



INSPECTION RECORD

This record, together with the Building Consent and approved plans, is to remain on the construction site at all times.

Project Location	TO BOOK AN INSPECTION PLEASE PHONE WDC BUILDING CONTROL	BCon18/0658
25 Springvale Rd WHANGANUI	ON 349 0001 AND QUOTE THE FOLLOWING APPLICATION NUMBER:	
Description of Work	New 169m2 Dwelling With Attached Garage.	
Applicant	Devon Homes 165A Great North Road, Otamatea, Whanganui 4501	

SUMMARY OF CONDITIONS

Building Consent Number BCon18/0658

PIM Conditions

Code	Condition
	All work on the project must comply with the requirements of the NZ Building Code.
	A PIM only document is not an approval to build. A Building Consent is required before building work commences.
	W.D.C will follow up on building work not completed within two years of building consent issue.
	A Building Consent lapses and is of no effect if the building work has not been started within 12 months of the date of issue.
	If the building is public premises it may not be occupied until either a code compliance certificate or certificate for public use has been issued.
	Please note [Electrical, and Gasfitting subtrades do not form part of the building consent inspection process. However, Council is required to receive 'Energy Certificates' from both of these trades before issue of a Code Compliance Certificate].
PIMCond	The original vehicle crossing into this site will need to be removed and the footpath, kerb and grass reinstated during the process of building the new vehicle crossing and before the COC is supplied. Craig Bright - Corridor Access Officer.
PimLqftn	This property has been assessed as "medium liquefaction".

Building Consent Information

Code	Information
BCPropBdy	[Informative note:The property boundary must be defined before any construction commences.]

Your project's inspections are listed on the next page...



Please Note: A minimum of 48 hours notice is required for the booking of an inspection. The inspection record sheet and accompanying building consent documentation must be on site for use by the inspector at the time of the inspection.

All inspections are to be carried out by BCA Building Inspectors unless prior arrangements have been made by the BCA to have an approved qualified person inspect specific items (eg. Engineer). Inspections shall be carried out in accordance with the attached schedule of inspection types. It is the owner's responsibility to ensure all necessary inspections are carried out as required. Please contact WDC if you are unsure what requires inspection – do not cover or enclose any building work without inspection.

Note: Further inspections may incur additional cost at time of Code Compliance Certificate issue.

Inspections Record For Building Consent Number BCon18/0658								
<i>Inspection</i>	<i>When to Request</i>	<i>Date</i>	<i>Inspector</i>	<i>Complies with Code</i>	<i>Reinspect</i>	<i>Notes</i>		
CONCRETE SLAB INSPECTION	Prior to placing Concrete					This inspection is to include the post foundations.		
FRAMING INSPECTION	When all framing is complete.							
BRICK MASONRY INSPECTION	When bricks have been laid to sill height.							
Cladding Cavity Inspection	To inspect drainage cavity before cladding.					Linea cavity		
BUILDING PRELINE INSPECTION	Before Internal linings are fixed.							
POST LINE INSPECTION	To inspect fixings. Prior to covering up.							
PLUMBING SUBFLOOR INSPECTION	Before covering up							



PLUMBING PRELINE INSPECTION	Before covering up							
SANITARY DRAINS INSPECTION	Before backfilling drains							
STORMWATER DISPOSAL INSPECTION	Before backfilling drains							
WATERPROOFING INSPECTION	Before covering up					Shower waterproofing		
FINAL BUILDING AND PLUMBING COMBINED INSPECTION	On Completion							
CONSTRUCTION REVIEWS (NO INSPECTION)	On Completion					Before requesting a final inspection please supply the following information: • Application for Code Compliance Certificate • Memorandum of Restricted Building Work (RBW) for all required • Trades • As-built Drainage plan • Energy certificate/s.		



BUILDING CONSENT NUMBER BCon18/0658

Section 51, Building Act 2004

The building:

Street address of building:	Legal description of land where building is located:
25 Springvale Rd WHANGANUI	Lot 30 DP 500432 0.0448 Ha
Building name:	Location of building within site/block number:
<i>New Dwelling With Attached Garage</i>	
Level/unit number:	

The owner:

Name of Owner:	
Mr G Lennox, Mrs GM Lennox	
Mailing address:	Street Address/registered Office:
PO Box 165 Waverley 4544	PO Box 165 Waverley 4544

Phone numbers:

Landline:		Mobile:	
Daytime:		After hours:	
Facsimile number:			
Email address:		Website:	

First point of contact for communications with the building consent authority:

Contact Person:	
Devon Homes	
Mailing address:	Street Address/registered Office:
165A Great North Road, Otamatea, Whanganui 4501	165A Great North Road, Otamatea, Whanganui 4501

Phone number:

Landline:		Mobile:	
Daytime:	3452393	After hours:	
Facsimile number:			
Email address:		Website:	

Building Work

The following building work is authorised by this consent

Project
New 169m2 Dwelling With Attached Garage.

<i>Intended Use</i>	<i>Intended Life</i>
Single Detached Residential	50+ Years
<i>Estimated Value (\$)</i>	
\$359600.00	

This building consent is issued under section 51 of the Building Act 2004. This building consent does not relieve the owner of the building (or proposed building) of any duty of responsibility under any other Act relating to or affecting the building (or proposed building). This building consent also does not permit the construction, alteration, demolition, or removal of the building (or proposed building) if that construction, alteration, demolition or removal would be in breach of any other Act.



CONDITIONS OF BUILDING CONSENT NUMBER BCon18/0658

This Building Consent is issued Subject to the following conditions:

Building Act 2004, Section 90:

Inspections by Building Consent Authorities

Agents authorised by the building consent authority for the purposes of this section are entitled, at all times during normal working hours or while building work is being done, to inspect

- (a) land on which building work is being or is proposed to be carried out; and
- (b) building work that has been or is being carried out on or off the building site; and
- (c) any building.

Informative notes:

- [Informative note: The Building Consent, conditions, inspection sheet, and approved plans must be kept on site at all times until completion of the project.]
- [Informative note: Failure to request inspections will risk the non-issuing of a code compliance certificate and the structure may be deemed non-complying.]
- [Informative note: Any inspection time required over and above that allowed may incur a further charge.]
- [Informative note: Under Section 52, a building consent lapses and is of no effect if the building work to which it relates is not commenced within 12 months after the date of issue.]
- [Informative note: Under Section 93, if the owner has not made application within 24 months, the BCA (Building Control Authority), must decide whether or not to issue a CCC (Code Compliance Certificate).]
- [Informative note: The property boundary must be defined before any construction commences.]

Compliance Schedule:

A compliance schedule (CS) is not required for this building.

#Attachments

‡Copies of the following documents are attached to this building consent:
‡Project information memorandum number BCon18/0658'
‡Inspection record

Signed for and on behalf of the Whanganui District Council

GJ Hoobin
Building Control Manager

Date: 02 November, 2018



PROJECT INFORMATION MEMORANDUM NUMBER BCon18/0658

Section 31, Building Act 1991

**Devon Homes
165A Great North Road
Otamatea
Whanganui 4501**

<i>Project Location</i>	<i>Assessment Number/Legal Description</i>
25 Springvale Rd WHANGANUI	Lot 30 DP 500432 0.0448 Ha
<i>Category</i>	<i>Description of Work</i>
New Residential Dwellings - \$200001 & over	New 169m2 Dwelling With Attached Garage.
<i>Intended Life</i>	<i>Estimated Value (\$)</i>
50+ Years	359600.00

This Project Information Memorandum is confirmation that the proposed work may be undertaken, subject to the provisions of the Building Act 2004 and any requirements of the Building Consent (number BCon18/0658), which has been granted.

This Project Information Memorandum is subject to the following conditions:

- **The original vehicle crossing into this site will need to be removed and the footpath, kerb and grass reinstated during the process of building the new vehicle crossing and before the COC is supplied. Craig Bright - Corridor Access Officer.**
- **This property has been assessed as "medium liquefaction".**
- **All work on the project must comply with the requirements of the NZ Building Code.**

Signed for and on behalf of the Whanganui District Council

GJ Hoobin
Building Control Manager

Date: 1 November 2018

29 October 2018

Wanganui District Council
101 Guyton Street, PO Box 637
Wanganui

Project number: BCon 18/0658

Project location: 25 Springvale Road, Whanganui

Response to your letter dated (29 October 2018)

1. Refer to attached revised drawing sheet 1, site plan.
2. Refer to attached revised drawing sheet 1, site plan.
3. Refer to attached revised drawing sheet 2, floor plan.

Zhiyong Guan

Zhiyong Guan

Devon Homes

29th Oct 2018

RECEIVED 30/10/2018



**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**




R. W. Muir
Registrar-General
of Land

Search Copy

Identifier 852403
Land Registration District Wellington
Date Issued 20 August 2018

Prior References

845834

Estate Fee Simple
Area 448 square metres more or less
Legal Description Lot 30 Deposited Plan 500432

Proprietors

Guy Robert James Lennox and Gillian Maree Lennox

Interests

Subject to Part IVA Conservation Act 1987

Subject to Section 11 Crown Minerals Act 1991 excluding coal and other minerals which remain in cancelled titles WN185/268, WN432/154-155 and WN958/74

10635291.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 2.12.2016 at 4:34 pm

Land Covenant in Easement Instrument 10635291.5 - 2.12.2016 at 4:34 pm



WHANGANUI
DISTRICT COUNCIL
Te Kaitihera a Rohe o Whanganui

REUTERS DEVELOPMENT LIMITED, 25 SPRINGVALE ROAD, WHANGANUI:
LT 500432

CERTIFICATE PURSUANT TO SECTION 221 OF THE
RESOURCE MANAGEMENT ACT 1991

The Whanganui District Council has granted a Resource Consent under Section 104A of the Resource Management Act 1991 to Reuters Developments Limited being a subdivision of Lots 1 & 2 DP 474904, 25 Springvale Road, Whanganui.

The subdivision is subject to the following conditions:

1. A Consent Notice shall be registered against the Certificates of Title for all new lots created with the exclusion of Lot 35 & 36:

'Prior to construction of a building on the lot the developer shall appoint a chartered professional engineering, experienced in storm water, geotechnical investigations and foundation design, who will provide building site certification for the lot. This certificate shall specify suitable foundation types for the building.'

This Consent Notice shall be registered as appropriate against the Computer Freehold Registers issued for all new lots created with the exclusion of Lot 35 & 36 of LT 502171 being a subdivision of Lots 1 & 2 DP 474904, 25 Springvale Road in terms of the Land Transfer Act 1952.

Dated at Whanganui this 09th day of November 2016.

Johanna Verhoek
Resource Management Planner

(Acting pursuant to a delegated authority from the
Principal Administrative Officer).



View Instrument Details

Instrument No. 10635291.4
Status Registered
Date & Time Lodged 02 Dec 2016 16:34
Lodged By Robertson, David Andrew
Instrument Type Consent Notice under s221(4)(a) Resource Management Act 1991

Toitu te
Land whenua
Information
New Zealand



Affected Computer Registers	Land District
-----------------------------	---------------

761964	Wellington
761965	Wellington
761966	Wellington
761967	Wellington
761968	Wellington
761969	Wellington
761970	Wellington
761971	Wellington
761972	Wellington
761973	Wellington

Annexure Schedule: Contains 1 Page.

Signature

Signed by David Andrew Robertson as Territorial Authority Representative on 02/12/2016 04:19 PM

*** End of Report ***



3.8.2018

Mr G & Mrs G Lennox
P O Box 165
Waverley

Dear Guy & Gillian,

Re: Authorisation letter

We authorise Zhi Yong Guan, our LBP Designer, Licence number BP133003, to act on our behalf with the Whanganui District Council on Lot 30, 25 Springvale Road, Wanganui.

Signed: Guy & Gillian Lennox

Two handwritten signatures in blue ink are shown over a horizontal line. The first signature is a stylized "guy" and the second is a stylized "gillian".

Reuters Construction Ltd.
Trading as **DEVON Homes**
165A Great North Road, Wanganui 4501, New Zealand
Telephone: 06-345 2393, Facsimile: 06-345 2165, Email: reuters@devonhomes.co.nz
www.devonhomes.co.nz



Proud to be



Infrastructure Bond and Acceptance of Liability Agreement

Streets Infrastructure Bylaw 2009
Form IG-001



**WHANGANUI
DISTRICT COUNCIL**
Te Kaunihira a Rohe o Whanganui

Agreement details

Building Consent



Resource Consent



(Please tick)

I **ZHIYONG GUAN**

(applicant's full name)

DEVON HOMES

Company name (if applicable)

of **165A GREAT NORTH ROAD, OTAMATEA, WHANGANUI**

(address of applicant)

06 3452393

Phone

das@devonhomes.co.nz

Email

give notice that I will be undertaking work at:

25 SPRINGVALE ROAD, WANGANUI

(address of where work is to be carried out)

and that I agree to abide fully with the following conditions:

1. Prior to any work being undertaken I will request Council to undertake an initial inspection of its infrastructure assets located in the road corridor to identify any pre-existing damage;
2. At the completion of the scheduled work I will request Council to undertake a final inspection of its infrastructure assets to determine whether any damage has occurred since the initial inspection;
3. To take responsibility for the building related care of infrastructure assets for the duration of the above building and/or resource consents;
4. To pay a non-refundable inspection and administration fee of **\$200.00**;
5. To pay a refundable Infrastructure Bond of **\$1,500.00**;
6. That the refundable Infrastructure Bond can be used by Council to offset the cost of damaged assets relating to other building or resource consents that I am also responsible for;
7. To pay the full cost of making good any damage caused to Council's infrastructure assets to an appropriate standard as determined by Council;
8. The refund of the Infrastructure Bond is subject to the making good of any damage to Council's infrastructure assets (as determined by Council) within a period of 4 (four) weeks from the date of Council's written notification to above address.

Note: Council should be contacted at the completion of the building work so that it may undertake an inspection of its infrastructure assets to confirm that no damage has occurred. (Please telephone 06 349 0001 to book an inspection)

ZHIYONG GUAN

Signature

Zhiyong Guan

Name of person signing: (please print clearly)

24 / 09 / 18

Dated

OFFICE USE ONLY

Preferred Applicant

Yes



No



(Please tick)

Explanation

1. The Whanganui District Council has significant infrastructure assets in its road corridor. Damage to those assets from building works can come at a cost to the ratepayers of the Whanganui District.
2. The purpose of the Infrastructure Bond is to encourage the applicant to ensure that the infrastructure assets are not damaged. Further, in the event of damage, the infrastructure bond will ensure that the cost of repairing rests with the party responsible for its damage.
3. Damage includes but is not limited to the following: damage to footpaths, kerbing and channel, road surface, street furniture, tobies, trees, berms and other Council assets in the road corridor.
4. The Infrastructure Bond applies to all building consents (and/or resource consents) for demolition, removal, relocation and construction of buildings, and structures (including commercial) in the urban zone.

Review of Bond Amount

5. Pursuant to a Resolution of the Whanganui District Council (17 June 2008) a builder who is a preferred applicant may apply for an exemption from paying an infrastructure bond on each consent. The resolution states: "*That the Chief Executive has delegated authority to waive the refundable bond amount for builders with multiple consents*".
6. An application for waiver of the Bond amount can be made on the appropriate form obtainable from the Council building at 101 Guyton Street, Whanganui.
7. To find out if you are eligible for a waiver of the bond amount, please talk to a member of the Customer Services team in the first instance.

OFFICE USE ONLY

Date received

IBR No:

Receipt No:

Received by:

(print name)

COMMENTS

Vehicle Crossing Permit

Whanganui District Council — Streets
Infrastructure Bylaw 2008



WHANGANUI
DISTRICT COUNCIL
Te Kaunihera a Rohe o Whanganui

Permit No.

1. Property owner details

1a. Name 1b. Contact Person/agent
(If owner is a corporation,
partnership or trust) 1c. Postal address
1d. Contact numbers

Phone

Mobile Fax 1e. Email

2. Property details

2a. Site Address
(Specify unit/level number,
location of building within
site/block number, building
name and street name)
2b. Currently lawfully
established use 2c. Legal description 2d. Rapid number (rural)

3. Description of project

3a. Detailed description
of the development/
project (tick one) ☒ Urban ☐ Rural
☐ Commercial ☐ Other (please specify)3b. Width of proposed
vehicle crossing 3c. Estimated value of
the work \$ including GST.

4. Council approved contractor undertaking the work

4a. (Refer to list of
approved contractors
provided in the
guide)

OFFICE USE ONLY

Date received Application # Document # Other Property ID Legal ID Receipt # Amount Paid \$

5. Diagram for vehicle crossing location

- 5a. Provide a site plan to show the location of the proposed vehicle crossing, and, if applicable, location of water toby, trees, streetlights or poles, stormwater sump and other services/street furniture, such as bus stops, signs etc.

6. Applicant's declaration

PRIVACY STATEMENT

Information on this form is required to be provided under the acts, regulations and bylaw administered by the Council and is required to process your application. This information has to be made available to members of the public, including business organisations. In appropriate circumstances, it may also be made available to other units of the council, council's approved contractors and other government agencies.

Under the Privacy Act 1993, you have the right to access the personal information held about you by the council and you can also request that the council correct any personal information it holds about you.

I understand that as the applicant, all correspondence related to this application will be made to me.

I confirm that I have read and understood the Privacy Statement and that the information provided on the application form is true and correct.

Zhiyong Guan

Signature

Zhiyong Guan

Name of person signing: (please print clearly)

24/09/2018

Dated

OFFICE USE ONLY

Reference no:

Owner ID:

Parcel Prop ID

Tax Invoice GST No: 51 700 449 Credit No: 778030.921 VX

Date Received:

Fee Payable (incl. GST)

\$

Received by:

Receipt no:

Loaded by:

Date Paid:

Date Loaded:

Roading and Assets

Approved by WDC:

Notes:

Logged:

First inspection date:

Final inspection date:

DAVID MULHOLLAND
ENGINEER

Scala Penetrometer Test Sheet

Our Ref: 17019.36

Project Name: Soils Test

Date Tested: 14 September 2018

Project Location: Lot 30 Springvale Road

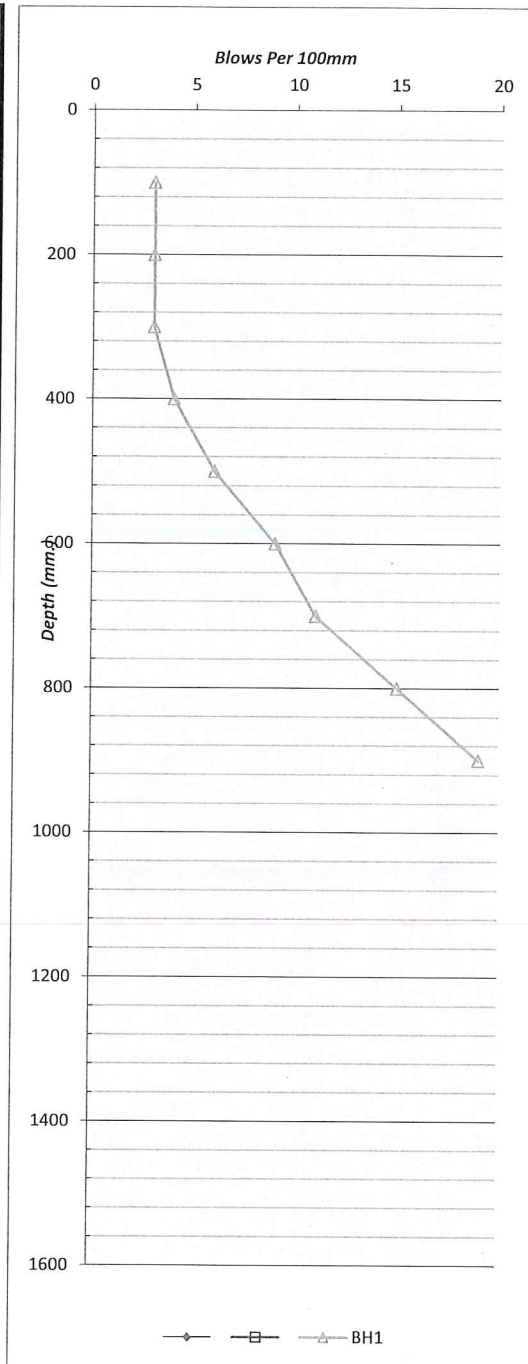
Time Tested: 2pm

Tested By: Andrew

Report Date: 17 September 2018

Tests: NZS4402:1986 Test 6.5.2 Hand Method Using a Scala Penetrometer

Test Hole (Blows / 100mm : Bearing Capacity (Kpa))						
Depth (mm)					BH1	
	Blows per 100mm	Safe Bearing Capacity (Kpa)	Blows per 100mm	Safe Bearing Capacity (Kpa)	Blows per 100mm	Safe Bearing Capacity (Kpa)
100					3	100
200					3	100
300					3	100
400					4	125
500					6	175
600					9	230
700					11	260
800					15	320
900					19	350
1000						
1100						
1200						
1300						
1400						
1500						



Test taken in centre of site

Ground quite adequate to support slab on ground with single storey house

Memorandum from licensed building practitioner: Certificate of design work

Section 45 and section 30C, Building Act 2004

Please fill in the form as fully and correctly as possible.

If there is insufficient room on the form for requested details, please continue on another sheet and attach the additional sheet(s) to this form.

THE BUILDING

Street address: 25 Springvale Road

Suburb: Springvale

Town/City: Whanganui

Postcode: 4501

THE OWNER(S)

Name(s): Mr. Guy and Mrs. Gillian Lennox

Mailing address:

Suburb: Waveley

PO Box/Private Bag: P O Box 165

Town/City: Taranaki

Postcode: 4544

Phone number: 027 343 5598

Email address: glennox@xtra.co.nz

BASIS FOR PROVIDING THIS MEMORANDUM

I am providing this memorandum in my role as the: Please tick the option that applies ☒

- ☒ **sole** designer of all of the RBW design outlined in this memorandum – I carried out all of the RBW design work myself – no other person will be providing any additional memoranda for the project
- ☐ **lead** designer who carried out some of the RBW design myself but also supervised other designers – this memorandum covers their RBW design work as well as mine, and **no other** person will be providing any additional memoranda for the project
- ☐ **lead** designer for all but specific elements of RBW – this memorandum only covers the RBW design work that I carried out or supervised and the **other** designers will provide their own memorandum relating to their specific RBW design
- ☐ **specialist** designer who carried out specific elements of RBW design work as outlined in this memorandum – other designers will be providing a memorandum covering the remaining RBW design work

IDENTIFICATION OF DESIGN WORK THAT IS RESTRICTED BUILDING WORK (RBW)

I ZHIYONG GUAN carried out /~~supervised~~ the following design work that is restricted building work

PRIMARY STRUCTURE: B1

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick ☒ if included. Cross ☐ if excluded	If appropriate, provide details of the RBW	Tick ☒ whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
All RBW design work relating to B1 ☒	N/A	☐ Carried out ☐ Supervised	N/A
Foundations and subfloor framing ☒	CONCRETE FLOOR SLAB (NZS 3604 - 2011)	☒ Carried out ☐ Supervised	SHT 5 & 6 SECTION FOUNDATION PLAN

Design work that is RBW		Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick ☒ if included. Cross ☒ if excluded		If appropriate, provide details of the RBW	Tick ☒ whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
Walls	☒	TIMBER FRAMED WALL (NZS 3604 - 2011)	☒ Carried out ☐ Supervised	SHT 5 SECTION
Roof	☒	GANGNAIL ROOF TRUSSES	☒ Carried out ☐ Supervised	SHT 5 SECTION
Columns and beams	☒	TIMBER POSTS BEAMS & LINTELS	☒ Carried out ☐ Supervised	SHT 3 & 4 ELEVATIONS SET-OUT PLAN
Bracing	☒	ELEPHANT BOARD WALL BRACING (NZS 3604 - 2011)	☒ Carried out ☐ Supervised	SHT 8 BRACING PLAN SCHEDULE
Other	☒	N/A	☐ Carried out ☐ Supervised	N/A

Design work that is RBW		Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick (✓) if included. Cross (✗) if excluded		If appropriate, provide details of the RBW	Tick (✓) whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2				
All RBW design work relating to E2	✗	N/A	☐ Carried out ☐ Supervised	N/A
Damp proofing	✓	Damp proof course & membrane	☒ Carried out ☐ Supervised	SHT 5 & 13 SECTION TYP DETAILS
Roof cladding or roof cladding system	✓	Colour tile roofing on self supporting build paper	☒ Carried out ☐ Supervised	SHT 3, 5 & 10 ELEVATIONS SECTION ROOF PLAN
Ventilation system (for example, subfloor or cavity)	✓	Masonry brick veneer on 50mm cavity, fibre cement weatherboards on cavity battens	☒ Carried out ☐ Supervised	SHT 3 ELEVATIONS
Wall cladding or wall cladding system	✓	Masonry brick veneer and fibre cement weatherboard wall cladding	☒ Carried out ☐ Supervised	SHT 3 EVELATIONS
Waterproofing	✓	Ardex water-proofing membrane	☒ Carried out ☐ Supervised	SHT 13 TYP DETAILS
Other	✗	N/A	☐ Carried out ☐ Supervised	N/A

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick ☒ if included. Cross ☐ if excluded	If appropriate, provide details of the RBW	Tick ☒ whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
FIRE SAFETY SYSTEMS: C1 - C6			
Emergency warning systems Evacuation and fire service operation systems ☒ Suppression or control systems Other	Smoke alarm	☒ Carried out ☐ Supervised	SHT 7 ELECTRICAL LAYOUT
Note: The design of fire safety systems is only restricted building work when it involves small-to-medium apartment buildings as defined by the Building (Definition of Restricted Building Work) Order 2011.			

WAIVERS AND MODIFICATIONS	
Waivers or modifications of the Building Code are required. ☐ Yes ☒ No	
If Yes, provide details of the waivers or modifications below:	
Clause	Waiver/modification required
List relevant clause numbers of building code	Specify nature of waiver or modification of building code required

ISSUED BY

Name and contact details of the licensed building practitioner who is licensed to carry out or supervise design work that is restricted building work.

Name: **ZHIYONG GUAN**

LBP or Registration number: **BP133003**

The practitioner is a: ☒ Design LBP ☐ Registered architect ☐ Chartered professional engineer

Design Entity or Company (optional): **DEVON HOMES**

Mailing address (if different from below):

Street address/Registered office: **165A GREAT NORTH ROAD**

Suburb: **OTAMATEA**

Town/City: **WANGANUI**

PO Box/Private Bag:

Postcode: **4501**

Phone number: **06 3452393**

Mobile: **021 02587677**

After hours:

Fax:

Email address: **das@devonhomes.co.nz**

Website:

DECLARATION

I **ZHIYONG GUAN** LBP, state that I have applied the skill and care reasonably required of a competent design professional in carrying out or supervising the Restricted Building Work (RBW) described in this form, and that based on this, I also state that the RBW:

- Complies with the building code, or
- ~~Complies with the building code subject to any waiver or modification of the building code recorded on this form~~

Signature:

Zhiyong Guan

Date:

24th September 2018



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10. ROOF PLAN
11. TYPICAL DETAILS
12. TYPICAL DETAILS
13. TYPICAL DETAILS
14. TYPICAL DETAILS

PROPOSED RESIDENCE FOR MR. GUY AND MRS. GILLIAN LENNOX LOT 30, 25 SPRINGVALE ROAD, WANGANUI, NEW ZEALAND

BUILDERS:



DEVON HOMES
REUTERS CONSTRUCTION LTD.

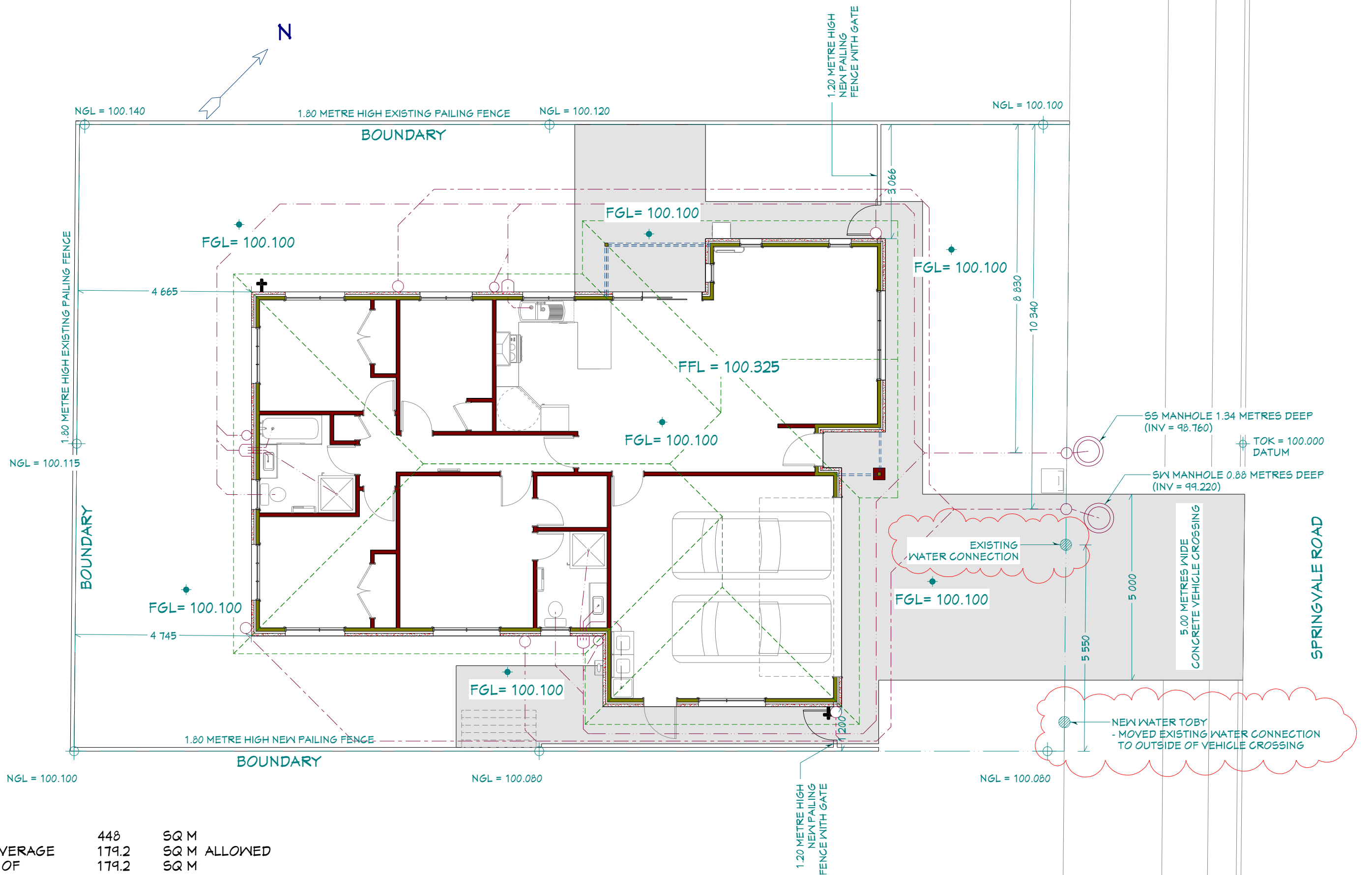
165A, GREAT NORTH ROAD,
WANGANUI,
NEW ZEALAND.

