

Sharalyn Fraser *Agency*

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CODE COMPLIANCE CERTIFICATE

Section 95 Building Act 2004 [Form 7 – Building (forms) Regulations 2004]



Consent No(s): 200896

The Building			
Street address of building:	9 Kaiwaru Place, Waikanae	Building name:	N/A
Current, Lawfully established, use:	Detached Dwelling	Location of building within site/block number:	Located centrally on site.
Level/unit number:	N/A	Intended life of the building if 50 years or less:	-
Legal description of land where building is located:	Lot 6 DP 547543	Year first constructed:	2021
The Owner			
Name of owner:	Green Daniel Perry	Street address /registered office:	N/A
Contact person:	As above	Phone numbers:	
Mailing address:	25 Gallipoli Place Paraparaumu 5032	Landline:	-
Email address:	-	Mobile:	021 127 6073
Website:	-	Daytime:	-
		After hours:	-
		Facsimile number:	-
First point of contact for communications with the Kapiti Coast District Council:			
As above			
Building Work			
Building Consent No(s):	200896	Issued by:	Kapiti Coast District Council

Code Compliance

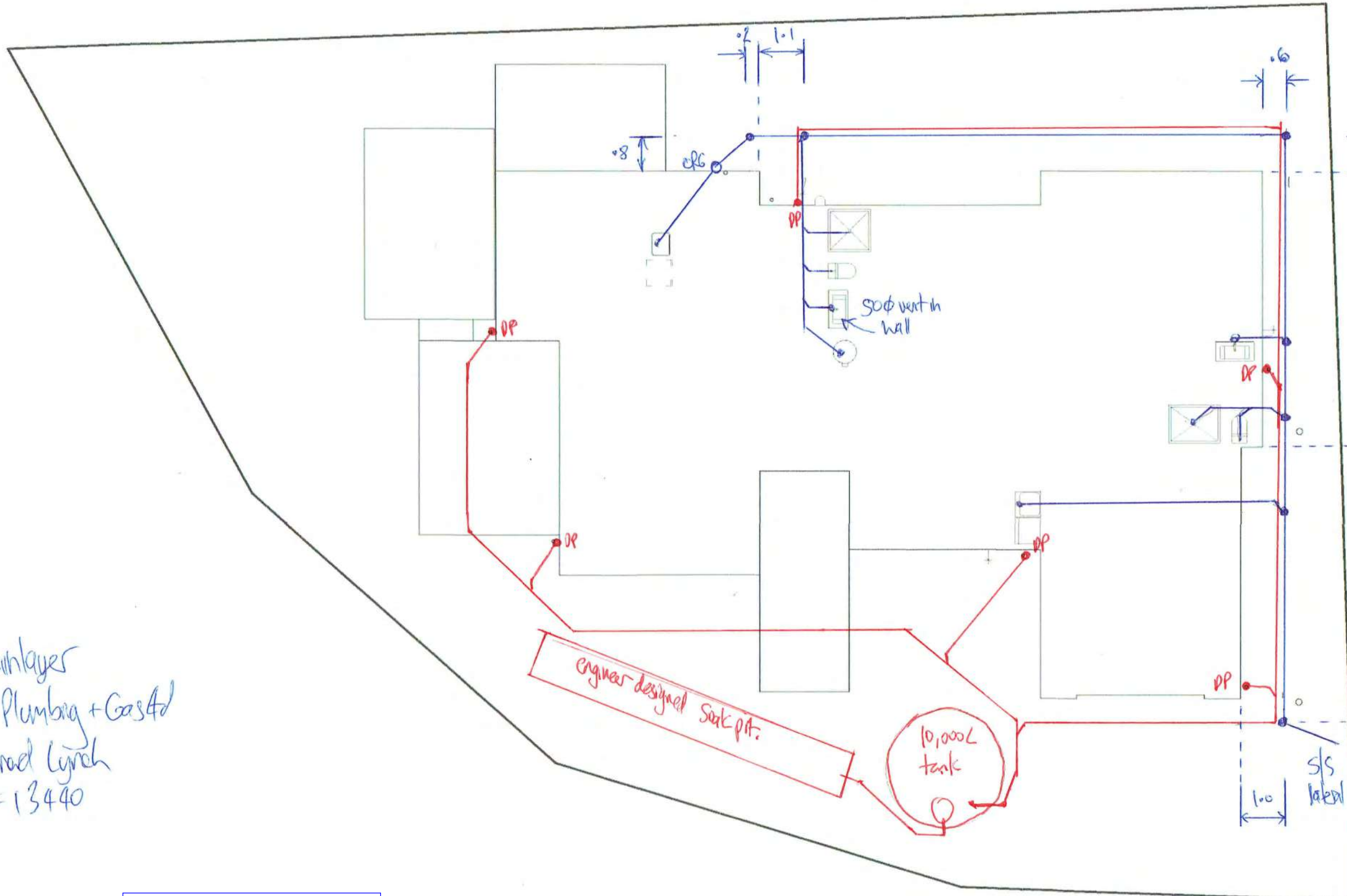
The building consent authority named below is satisfied, on reasonable grounds, that:

- (a) the building work complies with the building consent

A handwritten signature in blue ink, appearing to read 'Michelle Salmon'.

Michelle Salmon –
Building Inspections Team Leader
On behalf of **Kapiti Coast District Council**

Date: 11 January 2022



Drainlayer
 Pro Plumbing + Gas Ltd
 Bernard Lynch
 #13440

BC200896
 Received by
 Kapiti Coast District Council
 08/12/21
 via Simpli

DRAINAGE PLAN As Built
 1 : 100



Rev	Date	Description

a. ADarchitecture
 Leaders in Applied Design
 Email: info@adarchitecture.nz Web: adarchitecture.nz
 Phone: (04) 298 5662
 5 Kodex Place, Paraparaumu 5032

Proposed House
 for Dan and Suki Green
 Lot 6 Anderson Park
 Waikanae

As Built

Drainage Plan

DO NOT SCALE DRAWING

Job	Date	Sheet(A3)	Rev.
20018	10/03/2021	A101a	



RECORD OF INSPECTION (ROI) OF HIGH- RISK PRESCRIBED ELECTRICAL WORK
PURSUANT TO THE ELECTRICITY (SAFETY) REGULATIONS 2010

Reference/Record ID Number: 45954

Issuer (Inspector) details:

Name of Inspector: Iain Duncan

Registration #: I 258574

Email address: iain@brienelectrical.co.nz

Telephone: 021 459 268

Location of installation:

Location details: 9 Kaiwaru Place Waikanae

Location type: Domestic Non-Domestic Accommodation Industrial Commercial
 Educational Healthcare Miscellaneous (other)

Certifying Electrical Work and Certificate of Compliance (CoC) details:

Name of Electrical worker(s): Mitch Anderson

Registration #: E 280253

Angus Daly, Cullen Taylor

CoC details: 45954

CoC(s) attached

Certifying Electrical Work and ROI details:

What was inspected:

MEN Point,
Main Earth,

Specify the regulation(s) and companion standard(s), or identify the certified design, followed when carrying out the inspection:

AS/NZ 3000:2007
Reg 6A(2)(b)

What are the results of the inspection:

V ~ 241 IR P-N ~ >499M Ohm Earth Lead Resistance ~ 0.02 Ohm
Earth Loop ~ 0.18 Ohm PSC ~ 1.28 KA

High Risk Category:

Not to AS/NZS 3000 Part 2 – 6A(2)(a)(i) Photovoltaic system – 6A(2)(a)(iv) Electrical medical area – 6A(2)(a)(vi)
 High voltage installation – 6A(2)(a)(ii) Hazardous area – 6A(2)(a)(v) Mains work – 6A(2)(b)
 Mains parallel generation – 6A(2)(a)(iii) Animal stunning or meat conditioning – 6A(2)(c)
 Other – please describe:

Declaration

I hereby confirm that the work described above has been done in accordance with the regulations; and the part installation on which the work has been done is, and will be, when enlivened, electrically safe.

Signature:

Date: 18/11/2021



ELECTRICAL CERTIFICATE OF COMPLIANCE & ELECTRICAL SAFETY CERTIFICATE

BRIEN ELECTRICAL JOB #/ CERTIFICATE # 45954

This form has been designed to be used by licensed electrical workers to certify that installations or Part installations under **Part 1 or Part 2 of AS/NZS 3000** are safe to be connected to the specified system of electrical supply.

Location Address 9 KAIWARU PLACE

Customer Details:
 Name: DAVID REID HOMES (KAPITI) LTD
 Address: 104 Ngarara Road Phone: 049045959

Name of Electrical worker: Shaun Brosnahan **Registration/Practising licence number:** E 279806

Company Details: BRIEN ELECTRICAL LTD 15 IHAKARA ST, PARAPARAUMU 04 298 7053 info@brienelectrical.co.nz

- | | | | |
|--|--|--|---|
| Type of work: | The prescribed electrical work is: | Specify type of supply system: | Reference Standards: |
| <input type="checkbox"/> Additions | <input type="checkbox"/> Low risk | <input checked="" type="checkbox"/> 240V MEN | <input type="checkbox"/> Part 1 of AS/NZS 3000 |
| <input type="checkbox"/> Alterations | <input checked="" type="checkbox"/> General | <input type="checkbox"/> 400V MEN | <input checked="" type="checkbox"/> Part 2 of AS/NZS 3000 |
| <input checked="" type="checkbox"/> New work | <input type="checkbox"/> High risk (Specify):
[] | | <input type="checkbox"/> Additional Standards:
[] |

Description of work:
 Complete new build installation wired as per plans.
 16mm ns main. MEN point in garage.

Date/range of dates that prescribed electrical work undertaken:

I certify that the completed prescribed electrical work to which this certificate applies has been done lawfully and safely, and the information in the certificate is correct in that the installation, or part of the installation:

- Has been installed in accordance with the specified certified design¹
- Has an earthing system that is correctly rated (where applicable)
- Contains fittings that are safe to connect to a power supply
- Relies on a supplier Declaration of Conformity¹
- Relies on a manufacturer's instructions¹
- Has been tested in accordance with the Electricity (Safety) Regulations 2010
- Is safe to connect

¹ Attach or reference. If it is Impractical to attach a copy of a manufacturer's instructions, or of any certified design or supplier declaration of conformity, provide a reference to where the documents can be found, in a readily accessible format, by electronic means.

Test Results		
Polarity (Independent Earth):		
Insulation Resistance:	>250	M Ω
Earth Continuity:	.02	Ω
Bonding:	.02	Ω
Fault Loop impedance:	.55	Ω
Other (specify): P55C		Ka

Certifier's signature: [Signature]

Date: 08/12/2021

I certify that the installation, or part of the installation, to which the Electrical Safety Certificate applies is connected to a power supply and is safe to use.

Certifier's name: Shaun Brosnahan

Registration/Practising licence number: E 279806

Certifier's signature: [Signature]

Certificate Issue Date: 08/12/2021

CUSTOMER COPY – THIS IS AN IMPORTANT DOCUMENT AND SHOULD BE RETAINED FOR A MINIMUM OF 7 YEARS
 This certificate also confirms that the electrical work complies with the building code for the purposes of Section 19(1)(e) of the Building Act 2004.

BC200896
Received by
Kapiti Coast District Council
5/01/22
via Site



Building Code Clause(s) B1 & B2

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

(Guidance notes on the use of this form are printed on page 2)

ISSUED BY: Hamish Wells Engineer Limited
(Construction Review Firm)

TO: David Reid Homes
(Owner/Developer)

TO BE SUPPLIED TO: KCOC
(Building Consent Authority)

IN RESPECT OF: Raincrate Soakpit
(Description of Building Work)

AT: 9 Kaiwaru Place, Waikanae
(Address)

LOT..... DP..... SO.....

.....has been engaged by
(Construction Review Firm)

To provide CM1 CM2 CM3 CM4 CM5 (Engineering Categories) or observation as per agreement with owner/developer or other services

in respect of clause(s) B1 and B2 (Extent of Engagement) of the Building Code for the building work described in

documents relating to Building Consent No. 200896 and those relating to

Building Consent Amendment(s) Nos. None issued during the

course of the works. We have sighted these Building Consents and the conditions of attached to them.

Authorised instructions / variations(s) No. None (copies attached)

or by the attached Schedule have been issued during the course of the works.

On by the basis of this these review(s) and information supplied by the contractor during the course of the works

and on behalf of the firm undertaking this Construction Review, I believe on reasonable grounds that All Part

only of the building works have been completed in accordance with the relevant requirements of the Building Consent

and Building Consent Amendments identified above, with respect to Clause(s) B1 & 2 of the Building Code.

I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.

I, Hamish Tennent Wells am: CPEng No. 186323
(Name of Construction Review Professional) Reg Arch No.

I am a Member of: IPENZ NZIA and hold the following qualifications: NZCE Civil REA

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$500,000*.
The Construction Review Firm is a member of ACENZ:

SIGNED BY Hamish Tennent Wells ON BEHALF OF Hamish Tennent Wells

Date: 27/10/2021 Signature: [Signature]

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$500,000*.

This form is to accompany Forms 6 or 8 of the Building (Form) Regulations 2004 for the issue of a Code Compliance Certificate.

Site Inspection / Report Form

No: 3392

Controlling Authority	KCDC	Date	8/10	2021
BC/RC reference #	200896	Job #		
Site location (add UTM co-ords for rural sites)	Lot 6 / # 9 Kaiwaru Place, Waikanae			
Client & designer Phone # Email	David Reid Homes tim.sunderland@davidreidhomes.co.nz			
Contractor Phone # Email				

Description of work being inspected:

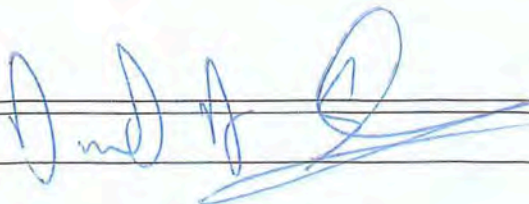
Raincrate Soakpit.

7.1m x 1.2m x 1.62m deep

10 crates long x 3 crates wide x 3 crates deep

Pit dug, crates in place & wrapped with
filter fabric.

Signed

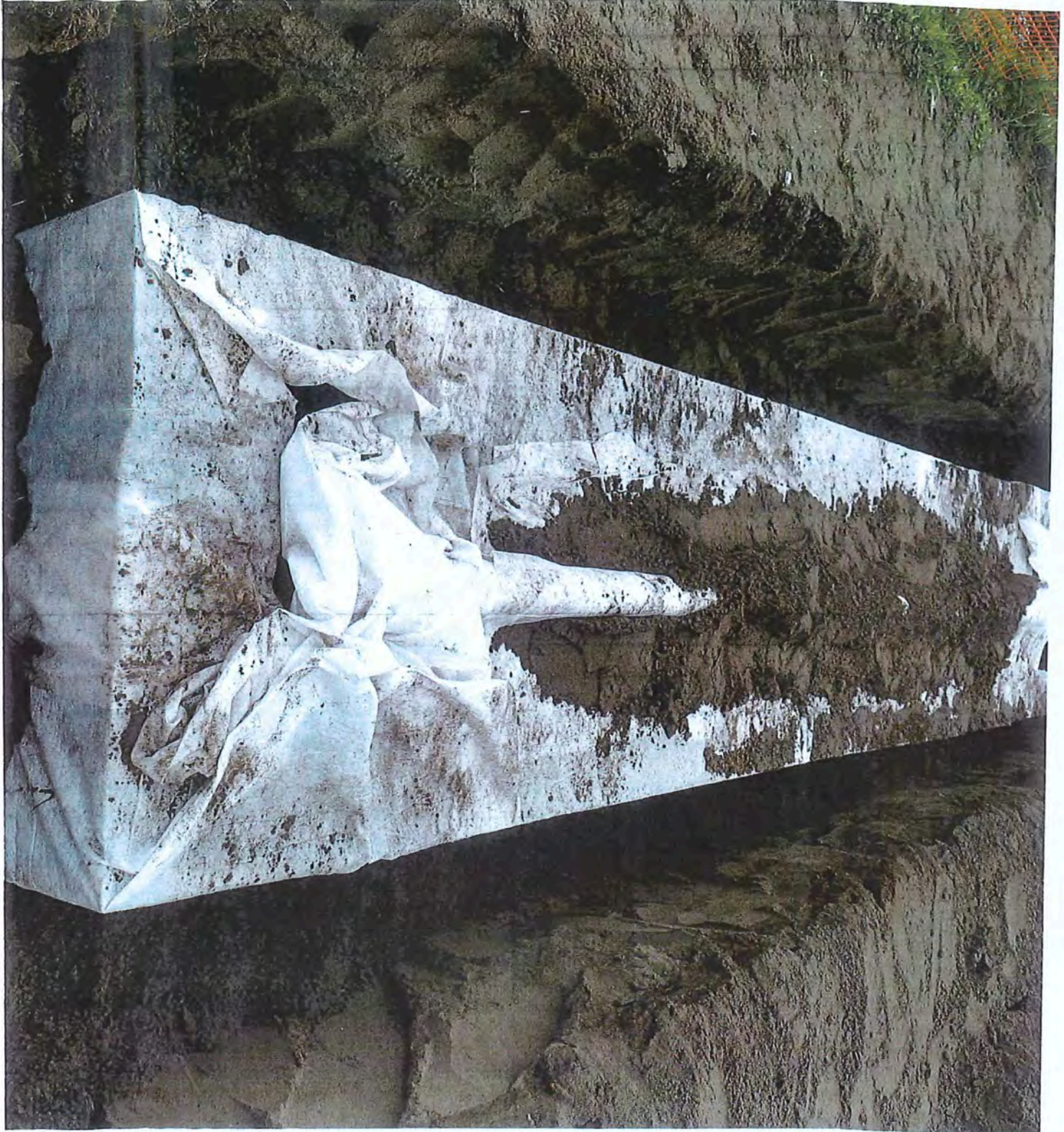


Page

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of

1




BRIEN ELECTRICAL

ELECTRICAL CERTIFICATE OF COMPLIANCE & ELECTRICAL SAFETY CERTIFICATE

BRIEN ELECTRICAL JOB #/ CERTIFICATE #

45954

This form has been designed to be used by licensed electrical workers to certify that installations or Part Installations under Part 1 or Part 2 of AS/NZS 3000 are safe to be connected to the specified system of electrical supply.

Location Address

9 KAIWARU PLACE

Customer Details:

Name: DAVID REID HOMES (KAPITI) LTD

Address: 104 Ngarara Road

Phone: 049045959

Name of Electrical worker:

Mitchell Anderson

Registration/Practising licence number:

E 280253

Company Details:

BRIEN ELECTRICAL LTD 15 IHAKARA ST, PARAPARAUMU 04 298 7053 info@brienelectrical.co.nz

Type of work:

The prescribed electrical work is:

Specify type of supply system:

Reference Standards:

 Additions

 Low risk

 240V MEN

 Part 1 of AS/NZS 3000

 Alterations

 General

 400V MEN

 Part 2 of AS/NZS 3000

 New work

 High risk (Specify):

 Additional Standards:

Description of work:

New connection of house to switchboard only. Mains not connected in pillar

BC200896

 Received by
 Kapiti Coast District Council
 08/12/21
 via Simpli

Date/range of dates that prescribed electrical work undertaken:

I certify that the completed prescribed electrical work to which this certificate applies has been done lawfully and safely, and the information in the certificate is correct in that the installation, or part of the installation:

- Has been installed in accordance with the specified certified design¹
 Has an earthing system that is correctly rated (where applicable)
 Contains fittings that are safe to connect to a power supply
 Relies on a supplier Declaration of Conformity¹
 Relies on a manufacturer's instructions¹
 Has been tested in accordance with the Electricity (Safety) Regulations 2010
 Is safe to connect

¹ Attach or reference. If it is impractical to attach a copy of a manufacturer's instructions, or of any certified design or supplier declaration of conformity, provide a reference to where the documents can be found, in a readily accessible format, by electronic means.

Test Results		
Polarity (Independent Earth):		
Insulation Resistance:	>100	M Ω
Earth Continuity:	0.1	Ω
Bonding:	0.1	Ω
Fault Loop Impedance:		Ω
Other (specify): PSSC		Ka

Certifier's signature:

Date:

15/11/2021

I certify that the installation, or part of the installation, to which the Electrical Safety Certificate applies is connected to a power supply and is safe to use.

Certifier's name:

Mitchell Anderson

Registration/Practising licence number:

E 280253

Certifier's signature:

Certificate Issue Date:

15/11/2021

CUSTOMER COPY – THIS IS AN IMPORTANT DOCUMENT AND SHOULD BE RETAINED FOR A MINIMUM OF 7 YEARS

This certificate also confirms that the electrical work complies with the building code for the purposes of Section 19(1)(e) of the Building Act 2004.

Producer statement

Warranty

Our windows and doors comply with the building code

All products supplied by First Windows & Doors meet or exceed the requirements of the New Zealand Building Code and New Zealand Standards; NZS4211, Performance of Windows, and NZS4223, Glazing in Buildings - Parts 1-4 incl.

This means our windows and doors have been designed and successfully tested to perform in New Zealand's most diverse conditions, and will:

- satisfy the strength and deflection requirements of the standards
- deliver the desired levels of weathertightness appropriate to the prescribed wind zones
- meet the air leakage requirements necessary to provide comfort and efficiency
- include glazing of appropriate weight, strength and safety to satisfy not only the expected wind load but also accidental human impact.

In accordance with the Terms and Conditions of Warranty, a warranty for all First Windows & Doors products is provided, under normal conditions of use, against failure of materials and/or workmanship for a period of 5 years.

The surface finishing of the aluminium extrusion is covered by a separate Performance Warranty which is dependent on the actual finish selected.

A window and door hardware/component warranty protects against defects in manufacturing, functionality and surface finish for a period of 5 years, provided care and maintenance guidelines have been followed. Plated (soft) finishes are excluded from the warranty.

Please note

This warranty is subject to correct installation, as outlined in the Building Code Acceptable Solution Clause E2/AS1 External Moisture, or an approved alternative solution.

Homeowner details

Name	Dan & Suki Green
Mobile	027 361 1096
Email	danielgreen00@hotmail.com

Site details

Address / lot number	9 Kaiwaru Place, Anderson Park, Waikanae
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Product details

Delivery date	7 July 2021
Glass Products used	AGP System
Joinery Products used	Residential Series
Joinery colour	Matt Flaxpod
Warranty number	21-07-117887F

Manufacturer details

Name	Metro Windows & Doors
Address	23 The Cutting Way, Milson, Palmerston North

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Kapiti Coast District Council
08/12/21
via Simpli



**PRODUCER STATEMENT
- SUPPLY -**

BC200896
Received by
Kapiti Coast District Council
08/12/21
via Simpli

Issued By: MCG Ltd T/A Larsens Concrete & Drainage

To: David Reid Homes Ltd (Kapiti)

In Respect of: Ele10 Plus – 10,000 L Underground Tank & Pump System

McDonald Concrete Group Ltd were engaged to supply the above item to KCDC Plan Change 75 specification and AS/NZS1546 and AS/NZS1547 Standards; at

**Lot 6, 9 Kaiwaru Place
Anderson Park
Waikanae**

The article has been built and installed in accordance with the above standards and as described in our technical descriptions and drawings as issued by McDonald Concrete Group Ltd.

I believe on reasonable grounds that subject to;

- (i) all proprietary products meeting the performance specification requirements that this item is constructed and installed in accordance with the New Zealand Standards as listed above.

Signed

Dated: 18/11/2021

Note: This producer statement covers only these sections of the work specifically referred to in the details above.

Some items of installation are required to be performed by others and we are not qualified to inspect these or these have not yet been performed.

- Electrical Connection
- House Plumbing Connection

**18 Murray Street
WANGANUI
Phone: (06) 344 5911 Fax: (06) 344 8189**

Residential Warranty and Maintenance Requirements

SUPPLY DATE: JUNE 2021

PROPERTY OWNER	Dan and Suki Green
SITE ADDRESS	9 Kaiwaru Place, Waikanae, New Zealand
SITE ENVIRONMENT	Moderate
BUILDING TYPE	Residential
ROLLFORMER	Metalcraft Wellington

WARRANTY THAT PRODUCT:	ROOFING	WALL CLADDING	GUTTERS/DOWNPipes	FLASHINGS	FASCIA
Paint will not flake, peel or excessively fade	18 Years	-	-	-	-
Will not perforate through corrosion	30 Years	-	-	-	-

The product manufactured from **COLORSTEEL® ENDURA®** is subject to normal wear and tear, which may include uniform fading, chalking and dirt collection. Minor white corrosion, which may appear at unwashed tension bends or cut edges, is a natural weathering phenomenon of **COLORSTEEL® ENDURA®** and does not constitute a failure of the coating system. Testing to determine coating performance will be in accordance with the methods described in Australian Standard AS1580.

This warranty is issued by New Zealand Steel Limited and is subject to the following terms and conditions:

(Note: all New Zealand Steel literature referred to in this warranty is that which is current at the time of installation and is available from the rollformer or www.colorsteel.co.nz)

- The maintenance programme specified on the reverse **BEING STRICTLY ADHERED TO and documented.**
- The warranty periods stated above start from the date the material is supplied to site.
- The installed pitch of the roof is equal to or greater than 3°, or the minimum recommended for the profile, whichever is greater.
- The product is only used in the environments and applications as recommended in the *Environmental Categories, Warranty & Product Maintenance Recommendations* brochure (or on-line *Guidelines for Use*).
- The product is designed, formed, stored, handled and installed in accordance with recommendations given in *Specifiers and Builders Guide (on-line Guidelines for Use)*, *Information Bulletins* and *NZ Metal Roof and Wall Cladding Code of Practice*.
- This warranty covers the **COLORSTEEL® ENDURA®** material only and no accessories supplied which include, without limitation, fasteners, soft edge and building wrap.
- All warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed in law. In particular, where the product is supplied for the purpose of business, the guarantees contained in the Consumer Guarantees Act 1993 do not apply.
- Failure of the material or the coating partially or wholly due to one or more of the following causes is not covered by this warranty:
 - Physical damage during or after installation, including scratching, contact with other metal items, incorrect installation of external objects such as air-conditioning units, PV/Solar energy systems, and failure to remove swarf.
 - Contact with soil, ash, fertilizer, sunscreen, moisture retaining substances, or immersion in water.

- Contact with or runoff from lead or copper and other dissimilar metals, chemical agents, green or wet timber or treated timber.
- Water entrapment or ponding for any reason.
- Mechanical damage, chemical attack, corrosion or other damage sustained during transport, handling, storage, installation or subsequent to installation.
- Attack from chemical or other agents, fumes, solids or liquids other than direct rain or run-off falling onto the product under warranty.
- Application of post paint treatments or systems.
- Failure to install, use and maintain the product in accordance with NZ Steel's guidelines and applicable industry standards.
- Underside corrosion as a result of high humidity, condensation or pollution generated within a building.
- Failure to replace corroded fasteners, or use of incorrect fasteners.
- Corrosion arising from lapped areas of end-lapped sheets.
- The product having been inappropriately stored prior to installation.
- Causes beyond the control of New Zealand Steel or the roofing manufacturer, including earthquakes, fires, cyclones, tornadoes, storms, hurricanes, lightning, hail, volcanic activity and other similar extreme "Acts of God".
- Actions by other persons.

If **COLORSTEEL® ENDURA®** pre-painted steel has failed to perform as warranted, then a claim, in writing, specifying in what respect the **COLORSTEEL® ENDURA®** has failed to perform, must be made within the applicable warranty period, to New Zealand Steel who will at its sole option repair or replace (including labour) the affected material or provide a refund equal to the cash value based on New Zealand Steel's estimate of the cost of the then current New Zealand Steel equivalent product. All claims must be accompanied by this original warranty document. A new warranty will be issued to cover the balance of the original warranty offer for both the paint coating and perforation protection where repair or replacement is made, this period is not extended in case of replacement. Neither the roofing manufacturer named below nor New Zealand Steel will be liable for any consequential loss or damage except as may be required under any mandatory statutory provisions. Nothing in this warranty is intended to exclude or limit any rights consumers may have under the Consumer Guarantees Act 1993.

New Zealand Steel and/or the roofing manufacturer reserve the right to inspect a building prior to issuing of the warranty and/or to inspect and conduct tests as necessary at any time after a claim is made under this warranty and accordingly have access to the property.



Warranty ID: 71887

For more information call 0800 697 833, visit www.colorsteel.co.nz, mail us at Private Bag 92121, Auckland 1142, or email us at nzs.warranty@bluescopesteel.com



PRODUCT USAGES

Roofing with a MC700 profile and a pitch of 4 degrees

- Paint will not flake, peel or excessively fade for 18 years
- Will not perforate through corrosion for 30 years

Coil References: P702408: FlaxPod®, 0.4mm - P711271: FlaxPod®, 0.4mm

SIGNATURES

Installed by Supply Only.

This Warranty is issued by (the manufacturer): Metalcraft Wellington

Signed: Harriet Garte Position: Production Date: 28/10/2021

MAINTENANCE PROGRAMME

All roofing and cladding products are subject to the cumulative effects of weather, dust and other deposits. Normal rain-washing will remove accumulated atmospheric contaminants from roofs. Gutters must be regularly inspected to remove debris, which may cause ponding.

ENVIRONMENT	MODERATE ISO CATEGORY 3	SEVERE ISO CATEGORY 4	VERY SEVERE ISO CATEGORY 5
Roof	Rain washing	Rain washing	Not warranted
Wall Cladding	Manual washing every year	Not warranted	Not warranted
Gutters, fascias and unwashed or high risk areas	Manual washing every 6 months	Manual washing every 3 months	Not warranted

Environment zones are described in detail in the *Environmental Categories, Warranty & Product Maintenance Recommendations* brochure. If your building is within 1000 metre of the sea or in an area with a corrosive environment you should check these Categories.

Regular washing of COLORSTEEL® ENDURA® products increases the durability by reducing attack from airborne salts and pollutants. COLORSTEEL® ENDURA® surfaces should be manually washed with water and a sponge or a soft nylon-bristled brush. For large areas it may be appropriate to use water blasting at pressures up to 20 MPa. Regular inspection for, and removal of lichen should be carried out as per Information Bulletin - *Removal of Lichen*.

Note: high risk areas include areas around flues, chimneys and extractor vents, under television aerials and trees and sites prone to mould, lichen, bird droppings or debris. External objects such as walkways and platforms, air conditioning units, solar hot water and solar photovoltaic systems, all have the potential to create areas on the roof that are sheltered from the rain (unwashed areas) and, as such, additional maintenance of the roof area affected is required as highlighted in the above table.

COLORSTEEL® and COLORSTEEL® ENDURA® are registered trademarks of New Zealand Steel Limited.



Warranty ID: 71887

For more information call 0800 697 833, visit www.colorsteel.co.nz.

mail us at Private Bag 92121, Auckland 1142, or email us at nzs.warranty@bluescopesteel.com





Installation Guarantee

This is to certify

This home has been insulated by PinkFit®, the preferred installers of Pink® Batts® insulation.

The PinkFit® licensee guarantees that, at the time of installation the insulation was installed in accordance with New Zealand Standard Energy Efficiency - Installing Insulation in Residential Buildings NZS 4246:2016.

Proper installation is essential for insulation to meet the durability requirements of NZBC B2.3.1(a) of not less than 50 years.

This guarantee is transferable to subsequent owners of the home.

Please keep this document in a safe place.

Signature:

TODD RUSSELL

Date: 14/09/2021

PinkFit® Licensee Trading As :

PinkFit® Wellington

PinkFit® Licensee Company Name :

THIS Wellington Limited

BC200896
Received by
Kapiti Coast District Council
08/12/21
via Simpli

Registration Details

Compliance No.: **M100097891**

Date Printed: 14/09/2021

Builder Details: David Reid Homes

Install Date: 07/09/2021

Site Details: Lot 6, 9 Kaiwaru Place
 Waikanae

Completion: 14/09/2021

Building Consent No.:

Product Details:

Ceiling insulation	Pink® Batts® Classic R3.2 Ceiling thickness 170mm, Pink® Batts® Skillion Roof R3.2 thickness 115mm
Wall insulation	Pink® Batts® Classic R2.4 Wall thickness 90mm, Pink® Batts® Ultra® R2.6 Narrow Wall thickness 90mm, Pink® Batts® Silencer® Wall thickness 100mm

PinkFit® is a network of independent installers licensed by Tasman Insulation New Zealand Limited. PinkFit®, Pink® and the colour PINK are registered trade marks of Owens Corning used under license by Tasman Insulation. Batts® is the registered trade mark of Tasman Insulation New Zealand.

0800 746 534

PINKBATTS.CO.NZ

Post Installation Photos

PinkFit® is a network of independent installers licensed by Tasman Insulation New Zealand Limited. PinkFit®, Pink® and the colour PINK are registered trade marks of Owens Corning used under license by Tasman Insulation. Batts® is the registered trade mark of Tasman Insulation New Zealand.

STATEMENT PIPED SERVICES AND PLUMBING STACKS



Construction Review

Send or deliver this form to: Kapiti Coast District Council,
175 Rimu Road, Paraparaumu 5032
Private Bag 60601, Paraparaumu 5254
For enquiries, phone 04 296 4700 (Toll Free: 0800 486 486)

BC200896
Received by
Kapiti Coast District Council
08/12/21
via Simpli

TO BE COMPLETED BY THE INSTALLER

Issued by: Pro Plumbing + Gas Ltd

Registration number: 13440

In respect of Piped Services installed in accordance with G12/AS1 as shown on the approved plans or as per the attached amended plan and Sanitary Plumbing Stacks installed in accordance with G13/AS1 or AS/NZS 3500.2.2

Installed at: 9 Karuani Place, Waikanae

Building Consent No: 200896

As a certified plumber, currently holding an annual practicing license, certify that I, or personnel under my control, have carried out the installation of the above system and I believe on reasonable grounds that the installation complies with the New Zealand Building Code. Both hot and cold systems have been pressure tested for a period of 15 minutes at a pressure of 1500 kPa.

Name: Benoit Lynch

Signature:

Address:

Date: 29/11/21

Phone:

Fax:

Mobile: 021 524823

Email:

Kāpiti Coast District Council Office Use Only

Statement author authenticated and current registration verified. Verification and Registration checked through public register on www.pgdb.co.nz.

Date:

Name:

Signature:

STATEMENT DRAINAGE WORK INSTALLED Construction Review



Send or deliver this form to: Kapiti Coast District Council,
175 Rimu Road, Paraparaumu 5032; Private Bag 60601, Paraparaumu 5254
For enquiries, phone 04 296 4700 (Toll Free: 0800 486 486)

TO BE COMPLETED BY THE INSTALLER

Issued by: *KW Plumbing + Gas Ltd*

Registration number: *13440*

Tick applicable

In respect of: Stormwater Drains installed in accordance with E1 AS1 as shown on the approved plans or as per the attached amended plan.

In respect of: Private Sewer Drains installed in accordance with G13 AS2 or AS/NZS 3500 .2.2 as shown on the approved plans or as per the attached amended plan.

Installed at: *9 Kaitiaki Place, Waitane*

Building Consent No: *200896*

As a certified drainlayer, currently holding an annual practicing license, I certify that I, or personnel under my control, have carried out the installation of the above system and I believe on reasonable grounds that the installation complies with the New Zealand Building Code.

Name: *Bened Lynch* Signature: *[Signature]*

Address: Date: *29/11/21*

Phone: Fax:

Mobil: *021 524823* Email:

Note: Fully dimensioned as built drain plan to be supplied.(scale 1:100)
Drains may be laid and backfilled without inspection provided that the drain is left under test with a min of 1.0 m head and the inspection at the lateral left exposed.

Kāpiti Coast District Council Office Use Only

Statement author authenticated and current registration verified. Verification and Registration checked through public register on www.pgdb.co.nz.

Name:			
Signature:		Date:	

PlaceMakers Frame and Truss

5 Beattie Close

Porirua

Wellington

Ph 04 298 8567

07/04/2021

Frame Manufacturing Statement

Customer: David Reid Homes

Job Address: 9 Kaiwaru Place, Waikanae

Job Reference Number: 21-01602

This statement is to confirm the frames supplied for the above job have been manufactured according to the plans and specifications provided by the customer using a minimum of SG8 timber or higher grade where specified.

Timber Treatment:

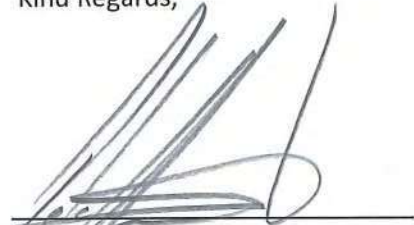
External Walls: H1.2 Boron Treated

Internal Walls: H1.2 Boron Treated

"H" Walls: H3.2 CCA Treated

Trusses: H1.2 Boron Treated

Kind Regards,



Peter Hammond
Detailer

BC200896
Received by
Kapiti Coast District Council
08/12/21
via Simpli

MiTek New Zealand Limited

Correspondence from : AUCKLAND
 40 Neales Road, East Tamaki 2013
 PO Box 58-014, Botany 2163
 Phone: 09 274 7109
 Fax: 09 274 7100

CHRISTCHURCH
 14 Pilkington Way, Wigram 8042
 PO Box 8387, Riccarton 8440
 Phone: 03 348 8691
 Fax: 03 348 0314

www.mitek.nz.co.nz

Printed: 10:14:40 07 Apr 2021

MiTek 20/20 Engineering 4.7.346.0

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

ISSUED BY: **MiTek New Zealand Limited**
 TO: **PlaceMakers Wellington Frame & Truss**
 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 **21-01602** 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 Clause B1 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: Wednesday, 7 April 2021**

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

Job: 21-01602 Client: Placemakers Paraparaumu Site: DRH - Green
 Description: Phone: DRH - Green 9 Kaiwaru Place Waikanae
 Building Consent No.: MITEK 20/20° Engineering 4.2.348.0 MITEK New Zealand Limited Phone: 10 14 10 07 Apr 2021

MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MiTek accredited fabricator PlaceMakers Wellington Frame & Truss, 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	Importance Level : 2	Design Working Life : 50 years
Roof Truss	Pitch: 7.500 deg	Nominal Overhang: 0 mm
Timber Group: MSGx45 H1.2	Celling	Wind
Roof	Material: Standard	Area: Very High (50.0 m/s)
Material: Galv Iron .5mm	Dead Load: 0.200 kPa	Pressure Coeff: Cpe = varies; Cpi = -0.30, 0.20
Dead Load: 0.210 kPa	Restraints: 400 mm centres	
Restraints: 900 mm centres	Live Load: Qc = 1.400 kN	
Live Load: Q _{ur} = 0.250 kPa		
Q _c = 1.100 kN		

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, ✕ = failed design, Ø = non certified, Unmarked trusses = designed successfully, LB = lateral bracing required
 GB = gable brace required, CF = Chemical Free Treatment

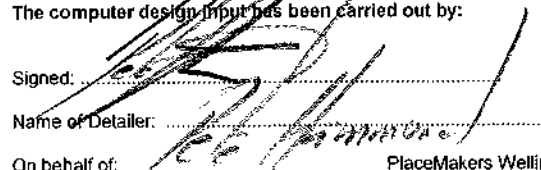
Roof Truss

Treatment: Top Chords - H1.2	Bottom Chords - H1.2	Webs - H1.2												
Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
BM6	1D	2290	0.000	900	T1	1	4610	7.500	860	T5B	1	4200	4.000	819
PS1	6	4741	0.000	856	T1A	4	4610	7.500	860	T6	1	8100	4.000	819
PS2	4	4035	0.000	856	T2	1	4610	7.500	895	T6A	1	8100	4.000	819
*R1	6	1590	7.500	856	T3	7	5110	7.500	895	T7	1	3810	4.000	819
*R2	1	1590	7.500	900	T4	1	8010	4.000	819	T7A	1	3810	4.000	819
*R3	4	4060	4.000	900	T4A	1	8010	4.000	819	T7B	1	3810	4.000	819
*R4	1	3910	7.500	900	T5	1	4200	4.000	819	T8	4	2110	7.500	856
*R5	1	4610	7.500	900	T5A	1	4200	4.000	819					

Roof Truss quantity : 51

Total quantity : 51

The computer design input has been carried out by:

Signed: 

Date: ...Wednesday, 7 April 2021....

Name of Detailer: 

Qualifications and Title: Designer (MiTek C.O.C. - 10606)

On behalf of:  PlaceMakers Wellington Frame & Truss

Job: 21-01602

Client: Placemakers Paraparaumu
Phone:

Site: DRH - Green
9 Kaiwaru Place
Waikanae

Description:
Building Consent No.:
MITek 20/20 Engineers 4.7.348.0

MITek New Zealand Limited

Phone: Printed: 10:14:49 AM 2021

MANUFACTURER STATEMENT

This statement is issued by PlaceMakers Wellington Frame & Truss 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. The MiTek® trusses for the job reference 21-01602 have been fabricated in accordance with the MiTek 20/20° truss design, truss layout and shop drawing output and the specifications for timber defined therein, and are covered by the Producer Statement issued by MiTek New Zealand Limited and the MiTek Fabricator Design Statement.

Summary of fabricated MiTek® trusses in accordance with MiTek 20/20° output

These MiTek® trusses must be erected in accordance with the Truss Layout. Proper erection bracing must be installed to hold the trusses true and plumb and in a safe condition until permanent bracing is fixed. All permanent bracing and fixing must be installed before any loads are applied.

Job Details		Importance Level : 2	Design Working Life : 50 years
Roof	Celling	Wind	
Material: Galv Iron .5mm	Material: Standard	Area: Very High (50.0 m/s)	
Dead Load: 0.210 kPa	Dead Load: 0.200 kPa	Pressure Coeff: Cpe = varies; Cpi = -0.30, 0.20	
Restraints: 900 mm centres	Restraints: 400 mm centres		
Live Load: Qur = 0.250 kPa	Live Load: Qc = 1.400 kN		
	Qc = 1.100 kN		

MiTek® Truss List

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

Roof Truss

Treatment: Top Chords - H1.2				Bottom Chords - H1.2				Webs - H1.2						
Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
BM6	1D	2290	0.000	900	T1	1	4610	7.500	860	T5B	1	4200	4.000	819
PS1	6	4741	0.000	856	T1A	4	4610	7.500	860	T6	1	8100	4.000	819
PS2	4	4035	0.000	856	T2	1	4610	7.500	895	T6A	1	8100	4.000	819
*R1	6	1590	7.500	856	T3	7	5110	7.500	895	T7	1	3810	4.000	819
*R2	1	1590	7.500	900	T4	1	8010	4.000	819	T7A	1	3810	4.000	819
*R3	4	4050	4.000	900	T4A	1	8010	4.000	819	T7B	1	3810	4.000	819
*R4	1	3910	7.500	900	T5	1	4200	4.000	819	T8	4	2110	7.500	856
*R5	1	4610	7.500	900	T5A	1	4200	4.000	819					

Roof Truss quantity : 51

Total quantity : 51

The MiTek® trusses are fabricated under the supervision of:

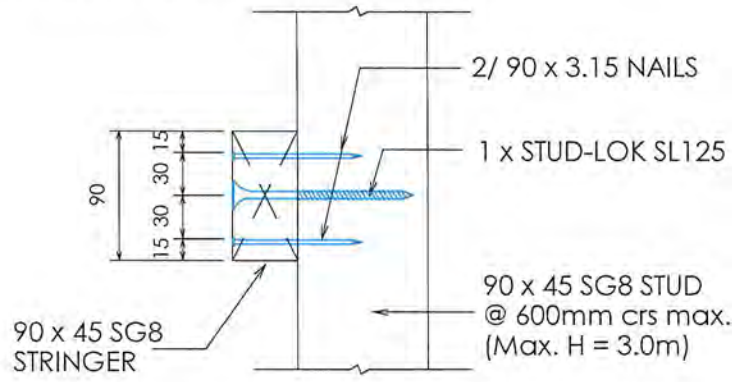
Signed: 

Date: 7/04/21

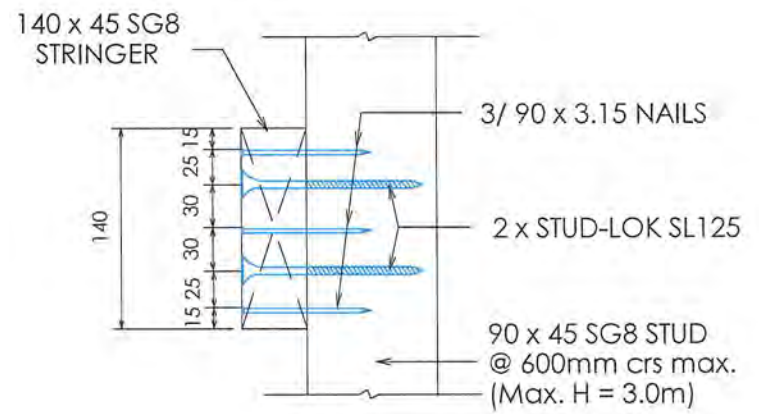
Name of Supervisor:

On behalf of : PlaceMakers Wellington Frame & Truss

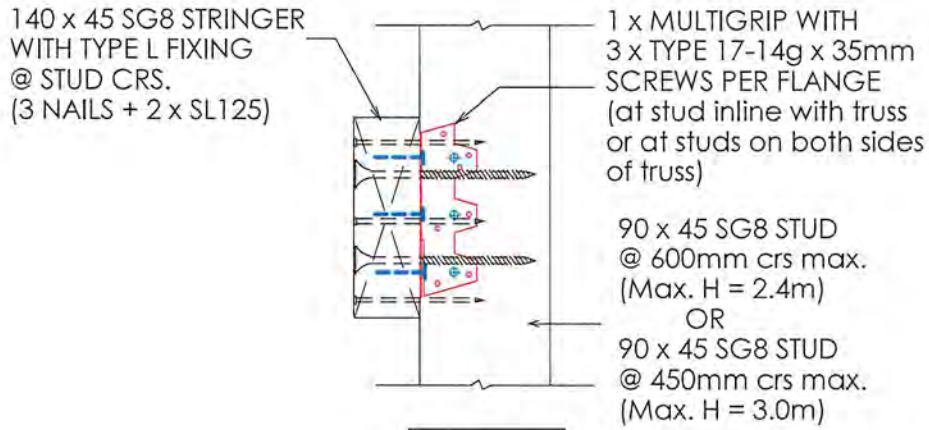
- NOTES:
 1) Assume supported trusses are at 900 mm crs
 2) Refer to Truss Fixing Report for maximum Truss Characteristic Reactions (Up or Down)
 3) Select Stringer Fixing Type Characteristic Strength > or = max. Truss Characteristic Reaction
 4) H = Height of stringer from base of stud
 5) Stud size and spacing indicated are min. requirements



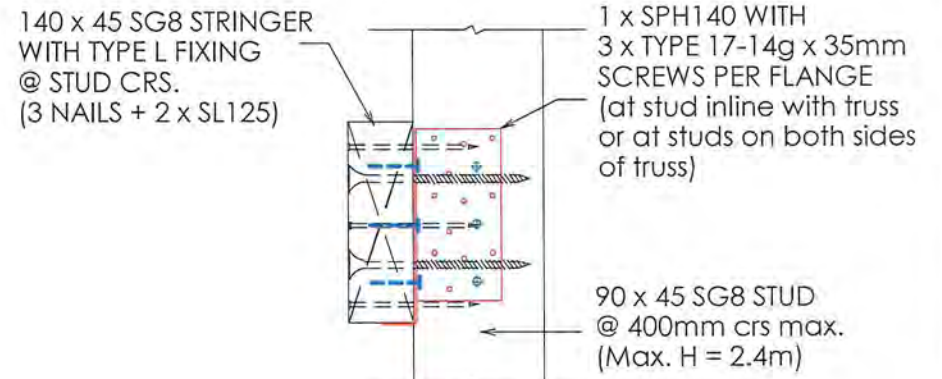
TYPE K @ STUD CRS.
 (3.9kN CHARACTERISTIC)



TYPE L @ STUD CRS.
 (7.2kN CHARACTERISTIC)



TYPE M (L + MULTIGRIP)
 (12.7kN CHARACTERISTIC)



TYPE N (L + SPH140)
 (17.7kN CHARACTERISTIC)

MiTek New Zealand Limited
 AUCKLAND
 PO Box 59-014, Botany 2163
 Phone: 09-274 7109
 Fax: 09-274 7100
 www.mitek.nz
 CHRISTCHURCH
 PO Box 6387, Riccarton 8440
 Phone: 03-349 6691
 Fax: 03-349 0314
 MITEK® LUMBERLOK® BOWMAC®

Job Title :

**STRINGER TO STUD FIXING
 WITH STUD-LOK SL125**

Sheet Title :

STRINGER FIXING DETAILS

PrimeCAD V4.3

Drawing Number :

25804

A4

Date : 18/12/2019

Designed : ILN

Checked :

Sheet :

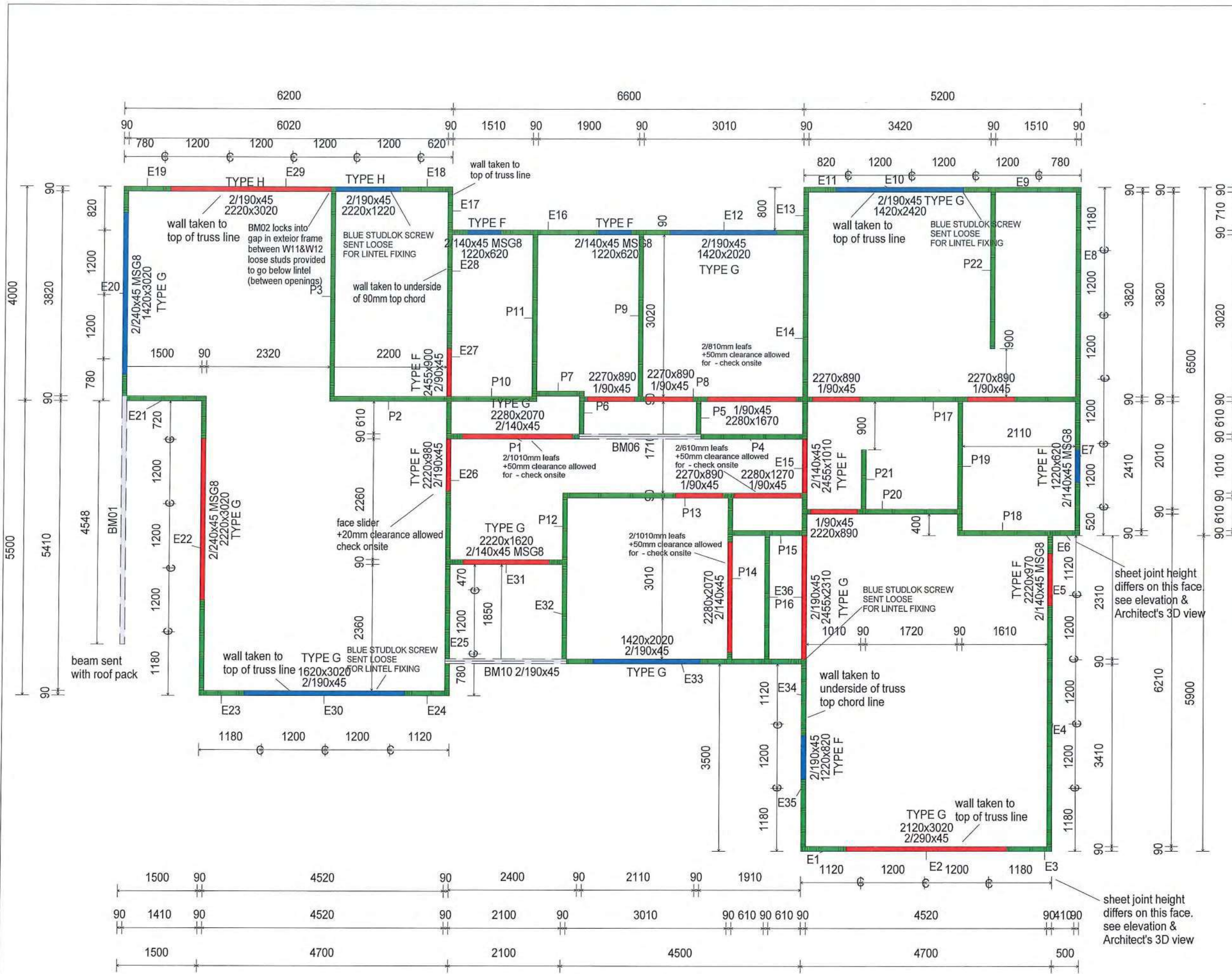
1

Scale : 1:5

Drawn : DXU

Certified :

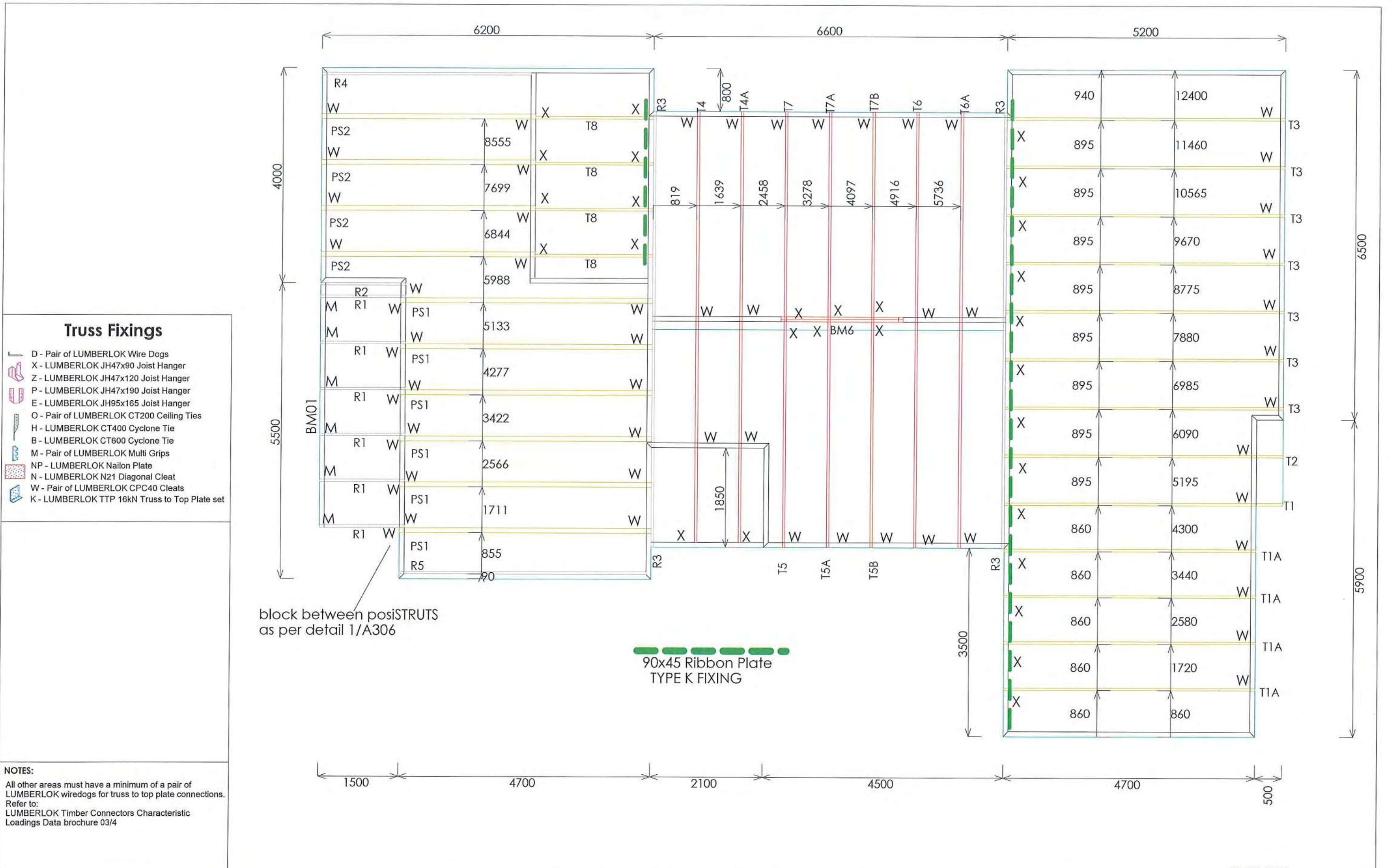
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via Simpli



Factory Notes :	Mitek Version:	4.6
<p>- Treatment :</p> <p>Ext Walls - H1.2</p> <p>Int Walls - H1.2</p> <p>Walls with 'H' in the label to be H3.1</p>		
<p>Please Note :</p> <p>These plans are provided solely to enable the builder to erect the pre-nail on site. They are not intended for any other purpose and PlaceMakers will not accept any liability arising from any other use of these plans.</p> <p>Builder to read pre-cut plans in conjunction with architectural plans.</p> <p>Builder should ensure that ALL OSH approved safety practices are carried out when erecting framing.</p> <p>Builder to check all opening trim / lintel sizes and braces on site before enclosing.</p> <p>FRAME ORIENTATION: Frame markings are on the same side as the number on the plan.</p> <p>PlaceMakers will not accept any charges for remedial work unless a written order is issued before any work is commenced. A copy of the order is to accompany any invoice to Wellington Frame & Truss.</p> <p>All internal door trims 2270 unless otherwise listed</p> <p>If Experiencing Problems, Contact :</p> <p>Sandy Brewer</p> <p>Phone (04) 298 8567 email : scott.halvorsen@placemakers.co.nz</p>		
 <p>PlaceMakers Know how. Can do.</p>		
<p>Wellington Frame & Truss</p>		
5 Beattie Close Porirua		Ph 04- 298 8567
Customer : David Reid Homes - GREEN		
Address : 9 Kaiwaru Place Waikanae		
Job No.: 21-01602		
5/04/2021		
FILE	SITE	FACTORY

sheet joint height differs on this face. see elevation & Architect's 3D view

sheet joint height differs on this face. see elevation & Architect's 3D view



Site Address :
DRH - Green
 9 Kaiwaru Place
 Waikanae

Sheet Title :
AS BUILT
Truss Fixings

Date : 5 Apr 2021
 TO FIT

Drawn : Peter Hammond
 System : MiTek 20/20

Job Details:

Roof Pitch : 7.50Deg
 Roof Material : Galv Iron .5mm
 Ceiling Material : Standard
 Wind Zone : Very High
 Roof Snow Load : 0.000 kPa

Truss Centres : 900 mm
 Roof Live Load : 0.250kPa
 Floor Live Load : kPa
 Wind Speed : 50.0 m/s

PrimeCad v4.7.346

MiTek Job Title :
21-01602

Sheet :
1

Revision Number :



Building Code Clause(s) **B1 & B2**

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

(Guidance notes on the use of this form are printed on page 2)

ISSUED BY: **Hamish Wells Engineer Limited**
(Construction Review Firm)

TO: **David Reid Homes**
(Owner/Developer)

TO BE SUPPLIED TO: **KCDC**
(Building Consent Authority)

IN RESPECT OF: **Raincrate Soakpit**
(Description of Building Work)

AT: **9 Kaiwaru Place, Waikanae**
(Address)

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08/12/21
via Simpli

LOT DP SO

.....has been engaged by

To provide CM1 CM2 CM3 CM4 CM5 (Engineering Categories) or observation as per agreement with owner/developer or other services

in respect of clause(s) **B1 and B2** of the Building Code for the building work described in

documents relating to Building Consent No. **200896** and those relating to

Building Consent Amendment(s) Nos. **None** issued during the

course of the works. We have sighted these Building Consents and the conditions of attached to them.

