the Renter has allowed or permitted to be at the Premises does not cause damage to the Premises. This obligation shall not extend to the Rental Provider or Biggin & Scott Seaford or their respective contractors.

49. Shared Services

The Renter shall not do or allow to be done anything at the Premises that will cause the shared service facilities including (but not limited to) any driveway, lift or stairwell to become obstructed, untidy, damaged or used for any purpose other than for which it may be intended.

50. No Servicing Vehicles

The Renter must not service or repair or allow the service or repair of any motor vehicle, motorcycle, boat or caravan at the Premises except minor routine maintenance and cleaning, other than greasing and changing oil.

51. Report Damage or Injury

The Renter shall notify Biggin & Scott Seaford immediately in writing on becoming aware of any damage to or defects in the Premises or breakdown of facilities, whether or not it might injure a person or cause damage to the Premises.

52. Notify Blockages

The Renter must as soon as practicable notify the Rental Provider or Biggin & Scott Seaford of any blockage or defect in any drain, water service or sanitary system. No item that could cause a blockage including (but not limited to) any feminine hygiene product, disposable nappy or excessive amounts of toilet paper may be flushed down the sewerage septic stormwater or drainage systems. The Renter must pay the Rental Provider all reasonable expenses that are incurred in rectifying any defect or blockage that may be caused by the Renter or a person that the Renter has allowed or permitted to be at the Premises. This obligation shall not extend to any defect or blockage caused by the Rental Provider or Biggin & Scott Seaford or their respective contractors.

53. Alterations

The Renter shall not paint or affix any sign or any antenna or cabling onto the Premises without the prior written consent of the Rental Provider. The consent of the Rental Provider will not be unreasonably withheld. The consent of the Rental Provider may be made subject to any reasonable condition including (but not limited to) removal of the thing affixed when the tenancy is terminated. The Renter's rights and obligations in relation to modifications are set out in Part D, Item 22 of this Agreement. The Rental Provider may require the Renter to remove such items affixed and make good any damage caused by such removal.

54. Rubbish

The Renter shall deposit all rubbish including any carton and newspaper in a proper rubbish receptacle with a close fitting lid as required by the local council. Such rubbish receptacle shall be kept only in the place provided and placed out by the Renter for collection and returned to its allotted place in accord with local council by-laws and/or good practice.

55. Pests

The extermination of all pests including (but not limited to) any rat, cockroach, mouse, flea, ant or other pest that may infest the Premises is considered an urgent repair and shall be dealt with in accordance with Part D, Item 25 of this Agreement.

56. Hanging Clothes

The Renter shall not hang any clothes outside the Premises other than where provision for the hanging of clothes has been provided. The Renter must use any clothes drying facilities in the manner required by the Rental Provider or any owner's corporation.

57. Replace Light Globes

The Renter shall, at the Renter's expense, replace with a similar type style and feature/attribute any lighting tube, globe and down-light (including any starter ballast or transformer) at the Premises which become defective during the term or any extension of this Agreement unless the defect is proven to be caused by faulty wiring or a defective fitting.

58. Smoke Free Zone

The Renter acknowledges that the Premises are a 'Smoke Free Zone' and the Renter will ensure that the Renter and any invitees do not smoke inside the Premises.

59. Payment of Rental

All payments of Rental shall be made without demand by or on behalf of the Rental Provider and on time. No part payment will be accepted. All payments of Rental are to be made by the method advised in Item 8 in Part B of this Agreement or as notified in writing by Biggin & Scott Seaford from time to time.

60. Rental Increase

If the Renter disagrees with a Rental increase sought by the Rental Provider, the Renter may apply to the Director of Consumer Affairs Victoria for an investigation, provided the application to the Director of Consumer Affairs Victoria is made within 30 days after the notice of the Rental increase is given by or on behalf of the Rental Provider.

61. Maintain Garden

The Renter must maintain any garden at or adjacent to the Premises including the mowing and edging of any lawn, light trimming/pruning of small trees, shrubs and taking care of plants. Garden beds, paths and paving are to be maintained by the Renter in a neat and tidy condition, free of weeds and so far as is reasonably possible, free of garden pests and properly watered. When watering any garden, the Renter must comply with any government watering restrictions in place, from time to time. It is the responsibility of the Renter to maintain any water feature/fountain or pond at the Premises. The Renter must maintain the water quality and keep the water feature/fountain or pond clean as per the Condition Report at the commencement of the tenancy and taking into account fair wear and tear.

