Contract of Sale of Land

Property:

2145 Steiglitz Road, Maude VIC 3331

Alison Watson Property Conveyancing

Tel: 0404 508 826
PO Box 345, Lara VIC 3212
Ref: AW:969638

Contract of Sale of Land

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

WARNING TO ESTATE AGENTS
DO NOT USE THIS CONTRACT FOR SALES OF 'OFF THE PLAN' PROPERTIES
UNLESS IT HAS BEEN PREPARED BY A LEGAL PRACTITIONER

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: **Grant Thomas Stripling**

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: First National Real Estate

Address: 19 Milton Street, Bannockburn VIC 3331

Email: owen@goldenplainsfn.com.au

Tel: 0417365607 Mob: 0417365607 Fax: Ref: Owen Sharkey

Vendor

Name: Grant Thomas Stripling

Address: 2145 Steiglitz Road, Maude VIC 3331

Vendor's legal practitioner or conveyancer

Name: Alison Watson Property Conveyancing

Address: PO Box 345, Lara VIC 3212

Email: awconveyancing@outlook.com

Tel: 0404 508 826 Mob: Fax: Ref: 969638

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	10672	Folio	064	1	TP 811993R

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: 2145 Steiglitz Road, Maude VIC 3331

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

.....

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) – NOT APPLICABLE WITH AUCTION CONTRACT

☐ 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

1. Purchaser acknowledgements

The purchaser acknowledges that they are purchasing the property as a result of their own enquiries and inspection and not relying upon any representation made by the vendor or any other person on the vendor's behalf:

1.1 in its present condition and state of repair including any rubbish and/or building materials on the property;

1.2 subject to all faults, defects and contamination (if any) whether latent and patent;

1.3 subject to any infestations and dilapidation;

1.4 subject to all existing water, sewerage, drainage and plumbing services and connections in respect of the property;

1.5 subject to any misdescription, inaccuracy or measurements of the property;

1.6 subject to any failure to comply with any regulations, laws or requirements by any authority;

1.7 subject to any improvements not being erected within the boundaries in respect of any building and improvements on the land;

1.9 subject to any encumbrances, easements, covenants (including positive covenants) or like restrictions imposed on the land or its use and disclosed in the vendor's statement including any caveat that exists in relation to such restrictions, excluding any mortgage; and

1.10 subject to any fences, as they are whether on the correct boundary lines or not and whether give and take fences and in their present condition and state of repair. The vendor is under no obligation to fence or repair fencing before completion. The purchaser agrees not to seek to terminate rescind or make any objection requisition or claim for compensation arising out of any of the matters covered by this clause.

2. Directors Guarantee

If the purchaser is a corporate entity then the directors signing on behalf of the purchaser shall execute a guarantee. The purchaser shall be obliged to obtain the execution of the guarantee and deliver same to the agent or the vendors legal practitioner within 14 days of signing the contract. Should the purchaser fail to obtain the execution of the guarantee in the time stipulated then such failure shall be deemed to be a breach of this contract and shall entitle the vendor to exercise all its remedies given to the vendor under the contract.

3. Purchase in unequal shares

3.1 If there is more than one purchaser, it is the purchaser's responsibility to ensure the contract correctly records the proportion in which each purchaser will hold the property as at the date of settlement.

3.2 If the proportion recorded on the transfer differ from the contract, it is the purchaser's responsibility to pay any additional duty which may be assessed as a result of the variation.

3.3 The purchaser will fully indemnify the vendor, the vendor's agent and the vendors legal which may be made against any or all of them in relation to any additional duty payable as a result of the proportions being different in the contract and transfer.

3.4 This condition will not merge on completion.

4. Default

If the purchaser defaults in any of the terms and conditions of this contract, and the vendor serves on the purchaser any notice pursuant to the provisions of this contract relating to that default, the purchaser does not rectify the default until:

4.1 the remedy by the purchaser of the relevant default or, if the default is incapable of remedy, full and proper compensation is paid to the vendor in satisfaction of all loss and damage suffered by the vendor; and

4.2 the purchaser pays all costs and expenses incurred by the vendor as a result of the default including, without limitation:

(a) legal costs on a lawyer client basis and disbursements incurred in drawing and giving the notice

(b) all costs, charges, expenses and damages which are incurred or suffered by the vendor arising from any default in payment of the money overdue or from any other breach or failure by the purchaser to observe any of the terms and conditions of this contract; and

(c) all additional costs incurred by the vendor including, without limitation, accommodation expenses, interest on any existing mortgage registered over the property, discount on bills and borrowing expenses in relation to this property or any other property (including the costs on bridging finance) now or later purchased by the vendor in anticipation of or reliance upon this contract; and

4.3 the purchaser pays interest calculated in accordance with Special Condition 5.

5. Default Interest

If the purchaser breaches this Contract, without limiting any other rights or remedies the vendor may have against the purchaser, the purchaser must pay interest on any money owing under the Contract during the period of default, calculated at the rate of four percent (4%) above the rate for the time being fixed under Section 2 of the *Penalty Interest Rates Act 1983 (Vic).*

6. Reschedule settlement date

Without limiting any other rights of the Vendor, if the Purchaser fails to settle on the due date for settlement as set out in the particulars of sale to this Contract (Due Date) or requests an extension to the Due Date, the Purchaser must pay to the Vendor's solicitors an amount of $300 plus GST representing a contribution to the Vendor's additional legal cost and disbursements.

7. Service of Rescission Notice

Without limiting any other rights of the vendor, the purchaser agrees that the reasonable costs of each and every default notice prepared and served on the purchaser or his representative is $900. The default sum shall be payable at settlement to the vendor's solicitor.

8. Adjustments

8.1 The purchaser must provide correct statement of adjustments to the vendors conveyancer five (5) business days prior to settlement together with all current certificates obtained by the purchaser's legal representative and other information used to calculate the outgoings, rent and other income received in respect of the property. The vendor is not obliged to provide cheque directions to the purchaser until this condition has been complied with. If the purchaser does not comply with the above clause:

(a) the purchaser is in default under the contract;

(b) the vendor is not obligated to settle until five business days after the date on which the purchaser delivers correct statement of adjustments to the vendors legal practitioner; and

(c) the purchaser must pay interest calculated in accordance with Special Condition 4 on any money owing under the Contract from the settlement date until this Contract is completed.

8.2 Notwithstanding any other condition or provision contain in this Contract, any Land Tax liability attached to or as a charge on the property is to remain the Vendor's responsibility. The Vendor shall pay the full amount of Land Tax (by deduction) at settlement, and there will be no adjustment of this amount whatsoever between the parties at settlement.

9. GST Notice

The vendor gives notice to the purchaser that 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)* and any withholding of GST does not apply.

10. Restriction

The property is sold subject to any restrictions as to the use and development imposed by law or by any Authority with power under any legislation to control the use and development of the land. Any such restrictions shall not constitute a defect in title or a matter of title or effect the validity of this contract and the purchaser shall not make any requisition or objection or claim or be entitled to compensation or damages from the vendor in respect thereof.

11. Nomination

11.1 The purchaser may, at least 14 days before the due date for settlement, nominate a substitute or additional transferee. If the purchaser wishes to so nominate, the purchaser must deliver to the vendor's representative a completed and executed notice of nomination in which the purchaser and the nominee agree to be bound by this contract and otherwise in a form acceptable to the Vendor.

11.2 If the nominee is or includes a proprietary company, the Guarantee and Indemnity executed by that company's directors. If the nominee is a company, the Guarantee and Indemnity duly executed by each of the directors of the nominee.

11.3 If the Purchaser nominates a Trust, the Guarantee and Indemnity executed by the primary beneficiaries of the Trust and the directors of any corporate trustee simultaneously with the provision of the nomination documents.

11.4 The Nominee must allow the amount of $300.00 at settlement which represents the costs to obtain advice in relation to compliance with this Special Condition.

12. Conditions

The purchaser acknowledges if there is any inconsistency between the general conditions and the special conditions in this Contract, the special conditions will prevail.

13. Warranties

The purchaser acknowledges that there are no conditions warranties or other matters affecting the sale other than those embodied herein and that no representations or statements of any kind have been made either orally or in writing by the vendor or its agents which induced the purchaser to enter into this contract. The purchaser further acknowledges that the vendor has not nor has anyone on the vendor's behalf made any representation or warranty as to the fitness for any particular purpose or in relation to any other matter in respect to the property sold and the purchaser expressly releases the vendor and/or the vendor's servants or agents from any claim or demands in respect thereof. The purchaser shall not be entitled to rely on any representation alleged to have been made by the vendor or the vendor's agent other than the conditions of the Contract.

15. Special conditions

15.1 The purchaser acknowledges and agrees that any special conditions existing or to be added, amended, deleted or changed in any manner whatsoever shall not be binding without the vendor's prior written consent.

15.2 Each page of the special conditions must be initialled by all parties when executing the contract of sale.

General Conditions

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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 11.4(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 11.14 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

13.1 The vendor must complete a conversion of title in accordance with section 14 of the *Transfer of Land Act* 1958 before settlement if the land is the subject of a provisional folio under section 23 of that Act.

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.

13.8 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, unless the margin scheme applies.

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.

Schedule 2

INFORMATION CONCERNING THE CONDUCT OF PUBLIC AUCTIONS OF LAND
Sale of Land (Public Auctions) Regulations 2014 (Vic) – Schedule 5

Meaning of vendor

The vendor is the person who is selling the property that is being auctioned. There may be more than one vendor. Where there are two or more vendors, they are selling the property as co-owners.

Bidding by co-owners

Where there are two or more vendors of the property, one or some or all of them may bid to purchase the property from their co-owners. The vendor or vendors intending to bid to purchase the property can make these bids themselves, or through a representative, but not through the auctioneer.

Vendor bids

The law of Victoria allows vendors to choose to have bids made for them by the auctioneer. If this is the case, it will be stated as the first rule applying to the auction. However, these bids cannot be made for a co-owner intending to bid to purchase the property from their co-owner or co-owners.

The auctioneer can only make a vendor bid if:

- the auctioneer declares before bidding starts that the auctioneer can make bids on behalf of a vendor, and states how these bids will be made; and
- the auctioneer states when making the bid that it is a bid for the vendors. The usual way for an auctioneer to indicate that the auctioneer is making a vendor bid is to say "vendor bid" in making the bid.

What rules and conditions apply to the auction?

Different rules apply to an auction depending upon whether there are any co-owners intending to bid to purchase the property from their co-owners, and whether vendor bids can be made. The auctioneer must display the rules that apply at the auction.

It is possible that a vendor may choose to have additional conditions apply at the auction. This is only allowed if those additional conditions do not conflict with the rules that apply to the auction or any other legal requirement. The additional conditions are usually contained in the contract of sale.

Copies of the rules

The law requires that a copy of the rules and conditions that are to apply to a public auction of land be made available for public inspection a reasonable time before the auction starts and in any case not less than 30 minutes before the auction starts.

Questions

A person at a public auction of land may ask the auctioneer in good faith a reasonable number of questions about the property being sold, the contract of sale, the rules under which the auction is being conducted and the conduct of the auction.

Forbidden activities at auctions

The law forbids any of the following:

- any person bidding for a vendor other than:
    - the auctioneer (who can only make bids for a vendor who does not intend to purchase the property from their co-owner or co-owners); or

- a representative of a vendor who is a co-owner of the property wishing to purchase the property from their co-owner or co-owners;
- the auctioneer taking any bid that the auctioneer knows was made on behalf of the vendor, unless it is made by a vendor (or their representative) who is a co-owner wishing to purchase the property;
- the auctioneer acknowledging a bid if no bid was made;
- any person asking another person to bid on behalf of the vendor, other than a vendor who is a co-owner engaging a representative to bid for them;
- any person falsely claiming or falsely acknowledging that they made a bid;
- an intending bidder (or a person acting on behalf of an intending bidder) harassing or interfering with other bidders at a public auction of land.

Substantial penalties apply to any person who does any of the things in this list.

Who made the bid?

At any time during a public auction of land, a person at the auction may ask the auctioneer to indicate who made a bid. Once such a request has been made, the auctioneer is obliged by law to comply with such a request before taking another bid.

It is an offence to disrupt an auction

The law forbids an intending bidder or a person acting on behalf of an intending bidder from doing any thing with the intention of preventing or causing a major disruption to, or causing the cancellation of, a public auction of land.

The cooling off period does not apply to public auctions of land

If you purchase a property that has been offered for sale by public auction either at the auction or within 3 clear business days before or after the auction, there is no cooling off period.

What law applies

The information in this document is only intended as a brief summary of the law that applies to public auctions of land in Victoria. Most of the laws referred to in this document can be found in the *Sale of Land Act 1962* or the *Sale of Land (Public Auctions) Regulations 2014*. Copies of those laws can be found at the following web site: www.legislation.vic.gov.au under the title “Victorian Law Today”.

FORM OF GUARANTEE

We _____

of _____

(**Guarantor**)

1 In consideration of the vendor named in the contract of sale of land to which this guarantee and indemnity is annexed (**Contract**) having at my/our request entered into the Contract with the purchaser named in it on the terms and conditions contained in the Contract do jointly and severally covenant with the vendor for ourselves our executors, administrators and personal representatives as follows:

1.1 To indemnify and keep indemnified from and against any and all costs, charges, claims, demands, suits and expenses whatever and however arising out of this guarantee and indemnity.

1.2 If at any time and from time to time the purchaser defaults:

(a) In the payment of money payable by it to the vendor under the Contract; or

(b) In the performance or observance of any term or condition on the part of the purchaser to be performed or observed

to pay to the vendor the whole of the money which is due and payable to the vendor on the same terms and conditions and in the same manner prescribed by the Contract as if I/we were each jointly or severally parties to the Contract and our names were inserted in it in place of the name of the purchaser.

2 I/We jointly and severally declare

2.1 That this guarantee and indemnity is and will be an unconditional and continuing guarantee and indemnity and is not affected or released by:

(a) any waiver neglect or forbearance by the vendor in enforcing payment of any money payable under the Contract by the purchaser or in enforcing the performance or observance of any of the covenants, agreements, obligations and conditions in the Contract to be performed or observed by the purchaser;

(b) any release, variation, exchange, renewal or modification of the Contract or any other dealing by the vendor with the terms of the Contract;

(c) any other guarantee or security which the vendor may hold in respect of the Contract or any judgement obtained by the vendor in relation to the Contract;

(d) the transfer or assignment of the benefit of this guarantee and indemnity to any person in whole or in part;

(e) the failure to give notice to us or our lack of consent before or after the happening of any of the above mentioned acts or events; or

(f) generally the making of any agreement between the vendor and the purchaser.

2.2 That I/we waive our rights whether legal, equitable, statutory or otherwise which may at any time be inconsistent with my/our covenants and declarations or which may in any manner prejudice or limit our rights, remedies or recourse of the vendor against me/us and our executors, administrators and personal representatives.

EXECUTED as a deed.

SIGNED SEALED AND DELIVERED by)
)
in the presence of:) _____

_____
Signature of Witness

_____
Name of Witness [print]

SIGNED SEALED AND DELIVERED by)
)
in the presence of:) _____

_____
Signature of Witness

_____
Name of Witness [print]

Vendor Statement

The vendor makes this statement in respect of the land in accordance with section 32 of the *Sale of Land Act* 1962.

This statement must be signed by the vendor and given to the purchaser before the purchaser signs the contract. The vendor may sign by electronic signature.

The purchaser acknowledges being given this statement signed by the vendor with the attached documents before the purchaser signed any contract.

Land	2145 STEIGLITZ ROAD, MAUDE VIC 3331

Vendor's name	Grant Thomas Stripling	Date / /
Vendor's signature _____		

Purchaser's name		Date / /
Purchaser's signature _____		
Purchaser's name		Date / /
Purchaser's signature _____		

1. FINANCIAL MATTERS

1.1 **Particulars of any Rates, Taxes, Charges or Other Similar Outgoings** (and any interest on them)

(a) ☒ Are contained in the attached certificate/s.

1.2 **Particulars of any Charge** (whether registered or not) imposed by or under any Act to secure an amount due under that Act, including the amount owing under the charge

	To	

Other particulars (including dates and times of payments):

1.3 **Terms Contract**

This section 1.3 only applies if this vendor statement is in respect of a terms contract where the purchaser is obliged to make 2 or more payments (other than a deposit or final payment) to the vendor after the execution of the contract and before the purchaser is entitled to a conveyance or transfer of the land.

Not Applicable

1.4 **Sale Subject to Mortgage**

This section 1.4 only applies if this vendor statement is in respect of a contract which provides that any mortgage (whether registered or unregistered), is NOT to be discharged before the purchaser becomes entitled to possession or receipts of rents and profits.

Not Applicable

1.5 **Commercial and Industrial Property Tax Reform Act 2024 (Vic) (CIPT Act)**

(a) The Australian Valuation Property Classification Code (within the meaning of the CIPT Act) most recently allocated to the land is set out in the attached Municipal rates notice or property clearance certificate or is as follows	AVPC No.
(b) Is the land tax reform scheme land within the meaning of the CIPT Act?	☐ YES ☒NO
(c) If the land is tax reform scheme land within the meaning of the CIPT Act, the entry date within the meaning of the CIPT Act is set out in the attached Municipal rates notice or property clearance certificate or is as follows	Date: OR ☒ Not applicable

2. INSURANCE

2.1 **Damage and Destruction**

This section 2.1 only applies if this vendor statement is in respect of a contract which does NOT provide for the land to remain at the risk of the vendor until the purchaser becomes entitled to possession or receipt of rents and profits.

Not Applicable

2.2 **Owner Builder**

This section 2.2 only applies where there is a residence on the land that was constructed by an owner-builder within the preceding 6 years and section 137B of the Building Act 1993 applies to the residence.

Not Applicable

3. LAND USE

3.1 **Easements, Covenants or Other Similar Restrictions**

(a) A description of any easement, covenant or other similar restriction affecting the land (whether registered or unregistered):

☒ Is in the attached copies of title document/s

(b) Particulars of any existing failure to comply with that easement, covenant or other similar restriction are:

Not Applicable

3.2 **Road Access**

There is NO access to the property by road if the square box is marked with an 'X' ☐

3.3 **Designated Bushfire Prone Area**

The land is in a designated bushfire prone area within the meaning of section 192A of the *Building Act* 1993 if the square box is marked with an 'X' ☒

3.4 **Planning Scheme**

☒ Attached is a certificate with the required specified information.

4. NOTICES

4.1 **Notice, Order, Declaration, Report or Recommendation**

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, being a notice, order, declaration, report, recommendation or approved proposal of which the vendor might reasonably be expected to have knowledge:

☒ Are as follows

None to the vendor's knowledge.

4.2 **Agricultural Chemicals**

There are NO 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. However, if this is not the case, the details of any such notices, property management plans, reports or orders, are as follows:

NIL

4.3 **Compulsory Acquisition**

The particulars of any notices of intention to acquire that have been served under section 6 of the *Land Acquisition and Compensation Act* 1986 are as follows:

NIL

5. BUILDING PERMITS

Particulars of any building permit issued under the *Building Act* 1993 in the preceding 7 years (required only where there is a residence on the land):

☒ Are contained in the attached certificate

6. OWNERS CORPORATION

This section 6 only applies if the land is affected by an owners corporation within the meaning of the *Owners Corporations Act* 2006.

Not Applicable

7. GROWTH AREAS INFRASTRUCTURE CONTRIBUTION ("GAIC")

Words and expressions in this section 7 have the same meaning as in Part 9B of the *Planning and Environment Act* 1987.

Not Applicable

8. SERVICES

The services which are marked with an 'X' in the accompanying square box are NOT connected to the land:

Electricity supply ☒	Gas supply ☐	Water supply ☒	Sewerage ☐	Telephone services ☐

9. TITLE

Attached are copies of the following documents:

9.1 ☒ (a) Registered Title

A Register Search Statement and the document, or part of a document, referred to as the 'diagram location' in that statement which identifies the land and its location.

10. SUBDIVISION

10.1 **Unregistered Subdivision**

This section 10.1 only applies if the land is subject to a subdivision which is not registered.

Not Applicable

10.2 **Staged Subdivision**

This section 10.2 only applies if the land is part of a staged subdivision within the meaning of section 37 of the *Subdivision Act* 1988.

(a) Attached is a copy of the plan for the first stage if the land is in the second or subsequent stage.

(b) The requirements in a statement of compliance relating to the stage in which the land is included that have Not been complied With are As follows:

NIL

(c) The proposals relating to subsequent stages that are known to the vendor are as follows:

NIL

(d) The contents of any permit under the Planning and Environment Act 1987 authorising the staged subdivision are:

NIL

10.3 **Further Plan of Subdivision**

This section 10.3 only applies if the land is subject to a subdivision in respect of which a further plan within the meaning of the *Subdivision Act* 1988 is proposed.

Not Applicable

11. DISCLOSURE OF ENERGY INFORMATION

(Disclosure of this information is not required under section 32 of the Sale of Land Act 1962 but may be included in this vendor statement for convenience.)

Details of any energy efficiency information required to be disclosed regarding a disclosure affected building or disclosure area affected area of a building as defined by the *Building Energy Efficiency Disclosure Act* 2010 (Cth)

(a) to be a building or part of a building used or capable of being used as an office for administrative, clerical, professional or similar based activities including any support facilities; and

(b) which has a net lettable area of at least 1000m²; (but does not include a building under a strata title system or if an occupancy permit was issued less than 2 years before the relevant date):

☒ Are as follows:
Not applicable.

12. DUE DILIGENCE CHECKLIST

(The Sale of Land Act 1962 provides that the vendor or the vendor's licensed estate agent must make a prescribed due diligence checklist available to purchasers before offering land for sale that is vacant residential land or land on which there is a residence. The due diligence checklist is NOT required to be provided with, or attached to, this vendor statement but the checklist may be attached as a matter of convenience.)

Is attached

13. ATTACHMENTS

(Any certificates, documents and other attachments may be annexed to this section 13)

(Additional information may be added to this section 13 where there is insufficient space in any of the earlier sections)

(Attached is an "Additional Vendor Statement" if section 1.3 (Terms Contract) or section 1.4 (Sale Subject to Mortgage) applies)

Register Search Statements
Plan of Subdivision
Building Approval
Land Tax Certificate

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 the Due diligence checklist page on the Consumer Affairs Victoria website (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.

(04/10/2016)

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.

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

VOLUME 10672 FOLIO 064

Security no : 124125724473S
Produced 27/06/2025 11:37 AM

LAND DESCRIPTION

Lot 1 on Title Plan 811993R.
PARENT TITLE Volume 06934 Folio 749
Created by instrument AB366638Y 25/06/2002

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
GRANT THOMAS STRIPLING of 2145 STEIGLITZ ROAD MAUDE VIC 3331
AW630094L 14/03/2023

ENCUMBRANCES, CAVEATS AND NOTICES

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 set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE TP811993R 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)

Street Address: 2145 STEIGLITZ ROAD MAUDE VIC 3331

ADMINISTRATIVE NOTICES

NIL

eCT Control 17566A ALISON WATSON CONVEYANCING
Effective from 14/03/2023

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	**TP811993R**
Number of Pages (excluding this cover sheet)	**2**
Document Assembled	**27/06/2025 11:37**

TITLE PLAN		EDITION 2	TP811993R

Location of Land

Parish: Durdidwarrah
Township:
Section:
Crown Allotment: 44A & 44B (pt)
Crown Portion:

LTO Base Record:
Last Plan Reference:
Title References: Vol 6934 Fol 749
Depth Limitation:

Notations

WATERWAY NOTATION: LAND IN THIS PLAN MAY ABUT CROWN LAND THAT MAY BE SUBJECT TO A CROWN LICENCE TO USE

LOT 1 FORMS PART OF CA 44B

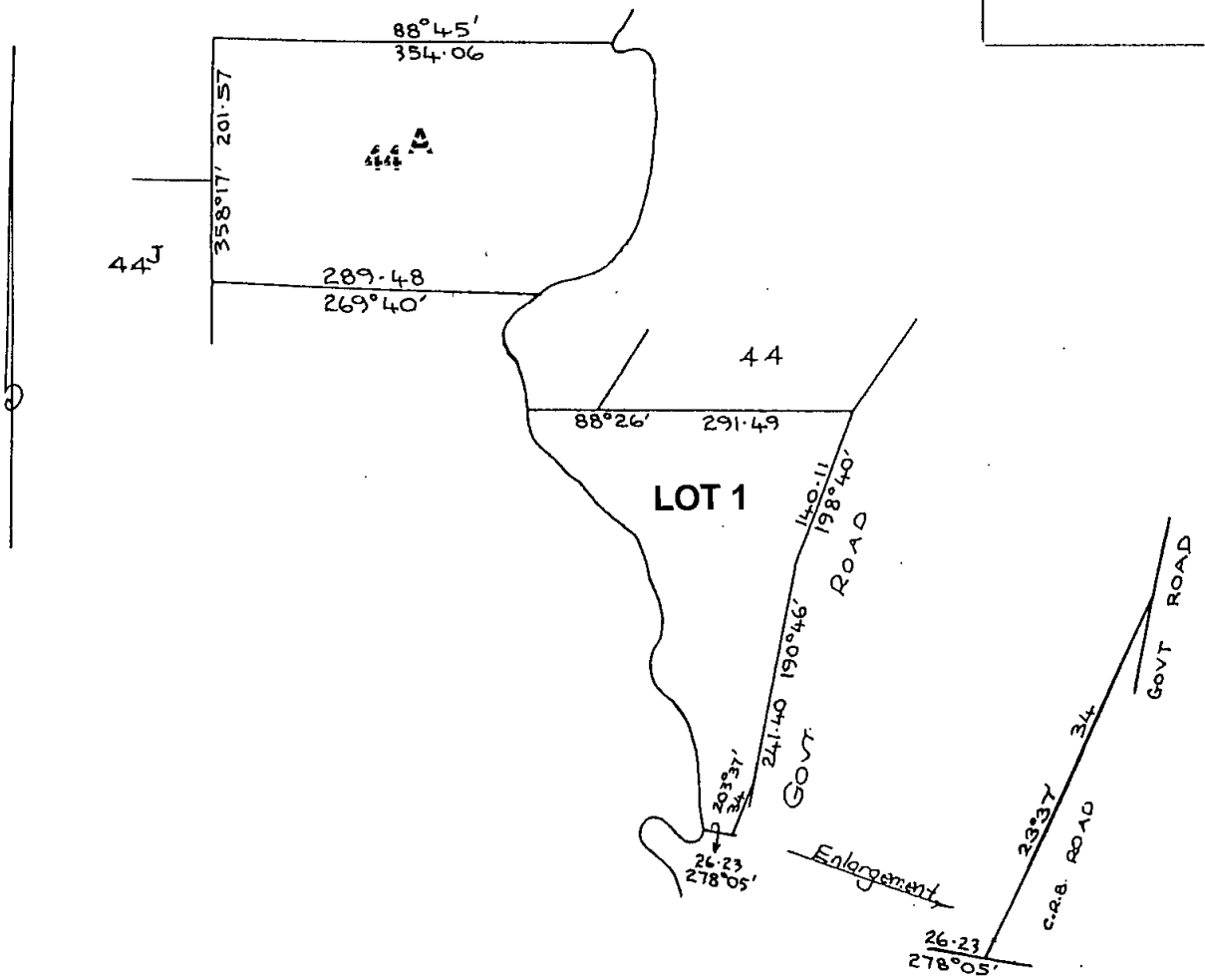
Easement Information

Easement Reference	Purpose / Authority	Width (Metres)	Origin	Land benefited / In favour of

THIS PLAN HAS BEEN PREPARED FOR LAND REGISTRY, LAND VICTORIA FOR TITLE DIAGRAM PURPOSES

Checked by .....

Date 26 / 8 / 2002
Assistant Registrar of Titles



LENGTHS ARE IN METRES	SCALE	SHEET SIZE A3	FILE NO: AB366638Y

LAND VICTORIA MARLAND HOUSE 570 Bourke St. Melbourne - 3000	Drawn By: ALEX MANZELLA	DEALING CODE: 103R10	Sheet 1 of 1

MODIFICATION TABLE

RECORD OF ALL ADDITIONS OR CHANGES TO THE PLAN

PLAN NUMBER

TP811993R

WARNING: THE IMAGE OF THIS PLAN/DOCUMENT HAS BEEN DIGITALLY AMENDED. NO FURTHER AMENDMENTS ARE TO BE MADE TO THE ORIGINAL PLAN/DOCUMENT.

AFFECTED LAND/PARCEL	LAND/PARCEL IDENTIFIER CREATED	MODIFICATION	DEALING NUMBER	DATE	TIME	EDITION NUMBER	ASSISTANT REGISTRAR OF TITLES
LOTS 1 & 2		RESTRUCTURE: LOT 1 ALTERED TO CA 44A AND LOT 2 TO LOT 1	X872200S			2	A.M.

27 June 2025

Alison Watson Conveyancing C/-
Triconvey2 (Reseller) c/o LANDATA
Landata.online@servictoria.com.au

GPSC Ref: PI2504022
Applicant Ref: 77243751-014-7
Property Number: A41400905

Dear Sir/Madam,

ISSUED TO PROPERTY:

Lot 1 2145 Steiglitz Road MAUDE Victoria 3331

With regard to your request for property information, a check of Council's records indicates the following:

- Details of building permits, occupancy permits, certificates of final inspection, notices and orders issued in the preceding 10 years on this property are set out on the following page.

Information supplied in accordance with Regulation 51 of the *Building Regulations 2018,* is provided based on the information contained in records held by Council.

Should you require any further information please contact the Building Services Team on **5220 7111.**

Yours faithfully,

Building Services Team
Golden Plains Shire Council

Enclosed: List of permits issued in the preceding 10 years.
List of current Building Orders/Notices (If applicable)

5220 7111 PO Box 111, Bannockburn VIC 3331 goldenplains.vic.gov.au enquiries@gplains.vic.gov.au

Property address:	Lot 1 2145 Steiglitz Road MAUDE Victoria 3331

Building Permit Number	Relevant Building Surveyor	Description of works	Issue Date	Occupancy Permit / Certificate of Final Inspection date	Regulation 64	Regulation 231

Building Notice/Order Reference Number	Type	Relevant Building Surveyor	Description	Issue Date

Property Clearance Certificate

Land Tax

INFOTRACK / ALISON WATSON CONVEYANCING

Your Reference:	969638
Certificate No:	91978117
Issue Date:	27 JUN 2025
Enquiries:	ESYSPROD

Land Address: 2145 STEIGLITZ ROAD MAUDE VIC 3331

Land Id	Lot	Plan	Volume	Folio	Tax Payable
29624687	1	811993	10672	64	$0.00

Vendor: GRANT STRIPLING

Purchaser: FOR INFORMATION PURPOSES

Current Land Tax	Year	Taxable Value (SV)	Proportional Tax	Penalty/Interest	Total
MR GRANT THOMAS STRIPLING	2025	$570,000	$0.00	$0.00	$0.00

Comments: Property is exempt: LTX Principal Place of Residence.

Current Vacant Residential Land Tax	Year	Taxable Value (CIV)	Tax Liability	Penalty/Interest	Total

Comments:

Arrears of Land Tax	Year	Proportional Tax	Penalty/Interest	Total

This certificate is subject to the notes that appear on the reverse. The applicant should read these notes carefully.

Paul Broderick
Commissioner of State Revenue

CAPITAL IMPROVED VALUE (CIV):	$660,000
SITE VALUE (SV):	$570,000
CURRENT LAND TAX AND VACANT RESIDENTIAL LAND TAX CHARGE:	**$0.00**

Notes to Certificate - Land Tax

Certificate No: 91978117

Power to issue Certificate

1. Pursuant to section 95AA of the *Taxation Administration Act 1997*, the Commissioner of State Revenue must issue a Property Clearance Certificate (Certificate) to an owner, mortgagee or bona fide purchaser of land who makes an application specifying the land for which the Certificate is sought and pays the application fee.

Amount shown on Certificate

2. The Certificate shows any land tax (including Vacant Residential Land Tax, interest and penalty tax) that is due and unpaid on the land described in the Certificate at the date of issue. In addition, it may show:
   - Land tax that has been assessed but is not yet due,
   - Land tax for the current tax year that has not yet been assessed, and
   - Any other information that the Commissioner sees fit to include, such as the amount of land tax applicable to the land on a single holding basis and other debts with respect to the property payable to the Commissioner.

Land tax is a first charge on land

3. Unpaid land tax (including Vacant Residential Land Tax, interest and penalty tax) is a first charge on the land to which it relates. This means it has priority over any other encumbrances on the land, such as a mortgage, and will continue as a charge even if ownership of the land is transferred. Therefore, a purchaser may become liable for any such unpaid land tax.

Information for the purchaser

4. Pursuant to section 96 of the *Land Tax Act 2005*, if a purchaser of the land described in the Certificate has applied for and obtained a certificate, the amount recoverable from the purchaser by the Commissioner cannot exceed the amount set out in the certificate, described as the "Current Land Tax Charge and Vacant Residential Land Tax Charge" overleaf. A purchaser cannot rely on a Certificate obtained by the vendor.

Information for the vendor

5. Despite the issue of a Certificate, the Commissioner may recover a land tax liability from a vendor, including any amount identified on this Certificate.

Apportioning or passing on land tax to a purchaser

6. A vendor is prohibited from apportioning or passing on land tax including vacant residential land tax, interest and penalty tax to a purchaser under a contract of sale of land entered into on or after 1 January 2024, where the purchase price is less than $10 million (to be indexed annually from 1 January 2025, as set out on the website for Consumer Affairs Victoria).

General information

7. A Certificate showing no liability for the land does not mean that the land is exempt from land tax. It means that there is nothing to pay at the date of the Certificate.

8. An updated Certificate may be requested free of charge via our website, if:
   - The request is within 90 days of the original Certificate's issue date, and
   - There is no change to the parties involved in the transaction for which the Certificate was originally requested.

For Information Only

LAND TAX CALCULATION BASED ON SINGLE OWNERSHIP

Land Tax = $2,160.00

Taxable Value = $570,000

Calculated as $1,350 plus ($570,000 - $300,000) multiplied by 0.300 cents.

VACANT RESIDENTIAL LAND TAX CALCULATION

Vacant Residential Land Tax = $6,600.00

Taxable Value = $660,000

Calculated as $660,000 multiplied by 1.000%.

Land Tax - Payment Options

BPAY

Biller Code:5249
Ref: 91978117

Telephone & Internet Banking - BPAY®

Contact your bank or financial institution to make this payment from your cheque, savings, debit or transaction account.

www.bpay.com.au

CARD

Ref: 91978117

Visa or Mastercard

Pay via our website or phone 13 21 61. A card payment fee applies.

sro.vic.gov.au/paylandtax

Property Clearance Certificate

Commercial and Industrial Property Tax

INFOTRACK / ALISON WATSON CONVEYANCING

Your Reference:	969638
Certificate No:	91978117
Issue Date:	27 JUN 2025
Enquires:	ESYSPROD

Land Address:	2145 STEIGLITZ ROAD MAUDE VIC 3331

Land Id	Lot	Plan	Volume	Folio	Tax Payable
29624687	1	811993	10672	64	$0.00

AVPCC	Date of entry into reform	Entry interest	Date land becomes CIPT taxable land	Comment
117	N/A	N/A	N/A	The AVPCC allocated to the land is not a qualifying use.

This certificate is subject to the notes found on the reverse of this page. The applicant should read these notes carefully.

Paul Broderick
Commissioner of State Revenue

CAPITAL IMPROVED VALUE:	$660,000
SITE VALUE:	$570,000
CURRENT CIPT CHARGE:	**$0.00**

Notes to Certificate - Commercial and Industrial Property Tax

Certificate No: 91978117

Power to issue Certificate

1. Pursuant to section 95AA of the *Taxation Administration Act 1997,* the Commissioner of State Revenue must issue a Property Clearance Certificate (Certificate) to an owner, mortgagee or bona fide purchaser of land who makes an application specifying the land for which the Certificate is sought and pays the application fee.

Amount shown on Certificate

2. The Certificate shows any commercial and industrial property tax (including interest and penalty tax) that is due and unpaid on the land described in the Certificate at the date of issue.

Australian Valuation Property Classification Code (AVPCC)

3. The Certificate may show one or more AVPCC in respect of land described in the Certificate. The AVPCC shown on the Certificate is the AVPCC allocated to the land in the most recent of the following valuation(s) of the land under the *Valuation of Land Act 1960:*
   - a general valuation of the land;
   - a supplementary valuation of the land returned after the general valuation.
4. The AVPCC(s) shown in respect of land described on the Certificate can be relevant to determine if the land has a qualifying use, within the meaning given by section 4 of the *Commercial and Industrial Property Tax Reform Act 2024* (CIPT Act). Section 4 of the CIPT Act Land provides that land will have a qualifying use if:
   - the land has been allocated one, or more than one, AVPCC in the latest valuation, all of which are in the range 200-499 and/or 600-699 in the Valuation Best Practice Specifications Guidelines (the requisite range);
   - the land has been allocated more than one AVPCC in the latest valuation, one or more of which are inside the requisite range and one or more of which are outside the requisite range, and the land is used solely or primarily for a use described in an AVPCC in the requisite range; or
   - the land is used solely or primarily as eligible student accommodation, within the meaning of section 3 of the CIPT Act.

Commercial and industrial property tax information

5. If the Commissioner has identified that land described in the Certificate is tax reform scheme land within the meaning given by section 3 of the CIPT Act, the Certificate may show in respect of the land:
   - the date on which the land became tax reform scheme land;
   - whether the entry interest (within the meaning given by section 3 of the Duties Act 2000) in relation to the tax reform scheme land was a 100% interest (a whole interest) or an interest of less than 100% (a partial interest); and
   - the date on which the land will become subject to the commercial and industrial property tax.
6. A Certificate that does not show any of the above information in respect of land described in the Certificate does not mean that the land is not tax reform scheme land. It means that the Commissioner has not identified that the land is tax reform scheme land at the date of issue of the Certificate. The Commissioner may identify that the land is tax reform scheme land after the date of issue of the Certificate.

Change of use of tax reform scheme land

7. Pursuant to section 34 of the CIPT Act, an owner of tax reform scheme land must notify the Commissioner of certain changes of use of tax reform scheme land (or part of the land) including if the actual use of the land changes to a use not described in any AVPCC in the range 200-499 and/or 600-699. The notification must be given to the Commissioner within 30 days of the change of use.

Commercial and industrial property tax is a first charge on land

8. Commercial and industrial property tax (including any interest and penalty tax) is a first charge on the land to which the commercial and industrial property tax is payable. This means it has priority over any other encumbrances on the land, such as a mortgage, and will continue as a charge even if ownership of the land is transferred. Therefore, a purchaser may become liable for any unpaid commercial and industrial property tax.

Information for the purchaser

9. Pursuant to section 27 of the CIPT Act, if a bona fide purchaser for value of the land described in the Certificate applies for and obtains a Certificate in respect of the land, the maximum amount recoverable from the purchaser is the amount set out in the Certificate. A purchaser cannot rely on a Certificate obtained by the vendor.

Information for the vendor

10. Despite the issue of a Certificate, the Commissioner may recover a commercial and industrial property tax liability from a vendor, including any amount identified on this Certificate.

Passing on commercial and industrial property tax to a purchaser

11. A vendor is prohibited from apportioning or passing on commercial and industrial property tax to a purchaser under a contract of sale of land entered into on or after 1 July 2024 where the purchase price is less than $10 million (to be indexed annually from 1 January 2025, as set out on the website for Consumer Affairs Victoria).

General information

12. Land enters the tax reform scheme if there is an entry transaction, entry consolidation or entry subdivision in respect of the land (within the meaning given to those terms in the CIPT Act). Land generally enters the reform on the date on which an entry transaction occurs in respect of the land (or the first date on which land from which the subject land was derived (by consolidation or subdivision) entered the reform).
13. The Duties Act includes exemptions from duty, in certain circumstances, for an eligible transaction (such as a transfer) of tax reform scheme land that has a qualifying use on the date of the transaction. The exemptions apply differently based on whether the entry interest in relation to the land was a whole interest or a partial interest. For more information, please refer to www.sro.vic.gov.au/CIPT.
14. A Certificate showing no liability for the land does not mean that the land is exempt from commercial and industrial property tax. It means that there is nothing to pay at the date of the Certificate.
15. An updated Certificate may be requested free of charge via our website, if:
    - the request is within 90 days of the original Certificate's issue date, and
    - there is no change to the parties involved in the transaction for which the Certificate was originally requested.

Property Clearance Certificate

Windfall Gains Tax

INFOTRACK / ALISON WATSON CONVEYANCING

Your Reference:	969638
Certificate No:	91978117
Issue Date:	27 JUN 2025

Land Address:	2145 STEIGLITZ ROAD MAUDE VIC 3331

Lot	Plan	Volume	Folio
1	811993	10672	64

Vendor: GRANT STRIPLING

Purchaser: FOR INFORMATION PURPOSES

WGT Property Id	Event ID	Windfall Gains Tax	Deferred Interest	Penalty/Interest	Total
		$0.00	$0.00	$0.00	$0.00

Comments: No windfall gains tax liability identified.

This certificate is subject to the notes that appear on the reverse. The applicant should read these notes carefully.

CURRENT WINDFALL GAINS TAX CHARGE:

$0.00

Paul Broderick
Commissioner of State Revenue

Notes to Certificate - Windfall Gains Tax

Certificate No: 91978117

Power to issue Certificate

1. Pursuant to section 95AA of the *Taxation Administration Act 1997*, the Commissioner of State Revenue must issue a Property Clearance Certificate (Certificate) to an owner, mortgagee or bona fide purchaser of land who makes an application specifying the land for which the Certificate is sought and pays the application fee.

Amount shown on Certificate

2. The Certificate shows in respect of the land described in the Certificate:
   - Windfall gains tax that is due and unpaid, including any penalty tax and interest
   - Windfall gains tax that is deferred, including any accrued deferral interest
   - Windfall gains tax that has been assessed but is not yet due
   - Windfall gains tax that has not yet been assessed (i.e. a WGT event has occurred that rezones the land but any windfall gains tax on the land is yet to be assessed)
   - Any other information that the Commissioner sees fit to include such as the amount of interest accruing per day in relation to any deferred windfall gains tax.

Windfall gains tax is a first charge on land

3. Pursuant to section 42 of the *Windfall Gains Tax Act 2021*, windfall gains tax, including any accrued interest on a deferral, is a first charge on the land to which it relates. This means it has priority over any other encumbrances on the land, such as a mortgage, and will continue as a charge even if ownership of the land is transferred. Therefore, a purchaser may become liable for any unpaid windfall gains tax.

Information for the purchaser

4. Pursuant to section 42 of the *Windfall Gains Tax Act 2021*, if a bona fide purchaser for value of land applies for and obtains a Certificate in respect of the land, the maximum amount recoverable from the purchaser by the Commissioner is the amount set out in the certificate, described as the "Current Windfall Gains Tax Charge" overleaf.
5. If the certificate states that a windfall gains tax is yet to be assessed, note 4 does not apply.
6. A purchaser cannot rely on a Certificate obtained by the vendor.

Information for the vendor

7. Despite the issue of a Certificate, the Commissioner may recover a windfall gains tax liability from a vendor, including any amount identified on this Certificate.

Passing on windfall gains tax to a purchaser

8. A vendor is prohibited from passing on a windfall gains tax liability to a purchaser where the liability has been assessed under a notice of assessment as at the date of the contract of sale of land or option agreement. This prohibition does not apply to a contract of sale entered into before 1 January 2024, or a contract of sale of land entered into on or after 1 January 2024 pursuant to the exercise of an option granted before 1 January 2024.

General information

9. A Certificate showing no liability for the land does not mean that the land is exempt from windfall gains tax. It means that there is nothing to pay at the date of the Certificate.
10. An updated Certificate may be requested free of charge via our website, if:
    - The request is within 90 days of the original Certificate's issue date, and
    - There is no change to the parties involved in the transaction for which the Certificate was originally requested.
11. Where a windfall gains tax liability has been deferred, interest accrues daily on the deferred liability. The deferred interest shown overleaf is the amount of interest accrued to the date of issue of the certificate.

Windfall Gains Tax - Payment Options

BPAY

Biller Code: 416073
Ref: 91978114

Telephone & Internet Banking - BPAY®

Contact your bank or financial institution to make this payment from your cheque, savings, debit or transaction account.

www.bpay.com.au

CARD

Ref: 91978114

Visa or Mastercard

Pay via our website or phone 13 21 61.
A card payment fee applies.

sro.vic.gov.au/payment-options

Important payment information

Windfall gains tax payments must be made using only these specific payment references.

Using the incorrect references for the different tax components listed on this property clearance certificate will result in misallocated payments.

Supplementary Rates & Valuation Notice

2023/24 RATING YEAR

GOLDEN PLAINS SHIRE

ABN 86 998 570 296
All items are GST free.

034 0000096

GT Stripling
2145 Steiglitz Road
MAUDE VIC 3331

Notice Issue Date:	**8/09/2023**
Operative Date:	1/07/2023
Total Balance Outstanding	**$2,078.21**

Property number:	A41400905
Property Address:	2145 STEIGLITZ ROAD MAUDE 3331
Land Area:	4.94 HA
Parcels attached:	L1 TP811993
Capital Improved Value (CIV):	**$647,000.00** (land + building + improvements)
Site Value:	**$529,000.00** (land only)
Net Annual Value:	**$32,350.00**
Rate in $ on CIV:	RESIDENTIAL 0.0019265
AVPCC:	117 Residential Rural/Rural Lifestyle

Any Arrears/Credit Carried forward	$0.00
Original Rates Levied 01/07/23 (if available)	$1,554.69
Levied/Adjustment to Rates	-$308.24
Levied/Adjusted Municipal charge	$250.00
Levied/Adjusted Waste Management compulsory charge (if applicable)	$427.00
Levied/Adjusted Addi. Garbage & Recycle charge (if applied)	$0.00
Levied/Adjusted Addi. Garbage charge (if applied)	$0.00
Levied/Adjusted Addi. Recycle charge (if applied)	$0.00
Levied/Adjusted Fire Service Property Levy (FSPL)	$154.76
Total Interest accrued to date	$0.00
Legal charges to date (if applicable)	$0.00
Other	
Payments made to date	$0.00
Pension rebate for Rates (if applied)	$0.00
Pension rebate for FSPL (if applied)	$0.00
Other	
Total Balance Outstanding	**$2,078.21**

- Please note this is a **supplementary valuation and rates notice** issued due to a change of attributes to your property listed in Section 13DF and 13L of Valuation of Land Act 1960. This process could result in an amendment to the Capital Improved Value (CIV) of your property, which may result in an increase or decrease in the rates payable for the 2023-2024 rating year.
- If you have already received a rates notice, the supplementary notice would indicate an 'adjustment' to your original rates notice.
- If you have **enrolled** to pay your rates bill via the **four quarterly instalment option**, please compare the **"issue date"** of the 'instalment notices' you have already received with the issue date of this supplementary notice to identify the most up-to-date outstanding balance in your rates account. Please note that subsequent instalments will be adjusted accordingly.
- Please contact the Council if this supplementary notice is the first notice you have received for the current financial year and you wish to discuss your payment options.

Payment Options

Online or by phone
www.goldenplains.vic.gov.au/payment
Phone: 5220 7111 Ref: **41400905**

Direct Debit
Call 5220 7111 for an application form

Biller Code: **35238** Ref: **1414 0090 56**
BPAY® this payment is via internet or phone banking.
BPAY View® - View and pay this bill using internet banking.
BPAY View® Registration No.: **1414 0090 56**

In Person Pay by cheque, cash or EFTPOS (including credit card) at a Council Customer Hub: 2 Pope St, Bannockburn or 19 Heales St, Smythesdale.

Mail Post cheque and payment slip to PO Box 111, Bannockburn Vic 3331

Post Billpay

$2,078.21

*2335 1414009056

In store at Australia Post,
online at auspost.com.au/postbillpay
or call 13 18 16

Billpay Code: **2335**

Property No: **1414 0090 56**

Property Address: 2145 Steiglitz Road
Maude 3331

About Your Rates and Valuation Notice

Payment of Rates

There are three options for paying your Rates & Charges 2023/24:

1. Pay in one full payment by 15 February 2024.
2. Pay in four instalments, due at the end of September, November, February and May. Direct debit is available or notices are mailed out for each instalment with a range of payment options.
3. Pay in 10 monthly direct debit payments, due on the 15th of the month from September 2023 to June 2024. Please note: you must sign up for direct debit with Council to join the monthly payment plan. Call Council's Rates Team at 5220 7111.

Please note: If you don't sign up for the monthly plan with Council by 15 September 2023 or pay the first instalment amount by 30 September 2023, the rates system will automatically switch you to the full payment option and the total will be due on 15 February 2024. If this is an issue, please contact Council's Rates Team at 5220 7111.

If these payment options aren't possible for you, please contact Council's Rates Team at 5220 7111 for a confidential conversation about payment plan alternatives.

Payments will be allocated in the following order: legal costs (if any), interest owing (if any), arrears owing (if any), current rates and charges owing.

Rates Concession for Pensioners

If you hold an Australian Pensioner Card and you pay rates on your principal place of residence, you may be entitled to a rates discount. For more information, please contact Council's Customer Service team at 5220 7111.

The *Fire Service Property Levy Act 2012* also provides for a concession for eligible pensioners and veterans.

Arrears and Late Payments

Payment listed under 'Arrears Carried Forward' on this notice are overdue and must be paid immediately. If you are unable to pay in full, please contact Council's Rates Team on 5220 7111 to discuss alternative payment options and plans available. The 2023/24 penalty interest rate of 10% per annum is set by the Victorian Government and will be charged on overdue amounts.

Change of Ownership or Address

Notification of change of ownership of a property is the responsibility of the purchasers' appointed agent and failure to give notification carries a penalty under the *Local Government Act 1989*. A notice of acquisition must be lodged within one month after disposal of land. Council must be notified in writing of changes to postal address or occupancy.

Differential Rates

For information on different rates visit our website **https://www.goldenplains.vic.gov.au/resident/rates-and-charges/rates-and-charges**

Annual Property Valuations

In accordance with the State Government requirements, the Valuer-General Victoria is responsible for all property valuations. Starting in 2019, municipal property valuations have been undertaken every year, instead of every two years.

Property owners may object to the valuation of their property within 60 days of the date of issue on the initial rates notice. For more information, call 5220 7111.

Disagreement with Notice

If you disagree with information on your Rate and Valuation Notice, please contact Council's Rates Team at 5220 7111, who will review your situation and work to find a solution. If your issue cannot be resolved, you have the right to appeal.

If you choose to appeal, you must still pay your rates by the due date. If your appeal is successful, we will credit your account or refund, if requested.

What you can appeal	By when	Legislation	How to lodge
Differential rate applied to your property	Within 60 days of the date of issue of the initial rates notice	*Local Government Act 1989* - Section 183	Search for 'differential rating' at www.vcat.vic.gov.au
The property valuation / AVPCC	Within two months** of the date of issue of the initial rates notice	*Valuation of Land Act 1960* - Sections 16,17,18	Contact council at 5220 7111 Or visit www.ratingvaluationobjections.vic.gov.au
Any other rate or charge	Within 60 days of the date of issue of the initial rates notice	*Local Government Act 1989* - Section 184	Must be lodged in the County Court - seek legal advice

**Within four months if a notice has not been supplied to the occupier of the land.

The 2023/24 Rate Cap

The 2023/24 rate cap has been set by the Minister for Local Government at 3.50% and it's the law that Council's rates revenue cannot exceed this amount. The cap applies to the General Rates and Municipal Charge and it's based on an average, which means the value of your property will impact your rates increase in 2023/24.

For a detailed breakdown of your rates notice, read the 'Your Rates Notice Explained' brochure supplied with this notice or available at **goldenplains.vic.gov.au**

Key Terms on Your Rates and Valuation Notice

Valuation - the value of your property, assessed annually by the Valuer-General Victoria. Your property is assessed three ways: Site Value, which is used by the State Government to calculate land tax; Capital Improved Value; and Net Annual Value. The CIV is used to calculate your rates.