PHONE: +64-6-3452393

FAX: +64-6-3452165

EMAIL: reuters@devonhomes.co.nz

HTTP://www.devonhomes.co.nz



SITE AREA: 448 SQ M
 40% SITE COVERAGE 179.2 SQ M ALLOWED
 TOTAL AREA OF 179.2 SQ M
 PROPOSED DWELLING

PROPOSED RESIDENCE FOR
**MR. GUY & MRS. GILLIAN
 LENNOX**
 LOT 30, 25 SPRINGVALE ROAD, WANGANUI

SITE PLAN

Scale:
 1:100
 Date:
 13 JULY 2018
 Job No.

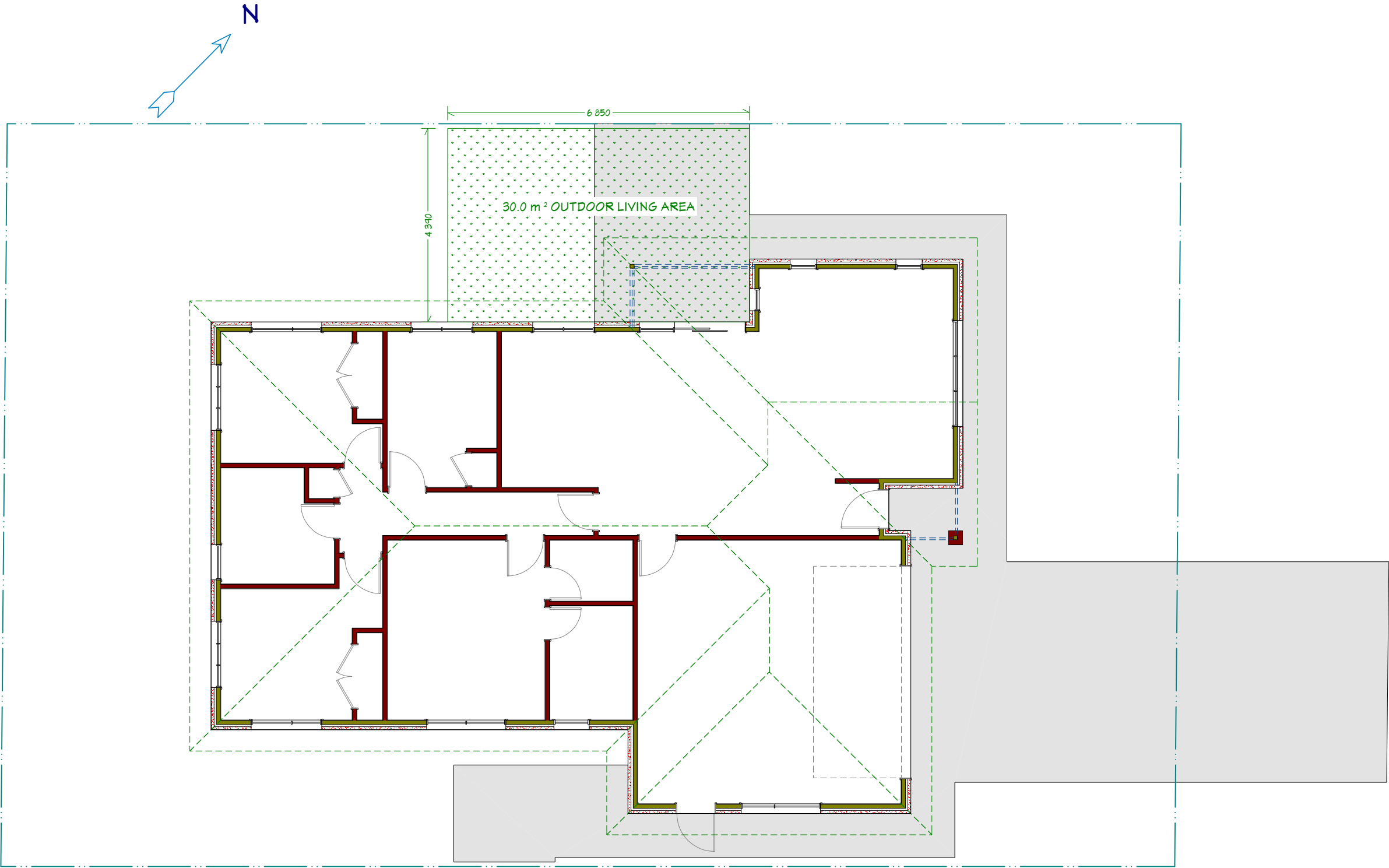
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1
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No	Dates	Amendments
a	28 AUG 2018	
b	26 SEPT 2018	
c		
d		
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f		

Notes:



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PROPOSED RESIDENCE FOR
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LENNOX**
LOT 30, 25 SPRINGVALE ROAD, WANGANUI

**OUTDOOR
LIVING AREA
PLAN**

Scale:
1:100
Date:
13 JULY 2018
Job No.

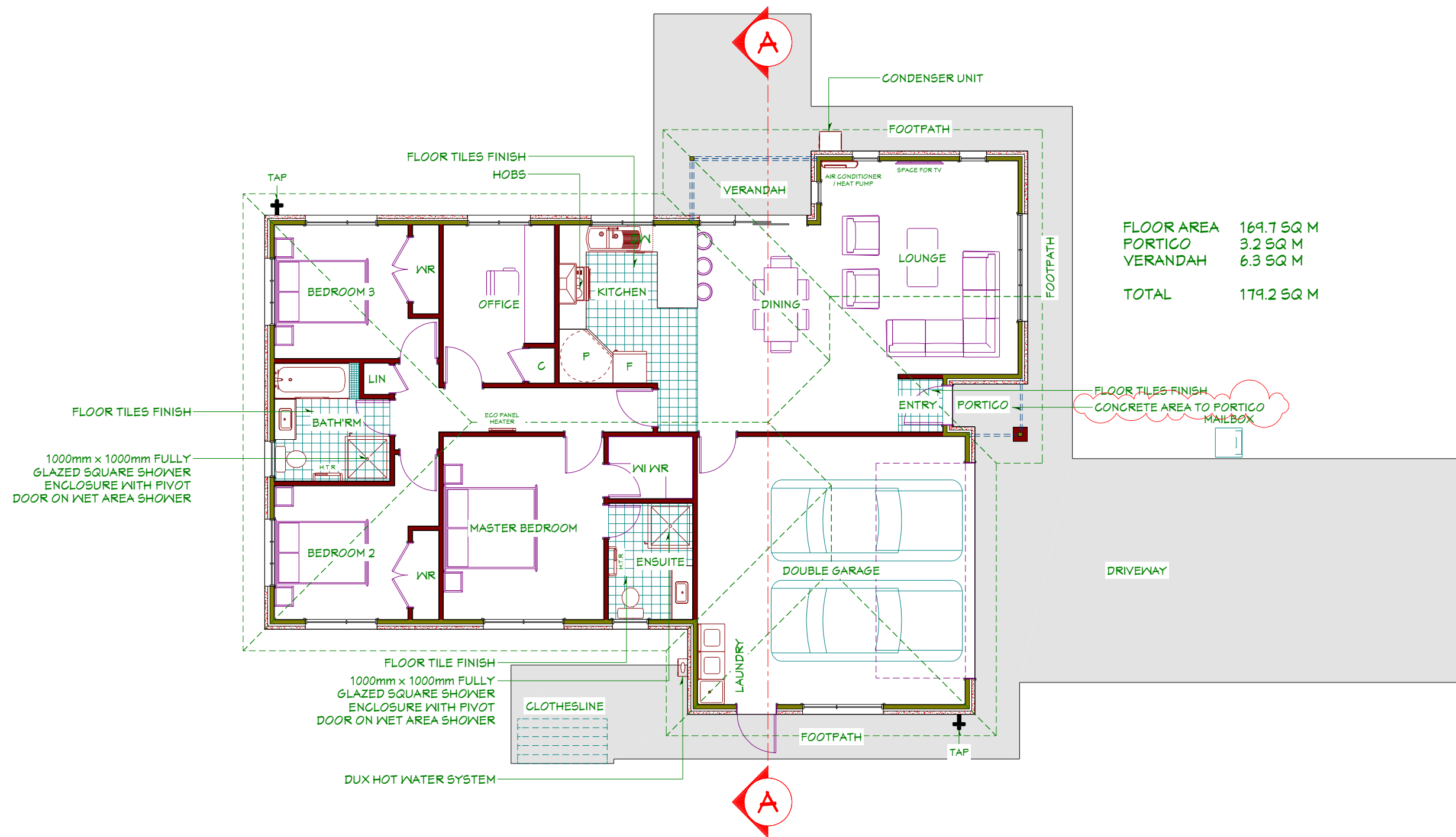
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1-A
Revision

No	Dates	Amendments
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LOT 30, 25 SPRINGVALE ROAD, WANGANUI

FLOOR PLAN

Scale:
1:100
Date:
13 JULY 2018
Job No.

Sheet No.
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Revision

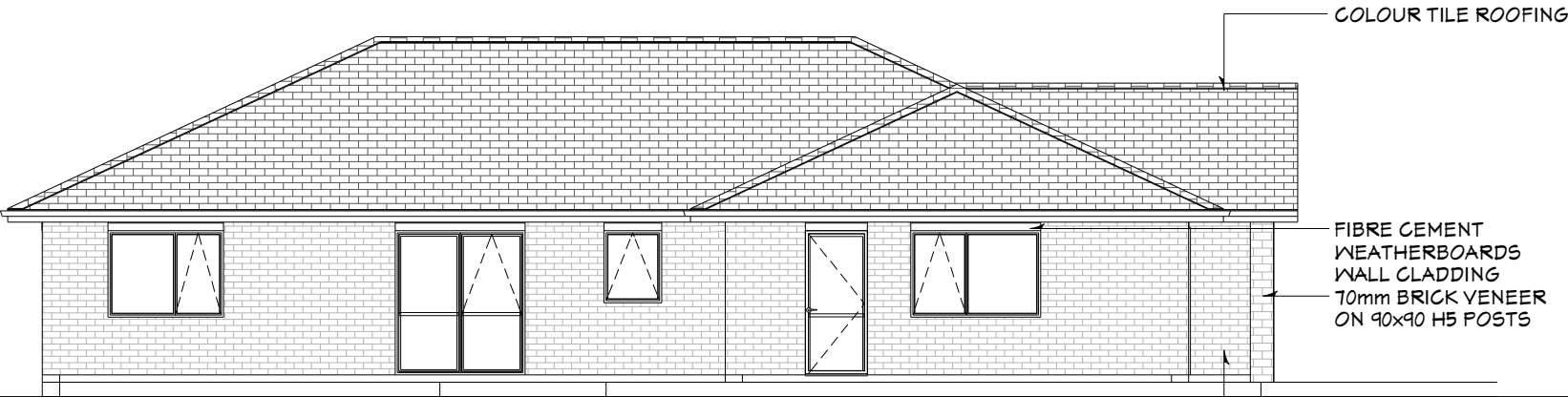
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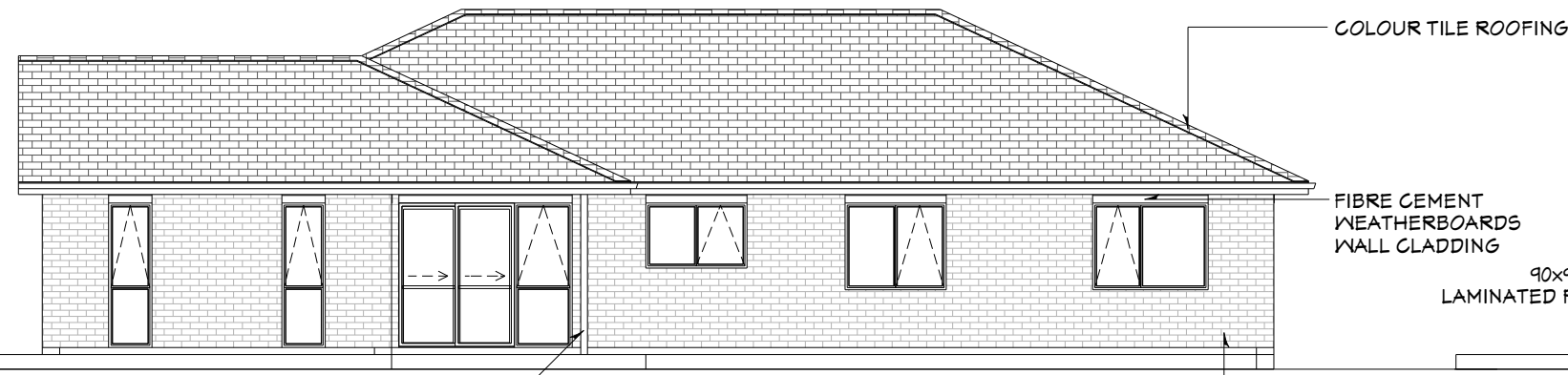
RISK MATRIX FOR ALL ELEVATIONS		
WIND ZONE	HIGH	1
NUMBER OF STOREYS	LOW	0
WALL ROOF INTERSECTION	LOW	0
EAVES WIDTH	MEDIUM	0
ENVELOPE COMPLEXITY	MEDIUM	3
DECK DESIGN	LOW	0
TOTAL SCORE		4



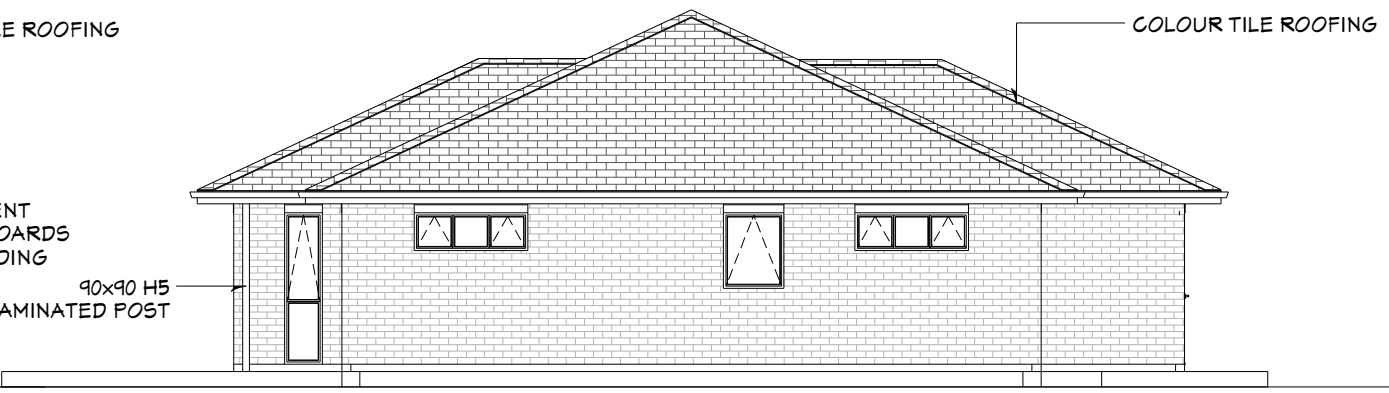
SOUTH-EAST ELEVATION



NORTH-EAST ELEVATION



NORTH-WEST ELEVATION



SOUTH-WEST ELEVATION

ALL EXTERIOR DOORS & WINDOWS
EXCEPT FOR GARAGE TO BE DOUBLE GLAZING
TO COMPLY WITH NZS 4223.3:2016

PROPOSED RESIDENCE FOR
**MR. GUY & MRS. GILLIAN
LENNOX**
LOT 30, 25 SPRINGVALE ROAD, WANGANUI

ELEVATIONS

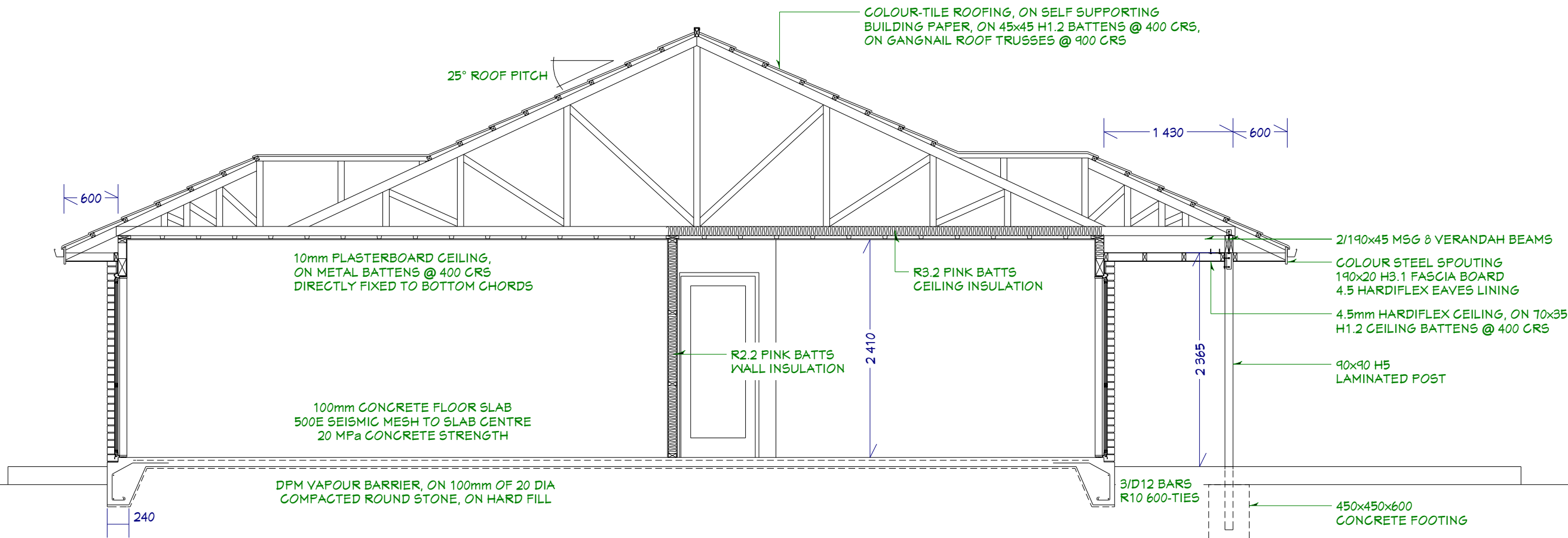
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Job No.	

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TIMBER GRADES: ALL TIMBER TO BE MSG8, UNLESS SPECIFIED
2.40 METRES STUDS HEIGHT: 90x45 H1.2 FRAMING STUDS @ 600 CRS

PROPOSED RESIDENCE FOR
**MR. GUY & MRS. GILLIAN
LENNOX**
LOT 30, 25 SPRINGVALE ROAD, WANGANUI

SECTION

Scale:

1:50

Sheet No.

5

Date:
13 JULY 2018

Revision

Job No.

No

Dates

Amendments

a

28 AUG 2018

b

26 SEPT 2018

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d

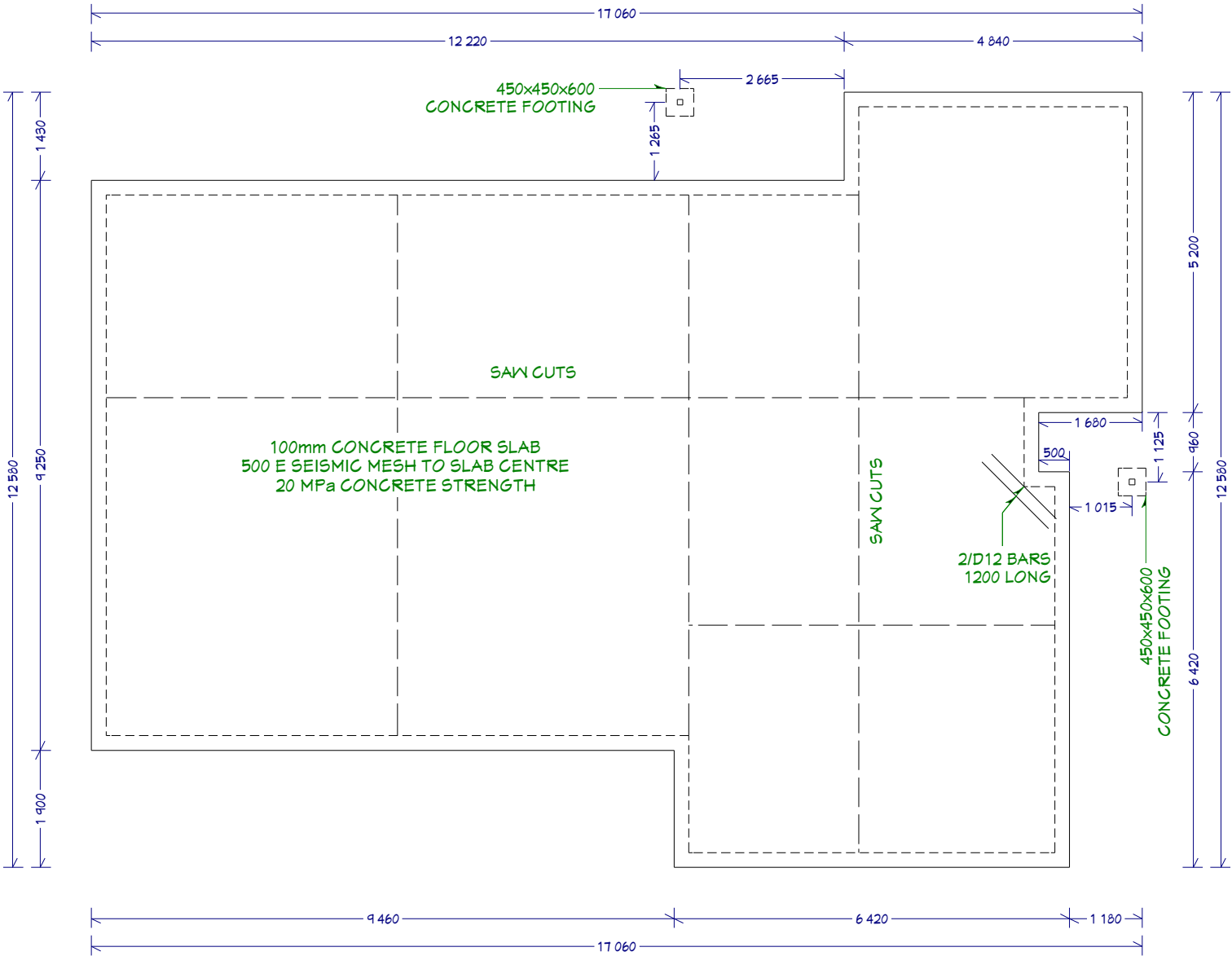
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f

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PROPOSED RESIDENCE FOR
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LOT 30, 25 SPRINGVALE ROAD, WANGANUI

**FOUNDATION
PLAN**

Scale:
1:100
Date:
13 JULY 2018
Job No.

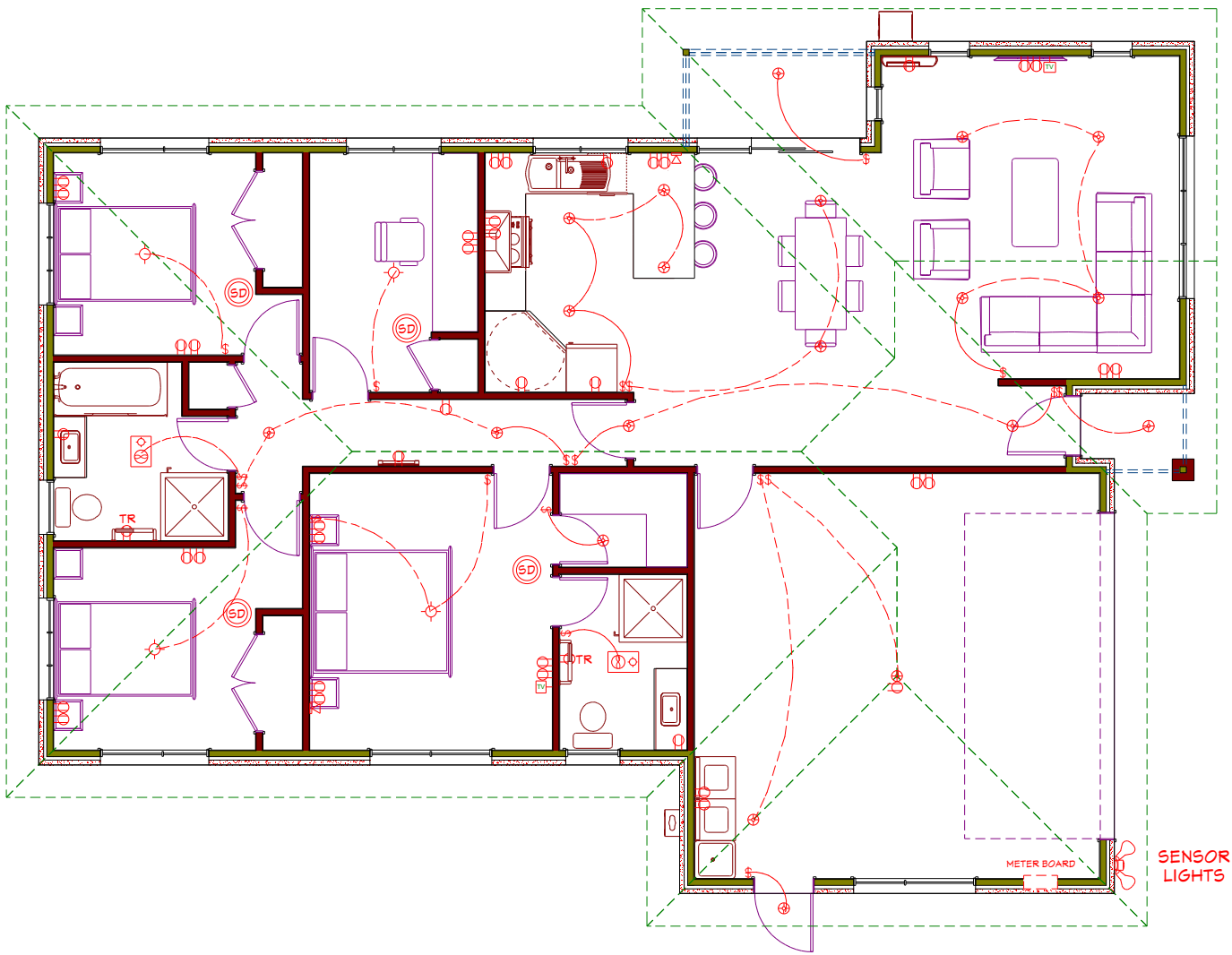
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ELECTRICAL LEGEND

	LED MUSHROOM LIGHT	
	LED DOWN LIGHT	
	TELEPHONE	
	TELEVISION	
	POWERPOINT	
	SMOKE DETECTOR	
	LIGHT SWITCH	
	ELECTRICAL CONNECTION	
	HEAT LIGHT FAN	
	HEATED TOWEL RAIL	

PROPOSED RESIDENCE FOR
**MR. GUY & MRS. GILLIAN
LENNOX**
LOT 30, 25 SPRINGVALE ROAD, WANGANUI

ELECTRICAL
LAYOUT

Scale:
1:100
Date:
13 JULY 2018
Job No.

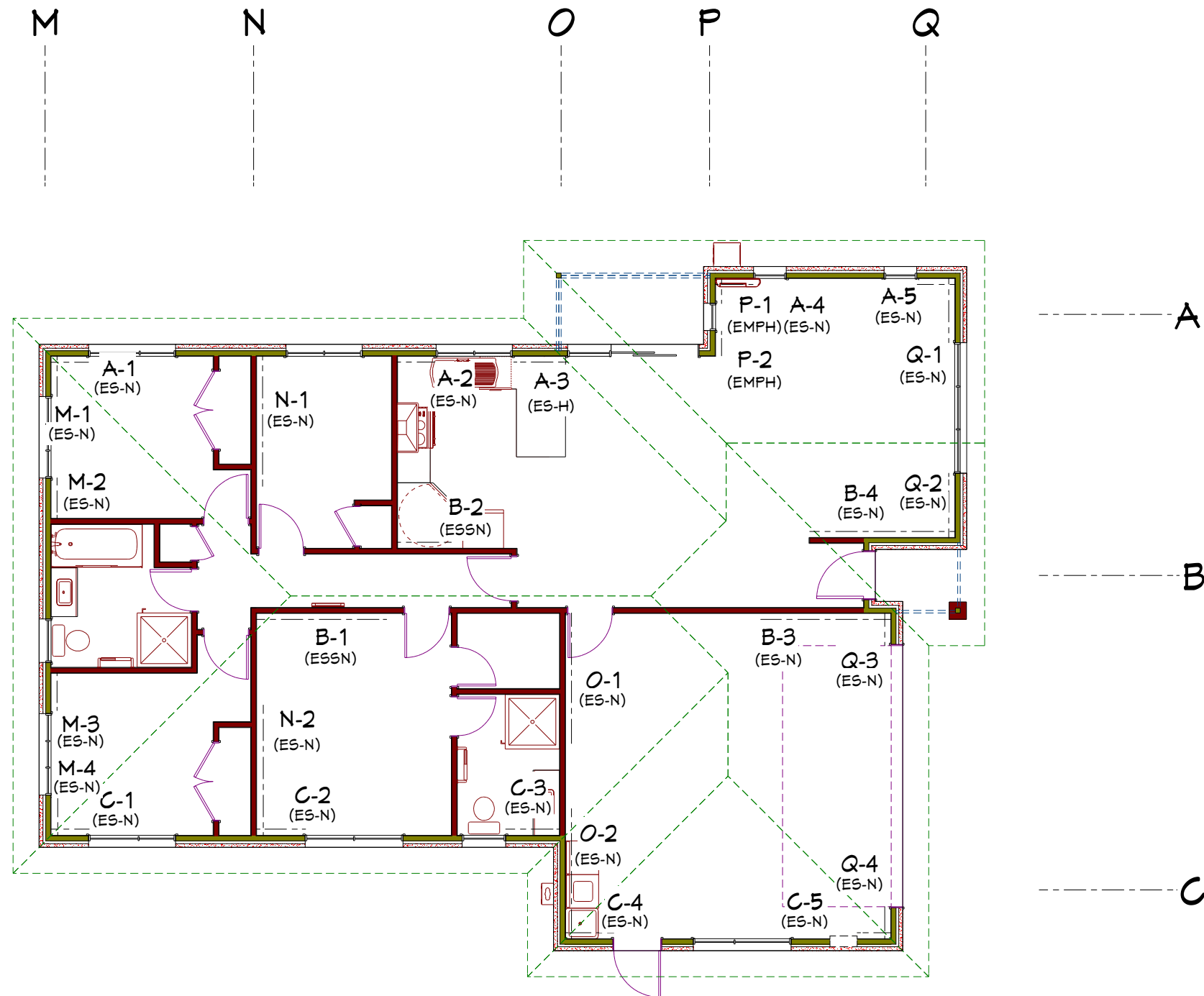
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LOT 30, 25 SPRINGVALE ROAD, WANGANUI

BRACING PLAN

Scale:
1:100
Date:
13 JULY 2018
Job No.