62. Watering System

If any garden is watered by a watering system and/or via any tank water, the Renter must maintain the system and/or tank in the state of repair and condition it was in at the start of this Agreement (fair wear and tear excepted). The Renter is not required to repair damage to the watering system caused by the Rental Provider, Biggin & Scott Seaford or their contractors.

63. Rental Provider Repairs

The Renter acknowledges that the Premises may require maintenance during the tenancy due to unforeseen acts of nature, wear and tear or other causes. Should this occur, the Rental Provider will use best endeavours to rectify any damage in a timely manner and in conjunction with any insurer and/or tradespeople appointed by any insurer. The Renter agrees to allow the Rental Provider or any tradespeople reasonable access to carry out any such repairs.

The Rental Provider must ensure that the Premises are provided and maintained in good repair. If there is a need for an urgent repair the Renter must notify Biggin & Scott Seaford in writing.

64. Urgent Repairs

The Renter acknowledges that Biggin & Scott Seaford is authorised to attend to urgent repairs to a maximum of \$2,500.00 (including GST) and the Renter agrees to use all reasonable efforts to contact Biggin & Scott Seaford during business hours or after hours information service on 03 9785 3888 or Biggin & Scott Seaford approved after hours emergency tradespeople before any urgent repairs are completed. Please refer to the booklet 'Renting a Home - A guide for Renters' as provided for classification of urgent repairs.

65. Vehicle Parking

The Renter shall not park or allow any vehicle to be parked on the Premises or in any garage facilities made

available for use by the Renter as part of this Agreement which leaks oil unless a suitable oil drip tray is provided. No visitor cars are permitted to be parked at the Premises unless any dedicated visitor parking is provided by the Rental Provider or any owner's corporation. The Renter acknowledges that if the Premises are advertised without any off-street parking being made available, it shall be the responsibility of the Renter to enquire with the local council whether any parking permit is required for on-street parking in the vicinity of the Premises and/or otherwise make independent arrangements for the parking of any motor vehicle.

66. Pets

The Renter must not keep any animal, bird, or other pet at the Premises without first obtaining the written permission of the Rental Provider or Biggin & Scott Seaford. Permission will not be unreasonably withheld. In giving permission, the Rental Provider or Biggin & Scott Seaford may impose reasonable conditions. It is not unreasonable for the Rental Provider or Biggin & Scott Seaford to withhold permission if the rules of an owner's corporation prohibit pets being on common property or kept on the Premises. If an occupant of the Premises is blind, permission will not be required for the occupant to have a trained guide dog at the Premises (unless permission must be obtained from an owner's corporation). To seek the written permission of the Rental Provider or Biggin & Scott Seaford to keep a pet at the Premises the Renter must complete and provide a pet request form.

67. Pools and Water Features

The Renter must not install any pool, spa, pond or any other water retaining device (either inflatable or constructed) at the Premises without the express written permission of the Rental Provider. The Renter also agrees that should any such permission be granted it will be conditional on the Renter obtaining and providing evidence to the Rental Provider, of compliance with Council or any other regulations relating to pool installation or pool fencing requirements prior to the installation taking place.

68. Rental Provider Entry

Subject to compliance with the Act, the Rental Provider or Biggin & Scott Seaford has the right to enter the Premises:

- To carry out duties specified in this Agreement, or the Act or any other legislation or law;
- To value the Premises or any property of which the Premises form part, provided that at least 7 days' written notice has been given to the Renter;
- At any time between 8am and 6pm on any day (except a public holiday), for the purposes of showing prospective buyers or financial lenders through the Premises, provided that at least 48 hours' written notice has been given to the Renter;
- At any time between 8am and 6pm on any day (except a public holiday), for the purposes of showing prospective new renters through the Premises provided that at least 48 hours' written notice has been given to the Renter (and provided that such entry occurs in the period that is within 21 days before the termination date specified in the notice to vacate or notice of intention to vacate and otherwise subject to the requirements of the Act);
- To verify a reasonable belief that the Renter or any occupier may not have met any duties as a Renter of the Premises, provided that at least 24 hours' written notice has been given to the Renter;
- To make one general inspection provided that entry for that purpose has not been made within the last 6 months, and provided further that at least 7 days' written notice has been given to the Renter.