Site Value - Value of land only.

Capital Improved Value - Value of land plus building and improvements.

Net Annual Value - Net annual rental income of property or 5% of CIV for dwellings and farms.

Differential rate - the 'rate in the dollar' charged on properties. This varies depending on the land use category, for example, residential or commercial.

Australian Valuation Property Classification Code - A classification that assigns a code to the land, based on its existing use.

Privacy Statement

Golden Plains Shire Council will comply with the Information Privacy and Health Privacy Principles as set out in the *Privacy and Data Protection Act 2014*. To change or view your personal information, please contact Council's Customer Service team at 5220 7111.

Golden Plains Shire Council
PO Box 111
Bannockburn Vic 3331

Customer Hubs
2 Pope Street
Bannockburn Vic 3331

19 Heales Street
Smythesdale Vic 3351

5220 7111
enquiries@gplains.vic.gov.au
goldenplains.vic.gov.au

GOLDEN PLAINS SHIRE

PLANNING PERMIT

Permit Number	P23185
Planning Scheme	Golden Plains Planning Scheme
Responsible Authority	Golden Plains Shire Council

ADDRESS OF THE LAND

Lot 1 on Title Plan 811993 (2145 Steiglitz Road, Maude)

THE PERMIT ALLOWS

Development of an extension to an existing section 2 use building (dwelling) within the setbacks specified under Clause 35.07-4 (FZ), Clause 44.06-4 (BMO) and Clause 42.01-2 (ESO3) in accordance with the endorsed plans.

THE FOLLOWING CONDITIONS APPLY TO THE PERMIT (11 Conditions)

Amended plans

1. Before the use/development starts, amended plans to the satisfaction of the Responsible Authority must be submitted to and approved by the Responsible Authority. Once approved, the plans will be endorsed and will then form part of the permit. The plans must be generally in accordance with the plans prepared by insert name, date, revision number and drawing number. The plans must be drawn to scale and with dimensions, but modified to show:
    a. Amended Bushfire Management Plan in accordance with condition 9.

Endorsed Plans

2. The development as shown on the endorsed plans must not be altered or modified (unless the Golden Plains Planning Scheme specifies a permit is not required) without the written consent of the Responsible Authority.

General conditions (Dwelling)

3. All works must be undertaken in a manner that minimises soil erosion, and any exposed areas of soil must be stabilised to prevent soil erosion, to the satisfaction of the Responsible Authority.

4. All external materials to be used in the construction of the dwelling must be of muted tones and be non-reflective and must not result in any unreasonable visual impact on the amenity of the surrounding area.

5. The dwelling must be connected to reticulated sewerage, if available. If reticulated sewerage is not available all wastewater from the dwelling must be treated and retained within the lot in accordance with the requirements of the Environment Protection Regulations under the *Environment Protection Act* 2017 for an on-site wastewater management system.

6. The development hereby permitted must not cause any nuisance or loss of amenity in any adjacent or nearby land by reason of the discharge of drainage.

7. All run off from the proposed buildings and works must be directed to a legal point of discharge to the satisfaction of the responsible authority.

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GOLDEN PLAINS SHIRE

Bushfire Management Plan (BMO)

8. The bushfire protection measures forming part of this permit or shown on the endorsed plans, including those relating to construction standards, defendable space, water supply and access, must be maintained to the satisfaction of the responsible authority on a continuing basis. This condition continues to have force and effect after the development authorised by this permit has been completed.

CFA

9. Before the development starts, a Bushfire Management Plan must be submitted to and endorsed by the Responsible Authority. Once endorsed the plan must not be altered unless agreed to in writing by CFA and the Responsible Authority. The plan must be generally in accordance with BMP at Appendix 3, 2145 Steiglitz Road Maude, dated: 17/08/2023, Drawing no; 321215BMP-BMP, Version 1 prepared by Spiire but modified to include Construction standards condition and replace the conditions for Defendable space and Access with:

a. Defendable space

Defendable space for a distance of 37 metres in all directions around the proposed building (or to the property boundary, whichever is the lesser distance) must be provided where vegetation (and other flammable materials) will be modified and managed in accordance with the following requirements:

- Grass must be short cropped and maintained during the declared fire danger period.
- All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.
- Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.
- Plants greater than 10 centimetres in height must not be placed within 3m of a window or glass feature of the building.
- Shrubs must not be located under the canopy of trees.
- Individual and clumps of shrubs must not exceed 5 sq. metres in area and must be separated by at least 5 metres.
- Trees must not overhang or touch any elements of the building.
- The canopy of trees must be separated by at least 5 metres.
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level.
-

b. Construction standards

The building must be constructed to a minimum Bushfire Attack Level of 19 (BAL19).

c. Access

Access for firefighting purposes must be provided which meets the following requirements:

- Access must have a load limit of at least 15 tonnes.
- Curves must have a minimum inner radius of 10m.
- The average grade must be no more than 1 in 7 (14.4 per cent) (8.1 degrees) with a maximum of no more than 1 in 5 (20 per cent) (11.3 degrees) for no more than 50m.
- Have a minimum trafficable width of 3.5m of all- weather construction.
- Be clear of encroachments for at least 0.5m on each side and 4m above the accessway.
- Dips must have no more than a 1 in 8 (12.5 per cent) (7.1 degrees) entry and exit angle.

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- Incorporate a turning area for fire fighting vehicles close to the building by one of the following:
  - A turning circle with a minimum radius of eight metres.
  - A driveway encircling the dwelling.
  - The provision of other vehicle turning heads – such as a T or Y head – which meet the specification of Austroad Design for an 8.8 metre Service Vehicle
- Incorporate passing bays at least every 200m which must be at least 20m long and have a minimum trafficable width of 6m.

Environmental Health – Wastewater Treatment

10. A Permit to Install / Alter an On-Site Wastewater Management System must be obtained from Council's Environmental Health Unit before any works commence.

Expiry

11. This permit will expire if one of the following circumstances applies:
    a. The development is not started within two (2) years of the date of this permit; or
    b. The development is not completed within four (4) years of the date of this permit.

    The Responsible Authority may extend the periods referred to if a request is made in writing before the permit expires or within six months afterwards (or twelve months after the permit expires for a request to extend the time to complete the development).

Note: ***The location of the proposed buildings and works must not interfere with or be detrimental to the operation of the effluent disposal system or associated irrigation lines. It is the applicant's responsibility to ensure that this requirement is complied with.***

Note: ***This permit does not authorise the commencement of any building construction works. Before any such development may commence, the applicant must apply for and obtain appropriate building approval.***

Note: ***This application for a dwelling has not been assessed under Clause 54 of the Golden Plains Planning Scheme (ResCode provisions) or Part 4 of the Building Regulations 2018.***

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COORDINATOR STATUTORY PLANNING

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 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 and 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?

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 (2) 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 (2) years after the issue of the permit or in the case of a subdivision or consolidation within five (5) years of the certification of the plan of subdivision or consolidation under the *Subdivision Act* 1988.

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 (2) years after the issue of the permit; or
- the use is discontinued for a period of two (2) years.

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 (2) 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 (2) years after the completion of the development or
- the use is discontinued for a period of two (2) years.

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 (2) years of the issue of the permit.

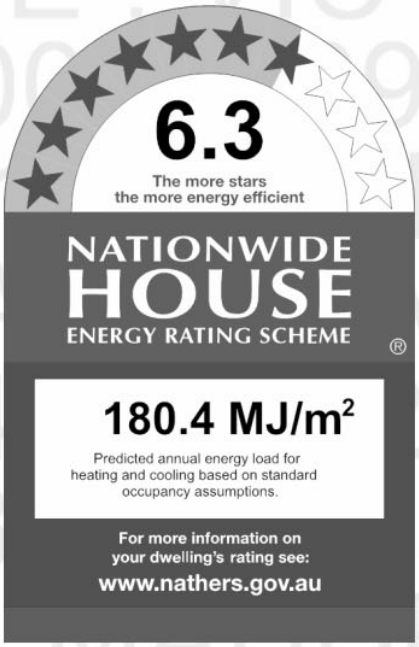
The expiry of a permit does not affect the validity of anything done under that permit before the expiry.

WHAT ABOUT REVIEWS?

- The person who applied for the: permit may appeal against any condition in the permit unless it was granted at the direction of the Victorian Civil and Administrative Tribunal where, in which case no right of appeal exists.
- An appeal 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 appeal must be lodged within 60 days after the giving of that notice.
- An appeal is lodged with the Victorian Civil and Administrative Tribunal.
- An appeal must be made on a Notice of Appeal form, which can be obtained from the Victorian Civil and Administrative Tribunal, and be accompanied by the applicable fee.
- An appeal must state the grounds upon which it is based.
- An appeal must also be served on the Responsible Authority.
- Details about appeals and the fees payable can be obtained from the Victorian Civil an Administrative Tribunal.

Nationwide House Energy Rating Scheme
NatHERS Certificate No. 0009528951

Generated on 13 Jun 2024 using BERS Pro v4.4.1.5 (3.21)



Property

Address	2145 Steiglitz Road, Maude , Vic , 3331
Lot/DP	0
NCC Class*	1A
Type	Renovations

Plans

Main plan	1101
Prepared by	Homemade Builders

Construction and environment

Assessed floor area (m^2)*	
Conditioned*	330.0
Unconditioned*	71.0
Total	401.0
Garage	49.0

Exposure type

Open

NatHERS climate zone

66

Thermal performance

Heating	**Cooling**
148.1	**32.3**
MJ/m^2	MJ/m^2

Accredited assessor

Name	Terry Robinson
Business name	Surfcoast Thermal Performance Energy Raters
Email	terry@surfcoastenergy.com.au
Phone	0434420033
Accreditation No.	51272
Assessor Accrediting Organisation	ABSA
Declaration of interest	Declaration completed: no conflicts

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 hstar.com.au/QR/Generate?p=sKwBAGxtL.
When using either link, ensure you are visiting hstar.com.au

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.

* Refer to glossary

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

I have modeled the shading in accordance with NatHERS principles

Window and glazed door *type and performance*

Default* windows

Window ID	Window Description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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
STG-001-20 A	STG-001-20 A Aluminium Awning Window DG 4-8Ar-4	4.1	0.57	0.54	0.60
STG-004-12 A	STG-004-12 A Aluminium Sliding Door DG 4-10Ar-4	3.9	0.60	0.57	0.63
STG-074-14 A	STG-074-14 A Alumiere Fixed Window DG 4Clr-12Ar-4PlanAs	2.4	0.53	0.50	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	STG-001-20 A	n/a	900	3500	n/a	60	N	No
Kitchen/Living	STG-001-20 A	n/a	2400	1600	n/a	10	S	No
Kitchen/Living	STG-001-20 A	n/a	2400	2400	n/a	30	W	No
Kitchen/Living	STG-001-20 A	n/a	2400	2400	n/a	30	W	No
Kitchen/Living	STG-004-12 A	n/a	2400	2700	n/a	45	W	No
Kitchen/Living	STG-074-14 A	n/a	1080	2700	n/a	00	W	No
Laundry	STG-001-20 A	n/a	1200	900	n/a	90	N	No
Rumpus	STG-001-20 A	n/a	1400	1800	n/a	45	N	No
Rumpus	STG-001-20 A	n/a	1400	1800	n/a	45	N	No
Shower	STG-001-20 A	n/a	1400	900	n/a	90	N	No
Bath	STG-001-20 A	n/a	1400	900	n/a	90	N	No
Bed 1 Ens	STG-001-20 A	n/a	1800	2700	n/a	10	W	No
Bedroom 1	STG-004-12 A	n/a	2400	2400	n/a	45	E	No
Bedroom 1	STG-074-14 A	n/a	2400	1200	n/a	00	S	No
Bedroom 1	STG-074-14 A	n/a	2400	1200	n/a	00	S	No
Bedroom 1	STG-001-20 A	n/a	2400	2400	n/a	10	W	No
Bedroom 2	STG-001-20 A	n/a	1400	1800	n/a	10	N	No
Bedroom 3	STG-001-20 A	n/a	1400	1800	n/a	10	N	No
Passage	STG-001-20 A	n/a	2400	850	n/a	60	E	No
Bedroom 4	STG-001-20 A	n/a	1400	1800	n/a	10	S	No
Bedroom 5	STG-001-20 A	n/a	1400	1800	n/a	10	S	No
Bedroom 6	STG-001-20 A	n/a	1400	1800	n/a	10	S	No
Dining	STG-074-14 A	n/a	2400	300	n/a	00	E	No
Dining	STG-074-14 A	n/a	2400	1800	n/a	00	S	No
Dining	STG-074-14 A	n/a	2400	3000	n/a	00	S	Yes

Roof window *type and performance*

* Refer to glossary.

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 %	Height (mm)	Width (mm)	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 (m^2)	Orientation	Outdoor shade	Diffuser	Skylight shaft reflectance
No Data Available								

External door *schedule*

Location	Height (mm)	Width (mm)	Opening %	Orientation
Garage	2400	4800	90	S
Garage	2040	820	90	W
Laundry	2340	820	90	N
Store	2040	820	90	W
Dining	2340	920	90	E

* Refer to glossary.

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
EW-1	Metal Clad Cavity Panel Direct Fix	0.50	Medium	Foil, Anti-glare one side + Bulk Insulation R2.7	No
EW-2	Metal Clad Cavity Panel Direct Fix	0.50	Medium	Foil, Anti-glare one side, Reflective other	Yes
EW-3	Weatherboard Cavity Panel Direct Fix	0.50	Medium	Foil, Anti-glare one side, Reflective other	Yes
EW-4	Metal Clad Cavity Panel Direct Fix	0.50	Medium	Anti-glare foil with bulk no gap R2.7	No
EW-5	Fibro Cavity Panel on Battens	0.50	Medium	Anti-glare foil with bulk no gap R2.7	No
EW-6	Fibro Cavity Panel on Battens	0.50	Medium	Foil, Anti-glare one side + Bulk Insulation R2.9	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Stairs	EW-1	2710	2545	W	0	NO
Stairs	EW-1	2710	4700	N	0	NO
Stairs	EW-1	2710	1245	E	0	YES
Garage	EW-2	2710	1350	N	0	YES
Garage	EW-2	2710	8500	E	0	NO
Garage	EW-3	2710	6050	S	0	NO
Garage	EW-2	2710	7195	W	0	NO
Kitchen/Living	EW-1	2740	8295	N	250	NO
Kitchen/Living	EW-4	2740	2245	S	250	YES
Kitchen/Living	EW-5	3685	10000	W	700	NO
Pantry	EW-1	2740	1840	N	250	NO
Laundry	EW-1	2740	1890	N	250	NO
Rumpus	EW-1	2740	5390	N	250	NO
Shower	EW-1	2740	2490	N	600	NO
Bath	EW-1	2740	1890	N	600	NO
Bed 1 Ens	EW-1	2740	4290	W	250	YES
Bedroom 1	EW-1	2740	4295	E	250	YES

* Refer to glossary.
Generated on 13 Jun 2024 using BERS Pro v4.4.1.5 (3.21) for Maude , Vic , 3331

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Bedroom 1	EW-1	3500	4200	E	250	NO
Bedroom 1	EW-5	3500	6050	S	600	NO
Bedroom 1	EW-1	3500	4200	W	250	NO
Store	EW-6	2740	945	S	7300	NO
Store	EW-6	2740	1795	W	250	YES
Bedroom 2	EW-1	2740	3590	N	600	NO
Bedroom 3	EW-1	2740	3545	N	600	NO
Bedroom 3	EW-6	2740	4495	E	600	NO
Passage	EW-6	2740	1290	E	600	NO
Bedroom 4	EW-6	2740	4195	E	600	NO
Bedroom 4	EW-6	2740	3545	S	550	NO
Bedroom 5	EW-6	2740	3640	S	550	NO
Bedroom 6	EW-6	2740	3640	S	550	NO
Dining	EW-1	2740	1340	N	250	NO
Dining	EW-6	2740	995	S	550	YES
Dining	EW-6	2740	1800	E	250	YES
Dining	EW-6	2740	3095	S	7300	NO
Dining	EW-5	2740	6145	S	250	YES

Internal wall *type*

Wall ID	Wall type	Area (m^2)	Bulk insulation
IW-1 - Cavity wall, direct fix plasterboard, single gap		87.00	Bulk Insulation, No Air Gap R2.7
IW-2 - Cavity wall, direct fix plasterboard, single gap		281.00	No insulation
IW-3 - Cavity wall, plasterboard on battens one side		39.00	Foil Anti-glare one side and Reflective other of the Bulk Insulation R2.7

* Refer to glossary.

Floor *type*

Location	Construction	Area (m^2)	Sub-floor ventilation	Added insulation (R-value)	Covering
Stairs	Concrete Slab on Ground 125mm	9.70	None	No Insulation	Bare
Garage	Concrete Slab on Ground 125mm	47.10	None	No Insulation	Bare
Kitchen/Living	Suspended Timber Floor 19mm	75.50	Enclosed	Bulk Insulation, Gap to Floor R2.7	Cork Tiles or Parquetry 8mm
Stairs/Stairs	Timber Above Plasterboard 100mm	5.30		Bulk Insulation R2.7	Carpet 10mm
Pantry	Suspended Timber Floor 19mm	7.50	Enclosed	Bulk Insulation, Gap to Floor R2.7	Cork Tiles or Parquetry 8mm
Laundry	Suspended Timber Floor 19mm	8.00	Enclosed	Bulk Insulation, Gap to Floor R2.7	Ceramic Tiles 8mm
Rumpus	Suspended Timber Floor 19mm	23.20	Enclosed	Bulk Insulation, Gap to Floor R2.7	Cork Tiles or Parquetry 8mm
Shower	Suspended Timber Floor 19mm	5.40	Enclosed	Bulk Insulation, Gap to Floor R2.7	Ceramic Tiles 8mm
Bath	Suspended Timber Floor 19mm	9.20	Enclosed	Bulk Insulation, Gap to Floor R2.7	Ceramic Tiles 8mm
Bed 1 Ens/Stairs	Timber Above Plasterboard 19mm	3.40		Bulk Insulation R2.7	Ceramic Tiles 8mm
Bed 1 Ens/Garage	Timber Above Plasterboard 19mm	7.90		Bulk Insulation R2.7	Ceramic Tiles 8mm
Bed 1 WIR/Stairs	Timber Above Plasterboard 19mm	0.50		Bulk Insulation R2.7	Carpet+Rubber Underlay 18mm
Bed 1 WIR/Garage	Timber Above Plasterboard 19mm	7.30		Bulk Insulation R2.7	Carpet+Rubber Underlay 18mm
Bedroom 1/Garage	Timber Above Plasterboard 19mm	30.70		Bulk Insulation R2.7	Carpet+Rubber Underlay 18mm
Store	Suspended Timber Floor 19mm	1.60	Enclosed	Bulk Insulation, Gap to Floor R2.7	Cork Tiles or Parquetry 8mm
Bedroom 2	Suspended Timber Floor 19mm	15.10	Enclosed	Bulk Insulation, Gap to Floor R2.7	Carpet+Rubber Underlay 18mm
Bedroom 3	Suspended Timber Floor 19mm	15.00	Enclosed	Bulk Insulation, Gap to Floor R2.7	Carpet+Rubber Underlay 18mm
Passage	Suspended Timber Floor 19mm	18.20	Enclosed	Bulk Insulation, Gap to Floor R2.7	Cork Tiles or Parquetry 8mm
Bedroom 4	Suspended Timber Floor 19mm	13.70	Enclosed	Bulk Insulation, Gap to Floor R2.7	Carpet+Rubber Underlay 18mm
Bedroom 5	Suspended Timber Floor 19mm	14.10	Enclosed	Bulk Insulation, Gap to Floor R2.7	Carpet+Rubber Underlay 18mm
Bedroom 6	Suspended Timber Floor 19mm	14.10	Enclosed	Bulk Insulation, Gap to Floor R2.7	Carpet+Rubber Underlay 18mm
Dining	Suspended Timber Floor 19mm	74.80	Enclosed	Bulk Insulation, Gap to Floor R2.7	Cork Tiles or Parquetry 8mm

* Refer to glossary.

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
Stairs	Timber Above Plasterboard	Bulk Insulation R2.7	No
Garage	Timber Above Plasterboard	Bulk Insulation R2.7	No
Kitchen/Living	Plasterboard	Bulk Insulation R5	No
Stairs	Plasterboard	Bulk Insulation R5	No
Pantry	Plasterboard	Bulk Insulation R5	No
Laundry	Plasterboard	Bulk Insulation R5	No
Rumpus	Plasterboard	Bulk Insulation R5	No
Shower	Plasterboard	Bulk Insulation R5	No
Bath	Plasterboard	Bulk Insulation R5	No
Bed 1 Ens	Plasterboard	Bulk Insulation R5	No
Bed 1 WIR	Plasterboard	Bulk Insulation R5	No
Bedroom 1	Plasterboard	Bulk Insulation R5	No
Store	Plasterboard	Bulk Insulation R5	No
Bedroom 2	Plasterboard	Bulk Insulation R5	No
Bedroom 3	Plasterboard	Bulk Insulation R5	No
Passage	Plasterboard	Bulk Insulation R5	No
Bedroom 4	Plasterboard	Bulk Insulation R5	No
Bedroom 5	Plasterboard	Bulk Insulation R5	No
Bedroom 6	Plasterboard	Bulk Insulation R5	No
Dining	Plasterboard	Bulk Insulation R5	No

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Kitchen/Living	1	Ceiling Vents	0	
Rumpus	6	Downlights - LED	0	Sealed
Shower	1	Exhaust Fans	0	Sealed
Bath	1	Downlights - LED	0	Sealed

* Refer to glossary.

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bath	1	Exhaust Fans	0	Sealed
Bed 1 Ens	1	Exhaust Fans	0	Sealed
Bed 1 WIR	1	Downlights - LED	0	Sealed
Bedroom 1	5	Downlights - LED	0	Sealed
Dining	16	Downlights - LED	0	Sealed
Dining	1	Ceiling Vents	300	

Ceiling *fans*

Location	Quantity	Diameter (mm)
Kitchen/Living	3	1200
Laundry	1	1200

Roof *type*

Construction	Added insulation (R-value)	Solar absorptance	Roof shade
Corrugated Iron	Bulk, Reflective Side Down, No Air Gap Above R1.3	0.70	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.

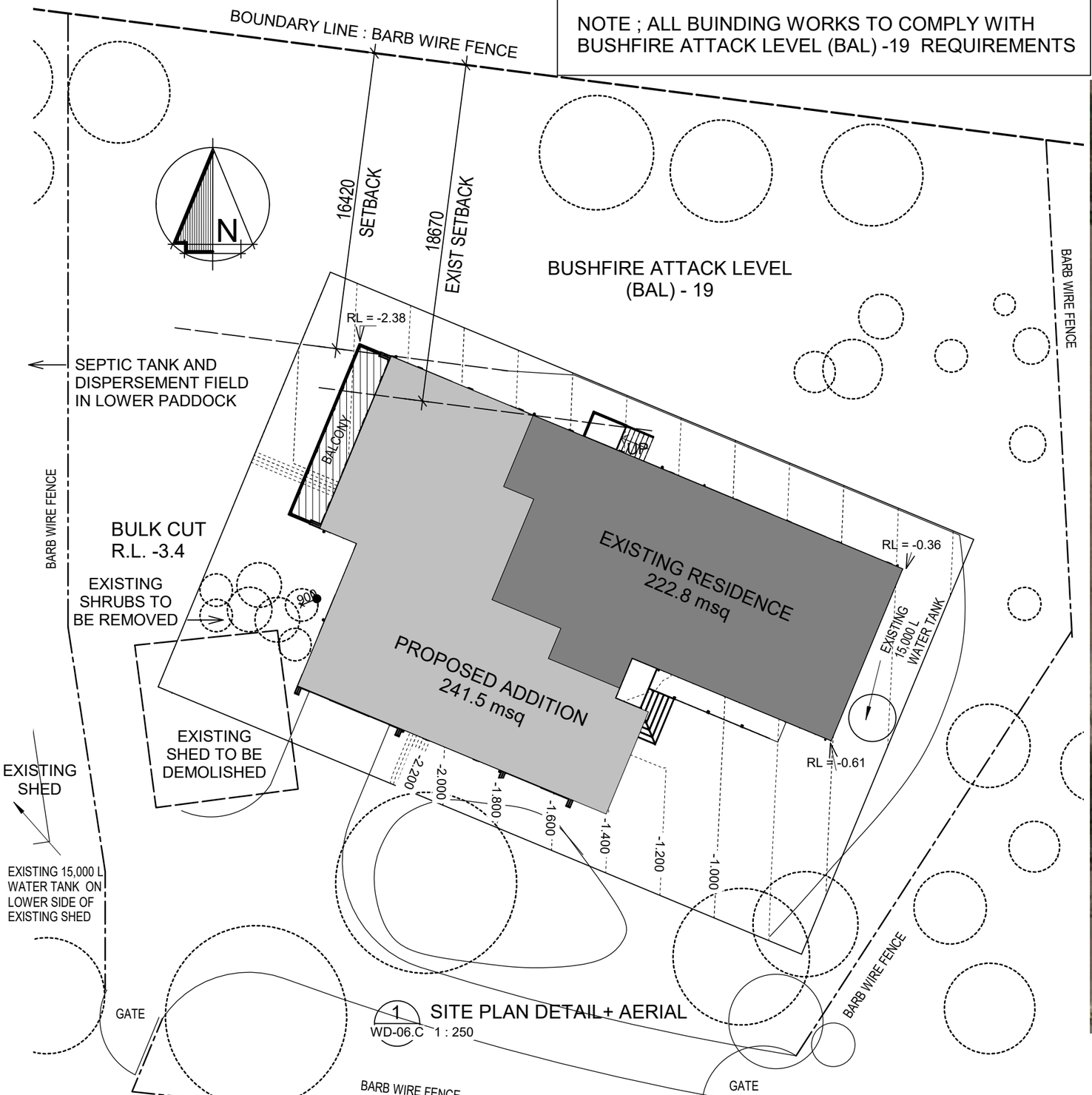
Information presented in this report relies on a range of standard assumptions (both embedded in NatHERS accredited software and made by the assessor who prepared this report), including assumptions about occupancy, indoor air temperature and local climate.

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.

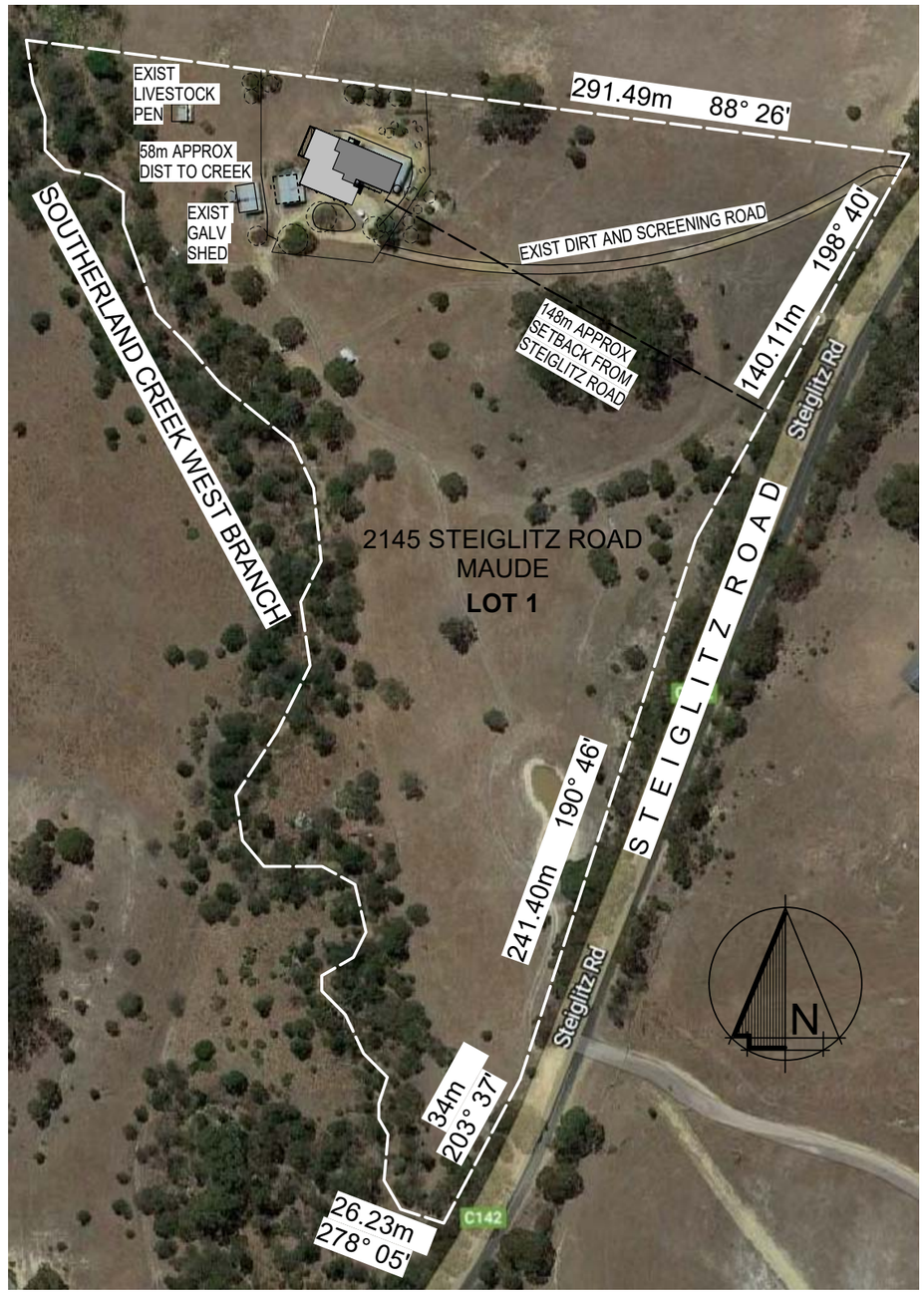
Glossary

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.
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).

NOTE ; ALL BUINDING WORKS TO COMPLY WITH
BUSHFIRE ATTACK LEVEL (BAL) -19 REQUIREMENTS



1 WD-06.C SITE PLAN DETAIL + AERIAL 1 : 250



2 WD-06.C SITE PLAN 1 : 2000

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Revisions

No.	Description.	Date

STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

SITE PLAN

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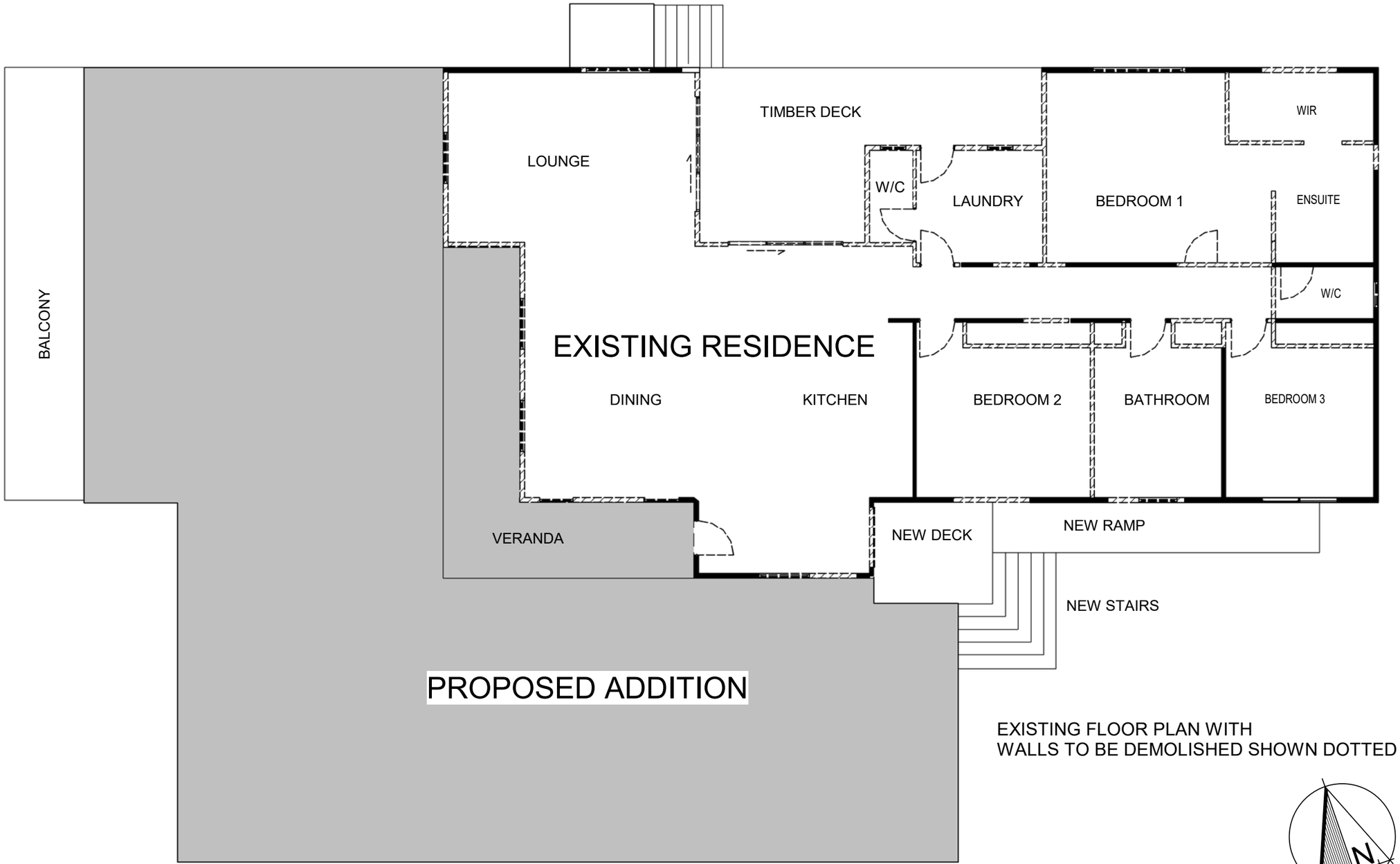

EXISTING FLOOR PLAN WITH
WALLS TO BE DEMOLISHED SHOWN DOTTED

1 WD-06.C DEMOLITION PLAN 1 : 100

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STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

EXISTING PLAN

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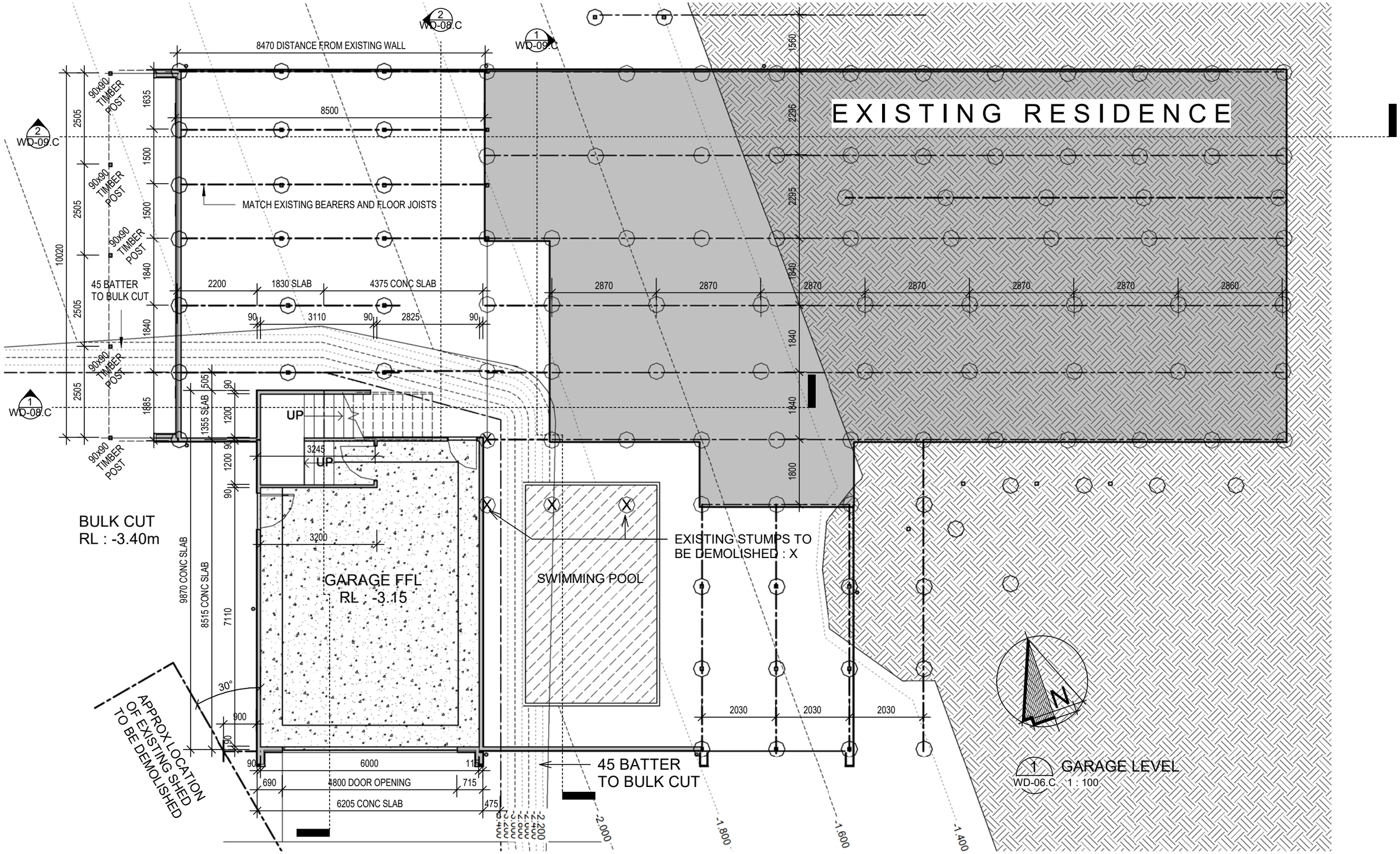

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Revisions

No.	Description.	Date

STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

GARAGE PLAN

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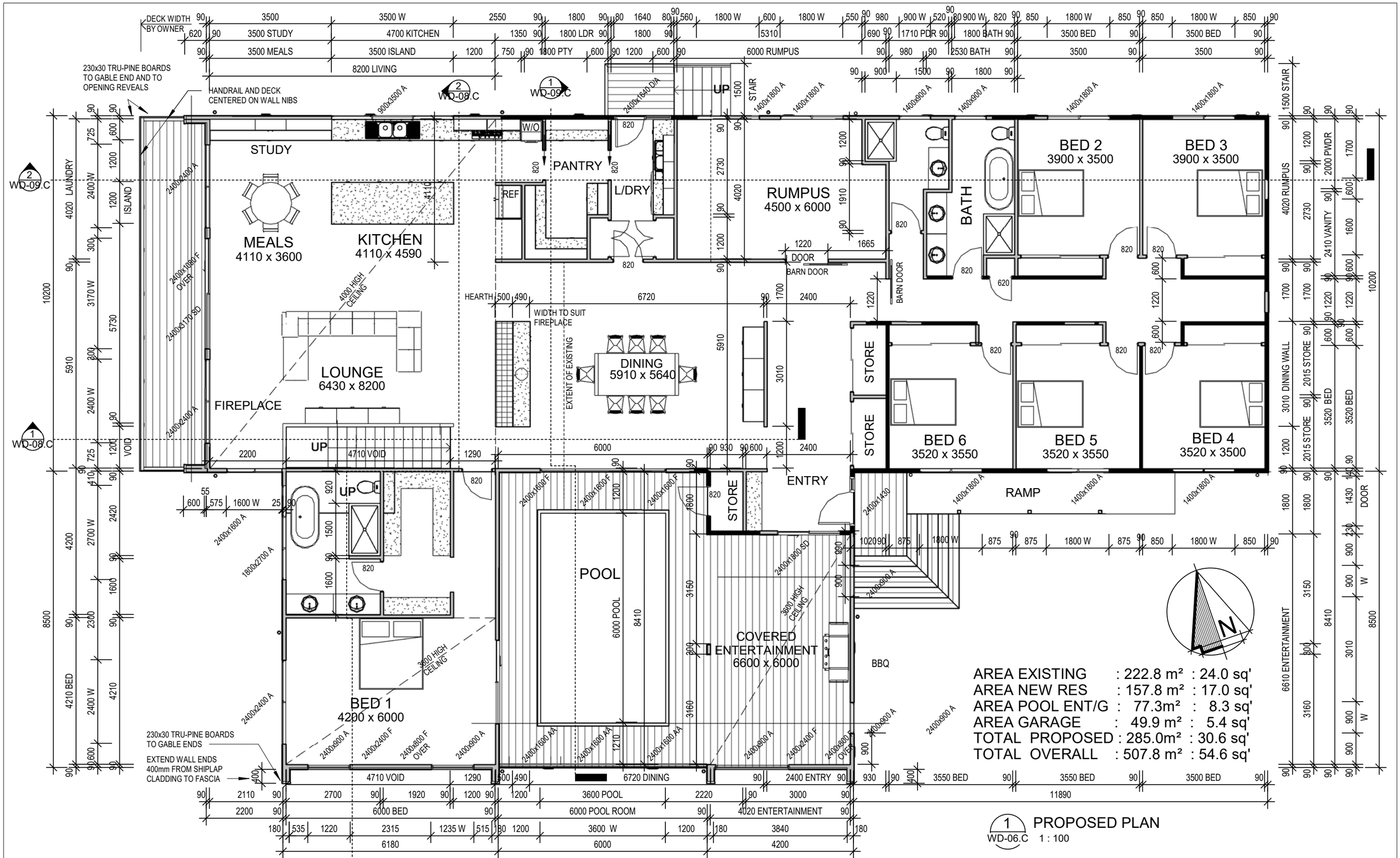

1 WD-06.C PROPOSED PLAN 1 : 100

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MOBILE : 0423 652 834

Revisions

No.	Description.	Date

STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

FLOOR PLAN

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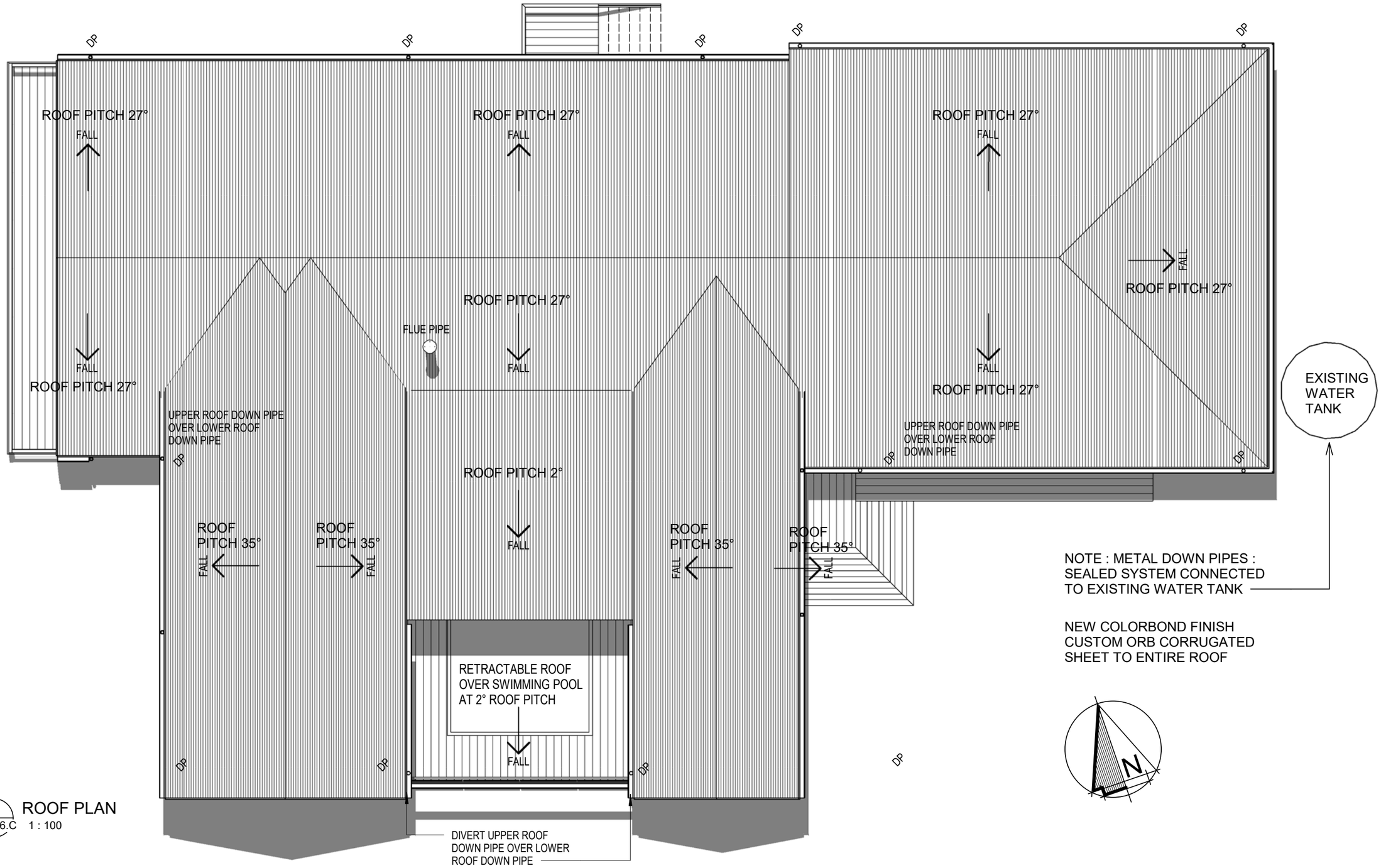

1 ROOF PLAN
WD-06.C 1 : 100

HOMEMADE BUILDERS
HOMEMADE BUILDERS PTY. LTD.
BUILDER REG No. DB-U 45320
MOBILE : 0423 652 834

Revisions

No.	Description.	Date

STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

ROOF PLAN

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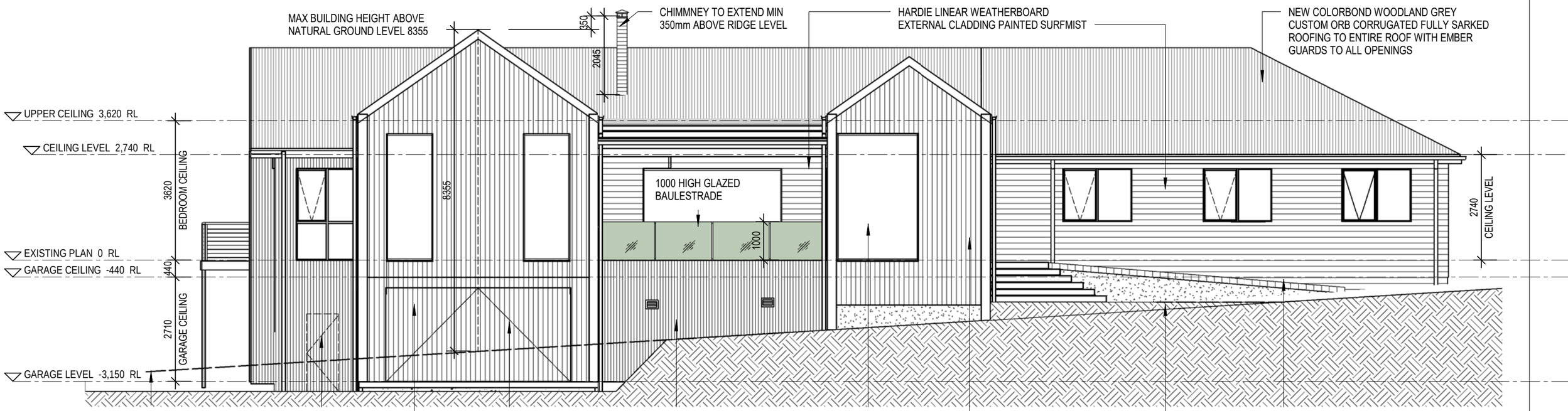
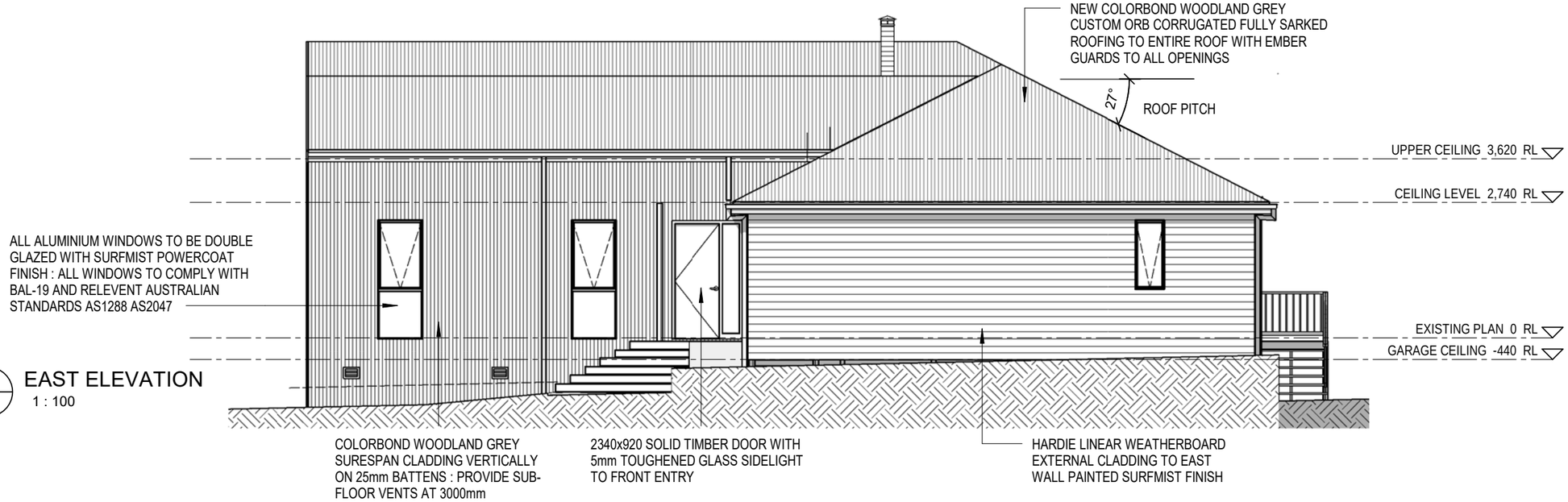