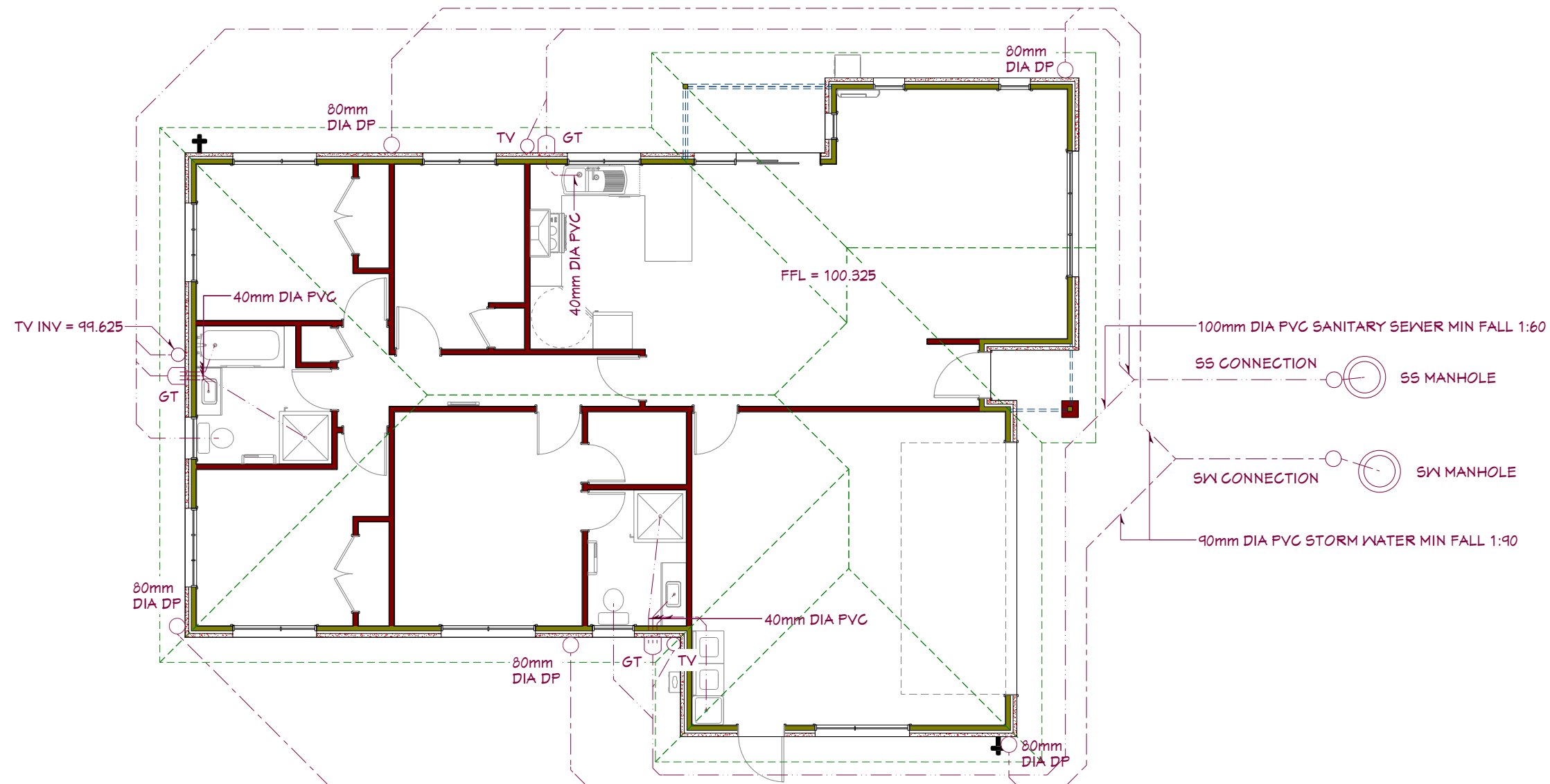
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 LOT 30, 25 SPRINGVALE ROAD, WANGANUI

DRAINAGE PLAN

Scale:
 1:100

Date:
 13 JULY 2018

Job No.

Sheet No.
9

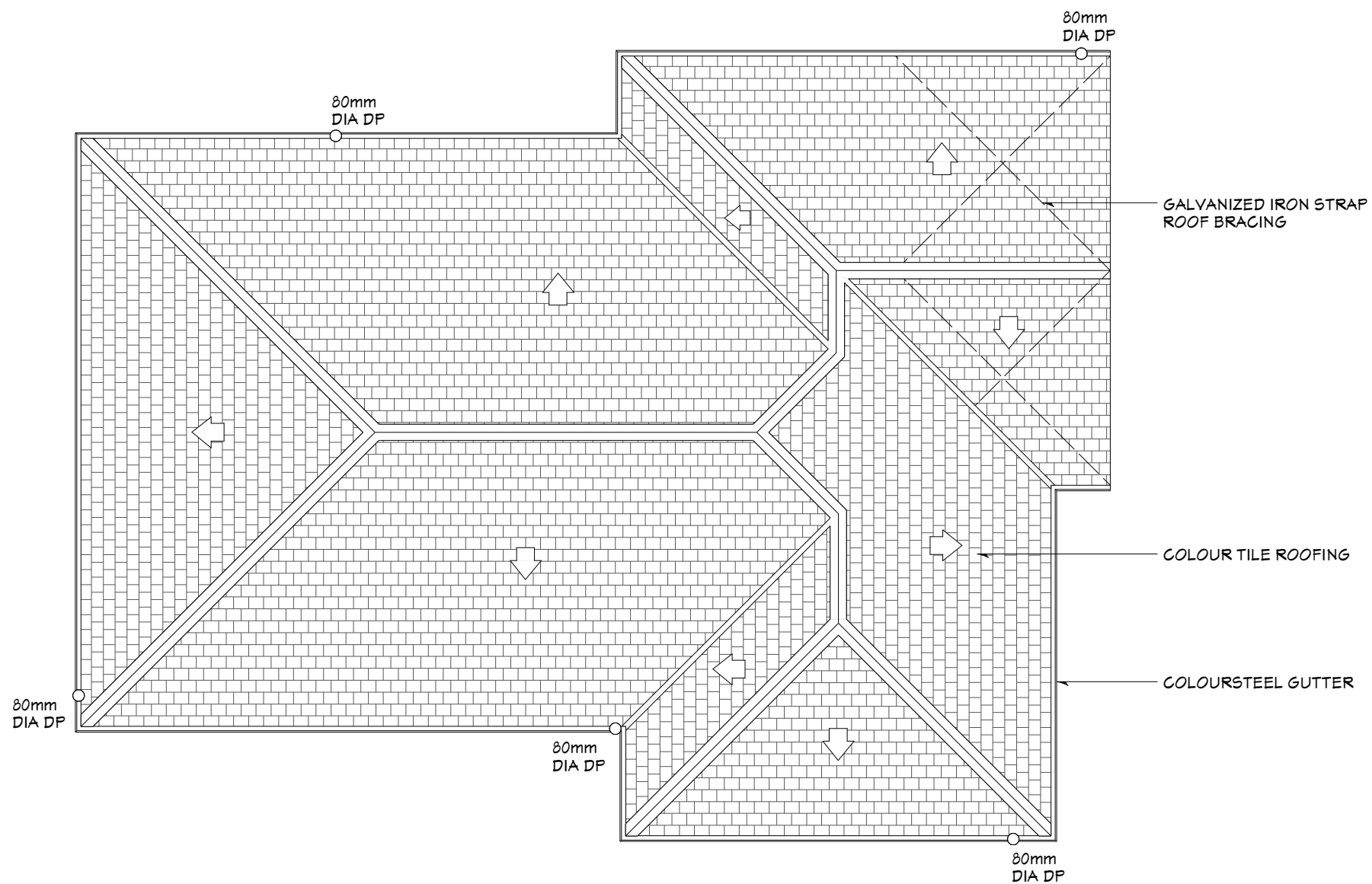
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LENNOX**
LOT 30, 25 SPRINGVALE ROAD, WANGANUI

ROOF PLAN

Scale:
1:100
Date:
13 JULY 2018
Job No.

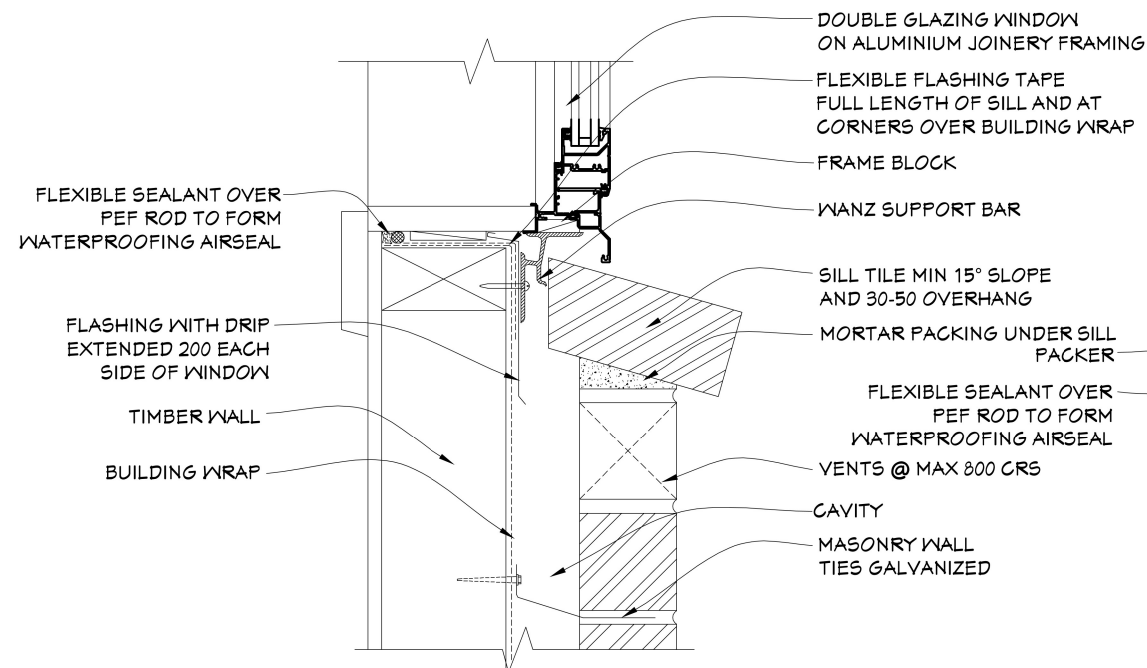
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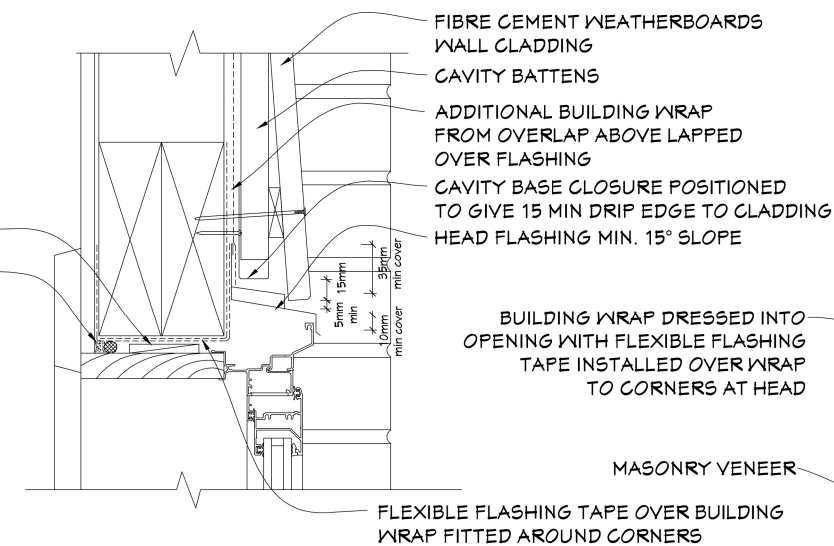
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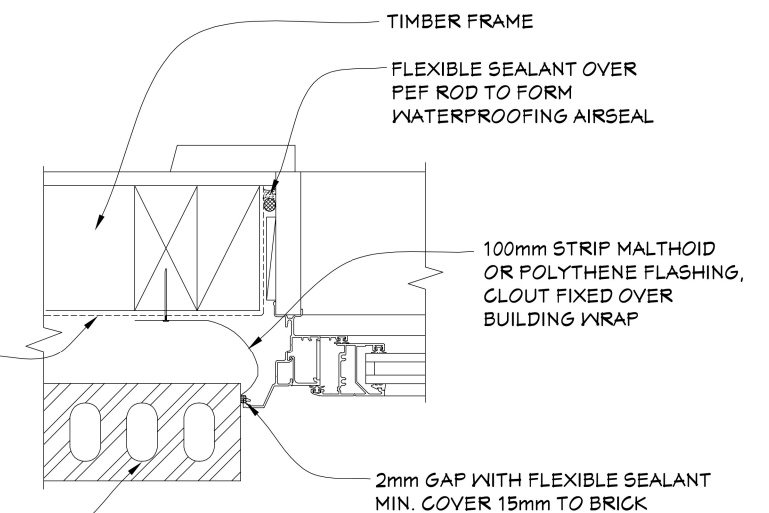
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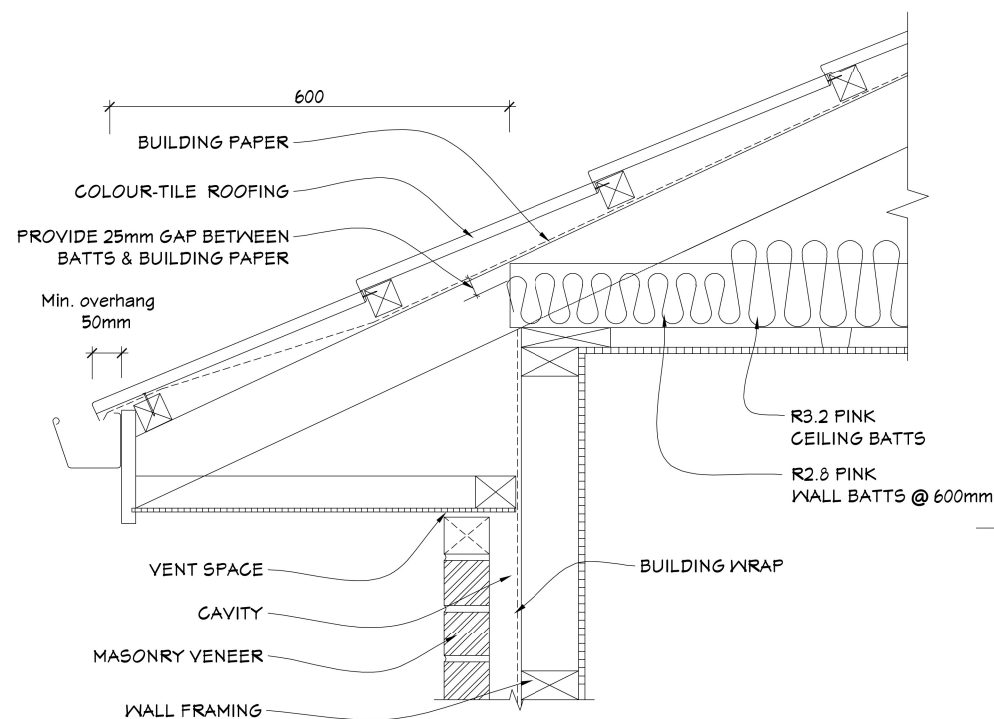
MASONRY VENEER WINDOW SILL DETAIL



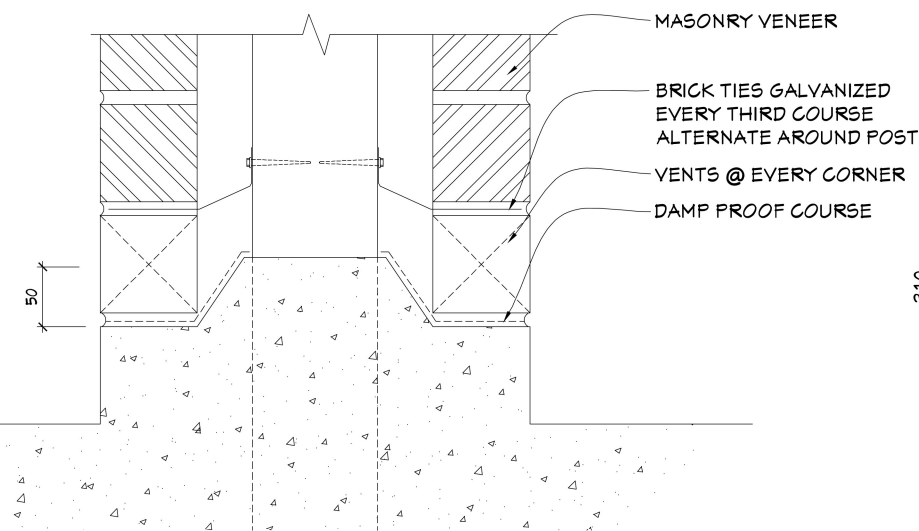
MASONRY VENEER WINDOW HEAD DETAIL



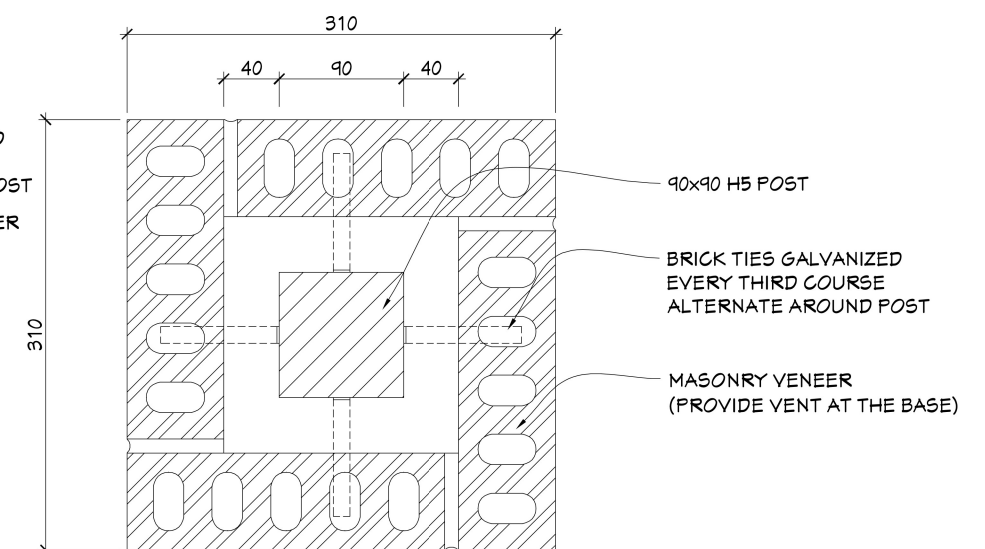
MASONRY VENEER WINDOW JAMB DETAIL



SOFFIT DETAIL @ MASONRY VENEER



SECTION



PLAN

ENTRANCE POST DETAIL

PROPOSED RESIDENCE FOR
**MR. GUY & MRS. GILLIAN
LENNOX**
LOT 30, 25 SPRINGVALE ROAD, WANGANUI

**TYPICAL
DETAILS**

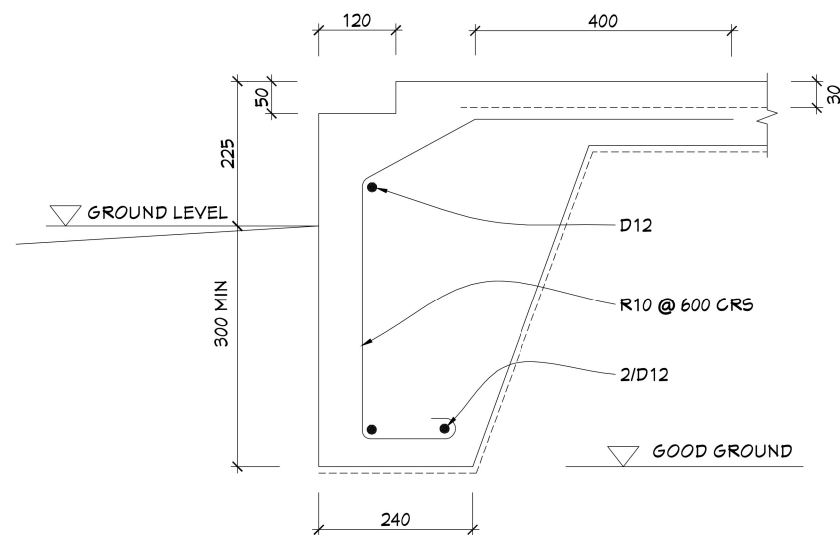
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Date:	Revision
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Job No.	

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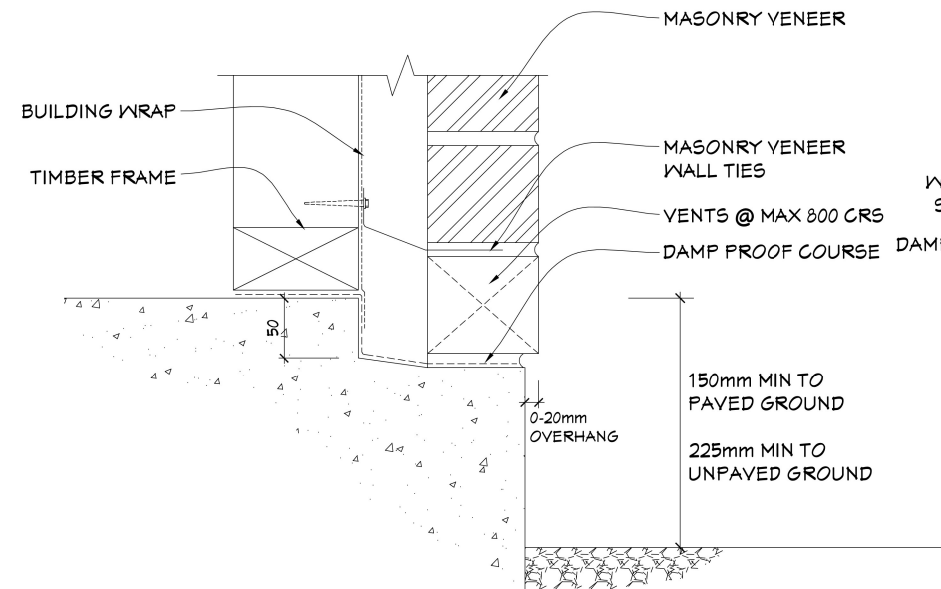
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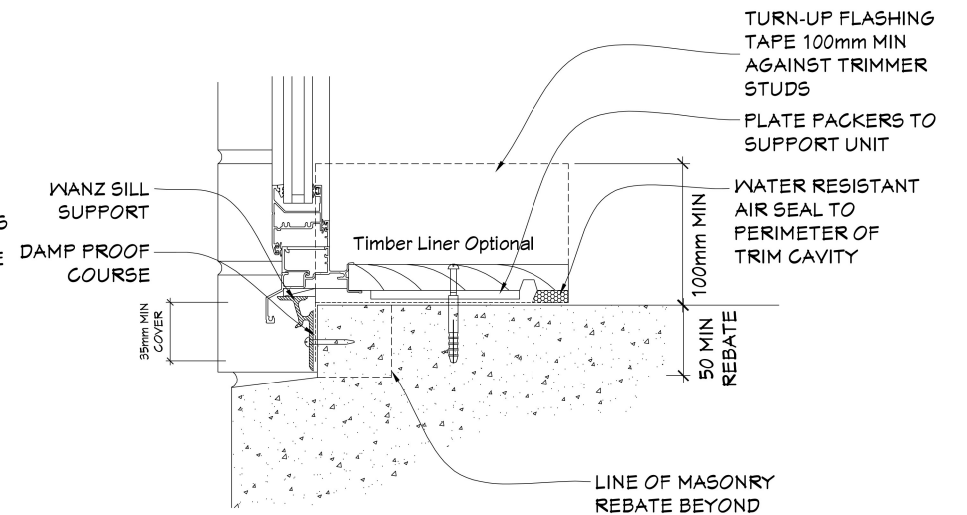
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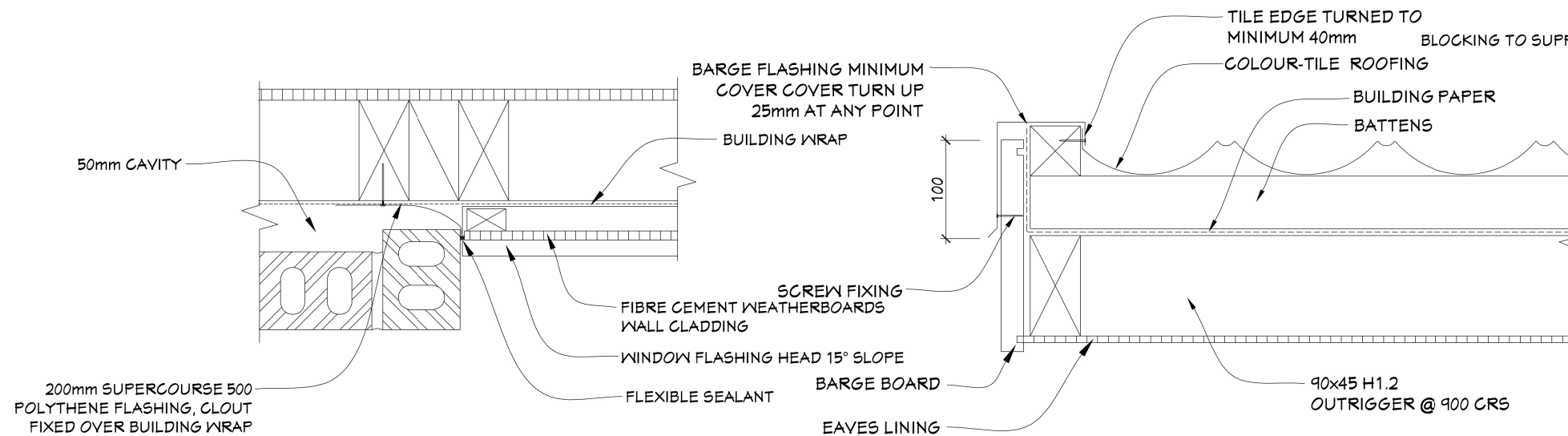
FOUNDATION DETAIL @ MASONRY VENEER