Authorised instructions / variations(s) No. **None** (copies attached)

or by the attached Schedule have been issued during the course of the works.

On the basis of this these review(s) and information supplied by the contractor during the course of the works

and **on behalf of the firm** undertaking this Construction Review, **I believe on reasonable grounds** that All Part

only of the building works have been completed in accordance with the relevant requirements of the Building Consent

and Building Consent Amendments identified above, with respect to Clause(s) **B1 & 2** of the Building Code.

I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary

competency to do so.

I, **Hamish Tennent Wells** am: CPEng No. **186323**

(Name of Construction Review Professional)

Reg Arch No.

I am a Member of: IPENZ NZIA and hold the following qualifications: **NZCE Civil REA**

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$500,000*.

The Construction Review Firm is a member of ACENZ:

SIGNED BY **Hamish Tennent Wells** ON BEHALF OF **Hamish Tennent Wells**

Date: **27/10/2021** Signature:

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$500,000*.

This form is to accompany **Forms 6 or 8 of the Building (Form) Regulations 2004** for the issue of a Code Compliance Certificate.



RECORD OF INSPECTION (ROI) OF HIGH- RISK PRESCRIBED ELECTRICAL WORK PURSUANT TO THE ELECTRICITY (SAFETY) REGULATIONS 2010

Reference/Record ID Number: 45954

Issuer (Inspector) details:

Name of Inspector: Iain Duncan

Registration #: I 258574

Email address: iain@brienelectrical.co.nz

Telephone: 021 459 268

Location of installation:

Location details: 9 Kaiwaru Place Waikanae

Location type: Domestic Non-Domestic Accommodation Industrial Commercial
 Educational Healthcare Miscellaneous (other)

Certifying Electrical Work and Certificate of Compliance (CoC) details:

Name of Electrical worker(s): Mitch Anderson

Registration #: E 280253

Angus Daly, Cullen Taylor

CoC details: 45954

CoC(s) attached

Certifying Electrical Work and ROI details:

What was inspected:

MEN Point,
Main Earth,

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08/12/21
via Simpli

Specify the regulation(s) and companion standard(s), or identify the certified design, followed when carrying out the inspection:

AS/NZ 3000:2007
Reg 6A(2)(b)

What are the results of the inspection:

V ~ 241 IR P-N ~ >499M Ohm Earth Lead Resistance ~ 0.02 Ohm
Earth Loop ~ 0.18 Ohm PSC ~ 1.28 KA

High Risk Category:

- Not to AS/NZS 3000 Part 2 – 6A(2)(a)(i) Photovoltaic system – 6A(2)(a)(iv) Electrical medical area – 6A(2)(a)(vi)
 High voltage installation – 6A(2)(a)(ii) Hazardous area – 6A(2)(a)(v) Mains work – 6A(2)(b)
 Mains parallel generation – 6A(2)(a)(iii) Animal stunning or meat conditioning – 6A(2)(c)
 Other – please describe: _____

Declaration

I hereby confirm that the work described above has been done in accordance with the regulations; and the part installation on which the work has been done is, and will be, when enlivened, electrically safe.

Signature: 

Date: 18/11/2021

Form 6A

Memorandum from licensed building practitioner: Record of building work

Section 88, 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:

Suburb:

Town/City:

Postcode:

THE PROJECT

Building consent number:

THE OWNER(S)

Name(s):

Mailing address:

Suburb:

PO Box/Private Bag:

Town/City:

Postcode:

Phone number:

Email address:

RECORD OF WORK THAT IS RESTRICTED BUILDING WORK

PRIMARY STRUCTURE

Work that is restricted building work	Description of restricted building work	Carried out or supervised
Tick <input checked="" type="checkbox"/>	If necessary, describe the restricted building work.	Tick <input checked="" type="checkbox"/> whether you carried out the restricted building work or supervised someone else carrying out the restricted building work.
Foundations and subfloor framing <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
Walls <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
Roof <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
Columns and beams <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
Bracing <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
Other <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised

EXTERNAL MOISTURE MANAGEMENT SYSTEMS		
Work that is restricted building work	Description of restricted building work	Carried out or supervised
Tick <input checked="" type="checkbox"/>	If necessary, describe the restricted building work.	Tick <input checked="" type="checkbox"/> whether you carried out the restricted building work or supervised someone else carrying out the restricted building work.
Damp proofing <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
Roof cladding or roof cladding system <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
Ventilation system (for example, subfloor or cavity) <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
Wall cladding or wall cladding system <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
Waterproofing <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
Other <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised

ISSUED BY

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

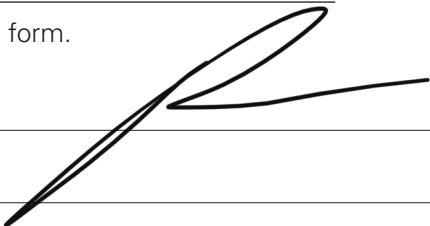
Name:	LBP number:
Class(es) licensed in:	
Plumbers, Gasfitters and Drainlayers registration number (if applicable):	
Mailing address (if different from below):	
Street address/Registered office:	
Suburb:	Town/City:
PO Box/Private Bag	Postcode:
Phone number:	Mobile:
After hours:	Fax:
Email address:	Website:

DECLARATION

I _____ carried out or supervised the restricted building work recorded on this form.

Signature: _____

Date: _____



Installed Address:

9 Kaiwaru pl

Waikanae

Installed For:

David Reid Homes

BC200896

Received by

Kapiti Coast District Council

08/12/21

via Simpli


Issued Date:

01/10/2020

Expiration Date:

01/10/2025

Signed:



WORKMANSHIP WARRANTY CERTIFICATE

WB ROOFING ISSUES ALL WARRANTIES IN ACCORDANCE OF THE PURCHASE CONTRACT AND GUARANTEES ALL WORK COMPLETED, DETAILED IN THE PURCHASE CONTRACT FOR A PERIOD OF

5 YEARS

In any case of such leaking, WB Roofing guaranties to repair or replace any defect of workmanship within the warranty period at no expense to the customer. All materials are warranted by manufacture for the period indicated in the purchase contract. The warranty will automatically transfer to any new owners of the above listed structure.

Within ten days of first knowledge of any defect, or failure to function properly, WB Roofing is to be notified, in writing, of same by owner or his/hers agents. WB Roofing shall be given first opportunity to promptly repair, replace and/or correct any item found to be defective, or that fails to function properly, at no cost to owner, with a reasonable period of time as long as WB Roofing, the owner, the supplier and the nominated contractor agree on fault and solution.

Under no circumstances shall WB Roofing be liable for virtue of this warranty otherwise, for damage to any person or property whatsoever, or any special, indirect, secondary or consequential damages, of any nature, arising out of the use or inability to use because of the construction defect.

BC200896
 Received by
 Kapiti Coast District Council
 08/12/21
 via Simpli

Memorandum from licensed building practitioner: Record of building work

Section 88, 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.

PROPERTY ADDRESS	
Street address:	Lot 6 Anderson Park
Suburb:	
Town/City:	WAIKANAЕ
Postcode:	


BUILDING CONSENT	
Building consent number:	BC200896

CLIENT DETAILS	
Name(s):	Dan and Suzi Green/David Reid Homes
Mailing address:	
Suburb:	PO Box/Private Bag:
Town/City:	Postcode:
Phone number:	Email address:

PRIMARY STRUCTURE		
Work that is restricted building work	Description of restricted building work	Carried out or supervised
Tick <input checked="" type="checkbox"/>	If necessary, describe the restricted building work.	Tick <input checked="" type="checkbox"/> whether you carried out the restricted building work or supervised someone else carrying out the restricted building work.
Foundations and subfloor framing <input checked="" type="checkbox"/>	Installed Ribraft Concrete Foundation to Engineers design and as per consented plans	<input checked="" type="radio"/> Carried out <input type="radio"/> Supervised
Walls <input type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised
Roof <input type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised
Columns and beams <input type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised
Bracing <input type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised
Other <input type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised

EXTERNAL MOISTURE MANAGEMENT SYSTEMS		
Work that is restricted building work	Description of restricted building work	Carried out or supervised
Tick <input checked="" type="checkbox"/>	If necessary, describe the restricted building work.	Tick <input checked="" type="checkbox"/> whether you carried out the restricted building work or supervised someone else carrying out the restricted building work.
Damp proofing <input checked="" type="checkbox"/>	Installed Polythene to underside of concrete foundation as per Ribraft design shown in consented plans	<input checked="" type="radio"/> Carried out <input type="radio"/> Supervised
Roof cladding or roof cladding system <input type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised
Ventilation system (for example, subfloor or cavity) <input type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised
Wall cladding or wall cladding system <input type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised
Waterproofing <input type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised
Other <input type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised

Name and contact details of the licensed building practitioner who is licensed to carry out or supervise restricted building work.	
Name: Shane MacKenzie	LBP number: 102284
Class(es) licensed in:	
Carpentry	
Plumbers, Gasfitters and Drainlayers registration number (if applicable):	
Mailing address (if different from below):	
Street address/Registered office: 18 Taranui Way	
Suburb: Paraparaumu Beach	Town/City: Paraparaumu
PO Box/Private Bag	Postcode: 5032
Phone number: 027 222 5047	Mobile:
After hours: 027 222 5047	Fax:
Email address: landmax@xtra.co.nz	Website:

DECLARATION	
I, Shane MacKenzie carried out or supervised the restricted building work recorded on this form.	
Signature:	
Date:	09 MARCH 2011



THE BUILDING		
Street address:	9 Kaiwaru Place	
Suburb:	Anderson Park	
Town/City:	Waikanae	Postcode:
THE PROJECT		
Building consent number:	BC 200896	
THE OWNER(S)		
Name(s):	Dan & Suki Green	
Mailing address:		
Suburb:		PO Box/Private Bag:
Town/City:		Postcode:
Phone number:	Email address:	
RECORD OF WORK THAT IS RESTRICTED BUILDING WORK		
PRIMARY STRUCTURE		
Work that is restricted building work Tick	Description of restricted building work If necessary, describe the restricted building work	Carried out or supervised Tick <input checked="" type="checkbox"/> whether you carried out the RBW or supervised someone else.
<input type="checkbox"/>	Foundations and subfloor framing	<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
<input checked="" type="checkbox"/>	Stood Pre-nail frames as per plan.	<input checked="" type="checkbox"/> Carried out <input type="checkbox"/> Supervised
<input checked="" type="checkbox"/>	Stood Posts as per plan	<input checked="" type="checkbox"/> Carried out <input type="checkbox"/> Supervised
<input checked="" type="checkbox"/>	Post & Exterior beams	<input type="checkbox"/> Carried out <input checked="" type="checkbox"/> Supervised
<input type="checkbox"/>	Bracing	<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised
<input type="checkbox"/>	Other	<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised

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 08/12/21
 via Simpli

RECORD OF WORK THAT IS RESTRICTED BUILDING WORK

EXTERNAL MOISTURE MANAGEMENT SYSTEMS

Damp proofing <input type="radio"/>	/	<input type="radio"/> Carried out <input type="radio"/> Supervised
Roof cladding or roof cladding system <input checked="" type="radio"/>	Purlins as per plan	<input checked="" type="radio"/> Carried out <input type="radio"/> Supervised
Ventilation system (for example, subfloor or cavity) <input checked="" type="radio"/>	Cavity for cladding	<input type="radio"/> Carried out <input checked="" type="radio"/> Supervised
Wall cladding or wall cladding system <input type="radio"/>	/	<input type="radio"/> Carried out <input type="radio"/> Supervised
Waterproofing <input type="radio"/>	/	<input type="radio"/> Carried out <input type="radio"/> Supervised
Other <input type="radio"/>	/	<input type="radio"/> Carried out <input type="radio"/> Supervised

ISSUED BY

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

Name: Ben Kusabs LBP number: BP 130832

Class(es) licensed in: Carpentry.

Plumbers, Gasfitters and Drainlayers registration number (if applicable):

Mailing address (if different from below): 89 Puruaha Road Te Horo

Street address/Registered office: 89 Puruaha Road

Suburb: Te Horo Town/City: Otaki

PO Box/Private Bag: Postcode: 5582

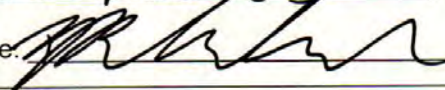
Phone number: Mobile: 027 549 5483

After hours: Fax:

Email address: Ben@Blackpine.construction Website:

DECLARATION

I Ben Kusabs carried out or supervised the restricted building work recorded on this form.

Signature:  Date: 3/12/21

GASFITTING CERTIFICATE OF COMPLIANCE – GAS SAFETY CERTIFICATE



Certificate of Compliance:

Client Name:

Reference / Job #: ICP (if known):

Address of work:

Suburb: Town / City:

Description of gasfitting work: (If different gasfitting work was done by different people, state who did what gasfitting.)

Gas supply pressure kPa Risk classification (tick one) Low-Risk General High-risk

Gas type (tick one) Natural gas LPG Biogas Other (specify)

The work has been done in accordance with a certified design: Yes No

If yes – identify the certified design including name, date and version. Also attach a copy of the certified design to this certificate.

(Or provide reference to readily accessible electronic format, eg Internet link.)

Identify:

Link:

The work relies on manufacturer's instructions: No Yes:

If yes – identify the instruction manual including name, date and version. Also attach a copy of manufacturer's instructions to this certificate.

(Or provide reference to readily accessible electronic format, eg Internet link.)

Identify:

Link:

The work has been done in accordance with means of compliance (specify):

Yes – AS/NZS 5601.1 sections 3 to 6 Yes – AS/NZS 5601.2 sections 3 to 9 No

Were any other standards or gas code of practice required for compliance?

Yes (specify) No

Parts of the gas installation to which this certificate relates that are safe to connect to a gas supply?

All Parts (specify)

Date(s) on which the work was done:

Name and registration number of anyone who carried out work under supervision:

By signing this document I confirm that I am satisfied that the work described in this certificate of compliance has been done lawfully and safely, and that the information on this certificate is correct.

Certifier name: Registration number:

Certifier Signature: Date:

Gas Safety Certificate:

By signing this document I confirm that the work described in this Gas Safety Certificate, and the installation or part installation, is connected to a gas supply and is safe to use.

Name of person authorised to certify the connection:

Registration number: Date of completion or connection:

Certifier Signature: Date:

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BRIEN ELECTRICAL

ELECTRICAL CERTIFICATE OF COMPLIANCE & ELECTRICAL SAFETY CERTIFICATE

BRIEN ELECTRICAL JOB #/ CERTIFICATE #

45954

This form has been designed to be used by licensed electrical workers to certify that installations or Part installations under **Part 1 or Part 2 of AS/NZS 3000** are safe to be connected to the **specified** system of electrical supply.

Location Address

9 KAIWARU PLACE

Customer Details:

Name: DAVID REID HOMES (KAPITI) LTD

Address: 104 Ngarara Road

Phone: 049045959

Name of Electrical worker:

Shaun Brosnahan

Registration/Practising licence number:

E 279806

Company Details:

BRIEN ELECTRICAL LTD 15 IHAKARA ST, PARAPARAUMU 04 298 7053 info@brienelectrical.co.nz

Type of work:

 Additions

 Alterations

 New work

The prescribed electrical work is:

 Low risk

 General

 High risk (Specify):

Specify type of supply system:

 240V MEN

 400V MEN

Reference Standards:

 Part 1 of AS/NZS 3000

 Part 2 of AS/NZS 3000

 Additional Standards:

Description of work:

Complete new build installation wired as per plans.
16mm ns main. MEN point in garage.

Date/range of dates that prescribed electrical work undertaken:

I certify that the completed prescribed electrical work to which this certificate applies has been done lawfully and safely, and the information in the certificate is correct in that the installation, or part of the installation:

- Has been installed in accordance with the specified certified design¹
 Has an earthing system that is correctly rated (where applicable)
 Contains fittings that are safe to connect to a power supply
 Relies on a supplier Declaration of Conformity¹
 Relies on a manufacturer's instructions¹
 Has been tested in accordance with the Electricity (Safety) Regulations 2010
 Is safe to connect

¹ Attach or reference. If it is impractical to attach a copy of a manufacturer's instructions, or of any certified design or supplier declaration of conformity, provide a reference to where the documents can be found, in a readily accessible format, by electronic means.

Test Results		
Polarity (Independent Earth):		
Insulation Resistance:	>250	M Ω
Earth Continuity:	.02	Ω
Bonding:	.02	Ω
Fault Loop impedance:	.55	Ω
Other (specify): PSSC		Ka

Certifier's signature:

Date:

08/12/2021

I certify that the installation, or part of the installation, to which the Electrical Safety Certificate applies is connected to a power supply and is safe to use.

Certifier's name:

Shaun Brosnahan

Registration/Practising licence number:

E 279806

Certifier's signature:

Certificate Issue Date:

08/12/2021

CUSTOMER COPY – THIS IS AN IMPORTANT DOCUMENT AND SHOULD BE RETAINED FOR A MINIMUM OF 7 YEARS

This certificate also confirms that the electrical work complies with the building code for the purposes of Section 19(1)(e) of the Building Act 2004.



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via Email

46

Kapiti Coast District Council
175 Rimu Road
Private Bag 60601
Paraparaumu 5254
Phone (04) 296 4700

SITE NOTICE

Consent No: **200896**
Applicant: **Daniel Perry Green**
Site Address: **9 Kaiwaru Place, Waikanae**
Work Type: **New dwelling contains 3 bedrooms, 2 bathrooms, Living area, open dining and kitchen area. Multiple cladding exterior walls and monopitched and gabled long run metal roofs cover the dwelling.**

Building Category: **R2**

Inspection Type: **Preline Building**
Inspection Outcome: **Fail**
Inspected By: **Anthony Wilson**
Inspection Date: **27 September 2021**

Failed Items

General

Confirm additional information/amended plan

Minor change of strand board bracing to ply bracing in garage on 3 walls, architect to provide revised details.

This can be accepted as a variation.

Agent/owner written approval

Owner to give written approval for change to ply in garage

Passed Items

General

Sighted previous inspection notes

Previous inspections reviewed and updated

Conforms with approved drawings

Set out as per plan

Max moisture content

15%-18%

Ventilation to rooms

Window sizes and openings as per consented documentation

Timber treatment

H1.2 studs and H3.2 bottom plates.

Lintel/beam size and fixing

As required

Insulation

**R2.6 wall
Acoustic R2.2 wall
R3.2 ceiling
R3.2 skillion**

Ceiling batten spacing

600mm timber

Stud spacing

400 and 600mm

Bracing connections

All fixings in place

Air seals

Sealed with pf rod and foam

Bottom plate fixings

In as required

Building closed in

Building closed in adequately to allow lining

Grade of timber framing

SG8

LBP number

139787

non compliance discussed onsite

Get architect to supply revised brace plan

Next Inspection required

Post line required

27 September 2021

KEEP ON SITE FOR RECHECK

Page 1 of 2

Inspection Type: **Pre Wrap**
Inspection Outcome: **Pass**
Inspected By: **Anthony Wilson**
Inspection Date: **27 September 2021**

Passed Items

General

Inspection notes
Bottom plate connections

**Previous inspection reviewed
Bolts located as required.**

**Bowmac U bracket is holding intermediate jack studs,
full length lintel is anchored at the ends.**

Other

**All aspects relating to this inspection have been
assessed and checked against the consented
documentation and deemed to comply.**

Demand Calculation Sheet

Job Details

Name: Dan and Suki Green
 Street and Number: Anderson Park
 Lot and DP Number: Lot 6
 City/Town/District: Waikanae
 Designer: M. Nemeth
 Company: AD Architecture
 Date: Wednesday, 8 September 2021

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Building Specification

Number of Storeys: 1
 Floor Loading: 2 kPa
 Foundation Type: Slab

Single

Cladding Weight: Light
 Roof Weight: Light
 Room in Roof Space: No
 Roof Pitch (degrees): 7.5
 Roof Height above Eaves (m): 1.0
 Building Height to Apex (m): 3.5
 Ground to Lower Floor (m): 0.2

Average Stud Height (m): 2.4
 Building Length (m): 18
 Building Width (m): 12.4
 Building Plan Area (m²): 164.5

Building Location

Wind Zone = Very High

Earthquake Zone 3

Soil Type: D & E (Deep to Very Soft)
 Annual Prob. of Exceedance: 1 in 500 (Default)

Bracing Units required for Wind

	Along	Across
Single Level	570	677

Bracing Units required for Earthquake

	Along & Across
Single Level	845

Single Level Along Resistance Sheet

Job Name: Dan and Suki Green

									Wind	EQ
									Demand	
									570	845
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1160 204%	1131 134%
A	1	0.80		2.4	GS1-N	GIB®	49	47		
	2	0.90		2.4	GS1-N	GIB®	57	53		
	3	0.50		2.4	GS1-N	GIB®	28	29		
	4	0.50		2.4	GS1-N	GIB®	28	29		
	5	1.50		2.4	GS1-N	GIB®	104	90		
									264 OK	249 OK
b	1	1.50		2.4	GS1-N	GIB®	104	90		
	2	1.20		2.4	GS1-N	GIB®	83	72		
	3	1.20		2.4	GS1-N	GIB®	83	72		
	4	1.10		2.4	GS1-N	GIB®	74	66		
									343 OK	300 OK
c	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	1.20		2.4	EP1_1.2	Ecoply	144	162		
									227 OK	234 OK
d	1	0.75		2.4	GS1-N	GIB®	45	44		
	2	0.75		2.4	GS1-N	GIB®	45	44		
	3	0.50		2.4	GS1-N	GIB®	28	29		
	4	0.70		2.4	EP1_0.6	Ecoply	67	74		
									184 OK	191 OK
e	1	0.75		2.4	EP1_0.6	Ecoply	71	79		
	2	0.75		2.4	EP1_0.6	Ecoply	71	79		
									143 OK	158 OK

Single Level Across Resistance Sheet

Job Name: Dan and Suki Green

									Wind	EQ
									Demand	
									677	845
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1069 158%	1012 120%
m	1	0.40		2.4	GS1-N	GIB®	21	23		
	2	0.40		2.4	GS1-N	GIB®	21	23		
	3	1.20		2.4	GS1-N	GIB®	83	72		
									125 OK	118 OK
n	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	1.20		2.4	GS1-N	GIB®	83	72		
									166 OK	144 OK
o	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	1.20		2.4	GS1-N	GIB®	83	72		
									166 OK	144 OK
p	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	2.30		2.4	GS1-N	GIB®	159	138		
	3	1.20		2.4	EP1_1.2	Ecoply	144	162		
									386 OK	372 OK
q	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	1.20		2.4	EP1_1.2	Ecoply	144	162		
									227 OK	234 OK

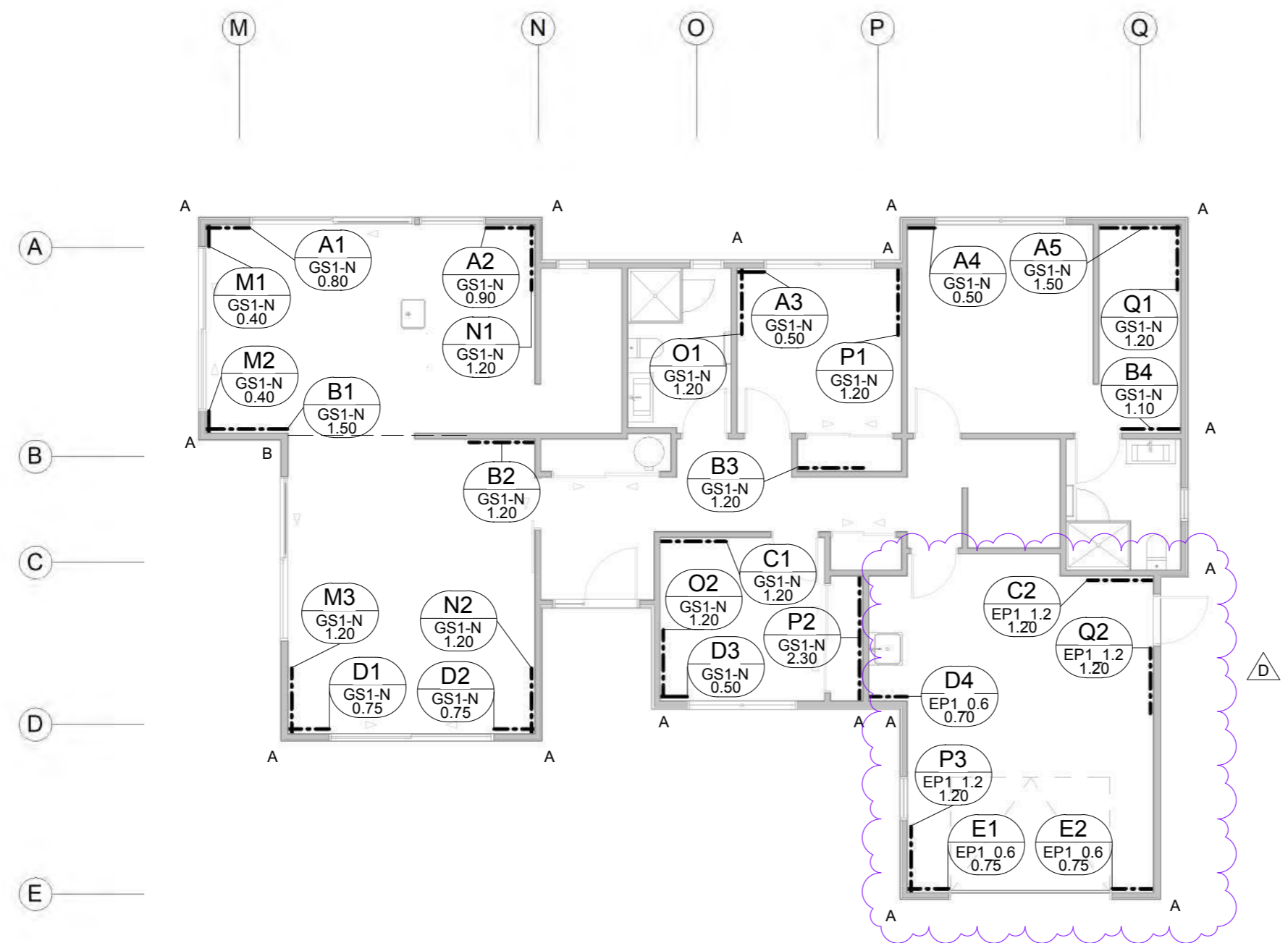
Custom Wall Elements

Supplier	System	Min. Length m	Wind BUs/m	EQ BUs/m
Strandboard	SBD-9	0.6	105	115
Ecoply	EPB1_0.4	0.4	80	95
Ecoply	EPB1_0.6	0.6	95	105
Ecoply	EPB1_1.2	1.2	120	135
Ecoply	EPBG_0.4	0.4	100	115
Ecoply	EPBG_1.2	1.2	150	150
Ecoply	EP1_0.4	0.4	80	95
Ecoply	EP1_0.6	0.6	95	105
Ecoply	EP1_1.2	1.2	120	135
Ecoply	EPBS_0.4	0.4	60	60
Ecoply	EPBS_0.6	0.6	60	65
Ecoply	EPBS_1.2	1.2	65	70
Ecoply	EPBS_2.4	2.4	80	90
Gammabrace	GBF400_2.4	0.4	112	137
Gammabrace	GBF600_2.4	0.6	133	150

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

Bracing Notes
 • All bracing elements be installed in accordance with manufacturers specifications for Winstones GIB EZYBrace system, Ecoply bracing system,
 • All bracing elements in exterior and interior walls that require hold down fixings to a concrete slab floor are to have GIB handibrac brackets with Bowmac screw bolts installed to manufacturers specifications
 • Penetrations up to 90x90 maximum are allowed within a bracing element but must be no closer than 90mm to the edge of the bracing element
 • Openings larger than 90x90mm are not permitted with bracing elements

Top Plate Connection Key
 A Lumberlok Plate-Lok 6KN connection between top plates
 B Framing member (truss bottom chord or ceiling joist) with 6KN connection to top plate - CPC40 cleat each side



BRACING PLAN
 1 : 100



Rev	Date	Description
D	27/09/21	Ply bracing edit

ADarchitecture
 Leaders in Applied Design
 Email: info@adarchitecture.nz Web: adarchitecture.nz

Phone: (04) 298 5662
 5 Kodex Place, Paraparaumu 5032

Proposed House
 for Dan and Suki Green
 Lot 6 Anderson Park
 Waikanae

Building Consent
 Bracing Plan

Angie Mazur

From: Daniel Green <danielgreen00@hotmail.com>
Sent: Tuesday, 28 September 2021 9:23 am
To: Lewis Franks
Subject: Re: Ply to Garage

BC200896
Received by
Kapiti Coast District Council
1/10/21
via Email

Like wise!

Yep - all good.

What is the finish going to be like i.e will we see hundreds of screws?

On 27/09/2021, at 3:59 PM, Lewis Franks <Lewis.Franks@davidreidhomes.co.nz> wrote:

Hi Dan,

Good to put some faces to the names of my favourite clients today.

We just had a pre-line inspection with the council which all went pretty well. One thing they wanted from us is confirmation that the owners are happy with the change from Strandboard on the garage walls as shown in the plans to Plywood.

Cheers,
Lewis



Lewis Franks
Project Manager
David Reid Homes (Kapiti) Ltd
Franchisee for David Reid Homes Kapiti/Wellington region

M 027 389 9350 **P** 04 904 5959
102 Ngarara Road, Waikanae
PO Box 148, Paraparaumu



COMMENT:

External air pressures in higher *wind zones* can transfer to interior linings, and exceed recommended loadings prescribed by some *lining* manufacturers. Rigid *underlays* will protect *linings* from undue air pressure loadings, and help ensure cavity depths are maintained for the proper functioning of the *drained cavity*.

Amend 5
 Aug 2011

9.1.8 Drained cavities

Based on the *risk score* for an *external wall* calculated as per Paragraph 3.1, a *wall cladding* may require the inclusion of a *drained cavity*. Where a *drained cavity* is required, it shall meet the requirements of Paragraphs 9.1.8 to 9.1.9.4.

Amend 2
 Jul 2005

COMMENT:

Cavities manage occasional ingress of water past the *cladding*, but should not act as gutters or drains.

9.1.8.1 Limitations

This Acceptable Solution is limited to systems where:

- Cavity battens* are fixed, by the *cladding* fixings, to the *wall framing*,
- Claddings* are fixed through the *cavity battens* into the *wall framing*, and
- The *drained cavity* behind *claddings*, except in *masonry veneer*, is not vented at the top.

Systems where the *cladding* is fixed into the *cavity batten* only are outside the scope of this Acceptable Solution.

9.1.8.2 Requirements

Where a *drained cavity* is required, it shall:

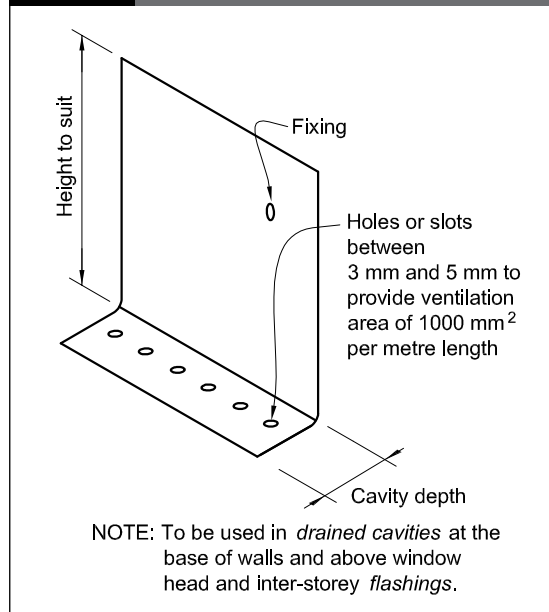
- Be installed over a *wall underlay*, either flexible or rigid, that:
 - complies with Table 23, and
 - is fixed to *wall framing*,
- Be formed using vertical *cavity battens*,
- Restrict air movement between the *drained cavity* and:
 - floor, *wall* and *roof framing*,
 - attic *roof* space, and
 - subfloor space,
- Be drained and open to the exterior at the bottom of cavities,
- Use vermin-proofing at the cavity base as per Paragraph 9.1.8.3 and Figure 66,

Amend 5
 Aug 2011

Amend 2
 Jul 2005

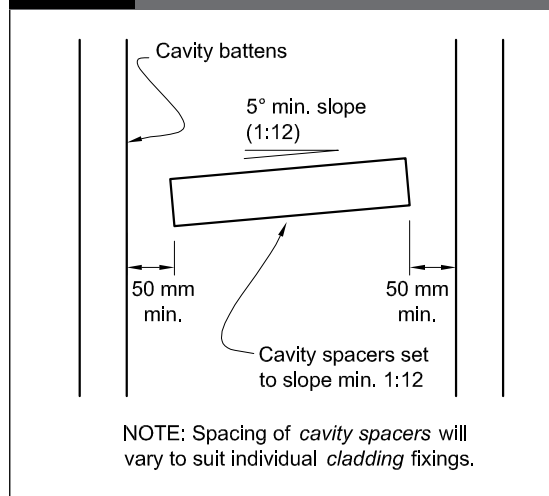
Amend 2
 Jul 2005

Figure 66: Cavity base closer/vermin proofing
 Paragraph 9.1.8.2



Amend 5
 Aug 2011

Figure 67: Cavity spacers
 Paragraphs 9.1.8.2 and 9.1.8.4



Amend 5
 Aug 2011

- Use *cavity spacers* as shown in Figure 67, where fixing is required between *cavity battens*. Alternative *cavity spacers* to those described in Paragraph 9.1.8.2 are permitted. Refer to Paragraph 9.1.8.4 f).

Amend 5
 Aug 2011

COMMENT:

Solid horizontal *cavity spacers* risk obstruction of air flow in cavities and risk bridging moisture across the *cavity*.

Amend 5
 Aug 2011

David Reid Homes (Kapiti) Ltd
PO Box 148
Paraparaumu 5254

10 March 2021

Dear Building Consent Applicant / Building Owner

Approval of Building Consent – Detached Residential / Outbuilding: 200896

Location: Lot 6 DP 547543, 9 Kaiwaru Place, Waikanae
Legal Description: LOT 1 DP 544253
Description: New dwelling contains 3 bedrooms, 2 bathrooms, Living area, open dining and kitchen area. Multiple cladding exterior

I am pleased to inform you that the above building consent application has been approved. The building consent documents have been issued and are enclosed.

The building consent attached to this letter is consent under the Building Act 2004 to undertake building work in accordance with the plans and specifications that accompanied your application. Under section 49 of that Act, Council is satisfied that the provisions of the building code would be met if the proposed building work were completed in accordance with those plans and specifications. This consent does not affect any duty or responsibility under any other Act or permit any breach of any other Act.

This building consent does not give or imply any rights to transgress beyond your legal boundaries. Any work that is required beyond your legal boundaries can only be undertaken with the permission of the affected owner/s.

Before starting any work please read ALL the building consent documents carefully and in full so that you, as the owner, understand the conditions under which the consent has been issued.

Please note that this building consent includes restricted building work, the details of this are included in this letter.

Owner responsibilities

The owner is responsible for ensuring:

- building work starts within 12 months of the approval of the building consent and that work progresses at a reasonable pace.
- written notice of every licensed building practitioner undertaking restricted building work is provided to Council before that work commences, and any changes are advised in writing

- the approved building consent documents are kept on site during construction and available for the District inspector at inspections
- all required inspections are completed and that a Code Compliance Certificate is obtained once the work has been completed. The list of supporting documentation required before issue of the Code Compliance Certificate and information on filling out the application form for code compliance certificate is attached. Failure to obtain a final inspection and a code compliance certificate may affect your insurance cover and could affect future re-sale of your property.
- a Corridor Access Request is made and a Works Access permit is obtained before undertaking work in the legal road/road reserve, including installing a vehicle access crossing from the public road into your property. The process to be followed and the forms can be found on the Council website under Council Services/Roads or Council Services/Frequently asked questions/Access & Transport.
- before any excavations are undertaken a "Before U Dig" inquiry is made to check for locations of any underground services.
- no work with noisy equipment is to be carried out before 7.30 a.m. or after 6 p.m. Monday to Saturday. During the week there may be workers on site from 6.30 a.m. quietly preparing for work. Work with noisy equipment is not permitted on Sundays and public holidays.
- all loose materials that are capable of being carried by the wind are either secured or removed from the site. All activities must be carried out in a manner that keeps to a minimum the dust nuisance to adjacent properties.
- no damage occurs to public property, for example footpaths, water meters or retaining structures. Should damage occur you will be required to pay for any repairs.
- obtaining an amendment to the building consent for any changes to the approved building consent, prior to that work being undertaken.
- meeting the requirements of any easements, consent notices, covenants, and like listings registered on the title.
- the development contributions invoiced, if any, must be paid before a code compliance certificate can be issued.
- all maintenance recommended by the manufacturers is carried out at the required intervals.

General requirements

Note: Your attention is drawn to the notes contained in the 'Addendum to the Consent' and guidance documents referred to.

The following information is relevant to this building consent:

1. The Building Inspector is to be given 24 hours' notice before carrying out the inspections on the attached list. To arrange for inspections by the District Inspector, please contact the building inspectorate on 04 296 4700 between the hours of 8.00am and 4.30pm.

2. You are responsible for the safety of visitors to the work site including those undertaking building inspections. You must provide safe access to parts of the construction necessary for inspection. Ladder access must be securely founded and tied. Scaffold access and roof edge protection is generally required.
3. If required inspections, including those by designers of specifically designed elements, are not undertaken you may experience difficulty in obtaining a Code Compliance Certificate for the project. We suggest that at the time of the first inspection you discuss the inspection requirements with the inspecting officer.
4. This building consent will lapse and be of no effect if the building work concerned has not been commenced within 12 calendar months after the date of issue, or within such further period as the territorial authority allows.
5. The contractor is to leave the site clear of all demolition materials and in a tidy state.
6. Easements, consent notices, covenants, and like listings registered on the title are the responsibility of the applicant.
7. Note and comply with endorsements on approved plans.

Restricted Building Work

The following building work associated with this building consent is restricted building work [Section 7 and 402(1)(n) of the Building Act 2004 and Building (Definition of Restricted Building Work) Order 2011]:

Description of restricted building work including design work that is restricted building work
<i>Primary structure</i>
Foundations and subfloor framing
Walls
Roof
Columns and beams
Bracing
Other
<i>External moisture management systems</i>
Damp proofing
Roof cladding or roof cladding system
Ventilation system (for example subfloor or cavity)
Wall cladding or wall cladding system
Waterproofing
Other

Please note that the design work and restricted building work must be supervised or carried out by a licensed building practitioner who is licensed to carry out or supervise that kind of building work.

You or your agent will need to provide their details to the Council in writing prior to commencement of the building work. If after the restricted building work commences the named licensed building practitioner(s) ceases to be engaged to carry out or supervise the restricted building work under the building consent, this must also be advised in writing as must also the details of any other licensed building practitioner(s) subsequently engaged

to carry out or supervise the restricted building work (Section 87 of the Building Act 2004). A form "Advice of licensed building practitioner(s)" is enclosed for you to use to advise the Council of licensed building practitioner details.

Please also note that it is an offence to engage another person to carry out or supervise restricted building work who is not a licensed building practitioner (Section 86 of the Building Act 2004).

Other reference material

- Guide for completing an application for code compliance,
<http://www.kapiticoast.govt.nz/globalassets/regulatory/building/form-278a-guide-for-ccc-application.pdf>
- A guide to the inspection process
http://www.kapiticoast.govt.nz/globalassets/regulatory/building/form_559_a_guide_to_the_inspection_process.pdf

If you have any questions regarding your building consent or your responsibilities, please contact Kapiti Coast District Council on 04 296 4700 or toll free on 0800 486 486.

Building Consent

[Form 5, Building (Forms) Regulations 2004]

200896

Section 51, Building Act 2004

The building

Street address of building: Lot 6 DP 547543, 9 Kaiwaru Place, Waikanae

Legal description of land where building is located: LOT 1 DP 544253

Valuation number: 1494126601

Building name: N/A

Location of building within site/block number: Located centrally on site.

Level/unit number:

The owner

Name of owner: Daniel Perry Green

Contact person: As above

Mailing address: PO Box 148, Paraparaumu 5254

Street address/registered office: N/A

Phone numbers:

Landline: - *Mobile:* 021 127 6073

After hours: - *Fax number:* -

Email address: jo.kunac@davidreidhomes.co.nz

Website: -

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

Full Name: David Reid Homes (Kapiti) Ltd

Mailing Address: PO Box 148, Paraparaumu 5254

Phones: 021 127 6073

Email: jo.kunac@davidreidhomes.co.nz

Building work

The following building work is authorised by this building consent:

New dwelling contains 3 bedrooms, 2 bathrooms, Living area, open dining and kitchen area. Multiple cladding exterior walls and mono-pitched and gabled long run metal roofs cover the dwelling.

Residential Dwelling

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 or 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

This building consent is subject to the following conditions:

1. Refer to the list of inspections required. Under section 90 of the Building Act 2004 agents authorised by the Council (acting as a Building Consent Authority) 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 that building site; and
 - c. any building.

Compliance schedule

A compliance schedule is not required for the building.

Attachments

Copies of the following documents are attached to this building consent:

- List of required inspections and supporting documentation required
- Building Consent Addendum
- Plans and specifications
- Advice of licensed building practitioners

Note: The cover letter and all attachments to this building consent should be read fully to ensure you understand all conditions of this consent.

Signature

Position

On behalf of: KAPITI COAST DISTRICT COUNCIL

Date: 4/03/21

Relevant Information

Issued in accordance with Building Consent No. 200896

1. Both hot and cold water pipes are to be tested to 1500kPa pressure.
2. Earthworks (used regardless as to whether it complies with the District Plan or not): Should a waahi tapu or other cultural site be unearthed during earthworks, the operator and/or owner shall: 1) Cease operations; 2) Inform local Iwi; 3) Inform Heritage New Zealand (HNZ) and apply for an appropriate authority; and 4) Take appropriate action, after discussion with HNZ, Council and Tangata Whenua, to remedy damage and/or restore the site. NB: In accordance with the Heritage New Zealand Pouhere Taonga Act 2014, where an archaeological site is present (or uncovered), authority from HNZ is required if the site is to be modified in any way.
3. Ensure that before any excavations are undertaken a "Before U Dig" inquiry is made to check for locations of any underground services. This is a web based service that you or your contractor use to get plans and information emailed out to you.
4. Any external cladding system must be completed before a pre-lining inspection for the affected wall can take place.
5. The owner/builder is responsible for clearly defining the site boundary lines and pegs. This may require a survey. NOTE: established fences are not necessarily on the boundary.
6. Plan notes take precedence over general specifications.

Building Consent Addendum to 200896

Application	Building Consent No. 200896
David Reid Homes (Kapiti) Ltd	
PO Box 148	
Paraparaumu 5254	

Project	
Description:	New (& prebuilt) House, Unit, Bach, Crib, Town House etc. Being Stage 1 of an intended 1 Stages New dwelling contains 3 bedrooms, 2 bathrooms, Living area, open dining and kitchen area. Multiple cladding exterior
Intended Life:	Indefinite, but not less than 50 years
Intended Use:	Residential Dwelling
Estimated Value:	\$500,000
Location:	Lot 6 DP 547543, 9 Kaiwaru Place, Waikanae
Legal Description:	LOT 1 DP 544253
Valuation No:	1494126601

Designer: Peter Davis 5 Kodex Place, Paraparaumu : 04 298 5662

Specific requirements

- Names and registration numbers of the plumber and drainlayer are required before work commences.
- A certifying plumber/drainlayer is to complete the attached producer statement forms and return to Council. Also provide a neat `as built` drainage plan showing sewer, stormwater and water.
- The inspection of all specific design components covered by a producer statement design (PS1), where the designer has recommended construction monitoring, is the responsibility of the Design Engineer who is also required to supply a written report (PS4) to the Council. It is the Design engineer's responsibility to confirm design assumptions.

KAPITI COAST DISTRICT COUNCIL

Consent No: 200896

Building Category: R2

Site Address: Lot 6 DP 547543, 9 Kaiwaru Place, Waikanae

Owner/Agent: David Reid Homes (Kapiti) Ltd

Inspections

The following inspections are required:

- 1 Piles
- 1 Pre-Slab Building
- 1 Pre-Slab Plumbing
- 2 Drainage
- 1 Preline Building
- 1 Postline / Wet area Pre Application
- 1 Pre Wrap
- 1 Pre Clad
- 1 Preline Plumbing
- 1 Final Inspection
- 11 Total Inspections

Note: Engineer to inspect soakpit. Hamish Wells.

Documentation

The following documentation is required:

- 1 Application for CCC
- 1 Electrical safety certificate - Electrician
- 1 As-built drainage plan
- 1 Drainage (Form 126) for stormwater & private Sewer installation
- 1 Plumbing (Form 125) for pressure test and installation piped services
- 1 Construction review PS4 statement for geo-technical engineering
- 1 Roof product manufacturers warranty
- 1 Record of Work
- 1 Water tank warranty

PS4 required from Hamish Wells for soakpit.

Building Practitioners

- 1 Designer 1 Peter Davis
- 1 Designer 2 Hamish Wells
- 1 Carpentry 1
- 1 Foundations 1
- 1 Roofing 1
- 1 Plumber
- 1 Drainlayer
- 1 Electrician

APPROVED BY
BUILDING
melissag
OFFICER
4/03/2021

APPROVED BY
PLUMBING
melissag
OFFICER
4/03/2021

Drawing List		
No.	Sheet Name	Rev.
A001	Building 3D	
A002	Construction Notes	
A003	Site Plan	B
A004	Floor Plan	
A005	Elevations	
A006	Elevations	
A101	Drainage Plan	B
A102	Plumbing Details	
A103	Foundation Plan	
A104	Framing Plan	
A105	Beam Schedule	
A106	Bracing Plan	
A107	Electrical Plan	
A108	Lighting Plan	
A109	Roof Plan	
A201	Building Section	
A202	Building Section	
A203	Building Section	
A301	Foundation Details	
A302	Foundation Details	
A303	Roof Details	B
A304	Cladding Details	B
A305	Cladding Details	
A306	Cladding Details	B
A307	Deck Details	
A308	Window Details	
A309	Window Details	
A310	Bathroom Details	
A401	Exterior Joinery Schedule	
A402	Interior Opening Schedule	
A501	Interior Elevations	
A502	Interior Elevations	

Proposed House
FOR
Dan and Suki Green
AT
Lot 6 Anderson Park
Waikanae





VIEW FROM NORTH



VIEW FROM STREET (SOUTH)



VIEW FROM STREET (WEST)



Rev	Date	Description
-----	------	-------------

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Phone: (04) 298 5662
 5 Kodex Place, Paraparaumu 5032

Proposed House
 for Dan and Suki Green
 Lot 6 Anderson Park
 Waikanae

Building Consent

Building 3D

DO NOT SCALE DRAWING

Job	Date	Sheet(A3)	Rev.
20018	30/11/2020	A001	

General Construction Notes

- All work is to comply with the New Zealand Building Code, territorial authority requirements, NZ standards (in particular NZS 3604), manufacturers literature and endorsed building consent plans
- All references to codes and standards shall be taken to mean the latest version including amendments
- Documents may have been scanned and digitally reproduced and may not be to scale
- Contractor to provide site fencing, signage and scaffolding to comply with NZBC F5/AS1 and Worksafe NZ requirements
- Site fencing on boundaries inaccessible to the public are to be 1000 high plastic safety mesh with warratah stakes at 1500crs with safety caps
- Install all materials in accordance with manufacturers specifications and instructions
- Slip resistance rating of trafficable surfaces to comply with NZBC D1
- Contractor must obtain territorial authority acceptance for any variations to plans and construction details

Building Environment Notes

- This construction site shall adhere to the REBRI (Resource Efficiency in the building and related industries) guidelines for construction - waste reduction
- This site is in a very high wind zone. Ensure correct fixings, tie downs, connectors, glazing etc are used
- This site is in exposure zone C :
 - all treated timber pile connections and subfloor fixing connections within 600 from ground level or in exposed situations are to be type 304 S.S.
 - all other structural fixings (except fabricated brackets) in sheltered locations to be hot dip galvanized, and in exposed situations to be type 304 s.s.
 - all fabricated brackets to be minimum 5mm mild steel and be hot dip galvanized
- All fixings (including nails and screws) in contact with timber treated with copper quaternary (ACQ) or copper azole (CuAz) preservative are to be type 304 s.s. in exposed or sheltered locations, and hot dipped galvanized in closed situations

Site Notes

- The contractor is responsible for clearly defining the site boundaries. In order to correctly set the building out, a registered surveyor may be required. Established fences are not necessarily on the site boundary
- The site is to have permeable surfaces that are not covered by buildings or paving of at least 30% of the site area
- The minimum clearance from floor slab to finished ground level to be:
 - 150mm to paved areas and 225mm to non-paved areas for other claddings

Foundation Notes

- Ground bearing must be reconfirmed on site following the excavation of foundation trenches and prior to pouring any concrete. Soft ground may be encountered, requiring specific design by a consulting structural engineer
- Contractor to ensure that the foundation height will allow for required drainage falls to the sewer main
- Concrete floor slab to have control joints and shrinkage control joints formed in accordance with NZS3604 clause 7.5.8.6. provide a control joint around the perimeter of tiled areas.

Aluminium Joinery & Glazing Notes

- All habitable and service rooms are required to have opening windows equivalent to a minimum of 5% of their floor area, or an approved alternative ventilation system
- Opening windows projecting over access routes and decks to be protected to comply with NZBC D1, clause 1.5.4
- Provide sill support brackets to external windows and doors
- Aluminium joinery to be in accordance with NZS 4211
- All glazing is to comply with NZS 4223 parts 1,2,3
- Window manufacturer is to confirm all windows required to have safety glass
- Window manufacturer to supply all flashings and wanz wis components
- Fit restrictor stays to opening sashes to limit the opening to a maximum of 100mm wherever the sill height is less than 760mm and the difference in levels is 1000mm or greater. Refer to NZBC F4

Wall & Roof Framing Notes

- Timber treatment to comply with NZS 3602
- Trusses must be designed and supplied by a licensed pre-nail manufacturer. Provide a copy of the design and producer statement to the territorial authority
- Prefabricated walls must be designed and supplied by a licensed pre-nail manufacturer.
- Bottom plates to be fixed with approved bottom plate anchors installed in accordance with manufacturers specifications and NZS 3604
- Stud / top plate fixings to be in accordance with Bowmac Studlok specifications
- Lintel hold downs to be in accordance with lumberlok lintel fixing schedule unless specified by pre-nail manufacturer
- All fixings to be galvanized to prevent deterioration due to temporary exposure
- Where bolted connections are used, fit with 50x50x3mm square or 55x3mm round washers to both sides
- Roof framing and fixing requirements to comply with NZS 3604 section 10
- Do not support bottom chords of trusses at points other than those designated by the truss manufacturer

Cladding Notes

- Provide temporary work platforms and / or scaffolding in accordance with Worksafe NZ guidelines
- Return wall underlay into all framing openings and fit approved window flashing system to manufacturers specification.
- Fit flashings to comply with the window and cladding manufacturers specifications and details. Fit air seals to the inner edge of the joinery reveals
- A heavy duty wind barrier is required behind bevel back weatherboards in wind zones very high and above

Roofing Notes

- Provide temporary work plate forms, scaffolding, internal safety system and roof edge protection in accordance with Worksafe NZ guidelines
- Roof framing and fixing requirements to comply with NZS 3604 section 10
- Roof cladding to be installed to manufacture specification and the requirements of NZBC E2, section 8. Steel coating to be suitable for the corrosion zone. Site and project specific confirmation of the specified roofing required. Provide a copy of the manufacturers warranty to the territorial authority
- Ensure adequate cross flow ventilation is provided to roof space above thermal insulation to proven condensation
- Provide a roof space passive ventilation system to prevent build up of roof space moisture
- Contractor to provide owner with suitable written details of a regular inspection and maintenance regime for all roof deck membranes and associated flashings

Exterior Decks and Stair Notes

- Deck surfaces to achieve a slip resistance rating to comply with NZS 3604 clause 7.4.4

Interior Notes

- "Wet area" showers to be fully waterproofed using an approved membrane installed in accordance with manufacturers specifications. Installation to be by registered specialist. Supply a copy of the materials warranty and installation instructions to the territorial authority
- Extent of waterproofing membrane to be :
 - 300mm minimum higher than any basin or vanity top
 - 150mm minimum higher than any bath edge
 - Full wall height up to ceiling and full wall width for shower areas (1500mm minimum horizontal distance from shower head)

Plumbing Notes

- All plumbing and drainage to be in accordance with AS / NZS 3500 part 2
- Contractor to confirm locations of existing laterals onsite
- Provide protection to all waste pipes and drains that run under of through foundation ground beams
- Provide drainage producer statement and as-built drainage plan to the territorial authority prior to CCC being issued
- Hot water supply pipes from water heater shall be thermally insulated in accordance with NZS 4305
- Fit a tempering valve to the hot water service
- Water pipes to be tested to 1500 KPa
- Ensure that plumbing can run to the exterior without damaging structural members
- Drainage pipes to be tested and inspected prior to backfilling
- All gas work to be in accordance with Plumbers, Gasfitters and Drainlayer act
- Provide gas certification after completion to the territorial authority prior to CCC being issued

Electrical Notes

- Install smoke alarms to comply with NZBC F7
- Recessed downlights (if used) are to be IC-F rated and installed to prevent transfer of moisture into ceiling space to comply with NZECP 54
- Extract fans for enclosed bathrooms and laundries are to provide extraction of 25 l/s minimum in accordance with AS 1668.2
- Extract fan for kitchen to provide extraction of 50 l/s minimum in accordance with AS 1668.2
- Provide electrical certification after completion to the territorial authority prior to CCC being issued

Timber Treatment Schedule	
Component	Treat
Below ground / set in concrete	H5
In contact with ground	H4
Exterior timber - coated	H3.1
Exterior timber - exposed	H3.2
Wall framing generally	H1.2
Bottom plates	H3.2
Floor joist generally	H1.2
All roof framing and purlins	H1.2
Timber slat decking & framing	H3.2 / H4
Cavity battens	H3.1
Plywood cladding	H3.1
Cladding battens and trim	H3.1

- All timber to comply with NZS 3602
- Treat cut ends and bore holes as required by NZS3602, NZS3460 and timber manufacturers specifications
- Timber species to be Radiata Pine unless noted otherwise
- All fixings in contact with timber treated with copper quaternary (ACQ) or copper azole (CuAz) preservatives are to be type 304 S.S. in exposed or sheltered locations, and hot dipped galvanized in closed situations

BC200896
Received by
Kapiti Coast District Council
7/12/20



Rev Date Description



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Proposed House
 for Dan and Suki Green
 Lot 6 Anderson Park
 Waikanae

Building Consent

Construction Notes

DO NOT SCALE DRAWING

Job Date Sheet(A3) Rev.