1 South Elevation
1 : 100



2 EAST ELEVATION
1 : 100

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MOBILE : 0423 652 834

Revisions

No.	Description.	Date

STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

ELEVATIONS

Issue Date :	15/01/2024 10:18:03 PM
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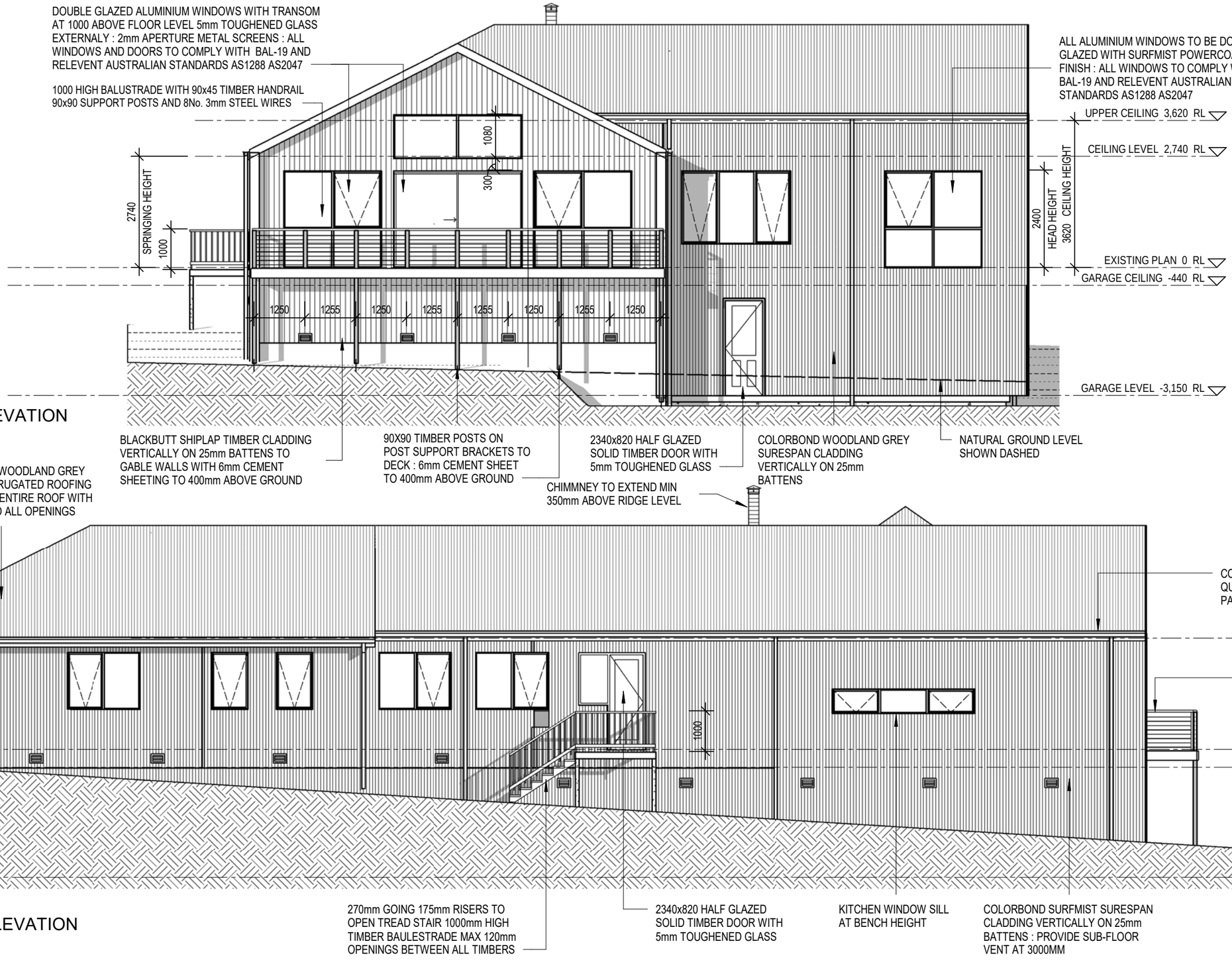

2 WEST ELEVATION
1 : 100

1 NORTH ELEVATION
1 : 100

HOMEMADE BUILDERS
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MOBILE : 0423 652 834

Revisions

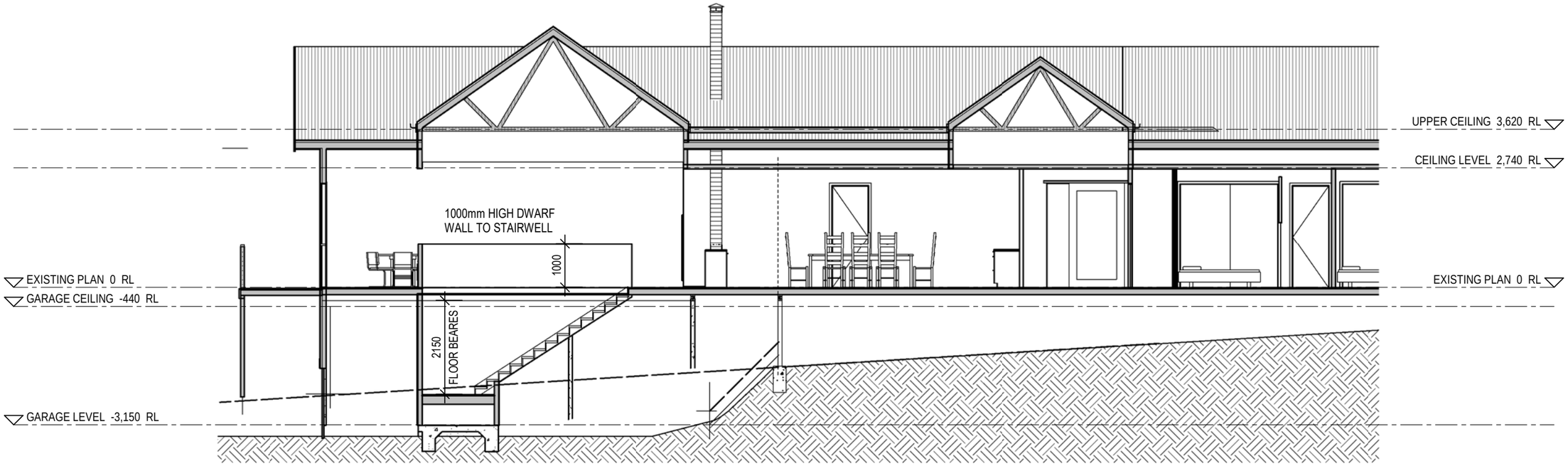
No.	Description.	Date

STRIPLING RESIDENCE

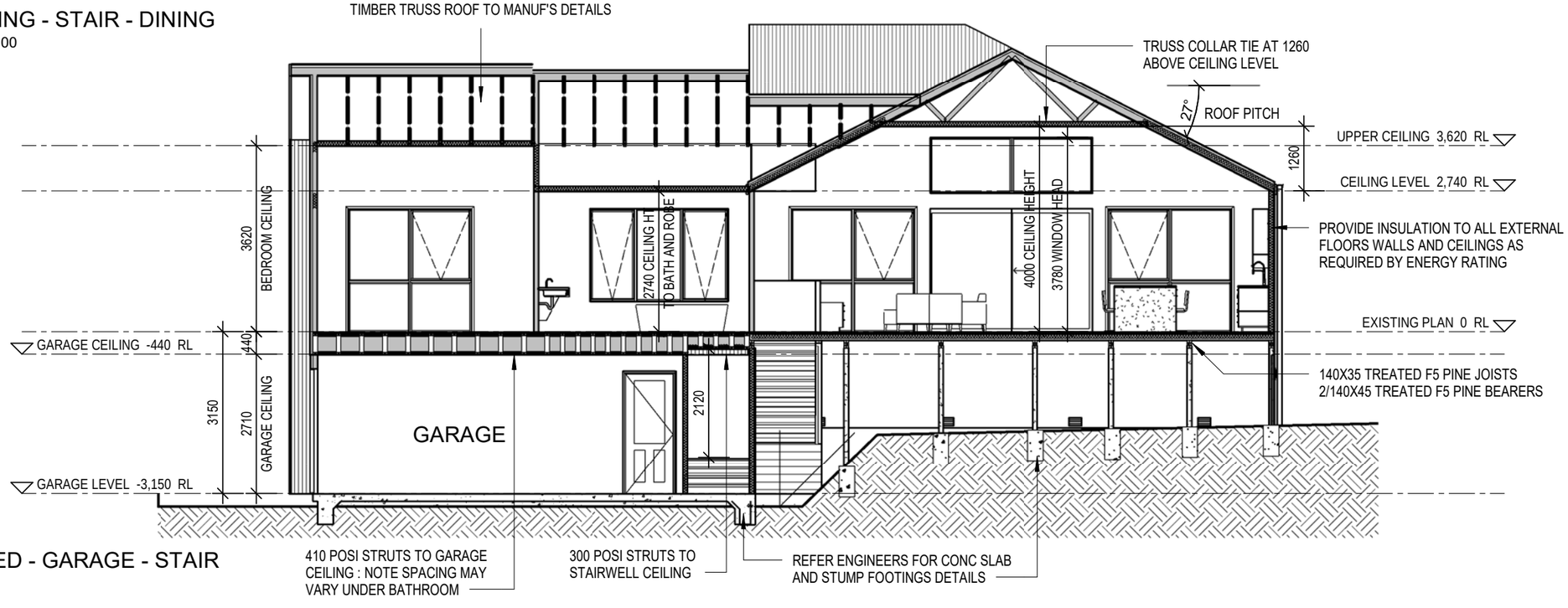
2145 STEIGLITZ ROAD MAUDE

ELEVATIONS

Issue Date :	15/01/2024 10:18:05 PM
Job No :	**1101**
Sheet :	**WD-07.C**
Drawn :	BPN : DB-U 45320



1 LIVING - STAIR - DINING
WD-03.C 1 : 100



2 MASTER BED - GARAGE - STAIR
WD-03.C 1 : 100

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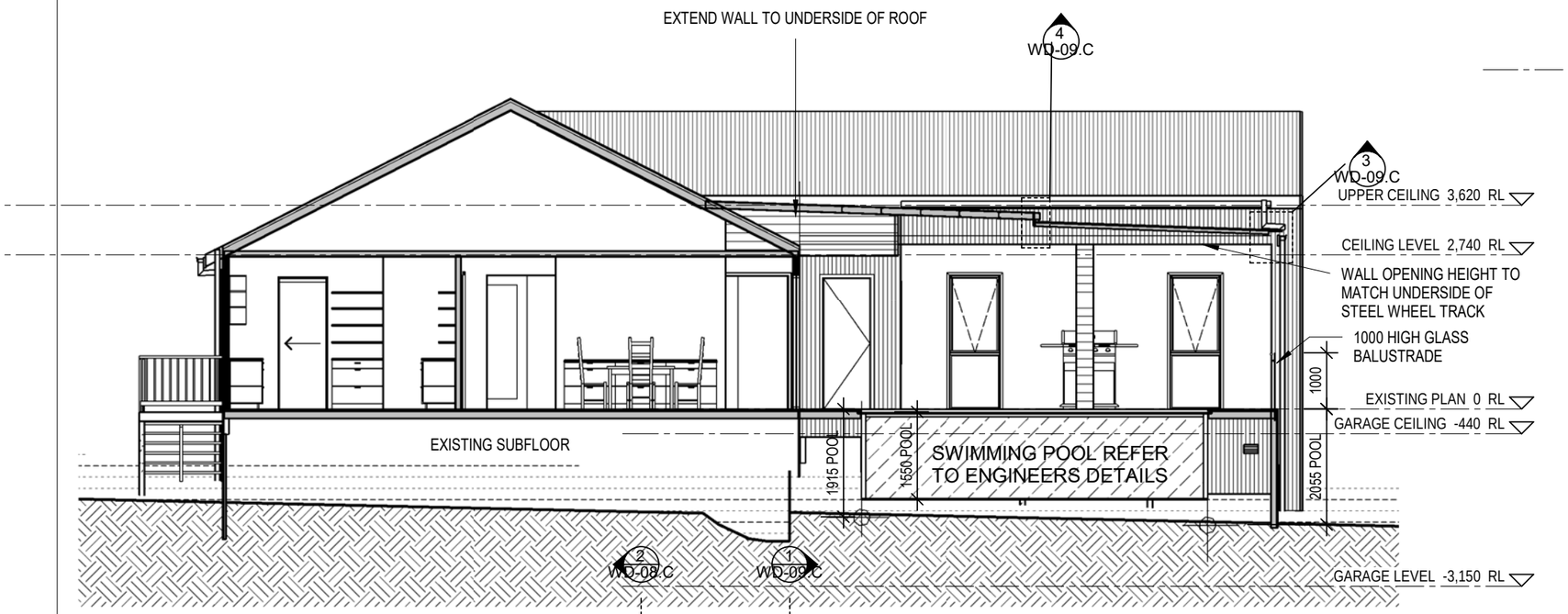
STRIPLING RESIDENCE

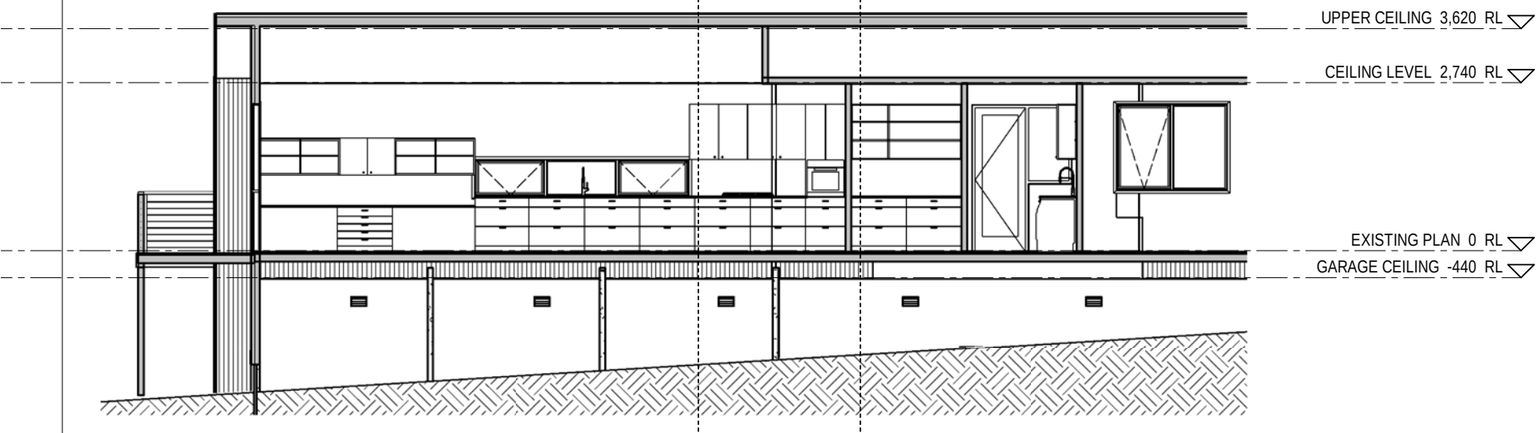
2145 STEIGLITZ ROAD MAUDE

SECTIONS

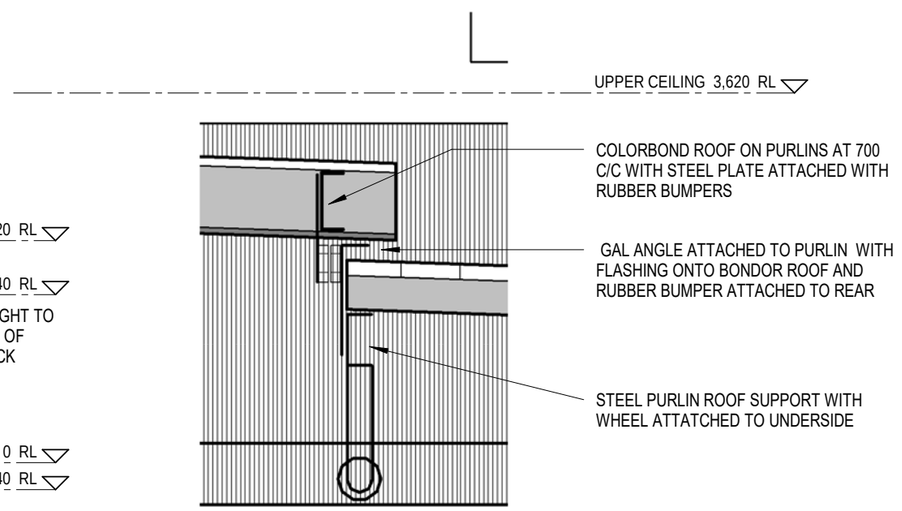
Issue Date :	15/01/2024 10:18:06 PM
Job No :	**1101**
Sheet :	**WD-08.C**
Drawn :	BPN : DB-U 45320



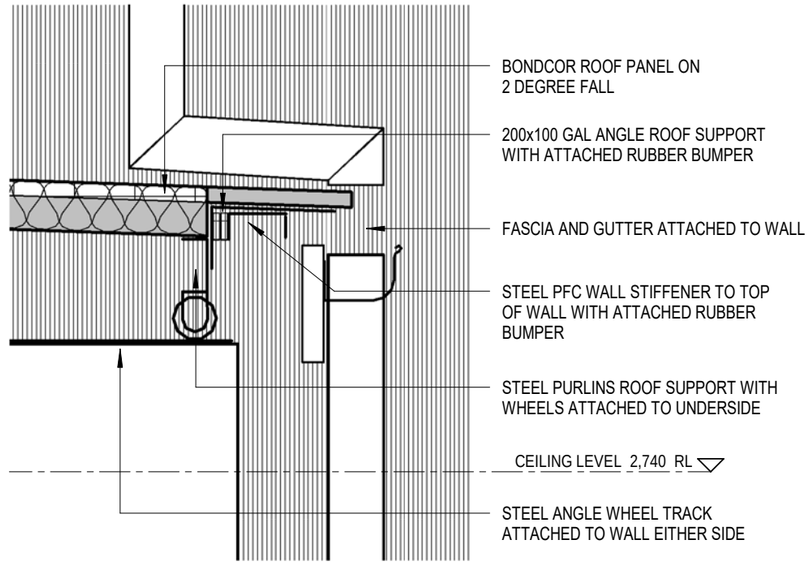
1 WD-03.C 1 : 100 PANTRY - DINING - POOL



2 WD-03.C 1 : 100 STUDY - KITCHEN - ELEVATION



4 WD-09.C 1 : 10 RETRACTABLE ROOF MID DETAIL



3 WD-09.C 1 : 10 RETRACTABLE ROOF END DETAIL

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STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

SECTIONS

Issue Date :	15/01/2024 10:18:07 PM
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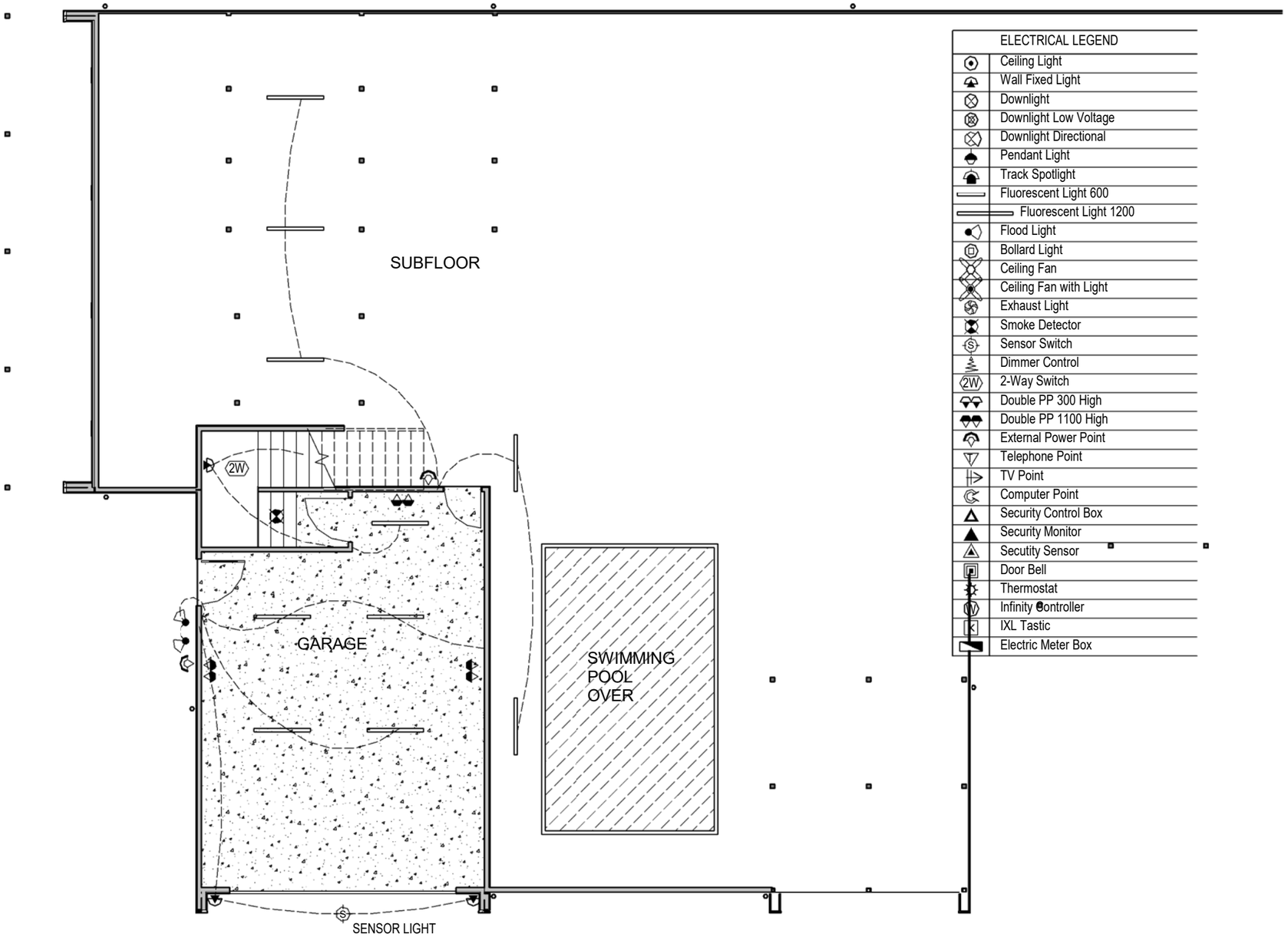
Sheet :	**WD-09.C**
Drawn :	BPN : DB-U 45320



ELECTRICAL LEGEND
Ceiling Light
Wall Fixed Light
Downlight
Downlight Low Voltage
Downlight Directional
Pendant Light
Track Spotlight
Fluorescent Light 600
Fluorescent Light 1200
Flood Light
Bollard Light
Ceiling Fan
Ceiling Fan with Light
Exhaust Light
Smoke Detector
Sensor Switch
Dimmer Control
2-Way Switch
Double PP 300 High
Double PP 1100 High
External Power Point
Telephone Point
TV Point
Computer Point
Security Control Box
Security Monitor
Secutity Sensor
Door Bell
Thermostat
Infinity Controller
IXL Tastic
Electric Meter Box

1 / WD-06.C ELECTRICAL LOWER
1 : 100

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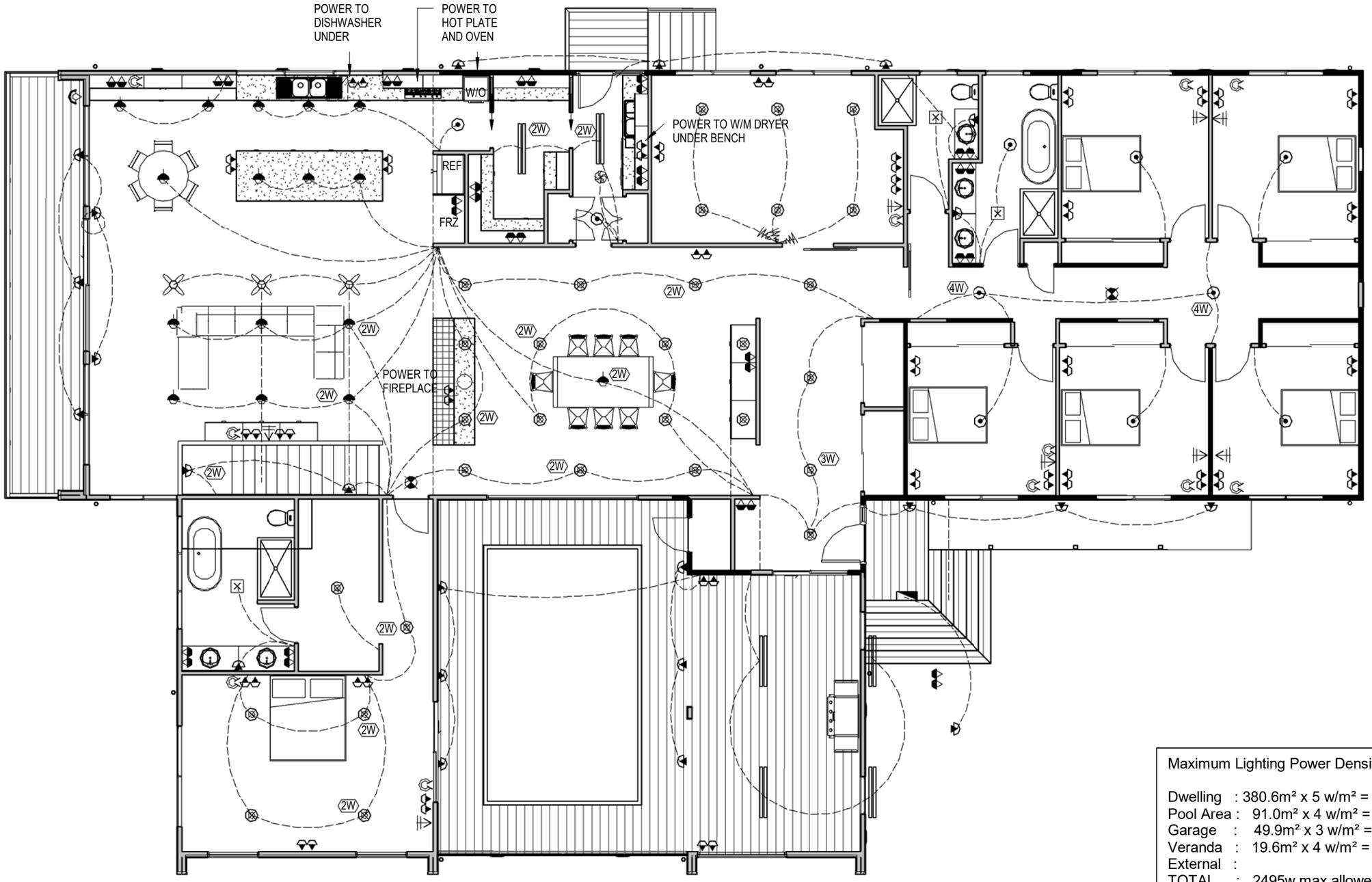
STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

LOWER ELECTRICAL

Issue Date :	15/01/2024 10:18:07 PM
Job No :	**1101**
Sheet :	**WD-10.C**
Drawn :	BPN : DB-U 45320



2 ELECTRICAL UPPER
WD-06.C 1 : 100

ELECTRICAL LEGEND
Ceiling Light
Wall Fixed Light
Downlight
Downlight Low Voltage
Downlight Directional
Pendant Light
Track Spotlight
Fluorescent Light 600
Fluorescent Light 1200
Flood Light
Bollard Light
Ceiling Fan
Ceiling Fan with Light
Exhaust Light
Smoke Detector
Sensor Switch
Dimmer Control
2-Way Switch
Double PP 300 High
Double PP 1100 High
External Power Point
Telephone Point
TV Point
Computer Point
Security Control Box
Security Monitor
Secutity Sensor
Door Bell
Thermostat
Infinity Controller
IXL Tastic
Electric Meter Box

Maximum Lighting Power Density

Dwelling : 380.6m² x 5 w/m² = 1903w max (792w req'd)
Pool Area : 91.0m² x 4 w/m² = 364w max (216w req'd)
Garage : 49.9m² x 3 w/m² = 150w max (72w req'd)
Veranda : 19.6m² x 4 w/m² = 78w max (36w req'd)
External : (234w req'd)
TOTAL : 2495w max allowed / 759w required

LED Globe 12w each : LED Batten / Flood 18w each

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Revisions

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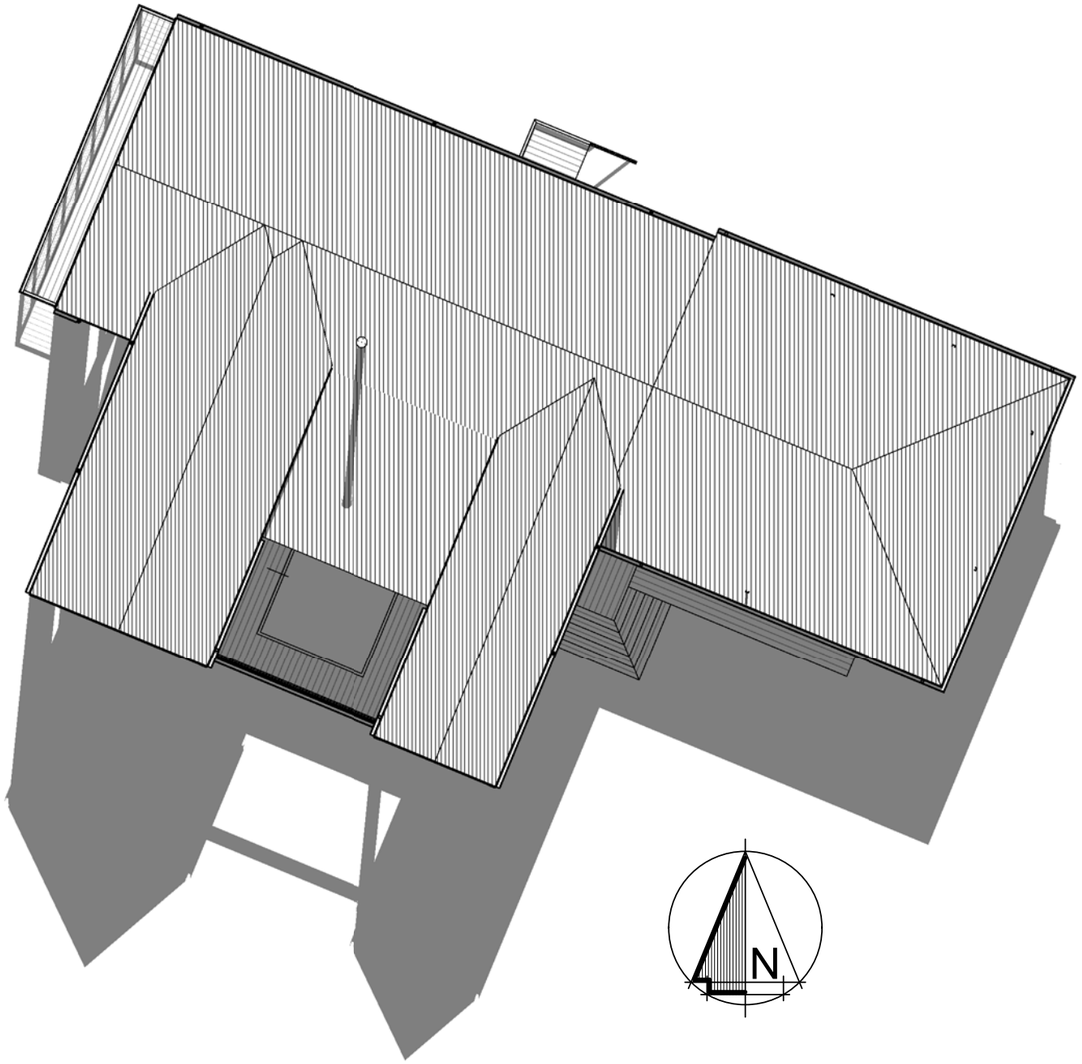
STRIPLING RESIDENCE

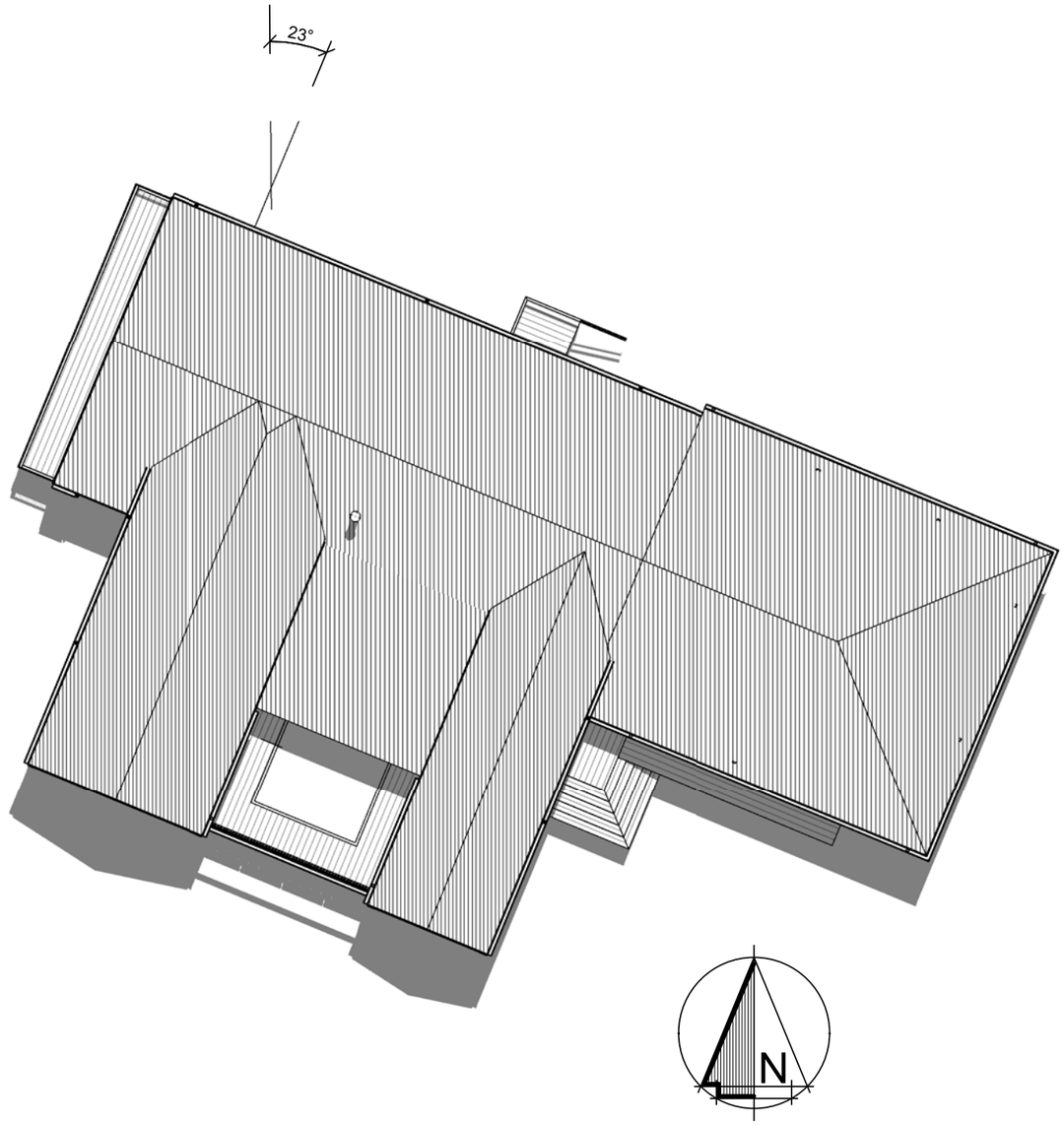
2145 STEIGLITZ ROAD MAUDE

UPPER ELECTRICAL

Issue Date :	15/01/2024 10:18:08 PM
Job No :	**1101**
Sheet :	**WD-11.C**
Drawn :	BPN : DB-U 45320



1 WD-06.C SHADOW PLAN - NOON SEP 22
1 : 200



2 WD-06.C SHADOW PLAN - NOON DEC 22
1 : 200

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Revisions

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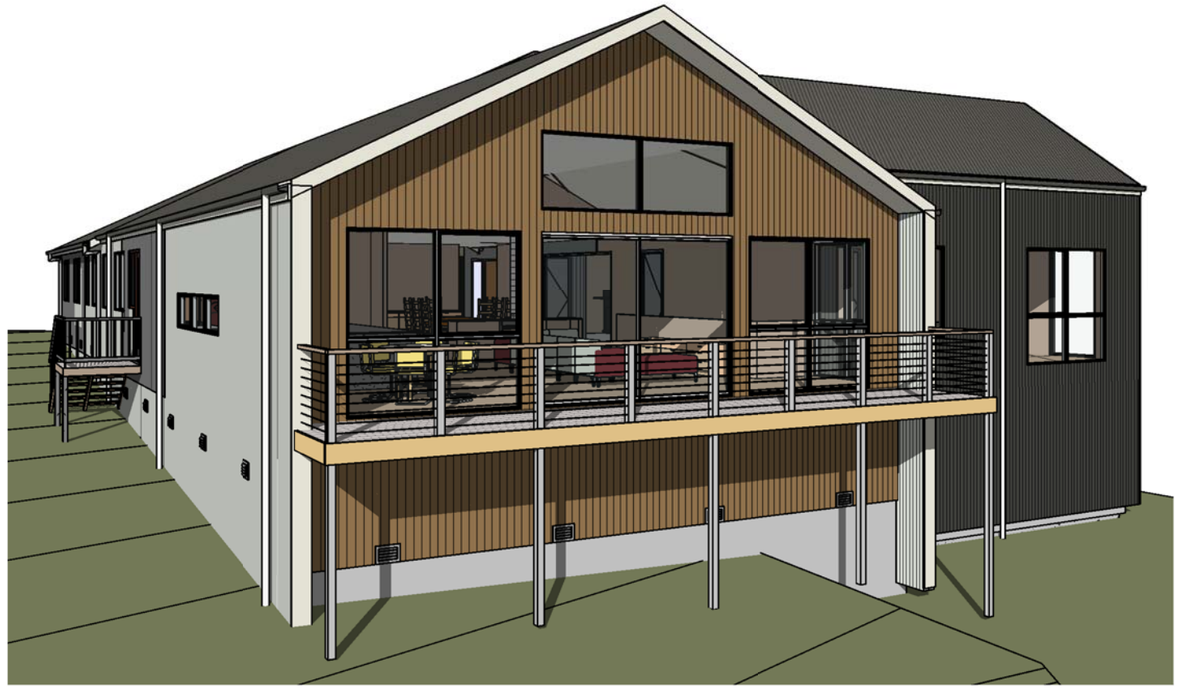
SHADOW PLANS

Issue Date :	15/01/2024 10:18:10 PM
Job No :	**1101**
Sheet :	**WD-12.C**
Drawn :	BPN : DB-U 45320

1 3D View EXT ENTRANCE



2 3D View EXT NORTH WEST

3 3D View EXT SOUTH WEST

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BUILDER REG No. DB-U 45320
MOBILE : 0423 652 834

HOMEMADE BUILDERS

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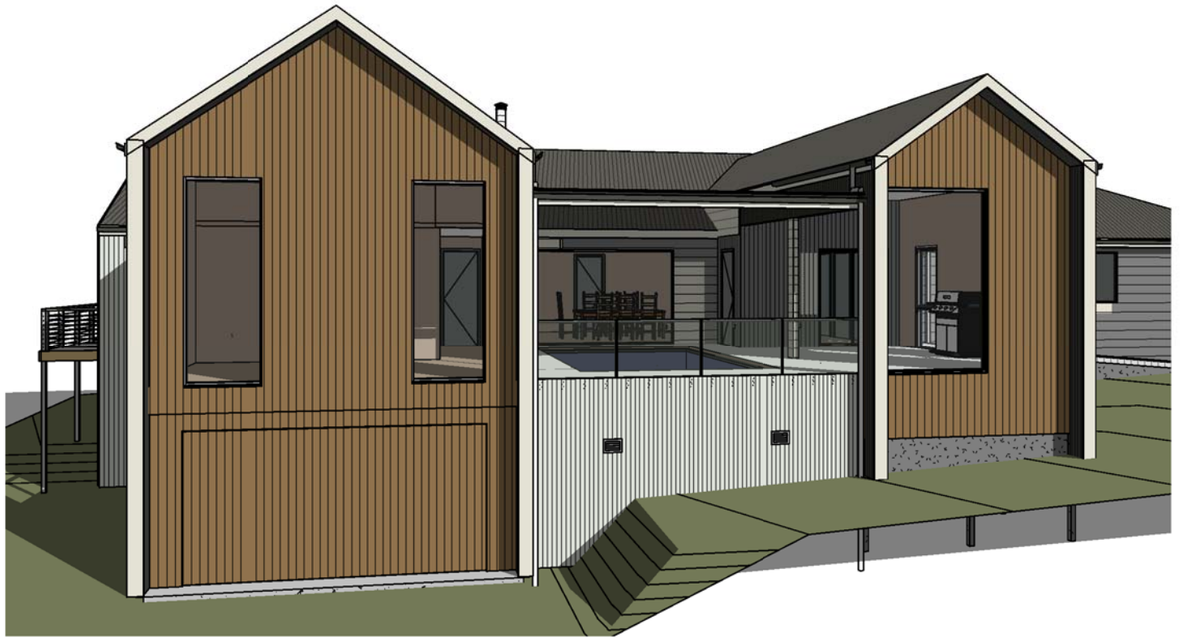
STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

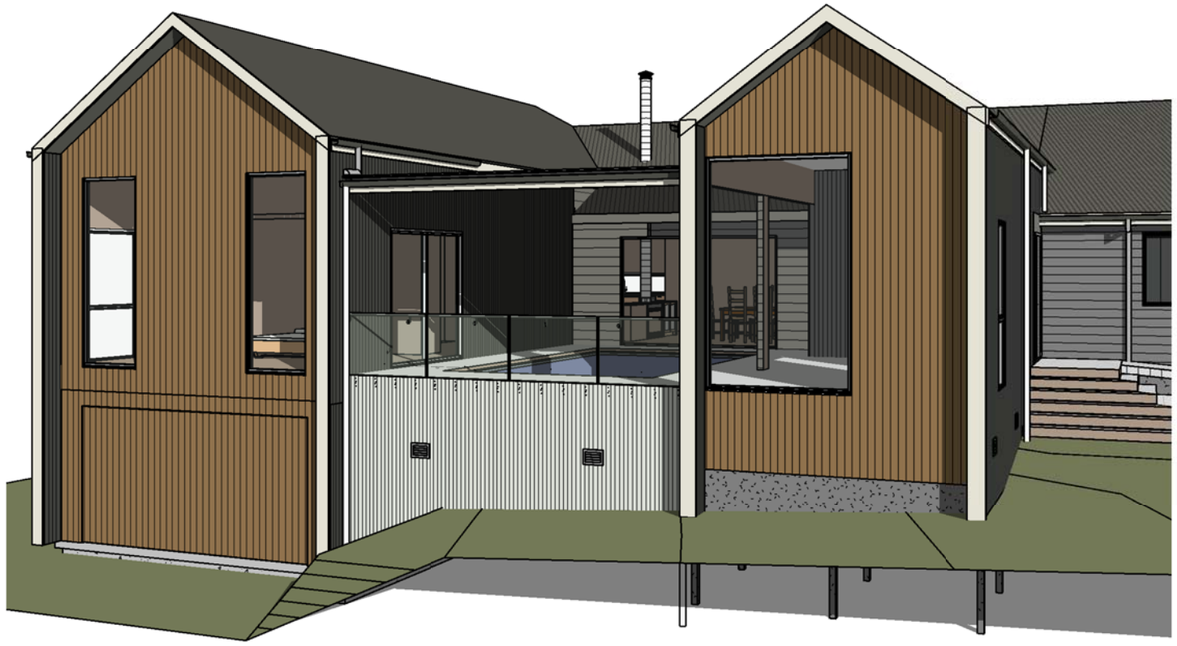
3D VIEWS 1

Issue Date :	15/01/2024 10:18:12 PM
Job No :	**1101**
Sheet :	**WD-13.C**
Drawn :	BPN : DB-U 45320

1 3D View SOUTH WEST



2 3D View SOUTH



3 3D View 3D View SOUTH EAST

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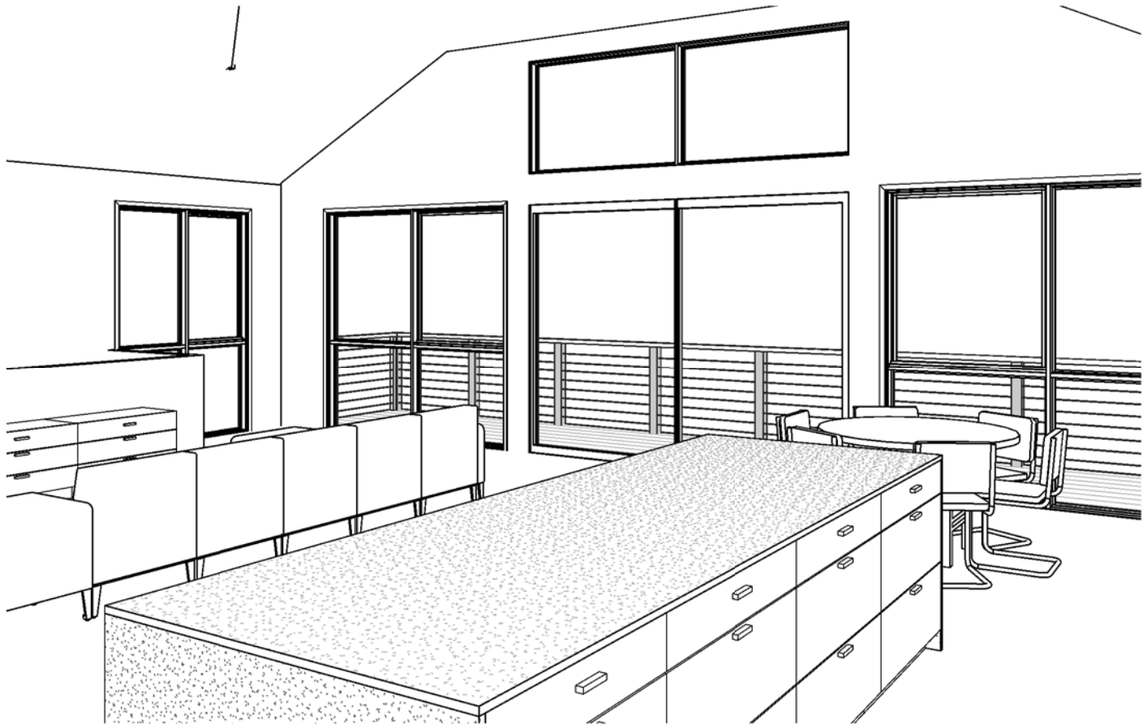
STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

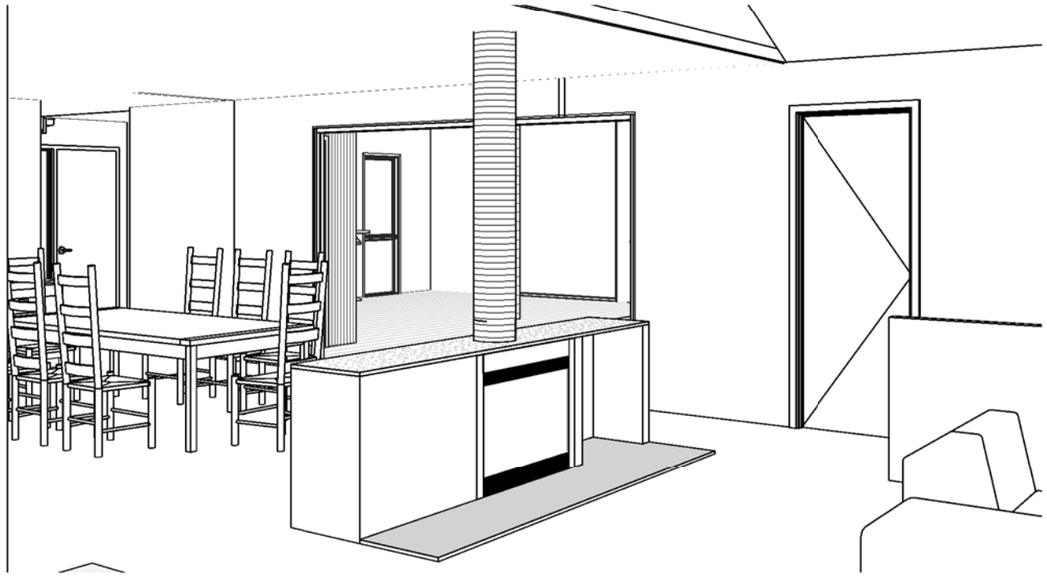
3D VIEWS 2

Issue Date :	15/01/2024 10:18:14 PM
Job No :	**1101**
Sheet :	**WD-14.C**
Drawn :	BPN : DB-U 45320

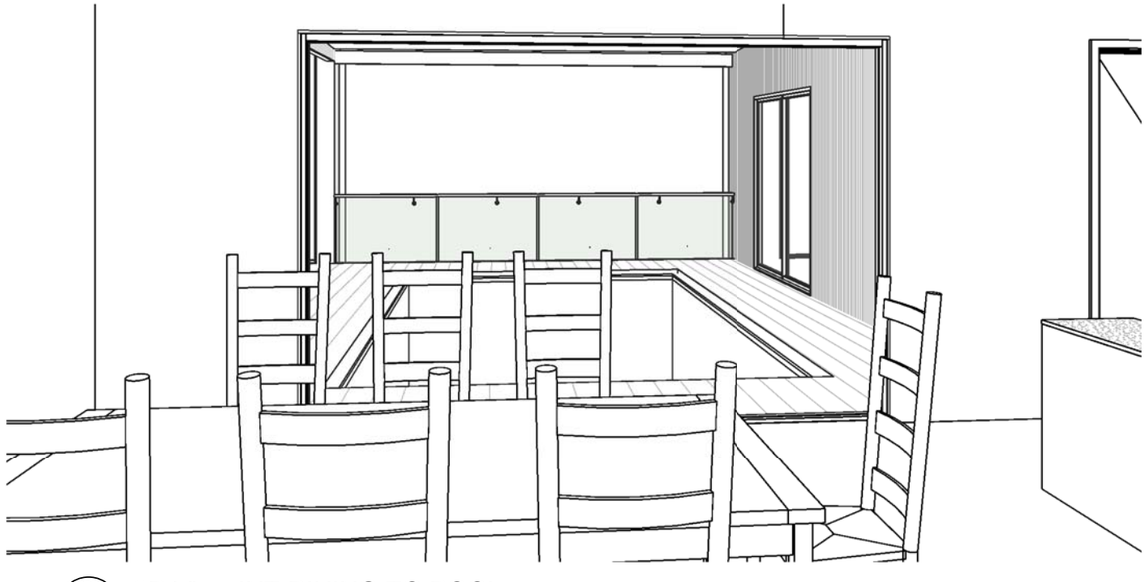
1 3D View INT DINING TO LIVING 2



3 3D View INT KITCHEN TO REAR DECK



4 3D View - INT KITCHEN TO POOL



2 3D View INT DINING TO POOL

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BUILDER REG No. DB-U 45320
MOBILE : 0423 652 834

HOMEMADE BUILDERS

Revisions

No.	Description.	Date

STRIPLING RESIDENCE

2145 STEIGLITZ ROAD MAUDE

3D VIEWS 3

Issue Date :	15/01/2024 10:18:16 PM
Job No :	**1101**
Sheet :	**WD-15.C**
Drawn :	BPN : DB-U 45320

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81 Mornington Street
North Geelong, Vic. 3215
Phone (03) 5277 0769

Grant Stripling – Homemade Builder Pty Ltd

2145 Steiglitz Road

Maude VIC 3331

Proposed Extension
2145 Steiglitz Road
Maude VIC 3331

Project No: 23094

April 2024

Document Name: 23094-Com01 (AM1025)

AMKAD Group Pty Ltd
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Design: DL	Check	REF No. 23093	Date Apr 24	Sheet 1 of 58

Project Ref No: ***23063***

Scope Of Work

Provide design and details of the following:

- Rafters, Lintels and Roof Members
- Floor Joists and Beams
- Pool Decking
- Lintels
- Wall Bracing
- Columns
- Footings, Slab
- Connections

Calculation Method

- Manual calculation
- Structural Toolkit

Design Criteria based on Information Provided by Client

- Colorbond roof sheeting

Conclusion

- Refer to Drawings for layout, member sizes, details and general notes
- These computations shall be read in conjunction with the drawings
- All work shall be in accordance with all relevant Occupational Health and Safety Codes, Practices and Regulations

A) LOADINGS

A-1) Dead Loadings

Roof	Steel Decking	0.10 KPa
	Insulation	0.03 kPa
	Rafters/Trusses	0.15 KPa
	Miscellaneous	0.05 KPa
		0.40 KPa
Walls	Lining (x2)	0.20 KPa
	Studs	0.10 KPa
		0.30 Kpa
Ground Floor	Coverings	0.1 0KPa
	Miscellaneous	0.05 KPa
		0.15 KPa