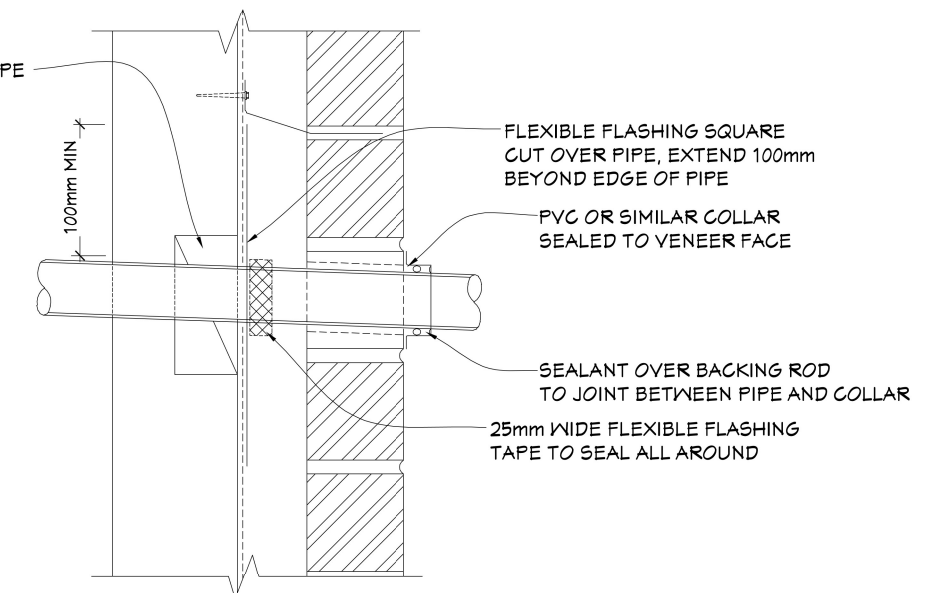
MASONRY VENEER FLOOR REBATE DETAIL



SILL THRESHOLD FLASHING DETAIL



FIBRE CEMENT WEATHERBOARDS TO BRICK VENEER JUNCTION DETAIL



PIPE PENETRATION DETAIL @ BRICK VENEER

PROPOSED RESIDENCE FOR
MR. GUY & MRS. GILLIAN
LENNOX
LOT 30, 25 SPRINGVALE ROAD, WANGANUI

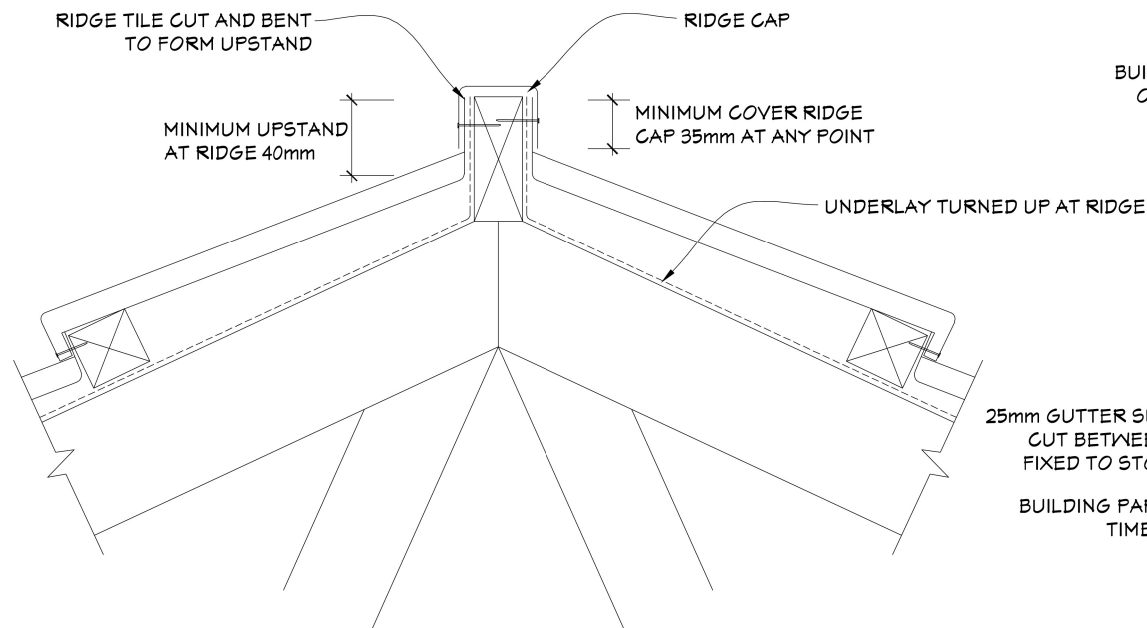
TYPICAL DETAILS

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Date:	Revision	c		
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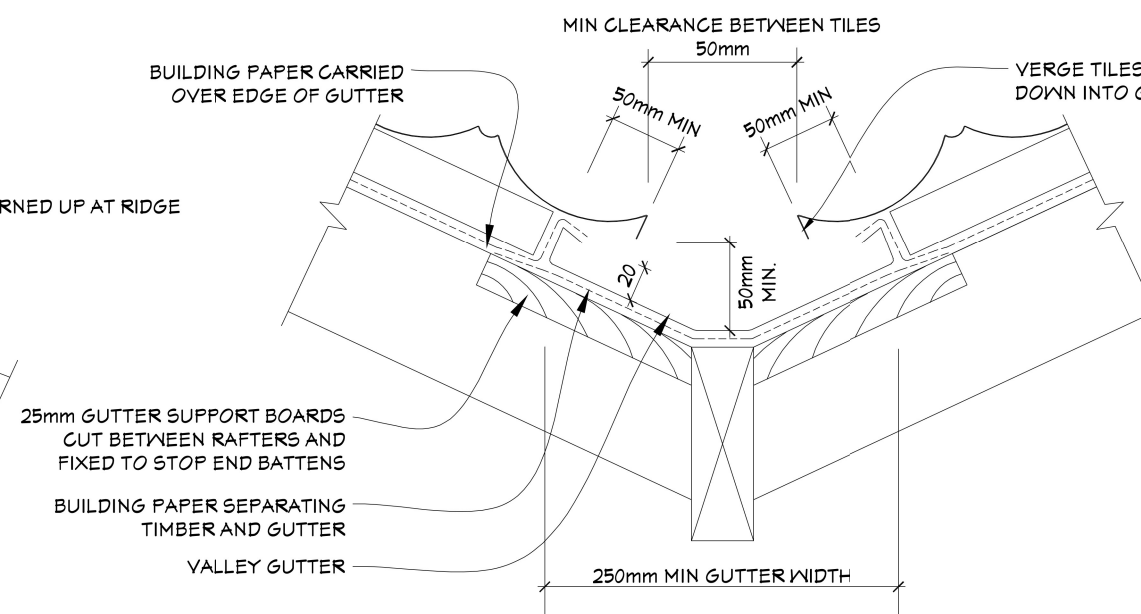
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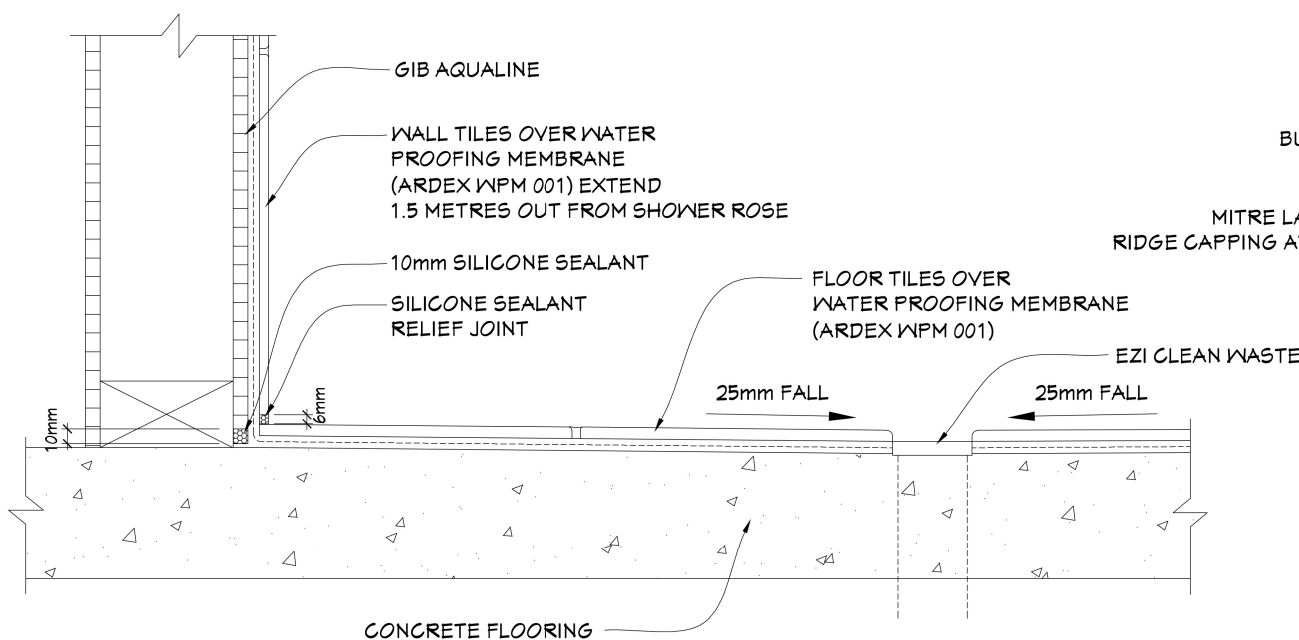
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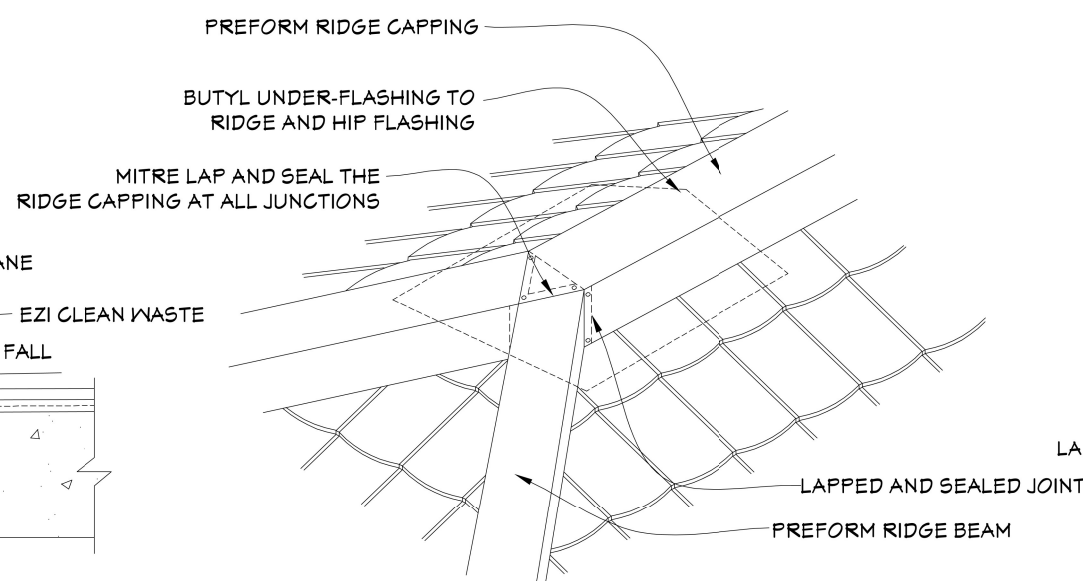
RIDGE / HIP FLASHING DETAIL



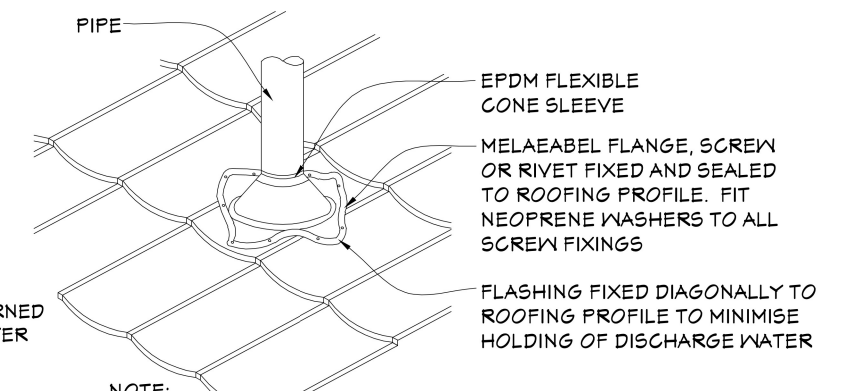
VALLEY GUTTER DETAIL



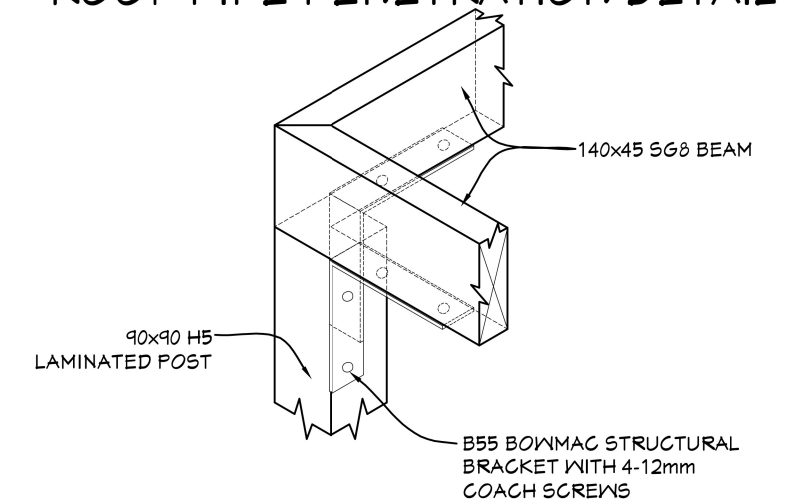
WET AREA SHOWER DETAIL



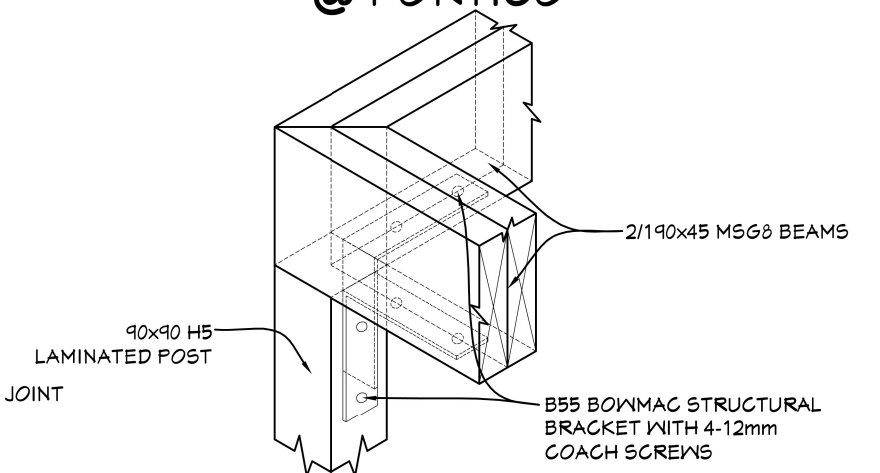
RIDGE TO HIP DETAIL



ROOF PIPE PENETRATION DETAIL



POST & BEAM FIXING DETAIL @ PORTICO



POST & BEAM FIXING DETAIL @ VERANDAH

PROPOSED RESIDENCE FOR
**MR. GUY & MRS. GILLIAN
LENNOX**
LOT 30, 25 SPRINGVALE ROAD, WANGANUI

**TYPICAL
DETAILS**

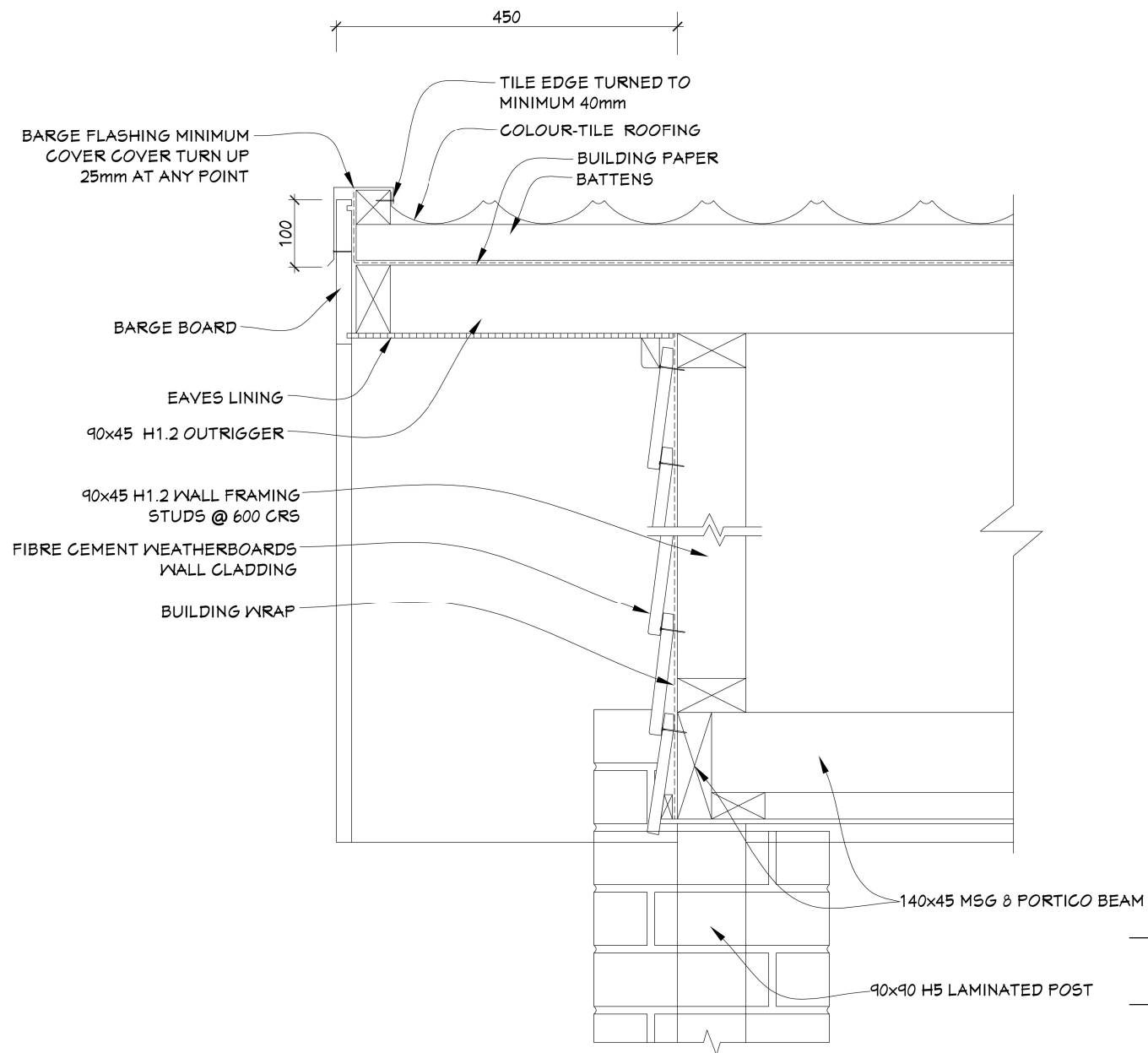
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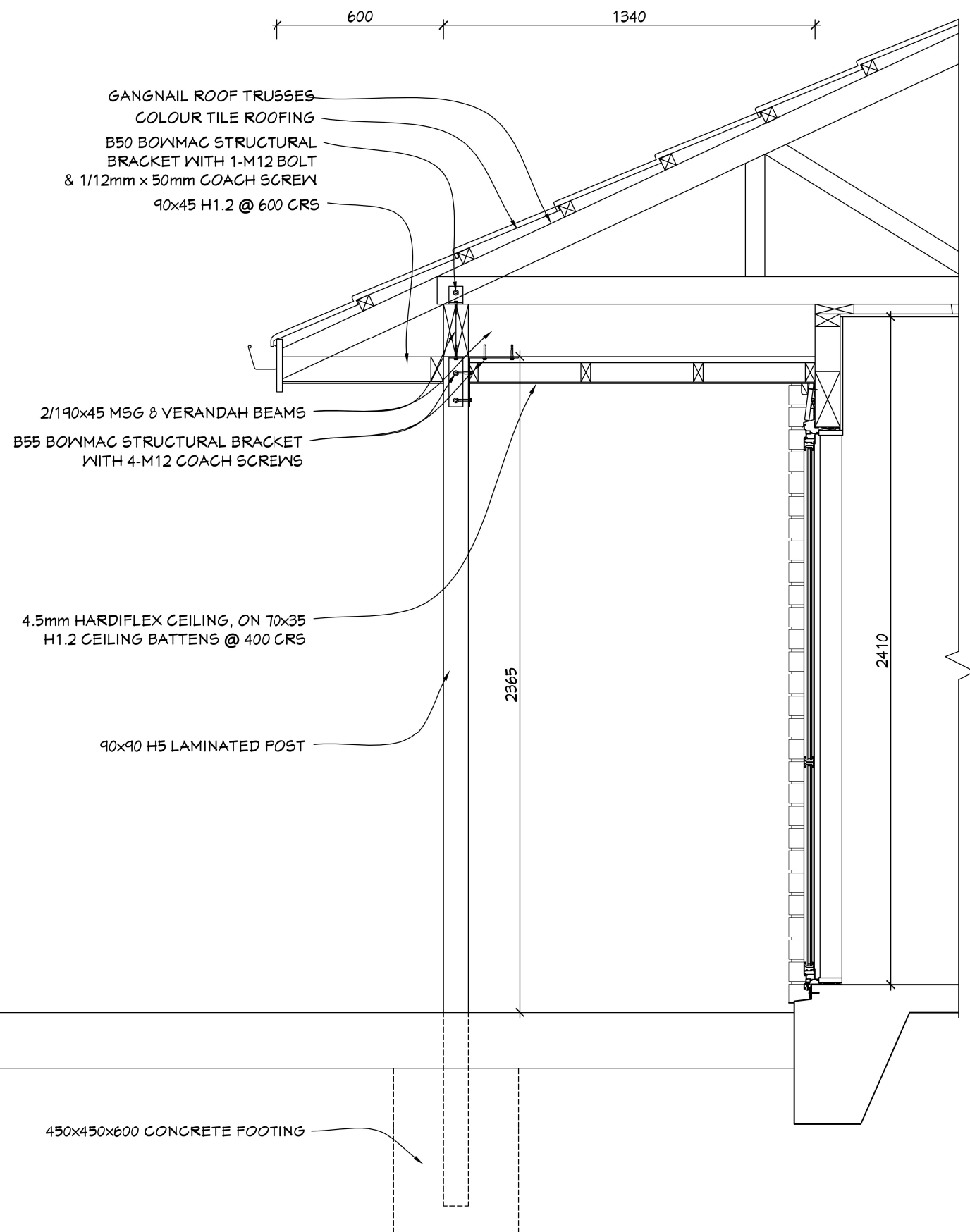
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ENTRANCE PORTICO SECTION DETAIL



VERANDAH SECTION DETAIL

PROPOSED RESIDENCE FOR
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LENNOX**
LOT 30, 25 SPRINGVALE ROAD, WANGANUI

**TYPICAL
DETAILS**

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CHRISTCHURCH
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PO Box 8387, Riccarton 8440
Phone: 03 348 8691
Fax: 03 348 0314

www.mitek.nz.co.nz

Printed: 12:29:12 13 Sep 2018

MiTek 20/20 Engineering 4.7.184.0

PRODUCER STATEMENT for MiTek 20/20® TRUSS DESIGN - Version 4.7

ISSUED BY: **MiTek New Zealand Limited**

TO: **CARTERS**

IN RESPECT OF: **MiTek® Truss Designs**

This producer statement covers the MiTek 20/20® truss design and the structural performance of the GANG-NAIL® connector plate for the job reference **278824C1** and may be used by a Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

The MiTek 20/20® truss design program has been developed by MiTek New Zealand Limited for the design of MiTek® timber roof, floor and attic trusses in New Zealand. The truss designs computed by MiTek 20/20® are prepared using sound and widely accepted engineering principles, and in accordance with compliance documents of the New Zealand Building Code and Verification Method B1/VM1; and internationally accepted standard ANSI/TPI 1 - 2002 as an alternative solution, to satisfy the requirements of Clauses B1 and B2 of the New Zealand Building Code.

On behalf of MiTek New Zealand Limited, and subject to:

- i) All proprietary products meeting their performance specification requirements
- ii) The provision of adequate roof bracing and overall building stability
- iii) Correct selection and placement of GANG-NAIL connector plates
- iv) Correct input of Truss Design Data as shown in the Fabricator Design Statement for this job
- v) The design being undertaken by the accredited fabricator under the terms of the software licence
- vi) Timber is graded to the requirements of NZS 3603:1993
- vii) Minimum timber treatment for these MiTek® trusses shall be in accordance with B2/AS1 Table 1A and the relevant sections of NZS 3602:2003

I believe on reasonable grounds that the trusses, if constructed in accordance with the MiTek 20/20® truss design and shop drawings, will comply with the relevant provisions of the New Zealand Building Code.

MiTek New Zealand Limited holds a current policy of Professional Indemnity Insurance no less than \$500,000.

On behalf of MiTek New Zealand Limited,

Date: Thursday, 13 September 2018

In Ling Ng, BE (Hons), CPEng, IntPE, MIPENZ (ID: 146585)
TECHNICAL SERVICES MANAGER, MiTek New Zealand Limited

CARTERS

Fabricator Design Statement : Page 1

Job: 278824C1

Client: Reuters Construction Ltd
Phone:

Site: Lennox
Lot 30
25 Springvale Road
Wanganui

Phone:

Description:
Building Consent No.:
MiTek 20/20 Engineering 4.7.184.0

MiTek New Zealand Limited

Printed: 12/29/12 13 Sep 2018

MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MiTek accredited fabricator **CARTERS**, being licensed to use the MiTek 20/20® software, to the client listed above and may be used by the Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

MiTek 20/20® TRUSS DESIGN DATA

The MiTek 20/20® computer design for this job is based on the following design parameters entered into the program. The Fabricator shall ensure that these job details are current and relevant to the project for the design of the MiTek® trusses.

Job Details

Roof Truss

Timber Group: MSG8 DDP H1.2

Roof

Material: Metal Tiles
Dead Load: 0.210 kPa
Restraints: 400 mm centres
Live Load: Q_r = 0.250 kPa
Q_c = 1.100 kN

Importance Level : 2

Ceiling

Pitch: 25.000 deg
Material: Gib 10mm/Rondo Screwed
Dead Load: 0.200 kPa
Restraints: 400 mm centres
Live Load: Q_c = 1.400 kN

Design Working Life : 50 years

Nominal Overhang: 600 mm

Wind

Area: High (44.0 m/s)
Pressure Coeff: C_{pe} = varies; C_{pi} = -0.30, 0.20

The minimum timber treatment for these MiTek® trusses shall be in accordance with B2/AS1 Table 1A and the relevant sections of NZS 3602:2003. The timber for these MiTek® trusses shall be graded to the requirements of NZS 3603:1993. Proprietary fixings and timber connectors shall be selected in accordance with NZS3604:2011 Section 4 - Durability.

MiTek® Truss List

Legend: * = detail only, ? = input only, ~~xxx~~ = failed design, Ø = non certified, Unmarked trusses = designed successfully, LB = lateral bracing required
GB = gable brace required

Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
ET1	1D	6254	25.000	900	T9	1	1117	25.000	637	TG2	1	3644	25.000	900
*HB1	2	7165	18.249	900	TR1	1	9010	25.000	900	J4A	1	2167	25.000	900
*HB2	2	5164	18.249	900	V1	1	1454	25.000	900	J4B	1	2167	25.000	900
*HB3	1	5214	18.249	900	V2	1	2128	25.000	900	J4C	1	2167	25.000	900
*HB4	1	2057	18.249	900	V3	1	1228	25.000	900	J4D	1	2167	25.000	900
*HB5	1	2088	18.249	900	V4	1	2182	25.000	900	J4E	3	2167	25.000	900
HT1	1	3068	25.000	900	V5	1	1315	25.000	900	J7A	1	2202	25.000	900
J1	2	2682	25.000	900	J1A	2	2682	25.000	900	T8	1	3785	25.000	637
J2	2	1782	25.000	900	J1D	1	2682	25.000	900	TG1	1	9010	25.000	900
J5	2	1267	25.000	900	J2A	2	1782	25.000	900	HTG2	1	6180	25.000	900
J8	1	1302	25.000	900	J5A	2	1267	25.000	900	J3	1	3067	25.000	900
J9	1	1117	25.000	900	J8A	1	1302	25.000	900	J6	1	3102	25.000	900
*R1	2	1473	25.000	900	J9A	1	1117	25.000	900	HTG1	1	3068	25.000	900
*R2	10	891	25.000	900	T2A	2	9010	25.000	829	J6A	1	3102	25.000	900
*R3	2	958	25.000	900	T4A	1	3644	25.000	900	HTG1A	1	3068	25.000	900
*R4	1	993	25.000	900	T6A	1	6250	25.000	900	T3	1	3785	25.000	900
T1	1	9010	25.000	900	J1B	1	2682	25.000	900	HTG3	1	6180	25.000	900
T2	3	9010	25.000	829	J1C	1	2682	25.000	900	T5	1	9010	25.000	900
T4	1	3644	25.000	900	J4	1	2167	25.000	900	T7	1	6250	25.000	900
T6	2	6250	25.000	900	J7	1	2202	25.000	900					

Total quantity : 84

The computer design input has been carried out by:

MiTek 20/20 Software Operator: Marc Cable

MiTek Candidate Number and Qualifications: Trainee Detailer

Accredited Fabricator:



Thursday, 13 September 2018



Date printed: 13 September 2018

Page 1 of 5

DESIGN CERTIFICATE

Technical basis for structural design methodology contained in designIT for houses - New Zealand.

designIT for houses, New Zealand has been developed by experienced timber engineers to assist designers in selecting appropriate sizes of structural laminated veneer lumber products manufactured by Carter Holt Harvey (including hySPAN, hy90, hyONE and hyJOIST) and other generic stress grades of timber, to be used as structural elements for the construction of buildings that fall within the scope of NZS 3604.

The design methodology used for the software complies with the loading and general design requirements contained within AS/NZS 1170 and with timber structural design in accordance with NZS 3603:1993 including Amendment 4 (Verification method B1/VM1, 6.1).

designIT relies on the accurate input of span and loading information by the user. Where accurate inputs are submitted the product and/or stress grade and the size given will comply with the structural requirements of the New Zealand Building Code (NZBC), provided the installation is in accordance with the installation requirements provided by designIT and/or in product literature and/or NZS 3604, or specific engineering design, as appropriate.

Futurebuild LVL and Laserframe components, when used and treated to the required treatment levels prescribed in NZS 3602 and NZS 3604, as modified by Acceptable Solution B2/AS1, will comply with the requirements of the NZBC (Acceptable Solution B2/AS1, 3.2).

References:

NZS 3603:1993 Timber Structures Standard.

NZS 3604:2011 Timber-framed buildings.

AS 1720.1:2010 Timber structures. Part 1: Design methods.

AS 1720.3:2016 Timber structures. Part 3: Design criteria for timber-framed residential buildings

AS/NZS 1170:2002 Structural design actions, Parts 0 and 1.

AS/NZS 1170:2011 Structural design actions, Part 2: Wind actions.

AS/NZS 1170:2003 Structural design actions, Part 3: Snow and ice actions.

This Design Certificate, and any associated warranty/certification, is void where there has been substitution of alternate products not detailed within the Member Specification.