20018 30/11/2020 A002

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

Legal Description

LOT 6
 DP 547543

Site areas

Site area 495m²
 Site coverage 178m² (36%)

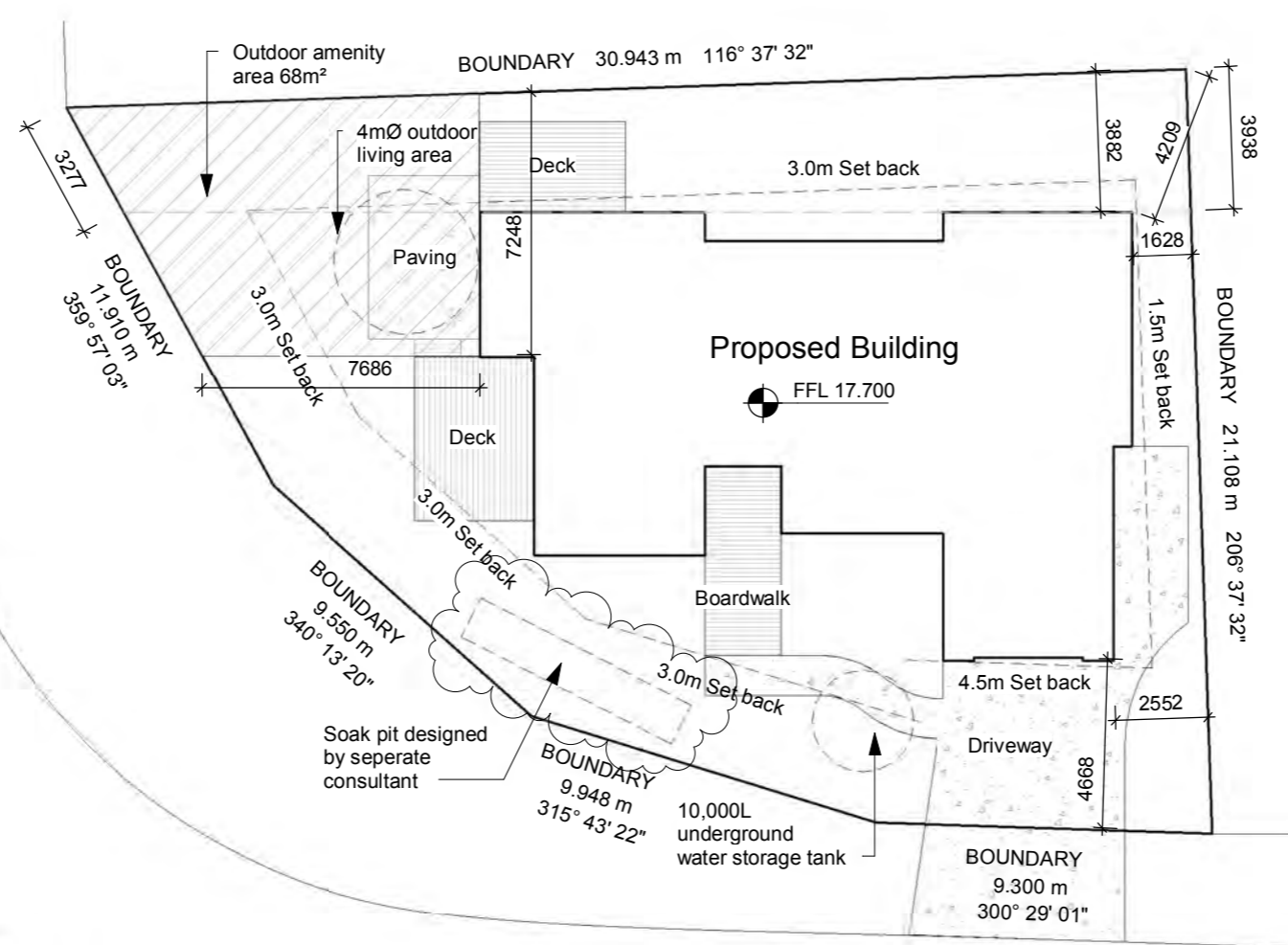
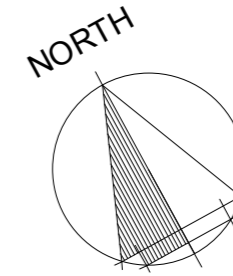
Planning features

Planning zone - Residential
 Hazard zone - No
 Coastal building zone - No
 Noise zone - No

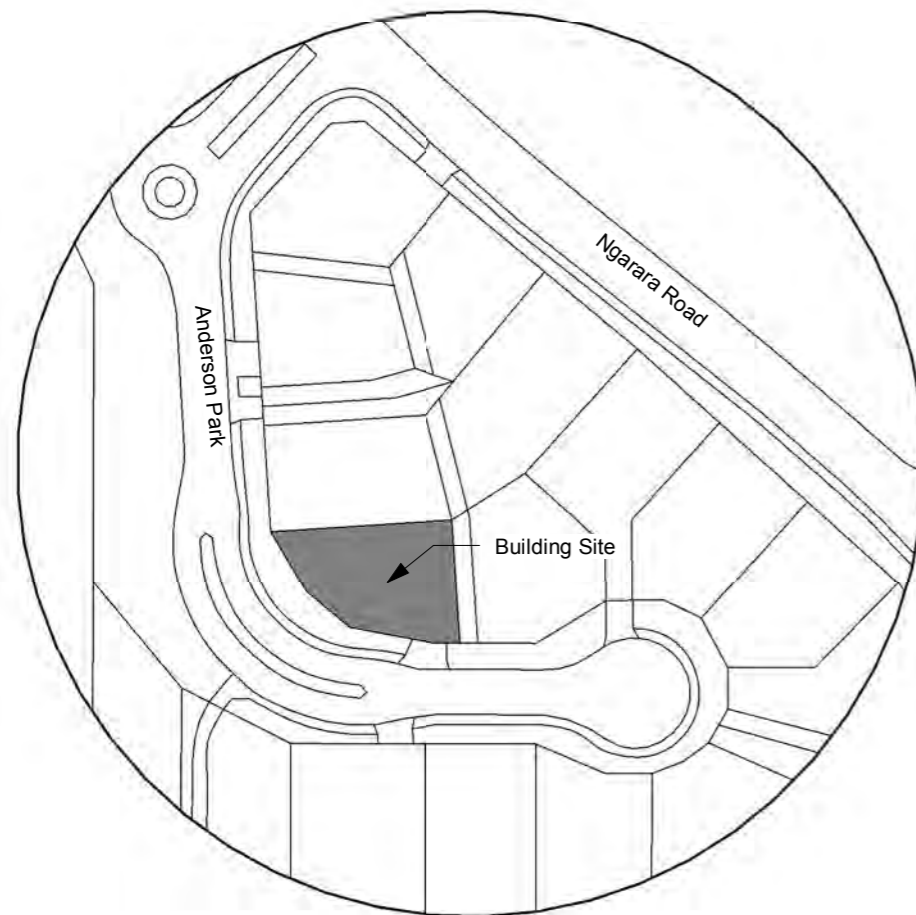
Site information

Wind zone - Very High
 Exposure zone - Zone C
 Earthquake zone - Zone 3
 Climate zone - Zone 2
 Snow zone - N1 (0-400m)
 Soil class - Refer to Eng.

Note - all boundaries are still to be confirmed by subdivision approval



SITE PLAN
 1 : 200



LOCATION PLAN



Rev	Date	Description
B	18/01/21	RFI Round 2

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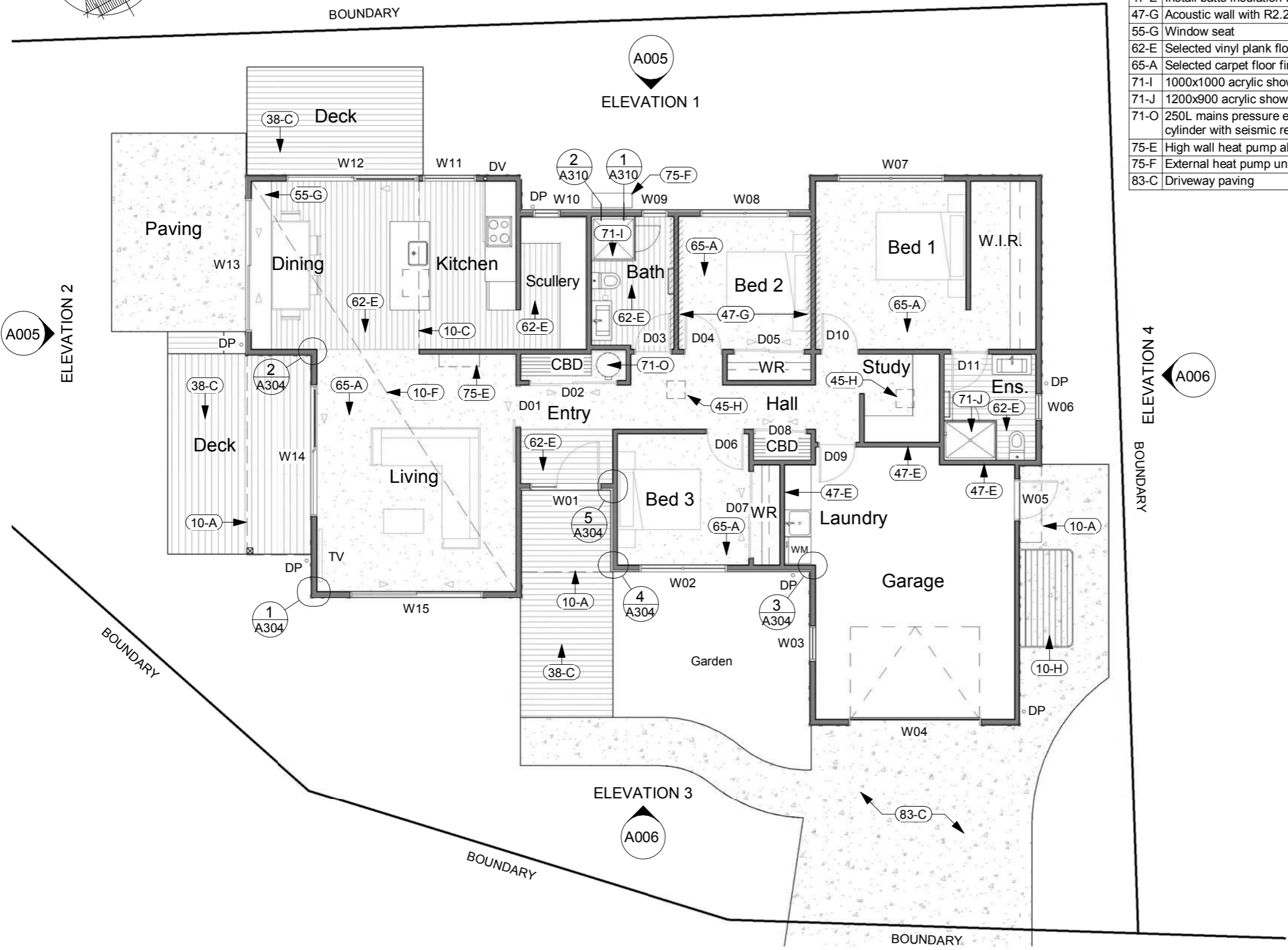
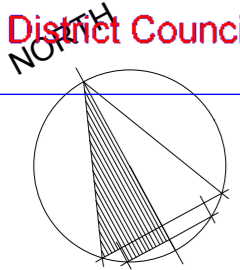
Proposed House
 for Dan and Suki Green
 Lot 6 Anderson Park
 Waikanae

Building Consent

Site Plan

DO NOT SCALE DRAWING

Job	Date	Sheet(A3)	Rev.
20018	3/03/2021	A003	B



Keynote Legend	
10-A	Outline of roof above
10-C	Bulk head above
10-F	Extent of sloping ceiling above
10-H	Clothesline
38-C	19mm timber decking fixed to deck joists - refer to foundation / joist plan
45-H	Velux suntunnel
47-E	Install batts insulation to garage interior walls
47-G	Acoustic wall with R2.2 batts
55-G	Window seat
62-E	Selected vinyl plank floor finish
65-A	Selected carpet floor finish
71-I	1000x1000 acrylic shower with acrylic walls
71-J	1200x900 acrylic shower with acrylic walls
71-O	250L mains pressure electric hot water cylinder with seismic restraints and safety tray
75-E	High wall heat pump above
75-F	External heat pump unit
83-C	Driveway paving

- Construction Notes**
- This page is to be read in conjunction with sheet A002 - construction notes for additional information
- General Notes**
- Stud height generally 2455 unless noted otherwise on the plan
 - Window head height to be 2200 high
 - Ceiling linings to be 13mm GIB standard on 70x35 timber battens (13mm Aqualine to bathrooms and ensuites)
 - Wall linings to be generally 10mm GIB standard fixed horizontally (10mm Aqualine to bathrooms and ensuites)
 - Install 9mm strandboard wall linings to garage
 - Square stop scotia throughout
 - 60mm bevel edge skirting throughout
 - MDF generally, pine to wet areas and garage
 - Slimline reveals rebated for wall linings to windows and doors
 - Install hot water cylinder to manuf.
 - Install hot water cylinder to manuf.
 - specifications
 - All floor finishes to comply with NZBC D1 for slip resistance
 - All vent outlets ducted through walls are to have weatherproof grilles and rain deflectors installed
 - All vent outlets ducted through soffits are to have weatherproof grilles installed



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Proposed House
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Building Consent

Floor Plan

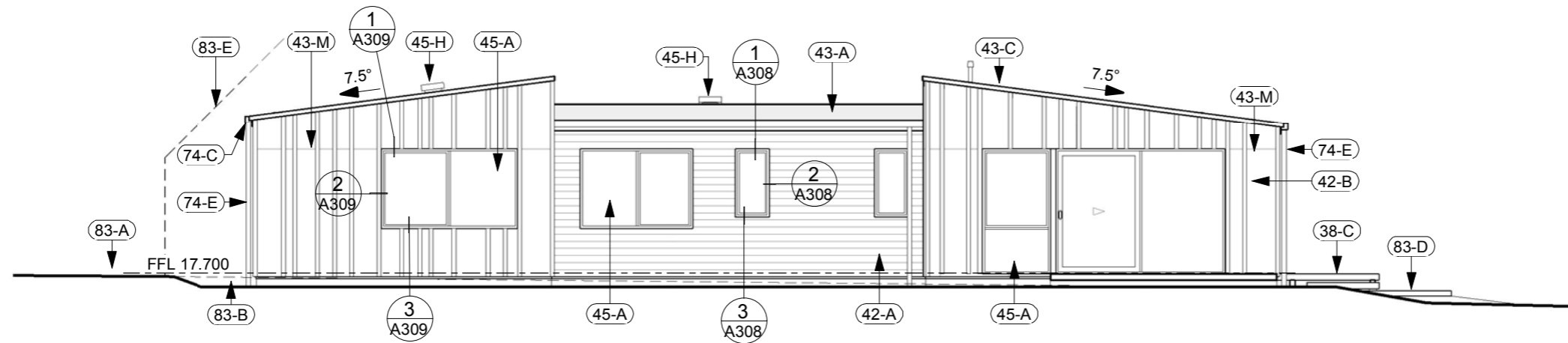
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Job	Date	Sheet(A3)	Rev.
20018	30/11/2020	A004	

FLOOR PLAN
 1 : 100

FLOOR AREA TO FRAMING	
Floor area	161.8 m ²
FLOOR AREA TO CLADDING	
Floor area	164.4 m ²
Kitchen deck area	9.8 m ²
Living deck area	14.6 m ²
Entry deck area	10.7 m ²

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information



ELEVATION 1
 1 : 100



ELEVATION 2
 1 : 100

Keynote Legend	
38-C	19mm timber decking fixed to deck joists - refer to foundation / joist plan
42-A	Natural finish heart grade Macrocarpa bevel back weatherboard on 50x25mm H3.1 timber cavity battens on Tekton weatherization system on framing
42-B	Paint finished H3.1 ex75x25 timber battens at random spacing on 12mm H3.1 Ultra Texture Shadowclad ply on ex50x25 H3.1 timber cavity battens on Tekton weatherization system on framing
43-A	Metalcraft MC700 Colorsteel Endura 0.4mm roofing on Dristud FRU38 roofing underlay on wire mesh on purlins on roof framing - fix roofing every second crest
43-C	Colorsteel Endura metal barge flashing
43-D	Colorsteel Endura Metal ridge flashing
43-M	Horizontal cladding flashing
45-A	APL residential suite powdercoat aluminium double glazed windows
45-H	Velux suntunnel
74-C	Metalcraft Colorsteel 125 box gutter
74-E	Metalcraft Colorsteel down pipe
83-A	Existing ground level
83-B	Finished ground level
83-D	Concrete Paving
83-E	2.1/45° recession plane



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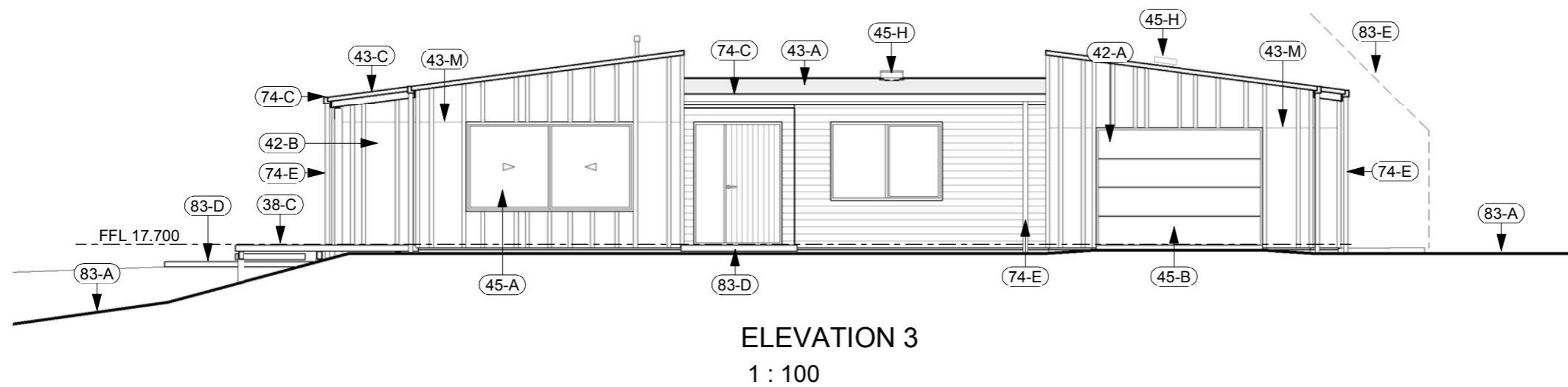
Building Consent

Elevations

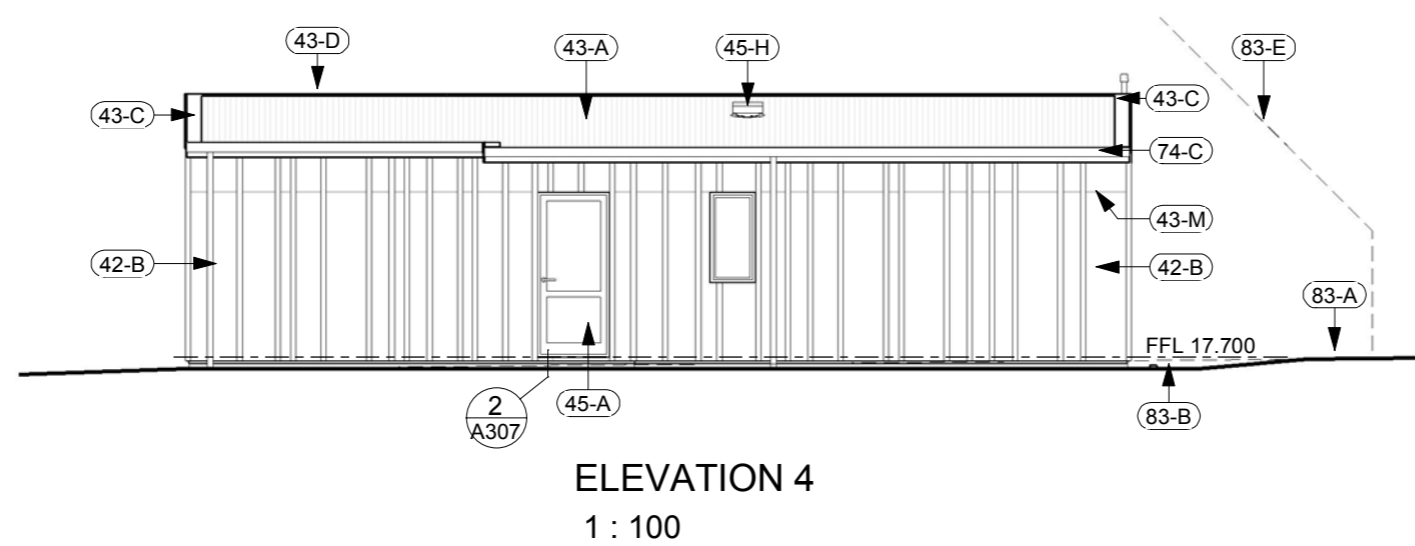
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Job Date Sheet(A3) Rev.
 20018 30/11/2020 A005

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information



Keynote Legend	
38-C	19mm timber decking fixed to deck joists - refer to foundation / joist plan
42-A	Natural finish heart grade Macrocarpa bevel back weatherboard on 50x25mm H3.1 timber cavity battens on Tekton weatherization system on framing
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43-C	Colorsteel Endura metal barge flashing
43-D	Colorsteel Endura Metal ridge flashing
43-M	Horizontal cladding flashing
45-A	APL residential suite powdercoat aluminium double glazed windows
45-B	Auto-sectional garage door
45-H	Velux suntunnel
74-C	Metalcraft Colorsteel 125 box gutter
74-E	Metalcraft Colorsteel down pipe
83-A	Existing ground level
83-B	Finished ground level
83-D	Concrete Paving
83-E	2.1/45° recession plane



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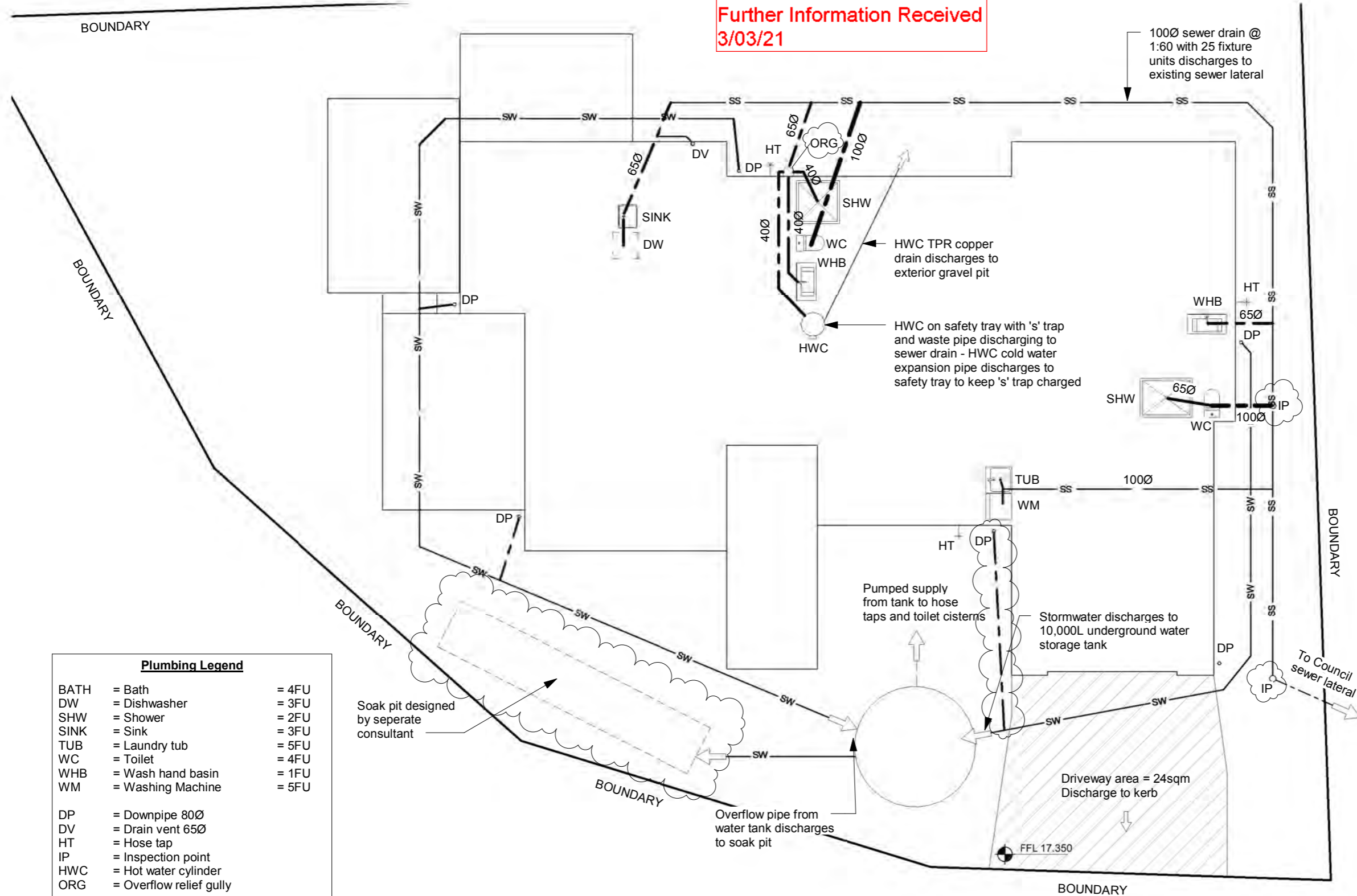
Building Consent

Elevations

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Job Date Sheet(A3) Rev.
 20018 30/11/2020 A006

BC200896
Further Information Received
3/03/21



DRAINAGE PLAN
1 : 100

Plumbing Legend		
BATH	= Bath	= 4FU
DW	= Dishwasher	= 3FU
SHW	= Shower	= 2FU
SINK	= Sink	= 3FU
TUB	= Laundry tub	= 5FU
WC	= Toilet	= 4FU
WHB	= Wash hand basin	= 1FU
WM	= Washing Machine	= 5FU
DP	= Downpipe 80Ø	
DV	= Drain vent 65Ø	
HT	= Hose tap	
IP	= Inspection point	
HWC	= Hot water cylinder	
ORG	= Overflow relief gully	

Maximum number of fixture units for vented 100mmØ drain laid 1 in 60 = 165
Refer to table 4.3 AS/NZS 3500.2 for other gradient.

Minimum pipe gradients		
65mmØ & less -	1 in 40	
80mmØ & 100mmØ -	1 in 60	
100Ø Stormwater drain -	1 in 120	

Water supply - Nominal pipe sizes	
• 20mmØ to shower (15mmØ if supply from separate pipe from HWC)	
• 15mmØ to all others	

Drainage Pipe Key	
SS	100mmØ Sanitary Sewer
SW	100mmØ Storm Water

- Construction Notes**
- This page is to be read in conjunction with sheet A002 - construction notes for additional information
- Plumbing and Drainage Notes**
- This plan has been designed in accordance with Branz Plumbing and Drainage Guide Section D AS/NZS 3500 part 2 for ground floor systems, single stack residential systems and Section F drainage requirements
 - Refer also to drainage schematic
 - Confirm positions of laterals and mains on site
 - Provide 10,000 L water storage tank with pump supply to WC cisterns and exterior hose taps - location to be confirmed by client
 - Install water supply top up to water tank from town water main
 - All pipes from water tank supply WC and exterior taps to be clearly labelled as such
 - Install signs at exterior taps to show water not fit for drinking
 - Provide seismic restraints hot water cylinders
 - Hot water supply pipes from a hot water cylinder shall be thermally insulated in accordance with NZS 4305
 - Install isovalve access control valves to hot and cold water supplies at all basins, sinks, and tubs
 - Make provision in internal linings to allow for convenient access to isolation valves or switches



Rev	Date	Description
B	18/01/21	RFI Round 2

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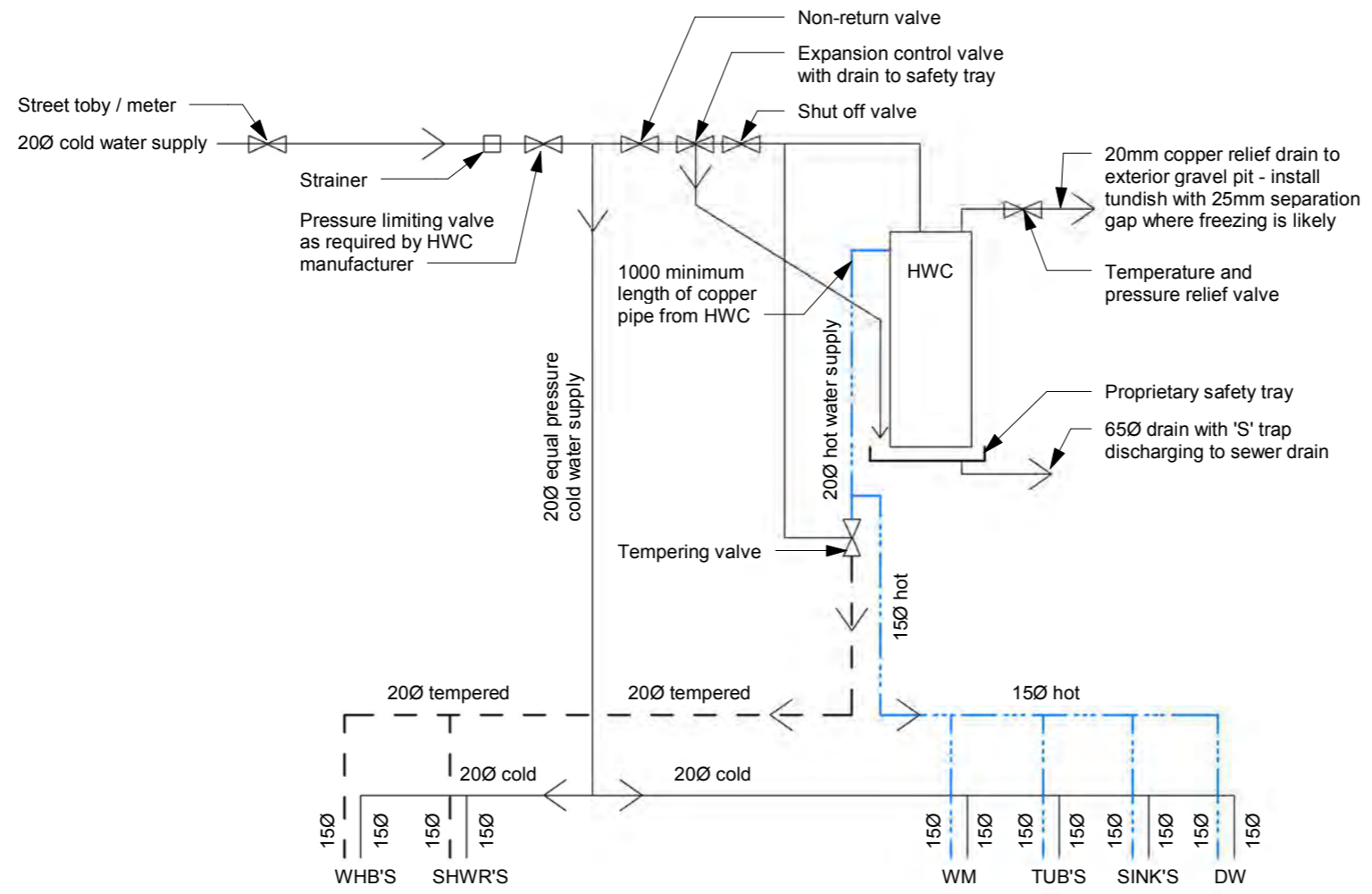
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Drainage Plan

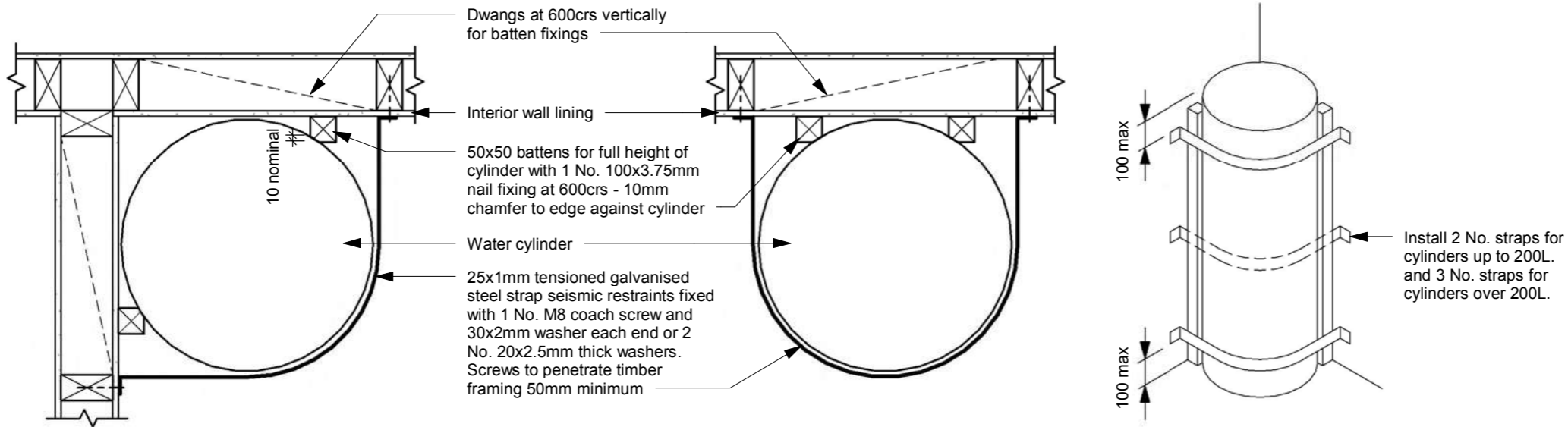
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Job	Date	Sheet(A3)	Rev.
20018	3/03/2021	A101	B



- Notes:**
- All work to be in accordance with AS/NZS 3500.5 and NZBC G12
 - Refer to manufacturer's specification for HWC installation requirements

HWC MP NON VENTED SYSTEM
 1 : 25



HWC SEISMIC RESTRAINTS
 1 : 10

- Construction Notes**
- This page is to be read in conjunction with sheet A002 - construction notes for additional information
- Plumbing and Drainage Notes**
- This plan has been designed in accordance with Branz Plumbing and Drainage Guide Section D AS/NZS 3500 part 2 for ground floor systems, single stack residential systems and Section F drainage requirements
 - Refer also to drainage schematic
 - Confirm positions of laterals and mains on site
 - Provide 10,000 L water storage tank with pump supply to WC cisterns and exterior hose taps - location to be confirmed by client
 - Install water supply top up to water tank from town water main
 - All pipes from water tank supply WC and exterior taps to be clearly labelled as such
 - Install signs at exterior taps to show water not fit for drinking
 - Provide seismic restraints hot water cylinders
 - Hot water supply pipes from a hot water cylinder shall be thermally insulated in accordance with NZS 4305
 - Install isovalve access control valves to hot and cold water supplies at all basins, sinks, and tubs
 - Make provision in internal linings to allow for convenient access to isolation valves or switches



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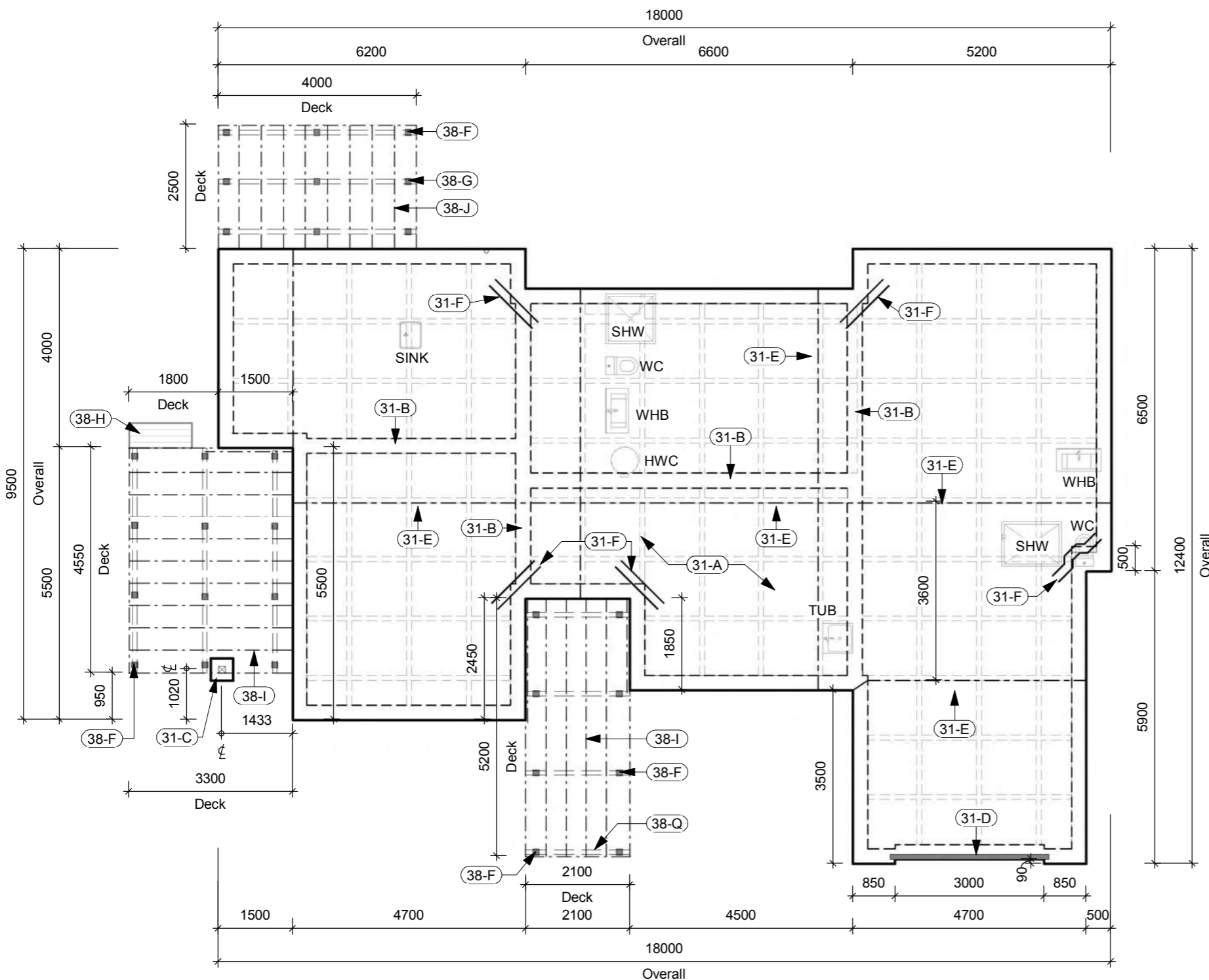
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Plumbing Details

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Job Date Sheet(A3) Rev.
 20018 30/11/2020 A102



FOUNDATION PLAN
 1 : 100

File Key

- 125x125mm H5 ordinary pile set in 350x350x450mm deep concrete footing

Keynote Legend	
31-A	Ribraft floor system on polythene DPM on sand on solid bearing
31-B	Internal load bearing foundation
31-C	450x450x650mm deep concrete post footing on solid bearing
31-D	3200x100x20mm rebate for garage door
31-E	Sawcut Shrinkage control joints
31-F	Reinforcing bars at each internal corner - 2/D12, 1.2m long
38-F	140x90 bearer H4, piles at 1650mm
38-G	140x90 bearer H4, piles at 2000mm
38-H	Timber step
38-I	90x45 joists H3.2 at 400crs, max span 1600
38-J	90x45 joists H3.2 at 450crs, max span 1500
38-Q	Allow for H5 bearer where retaining ground

Foundation Bracing Calculation

Demand across
 $80 \times 12.4 \times 1.3 = 1289.6$

Demand along
 $90 \times 18 \times 1.3 = 2106$

BU's provided
 $1630 \times 1.618 = 2637.34$

No shear keys required

Construction Notes

- This page is to be read in conjunction with sheet A002 - construction notes for additional information

Foundation Notes

- Firth Ribraft concrete slab system
- Foundation details to Firth Ribraft specification
- Prior to pouring concrete consult all relevant contractors and install conduit suitable for water, gas, electricity and telecommunications services
- Seal all slab penetrations with DPM manufacturers approved tape
- Confirm all window and door sill slab rebate sizes with window manufacturer
- Refer also to joist layout plan by proprietary joist manufacturer
- This site is exposure zone C :
 - All treated timber pile connections and subfloor fixings within 600mm from ground level or in exposed situations are to be type 304 S.S.
 - Nail and screw fixings can be galvanized
 - All structural fixings (except fabricated brackets) in sheltered location to be hot dip galvanized, and exposed situations to be type 304 S.S.
 - All fabricated brackets to be minimum 5mm mild steel and hot dip galvanized
 - All fixings in contact with timber treated with copper quaternary (ACQ) or copper azole (CuAz) preservatives are to be type 304 S.S. in exposed or sheltered locations, and hot dipped galvanized in closed situations
 - All timber joist to have full depth blocking lateral support at each bearer line



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Foundation Plan

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Job	Date	Sheet(A3)	Rev.
20018	30/11/2020	A103	

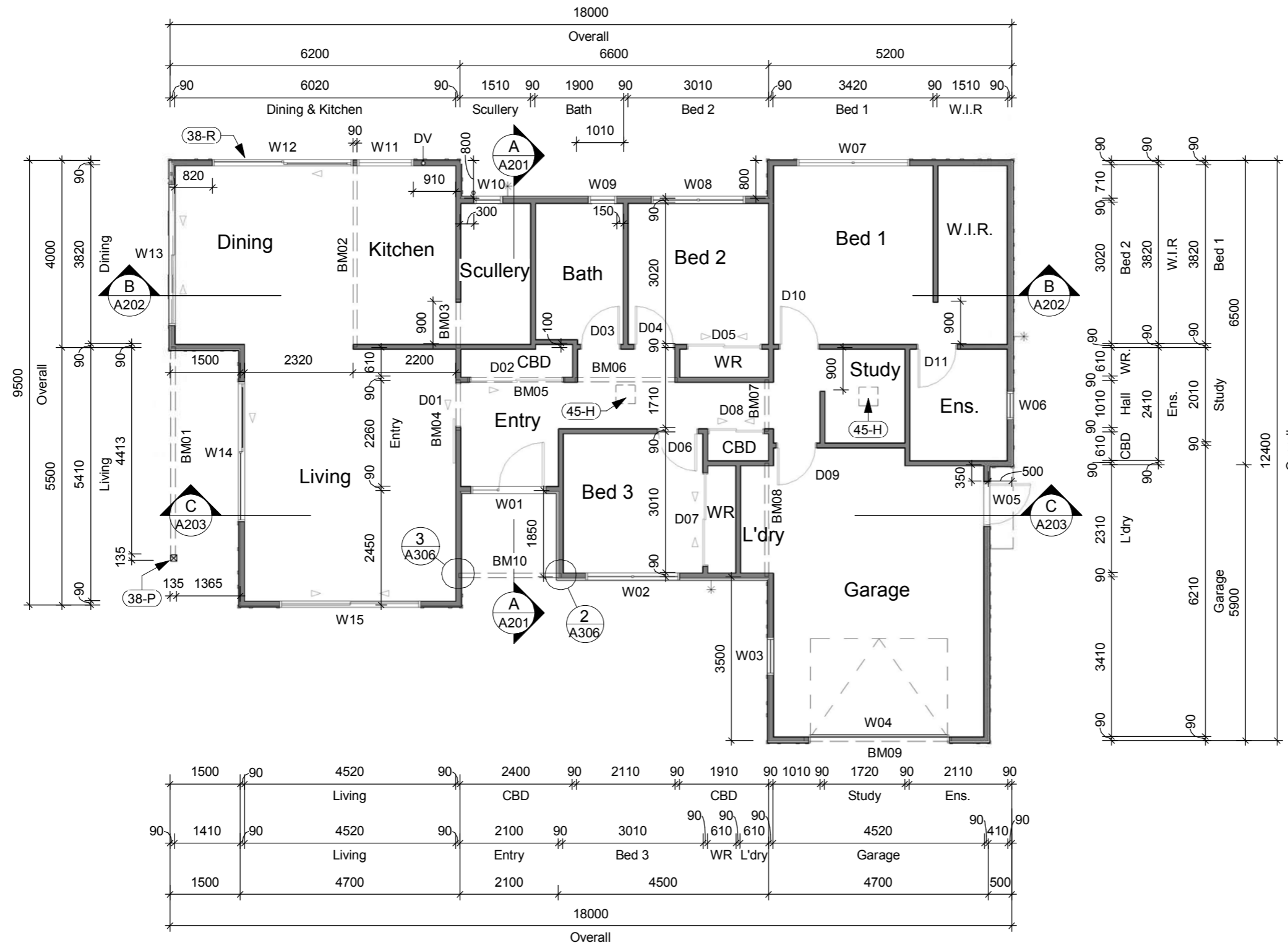
Keynote Legend	
38-P	Prolam PLPH5-150 post
38-R	W12 lintel to be continuous over W11
45-H	Velux suntunnel

Construction Notes

- This page is to be read in conjunction with sheet A002 - construction notes for additional information

Wall Framing Notes

- Wall framing to be in accordance with NZS 3604 Section 8
- Wall framing to be kiln dried SG8 minimum unless noted otherwise
- All bottom plates to be H3.2 treated
- Top plates to be fixed to studs in accordance with Bowmac Studlok specifications
- Lintel fixings to be in accordance with lumberlok lintel fixing schedule
- All window and door lintels are to prenil manufacturers design unless noted otherwise
- Window openings to be 20mm larger than window sizes (10mm tolerance each side)
- Exterior wall framing to be :
 - 90x45 at 400crs up to 2.4 high
 - 2/90x45 at 400crs up to 3.6 high
- Interior wall framing to be :
 - 90x45 at 600crs up to 2.4 high
 - 2/90x45 at 600crs up to 3.6 high
- All fixings in contact with timber treated with copper quaternary (ACQ) or copper azole (CuAz) preservatives are to be type 304 S.S. in exposed or sheltered locations, and hot dipped galvanized in closed situations



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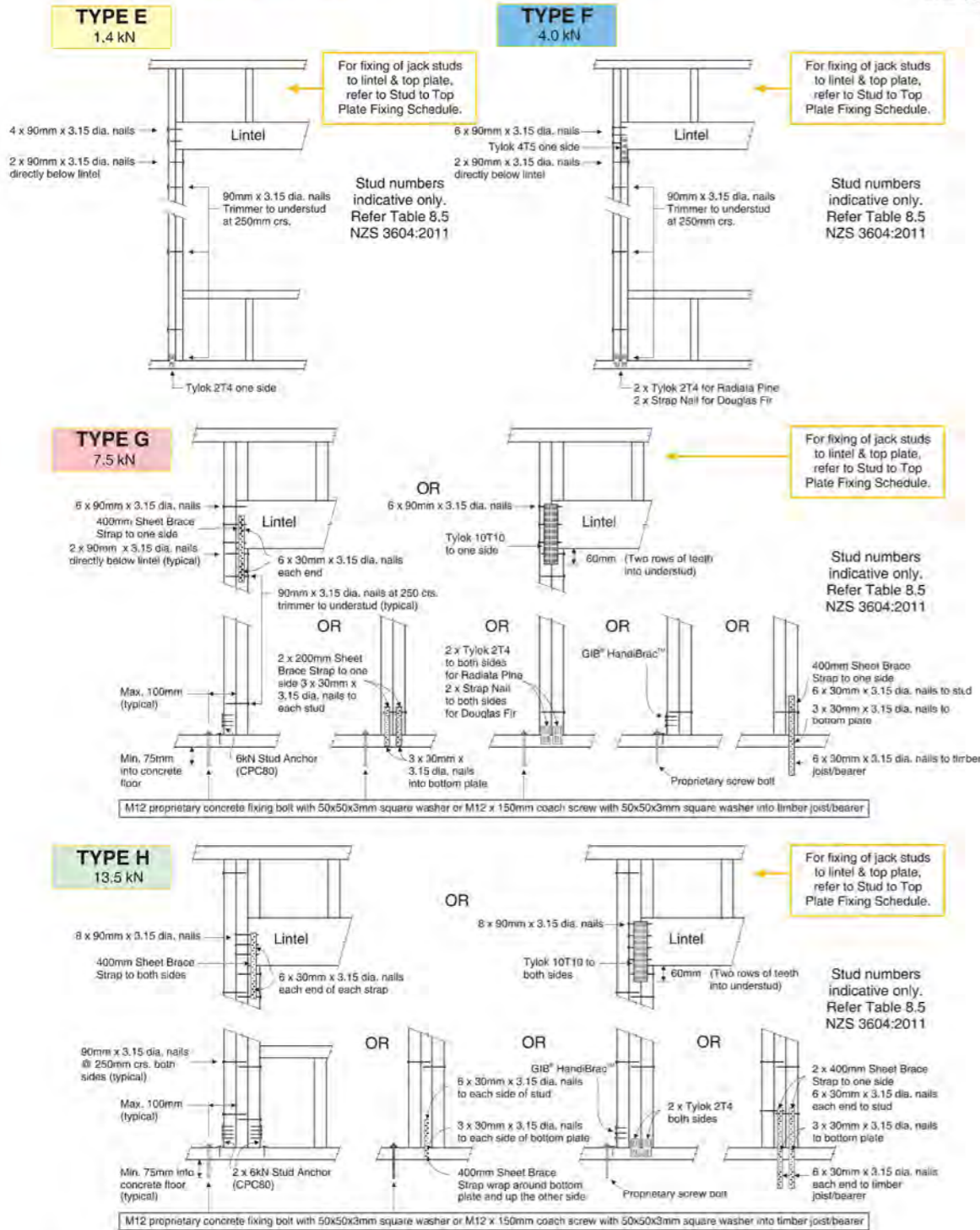
Framing Plan

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Job Date Sheet(A3) Rev.
 20018 30/11/2020 A104

FRAMING PLAN
 1 : 100

LINTEL FIXING OPTIONS



Beam Schedule						
MARK	SIZE/TYPE	GRADE	TREATMENT	DESIGN	NOTES	FIXING
BM01	PLVL8H3-200100	MSG8	H3	Prolam calc.	Verandah Beam	Fig 9.3c, NZS3604 - 2/M12 bolts and 50x50 x3mm washers - Bolts 60 min apart
BM02	I-BUILT 200x90 LVL11			Hyne calc.	In roof space	Lumberlok Type H
BM03	90x90	SG8	H1.2	per 3604	In roof space	Lumberlok Type F
BM04	90x90	SG8	H1.2	per 3604		Lumberlok Type F
BM05	140x90	SG8	H1.2	per 3604		Lumberlok Type F
BM06	190x90	SG8	H1.2	per 3604	In roof space	Lumberlok Type F
BM07	140x90	SG8	H1.2	per 3604	In roof space	Lumberlok Type F
BM08	190x90	SG8	H1.2	per 3604	In roof space	Lumberlok Type G
BM09	240x90	SG8	H1.2	per 3604	Garage lintel	Lumberlok Type G
BM10	2/140x45	SG8	H3	per 3604	Verandah Beam in roof space	Lumberlok Type G

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

Wall Framing Notes
 • Wall framing to be in accordance with NZS 3604 Section 8
 • Wall framing to be kiln dried SG8 minimum unless noted otherwise
 • All bottom plates to be H3.2 treated
 • Top plates to be fixed to studs in accordance with Bowmac Studlok specifications
 • Lintel fixings to be in accordance with lumberlok lintel fixing schedule
 • All window and door lintels are to pre-nail manufacturers design unless noted otherwise
 • Window openings to be 20mm larger than window sizes (10mm tolerance each side)
 • Exterior wall framing to be :
 - 90x45 at 400crs up to 2.4 high
 - 2/90x45 at 400crs up to 3.6 high
 • Interior wall framing to be :
 - 90x45 at 600crs up to 2.4 high
 - 2/90x45 at 600crs up to 3.6 high
 • All fixings in contact with timber treated with copper quaternary (ACQ) or copper azole (CuAz) preservatives are to be type 304 S.S. in exposed or sheltered locations, and hot dipped galvanized in closed situations



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Beam Schedule

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 20018 30/11/2020 A105

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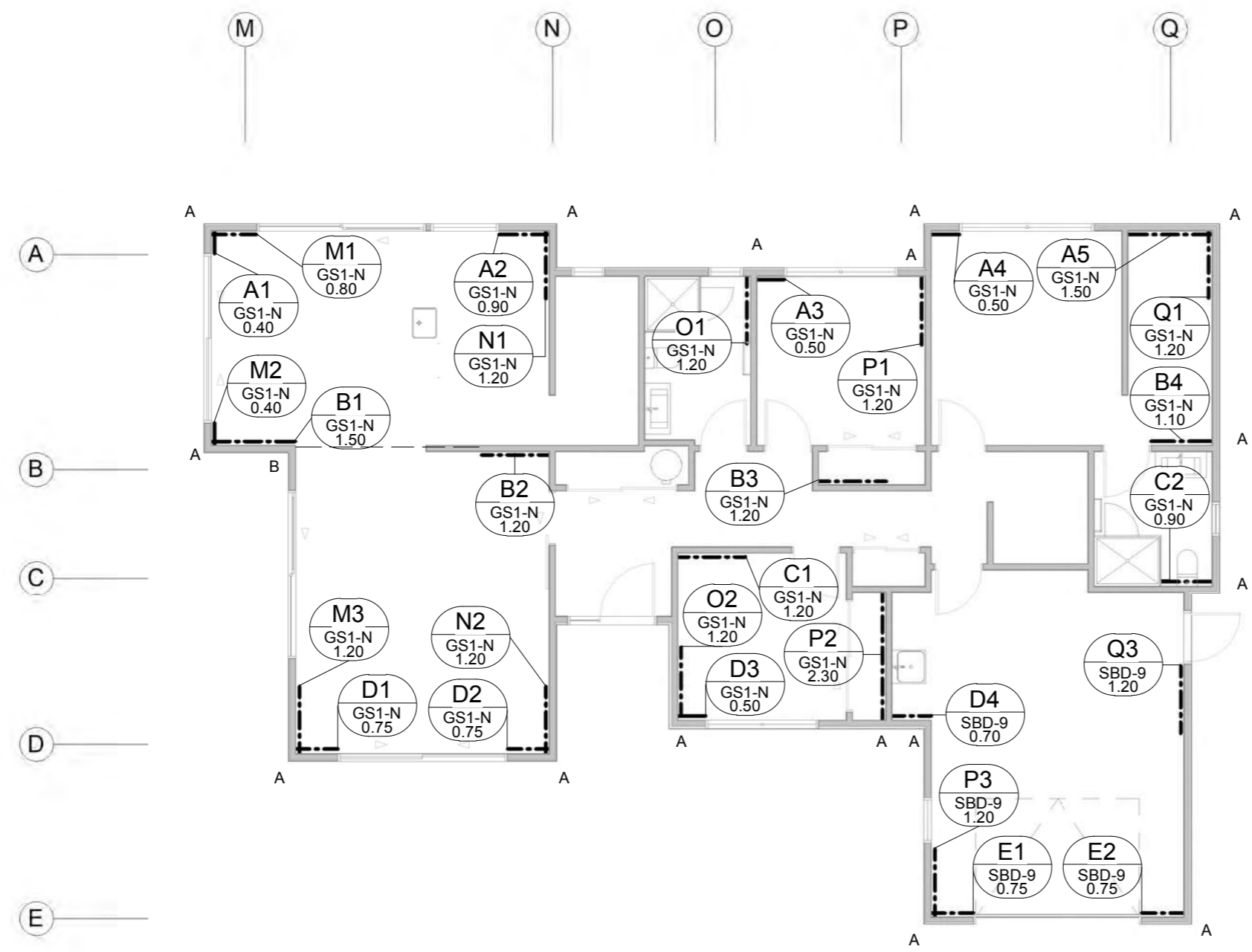
CHRISTCHURCH PO Box 8887, Riccarton 8440
 Phone: 03-348 8891 Fax: 03-348 0314

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GANG-NAIL® LUMBERLOK® BOWMAC®

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

Bracing Notes
 • All bracing elements be installed in accordance with manufacturers specifications for Winstones GIB EZYBrace system, Ecoply bracing system,
 • All bracing elements in exterior and interior walls that require hold down fixings to a concrete slab floor are to have GIB handibrac brackets with Bowmac screw bolts installed to manufacturers specifications
 • Penetrations up to 90x90 maximum are allowed within a bracing element but must be no closer than 90mm to the edge of the bracing element
 • Openings larger than 90x90mm are not permitted with bracing elements



Top Plate Connection Key
 A Lumberlok Plate-Lok 6KN connection between top plates
 B Framing member (truss bottom chord or ceiling joist) with 6KN connection to top plate - CPC40 cleat each side



BRACING PLAN
 1 : 100

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 Bracing Plan

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 Job Date Sheet(A3) Rev.
 20018 30/11/2020 A106



ELECTRICAL PLAN
 1 : 100

Electrical Legend	
	Power point (2 = double)
	Auto garage door opener
	Heated towel rail
	Dishwasher
	Rangehood
	Oven
	Microwave
	Hob
	Hot water cylinder
	Heat pump
	Phone outlet
	USB outlet
	TV outlet
	Data outlet on separate line
	Hardwired door bell with button at front door
	Main switchboard
	Meter panel (smart meter)

- Construction Notes**
- This page is to be read in conjunction with sheet A002 - construction notes for additional information
- Electrical Notes**
- All socket and switch gear to be as selected by owner
 - TV wiring to be suitable for sky digital, vodafone cable TV and freeview HD
 - Phone line wiring to be suitable for internet fibre and ultra high speed connections
 - All power circuits to have RCD at switchboard
 - Meter panel to be a smart meter
 - Extract fans for enclosed bathrooms and laundries are to provide extraction of 25 l/s minimum in accordance with AS 1668.2
 - Extract fan for kitchen to provide extraction of 50 l/s minimum in accordance with AS 1668.2
 - All vent outlets ducted through walls are to have weatherproof grilles and rain deflectors installed
 - All ducting to be rigid pipe (no flexi ducting to be installed)
 - All switches to be aligned with door handles 1050mm above floor level
 - All power points and socket outlets to be at a consistent height of 300mm minimum above floor level 500mm minimum from wall internal corners
 - Allow for electrical requirements to hot water cylinder
 - Allow for electrical requirements to pump at water storage tank.