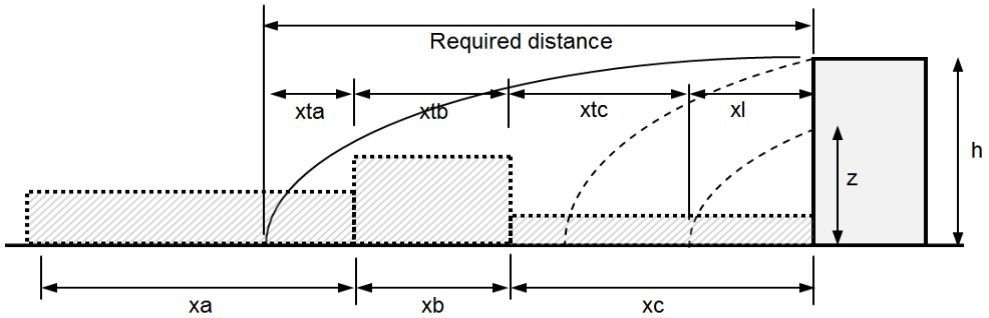
A-2) Live Loadings

Roof	1.8/A+0.25KPa or 0.25KPa	
Floor	Residential - 1.5kPa or 1.4kN	

A-3) Wind Loadings

V^{500} (Importance Level 3.0)		45m/s
Wind Category Mz,cat(Z<10m)	2.0 (Urban)	1.00
Direction Md (Region A5)	West	1.0
Shielding Ms (Shielding parameter s)		1.0
Topographic Multiplier (Mt)		1.0
V_R (Ultimate) =		38m/s
Q_z)(1:500 Ultimate) =		0.82 KPa
Q_z)(1:20 Serviceability) =		1.22 KPa
Coefficients		
	Windward Wall	0.7
	Leeward Wall	0.5
	Roof	0.9
	Internal	+/-0.3

Terrain Category - Cl 4.2



Surface	zo	TC
City buildings (10 to 30m)	2	4.0
Forests	1	3.7
High density metropolitan	0.8	3.6
Centres of small towns	0.4	3.3
Level wooded, suburban buildings	0.2	3.0
Few trees, long grass	0.06	2.5
Crops	0.04	2.3
Isolated trees, uncut grass, airfields, rough open water	0.02	2.0
Cut grass (10mm)	0.008	1.6
Openwater subjected to shoaling waves	0.006	1.5
Desert (stones)	0.006	1.5
Snow, poorly grassed plains, lakes	0.002	1.0

Changes in terrain category **Error - Averaging upstream distance must equal the total distance**

Number of levels =	1	(12 max.)
Total structure height (h) =	4.0	m
Height (z) =	4.0	m
Lag distance at full height (lag = 20*z) =	80	m Cl 4.2.3
Averaging distance max(500, 40*z) =	500	m Cl 4.2.3
Required distance = Averaging distance + Lag dist =	580	m Cl 4.2.3

Zone	xa	xb	xc
TC		3.0	4.0
Distance		700	300
Mz	0.000	0.830	0.750

1000 m total distance > 580m

Is region A0 = N (Y)es,(N)o

Level	Storey Ht (m)	Storey Ht (m)	Height z (m)	Lag - xl (m)	Mz,a	xta (m)	Mz,b	xtb (m)	Mz,c	xtc (m)	Mz,cat
1	4.0	4.0	4.0	80.0	0.000	0	0.830	280	0.750	220	0.795

Design: **(Wind Analysis) A5 - South coast below 30°S from 125°E to the Victoria/NSW border, to 200km inland, Non-temporary structure**
Importance: **All other structures not included in 1,3 or 4, Life = 50 years, Non-Cyclonic, APE = 500 years, APE.Serv = 25 years**
Pressures: **Wu.max = 1.22kPa, Ws/Wu =0.68**

Location - Fig 3.1(A), 3.1(B)

Location = A5 - South coast below 30°S from 125°E to the Victoria/NSW border, to 200km inland
Region = A Figure 3.1(A)
Sub region = 5 Figure 3.1(A)
Cyclonic = N (Y)es, (N)o Table 3.2(A) Circular/polygonal = N (Y)es,(N)o - Cl 3.3(a)

Importance All other structures not included in 1,3 or 4

Importance level = 2 1,2,3,4,(C)ustom
Design working life = 50 Years

Annual prob. of exceedance (APE) = 1/ 500 years AS1170.0 - Table F2
Annual prob. of exceed. Serv. (APE.s) = 1/ 25 years AS1170.0 - Appendix C

Design wind speed (Vdes,q) - Cl 2.3

Ultimate regional wind speed (VR) = 45 m/s For a 1/500 APE - Table 3.1
Serv. regional wind speed (VR.s) = 37 m/s For a 1/25 APE.s - Table 3.1
Climate change multiplier(Mc) = 1.00 Table 3.3

Minimum ultimate speed (Vdes,θ) = 30 m/s - Cl 2.3
Ratio VR.s / VR = 0.82

Ratio Ws / Wu = 0.68

Design wind data for non-cyclonic areas with APE of 1:500 years

Dir (b)	Vdes,θ m/s	Wu kPa	Ws kPa	Dir (b)	Vdes.θ m/s	Wu kPa	Ws kPa
N	42.8	1.10	0.74	**NE**	42.8	1.10	0.74
S	42.8	1.10	0.74	**SW**	45.0	1.22	0.82
E	36.0	0.78	0.53	**SE**	36.0	0.78	0.53
W	45.0	1.22	0.82	**NW**	45.0	1.22	0.82

Site wind data for non-cyclonic areas with APE of 1:500 years

Dir (b)	Md (*1)	VR*Mc*Md m/s	Ave. Ht (z) m	Cat	Mz,cat	Ms	Mt	Vsit,β m/s	Wu.sit kPa
N	0.95	42.8	10	2	1.00	1.00	1.00	42.8	1.10
NE	0.80	36.0	10	2	1.00	1.00	1.00	36.0	0.78
E	0.80	36.0	10	2	1.00	1.00	1.00	36.0	0.78
SE	0.80	36.0	10	2	1.00	1.00	1.00	36.0	0.78
S	0.80	36.0	10	2	1.00	1.00	1.00	36.0	0.78
SW	0.95	42.8	10	2	1.00	1.00	1.00	42.8	1.10
W	1.00	45.0	10	2	1.00	1.00	1.00	45.0	1.22
NW	0.95	42.8	10	2	1.00	1.00	1.00	42.8	1.10

*1 - Refer to Table 3.2 and Cl 3.3, TC interpolated

Member:	**(JS-Roof) 2 / 90mm x 45mm MGP10 (Fully Laminated*)**	
Comp:	**Nc(dl)* = 4.05kN < øNc(dl) = 10.97kN, Nc* = 6.60kN < øNc = 19.77kN**	**OK (0.37,0.33)**
	Ncw* = 3.60kN < øNcw = 23.64kN	**OK (0.15)**
Bending:	**M(dl)* = 0.18kNm < øM(dl) = 0.94kN, M* = 0.30kN < øM = 1.55kNm**	**OK (0.19,0.19)**
	Mw.in* = 1.05kNm < øMwi = 1.65kNm, Mw.out* = 1.16kN < øMwo = 1.65kNm	**OK (0.64,0.70)**
Combined:	**Refer table below**	**OK (0.87)**
Deflection:	**δin = L/216 (16mm), δout = L/228 (15mm)**	**OK**
Reactions:	**(Each end) R.in* = 1.2kN, (Each end) R.out* = 1.2kN**	

Geometry (House member affecting > 25m² or primary building member)

Category = 2 (1) House, (2) Primary building elements, (3) Important

Length (L) = 3400 mm
Centres (cts) = 450 mm

Strong axis eff. length (Lax) = 3400 mm — Edge restrained = B (O)uter,(I)nner,(B)oth
Weak axis eff. length (Lay) = 1200 mm, (C)ontinuous — Bending (Layb) = 1200 mm
Effective length factor (g13) = 0.9 Studs in framing=0.9, Restrained both ends in pos.=1.0, Other cases - Table 3.2

Loadings Wind area too small to apply area reduction

Compression

Dead load (Ndl) = 3.00 kN — Eccentricity (ecc) = 45 mm (+ve increases out)
Live load (Nll) = 2.00 kN — D/2 = 45 mm
Wind load (Nwl*) = kN (Comp.)

Live load duration = Roof
Duration (k1) = 0.94 Table 2.3
Long term LL factor (Ψlp) = 0.00 Table 4.1, AS1170.0
Combination factor (Ψcp) = 0.00 Table 4.1, AS1170.0

Bending

Wall area = 1.5 m² — Apply wind reduction = W (N)one,(S)ide,(W)ind,(L)ee
Ws/Wu = 0.68 — Area reduction (ka) = 1.00 AS 1170.2 Table 5.4

Ult. wind load in (Wu.in) = 1.8 kPa
cpe = 0.7 cpi = 0.2 w.in* = 0.73 kN/m

Ult. wind load out (Wu.out) = 1.8 kPa
cpe = 0.65 cpi = 0.2 w.out* = 0.69 kN/m

Ndl* = 1.35*Ndl = 4.05 kN — M(dl)* = 0.18 kNm
Nc* = 1.2*Ndl+1.5*Nll = 6.60 kN — M* = 0.30 kNm
Ncw* = 1.2*Ndl + Nwl* + 1.5*Ψc*Nll = 3.60 kN — Mwi* = 0.00 kNm
Mwo* = 0.16 kNm

Horz. Point loads

Wind load (pwl.in*) = kN — Position = 1700 mm from bottom
Wind load (pwl.out*) = kN

w.in* =	0.73 kN/m	w.out* =	0.69 kN/m	R.in* =	1.2 kN
p.in* =	0.00 kN	p.out* =	0.00 kN	R.out* =	1.2 kN
Mw.in* =	1.05 kNm	Mw.out* =	1.16 kNm		

Axial Capacity - Cl 3.3

Member =	2 / 90mm x 45mm MGP10	Area (A) =	8100 mm²
Description =	MGP10 seasoned softwood	Section modulus (Zx) =	121.5 x10³ mm³
Design depth (dD) =	90 mm	Section modulus (Zy) =	121.5 x10³ mm³
Design width (dW) =	90 mm	Stiffness (Ix) =	5.47 x10⁶ mm⁴
		Stiffness (Iy) =	5.47 x10⁶ mm⁴
		Modulus of elasticity (E) =	10000 MPa - Table H3.1

S3x =min(g13*L/dD & Lax/dD) =	34.00	k12cx =	0.206	for ρc*S3x ≥ 20 - Cl 3.3.3
S4y = min(g13*L/dW & Lay/dW) =	13.33	k12cy =	0.889	for 10 < ρc*S4y ≤ 20 - Cl 3.3.3
Critical S =	34.00	k12c =	0.206	for ρc*S ≥ 20 - Cl 3.3.3
		k12cd =	0.189	for ρcd*S ≥ 20 - Cl 3.3.3
		k12cw =	0.232	for ρcw*S ≥ 20 - Cl 3.3.3

			f'c =	18.0 MPa
Strength reduction factor (ø) =	0.7	Table 2.1	f't =	7.7 MPa
øNc(dl) = ø*0.57*k4*k6*k12cd*f'c*A =	11.0	kN	Material constant (ρcd) =	0.96 (rcd=0.25)
øNc = ø*k1*k4*k6*k12c*f'c*A =	19.8	kN	Material constant (ρc) =	0.92 (rc=0.45)
øNcw = ø*(k1=1)*k4*k6*k12cw*f'c*A =	23.6	kN	Material constant (ρcw) =	0.86 (rcw=1.00)
			Moisture factor (k4) =	1.00
			Temp. factor (k6) =	1.00
			Size modifier (mod.c) =	1.00

Bending Capacity - Cl 3.2

S1i = (dD/dW)^1·35*(Lay/dD)^0·25 =	1.91	for tension edge restrained - Cl 3.2.3.2
S1o = (dD/dW)^1·35*(Lay/dD)^0·25 =	1.91	for tension edge restrained - Cl 3.2.3.2

k12di =	1.000	for ρbd*S1i ≤ 10 - Cl 3.2.4	k12do =	1.000 for ρbd*S1o ≤ 10 - Cl 3.2.4
k12i =	1.000	for ρb*S1i ≤ 10 - Cl 3.2.4	k12o =	1.000 for ρb*S1o ≤ 10 - Cl 3.2.4
k12wi =	1.000	for ρbi*S1i ≤ 10 - Cl 3.2.4	k12wo =	1.000 for ρbo*S1o ≤ 10 - Cl 3.2.4

			f'b =	17.0 MPa
Strength reduction factor (ø) =	0.7	Table 2.1	Material constant (ρbd) =	0.75 (rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*min(k12di,k12do)*f'b*Zx =	0.94	kNm	Material constant (ρb) =	0.69 (rb=1.00)
øM = ø*k1*k4*k6*k9*min(k12i,k12o)*f'b*Zx =	1.55	kNm	Material constant (ρbi) =	0.69 (rbi=1.00)
øMwi = ø*(k1=1)*k4*k6*k9*k12wi*f'b*Zx =	1.65	kNm	Stress reversal (ρbo) =	0.69 (rbo=1.00)
øMwo = ø*(k1=1)*k4*k6*k9*k12wo*f'b*Zx =	1.65	kNm	Duration factor (k1) =	0.94
			Moisture factor (k4) =	1.00
			Temp. factor (k6) =	1.00
			Sharing factor (k9) =	1.14
			Size modifier (mod.b) =	1.00

Combined - Cl 3.5.1 & Appendix E5

Comp/Bend	Nc(dl)*	Nc*	Ncw*
Minor buckling	0.12	0.11	0.53
Major buckling	0.53	0.53	0.87

Member:	**(DS) 2 / 90mm x 45mm MGP10 (Fully Laminated*)**	
Comp:	**Nc(dl)* = 5.40kN < øNc(dl) = 13.59kN, Nc* = 10.80kN < øNc = 25.22kN**	**OK (0.40,0.43)**
	Ncw* = 4.80kN < øNcw = 29.27kN	**OK (0.16)**
Bending:	**M(dl)* = 0.24kNm < øM(dl) = 0.94kN, M* = 0.49kN < øM = 1.55kNm**	**OK (0.26,0.31)**
	Mw.in* = 0.00kNm < øMwi = 1.65kNm, Mw.out* = 0.22kN < øMwo = 1.65kNm	**OK (0.00,0.13)**
Combined:	**Refer table below**	**OK (0.74)**
Deflection:	**δin = L/- (0mm), δout = L/- (0mm)**	**OK**
Reactions:	**(Each end) R.in* = 0.0kN, (Each end) R.out* = 0.0kN**	

Geometry (House member affecting > 25m² or primary building member)

Category = 2 (1) House, (2) Primary building elements, (3) Important

Length (L) = 3200 mm
Centres (cts) = 0 mm

Strong axis eff. length (Lax) = 2750 mm — Edge restrained = B (O)uter,(I)nner,(B)oth
Weak axis eff. length (Lay) = 1100 mm, (C)ontinuous — Bending (Layb) = 1000 mm
Effective length factor (g13) = 0.9 Studs in framing=0.9, Restrained both ends in pos.=1.0, Other cases - Table 3.2

Loadings Wind area reduction not applied

Compression

Dead load (Ndl) = 4.00 kN — Eccentricity (ecc) = 45 mm (+ve increases out)
Live load (Nll) = 4.00 kN — D/2 = 45 mm
Wind load (Nwl*) = kN (Comp.)

Live load duration = Roof
Duration (k1) = 0.94 Table 2.3
Long term LL factor (Ψlp) = 0.00 Table 4.1, AS1170.0
Combination factor (Ψcp) = 0.00 Table 4.1, AS1170.0

Bending

Wall area = 0.0 m² — Apply wind reduction = N (N)one,(S)ide,(W)ind,(L)ee
Ws/Wu = 0.68 — Area reduction (ka) = 1.00 AS 1170.2 Table 5.4

Ult. wind load in (Wu.in) = 2 kPa
cpe = 0.7 cpi = 0.2 w.in* = 0.00 kN/m

Ult. wind load out (Wu.out) = 2 kPa
cpe = 0.65 cpi = 0.2 w.out* = 0.00 kN/m

Ndl* = 1.35*Ndl = 5.40 kN — M(dl)* = 0.24 kNm
Nc* = 1.2*Ndl+1.5*Nll = 10.80 kN — M* = 0.49 kNm
Ncw* = 1.2*Ndl + Nwl* + 1.5*Ψc*Nll = 4.80 kN — Mwi* = 0.00 kNm
Mwo* = 0.22 kNm

Horz. Point loads

Wind load (pwl.in*) = kN — Position = 1600 mm from bottom
Wind load (pwl.out*) = kN

w.in* =	0.00 kN/m	w.out* =	0.00 kN/m	R.in* =	0.0 kN
p.in* =	0.00 kN	p.out* =	0.00 kN	R.out* =	0.0 kN
Mw.in* =	0.00 kNm	Mw.out* =	0.22 kNm		

Axial Capacity - Cl 3.3

Member =	2 / 90mm x 45mm MGP10	Area (A) =	8100 mm²
Description =	MGP10 seasoned softwood	Section modulus (Zx) =	121.5 x10³ mm³
Design depth (dD) =	90 mm	Section modulus (Zy) =	121.5 x10³ mm³
Design width (dW) =	90 mm	Stiffness (Ix) =	5.47 x10⁶ mm⁴
		Stiffness (Iy) =	5.47 x10⁶ mm⁴
		Modulus of elasticity (E) =	10000 MPa - Table H3.1

S3x =min(g13*L/dD & Lax/dD) =	30.56	k12cx =	0.263	for ρc*S3x ≥ 20 - Cl 3.3.3
S4y = min(g13*L/dW & Lay/dW) =	12.22	k12cy =	0.948	for 10 < ρc*S4y ≤ 20 - Cl 3.3.3
Critical S =	30.56	k12c =	0.263	for ρc*S ≥ 20 - Cl 3.3.3
		k12cd =	0.234	for ρcd*S ≥ 20 - Cl 3.3.3
		k12cw =	0.287	for ρcw*S ≥ 20 - Cl 3.3.3

				f'c =	18.0 MPa
Strength reduction factor (ø) =	0.7	Table 2.1		f't =	7.7 MPa
øNc(dl) = ø*0.57*k4*k6*k12cd*f'c*A =	13.6	kN		Material constant (ρcd) =	0.96 (rcd=0.25)
øNc = ø*k1*k4*k6*k12c*f'c*A =	25.2	kN		Material constant (ρc) =	0.90 (rc=0.56)
øNcw = ø*(k1=1)*k4*k6*k12cw*f'c*A =	29.3	kN		Material constant (ρcw) =	0.86 (rcw=1.00)
				Moisture factor (k4) =	1.00
				Temp. factor (k6) =	1.00
				Size modifier (mod.c) =	1.00

Bending Capacity - Cl 3.2

S1i = (dD/dW)^1.35*(Lay/dD)^0.25 =	1.83 for tension edge restrained - Cl 3.2.3.2
S1o = (dD/dW)^1.35*(Lay/dD)^0.25 =	1.83 for tension edge restrained - Cl 3.2.3.2

k12di =	1.000	for ρbd*S1i ≤ 10 - Cl 3.2.4	
k12i =	1.000	for ρb*S1i ≤ 10 - Cl 3.2.4	
k12wi =	1.000	for ρbi*S1i ≤ 10 - Cl 3.2.4	
k12do =	1.000	for ρbd*S1o ≤ 10 - Cl 3.2.4	
k12o =	1.000	for ρb*S1o ≤ 10 - Cl 3.2.4	
k12wo =	1.000	for ρbo*S1o ≤ 10 - Cl 3.2.4	

				f'b =	17.0 MPa
Strength reduction factor (ø) =	0.7	Table 2.1		Material constant (ρbd) =	0.75 (rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*min(k12di,k12do)*f'b*Zx =	0.94	kNm		Material constant (ρb) =	0.69 (rb=1.00)
øM = ø*k1*k4*k6*k9*min(k12i,k12o)*f'b*Zx =	1.55	kNm		Material constant (ρbi) =	0.69 (rbi=1.00)
øMwi = ø*(k1=1)*k4*k6*k9*k12wi*f'b*Zx =	1.65	kNm		Stress reversal (ρbo) =	0.69 (rbo=1.00)
øMwo = ø*(k1=1)*k4*k6*k9*k12wo*f'b*Zx =	1.65	kNm		Duration factor (k1) =	0.94
				Moisture factor (k4) =	1.00
				Temp. factor (k6) =	1.00
				Sharing factor (k9) =	1.14
				Size modifier (mod.b) =	1.00

Combined - Cl 3.5.1 & Appendix E5

Comp/Bend	Nc(dl)*	Nc*	Ncw*
Minor buckling	0.16	0.22	0.07
Major buckling	0.61	0.74	0.31

Member:	**(C01, C02) 89 x 5.0 SHS (G450) (Manual moments specified)**	
Compression:	**Nc* = 46.5kN < øNc = 272.4kN**	**OK (0.17)**
Bending:	**Mx* = 2.1kNm < øMb(3200,αm=1.75) = 19.9kNm**	**OK (0.10)**
	No minor bending	
Combined:	**In-plane = 0.27, Out-of-plane = 0.27**	**OK (0.27)**

Geometry

Column length (L) =	3200	mm	L = Lb = Lx = Ly =	Y	(Y)es,(N)o
Compression:					
Major axis length (Lx) =	3200	mm			
Minor axis length (Ly) =	3200	mm			
Effective length X factor (kex) =	1.00	Fig 4.6.3.2			
Effective length Y factor (key) =	1.00	Fig 4.6.3.2	Holes =	0	mm² (axial reduction only)
Bending:					
Bending length (Lb) =	3200	mm	Eff. length Lex(3200,1.00) =	3200	mm
Bending effective length factor (ke) =	1.00	Cl 5.6.3	Eff. length Ley(3200,1.00) =	3200	mm
Moment modification factor (αm) =	1.75	Cl 5.6.1.1(a)	Eff. length Leb(3200,1.00) =	3200	mm

Loadings S.Wt = 0.12 kN/m (excluded)

				Elastic Analysis	
Dead load comp. (Ndl) =	20.0	kN	Analysis type =	1	(1)st order,(2)nd order
Live load comp. (Nll) =	15.0	kN	Type =	B	(B)raced/(S)way - Cl 4.1.2
Nc* = 1.2*Ndl+1.5*Nll =	46.5	kN	βm =	0.0	cm = 0.60
			δbx = cm/(1-N*/Nomx) =	1.00	and δby = 1.00
Beam End Connection (For moment) =	M	(C)ap,(F)ace,(M)anual,(L)oading			
Major axis (Mx*=δbx.Mx*) =	2.1	kNm	Major bending (Mx*) =	2.1	kNm
Minor axis My*=δby.My* =	0.0	kNm - App. E	Minor bending (My*) =	0.0	kNm

Capacity Section doubly symmetric

Description =	89 x 5.0 SHS (G450)		Warping constant (Iw) =	0	x10⁹ mm⁶
Flange yield (fyf) =	450	MPa	Torsional constant (J) =	3060	x10³ mm⁴
Web yield (fyw) =	450	MPa	Effective section mod. (Zex) =	49.2	x10³ mm³
Area (Ag) =	1590	mm²	Effective section mod. (Zey) =	49.2	x10³ mm³
Stiffness (Ix) =	1.82	x10⁶ mm⁴	Elastic modulus (E) =	200000	MPa - Cl 1.4
Stiffness (Iy) =	1.82	x10⁶ mm⁴	Shear modulus (G) =	80000	MPa - Cl 1.4
rx =	33.8	mm	αb =	-0.5	(Comp.)
ry =	33.8	mm	Net area (An) =	1590	mm²

			Nomx = π²*E*Ix/(kex*Lx)² =	351	kN - Cl 4.6.2
Compression - Section 6			Nomy = π²*E*Iy/(key*Ly)² =	351	kN
ø =	0.9	Table 3.4	øNs = ø*kf*An*fy =	644.0	kN - Cl 6.2.1
αcx (Lex) =	0.423		øNcx = øNs*αcx =	272.4	kN - Cl 6.3.3
αcx1 (kex=1, Lex=Lx) =	0.423		øNcy = øNs*αcy =	272.4	kN - Cl 6.3.3
αcy (Ley) =	0.423		øNc =	272.4	kN
αcy1 (key=1, Ley=Ly) =	0.423		øNcx1 = øNs*αcx1 =	272.4	kN - Cl 8.4.2.2
			øNcy1 = øNs*αcy1 =	272.4	kN - Cl 8.4.2.2

Bending - Section 5

ø =	0.9	Table 3.4				øMsy =	19.9 kNm
Msx = min(fyf,fyw)*Zex =	22.1	kNm - Cl 5.2.1	øMsx =	19.9	kNm	øMbx =	19.9 kNm
Moa =	293.1	kNm	αs = 0.995		αm = 1.75	øMbx(αm=1) =	19.8 kNm

Combined - Section 8

Uniaxial bending about major axis - øMrxc = øMsx*(1-Nc*/øNs) =	18.5	kNm - Cl 8.3.2	OK (0.11)
In-plane capacity - øMixc = øMsx*(1-Nc*/øNcx1) =	16.5	kNm - Cl 8.4.2.2	OK (0.13)
Out-of-plane capacity - øMoxc = øMbx*(1-Nc*/øNcy) =	16.5	kNm - Cl 8.4.4.1	OK (0.13)
In-plane member ratio = Mx*/øMsx + Nc*/øNcx1 =	0.27		OK (0.27)
In-plane member ratio = My*/øMsy + Nc*/øNcy1 =	0.17		OK (0.17)
Out-of-plane member ratio = Mx*/øMbx + Nc*/øNcy =	0.27		OK (0.27)
øMcx = min(øMoxc & øMixc) =	16.5	kNm - Cl 8.4.5	
øMiyc = øMsy*(1-Nc*/øNcy1) =	16.5	kNm - Cl 8.4.2.2	
Biaxial bending ratio = (Mx*/øMcx)^1.4 + (My*/øMiy)^1.4 =	0.05	Cl 8.4.5	OK (0.05)
Biaxial section ratio = Nc*/øNs + Mx*/øMsx + My*/øMsy =	0.18		OK (0.18)

Beam:	**(R01) 190mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 1.09kNm (+ve) < øM(dl) = 2.19kNm, M* = 3.07kNm (+ve) < øM = 3.60kNm**	**OK (0.50,0.85)**
	Mw* = 2.57kNm (-ve) < øMw = 3.84kNm	**OK (0.67)**
Shear:	**V(dl)* = 1.09kN < øV(dl) = 7.29kN, V* = 3.07kN < øV = 12.03kN**	**OK (0.15,0.25)**
	Vw* = 2.57kN < øVw = 12.79kN	**OK (0.20)**
Deflection:	**δDL = L/383 (10mm) , δΨs.LL = L/551 (7mm), δWLs = L/276 (-15mm)**	**OK**
Reactions:	**(Each end) Rdl = 0.81kN, Rll = 1.40kN, Rwl* = -3.29kN, R.dn* = 3.07kN, R.up* = 2.57kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important		House =	N	(Y)es,(N)o
Span (L) =	4000 mm	Edge restrained (down) =	C	(T)ension,(C)ompression,(B)oth	
Centres (cts) =	900 mm	Lay.t (Top) =	900	mm	
Span type =	S (S)ingle,(D)ouble				

Loadings

Roof area (A) =	3.60 m²	Apply wind reduction =	Y	(Y)es,(N)o			
LL = 1.8/A+0.12 ≥ 0.25 =	0.62 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) =	kPa *	900 mm +		kN/m =	0.00	kN/m	
Include S.Wt =	Y (Y)es,(N)o			S.Wt =	0.04	kN/m	
				Σwdl =	0.40	kN/m	

Uniform live loads

Roof live load (wll) =	0.62 kPa *	900 mm +		kN/m =	0.56	kN/m	
Other live load (wll) =	kPa *	900 mm +		kN/m =	0.00	kN/m	
Alternate point live load =	1.40 kN (critical)	Distr. to	1	members	Σwll =	0.70	kN/m

Uniform wind loads

Ult. wind load (Wu) =	1.22 kPa *	900 mm				
Cp,e =	1.5	Cp,i =	0	Σwwl* =	-1.65	kN/m (up)

Point loads

Dead load (pdl) =	kN	Position =	2000	mm from LHS	
Live load (pll) =	kN	Shear using PL at support =	Y	(Y)es,(N)o	
Wind load (pwl*) =	kN (-ve up)				

w(dl)* = 1.35*wdl =	0.54 kN/m	M(dl)* =	1.09	kNm (Max at 2000mm)
w* = 1.2*wdl + 1.5*wll =	1.53 kN/m	M* =	3.07	kNm (Max at 2000mm)
w.up* = 0.9*wdl + wwl* =	1.28 kN/m (up)	Mw.up* =	2.57	kNm (Max at 2000mm)
p(dl)* = 1.35*pdl =	0.00 kN	V(dl)* =	1.09	kN
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	3.07	kN
p.up* = 0.9*pdl + pwl* =	0.00 kN	Vw.up* =	2.57	kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	190mm x 45mm MGP10	Area (A) =	8550	mm²	
Description =	MGP10 seasoned softwood	Section modulus (Zx) =	271	x10³ mm³	
Design depth (dD) =	190 mm	Stiffness (Ix) =	25.7	x10⁶ mm⁴	
Design width (dW) =	45 mm	Modulus of elasticity (E) =	10000	MPa - Table H3.1	

S1d = 1.25*dD/dW*(Lay.t/dD)^0.5 =	11.49	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1.35*(Lay.t/dD)^0.25 =	10.31	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1d ≤ 10 - Cl 3.2.4			
k12 =	1.000	for ρb*S1d ≤ 10 - Cl 3.2.4	f'b =	15.7	MPa
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	2.5	MPa
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρbd) =	0.72	(rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	2.19	kNm	Material constant (ρb) =	0.68	(rb=0.68)
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	3.60	kNm	Stress reversal (ρbu) =	0.66	(rbu=1.00)
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	3.84	kNm	Duration factor (k1) =	0.94	(Live)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	7.29	kN	Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	12.03	kN	Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	12.79	kN	Sharing factor (k9) =	1.00	
			Size modifier (mod.b & s) =	0.93	& 0.96

Deflections

			Duration factor (j2) =	2.0		
Ireq'd j2.(DL+Ψl.LL) (L/300) =	20.1 x10⁶ mm⁴	< Critical	δDL=	10.4	mm	Span / 383
Ireq'd `LL (L/240) =	11.2 x10⁶ mm⁴		δΨs.LL =	7.3	mm	Span / 551
Ireq'd WLs (L/180) =	16.8 x10⁶ mm⁴		δWLs =	-14.5	mm	Span / 276

Beam:	**(RL01) 120mm x 45mm F17 KD HW (Single span)**	
Bending:	**M(dl)* = 1.14kNm (+ve) < øM(dl) = 2.20kNm, M* = 1.69kNm (+ve) < øM = 3.08kNm**	**OK (0.52,0.55)**
Shear:	**V(dl)* = 4.56kN < øV(dl) = 6.28kN, V* = 6.76kN < øV = 8.81kN**	**OK (0.73,0.77)**
Deflection:	**δDL = L/514 (2mm) , δΨs.LL = L/1429 (1mm), δTotal = L/378 (3mm), 1kN mid. δ = 0.2mm**	**OK**
Reactions:	**(Each end) Rdl = 2.59kN, Rll = 2.44kN, R* = 6.76kN**	

Geometry (House member affecting > 25m² or primary building member)

Category =	2	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	1000	mm	Lay.t (Top) =	600	mm
Centres (cts) =	3250	mm			
Span type =	S	(S)ingle,(D)ouble			

Loadings

Floor area (A) =	3.25	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 *	3250	mm +		kN/m =	1.63 kN/m
Wall dead load (wdl) =	0.50	kPa *	4300	mm +		kN/m =	2.15 kN/m
Other dead load (wdl) =	0.40	kPa *	3400	mm +		kN/m =	1.36 kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.04 kN/m
						Σwdl =	5.17 kN/m
Uniform live loads							
Floor live load (wll) =	1.50	kPa *	3250	mm +		kN/m =	4.88 kN/m
Partitions (wll) =		kPa *	3250	mm +		kN/m =	0.00 kN/m
Alternate point live load =	1.80	kN	Distr. to	1	members	Σwll =	4.88 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) =	1.00		(Ψsp) =	1.00	
Long term LL factor (Ψlu) =	0.33	/ 0.40 (wdl*)	(Ψlp) =	0.33	/ 0.40 (pdl*)
wdl* = 1.2*wdl+1.5*Ψlu*wll =	9.13	kN/m	M(dl+Ψl.ll)* =	1.14	kNm (Max at 500mm)
w* = 1.2*wdl+1.5*wll =	13.52	kN/m	M* =	1.69	kNm (Max at 500mm)
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00	kN	V(dl+Ψl.ll)* =	4.56	kN
p* = 1.2*pdl+1.5*pll =	0.00	kN	V* =	6.76	kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	120mm x 45mm F17 KD HW		Area (A) =	5400	mm²
Description =	F17k seasoned hardwood		Section modulus (Zx) =	108	x10³ mm³
Design depth (dD) =	120	mm	Stiffness (Ix) =	6.5	x10⁶ mm⁴
Design width (dW) =	45	mm	Modulus of elasticity (E) =	14000	MPa - Table H2.1

S1 = 1.25*dD/dW*(Lay.t/dD)^0.5 =	7.45	For top comp. edge restrained - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1 ≤ 10 - Cl 3.2.4	f'b =	42.0	MPa
k12 =	1.000	for ρb*S1 ≤ 10 - Cl 3.2.4	f's =	3.6	MPa
			Material constant (ρbd) =	0.98	(rbd=0.25)
Strength reduction factor (ø) =	0.85	Table 2.1	Material constant (ρb) =	0.94	(rb=0.54)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	2.20	kNm	Duration factor (k1) =	0.80	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	3.08	kNm	Moisture factor (k4) =	1.00	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	6.28	kN	Temp. factor (k6) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	8.81	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+Ψl.LL) (L/300) =	3.8 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	1.9	mm	Span / 514
Ireq'd Ψs.LL (L/300) =	1.4 x10⁶ mm⁴		Ψs.δLL =	0.7	mm	Span / 1429
Ireq'd Total (L/250) =	4.3 x10⁶ mm⁴		δTotal =	2.6	mm	Span / 378
			1kN midspan δ =	0.2	mm	

Beam:	**(RL02A) 400mm x 75mm Smart LVL15 (Oregon) (Single span)**	
Bending:	**M(dl)* = 17.94kNm (+ve) < øM(dl) = 45.12kNm, M* = 18.87kNm (+ve) < øM = 63.33kNm**	**OK (0.40,0.30)**
Shear:	**V(dl)* = 14.95kN < øV(dl) = 43.09kN, V* = 15.72kN < øV = 60.48kN**	**OK (0.35,0.26)**
Deflection:	**δDL = L/439 (11mm) , δΨs.LL = L/6296 (1mm), δTotal = L/411 (12mm), 1kN mid. δ = 0.4mm**	**OK**
Reactions:	**(Each end) Rdl = 11.08kN, Rll = 1.62kN, R* = 15.72kN**	

Geometry (House member affecting > 25m² or primary building member)

Category =	2	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	4800	mm	Lay.t (Top) =	600	mm
Centres (cts) =	450	mm			
Span type =	S	(S)ingle,(D)ouble			

Loadings

Floor area (A) = 2.16 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 *	450	mm +		kN/m =	0.23 kN/m
Wall dead load (wdl) =	0.50	kPa *	5700	mm +		kN/m =	2.85 kN/m
Other dead load (wdl) =	0.40	kPa *	3400	mm +		kN/m =	1.36 kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.18 kN/m
						Σwdl =	4.62 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	Distr. to	2	members	Σwll =	0.68 kN/m

Point loads

Dead load (pdl) = kN | Position = 2400 mm from LHS
Live load (pll) = kN | Shear using PL at support = N (Y)es,(N)o

Short term LL factor (Ψsu) =	1.00	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.33 / 0.40 (wdl*)	(Ψlp) =	0.33 / 0.40 (pdl*)
wdl* = 1.35*wdl =	6.23 kN/m	M(dl+Ψl.ll)* =	17.94 kNm (Max at 2400mm)
w* = 1.2*wdl+1.5*wll =	6.55 kN/m	M* =	18.87 kNm (Max at 2400mm)
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00 kN	V(dl+Ψl.ll)* =	14.95 kN
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	15.72 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	400mm x 75mm Smart LVL15	Area (A) =	30000 mm²
Description =	LVL15 seasoned softwood	Section modulus (Zx) =	2000 x10³ mm³
Design depth (dD) =	400 mm	Stiffness (Ix) =	400.0 x10⁶ mm⁴
Design width (dW) =	75 mm	Modulus of elasticity (E) =	15300 MPa - Cl 8.3

S1 = 1.25*dD/dW*(Lay.t/dD)^0.5 = 8.16 For top comp. edge restrained - Cl 3.2.3.2(a)
k12d = 1.000 for ρbd*S1 ≤ 10 - Cl 3.2.4
k12 = 1.000 for ρb*S1 ≤ 10 - Cl 3.2.4

Strength reduction factor (ø) =	0.9 Table 2.1	f'b =	44.0 MPa
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	45.12 kNm	f's =	4.2 MPa
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	63.33 kNm	Material constant (ρbd) =	0.96 (rbd=0.25)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	43.09 kN	Material constant (ρb) =	0.96 (rb=0.25)
øV = ø*k1*k4*k6*f's*(2/3*A) =	60.48 kN	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+Ψl.LL) (16mm) =	273.2 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	10.9 mm	Span / 439
Ireq'd Ψs.LL (12mm) =	25.4 x10⁶ mm⁴		Ψs.δLL =	0.8 mm	Span / 6296
Ireq'd Total (L/250) =	243.5 x10⁶ mm⁴		δTotal =	11.7 mm	Span / 411
			1kN midspan δ =	0.4 mm	

Beam:	**(RL02B) 2 / 400mm x 45mm hySPAN (Single span) (Fully Laminated*)**	
Bending:	**M(dl)* = 18.15kNm (+ve) < øM(dl) = 49.33kNm, M* = 19.05kNm (+ve) < øM = 69.24kNm**	**OK (0.37,0.28)**
Shear:	**V(dl)* = 15.13kN < øV(dl) = 56.64kN, V* = 15.88kN < øV = 79.49kN**	**OK (0.27,0.20)**
Deflection:	**δDL = L/450 (11mm) , δΨs.LL = L/6519 (1mm), δTotal = L/421 (11mm), 1kN mid. δ = 0.4mm**	**OK**
Reactions:	**(Each end) Rdl = 11.21kN, Rll = 1.62kN, R* = 15.88kN**	

Geometry (House member affecting > 25m² or primary building member)

Category =	2	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	4800	mm	Lay.t (Top) =	600	mm
Centres (cts) =	450	mm			
Span type =	S	(S)ingle,(D)ouble			

Loadings

Floor area (A) =	2.16	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 *	450	mm +	kN/m =	0.23	kN/m
Wall dead load (wdl) =	0.50	kPa *	5700	mm +	kN/m =	2.85	kN/m
Other dead load (wdl) =	0.40	kPa *	3400	mm +	kN/m =	1.36	kN/m
Include S.Wt =	Y	(Y)es,(N)o			S.Wt =	0.23	kN/m
					Σwdl =	4.67	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	Distr. to	2	members Σwll =	0.68	kN/m
Point loads							
Dead load (pdl) =		kN			Position =	2400	mm from LHS
Live load (pll) =		kN			Shear using PL at support =	N	(Y)es,(N)o

Short term LL factor (Ψsu) =	1.00	(Ψsp) =	1.00	
Long term LL factor (Ψlu) =	0.33 / 0.40 (wdl*)	(Ψlp) =	0.33 / 0.40 (pdl*)	
wdl* = 1.35*wdl =	6.30 kN/m	M(dl+Ψl.ll)* =	18.15	kNm (Max at 2400mm)
w* = 1.2*wdl+1.5*wll =	6.62 kN/m	M* =	19.05	kNm (Max at 2400mm)
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00 kN	V(dl+Ψl.ll)* =	15.13	kN
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	15.88	kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 400mm x 45mm hySPAN		Area (A) =	36000	mm²
Description =	HYSPAN seasoned softwood		Section modulus (Zx) =	2400	x10³ mm³
Design depth (dD) =	400 mm		Stiffness (Ix) =	480.0	x10⁶ mm⁴
Design width (dW) =	90 mm		Modulus of elasticity (E) =	13200	MPa - Cl 8.3

S1 = 1.25*dD/dW*(Lay.t/dD)^0.5 =	6.80	For top comp. edge restrained - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1 ≤ 10 - Cl 3.2.4	f'b =	40.1	MPa
k12 =	1.000	for ρb*S1 ≤ 10 - Cl 3.2.4	f's =	4.6	MPa
			Material constant (ρbd) =	0.99	(rbd=0.25)
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρb) =	0.99	(rb=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	49.33	kNm	Duration factor (k1) =	0.80	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	69.24	kNm	Moisture factor (k4) =	1.00	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	56.64	kN	Temp. factor (k6) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	79.49	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+Ψl.LL) (16mm) =	320.2 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	10.7	mm	Span / 450
Ireq'd Ψs.LL (12mm) =	29.5 x10⁶ mm⁴		Ψs.δLL =	0.7	mm	Span / 6519
Ireq'd Total (L/250) =	285.2 x10⁶ mm⁴		δTotal =	11.4	mm	Span / 421
			1kN midspan δ =	0.4	mm	

Member:	**(RL02C) 250x90PFC (G300)**	
Bending:	**M*(max) = 19.5kNm < øMb(600,αm=1.00) = 113.7kNm**	**OK (0.17)**
	(Single span)	
Shear:	**V.max*=16.2kN < øVvm = 345.6kN (Web area full depth)**	**OK (0.05)**
Deflection:	**δDL = L/1308 (4mm), δΨs.LL = L/13257 (0mm), δTotal = L/1190 (4mm), 1kN mid. δ = 0.3mm**	**OK**
Precamber:	**Not required**	
Reactions:	**(Each end) Rdl = 11.5kN, Rll = 1.6kN, R* = 16.2kN**	

Geometry

Span (L) =	4800	mm	Eff. Len. (Le) =	600	mm
Centres (cts) =	450	mm	αm.t =	1.00	
Design at =	M	mm from LHS, (M)ax, (S)eg			
Span type =	S	(S)ingle,(D)ouble			
Effective length (Le) =	600	mm			
αm =	1.00				

Loadings

Floor area =	2.2	m²	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 (Ψa) =	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 *	5700	mm +		kN/m =	2.85	kN/m
Other dead load (wdl) =	0.40	kPa *	3400	mm +		kN/m =	1.36	kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.36	kN/m
						Σwdl =	4.79	kN/m

Uniform live loads

Floor live load (wll) =	1.50	kPa * Ψa *	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	Distr. to	2	members	Σwll =	0.68	kN/m

Point loads

Dead load (pdl) =		kN	Position =	2400	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
w* = 1.2*wdl + 1.5*wll =	6.76	kN/m	M* =	19.5 kNm (Max at 2400mm)
p* = 1.2*pdl + 1.5*pll =	0.00	kN	V* =	16.2 kN

Capacity

Description =	250x90PFC (G300)		Warping constant (Iw) =	35.9	x10⁹ mm⁶
Flange yield (fyf) =	300	MPa	Torsional constant (J) =	248	x10³ mm⁴
Web yield (fyw) =	320	MPa	Effective section mod. (Zex) =	421	x10³ mm³
Area (Ag) =	4520	mm²	Effective section mod. (Zey) =	88.7	x10³ mm³
Stiffness (Ix) =	45.1	x10⁶ mm⁴	Elastic modulus (E) =	200000	MPa - Cl 1.4
Stiffness (Iy) =	3.64	x10⁶ mm⁴	Shear modulus (G) =	80000	MPa - Cl 1.4
ø =	0.9	Table 3.4			
Msx = min(fyf,fyw)*Zex =	126.3	kNm - Cl 5.2.1	øMsx =	113.7	kNm
Positive: Moa.p =	2079.6	kNm	αs.t = 1.000	αm.t = 1.00	øMbx.p = 113.7 kNm
Negative: Moa.n =	N.A.				

			øMsy =	23.9	kNm - Cl 5.2.1

Deflections

Ireq'd DL (L/360) =	12.4	x10⁶ mm⁴ < Critical	δDL =	3.7 mm	Span / 1308
Ireq'd Ψs.LL (L/360) =	1.2	x10⁶ mm⁴	Ψs.δLL =	0.4 mm	Span / 13257
Ireq'd (DL+Ψs.LL) (L/250) =	9.5	x10⁶ mm⁴ < Critical	δTotal =	4.0 mm	Span / 1190

Max. precamber (0.3%*span) =	14 mm	Min. precamber =	15 mm
Precamber 80% of δDL =	3 mm	Adopted precamber =	0 mm
		1kN midspan δ =	0.3 mm

Beam:	**(RL03) 120mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 0.56kNm (+ve) < øM(dl) = 0.94kNm, M* = 1.13kNm (+ve) < øM = 1.55kNm**	**OK (0.60,0.73)**
	Mw* = 1.13kNm (-ve) < øMw = 1.65kNm	**OK (0.68)**
Shear:	**V(dl)* = 1.87kN < øV(dl) = 4.80kN, V* = 3.76kN < øV = 7.92kN**	**OK (0.39,0.47)**
	Vw* = 3.76kN < øVw = 8.42kN	**OK (0.45)**
Deflection:	**δDL = L/624 (2mm) , δΨs.LL = L/1543 (1mm), δWLs = L/508 (-2mm)**	**OK**
Reactions:	**(Each end) Rdl = 1.38kN, Rll = 1.40kN, Rwl* = -5.01kN, R.dn* = 3.76kN, R.up* = 3.76kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important			House =	N (Y)es,(N)o
Span (L) =	1200 mm	Edge restrained (down) =	C	(T)ension,(C)ompression,(B)oth	
Centres (cts) =	5700 mm	Lay.t (Top) =	900	mm	
Span type =	S (S)ingle,(D)ouble				

Loadings

Roof area (A) =	6.84	m²	Apply wind reduction =	Y	(Y)es,(N)o		
LL = 1.8/A+0.12 ≥ 0.25 =	0.38	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 *	5700	mm +		kN/m =	2.28 kN/m
Other dead load (wdl) =		kPa *	5700	mm +		kN/m =	0.00 kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.03 kN/m
						Σwdl =	2.31 kN/m

Uniform live loads

Roof live load (wll) =	0.38	kPa *	5700	mm +		kN/m =	2.18 kN/m
Other live load (wll) =		kPa *	5700	mm +		kN/m =	0.00 kN/m
Alternate point live load =	1.40	kN (critical)	Distr. to	1	members	Σwll =	2.33 kN/m

Uniform wind loads

Ult. wind load (Wu) =	1.22	kPa *	5700	mm		
Cp,e =	0.9	Cp,i =	0.3		Σwwl* =	-8.34 kN/m (up)

Point loads

Dead load (pdl) =		kN	Position =	600	mm from LHS
Live load (pll) =		kN	Shear using PL at support =	Y	(Y)es,(N)o
Wind load (pwl*) =		kN (-ve up)			

w(dl)* = 1.35*wdl =	3.11	kN/m	M(dl)* =	0.56	kNm (Max at 600mm)
w* = 1.2*wdl + 1.5*wll =	6.27	kN/m	M* =	1.13	kNm (Max at 600mm)
w.up* = 0.9*wdl + wwl* =	6.27	kN/m (up)	Mw.up* =	1.13	kNm (Max at 600mm)
p(dl)* = 1.35*pdl =	0.00	kN	V(dl)* =	1.87	kN
p* = 1.2*pdl+1.5*pll =	0.00	kN	V* =	3.76	kN
p.up* = 0.9*pdl + pwl* =	0.00	kN	Vw.up* =	3.76	kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	120mm x 45mm MGP10		Area (A) =	5400	mm²
Description =	MGP10 seasoned softwood		Section modulus (Zx) =	108	x10³ mm³
Design depth (dD) =	120 mm		Stiffness (Ix) =	6.5	x10⁶ mm⁴
Design width (dW) =	45 mm		Modulus of elasticity (E) =	10000	MPa - Table H3.1

S1d = 1.25*dD/dW*(Lay.t/dD)^0.5 =	9.13	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1.35*(Lay.t/dD)^0.25 =	6.22	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1d ≤ 10 - Cl 3.2.4			
k12 =	1.000	for ρb*S1d ≤ 10 - Cl 3.2.4	f'b =	17.0	MPa
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	2.6	MPa
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρbd) =	0.75	(rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	0.94	kNm	Material constant (ρb) =	0.71	(rb=0.56)
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	1.55	kNm	Stress reversal (ρbu) =	0.69	(rbu=1.00)
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	1.65	kNm	Duration factor (k1) =	0.94	(Live)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	4.80	kN	Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	7.92	kN	Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	8.42	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+Ψl.LL) (L/300) =	3.1 x10⁶ mm⁴	< Critical	δDL=	1.9	mm	Span / 624
Ireq'd `LL (L/240) =	1.0 x10⁶ mm⁴		δΨs.LL =	0.8	mm	Span / 1543
Ireq'd WLs (L/180) =	2.3 x10⁶ mm⁴		δWLs =	-2.4	mm	Span / 508

Beam:	**(RL04) 190mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 1.36kNm (+ve) < øM(dl) = 2.19kNm, M* = 2.47kNm (+ve) < øM = 3.60kNm**	**OK (0.62,0.69)**
	Mw* = 2.38kNm (-ve) < øMw = 3.84kNm	**OK (0.62)**
Shear:	**V(dl)* = 2.27kN < øV(dl) = 7.29kN, V* = 4.12kN < øV = 12.03kN**	**OK (0.31,0.34)**
	Vw* = 3.96kN < øVw = 12.79kN	**OK (0.31)**
Deflection:	**δDL = L/509 (5mm) , δΨs.LL = L/1531 (2mm), δWLs = L/461 (-5mm)**	**OK**
Reactions:	**(Each end) Rdl = 1.68kN, Rll = 1.40kN, Rwl* = -5.48kN, R.dn* = 4.12kN, R.up* = 3.96kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important			House =	N (Y)es,(N)o
Span (L) =	2400 mm	Edge restrained (down) =	C	(T)ension,(C)ompression,(B)oth	
Centres (cts) =	3400 mm	Lay.t (Top) =	900	mm	
Span type =	S (S)ingle,(D)ouble				

Loadings

Roof area (A) =	8.16	m²	Apply wind reduction =	Y	(Y)es,(N)o		
LL = 1.8/A+0.12 ≥ 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 *	3400	mm +		kN/m =	1.36	kN/m
Other dead load (wdl) =		kPa *	3400	mm +		kN/m =	0.00	kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.04	kN/m
						Σwdl =	1.40	kN/m

Uniform live loads

Roof live load (wll) =	0.34	kPa *	3400	mm +		kN/m =	1.16	kN/m
Other live load (wll) =		kPa *	3400	mm +		kN/m =	0.00	kN/m
Alternate point live load =	1.40	kN (critical)	Distr. to	1	members	Σwll =	1.17	kN/m

Uniform wind loads

Ult. wind load (Wu) =	1.22	kPa *	3400	mm			
Cp,e =	0.9	Cp,i =	0.2			Σwwl* =	-4.56 kN/m (up)

Point loads

Dead load (pdl) =		kN	Position =	1200	mm from LHS
Live load (pll) =		kN	Shear using PL at support =	Y	(Y)es,(N)o
Wind load (pwl*) =		kN (-ve up)			

w(dl)* = 1.35*wdl =	1.89	kN/m	M(dl)* =	1.36	kNm (Max at 1200mm)
w* = 1.2*wdl + 1.5*wll =	3.43	kN/m	M* =	2.47	kNm (Max at 1200mm)
w.up* = 0.9*wdl + wwl* =	3.30	kN/m (up)	Mw.up* =	2.38	kNm (Max at 1200mm)
p(dl)* = 1.35*pdl =	0.00	kN	V(dl)* =	2.27	kN
p* = 1.2*pdl+1.5*pll =	0.00	kN	V* =	4.12	kN
p.up* = 0.9*pdl + pwl* =	0.00	kN	Vw.up* =	3.96	kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	190mm x 45mm MGP10		Area (A) =	8550	mm²
Description =	MGP10 seasoned softwood		Section modulus (Zx) =	271	x10³ mm³
Design depth (dD) =	190 mm		Stiffness (Ix) =	25.7	x10⁶ mm⁴
Design width (dW) =	45 mm		Modulus of elasticity (E) =	10000	MPa - Table H3.1