Version date: 3 May 2017

For further information or advice contact:

Carter Holt Harvey LVL Ltd,
173 Captain Springs Road, Onehunga. Auckland
Telephone: 0800 808 131
Facsimile: 0800 808 132
Email: designit@chhwoodproducts.co.nz
Web: <http://www.chhwoodproducts.co.nz>

Specifier details:

Specifier:	Marc Cable
Business name:	Carters
Address:	69 Railway Road Palmerston North
Email:	marc.cable@carters.co.nz

Project & site details:

Project:	Lennox House
Site address:	25 Springvale Road Wanganui
Design wind zone	High
Snow loading	Design snow zone: N0

MEMBER DESIGN DETAILS

Member 1

- 1) Member code and description** Garage Door - Lintels - In single or upper storey load bearing walls
- 2) Date prepared** 12 September 2018

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	4.8 m
Roof load width 'RLW'	3.1 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 300 x 90 hyONE
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \Psi_L Q^*$	10.0 mm	5.8 mm (long term)	1.7
Live load - $\Psi_S Q$	15.0 mm	1.6 mm	9.4
Wind load - W_s	24.0 mm	4.8 mm	5.0

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-4.8
1.2G + 1.5Q	0.80	-7.2
1.2G + W_u + $\Psi_c Q$	1.00	-10.1
0.9G + W_u	1.00	6.0

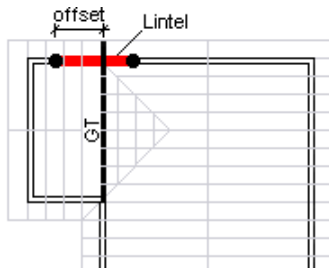
8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 2

1) Member code and description

Dining Door - Lintels - Supporting girder truss / truncated girder truss



2) Date prepared

13 September 2018

3) Serviceability criteria

AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Roof type	Light roof and ceiling - 40 kg/m ²
Roof pitch	25.0 °
Truss spacing	900 mm
Eaves overhang	600 mm
Common truss span	2200 mm
GT span	3100 mm
GT offset	1200 mm
Lintel span	2400 mm
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 200 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \Psi_L Q^*$	8.0 mm	2.0 mm (long term)	4.0
Live load - $\Psi_S Q$	9.6 mm	0.6 mm	16.7
Wind load - W_s	12.0 mm	1.7 mm	6.9

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-2.2
1.2G + 1.5Q	0.80	-3.3
1.2G + W_u + $\Psi_c Q$	1.00	-4.6
0.9G + W_u	1.00	2.9

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 3**1) Member code and description**

Dining Verandah Beams - Verandah beams

2) Date prepared

13 September 2018

3) Serviceability criteria

AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	2.8 m - single span
Roof mass	40 kg/m ²
Roof load width 'RLW'	1.5 m

5) Member specification

Size, stress grade/product	Use 2/190 x 45 SG8 Laserframe
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m ³



Date printed: 13 September 2018

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6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \Psi_L Q^*$	7.0 mm	4.1 mm (long term)	1.7
Live load - $\Psi_S Q$	11.2 mm	1.1 mm	10.6
Wind load - W_S	14.0 mm	4.6 mm	3.0

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3} End kN ⁴
1.35G	0.60	-1.6
1.2G + 1.5Q	0.80	-2.4
1.2G + $W_u + \Psi_c Q$	1.00	-4.2
0.9G + W_u	1.00	3.2

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 4

1) Member code and description All Others 1.0m-2.4m x 9 - Lintels - In single or upper storey load bearing walls

2) Date prepared 13 September 2018

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	1.8 m
Roof load width 'RLW'	5.0 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \Psi_L Q^*$	6.0 mm	2.4 mm (long term)	2.5
Live load - $\Psi_S Q$	7.2 mm	0.7 mm	9.9
Wind load - W_S	9.0 mm	2.2 mm	4.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3} End kN ⁴
-----------	---------	--



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1.35G	0.60	-3.6
1.2G + 1.5Q	0.80	-5.6
1.2G + W _u + Ψ _c Q	1.00	-8.0
0.9G + W _u	1.00	5.1

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Notes for interpretation of serviceability data

1. 'average deflection' is an engineering concept based upon a notional estimated load, notional member rigidity and, in some cases, an approximate model of material response to environmental conditions. These parameters are, 'standardised' in AS 1170 and AS 1720. Deflections calculated using this methodology cannot therefore be usefully compared with deflections calculated using other methods, eg GLTAA design methodology.

2. Deflection is the flexural response to load 'out-of-level' measurements of installations are not necessarily deflections and can incorporate 'initial out-of-straightness', whether intended or not. Furthermore, loads can be higher/lower than the notional estimate and in any comparison with measured levels, material variability needs to also be considered. AS 1720 gives the following basis for estimation of upper bound deflections for various materials.

No 1 Framing – visually graded to NZS 3631	Average + 100%
SG grades - mechanically graded to AS/NZS 1748	Average + 43%
GL grades for glulam to AS 1328	Average + 33%
LVL to AS/NZS 4357 (includes hySPAN and hyJOIST)	Average +18%

As can be seen, comparison of the 'average deflection' for different materials, even if calculated on the same basis, does not give the whole picture!

3. The limits referred are those specified in AS 1720.3 for the stated load case.

4. 'Rigidity ratio' expresses the rigidity of the specified beam relative to the rigidity of a notional beam just meeting the serviceability requirements of AS 1720.3

Notes for interpretation of reaction data

1. Duration of load factor 'k₁' for strength as per NZ 3603:1993
2. Negative (-) reactions relate to the 'gravity' or 'downwards' force on the support
3. Positive reactions relate to the 'upwards' forces or 'tie-down' requirement on the support
4. End reaction includes allowance for overhang/cantilever where one has been designed

TRUSS BEARINGS EXCEEDING 10KN REPORT -
Ultimate Limit State Loads

MiTek® Truss List

Legend: ? = input only, ✕ = failed design, Ø = non certified, Unmarked trusses = designed successfully

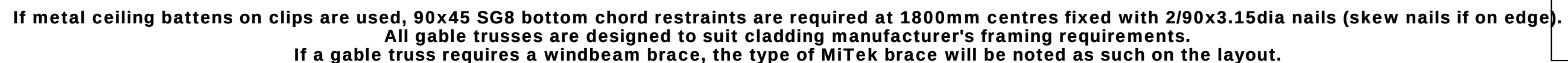
Critical Trusses	Qty	Span (mm)	Joint	Bearing Reactions (kN) Down Uplift
------------------	-----	--------------	-------	--

Note:

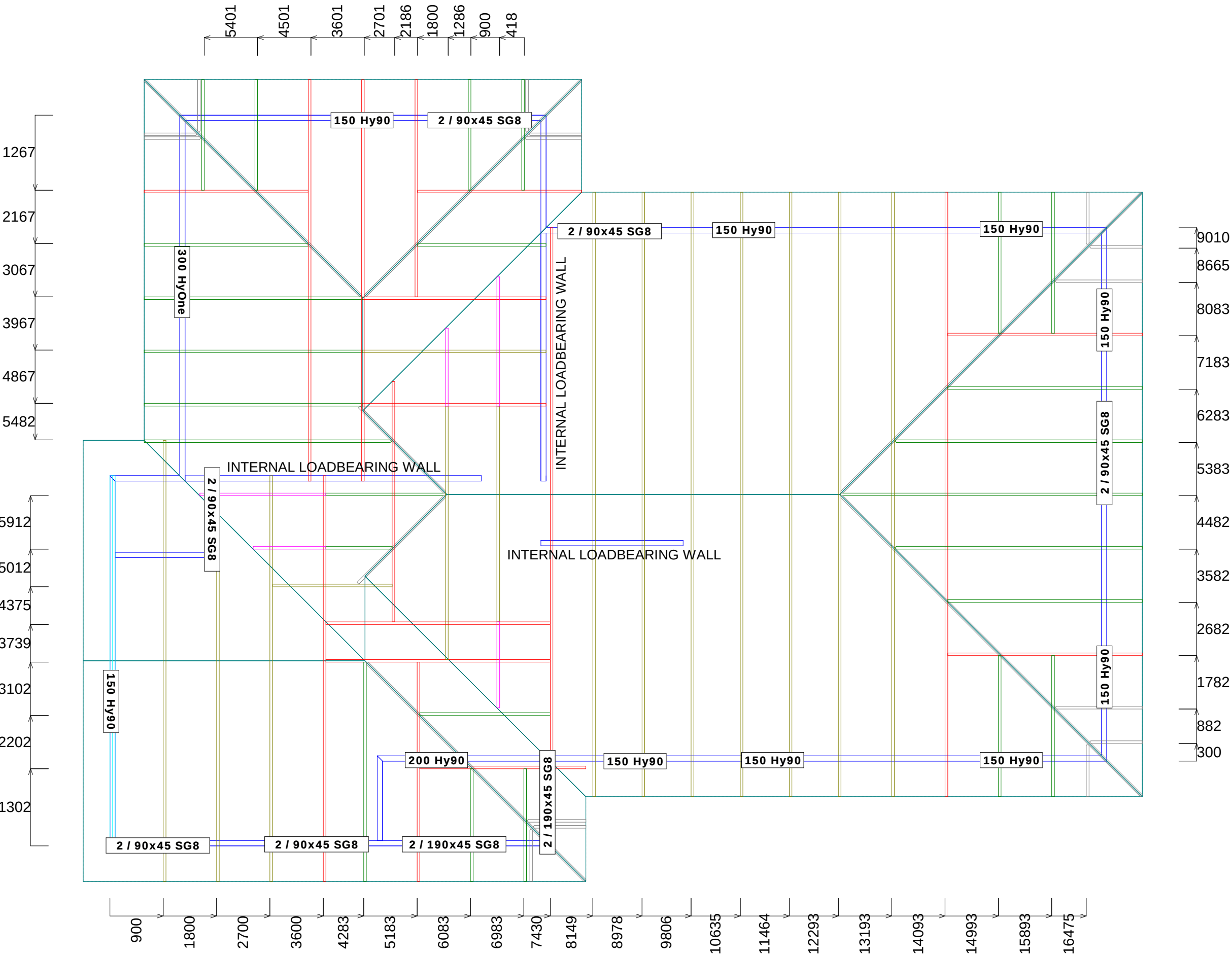
1) Select appropriate Slab Thickening Detail from the MiTek 'Internal Load Bearing On Concrete Floor Slabs' brochure.

Bcon18/0658 - WDC Approved Plans - 2/11/2018

For valley/saddle truss fixing unless stated otherwise use a pair of wire dogs at 900mm centres for up to and including a very high wind zone. Or a pair of CT200's at 900mm centres for extra high wind zone. This fixing is to meet the minimum requirements as per NZS3604.



BUILDABLE CONSENT LAYOUT



All internal walls shown hatched on this layout are considered to be loadbearing
Lintel fixing specification remains the responsibility of the architect / draughtsperson

CARTERS
Carters Manufacturing Napier
(06) 834 2640

JOB No 278824C1
Client: Reuters Construction Ltd
Job: Lennox
Site: Lot 30
25 Springvale Road
Wanganui

Pitch: 25.0deg
Roof Type: Metal Tiles
Overhang: 600mm
Wind Area: High
Roof Snow: 0.000kPa

Trusses and rafters at 900 mm
max centres unless stated otherwise.
This layout is to be read in conjunction
with the Architectural plans.

DRAWN Marc Cable13 Sep,2018

↓
Dn

kN

↑
Up

kN

Ultimate Limit
State Loads

Notification of point loaded lintels
or point loads on internal walls
where the downward load is
higher than 8kN (85mm raft type slab)
or 10kN (100mm standard slab), or
the upward load is greater than 10kN.

Any roof loads as stated on this
layout over 16kN up or down are
outside the scope of NZS3604, and
the architect / draughtsperson is
responsible for the design to transfer
the loads to the ground.

The lintels have been sized using
one of the following:

hy90, hyONE and hySPAN lintels
have been sized using the designIT
for houses - New Zealand series 6
software.

GANGLAM and FLITCH BEAMS
have been sized using the MiTek
Beam Program V1.10 June 2011.

Any treated LVL product is H1.2, which
satisfies the minimum treatment
requirement of NZS3602.

Unless otherwise stated the timber grade
for all lintels is SG8. Lintels not shown
are to be selected as per NZS3604: 2011.

Elephant QuickBrace™ First Principles - May 2018 V.1.0		Print Date: 2-Oct-18	
Specification Sheet		NZS3604:2011 Compliant	

<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Project Name:</td><td>Lennox</td></tr> <tr><td>Level, Wing or Block etc.</td><td></td></tr> <tr><td>Street Address:</td><td>25 Springvale Road</td></tr> <tr><td>Lot and DP Number:</td><td>Lot 30 DP 500432</td></tr> <tr><td>City/Town/District:</td><td>Whanganui</td></tr> </table>	Project Name:	Lennox	Level, Wing or Block etc.		Street Address:	25 Springvale Road	Lot and DP Number:	Lot 30 DP 500432	City/Town/District:	Whanganui	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Designer Name:</td><td>Zhiyong Guan</td></tr> <tr><td>Design Company Name:</td><td>Devon Homes</td></tr> <tr><td>Bracing Design Date:</td><td>9/17/2018</td></tr> <tr><td>Engineering Company Name:</td><td></td></tr> <tr><td>This form filled out by:</td><td>Zhiyong Guan</td></tr> </table>	Designer Name:	Zhiyong Guan	Design Company Name:	Devon Homes	Bracing Design Date:	9/17/2018	Engineering Company Name:		This form filled out by:	Zhiyong Guan
Project Name:	Lennox																				
Level, Wing or Block etc.																					
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Designer Name:	Zhiyong Guan																				
Design Company Name:	Devon Homes																				
Bracing Design Date:	9/17/2018																				
Engineering Company Name:																					
This form filled out by:	Zhiyong Guan																				

General Specifications

Storey Type:	Single	
Foundation Type	Slab	
Floor Loads	2 kPA	
Height: Top of Slab to Apex (H)	5.00	m

Roof Specifications

Roof Pitch:	25.0	degrees	21.1
Height (h) above Eaves:	2.60	m	
Roof Type:	Typical (Gabled End)		
Roof Cladding Weight:	Light		
Roof Length:	17.9	m	
Roof Width:	13.5	m	

Single Storey Specifications

External Wall Height:	2.40	m
Internal Stud Height	2.40	m
Cladding Weight	Heavy	
Building Length	17.0	m
Building Width	12.6	m
Gross Plan Area (GPA)	170.0	m2
Slab Floor Limit: 150 bu's/m	Slab: 150 Bu's/m	
Part Storey in Roof Spaces?	No	

Select Wind Zone ==>> High

Determine Earthquake Zone and Subsoil Class.

Earthquake Zone:	2
Subsoil Classification:	E: Very Soft
Annual Exceedance Probability:	1/ 500 yrs - NZS3604:2011 Default

Single Level Demand Demand Source= QuickBrace (FP)

QuickBrace© First Principles	
Demands (Bu's)	
Wind Along	57.9
Wind Across	41.0
Earthquake	5.5

729 Bu's
697 Bu's
935 Bu's

Elephant QuickBrace™ First Principles - May 2018 V.1.0									Wind		Earthquake	
Wall Along			Lennox			Demand Source: QuickBrace® First Principles		Achieved = Total Demand =	185%	1347	127%	1184
Single Storey			25 Springvale Road			Min. Bu's per either External side of Project=			255		255	
						Minimum Bu's Req. on each Bracing Line =			122		156	
Line	Element #	Top, Bottom OR Internal	Available Wall Length	Wall Angle °	Element Height	System Number	Supplier	Floor Type Max BU's/m or SED	Wind		Earthquake	
									Bu/m	Achieved Bu's	Bu/m	Achieved Bu's
A	A1	Top External	0.70		2.4	ES-N	EPB	150 BU's	71	49	66	46
	A2	Top External	0.70		2.4	ES-N	EPB	150 BU's	71	49	66	46
	A3	Top External	1.00		2.4	ES-H	EPB	150 BU's	109	109	88	88
	A4	Top External	0.70		2.4	ES-N	EPB	150 BU's	71	49	66	46
	A5	Top External	0.70		2.4	ES-N	EPB	150 BU's	71	49	66	46
A Line: Min. Requirement									122	306	156	273
B	B1	Internal	2.40		2.4	ESSN	EPB	150 BU's	98	235	88	211
	B2	Internal	1.00		2.4	ESSN	EPB	150 BU's	98	98	88	88
	B3	Internal	2.60		2.4	ES-N	EPB	150 BU's	83	216	68	177
	B4	Internal	2.40		2.4	ES-N	EPB	150 BU's	83	199	68	163
B Line: Min. Requirement									122	748	156	639
C	C1	Bot. External	0.70		2.4	ES-N	EPB	150 BU's	71	49	66	46
	C2	Bot. External	0.90		2.4	ES-N	EPB	150 BU's	72	65	66	60
	C3	Bot. External	1.00		2.4	ES-N	EPB	150 BU's	73	73	67	67
	C4	Bot. External	0.90		2.4	ES-N	EPB	150 BU's	72	65	66	60
	C5	Bot. External	0.60		2.4	ES-N	EPB	150 BU's	69	41	66	40
C Line: Min. Requirement									122	293	156	272
D												
E												
F												
G												
H												
I												
J												
User Comments:									Wind		Earthquake	
Print Date: 2-Oct-18			Single Storey		Wall Along		Achieved BU's =		185%	1347	127%	1184
Elephant QuickBrace™ First Principles - May 2018 V.1.0							Total Demand =		Bu's	729	Bu's	935

Elephant QuickBrace™ First Principles - May 2018 V.1.0						Demand Source: QuickBrace® First Principles			Wind		Earthquake	
Wall Across		Lennox							Achieved =	194%	1350	127%
Single Storey		25 Springvale Road				Min. Bu's per either External side of Project=			189		189	
						Minimum Bu's Req. on each Bracing Line =			100		100	
									Wind		Earthquake	
Line	Element #	Left ,Right OR Internal	Available Wall Length	Wall Angle °	Element Height	System Number	Supplier	Floor Type Max BU's/m or SED	Bu/m	Achieved Bu's	Bu/m	Achieved Bu's
M	M1	Left External	0.70		2.4	ES-N	EPB	150 BU's	71	49	66	46
	M2	Left External	0.70		2.4	ES-N	EPB	150 BU's	71	49	66	46
	M3	Left External	0.70		2.4	ES-N	EPB	150 BU's	71	49	66	46
	M4	Left External	0.70		2.4	ES-N	EPB	150 BU's	71	49	66	46
	M Line: Min. Requirement							100	197	100	185	
N	N1	Internal	2.40		2.4	ES-N	EPB	150 BU's	83	199	68	163
	N2	Internal	2.40		2.4	ES-N	EPB	150 BU's	83	199	68	163
	N Line: Min. Requirement							100	398	100	326	
O	O1	Internal	2.40		2.4	ES-N	EPB	150 BU's	83	199	68	163
	O2	Internal	2.40		2.4	ES-N	EPB	150 BU's	83	199	68	163
	O Line: Min. Requirement							100	398	100	326	
P	P1	Left External	0.45		2.4	EMPH	EPB	150 BU's	125	56	142	64
	P2	Left External	0.45		2.4	EMPH	EPB	150 BU's	125	56	142	64
	P Line: Min. Requirement							100	113	100	128	
Q	Q1	Right External	1.10		2.4	ES-N	EPB	150 BU's	73	80	67	73
	Q2	Right External	1.10		2.4	ES-N	EPB	150 BU's	73	80	67	73
	Q3	Right External	0.60		2.4	ES-N	EPB	150 BU's	69	41	66	40
	Q4	Right External	0.60		2.4	ES-N	EPB	150 BU's	69	41	66	40
	Q Line: Min. Requirement							100	243	100	226	
R												
S												
T												
U												
V												
User Comments:								Wind		Earthquake		
Print Date: 2-Oct-18		Single Storey		Wall Across		Achieved BU's =		194%	1350	127%	1191	
Elephant QuickBrace™ First Principles - May 2018 V.1.0						Total Demand =		Bu's	697	Bu's	935	

**Proposed Residence for
Mr. Guy and Mrs. Gillian Lennox
lot 30, 25 Springvale Road,
Wanganui**

Builder:

Reuters Construction Ltd
Trading as Devon Homes
165A Great North Road, Wanganui

T. 06-345-2393

F. 06-345-2165

PRELIMINARY AND GENERAL

1. SCOPE

This specification conforming to the attached Agreement and Conditions of Contract describes the work to be done and the materials to be used in the construction of the house shown on the attached drawings.

2. BUILDING CONSENT/S: -

The Owner or Owner's agent shall apply to the Territorial Authority (TA) for a BUILDING CONSENT, for inspections by the TA during construction and pay all bonds and fees incurred.

3. ACCEPTABLE SOLUTIONS:

All work shall be equal to (or better than) 'Acceptable Solutions' given in NZBC Approved Documents; complying with the Building Act 2004 and Building Regulations.

4. HEALTH AND SAFETY:

As directed by the Owner, the Contractor shall be responsible in complying with the Health and Safety in Employment Act 1992, effectively operating a Safety Management Programme for the duration of the contract.

5. INSURANCES:

The Contractor shall take out Builders All Risk Policy.

6. INTERPRETATION:

Work or materials shown on the drawings but not specified (or specified and not shown) shall be supplied as though both shown and specified. Materials shown but not specified must be of the kinds commonly employed for the service they are intended to perform. All figured dimensions shall be taken in preference to scale. The Contractor shall be held responsible for setting out of work and he shall make good at his own expense any errors that occur through his lack of checking or faulty workmanship. Unless written as provide only or fix only, the words 'provide' and 'fix' shall mean 'provide and fix'.

"This document is a general specification and is to be read in conjunction with the Plans and the Building Contract. Where there is any contradiction between the Building Contract, the Plans and Specifications, then the Building Contract shall take first precedence, the Plans second precedence, the Specification Schedule third precedence and the General Specification fourth precedence."

7. STABILITY DURING CONSTRUCTION:

The Contractor shall carefully brace and support all parts of his work against damage by wind and protect work from the elements as necessary during construction.

8. PROTECTION OF PROPERTY:

The Contractor shall protect adjoining properties during the contract and shall make good all damage at his own expense.

9. DAMAGE:

The Contractor shall make good at his own expense and to the satisfaction of controlling authorities, any damage done to footpaths, kerbs, drainage, etc, or other property under control of such authorities.

Each trade shall take care to prevent damage or disfigurement of the work of other trades and will be responsible for cost of restoring it.

10. MATERIALS:

Any materials specified that are not procurable when required, thus slowing progress of the Contract, may be substituted with other similar materials, providing that the substitute materials conform to the NZBC and the Owner gives permission. The Contractor is first to notify the Owner of any change proposed and at the completion of the Contract adjust any difference in cost.

11. WORKMANSHIP:

All work shall be carried out in accordance with the best trade practice, in strict conformity with the drawings and specification to the satisfaction of the Owner. All defective or damaged work shall be removed and made good to the satisfaction of the Owner.

12. CLEANING:

The Contractor, at the conclusion of the Contract, shall have all ceilings, walls and woodwork carefully dusted and wiped down, windows washed and glass free from scratches, floors brushed and wiped down and the entire building left in a perfectly clean condition for occupation.

EXCAVATION

1. GENERAL:

In accordance with Preliminary and General clauses applying to this section and:

- Means of compliance to relevant NZBC requirements.
- Excavation code of Practice, Occupational Health and Safety Department.
- Regional/Territorial Authority requirements for silt control from excavations.

2. *SETTING OUT:*

Set out the work as shown or implied on the drawings. Check accuracy in terms of position, levels and square.

3. *HARDFILL:*

Use only approved fill well-compacted under concrete ground floors and as otherwise specified.

4. *DRAINAGE TRENCHES:*

Take out seepage and drainage trenches where indicated to adequate depth and falls to prevent dampness under the building. Provide *Nova* drains or similar bedded on scoria where required.

CONCRETE AND REINFORCING

1. *GENERAL:*

Accord with Preliminary & General clauses applying to this section and means on compliance to relevant NZBC requirements.

2. *EXTENT OF WORK:*

Comprises the setting out, boxing and placing of concrete in the foundations, floor slabs, walls, beams and bands and any other concrete work shown in the drawings.

3. *MATERIALS:*

Ordinary grade concrete shall comply with NZS 3109.
Concrete from an Approved Batching plant only shall be used.

Minimum concrete strength at 28 days shall be:

- a) 10 MPa for un-reinforced concrete used in mass foundations.
- b) 17.5 MPa for un-reinforced concrete applications for reinforced concrete either not exposed to weather or exposed to the weather in zone B as shown in figure 4.1 NZS 3604:2011.
- c) 20 MPa for reinforced concrete exposed to the weather at least 500m from mean high tide mark in Zone C as shown in figure 4.1 NZS 3604:2011.
- d) 25 MPa for reinforced concrete exposed to weather and within 500m of the mean high tide mark.

4. FORMWORK:

Formwork shall be so constructed that the concrete thickness and shapes required are obtained as detailed without removal causing damage. Methods of construction and pouring and curing of concrete and times of removal of Formwork shall be as set down in NZS 3109.

5. CONCRETE FOUNDATION & FLOOR SLAB:

Foundation footings and reinforcing shall be to the sizes shown on drawings in accordance with relevant clauses of NZS 3604:2011, supporting single storey, 2 or 3 storey as appropriate. Such walls shall finish not less than 225mm above finished ground level but not measure more than 2m above the bottom of the footings.

6. PATHS:

Where shown on drawings, paths shall be laid not less than 75mm thick reinforced with 668 mesh or similar. The surface shall be graded evenly to provide suitable drainage and left with a uniform finish using a wooden float.

7. OTHER REQUIREMENTS:

Paving as detailed on drawings.

8. COMPLETION:

Make good any defective work. Leave all clean and stain free.

CARPENTRY AND JOINERY

1. GENERAL:

Accord with Preliminary & General clauses applying to this section and means of compliance to relevant NZBC requirements.

2. EXTENT OF WORK:

The work of this section shall include all labour, materials, equipment necessary to carry out and complete the carpentry as shown, or as further required by this specification. Any work that is intended or implied but not specifically shown but necessary for the proper completion of the building shall be included.

3. ATTENDANCE AND PROTECTION:

Arrange and attend upon all works by other trades in a logical sequence e.g. as in this section to allow early closing-in. Provide all blocking, fixings, trims, nogging as necessary for the full completion of their respective works and make good after all trades. Provide for temporary protection from adverse weather and damage and ensure closing in of the building as soon as possible.

4. MATERIALS AND WORKMANSHIP:

All timber and wood based products shall conform to NZS 3602 requirements, "Code of practice for specifying timber and wood-based products for use in building". Timbers shown in the Schedule of Timbers to be treated with an approved preservative process in plants licensed by the Timber Preservation Council. Any materials which in the opinion of the Owner, Loan Body or Territorial Authority are not up to standard, to be removed immediately from the site. All work shall be carried out in accordance with best trade practice.

5. COMPLIANCE WITH THIS SPECIFICATION:

- a) Do any works under specific design in accord with details provided. The Contractor and Carpenter shall do all other work in accord with NZS 3604:2011. In particular complying with the whole of SECTION 2 - GENERAL of NZS 3604:2011. The treatment requirements are:
- Roof framing, trusses and ceiling joists: H1.2
 - All wall framing: H1.2
 - Enclosed framing with flat roofs: H3.1
- b) All fixings of materials to be in accordance with NZS 3604:2011, Section 4.4. Including sheet lining and cladding materials for walls and ceilings that are not wood-based, e.g.: *Gibraltar* board, fibrous plaster or wood cellulose sheeting; especially when used as diaphragms and for wall bracing.

6. GENERAL FRAMING:

All framing to be 90mm x 45mm stud or 70mm x 45mm stud with 45mm wide studs to all openings not exceeding 3m span where supporting only one storey. Top and bottom plates to be same size as studs in long lengths, halved or nail plated at wall junctions and jointed over studs. All studs at 600mm c.c. Provide two (2) rows of dwangs to full height each wall unless otherwise stated on drawings to full height each wall unless otherwise stated on drawings. Alternative kiln-dried ("dry frame").

7. WALL BRACING:

Provide all walls bracing as shown on drawings and wall bracing calculation sheets as is intended to satisfy the Territorial Building Authority. Keep strictly to the "Type", Lengths and Locations shown on plan and elevations.

8. POST AND BEAMS:

Where within maximum permitted by NZS 3604:2011, Section 9, secure in equivalent manner.

9. EXTERIOR JOINERY:

All windows shall be to NZS 4211.

Aluminium joinery complete with glazing, frictional restraints and catches, fix plumb both ways and in correct alignment and flash all in accord with manufacturer's instructions. All glazing to be in accordance with NZS 4223.

10. DAMP PROOFING:

All timber to be protected from dampness with 3-ply bituminous felt or other approved damp proofing material when in contact with concrete or brickwork, or as in clause 7.5 of NZS 3604:2011.

11. ROOF CONSTRUCTION: (See Drawings and Schedule of Timbers for types)

TRUSSED ROOFS: Drawings showing clearly the type, pitch, span, spacing and overhangs of roof trusses and details of roof cladding shall be provided to the truss manufacturer to allow him to comply with clause 10.2.2 of NZS 3604:2011. Thereafter, the Contractor shall match construction with the drawings and details provided by the truss manufacturer throughout all stages of fixing and bracing. The Contractor shall especially accord with the manufacturer's instructions for tying down where overhangs exceed 750mm. In all cases anchorage of all trusses to plates shall be with not less than 2/100mm skew nails plus 2/4.9mm wire dogs.

ROOF FRAMING: Supply and fix Hibeam rafters as shown on the plans. Fixing to be in accord with NZS3604:2011 and manufacturers specifications.

12. PURLINS, EAVES, GABLE ENDS:

Size of framing, spacing, overhangs and sheathing type as shown on plan.

13. FASCIA BOARDS ETC:

Fix fascia, barge, frieze etc to suit roofing selected.

14. THERMAL INSULATION:

All roofs, walls, and floors are to be insulated in accordance with NZS 4214 and NZS 4218:2009. No insulation material shall be used that does not comply with NZBC clause H1. All insulation materials are to be installed in accordance with manufacturer's recommendations.

15. MOISTURE CONTROL:

Where a vapour barrier is required in the form of foil or polythene film, this barrier shall be fixed according to manufacturer's instructions. Foil or polythene film shall not be used as a substitute for building paper. Building paper shall be properly fixed to bottom plates, especially in veneer construction, to prevent entry of sub-floor air into stud cavities. Linings shall not be fixed until moisture content of framing has been tested and approved.

A proper solvent based paint or varnish finish must be used for plaster (Gibraltar board or fibrous plaster) linings to 'wet' rooms such as kitchens, bathrooms and laundry. Water based/emulsion paints must not be used in such rooms.