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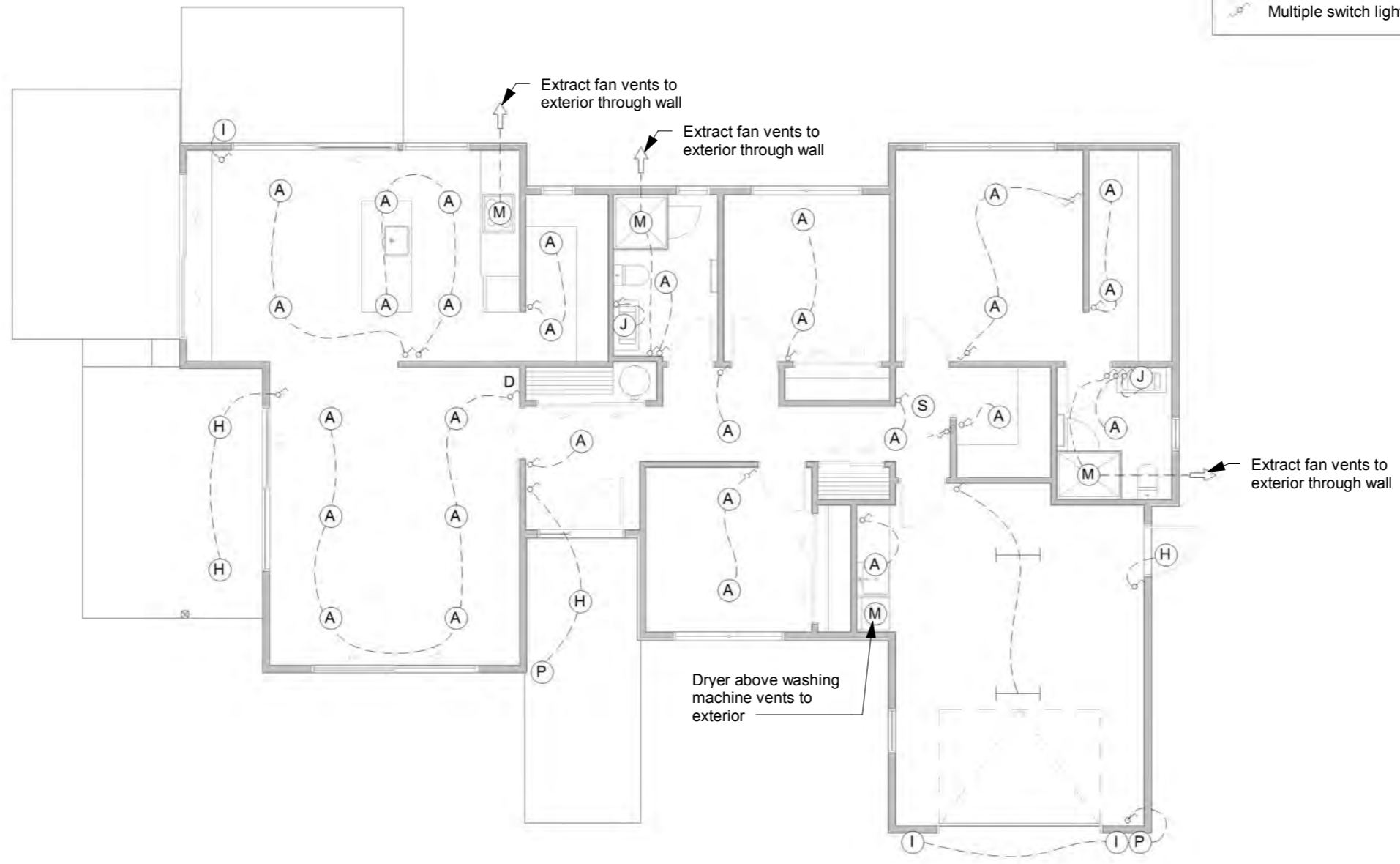
Electrical Plan

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Job	Date	Sheet(A3)	Rev.
20018	30/11/2020	A107	

Lighting Legend	
(A)	Recessed LED downlight (IC-F)
(H)	Exterior soffit mounted LED light
(I)	Exterior wall mounted LED light
(J)	Over mirror LED light
(M)	Extract fan - vented to exterior
(P)	PIR sensor
(S)	Battery powered smoke detector
—	LED strip light
⎓	One way switch light
⎓	Multiple switch light

- Construction Notes**
- This page is to be read in conjunction with sheet A002 - construction notes for additional information
- Electrical Notes**
- All socket and switch gear to be as selected by owner
 - TV wiring to be suitable for sky digital, vodafone cable TV and freeview HD
 - Phone line wiring to be suitable for internet fibre and ultra high speed connections
 - All power circuits to have RCD at switchboard
 - Meter panel to be a smart meter
 - Extract fans for enclosed bathrooms and laundries are to provide extraction of 25 l/s minimum in accordance with AS 1668.2
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 - All vent outlets ducted through walls are to have weatherproof grilles and rain deflectors installed
 - All ducting to be rigid pipe (no flexi ducting to be installed)
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 - Allow for electrical requirements to hot water cylinder
 - Allow for electrical requirements to pump at water storage tank.



LIGHTING PLAN
 1 : 100



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Lighting Plan

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Job	Date	Sheet(A3)	Rev.
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Site information

Wind zone - Very High
 Exposure zone - Zone C
 Earthquake zone - Zone 3
 Climate zone - Zone 2
 Snow zone - N1 (0-400m)
 Soil class - Refer to Eng.

Construction Notes

• This page is to be read in conjunction with sheet A002 - construction notes for additional information

Roof Notes

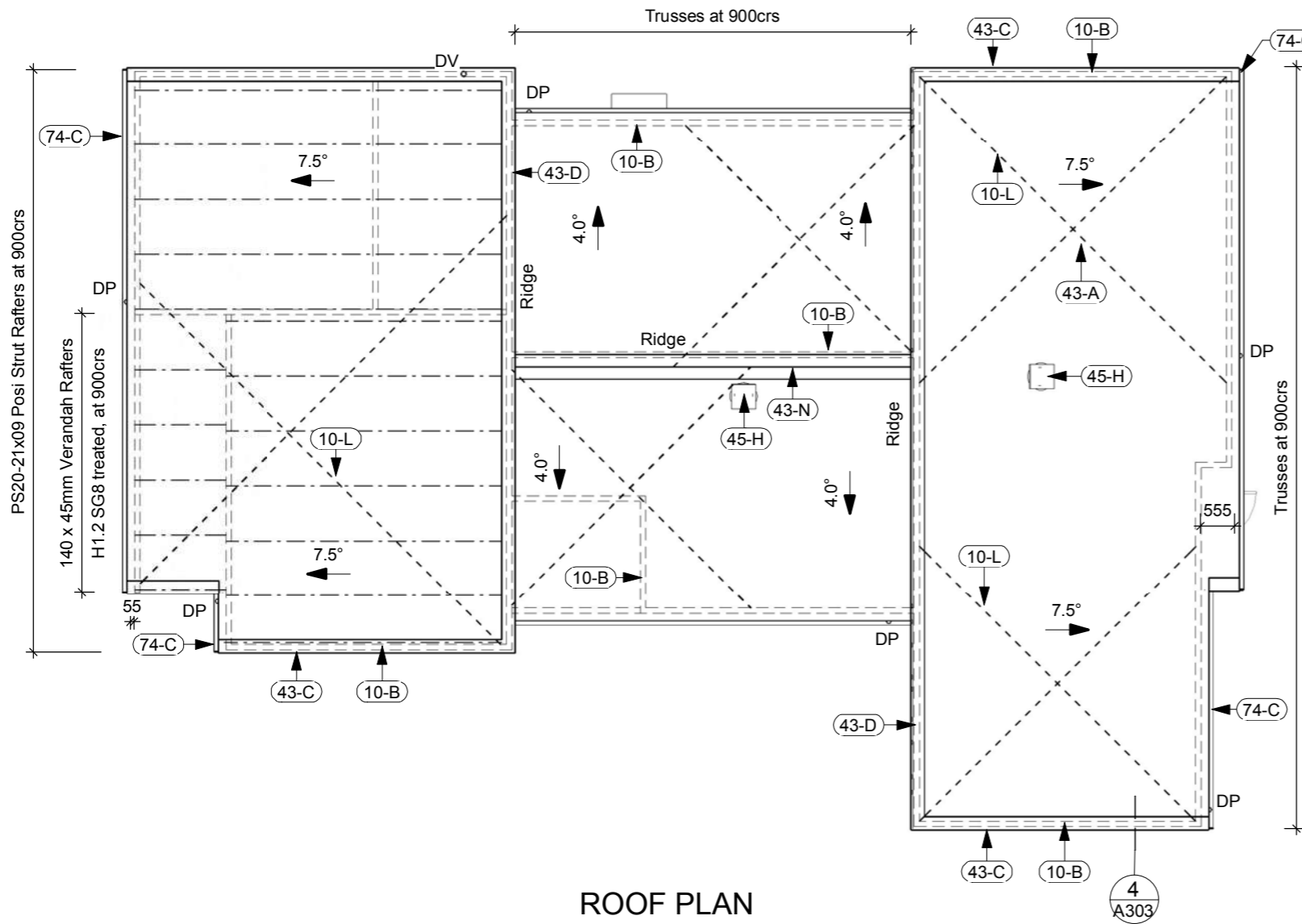
- Provide roof space passive ventilation system - refer to details
- Install eaves flashing to all eaves
- Refer also to details for flashing dimensions
- All soffit dimensions are for sloping soffits
- All roof framing to be SG8 minimum unless noted otherwise
- Roof purlins to be grade SG8 70x45 at 800 crs on their flat
- Roof purlin hold down fixings to be 1 No. 10g self drilling 80mm screw or other approved fixing 2.4kN connection
- Rafter / top plate connection to be 2 No. 90x3.15mm skew nails + 2 No. wire dogs or other approved 4.7kN connection
- Skillion rafter / top plate connection to be nail strap fixing each side of rafter with 8 No. 30x3.15 nails each strap (4 No. nails to top plate and 4 No. nails to rafter) or other approved 7kN connection - refer NZS 3604 figure 10.6
- Truss / top plate connections specified by truss manufacturer

Downpipes & Gutter Details

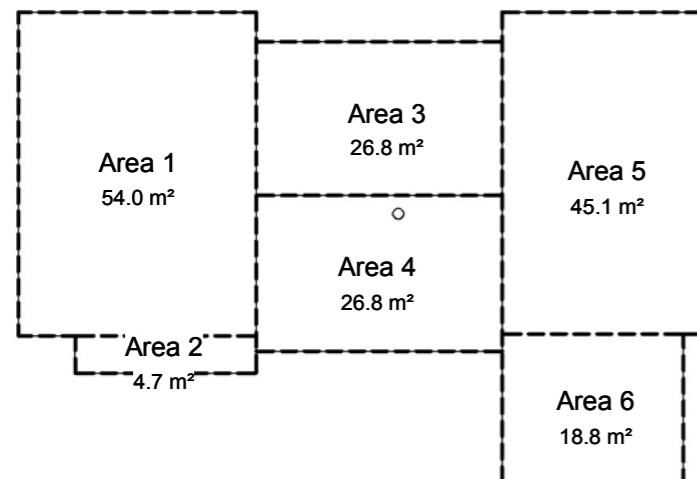
Rainfall Intensity 100mm/hr
 Downpipe Size 80mmØ
 Roof Pitch 7.5°
 Roof Area per DP 85m²
 Gutter Type 125 box
 Cross Sectional Area 8435mm²
 Roof Area / Gutter 54m²

Down pipe Calculation			
DP	DIA	PITCH	AREA
Area 1	80Ø	7.5°	54.0 m²
Area 2	80Ø	7.5°	4.7 m²
Area 3	80Ø	7.5°	26.8 m²
Area 4	80Ø	4°	26.8 m²
Area 5	80Ø	4°	45.1 m²
Area 6	80Ø	7.5°	18.8 m²
TOTAL DOWNPIPES REQUIRED:			6 176.2 m²

Keynote Legend	
10-B	Line of load bearing walls and beams shown double dash
10-L	Roof diagonally opposing steel strip roof plane bracing to NZS 3604
43-A	Metalcraft MC700 Colorsteel Endura 0.4mm roofing on Dristud FRU38 roofing underlay on wire mesh on purlins on roof framing - fix roofing every second crest
43-C	Colorsteel Endura metal barge flashing
43-D	Colorsteel Endura Metal ridge flashing
43-N	Metal ridge flashing
45-H	Velux suntunnel
74-C	Metalcraft Colorsteel 125 box gutter



ROOF PLAN
 1 : 100



ROOF AREA KEY
 1 : 200

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Roof Plan

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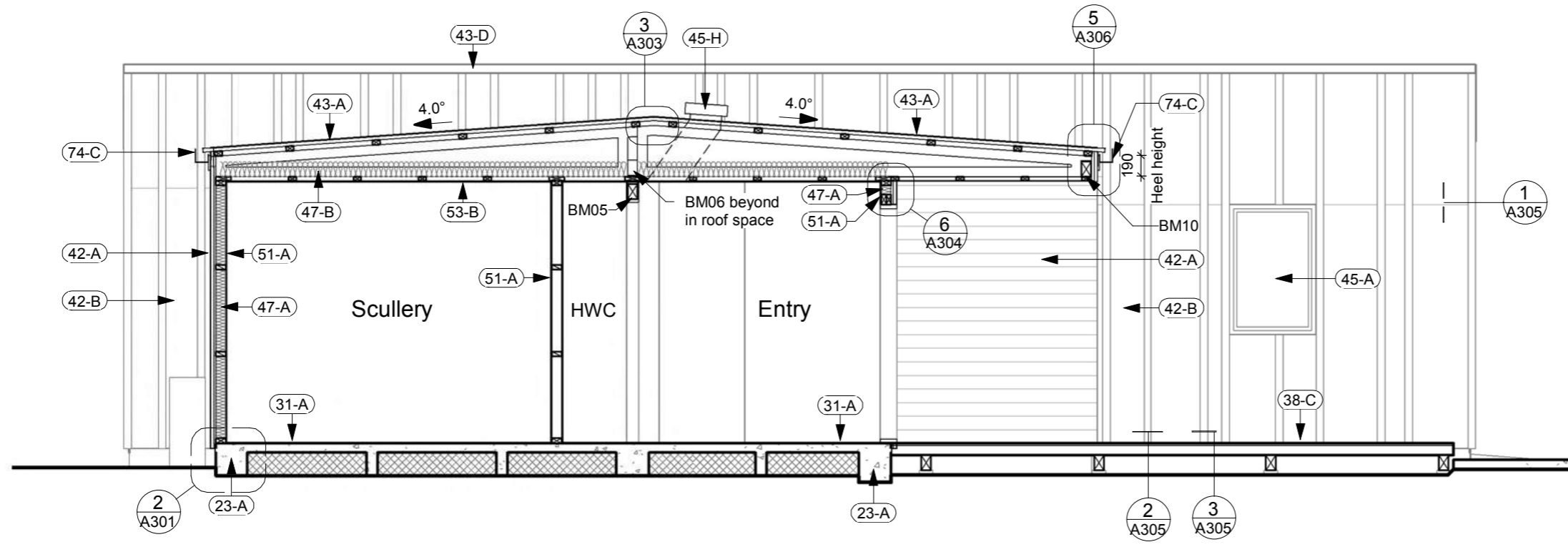
Job	Date	Sheet(A3)	Rev.
20018	30/11/2020	A109	

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

Insulation "R" Values

Exterior walls	R2.6
Garage interior walls	R2.4
Ceilings generally	R3.2
Skillion ceilings	R3.2 Skillion
Interior acoustic walls	R2.2

- Comply with NZBC H1 AS1 & NZS 4218
- Refer to spec for insulation types
- Refer also to H1 calculation sheet



SECTION A
 1 : 50

Keynote Legend	
23-A	Ribraft load bearing foundation beam on good ground
31-A	Ribraft floor system on polythene DPM on sand on solid bearing
38-C	19mm timber decking fixed to deck joists - refer to foundation / joist plan
42-A	Natural finish heart grade Macrocarpa bevel back weatherboard on 50x25mm H3.1 timber cavity battens on Tekton weatherization system on framing
42-B	Paint finished H3.1 ex75x25 timber battens at random spacing on 12mm H3.1 Ultra Texture Shadowclad ply on ex50x25 H3.1 timber cavity battens on Tekton weatherization system on framing
43-A	Metalcraft MC700 Colorsteel Endura 0.4mm roofing on Dristud FRU38 roofing underlay on wire mesh on purlins on roof framing - fix roofing every second crest
43-D	Colorsteel Endura Metal ridge flashing
45-A	APL residential suite powdercoat aluminium double glazed windows
45-H	Velux suntunnel
47-A	Wall insulation - refer insulation R-values note
47-B	Ceiling insulation - refer insulation R-values note
51-A	10mm Gib standard wall lining
53-B	13mm Gib standard on 70x35 H1.2 timber battens @ 600crs
74-C	Metalcraft Colorsteel 125 box gutter



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Building Section

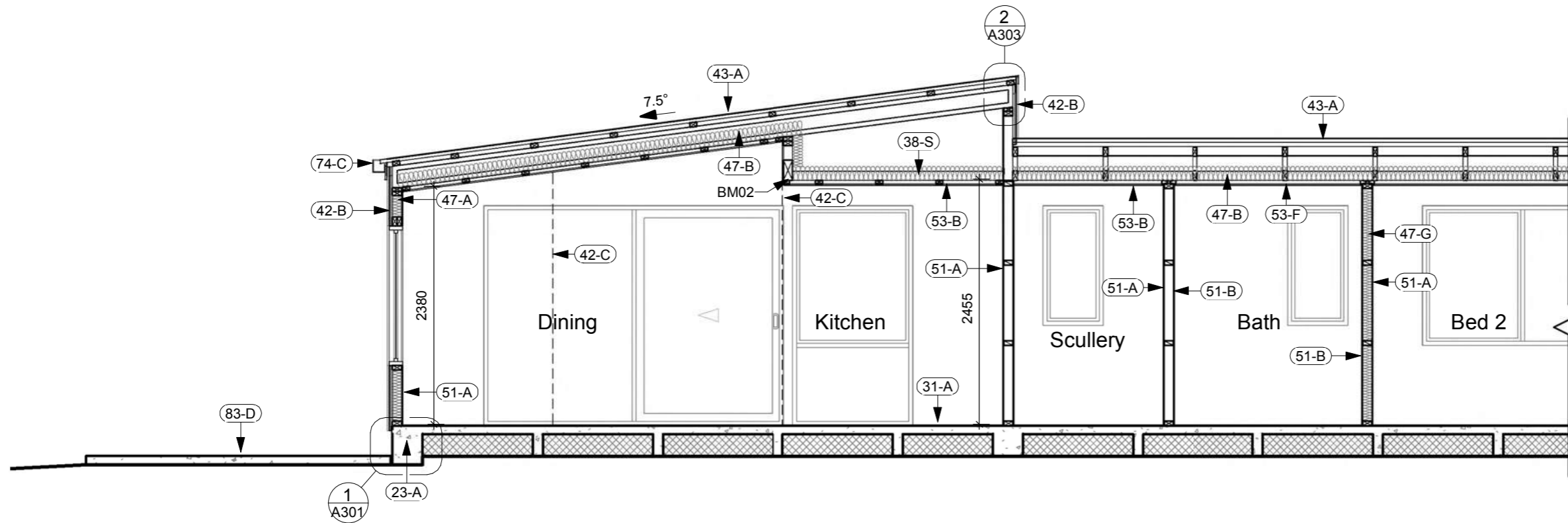
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Construction Notes
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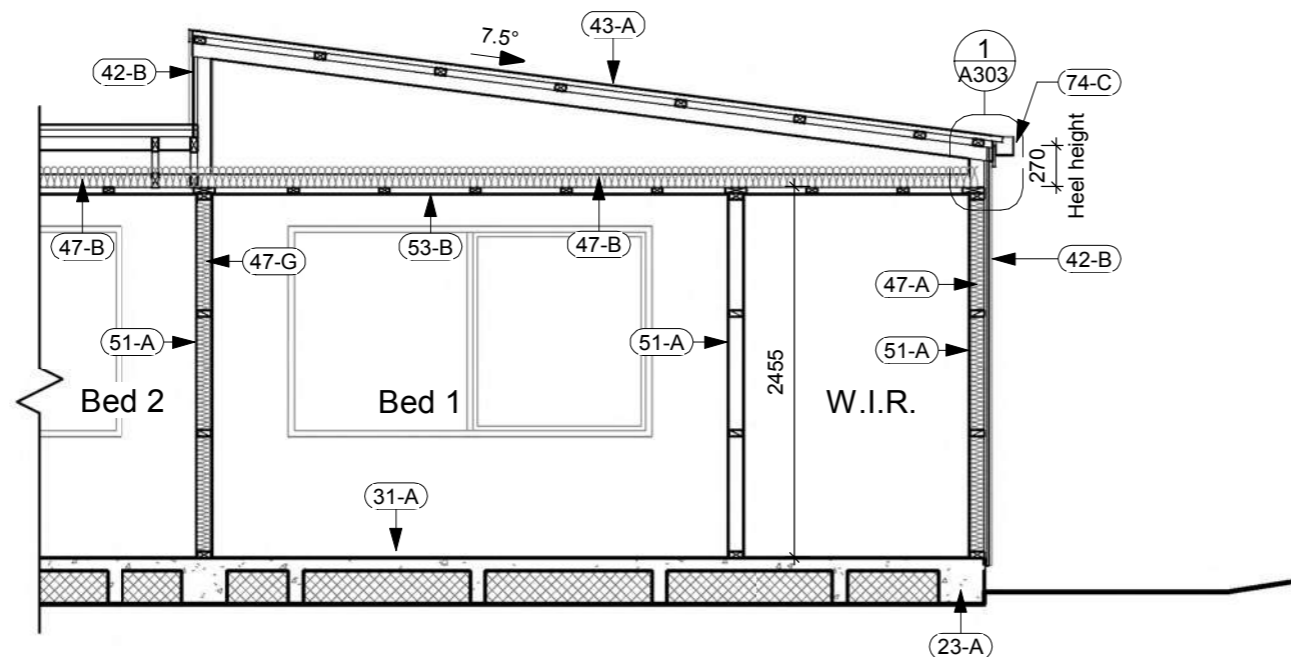
Insulation "R" Values

Exterior walls	R2.6
Garage interior walls	R2.4
Ceilings generally	R3.2
Skillion ceilings	R3.2 Skillion
Interior acoustic walls	R2.2

- Comply with NZBC H1 AS1 & NZS 4218
- Refer to spec for insulation types
- Refer also to H1 calculation sheet



PART SECTION B
 1 : 50



PART SECTION B
 1 : 50

Keynote Legend	
23-A	Ribraft load bearing foundation beam on good ground
31-A	Ribraft floor system on polythene DPM on sand on solid bearing
38-S	90x45 ceiling joists @ 600crs max
42-B	Paint finished H3.1 ex75x25 timber battens at random spacing on 12mm H3.1 Ultra Texture Shadowclad ply on ex50x25 H3.1 timber cavity battens on Tekton weatherization system on framing
42-C	Door opening behind to living room behind
43-A	Metalcraft MC700 Colorsteel Endura 0.4mm roofing on Dristud FRU38 roofing underlay on wire mesh on purlins on roof framing - fix roofing every second crest
47-A	Wall insulation - refer insulation R-values note
47-B	Ceiling insulation - refer insulation R-values note
47-G	Acoustic wall with R2.2 batts
51-A	10mm Gib standard wall lining
51-B	10mm Gib Aqualine wall lining
53-B	13mm Gib standard on 70x35 H1.2 timber battens @ 600crs
53-F	13mm Gib Aqualine on 70x35 H1.2 timber battens @ 600crs
74-C	Metalcraft Colorsteel 125 box gutter
83-D	Concrete Paving



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Building Section

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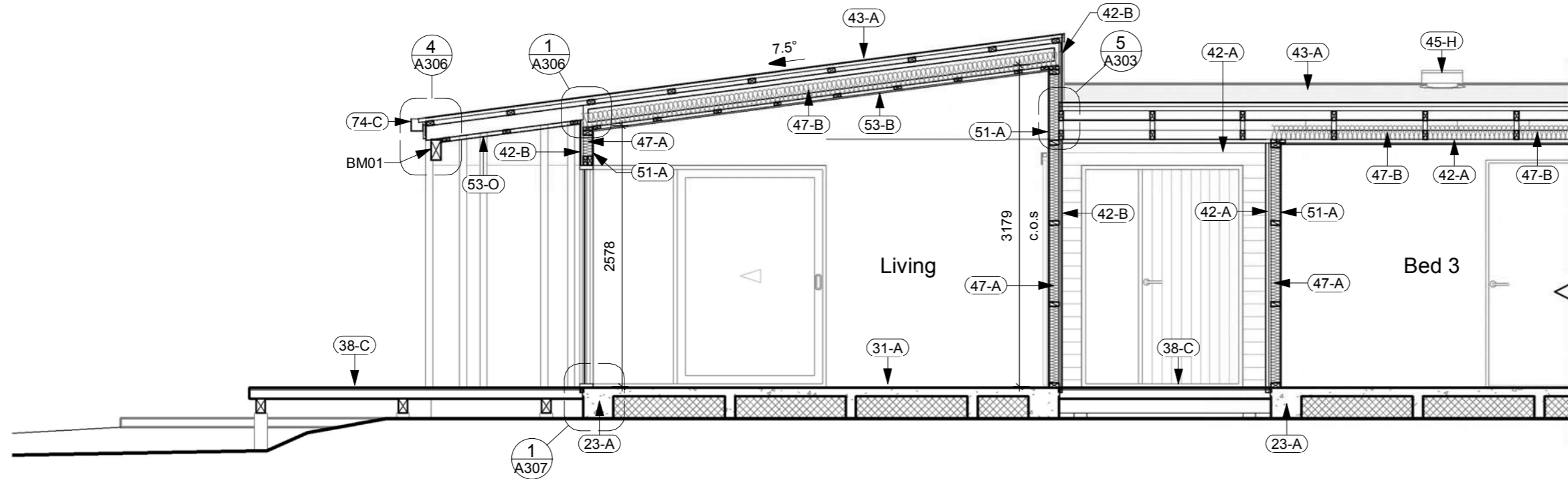
Job Date Sheet(A3) Rev.
 20018 30/11/2020 A202

Construction Notes
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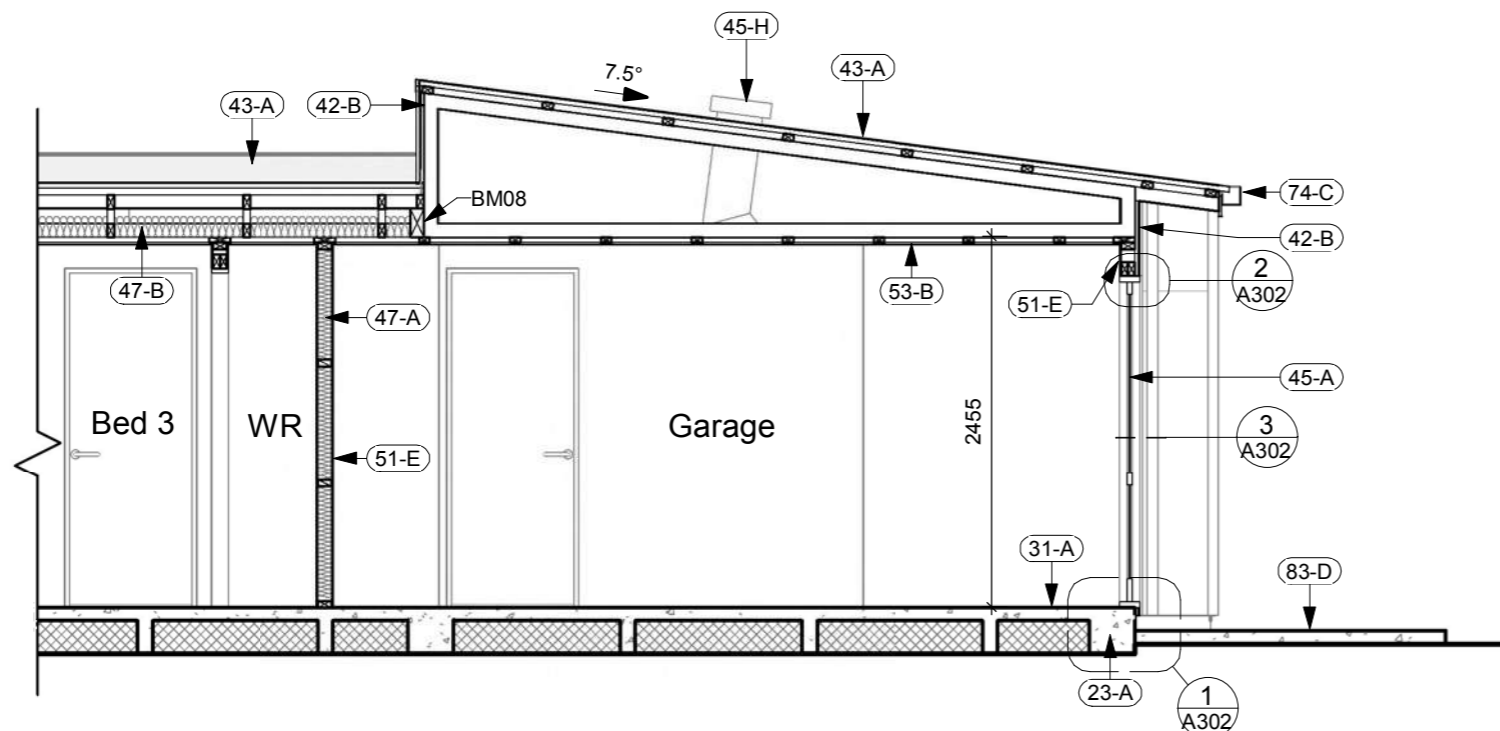
Insulation "R" Values

Exterior walls	R2.6
Garage interior walls	R2.4
Ceilings generally	R3.2
Skillion ceilings	R3.2 Skillion
Interior acoustic walls	R2.2

- Comply with NZBC H1 AS1 & NZS 4218
- Refer to spec for insulation types
- Refer also to H1 calculation sheet



PART SECTION C
 1 : 50



PART SECTION C
 1 : 50

Keynote Legend	
23-A	Ribraft load bearing foundation beam on good ground
31-A	Ribraft floor system on polythene DPM on sand on solid bearing
38-C	19mm timber decking fixed to deck joists - refer to foundation / joist plan
42-A	Natural finish heart grade Macrocarpa bevel back weatherboard on 50x25mm H3.1 timber cavity battens on Tekton weatherization system on framing
42-B	Paint finished H3.1 ex75x25 timber battens at random spacing on 12mm H3.1 Ultra Texture Shadowclad ply on ex50x25 H3.1 timber cavity battens on Tekton weatherization system on framing
43-A	Metalcraft MC700 Colorsteel Endura 0.4mm roofing on Dristud FRU38 roofing underlay on wire mesh on purlins on roof framing - fix roofing every second crest
45-A	APL residential suite powdercoat aluminium double glazed windows
45-H	Velux suntunnel
47-A	Wall insulation - refer insulation R-values note
47-B	Ceiling insulation - refer insulation R-values note
51-A	10mm Gib standard wall lining
51-E	9mm strandboard wall lining to garage
53-B	13mm Gib standard on 70x35 H1.2 timber battens @ 600crs
53-O	4.5mm Hardiflex with PVC jointers
74-C	Metalcraft Colorsteel 125 box gutter
83-D	Concrete Paving



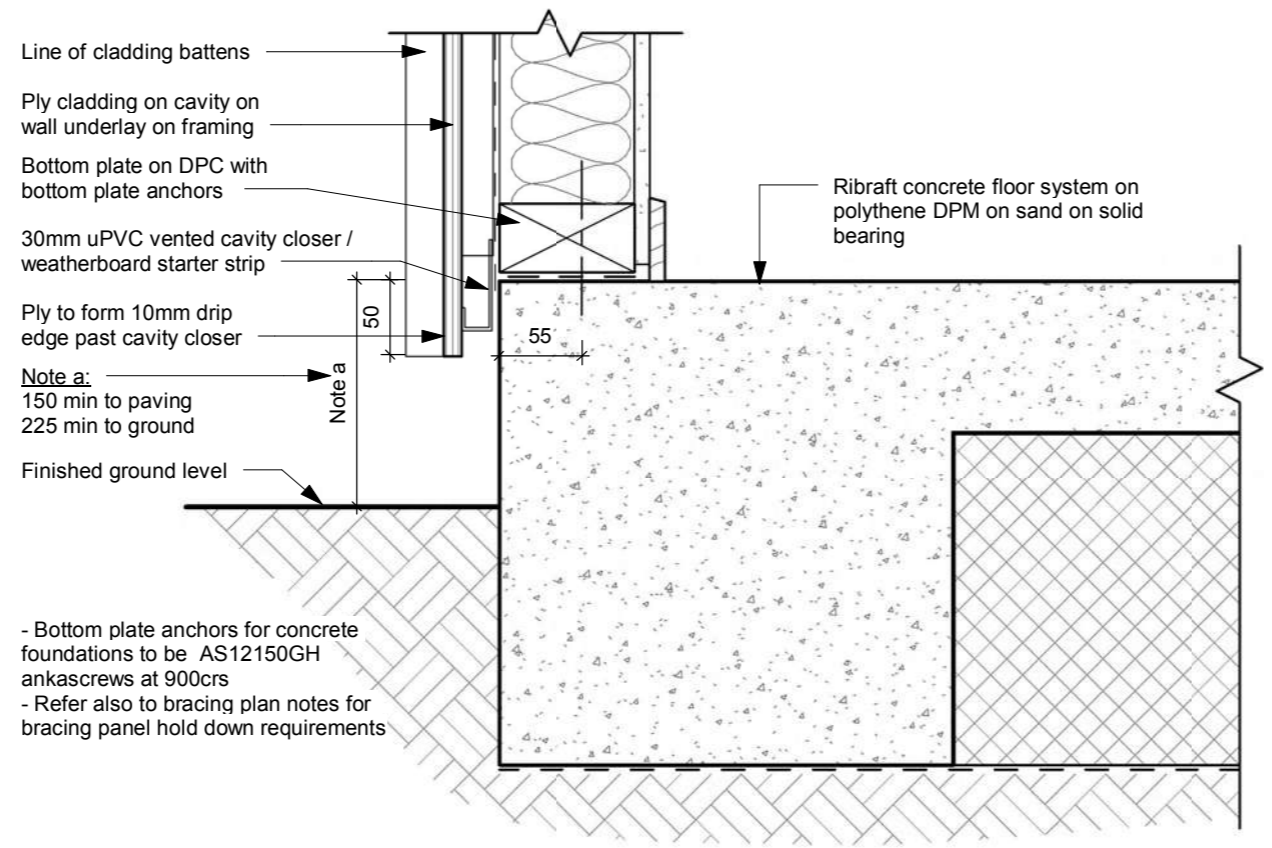
Rev Date Description

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 for Dan and Suki Green
 Lot 6 Anderson Park
 Waikanae

Building Consent
Building Section

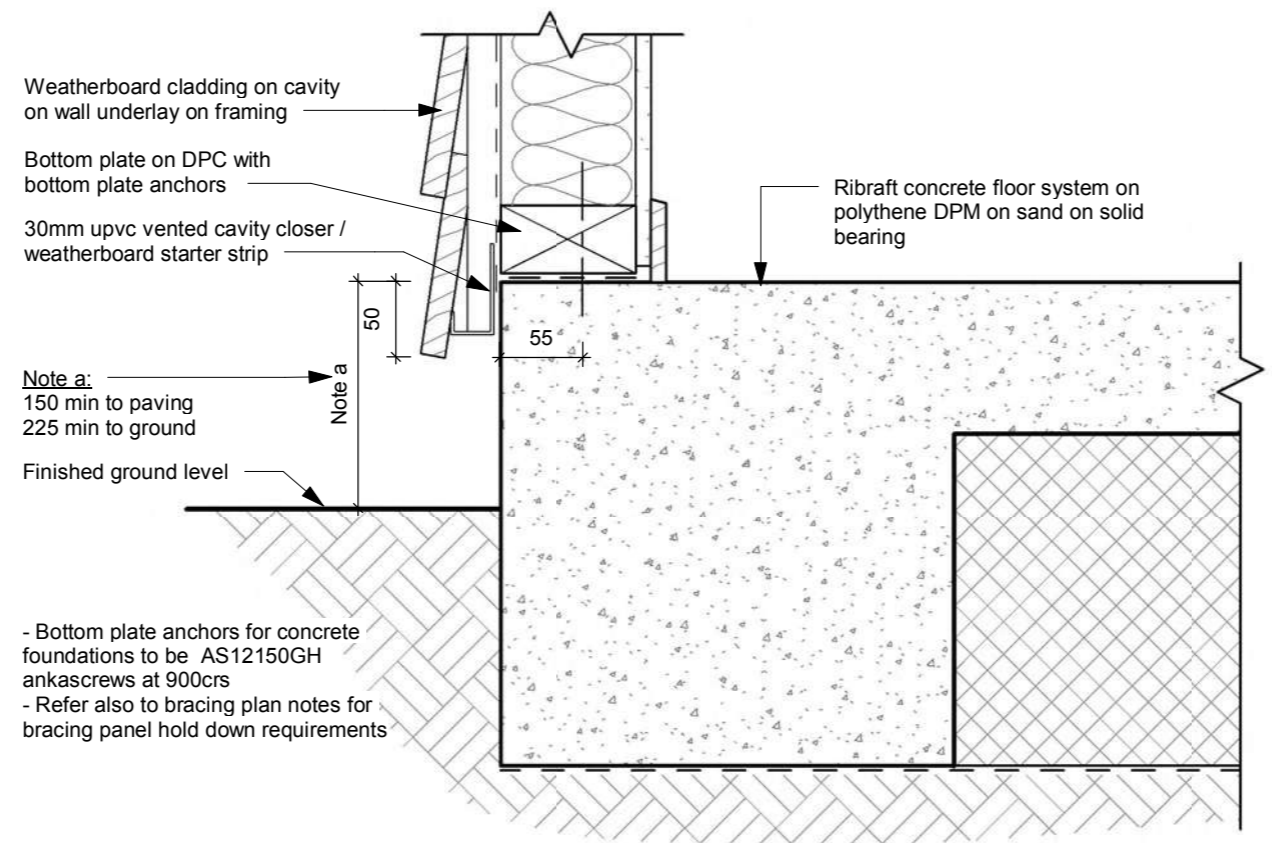
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 Job Date Sheet(A3) Rev.
 20018 30/11/2020 A203



Note a:
 150 min to paving
 225 min to ground

- Bottom plate anchors for concrete foundations to be AS12150GH ankascrews at 900crs
 - Refer also to bracing plan notes for bracing panel hold down requirements

1 SHADOWCLAD FOUNDATION
 A202 1 : 5



Note a:
 150 min to paving
 225 min to ground

- Bottom plate anchors for concrete foundations to be AS12150GH ankascrews at 900crs
 - Refer also to bracing plan notes for bracing panel hold down requirements

2 WBD FOUNDATION
 A201 1 : 5

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

Detail Notes
 • Contractor must obtain territorial authority acceptance for variation to details



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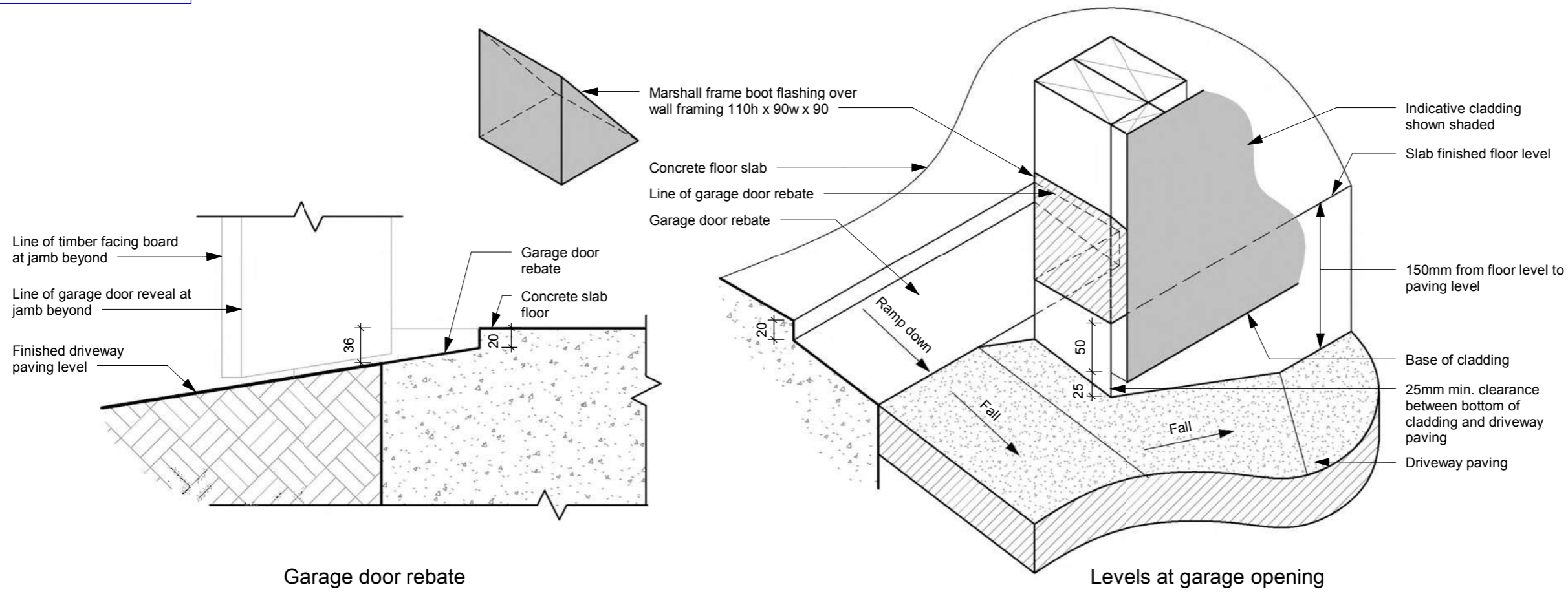
Foundation Details

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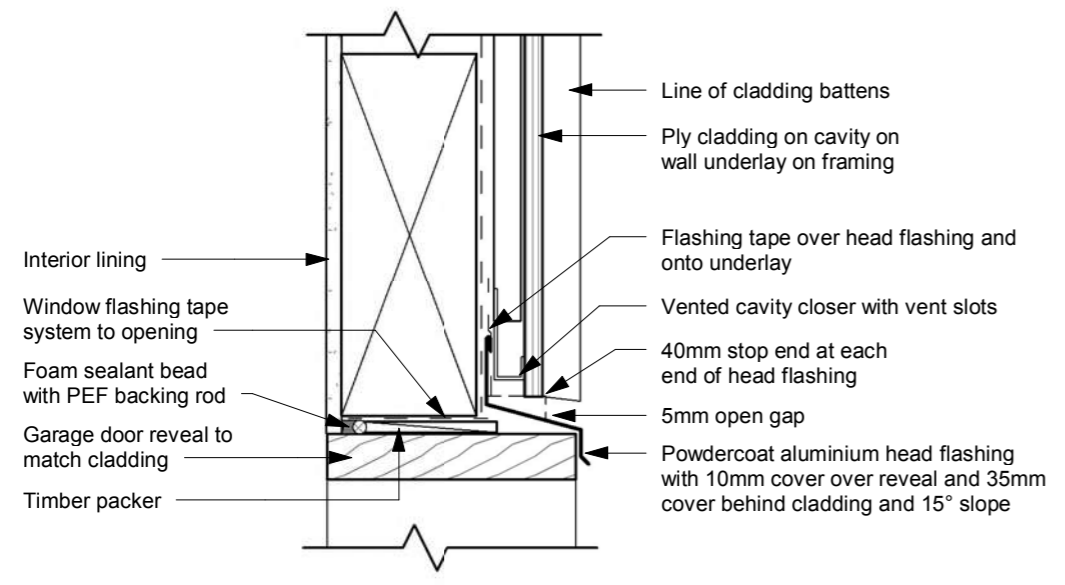
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20018	30/11/2020	A301	

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

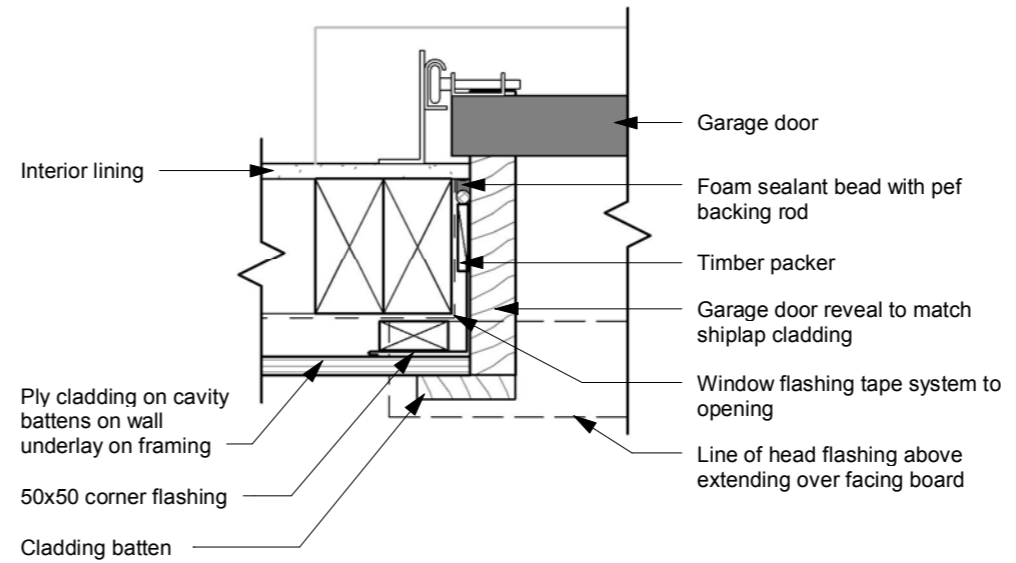
Detail Notes
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1 GARAGE DOOR REBATE
 1 : 5



2 A GARAGE DOOR HEAD
 1 : 5



3 A GARAGE DOOR JAMB
 1 : 5

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Foundation Details

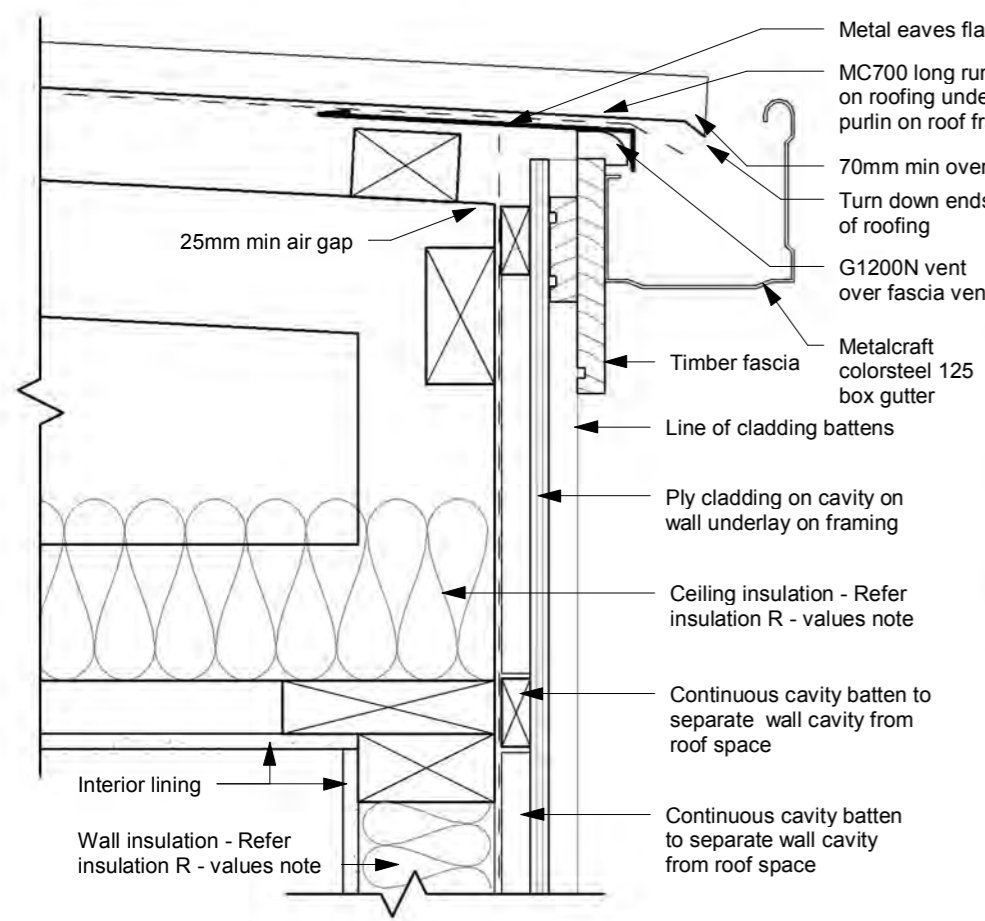
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Job	Date	Sheet(A3)	Rev.
20018	30/11/2020	A302	

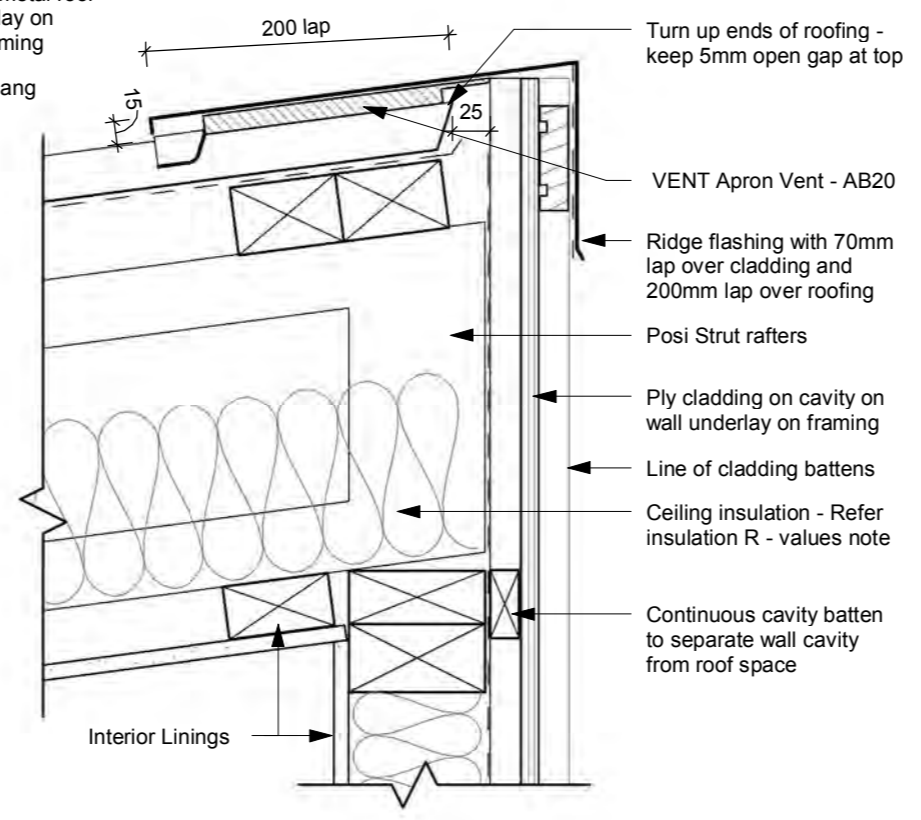
BC200896
Further Information Received
3/03/21

Construction Notes
• This page is to be read in conjunction with sheet A002 - construction notes for additional information

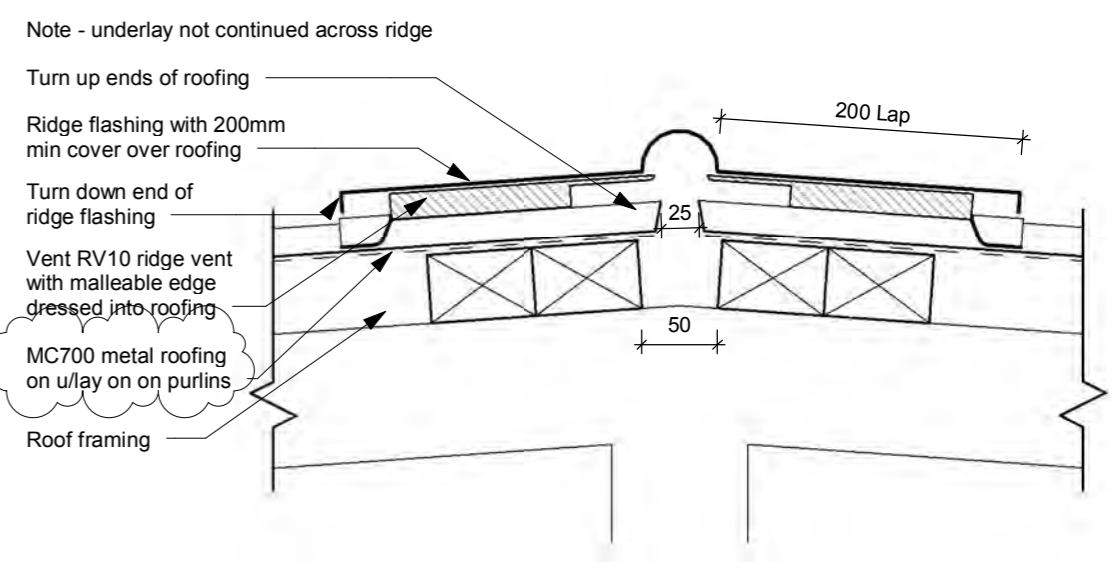
Detail Notes
• Contractor must obtain territorial authority acceptance for variation to details