S1d = 1.25*dD/dW*(Lay.t/dD)^0.5 =	11.49	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1.35*(Lay.t/dD)^0.25 =	10.31	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1d ≤ 10 - Cl 3.2.4			
k12 =	1.000	for ρb*S1d ≤ 10 - Cl 3.2.4	f'b =	15.7	MPa
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	2.5	MPa
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρbd) =	0.72	(rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	2.19	kNm	Material constant (ρb) =	0.69	(rb=0.51)
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	3.60	kNm	Stress reversal (ρbu) =	0.66	(rbu=1.00)
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	3.84	kNm	Duration factor (k1) =	0.94	(Live)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	7.29	kN	Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	12.03	kN	Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	12.79	kN	Sharing factor (k9) =	1.00	
			Size modifier (mod.b & s) =	0.93	& 0.96

Deflections

			Duration factor (j2) =	2.0		
Ireq'd j2.(DL+Ψl.LL) (L/300) =	15.1	x10⁶ mm⁴	< Critical	δDL=	4.7 mm	Span / 509
Ireq'd `LL (L/240) =	4.0	x10⁶ mm⁴		δΨs.LL =	1.6 mm	Span / 1531
Ireq'd WLs (L/180) =	10.1	x10⁶ mm⁴		δWLs =	-5.2 mm	Span / 461

Beam:	**(RL05) 140mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 1.00kNm (+ve) < øM(dl) = 1.28kNm, M* = 1.57kNm (+ve) < øM = 2.11kNm**	**OK (0.78,0.75)**
	Mw* = 1.56kNm (-ve) < øMw = 2.24kNm	**OK (0.70)**
Shear:	**V(dl)* = 2.50kN < øV(dl) = 5.58kN, V* = 3.93kN < øV = 9.21kN**	**OK (0.45,0.43)**
	Vw* = 3.90kN < øVw = 9.80kN	**OK (0.40)**
Deflection:	**δDL = L/417 (4mm) , δΨs.LL = L/1934 (1mm), δWLs = L/408 (-4mm)**	**OK**
Reactions:	**(Each end) Rdl = 1.85kN, Rll = 1.14kN, Rwl* = -5.56kN, R.dn* = 3.93kN, R.up* = 3.90kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important			House =	Y (Y)es,(N)o
Span (L) =	1600 mm		Edge restrained (down) =	T	(T)ension,(C)ompression,(B)oth
Centres (cts) =	5700 mm				
Span type =	S (S)ingle,(D)ouble		Lay.b (Bottom) =	900 mm	

Loadings

Roof area (A) =	9.12 m²		Apply wind reduction =	Y	(Y)es,(N)o
Live load (LL) =	0.25 kPa		Roof reduction (Ka) =	1.00	AS/NZS 1170.2, Table 5.4
	Refer AS 1170.1, Table 3.2, Note 3		Ratio Ws/Wu =	0.68	(Refer wind analysis)

Uniform dead loads

Roof dead load (wdl) =	0.40 kPa *	5700 mm +		kN/m =	2.28 kN/m		
Other dead load (wdl) =	kPa *	5700 mm +		kN/m =	0.00 kN/m		
Include S.Wt =	Y (Y)es,(N)o			S.Wt =	0.03 kN/m		
				Σwdl =	2.31 kN/m		

Uniform live loads

Roof live load (wll) =	0.25 kPa *	5700 mm +		kN/m =	1.43 kN/m		
Other live load (wll) =	kPa *	5700 mm +		kN/m =	0.00 kN/m		
Alternate point live load =	1.10 kN	Distr. to	1 members	Σwll =	1.43 kN/m		

Uniform wind loads

Ult. wind load (Wu) =	1.22 kPa *	5700 mm			
Cp,e =	0.4	Cp,i =	0.6	Σwwl* =	-6.95 kN/m (up)

Point loads

Dead load (pdl) =	kN	Position =	800 mm from LHS
Live load (pll) =	kN	Shear using PL at support =	Y (Y)es,(N)o
Wind load (pwl*) =	kN (-ve up)		

w(dl)* = 1.35*wdl =	3.12 kN/m	M(dl)* =	1.00 kNm (Max at 800mm)
w* = 1.2*wdl + 1.5*wll =	4.91 kN/m	M* =	1.57 kNm (Max at 800mm)
w.up* = 0.9*wdl + wwl* =	4.87 kN/m (up)	Mw.up* =	1.56 kNm (Max at 800mm)
p(dl)* = 1.35*pdl =	0.00 kN	V(dl)* =	2.50 kN
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	3.93 kN
p.up* = 0.9*pdl + pwl* =	0.00 kN	Vw.up* =	3.90 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	140mm x 45mm MGP10	Area (A) =	6300 mm²
Description =	MGP10 seasoned softwood	Section modulus (Zx) =	147 x10³ mm³
Design depth (dD) =	140 mm	Stiffness (Ix) =	10.3 x10⁶ mm⁴
Design width (dW) =	45 mm	Modulus of elasticity (E) =	10000 MPa - Table H3.1

S1d = (dD/dW)^1·35*(Lay.b/dD)^0·25 =	7.37	For bottom tension edge restrained - Cl 3.2.3.2(a)			
S1u = 1.25*dD/dW*(Lay.b/dD)^0·5 =	9.86	For bottom comp. edge restrained in uplift - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1d ≤ 10 - Cl 3.2.4			
k12 =	1.000	for ρb*S1d ≤ 10 - Cl 3.2.4	f'b =	17.0	MPa
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	2.6	MPa
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρbd) =	0.75	(rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	1.28 kNm		Material constant (ρb) =	0.72	(rb=0.44)
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	2.11 kNm		Stress reversal (ρbu) =	0.69	(rbu=1.00)
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	2.24 kNm		Duration factor (k1) =	0.94	(Live)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	5.58 kN		Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	9.21 kN		Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	9.80 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+Ψl.LL) (L/300) =	7.4 x10⁶ mm⁴	< Critical	δDL=	3.8 mm	Span / 417
Ireq'd `LL (L/240) =	1.3 x10⁶ mm⁴		δΨs.LL =	0.8 mm	Span / 1934
Ireq'd WLs (L/180) =	4.5 x10⁶ mm⁴		δWLs =	-3.9 mm	Span / 408

Beam:	**(RL06) 190mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 1.27kNm (+ve) < øM(dl) = 2.19kNm, M* = 2.15kNm (+ve) < øM = 3.60kNm**	**OK (0.58,0.60)**
	Mw* = 2.53kNm (-ve) < øMw = 3.84kNm	**OK (0.66)**
Shear:	**V(dl)* = 2.82kN < øV(dl) = 7.29kN, V* = 4.78kN < øV = 12.03kN**	**OK (0.39,0.40)**
	Vw* = 5.62kN < øVw = 12.79kN	**OK (0.44)**
Deflection:	**δDL = L/729 (2mm) , δΨs.LL = L/2873 (1mm), δWLs = L/597 (-3mm)**	**OK**
Reactions:	**(Each end) Rdl = 2.09kN, Rll = 1.52kN, Rwl* = -7.50kN, R.dn* = 4.78kN, R.up* = 5.62kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1	(1) House, (2) Primary building elements, (3) Important		House =	N (Y)es,(N)o
Span (L) =	1800 mm		Edge restrained (down) =	C	(T)ension,(C)ompression,(B)oth
Centres (cts) =	5700 mm		Lay.t (Top) =	900 mm	
Span type =	S	(S)ingle,(D)ouble			

Loadings

Roof area (A) =	10.26 m²		Apply wind reduction =	Y	(Y)es,(N)o		
LL = 1.8/A+0.12 ≥ 0.25 =	0.30 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 *	5700 mm +			kN/m =	2.28	kN/m
Other dead load (wdl) =	kPa *	5700 mm +			kN/m =	0.00	kN/m
Include S.Wt =	Y	(Y)es,(N)o			S.Wt =	0.04	kN/m
					Σwdl =	2.32	kN/m
Uniform live loads							
Roof live load (wll) =	0.30 kPa *	5700 mm +			kN/m =	1.68	kN/m
Other live load (wll) =	kPa *	5700 mm +			kN/m =	0.00	kN/m
Alternate point live load =	1.40 kN	Distr. to	1	members	Σwll =	1.68	kN/m
Uniform wind loads							
Ult. wind load (Wu) =	1.22 kPa *	5700 mm					
Cp,e =	0.5	Cp,i =	0.7		Σwwl* =	-8.34	kN/m (up)
Point loads							
Dead load (pdl) =	kN				Position =	900	mm from LHS
Live load (pll) =	kN				Shear using PL at support =	Y	(Y)es,(N)o
Wind load (pwl*) =	kN (-ve up)						
w(dl)* = 1.35*wdl =	3.14 kN/m			M(dl)* =	1.27	kNm (Max at 900mm)	
w* = 1.2*wdl + 1.5*wll =	5.31 kN/m			M* =	2.15	kNm (Max at 900mm)	
w.up* = 0.9*wdl + wwl* =	6.25 kN/m (up)			Mw.up* =	2.53	kNm (Max at 900mm)	
p(dl)* = 1.35*pdl =	0.00 kN			V(dl)* =	2.82	kN	
p* = 1.2*pdl+1.5*pll =	0.00 kN			V* =	4.78	kN	
p.up* = 0.9*pdl + pwl* =	0.00 kN			Vw.up* =	5.62	kN	

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	190mm x 45mm MGP10		Area (A) =	8550	mm²
Description =	MGP10 seasoned softwood		Section modulus (Zx) =	271	x10³ mm³
Design depth (dD) =	190 mm		Stiffness (Ix) =	25.7	x10⁶ mm⁴
Design width (dW) =	45 mm		Modulus of elasticity (E) =	10000	MPa - Table H3.1
S1d = 1.25*dD/dW*(Lay.t/dD)^0·5 =	11.49	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1·35*(Lay.t/dD)^0·25 =	10.31	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1d ≤ 10 - Cl 3.2.4			
k12 =	1.000	for ρb*S1d ≤ 10 - Cl 3.2.4	f'b =	15.7	MPa
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	2.5	MPa
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρbd) =	0.72	(rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	2.19 kNm		Material constant (ρb) =	0.69	(rb=0.48)
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	3.60 kNm		Stress reversal (ρbu) =	0.66	(rbu=1.00)
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	3.84 kNm		Duration factor (k1) =	0.94	(Live)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	7.29 kN		Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	12.03 kN		Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	12.79 kN		Sharing factor (k9) =	1.00	
			Size modifier (mod.b & s) =	0.93	& 0.96

Deflections

			Duration factor (j2) =	2.0	
Ireq'd j2.(DL+Ψl.LL) (L/300) =	10.6 x10⁶ mm⁴	< Critical	δDL=	2.5 mm	Span / 729
Ireq'd `LL (L/240) =	2.1 x10⁶ mm⁴		δΨs.LL =	0.6 mm	Span / 2873
Ireq'd WLs (L/180) =	7.8 x10⁶ mm⁴		δWLs =	-3.0 mm	Span / 597

Beam:	**(RL07) 190mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 1.27kNm (+ve) < øM(dl) = 2.19kNm, M* = 2.39kNm (+ve) < øM = 3.60kNm**	**OK (0.58,0.66)**
	Mw* = 0.10kNm (-ve) < øMw = 3.84kNm	**OK (0.03)**
Shear:	**V(dl)* = 2.11kN < øV(dl) = 7.29kN, V* = 3.98kN < øV = 12.03kN**	**OK (0.29,0.33)**
	Vw* = 0.17kN < øVw = 12.79kN	**OK (0.01)**
Deflection:	**δDL = L/548 (4mm) , δΨs.LL = L/1531 (2mm), δWLs = L/1595 (-2mm)**	**OK**
Reactions:	**(Each end) Rdl = 1.56kN, Rll = 1.40kN, Rwl* = -1.58kN, R.dn* = 3.98kN, R.up* = 0.17kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1	(1) House, (2) Primary building elements, (3) Important	House =	N	(Y)es,(N)o
Span (L) =	2400	mm	Edge restrained (down) =	C	(T)ension,(C)ompression,(B)oth
Centres (cts) =	900	mm	Lay.t (Top) =	900	mm
Span type =	S	(S)ingle,(D)ouble			

Loadings

Roof area (A) =	2.16	m²	Apply wind reduction =	Y	(Y)es,(N)o			
LL = 1.8/A+0.12 ≥ 0.25 =	0.95	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 *	1800	mm +		kN/m =	0.90	kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.04	kN/m
						Σwdl =	1.30	kN/m

Uniform live loads

Roof live load (wll) =	0.95	kPa *	900	mm +		kN/m =	0.86	kN/m
Other live load (wll) =		kPa *	900	mm +		kN/m =	0.00	kN/m
Alternate point live load =	1.40	kN (critical)	Distr. to	1	members	Σwll =	1.17	kN/m

Uniform wind loads

Ult. wind load (Wu) =	1.22	kPa *	900	mm			
Cp,e =	0.5	Cp,i =	0.7		Σwwl* =	-1.32	kN/m (up)

Point loads

Dead load (pdl) =		kN	Position =	1200	mm from LHS
Live load (pll) =		kN	Shear using PL at support =	Y	(Y)es,(N)o
Wind load (pwl*) =		kN (-ve up)			

w(dl)* = 1.35*wdl =	1.76	kN/m	M(dl)* =	1.27	kNm (Max at 1200mm)
w* = 1.2*wdl + 1.5*wll =	3.31	kN/m	M* =	2.39	kNm (Max at 1200mm)
w.up* = 0.9*wdl + wwl* =	0.15	kN/m (up)	Mw.up* =	0.10	kNm (Max at 1200mm)
p(dl)* = 1.35*pdl =	0.00	kN	V(dl)* =	2.11	kN
p* = 1.2*pdl+1.5*pll =	0.00	kN	V* =	3.98	kN
p.up* = 0.9*pdl + pwl* =	0.00	kN	Vw.up* =	0.17	kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	190mm x 45mm MGP10		Area (A) =	8550	mm²
Description =	MGP10 seasoned softwood		Section modulus (Zx) =	271	x10³ mm³
Design depth (dD) =	190	mm	Stiffness (Ix) =	25.7	x10⁶ mm⁴
Design width (dW) =	45	mm	Modulus of elasticity (E) =	10000	MPa - Table H3.1

S1d = 1.25*dD/dW*(Lay.t/dD)^0.5 =	11.49	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1.35*(Lay.t/dD)^0.25 =	10.31	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1d ≤ 10 - Cl 3.2.4			
k12 =	1.000	for ρb*S1d ≤ 10 - Cl 3.2.4	f'b =	15.7	MPa
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	2.5	MPa
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρbd) =	0.72	(rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	2.19	kNm	Material constant (ρb) =	0.69	(rb=0.53)
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	3.60	kNm	Stress reversal (ρbu) =	0.66	(rbu=1.00)
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	3.84	kNm	Duration factor (k1) =	0.94	(Live)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	7.29	kN	Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	12.03	kN	Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	12.79	kN	Sharing factor (k9) =	1.00	
			Size modifier (mod.b & s) =	0.93	& 0.96

Deflections

			Duration factor (j2) =	2.0		
Ireq'd j2.(DL+Ψl.LL) (L/300) =	14.1	x10⁶ mm⁴	< Critical	δDL=	4.4 mm	Span / 548
Ireq'd `LL (L/240) =	4.0	x10⁶ mm⁴		δΨs.LL =	1.6 mm	Span / 1531
Ireq'd WLs (L/180) =	2.9	x10⁶ mm⁴		δWLs =	-1.5 mm	Span / 1595

Beam:	**(RL08) 240mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 2.27kNm (+ve) < øM(dl) = 3.22kNm, M* = 3.70kNm (+ve) < øM = 5.31kNm**	**OK (0.71,0.70)**
	Mw* = 0.17kNm (-ve) < øMw = 5.65kNm	**OK (0.03)**
Shear:	**V(dl)* = 2.84kN < øV(dl) = 8.85kN, V* = 4.62kN < øV = 14.60kN**	**OK (0.32,0.32)**
	Vw* = 0.22kN < øVw = 15.53kN	**OK (0.01)**
Deflection:	**δDL = L/462 (7mm) , δΨs.LL = L/1736 (2mm), δWLs = L/1356 (-2mm)**	**OK**
Reactions:	**(Each end) Rdl = 2.10kN, Rll = 1.40kN, Rwl* = -2.11kN, R.dn* = 4.62kN, R.up* = 0.22kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important		House =	N	(Y)es,(N)o
Span (L) =	3200 mm	Edge restrained (down) =	C	(T)ension,(C)ompression,(B)oth	
Centres (cts) =	900 mm	Lay.t (Top) =	900	mm	
Span type =	S (S)ingle,(D)ouble				

Loadings

Roof area (A) =	2.88 m²	Apply wind reduction =	Y	(Y)es,(N)o			
LL = 1.8/A+0.12 ≥ 0.25 =	0.75 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 *	1800 mm +		kN/m =	0.90	kN/m	
Include S.Wt =	Y (Y)es,(N)o			S.Wt =	0.05	kN/m	
				Σwdl =	1.31	kN/m	

Uniform live loads

Roof live load (wll) =	0.75 kPa *	900 mm +		kN/m =	0.67	kN/m	
Other live load (wll) =	kPa *	900 mm +		kN/m =	0.00	kN/m	
Alternate point live load =	1.40 kN (critical)	Distr. to	1	members	Σwll =	0.88	kN/m

Uniform wind loads

Ult. wind load (Wu) =	1.22 kPa *	900 mm					
Cp,e =	0.5	Cp,i =	0.7		Σwwl* =	-1.32	kN/m (up)

Point loads

Dead load (pdl) =	kN	Position =	1600	mm from LHS	
Live load (pll) =	kN	Shear using PL at support =	Y	(Y)es,(N)o	
Wind load (pwl*) =	kN (-ve up)				

w(dl)* = 1.35*wdl =	1.77 kN/m	M(dl)* =	2.27	kNm (Max at 1600mm)
w* = 1.2*wdl + 1.5*wll =	2.89 kN/m	M* =	3.70	kNm (Max at 1600mm)
w.up* = 0.9*wdl + wwl* =	0.14 kN/m (up)	Mw.up* =	0.17	kNm (Max at 1600mm)
p(dl)* = 1.35*pdl =	0.00 kN	V(dl)* =	2.84	kN
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	4.62	kN
p.up* = 0.9*pdl + pwl* =	0.00 kN	Vw.up* =	0.22	kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	240mm x 45mm MGP10		Area (A) =	10800	mm²
Description =	MGP10 seasoned softwood		Section modulus (Zx) =	432	x10³ mm³
Design depth (dD) =	240 mm		Stiffness (Ix) =	51.8	x10⁶ mm⁴
Design width (dW) =	45 mm		Modulus of elasticity (E) =	10000	MPa - Table H3.1
S1d = 1.25*dD/dW*(Lay.t/dD)^0.5 =	12.91	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1.35*(Lay.t/dD)^0.25 =	13.33	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1d ≤ 10 - Cl 3.2.4			
k12 =	1.000	for ρb*S1d ≤ 10 - Cl 3.2.4	f'b =	14.5	MPa
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	2.4	MPa
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρbd) =	0.70	(rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	3.22 kNm		Material constant (ρb) =	0.67	(rb=0.45)
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	5.31 kNm		Stress reversal (ρbu) =	0.64	(rbu=1.00)
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	5.65 kNm		Duration factor (k1) =	0.94	(Live)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	8.85 kN		Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	14.60 kN		Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	15.53 kN		Sharing factor (k9) =	1.00	
			Size modifier (mod.b & s) =	0.85	& 0.92

Deflections

			Duration factor (j2) =	2.0		
Ireq'd j2.(DL+Ψl.LL) (L/300) =	33.6 x10⁶ mm⁴	< Critical	δDL=	6.9 mm		Span / 462
Ireq'd `LL (L/240) =	7.2 x10⁶ mm⁴		δΨs.LL =	1.8 mm		Span / 1736
Ireq'd WLs (L/180) =	6.9 x10⁶ mm⁴		δWLs =	-2.4 mm		Span / 1356

Member:	**(Trimmers Below RL08) 2 / 120mm x 45mm F17 KD HW (120mm Horz.) (Interior)**	
Bending:	**M*in = 1.64kNm < øMwi = 9.82kNm**	**OK (0.17)**
	M*out = 1.87kNm < øMwo = 9.82kNm	**OK (0.19)**
	M*y = 0.01kNm < øMy = 2.10kNm	**OK (0.01)**
Deflection:	**δWLs.in = L/488 (7mm), δWLs.out = L/427 (7mm), δDL = L/11500 (0mm)**	**OK**
Reactions:	**(1 End) R*in = 2.0kN, R*out = 2.3kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category = 1 (1) House, (2) Primary building elements, (3) Important

Span (L) = 3200 mm — Outer edge in compression from inward wind
Wall loadwidth (wcts) = 1500 mm — Edge restrained (Horz.) = B (O)uter,(I)nner,(B)oth
Horz.bending restraints (Lay) = 450 mm
Number of hangers = 2 (equally spaced)
Vert. bending restraints (Lax=L) = 3200 mm

Loadings

Ratio Ws/Wu = 0.68 (Refer wind analysis)

S.Wt = 0.07 kN/m

Inward
Ult. inward wind load (Wui) = 1.22 kPa
cpe = 0.7 cpi = 0 w.in* = 1.28 kN/m

Outward
Ult. outward wind load (Wuo) = 1.22 kPa
cpe = 0.5 cpi = 0.3 w.out* = 1.46 kN/m

w.in* =	1.28 kN/m	w.out* =	1.46 kN/m	R.in* =	2.0 kN
M.in* =	1.64 kNm	M.out* =	1.87 kNm	R.out* =	2.3 kN
My* =	0.01 kNm (Self weight)				

Bending Capacity - Cl 3.2

Member = 2 / 120mm x 45mm F17 KD HW — Area (A) = 10800 mm²
Description = F17k seasoned hardwood — Section modulus (Zx) = 216 x10³ mm³
Design depth (dD) = 120 mm — Section modulus (Zy) = 81 x10³ mm³
Design width (dW) = 45 mm — Stiffness (Ix) = 13.0 x10⁶ mm⁴
Density = 650 kg/m³ — Stiffness (Iy) = 1.8 x10⁶ mm⁴
Modulus of elasticity (E) = 14000 MPa - Table H2.1

S1i = (dD/dW)^1.35*(Lay/dD)^0.25 = 5.23 for tension edge restrained - Cl 3.2.3.2
S1o = (dD/dW)^1.35*(Lay/dD)^0.25 = 5.23 for tension edge restrained - Cl 3.2.3.2
S1y = 1.25*dW/dD*(Lax/dW)^0.5) = 3.95 for critical edge restrained
k12i = 1.000 for ρbi*S1i ≤ 10 - Cl 3.2.4
k12o = 1.000 for ρbo*S1o ≤ 10 - Cl 3.2.4
k12y = 1.000 for ρbd*Sy ≤ 10 - Cl 3.2.4

f'b = 42.0 MPa
f's = 3.6 MPa

Strength reduction factor (ø) = 0.95 Table 2.1 — Material constant (ρbd) = 0.98 (rbd=0.25)
øMwi = ø*(k1=1)*k4*k6*k9*k12i*f'b*Zx = 9.82 kNm — Material constant (ρbi) = 0.90 (rbi=1.00)
øMwo = ø*(k1=1)*k4*k6*k9*k12o*f'b*Zx = 9.82 kNm — Material constant (ρbo) = 0.90 (rbo=1.00)
øMy(dl) = ø*(k1=0.57)*k4*k6*k9*k12yd*f'b*Zy = 2.10 kNm — Moisture factor (k4) = 1.00
Temp. factor (k6) = 1.00
Sharing factor (k9) = 1.14

Deflections

Ireq'd WLs.in (15mm max) =	5.7 x10⁶ mm⁴		δWLs.in =	6.6 mm	Span / 488
Ireq'd WLs.out (15mm max) =	6.5 x10⁶ mm⁴	< Critical	δWLs.out =	7.5 mm	Span / 427
Ireq'd j2.DL (L/360) =	0.0 x10⁶ mm⁴		δj2.DL=	0.1 mm	Span / 11500
Duration factor (j2) =	2.0				

Member:	**(HB01) 2 / 190mm x 45mm F17 KD HW (190mm Vert.) (Fully Laminated*) (Interior)**	
Bending:	**M(dl)* = 1.40kNm < øM(dl) = 13.57kNm, M* = 1.40kNm < øM = 22.38kNm**	**OK (0.10,0.06)**
	M*in = 2.60kNm < øMwi = 11.67kNm	**OK (0.22)**
	M*out = 2.46kNm < øMwo = 11.67kNm	**OK (0.21)**
	Biaxial (Refer below)	**OK (0.23)**
Shear:	**V(dl)* = 1.75kN < øV(dl) = 22.22kN, V* = 1.75kN < øV = 36.65kN**	**OK (0.08,0.05)**
	Vh* = 3.25kN < øVw = 38.99kN	**OK (0.08)**
Deflection:	**δDL = L/1040 (3mm) , δTotal = L/1040 (3mm)**	**OK**
	δWLs.in = L/274 (12mm), δWLs.out = L/290 (11mm)	**OK**
H. Reactions:	**(1 End) R*in = 3.3kN, R*out = 3.1kN**	
V. Reactions:	**(Each end) Rdl = 1.3kN, Rll = 0.0kN, Rv* = 1.8kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained (Vert.) =	B	(T)ension,(C)omp,(B)oth
Span (L) =	3200	mm	Vert. bending restraints (Lay.b) =	3200	mm
Roof loadwidth (cts) =	0	mm (for vert. loading)	Outer edge in compression from inward wind		
Wall loadwidth (wcts) =	1850	mm (for horz. wind)	Edge restrained (Horz.) =	B	(O)uter,(I)nner,(B)oth
			Horz. bending restraints (Lax) =	900	mm

Loadings - Vertical

Uniform dead loads

Roof dead load (wdl) =	0.40	kPa *	0	mm +		kN/m =	0.00 kN/m
Wall dead load (wdl) =	0.50	kPa *	1400	mm +		kN/m =	0.70 kN/m
Other dead load (wdl) =		kPa *	1200	mm +		kN/m =	0.00 kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.11 kN/m
						Σwdl =	0.81 kN/m

Uniform live loads

Roof live load (wll) =	0.25	kPa *	0	mm +		kN/m =	0.00 kN/m
Other live load (wll) =		kPa *	0	mm +		kN/m =	0.00 kN/m
						Σwll =	0.00 kN/m

Live Load duration = Roof

Duration (k1) = 0.94

Point loads

Dead load (pdl) =		kN	Position =	1600	mm from LHS
Live load (pll) =		kN	Shear using PL at support =	Y	(Y)es,(N)o

Short term LL factor (Ψsu) =	0.70		(Ψsp) =	1.00	
Long term LL factor (Ψlu) =	0.00		(Ψlp) =	0.00	
wdl* = 1.35*wdl =	1.10	kN/m	M(dl)* =	1.40	kNm (Max at 1600mm)
w* = 1.35*wdl =	1.10	kN/m	M* =	1.40	kNm (Max at 1600mm)
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00	kN	V(dl)* =	1.75	kN
p* = 1.2*pdl+1.5*pll =	0.00	kN	V* =	1.75	kN

Loadings - Horizontal

Inward

Ratio Ws/Wu = 0.68 (Refer wind analysis)

Ult. inward wind load (Wu) =	1.22	kPa			
cpe =	0.7	cpi =	0.2	w.in* =	2.03 kN/m

Outward

Ult. outward wind load (Wu) =	1.22	kPa			
cpe =	0.65	cpi =	0.2	w.out* =	1.92 kN/m

w.in* =	2.03 kN/m	w.out* =	1.92 kN/m	R.in* =	3.3 kN
M.in* =	2.60 kNm	M.out* =	2.46 kNm	R.out* =	3.1 kN

Bending Capacity - Cl 3.2

Member =	2 / 190mm x 45mm F17 KD HW		Area (A) =	17100	mm²
Description =	F17k seasoned hardwood		Section modulus (Zx) =	542	x10³ mm³
Design depth (dD) =	190 mm		Section modulus (Zy) =	257	x10³ mm³
Design width (dW) =	90 mm		Stiffness (Ix) =	51.4	x10⁶ mm⁴
Density =	650 kg/m³		Stiffness (Iy) =	11.5	x10⁶ mm⁴
			Modulus of elasticity (E) =	14000	MPa - Table H2.1

$S1y = 1.25*dD/dW*(Lay/dD)^{0.5}$ =	10.83	for tension edge restrained - Cl 3.2.3.2
$S1i = (dW/dD)^{1.35}*(Lax/dW)^{0.25}$ =	0.65	for tension edge restrained - Cl 3.2.3.2
$S1o = (dW/dD)^{1.35}*(Lax/dW)^{0.25}$ =	0.65	for tension edge restrained - Cl 3.2.3.2
k12d = 1.5-0.05*ρbd*S1 =	0.967	for 10 ≤ ρbd*S1 ≤ 20 - Cl 3.2.4
k12 = 1.5-0.05*ρb*S1 =	0.967	for 10 ≤ ρb*S1 ≤ 20 - Cl 3.2.4
k12i =	1.000	for ρbi*S1i ≤ 10 - Cl 3.2.4
k12o =	1.000	for ρbo*S1o ≤ 10 - Cl 3.2.4

			f'b =	42.0	MPa
Strength reduction factor (ø) =	0.95	Table 2.1	f's =	3.6	MPa
øMx(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	13.57	kNm	Material constant (ρbd) =	0.98	(rbd=0.25)
øMx(dl+ll) = ø*(k1=0.94)*k4*k6*k9*k12*f'b*Zx =	22.38	kNm	Material constant (ρb) =	0.98	(rb=0.25)
øVx(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	22.22	kN	Material constant (ρbi) =	0.90	(rbi=1.00)
øVx(dl+ll) = ø*(k1=0.94)*k4*k6*f's*(2/3*A) =	36.65	kN	Material constant (ρbo) =	0.90	(rbo=1.00)
øMwi = ø*(k1=1)*k4*k6*k9*k12i*f'b*Zy =	11.67	kNm	Moisture factor (k4) =	1.00	
øMwo = ø*(k1=1)*k4*k6*k9*k12o*f'b*Zy =	11.67	kNm	Temp. factor (k6) =	1.00	
øVy = ø*(k1=1)*k4*k6*f's*(2/3*A) =	38.99	kN	Sharing factor (k9) =	1.14	

Combined - Cl 3.5.1 & Cl 3.5.2 & Appendix E5

Dead only	Out-of-plane =	0.23	**Dead + Live**	Out-of-plane =	0.23
	In-plane =	0.15		In-plane =	0.11

Deflections

Vertical						
Ireq'd j2.(DL+ΨI.LL) (L/9) =	17.8 x10⁶ mm⁴	< Critical	j2.(DL+ΨI.LL) =	3.1 mm		Span / 1040
Ireq'd Ψs.LL (L/360) =	0.0 x10⁶ mm⁴		δΨs.LL =	0.0 mm		Span / -
Ireq'd Total (L/250) =	12.4 x10⁶ mm⁴		δTotal =	3.1 mm		Span / 1040
Horizontal			Duration factor (j2) =	2.0		
Ireq'd WLs.in (15mm max) =	9.0 x10⁶ mm⁴	< Critical	δWLs.in =	11.7 mm		Span / 274
Ireq'd WLs.out (15mm max) =	8.5 x10⁶ mm⁴		δWLs.out =	11.0 mm		Span / 290
j2 =	2.0					

Beam:	**(HB01A) 150mm x 45mm hySPAN (Single span) (Interior)**	
Bending:	**M(dl)* = 1.04kNm (+ve) < øM(dl) = 4.07kNm, M* = 2.61kNm (+ve) < øM = 6.93kNm**	**OK (0.26,0.38)**
	Mw* = 0.00kNm (-ve) < øMw = 7.47kNm	**OK (0.00)**
Shear:	**V(dl)* = 1.30kN < øV(dl) = 11.21kN, V* = 3.26kN < øV = 18.49kN**	**OK (0.12,0.18)**
	Vw* = 1.16kN < øVw = 19.67kN	**OK (0.06)**
Deflection:	**δDL = L/324 (10mm) , δΨs.LL = L/559 (6mm)**	**OK**
Reactions:	**(Each end) Rdl = 0.97kN, Rll = 1.40kN, Rwl* = 0.00kN, R.dn* = 3.26kN, R.up* = -1.16kN (Down)**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1	(1) House, (2) Primary building elements, (3) Important		House =	N (Y)es,(N)o
Span (L) =	3200 mm		Edge restrained (down) =	C	(T)ension,(C)ompression,(B)oth
Centres (cts) =	mm		Lay.t (Top) =	900 mm	
Span type =	S	(S)ingle,(D)ouble			

Loadings

Roof area (A) =	0.00 m²		Apply wind reduction =	Y	(Y)es,(N)o		
LL = 1.8/A+0.12 ≥ 0.25 =	0.00 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 *	0 mm +			kN/m =	0.00	kN/m
Other dead load (wdl) =	0.40 kPa *	1400 mm +			kN/m =	0.56	kN/m
Include S.Wt =	Y	(Y)es,(N)o			S.Wt =	0.04	kN/m
					Σwdl =	0.60	kN/m
Uniform live loads							
Roof live load (wll) =	0.00 kPa *	0 mm +			kN/m =	0.00	kN/m
Other live load (wll) =	kPa *	0 mm +			kN/m =	0.00	kN/m
Alternate point live load =	1.40 kN (critical)	Distr. to	1	members	Σwll =	0.88	kN/m
Uniform wind loads							
Ult. wind load (Wu) =	1.22 kPa *	0 mm					
Cp,e =	0.5	Cp,i =	0.7		Σwwl* =	0.00	kN/m
Point loads							
Dead load (pdl) =	kN			Position =	1600	mm from LHS	
Live load (pll) =	kN		Shear using PL at support =	Y	(Y)es,(N)o		
Wind load (pwl*) =	kN (-ve up)						

w(dl)* = 1.35*wdl =	0.82 kN/m	M(dl)* =	1.04	kNm (Max at 1600mm)	
w* = 1.2*wdl + 1.5*wll =	2.04 kN/m	M* =	2.61	kNm (Max at 1600mm)	
w.dn* = 1.2*wdl + wwl* =	-0.72 kN/m (down)	Mw.dn* =	0.00	kNm	
p(dl)* = 1.35*pdl =	0.00 kN	V(dl)* =	1.30	kN	
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	3.26	kN	
p.dn* = 1.2*pdl + pwl* =	0.00 kN	Vw.dn* =	1.16	kN	

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	150mm x 45mm hySPAN		Area (A) =	6750	mm²
Description =	HYSPAN seasoned softwood		Section modulus (Zx) =	169	x10³ mm³
Design depth (dD) =	150 mm		Stiffness (Ix) =	12.7	x10⁶ mm⁴
Design width (dW) =	45 mm		Modulus of elasticity (E) =	13200	MPa - Cl 8.3
S1d = 1.25*dD/dW*(Lay.t/dD)^0.5 =	10.21	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1ud = 1.25*dD/dW*(Lay.t/dD)^0.5 =	10.21	For top comp. edge restrained - Cl 3.2.3.2(a)			
k12d = 1.5-0.05*ρbd*S1d =	0.957	for 10 ≤ ρbd*S1d ≤ 20 - Cl 3.2.4			
k12 = 1.5-0.05*ρb*S1d =	0.987	for 10 ≤ ρb*S1d ≤ 20 - Cl 3.2.4	f'b =	46.6	MPa
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	4.6	MPa
Strength reduction factor (ø) =	0.95	Table 2.1	Material constant (ρbd) =	1.06	(rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	4.07	kNm	Material constant (ρb) =	1.01	(rb=0.64)
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	6.93	kNm	Stress reversal (ρbu) =	0.98	(rbu=1.00)
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	7.47	kNm	Duration factor (k1) =	0.94	(Live)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	11.21	kN	Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	18.49	kN	Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	19.67	kN	Sharing factor (k9) =	1.00	

Deflections

			Duration factor (j2) =	2.0		
Ireq'd j2.(DL+Ψl.LL) (L/300) =	11.7 x10⁶ mm⁴	< Critical	δDL=	9.9 mm		Span / 324
Ireq'd `LL (L/240) =	5.4 x10⁶ mm⁴		δΨs.LL =	5.7 mm		Span / 559
Ireq'd WLs (L/180) =	0.0 x10⁶ mm⁴		δWLs =	0.0 mm		Span / -

Member:	**(HB1 Lintel Above Door) 3 / 90mm x 45mm F17 KD HW (90mm Horz.) (Interior)**	
Bending:	**M*in = 2.06kNm < øMwi = 8.73kNm**	**OK (0.24)**
	M*out = 2.35kNm < øMwo = 8.73kNm	**OK (0.27)**
	M*y = 0.02kNm < øMy = 2.49kNm	**OK (0.01)**
Deflection:	**δWLs.in = L/246 (13mm), δWLs.out = L/216 (15mm), δDL = L/11500 (0mm)**	**OK**
Reactions:	**(1 End) R*in = 2.6kN, R*out = 2.9kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category = 1 (1) House, (2) Primary building elements, (3) Important

Span (L) = 3200 mm — Outer edge in compression from inward wind
Wall loadwidth (wcts) = 1880 mm — Edge restrained (Horz.) = B (O)uter,(I)nner,(B)oth
Horz.bending restraints (Lay) = 450 mm
Number of hangers = 2 (equally spaced)
Vert. bending restraints (Lax=L) = 3200 mm

Loadings

Ratio Ws/Wu = 0.68 (Refer wind analysis)

S.Wt = 0.08 kN/m

Inward
Ult. inward wind load (Wui) = 1.22 kPa
cpe = 0.7 cpi = 0 w.in* = 1.61 kN/m

Outward
Ult. outward wind load (Wuo) = 1.22 kPa
cpe = 0.5 cpi = 0.3 w.out* = 1.83 kN/m

w.in* =	1.61 kN/m	w.out* =	1.83 kN/m	R.in* =	2.6 kN
M.in* =	2.06 kNm	M.out* =	2.35 kNm	R.out* =	2.9 kN
My* =	0.02 kNm (Self weight)				

Bending Capacity - Cl 3.2

Member = 3 / 90mm x 45mm F17 KD HW — Area (A) = 12150 mm²
Description = F17k seasoned hardwood — Section modulus (Zx) = 182 x10³ mm³
Design depth (dD) = 90 mm — Section modulus (Zy) = 91 x10³ mm³
Design width (dW) = 45 mm — Stiffness (Ix) = 8.2 x10⁶ mm⁴
Density = 650 kg/m³ — Stiffness (Iy) = 2.1 x10⁶ mm⁴
Modulus of elasticity (E) = 14000 MPa - Table H2.1

S1i = (dD/dW)^1.35*(Lay/dD)^0.25 = 3.81 for tension edge restrained - Cl 3.2.3.2
S1o = (dD/dW)^1.35*(Lay/dD)^0.25 = 3.81 for tension edge restrained - Cl 3.2.3.2
S1y = 1.25*dW/dD*(Lax/dW)^0.5) = 5.27 for critical edge restrained
k12i = 1.000 for ρbi*S1i ≤ 10 - Cl 3.2.4
k12o = 1.000 for ρbo*S1o ≤ 10 - Cl 3.2.4
k12y = 1.000 for ρbd*Sy ≤ 10 - Cl 3.2.4

f'b = 42.0 MPa
f's = 3.6 MPa

Strength reduction factor (ø) = 0.95 Table 2.1 — Material constant (ρbd) = 0.98 (rbd=0.25)
øMwi = ø*(k1=1)*k4*k6*k9*k12i*f'b*Zx = 8.73 kNm — Material constant (ρbi) = 0.90 (rbi=1.00)
øMwo = ø*(k1=1)*k4*k6*k9*k12o*f'b*Zx = 8.73 kNm — Material constant (ρbo) = 0.90 (rbo=1.00)
øMy(dl) = ø*(k1=0.57)*k4*k6*k9*k12yd*f'b*Zy = 2.49 kNm — Moisture factor (k4) = 1.00
Temp. factor (k6) = 1.00
Sharing factor (k9) = 1.20

Deflections

Ireq'd WLs.in (15mm max) =	7.1 x10⁶ mm⁴		δWLs.in =	13.0 mm	Span / 246
Ireq'd WLs.out (15mm max) =	8.1 x10⁶ mm⁴	< Critical	δWLs.out =	14.8 mm	Span / 216
Ireq'd j2.DL (L/360) =	0.0 x10⁶ mm⁴		δj2.DL=	0.1 mm	Span / 11500
Duration factor (j2) =	2.0				

Beam:	**(RL09) 2 / 290mm x 45mm F17 KD HW (Single span)**	
Bending:	**M(dl)* = 8.85kNm (+ve) < øM(dl) = 26.21kNm, M* = 13.52kNm (+ve) < øM = 44.55kNm**	**OK (0.34,0.30)**
	Mw* = 6.07kNm (-ve) < øMw = 43.44kNm	**OK (0.14)**
Shear:	**V(dl)* = 11.46kN < øV(dl) = 33.92kN, V* = 17.45kN < øV = 55.94kN**	**OK (0.34,0.31)**
	Vw* = 7.73kN < øVw = 59.51kN	**OK (0.13)**
Deflection:	**δDL = L/521 (7mm) , δΨs.LL = L/2353 (2mm), δWLs = L/838 (-4mm)**	**OK**
Reactions:	**(1 End) Rdl.max = 7.66kN, Rll.max = 4.40kN, Rwl.max* = -13.95kN, R.dn.max* = 15.78kN, R.up.max* = 7.06kN**	
	(1 End) Rdl.min = 6.32kN, Rll.min = 3.68kN, Rwl.min* = -11.68kN, R.dn.min* = 13.11kN, R.up.min* = 5.99kN	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1	(1) House, (2) Primary building elements, (3) Important	House =	N	(Y)es,(N)o
Span (L) =	3600	mm	Edge restrained (down) =	C	(T)ension,(C)ompression,(B)oth
Centres (cts) =	7200	mm	Lay.t (Top) =	900	mm
Span type =	S	(S)ingle,(D)ouble			

Loadings

Roof area (A) =	25.92	m²	Apply wind reduction =	Y	(Y)es,(N)o			
LL = 1.8/A+0.12 ≥ 0.25 =	0.25	kPa	Roof reduction (Ka) =	0.90	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 *	7200	mm +		kN/m =	2.88	kN/m
Other dead load (wdl) =		kPa *		mm +		kN/m =	0.00	kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.17	kN/m
						Σwdl =	3.05	kN/m
Uniform live loads								
Roof live load (wll) =	0.25	kPa *	7200	mm +		kN/m =	1.80	kN/m
Other live load (wll) =		kPa *		mm +		kN/m =	0.00	kN/m
Alternate point live load =	1.40	kN	Distr. to	1	members	Σwll =	1.80	kN/m
Uniform wind loads								
Ult. wind load (Wu) =	1.22	kPa *	7200	mm				
Cp,e =	0.5	Cp,i =	0.2			Σwwl* =	-5.70	kN/m (up)
Point loads								
Dead load (pdl) =	3.00	kN			Position =	1000	mm from LHS	
Live load (pll) =	1.60	kN			Shear using PL at support =	Y	(Y)es,(N)o	
Wind load (pwl*) =	-5.10	kN (up)						
w(dl)* = 1.35*wdl =	4.12	kN/m		M(dl)* =	8.85	kNm (Max at 1527mm)		
w* = 1.2*wdl + 1.5*wll =	6.36	kN/m		M* =	13.52	kNm (Max at 1538mm)		
w.up* = 0.9*wdl + wwl* =	2.96	kN/m (up)		Mw.up* =	6.07	kNm (Max at 1575mm)		
p(dl)* = 1.35*pdl =	4.05	kN		V(dl)* =	11.46	kN		
p* = 1.2*pdl+1.5*pll =	6.00	kN		V* =	17.45	kN		
p.up* = 0.9*pdl + pwl* =	2.40	kN (up)		Vw.up* =	7.73	kN		

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 290mm x 45mm F17 KD HW		Area (A) =	26100	mm²
Description =	F17k seasoned hardwood		Section modulus (Zx) =	1262	x10³ mm³
Design depth (dD) =	290 mm		Stiffness (Ix) =	182.9	x10⁶ mm⁴
Design width (dW) =	45 mm		Modulus of elasticity (E) =	14000	MPa - Table H2.1
S1d = 1.25*dD/dW*(Lay.t/dD)^0.5 =	14.19	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1.35*(Lay.t/dD)^0.25 =	16.42	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d = 1.5-0.05*ρbd*S1d =	0.801	for 10 ≤ ρbd*S1d ≤ 20 - Cl 3.2.4			
k12 = 1.5-0.05*ρb*S1d =	0.826	for 10 ≤ ρb*S1d ≤ 20 - Cl 3.2.4	f'b =	42.0	MPa
k12u = 1.5-0.05*ρbu*S1u =	0.757	for 10 ≤ ρbu*S1u ≤ 20 - Cl 3.2.4	f's =	3.6	MPa
Strength reduction factor (ø) =	0.95	Table 2.1	Material constant (ρbd) =	0.98	(rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	26.21	kNm	Material constant (ρb) =	0.95	(rb=0.45)
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	44.55	kNm	Stress reversal (ρbu) =	0.90	(rbu=1.00)
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	43.44	kNm	Duration factor (k1) =	0.94	(Live)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	33.92	kN	Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	55.94	kN	Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	59.51	kN	Sharing factor (k9) =	1.14	
			Size modifier (mod.b & s) =	1.00	& 1.00

Deflections

			Duration factor (j2) =	2.0		
Ireq'd j2.(DL+Ψl.LL) (L/300) =	105.4	x10⁶ mm⁴	< Critical	δDL=	6.9 mm	Span / 521
Ireq'd `LL (L/240) =	18.7	x10⁶ mm⁴		δΨs.LL =	1.5 mm	Span / 2353
Ireq'd WLs (L/180) =	39.3	x10⁶ mm⁴		δWLs =	-4.3 mm	Span / 838

Member:	**(RB01) 200x75PFC (G300) - 1 Flybrace**	
Bending:	**M.dn*(max) = 17.8kNm < øMb(900,αm.t=1.00) = 55.9kNm**	**OK (0.32)**
	M.up*(max) = 26.1kNm < øMb(3600,αm.b=1.33) = 40.8kNm	**OK (0.64)**
Shear:	**V.max*=11.9kN < øVvm = 207.4kN (Web area full depth)**	**OK (0.08)**
	Vw* = 17.4kN < øVw = 207.4kN (Web area full depth)	**OK (0.08)**
Deflection:	**δDL = L/697 (9mm), δΨs.LL = L/1805 (3mm), δWLs = L/265 (23mm)**	**OK**
Precamber:	**Not required**	
Reactions:	**(Each end) Rdl = 5.8kN, Rll = 3.2kN, Rwl* = -22.6kN, R.dn* = 11.9kN, R.up* = 17.4kN**	

Geometry

Span (L) =	6000	mm	Top flange restraint/purlin cts (Le) =	900	mm (Top flange)
Centres (cts) =	4300	mm	Moment mod. factor (αm.t) =	1.00	
Design at =	M	mm from LHS, (M)ax, (S)eg	Flybraces / Leb =	1	(≥ 500 for seg. length)
Span type =	S	(S)ingle,(D)ouble			

Bottom αm.b = 1.33 (Calc. αm, Leb = 3600 mm) Top αm.t = 1.00 (Man. αm, Le = 900 mm)

Loadings

Roof area (A) = 25.8 m² Apply wind reduction = Y (Y)es,(N)o
LL = 1.8/A+0.12 ≥ 0.25 = 0.25 kPa AS 1170.1 T3.2 Roof reduction (Ka) = 0.90 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 *	4300	mm +		kN/m =	1.72	kN/m
Other dead load (wdl) =		kPa *		mm +		kN/m =	0.00	kN/m
Down only load (wdl) =		kPa *		mm +		kN/m =	0.00	kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.23	kN/m
			Σwdl.up =	1.95	kN/m	Σwdl =	1.95	kN/m

Uniform live loads

Roof live load (wll) =	0.25	kPa *	4300	mm +		kN/m =	1.08	kN/m
Other live load (wll) =		kPa *		mm +		kN/m =	0.00	kN/m
Alternate point live load =	1.40	kN	Distr. to	1	members	Σwll =	1.08	kN/m

Uniform wind loads

Ult. wind load (Wu) = 1.22 kPa * 4300 mm
Cp,e = 1.6 Cp,i = w.wl* = -7.55 kN/m (up)

Point loads

Dead load (pdl) = kN Position = 3000 mm from LHS
Live load (pll) = kN Shear using PL at support = Y (Y)es,(N)o
Wind load (pwl*) = kN (-ve up)

w* = 1.2*wdl + 1.5*wll = 3.95 kN/m M* = 17.78 kNm (Max at 3000mm)
p* = 1.2*pdl + 1.5*pll = 0.00 kN Mw.up* = 26.06 kNm (Max at 3000mm)
w.up* = 0.9*wdl.up + wwl* = 5.79 kN/m (up) V* = 11.86 kN
p.up* = 0.9*pdl + pwl* = 0.00 kN Vw.up* = 17.37 kN

Capacity

Description =	200x75PFC (G300)				Warping constant (Iw) =	10.5	x10⁹ mm⁶
Flange yield (fyf) =	300	MPa			Torsional constant (J) =	105	x10³ mm⁴
Web yield (fyw) =	320	MPa			Effective section mod. (Zex) =	221	x10³ mm³
Area (Ag) =	2920	mm²			Effective section mod. (Zey) =	46.7	x10³ mm³
Stiffness (Ix) =	19.1	x10⁶ mm⁴			Elastic modulus (E) =	200000	MPa - Cl 1.4
ø =	0.9	Table 3.4			Shear modulus (G) =	80000	MPa - Cl 1.4
Msx = min(fyf,fyw)*Zex =	66.3	kNm - Cl 5.2.1		øMsx =	59.7 kNm	øMsy =	12.6 kNm - Cl 5.2.1
Down: Moa =	369.7	kNm	αs.t =	0.937	αm.t = 1.00	øMbx.d =	55.9 kNm
Uplift: Moa =	50.1	kNm	αs.b =	0.514	αm.b = 1.33	øMbx.u =	40.8 kNm

Deflections

Ireq'd DL (L/250) =	6.9	x10⁶ mm⁴		δDL =	8.6 mm	Span / 697
Ireq'd `LL (L/240) =	2.5	x10⁶ mm⁴		δΨs.LL =	3.3 mm	Span / 1805
Ireq'd WLs (L/250) =	18.0	x10⁶ mm⁴	< Critical	δWLs =	22.7 mm	Span / 265

Max. precamber (0.3%*span) = 18 mm Min. precamber = 15 mm
Precamber 80% of δDL = 7 mm Adopted precamber = 0 mm

Member:	**(RB02) 250x90PFC (G300) - Btm flange restraint at 3300mm cts**	
Bending:	**M.dn*(max) = 45.4kNm < øMb(900,αm.t=1.00) = 109.6kNm**	**OK (0.41)**
	M.up*(max) = 63.9kNm < øMb(3300,αm.b=1.00) = 69.7kNm	**OK (0.92)**
Shear:	**V.max*=27.5kN < øVvm = 345.6kN (Web area full depth)**	**OK (0.09)**
	Vw* = 38.7kN < øVw = 345.6kN (Web area full depth)	**OK (0.11)**
Deflection:	**δDL = L/632 (10mm), δΨs.LL = L/1460 (5mm), δWLs = L/251 (26mm)**	**OK**
Precamber:	**Not required**	
Reactions:	**(Each end) Rdl = 10.8kN, Rll = 5.7kN, Rwl* = -39.9kN, R.dn* = 21.5kN, R.up* = 30.2kN**	