69. Assignment and Sub-Letting

If during the term of the tenancy the people in occupation of the Premises change -

The Renter must as soon as practicable notify the Rental Provider or Biggin & Scott Seaford in writing and comply with clause 27 in Part D of this Agreement.

The Renter acknowledges that the Renter will be required to reimburse the Rental Provider or Biggin & Scott Seaford for any cost or charge incurred in preparing a written transfer of this Agreement in accord with the fees within the Rental Provider's appointment of Biggin & Scott Seaford as agent to manage the Premises.

70. Rental Provider Notice

If the Rental Provider requires possession of the Premises when the tenancy ends, the Rental Provider will give the Renter the notice required by and in the manner prescribed by the Act.

71. Renter Notice

If the Renter wishes to vacate the Premises at the expiration of this Agreement the Renter must give the Rental Provider written notice of the intention of the Renter to vacate at least 28 days prior to the expiration of this Agreement.

72. Periodic Tenancy

If the Renter remains in occupation of the Premises after the expiration of this Agreement and does not enter into a new fixed term Agreement the tenancy reverts to a periodic tenancy such that the Renter must give written notice of the intention of the Renter to vacate the Premises specifying a termination date that is not earlier than 28 days after the day on which the Renter gives written notice.

73. Rental Provider Expenses

If the Renter decides to vacate the Premises during the term of this Agreement for whatever reason, the Renter shall be responsible for reimbursing to the Rental Provider or Biggin & Scott Seaford the following costs:

1. A pro rata letting fee;
2. Marketing costs as incurred by Biggin & Scott Seaford;
\$290.00 for advertising & \$80 for professional photos if needed
3. National tenancy database checks on each applicant or as required;
4. The continued payment of Rental until the first to occur of the Premises being relet or the current term of this Agreement expiring;
5. If the Premises are relet at a lower Rental, the Renter must pay to the Rental Provider any difference or shortfall as required for the unexpired portion of the term of this agreement subject to legal requirements.

74. Return Keys

The Renter acknowledges that it is the responsibility of the Renter on the termination of this Agreement to deliver all keys and any auto remote controls for the Premises to Biggin & Scott Seaford during business hours and to continue paying Rental until such time as all keys and auto remote controls are delivered.

75. No Set-Off

The Renter acknowledges that pursuant to the Act, the Renter cannot refuse to pay Rental on the grounds that the Renter intends to regard any part of the Bond as rent paid by the Renter. The Renter acknowledges that failure to comply with the Act may render the Renter liable to a penalty.

76. Remove Personal Property

The Renter shall be responsible for the removal of any furniture, fitting, personal property, motorcycle, car or boat spare parts or any other equipment at the termination of the tenancy, and shall reinstate the Premises or the land on which it is situated to the condition which existed at the commencement of the tenancy subject only to fair wear and tear.

77. Window Cleaning

If required in order to return the Premises to the state evidenced in the condition report or if otherwise required due to the size, location or inaccessibility of the windows at the Premises, the Renter agrees to have all windows at the Premises cleaned (both internally and externally) in a professional manner at the Renter's own cost immediately prior to vacating the Premises and taking into account fair wear and tear.

78. Carpet Cleaning

If required in order to return the Premises to the state evidenced in the condition report, the Renter will at the termination of the tenancy (whatever the cause of the termination might be) arrange for the carpet or rugs in the Premises to be professionally steam cleaned or dry cleaned (at the direction of the Rental Provider) by a reputable carpet cleaning contractor at the Renter's own cost and provide Biggin & Scott Seaford with an invoice/receipt for such work. The cleanliness of the carpet as stated on the ingoing condition report completed at the commencement of the tenancy will be taken into consideration in assessing the quality or outcome of such cleaning and taking into account fair wear and tear.