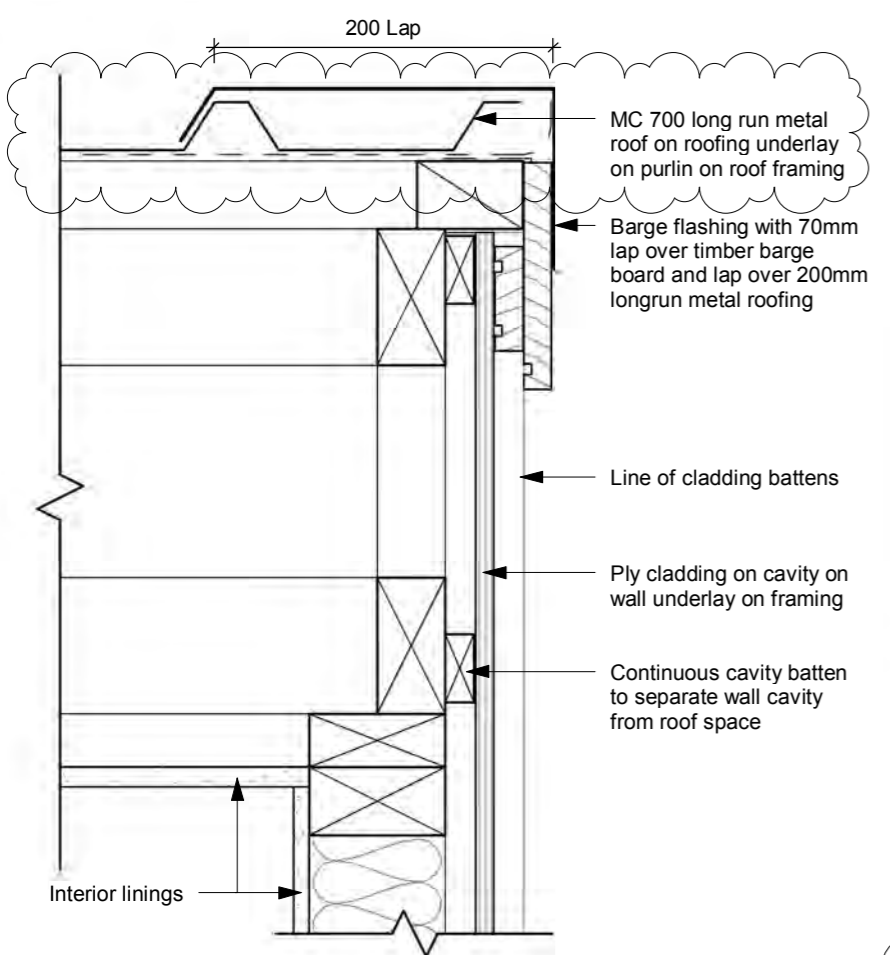
1 TRUSS ROOF EAVE
A202 1 : 5



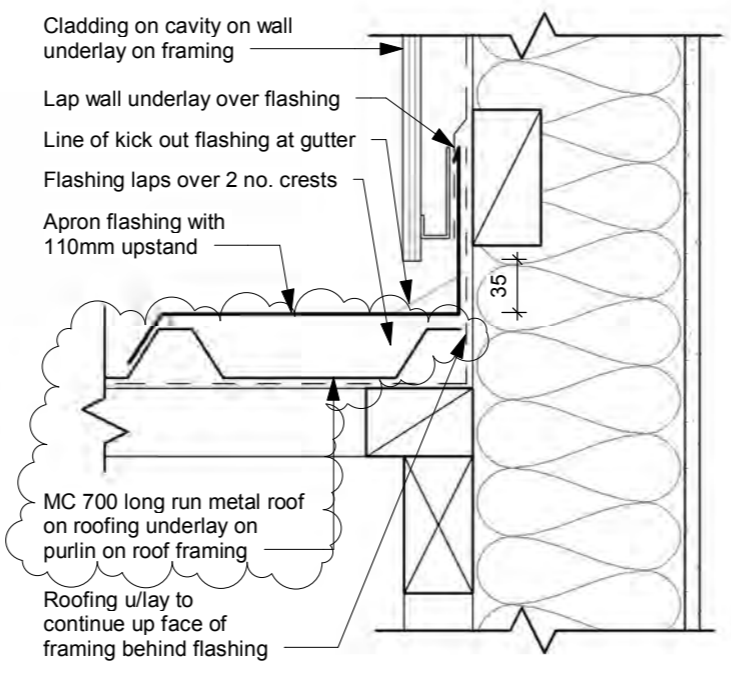
2 POSISTRUT / RIDGE DETAIL
A202 1 : 5



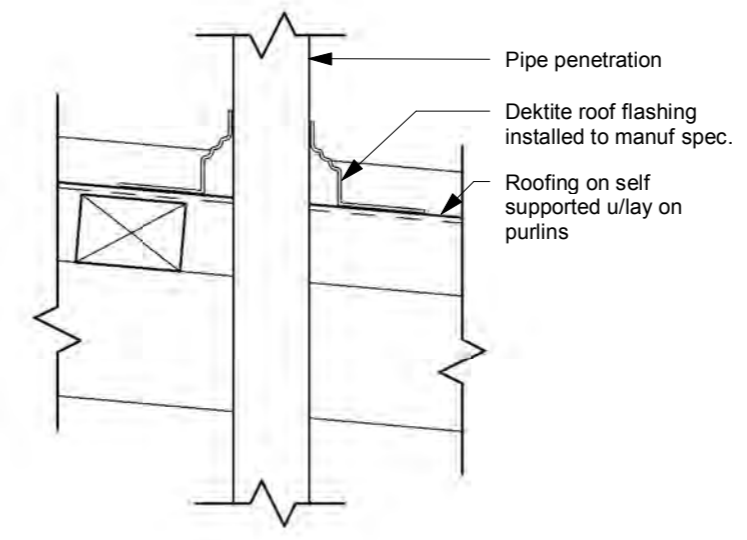
3 METAL ROOF RIDGE
A201 1 : 5



4 METAL ROOF BARGE
A109 1 : 5



5 METAL ROOF PARALLEL APRON
A203 1 : 5



ROOF PENETRATION
1 : 5



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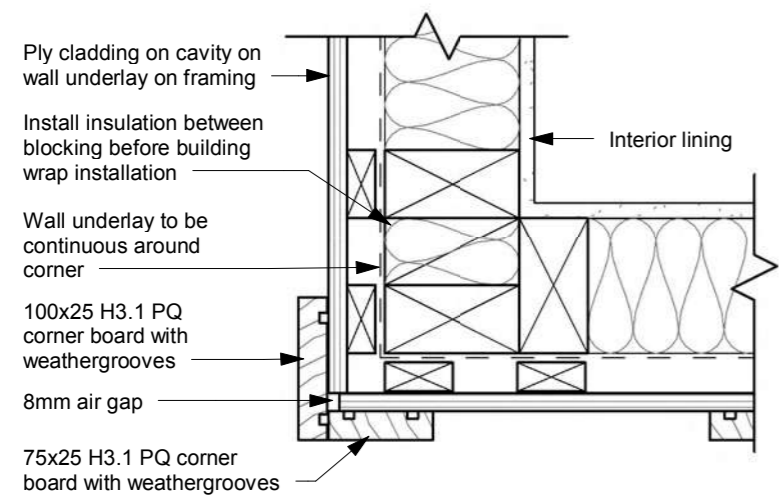
Roof Details

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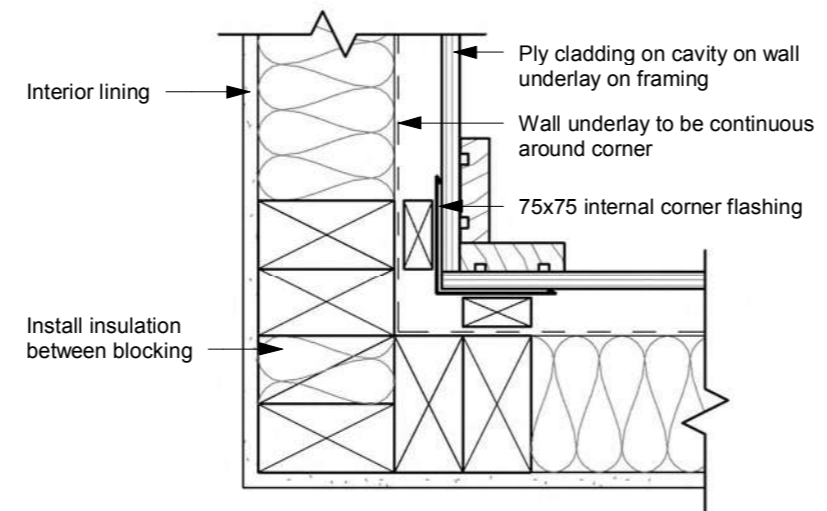
Job	Date	Sheet(A3)	Rev.
20018	3/03/2021	A303	B

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

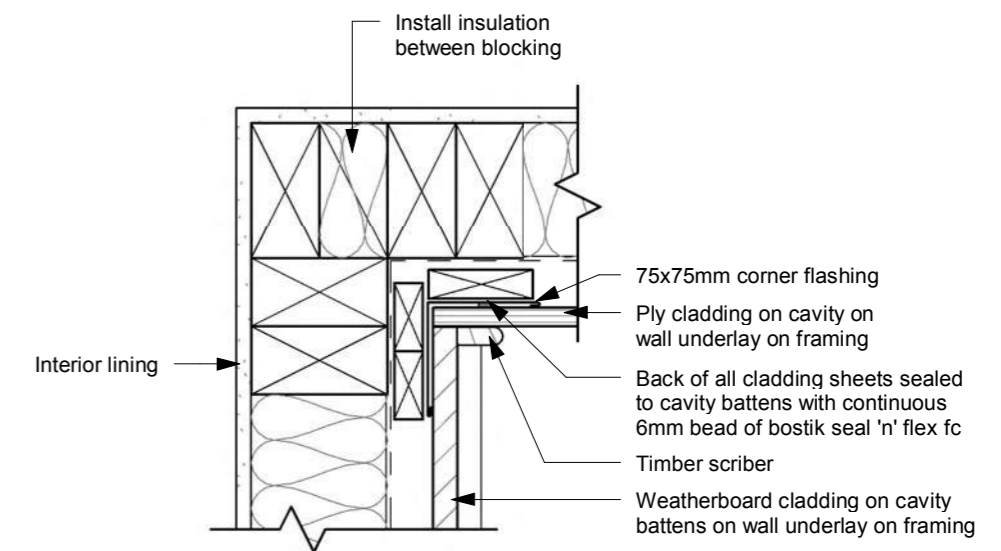
Detail Notes
 • Contractor must obtain territorial authority acceptance for variation to details



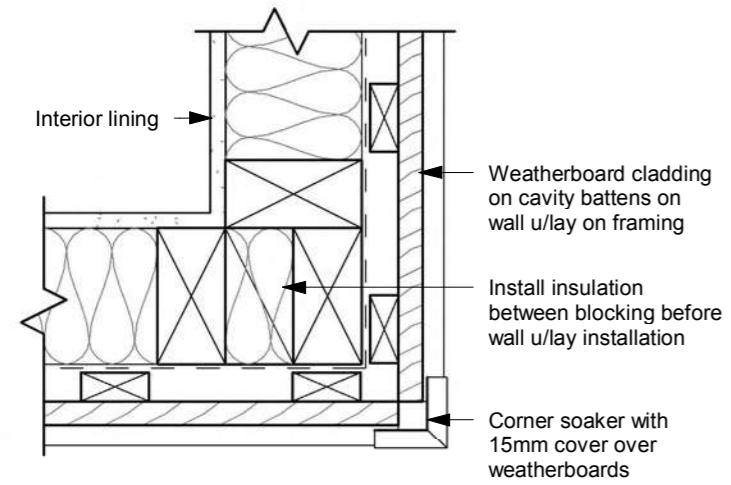
1 PLY EXTERNAL CORNER
 A004 1 : 5



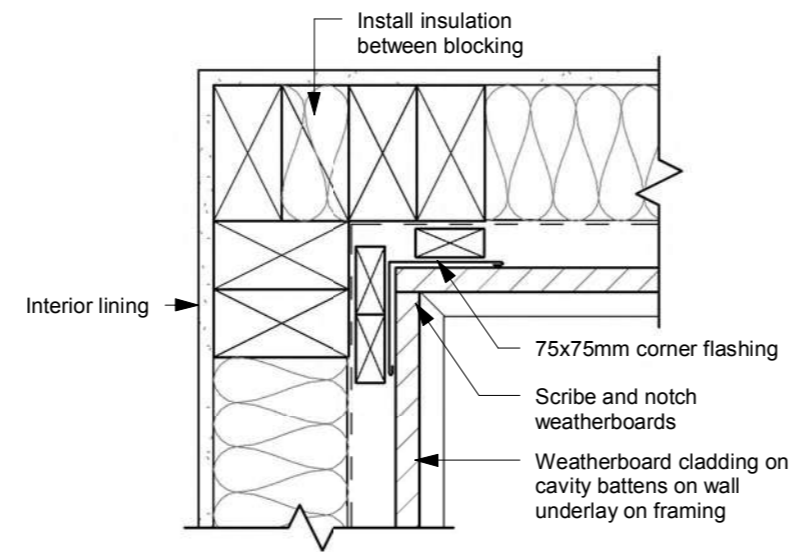
2 PLY INTERNAL CORNER
 A004 1 : 5



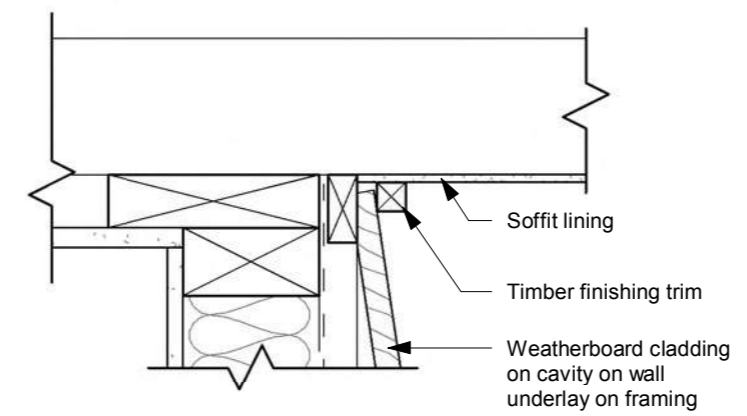
3 PLY / WBD INTERNAL CORNER
 A004 1 : 5



4 WBD EXTERIOR CORNER
 A004 1 : 5



5 WBD INTERIOR CORNER
 A004 1 : 5



6 WBD / SOFFIT JUNCTION
 A201 1 : 5



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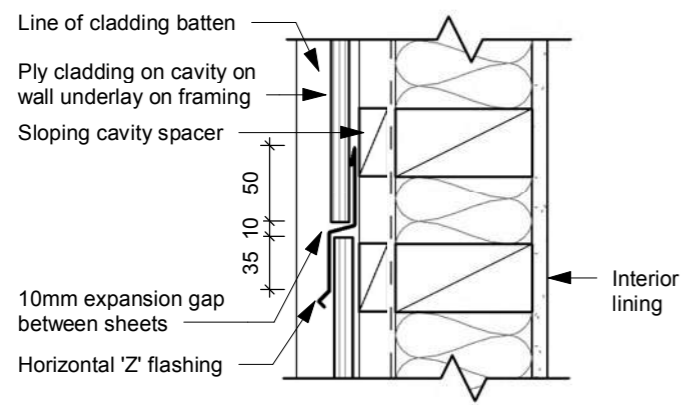
Cladding Details

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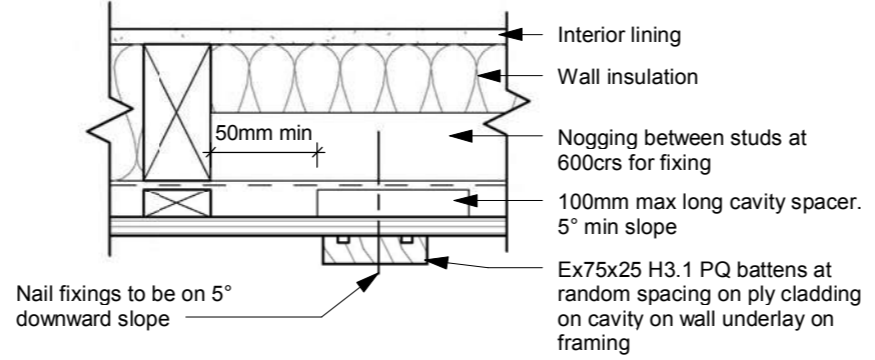
Job Date Sheet(A3) Rev.
 20018 30/11/2020 A304

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

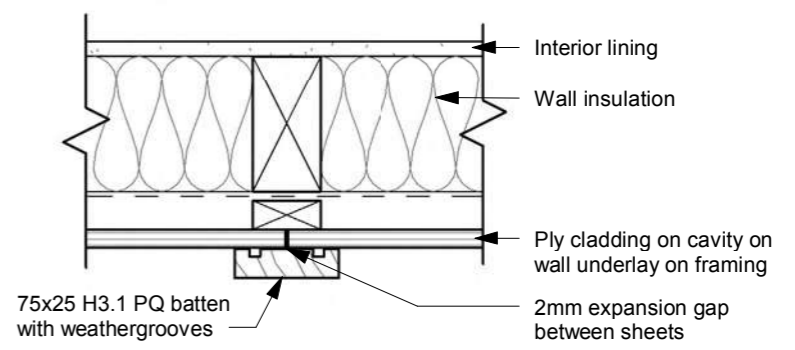
Detail Notes
 • Contractor must obtain territorial authority acceptance for variation to details



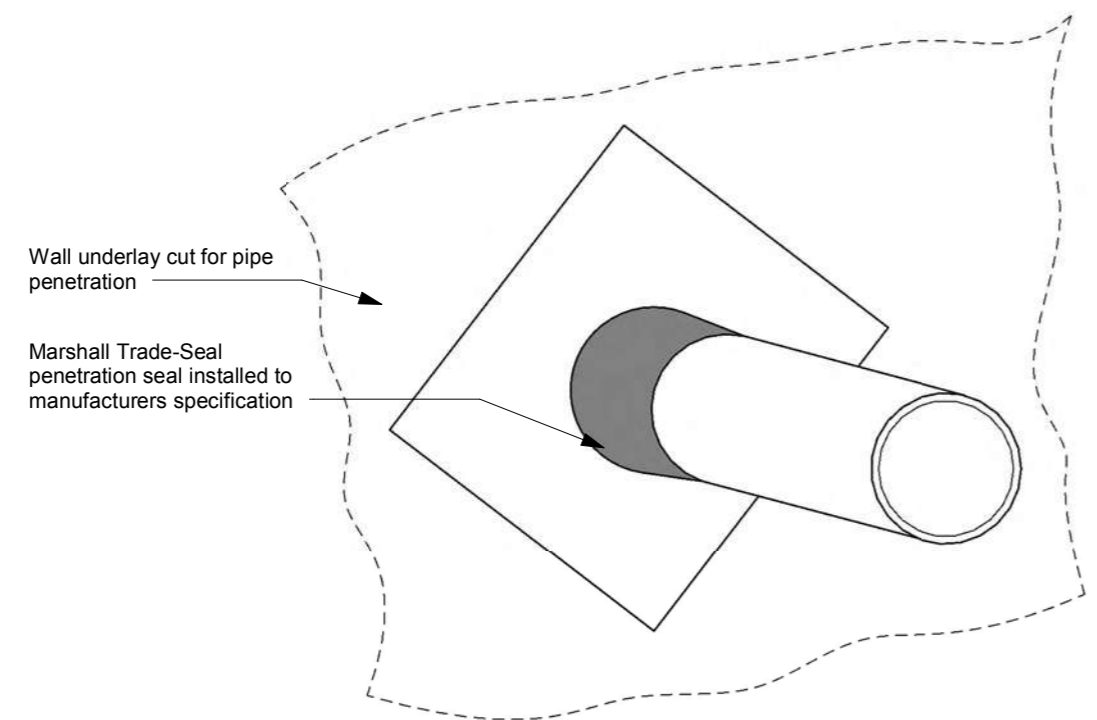
1 HORIZONTAL SHEET JOINT
 A201 1 : 5



2 VERTICAL BATTEN FIXINGS
 A201 1 : 5

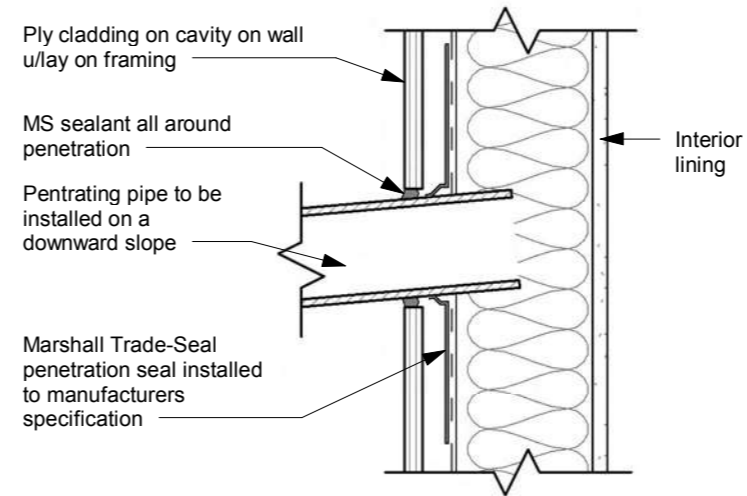


3 VERTICAL SHEET JOINT
 A201 1 : 5



Note:
 Cable / pipe penetration to comply with
 NZBC E2/AS1 paragraph 9.1.9.3

TYPICAL PIPE / CLADDING PENETRATION
 1 : 5



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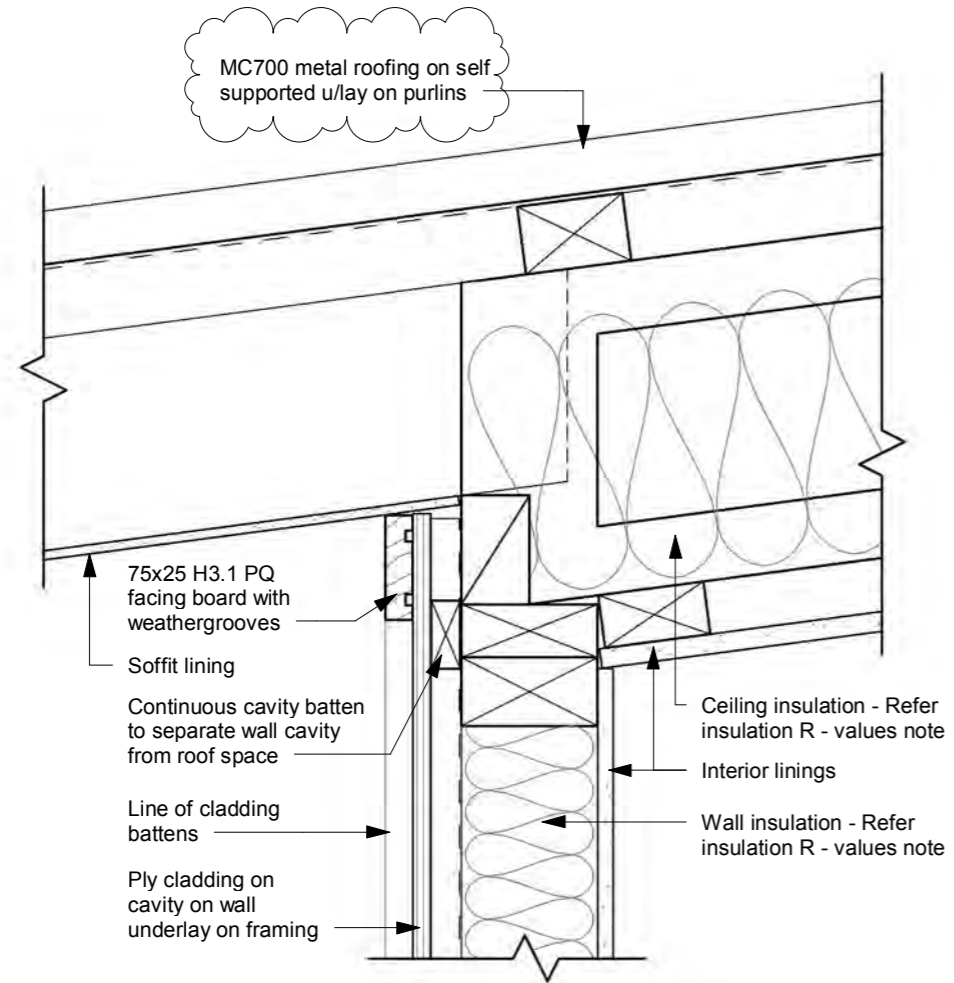
Cladding Details

DO NOT SCALE DRAWING

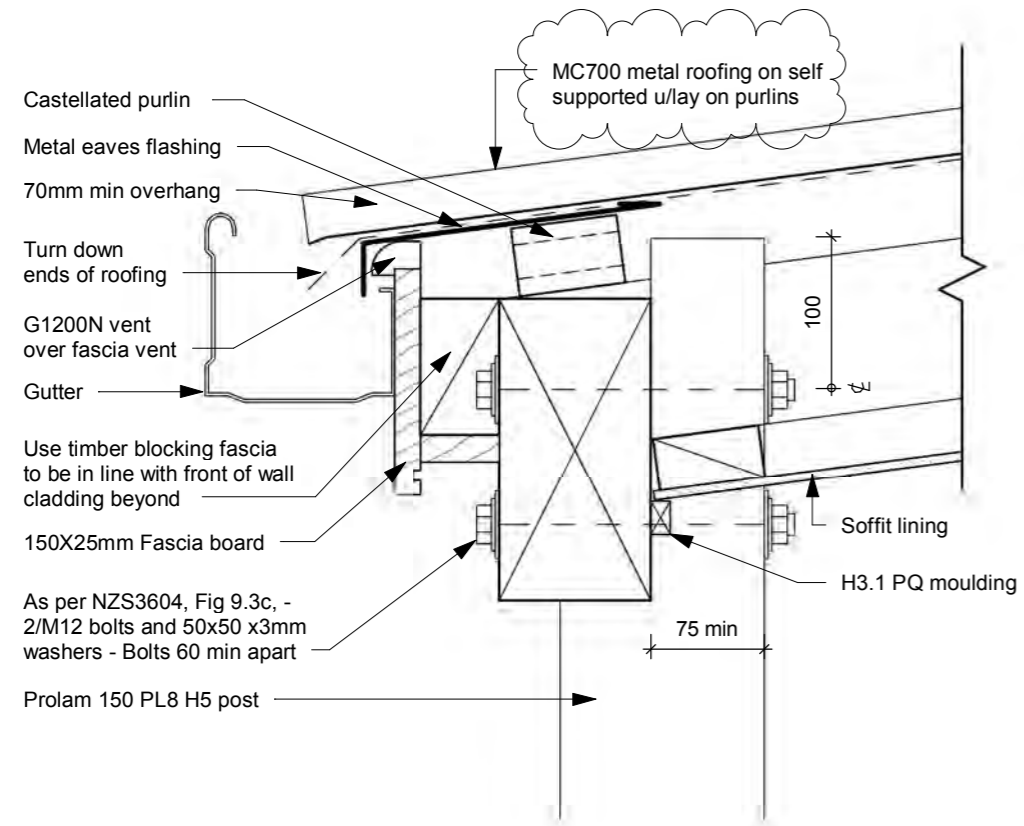
Job	Date	Sheet(A3)	Rev.
20018	30/11/2020	A305	

Construction Notes
• This page is to be read in conjunction with sheet A002 - construction notes for additional information

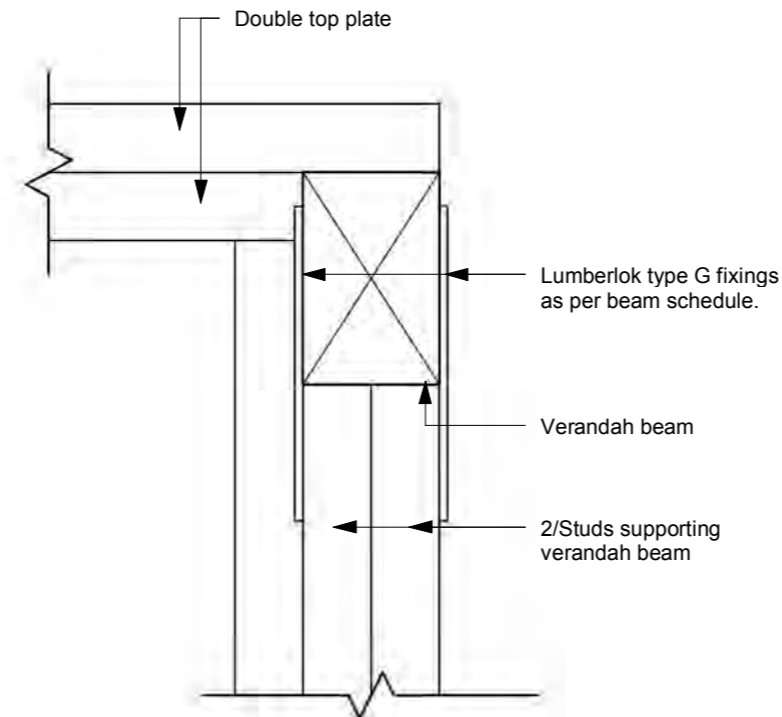
Detail Notes
• Contractor must obtain territorial authority acceptance for variation to details



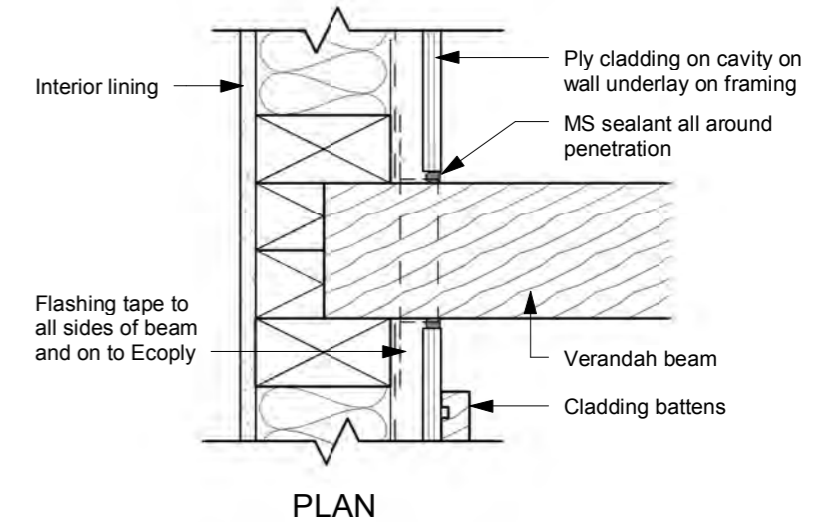
1 PLY SOFFIT/ POSISTUT
A203 1 : 5



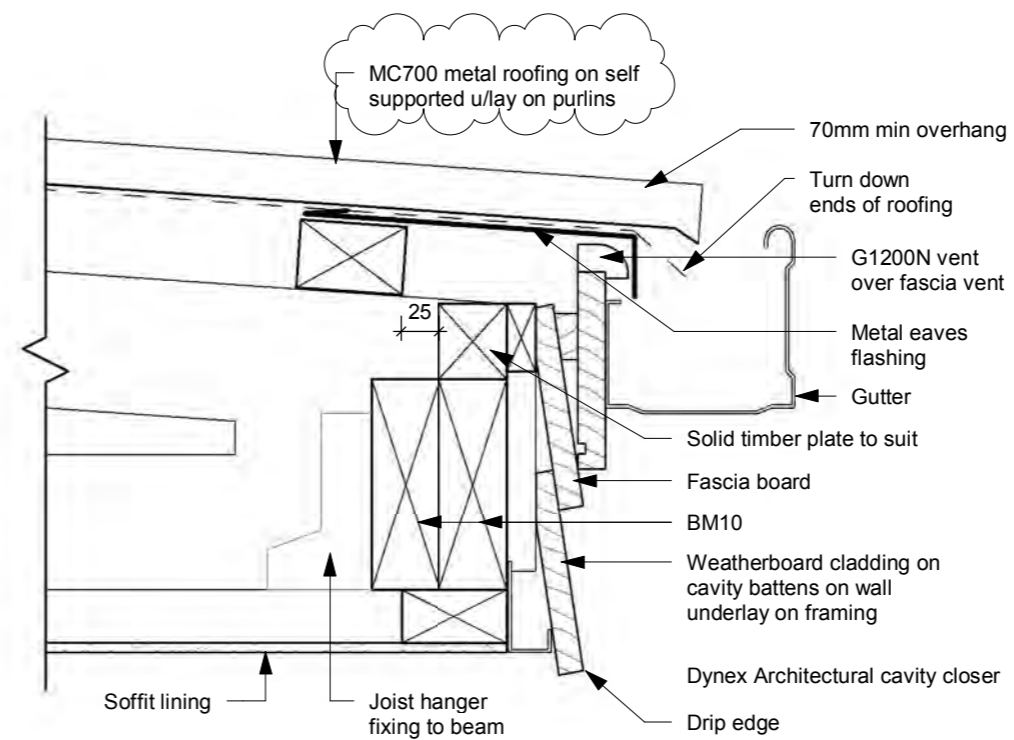
4 OUTDOOR DECK EAVE
A203 1 : 5



2 VERANDAH BEAM FIXING
A104 1 : 5



3 BEAM / PLY PENETRATION
A104 1 : 5



5 FRONT DECK EAVE
A201 1 : 5



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B	18/01/21	RFI Round 2

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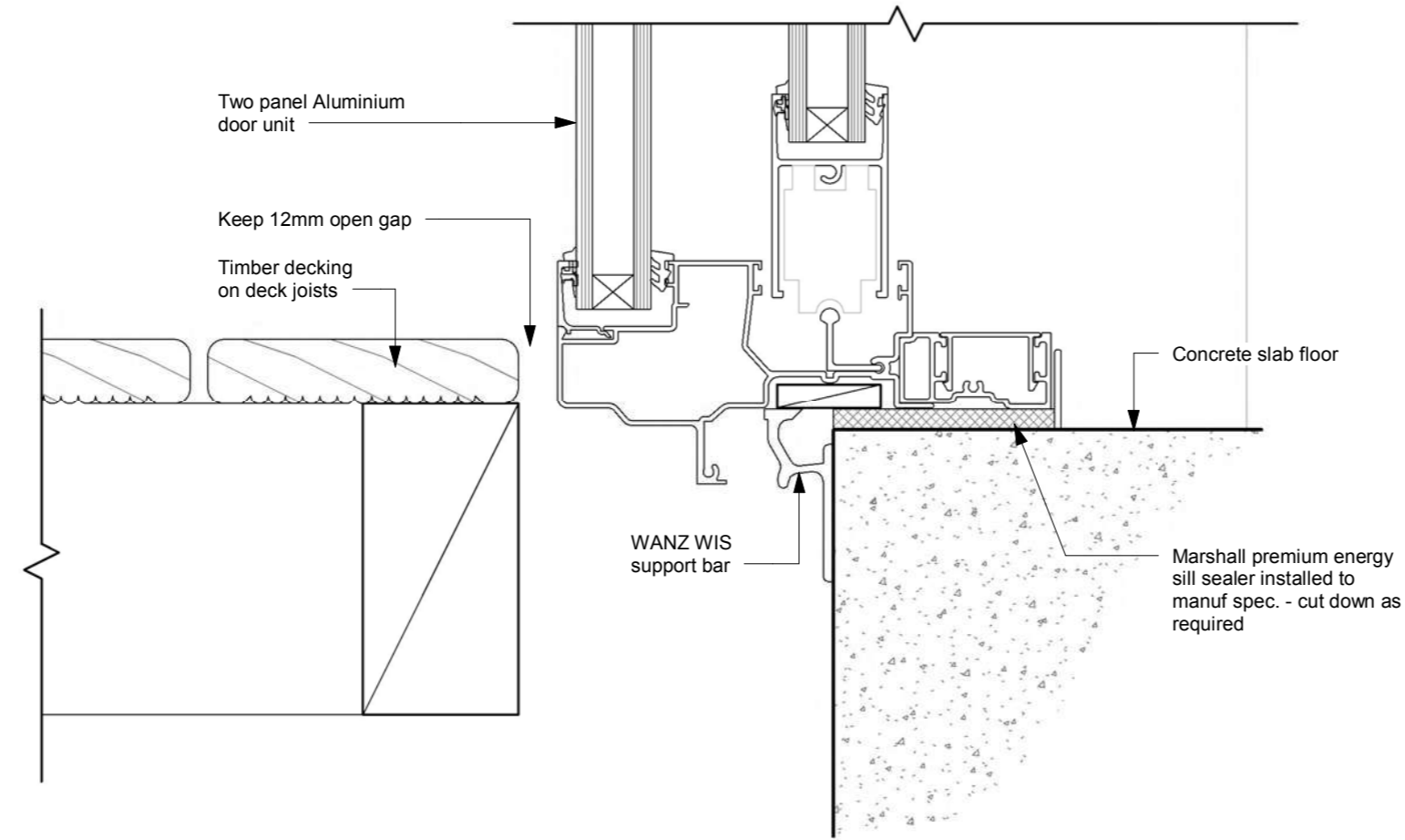
Proposed House
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Waikanae

Building Consent

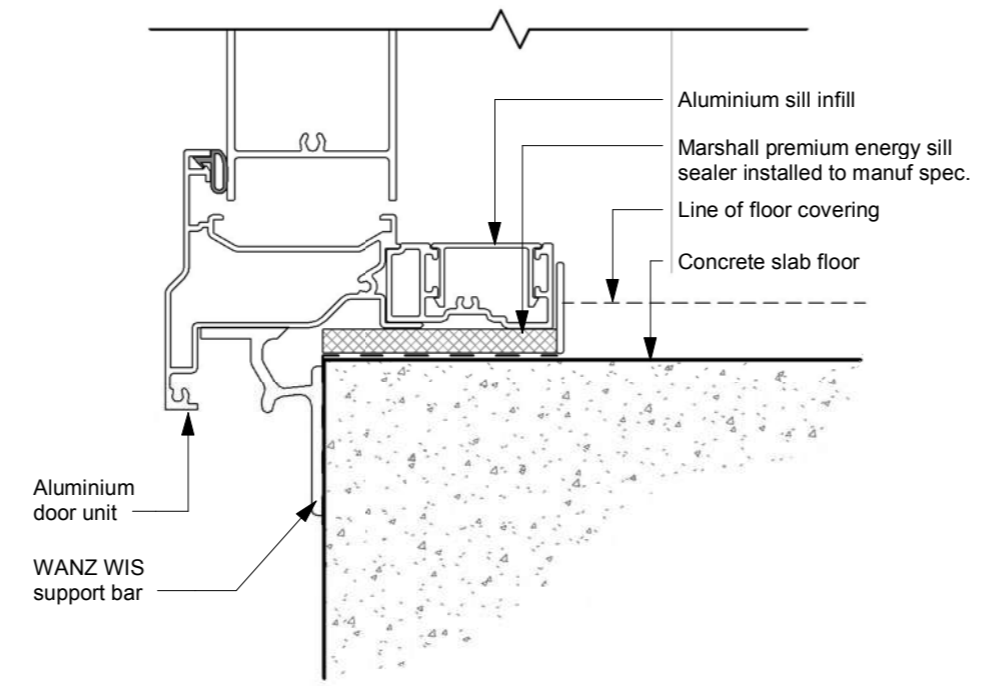
Cladding Details

DO NOT SCALE DRAWING

Job	Date	Sheet(A3)	Rev.
20018	3/03/2021	A306	B



1 SLIDING DOOR SILL
 A203 1:2



2 DOOR SILL
 A006 1:2

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

Detail Notes
 • Contractor must obtain territorial authority acceptance for variation to details



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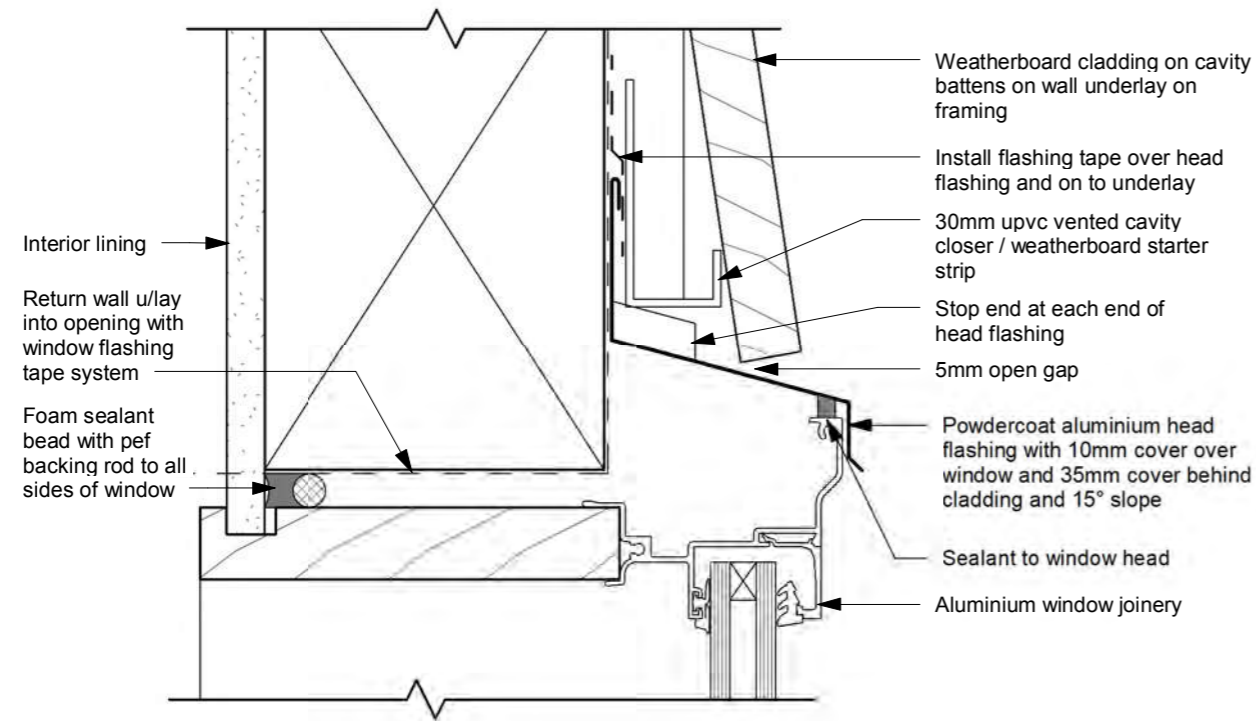
Deck Details

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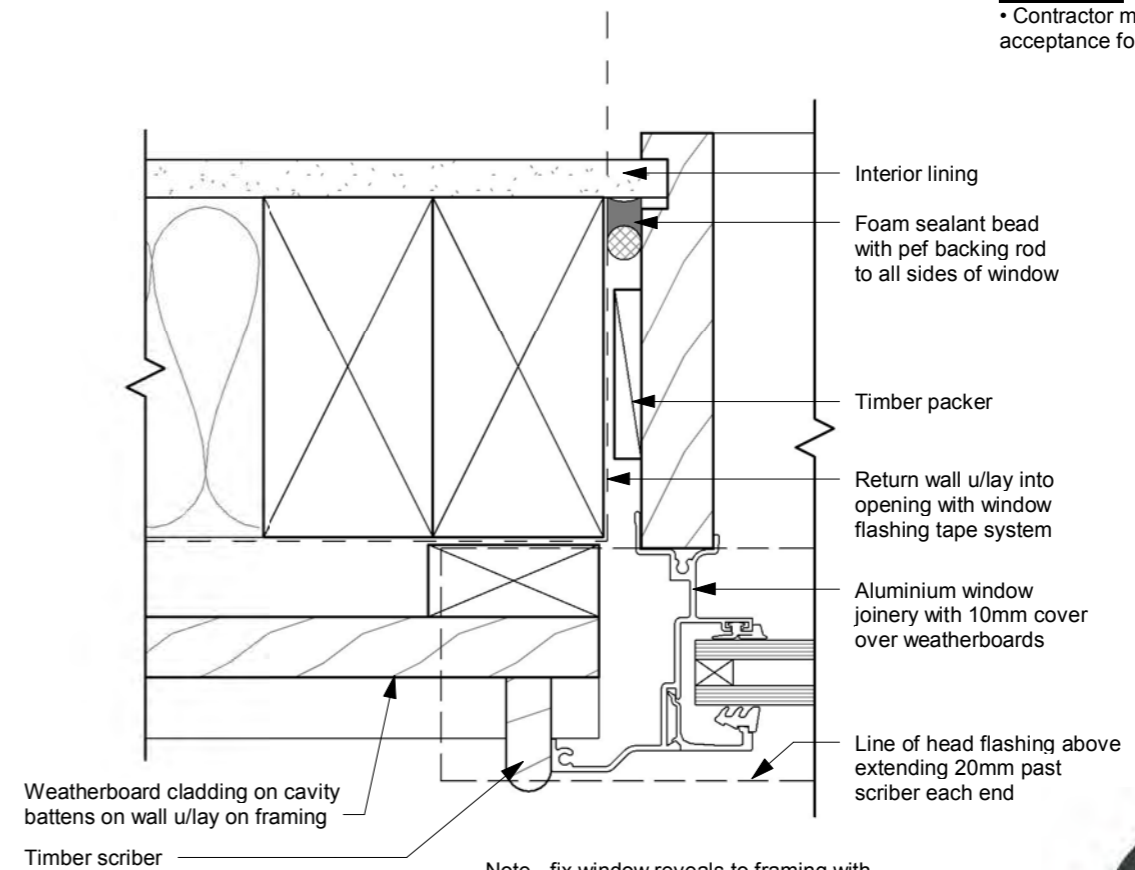
Job	Date	Sheet(A3)	Rev.
20018	30/11/2020	A307	

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

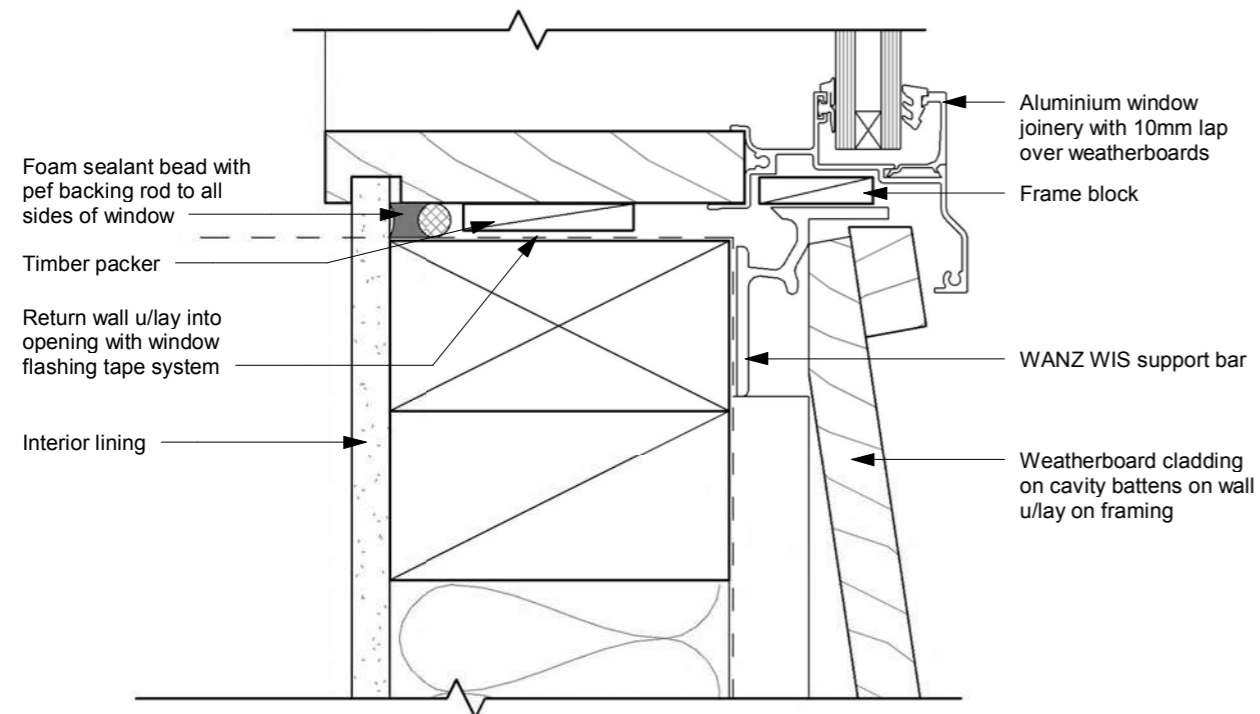
Detail Notes
 • Contractor must obtain territorial authority acceptance for variation to details



1 WBD WINDOW HEAD
 A005 1 : 2



2 WBD WINDOW JAMB
 A005 1 : 2



3 WBD WINDOW SILL
 A005 1 : 2



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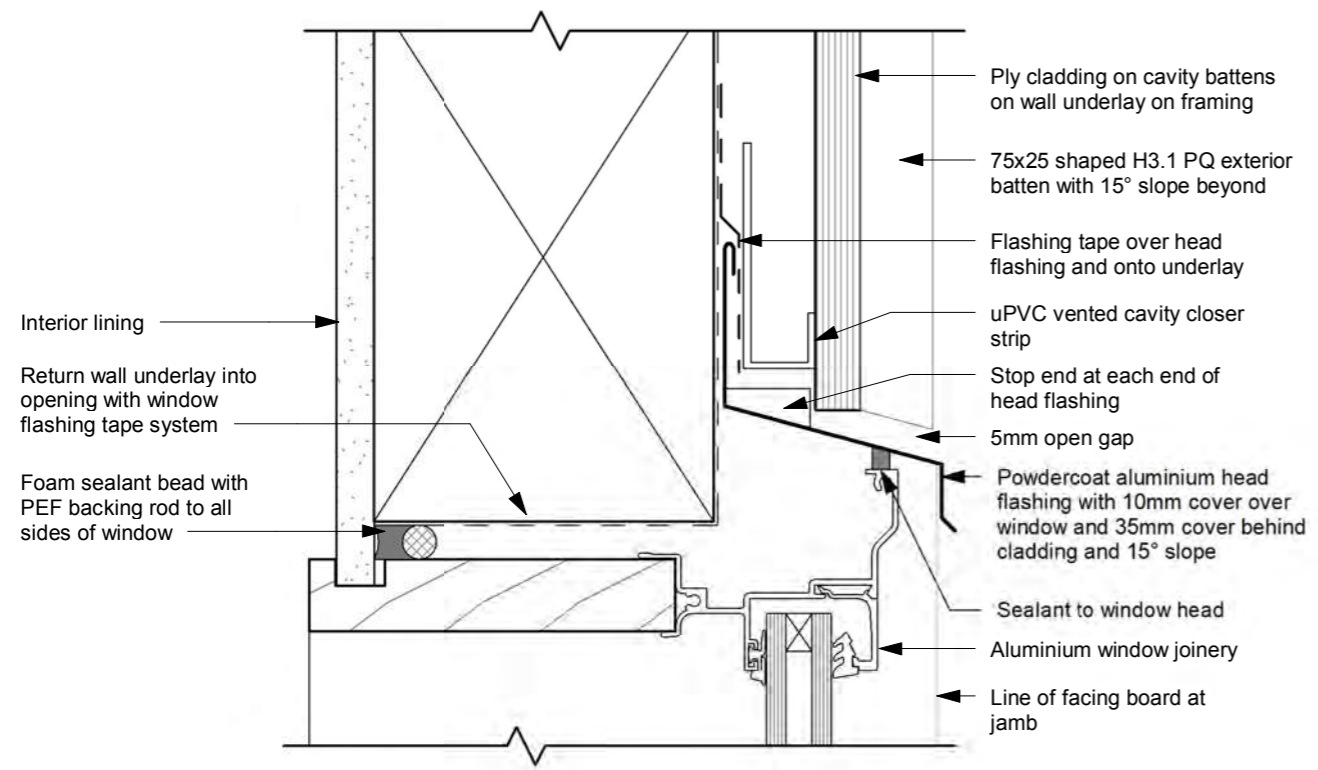
Window Details

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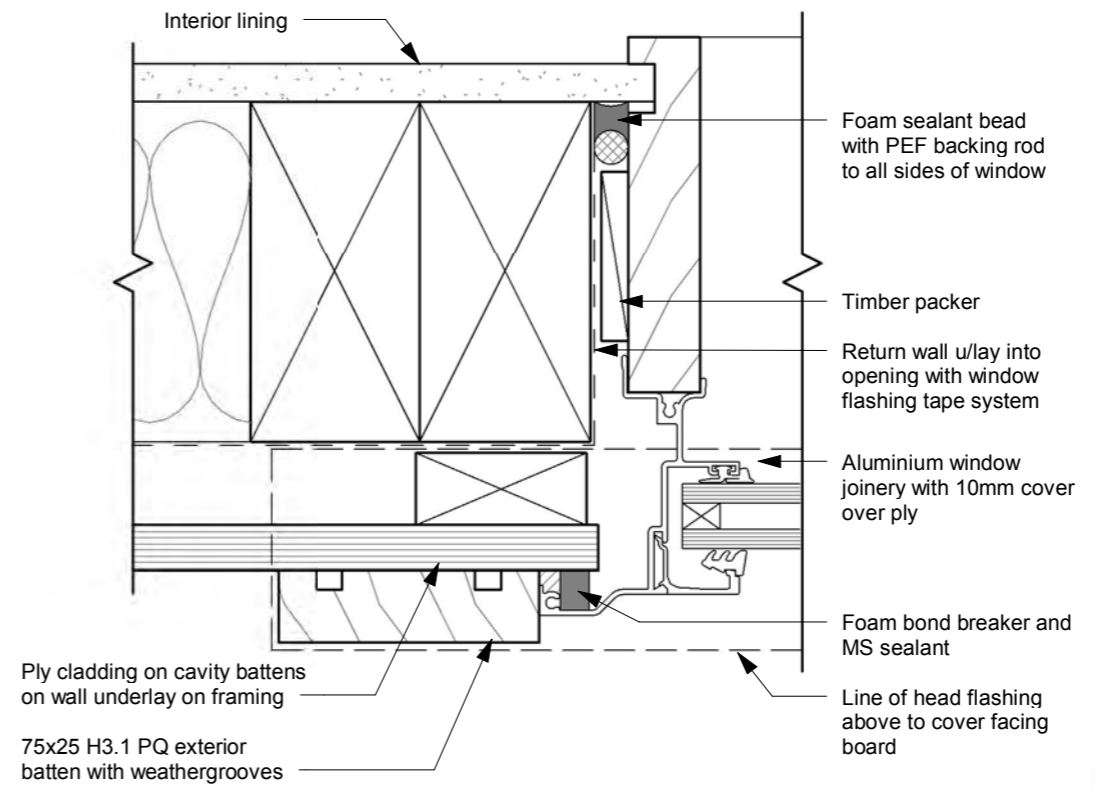
Job	Date	Sheet(A3)	Rev.
20018	30/11/2020	A308	

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

Detail Notes
 • Contractor must obtain territorial authority acceptance for variation to details

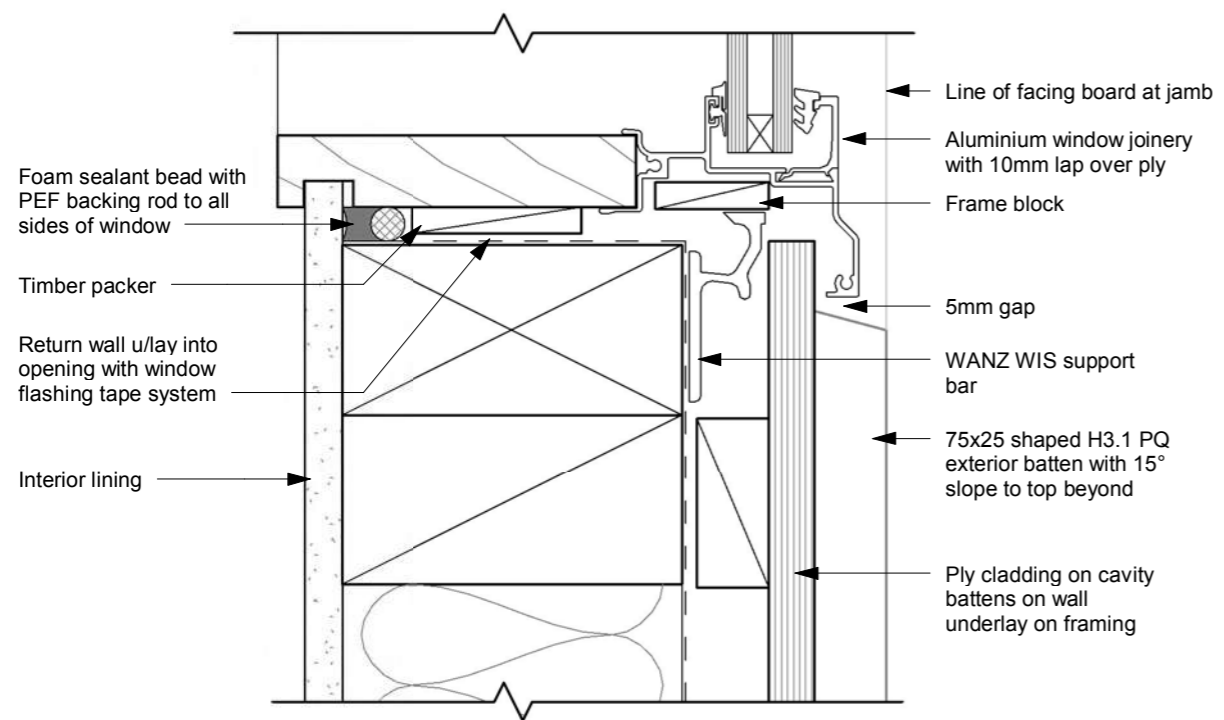


1 PLY WINDOW HEAD
 A005 1:2



Note - fix window reveals to framing with 2 No. 100x3.15mm nails at 300crs max.