Geometry

Span (L) =	6600	mm	Top flange restraint/purlin cts (Le) =	900	mm (Top flange)
Centres (cts) =	5000	mm	Moment mod. factor (αm.t) =	1.00	
Design at =	M	mm from LHS, (M)ax, (S)eg	Bot. flange restraint (Le) =	3300	mm (Bottom flange)
Span type =	S	(S)ingle,(D)ouble	Moment mod. factor (αm.b) =	1.00	

Bottom αm.b = 1.00 (Man. αm, Leb = 3300 mm) Top αm.t = 1.00 (Man. αm, Le = 900 mm)

Loadings

Roof area (A) =	33.0	m²	Apply wind reduction =	Y	(Y)es,(N)o		
LL = 1.8/A+0.12 ≥ 0.25 =	0.25	kPa AS 1170.1 T3.2	Roof reduction (Ka) =	0.89	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 *	5000	mm +		kN/m =	2.00 kN/m
Other dead load (wdl) =		kPa *		mm +		kN/m =	0.00 kN/m
Down only load (wdl) =		kPa *		mm +		kN/m =	0.00 kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.36 kN/m
			Σwdl.up =	2.36	kN/m	Σwdl =	2.36 kN/m
Uniform live loads							
Roof live load (wll) =	0.25	kPa *	5000	mm +		kN/m =	1.25 kN/m
Other live load (wll) =		kPa *		mm +		kN/m =	0.00 kN/m
Alternate point live load =	1.40	kN	Distr. to	1	members	Σwll =	1.25 kN/m
Uniform wind loads							
Ult. wind load (Wu) =	1.22	kPa *	5000	mm			
Cp,e =	1.6	Cp,i =				w.wl* =	-8.68 kN/m (up)
Point loads							
Dead load (pdl) =	6.0	kN			Position =	3300	mm from LHS
Live load (pll) =	3.2	kN			Shear using PL at support =	Y	(Y)es,(N)o
Wind load (pwl*) =	-22.5	kN (up)					
w* = 1.2*wdl + 1.5*wll =	4.70	kN/m			M* =	45.40	kNm (Max at 3300mm)
p* = 1.2*pdl + 1.5*pll =	12.00	kN			Mw.up* =	63.94	kNm (Max at 3300mm)
w.up* = 0.9*wdl.up + wwl* =	6.56	kN/m (up)			V* =	27.51	kN
p.up* = 0.9*pdl + pwl* =	17.10	kN (up)			Vw.up* =	38.75	kN

Capacity

Description =	250x90PFC (G300)				Warping constant (Iw) =	35.9	x10⁹ mm⁶
Flange yield (fyf) =	300	MPa			Torsional constant (J) =	248	x10³ mm⁴
Web yield (fyw) =	320	MPa			Effective section mod. (Zex) =	421	x10³ mm³
Area (Ag) =	4520	mm²			Effective section mod. (Zey) =	88.7	x10³ mm³
Stiffness (Ix) =	45.1	x10⁶ mm⁴			Elastic modulus (E) =	200000	MPa - Cl 1.4
ø =	0.9	Table 3.4			Shear modulus (G) =	80000	MPa - Cl 1.4
Msx = min(fyf,fyw)*Zex =	126.3	kNm - Cl 5.2.1		øMsx = 113.7	kNm	øMsy =	23.9 kNm - Cl 5.2.1
Down: Moa =	975.7	kNm	αs.t = 0.964		αm.t = 1.00	øMbx.d =	109.6 kNm
Uplift: Moa =	131.8	kNm	αs.b = 0.613		αm.b = 1.00	øMbx.u =	69.7 kNm

Deflections

Ireq'd DL (L/250) =	17.8	x10⁶ mm⁴	δDL =	10.4 mm	Span / 632
Ireq'd `LL (L/240) =	7.4	x10⁶ mm⁴	δΨs.LL =	4.5 mm	Span / 1460
Ireq'd WLs (L/250) =	45.0	x10⁶ mm⁴ < Critical	δWLs =	26.3 mm	Span / 251

Max. precamber (0.3%*span) =	20 mm	Min. precamber =	15 mm
Precamber 80% of δDL =	8 mm	Adopted precamber =	0 mm

Beam:	**(RB11) 2 / 290mm x 45mm F17 KD HW (Single span)**	
Bending:	**M(dl)* = 5.89kNm (+ve) < øM(dl) = 26.21kNm, M* = 8.88kNm (+ve) < øM = 44.34kNm**	**OK (0.22,0.20)**
	Mw* = 3.69kNm (-ve) < øMw = 43.44kNm	**OK (0.08)**
Shear:	**V(dl)* = 3.93kN < øV(dl) = 33.92kN, V* = 5.92kN < øV = 55.94kN**	**OK (0.12,0.11)**
	Vw* = 2.46kN < øVw = 59.51kN	**OK (0.04)**
Deflection:	**δDL = L/470 (13mm) , δΨs.LL = L/2409 (2mm), δWLs = L/791 (-8mm)**	**OK**
Reactions:	**(Each end) Rdl = 2.91kN, Rll = 1.62kN, Rwl* = -5.08kN, R.dn* = 5.92kN, R.up* = 2.46kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important			House =	N (Y)es,(N)o
Span (L) =	6000 mm	Edge restrained (down) =	C (T)ension,(C)ompression,(B)oth		
Centres (cts) =	2000 mm	Lay.t (Top) =	900 mm		
Span type =	S (S)ingle,(D)ouble				

Loadings

Roof area (A) =	12.00 m²		Apply wind reduction =	Y (Y)es,(N)o			
LL = 1.8/A+0.12 ≥ 0.25 =	0.27 kPa		Roof reduction (Ka) =	0.99 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 *	2000 mm +		kN/m =	0.80 kN/m		
Other dead load (wdl) =	kPa *	mm +		kN/m =	0.00 kN/m		
Include S.Wt =	Y (Y)es,(N)o			S.Wt =	0.17 kN/m		
				Σwdl =	0.97 kN/m		
Uniform live loads							
Roof live load (wll) =	0.27 kPa *	2000 mm +		kN/m =	0.54 kN/m		
Other live load (wll) =	kPa *	mm +		kN/m =	0.00 kN/m		
Alternate point live load =	1.40 kN	Distr. to	1 members	Σwll =	0.54 kN/m		
Uniform wind loads							
Ult. wind load (Wu) =	1.22 kPa *	2000 mm					
Cp,e =	0.5	Cp,i =	0.2	Σwwl* =	-1.69 kN/m (up)		
Point loads							
Dead load (pdl) =	kN			Position =	3000 mm from LHS		
Live load (pll) =	kN			Shear using PL at support =	Y (Y)es,(N)o		
Wind load (pwl*) =	kN (-ve up)						
w(dl)* = 1.35*wdl =	1.31 kN/m		M(dl)* =	5.89 kNm (Max at 3000mm)			
w* = 1.2*wdl + 1.5*wll =	1.97 kN/m		M* =	8.88 kNm (Max at 3000mm)			
w.up* = 0.9*wdl + wwl* =	0.82 kN/m (up)		Mw.up* =	3.69 kNm (Max at 3000mm)			
p(dl)* = 1.35*pdl =	0.00 kN		V(dl)* =	3.93 kN			
p* = 1.2*pdl+1.5*pll =	0.00 kN		V* =	5.92 kN			
p.up* = 0.9*pdl + pwl* =	0.00 kN		Vw.up* =	2.46 kN			

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 290mm x 45mm F17 KD HW		Area (A) =	26100 mm²	
Description =	F17k seasoned hardwood		Section modulus (Zx) =	1262 x10³ mm³	
Design depth (dD) =	290 mm		Stiffness (Ix) =	182.9 x10⁶ mm⁴	
Design width (dW) =	45 mm		Modulus of elasticity (E) =	14000 MPa - Table H2.1	
S1d = 1.25*dD/dW*(Lay.t/dD)^0.5 =	14.19	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1.35*(Lay.t/dD)^0.25 =	16.42	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d = 1.5-0.05*ρbd*S1d =	0.801	for 10 ≤ ρbd*S1d ≤ 20 - Cl 3.2.4			
k12 = 1.5-0.05*ρb*S1d =	0.822	for 10 ≤ ρb*S1d ≤ 20 - Cl 3.2.4	f'b =	42.0 MPa	
k12u = 1.5-0.05*ρbu*S1u =	0.757	for 10 ≤ ρbu*S1u ≤ 20 - Cl 3.2.4	f's =	3.6 MPa	
Strength reduction factor (ø) =	0.95	Table 2.1	Material constant (ρbd) =	0.98 (rbd=0.25)	
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	26.21 kNm		Material constant (ρb) =	0.96 (rb=0.41)	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	44.34 kNm		Stress reversal (ρbu) =	0.90 (rbu=1.00)	
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	43.44 kNm		Duration factor (k1) =	0.94 (Live)	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	33.92 kN		Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	55.94 kN		Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	59.51 kN		Sharing factor (k9) =	1.14	
			Size modifier (mod.b & s) =	1.00 & 1.00	

Deflections

			Duration factor (j2) =	2.0	
eq'd j2.(DL+Ψl.LL) (16mm max) =	146.1 x10⁶ mm⁴	< Critical	δDL=	12.8 mm	Span / 470
Ireq'd `LL (L/240) =	18.2 x10⁶ mm⁴		δΨs.LL =	2.5 mm	Span / 2409
Ireq'd WLs (L/180) =	41.6 x10⁶ mm⁴		δWLs =	-7.6 mm	Span / 791

Beam:	**(RB13) 2 / 190mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 3.62kNm (+ve) < øM(dl) = 4.98kNm, M* = 5.61kNm (+ve) < øM = 8.22kNm**	**OK (0.73,0.68)**
	Mw* = 0.34kNm (-ve) < øMw = 8.74kNm	**OK (0.04)**
Shear:	**V(dl)* = 7.24kN < øV(dl) = 14.58kN, V* = 11.21kN < øV = 24.05kN**	**OK (0.50,0.47)**
	Vw* = 0.01kN < øVw = 25.59kN	**OK (0.00)**
Deflection:	**δDL = L/518 (4mm) , δΨs.LL = L/2067 (1mm), δWLs = L/1502 (-1mm)**	**OK**
Reactions:	**(Each end) Rdl = 3.87kN, Rll = 2.38kN, Rwl* = -4.84kN, R.dn* = 8.21kN, R.up* = 1.36kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important			House =	N (Y)es,(N)o
Span (L) =	2000 mm	Edge restrained (down) =	C (T)ension,(C)ompression,(B)oth		
Centres (cts) =	5700 mm	Lay.t (Top) =	900 mm		
Span type =	S (S)ingle,(D)ouble				

Loadings

Roof area (A) =	11.40 m²		Apply wind reduction =	Y (Y)es,(N)o			
LL = 1.8/A+0.12 ≥ 0.25 =	0.28 kPa		Roof reduction (Ka) =	0.99 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 *	5700 mm +		kN/m =	2.28 kN/m		
Other dead load (wdl) =	kPa *	mm +		kN/m =	0.00 kN/m		
Include S.Wt =	Y (Y)es,(N)o			S.Wt =	0.09 kN/m		
				Σwdl =	2.37 kN/m		
Uniform live loads							
Roof live load (wll) =	0.28 kPa *	5700 mm +		kN/m =	1.58 kN/m		
Other live load (wll) =	kPa *	mm +		kN/m =	0.00 kN/m		
Alternate point live load =	1.40 kN	Distr. to	1 members	Σwll =	1.58 kN/m		
Uniform wind loads							
Ult. wind load (Wu) =	1.22 kPa *	5700 mm					
Cp,e =	0.5	Cp,i =	0.2	Σwwl* =	-4.84 kN/m (up)		
Point loads							
Dead load (pdl) =	3.00 kN			Position =	1000 mm from LHS		
Live load (pll) =	1.60 kN			Shear using PL at support =	Y (Y)es,(N)o		
Wind load (pwl*) =	kN (-ve up)						
w(dl)* = 1.35*wdl =	3.19 kN/m			M(dl)* =	3.62 kNm (Max at 1000mm)		
w* = 1.2*wdl + 1.5*wll =	5.21 kN/m			M* =	5.61 kNm (Max at 1000mm)		
w.up* = 0.9*wdl + wwl* =	2.71 kN/m (up)			Mw.up* =	0.34 kNm (Max at 501mm)		
p(dl)* = 1.35*pdl =	4.05 kN			V(dl)* =	7.24 kN		
p* = 1.2*pdl+1.5*pll =	6.00 kN			V* =	11.21 kN		
p.up* = 0.9*pdl + pwl* =	-2.70 kN (down)			Vw.up* =	0.01 kN		

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 190mm x 45mm MGP10		Area (A) =	17100 mm²	
Description =	MGP10 seasoned softwood		Section modulus (Zx) =	542 x10³ mm³	
Design depth (dD) =	190 mm		Stiffness (Ix) =	51.4 x10⁶ mm⁴	
Design width (dW) =	45 mm		Modulus of elasticity (E) =	10000 MPa - Table H3.1	
S1d = 1.25*dD/dW*(Lay.t/dD)^0·5 =	11.49	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1·35*(Lay.t/dD)^0·25 =	10.31	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1d ≤ 10 - Cl 3.2.4			
k12 =	1.000	for ρb*S1d ≤ 10 - Cl 3.2.4	f'b =	15.7 MPa	
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	2.5 MPa	
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρbd) =	0.72 (rbd=0.25)	
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	4.98 kNm		Material constant (ρb) =	0.70 (rb=0.43)	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	8.22 kNm		Stress reversal (ρbu) =	0.66 (rbu=1.00)	
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	8.74 kNm		Duration factor (k1) =	0.94 (Live)	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	14.58 kN		Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	24.05 kN		Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	25.59 kN		Sharing factor (k9) =	1.14	
			Size modifier (mod.b & s) =	0.93 & 0.96	

Deflections

			Duration factor (j2) =	2.0	
Ireq'd j2.(DL+Ψl.LL) (L/300) =	29.8 x10⁶ mm⁴	< Critical	δDL=	3.9 mm	Span / 518
Ireq'd `LL (L/240) =	6.0 x10⁶ mm⁴		δΨs.LL =	1.0 mm	Span / 2067
Ireq'd WLs (L/180) =	6.2 x10⁶ mm⁴		δWLs =	-1.3 mm	Span / 1502

Beam:	**(RB12) 2 / 240mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 5.89kNm (+ve) < øM(dl) = 7.34kNm, M* = 9.51kNm (+ve) < øM = 12.10kNm**	**OK (0.80,0.79)**
	Mw* = 2.43kNm (-ve) < øMw = 12.87kNm	**OK (0.19)**
Shear:	**V(dl)* = 7.85kN < øV(dl) = 17.70kN, V* = 12.68kN < øV = 29.19kN**	**OK (0.44,0.43)**
	Vw* = 2.98kN < øVw = 31.06kN	**OK (0.10)**
Deflection:	**δDL = L/310 (13mm) , δΨs.LL = L/1020 (4mm), δWLs = L/604 (-7mm)**	**OK**
Reactions:	**(1 End) Rdl.max = 4.82kN, Rll.max = 3.20kN, Rwl.max* = -7.02kN, R.dn.max* = 10.58kN, R.up.max* = 2.68kN**	
	(1 End) Rdl.min = 2.82kN, Rll.min = 2.00kN, Rwl.min* = -4.62kN, R.dn.min* = 6.38kN, R.up.min* = 2.08kN	

Geometry

(House member affecting ≤ 25m² or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important			House =	N (Y)es,(N)o
Span (L) =	4000 mm	Edge restrained (down) =	C (T)ension,(C)ompression,(B)oth		
Centres (cts) =	2000 mm	Lay.t (Top) =	900 mm		
Span type =	S (S)ingle,(D)ouble				

Loadings

Roof area (A) =	8.00 m²			Apply wind reduction =	Y (Y)es,(N)o		
LL = 1.8/A+0.12 ≥ 0.25 =	0.35 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 *	2000 mm +		kN/m =	0.80 kN/m		
Other dead load (wdl) =	kPa *	mm +		kN/m =	0.00 kN/m		
Include S.Wt =	Y (Y)es,(N)o			S.Wt =	0.11 kN/m		
				Σwdl =	0.91 kN/m		

Uniform live loads

Roof live load (wll) =	0.35 kPa *	2000 mm +		kN/m =	0.69 kN/m		
Other live load (wll) =	kPa *	mm +		kN/m =	0.00 kN/m		
Alternate point live load =	1.40 kN (critical)	Distr. to	1 members	Σwll =	0.70 kN/m		

Uniform wind loads

Ult. wind load (Wu) =	1.22 kPa *	2000 mm			
Cp,e =	0.5	Cp,i =	0.2	Σwwl* =	-1.71 kN/m (up)

Point loads

Dead load (pdl) =	4.00 kN	Position =	1000 mm from LHS
Live load (pll) =	2.40 kN	Shear using PL at support =	Y (Y)es,(N)o
Wind load (pwl*) =	-4.80 kN (up)		

w(dl)* = 1.35*wdl =	1.23 kN/m	M(dl)* =	5.89 kNm (Max at 1000mm)
w* = 1.2*wdl + 1.5*wll =	2.14 kN/m	M* =	9.51 kNm (Max at 1019mm)
w.up* = 0.9*wdl + wwl* =	0.89 kN/m (up)	Mw.up* =	2.43 kNm (Max at 1663mm)
p(dl)* = 1.35*pdl =	5.40 kN	V(dl)* =	7.85 kN
p* = 1.2*pdl+1.5*pll =	8.40 kN	V* =	12.68 kN
p.up* = 0.9*pdl + pwl* =	1.20 kN (up)	Vw.up* =	2.98 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 240mm x 45mm MGP10	Area (A) =	21600 mm²
Description =	MGP10 seasoned softwood	Section modulus (Zx) =	864 x10³ mm³
Design depth (dD) =	240 mm	Stiffness (Ix) =	103.7 x10⁶ mm⁴
Design width (dW) =	45 mm	Modulus of elasticity (E) =	10000 MPa - Table H3.1

S1d = 1.25*dD/dW*(Lay.t/dD)^0.5 =	12.91	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1.35*(Lay.t/dD)^0.25 =	13.33	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1d ≤ 10 - Cl 3.2.4			
k12 =	1.000	for ρb*S1d ≤ 10 - Cl 3.2.4	f'b =	14.5	MPa
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	2.4	MPa
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρbd) =	0.70	(rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	7.34	kNm	Material constant (ρb) =	0.67	(rb=0.50)
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	12.10	kNm	Stress reversal (ρbu) =	0.64	(rbu=1.00)
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	12.87	kNm	Duration factor (k1) =	0.94	(Live)
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	17.70	kN	Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	29.19	kN	Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	31.06	kN	Sharing factor (k9) =	1.14	
			Size modifier (mod.b & s) =	0.85	& 0.92

Deflections

			Duration factor (j2) =	2.0	
Ireq'd j2.(DL+Ψl.LL) (L/300) =	100.4 x10⁶ mm⁴	< Critical	δDL=	12.9 mm	Span / 310
Ireq'd `LL (L/240) =	24.4 x10⁶ mm⁴		δΨs.LL =	3.9 mm	Span / 1020
Ireq'd WLs (L/180) =	30.9 x10⁶ mm⁴		δWLs =	-6.6 mm	Span / 604

Beam:	**(RB14) 2 / 190mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 3.62kNm (+ve) < øM(dl) = 4.98kNm, M* = 5.61kNm (+ve) < øM = 8.22kNm**	**OK (0.73,0.68)**
	Mw* = 0.34kNm (-ve) < øMw = 8.74kNm	**OK (0.04)**
Shear:	**V(dl)* = 7.24kN < øV(dl) = 14.58kN, V* = 11.21kN < øV = 24.05kN**	**OK (0.50,0.47)**
	Vw* = 0.01kN < øVw = 25.59kN	**OK (0.00)**
Deflection:	**δDL = L/518 (4mm) , δΨs.LL = L/2067 (1mm), δWLs = L/1502 (-1mm)**	**OK**
Reactions:	**(Each end) Rdl = 3.87kN, Rll = 2.38kN, Rwl* = -4.84kN, R.dn* = 8.21kN, R.up* = 1.36kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1 (1) House, (2) Primary building elements, (3) Important			House =	N (Y)es,(N)o
Span (L) =	2000 mm	Edge restrained (down) =	C (T)ension,(C)ompression,(B)oth		
Centres (cts) =	5700 mm	Lay.t (Top) =	900 mm		
Span type =	S (S)ingle,(D)ouble				

Loadings

Roof area (A) =	11.40 m²		Apply wind reduction =	Y (Y)es,(N)o			
LL = 1.8/A+0.12 ≥ 0.25 =	0.28 kPa		Roof reduction (Ka) =	0.99 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 *	5700 mm +		kN/m =	2.28 kN/m		
Other dead load (wdl) =	kPa *	mm +		kN/m =	0.00 kN/m		
Include S.Wt =	Y (Y)es,(N)o			S.Wt =	0.09 kN/m		
				Σwdl =	2.37 kN/m		
Uniform live loads							
Roof live load (wll) =	0.28 kPa *	5700 mm +		kN/m =	1.58 kN/m		
Other live load (wll) =	kPa *	mm +		kN/m =	0.00 kN/m		
Alternate point live load =	1.40 kN	Distr. to	1 members	Σwll =	1.58 kN/m		
Uniform wind loads							
Ult. wind load (Wu) =	1.22 kPa *	5700 mm					
Cp,e =	0.5	Cp,i =	0.2	Σwwl* =	-4.84 kN/m (up)		
Point loads							
Dead load (pdl) =	3.00 kN			Position =	1000 mm from LHS		
Live load (pll) =	1.60 kN			Shear using PL at support =	Y (Y)es,(N)o		
Wind load (pwl*) =	kN (-ve up)						
w(dl)* = 1.35*wdl =	3.19 kN/m			M(dl)* =	3.62 kNm (Max at 1000mm)		
w* = 1.2*wdl + 1.5*wll =	5.21 kN/m			M* =	5.61 kNm (Max at 1000mm)		
w.up* = 0.9*wdl + wwl* =	2.71 kN/m (up)			Mw.up* =	0.34 kNm (Max at 501mm)		
p(dl)* = 1.35*pdl =	4.05 kN			V(dl)* =	7.24 kN		
p* = 1.2*pdl+1.5*pll =	6.00 kN			V* =	11.21 kN		
p.up* = 0.9*pdl + pwl* =	-2.70 kN (down)			Vw.up* =	0.01 kN		

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 190mm x 45mm MGP10		Area (A) =	17100 mm²	
Description =	MGP10 seasoned softwood		Section modulus (Zx) =	542 x10³ mm³	
Design depth (dD) =	190 mm		Stiffness (Ix) =	51.4 x10⁶ mm⁴	
Design width (dW) =	45 mm		Modulus of elasticity (E) =	10000 MPa - Table H3.1	
S1d = 1.25*dD/dW*(Lay.t/dD)^0·5 =	11.49	For top comp. edge restrained - Cl 3.2.3.2(a)			
S1u = (dD/dW)^1·35*(Lay.t/dD)^0·25 =	10.31	For top tension edge restrained in uplift - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1d ≤ 10 - Cl 3.2.4			
k12 =	1.000	for ρb*S1d ≤ 10 - Cl 3.2.4	f'b =	15.7 MPa	
k12u =	1.000	for ρbu*S1u ≤ 10 - Cl 3.2.4	f's =	2.5 MPa	
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρbd) =	0.72 (rbd=0.25)	
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	4.98 kNm		Material constant (ρb) =	0.70 (rb=0.43)	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	8.22 kNm		Stress reversal (ρbu) =	0.66 (rbu=1.00)	
øMw = ø*(k1=1)*k4*k6*k9*k12u*f'b*Zx =	8.74 kNm		Duration factor (k1) =	0.94 (Live)	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	14.58 kN		Moisture factor (k4) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	24.05 kN		Temp. factor (k6) =	1.00	
øVw = ø*(k1=1)*k4*k6*f's*(2/3*A) =	25.59 kN		Sharing factor (k9) =	1.14	
			Size modifier (mod.b & s) =	0.93 & 0.96	

Deflections

			Duration factor (j2) =	2.0	
Ireq'd j2.(DL+Ψl.LL) (L/300) =	29.8 x10⁶ mm⁴	< Critical	δDL=	3.9 mm	Span / 518
Ireq'd `LL (L/240) =	6.0 x10⁶ mm⁴		δΨs.LL =	1.0 mm	Span / 2067
Ireq'd WLs (L/180) =	6.2 x10⁶ mm⁴		δWLs =	-1.3 mm	Span / 1502

Beam:	**(DJ01) 140mm x 45mm MGP10 (Single span)**	
Bending:	**M(dl)* = 0.72kNm (+ve) < øM(dl) = 1.28kNm, M* = 1.45kNm (+ve) < øM = 1.79kNm**	**OK (0.56,0.81)**
Shear:	**V(dl)* = 1.60kN < øV(dl) = 5.58kN, V* = 3.22kN < øV = 7.84kN**	**OK (0.29,0.41)**
Deflection:	**δDL = L/671 (3mm) , δΨs.LL = L/847 (2mm), δTotal = L/374 (5mm), 1kN mid. δ = 1.2mm**	**Warning (vibr.)**
Reactions:	**(Each end) Rdl = 0.43kN, Rll = 1.80kN, R* = 3.22kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	1800	mm	Lay.t (Top) =	600	mm
Centres (cts) =	450	mm			
Span type =	S	(S)ingle,(D)ouble			

Loadings

Floor area (A) =	0.81	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) =	1.00	kPa *	450	mm +		kN/m =	0.45 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
						Σwdl =	0.48 kN/m

Uniform live loads

Floor live load (wll) =	2.00	kPa *	450	mm +		kN/m =	0.90 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	Σwll =	2.00 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) =	1.00	(Ψsp) =	1.00	
Long term LL factor (Ψlu) =	0.33 / 0.40 (wdl*)	(Ψlp) =	0.33 / 0.40 (pdl*)	
wdl* = 1.2*wdl+1.5*Ψlu*wll =	1.78 kN/m	M(dl+Ψl.ll)* =	0.72 kNm	(Max at 900mm)
w* = 1.2*wdl+1.5*wll =	3.58 kN/m	M* =	1.45 kNm	(Max at 900mm)
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00 kN	V(dl+Ψl.ll)* =	1.60 kN	
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	3.22 kN	

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	140mm x 45mm MGP10	Area (A) =	6300 mm²
Description =	MGP10 seasoned softwood	Section modulus (Zx) =	147 x10³ mm³
Design depth (dD) =	140 mm	Stiffness (Ix) =	10.3 x10⁶ mm⁴
Design width (dW) =	45 mm	Modulus of elasticity (E) =	10000 MPa - Table H3.1

S1 = 1.25*dD/dW*(Lay.t/dD)^0.5 =	8.05	For top comp. edge restrained - Cl 3.2.3.2(a)			
k12d =	1.000	for ρbd*S1 ≤ 10 - Cl 3.2.4	f'b =	17.0	MPa
k12 =	1.000	for ρb*S1 ≤ 10 - Cl 3.2.4	f's =	2.6	MPa
			Material constant (ρbd) =	0.75	(rbd=0.25)
Strength reduction factor (ø) =	0.9	Table 2.1	Material constant (ρb) =	0.70	(rb=0.84)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	1.28 kNm		Duration factor (k1) =	0.80	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	1.79 kNm		Moisture factor (k4) =	1.00	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	5.58 kN		Temp. factor (k6) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	7.84 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+Ψl.LL) (L/300) =	4.6 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	2.7	mm	Span / 671
Ireq'd Ψs.LL (L/300) =	3.6 x10⁶ mm⁴		Ψs.δLL =	2.1	mm	Span / 847
Ireq'd Total (L/250) =	6.9 x10⁶ mm⁴		δTotal =	4.8	mm	Span / 374
			1kN midspan δ =	1.2	mm	

Beam:	**(DB01) 2 / 190mm x 45mm F17 KD HW (Single span)**	
Bending:	**M(dl)* = 3.18kNm (+ve) < øM(dl) = 14.04kNm, M* = 4.44kNm (+ve) < øM = 19.70kNm**	**OK (0.23,0.23)**
Shear:	**V(dl)* = 5.09kN < øV(dl) = 22.22kN, V* = 7.11kN < øV = 31.19kN**	**OK (0.23,0.23)**
Deflection:	**δDL = L/574 (4mm) , δΨs.LL = L/1967 (1mm), δTotal = L/444 (6mm), 1kN mid. δ = 0.5mm**	**OK**
Reactions:	**(Each end) Rdl = 3.11kN, Rll = 2.25kN, R* = 7.11kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category =	1	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	2500	mm	Lay.t (Top) =	600	mm
Centres (cts) =	900	mm			
Span type =	S	(S)ingle,(D)ouble			

Loadings

Floor area (A) = 2.25 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) =	1.00	kPa *	900	mm +		kN/m =	0.90 kN/m
Wall dead load (wdl) =	0.40	kPa *	1000	mm +		kN/m =	0.40 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 =	0.11 kN/m
						Σwdl =	2.49 kN/m

Uniform live loads

Floor live load (wll) =	2.00	kPa *	900	mm +		kN/m =	1.80 kN/m
Partitions (wll) =		kPa *	900	mm +		kN/m =	0.00 kN/m
Alternate point live load =	1.80	kN	Distr. to	1	members	Σwll =	1.80 kN/m

Point loads

Dead load (pdl) = kN | Position = 1250 mm from LHS

Live load (pll) = kN | Shear using PL at support = N (Y)es,(N)o

Short term LL factor (Ψsu) =	1.00	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.33 / 0.40 (wdl*)	(Ψlp) =	0.33 / 0.40 (pdl*)
wdl* = 1.2*wdl+1.5*Ψlu*wll =	4.07 kN/m	M(dl+Ψl.ll)* =	3.18 kNm (Max at 1250mm)
w* = 1.2*wdl+1.5*wll =	5.69 kN/m	M* =	4.44 kNm (Max at 1250mm)
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00 kN	V(dl+Ψl.ll)* =	5.09 kN
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	7.11 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 190mm x 45mm F17 KD HW	Area (A) =	17100 mm²
Description =	F17k seasoned hardwood	Section modulus (Zx) =	542 x10³ mm³
Design depth (dD) =	190 mm	Stiffness (Ix) =	51.4 x10⁶ mm⁴
Design width (dW) =	45 mm	Modulus of elasticity (E) =	14000 MPa - Table H2.1

S1 = 1.25*dD/dW*(Lay.t/dD)^0.5 = 9.38 For top comp. edge restrained - Cl 3.2.3.2(a)

k12d = 1.000 for ρbd*S1 ≤ 10 - Cl 3.2.4 | f'b = 42.0 MPa

k12 = 1.000 for ρb*S1 ≤ 10 - Cl 3.2.4 | f's = 3.6 MPa

Material constant (ρbd) = 0.98 (rbd=0.25)

Strength reduction factor (ø) =	0.95 Table 2.1	Material constant (ρb) =	0.95 (rb=0.47)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	14.04 kNm	Duration factor (k1) =	0.80
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	19.70 kNm	Moisture factor (k4) =	1.00
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	22.22 kN	Temp. factor (k6) =	1.00
øV = ø*k1*k4*k6*f's*(2/3*A) =	31.19 kN	Sharing factor (k9) =	1.14
		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) =	26.9 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	4.4 mm	Span / 574
Ireq'd Ψs.LL (L/300) =	7.8 x10⁶ mm⁴		Ψs.δLL =	1.3 mm	Span / 1967
Ireq'd Total (L/250) =	29.0 x10⁶ mm⁴		δTotal =	5.6 mm	Span / 444
			1kN midspan δ =	0.5 mm	

Beam: (FJ01) 190mm x 45mm MGP10 (Double span)
Bending: M(dl)* = 1.96kNm (-ve) < øM(dl) = 2.19kNm, M* = 2.19kNm (-ve) < øM = 3.07kNm — OK (0.90,0.72)
Shear: V(dl)* = 4.91kN < øV(dl) = 7.29kN, V* = 5.75kN < øV = 10.24kN — OK (0.67,0.56)
Deflection: δDL = L/899 (2mm) , δΨs.LL = L/3062 (1mm), δTotal = L/695 (3mm), 1kN mid. δ = 0.5mm — OK
Reactions: (Left) Rdl.L = 2.00kN, Rll.L = 0.57kN, R.L* = 3.25kN (Right) Rdl.R = 2.00kN, Rll.R = -0.13kN, R.R* = 2.70kN
Rdl.mid = 6.67kN, Rll.mid =0.96kN, R* = 9.45kN

Geometry

(House member affecting ≤ 25m² or secondary building member)

Category =	1	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	2000	mm	Lay.t (Top) =	600	mm
Centres (cts) =	450	mm			
Span type =	D	(S)ingle,(D)ouble			

Loadings

Point load in left span

Floor area (A) = 0.90 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 *	450	mm +		kN/m =	0.23 kN/m
Wall dead load (wdl) =	1.00	kPa *	2400	mm +		kN/m =	2.40 kN/m
Other dead load (wdl) =		kPa *		mm +		kN/m =	0.00 kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.04 kN/m
						Σwdl =	2.67 kN/m

Uniform live loads Alternative point load is assessed at point load position

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 =	1.40	kN (critical)	Distr. to	1	members	Σwll =	0.00 kN/m

Point loads

Dead load (pdl) = kN — Position = 1000 mm from LHS
Live load (pll) = kN — Shear using PL at support = N (Y)es,(N)o
Point load in both spans = N (Y)es,(N)o

Short term LL factor (Ψsu) =	1.00	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.33 / 0.40 (wdl*)	(Ψlp) =	0.33 / 0.40 (pdl*)
wdl* = 1.35*wdl =	3.60 kN/m	M(dl+Ψl.ll)* =	1.96 kNm - Over support
w* = 1.35*wdl =	3.60 kN/m	M* =	2.19 kNm - Over support
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.84 kN	V(dl+Ψl.ll)* =	4.91 kN - Central Support
p* = 1.2*pdl+1.5*pll =	2.10 kN	V* =	5.75 kN - Central Support

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Capacity uses critical restraint length and edge

Member =	190mm x 45mm MGP10	Area (A) =	8550 mm²
Description =	MGP10 seasoned softwood	Section modulus (Zx) =	271 x10³ mm³
Design depth (dD) =	190 mm	Stiffness (Ix) =	25.7 x10⁶ mm⁴
Design width (dW) =	45 mm	Modulus of elasticity (E) =	10000 MPa - Table H3.1

S1 = 1.25*dD/dW*(Lay.t/dD)^0.5 = 9.38 For top comp. edge restrained - Cl 3.2.3.2(a)
k12d = 1.000 for ρbd*S1 ≤ 10 - Cl 3.2.4
k12 = 1.000 for ρb*S1 ≤ 10 - Cl 3.2.4

		f'b =	15.7 MPa
		f's =	2.5 MPa
		Material constant (ρbd) =	0.72 (rbd=0.25)
Strength reduction factor (ø) =	0.9 Table 2.1	Material constant (ρb) =	0.72 (rb=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	2.19 kNm	Duration factor (k1) =	0.80
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	3.07 kNm	Moisture factor (k4) =	1.00
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	7.29 kN	Temp. factor (k6) =	1.00
øV = ø*k1*k4*k6*f's*(2/3*A) =	10.24 kN	Sharing factor (k9) =	1.00
		Size modifier (mod.b) =	0.93
		Size modifier (mod.s) =	0.96

Deflections

			Duration factor (j2) =	2.0	
Ireq'd j2.(DL+Ψl.LL) (L/300) =	8.6 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	2.2 mm	Span / 899
Ireq'd Ψs.LL (L/300) =	2.5 x10⁶ mm⁴		Ψs.δLL =	0.7 mm	Span / 3062
Ireq'd Total (L/250) =	9.3 x10⁶ mm⁴		δTotal =	2.9 mm	Span / 695
			1kN midspan δ =	0.5 mm	

Beam:	**(FB01A) 2 / 290mm x 45mm F22 Seasoned (Single span)**	
Bending:	**M(dl)* = 3.38kNm (+ve) < øM(dl) = 34.14kNm, M* = 6.22kNm (+ve) < øM = 50.07kNm**	**OK (0.10,0.12)**
Shear:	**V(dl)* = 4.67kN < øV(dl) = 35.41kN, V* = 8.58kN < øV = 49.69kN**	**OK (0.13,0.17)**
Deflection:	**δDL = L/2121 (1mm) , δΨs.LL = L/3072 (1mm), δTotal = L/1255 (2mm), 1kN mid. δ = 0.2mm**	**OK**
Reactions:	**(Each end) Rdl = 1.71kN, Rll = 4.35kN, R* = 8.58kN**	

Geometry (House member affecting > 25m² or primary building member)

Category =	2	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	2900	mm	Lay.t (Top) =	600	mm
Centres (cts) =	2000	mm			
Span type =	S	(S)ingle,(D)ouble			

Loadings

Floor area (A) =	5.80	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) =		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 =	0.18	kN/m
					Σwdl =	1.18	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	Distr. to	1	members	Σwll =	3.00 kN/m
Point loads							
Dead load (pdl) =		kN	Position =	1450	mm from LHS		
Live load (pll) =		kN	Shear using PL at support =	N	(Y)es,(N)o		

Short term LL factor (Ψsu) =	1.00	(Ψsp) =	1.00	
Long term LL factor (Ψlu) =	0.33 / 0.40 (wdl*)	(Ψlp) =	0.33 / 0.40 (pdl*)	
wdl* = 1.2*wdl+1.5*Ψlu*wll =	3.22 kN/m	M(dl+Ψl.ll)* =	3.38	kNm (Max at 1450mm)
w* = 1.2*wdl+1.5*wll =	5.92 kN/m	M* =	6.22	kNm (Max at 1450mm)
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00 kN	V(dl+Ψl.ll)* =	4.67 kN	
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	8.58 kN	

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 290mm x 45mm F22 Seasoned	Area (A) =	26100 mm²
Description =	F22 seasoned hardwood	Section modulus (Zx) =	1262 x10³ mm³
Design depth (dD) =	290 mm	Stiffness (Ix) =	182.9 x10⁶ mm⁴
Design width (dW) =	45 mm	Modulus of elasticity (E) =	16000 MPa - Table H2.1

S1 = 1.25*dD/dW*(Lay.t/dD)^0.5 =	11.59	For top comp. edge restrained - Cl 3.2.3.2(a)			
k12d = 1.5-0.05*ρbd*S1 =	0.891	for 10 ≤ ρbd*S1 ≤ 20 - Cl 3.2.4	f'b =	55.0	MPa
k12 = 1.5-0.05*ρb*S1 =	0.931	for 10 ≤ ρb*S1 ≤ 20 - Cl 3.2.4	f's =	4.2	MPa
			Material constant (ρbd) =	1.05	(rbd=0.25)
Strength reduction factor (ø) =	0.85	Table 2.1	Material constant (ρb) =	0.98	(rb=0.76)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	34.14	kNm	Duration factor (k1) =	0.80	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	50.07	kNm	Moisture factor (k4) =	1.00	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	35.41	kN	Temp. factor (k6) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	49.69	kN	Sharing factor (k9) =	1.14	
			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) =	25.9 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	1.4	mm	Span / 2121
Ireq'd Ψs.LL (L/300) =	17.9 x10⁶ mm⁴		Ψs.δLL =	0.9	mm	Span / 3072
Ireq'd Total (L/250) =	36.4 x10⁶ mm⁴		δTotal =	2.3	mm	Span / 1255
			1kN midspan δ =	0.2	mm	

Beam:	**(FB01B) 2 / 240mm x 45mm F17 KD HW (Single span)**	
Bending:	**M(dl)* = 6.14kNm (+ve) < øM(dl) = 19.66kNm, M* = 7.56kNm (+ve) < øM = 27.79kNm**	**OK (0.31,0.27)**
Shear:	**V(dl)* = 8.47kN < øV(dl) = 25.12kN, V* = 10.43kN < øV = 35.25kN**	**OK (0.34,0.30)**
Deflection:	**δDL = L/495 (6mm) , δΨs.LL = L/3047 (1mm), δTotal = L/426 (7mm), 1kN mid. δ = 0.4mm**	**OK**
Reactions:	**(Each end) Rdl = 5.97kN, Rll = 2.18kN, R* = 10.43kN**	

Geometry (House member affecting > 25m² or primary building member)

Category =	2	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	2900	mm	Lay.t (Top) =	600	mm
Centres (cts) =	1000	mm			
Span type =	S	(S)ingle,(D)ouble			

Loadings

Floor area (A) = 2.90 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 *	1000	mm +		kN/m =	0.50 kN/m
Wall dead load (wdl) =	0.40	kPa *	3000	mm +		kN/m =	1.20 kN/m
Other dead load (wdl) =	0.40	kPa *	5700	mm +		kN/m =	2.28 kN/m
Include S.Wt =	Y	(Y)es,(N)o				S.Wt =	0.14 kN/m
						Σwdl =	4.12 kN/m

Uniform live loads

Floor live load (wll) =	1.50	kPa *	1000	mm +		kN/m =	1.50 kN/m
Partitions (wll) =		kPa *	1000	mm +		kN/m =	0.00 kN/m
Alternate point live load =	1.80	kN	Distr. to	1	members	Σwll =	1.50 kN/m

Point loads

Dead load (pdl) = kN | Position = 1450 mm from LHS

Live load (pll) = kN | Shear using PL at support = N (Y)es,(N)o

Short term LL factor (Ψsu) =	1.00	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.33 / 0.40 (wdl*)	(Ψlp) =	0.33 / 0.40 (pdl*)
wdl* = 1.2*wdl+1.5*Ψlu*wll =	5.84 kN/m	M(dl+Ψl.ll)* =	6.14 kNm (Max at 1450mm)
w* = 1.2*wdl+1.5*wll =	7.19 kN/m	M* =	7.56 kNm (Max at 1450mm)
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00 kN	V(dl+Ψl.ll)* =	8.47 kN
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	10.43 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 240mm x 45mm F17 KD HW	Area (A) =	21600 mm²
Description =	F17k seasoned hardwood	Section modulus (Zx) =	864 x10³ mm³
Design depth (dD) =	240 mm	Stiffness (Ix) =	103.7 x10⁶ mm⁴
Design width (dW) =	45 mm	Modulus of elasticity (E) =	14000 MPa - Table H2.1

S1 = 1.25*dD/dW*(Lay.t/dD)^0.5 = 10.54 For top comp. edge restrained - Cl 3.2.3.2(a)

k12d = 1.5-0.05*ρbd*S1 = 0.981 for 10 ≤ ρbd*S1 ≤ 20 - Cl 3.2.4

k12 = 1.5-0.05*ρb*S1 = 0.988 for 10 ≤ ρb*S1 ≤ 20 - Cl 3.2.4

		f'b =	42.0 MPa
		f's =	3.6 MPa
		Material constant (ρbd) =	0.98 (rbd=0.25)
Strength reduction factor (ø) =	0.85 Table 2.1	Material constant (ρb) =	0.97 (rb=0.31)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	19.66 kNm	Duration factor (k1) =	0.80
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	27.79 kNm	Moisture factor (k4) =	1.00
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	25.12 kN	Temp. factor (k6) =	1.00
øV = ø*k1*k4*k6*f's*(2/3*A) =	35.25 kN	Sharing factor (k9) =	1.14
		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) =	62.8 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	5.9 mm	Span / 495
Ireq'd Ψs.LL (L/300) =	10.2 x10⁶ mm⁴		Ψs.δLL =	1.0 mm	Span / 3047
Ireq'd Total (L/250) =	60.9 x10⁶ mm⁴		δTotal =	6.8 mm	Span / 426
			1kN midspan δ =	0.4 mm	

Beam:	**(FB02) 2 / 240mm x 45mm F17 KD HW (Single span)**	
Bending:	**M(dl)* = 1.64kNm (+ve) < øM(dl) = 19.66kNm, M* = 2.71kNm (+ve) < øM = 28.13kNm**	**OK (0.08,0.10)**
Shear:	**V(dl)* = 1.42kN < øV(dl) = 25.12kN, V* = 2.35kN < øV = 35.25kN**	**OK (0.06,0.07)**
Deflection:	**δDL = L/1305 (4mm) , δΨs.LL = L/2545 (2mm), δTotal = L/863 (5mm), 1kN mid. δ = 1.4mm**	**Warning (vibr.)**
Reactions:	**(Each end) Rdl = 0.67kN, Rll = 1.04kN, R* = 2.35kN**	

Geometry (House member affecting > 25m² or primary building member)

Category =	2	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	4600	mm	Lay.t (Top) =	600	mm
Centres (cts) =	300	mm			
Span type =	S	(S)ingle,(D)ouble			

Loadings

Floor area (A) = 1.38 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 *	300	mm +		kN/m =	0.15 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 =	0.14 kN/m
						Σwdl =	0.29 kN/m

Uniform live loads

Floor live load (wll) =	1.50	kPa *	300	mm +		kN/m =	0.45 kN/m
Partitions (wll) =		kPa *	300	mm +		kN/m =	0.00 kN/m
Alternate point live load =	1.80	kN	Distr. to	2	members	Σwll =	0.45 kN/m

Point loads

Dead load (pdl) = kN | Position = 2300 mm from LHS

Live load (pll) = kN | Shear using PL at support = N (Y)es,(N)o

Short term LL factor (Ψsu) =	1.00	(Ψsp) =	1.00
Long term LL factor (Ψlu) =	0.33 / 0.40 (wdl*)	(Ψlp) =	0.33 / 0.40 (pdl*)
wdl* = 1.2*wdl+1.5*Ψlu*wll =	0.62 kN/m	M(dl+Ψl.ll)* =	1.64 kNm (Max at 2300mm)
w* = 1.2*wdl+1.5*wll =	1.02 kN/m	M* =	2.71 kNm (Max at 2300mm)
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00 kN	V(dl+Ψl.ll)* =	1.42 kN
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	2.35 kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	2 / 240mm x 45mm F17 KD HW	Area (A) =	21600 mm²
Description =	F17k seasoned hardwood	Section modulus (Zx) =	864 x10³ mm³
Design depth (dD) =	240 mm	Stiffness (Ix) =	103.7 x10⁶ mm⁴
Design width (dW) =	45 mm	Modulus of elasticity (E) =	14000 MPa - Table H2.1

S1 = 1.25*dD/dW*(Lay.t/dD)^0.5 = 10.54 For top comp. edge restrained - Cl 3.2.3.2(a)

k12d = 1.5-0.05*ρbd*S1 = 0.981 for 10 ≤ ρbd*S1 ≤ 20 - Cl 3.2.4

k12 = 1.000 for ρb*S1 ≤ 10 - Cl 3.2.4

		f'b =	42.0 MPa
		f's =	3.6 MPa
		Material constant (ρbd) =	0.98 (rbd=0.25)
Strength reduction factor (ø) =	0.85 Table 2.1	Material constant (ρb) =	0.93 (rb=0.66)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	19.66 kNm	Duration factor (k1) =	0.80
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	28.13 kNm	Moisture factor (k4) =	1.00
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	25.12 kN	Temp. factor (k6) =	1.00
øV = ø*k1*k4*k6*f's*(2/3*A) =	35.25 kN	Sharing factor (k9) =	1.14
		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) =	23.8 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	3.5 mm	Span / 1305
Ireq'd Ψs.LL (12mm) =	15.6 x10⁶ mm⁴		Ψs.δLL =	1.8 mm	Span / 2545
Ireq'd Total (L/250) =	30.1 x10⁶ mm⁴		δTotal =	5.3 mm	Span / 863
			1kN midspan δ =	1.4 mm	

Beam:	**(FB03) 240mm x 45mm F17 KD HW (Single span)**	
Bending:	**M(dl)* = 0.83kNm (+ve) < øM(dl) = 8.62kNm, M* = 1.46kNm (+ve) < øM = 12.34kNm**	**OK (0.10,0.12)**
Shear:	**V(dl)* = 2.01kN < øV(dl) = 12.56kN, V* = 3.52kN < øV = 17.63kN**	**OK (0.16,0.20)**
Deflection:	**δDL = L/3313 (1mm) , δΨs.LL = L/5694 (0mm), δTotal = L/2095 (1mm), 1kN mid. δ = 0.2mm**	**OK**
Reactions:	**(1 End) Rdl.max = 0.84kN, Rll.max = 1.68kN, R.max* = 3.52kN**	
	(1 End) Rdl.min = 0.45kN, Rll.min = 1.13kN, R.min* = 2.23kN	

Geometry (House member affecting > 25m² or primary building member)

Category =	2	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	2000	mm	Lay.t (Top) =	600	mm
Centres (cts) =	450	mm			
Span type =	S	(S)ingle,(D)ouble			

Loadings

Floor area (A) =	0.90	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 *	450	mm +	kN/m =	0.23	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 =	0.07	kN/m
					Σwdl =	0.30	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	2	members Σwll =	0.90	kN/m
Point loads							
Dead load (pdl) =	0.70	kN			Position =	450	mm from LHS
Live load (pll) =	1.00	kN			Shear using PL at support =	N	(Y)es,(N)o

Short term LL factor (Ψsu) =	1.00		(Ψsp) =	1.00	
Long term LL factor (Ψlu) =	0.33	/ 0.40 (wdl*)	(Ψlp) =	0.33	/ 0.40 (pdl*)
wdl* = 1.2*wdl+1.5*Ψlu*wll =	0.89	kN/m	M(dl+Ψl.ll)* =	0.83	kNm (Max at 638mm)
w* = 1.2*wdl+1.5*wll =	1.70	kN/m	M* =	1.46	kNm (Max at 691mm)
pdl* = 1.2*pdl+1.5*Ψlp*pll =	1.44	kN	V(dl+Ψl.ll)* =	2.01	kN
p* = 1.2*pdl+1.5*pll =	2.34	kN	V* =	3.52	kN

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Member =	240mm x 45mm F17 KD HW		Area (A) =	10800	mm²
Description =	F17k seasoned hardwood		Section modulus (Zx) =	432	x10³ mm³
Design depth (dD) =	240	mm	Stiffness (Ix) =	51.8	x10⁶ mm⁴
Design width (dW) =	45	mm	Modulus of elasticity (E) =	14000	MPa - Table H2.1

S1 = 1.25*dD/dW*(Lay.t/dD)^0.5 =	10.54	For top comp. edge restrained - Cl 3.2.3.2(a)			
k12d = 1.5-0.05*ρbd*S1 =	0.981	for 10 ≤ ρbd*S1 ≤ 20 - Cl 3.2.4	f'b =	42.0	MPa
k12 =	1.000	for ρb*S1 ≤ 10 - Cl 3.2.4	f's =	3.6	MPa
			Material constant (ρbd) =	0.98	(rbd=0.25)
Strength reduction factor (ø) =	0.85	Table 2.1	Material constant (ρb) =	0.92	(rb=0.82)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	8.62	kNm	Duration factor (k1) =	0.80	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	12.34	kNm	Moisture factor (k4) =	1.00	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	12.56	kN	Temp. factor (k6) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	17.63	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+Ψl.LL) (L/300) =	4.7 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	0.6	mm	Span / 3313
Ireq'd Ψs.LL (L/300) =	2.7 x10⁶ mm⁴		Ψs.δLL =	0.4	mm	Span / 5694
Ireq'd Total (L/250) =	6.2 x10⁶ mm⁴		δTotal =	1.0	mm	Span / 2095
			1kN midspan δ =	0.2	mm	

Beam:	**(FB04) 2 / 240mm x 45mm F22 Seasoned (Double span)**	
Bending:	**M(dl)* = 3.80kNm (-ve) < øM(dl) = 22.75kNm, M* = 4.72kNm (-ve) < øM = 32.29kNm**	**OK (0.17,0.15)**
Shear:	**V(dl)* = 7.91kN < øV(dl) = 29.30kN, V* = 10.11kN < øV = 41.13kN**	**OK (0.27,0.25)**
Deflection:	**δDL = L/2748 (1mm) , δΨs.LL = L/16105 (0mm), δTotal = L/2347 (1mm), 1kN mid. δ = 0.1mm**	**OK**
Reactions:	**(Each end) Rdl = 3.41kN, Rll = 1.31kN, R* = 6.07kN**	
	Rdl.mid = 11.38kN, Rll.mid =4.38kN, R* = 20.22kN	