16. CEILINGS:

Ceiling linings "*Gib Ultraline*"

GIBRALTAR BOARD: Fix to manufacturer's instructions. 'Fixer' and 'Stopper' to be approved. All nail fixing and joints to be finished to a true even smooth surface. In particular fix all ceilings servicing as structural ceiling diaphragms under terms of NZS 3604:2011. (See Winstone Wallboards Ltd. taped joint system). Check that each wall under or connected to has adequate bracing for a diaphragm.

17. MANHOLE:

Provide manhole in ceiling 600mm x 600mm.

18. WALL LININGS:

See "INTERNAL WALL LININGS" section

Generally shall be of 10mm *Gibraltar Board* and shall be fixed to external walls only after placement of thermal insulation.

19. Aluminium Doors and Windows:

To comply with NZS 3504. All glazing to be in accordance with NZS 4223. Safety glass and mirrors in Bathroom and Ensuite.

20. DOORS AND FRAMES

External doorframes shall be of 40mm full width material, internal 30mm rebated or 25mm (or 18mm) material with 12mm planted stops. Doors shall comply with NZS 1158, with external Fibreglass panel as shown on drawings, all properly constructed with stiles and rails.

21. WARDROBES:

Construct as shown on plan shelving will be painted or mellamine finish.

22. PANTRY KITCHEN CUPBOARDS:

Construct units to sizes shown on plans, with door and shelves.

23. SKIRTINGS :

Finish at junction of floor and wall with 60mm x 12mm skirting with ends neatly butted, scribed or mitred. Scribed to floor where necessary. Where required fix Scotia mould at ceiling junction, supply and fix beads, half rounds and all trim as required to complete the work.

24. BATHROOM; ENSUITE; SHOWER AREAS:

All wall linings to be fixed to manufacturer's specification with adequate capillary gaps or flashing / trim or sealant to prevent leakage. Provide for all sanitary fittings shown on plan and given under "SANITARYWARE/FITTINGS" schedule.

25. LAUNDRY AND TOILET/S:

Fit out as shown on plan and given under "SANITARYWARE/FITTINGS" schedule.

26. METER RECESS:

Provide recess for Electric Meter Board where directed by electrician.

27. HARDWARE:

Allow for the supply of all hardware required. Door handles locks, window fitting, door and drawer pulls, stops, angles, vents, towel rails etc. Allow taking delivery and fix. Door handles polished brass lever action.

28. CLEANING AND COMPLETION:

The Contractor at the conclusion of the Contract shall have all ceilings, walls and woodwork carefully dusted and wiped down. Windows washed and glass free from scratches and paint. Floors brushed and the entire building and site left in a clean condition for occupation.

ROOF COVERINGS, ROOF PLUMBING AND DRAINAGE

1. TYPES OF ROOF COVERINGS:

- a) Coverings to the main areas of roof shall consist of colour tile roof with standard trim.
- b) The roof covering Fixer and plumber shall advise on substructure/substrate needs. Inspect and have defects or omissions remedied and do adequate preparatory work.

2. SUBSTRUCTURE AND SUBSTRATES:

- a) Timber substructure work shall be to NZS 3604:2011, Section 10- ROOFS, or to specific design, meeting NZBC B1 and B2 requirements. Purlin (roof batten) size and spacing and sarking/sheet substrates to approval in writing by covering manufacturer and be to NZS 3602.
- b) Purlin sizes when exposed rafters are used to allow for thermal insulation to meet the NZBC or to greater thickness. End-to-end joints in purlins shall be staggered (Not to occur in line on a single rafter or truss). Provide for closer spacing at ridges and eaves for better fixing against wind uplift.

3. ROOFING UNDERLAY/CLOSING IN WORK:

- a) Fix gutters and downpipes (even if temporary). Fix valleys at least 300mm wide with turned edges and base projecting into gutters.
- b) Unless otherwise stated, fix breather type building paper ex NZS 2295 to recommendations of roof covering manufacturer. Properly support, lap, turn up at up-stands and projections through roof and turn down into gutter.

4. PREPARATORY WORK:

The roof covering FIXER shall co-ordinate preparatory and installation aspects with plumber (see clauses 1 and 5) and contractor to ensure the following: -

- a) Temporary bracing of roof and walls below if some stacking of covering is required; keeping loads on timber to a minimum and not localised on too few members.
- b) Good in-plane alignment of purlins and/or sarking and adequate support and fixings for all ridging, capping and over flashing and at all projections through the roof.
- c) Neat setting out of work to all roof planes; avoiding any covering or flashing being cut too short, too narrow or in any manner that will prevent secure fixing and long term resistance to rain penetration. Tile, slate and shingle work to be set out to give a full course both at eaves and ridges.
- d) Corrosion protection is given to galvanised steel where difficult to paint after fixing. E.g. prime and top coat laps in the roof covering and where lapped by capping and flashing. Also to bottom underside at projections over gutters.

5. INSTALLATION:

The roof covering FIXER shall follow all relevant recommendations of the covering manufacturer and preferably be approved by the manufacturer. Roof flashing and drainage work shall be of a quality expected of work done by Craftsmen/ Registered plumbers - whether or not the Contractor or Fixer employs a plumber to do or supervise the work.

- (a) FIXER, plumber and others to wear soft-soled shoes to prevent damage to pre-finished metal, membrane and any special brush, spray or trowel applied coverings.
- (b) Fixing of coverings, accessories and flashing shall allow for differential movement. Lapse or joints shall where possible face away from the prevailing winds. SEALANTS SHALL NOT BE USED EXCEPT WHERE PRIOR APPROVED.
- (c) Take care of all roofing materials. Any damaged at time of delivery or during construction to be removed from site. Colour match making good of face fixings and minor damage. Each day remove rivet stems, metal scraps and debris from roof and any runs from soldering flux.

6. ROOF PLUMBING AND DRAINAGE:

- a) Arrange with Contractor to fix valley gutter (if any), normal gutters (or spouting) and downpipes for earliest possible closing in of the building.
- b) Sizing of gutters/spouting and downpipes and downpipe spacing shall accord with Acceptable Solution E1/AS1 -SURFACE WATER.
- c) Rainwater collected from roofing shall discharge into surface water drains connecting to a Territorial Authority system (Not into a FOUL WATER DRAIN unless approved by the TA)

7. ON COMPLETION:

Remove all traces of flux after brazing or soldering, swarf, snapped rived stems, metal wastes and other debris from roof surfaces and gutters.

EXTERNAL WALL COVERINGS

1. GENERAL:

Accord with all Clauses under Preliminary and General where they apply to work and materials shown on the drawings.

2. MAIN AREAS:

The main areas of walling shall consist of brick veneer and fibre cement weatherboards wall cladding.

3. WORKMANSHIP:

The Contractor/carpenter shall straighten all studs and nogs in external walls to the

satisfaction of the Owner and the Cladding Fixer and Wall Lining Fixer before fixing any building paper, bracing panels, (sheathings rigid backings). All to tolerances gave in Table 2.1 of NZS 3604:2011.

4. *FIXING AND FINISHING OF WALL CLADDING:*

Refer to Section 11 of NZS 3604:2011. Procure and accord with NZ Standards and Manufacturers instructions relating to the types of cladding shown on the drawings and specified above.

5. *ON COMPLETION:*

Leave all work and adjoining surfaces in a clean, stain free state and remove all rubbish.

INTERNAL WALL LININGS

1. *GENERAL:*

Accord with all relevant Preliminary and General where they apply to work and materials shown on the drawings. Linings to be fixed after plumber has set out pipe runs and set location on taps etc and after electrical wiring has been run to power and lighting outlets.

2. *MATERIALS:*

The wall linings shall be Gibraltar Board.

3. *WORKMANSHIP:*

The Contractor/carpenter shall straighten all studs and nogs to the satisfaction of the Owner and the wall lining fixer before the fixer commences fixing. All to tolerances gave in Table 2.1 of NZS 3604:2011.

4. *FIXING AND FINISHING OF WALL LININGS:*

Refer to Section 12 - WALL LININGS in NZS 3604:2011. Procure and accord with NZ Standards and manufacturers instructions relating to the types of lining shown on the drawings and specified above.

5. *ON COMPLETION:*

Leave all work and adjoining surfaces in a clean, stain free state and remove all rubbish.

CEILING LININGS

1. GENERAL:

Accord with all Preliminary and General clauses applying to work and materials shown on the drawings. Linings to be fixed after plumber has set out pipe runs and set location of taps etc and after electrical wiring has been run to power and lighting outlets.

2. MATERIALS:

The ceilings shall consist of 13mm plasterboard ceiling.

3. WORKMANSHIP:

The Contractor/carpenter shall erect and straighten ceiling framing to the satisfaction of the Owner and ceiling lining fixer. All to tolerances given in Table 2.1 of NZS 3604:2011 (remember thermal insulation needs to be provided in the roof-ceiling space. The work needs to be co-ordinated with other trades and care taken to avoid rain wetting).

4. FIXING AND FINISHING OF CEILING LININGS:

Refer to Section 13 - CEILINGS in NZS 3604:2011. Procure and accord with NZ Standards and manufacturers recommendations relating to the lining shown on drawings and mentioned above.

5. ON COMPLETION:

Leave all work and adjoining surfaces in a clean, stain free state and remove all rubbish.

DRAINLAYING

1. EXTENT OF WORK:

Work in this section of the contract comprises all surface and foul water drainage up to above ground level to connect to Plumber's work. Include all PVC drainage pipes and special fittings, construction of manholes, all gully traps and connections for terminal vents, soil and waste pipes. The Drainlayer shall confer with the Plumber and shall arrange with the Contractor before the foundations are laid to fix the exact position of all connections of wastes and drains.

2. DOCUMENTS:

NZBC	B1 / AS1	Structure – general
NZBC	E1 / AS1	Surface water

NZBC	G13 / ASI and AS2	Foul Water
AS/NZS 3500	National plumbing and drainage code	
	3500.3: Storm water drainage	
NZS 7643	Installation of unplasticized PVC pipe systems	
AS/NZS 1260 & 1254	Unplasticized PVC sewer and drain pipe fittings	

3. DRAIN TRENCHES:

The excavation of trenches for drains shall be accurately made with base clear and true to grade so that no unnecessary filling is required. Adequate width shall be allowed in accordance with depth of drain to enable laying and jointing to be properly carried out. Trenches shall be kept firm and dry and shall be opened up only in lengths that can be protected, utilised and refilled within a reasonable time.

4. LAYING OF DRAINS:

All drains to be adequately supported by firm trench bottom with additional pocket excavations to avoid sockets etc bearing on the ground.

5. FITTINGS:

The plans show the layout of the system. Additional fittings that are normally required such as inspection points and inspection bends etc that may be required but are not specifically shown must be allowed for by the Drainlayer to comply with normal practice under the regulations or special requirement of the NZBC.

6. FALL IN DRAINS:

The whole of the soil and stormwater drains is to be laid to a regular and even fall.

7. GULLY TRAPS:

Supply all gully traps and securely bed and build up with 5:1 concrete surround, 150mm above finished ground levels. Form large and deep dishings and trowel smooth. All gully traps are to be fitted with large gratings and also a grating or perforated plate above the wastes discharging into it.

8. SEWER AND STORM WATER CONNECTIONS:

Arrange with the Territorial Authority to connect drain to sewer and storm water where provided and pay all related testing fees etc.

SANITARYWARE/FITTINGS

1. GENERAL:

Accord with Preliminary and General clauses applying to this section and means of compliance to relevant NZBC requirements.

2. SCOPE:

This section consists of the supply of materials and labour involved in installing the whole of the water and drainage reticulation and metal flashing to leave the building plumbing systems and stormwater complete and working and the building watertight. See roofing section for roof flashing and roof plumbing.

3. DOCUMENTS:

The sanitary plumber shall be a Craftsman/Registered Plumber and may also be a Registered Drainlayer. He shall accord with the following: -

All work shall be carried out in accordance with the New Zealand Building Code 2004, and its amendments, with the local by-laws and with the relevant clauses of the Acceptable Solutions shall form part of this specification.

NZBC	B1/AS1	Structure – general
NZBC	E1/AS1	Surface water
AS/NZS 1260	PVC pipes and fittings for drain, waster and vent applications	
AS/NZS 3500	National plumbing and drainage code	
	3500.3: Stormwater drainage	
AS/NZS 1260:2002	Unplasticised PVC waste and ventilating pipe, fittings and accessories.	
AS/NZS 1477:1996	Unplasticised PVC pipes for cold water services.	
AS/NZS 1260 & 1254	Unplasticized PVC sewer and drain pipe and fittings.	

4. MATERIALS:

All materials and fittings shall be the best of their respective kinds.
All cold water piping may be unplasticised PVC or polybutylene.
All hot water piping may be copper or polybutylene.
All wastes, soil and vent pipes may be unplasticised PVC

5. WORKMANSHIP:

All work shall be in accordance with best trade practice. All runs shall be in straight lines with minimum bends and junctions.

All copper bends shall be either easy pipe bends or preformed elbows braze jointed. (Elbows shall be restricted to an absolute minimum.)

All pipework shall be concealed in concrete floor, framing or ceiling cavity.

Any pipework set into concrete shall be polybutylene and must be fully lagged with Denso tape or similar to allow for thermal and mechanical movement.

6. PIPES AND SIZES:

As a minimum requirement all individual fittings e.g. cisterns, sinks, basins etc. shall have a 12mm connection – cold (and hot where applicable).

Where fittings are grouped together 20mm branch supply (hot and cold) will be taken to each group with 12mm connections made.

Showers will be connected to branch lines independent of other fittings with their supply taken as directly as possible from either the water heater or the cold supply source.

Provide piped reticulation to all fittings shown in cold supply; and hot where applicable from water heater.

7. WASTES:

Provide U/PVC wastes from all fittings to gully traps as shown either to sizes given or to comply with standards. Over-length wastes to be oversized in diameter and to be fitted with screw cap cleaning eye and breather pipe mounted 2m up wall.

All wastes to be turned down into gullys – under grates (maximum of 4 per gully).

8. VENTS:

Provide all terminal vents to drains and back vents to fittings, from U/PVC, to comply with standards.

All back vent pipes to be run in wall cavities and project above roof.

All terminal vents to be neatly clipped to exterior of wall where shown. Terminate with perforated PVC flush end cap.

9. FITTINGS:

Provide and install all fittings shown on drawings and/or scheduled. Connect all water supplies pipes, wastes and taps and valves and leave complete in working order.

10. HOT WATER SYSTEM:

Water heating shall be Dux Gas hot water system.

ELECTRICAL

1. FEES:

Pay all fees and charges and obtain all necessary permits for this trade.

2. MATERIALS AND WORKMANSHIP:

All materials used under this contract shall be to approve New Zealand or overseas Standards. Allow for materials necessary to complete the Contract, whether specified or not. All work shall be carried out by a Registered Electrician holding a current practice licence in accordance with regulations and best trade practice and in a manner which will cause minimum inconvenience to other workmen and the work as a whole. Do all cutting away, drilling etc and with timber cut the minimum only for the entry of cables.

3. MAINS SUPPLY:

Arrange with the Electric Supply Authority, allow for and pay all fees for the connection of underground supply to the residence. Visit site to assess costs of obtaining supply, before submitting a tender for the work.

4. METER BOX:

Provide and install recessed meter box where shown on plan. Confer with Carpenter for trimming it.

5. MAIN SWITCHBOARD:

Provide and install in recess main switchboard complete with all necessary control and auxiliary equipment.

6. WIRING:

- a) Run new 2 and 3 core TPS cable for sub-circuit wiring to lights, power outlets, switches and for installation of appliances shown in the house drawings and/or in the Electrical Fittings, Fixtures and Appliances Schedule.
- b) Locate cable runs in centres of timber framing members so that nailing or screwing of linings can be done without damaging cables. Holes made should be just sufficient in size to pull cables through - not adversely affect the strength of the framing.
- c) Ensure wiring is to locations agreed with Owner without fouling installations by other trades e.g.: to required mounting height of switches and power outlets above floor level or above work tops and to required alignment of lights along and across ceilings.

7. SCHEDULE ITEMS:

Provide and install all goods in the ELECTRICAL SCHEDULE, except where it is indicated that the Owner or others shall supply.

Connect:

- Hob and Oven
- Dishwasher
- Circuits to internal Distribution Board

Wire:

- 2 TV Outlets (aerial not included)
- 2 Telephone Points

Install:

- Mains to Meter Board
- Mains Cable
- Range hood
- Heat Pump/Airconditioner & Condenser/Compressor

MISCELLANEOUS

1. KITCHEN:

The supply and fitting of the kitchen includes cupboards, pantry, benchtops and bowl (tapware supplied by plumber). There will be a P.C. Sum for the kitchen.

2. VANITIES:

To supply and fit two (2) vanity there will be a P.C. Sum.

3. APPLIANCES:

Oven and hobs will be Bosch unless otherwise requested by the Client

5. DECORATING AND PAINTING:

- a) Exterior painting to all fascias and soffits.



ARDEX WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part

Single Component Undertile Waterproofing Membrane

BRANZ Appraised

Low VOC content – meets Green Building Council of Australia Green Star IEQ-13 requirements

Fast drying one part acrylic membrane

DISCLAIMER The technical details, recommendations and other information contained in this data sheet are given in good faith and represent the best of our knowledge and experience at the time of printing. It is your responsibility to ensure that our products are used and handled correctly and in accordance with any applicable New Zealand Standard, our instructions and recommendations and only for the uses they are intended. We also reserve the right to update information without prior notice to you to reflect our ongoing research and development program. Country specific recommendations, depending on local standards, codes of practice, building regulations or industry guidelines, may effect specific installation recommendations. The supply of our products and services is also subject to certain terms, warranties and exclusions, which may have already been disclosed to you in prior dealings or are otherwise available to you on request. You should make yourself familiar with them.

ARDEX WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part Undertile Waterproofing Membrane



PRODUCT DESCRIPTION

Ardex WPM 001 (Superflex Bathroom & Balcony Premixed 1 Part) is a tough, ready to use waterproofing membrane specifically designed for use under tiles. Ardex WPM 001 has been uniquely formulated with synthetic microfibres to increase its strength and eliminate the need for a separate reinforcement mat. Ardex WPM 001 is based on the most advanced acrylic polymer technology, and is totally resistant to re-emulsification once cured.

Ardex WPM 001 is flexible, safe to use, low in odour, and is fully compatible with polymer modified tile adhesives. Ardex WPM 001 is one of the fastest drying one part acrylic membranes on the market – normally ready to tile in 48 hours @ 23°C.

Ardex WPM 001 meets the Green Building Council of Australia Green Star IEQ-13 requirements for Architectural Sealant when tested in accordance with SCAQMD Method 304-91 Determination of Volatile Organic Compounds (VOC) in Various Materials as referenced by South Coast Air Quality Management Division (SCAQMD) Rule 1168.

FEATURES/BENEFITS

- Fast drying Ardex WPM 001 can be tiled over in 48 hours in non critical areas*
- Liquid reinforced: Excellent strength, eliminates need for reinforcing mat
- Flexible: Accommodates normal building movement class 3 membrane as per AS/NZ 4858: 2004 Wet Area Membranes
- Advanced acrylic: Will not re-emulsify once cured
- Designed for tiling - Fully compatible with Ardex tile adhesive systems
- Water based, safe to use, low odour & easy cleaning
- CSIRO Appraisal #91 for undertile waterproofing in shower recesses
- Conforms to the requirements of AS/NZ 4858: 2004 Wet Area Membranes. (Ref: CSIRO Report 3779)

*Critical areas include areas where the membrane is applied at greater than 0.5mm or over impermeable substances such as over bond breakers or incorporating other reinforcement. Longer drying times are necessary in these areas.

APPLICATION RANGE

Performance Levels

Commercial and residential

Location

Internal wet areas, balconies, decks, and other areas that will be tiled or otherwise protected from regular foot traffic.

Surfaces

Walls & floors

Substrates

Concrete	Cured for min. 28 days or sealed when set with one coat of Ardex WPM 300 (HydrEpoxy 300) at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. External wet concrete should be allowed to dry thoroughly or sealed with one coat of Ardex WPM 300 as above.
Renders and screeds	Cured for min. 7 days or sealed when set with one coat of Ardex WPM 300 at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. Wet render should be allowed to dry thoroughly or sealed with one coat of Ardex WPM 300 as above.
Fibre cement	Suitable for wet area grade fibre cement.
Plasterboard	Wet area grade only.
Plywood	Structural plywood (PAA branded), marine grade or other wet area grade only.
Particleboard	Wet area grade, internal use only (special preparation is required – contact Ardex).
Permanent Immersion	In conditions of permanent immersion, it is recommended that Ardex WPM 002 (Superflex Two Part) is used. Must be covered with tiles for full immersion.
Contact Ardex for use over existing membranes, covering materials, and any other substrates not listed.	

SPECIFICATION CLAUSE

ARDEX WPM 001 (Superflex Premixed)

The waterproofing membrane shall be Ardex WPM 001: a one part acrylic modified fibre reinforced membrane formulated to provide a tough, long lasting water barrier under tiling systems.

PACKAGING

Single component: 20kg (approx 15 litres) or 6.5kg (approx 5 litres).

TABLE 1

	Thickness per Coat		Total Dry Film Thickness (2 coats)	Theoretical Coverage		Per Unit
	Dry Film	Wet Film		Per coat	For 2 coats	
FLOORS	0.5mm	1.0mm	1.0mm	15m ²	7.5m ²	20kg(15L) unit
WALLS	0.25mm	0.5mm	0.5mm	30m ²	15m ²	20kg(15L) unit

SHELF LIFE

12 months when stored in the original unopened packaging, in a dry place at 23°C. Do not store in direct sunlight. Replace lid tightly after use. Use remaining contents from part used containers within 3 months.

COVERAGE

Two coats are recommended for an effective waterproof membrane.

Coverage will vary depending on the porosity of the surface.

One 20kg (15 litre) unit will cover approximately 7.5-15m² (based on two coats) depending on area requirements between wall and floor surfaces to be treated. Refer Table 1.

DRYING TIMES**Recoat time**

1-2 hours at (23°C/50% RH) between first and second coats. Alternatively, if a polyester mat is used between coats then the second coat can be applied whilst the first coat is still wet.

Dry through

The slowest drying areas are those where the membrane has been applied over a silicone bond breaker, eg. wall and floor junctions. The membrane cannot be tiled over until these critical areas are completely dry. Ardex WPM 001 is totally dry in 48 hours at 23°C/50% RH, but can take up to 72 hours at 10°C/50% RH in corners or for thick films.

Fully cured

The shower should not be used until the membrane has reached its full strength. Ardex WPM 001 membrane is fully cured after 3 days at 23°C, or after 5 days at 10°C.

Drying times will vary depending on humidity, surface temperature and surface porosity.

Do not apply on substrates where the surface temperature is below 10°C or above 35°C.

CLEANING

Wash hands, brushes, rollers, etc, with water while the membrane is still fresh. Remove cured material with mineral turpentine.

SAFETY PRECAUTIONS

Do not use the product in the following situations:

- Areas subject to negative hydrostatic pressure or rising damp, unless treated with Ardex WPM 300.
- Where the substrate is wet – wet surfaces can be sealed with one coat of Ardex WPM 300 at a coverage rate of 3.0 square metres per litre and allowed to cure overnight.
- Where rain is imminent.
- Where the membrane will be left exposed and subjected to regular foot traffic.
- On glazed, glass or other totally impervious surfaces (eg. areas pre-treated with water repellants).
- Where the surface temperature is below 10°C or greater than 35°C.
- All floor areas must have adequate falls either built into the substrate or achieved with a sand/cement screed prior to application of the Ardex WPM 001.

For substrates or situations other than those listed contact Ardex.

SAFETY DATA

Ardex WPM 001 is non-hazardous and non dangerous. It may produce discomfort of the eyes, respiratory tract and skin. Do not breathe gas/fumes/vapour/spray. Avoid contact with skin. Wear eye/face protection. In case of contact with eyes, rinse with plenty of water and seek medical advice.

ADDITIONAL INFORMATION IS LISTED IN THE MATERIAL SAFETY DATA SHEET.

QUALITY PRODUCT

Ardex WPM 001 is manufactured and tested to Ardex procedures which are maintained in accordance with Quality System Standard ISO 9001.

ARDEX WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part Undertile Waterproofing Membrane

USER NOTES

The technical details and recommendations contained in this data sheet are given in good faith and represent the best of our knowledge and experience at the time of printing. It is the responsibility of the user to ensure that the product is used in accordance with Ardex instructions and in applications for which they are intended.

APPLICATION

Apply Ardex WPM 001 by brush or roller. A medium nap (12-15mm pile) paint roller is recommended. New rollers should be dampened with water before being used for the first time.

For best results with a paint brush use a good quality, 50mm long bristle variety.

To achieve the required dry film thickness per coat, application must consist of laying the product onto the surface and light finish the surface. Do not try to apply in the same manner as a building paint. A conventional building paint is normally applied at 25-40 micrometers wet film thickness while Ardex WPM 001 needs to be applied at between 0.5 and 1.0 mm per coat depending on product and application (Refer Table 1).

Critical Areas:

INTERNAL WET AREAS

1. Construction should be in accordance with Australian 3740 - 2004 Waterproofing of wet areas within residential buildings.
2. All render and tile bed requirements should be completed before application of the membrane and tiles or other floor coverings should be direct bonded to the membrane.
3. Ensure wall & floor sheets are installed as per sheet manufacturer's recommendations.
4. Ensure suitable brick/concrete hobs are used (do not use timber).

5. Ensure that falls to the waste are min 1:60 (ie. approx. 30mm in 2mtr)) before waterproofing. Ensure outlet pipes are fixed securely and that the waste or drainage flanges are recessed into the floor.
6. Avoid sheet joints in shower recess floor. Ensure that sheets are securely fixed to the wall at the bottom edge, and sheet joints are sealed with a neutral cure silicone sealant spread approximately 6mm on either side of the joint.
7. Treat nail and screw holes with neutral cure silicone sealant.
8. Seal the perimeters of taps, shower outlets and waste outlets with neutral cure silicone sealant.
9. Apply a bead of neutral cure silicone sealant to all horizontal and vertical corners.
10. Apply a bead of neutral cure silicone sealant to the junction of the hob or angle and walls. Spreading the sealant to 6mm on either side of the joint.
11. Waste outlets shall incorporate a puddle flange or similar in accordance with AS3740 & the top surface shall be set flush with the surface to which the membrane is to be applied. A bead of neutral cure silicone shall be applied across the intersection of the puddle flange and the screed/floor.
12. Apply the membrane to the entire shower recess floor and down into waste or drainage flange. Apply the membrane over the hob and at least 150mm beyond the outside edge of the hob (ideally to entire wet area floor).
13. Apply the membrane 1800mm up the walls or to the height of the shower rose within the shower recess.
14. Install the shower screen to inside edge of the hob.

Fig.1 – Shower Recess – Critical Areas

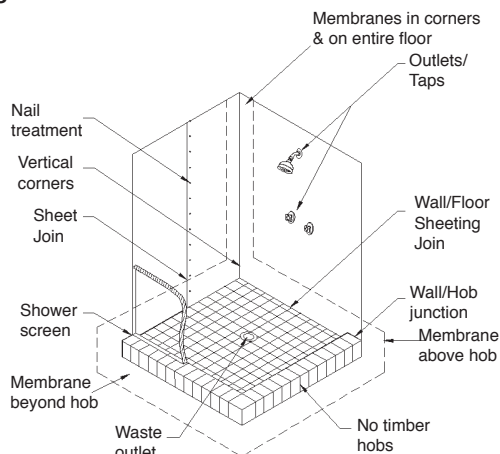
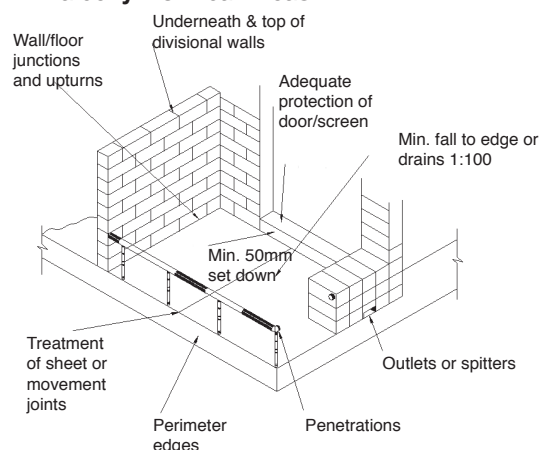


Fig.2 – Balcony – Critical Areas



BALCONIES AND DECKS

1. Ensure that the deck is constructed with falls to edge/drains of min 1:100 (ie. 20mm in 2m) or else achieve the fall with a sand/cement screed.
2. Ensure a min set down (step down) of 50mm to the finished floor level (ie. top of tiles).
3. Ensure suitable flashing is installed, ideally prior to the installation of the balcony screen/ sliding door.
4. Treat any sheet joints with a neutral cure silicone prior to waterproofing.
5. Prepare and seal all wall/floor junctions with a bead of neutral cure silicone.
6. Apply the membrane up the step down and as far up underneath the screen door flashing as possible (ideally waterproof prior to installing door).
7. Where possible, apply the membrane prior to building divisional walls, or other items such as planter boxes.
8. Apply the membrane to the entire balcony floor and at least 50mm up the wall above the top surface of the finished tiles and finished below the wall drainage vents.
9. Apply the membrane to the top of the parapets and divisional walls, or else install suitable metal capping.
10. Apply the membrane down over the front edge of the balcony onto the drip rail.
11. Carefully seal any gaps around balcony penetrations prior to applying the membrane.
12. Apply the membrane down into outlets and drains, ensuring excess material is removed.
13. Ensure all weep holes are above the membrane application area.

APPLICATION NOTES

Surface preparation

- Ensure all surfaces are structurally sound and totally dry. The pores of concrete surfaces should be open (absorbent surface). All sheet substrates must be securely fixed in accordance with the manufacturers instructions.
- Falls to outlets of at least 1:60 or approx. 30mm in 2mtr (wet areas) or 1:100 externally, must be achieved prior to tiling.
- The surface to be coated should be free from dust, oil, paint, curing compounds and any other contaminating materials.
- Damaged concrete should be repaired (leveled) and surface defects including all cracks and sharp protrusions should be treated prior to the application of the membrane.

- Remove laitance on concrete or screeds by mechanical means.
- Highly dense (>40MPa) or steel trowelled concrete should be roughened by suitable mechanical means (shot blasting, grinding, etc).