2 PLY WINDOW JAMB
 A005 1:2



3 PLY WINDOW SILL
 A005 1:2



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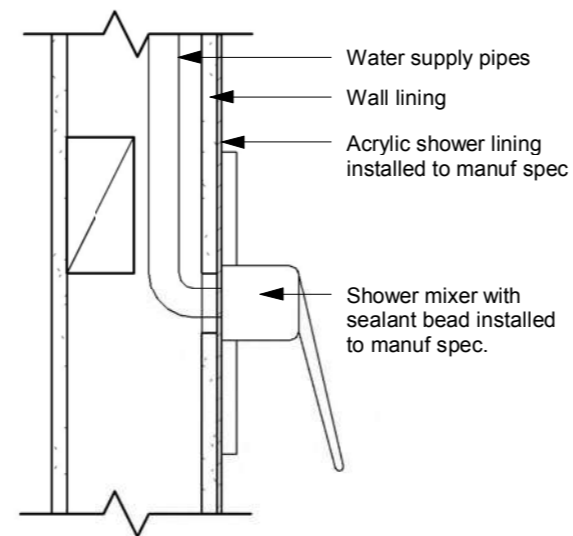
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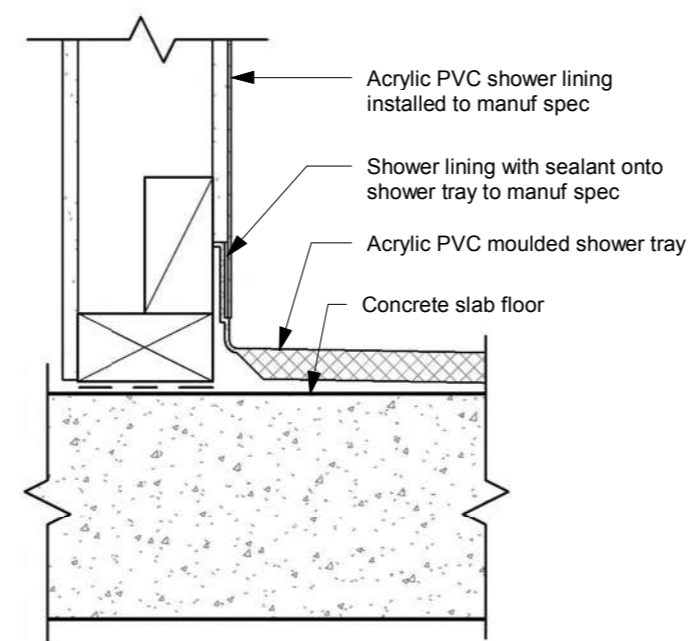
Job Date Sheet(A3) Rev.
 20018 30/11/2020 A309

Construction Notes
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Detail Notes
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1
 A004
ACRYLIC SHOWER PENETRATION
 1 : 5



2
 A004
ACRYLIC SHOWER BASE
 1 : 5



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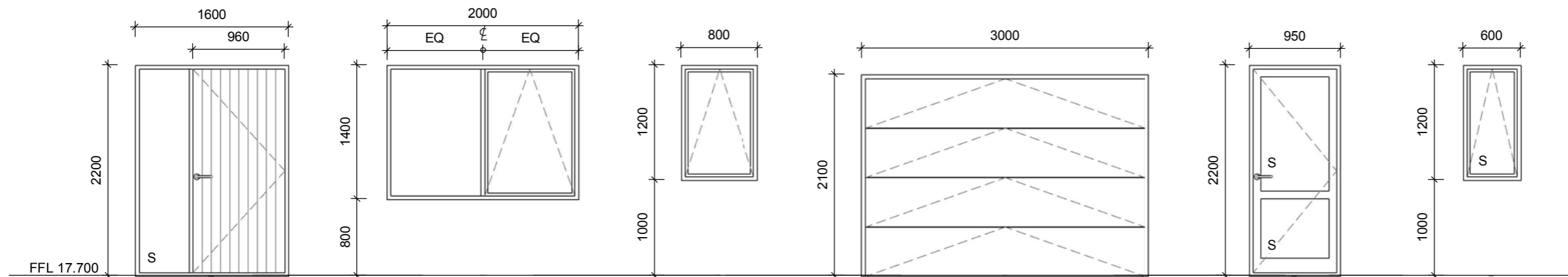
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Building Consent

Bathroom Details

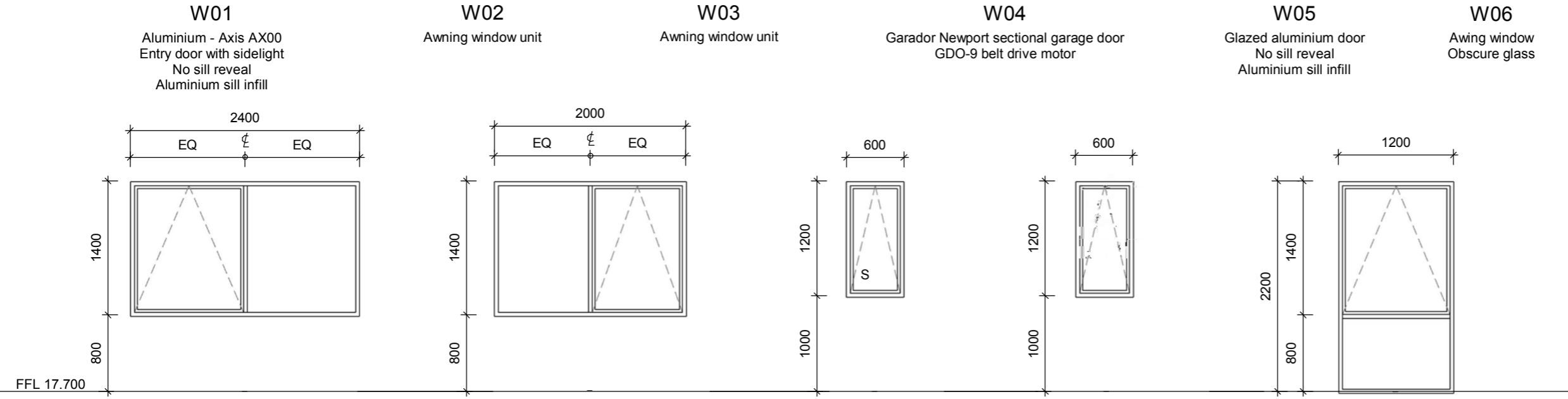
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Job	Date	Sheet(A3)	Rev.
20018	30/11/2020	A310	

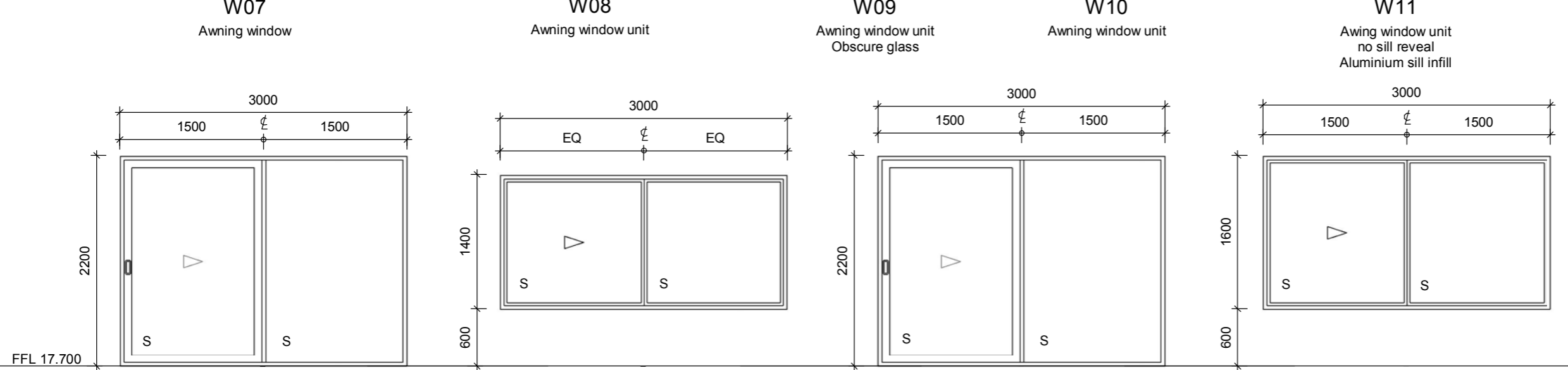


Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

Aluminium Window & Doors
 • Joinery shown as viewed from exterior
 • Window dimensions denote size measured over window reveals
 • Aluminium joiner to check opening sizes on site before manufacture
 • Window manufacturer to supply flashings and wanz wis components
 • Refer also to window details
 • All windows to be APL residential suite double glazed joinery
 • All windows have slimline reveals rebated for wall linings
 • All jamb liners to be 19mm fingerjointed pine, paint finish
 • All opening sashes to have colour matched double tongue catches
 • All window and door openings in exterior walls to have a window flashing system installed
 • Allow also for glazed balustrade
 • S - denotes safety glass required



BC200896
 Received by
 Kapiti Coast District Council
 7/12/20



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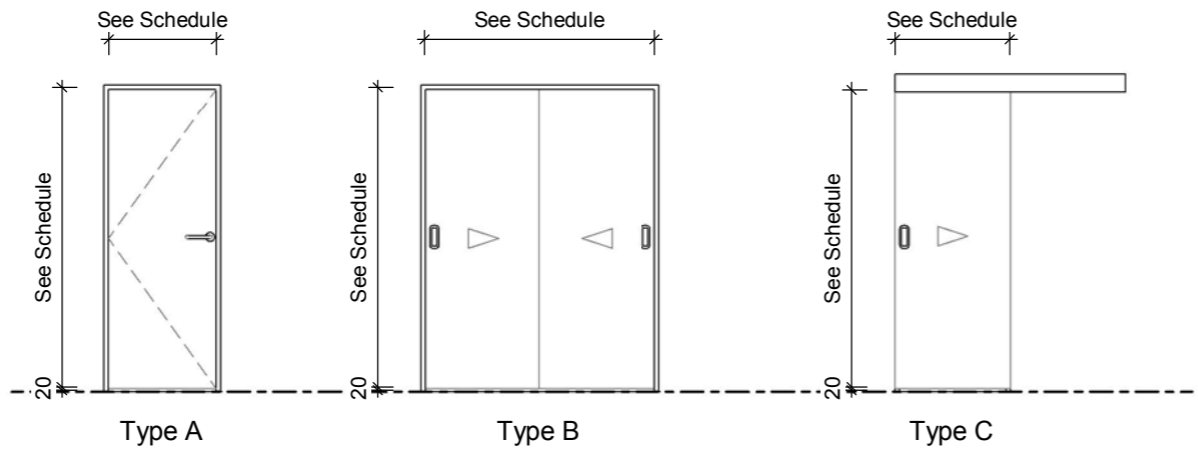
Building Consent

Exterior Joinery Schedule

DO NOT SCALE DRAWING

Job Date Sheet(A3) Rev.
 20018 30/11/2020 A401

Daylight and Ventilation Schedule						
Room	Floor Area	5% of area	10% of area	Associated windows	Daylight area	Ventilation area
Dining	12.1 m ²	0.6 m ²	1.2 m ²	W12,W13	10.8	5.4
Kitchen	10.9 m ²	0.5 m ²	1.1 m ²	W11	2.64	1.68
Bath	5.6 m ²	0.3 m ²	0.6 m ²	W09	0.72	0.72
Bed 2	9.0 m ²	0.4 m ²	0.9 m ²	W08	2.8	1.4
Bed 1	13.0 m ²	0.6 m ²	1.3 m ²	W07	2.8	1.4
Ens.	5.0 m ²	0.2 m ²	0.5 m ²	W06	0.72	0.72
Bed 3	8.9 m ²	0.4 m ²	0.9 m ²	W02	2.8	1.4
Living	24.3 m ²	1.2 m ²	2.4 m ²	W14, W15	11.4	5.7



Interior Door Notes

- Interior door and hardware to be as selected by client
- Refer to floor plans for door swing direction
- All door handles to be 1050mm above floor level or to match existing

Interior Door Schedule						
MARK	TYPE	SIZE	OPERATION	FRAME MATERIAL	PANEL MATERIAL	COMMENTS
D01	C	960w x 2200h	Sliding	Timber Frame	Ribcore panel with steel inserts	Wall mounted slider
D02	B	2000w x 2200h	Sliding	Timber Frame	MDF Panel	Aluminium framed slider
D03	A	810w x 2200h	Hinged Swinging	Timber Frame	Ribcore Panel	Privacy lock
D04	A	810w x 2200h	Hinged Swinging	Timber Frame	Ribcore Panel	
D05	B	1600w x 2200h	Sliding	Timber Frame	MDF Panel	Aluminium framed slider
D06	A	810w x 2200h	Hinged Swinging	Timber Frame	Ribcore Panel	
D07	B	2000w x 2200h	Sliding	Timber Frame	MDF Panel	Aluminium framed slider
D08	B	1200w x 2200h	Sliding	Timber Frame	MDF Panel	Aluminium framed slider
D09	A	810w x 2200h	Hinged Swinging	Timber Frame	Ribcore Panel	
D10	A	810w x 2200h	Hinged Swinging	Timber Frame	Ribcore Panel	
D11	A	810w x 2200h	Hinged Swinging	Timber Frame	Ribcore Panel	Privacy lock



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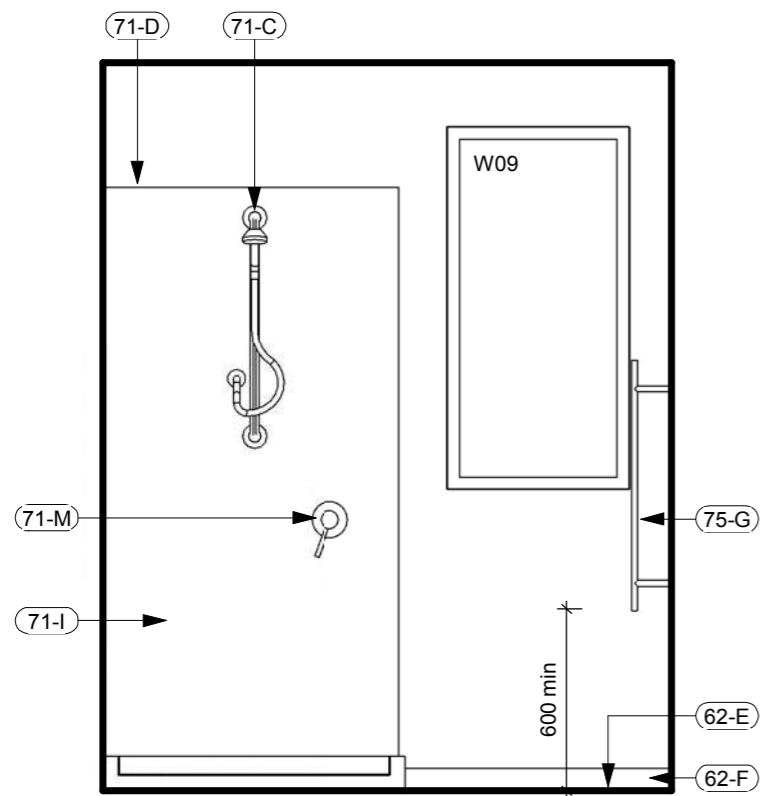
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Interior Opening Schedule

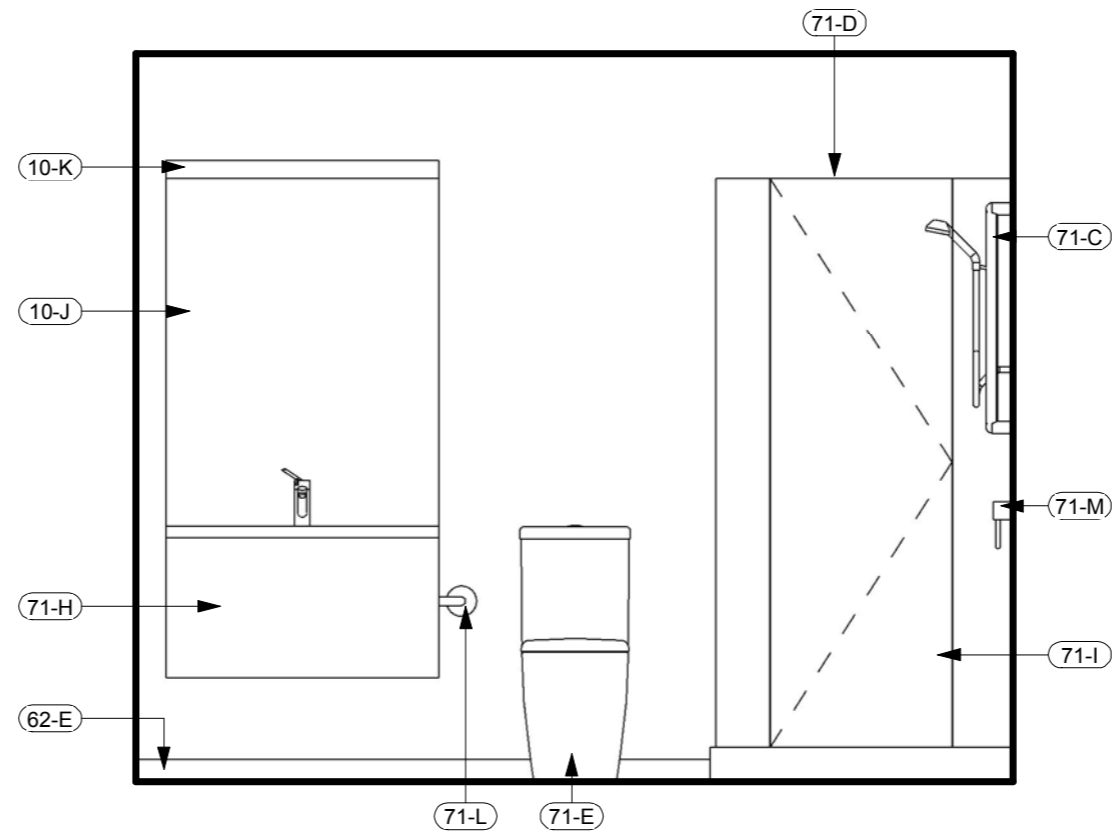
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Job Date Sheet(A3) Rev.
20018 30/11/2020 A402

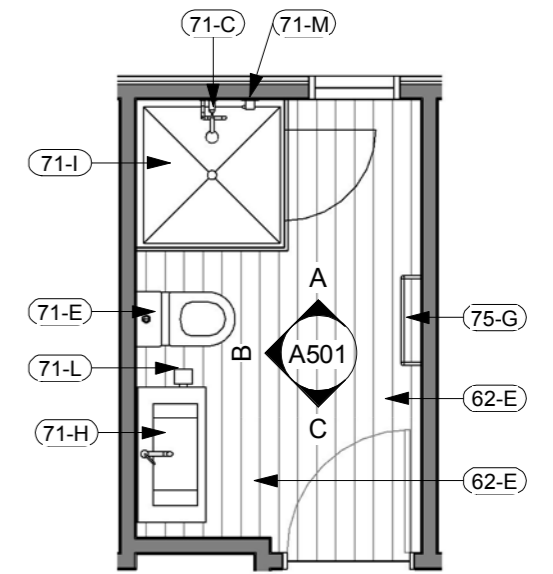
INTERIOR OPENING SCHEDULE
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BATHROOM ELEVATION A
 1 : 25

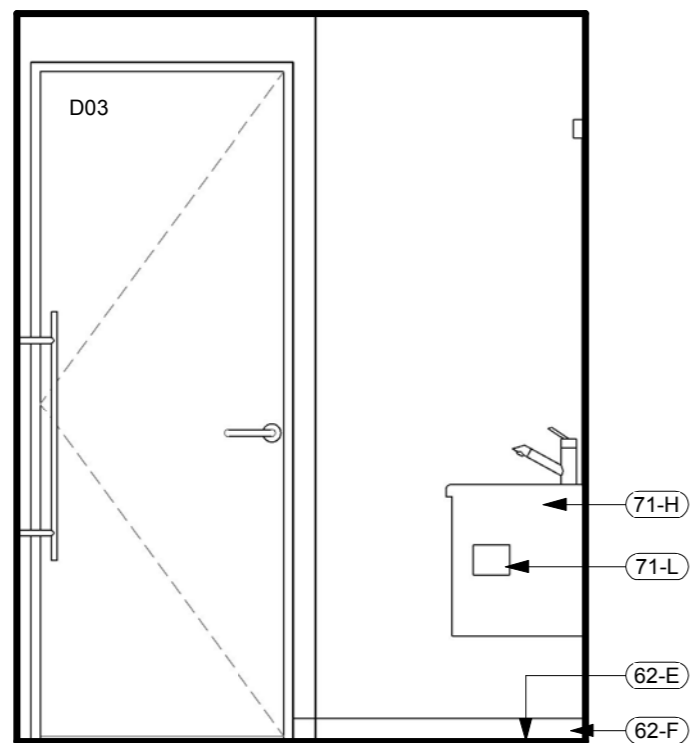


BATHROOM ELEVATION B
 1 : 25



BATHROOM
 1 : 50

Note- Refer to DRH addendum for types of fitting and fixtures



BATHROOM ELEVATION C
 1 : 25

Keynote Legend	
10-J	1200 high mirror sealed to vanity top
10-K	Over mirror light
62-E	Selected vinyl plank floor finish
62-F	Skirting board
71-C	Selected slide shower set
71-D	Safety glass shower door and screen
71-E	WC suite
71-H	Vanity unit with basin mixer
71-I	1000x1000 acrylic shower with acrylic walls
71-L	WC roll holder
71-M	Shower mixer
75-G	Heated towel rail

Rev	Date	Description

ADarchitecture
Leaders in Applied Design
 Email: info@adarchitecture.nz Web: adarchitecture.nz

Phone: (04) 298 5662
 5 Kodex Place, Paraparaumu 5032

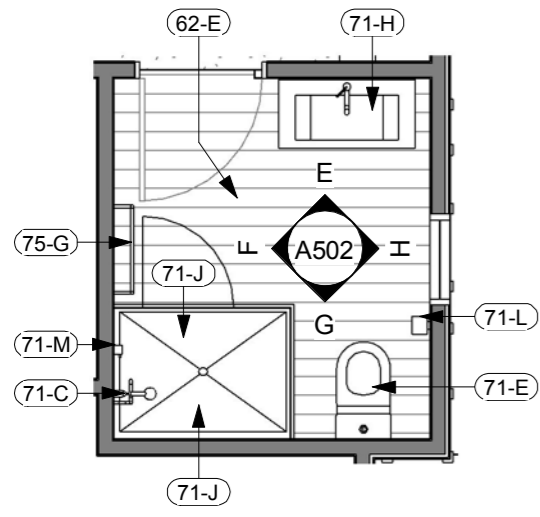
Proposed House
 for Dan and Suki Green
 Lot 6 Anderson Park
 Waikanae

Building Consent

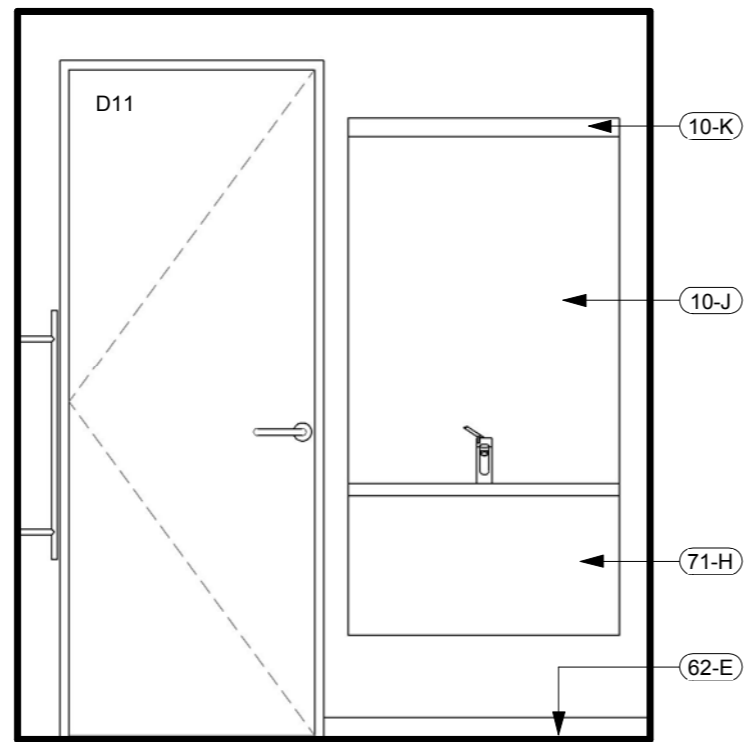
Interior Elevations

DO NOT SCALE DRAWING

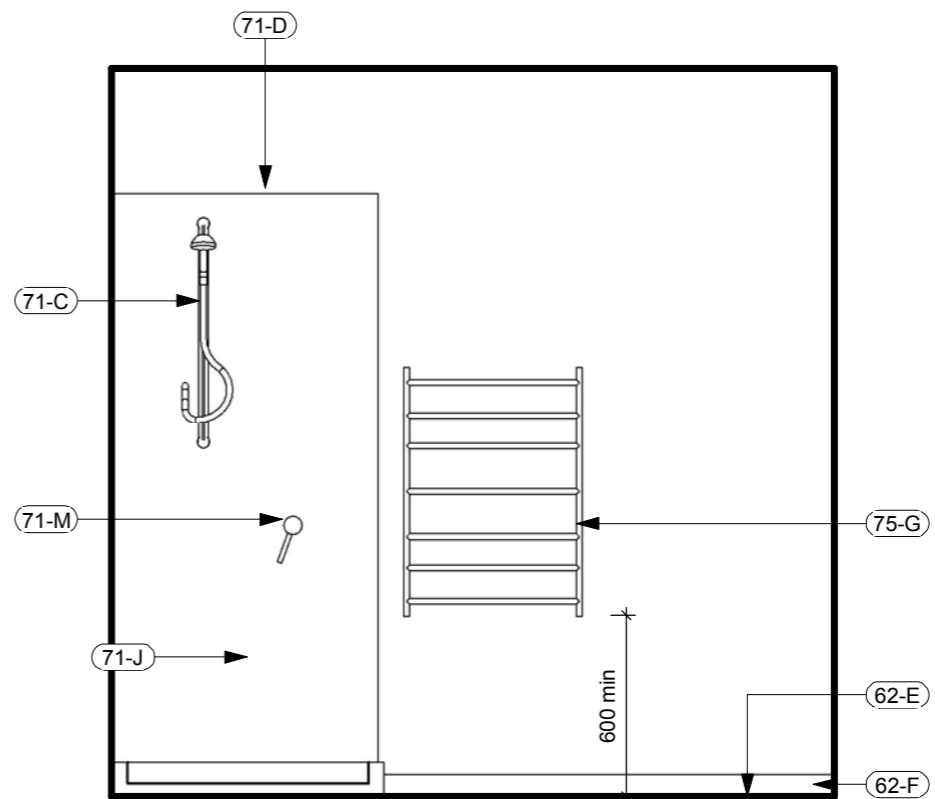
Job Date Sheet(A3) Rev.
 20018 30/11/2020 A501



ENSUITE
 1 : 50



ENSUITE ELEVATION E
 1 : 25



ENSUITE ELEVATION F
 1 : 25

Keynote Legend	
10-J	1200 high mirror sealed to vanity top
10-K	Over mirror light
62-E	Selected vinyl plank floor finish
62-F	Skirting board
71-C	Selected slide shower set
71-D	Safety glass shower door and screen
71-E	WC suite
71-H	Vanity unit with basin mixer
71-J	1200x900 acrylic shower with acrylic walls
71-L	WC roll holder
71-M	Shower mixer
75-G	Heated towel rail

Note- Refer to DRH addendum for types of fitting and fixtures



Rev Date Description

ADarchitecture
 Leaders in Applied Design
 Email: info@adarchitecture.nz Web: adarchitecture.nz

Phone: (04) 298 5662
 5 Kodex Place, Paraparaumu 5032

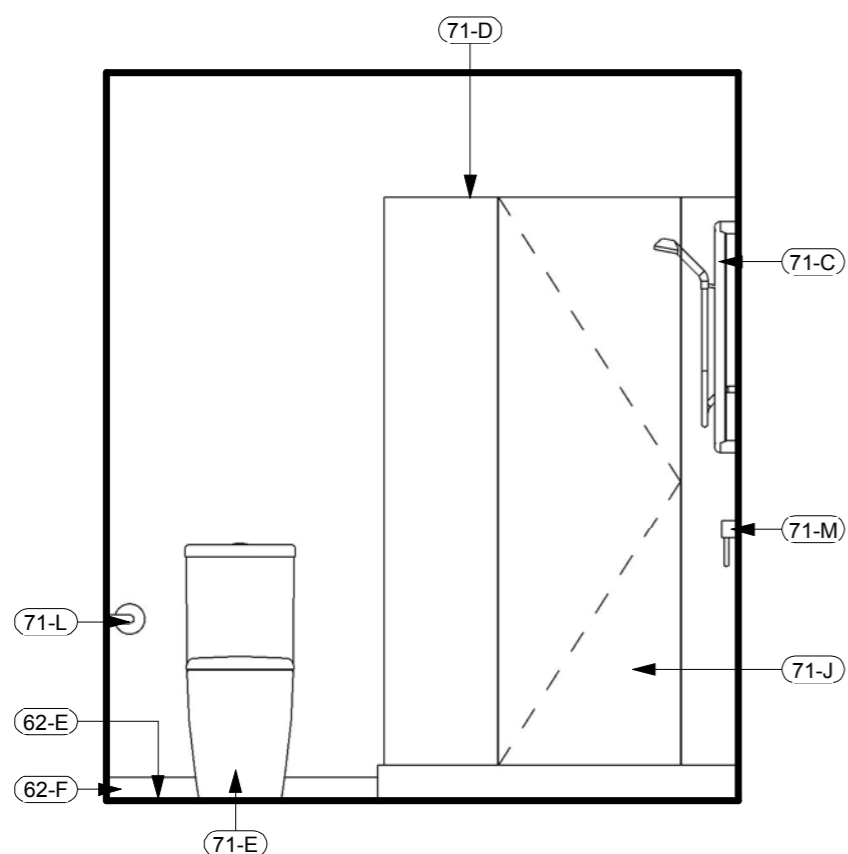
Proposed House
 for Dan and Suki Green
 Lot 6 Anderson Park
 Waikanae

Building Consent

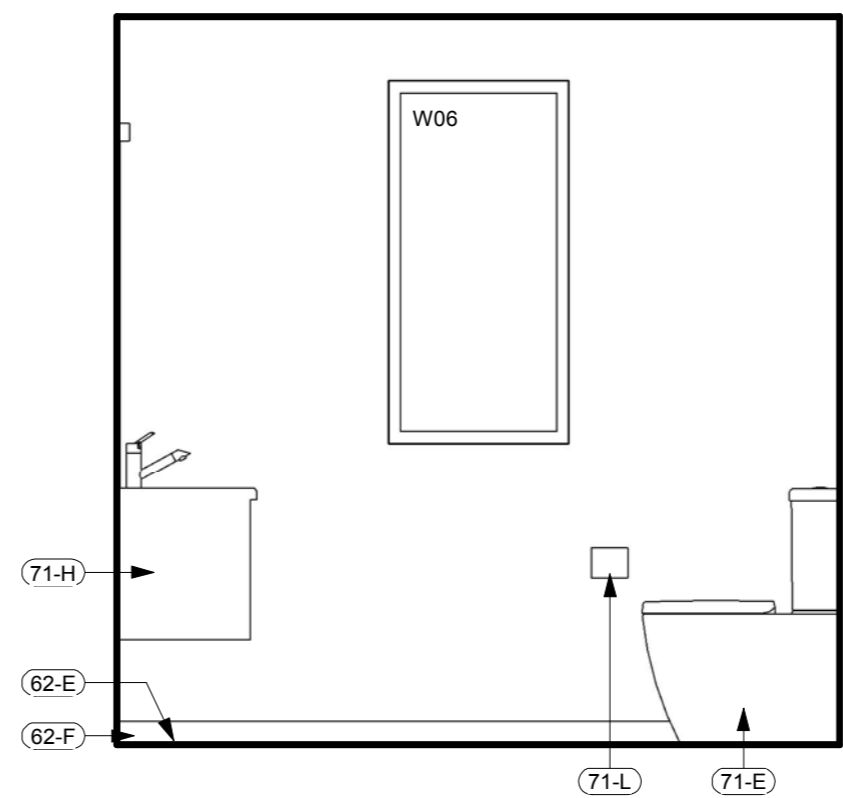
Interior Elevations

DO NOT SCALE DRAWING

Job Date Sheet(A3) Rev.
 20018 30/11/2020 A502



ENSUITE ELEVATION G
 1 : 25



ENSUITE ELEVATION H
 1 : 25

Angie Mazur

From: Shasthri Herath <shasthri.h@adarchitecture.nz>
Sent: Wednesday, March 3, 2021 1:32 PM
To: Mailbox - Building Approvals
Subject: Response to RFI letter - Building Consent 200896
Attachments: 20018_Green_BC_RevB.pdf; Supporting docs.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Melissa,

Response to RFI letter for 9 Kaiwaru Place as follows:

BUILDING

1. Please find the attached letter from engineer.
2. Please refer to attached PS1 and calculation chart by Posi-STRUT.
3. We confirm that roof cladding is to be Metalcraft MC700. Please refer to amended detail drawings. Sheet A303, A306
4. Please refer to attached Velux sun tunnel installation information.
5. ADA have noted that CHH recommend the use of a flashing at external corners. Detail 1/A304 has been revised accordingly and added to the returned RFI information.

PLUMBING AND DRAINAGE

1. Although the final kitchen materials are subject to a kitchen designer, we confirm that all adjacent wall linings behind the hob will be impervious, either selected tiles or glass splashback.
2. Please find the attached report.
3. Please find the attached water tank information.
4. Please refer to amended drainage plan. ORG is tagged.
5. Please refer to amended drainage plan. DP connected to SW line.
6. Please refer to amended drainage plan. Inspection points added.

Shasthri Herath

Junior Architectural Technician

ADarchitecture

Leaders in Applied Design

tel (04) 298 5662

www.adarchitecture.nz

OUR REF 12016

January 26, 2021

David Reid Homes
Box 148
PARAPARAUMU

ATTENTION: Tim Sunderland

EMAIL: tim.sunderland@davidreidhomes.co.nz

by email only

Dear Sir

**PROPOSED DWELLINGS
ANDERSON PARK SUBDIVISION
104-110 NGARARA ROAD, WAIKANAЕ, KAPITI COAST**

This letter is in response to an RFI from Council requesting confirmation of the liquefaction/lateral spread risk for several residential sites in the subdivision.

The geotechnical report for the subdivision, reference 12016 dated September 2019 for the Stage 1B subdivision clearly assesses the liquefaction and lateral spreading risks/effects for the subdivision. The report was provided as part of the original subdivision consent and in Council files.

This letter is in response to Lots 6 and 11, but is relevant to all lots in this stage of the subdivision.

The report assessment indicated the following:

- Under an SLS (serviceability) event the site is considered resistant to liquefaction.
- Under a ULS (ultimate) event some liquefaction may occur at depth (9.5 to 14.6 metres) but is expected to be largely rafted by the overlying soils with minimal effects (settlement up to 50 mm) possible.
- Lateral spreading is not considered a risk.

We trust this allows the consent process to continue.

Yours faithfully
ABUILD™ Consulting Engineers Limited



Richard Skilton
BE(Hons) CEngNZ CPEng
Chartered Professional Engineer
Director

PRODUCER STATEMENT

PS1- Design

ISSUED BY: MiTek New Zealand Limited

TO BE SUPPLIED TO: Building Consent Authorities in New Zealand

IN RESPECT OF: Posi-STRUT™ Design Manual - 04/2019

AT: Various Locations in New Zealand

MiTek New Zealand Limited has provided engineering design services in respect of the requirements of Clause B1 of the NZ Building Code for

All Part only as specified - Posi-STRUT™ trusses of the proposed building work.

The selection charts within this design manual have been prepared in accordance with **Compliance Documents and Verification Method B1/VM1** of the NZ Building Code and in accordance with sound and widely accepted engineering principles.

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

1. The verification of the design assumptions within this manual
2. All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that the use of Posi-STRUT™ trusses in the building if constructed in accordance with the drawings, specifications and other documents provided, will comply with the relevant provisions of the Building Code.

MiTek New Zealand Limited holds a current policy of Professional Indemnity Insurance of not less than \$500,000.

On behalf of MiTek New Zealand Limited

Date: April 2019



In Ling Ng
 Engineering Manager New Zealand
 BE (Hons), CPEng, IntPE
 CEngNZ (ID: 146585)

Rafter Trusses Light Roof

Maximum Span (m) at Spacing = S Low/Medium Wind - Grade MSG8										
	Truss Code	D mm	With Ceiling				Without Ceiling			
			Spacing "S" mm							
			600	900	1200	1800	900	1200	1800	2400
	PS20-21x07	217	4.8	4.3	3.8	3.2	4.8	4.6	3.8	3.3
	PS25-25x07	248	5.5	4.8	4.2	3.6	5.5	5.0	4.1	3.5
	PS30-30x07	302	6.3	5.6	4.9	3.9	6.3	5.6	4.6	4.0
	PS40-40x07	412	7.6	6.7	5.7	4.6	7.7	6.7	5.5	4.7
	PS20-19x09	197	4.8	4.0	3.7	3.2	4.8	4.0	3.7	3.2
	PS25-23x09	228	5.1	4.8	4.0	3.5	5.0	4.8	4.0	3.5
	PS30-28x09	282	6.2	5.5	4.8	3.8	6.4	5.7	4.6	3.9
	PS40-39x09	392	7.5	6.5	5.7	4.6*	7.6	6.8	5.4*	4.5*
	PS20-21x09	217	5.6	5.0	4.5	3.7	5.7	5.2	4.3	3.7
	PS25-25x09	248	6.0	5.4	4.9	3.9	6.2	5.7	4.7	4.0
	PS30-30x09	302	6.7	6.1	5.5	4.5	6.9	6.4	5.3	4.6
	PS40-40x09	412	8.0	7.3	6.4	5.3	8.2	7.6	6.3	5.5
Maximum Span (m) at Spacing = S High/Very High Wind - Grade MSG8										
	Truss Code	D mm	With Ceiling				Without Ceiling			
			Spacing "S" mm							
			600	900	1200	1800	900	1200	1800	2400
	PS20-21x07	217	4.8	4.1	3.6	2.8	3.6	3.2	2.5	2.1*
	PS25-25x07	248	5.5	4.4	3.8	3.1	3.9	3.4	2.6	2.3*
	PS30-30x07	302	6.2	5.0	4.3	3.3	4.4	3.8	3.0	2.6*
	PS40-40x07	412	7.2	5.7	5.0	3.8*	5.3	4.5	3.2*	2.6*
	PS20-19x09	197	4.8	3.9	3.3	2.5	3.7	3.1	2.5*	2.0*
	PS25-23x09	228	5.1	4.3	3.7	2.6	4.1	3.3	2.6*	2.1*
	PS30-28x09	282	6.1	4.9	4.2	3.1	4.7	3.8	2.7*	2.5*
	PS40-39x09	392	7.1	5.5	4.7	3.2*	5.3	4.0*	3.1*	2.4*
	PS20-21x09	217	5.5	4.7	4.0	3.2	4.4	3.8	3.0	2.4
	PS25-25x09	248	6.0	5.1	4.4	3.6	4.8	4.1	3.2	2.7*
	PS30-30x09	302	6.7	5.7	4.9	3.9	5.4	4.7	3.7	2.9
	PS40-40x09	412	8.0	6.8	5.9	4.2	6.3	5.4	4.0*	3.2*

(1) Spans with * indicate additional vertical webs are required at end panels (see page 6).

VELUX Sun Tunnels



(TWR pictured)



Time-Saving design

The VELUX Sun Tunnel has been designed with our Flexi Loc™ system that makes installation faster and easier than ever before.

The VELUX flexible (TWF), rigid (TWR) and flat-roof (TCR) Sun Tunnels provide installation flexibility. Rigid tunnels deliver a straight shaft of light directly to the room below. Flexible tunnels can be used when obstructions in the roof cavity prevent the use of rigid Sun Tunnels.

Versatile, tubular-shaft

VELUX Sun Tunnels are ideal for flooding natural light into small areas; such as corridors, hallways, walk-in wardrobes or spaces where it's not possible to install traditional skylights. The unit comes with an outer skylight that sits flat on the roof. Internally, a discrete white ceiling-mounted diffuser with 'EdgeGlow'‡ technology spreads light evenly over an area of up to 9m².

The VELUX low-pitched rigid Sun Tunnel (TCR) can be installed on flat roofs with a pitch of 0°–60°. Custom flashing made by roofer is required. (Not supplied by VELUX).



BRANZ Appraised
Accreditation No. 070 20171

WORLD-CLASS QUALITY



LOAD TESTED
(NZSC Clause B1)



DURABILITY
(NZSC Clause B2)



WEATHER-TIGHTNESS
(NZSC Clause B2)



SAFETY GLAZING
(NZSC Clause F2)

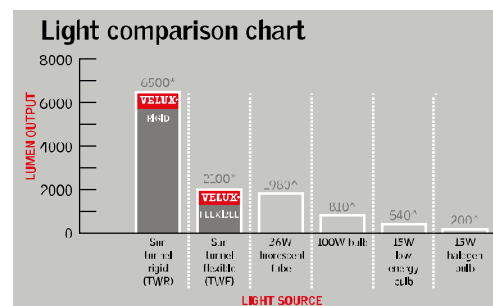


ENERGY EFFICIENCY
(NZSC Clause H1)



NATURAL LIGHT
(NZSC Clause G7)

NB: BRANZ appraisal scope does not cover custom flashings.



* Light transmittance of VELUX Sun Tunnels depends on parameters such as sky conditions (cloudy/sunny), direction of sunlight, orientation and length of Sun Tunnel. VELUX Sun Tunnels in this chart have been tested with a 1m² area, installed on a 15° roof pitch in summer, at noon on a sunny day using a photometer. (TWR rigid tunnel emits 440 lumens when measured on a cloudy winter's day).

† The graph features 60% of total lumen value for these light sources – allowing for light absorption when mounted in a lamp or fixture. (Lumen values represent an average for Australian manufactured products).

*Data source: VELUX Daylight Laboratory – Greenville, South Carolina, USA.

‡ Excludes TCR.

TWF

Flexible Tunnel



- Minimum distance from ceiling to roof 0.4m
- Standard length 1.5m
- Not extendable

TWR

Rigid Tunnel



- Minimum distance from ceiling to roof 0.9m
- Standard length 1.7m
- Extendable to 6m using ZTR extensions

TCR

Rigid Tunnel (Flat/low-pitch roof)



- Minimum distance from ceiling to roof 0.9m
- Standard length 1.15m
- Extendable to 6m using ZTR extensions

Technical information	TWF FLEXIBLE	TWR RIGID	TCR LOW PITCH
Rooftop glazing – 4mm toughened glass	✓	✓	-
Integrated flashing & apron for tiled or profiled metal roofs	✓	✓	-
Installation pitch 15°– 60°	✓	✓	-
Installation pitch 0°– 60°	-	-	✓
Shaft or tunnel diameter 350mm	✓	✓	✓
Standard tunnel length	1.5m	1.7m	1.15m
Extension kit ZTR OK14 (1180m in length). Max overall tunnel length 6.0m	-	✓	✓
'Stay clean' coating reduces cleaning frequency	✓	✓	-

Sun Tunnel packages come complete with:

- Choice of highly reflective rigid or flexible tunnel (350mm diameter, lengths vary).
- Dual-layered ceiling diffuser – spreads light over an area of up to 9m².
- Interior diffuser design with 'EdgeGlow,' a clear ring on the diffuser's edge.
- Outer polyurethane cappings with integrated flashings for tiled/profiled metal roofs (TWF/TWR only).
- 'Stay clean' coating on glass exterior reduces cleaning frequency (TWF/TWR only).
- 4mm toughened glass (TWF/TWR only).
- TCR requires custom flashing made by roofer. (Not supplied by VELUX).



Quicker assembly time

VELUX Flexi Loc™ system reduces tunnel assembly time significantly. The Rigid light tunnel is easy to work with; gives room for movement and adjustment while providing installation stability by locking the pieces into place. (TWR/TCR only).



No need to enter the attic or loft

The roof module with removable sash ensures quick and easy installation from the outside. Drop the light tunnel into place from the roof. There's no need to enter the attic or loft; the light tube is easy to install in tight spaces where attic access is not possible. (TWF/TWR only).



Easy to install and clean

The VELUX Sun Tunnel is easy to install thanks to the threaded pane. When you're finished, simply screw the diffused pane in place. And, as an added bonus, it's easy to clean as it can be unscrewed and cleaned as needed.

Construction

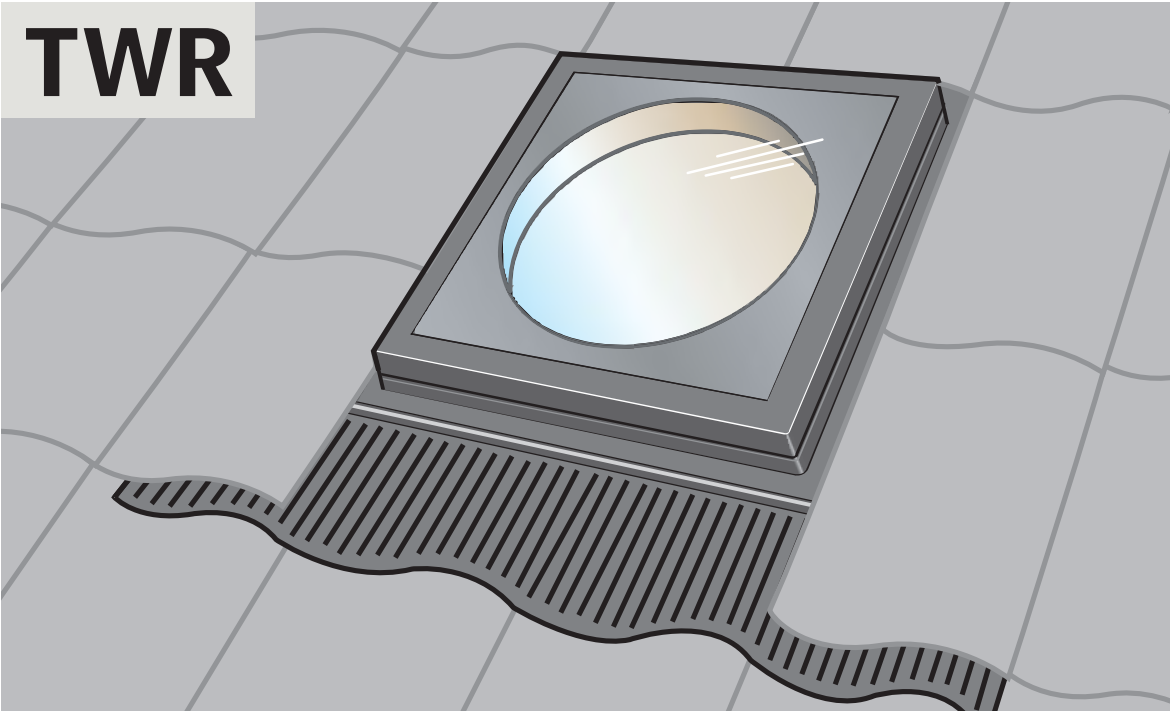
TWR/TWF: Easy to install, the skylight has an integrated polyurethane frame and flashing, together with flexible aluminium apron.

TCR: Acrylic dome with aluminium frame.

The flexible TWF can be used to circumvent obstructions in the roof cavity, while the TWR/TCR utilises two 45° elbows for most direct 'line-of-sight' applications. Standard shaft lengths can be extended with the addition of the rigid extension kit ZTR OK14 (1180mm long).

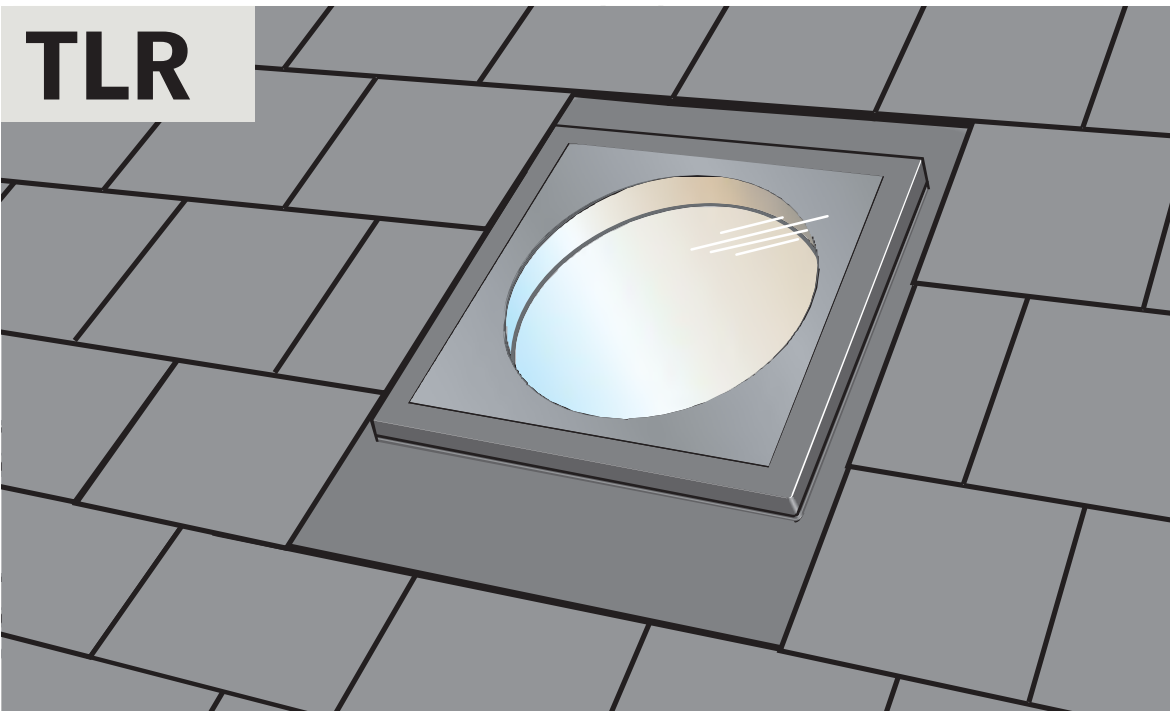


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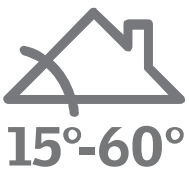