Geometry (House member affecting > 25m² or primary building member)

Category =	2	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	2333	mm	Lay.t (Top) =	600	mm
Centres (cts) =	1000	mm			
Span type =	D	(S)ingle,(D)ouble			

Loadings

Floor area (A) = 2.33 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) =	3.75	kPa *	1000	mm +		kN/m =	3.75 kN/m
Wall dead load (wdl) =	0.50	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 =	0.15 kN/m
						Σwdl =	3.90 kN/m

Uniform live loads

Floor live load (wll) =	1.50	kPa *	1000	mm +		kN/m =	1.50 kN/m
Partitions (wll) =		kPa *	1000	mm +		kN/m =	0.00 kN/m
Alternate point live load =	1.80	kN	Distr. to	2	members	Σwll =	1.50 kN/m

Point loads Pos ≠ L/2

Dead load (pdl) =		kN	Position =	450 mm from LHS
Live load (pll) =		kN	Shear using PL at support =	N (Y)es,(N)o
			Point load in both spans =	N (Y)es,(N)o

Short term LL factor (Ψsu) =	1.00	(Ψsp) =	1.00	
Long term LL factor (Ψlu) =	0.33 / 0.40 (wdl*)	(Ψlp) =	0.33 / 0.40 (pdl*)	
wdl* = 1.2*wdl+1.5*Ψlu*wll =	5.58 kN/m	M(dl+Ψl.ll)* =	3.80 kNm - Over support	
w* = 1.2*wdl+1.5*wll =	6.93 kN/m	M* =	4.72 kNm - Over support	
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00 kN	V(dl+Ψl.ll)* =	7.91 kN - Central Support	
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	10.11 kN - Central Support	

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5 Capacity uses critical restraint length and edge

Member =	2 / 240mm x 45mm F22 Seasoned	Area (A) =	21600 mm²
Description =	F22 seasoned hardwood	Section modulus (Zx) =	864 x10³ mm³
Design depth (dD) =	240 mm	Stiffness (Ix) =	103.7 x10⁶ mm⁴
Design width (dW) =	45 mm	Modulus of elasticity (E) =	16000 MPa - Table H2.1

S1 = (dD/dW)^1.35*(Lay.t/dD)^0.25 = 12.05 For top tension edge restrained - Cl 3.2.3.2(a)
k12d = 1.5-0.05*ρbd*S1 = 0.867 for 10 ≤ ρbd*S1 ≤ 20 - Cl 3.2.4
k12 = 1.5-0.05*ρb*S1 = 0.877 for 10 ≤ ρb*S1 ≤ 20 - Cl 3.2.4

			f'b =	55.0	MPa
			f's =	4.2	MPa
			Material constant (ρbd) =	1.05	(rbd=0.25)
Strength reduction factor (ø) =	0.85	Table 2.1	Material constant (ρb) =	1.03	(rb=0.32)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	22.75	kNm	Duration factor (k1) =	0.80	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	32.29	kNm	Moisture factor (k4) =	1.00	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	29.30	kN	Temp. factor (k6) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	41.13	kN	Sharing factor (k9) =	1.14	
			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) =	11.3 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	0.8	mm	Span / 2748
Ireq'd Ψs.LL (L/300) =	1.9 x10⁶ mm⁴		Ψs.δLL =	0.1	mm	Span / 16105
Ireq'd Total (L/250) =	11.0 x10⁶ mm⁴		δTotal =	1.0	mm	Span / 2347
			1kN midspan δ =	0.1	mm	

Beam:	**(FB05) 2 / 240mm x 45mm F17 KD HW (Double span)**	
Bending:	**M(dl)* = 7.46kNm (-ve) < øM(dl) = 18.17kNm, M* = 9.30kNm (-ve) < øM = 25.78kNm**	**OK (0.41,0.36)**
Shear:	**V(dl)* = 15.54kN < øV(dl) = 25.12kN, V* = 19.93kN < øV = 35.25kN**	**OK (0.62,0.57)**
Deflection:	**δDL = L/1225 (2mm) , δΨs.LL = L/7046 (0mm), δTotal = L/1043 (2mm), 1kN mid. δ = 0.1mm**	**OK**
Reactions:	**(Each end) Rdl = 6.69kN, Rll = 2.63kN, R* = 11.96kN**	
	Rdl.mid = 22.28kN, Rll.mid =8.75kN, R* = 39.87kN	

Geometry (House member affecting > 25m² or primary building member)

Category =	2	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	2333	mm	Lay.t (Top) =	600	mm
Centres (cts) =	2000	mm			
Span type =	D	(S)ingle,(D)ouble			

Loadings

Floor area (A) = 4.67 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) =	3.75	kPa *	2000	mm +		kN/m =	7.50 kN/m
Wall dead load (wdl) =	0.50	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 =	0.14 kN/m
						Σwdl =	7.64 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	Distr. to	2	members	Σwll =	3.00 kN/m

Point loads Pos ≠ L/2

Dead load (pdl) =		kN	Position =	450 mm from LHS
Live load (pll) =		kN	Shear using PL at support =	N (Y)es,(N)o
			Point load in both spans =	N (Y)es,(N)o

Short term LL factor (Ψsu) =	1.00	(Ψsp) =	1.00	
Long term LL factor (Ψlu) =	0.33 / 0.40 (wdl*)	(Ψlp) =	0.33 / 0.40 (pdl*)	
wdl* = 1.2*wdl+1.5*Ψlu*wll =	10.97 kN/m	M(dl+Ψl.ll)* =	7.46 kNm - Over support	
w* = 1.2*wdl+1.5*wll =	13.67 kN/m	M* =	9.30 kNm - Over support	
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00 kN	V(dl+Ψl.ll)* =	15.54 kN - Central Support	
p* = 1.2*pdl+1.5*pll =	0.00 kN	V* =	19.93 kN - Central Support	

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5 Capacity uses critical restraint length and edge

Member =	2 / 240mm x 45mm F17 KD HW	Area (A) =	21600 mm²
Description =	F17k seasoned hardwood	Section modulus (Zx) =	864 x10³ mm³
Design depth (dD) =	240 mm	Stiffness (Ix) =	103.7 x10⁶ mm⁴
Design width (dW) =	45 mm	Modulus of elasticity (E) =	14000 MPa - Table H2.1

S1 = (dD/dW)^1.35*(Lay.t/dD)^0.25 = 12.05 For top tension edge restrained - Cl 3.2.3.2(a)
k12d = 1.5-0.05*ρbd*S1 = 0.907 for 10 ≤ ρbd*S1 ≤ 20 - Cl 3.2.4
k12 = 1.5-0.05*ρb*S1 = 0.917 for 10 ≤ ρb*S1 ≤ 20 - Cl 3.2.4

			f'b =	42.0	MPa
			f's =	3.6	MPa
			Material constant (ρbd) =	0.98	(rbd=0.25)
Strength reduction factor (ø) =	0.85	Table 2.1	Material constant (ρb) =	0.97	(rb=0.33)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	18.17	kNm	Duration factor (k1) =	0.80	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	25.78	kNm	Moisture factor (k4) =	1.00	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	25.12	kN	Temp. factor (k6) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	35.25	kN	Sharing factor (k9) =	1.14	
			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) =	25.4 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	1.9	mm	Span / 1225
Ireq'd Ψs.LL (L/300) =	4.4 x10⁶ mm⁴		Ψs.δLL =	0.3	mm	Span / 7046
Ireq'd Total (L/250) =	24.8 x10⁶ mm⁴		δTotal =	2.2	mm	Span / 1043
			1kN midspan δ =	0.1	mm	

Member:	**(FB06) 250x90PFC (G300)**	
Bending:	**M*(max) = 26.4kNm < øMb(600,αm=1.00) = 113.7kNm**	**OK (0.23)**
	(Single span)	
Shear:	**V.max*=16.5kN < øVvm = 345.6kN (Web area full depth)**	**OK (0.05)**
Deflection:	**δDL = L/887 (7mm), δΨs.LL = L/3595 (2mm), δTotal = L/711 (9mm), 1kN mid. δ = 0.6mm**	**OK**
Precamber:	**Not required**	
Reactions:	**(Each end) Rdl = 9.5kN, Rll = 3.4kN, R* = 16.5kN**	

Geometry

Span (L) =	6400	mm	Eff. Len. (Le) =	600	mm
Centres (cts) =	700	mm	αm.t =	1.00	
Design at =	M	mm from LHS, (M)ax, (S)eg			
Span type =	S	(S)ingle,(D)ouble			
Effective length (Le) =	600	mm			
αm =	1.00				

Loadings

Floor area =	4.5	m²	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 (Ψa) =	1.00	AS/NZS 1170.1 - Cl 3.4.2					

Uniform dead loads

Floor dead load (wdl) =	3.75	kPa *	700	mm +		kN/m =	2.63 kN/m
Wall dead load (wdl) =	0.50	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 =	0.36 kN/m
						Σwdl =	2.98 kN/m

Uniform live loads

Floor live load (wll) =	1.50	kPa * Ψa *	700	mm +		kN/m =	1.05 kN/m
Partitions (wll) =		kPa *	700	mm +		kN/m =	0.00 kN/m
Alternate point live load =	1.80	kN	Distr. to	2	members	Σwll =	1.05 kN/m

Point loads

Dead load (pdl) =		kN	Position =	450	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
w* = 1.2*wdl + 1.5*wll =	5.15 kN/m	M* =	26.4 kNm (Max at 3200mm)
p* = 1.2*pdl + 1.5*pll =	0.00 kN	V* =	16.5 kN

Capacity

Description =	250x90PFC (G300)		Warping constant (Iw) =	35.9	x10⁹ mm⁶
Flange yield (fyf) =	300	MPa	Torsional constant (J) =	248	x10³ mm⁴
Web yield (fyw) =	320	MPa	Effective section mod. (Zex) =	421	x10³ mm³
Area (Ag) =	4520	mm²	Effective section mod. (Zey) =	88.7	x10³ mm³
Stiffness (Ix) =	45.1	x10⁶ mm⁴	Elastic modulus (E) =	200000	MPa - Cl 1.4
Stiffness (Iy) =	3.64	x10⁶ mm⁴	Shear modulus (G) =	80000	MPa - Cl 1.4
ø =	0.9	Table 3.4			
Msx = min(fyf,fyw)*Zex =	126.3	kNm - Cl 5.2.1	øMsx =	113.7	kNm
Positive: Moa.p =	2079.6	kNm	αs.t = 1.000	αm.t = 1.00	øMsy = 23.9 kNm - Cl 5.2.1
Negative: Moa.n =	N.A.				øMbx.p = 113.7 kNm

Deflections

Ireq'd DL (L/360) =	18.3	x10⁶ mm⁴ < Critical	δDL =	7.2 mm	Span / 887
Ireq'd Ψs.LL (L/360) =	4.5	x10⁶ mm⁴	Ψs.δLL =	1.8 mm	Span / 3595
Ireq'd (DL+Ψs.LL) (L/250) =	15.9	x10⁶ mm⁴ < Critical	δTotal =	9.0 mm	Span / 711

Max. precamber (0.3%*span) =	19 mm	Min. precamber =	15 mm
Precamber 80% of δDL =	6 mm	Adopted precamber =	0 mm
		1kN midspan δ =	0.6 mm

Geometry for (FB07): Steel Simple Beam

Description =	250x90PFC (G300)		Ix =	45.1	x10⁶ mm⁴
Span (L) =	6000	mm	Axis =	X	(X),(Y)
Span type =	S	(S)imple,(E)xt,(I)nt,(C)ant,(P)rop,(F)ixed,(O)ther	Ag =	4520	mm²
Material type =	S	(T)imber,(S)teel,(C)onc.,(SC)comp. steel,(O)ther	Density =	78.6	kN/m³
			E =	200000	MPa

Loading

Uniform loads (kN/m)

Uniform loads	UDL	Partial 1	Partial 2
Dead load (wdl) =	1.88		
Live load (wll) =	1.05		
Start from LHS (mm) =	0		
End from LHS (mm) =	6000		
S.Wt =	0.36	kN/m	
Ultimate load (w*) =	4.25	0.00	0.00

Point loads (kN)

Point loads	PL 1	PL 2	PL 3
Dead load (pdl) =	9.50	9.50	
Live load (pll) =	3.40	3.40	
Pos. from LHS (mm) =	1100	4900	
Ultimate load (p*) =	16.50	16.50	0.00

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) =	0.84	(Ψla) =	0.50	

Include S.Wt = Y (Y)es,(N)o
Strength loadcase = C (D)ead Only,(C)omb.

Results at midspan (Max +ve M)

Position of result (x) = 3000 mm

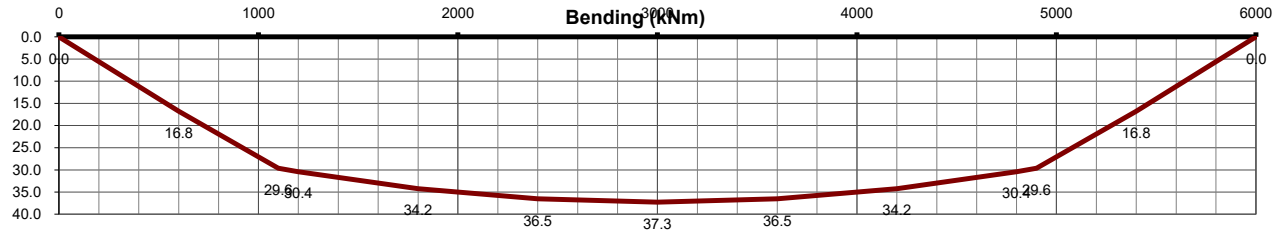
1.20*G+1.50*Q analysed

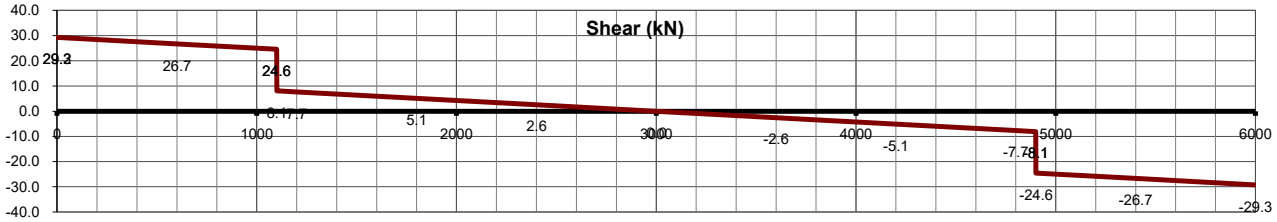
	Left	At x	Right	Max	At	Min	At	Units	
Rdl	16.19		16.19					kN	
Rll	6.55		6.55					kN	
R*	29.25		29.25					kN	
M*	0.00	37.28	0.00	37.28	3000	0.00	0	kNm	
V*	29.25	0.00	-29.25	29.25	0			kN	Span /
δdl	0.00	9.15	0.00	9.15	3000	0.00	0	mm	656
δll	0.00	3.75	0.00	3.75	3000	0.00	0	mm	1601
δdl+Ψs*δll	0.00	12.31	0.00	12.31	3000	0.00	0	mm	487

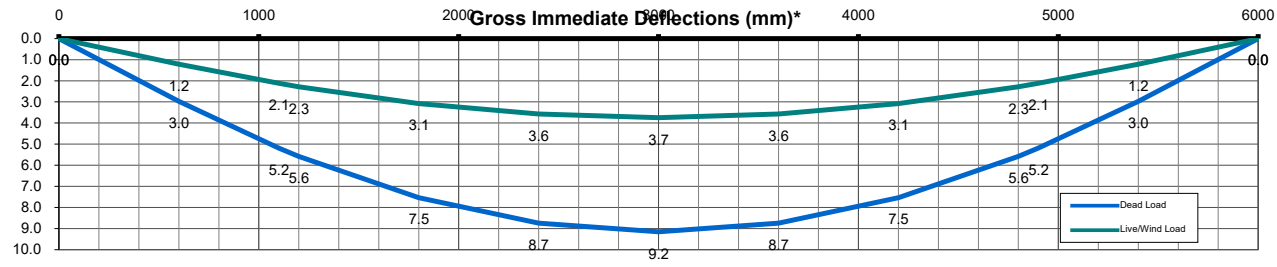
δPll/δTot.ll = 0.476

Graphs

* Deflections are Gross Ig immediate - assessment of long term effects to be considered







Section:	**(FB07) 250x90PFC (G300)**	
Bending:	**Mx* = 37.3kNm < øMb(4500,αm=1.30) = 73.7kNm, øMb(αm=1) = 56.7kNm**	**OK (0.51)**
	No minor bending	
Shear:	**Vx* = 29.3kN < øVvm = 345.6kN (Web area full depth)**	**OK (0.08)**
	No minor shear	
Compression:	**No compression**	
Tension:	**No tension**	
Torsion:	**No torsion**	
Deflection:	**δDL = L/656 (9mm), δΨs.LL = L/1900 (3mm), δTotal= L/487 (12mm) at 3000mm from LHS**	**OK**

Bending & Shear at critical locations - Section 5

Max. restraint (2.5% flange force) = 4.0 kN

(M* to include first order amplification as required - Cl 4.4.2)

Analysis values = C (M)anual, (L)eft, Position (X) from analysis, (R)ight, (C)ritical

Refer to the analysis output

Analysis Axis = X (X),(Y)

Major bending (Mx*) =	37.3	kNm			
Minor bending (My*) =	0.000	kNm	Minor bending (My*) =	0	kNm
Shear Force (Vx*) =	29.3	kN	Torsion (Mz*) =	0	kNm
Shear Force (Vy*) =	0.000	kN			
Effective length factor (ke) =	Calc		Shear Force (Vy*) =	0	kN
ke = (kt=1.00)*(kl=1.00)*(kr=1.00) =	1.00	(From Le Tab)	Span / Segment Length (L) =	4500	mm
Effective length (Le = L*ke) =	4500	mm	Moment modification factor (αm) =	1.30	
ø =	0.9	Table 3.4			
øMsx =	113.7	kNm	Bending (x) =	OK (0.51)	
øMbx(αm=1) =	56.7	kNm			
øMbx =	73.7	kNm	Shear =	OK (0.08)	
øMsyL =	23.9	kNm	øMsyR = 24.0 kNm		
øVv =	345.6	kN			
øVvm =	345.6	kN	Ix =	45.1	x10⁶ mm⁴
øMz =	2.68	kNm	S.Wt =	0.355	kN/m

Compression - Section 6 (No compression)

Axial compression (Nc*) =	0.0	kN	Axial compression (Nc*) =	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
øNs =	1220.4	kN	Minor axis effective length (Ley) =	1500	mm
øNcx(kex=1.00) =	527.7	kN			
In-Plane øNcx(kex=1.00) =	527.7	kN			
øNcy(key=1.00) =	926.9	kN			
In-Plane øNcy(key=1.00) =	926.9	kN			
øNc =	527.7	kN			

Tension - Section 7 (No tension)

Axial tension (Nt*) =	0.0	kN	Axial tension (Nt*) =	0	kN
kt =	1.00	Table 7.3.2			
øNt =	1220.4	kN			

Combined

øMrxt =	113.7 kNm	øMixt =	113.7 kNm	øMoxt =	73.7 kNm
øMrxc =	113.7 kNm	øMixc =	113.7 kNm	øMoxc =	73.7 kNm
øMryt =	23.9 kNm	øMiyc =	23.9 kNm	øMtx =	73.7 kNm
øMryc =	23.9 kNm			øMcx =	73.7 kNm

Beam: **(FB08) 2 / 240mm x 45mm F17 KD HW (Double span)**
Bending: **M(dl)* = 2.78kNm (-ve) < øM(dl) = 18.17kNm, M* = 3.46kNm (-ve) < øM = 25.77kNm** **OK (0.15,0.13)**
Shear: **V(dl)* = 6.76kN < øV(dl) = 25.12kN, V* = 8.65kN < øV = 35.25kN** **OK (0.27,0.25)**
Deflection: **δDL = L/3827 (1mm) , δΨs.LL = L/22378 (0mm), δTotal = L/3268 (1mm), 1kN mid. δ = 0.1mm** **OK**
Reactions: **(Each end) Rdl = 2.92kN, Rll = 1.13kN, R* = 5.19kN**
Rdl.mid = 9.73kN, Rll.mid =3.75kN, R* = 17.30kN

Geometry

(House member affecting > 25m² or primary building member)

Category =	2	(1) House, (2) Primary building elements, (3) Important			
House =	Y	(Y)es,(N)o	Edge restrained =	C	(T)ension, (C)ompression, (B)oth
Span (L) =	2000	mm	Lay.t (Top) =	600	mm
Centres (cts) =	1000	mm			
Span type =	D	(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) =	3.75	kPa *	1000	mm +		kN/m =	3.75 kN/m
Wall dead load (wdl) =	0.50	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 =	0.14 kN/m
						Σwdl =	3.89 kN/m

Uniform live loads

Floor live load (wll) =	1.50	kPa *	1000	mm +		kN/m =	1.50 kN/m
Partitions (wll) =		kPa *	1000	mm +		kN/m =	0.00 kN/m
Alternate point live load =	1.80	kN	Distr. to	2	members	Σwll =	1.50 kN/m

Point loads Pos ≠ L/2

Dead load (pdl) =		kN	Position =	450	mm from LHS
Live load (pll) =		kN	Shear using PL at support =	N	(Y)es,(N)o
			Point load in both spans =	N	(Y)es,(N)o

Short term LL factor (Ψsu) =	1.00		(Ψsp) =	1.00	
Long term LL factor (Ψlu) =	0.33	/ 0.40 (wdl*)	(Ψlp) =	0.33	/ 0.40 (pdl*)
wdl* = 1.2*wdl+1.5*Ψlu*wll =	5.57	kN/m	M(dl+Ψl.ll)* =	2.78	kNm - Over support
w* = 1.2*wdl+1.5*wll =	6.92	kN/m	M* =	3.46	kNm - Over support
pdl* = 1.2*pdl+1.5*Ψlp*pll =	0.00	kN	V(dl+Ψl.ll)* =	6.76	kN - Central Support
p* = 1.2*pdl+1.5*pll =	0.00	kN	V* =	8.65	kN - Central Support

Bending and Shear capacity - Cl 3.2.1 & Cl 3.2.5

Capacity uses critical restraint length and edge

Member =	2 / 240mm x 45mm F17 KD HW		Area (A) =	21600	mm²
Description =	F17k seasoned hardwood		Section modulus (Zx) =	864	x10³ mm³
Design depth (dD) =	240	mm	Stiffness (Ix) =	103.7	x10⁶ mm⁴
Design width (dW) =	45	mm	Modulus of elasticity (E) =	14000	MPa - Table H2.1

S1 = (dD/dW)^1.35*(Lay.t/dD)^0.25 =	12.05	For top tension edge restrained - Cl 3.2.3.2(a)			
k12d = 1.5-0.05*ρbd*S1 =	0.907	for 10 ≤ ρbd*S1 ≤ 20 - Cl 3.2.4	f'b =	42.0	MPa
k12 = 1.5-0.05*ρb*S1 =	0.916	for 10 ≤ ρb*S1 ≤ 20 - Cl 3.2.4	f's =	3.6	MPa
			Material constant (ρbd) =	0.98	(rbd=0.25)
Strength reduction factor (ø) =	0.85	Table 2.1	Material constant (ρb) =	0.97	(rb=0.33)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*k12d*f'b*Zx =	18.17	kNm	Duration factor (k1) =	0.80	
øM = ø*k1*k4*k6*k9*k12*f'b*Zx =	25.77	kNm	Moisture factor (k4) =	1.00	
øV(dl) = ø*(k1=0.57)*k4*k6*f's*(2/3*A) =	25.12	kN	Temp. factor (k6) =	1.00	
øV = ø*k1*k4*k6*f's*(2/3*A) =	35.25	kN	Sharing factor (k9) =	1.14	
			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) =	8.1 x10⁶ mm⁴	< Critical	j2.(DL+Ψl.LL) =	0.5 mm	Span / 3827
Ireq'd Ψs.LL (L/300) =	1.4 x10⁶ mm⁴		Ψs.δLL =	0.1 mm	Span / 22378
Ireq'd Total (L/250) =	7.9 x10⁶ mm⁴		δTotal =	0.6 mm	Span / 3268
			1kN midspan δ =	0.1 mm	

Member:	**(JS1) 2 / 120mm x 45mm F17 KD HW (Fully Laminated*)**	
Comp:	**Nc(dl)* = 2.70kN < øNc(dl) = 28.53kN, Nc* = 5.40kN < øNc = 56.33kN**	**OK (0.09,0.10)**
	Ncw* = 2.40kN < øNcw = 61.45kN	**OK (0.04)**
Bending:	**M(dl)* = 0.16kNm < øM(dl) = 5.60kN, M* = 0.32kN < øM = 9.82kNm**	**OK (0.03,0.03)**
	Mw.in* = 3.39kNm < øMwi = 9.82kNm, Mw.out* = 3.54kN < øMwo = 9.82kNm	**OK (0.35,0.36)**
Combined:	**Refer table below**	**OK (0.40)**
Deflection:	**δin = L/207 (22mm), δout = L/207 (22mm)**	**Warning**
Reactions:	**(1 End) R.in.max* = 1.7kN, (1 End) R.out.max* = 1.7kN**	

Geometry (House member affecting ≤ 25m² or secondary building member)

Category = 1 (1) House, (2) Primary building elements, (3) Important

Length (L) = 4600 mm
Centres (cts) = 0 mm

Strong axis eff. length (Lax) = 4600 mm — Edge restrained = B (O)uter,(I)nner,(B)oth
Weak axis eff. length (Lay) = 1200 mm, (C)ontinuous — Bending (Layb) = 1200 mm
Effective length factor (g13) = 0.9 Studs in framing=0.9, Restrained both ends in pos.=1.0, Other cases - Table 3.2

Loadings Wind area reduction not applied

Compression

Dead load (Ndl) = 2.00 kN — Eccentricity (ecc) = 60 mm (+ve increases out)
Live load (Nll) = 2.00 kN — D/2 = 60 mm
Wind load (Nwl*) = kN (Comp.)

Live load duration = Wind
Duration (k1) = 1.00 Table 2.3
Long term LL factor (Ψlp) = 0.00 Table 4.1, AS1170.0
Combination factor (Ψcp) = 0.00 Table 4.1, AS1170.0

Bending

Wall area = 0.0 m² — Apply wind reduction = N (N)one,(S)ide,(W)ind,(L)ee
Ws/Wu = 0.68 — Area reduction (ka) = 1.00 AS 1170.2 Table 5.4

Ult. wind load in (Wu.in) = 1.22 kPa
cpe = 0.7 — cpi = 0.2 — w.in* = 0.00 kN/m

Ult. wind load out (Wu.out) = 1.22 kPa
cpe = 0.65 — cpi = 0.2 — w.out* = 0.00 kN/m

Ndl* = 1.35*Ndl = 2.70 kN — M(dl)* = 0.16 kNm
Nc* = 1.2*Ndl+1.5*Nll = 5.40 kN — M* = 0.32 kNm
Ncw* = 1.2*Ndl + Nwl* + 1.5*Ψc*Nll = 2.40 kN — Mwi* = 0.00 kNm
Mwo* = 0.14 kNm

Horz. Point loads

Wind load (pwl.in*) = 3.00 kN — Position = 2000 mm from bottom
Wind load (pwl.out*) = 3.00 kN

w.in* =	0.00 kN/m	w.out* =	0.00 kN/m	R.in.max* =	1.7 kN
p.in* =	3.00 kN	p.out* =	3.00 kN	R.out.max* =	1.7 kN
Mw.in* =	3.39 kNm	Mw.out* =	3.54 kNm		

Axial Capacity - Cl 3.3

Member =	2 / 120mm x 45mm F17 KD HW	Area (A) =	10800 mm²
Description =	F17k seasoned hardwood	Section modulus (Zx) =	216.0 x10³ mm³
Design depth (dD) =	120 mm	Section modulus (Zy) =	162.0 x10³ mm³
Design width (dW) =	90 mm	Stiffness (Ix) =	12.96 x10⁶ mm⁴
		Stiffness (Iy) =	7.29 x10⁶ mm⁴
		Modulus of elasticity (E) =	14000 MPa - Table H2.1

S3x =min(g13*L/dD & Lax/dD) =	34.50	k12cx =	0.161	for ρc*S3x ≥ 20 - Cl 3.3.3
S4y = min(g13*L/dW & Lay/dW) =	13.33	k12cy =	0.820	for 10 < ρc*S4y ≤ 20 - Cl 3.3.3
Critical S =	34.50	k12c =	0.161	for ρc*S ≥ 20 - Cl 3.3.3
		k12cd =	0.143	for ρcd*S ≥ 20 - Cl 3.3.3
		k12cw =	0.176	for ρcw*S ≥ 20 - Cl 3.3.3

				f'c =	34.0 MPa
Strength reduction factor (ø) =	0.95	Table 2.1		f't =	25.0 MPa
øNc(dl) = ø*0.57*k4*k6*k12cd*f'c*A =	28.5	kN		Material constant (ρcd) =	1.08 (rcd=0.25)
øNc = ø*k1*k4*k6*k12c*f'c*A =	56.3	kN		Material constant (ρc) =	1.02 (rc=0.56)
øNcw = ø*(k1=1)*k4*k6*k12cw*f'c*A =	61.5	kN		Material constant (ρcw) =	0.98 (rcw=1.00)
				Moisture factor (k4) =	1.00
				Temp. factor (k6) =	1.00
				Size modifier (mod.c) =	1.00

Bending Capacity - Cl 3.2

S1i = (dD/dW)^1·35*(Lay/dD)^0·25 =	2.62	for tension edge restrained - Cl 3.2.3.2	
S1o = (dD/dW)^1·35*(Lay/dD)^0·25 =	2.62	for tension edge restrained - Cl 3.2.3.2	

k12di =	1.000	for ρbd*S1i ≤ 10 - Cl 3.2.4	k12do = 1.000 for ρbd*S1o ≤ 10 - Cl 3.2.4
k12i =	1.000	for ρb*S1i ≤ 10 - Cl 3.2.4	k12o = 1.000 for ρb*S1o ≤ 10 - Cl 3.2.4
k12wi =	1.000	for ρbi*S1i ≤ 10 - Cl 3.2.4	k12wo = 1.000 for ρbo*S1o ≤ 10 - Cl 3.2.4

				f'b =	42.0 MPa
Strength reduction factor (ø) =	0.95	Table 2.1		Material constant (ρbd) =	0.98 (rbd=0.25)
øM(dl) = ø*(k1=0.57)*k4*k6*k9*min(k12di,k12do)*f'b*Zx =	5.60	kNm		Material constant (ρb) =	0.90 (rb=1.00)
øM = ø*k1*k4*k6*k9*min(k12i,k12o)*f'b*Zx =	9.82	kNm		Material constant (ρbi) =	0.90 (rbi=1.00)
øMwi = ø*(k1=1)*k4*k6*k9*k12wi*f'b*Zx =	9.82	kNm		Stress reversal (ρbo) =	0.90 (rbo=1.00)
øMwo = ø*(k1=1)*k4*k6*k9*k12wo*f'b*Zx =	9.82	kNm		Duration factor (k1) =	1.00
				Moisture factor (k4) =	1.00
				Temp. factor (k6) =	1.00
				Sharing factor (k9) =	1.14
				Size modifier (mod.b) =	1.00

Combined - Cl 3.5.1 & Appendix E5

Comp/Bend	Nc(dl)*	Nc*	Ncw*
Minor buckling	0.02	0.02	0.14
Major buckling	0.11	0.13	0.40

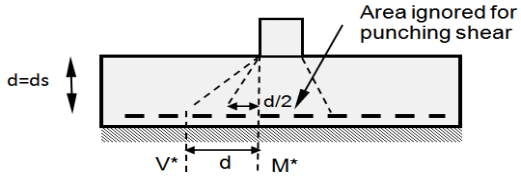
Pad:	**(S1 - S3 Footings Bearing Check) 400mm long x 400mm wide, 2000mm deep, f'c = 25MPa**	
	Bearing = 225kPa < 350kPa	**OK (0.64)**
Reinf't:	**Unreinforced section**	
Capacity:	**M*L = 4.0kNm/m < øMuo.ur = 1140.8kNm/m, M*W = 4.0kNm/m < øMuo.ur = 1140.8kNm/m**	**OK (0.00,0.00)**
	V*L = 0.0kN/m < øVu.ur = 513.2kN/m, V*W = 0.0kN/m < øVu.ur = 513.2kN/m	**OK (0.00,0.00)**
	VP* = 0kN < øVp.ur = 9407kN	**OK (0.00)**
Column:	**100mm long x 100mm wide, P* = 49kN**	

Geometry (Designing at asup from column centreline) Two-way slab footing

Concrete strength (f'c) =	25	MPa	Column length (CL) =	100	mm
Pad length (L) =	400	mm	Column width (CW, CW=0 for Circle) =	100	mm
Pad width (W) =	400	mm	Column area reduction =	0.16	m²
Pad depth (D) =	2000	mm			
Design moment at column face =	N	(Y)es,(N)o	Outstand in L direction =	150	mm
Use asup (=0.7) =	Y	(Y)es,(N)o	Outstand in W direction =	150	mm
Method =	E	(E)lastic/(P)lastic	Pad Area =	0.16	m²

Loading

Dead load (Pdl) =	14	kN (Excluding footing S.Wt)			
Live load (Pll) =	20	kN			
Eccentricity (EccL) =	0	mm			
Eccentricity (EccW) =	0	mm			
S.Wt. density (ρ) =	6.0	kN/m³			
S.Wt. = ρ*L*W*D =	1.9	kN			
P* = 1.2*(Pdl+SWt) + 1.5*Pll =	49	kN			
	(Bearing elastically determined)				
Allowable bearing pressure =	350	kPa	OK (0.64)		
Max. bearing pressure (Bp) =	225	kPa	Ultimate B.P.(Bp*) =	307	kPa
			P*/Rt =	1.3670	



Reinforcement - (unreinforced)

Unreinforced =	Y	(Y)es, (N)o	Bottom reinf't layers =	1	
Extreme bottom bars in =	L	(W), (L) dir	Ductility class =	A	(N)ormal,(L)ow,(A)uto
Cover to bottom layer of reinf't =	60	mm	Ductility class =	N	(N)ormal,(L)ow

BLL (in L dir.) =	**N20-200 cts (BLL)**		**BUL (in W dir.) =**	**N20-200 cts (BUL)**	
Bar size =	20	mm	Bar size =	20	mm
Bar cts/No. per m =	200	mm	Bar cts/No. per m =	200	mm
Steel Strength (fsy) =	500	MPa	Steel Strength (fsy) =	500	MPa
Area steel (Ast) =	1571	mm²/m	Area steel (Ast) =	1571	mm²/m
Depth to steel (ds) =	1930	mm	Depth to steel (ds) =	1910	mm
Ast.min = 0.19*(D/ds)²*f'ct.f/fsy*ds =	2363	mm²/m	Ast.min =	2387	mm²/m

Bending (Reinforced) - Cl 8.1 (Not applicable)

alpha (α2 = 0.85-0.0015*f'c) =	0.813	(0.67 ≤ α2)	Eq 8.1.3(1)		
gamma (γ = 0.97-0.0025*f'c) =	0.908	(0.67 ≤ γ)	Eq 8.1.3(2)		
Strength factor (øbl = 1.24-13*kuo/12) =	0.85		øbw =	0.85	(0.65 ≤ ø ≤ 0.85) Table 2.2.2 for N Class
Moment (ML*) =	4.0	kNm/m	MW* =	4.0	kNm/m
Ast Req'd =	5	mm²/m	Ast Req'd =	5	mm²/m
øMuo.L =	1275.5	kNm/m	øMuo.W =	1262.2	kNm/m
	OK (0.00)			OK (0.00)	

Bending (Unreinforced) - Cl 20.4.2 (Applicable)

Plain concrete (ø.ur) =	0.6	Table 2.2.2(g)			OK (0.00)
øMuo.ur.L = (ø=0.6)*f'ct.f*Z =	1140.8	kNm/m	øMuo.ur.W =	1140.8	kNm/m
	OK (0.00)			OK (0.00)	

Punching shear (Reinforced) - Cl 9.3 (Not applicable)

Pad load (P*) =	49	kN	dom =	1910	mm	
Column load reduction =	49	kN	Perim. (u) =	8040	mm	
Punching shear (Vp*) =	0	kN	βh =	1.0		Cl 9.3.1.4
			fcv =	1.70	MPa	Cl 9.3.3
øVp = (ø=0.7)*u*dom*f'cv =	18274.1	kN	OK (0.00)			

Punching shear (Unreinforced) - Cl 20.4.3 (Applicable)

Punching shear (Vp*) =	0	kN	
øVp.ur1 = (ø=0.6)*0.1*u*(D-50)*(1+2/βh)*√f'c =	14110.2	kN	
øVp.ur2 = (ø=0.6)*0.2*u*(D-50)*√f'c =	9406.8	kN	
øVp.ur = min(øVp.ur1,øVp.ur2) =	9406.8	kN	OK (0.00)

Strength of slab in one-way shear (Reinforced) - Cl 8.2 (Not applicable)

Use Simplified method =	N	(Y)es,(N)o			
Max. nominal aggregate size (dg) =	16	mm	(General method)		
Lightweight concrete =	N	(Y)es,(N)o	(General method)		
	Length			**Width**	
1-way shear (VL*) =	0.0	kN/m	VW* =	0.0	kN/m
ML* =	0.0	kNm/m	MW* =	0.0	kNm/m
ds =	1930	mm	ds =	1910	mm
Effective shear depth dv = max(0.72*D,0.9*ds) =	1737	mm	dv =	1719	mm
Total flange (W) =	400	mm	L =	400	mm
Effective flange (bv) =	1000	mm	bv =	1000	mm
Simple method for kv & θv - Cl 8.2.4.3					
kvo = 200/(1000+1.3*dv) =	0.061		kvo =	0.062	
kv = min(kvox, 0.15) =	0.061		kv =	0.062	Eq 8.2.4.3(1)
Angle of inclination of concrete comp. strut (θv) =	36.0	°	θv =	36.0	°
General method for kv & θv - Cl 8.2.4.2					
Tensile area of concrete (Act) =	1000000	mm²/m	Act =	1000000	mm²/m
Ast =	1571	mm²/m	Ast =	1571	mm²/m
Shear only εx1 ≤ 3000x10⁻⁶ =	0.0	x10⁻⁶	εx1 =	0.0	x10⁻⁶ Eq 8.2.4.2.2(1)
Shear only -200x10⁻⁶ ≤ εx2 (where εx1 < 0) ≤ 0 =	0.0	x10⁻⁶	εx2 =	0.0	x10⁻⁶ Eq 8.2.4.2.2(2)
Long. mid-depth concrete strain (εx) =	0.0	x10⁻⁶	εx =	0.0	x10⁻⁶
kdg = max(32/(16+dg), 0.8) =	1.000		kdg =	1.000	Eq 8.2.4.2(3)
kv = (0.4/(1+1500*εx))*(1300/(1000+kdg*dv)) =	0.190		kv =	0.191	Eq 8.2.4.2(2)
Angle (θv) = (29+7000*εx) =	29.0	°	θv =	29.0	° Eq 8.2.4.2(1)
Adopted kv & θv - General method - Cl 8.2.4.2					
kv =	0.190		kv =	0.191	
Angle of inclination of concrete compression strut (θv) =	29.0	°	θv =	29.0	°
Concrete contribution to shear stength - Cl 8.2.4.1					
Capacity reduction factor (ø) =	0.70		ø =	0.70	Table 2.2.2(e)
kv =	0.190		kv =	0.191	
Effective flange (bv) =	1000	mm/m	bv =	1000	mm/m
Effective shear depth (dv) =	1737	mm	dv =	1719	mm
min(√f'c,8.0) =	5.00	MPa			
Vuc = kv*bv*dv*min(√f'c, 8.0) =	1650.1	kN/m	Vuc =	1643.8	kN/m Cl 8.2.4.1
D ≥ 650mm, ks =	0.50				
ks*øVuc.L =	577.5	kN/m	ks*øVuc.W =	575.3	kN/m Eq 8.2.1.6(1)
	OK (0.00)			OK (0.00)	

Strength of slab in one-way shear (Unreinforced) - Cl 20.4.3 (Not applicable)

1-way shear (VL*) =	0.0	kN/m	VW* =	0.0	kN/m
øVu.ur.L = (ø=0.6)*0.15*b*(D-50)*f'c^1/3 =	513.2	kN/m	øVu.ur.W =	513.2	kN/m
	OK (0.00)			OK (0.00)	

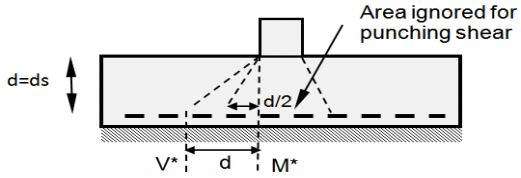
Pad:	**(S01) 532mm long x 532mm wide, 1000mm deep, f'c = 25MPa**	
	Bearing = 95kPa < 100kPa	**OK (0.95)**
Reinf't:	**Unreinforced section**	
Capacity:	**M*L = 3.0kNm/m < øMuo.ur = 270.8kNm/m, M*W = 3.0kNm/m < øMuo.ur = 270.8kNm/m**	**OK (0.01,0.01)**
	V*L = 0.0kN/m < øVu.ur = 250.0kN/m, V*W = 0.0kN/m < øVu.ur = 250.0kN/m	**OK (0.00,0.00)**
	VP* = 0kN < øVp.ur = 2303kN	**OK (0.00)**
Column:	**100mm long x 100mm wide, P* = 34kN**	

Geometry (Designing at asup from column centreline) Two-way slab footing

Concrete strength (f'c) =	25	MPa	Column length (CL) =	100	mm
Pad length (L) =	532	mm	Column width (CW, CW=0 for Circle) =	100	mm
Pad width (W) =	532	mm	Column area reduction =	0.28	m²
Pad depth (D) =	1000	mm			
Design moment at column face =	N	(Y)es,(N)o	Outstand in L direction =	216	mm
Use asup (=0.7) =	Y	(Y)es,(N)o	Outstand in W direction =	216	mm
Method =	E	(E)lastic/(P)lastic	Pad Area =	0.28	m²

Loading

Dead load (Pdl) =	21	kN (Excluding footing S.Wt)			
Live load (Pll) =	5	kN			
Eccentricity (EccL) =	0	mm			
Eccentricity (EccW) =	0	mm			
S.Wt. density (ρ) =	6.0	kN/m³			
S.Wt. = ρ*L*W*D =	1.7	kN			
P* = 1.2*(Pdl+SWt) + 1.5*Pll =	34	kN			
	(Bearing elastically determined)				
Allowable bearing pressure =	100	kPa	OK (0.95)		
Max. bearing pressure (Bp) =	95	kPa	Ultimate B.P.(Bp*) =	119	kPa
			P*/Rt =	1.2500	



Reinforcement - (unreinforced)

Unreinforced =	Y	(Y)es, (N)o	Bottom reinf't layers =	1	
Extreme bottom bars in =	L	(W), (L) dir	Ductility class =	A	(N)ormal,(L)ow,(A)uto
Cover to bottom layer of reinf't =	60	mm	Ductility class =	N	(N)ormal,(L)ow

BLL (in L dir.) =	**N20-200 cts (BLL)**		**BUL (in W dir.) =**	**N20-200 cts (BUL)**	
Bar size =	20	mm	Bar size =	20	mm
Bar cts/No. per m =	200	mm	Bar cts/No. per m =	200	mm
Steel Strength (fsy) =	500	MPa	Steel Strength (fsy) =	500	MPa
Area steel (Ast) =	1571	mm²/m	Area steel (Ast) =	1571	mm²/m
Depth to steel (ds) =	930	mm	Depth to steel (ds) =	910	mm
Ast.min = 0.19*(D/ds)²*f'ct.f/fsy*ds =	1226	mm²/m	Ast.min =	1253	mm²/m

Bending (Reinforced) - Cl 8.1 (Not applicable)

alpha (α2 = 0.85-0.0015*f'c) =	0.813	(0.67 ≤ α2)	Eq 8.1.3(1)		
gamma (γ = 0.97-0.0025*f'c) =	0.908	(0.67 ≤ γ)	Eq 8.1.3(2)		
Strength factor (øbl = 1.24-13*kuo/12) =	0.85		øbw =	0.85	(0.65 ≤ ø ≤ 0.85) Table 2.2.2 for N Class
Moment (ML*) =	3.0	kNm/m	MW* =	3.0	kNm/m
Ast Req'd =	8	mm²/m	Ast Req'd =	8	mm²/m
øMuo.L =	608.0	kNm/m	øMuo.W =	594.6	kNm/m
	OK (0.00)			OK (0.01)	

Bending (Unreinforced) - Cl 20.4.2 (Applicable)

Plain concrete (ø.ur) =	0.6	Table 2.2.2(g)			OK (0.01)
øMuo.ur.L = (ø=0.6)*f'ct.f*Z =	270.8	kNm/m	øMuo.ur.W =	270.8	kNm/m
	OK (0.01)			OK (0.01)	

Punching shear (Reinforced) - Cl 9.3 (Not applicable)

Pad load (P*) =	34	kN	dom =	910	mm	
Column load reduction =	34	kN	Perim. (u) =	4040	mm	
Punching shear (Vp*) =	0	kN	βh =	1.0		Cl 9.3.1.4
			fcv =	1.70	MPa	Cl 9.3.3
øVp = (ø=0.7)*u*dom*f'cv =	4374.9	kN	OK (0.00)			

Punching shear (Unreinforced) - Cl 20.4.3 (Applicable)

Punching shear (Vp*) =	0	kN	
øVp.ur1 = (ø=0.6)*0.1*u*(D-50)*(1+2/βh)*√f'c =	3454.2	kN	
øVp.ur2 = (ø=0.6)*0.2*u*(D-50)*√f'c =	2302.8	kN	
øVp.ur = min(øVp.ur1,øVp.ur2) =	2302.8	kN	OK (0.00)

Strength of slab in one-way shear (Reinforced) - Cl 8.2 (Not applicable)

Use Simplified method =	N	(Y)es,(N)o				
Max. nominal aggregate size (dg) =	16	mm	(General method)			
Lightweight concrete =	N	(Y)es,(N)o	(General method)			
	Length			**Width**		
1-way shear (VL*) =	0.0	kN/m	VW* =	0.0	kN/m	
ML* =	0.0	kNm/m	MW* =	0.0	kNm/m	
ds =	930	mm	ds =	910	mm	
Effective shear depth dv = max(0.72*D,0.9*ds) =	837	mm	dv =	819	mm	Cl 8.2.1.9
Total flange (W) =	532	mm	L =	532	mm	
Effective flange (bv) =	1000	mm	bv =	1000	mm	
Simple method for kv & θv - Cl 8.2.4.3						
kvo = 200/(1000+1.3*dv) =	0.096		kvo =	0.097		
kv = min(kvox, 0.15) =	0.096		kv =	0.097		Eq 8.2.4.3(1)
Angle of inclination of concrete comp. strut (θv) =	36.0	°	θv =	36.0	°	
General method for kv & θv - Cl 8.2.4.2						
Tensile area of concrete (Act) =	500000	mm²/m	Act =	500000	mm²/m	
Ast =	1571	mm²/m	Ast =	1571	mm²/m	
Shear only εx1 ≤ 3000x10⁻⁶ =	0.0	x10⁻⁶	εx1 =	0.0	x10⁻⁶	Eq 8.2.4.2.2(1)
Shear only -200x10⁻⁶ ≤ εx2 (where εx1 < 0) ≤ 0 =	0.0	x10⁻⁶	εx2 =	0.0	x10⁻⁶	Eq 8.2.4.2.2(2)
Long. mid-depth concrete strain (εx) =	0.0	x10⁻⁶	εx =	0.0	x10⁻⁶	
kdg = max(32/(16+dg), 0.8) =	1.000		kdg =	1.000		Eq 8.2.4.2(3)
kv = (0.4/(1+1500*εx))*(1300/(1000+kdg*dv)) =	0.283		kv =	0.286		Eq 8.2.4.2(2)
Angle (θv) = (29+7000*εx) =	29.0	°	θv =	29.0	°	Eq 8.2.4.2(1)
Adopted kv & θv - General method - Cl 8.2.4.2						
kv =	0.283		kv =	0.286		
Angle of inclination of concrete compression strut (θv) =	29.0	°	θv =	29.0	°	
Concrete contribution to shear stength - Cl 8.2.4.1						
Capacity reduction factor (ø) =	0.70		ø =	0.70		Table 2.2.2(e)
kv =	0.283		kv =	0.286		
Effective flange (bv) =	1000	mm/m	bv =	1000	mm/m	
Effective shear depth (dv) =	837	mm	dv =	819	mm	
min(√f'c,8.0) =	5.00	MPa				
Vuc = kv*bv*dv*min(√f'c, 8.0) =	1184.6	kN/m	Vuc =	1170.6	kN/m	Cl 8.2.4.1
D ≥ 650mm, ks =	0.50					
ks*øVuc.L =	414.6	kN/m	ks*øVuc.W =	409.7	kN/m	Eq 8.2.1.6(1)
	OK (0.00)			OK (0.00)		

Strength of slab in one-way shear (Unreinforced) - Cl 20.4.3 (Not applicable)

1-way shear (VL*) =	0.0	kN/m	VW* =	0.0	kN/m
øVu.ur.L = (ø=0.6)*0.15*b*(D-50)*f'c^1/3 =	250.0	kN/m	øVu.ur.W =	250.0	kN/m
	OK (0.00)			OK (0.00)	

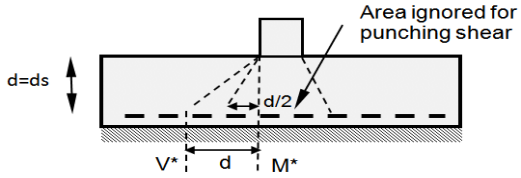
Pad:	**(S02) 265mm long x 265mm wide, 1000mm deep, f'c = 25MPa**	
	Bearing = 63kPa < 100kPa	**OK (0.63)**
Reinf't:	**Unreinforced section**	
Capacity:	**M*L = 0.4kNm/m < øMuo.ur = 270.8kNm/m, M*W = 0.4kNm/m < øMuo.ur = 270.8kNm/m**	**OK (0.00,0.00)**
	V*L = 0.0kN/m < øVu.ur = 250.0kN/m, V*W = 0.0kN/m < øVu.ur = 250.0kN/m	**OK (0.00,0.00)**
	VP* = 0kN < øVp.ur = 2303kN	**OK (0.00)**
Column:	**100mm long x 100mm wide, P* = 6kN**	

Geometry (Designing at asup from column centreline) Two-way slab footing

Concrete strength (f'c) =	25	MPa	Column length (CL) =	100	mm
Pad length (L) =	265	mm	Column width (CW, CW=0 for Circle) =	100	mm
Pad width (W) =	265	mm	Column area reduction =	0.07	m²
Pad depth (D) =	1000	mm			
Design moment at column face =	N	(Y)es,(N)o	Outstand in L direction =	83	mm
Use asup (=0.7) =	Y	(Y)es,(N)o	Outstand in W direction =	83	mm
Method =	E	(E)lastic/(P)lastic	Pad Area =	0.07	m²

Loading

Dead load (Pdl) =	2	kN (Excluding footing S.Wt)			
Live load (Pll) =	2	kN			
Eccentricity (EccL) =	0	mm			
Eccentricity (EccW) =	0	mm			
S.Wt. density (ρ) =	6.0	kN/m³			
S.Wt. = ρ*L*W*D =	0.4	kN			
P* = 1.2*(Pdl+SWt) + 1.5*Pll =	6	kN			
	(Bearing elastically determined)				
Allowable bearing pressure =	100	kPa	OK (0.63)		
Max. bearing pressure (Bp) =	63	kPa	Ultimate B.P.(Bp*) =	84	kPa
			P*/Rt =	1.3357	