Priming

The primer is a critical part of the waterproofing system. Apply one coat of Ardex WPM 265 (Sheltercoat/ Superflex Water Based Primer) by brush or roller to all areas to be waterproofed including the floor waste. Allow the primer to completely dry prior to the application of the Ardex WPM 001 membrane. This will take around 20-30 minutes depending upon weather conditions and porosity of the substrate. Coverage is approximately 6m² per litre. Plastic (eg. PVC) pipes should be primed with a solvent based plumbers pink primer. Prime metal surfaces with a suitable metal primer such as epoxy polyamide primer.

GENERAL APPLICATION

Crack preparation

Cracks <2mm:

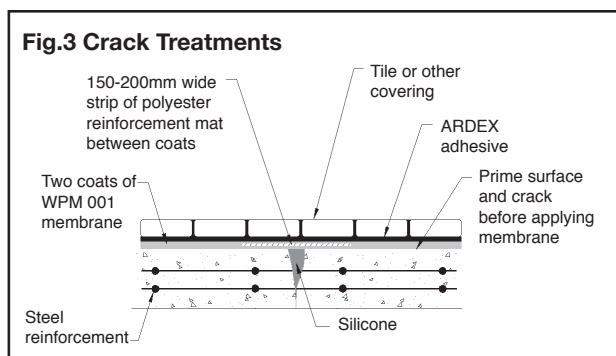
Clean and remove any loose particles in the crack. Prime the crack and adjacent area carefully with Ardex WPM 265 and allow to dry before applying two coats of Ardex WPM 001 membrane in a band at least 200mm wide equidistantly across the crack, along the length of the crack.

Cracks 2-6mm:

(Refer Fig. 3) Prepare and prime the crack as above. Apply a bead of neutral cure silicone into the crack and extend it 6mm either side. Apply a 300mm wide band of Ardex WPM 001 equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of Ardex "Deckweb" polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth preferably using a fluted roller, and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

Cracks >6mm:

Contact your local Ardex representative.



ARDEX WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part Undertile Waterproofing Membrane

Movement/construction joints

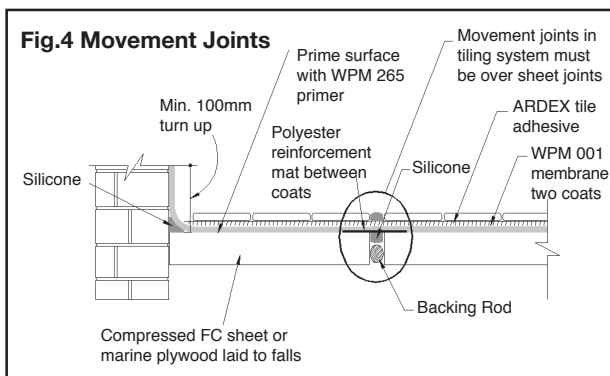
Movement joints (<6mm)

Use same procedure as in crack preparation.

Clean and prime the joint before filling it with a bead of neutral cure silicone and extending it 6mm each side of joint. Apply a 300mm wide band of Ardex WPM 001 equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of Ardex "Deckweb" polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the mat and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

Construction joints (>6mm)

Use the same procedure as above, but replace the reinforcing mat with 120mm of Ardex Coving Bandage. Note: if tiling, movement joints should be taken to the surface of the tiles. Fill the joints between the tiles immediately above the movement joints with an appropriate joint sealant. (Refer Fig.4)



Corners & coving areas

After priming with Ardex WPM 265 and allowing to dry, apply a generous bead (12mm) of neutral cure silicone sealant to seal all junctions between two substrates in coving areas and corners. Smooth over the silicone so that it extends 6mm up the wall and 6mm over the floor and allow to touch dry.

Apply a first coat of Ardex WPM 001 to the area and allow the membrane to dry.

Apply a second coat ensuring that excess product is removed from the junction (the final dry film thickness should be minimum of 1.0mm). Alternatively, if a polyester reinforcement mat is used between coats then the second coat can be applied as soon as the mat is fully bedded into the first coat.

WALL/FLOOR JUNCTION

After priming with Ardex WPM 265 and allowing to dry, apply a generous bead (12mm) of neutral cure silicone sealant to seal all junctions between two substrates. Smooth over the silicone so that it extends 6mm up the wall and 6mm over the floor and allow to touch dry. Place a 190mm wide band of Ardex "Deckweb" polyester woven mat reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. The Ardex WPM 001 should be applied to at least 100 mm up the wall surfaces as per the recommendations for the application of Ardex WPM 001 to floors.

Walls

Two coats of Ardex WPM 001 are required to achieve a minimum total dry film thickness of 0.5mm.

After priming with Ardex WPM 265 and allowing to dry, apply two coats of Ardex WPM 001 (to achieve a minimum dry film thickness of 0.5mm) in two opposite directions. Wall sheet joints should be treated with a neutral cure silicone, PVC duct tape or base jointing compound. In balcony situations take the membrane up underneath any existing cover flashing or install appropriate flashing. Allow the first coat to dry before applying the second coat.

Floors

Two coats of Ardex WPM 001 are required to achieve a minimum total dry film thickness of 1.0mm. The flooring recommendations should be extended at least 150 mm up all perimeter walls.

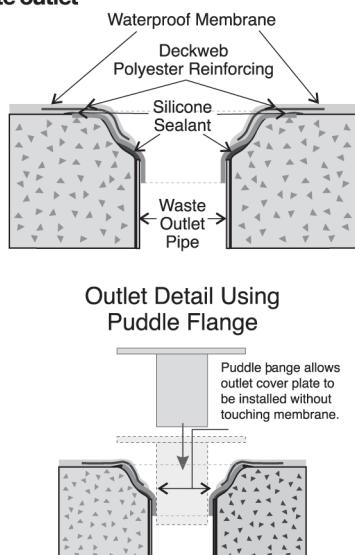
Prime the surface with Ardex WPM 265 and allow to dry.

Apply the first coat over the primed surface and allow it to dry (1-2 hours at 23°C, 50%RH) before applying a second coat in an opposite direction. In shower recesses a drainage flange must be installed on all timber/sheeted floors, and are strongly recommended on all other substrates. Where possible rebate the flange into the floor. Seal the perimeter of the flange with neutral cure silicone treatment. If a flange is not installed the membrane must be applied down into the pipe. (Refer Fig.5) Allow the membrane to dry completely before tiling. Refer drying times above.

Waste Outlet

Prime the surface with Ardex WPM 265 and allow to dry. Surfaces of the outlet flange must be primed with an appropriate primer.

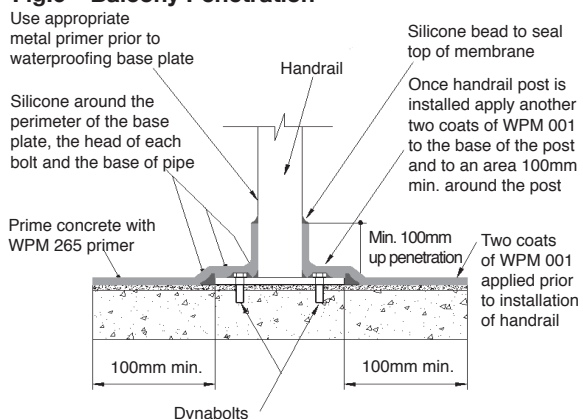
Apply Ardex WPM 001 over the adjacent floor surface extending down into the waste outlet flange overlapping the edge of flange by at least 30mm. Place Ardex "Deckweb" polyester woven mat reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. (Refer Fig. 5)

Fig.5 – Waste outlet**Balcony penetrations (Refer Fig.6)**

All upstands are to be mechanically fixed through the membrane, which must be fabricated with a base plate flange.

Prime the metal with an appropriate metal primer such as an epoxy polyamide primer and allow to dry. Apply a 10mm bead of neutral cure silicone around the perimeter of the penetration. Apply the first coat of Ardex WPM 001 on the substrate and the flanged metal.

Allow first coat to dry before applying a second coat ensuring a finished dry film thickness of no less than 1.0mm is achieved. Place a suitable flashing collar around the penetration sealing it with a suitable sealant.

Fig.6 – Balcony Penetration**Tiling systems**

It is advisable to conduct a flood test of the shower once the membrane has cured (normally after 72 hours), and before the tiling commences. A broad range of Ardex tile adhesives can be used over Ardex membranes. Contact Ardex or your nearest Ardex stockist for advice on the most suitable system.

TECHNICAL DATA**Ardex WPM 001 (Superflex Premixed)
Characteristics of liquid**

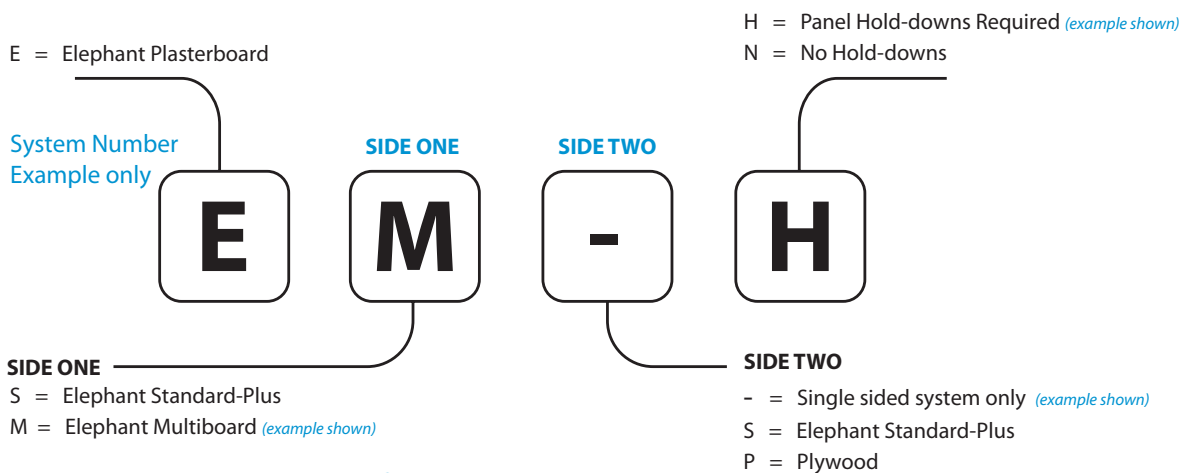
Form & Colour	Blue viscous paste
Type	Single part
Specific Gravity	Approx. 1.34kg/litre
pH of Liquid	8.5
Viscosity of Liquid (RVT Brookfield, spindle 7 speed 10)	52,000cps
Non Volatile Matter (volume) AS1321.10	50.3%±1
Tensile Strength 7 days dry AS1145	1.04 MPa
Full Cure	1.92 MPa
Elongation at Break 7 days dry AS1145	780%

Conforms to requirements of class 3 membrane of AS/NZ 4858: 2004 Wet Area Membranes.

NOTE: Most of the tests have been carried out in the Ardex laboratory under standard conditions (23±2°C, 50±5% R.H)

Quickbrace™ Design Solutions

Quickbrace™ Numbering System



QuickBrace™ Systems & Performance Table

System Number	Lining Requirement	Min. Length (m)	BU/m		Panel Hold-downs	Bracing Corner Pattern
			Wind	Earth-quake		
Plasterboard on One Side						
ES-N	Elephant Standard-Plus on One Side	0.4	65	60	No	Condensed
		1.2	70	65		
		1.8	80	65		
ES-H	Elephant Standard-Plus on One Side	0.4	80	75	Yes	
		0.8	100	85		
		1.8	115	85		
EM-H	Elephant Multiboard on One Side	0.4	95	100		
		0.8	120	110		
		1.2	140	115		
Plasterboard on Both Sides						
ESSN	Elephant Standard-Plus on Both Sides	0.4	80	75	No	
		0.8	90	80		
		1.2	95	85		
ESSH	Elephant Standard-Plus on Both Sides	0.4	95	110	Yes	
		0.8	140	130		
		1.2	150	140		
EMSH	Elephant Multiboard on One Side Elephant Standard-Plus on the Other	0.4	110	115		
		0.8	140	135		
		1.2	150	145		
Plasterboard One Side, Plywood the Other						
ESPH	Elephant Standard-Plus on One Side Plywood on the Other	0.4	100	115	Yes	
		0.8	140	140		
		1.2	150	150		
EMPH	Elephant Multiboard on One Side Plywood on the Other	0.4	120	135		
		0.8	140	145		
		1.2	150	150		

* Timber Floors - It is required by NZS 3604:2011 to limit BU ratings to 120 BU/m for timber floors. For a higher floor frame uplift, a specifically engineered design will be required.

Note- The QuickBrace™ Numbering System and the sub components thereof are protected by copyright.



Wall Bracing Design Sheet One

Manual Method

Design Step One: Determine and Record the Project Specifications

Please photocopy

Project Name	_____	Project Specifications	(tick where appropriate)
Street & Number	_____	Storey:	Single ☐ Double ☐
Lot & DP Number	_____	Foundation Type:	Subfloor ☐ Slab ☐
City/Town/District	_____	Single or Upper Floor Level to Apex	m
Designer Name	_____	Lower Floor Level to Apex (If Double storey)	m
Company Name	_____	Average Ground Level to Apex (If on Subfloor)	m
Engineers Name	_____	This Bracing Calculation completed by:	_____

Roof Details	
Height above Eaves (h)	m
Roof Cladding	Light/Heavy
Average Roof Pitch (deg.)	
Part Storey in Roof Space	Yes or No

Wall Details	Single/Upper Storey	Lower Storey	Subfloor
Average Internal Stud Height	m	m	m
Wall Cladding	Light/Medium/Heavy	Light/Medium/Heavy	Light/Medium/Heavy
Building length (BL)	m	m	m
Building width (BW)	m	m	m
Gross Plan Area (GPA)	m ²	m ²	m ²

NB. If the average roof pitch is over 25 degrees, use roof length and width to determine BL and BW

Design Step Two : Determine the Wind and Earthquake Zone

Wind Steps	Determine	Circle One of the following						Reference
1	Topographic Class	T1	T2	T3	T4			Page 7
2	Site Exposure	Sheltered	Exposed					Page 8
3	Ground Roughness	Urban	Open					Page 8
4	Wind Region	A	W					Figure 5.1, NZS 3604:2011
5	Lee Zone	Yes	No					Figure 5.1, NZS 3604:2011
6	Wind Zone	Low	Medium	High	Very High	Extra High	SED	Table Below

Wind Zone Table

Wind Zone Table		TOPOGRAPHIC CLASS							
Wind Region	Ground Roughness	T1 (Gentle)		T2 (Moderate)		T3 (Significant)		T4 (Extreme)	
		-----SITE EXPOSURE-----							
		Sheltered	Exposed	Sheltered	Exposed	Sheltered	Exposed	Sheltered	Exposed
A	Urban	L	M	M	H	H	H	H	VH
	Open	M	H	H	VH	H	VH	VH	EH
W	Urban	M	H	H	VH	H	VH	EH	EH
	Open	H	VH	VH	EH	VH	EH	SD	SD

Projects in Lee Zones shall have their Wind Zones increased as follows:

- Low wind becomes High,
- Medium wind becomes Very High
- High wind or above becomes Specific Design

Earthquake Zone

EQ Steps	Determine	Circle one of the following				Reference
1	Earthquake Zone	1	2	3	4	Figure 5.4, NZS 3604:2011
2	Site Subsoil classification	A or B	C	D	E	Territorial Authorities or SED
3	Floor Load	2 kPa	3 kPa			
4	Room in roof space	Yes	No			Building Plan
5	Annual Exceedance probability	1/500 yrs (factor 1.0)	1/1000 yrs (factor 1.3)	1/2500 yrs (factor 1.8)		



Wall Bracing Design Sheet Two

Manual Method

Please photocopy

Design Step Three: Calculate the Bracing Demand for Wind and Earthquake

Once the Project Specifications and Wind Zone and Earthquake Zone have been determined from Steps One and Two, refer to Wind and Earthquake tables in NZS 3604:2011. Section 5 (and Section 14 if floor load is 3kPa), to complete Design Sheet Two.

Wind Tables (refer NZS 3604:2011 Section 5)		Earthquake Tables (refer NZS 3604:2011 Section 5)			
Level	Table	Floor Load =	2kPa		3kPa
Single or Upper Storey	5.6	Storeys =	Single	Double	Single Double
Lower Storey	5.7	Foundation Type	Table		Table
Sub Floor Structure	5.5	Subfloor Framing	5.8	5.9	14.1 14.2
		Slab on Ground	5.10	5.10	14.3 14.3

Single or Upper Level Wind Demand					
Refer Table 5.6					
Single or Upper Level Wind Along =					BU/s/m
Single or Upper Level Wind Across =					BU/s/m
WIND ALONG	BW	W ALONG			
Single or Upper Level		X		=	BU/s
WIND ACROSS	BL	W ACROSS			
Single or Upper Level		X		=	BU/s

Single Or Upper Level Earthquake Demand					
If Subfloor refer Table 5.8 If Slab refer table 5.10					
Single or Upper Level Earthquake (E) =					BU/s/sqm
Note: For part storey in roof space add E + 4					
EQ ALONG and EQ ACROSS: GPA E					
Single or Upper Level		X		=	BU/s

Lower Level Wind Demand					
Refer Table 5.7					
Lower Level Wind Along =					BU/s/m
Lower Level Wind Across =					BU/s/m
WIND ALONG	BW	W ALONG			
Lower Level		X		=	BU/s
WIND ACROSS	BL	W ACROSS			
Lower Level		X		=	BU/s

Lower Level Earthquake Demand					
If Subfloor refer Table 5.9 If Slab refer table 5.10					
Lower Level Earthquake (E) =					BU/s/sqm
Note: For part storey in roof space add E + 4					
EQ ALONG and EQ ACROSS: GPA E					
Lower Level		X		=	BU/s

Sub Floor Level Wind Demand					
Refer Table 5.5					
Sub Floor Level Wind Along =					BU/s/m
Sub Floor Level Wind Across =					BU/s/m
WIND ALONG	BW	W ALONG			
Sub Floor Level		X		=	BU/s
WIND ACROSS	BL	W ACROSS			
Sub Floor Level		X		=	BU/s

Sub Floor Level Earthquake Demand					
If Single Storey refer Table 5.8 If Double Storey refer table 5.9					
Sub Floor Level Earthquake (E) =					BU/s/sqm
Note: For part storey in roof space add E + 4					
EQ ALONG and EQ ACROSS: GPA E					
Sub Floor Level		X		=	BU/s

Transfer Results to appropriate Solution Sheets overleaf

Design Step Four: Distribute Bracing Lines and Bracing Elements as evenly as possible.

Design Step Five: Ensure Individual Bracing Line Totals exceed the Individual Bracing Line Demand. (See Sheet Overleaf)

Design Step Six: Ensure Total Bracing Achieved exceeds Bracing Demand for both Wind & Earthquake. (See Sheet Overleaf)



Wall Bracing Solution Sheet: Along

Manual Method

Please photocopy for each level

Project Name							Storey Level			
Along							(Single, Upper, Lower or Sub-Floor)			
Wall Bracing Line							Wind		Earthquake	
1	2	3	4	5	6	7	W8	W9	E8	E9
Line Label	Bracing Element No.	Supplier	System Number	Element Length	Stud Height	Wall Angle	Rating BU/m	Achieved BUs	Rating BU/m	Achieved BUs
A										
		Minimum BUs Required for Line =			Line Sub-Total =					
B										
		Minimum BUs Required for Line =			Line Sub-Total =					
C										
		Minimum BUs Required for Line =			Line Sub-Total =					
D										
		Minimum BUs Required for Line =			Line Sub-Total =					
E										
		Minimum BUs Required for Line =			Line Sub-Total =					
F										
		Minimum BUs Required for Line =			Line Sub-Total =					
G										
		Minimum BUs Required for Line =			Line Sub-Total =					
							Wind		Earthquake	
							Along BUs Achieved =			
							OK?		OK?	
From Sheet Two Along BUs Required =										



Wall Bracing Solution Sheet: Across

Manual Method

Please photocopy for each level

Project Name							Storey Level			
Across							(Single, Upper, Lower or Sub-Floor)			
Wall Bracing Line							Wind		Earthquake	
1	2	3	4	5	6	7	W8	W9	E8	E9
Line Label	Bracing Element No.	Supplier	System Number	Element Length	Stud Height	Wall Angle	Rating BU/m	Achieved BUs	Rating BU/m	Achieved BUs
M										
		Minimum BUs Required for Line =			Line Sub-Total =					
N										
		Minimum BUs Required for Line =			Line Sub-Total =					
O										
		Minimum BUs Required for Line =			Line Sub-Total =					
P										
		Minimum BUs Required for Line =			Line Sub-Total =					
Q										
		Minimum BUs Required for Line =			Line Sub-Total =					
R										
		Minimum BUs Required for Line =			Line Sub-Total =					
S										
		Minimum BUs Required for Line =			Line Sub-Total =					

Wind		Earthquake	
Across BUs Achieved =		Across BUs Achieved =	
OK?		OK?	
From Sheet Two Across BUs Required =		From Sheet Two Across BUs Required =	



Wall & Ceiling Construction Details

Wall Framing

Framing is to comply to NZS 3604:2011 and must be a minimum of 70 x 45mm for internal walls and 90 x 35mm for external walls. Nogs or dwangs are not a requirement in order to achieve the bracing ratings published in this document.

Fastening Bracing Elements to Floors

Quick-Brace™ System Number	Bottom Plate Fixing Requirements			Additional Requirements
	Concrete Floors		Timber Floors	Concrete or Timber
	External Walls	Internal Walls	External or Internal Walls	External or Internal
ES-N	Fix as per NZS 3604:2011	Fix as per NZS 3604:2011. Alternatively see Note 1 below		None
ESSN	Not applicable			
ESSH	Not applicable	Fix as per NZS 3604:2011	Pairs of 100 x 3.75mm hand driven flat head nails or three 90 x 3.15mm power driven nails at 600mm centres all in accordance to NZS 3604:2011	Panel End Hold downs at each end of the bracing element.
EMSH				
ES-H				
EM-H				
ESPH				
EMPH				

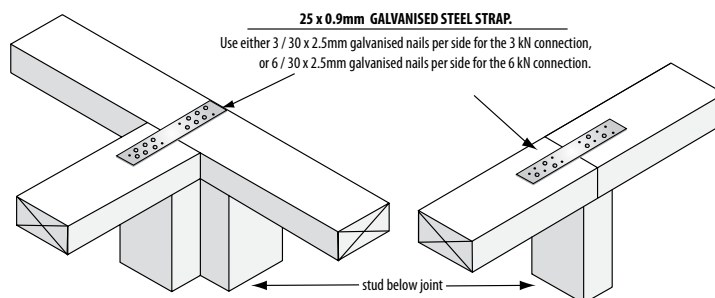
Note 1:

Min 75 x 3.8mm shot-fired fasteners with 16mm discs at 150mm & 300mm from end studs and thereafter at 600mm centres. Ensure a minimum penetration of 30mm into the concrete foundation.

Top Plate Connections

Top plate connections detailed on the right meet the requirements of NZS 3604:2011 clause 8.7.3 Joints in Plates. The joints must be over a stud or solid blocking.

A 6kN connection is required if any bracing element in the wall exceeds 100 bracing units. Otherwise a 3kN connection is adequate.



Panel End Hold down Details - Bracing Anchor Brackets

Either Pryda® Bracing Anchor or any other proprietary panel end hold down bracket with a minimum performance of 15kN.

Concrete Floors		Timber Floors	
M12 galvanised anchor bolt or proprietary equivalent with minimum characteristic strength of 15kN . Set no less than 75mm into the concrete.		M12 x 150mm galvanised coach screw or proprietary equivalent with minimum characteristic strength of 12kN.	
External	Internal	External	Internal
Locate the bracket flush with the inside face of the framing in order to maximise concrete edge distance.	Locate the bracket centrally on the bottom plate.	Locate the bracing anchor bracket so that the coach screw is centred over the timber below.	Full depth solid blocking centrally positioned beneath the coach screw.

Panel End Hold down Details - Bracing Strap & Bolt Detail

N.B. Bottom plate anchor placements have been reduced to 80mm from the end of the bracing element. This is to be consistent with the bolt location when using bracing anchor brackets and represents industry best practise. This does not affect previous designs or installations.

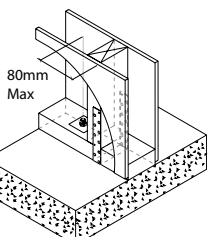
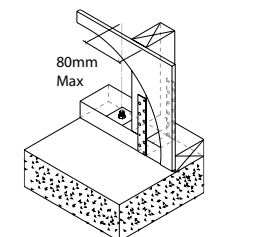
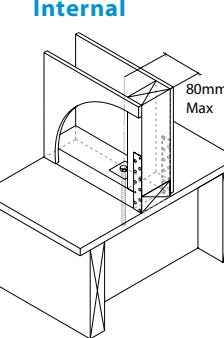
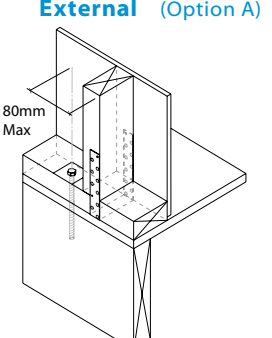
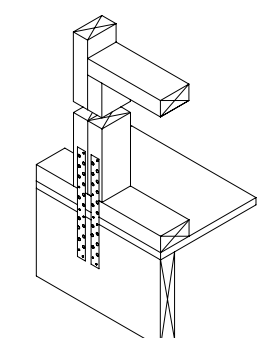
Bracing Strap:

400 x 25 x 0.9mm galvanised strap passing under the bottom plate. Six 30 x 2.5mm galvanised flat head nails to each side of the stud and three 30 x 2.5mm galvanised flat head nails to each side of the bottom plate.

The bracing strap should be checked into the framing in order to make the substrate flush when receiving the plasterboard lining.

Position it in such a way that the important corner fastenings of the bracing element are not affected by it. Keeping the strap to the edge of the end stud as shown below will ensure the important corner fastenings won't penetrate the bracing strap.

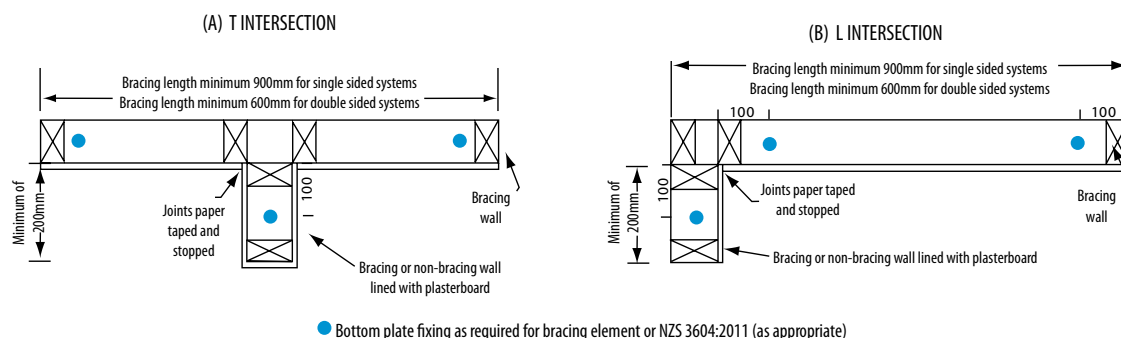
Extra thickness and/or corrosion protection may be required on exposed and unexposed sites as per requirements of NZS 3604:2011

Concrete Floors M12 x 150mm galvanised bolt or proprietary equivalent with minimum characteristic strength of 15kN. Set no less than 75mm into the concrete. Allow for a 3 x 50 x 50mm galvanised washer within 105mm of the ends of the bracing element.	Internal 	External 	Timber Floor: External (Option B) Block up to the first nog to allow for double strapping using three 100 x 3.75mm nails. Two 300 x 25 x 0.9mm galvanised straps pass down onto the floor joist. Six 30 x 2.5mm galvanised flat head nails to each stud and the floor joist and three to the bottom plate.
Timber Floors M12 x 150mm galvanised coach screw or proprietary equivalent with minimum characteristic strength of 12kN. Allow for a 3 x 50 x 50mm galvanised washer within 105mm of the ends of the bracing element.	Internal 	External (Option A) 	External (Option B) 

Intersecting Walls

Provided the minimum wall lengths are complied with and walls are constructed as described in this manual, bracing elements may be interrupted by intersecting walls as detailed below. Fasteners layout at the corners and around the perimeter of the bracing elements are as per The Fastener Layout figures on page 22. Joints between sheets shall be paper taped and stopped in accordance with the Elephant Plasterboard Installation Guide. Panel end hold-downs must also comply except that the location of bottom plate anchors is modified for L and T intersections as defined below.

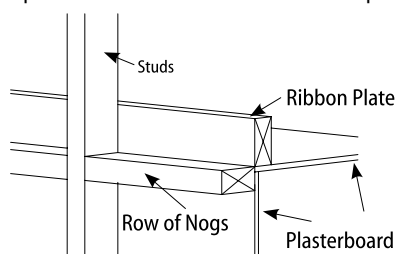
The minimum bracing element length is 900mm for single sided bracing systems (ES-N, ES-H and EM-H) and 600mm for double sided bracing systems, (ESSN, ESSH, ESPH, EMSH and EMPH.)



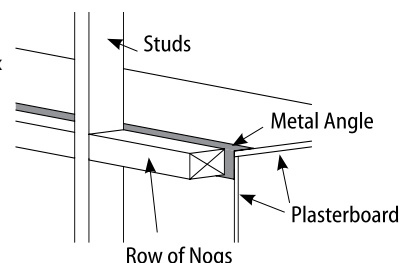
Parapets, Gable End Walls or Dropped or Suspended Ceilings

Sheeting material used in bracing elements must connect to both the top and bottom plates. Where the top plate is not accessible, fixing to a row of nogs is not an acceptable solution. Detail below are two possible solutions.

A continuous length of timber or ribbon plate, with the same minimum size as the bottom plate, fixed across the face of the studs just above the row of nogs and at the ceiling line.



A metal angle of minimum of 50 x 50 x 0.55mm fixed to the row of nogs at the ceiling line. Use minimum 30 x 2.5mm FH galv nails at 300mm centres.