79. Definitions and Interpretation

All terms used in this Agreement shall have the meanings given to them in the Schedule which shall form part of this Agreement and Act means Residential Tenancies Act 1997 including any subordinate regulations and

Schedule means the schedule to this Agreement and Agreement means this document incorporating the Schedule and all attachments to this document.

80. Electronic Notices

The Renter acknowledges that the Renter is entering into a binding Agreement if this Agreement is signed utilising an electronic signature. Unless indicated to the contrary in the Item 9 of Part B of this Agreement, the Renter consents to the electronic service of notices and other documents in accord with the requirements of the Electronic Transactions (Victoria) Act 2000. The Rental Provider consents to the electronic service of notices and other documents in accord with the requirements of the Electronic Transactions (Victoria) Act 2000 at the email address of Biggin & Scott Seaford. If the Renter has not consented to the electronic service of notices and other documents in accord with the requirements of the Electronic Transactions (Victoria) Act 2000 the Rental Provider shall not infer consent to the electronic service from the receipt or response to emails or other electronic communications.

81. Change of Electronic Address

The Rental Provider and the Renter must give immediate written notice to the Other Party and Biggin & Scott Seaford if the email address for the electronic service of Notices or other documents is changed or any other contact details are changed.

82. Withdraw Consent

The Renter may withdraw consent to the electronic service of notices or other documents by giving written notice to the Rental Provider or Biggin & Scott Seaford but such notice shall only become effective on receipt by the Rental Provider or Biggin & Scott Seaford.

83. Furnishings

If the Premises are let fully furnished or semi-furnished the Renter acknowledges that any furniture, fittings and chattels included in the Premises are listed in an attachment to this Agreement or in the Condition Report and the Renter further acknowledges that all such items are in good condition as at the date of this Agreement unless specifically noted to the contrary.

84. Care for Furnishings

The Renter agrees to care for and maintain any items of furniture, fittings and chattels leased with the Premises during the tenancy and deliver them to the Rental Provider at the end of the tenancy in the same condition as at the Commencement Date (fair wear and tear excepted). The Renter must follow any care or manufacturer's instruction manuals provided to properly care for any such furniture fittings and chattels leased with the Premises.

85. Repair/Replacement of Furnishings

At the end of the tenancy, the Renter must replace with items of equivalent quality features functionality and condition any of the items of furniture fittings and chattels leased with the Premises which have been damaged destroyed or rendered inoperable/useful during the term of this Agreement (fair wear and tear excepted).

86. Cost of Repairs/Replacements

The Renter acknowledges that the Renter may be liable for any repairs or maintenance costs to any furniture fittings and chattels leased with the Premises if the Renter has failed to comply with any manufacturer's recommendations if it results in loss or damage to any item of furniture fittings or chattels leased with the Premises.

87. Owners Corporation

A copy of the rules of any Owner's Corporation affecting the Premises are attached to this Agreement. The Renter must comply with the rules of the owner's corporation or any amending/superseding rules, a copy of which are provided to the Renter. The Renter is not obliged to contribute to owner's corporation capital costs or other owner's corporation expenses that would but for this clause be payable by the Rental Provider.

1. Rent will increase to \$1629 commencing on 01/02/2023.

Privacy Collection Notice

As professional property managers **Biggin & Scott Seaford** collects personal information about you. To ascertain what personal information we have about you, you can contact us on: 03 9785 3888

Primary Purpose

As professional property managers, **Biggin & Scott Seaford** collect your personal information to assess the risk in providing you with the lease / tenancy of the **Premises** you have requested, and if the risk is considered acceptable, to provide you with the lease / tenancy of the **Premises**.

To carry out this role, and during the term of your tenancy, we usually disclose your personal information to:

- The **Rental Provider**
- The **Rental Provider's** lawyers
- The **Rental Provider's** mortgagee
- Referees you have nominated
- Organisations / Tradespeople required to carry out maintenance to the **Premises**
- Third party organisations required to provide **Biggin & Scott Seaford** services
- Rental Bond Authorities
- Residential Tenancy Tribunals / Courts
- Collection Agents
- National Tenancy Database Pty Ltd (ABN 65 079 105 025 ("ntd"))
- Other Real Estate Agents, **Rental Providers** and Valuers

Secondary Purpose

Biggin & Scott Seaford also collect your personal information to:

- Enable us, or the **Rental Provider's** lawyers, to prepare the lease / tenancy documents for the **Premises**.
- Allow organisations / tradespeople to contact you in relation to maintenance matters relating to the **Premises**.
- Pay / release rental bonds to / from Rental Bond Authorities (where applicable).
- Refer to Tribunals, Courts and Statutory Authorities (where necessary).
- Refer to Collection Agent / Lawyers (where default / enforcement action is required).
- Provide confirmation details for organisations contacting us on your behalf i.e. Banks, Utilities

(Gas, Electricity, Water, Phone), Employers, etc.