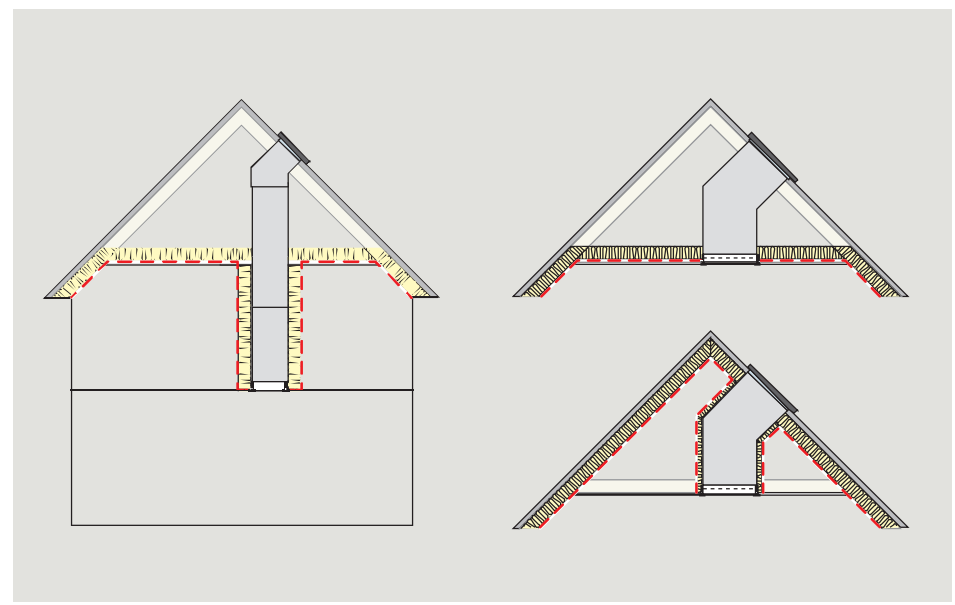
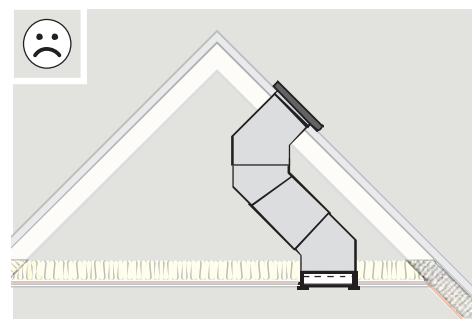
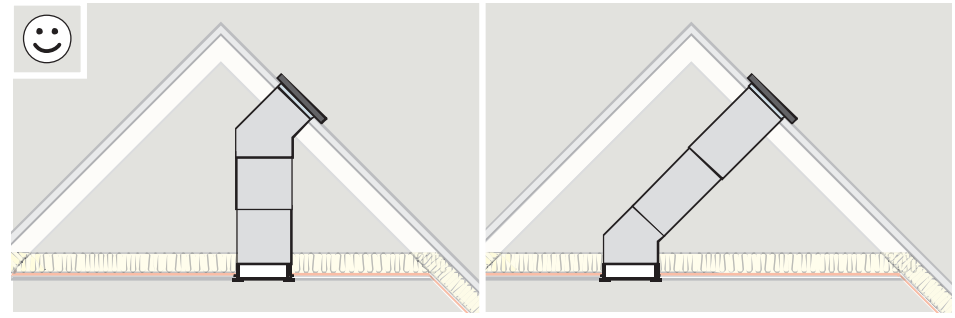
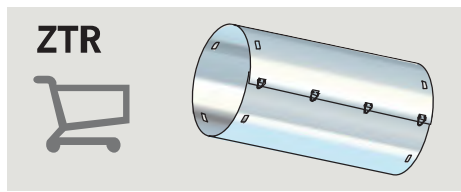
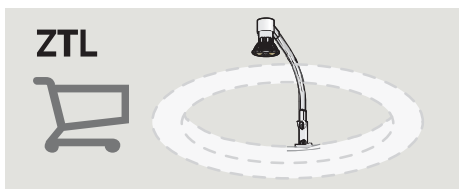
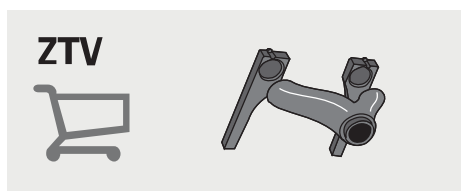
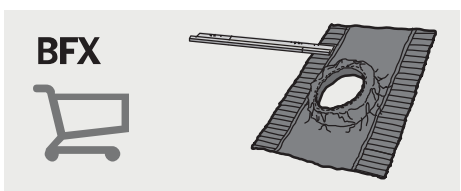
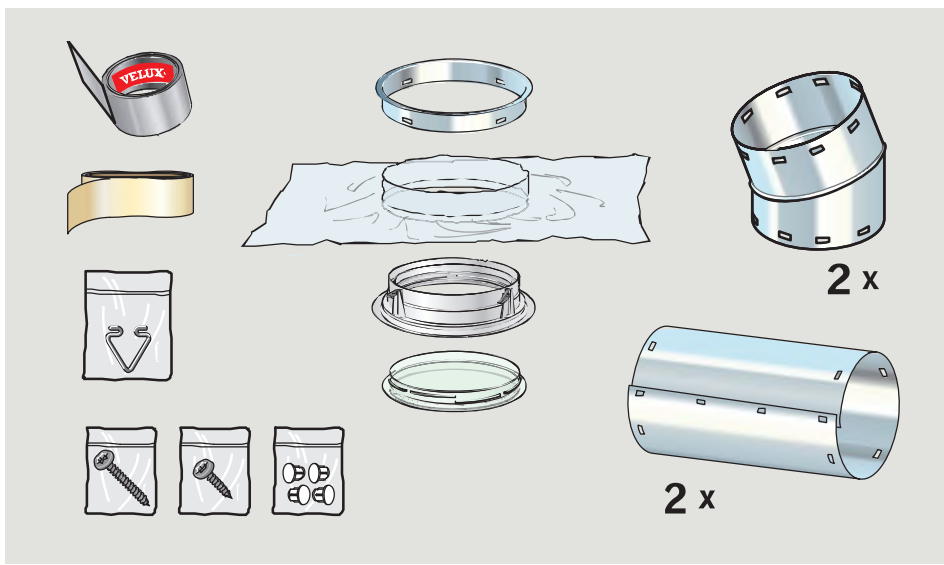
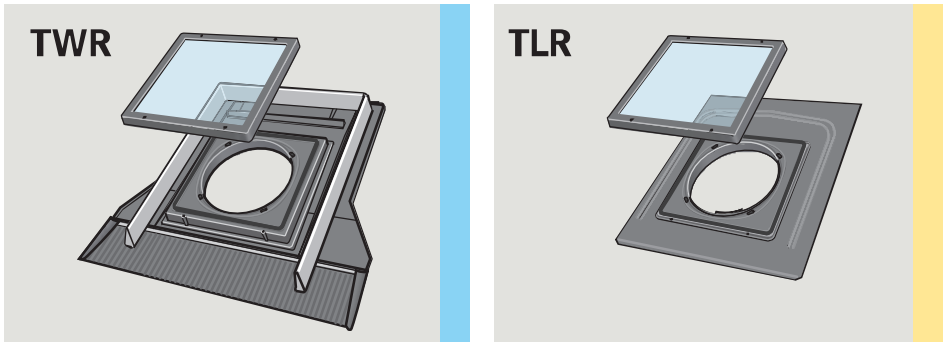
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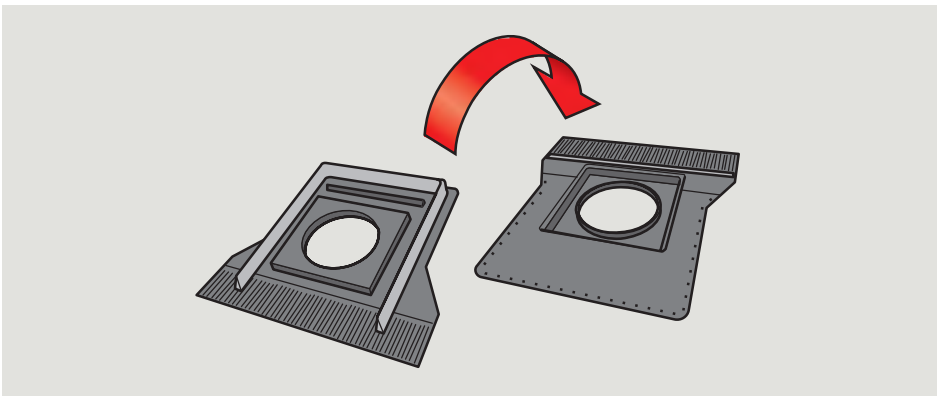
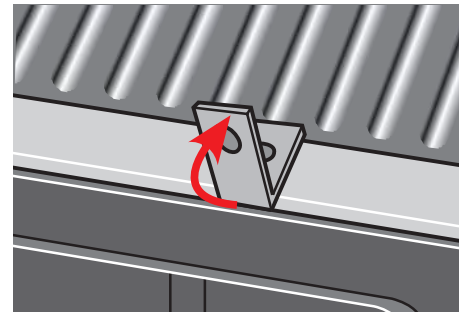
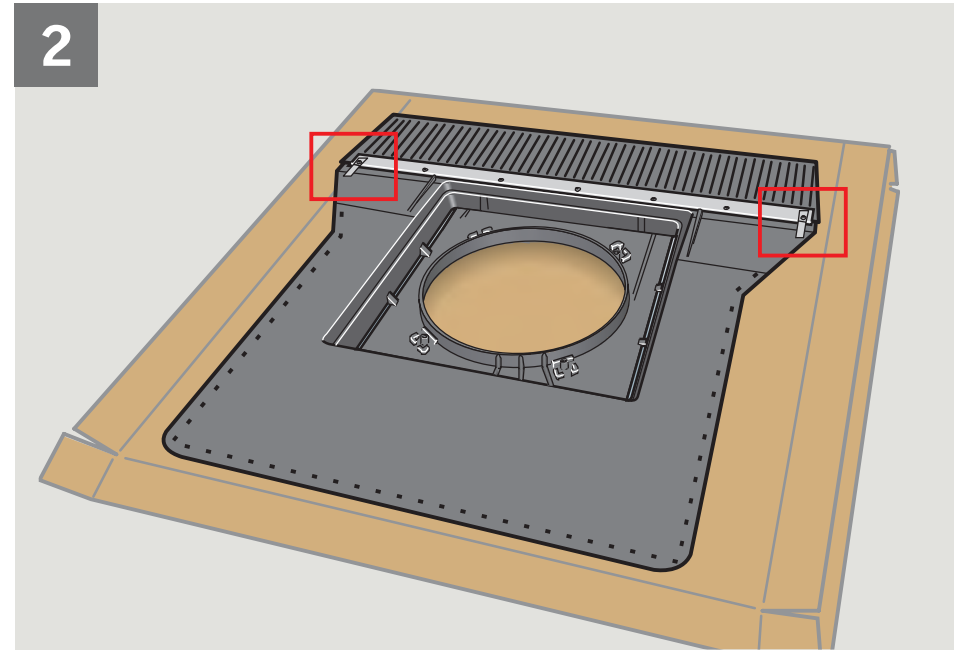
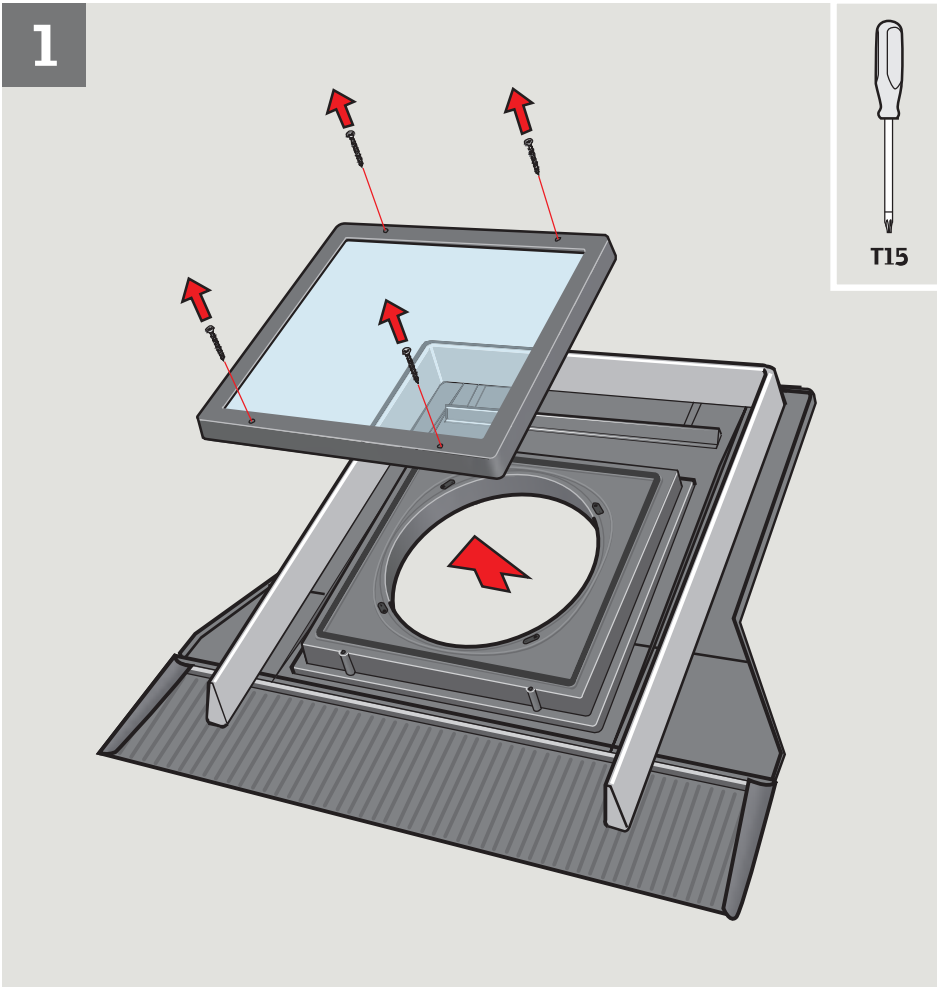
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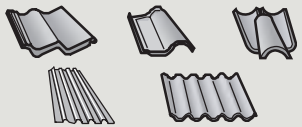
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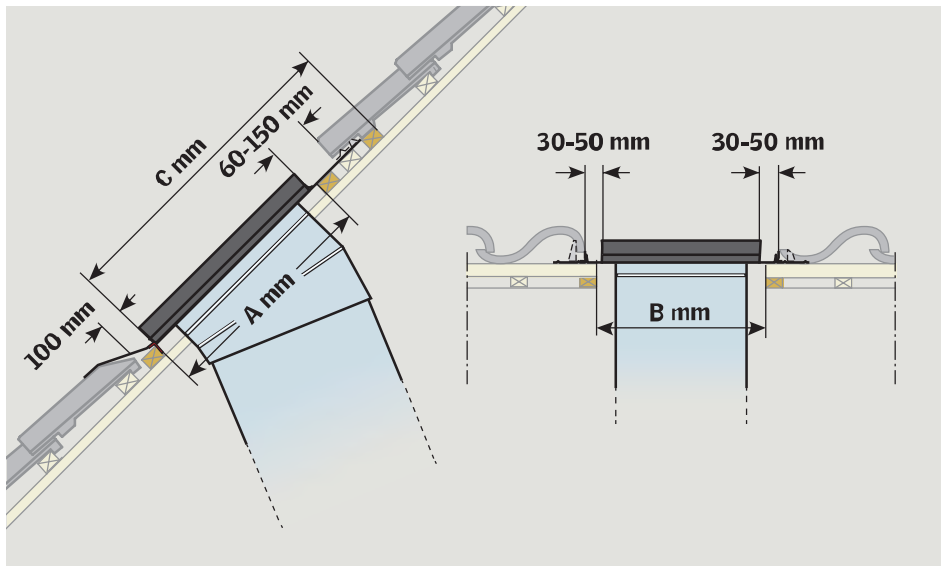
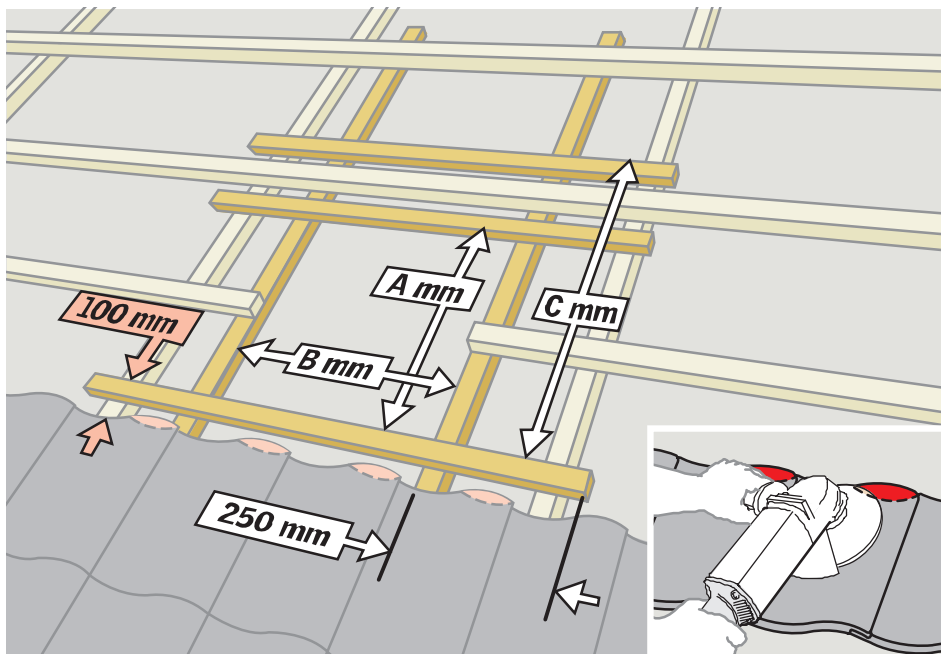




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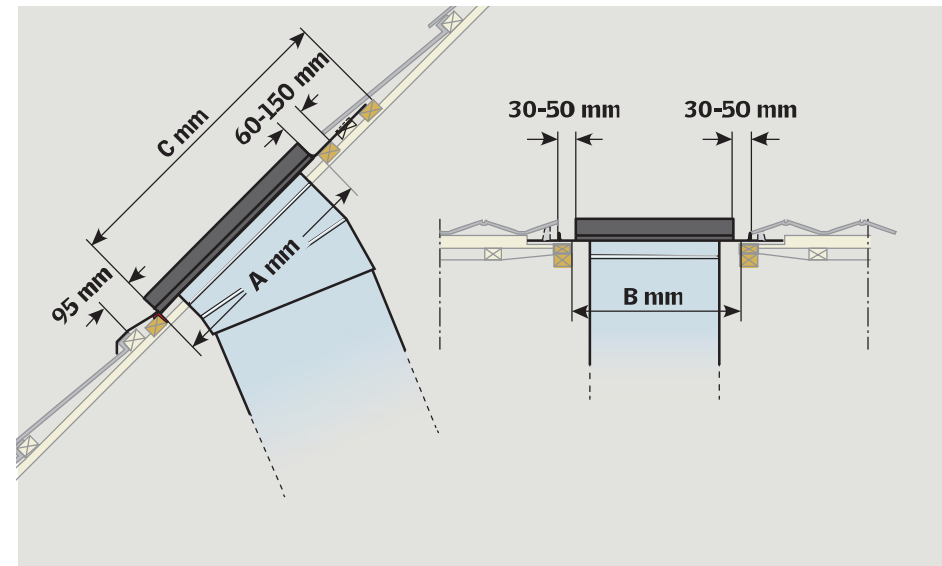
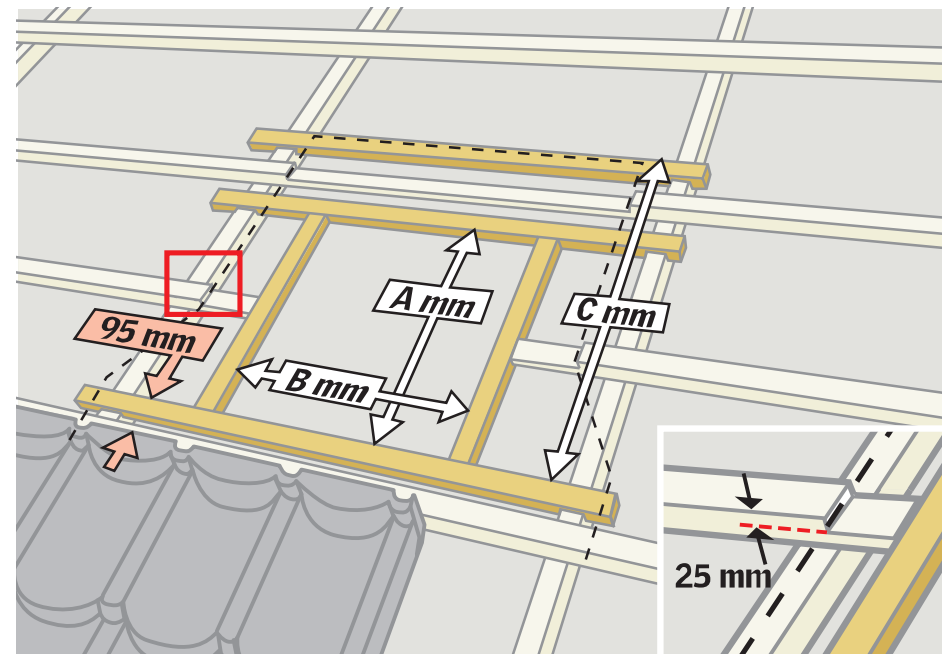
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TWR OK10	360-420	400	600
TWR OK14	460-520	500	700



3b



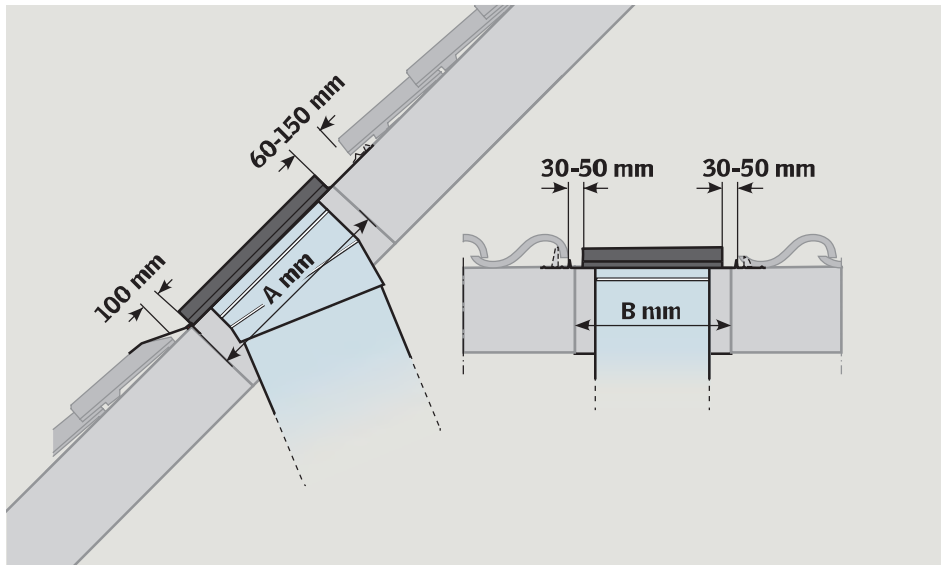
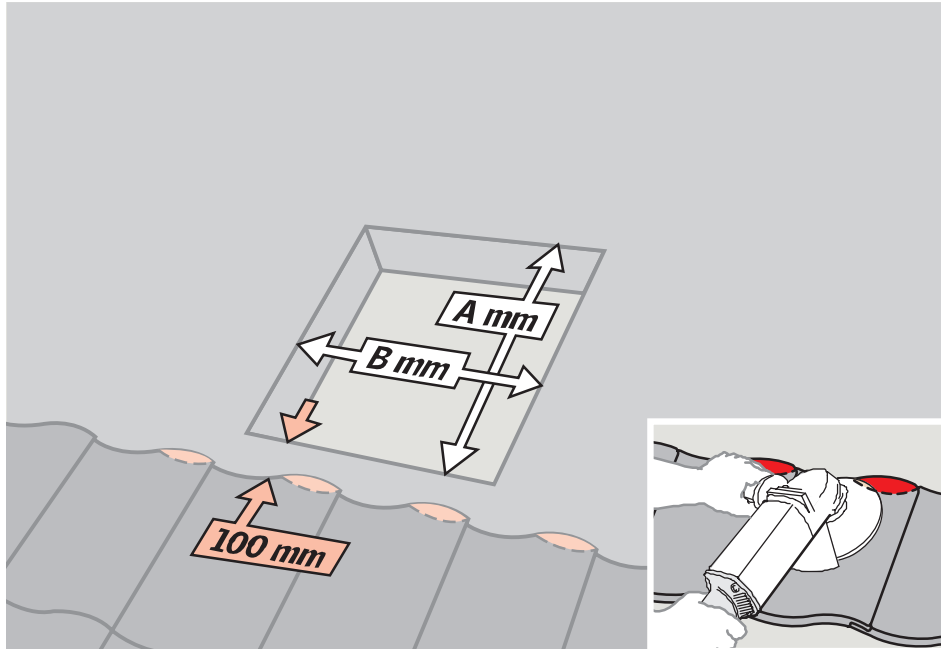
	A mm	B mm	C mm
TWR OK10	360-420	400	600
TWR OK14	460-520	500	700



3c



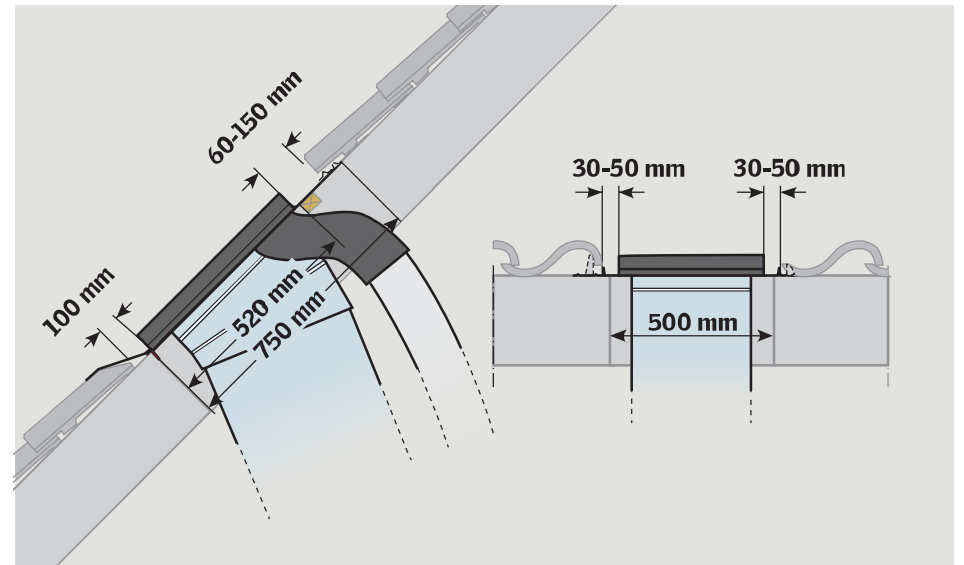
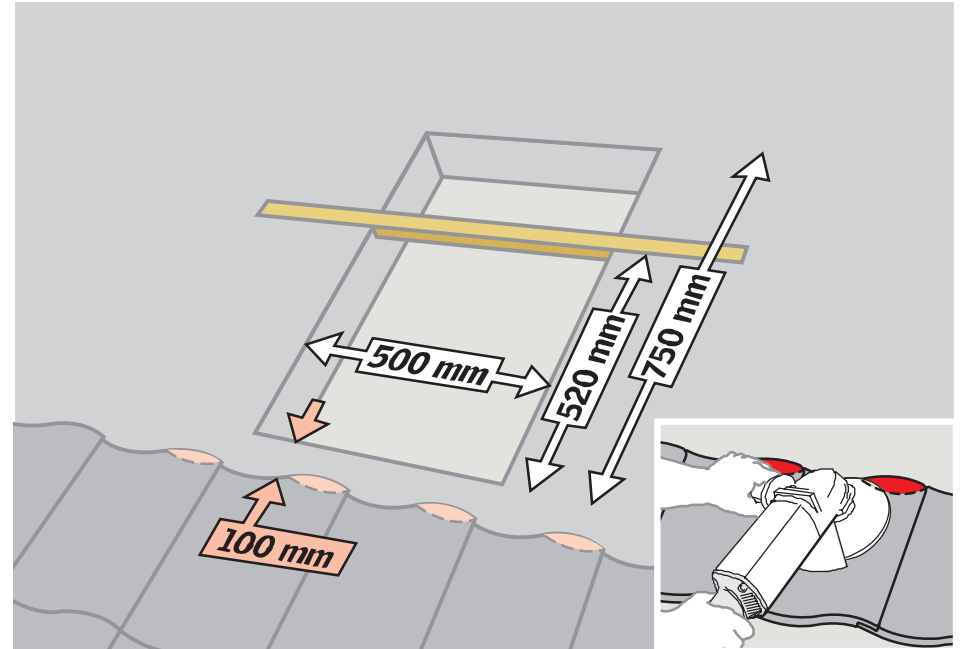
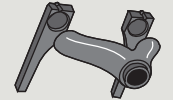
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TWR OK10	420	380
TWR OK14	520	500

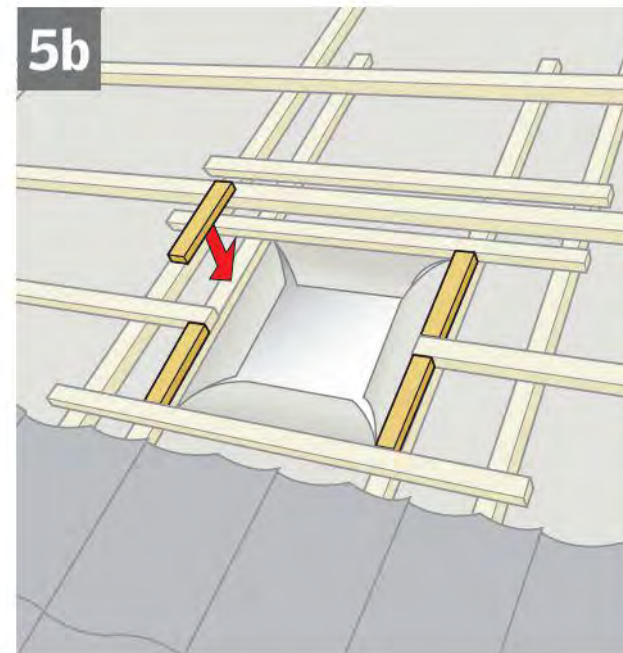
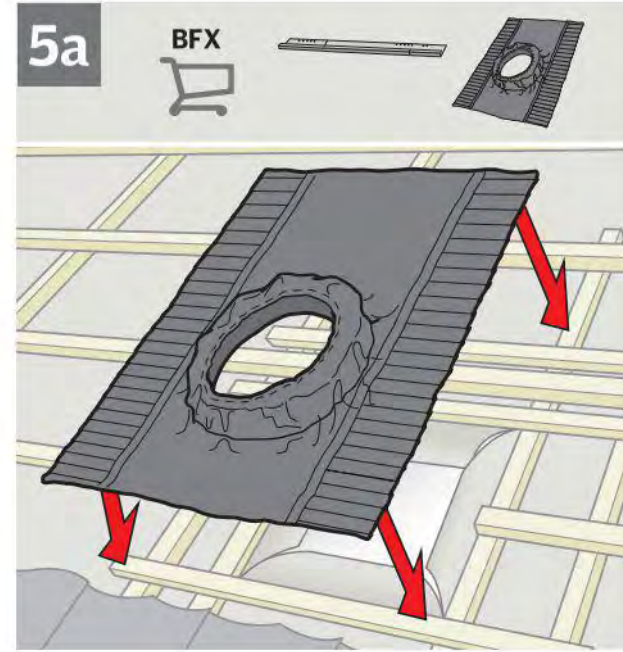
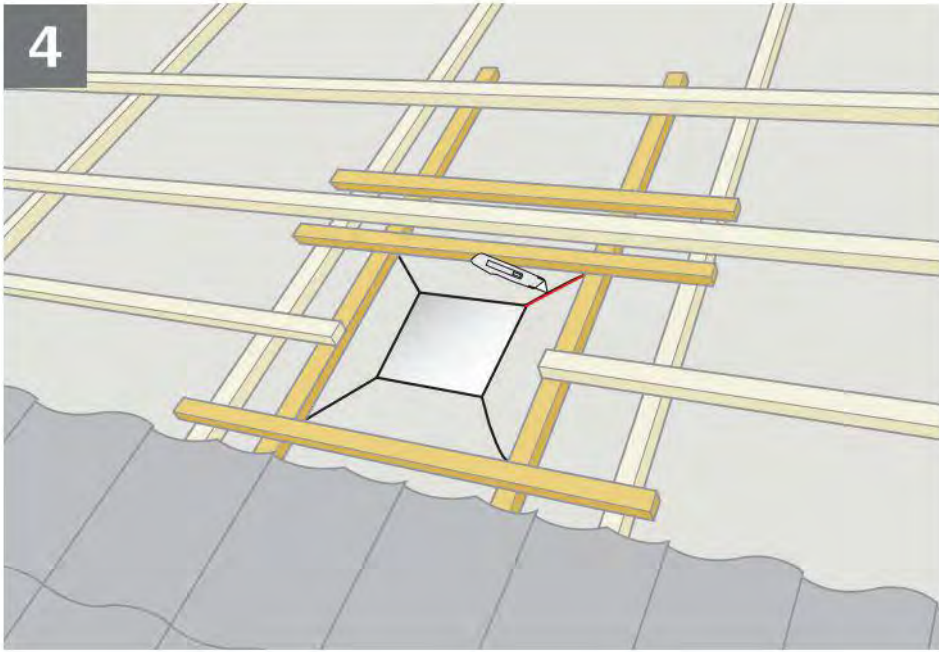


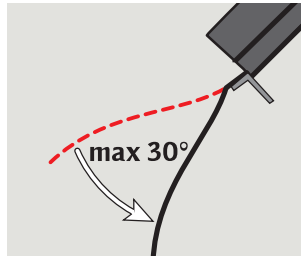
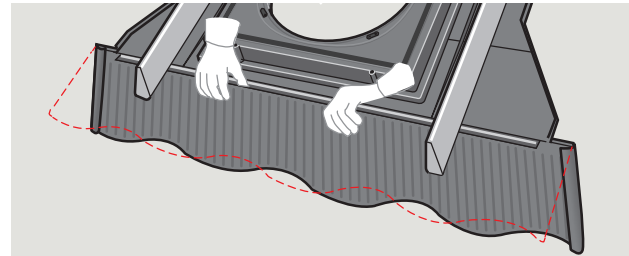
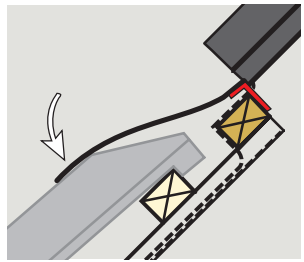
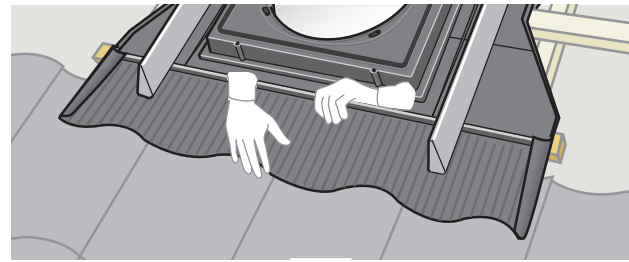
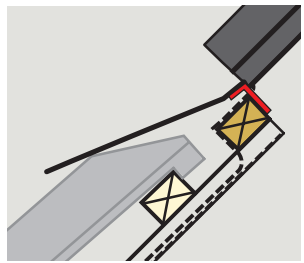
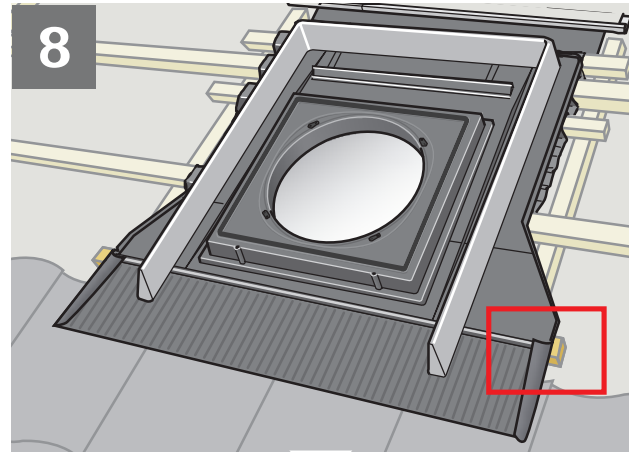
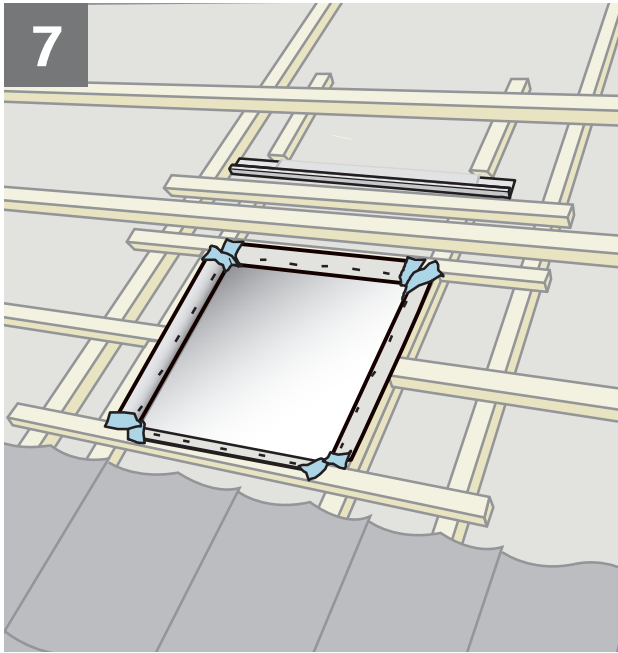
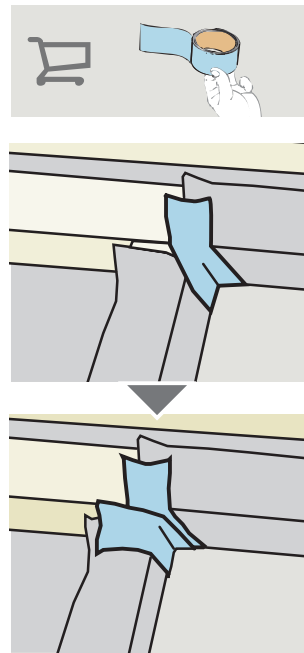
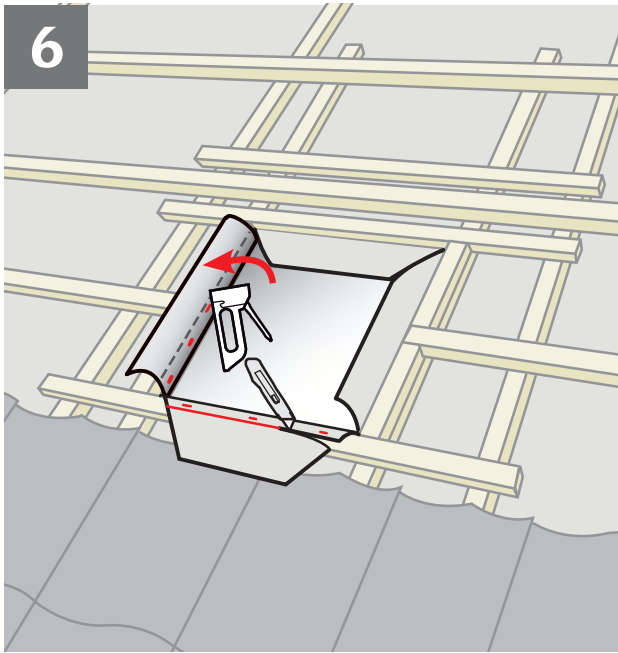
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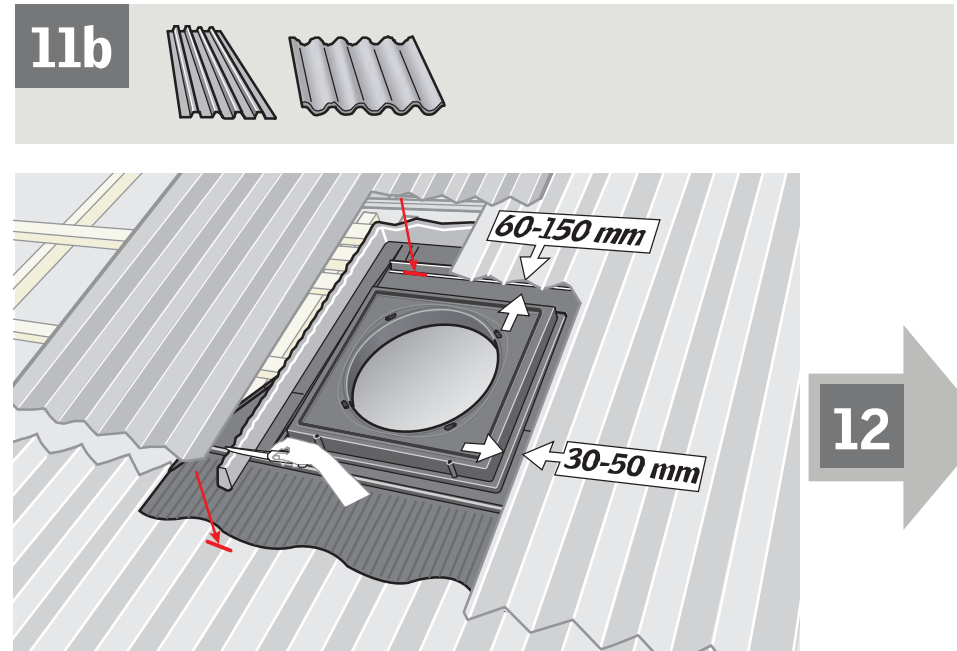
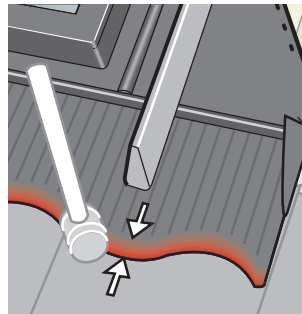
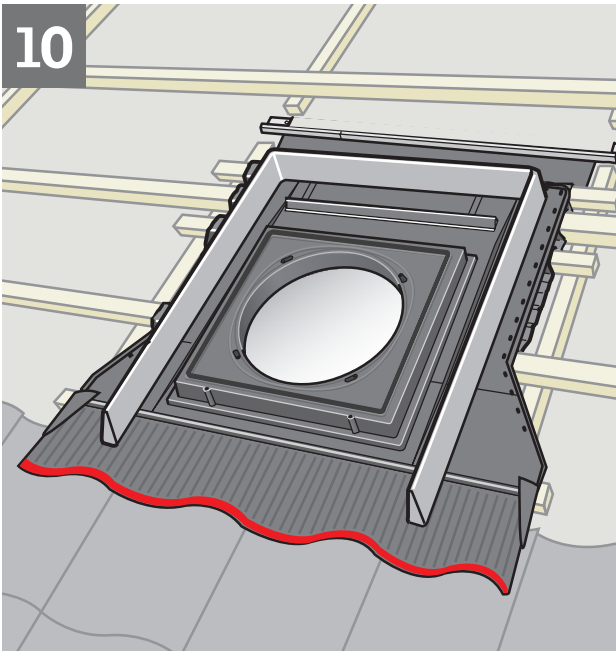
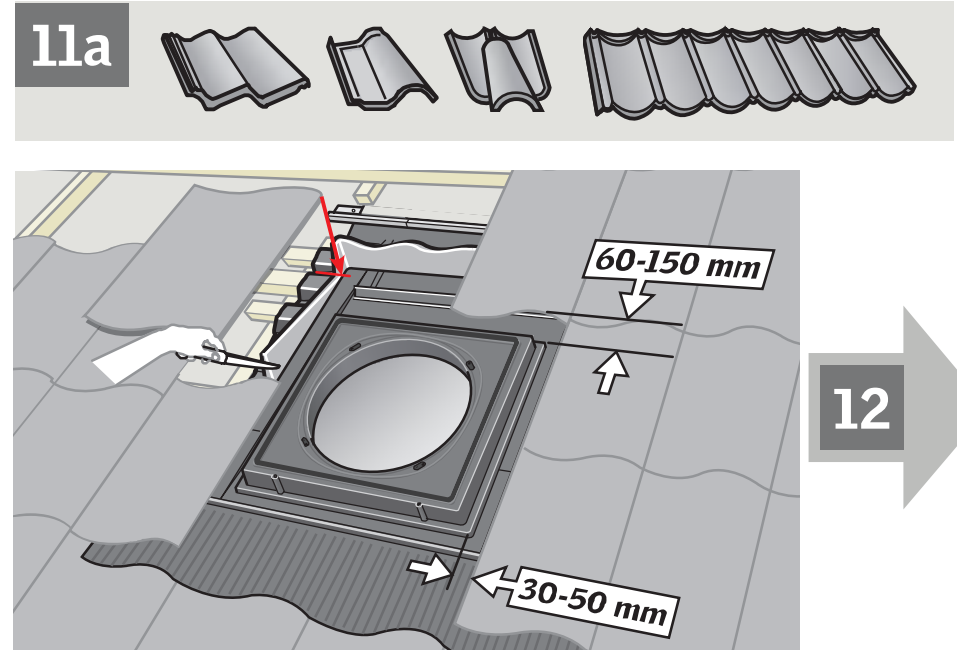
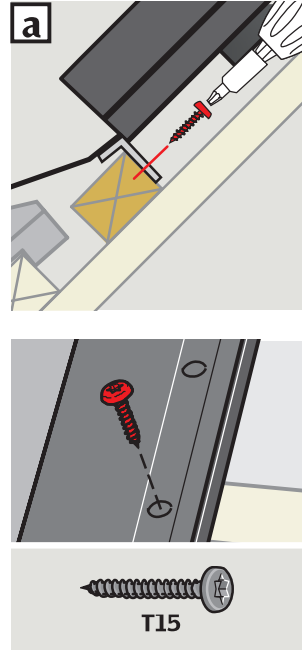
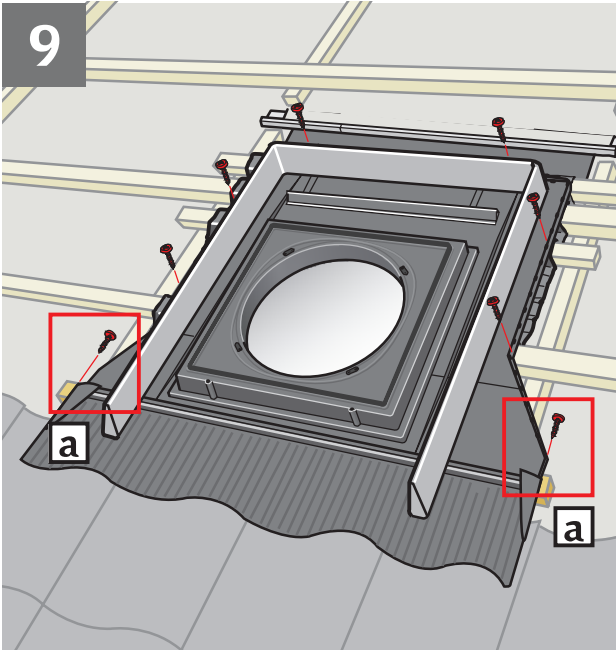


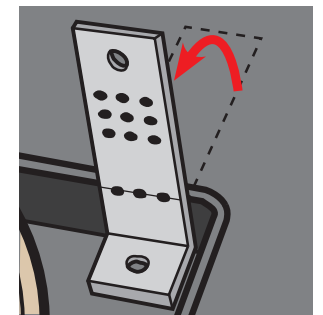
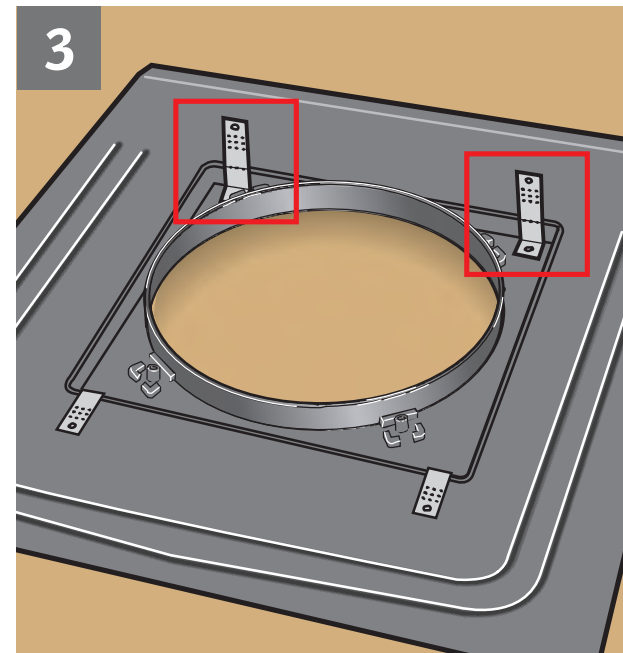
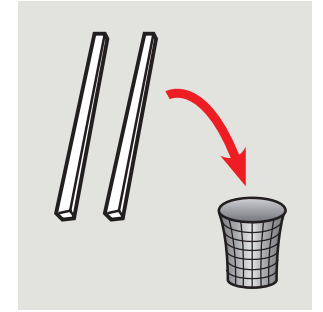
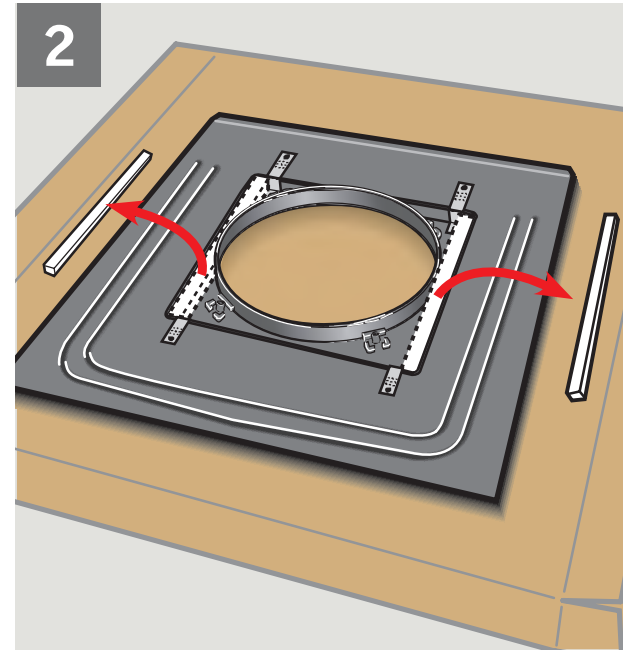
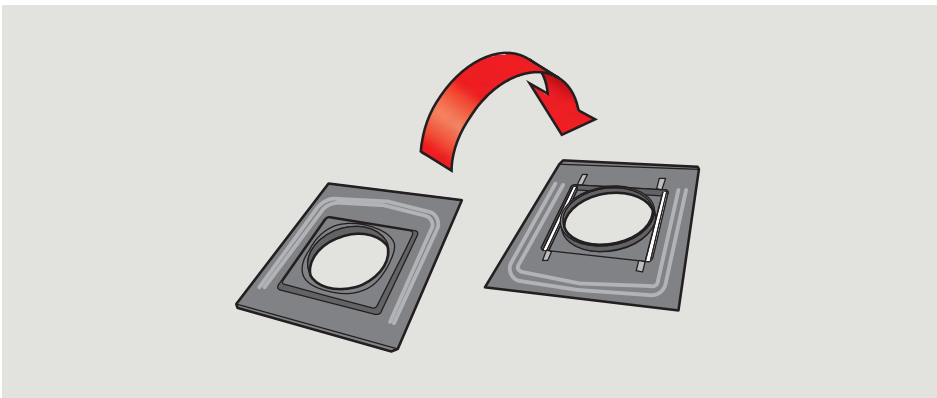
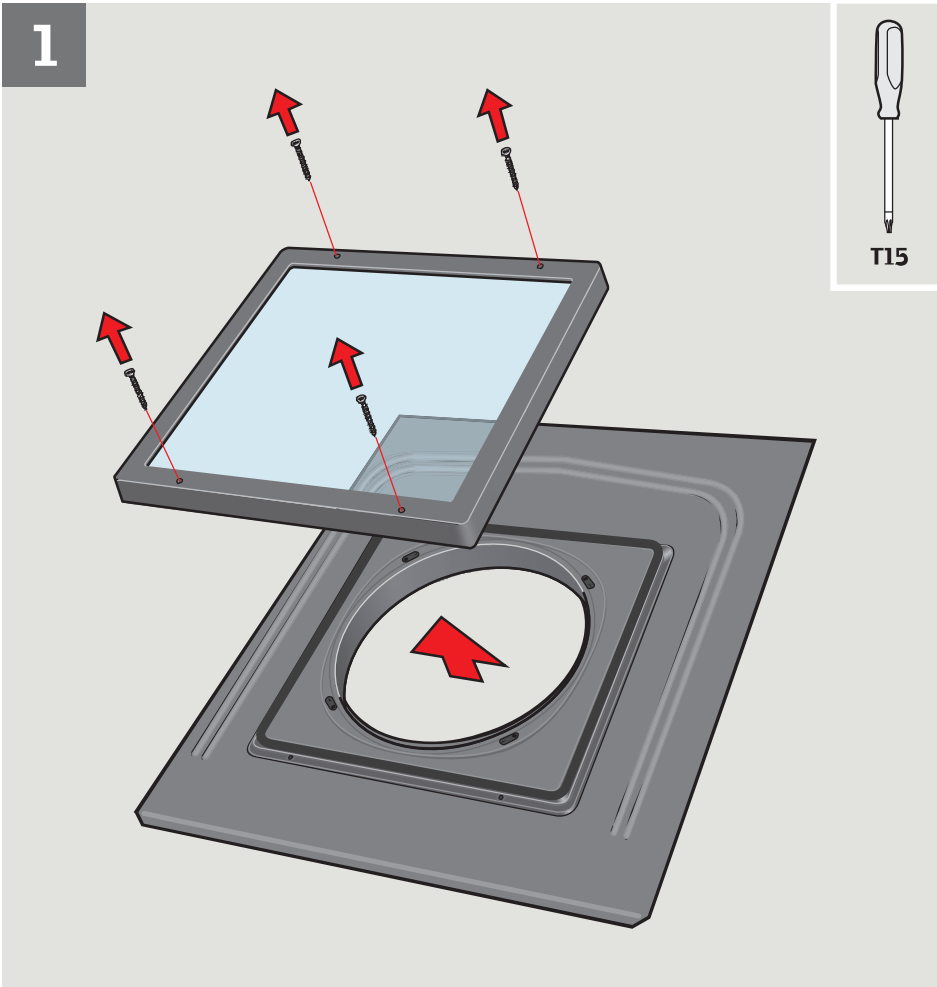
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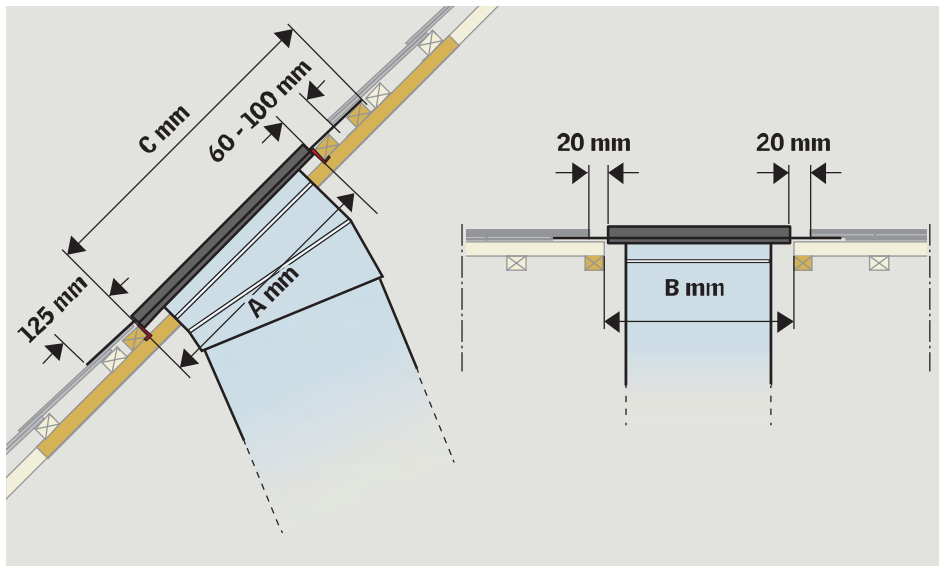
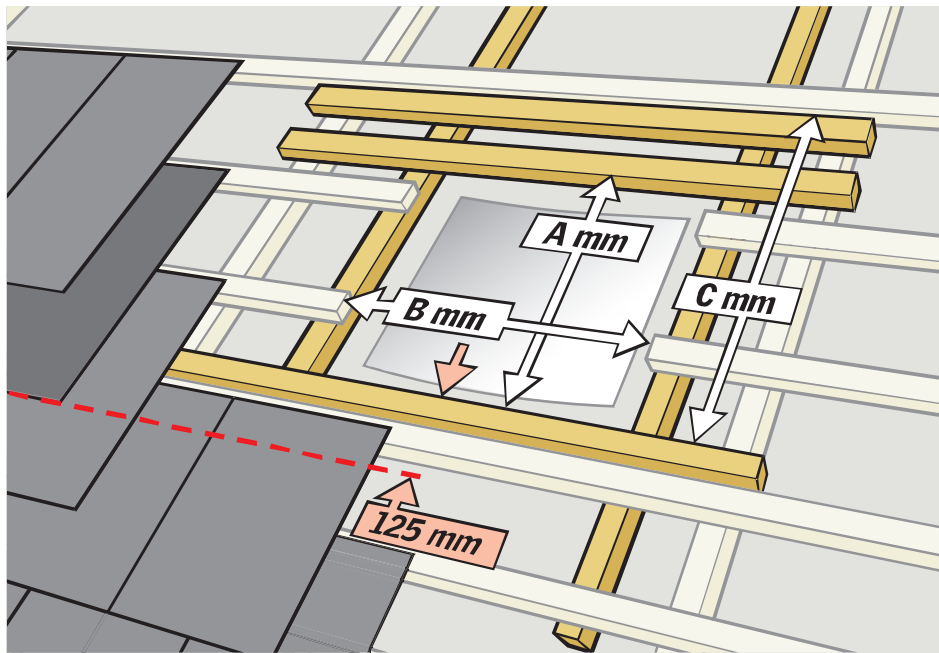




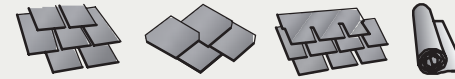
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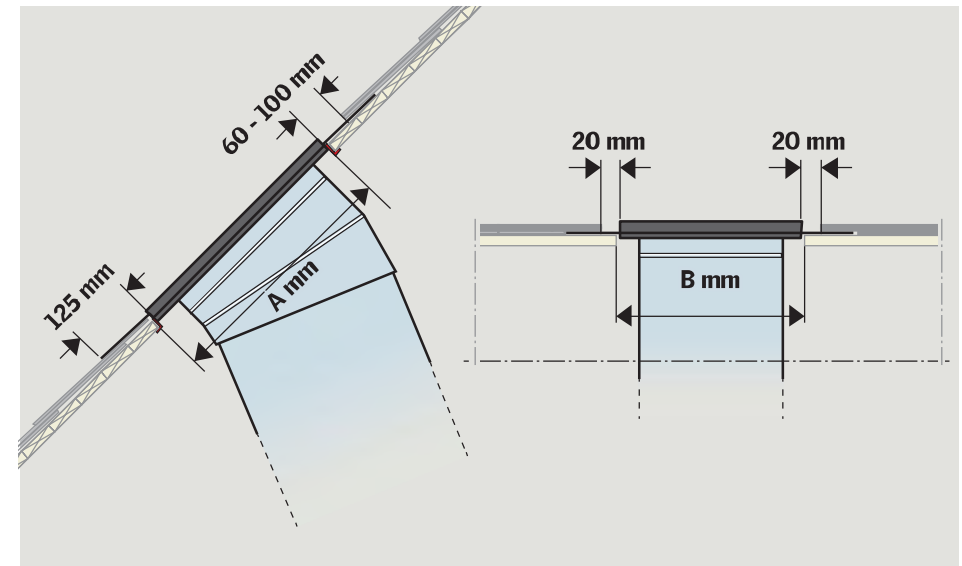
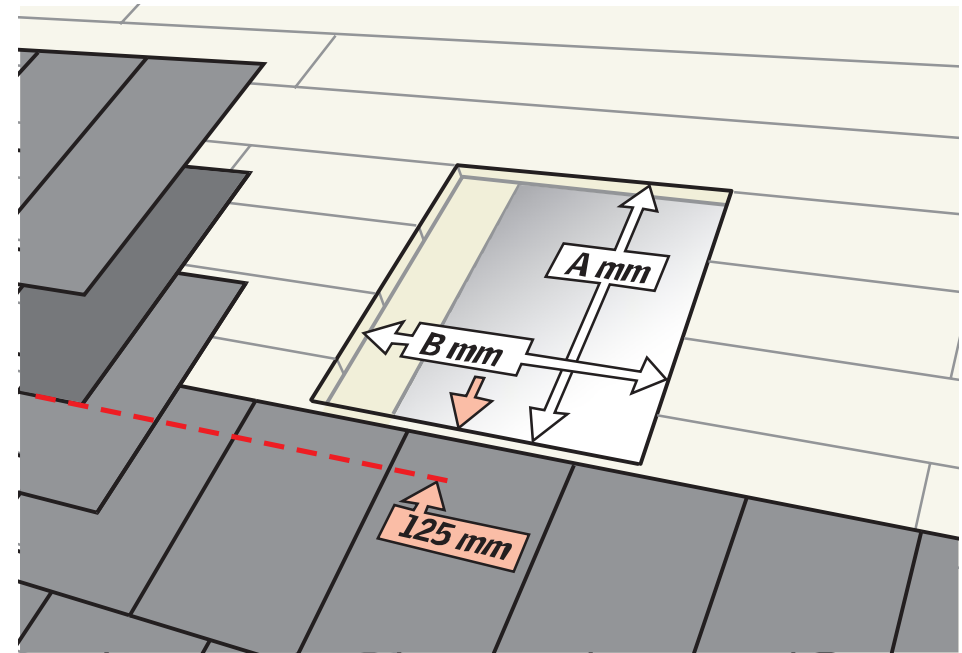
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TLR OK14	450	440-480	650

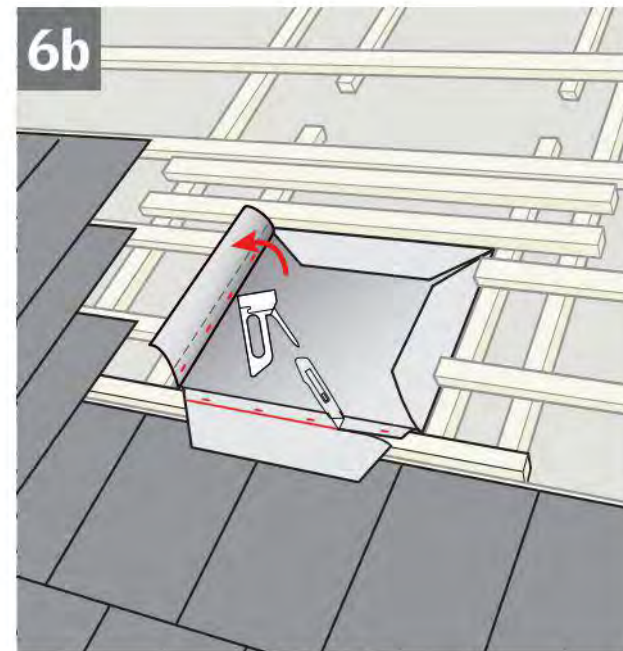
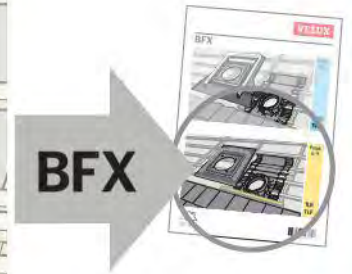
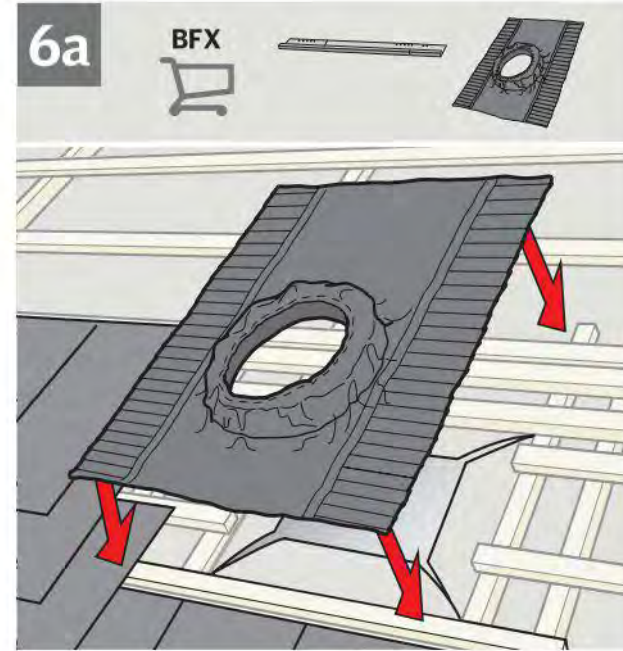
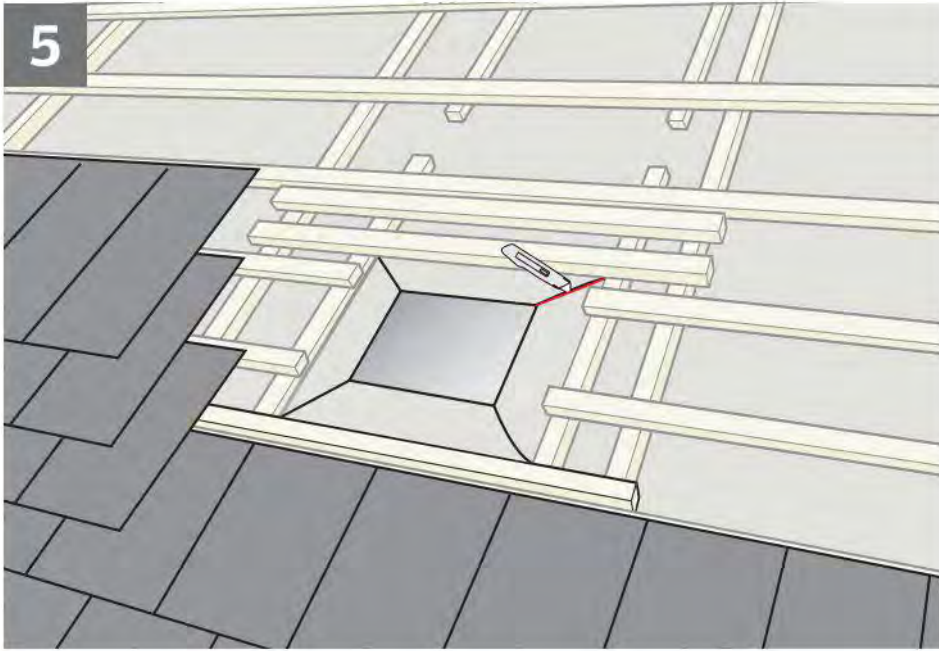