Reinforcement - (unreinforced)

Unreinforced =	Y	(Y)es, (N)o	Bottom reinf't layers =	1	
Extreme bottom bars in =	L	(W), (L) dir	Ductility class =	A	(N)ormal,(L)ow,(A)uto
Cover to bottom layer of reinf't =	60	mm	Ductility class =	N	(N)ormal,(L)ow

BLL (in L dir.) =	**N20-200 cts (BLL)**		**BUL (in W dir.) =**	**N20-200 cts (BUL)**	
Bar size =	20	mm	Bar size =	20	mm
Bar cts/No. per m =	200	mm	Bar cts/No. per m =	200	mm
Steel Strength (fsy) =	500	MPa	Steel Strength (fsy) =	500	MPa
Area steel (Ast) =	1571	mm²/m	Area steel (Ast) =	1571	mm²/m
Depth to steel (ds) =	930	mm	Depth to steel (ds) =	910	mm
Ast.min = 0.19*(D/ds)²*f'ct.f/fsy*ds =	1226	mm²/m	Ast.min =	1253	mm²/m

Bending (Reinforced) - Cl 8.1 (Not applicable)

alpha (α2 = 0.85-0.0015*f'c) =	0.813	(0.67 ≤ α2)	Eq 8.1.3(1)		
gamma (γ = 0.97-0.0025*f'c) =	0.908	(0.67 ≤ γ)	Eq 8.1.3(2)		
Strength factor (øbl = 1.24-13*kuo/12) =	0.85		øbw =	0.85	(0.65 ≤ ø ≤ 0.85) Table 2.2.2 for N Class
Moment (ML*) =	0.4	kNm/m	MW* =	0.4	kNm/m
Ast Req'd =	1	mm²/m	Ast Req'd =	1	mm²/m
øMuo.L =	608.0	kNm/m	øMuo.W =	594.6	kNm/m
	OK (0.00)			OK (0.00)	

Bending (Unreinforced) - Cl 20.4.2 (Applicable)

Plain concrete (ø.ur) =	0.6	Table 2.2.2(g)			OK (0.00)
øMuo.ur.L = (ø=0.6)*f'ct.f*Z =	270.8	kNm/m	øMuo.ur.W =	270.8	kNm/m
	OK (0.00)			OK (0.00)	

Punching shear (Reinforced) - Cl 9.3 (Not applicable)

Pad load (P*) =	6 kN		dom =	910 mm		
Column load reduction =	6 kN		Perim. (u) =	4040 mm		
Punching shear (Vp*) =	0 kN		βh =	1.0		Cl 9.3.1.4
			fcv =	1.70 MPa		Cl 9.3.3
øVp = (ø=0.7)*u*dom*f'cv =	4374.9 kN		OK (0.00)			

Punching shear (Unreinforced) - Cl 20.4.3 (Applicable)

Punching shear (Vp*) =	0 kN	
øVp.ur1 = (ø=0.6)*0.1*u*(D-50)*(1+2/βh)*√f'c =	3454.2 kN	
øVp.ur2 = (ø=0.6)*0.2*u*(D-50)*√f'c =	2302.8 kN	
øVp.ur = min(øVp.ur1,øVp.ur2) =	2302.8 kN	OK (0.00)

Strength of slab in one-way shear (Reinforced) - Cl 8.2 (Not applicable)

Use Simplified method =	N	(Y)es,(N)o			
Max. nominal aggregate size (dg) =	16 mm		(General method)		
Lightweight concrete =	N	(Y)es,(N)o	(General method)		
	Length			**Width**	
1-way shear (VL*) =	0.0 kN/m		VW* =	0.0 kN/m	
ML* =	0.0 kNm/m		MW* =	0.0 kNm/m	
ds =	930 mm		ds =	910 mm	
Effective shear depth dv = max(0.72*D,0.9*ds) =	837 mm		dv =	819 mm	Cl 8.2.1.9
Total flange (W) =	265 mm		L =	265 mm	
Effective flange (bv) =	1000 mm		bv =	1000 mm	
Simple method for kv & θv - Cl 8.2.4.3					
kvo = 200/(1000+1.3*dv) =	0.096		kvo =	0.097	
kv = min(kvox, 0.15) =	0.096		kv =	0.097	Eq 8.2.4.3(1)
Angle of inclination of concrete comp. strut (θv) =	36.0 °		θv =	36.0 °	
General method for kv & θv - Cl 8.2.4.2					
Tensile area of concrete (Act) =	500000 mm²/m		Act =	500000 mm²/m	
Ast =	1571 mm²/m		Ast =	1571 mm²/m	
Shear only εx1 ≤ 3000x10⁻⁶ =	0.0 x10⁻⁶		εx1 =	0.0 x10⁻⁶	Eq 8.2.4.2.2(1)
Shear only -200x10⁻⁶ ≤ εx2 (where εx1 < 0) ≤ 0 =	0.0 x10⁻⁶		εx2 =	0.0 x10⁻⁶	Eq 8.2.4.2.2(2)
Long. mid-depth concrete strain (εx) =	0.0 x10⁻⁶		εx =	0.0 x10⁻⁶	
kdg = max(32/(16+dg), 0.8) =	1.000		kdg =	1.000	Eq 8.2.4.2(3)
kv = (0.4/(1+1500*εx))*(1300/(1000+kdg*dv)) =	0.283		kv =	0.286	Eq 8.2.4.2(2)
Angle (θv) = (29+7000*εx) =	29.0 °		θv =	29.0 °	Eq 8.2.4.2(1)
Adopted kv & θv - General method - Cl 8.2.4.2					
kv =	0.283		kv =	0.286	
Angle of inclination of concrete compression strut (θv) =	29.0 °		θv =	29.0 °	
Concrete contribution to shear stength - Cl 8.2.4.1					
Capacity reduction factor (ø) =	0.70		ø =	0.70	Table 2.2.2(e)
kv =	0.283		kv =	0.286	
Effective flange (bv) =	1000 mm/m		bv =	1000 mm/m	
Effective shear depth (dv) =	837 mm		dv =	819 mm	
min(√f'c,8.0) =	5.00 MPa				
Vuc = kv*bv*dv*min(√f'c, 8.0) =	1184.6 kN/m		Vuc =	1170.6 kN/m	Cl 8.2.4.1
D ≥ 650mm, ks =	0.50				
ks*øVuc.L =	414.6 kN/m		ks*øVuc.W =	409.7 kN/m	Eq 8.2.1.6(1)
	OK (0.00)			OK (0.00)	

Strength of slab in one-way shear (Unreinforced) - Cl 20.4.3 (Not applicable)

1-way shear (VL*) =	0.0 kN/m		VW* =	0.0 kN/m
øVu.ur.L = (ø=0.6)*0.15*b*(D-50)*f'c^1/3 =	250.0 kN/m		øVu.ur.W =	250.0 kN/m
	OK (0.00)			OK (0.00)

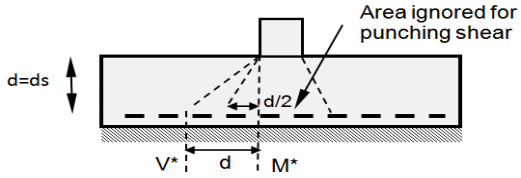
Pad:	**(S03) 398mm long x 398mm wide, 1000mm deep, f'c = 25MPa**	
	Bearing = 94kPa < 100kPa	**OK (0.94)**
Reinf't:	**Unreinforced section**	
Capacity:	**M*L = 1.5kNm/m < øMuo.ur = 270.8kNm/m, M*W = 1.5kNm/m < øMuo.ur = 270.8kNm/m**	**OK (0.01,0.01)**
	V*L = 0.0kN/m < øVu.ur = 250.0kN/m, V*W = 0.0kN/m < øVu.ur = 250.0kN/m	**OK (0.00,0.00)**
	VP* = 0kN < øVp.ur = 2303kN	**OK (0.00)**
Column:	**100mm long x 100mm wide, P* = 19kN**	

Geometry (Designing at asup from column centreline) Two-way slab footing

Concrete strength (f'c) =	25	MPa	Column length (CL) =	100	mm
Pad length (L) =	398	mm	Column width (CW, CW=0 for Circle) =	100	mm
Pad width (W) =	398	mm	Column area reduction =	0.16	m²
Pad depth (D) =	1000	mm			
Design moment at column face =	N	(Y)es,(N)o	Outstand in L direction =	149	mm
Use asup (=0.7) =	Y	(Y)es,(N)o	Outstand in W direction =	149	mm
Method =	E	(E)lastic/(P)lastic	Pad Area =	0.16	m²

Loading

Dead load (Pdl) =	12	kN (Excluding footing S.Wt)			
Live load (Pll) =	2	kN			
Eccentricity (EccL) =	0	mm			
Eccentricity (EccW) =	0	mm			
S.Wt. density (ρ) =	6.0	kN/m³			
S.Wt. = ρ*L*W*D =	1.0	kN			
P* = 1.2*(Pdl+SWt) + 1.5*Pll =	19	kN			
	(Bearing elastically determined)				
Allowable bearing pressure =	100	kPa	OK (0.94)		
Max. bearing pressure (Bp) =	94	kPa	Ultimate B.P.(Bp*) =	117	kPa
			P*/Rt =	1.2401	



Reinforcement - (unreinforced)

Unreinforced =	Y	(Y)es, (N)o	Bottom reinf't layers =	1	
Extreme bottom bars in =	L	(W), (L) dir	Ductility class =	A	(N)ormal,(L)ow,(A)uto
Cover to bottom layer of reinf't =	60	mm	Ductility class =	N	(N)ormal,(L)ow

BLL (in L dir.) =	**N20-200 cts (BLL)**		**BUL (in W dir.) =**	**N20-200 cts (BUL)**	
Bar size =	20	mm	Bar size =	20	mm
Bar cts/No. per m =	200	mm	Bar cts/No. per m =	200	mm
Steel Strength (fsy) =	500	MPa	Steel Strength (fsy) =	500	MPa
Area steel (Ast) =	1571	mm²/m	Area steel (Ast) =	1571	mm²/m
Depth to steel (ds) =	930	mm	Depth to steel (ds) =	910	mm
Ast.min = 0.19*(D/ds)²*f'ct.f/fsy*ds =	1226	mm²/m	Ast.min =	1253	mm²/m

Bending (Reinforced) - Cl 8.1 (Not applicable)

alpha (α2 = 0.85-0.0015*f'c) =	0.813	(0.67 ≤ α2)	Eq 8.1.3(1)		
gamma (γ = 0.97-0.0025*f'c) =	0.908	(0.67 ≤ γ)	Eq 8.1.3(2)		
Strength factor (øbl = 1.24-13*kuo/12) =	0.85		øbw =	0.85	(0.65 ≤ ø ≤ 0.85) Table 2.2.2 for N Class
Moment (ML*) =	1.5	kNm/m	MW* =	1.5	kNm/m
Ast Req'd =	4	mm²/m	Ast Req'd =	4	mm²/m
øMuo.L =	608.0	kNm/m	øMuo.W =	594.6	kNm/m
	OK (0.00)			OK (0.00)	

Bending (Unreinforced) - Cl 20.4.2 (Applicable)

Plain concrete (ø.ur) =	0.6	Table 2.2.2(g)			OK (0.01)
øMuo.ur.L = (ø=0.6)*f'ct.f*Z =	270.8	kNm/m	øMuo.ur.W =	270.8	kNm/m
	OK (0.01)			OK (0.01)	

Punching shear (Reinforced) - Cl 9.3 (Not applicable)

Pad load (P*) =	19 kN		dom =	910 mm		
Column load reduction =	19 kN		Perim. (u) =	4040 mm		
Punching shear (Vp*) =	0 kN		βh =	1.0		Cl 9.3.1.4
			fcv =	1.70 MPa		Cl 9.3.3
øVp = (ø=0.7)*u*dom*f'cv =	4374.9 kN		OK (0.00)			

Punching shear (Unreinforced) - Cl 20.4.3 (Applicable)

Punching shear (Vp*) =	0 kN	
øVp.ur1 = (ø=0.6)*0.1*u*(D-50)*(1+2/βh)*√f'c =	3454.2 kN	
øVp.ur2 = (ø=0.6)*0.2*u*(D-50)*√f'c =	2302.8 kN	
øVp.ur = min(øVp.ur1,øVp.ur2) =	2302.8 kN	OK (0.00)

Strength of slab in one-way shear (Reinforced) - Cl 8.2 (Not applicable)

Use Simplified method =	N	(Y)es,(N)o			
Max. nominal aggregate size (dg) =	16 mm		(General method)		
Lightweight concrete =	N	(Y)es,(N)o	(General method)		
	Length			**Width**	
1-way shear (VL*) =	0.0 kN/m		VW* =	0.0 kN/m	
ML* =	0.0 kNm/m		MW* =	0.0 kNm/m	
ds =	930 mm		ds =	910 mm	
Effective shear depth dv = max(0.72*D,0.9*ds) =	837 mm		dv =	819 mm	Cl 8.2.1.9
Total flange (W) =	398 mm		L =	398 mm	
Effective flange (bv) =	1000 mm		bv =	1000 mm	
Simple method for kv & θv - Cl 8.2.4.3					
kvo = 200/(1000+1.3*dv) =	0.096		kvo =	0.097	
kv = min(kvox, 0.15) =	0.096		kv =	0.097	Eq 8.2.4.3(1)
Angle of inclination of concrete comp. strut (θv) =	36.0 °		θv =	36.0 °	
General method for kv & θv - Cl 8.2.4.2					
Tensile area of concrete (Act) =	500000 mm²/m		Act =	500000 mm²/m	
Ast =	1571 mm²/m		Ast =	1571 mm²/m	
Shear only εx1 ≤ 3000x10⁻⁶ =	0.0 x10⁻⁶		εx1 =	0.0 x10⁻⁶	Eq 8.2.4.2.2(1)
Shear only -200x10⁻⁶ ≤ εx2 (where εx1 < 0) ≤ 0 =	0.0 x10⁻⁶		εx2 =	0.0 x10⁻⁶	Eq 8.2.4.2.2(2)
Long. mid-depth concrete strain (εx) =	0.0 x10⁻⁶		εx =	0.0 x10⁻⁶	
kdg = max(32/(16+dg), 0.8) =	1.000		kdg =	1.000	Eq 8.2.4.2(3)
kv = (0.4/(1+1500*εx))*(1300/(1000+kdg*dv)) =	0.283		kv =	0.286	Eq 8.2.4.2(2)
Angle (θv) = (29+7000*εx) =	29.0 °		θv =	29.0 °	Eq 8.2.4.2(1)
Adopted kv & θv - General method - Cl 8.2.4.2					
kv =	0.283		kv =	0.286	
Angle of inclination of concrete compression strut (θv) =	29.0 °		θv =	29.0 °	
Concrete contribution to shear stength - Cl 8.2.4.1					
Capacity reduction factor (ø) =	0.70		ø =	0.70	Table 2.2.2(e)
kv =	0.283		kv =	0.286	
Effective flange (bv) =	1000 mm/m		bv =	1000 mm/m	
Effective shear depth (dv) =	837 mm		dv =	819 mm	
min(√f'c,8.0) =	5.00 MPa				
Vuc = kv*bv*dv*min(√f'c, 8.0) =	1184.6 kN/m		Vuc =	1170.6 kN/m	Cl 8.2.4.1
D ≥ 650mm, ks =	0.50				
ks*øVuc.L =	414.6 kN/m		ks*øVuc.W =	409.7 kN/m	Eq 8.2.1.6(1)
	OK (0.00)			OK (0.00)	

Strength of slab in one-way shear (Unreinforced) - Cl 20.4.3 (Not applicable)

1-way shear (VL*) =	0.0 kN/m		VW* =	0.0 kN/m
øVu.ur.L = (ø=0.6)*0.15*b*(D-50)*f'c^1/3 =	250.0 kN/m		øVu.ur.W =	250.0 kN/m
	OK (0.00)			OK (0.00)

Tree Info : **(Tree Drying TD01) 6 Trees, Average height of 9m (Unknown tree maturity)**
Soil Info: **Located in Melbourne, ys = 40mm (Class M) under normal conditions, Normal profile type, (Hs = 2.3m)**
Modified Ys: **Additional movement from tree drying effect yt = 43.5mm, Modified ys = 83mm (Class E), Centre heave ym = 71mm**
Bending: **Centre Heave Moment - Min. 1.5*Mcr bending moment, Edge Heave Moment - Min. 1.5*Mcr bending moment**

Tree Geometry

Ave. height of trees =	7.0 m	Mature trees =	N	(Y)es/(N)o - Unknown
Number of trees =	6	Design height (HT) =	9.0	m (0.9*Tallest Ht.)
Tallest tree in group =	10.0 m	Influence distance (Di) =	18.0	m
Distance of closest tree to building (Dt) =	6.0 m	Dt/HT =	0.50	
Max. distance of tree effect =	50.0 m	Di/HT =	2.00	
Tree design effect =	Drying			

Soil Parameters

Geotechnical report =					
Location =	Melbourne				
Characteristic surface movement (ys) =	40 mm				
Depth of design soil suction change (Hs) =	2.3 m	Soil suction Hs =	1.8	m (lower value) Table 2.4
		Hs =	2.3	m (upper value)
Soil profile type =	N (N)ormal moisture, (D)eep-seated moisture			
Crack depth (z) =	1.7 m Cl 2.3.2 (1-3)			
Max. extra suction change (Δu base) =	0.43 pF -Figure H1			
Max. design drying depth (Ht) =	3.6 m	Normal Class =	Class M	

Soil Properties (Instability Index) - Appendix H & Cl 2.3

Ips for Normal conditions (Half triangle)	Depth mm	H mm	Δu pF	Δu av. pF	α	ys/Ips	Comments
Cracked soil =	0		0.60				Note - soil assumed to
	575	1725		0.375	1.00	6.47	be a single soil profile
	1725		0.15				
Uncracked soil =	1725		0.15				Suction of uncracked
	1917	575		0.075	1.62	0.70	soil at centroid
	2300		0.00				
				Half triangle ys/Ips =		7.17	
				Total ys/Ips =		14.33	
				Ips = ys/(Total ys/Ips) =		2.79	%/pF

Adopted Ips (Ave Ips) = 2.79 %pF

Additional Ips for Trees	Depth mm	H mm	Δu pF	Δu av. pF	α	Add. yt/Ips	Comments
Cracked soil =	0		0.00				Note - soil assumed to
	575	1725		0.184	1.00	3.18	be a single profile
	1725		0.37				
Uncracked soil =	1725		0.37				Suction of uncracked
	2026	575		0.430	1.59	3.94	soil at centroid
	2300		0.49				
Uncracked soil trees =	2300		0.49				Suction of add. uncracked
	2936	1300		0.461	1.41	8.46	soil caused by trees
	3600		0.43				at centroid
				Total Additional yt/Ips for trees =		15.58	

Tree Effects

yt max = Adopted Ips * Additional yt/Ips =	43.5 mm		
Design yt =	43.5 mm		
Modified ys = ys + yt =	83.5 mm	Modified Class =	Class E

Properties for use in either Walsh or Mitchell Analysis of Soil Structure Interaction Analysis

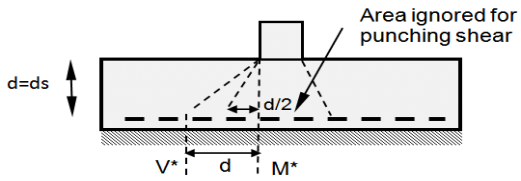
Centre heave ym = (0.7ys + yt) =	71.5 mm
Centre heave moment =	Min. 1.5*Mcr bending moment
Edge heave moment =	Min. 1.5*Mcr bending moment

Pad:	**(Pad Footing PF03) 3200mm long x 1200mm wide, 300mm deep, f'c = 20MPa**	
	Bearing = 17kPa < 250kPa	**OK (0.07)**
Reinf't:	**RL818 (main wires in L direction), RL818 (BLL bars in L dir.) , 60mm cover**	
Capacity:	**M*L = 3.0kNm/m < øMu.L = 33.8kNm/m, M*W = 2.5kNm/m < øMu.W = 16.6kNm/m**	**OK (0.09,0.15)**
	V*L = 0.0kN/m < øVuc.L = 289.2kN/m, V*W = 4.7kN/m < øVuc.W = 250.3kN/m	**OK (0.00,0.02)**
	VP* = 46kN < øVp = 1097kN	**OK (0.04)**
Column:	**3000mm long x 300mm wide, P* = 83kN**	
	Error - Ast less than minimum reinf't	
Geometry	(Designing at asup from column centreline)	Two-way slab footing

Concrete strength (f'c) =	20	MPa	Column length (CL) =	3000	mm
Pad length (L) =	3200	mm	Column width (CW, CW=0 for Circle) =	300	mm
Pad width (W) =	1200	mm	Column area reduction =	1.74	m²
Pad depth (D) =	300	mm			
Design moment at column face =	N	(Y)es,(N)o	Outstand in L direction =	100	mm
Use asup (=0.7) =	Y	(Y)es,(N)o	Outstand in W direction =	450	mm
Method =	E	(E)lastic/(P)lastic	Pad Area =	3.84	m²

Loading

Dead load (Pdl) =	50	kN (Excluding footing S.Wt)			
Live load (Pll) =	10	kN			
Eccentricity (EccL) =	0	mm			
Eccentricity (EccW) =	0	mm			
S.Wt. density (ρ) =	6.0	kN/m³			
S.Wt. = ρ*L*W*D =	6.9	kN			
P* = 1.2*(Pdl+SWt) + 1.5*Pll =	83	kN			
	(Bearing elastically determined)				
Allowable bearing pressure =	250	kPa	OK (0.07)		
Max. bearing pressure (Bp) =	17	kPa	Ultimate B.P.(Bp*) =	22	kPa
			P*/Rt =	1.2448	



Reinforcement Error - Ast less than minimum reinf't

Unreinforced =	N	(Y)es, (N)o	Bottom reinf't layers =	1	
Extreme bottom bars in =	L	(W), (L) dir	Ductility class =	A	(N)ormal,(L)ow,(A)uto
Cover to bottom layer of reinf't =	60	mm	Ductility class =	L	(N)ormal,(L)ow

BLL (in L dir.) =	**RL818 (main wires in L direction)**		**BUL (in W dir.) =**	**RL818**	
Bar size =	7.6	mm	Bar size =	7.6	mm
Bar cts/No. per m =	100	mm	Bar cts/No. per m =	200	mm
Steel Strength (fsy) =	500	MPa	Steel Strength (fsy) =	500	MPa
Area steel (Ast) =	454	mm²/m	Area steel (Ast) =	227	mm²/m
Depth to steel (ds) =	236	mm	Depth to steel (ds) =	229	mm
Ast.min = 0.19*(D/ds)²*f'ct.f/fsy*ds =	389	mm²/m	Ast.min =	401	mm²/m
			Warning - Ast less than min. reinf't (W)		

Bending (Reinforced) - Cl 8.1 (Applicable)

alpha (α2 = 0.85-0.0015*f'c) =	0.820	(0.67 ≤ α2)	Eq 8.1.3(1)			
gamma (γ = 0.97-0.0025*f'c) =	0.920	(0.67 ≤ γ)	Eq 8.1.3(2)			
Strength factor (øb) =	0.65		øbw =	0.65		Table 2.2.2 for L Class
Moment (ML*) =	3.0	kNm/m	MW* =	2.5	kNm/m	
Ast Req'd =	40	mm²/m	Ast Req'd =	33	mm²/m	
øMuo.L =	33.8	kNm/m	øMuo.W =	16.6	kNm/m	
	OK (0.09)			OK (0.15)		

Bending (Unreinforced) - Cl 20.4.2 (Not applicable)

Plain concrete (ø.ur) =	0.6	Table 2.2.2(g)			
øMuo.ur.L = (ø=0.6)*f'ct.f*Z =	16.8	kNm/m	øMuo.ur.W =	16.8	kNm/m
	OK (0.18)			OK (0.15)	

Punching shear (Reinforced) - Cl 9.3 (Applicable)

Pad load (P*) =	83	kN	dom =	229	mm	
Column load reduction =	38	kN	Perim. (u) =	7514	mm	
Punching shear (Vp*) =	46	kN	βh =	10.0		Cl 9.3.1.4
			fcv =	0.91	MPa	Cl 9.3.3
øVp = (ø=0.7)*u*dom*f'cv =	1097.0	kN	OK (0.04)			

Punching shear (Unreinforced) - Cl 20.4.3 (Not applicable)

Punching shear (Vp*) =	46	kN	
øVp.ur1 = (ø=0.6)*0.1*u*(D-50)*(1+2/βh)*√f'c =	604.9	kN	
øVp.ur2 = (ø=0.6)*0.2*u*(D-50)*√f'c =	1008.2	kN	
øVp.ur = min(øVp.ur1,øVp.ur2) =	604.9	kN	OK (0.08)

Strength of slab in one-way shear (Reinforced) - Cl 8.2 (Applicable)

Use Simplified method =	N	(Y)es,(N)o				
Max. nominal aggregate size (dg) =	16	mm	(General method)			
Lightweight concrete =	N	(Y)es,(N)o	(General method)			
	Length			**Width**		
1-way shear (VL*) =	0.0	kN/m	VW* =	4.7	kN/m	
ML* =	0.0	kNm/m	MW* =	0.5	kNm/m	
ds =	236	mm	ds =	229	mm	
Effective shear depth dv = max(0.72*D,0.9*ds) =	216	mm	dv =	216	mm	Cl 8.2.1.9
Total flange (W) =	1200	mm	L =	3200	mm	
Effective flange (bv) =	1000	mm	bv =	1000	mm	
Simple method for kv & θv - Cl 8.2.4.3						
kvo = 200/(1000+1.3*dv) =	0.156		kvo =	0.156		
kv = min(kvox, 0.15) =	0.150		kv =	0.150		Eq 8.2.4.3(1)
Angle of inclination of concrete comp. strut (θv) =	36.0	°	θv =	36.0	°	
General method for kv & θv - Cl 8.2.4.2						
Tensile area of concrete (Act) =	150000	mm²/m	Act =	150000	mm²/m	
Ast =	454	mm²/m	Ast =	227	mm²/m	
Shear only εx1 ≤ 3000x10⁻⁶ =	0.0	x10⁻⁶	εx1 =	103.5	x10⁻⁶	Eq 8.2.4.2.2(1)
Shear only -200x10⁻⁶ ≤ εx2 (where εx1 < 0) ≤ 0 =	0.0	x10⁻⁶	εx2 =	0.0	x10⁻⁶	Eq 8.2.4.2.2(2)
Long. mid-depth concrete strain (εx) =	0.0	x10⁻⁶	εx =	103.5	x10⁻⁶	
kdg = max(32/(16+dg), 0.8) =	1.000		kdg =	1.000		Eq 8.2.4.2(3)
kv = (0.4/(1+1500*εx))*(1300/(1000+kdg*dv)) =	0.428		kv =	0.370		Eq 8.2.4.2(2)
Angle (θv) = (29+7000*εx) =	29.0	°	θv =	29.7	°	Eq 8.2.4.2(1)
Adopted kv & θv - General method - Cl 8.2.4.2						
kv =	0.428		kv =	0.370		
Angle of inclination of concrete compression strut (θv) =	29.0	°	θv =	29.7	°	
Concrete contribution to shear stength - Cl 8.2.4.1						
Capacity reduction factor (ø) =	0.70		ø =	0.70		Table 2.2.2(e)
kv =	0.428		kv =	0.370		
Effective flange (bv) =	1000	mm/m	bv =	1000	mm/m	
Effective shear depth (dv) =	216	mm	dv =	216	mm	
min(√f'c,8.0) =	4.47	MPa				
Vuc = kv*bv*dv*min(√f'c, 8.0) =	413.1	kN/m	Vuc =	357.6	kN/m	Cl 8.2.4.1
D ≤ 300mm, ks =	1.00					
ks*øVuc.L =	289.2	kN/m	ks*øVuc.W =	250.3	kN/m	Eq 8.2.1.6(1)
	OK (0.00)			OK (0.02)		

Strength of slab in one-way shear (Unreinforced) - Cl 20.4.3 (Not applicable)

1-way shear (VL*) =	0.0	kN/m	VW* =	4.7	kN/m	
øVu.ur.L = (ø=0.6)*0.15*b*(D-50)*f'c^1/3 =	61.1	kN/m	øVu.ur.W =	61.1	kN/m	
	OK (0.00)			OK (0.08)		

APPENDIX A - SOIL REPORT

SOIL INDUSTRIES
BALLARAT • BENDIGO • GEELONG • MELBOURNE'S WEST

SITE CLASSIFICATION REPORT AS2870-2011.

For: Homemade Builders

At: Number 2145 Steiglitz Road Maude

Site Reference: 2312026

Report Version: A

Published: 17/01/24

SUMMARY.

Please ensure you read and understand the entire report it may contain important additional information.

Based on the above we have classified this site as a:	**CLASS P**

This P classification is due to:
Abnormal moisture conditions due to removal/proposed removal of building structures and/or pavements
Abnormal moisture conditions due to removal of significant vegetation
In the absence of these conditions a classification of CLASS M may apply.

Approximate depth of fill identified at test sites: 0mm

1.0 SCOPE

Soil Industries Pty. Ltd. has been commissioned to undertake a limited site investigation program for Homemade Builders at Number 2145 Steiglitz Road Maude.

In order to:

- Classify the site in accordance with Section 2.2.2 of AS2870-2011

2.0 PROPOSED DEVELOPMENT

At the time of commission we understand the following:

Proposed development:	Building extension
Construction type:	Unknown at time of report Single / double storey
Footing Type:	Not specified

3.0 SITE DESCRIPTION

At the time of attendance the site was described as:

Description:	Developed site in a residential acerage
Slope:	Gradient varies over site 1:15 to the Southwest Note: The given slope is an approximation only - if required this office can provide a contour survey.
Vegetation:	The vegetation proximate to the building envelope is described as: Sparse grasses Sparse Medium trees 4-10m

4.0 TESTING PROGRAM

On the date of 1/18/2024 2 test sites were established using a drilling rig. Disturbed samples were collected and classified by trained and experienced personal.

5.0 SITE GEOLOGY.

Quaternary Sediments. The geological origins of the site were determined by field observations and/or by reference to the appropriate Geological Survey map.

6.0 CLASSIFICATION

The following classification has been made in consideration of the following factors:

- Field identification of the soil profile as per Section 2.2.2 and Appendix D of AS2870-2011.
- The soil, site and adjoining site conditions plainly visible and present at the time of site attendance.
- The information supplied to us by the client at the time of commission.
- Past experience on sites in the area.

AS2870-2011 site classification:	**CLASS P**

This P classification is due to:
Abnormal moisture conditions due to removal/proposed removal of building structures and/or pavements
Abnormal moisture conditions due to removal of significant vegetation
In the absence of these conditions a classification of CLASS M may apply.

6.1 UNDISTURBED SOIL SURFACE MOVEMENT Y_S

For the natural undisturbed soil profile with normal seasonal soil moisture conditions we estimate a characteristic surface movement in the range of 20mm to 40mm or a CLASS M classification. Where any feature that negates a standard site classification is present larger surface movements than those given above may be expected.

7.0 SITE NOTES.

The following notes should be considered prior to footing selection and design.

7.1 FILL MATERIAL.

During testing we identified up to approximately 0mm depth of fill material across the test sites.

No fill material was encountered at test locations.
Due to past development or activities on this site fill depths may vary from those identified in this report. Areas of undetected and/or possibly deeper fill may exist on this site. This office can be contacted to undertake additional testing to provide additional information if required.

7.2 CONTROLLED FILL MATERIAL.

Not applicable for this site or no controlled fill material was identified from site observations.

7.3 SITE VEGETATION.

Please refer to the site diagram and photos for an ap[proximate indication of site vegetation.

Substantial vegetation present. Substantial vegetation was observed in close proximity to the building envelope which may cause abnormal moisture conditions as defined by AS2870 Clause 1.3.3. The footing designer must take into consideration the influence of this vegetation on soil moisture conditions and footing performance.

Vegetation removal. This site contains significant vegetation that has been or may require removal. Where vegetation has been removed it must be ensured that all stumps including root systems are grubbed out and clear of any organic matter. These areas should then be backfilled with locally derived soils similar to that removed (note: rocks and boulders are not considered appropriate). The backfilled material should then be compacted in layers to the proper degree of compaction (refer AS2870Section 6.4). Any soft/loose material or areas that do not respond to compaction must be excavated out to achieve a firm working base. The footing designer must take into consideration the influence of vegetation removal on soil moisture conditions which may cause abnormal moisture conditions as defined by AS2870 Clause 1.3.3.

7.4 BUILDINGS AND PREVIOUS DEVELOPMENT.

Building structure or pavement removal. Building structures and/or pavements were observed on site that have been or are expected to be removed. Any disturbed ground associated with the existing pavements or buildings and their services must be identified. Where disturbed spoils are present footings must be locally deepened to a minimum depth of 200mm into suitable undisturbed soils as required. Care should be taken to ensure that underground service lines in proximity to the proposed building are not damaged and do not adversely impact upon the foundation soils. Where applicable they should be diverted, removed or suitably terminated so they do not act as a conduit and deliver water or root growth to the foundation soils of the proposed development. It must be ensured that angle of repose is not exceeded with regards to pre-existing excavations. The footing designer must address the possibility of abnormal soil conditions being present on site.

7.5 SITE GROUNDWATER.

Possible perched watertable. At the time of investigation permeable topsoils encountered were in satisfactory condition for the proposed footings. However a perched watertable may occur on this site resulting in their saturation and a loss of available bearing capacity. Footings may require deepening to a suitable soil layer (typically underlying CLAYS) or to depth where the loss of bearing capacity will not occur. Both surface and sub-surface drainage for this site must be addressed by the footing designer to prevent this occurring. Required foundation depths may be in excess of those given in this report. Where soils are saturated the use of a piled footing system may be required.

7.6 BEDROCK AND FLOATERS.

Drill refusal on bedrock was encountered on site (refer log sheets). Depending on final excavations depths exposure of bedrock may result. This may cause difficulties during excavations resulting in variable widening and deepening of the footing excavations. Excavations may prove difficult for light machinery and it is possible that rock breaking equipment etc. may be required. Where the recommended footing depths cannot be maintained they may be reduced at the Building Surveyor's discretion. This may result in shallower footing depths than those given in this report.

7.7 SITE SOIL CONDITIONS.

Not applicable for this site.

7.8 SITE AND EARTHWORKS.

None proposed at time of commission. If earthworks and/or site cutting or filling are undertaken this office should be contacted to revise our report as the given classification can change.

7.9 CONSTRUCTION SPECIFIC NOTES.

Building Extension. We have been informed that a building extension forms part of this development. Where the proposed building extension abuts the existing building we recommend that adequate articulation be incorporated into the structure. This is of particular importance if the existing building exhibits signs of movement or where differing footing systems are utilized. In such cases it must be ensured that the movement of the existing building does not have an adverse effect on the proposed extension.

7.10 SITE REVISIT.

Not required at this time provided soil conditions do not vary from our findings. Deep or piled footings may require additional investigation.

7.11 ADDITIONAL SITE NOTES.

No notes made.

8.0 RECOMMENDATIONS.

The following recommendations given are a minimum for the most common types of residential construction footings. They do not constitute a footing design or a footing type selection.

Unless noted otherwise:

- All given foundation depths are relative to ground surface levels at the time of testing.
- The foundation recommendations given are for residential articulated masonry veneer construction. This report is valid for other construction methods provided the relevant minimum foundation depth and construction requirements are met.
- The foundation depths given do not make an allowance for the presence of abnormal moisture conditions on site. If present foundation depths greater than those given in this report are likely to be required and must determined by an experienced engineer.

CLASS P – ABNORMAL MOISTURE CONDITIONS.

Due to the possibility of abnormal moisture conditions on site we have classified this site as CLASS P in accordance with AS2870 Clause 1.3.3. This site will require an experienced engineer familiar with the soil and site conditions present to design an appropriate footing system for this site in accordance with the relevant sections of AS2870-2011.

Abnormal moisture conditions occur where soil moisture conditions are not uniform across a site which in turn may lead to differential ground surface movement particularly where CLAY soil are present. The effect of these conditions are dependent on the location of the proposed building envelope relative to the affected area. Consequently, part(s) of the site may or may not be affected. However, we must classify this site as a whole and for a worst-case scenario.

As a guide, we recommend that the upper classification Ys value of 40mm be adopted for the surface movement prior to abnormal moisture conditions. Additional surface movement greater than this value will be needed to compensate for the presence of abnormal moisture conditions. This office can be contacted to undertake additional laboratory soil testing to determine a more accurate surface movement value if required.

Please be advised that unless specifically noted that any foundation depths given in this report do not take into account the effect of abnormal moisture conditions. Foundation depths will need to be determined by the footing designer. This office can be contacted to undertake additional testing if required to assist in this process.

8.1 BEARING CAPACITY.

The following bearing capacity(s) were determined based on the soil profile and site conditions present at the time of investigation.

Material	Minimum Penetration	End Bearing kPa
SILTY SAND	10mm	50
CLAY	100mm	100

With regards to soil bearing capacity:

- The above are bearing capacity penetration depths and not foundation depths.
- The above bearing capacities are based on the soil conditions encountered thus far. If soil conditions deteriorate at a greater depth, there is potential for the soil bearing capacity to reduce.
- *This bearing capacity is only valid once proof drilling has been completed as soil conditions may change with depth. AS2870-2011 Appendix G. recommends that geotechnical site investigation for the design of deep footings should be taken to a depth not less than 1.5m beyond the founding depth or 1.5 times Hs depth - whichever is deeper. This office can be contacted to conduct deeper investigation if required.
- If higher bearing capacities than those given above are required, this office can be contacted to conduct additional bearing capacity specific testing.

8.2 STRIP FOOTINGS – ENGINEER DESIGNED.

Due to site or soil conditions present an engineer designed gridded continuous strip footing system (refer Figure 3.6 AS2870) may be appropriate for this site. The footing system must be designed by a suitably qualified and experienced engineer using engineering principles as per the relevant sections of AS2870 and who is fully familiar with the soil and site conditions present.

Strip footings should penetrate a minimum of 100mm into the natural undisturbed soils with a bearing capacity of 100kpa or greater. They should be founded at a minimum of standard CLASS M depths or at the depths listed below - whichever is deeper.

Test Site	Minimum Founding Depth for Strip Footings	Founding Material (>=100kpa bearing capacity)
1	525mm	CLAY
2	525mm	CLAY

It should be ensured the footing excavation is free from all organic matter and that any loose or soft material is removed from the bottom of the trench. Abnormal moisture conditions, poor or wet soil conditions may require an increase in foundation depth.

As a design alternative where foundation depths are deemed excessive a strip footing suspended on either piles or backhoe slots may be considered. This office should be contacted if further information is required with regards to this option.

8.3 PAD FOOTINGS – ENGINEER DESIGNED.

Due to site or soil conditions present an engineer designed pad footing system may be appropriate for this site. The footing system must be designed by a suitably qualified and experienced engineer using engineering principles as per the relevant sections of AS2870 and who is fully familiar with the soil and site conditions present.

Pad footings should penetrate a minimum of 100mm into the natural undisturbed soils with a bearing capacity of 100kpa or greater. They should be founded at a minimum of standard CLASS M depths or at the depths listed below - whichever is deeper.

Test Site	Minimum Founding Depth for Pad Footings	Founding Material (>=100kpa bearing capacity)
1	500mm	CLAY
2	500mm	CLAY

It should be ensured the footing excavation is free from all organic matter and that any loose or soft material is removed from the bottom of the trench. Abnormal moisture conditions, poor or wet soil conditions may require an increase in foundation depth.

9.0 FOOTING PERFORMANCE.

The client is advised that there are acceptable standards for the performance of building footing systems as described in Appendix B of AS2870-2011.

To summarise the client should ensure:

- The site remains well drained both during and after construction.
- Any landscaping or site works do not adversely impact on the foundation soils or site drainage.
- Any existing or proposed vegetation does not adversely impact on the foundation soils or site drainage. Adequate vegetation setbacks must be maintained (refer Section 9.3)
- Regular inspections and maintenance are undertaken on the site and building to ensure stable moisture conditions.
- Plumbing leaks and leaking taps shall be repaired promptly. Do not allow leaking taps or the overflow from hot water services and air conditioning units to discharge adjacent to the house footings.

The client should become familiar with and adhere to the relevant recommendations of Appendix B of AS2870-2011 and C.S.I.R.O. Building Technology Files 18, 19 and 22. These documents provide further information and are considered an integral part of this report. The Building Technology Files can be obtained from the C.S.I.R.O. at http://www.publish.csiro.au/.

10.0 CONSTRUCTION NOTES.

All site works related to the building project must be undertaken to comply with the relevant Codes and Standards and must not potentially adversely impact upon the building envelope, foundation soils, site drainage or nearby infrastructure or buildings. Soil Industries Pty Ltd accepts no liability or responsibility for any site works outside of our specific commission.

10.1 DRAINAGE.

Effective drainage is an essential part of a successful footing performance as must be installed as per Section 5.5.3 and 6.6 of AS2870-2011. Each site will have its own specific drainage requirements that must be considered at the design stage.

Both surface and sub-surface drainage must be controlled during both the construction period and for the life of the building. Water run-off shall be collected and channelled away from the building and/or connected to the legal point of discharge.

Care must be taken not to allow the soil moisture conditions to alter significantly by allowing water to pond close to the building, trees to grow near walls etc. The site should be graded and drained so that water cannot pond against the footings. The adjacent ground surface and pavements shall be graded at a uniform fall of 1:20 away from the building footings for a minimum distance of one meter.

Sloping sites or sites with permeable topsoil present may require the use of sub-surface cut-off drains. Where sub-surface drains such as agricultural drains are installed they must be located a minimum of 1.5m away from the building perimeter unless designed in accordance with engineering principles.

10.2 EASEMENTS AND TRENCHES

Where footings are located adjacent to easements or any excavations they must be deepened so that the projection from the underside of the excavation to the underside of the footing creates an angle of repose not exceeding 40˚ to the horizontal for clay soils and 30˚ for sandy/silty soils in good dry condition. Excessively moist soils or those in poor condition may require modification of the given angle of repose.

Where CLAY soils are present effort should be made to locate service trenches away from the building as practically possible to eliminate the potential of trench inundation leading to soil swelling. Trenches shall be backfilled with clay or a clay plug used to prevent water from flowing close to or under the residence. Porous material such as gravel, sand, crushed rock, screenings, or building rubble is not to be used.

10.3 VEGETATION AND GARDENS.

Vegetation in close proximity to buildings can significantly dry surrounding soils leading to soil shrinkage and building distress. The client must consider the potential effect of any existing or proposed vegetation on the foundation soils as it matures. As a guide it is not recommended to have significant trees or shrubs within a distance from the building to canopy edge equivalent to:

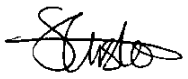
- 75% of the mature tree height for class “M” sites
- 100% of the mature tree height for class “H” sites
- 150% of the mature tree height for class “E” sites
- For groups or rows of trees this distance must be increased by 50%.

Garden beds adjacent to the building should be avoided where possible and not interfere with effective site drainage. Moderated watering of the garden is preferred to indiscriminative neglect and or irregular saturation as the over watering of garden beds may saturate foundation soils and cause excessive soil movement.

10.4 ARTICULATION.

Where reactive CLAY soils are present the structure must be articulated to allow flexibility of the building in response to footing movements that may occur. Articulation should be provided at the intersection differing footing types, where differing foundation soils are encountered, where footings are founded at significantly different depths and at points of high stress in the building structure. Articulation joins shall comply with AS4773.3 and CCA TN61-1998 Articulated Walling.

Regards,



Simon Christie
B.Sc (Hons) Geology

CONDITIONS OF THIS REPORT.

TERMS AND CONDITIONS.

The engagement of Soil Industries is considered as acceptance of our terms and conditions. These are available at https://soil.net.au/tandc/. In addition, the following conditions also apply:

SCOPE OF CLASSIFICATION REPORT.

This report has been prepared as a site classification report in accordance with Section 2.2.2 of AS2870-2011. It has been prepared with a limited site investigation and on the basis of the client's project specific criteria as understood by Soil Industries Pty. Ltd. (Soil Industries) at the time of commission. This report does not extend beyond that brief. Project criteria typically include the general nature of the project, building size and location; construction type/methods, landscaping, earthworks, site cuts and any other site treatments or works to be undertaken that may impact upon the validity of this report. Soil Industries must be consulted if changes are made to the project criteria or they differ from described in this report as these changes may render this report inappropriate.

This scope of this report does not include:

- Detection or comment regarding any soil or water contaminates
- Investigation of or comment on saline, acid sulphate soil conditions or other chemically aggressive soils. The client can contact the relevant government authority to seek further information regarding this or request additional testing from this office.
- Investigation of or comment on the hydrology of the site including groundwater, the effects of rainwater and runoff. Property height or flood risk on the property.
- A historical study of the site showing past land uses and topography e.g. vegetation or building removal and placement of fill material on site.
- Investigation of or comment on abnormal moisture conditions where there is no indication of differences across the site visibly, physically or by visual and tactile assessment or where they cannot be detected at the time of testing.
- Determination of any historical mining activity, presence of abandoned shafts or tunnels or the possibility of mine subsidence or waste on site. The client can contact the relevant government authority to seek further information regarding this.
- Assessment of ground slope or earth batter stability or if the site lays within a landslip prone area. Any assessment of the condition of existing or the need for retaining structures on site. Numerous councils require that a slope stability assessment be undertaken if a) the site is in a known landslip area or b) the gradient on site exceeds 20%. It is the clients responsibility to determine if any of these conditions are present.
- A pavement investigation.

This report is only intended for residential construction or residential like construction. It is only applicable to building with loading and a construction type similar that of a residential dwelling as described in section 3.1 of AS2870-2011. If a more detailed assessment of the site is required, this office can be contacted to arrange additional testing.

PREVIOUS SITE ACTIVITIES.

In preparing this report Soil Industries has relied upon information supplied by the client, their agents or third parties. It is expected that all relevant information including (but not limited to) the sites history, engineering plans, compaction reports and any known or suspected irregularities has been provided prior to testing. A historical study of the site is beyond the scope of this report.

The footing designer must review available aerial mapping data and available site context information to assess the current and pre-existing site conditions that may affect the validity of this report.

Should any relevant information be discovered, not be supplied or received by this office in writing then this report may be inappropriate. In such cases Soil Industries must then be contacted as soon as possible to revise our findings and/or conduct further testing. Soil Industries accepts no responsibility for any consequences, additional costs, loss or damages if relevant information regarding the site has not be forwarded on or received.

RELIANCE ON DATA AND 3RD PARTIES.

Soil Industries accepts no responsibility for the accuracy of any work previously completed or data, information or documentation supplied by the client, their agents, sub-contractors, government agencies or any third party that may have been used in the provision of this report. Soil Industries accepts no liability for any additional costs or consequences if any information supplied is inappropriate, incomplete, inaccurate or contains errors.

OUR ROLE.

For the purpose of this report Soil Industries undertakes the role of *Classifier* as defined in Appendix A of AS2870-2011. This is a classification report only and the classification stated and recommendations shall not be regarded as an engineering design nor shall it replace a design by engineering principles although it may contribute information for such designs. The information provided is not intended as a selection of a footing system for the project.

TESTING LIMITATIONS.

In assessing a site from a limited number of test sites there is the possibility that variations may occur between test locations and within bores. No subsurface exploration programme, no matter how comprehensive, can reveal all subsurface details and anomalies. In some circumstances the scope of services provided may have been limited by a range of factors including time, budget, access or site disturbance constraints. In some instances further testing may be required.

The data derived from both site observations and laboratory testing is deemed to be representative of the entire site.

Unless noted otherwise solid flight auger drilling or hand auger drilling has been utilised on this site and soil characteristics have been obtained by field assessment and not by laboratory testing. While these methods are both quick and economical, they do possess inherent inaccuracies. Consequently, soil characteristics, site conditions and fill or strata depths presented in this report should not be considered as exact and may vary from the in-situ profile. As a result, Soil Industries accepts no responsibility for any consequences, additional costs, loss or damages for variations between field assessment and the in-situ characteristics of the soil profile. If more accurate measurements are required, then this office should be contacted to arrange alternative testing methods.

Soil Industries must be contacted as soon as possible if subsurface or site conditions are found to differ from those given within this report to revise our findings and/or conduct further testing. Soil Industries accepts no responsibility for any consequences, additional costs, loss or damages if work continues without report revision.

SITE CONDITIONS ARE TIME DEPENDENT.

Changing natural forces or man-made influences may modify both site and subsurface conditions. Consequently, this report is only relevant for site and subsurface conditions encountered at time of the testing. Development of adjacent sites, earthworks, vegetation growth and natural events such as floods, or groundwater fluctuations, seasonal soil wetting and drying may affect site conditions, and thus the continuing adequacy of this report. If site or soil conditions differ from those described herein this office must be contacted to revise this report.

ADDITIONAL TESTING

In additional to the above additional testing or revision of this report will be required if:

- Site or foundation excavations exceed testing depth.
- Testing depth is less than two times footing width below its own foundation depth.
- Site cuts or filling in excess of 600mm are undertaken or significant earthworks not noted in this report are conducted as they have the potential to alter the given site classification and recommendations.
- High load footings (>150kpa) or pile footings require proof drilling to confirm soil conditions at depth.
- Landscaping of the general proposed building area is to be undertaken i.e., both the removal or planting of new vegetation
-

We take no responsibility for additional costs, loss or damages if additional testing is not undertaken. As we may not be privy to final design, construction or earthworks of the development it is the responsibility of the client/footing designer to commission additional testing if required.

MEASUREMENTS.

All gradients, north-points, feature heights, given dimensions and any other measurements should not be considered as exact. The size and location of vegetation, services and building structures, bore locations and other features noted are an approximation only.

Any site photos included within this report or provided otherwise (including digitally) form part of this report.

USE OF REPORT.

This report has been prepared for the sole use of the client named herein and is non-transferable to any other party.

This report remains the property of Soil Industries and is considered a draft report until its account is paid in full. Draft reports may not be used for any design or costing work what soever. Where an account is not paid in full by the due date Soil Industries reserves the right to cancel the report without notice. Soil Industries accepts no liability for any costs or consequences for the cancellation of a report.

No responsibility is taken if this report is not reproduced in full or altered in any way. This document is considered uncontrolled when printed.

SITE MAINTENANCE.

This report requires that an appropriate landscaping, drainage and maintenance regime will be implemented as soon as possible to ensure stable moisture conditions remain on site. Site drainage must be controlled during the construction period.

APPENDIX A – BORE LOGS

BORE LOG #1				
Depth mm (Top of layer)	Material Description Read down the bore log to the layer you wish to review. Read off the Depth mm in the column to the left. This is the starting depth (top) of that layer.	Moisture content	Estimated soil Cu	Fill
0	Silty SAND with GRAVEL orange brown medium dense	Moist		
200	CLAY (Cl) grading to Sandy CLAY orange red stiff	Moist		
1500	Very Clayey SAND (SC) orange dense	Moist		
1800	Refusal on weathered bedrock Excavation method: Solid auger drilling rig			

BORE LOG #2				
Depth mm (Top of layer)	Material Description Read down the bore log to the layer you wish to review. Read off the Depth mm in the column to the left. This is the starting depth (top) of that layer.	Moisture content	Estimated soil Cu	Fill
0	Silty SAND with GRAVEL orange brown medium dense	Moist		
300	CLAY (Cl) grading to Sandy CLAY orange red stiff	Moist		
900	Refusal on weathered bedrock Excavation method: Solid auger drilling rig			

APPENDIX B – SITE DIAGRAM

Note: Diagram not to scale. Feature measurements and positions approximate only. Aerial photographs may not display site condition at the time of site visit or its current condition. Tree heights are a visual estimate only and may not indicate all trees on site. Trees smaller than 4m in height may not be noted on diagram.

NORTH

Immature tree or new planting

Larger tree with estimated height in m.

Construction marker/peg

BH 1

Bore/test location

Photo Location

APPENDIX C - SITE PHOTOS