If your personal information is not provided to us and you do not consent to the uses to which we put your personal information, **Biggin & Scott Seaford** cannot properly assess the risk to our client, or carry out our duties as professional property managers. Consequently, we then cannot provide you with the lease / tenancy of the **Premises**. You also acknowledge that our related financial services company may contact you from time to time to explain other services that this company may be able to provide.

Our privacy policy contains information about how you may access the personal information we hold about you, including information about how to seek correction of such information. We are unlikely to disclose any of your personal information to overseas recipients.

The **Biggin & Scott Seaford** privacy policy contains information about how you may complain about an alleged breach of the Australian Privacy Principles, and how we will deal with such a complaint.

The **Biggin & Scott Seaford** privacy policy can be viewed without charge on the **Biggin & Scott Seaford** website; or contact your local **Biggin & Scott Seaford** office and we will send or email you a free copy.

Disclaimer

Biggin & Scott Seaford its directors partners employees and related entities responsible for preparing this **Agreement** believe that the information contained in this **Agreement** is up to date and correct. However no representation or warranty of any nature can be given intended or implied and the **Rental Provider** and the **Renter** should rely on their own enquiries as to the accuracy of any information or material incorporated in this **Agreement**. The law is subject to change without notice and terms and conditions in this **Agreement** may be amended as a result. **Biggin & Scott Seaford** disclaims all liability and responsibility including for negligence for any direct or indirect loss or damage suffered by any person arising out of any use and/or reliance on this **Agreement** or any information incorporated in it.

Signatures

This agreement is made under the Act.

Before signing you must read **Part D – Rights and obligations** of this form.

Rental Provider

Rental Provider : **Bekim Qaniu**



Signed at Wed, 30/11/2022 18:29 , from device: iOS 16.0.3 iPhone Mobile Safari 16.0

Renter(s)

Renter : **Alexandria Jane Schmidt**



Signed at Wed, 30/11/2022 04:33 , from device: Android 12 Samsung SM-G988B Chrome Mobile 107.0.0

AUDIT TRAIL

Alexandria Jane Schmidt (Renter)

- Wed, 30/11/2022 04:28 - Alexandria Jane Schmidt clicked 'start' button to view the Residential Rental Agreement (Android 12 Samsung SM-G988B Chrome Mobile 107.0.0, IP: 175.38.58.141)
- Wed, 30/11/2022 04:33 - Alexandria Jane Schmidt signed the Residential Rental Agreement (Android 12 Samsung SM-G988B Chrome Mobile 107.0.0, IP: 175.38.58.141)
- Wed, 30/11/2022 04:33 - Alexandria Jane Schmidt submitted the Residential Rental Agreement (Android 12 Samsung SM-G988B Chrome Mobile 107.0.0, IP: 175.38.58.141)

Bekim Qaniu (Rental Provider)

- Wed, 30/11/2022 18:25 - Bekim Qaniu clicked 'start' button to view the Residential Rental Agreement
- Wed, 30/11/2022 18:29 - Bekim Qaniu signed the Residential Rental Agreement
- Wed, 30/11/2022 18:29 - Bekim Qaniu submitted the Residential Rental Agreement

AGREEMENT END

Due Diligence Checklist

What you need to know before buying a residential property

Before you buy a home, you should be aware of a range of issues that may affect that property and impose restrictions or obligations on you, if you buy it. This checklist aims to help you identify whether any of these issues will affect you. The questions are a starting point only and you may need to seek professional advice to answer some of them. You can find links to organisations and web pages that can help you learn more, by visiting consumer.vic.gov.au/duediligencechecklist.

Urban living

Moving to the inner city?