Ceiling Diaphragms

Ceiling diaphragms are required to comply with Section 5.6 and 13.5 of NZS 3604:2011. Ceiling diaphragms are required when distances between bracing lines exceed 6m (when Dragon ties not used) or 7.5m if Dragon ties are used as per figure 8.1 in NZS 3604:2011.

Ceiling diaphragms shall not exceed 12m in length and the length shall not exceed twice the width (both length and width being measured between supporting walls). The ceiling lining shall cover the entire area of the ceiling diaphragm.

Limitations for Ceiling Diaphragm Systems

Ceiling diaphragm requirements are dependent on the length of the room and/or the roof pitch.

C1: Not steeper than 15 degrees and not longer than 7.5m

C2: Not steeper than 25 degrees and not longer than 12m
or Not steeper than 45 degrees and not longer than 7.5m

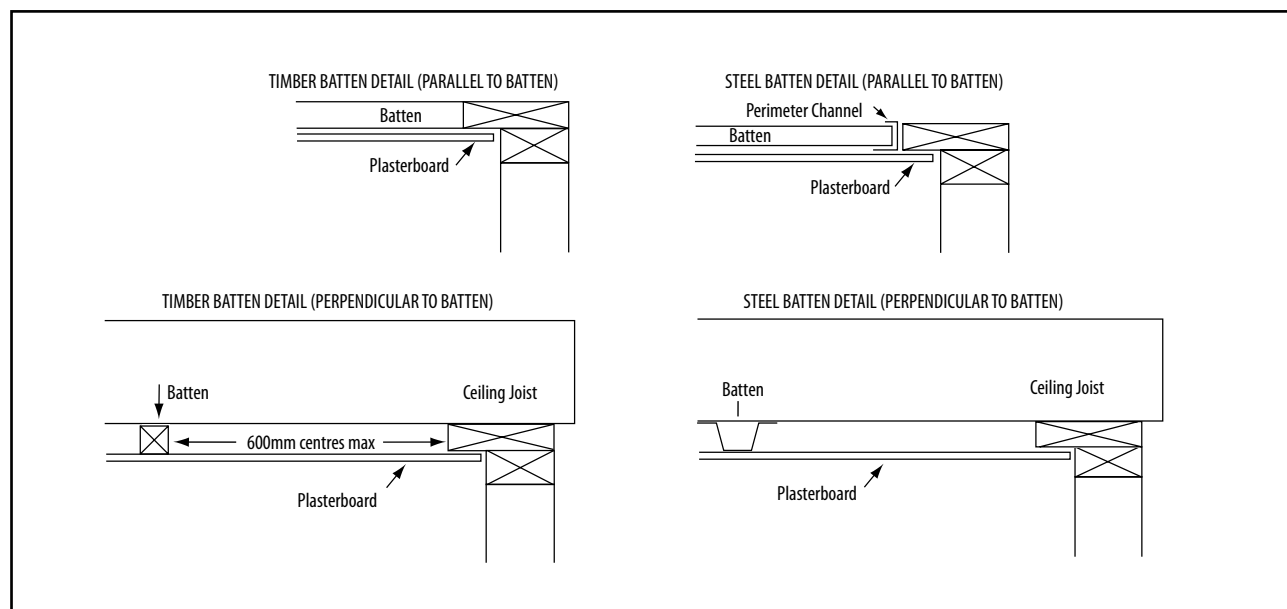
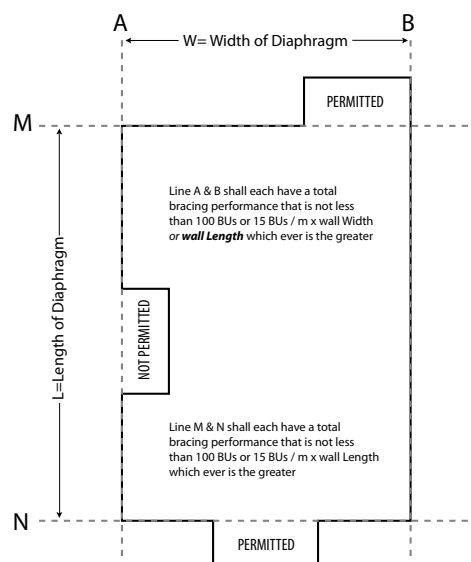
Plasterboard Lining Requirement:

Minimum 10mm Elephant Standard-Plus Plasterboard

Framing Members:

Ceiling battens shall be spaced at maximum;

- 600mm centres for 10mm Elephant Standard-Plus or 13mm Elephant Standard-Plus Plasterboard.



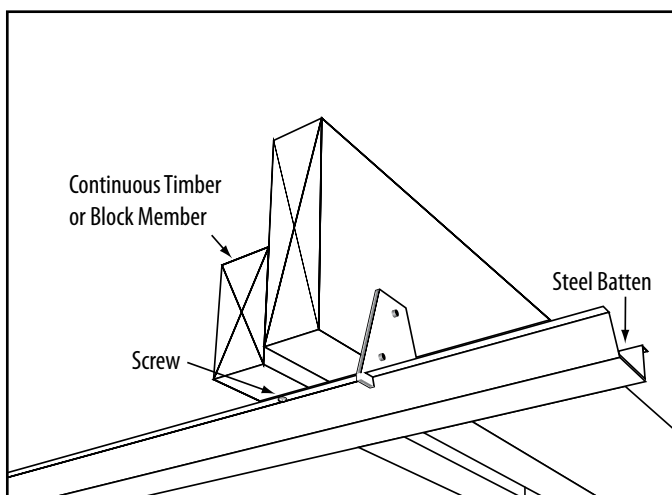
Timber or Steel Battens

Timber battens: Must be fixed according to NZS 3604:2011.

Steel battens: Minimum 0.55 BMT thickness with flanges not less than 8mm in order to allow the direct screwing, using 2/32mm x 8g wafer head self tapping screws, to the ceiling framing members. If a clip system is used then a solid timber block or continuous timber member must be fixed to the framing member.

A steel perimeter channel or metal angle is required to receive the ends of the steel battens.

The linings must be fastened to solid continuous timber member at the perimeter of the ceiling diaphragms. This is achieved with either at 140mm double top plate or by fixing continuous timber member to the original top plate using fixing requirements for built up members and nailed together according to NZS 3604:2011 clause 2.4.4.7



Ceiling Diaphragms continued

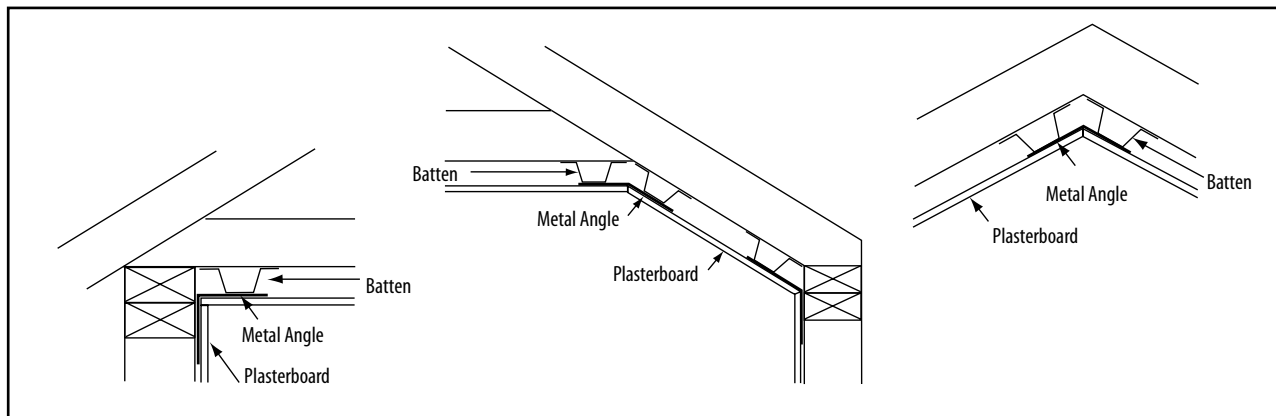
Coved Ceilings

Ceiling diaphragms with more than one gradient are allowable, by using metal folded angles with a minimum gauge of 0.55 BMT at the junctions.

Use 32mm x 6g course thread drywall screws when fixing to timber battens and use 32mm x 8g drywall self tapping screws or similar when fixing to metal battens.

The plasterboard is fixed to these folded metal angles at 75mm or 100mm or 150mm centres depending on conditions detailed below.

Use 25mm x 6g drywall self tapping screws.



Minimum sheet size requirements:

Minimum sheet size shall be 900mm wide by 1800mm long where possible except where building dimensions prevent their use.

Sheets between 600mm wide and 900mm wide by between 1200mm long and 1800mm long can be used provided they are back blocked with adjacent sheets.

Openings in Ceiling Diaphragms:

Openings are allowable and must be within the middle third of the diaphragms length and width and no opening dimension shall be greater than the ceiling diaphragm width. Fix sheets at 150mm centres minimum to opening trimmers. Refer to [Openings in Bracing Elements](#) on page 22.

Fasteners:

Timber battens & Timber perimeters: 32mm x 6g High thread Drywall screws

Steel battens and Steel perimeter: 25mm x 6g Self Tapping Drywall screws

Fastener Brands Allowable

Fortress®, Grabber® or Senco®.

(Other fastener brands need to demonstrate equal or better performance).

Fastening Centres:

The corner pattern fastening centres are as follows;

For ceiling diaphragms not steeper than 15 degrees and not longer than 7.5m

Place fasteners 50mm, 50mm, 50mm, 75mm, 75mm from all corners of the diaphragm.

Then place fasteners at maximum 150mm centres to the boundary members and around the perimeter of the diaphragm as per ceiling diaphragm pattern **C1** on the right.

For ceiling diaphragms that are:

either not steeper than 25 degrees and not longer than 12.0m

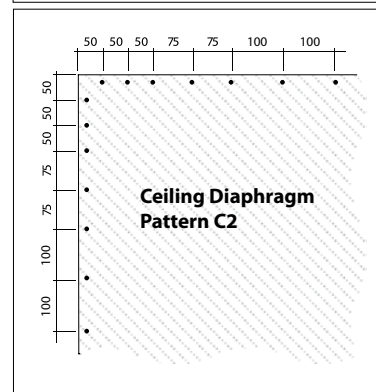
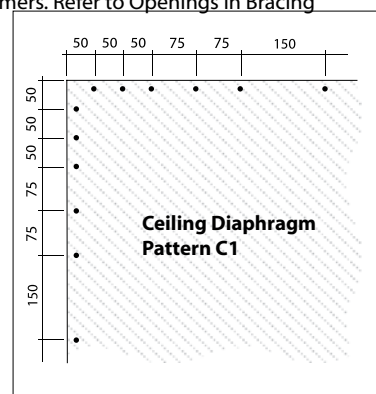
or not steeper than 45 degrees and not longer than 7.5m

Place fasteners 50mm, 50mm, 50mm, 75mm, 75mm from all corners of the diaphragm.

Then place fasteners at maximum 100mm centres to the boundary members and around the perimeter of the diaphragm as per ceiling diaphragm pattern **C2** on the right.

Fix all fasteners at no less than 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.

Fastening requirements within the ceiling diaphragm are conventional. All in accordance with the Elephant Plasterboard Installation Guide.



Jointing:

All joints shall be paper tape reinforced and stopped. Sheet end butt joints should be between the battens and back blocked.

All in accordance with the Elephant Plasterboard Installation Guide.



Wall Bracing Construction Details

Fastening the Plasterboard Linings

Elephant Plasterboard designated as a bracing element must be constructed with specified fasteners and fastener patterns. Specialised panel end hold downs may also be required as they are essential for obtaining the bracing unit ratings. The corner detail for plasterboard bracing elements require specific increased fastening. See figures below.

Fasteners:

Timber battens & Timber perimeters: 32mm x 6g High thread Drywall screws

Steel battens and Steel perimeter: 25mm x 6g self tapping screws

Fastener Brands Allowable

Fortress®, Grabber® or Senco®. (Other fastener brands need to demonstrate equal or better performance).

Fastener Layout

Refer Condensed Bracing Corner Pattern on the right. Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges. Fastening the middle of the bracing element is as per the recommended screw and glue methods. Refer to Elephant Plasterboard Installation Guide.

Minimum Sheet Size

Sheets less than 300mm wide are allowable provided that the joints form over solid framing or the sheet is back blocked. All joints must be paper taped and stopped.

Butt Joints

All butt joints should be either fitted over nogs or studs and fastened at 200mm centres or back-blocked.

All joints must be paper taped and stopped. Refer to Elephant Plasterboard Installation Guide.

Horizontal Fixing

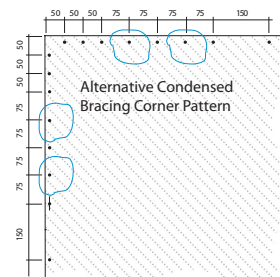
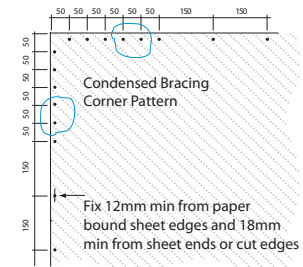
QuickBrace™ systems may be fixed horizontally. The specialised corner and perimeter bracing pattern need only to be placed over the length and width of the bracing element. Fastening in the field of the bracing element is as per the recommended glue and screw method.

Note- Care should be taken during the installation of the plasterboard, as often the studs that require the special mechanical fixing pattern are in the field of the sheet. It is important to insure that the adhesives are not placed on or near the studs that require these special perimeter fasteners as this can be a cause of screw popping.

Alternative Corner Fastener Layout

If the installer has used the 50, 50, 50, 75, 75, 150 corner screw pattern then this can easily be remedied by simply placing an extra screw between the first 150mm (where possible).

Refer to the Alternative Condensed Bracing Corner Pattern on the right.



Wet Areas

Do not place bracing elements in areas such as behind showers and baths. Placing bracing elements in water splash areas is acceptable provided that these areas are maintained impervious for the life of the building. Bracing elements require a 50 year durability.

Allowable Substitutions

Elephant Aquaboard can be substituted for the Elephant Standard-Plus in QuickBrace™ systems ES-N, ESSN, ES-H, ESSH, ESPH and EMSH.

Elephant Aquaboard can be substituted for the Elephant Multiboard in QuickBrace™ systems EM-H, EMSH and EMPH provided that the element is 600mm or longer and the perimeter screw pattern is reduced to 100mm centres. Ensure that all other relevant bracing system requirements including the important corner patterns are met.

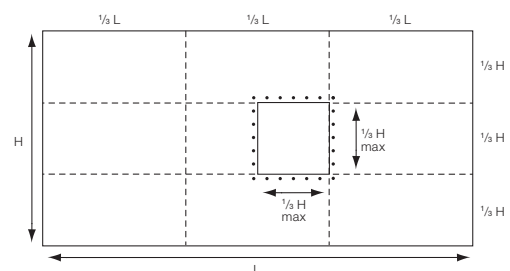
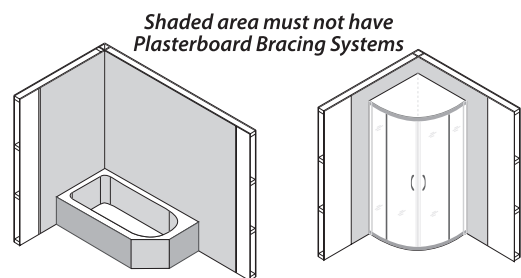
Openings in Bracing Elements

Large openings can only be placed in the middle 1/3 of the bracing element. Neither the opening height nor length can be more than 1/3 of the bracing element height. Fix the wall linings around the opening trimmers at 150mm centres. Smaller openings of 90 x 90mm or less are allowable but cannot be placed closer than 90mm from the edge of the bracing element.

Plywood

For systems ESPH and EMPH plywood is required. This can be Grade D-D 7mm construction plywood at a minimum. The plywood must be manufactured as per Australian/New Zealand Standard AS/NZS 2269:2004. The nailing pattern is at 150mm centres around the perimeter of the bracing element or each plywood sheet, whichever is the lesser width, using 50 x 2.8mm Flat head galvanised or stainless steel nails.

Sheet edges must be supported by framing or blocking. The corner pattern fastening is conventional and there is no need for the specialised corner patterns as is required on the plasterboard side of the brace.



PLASTERBOARD ON ONE SIDE

System Number	Lining Requirement	Min Length (m)	BU/m		Panel Hold-downs	5050505050150150 5050505050150 Condensed Bracing Corner Pattern Fix 12mm min from paper bound sheet edges and 18mm min from sheet ends or cut edges
			Wind	Earth-quake		
ES-N	Elephant Standard-Plus on one side	0.4	65	60	No	
		1.2	70	65		
		1.8	80	65		
ES-H	Elephant Standard-Plus on one side	0.4	80	75	Yes	
		0.8	100	85		
		1.8	115	85		
EM-H	Elephant Multiboard on one side	0.4	95	100		
		0.8	120	110		
		1.2	140	115		

FRAMING

Framing heights and dimensions to comply with NZS 3604:2011 and must be a minimum of 70 x 45mm for internal walls and 90 x 35mm for external walls. Nogs and Dwargs are not a requirement in order to achieve the bracing ratings in this document.

Refer to relevant sections and clauses of

NZBC B1: Structure; AS1 Clause 3 Timber -NZS 3604

NZBC B2: Durability; AS1 Clause 3.2 Timber -NZS 3602

FASTENING BRACING ELEMENTS TO FLOOR

Timber Floor:

Fastening within the bracing element must be done in accordance with NZS 3604:2011.

i.e. Either pairs of 100 x 3.75mm hand driven nails or three 90 x 3.15mm power driven nails at 600mm centres.

For **ES-H** and **EM-H**: Use the panel hold downs at each end of the bracing element.

Concrete Floors:

External or Internal walls: Within the bracing element fix the bottom plate as per NZS 3604:2011.

For **ES-N**: On Internal Walls alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs at 150mm & 300mm from end studs and thereafter at 600mm centres. Ensure a minimum penetration of 30mm into the concrete foundation.

For **ES-H** and **EM-H**: Use the panel hold downs at each end of the bracing element.

WALL LINING (As per Specified System Above)

One layer of Plasterboard lining type as per specified system above to ONE side of frame.

The Plasterboard sheets can be fixed vertically or horizontally. Use full height or full length sheets when fixing vertically or horizontally where possible. All sheet end butt joints must be fixed over solid timber framing and fastened at 200mm centres. Alternatively the sheet end butt joints may be back blocked. Sheets shall be touch fitted.

FIXING OF PLASTERBOARD LININGS

Fastening: (Corners and Perimeters of the bracing element)

32mm x 6g High thread Drywall screws (Fortress® or Grabber® or Senco®)

Fastening Centres: (Corners and Perimeters of the bracing element)

Corner Pattern: Refer to the bracing corner pattern above.

(See Page 22 for alternative allowable corner pattern.)

Perimeter Pattern: Place fasteners at 150mm centres around perimeter of bracing element.

Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.

Fasteners and Fastening Centres in the Field of the bracing element

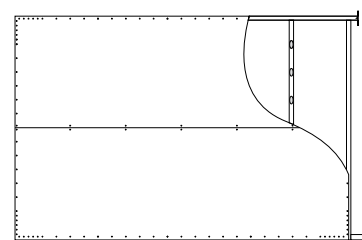
For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints. For Horizontally fixed sheets place fasteners at the sheet edge that crosses the studs. Place daubs of Drywall adhesives at 300mm centres to intermediate studs. Take extra care to ensure that screws or clouts are not placed closer than 200mm from any daubs of adhesive.

JOINTING

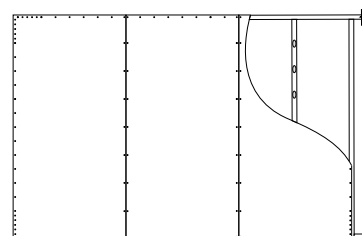
All fasteners stopped and all sheet joints reinforced with paper jointing tape.

All in accordance with the Elephant Plasterboard Installation Guide.

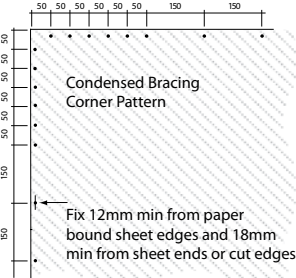
Horizontal Fixing



Vertical Fixing



PLASTERBOARD ON BOTH SIDES

System Number	Lining Requirement	Min Length (m)	BU/m		Panel Hold-downs	Bracing Corner Pattern
			Wind	Earth-quake		
ESSN	Elephant Standard-Plus on Both sides	0.4	80	75	No	 Condensed Bracing Corner Pattern Fix 12mm min from paper bound sheet edges and 18mm min from sheet ends or cut edges
		0.8	90	80		
		1.2	95	85		
ESSH	Elephant Standard-Plus on Both sides	0.4	95	110	Yes	
		0.8	140	130		
		1.2	150	140		
EMSH	Elephant Multiboard on one side, Elephant Standard plus on the other	0.4	110	115		
		0.8	140	135		
		1.2	150	145		

FRAMING

Framing heights and dimensions to comply with NZS 3604:2011 and must be a minimum of 70 x 45mm for internal walls and 90 x 35mm for external walls. Nogs and Dwargs are not a requirement in order to achieve the bracing ratings in this document.

Refer to relevant sections and clauses of

NZBC B1: Structure; AS1 Clause 3 Timber -NZS 3604

NZBC B2: Durability; AS1 Clause 3.2 Timber -NZS 3602

FASTENING BRACING ELEMENTS TO FLOOR

Timber Floor:

Fastening within the bracing element must be done in accordance with NZS 3604:2011.

i.e. Either pairs of 100 x 3.75mm hand driven nails Or three 90 x 3.15mm power driven nails at 600mm centres.

For **ESSH** and **EMSH**: Use the panel hold downs at each end of the bracing element.

Concrete Floors:

Within the bracing element fix the bottom plate as per NZS 3604:2011.

For **ESSN**: For Internal Walls alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs at 150mm & 300mm from end studs and thereafter at 600mm centres. Ensure a minimum penetration of 30mm into the concrete foundation.

For **ESSH** and **EMSH**: Use the panel hold downs at each end of the bracing element.

WALL LINING (As per Specified System Above)

One layer of Plasterboard lining type as per specified system above to BOTH sides of frame. The Plasterboard sheets can be fixed vertically or horizontally. Use full height or full length sheets when fixing vertically or horizontally where possible. All sheet end butt joints must be fixed over solid timber framing and fastened at 200mm centres. Alternatively the sheet end butt joints may be back blocked. Sheets shall be touch fitted.

FIXING OF PLASTERBOARD LININGS

Fastening: (Corners and Perimeters of the bracing element)

32mm x 6g High thread Drywall screws (Fortress® or Grabber® or Senco®)

Fastening Centres: (Corners and Perimeters of the bracing element)

Corner Pattern: Refer to the bracing corner pattern above.

(See Page 22 for alternative allowable corner pattern).

Perimeter Pattern: Place fasteners at 150mm centres around perimeter of bracing element. Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.

Fasteners and Fastening Centres in the Field of the bracing element

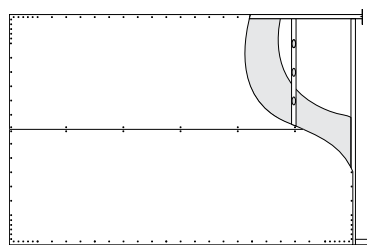
For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints. For Horizontally fixed sheets place fasteners at the sheet edge that crosses the studs. Place daubs of Drywall adhesives at 300mm centres to intermediate studs. Take extra care to ensure that screws or clouts are not placed closer than 200mm from any daubs of adhesive.

JOINTING

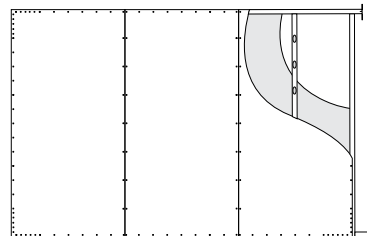
All fasteners stopped and all sheet joints reinforced with paper jointing tape.

All in accordance with the Elephant Plasterboard Installation Guide.

Horizontal Fixing



Vertical Fixing



PLASTERBOARD ON ONE SIDE, PLYWOOD THE OTHER

System Number	Lining Requirement	Min Length (m)	BU/m		Panel Hold-downs	Bracing Corner Pattern
			Wind	Earth-quake		
ESPH	Elephant Standard-Plus on One Side Plywood on the Other Side	0.4	100	115	Yes	
		0.8	140	140		
		1.2	150	150		
EMPH	Elephant Multiboard on One Side Plywood on the Other Side	0.4	120	135		
		0.8	140	145		
		1.2	150	150		

FRAMING

Framing heights and dimensions to comply with NZS 3604:2011 and must be a minimum of 70 x 45mm for internal walls and 90 x 35 mm for external walls. Nogs and Dwgans are not a requirement in order to achieve the bracing ratings in this document.

Refer to relevant sections and clauses of

NZBC B1: Structure; AS1 Clause 3 Timber -NZS 3604

NZBC B2: Durability; AS1 Clause 3.2 Timber -NZS 3602

FASTENING BRACING ELEMENTS TO FLOOR

Timber Floor:

Fastening within the bracing element must be done in accordance with NZS 3604:2011.

i.e. Either pairs of 100 x 3.75mm hand driven nails or three 90 x 3.15 power driven nails at 600mm centres.

For **ESPH** and **EMPH**: Use the panel hold downs at each end of the bracing element.

Concrete Floors:

Within the bracing element fix the bottom plate as per NZS 3604:2011.

For **ESPH** and **EMPH**: Use the panel hold downs at each end of the bracing element

WALL LINING (As per Specified System Above)

One layer of Plasterboard lining type as per specified system above to ONE side of frame.

One layer of 7mm D-D Plywood as per specified system above to OTHER side of frame.

The Plasterboard sheets can be fixed vertically or horizontally. Use full height or full length sheets when fixing vertically or horizontally where possible. All sheet end butt joints must be fixed over solid timber framing and fastened at 200mm centres.

Alternatively the sheet end butt joints may be back blocked.

Plywood sheets must be fixed vertically with edges supported by framing or blocking. Sheets shall be touch fitted.

FIXING OF PLASTERBOARD LININGS

Fasteners: (Corners and Perimeters of the bracing element)

32mm x 6g High thread Drywall screws (Fortress® or Grabber® or Senco®)

Fastening Centres: (Corners and Perimeters of the bracing element)

Corner Pattern: Refer to the bracing corner pattern above.

(See Page 22 for alternative allowable corner pattern).

Perimeter Pattern: Place fasteners at 150mm centres around perimeter of bracing element.

Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.

Fasteners and Fastening Centres in the Field of the bracing element

For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints. For horizontally fixed sheets place fasteners at the sheet edge that crosses the studs. Place daubs of Drywall adhesives at 300mm centres to intermediate studs. Take extra care to ensure that screws or clouts are not placed closer than 200mm from any daubs of adhesive.

FIXING OF PLYWOOD LININGS

Fasteners: (Corners and Perimeters of the bracing element)

50 x 2.8mm Flat head Galvanized or Stainless Steel Nails.

Fix at 150mm centres around perimeter of the bracing element and the perimeter of each sheet.

Fix at 300mm centres to intermediate studs that are not at the end of a bracing element.

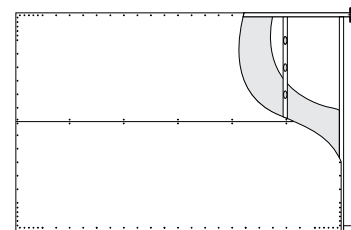
The corner pattern fastening is conventional and there is no need for the specialized corner pattern as is required on the plasterboard side of the brace.

JOINTING

All fasteners stopped and all sheet joints reinforced with paper jointing tape.

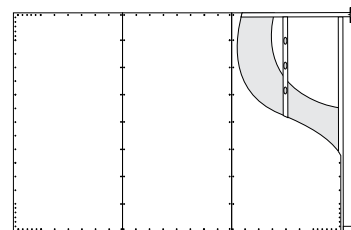
All in accordance with the Elephant Plasterboard Installation Guide.

Horizontal Fixing



Plasterboard side shown

Vertical Fixing



Product Range

TE/TE = Tapered Both Edges

TE/SE = Tapered One Edge, Square the Other

Product Weights and available Lengths

PRODUCT	THICK- NESS	EDGE TYPE	WIDTH	WEIGHT	LENGTH							
	mm		mm	Kg per m ²	2.4m	2.7m	3.0m	3.3m	3.6m	4.2m	4.8m	6.0m
Standard-Plus	10	TE/TE	1200	7.4	✓	✓	✓	✓	✓	✓	✓	✓
Standard-Plus	13	TE/TE	1200	9.2	✓	✓	✓	✓	✓	✓	✓	✓
Horizontal Standard-Plus	10	TE/SE	1200	7.4	✓		✓		✓	✓	✓	✓
Wide Horizontal Standard-Plus	10	TE/SE	1350	7.4					✓		✓	✓
Multiboard	10	TE/TE	1200	9.0	✓	✓	✓		✓			
Multiboard	13	TE/TE	1200	12.0	✓	✓	✓		✓			
Multiboard	16	TE/TE	1200	13.8	✓	✓	✓					
Aquaboard	10	TE/TE	1200	8.5	✓	✓	✓		✓			
Aquaboard	13	TE/TE	1200	11.5	✓	✓	✓		✓			

Product Primary Functions

PRODUCT	THICK- NESS	EDGE TYPE	WIDTH	Primary Functions							
				Superior Finish	Horizontal Fixing	Span 600* Centres on Ceilings	Bracing	Fire Resistant	Noise Control	Impact Resistant	Water Resistant
Standard-Plus	10	TE/TE	1200	•		•	•	•			
Standard-Plus	13	TE/TE	1200	•		•	•	•			
Horizontal Standard-Plus	10	TE/SE	1200	•	•		•	•			
Wide Horizontal Standard-Plus	10	TE/SE	1350	•	•		•	•			
Multiboard	10	TE/TE	1200	•		•	•	•	•		
Multiboard	13	TE/TE	1200	•		•	•	•	•	•	
Multiboard	16	TE/TE	1200	•		•		•	•	•	
Aquaboard	10	TE/TE	1200	•			•	•	•		•
Aquaboard	13	TE/TE	1200	•		•	•	•	•	•	•

* In areas with significant temperature or humidity variations e.g. bathrooms, it is recommended to place battens at max 450mm centres when using 10mm Standard-Plus or 10mm Aquaboard