High density areas are attractive for their entertainment and service areas, but these activities create increased traffic as well as noise and odours from businesses and people. Familiarising yourself with the character of the area will give you a balanced understanding of what to expect.

Is the property subject to an owners corporation?

If the property is part of a subdivision with common property such as driveways or grounds, it may be subject to an owners corporation. You may be required to pay fees and follow rules that restrict what you can do on your property, such as a ban on pet ownership.

Growth areas

Are you moving to a growth area?

You should investigate whether you will be required to pay a growth areas infrastructure contribution.

Flood and fire risk

Does this property experience flooding or bushfire?

Properties are sometimes subject to the risk of fire and flooding due to their location. You should properly investigate these risks and consider their implications for land management, buildings and insurance premiums.

Rural properties

Moving to the country?

If you are looking at property in a rural zone, consider:

- Is the surrounding land use compatible with your lifestyle expectations? Farming can create noise or odour that may be at odds with your expectations of a rural lifestyle.

- Are you considering removing native vegetation? There are regulations which affect your ability to remove native vegetation on private property.
- Do you understand your obligations to manage weeds and pest animals?
- Can you build new dwellings?
- Does the property adjoin crown land, have a water frontage, contain a disused government road, or are there any crown licences associated with the land?

Is there any earth resource activity such as mining in the area?

You may wish to find out more about exploration, mining and quarrying activity on or near the property and consider the issue of petroleum, geothermal and greenhouse gas sequestration permits, leases and licences, extractive industry authorisations and mineral licences.

Soil and groundwater contamination

Has previous land use affected the soil or groundwater?

You should consider whether past activities, including the use of adjacent land, may have caused contamination at the site and whether this may prevent you from doing certain things to or on the land in the future.

Land boundaries

Do you know the exact boundary of the property?

You should compare the measurements shown on the title document with actual fences and buildings on the property, to make sure the boundaries match. If you have concerns about this, you can speak to your lawyer or conveyancer, or commission a site survey to establish property boundaries.

Planning controls

Can you change how the property is used, or

the buildings on it?

All land is subject to a planning scheme, run by the local council. How the property is zoned and any overlays that may apply, will determine how the land can be used. This may restrict such things as whether you can build on vacant land or how you can alter or develop the land and its buildings over time.

The local council can give you advice about the planning scheme, as well as details of any other restrictions that may apply, such as design guidelines or bushfire safety design. There may also be restrictions – known as encumbrances – on the property's title, which prevent you from developing the property. You can find out about encumbrances by looking at the section 32 statement.

Are there any proposed or granted planning permits?

The local council can advise you if there are any proposed or issued planning permits for any properties close by. Significant developments in your area may change the local 'character' (predominant style of the area) and may increase noise or traffic near the property.

Safety

Is the building safe to live in?

Building laws are in place to ensure building safety. Professional building inspections can help you assess the property for electrical safety, possible illegal building work, adequate pool or spa fencing and the presence of asbestos, termites, or other potential hazards.

Building permits

Have any buildings or retaining walls on the property been altered, or do you plan to alter them?

There are laws and regulations about how buildings and retaining walls are constructed,

which you may wish to investigate to ensure any completed or proposed building work is approved. The local council may be able to give you information about any building permits issued for recent building works done to the property, and what you must do to plan new work. You can also commission a private building surveyor's assessment.

Are any recent building or renovation works covered by insurance?

Ask the vendor if there is any owner-builder insurance or builder's warranty to cover defects in the work done to the property.

Utilities and essential services

Does the property have working connections for water, sewerage, electricity, gas, telephone and internet?

Unconnected services may not be available, or may incur a fee to connect. You may also need to choose from a range of suppliers for these services. This may be particularly important in rural areas where some services are not available.

Buyers' rights

Do you know your rights when buying a property?

The contract of sale and section 32 statement contain important information about the property, so you should request to see these and read them thoroughly. Many people engage a lawyer or conveyancer to help them understand the contracts and ensure the sale goes through correctly. If you intend to hire a professional, you should consider speaking to them before you commit to the sale. There are also important rules about the way private sales and auctions are conducted. These may include a cooling-off period and specific rights associated with 'off the plan' sales. The important thing to remember is that, as the buyer, you have rights