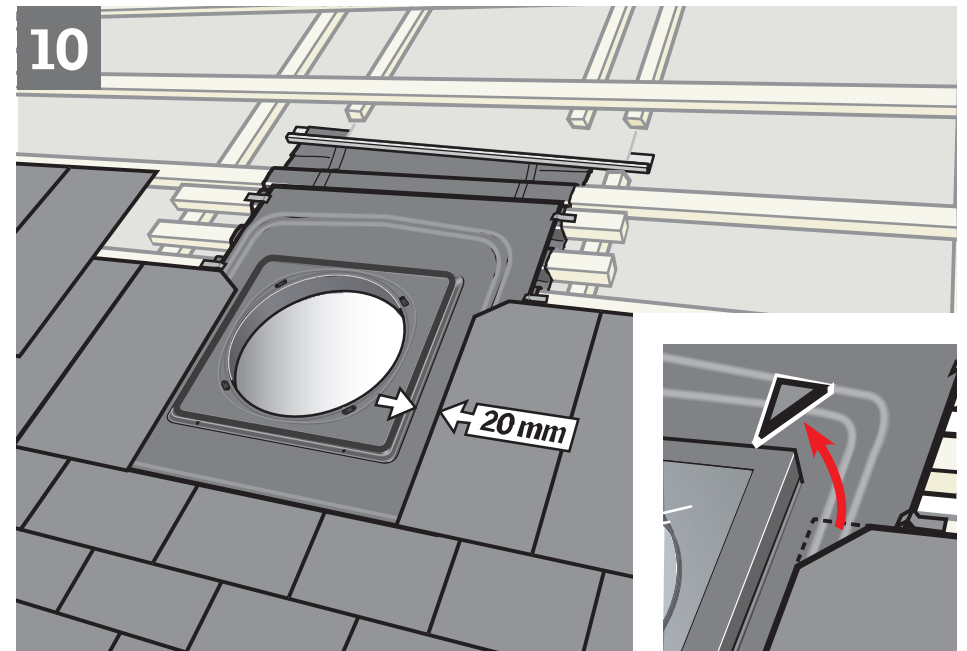
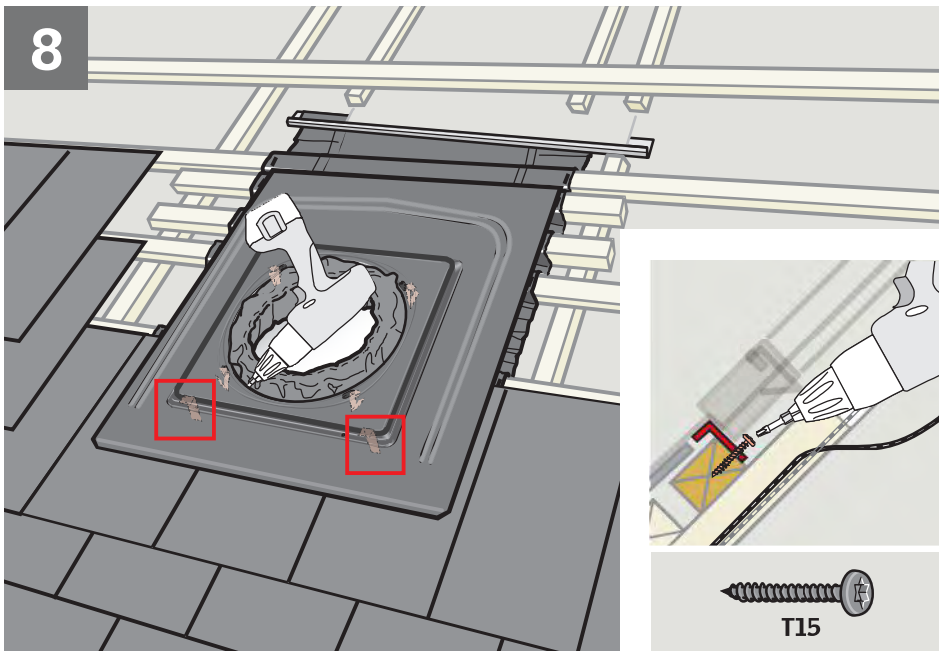
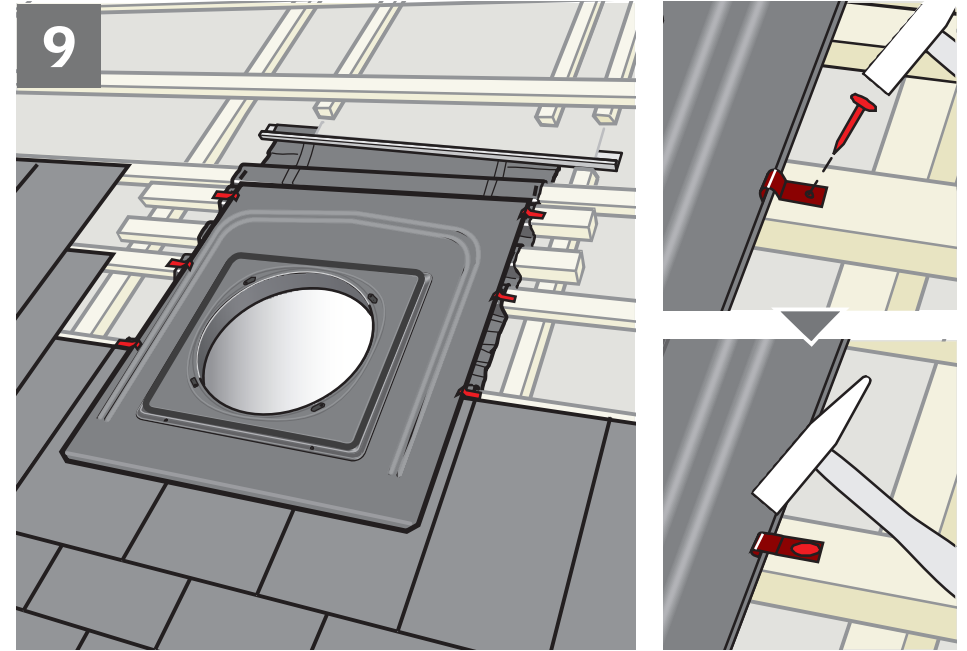
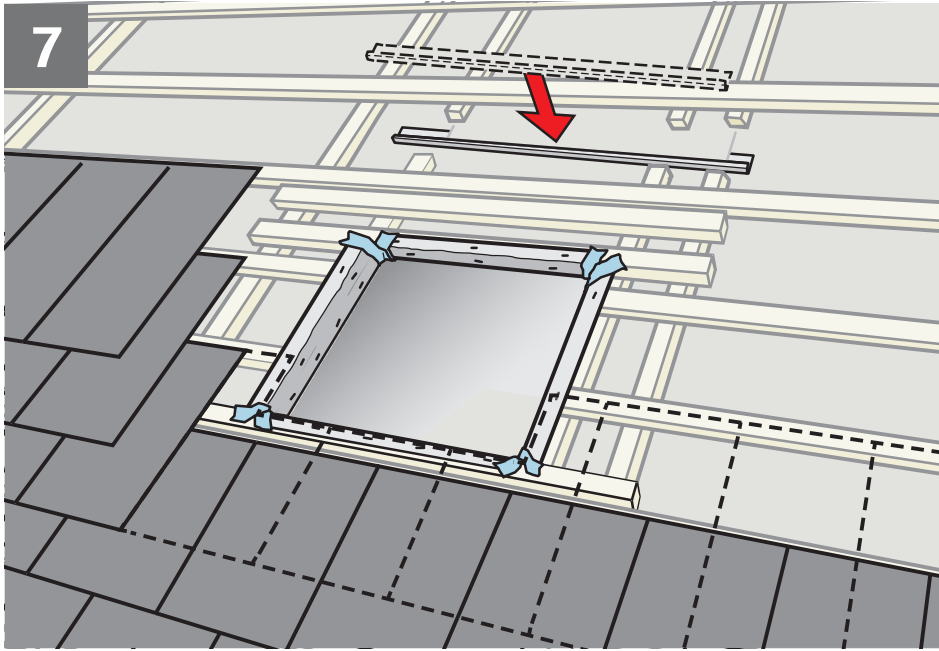
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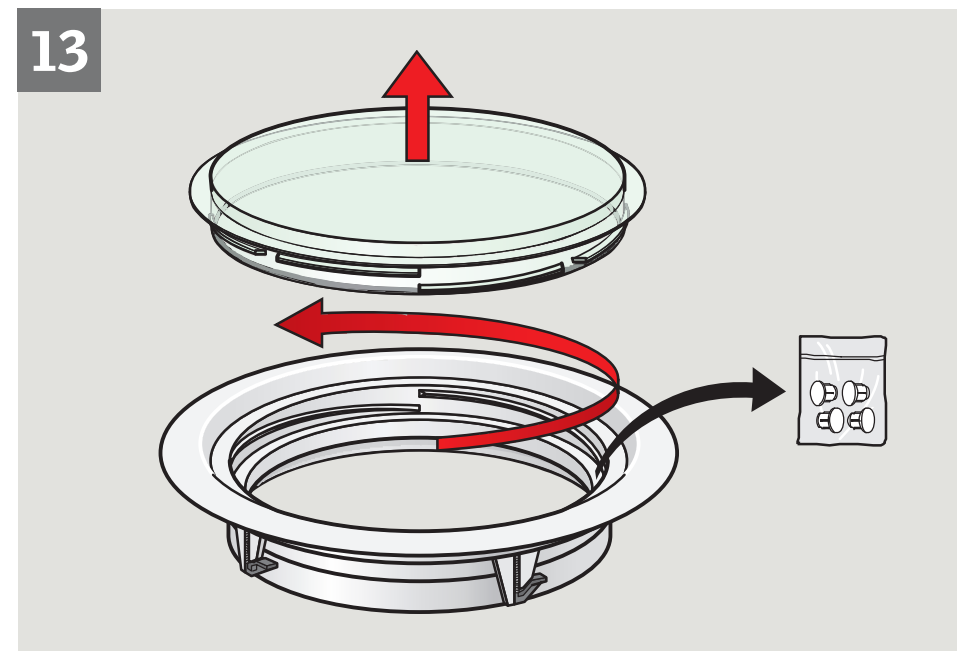
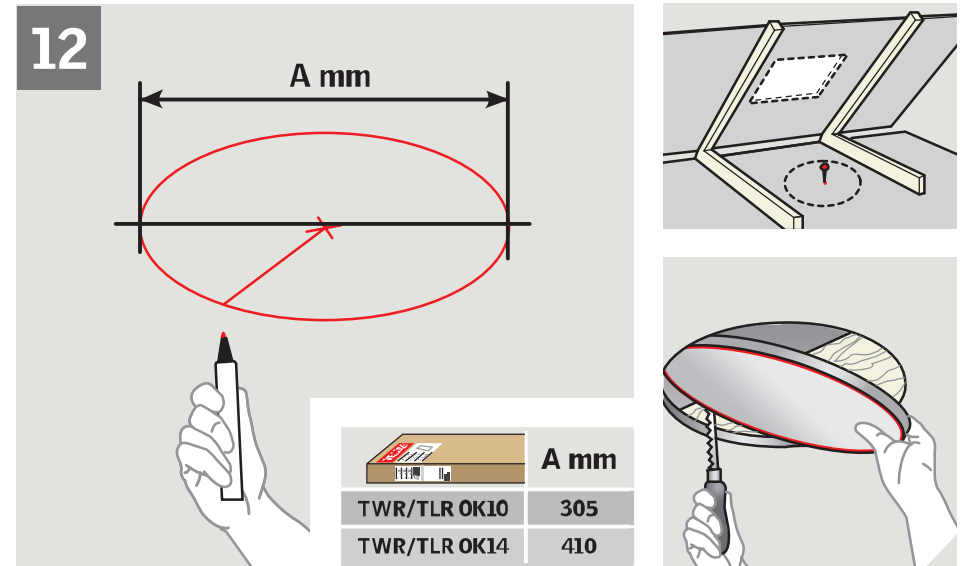
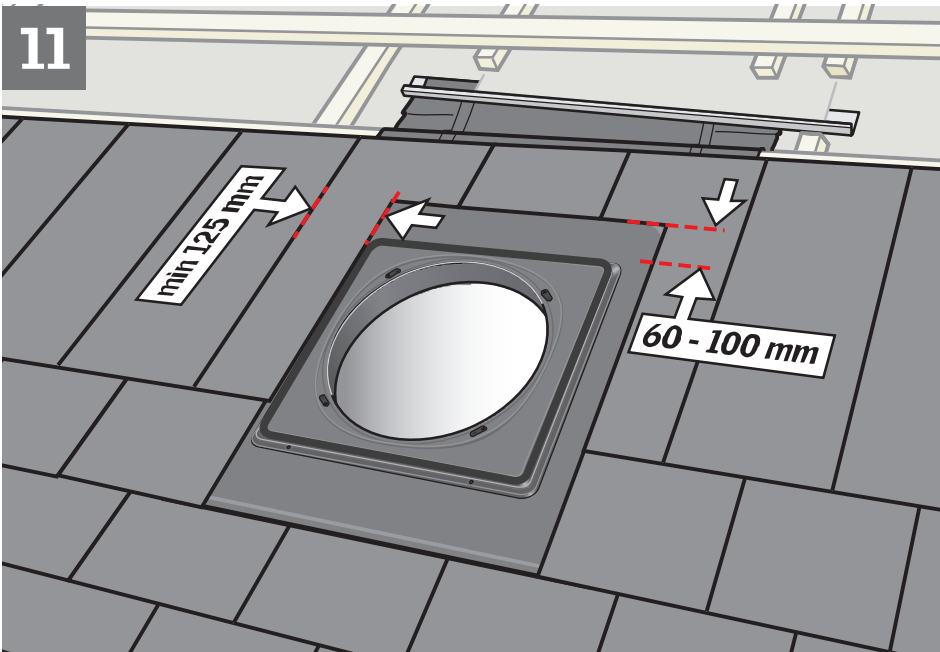


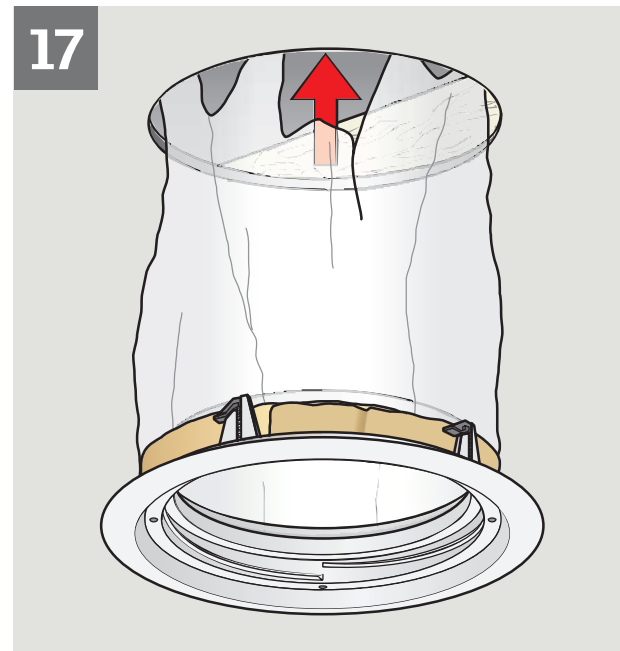
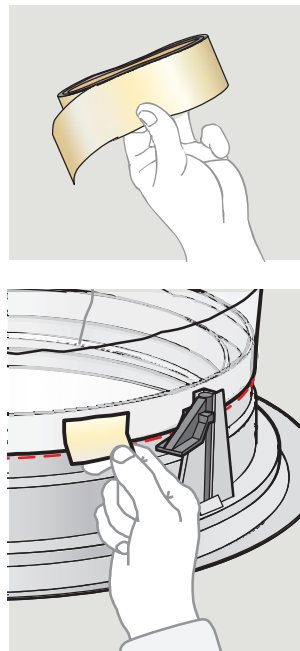
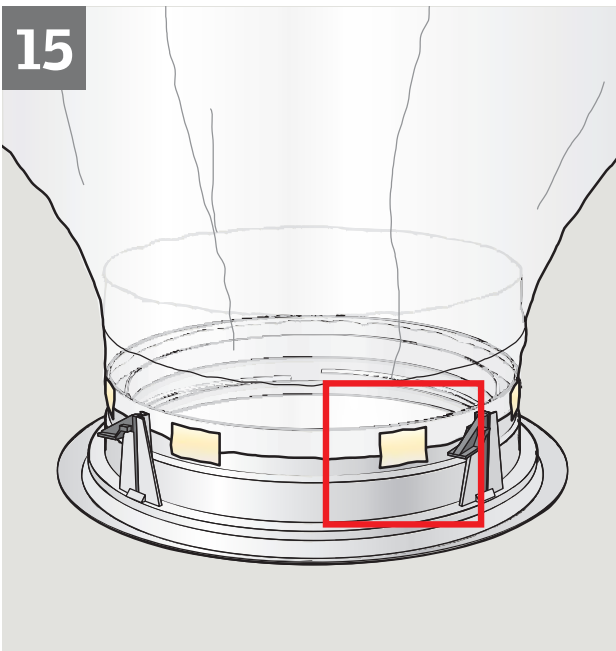
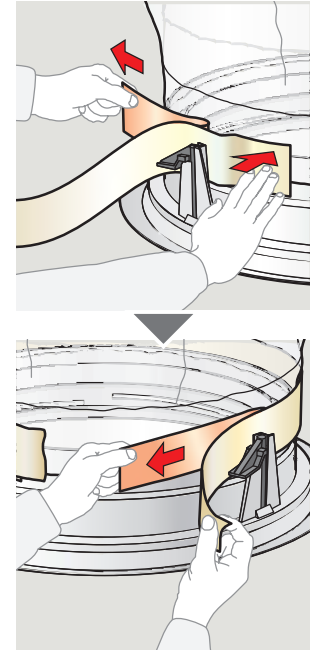
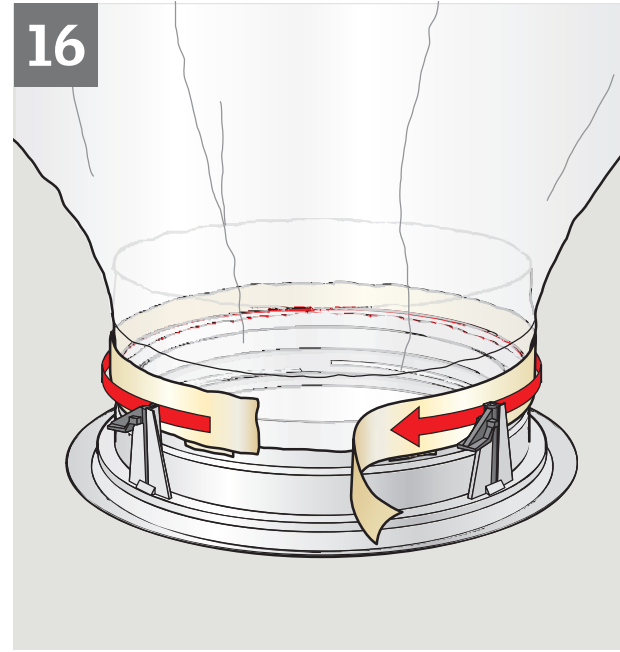
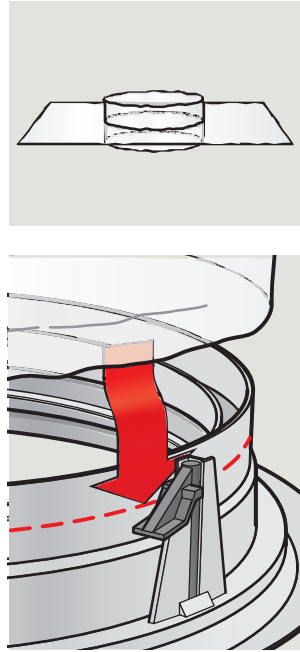
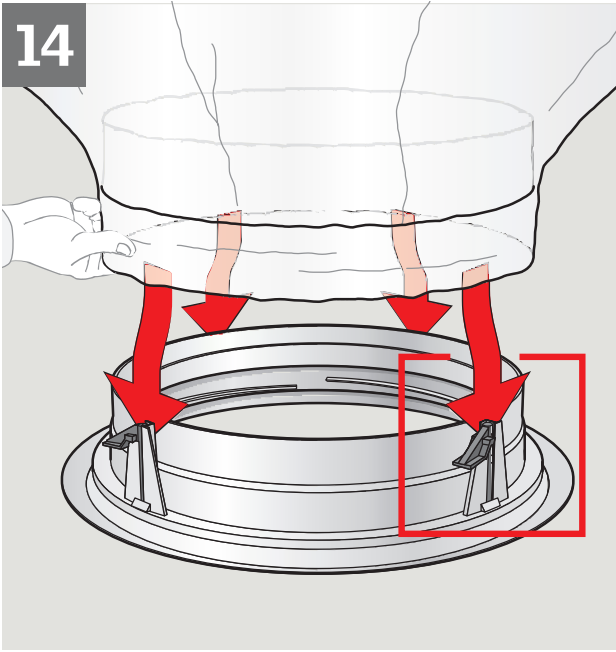
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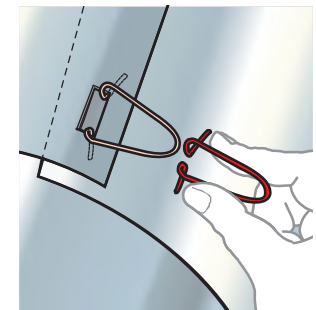
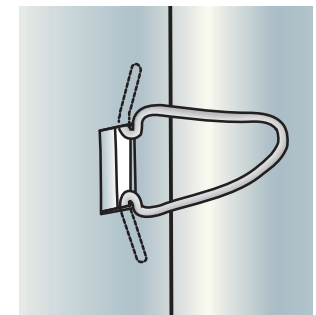
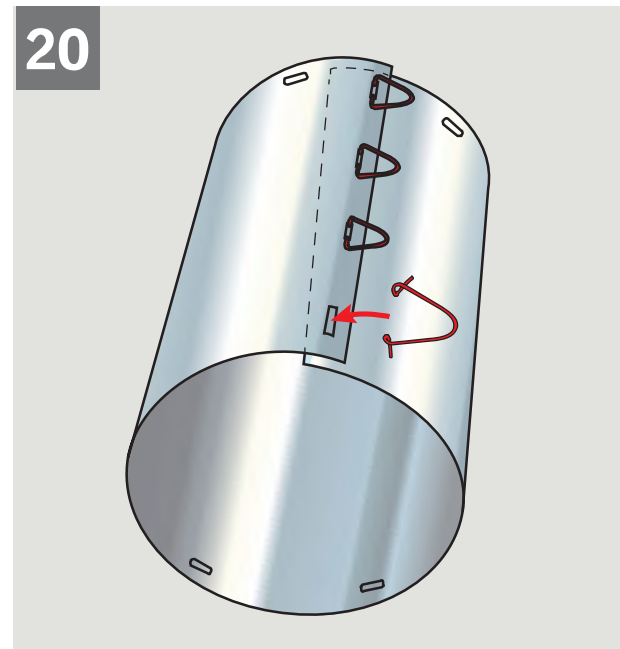
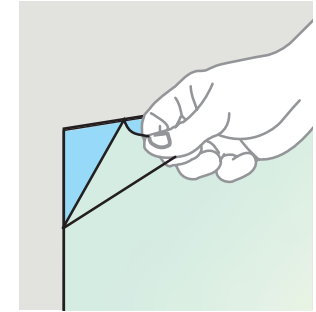
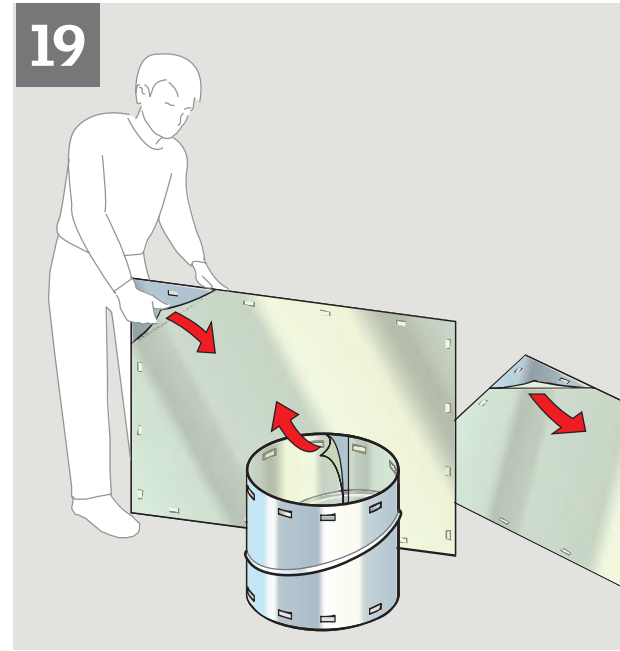
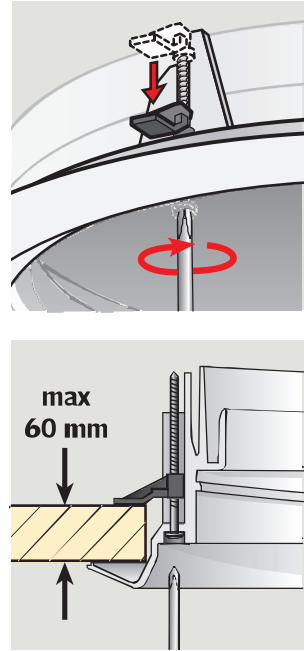
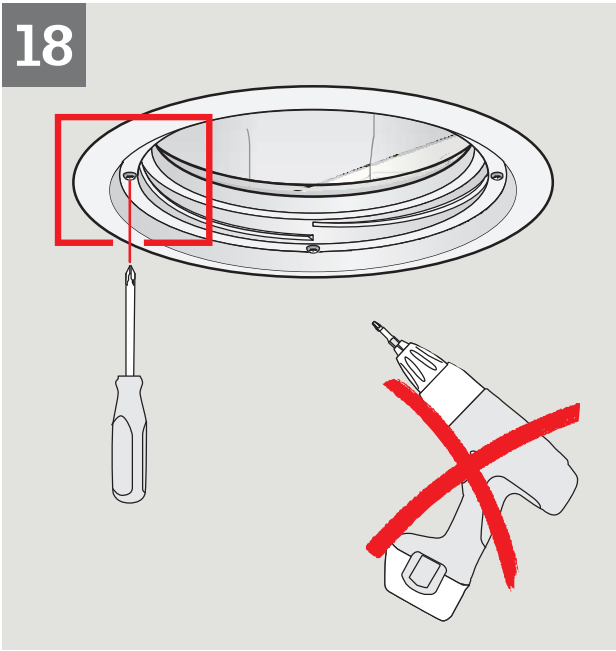


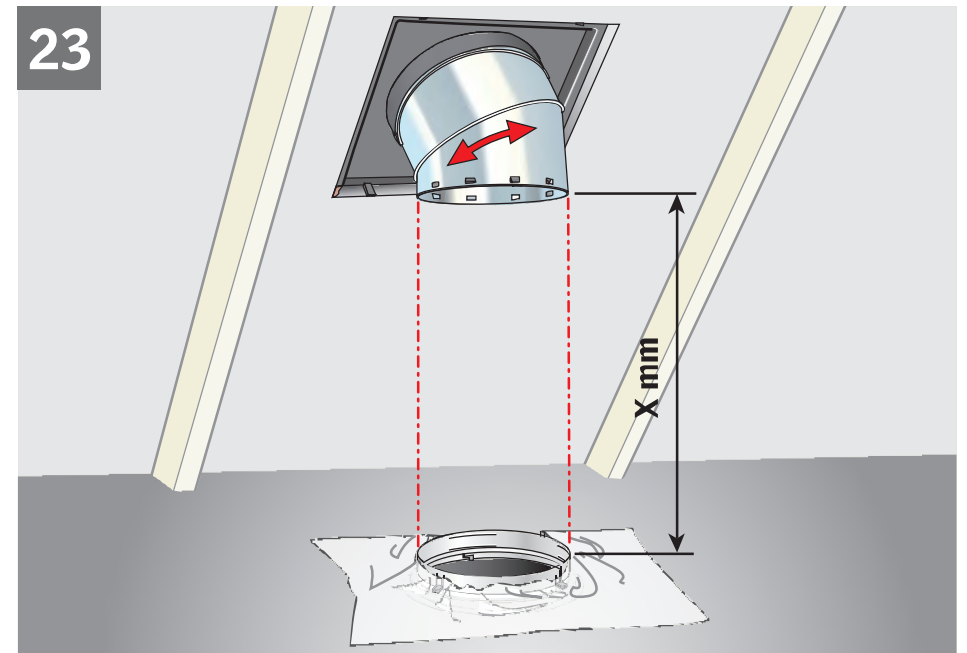
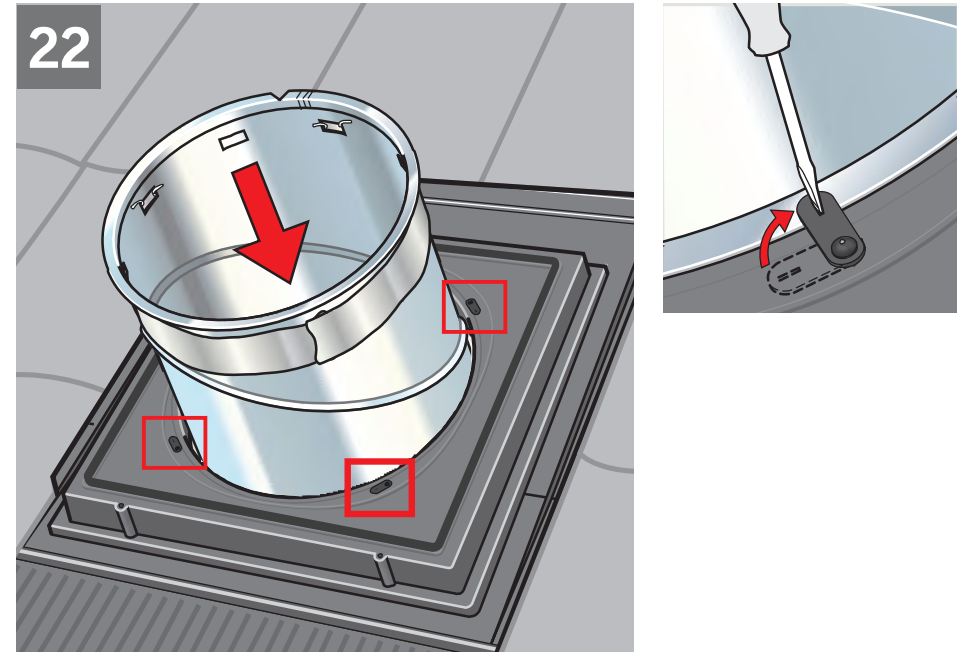
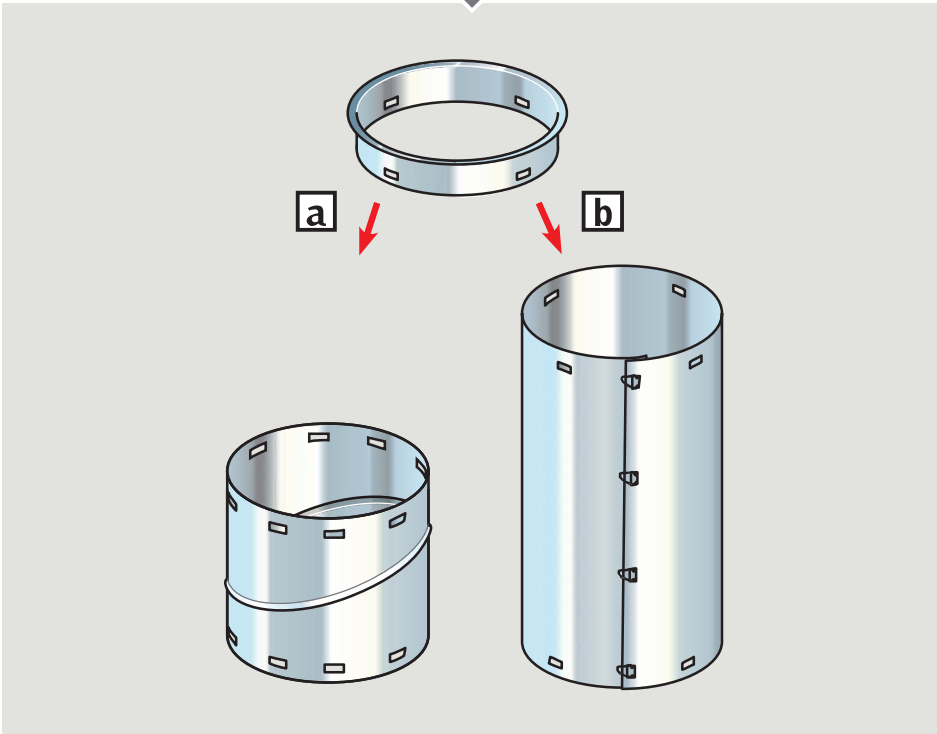
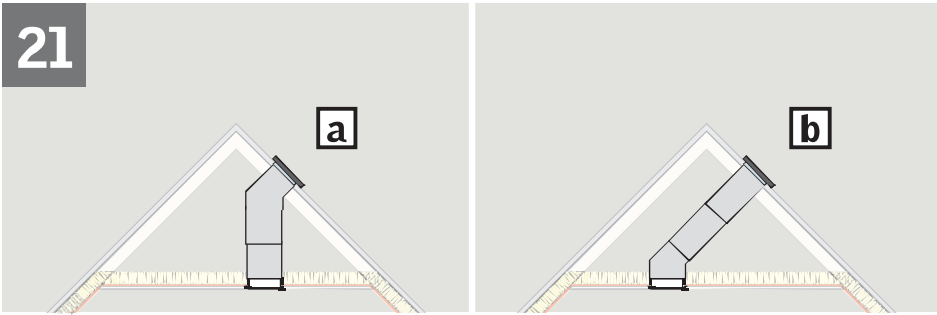




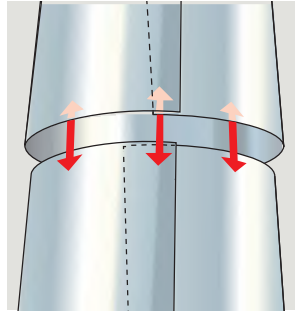
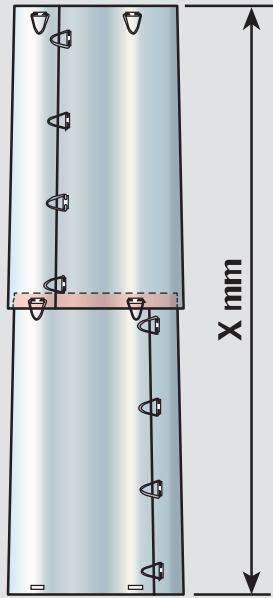




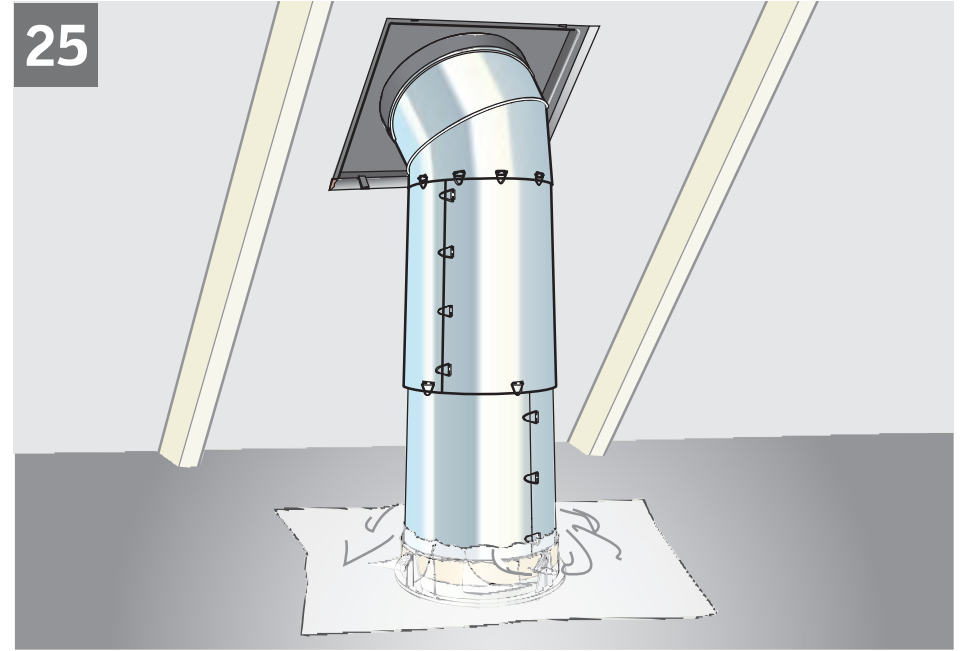




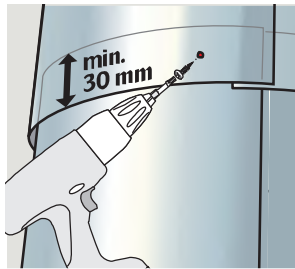
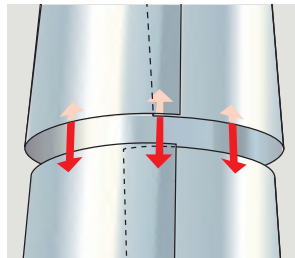
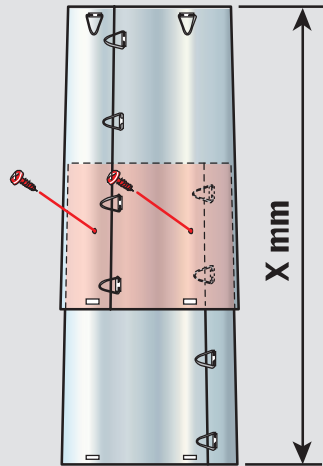
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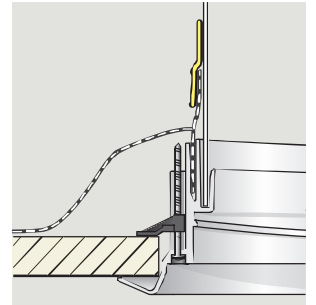
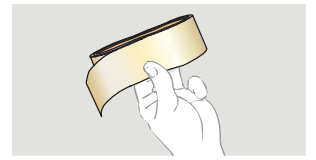
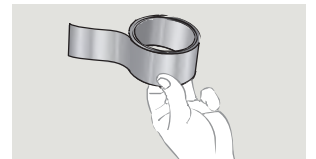
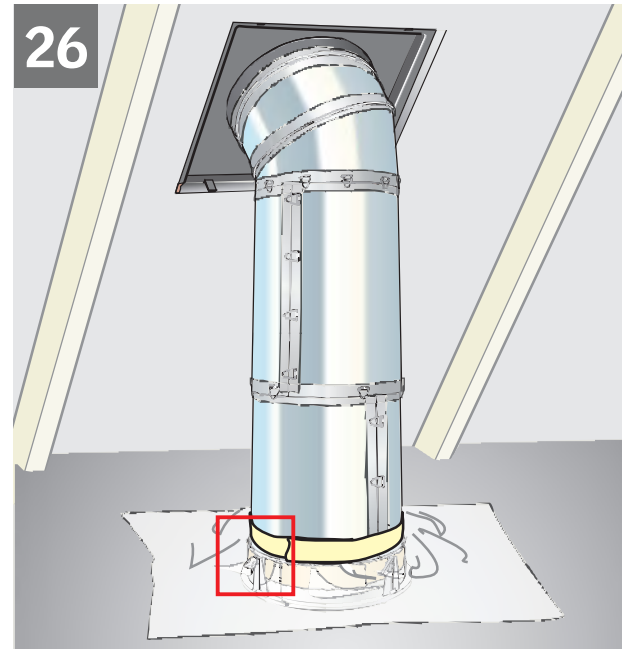


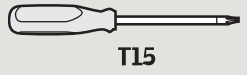
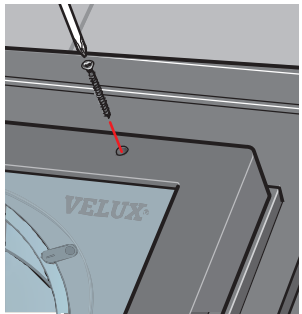
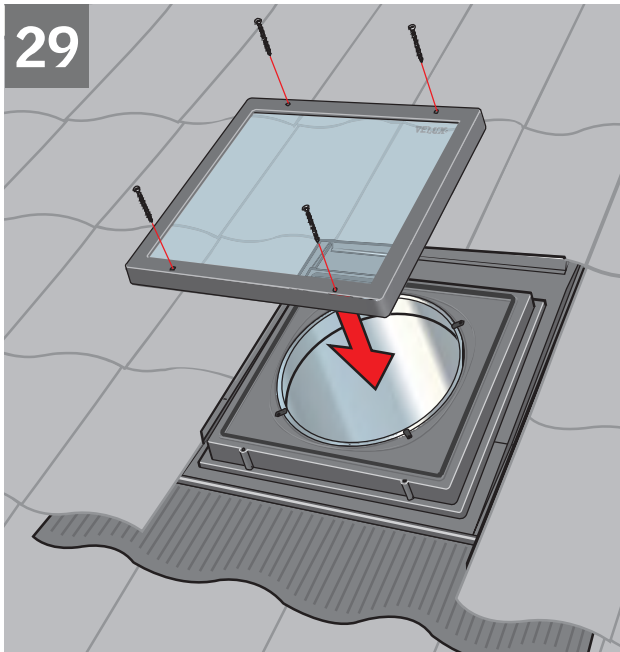
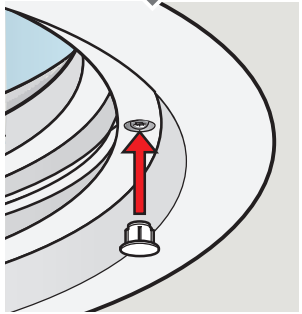
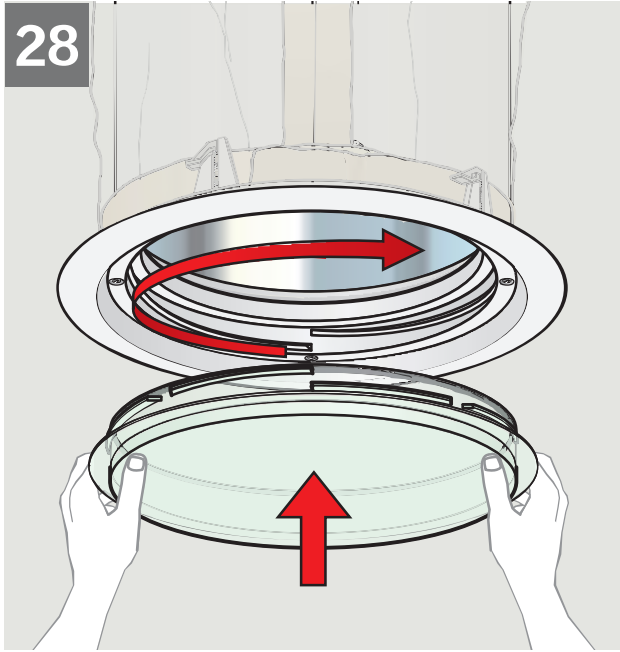
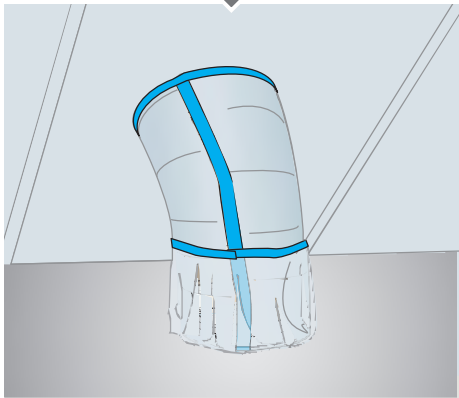
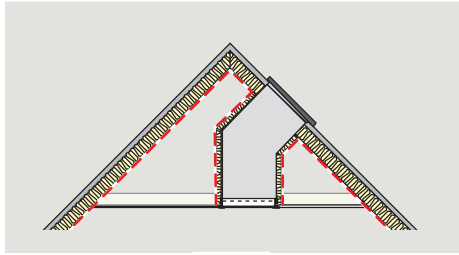
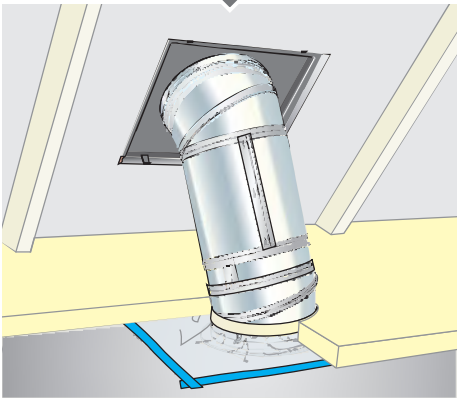
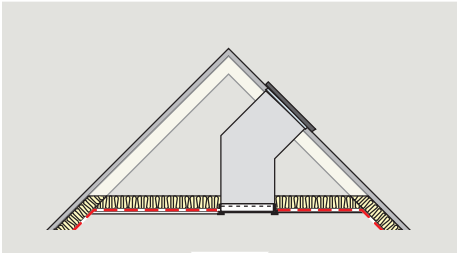
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8 mm

26

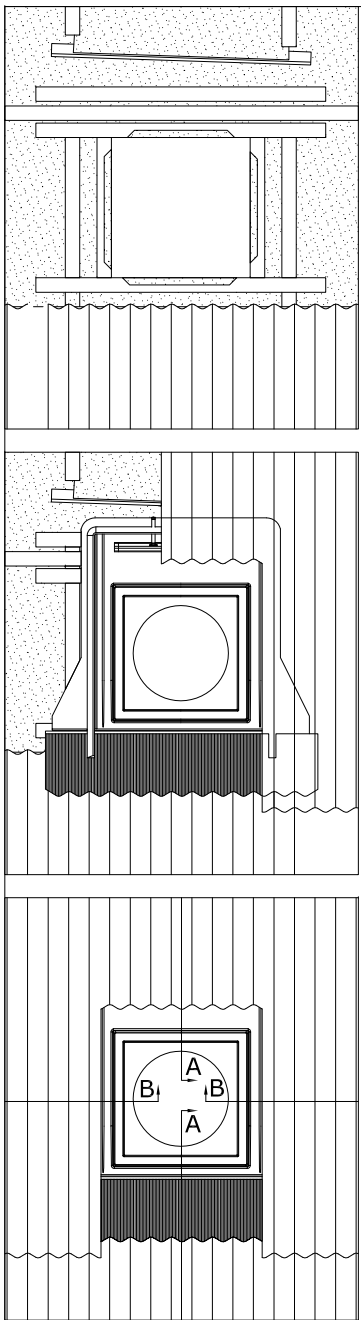




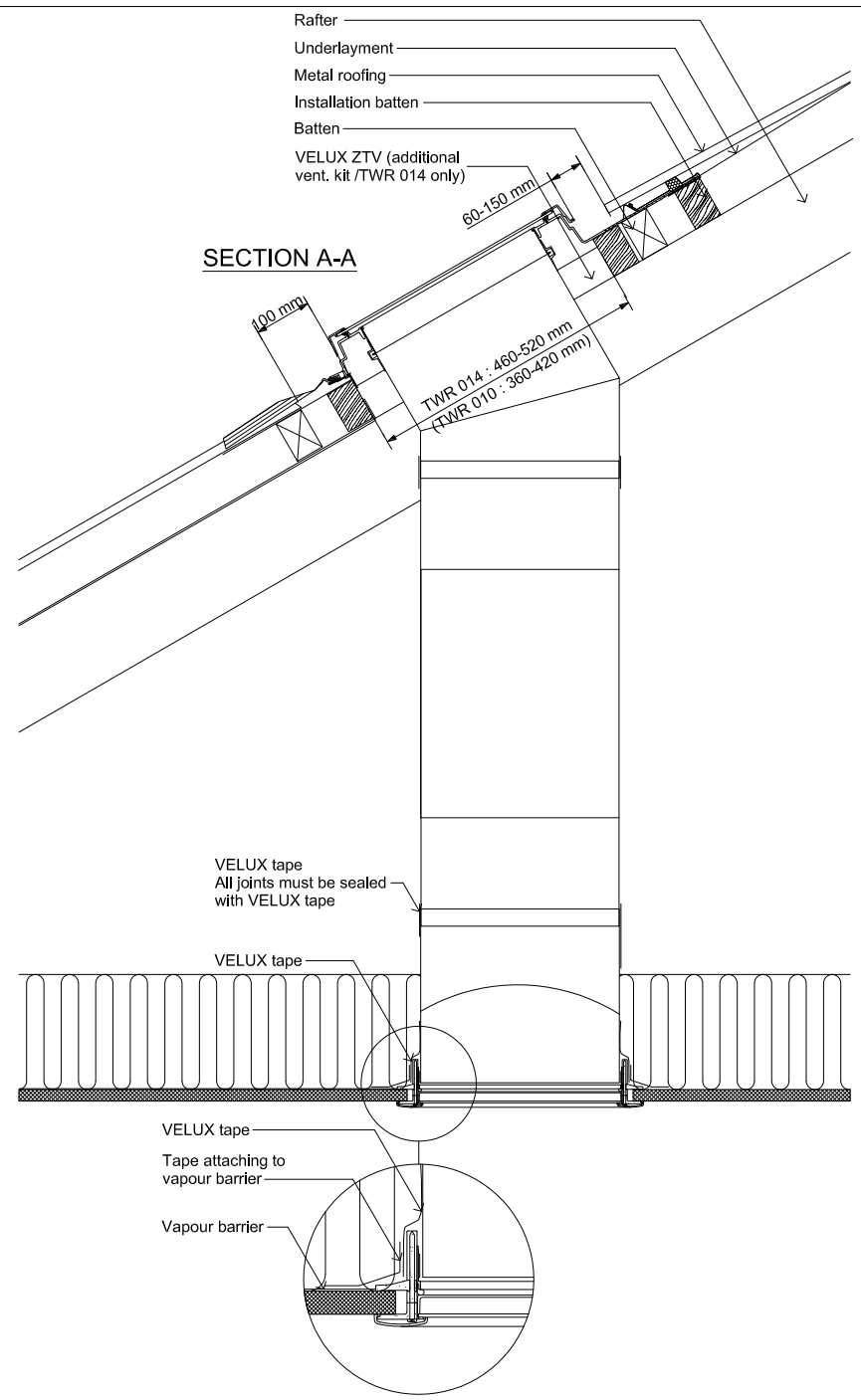


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AT: VELUX Österreich GmbH 02245/32 3 50	IT: VELUX Italia s.p.a. 045/6173666
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FR: VELUX France 0806 80 15 15 Service gratuit + prix appel	TR: VELUX Çatı Pencereleri Ticaret Limited Şirketi 0 216 302 54 10
GB: VELUX Company Ltd. 01592 778 225	UA: ТОВ "ВЕЛЮКС Україна" (044) 2916070
HR: VELUX Hrvatska d.o.o. 01/5555 444	US: VELUX America LLC 1-800-88-VELUX
HU: VELUX Magyarország Kft. (06/1) 436-0601	

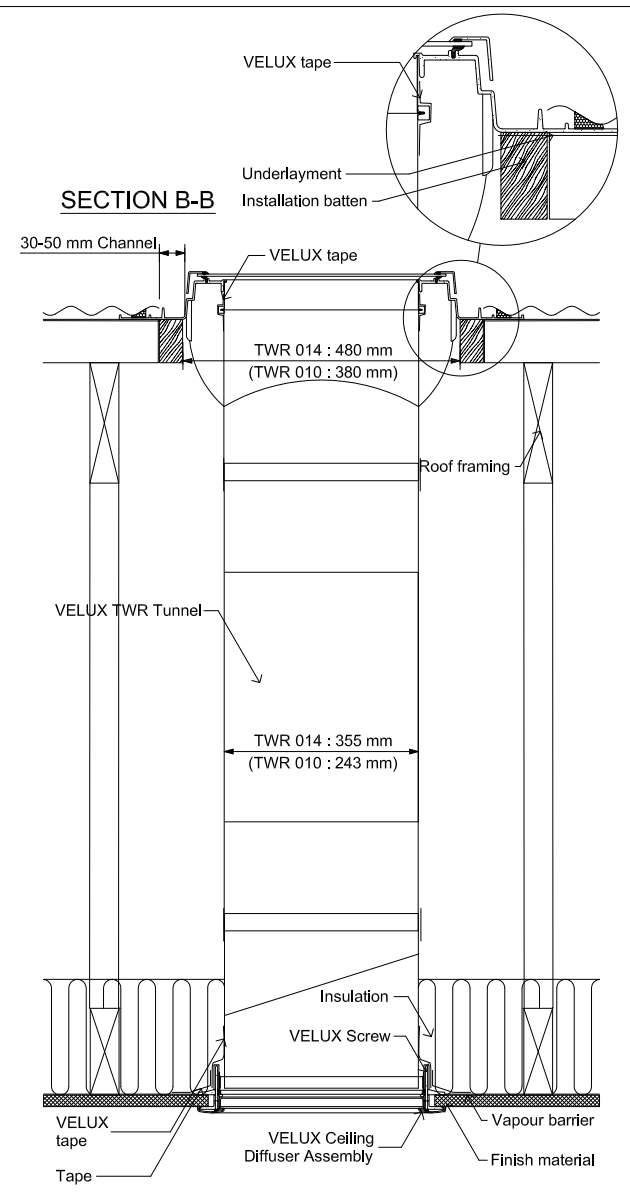
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ELEVATION



SECTION A-A



SECTION B-B

TWR

METAL ROOFING

15°-60°

<p>NEW ZEALAND LTD.</p> <p>0800 650 445</p> <p><small>Skylight - Global Product Management</small></p>	<table border="1"> <tr> <td>Name</td> <td>Date</td> </tr> <tr> <td>Drawn by</td> <td>Dec. 2012</td> </tr> <tr> <td>Checked by</td> <td>Dec. 2012</td> </tr> <tr> <td>Drawing No.</td> <td></td> </tr> </table>	Name	Date	Drawn by	Dec. 2012	Checked by	Dec. 2012	Drawing No.	
	Name	Date							
	Drawn by	Dec. 2012							
	Checked by	Dec. 2012							
Drawing No.									
<p>TWR - Rigid Sun Tunnel in Profiled Metal Roof</p>									
<p>© VELUX is a registered trademark</p>									
<p>This drawing is an Instrument of service and is provided for informational use only.</p>									

This drawing is an Instrument of service and is provided for informational use only.

Form 2A

Memorandum from licensed building practitioner: Certificate of design work Section 30C or 45, 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:

Suburb:

Town/City:

Postcode:

THE OWNER(S)

Name(s):

Mailing address:

Suburb:

PO Box/Private Bag:

Town/City:

Postcode:

Phone number:

Email address:

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 _____ 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 <input checked="" type="checkbox"/> if included. Leave blank if excluded	If appropriate, provide details of the RBW	Tick <input checked="" type="checkbox"/> 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 <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Foundations and subfloor framing <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick <input checked="" type="checkbox"/> if included. Leave blank if excluded	If appropriate, provide details of the RBW	Tick <input checked="" type="checkbox"/> whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
Walls <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Roof <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Columns and beams <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Bracing <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Other <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick <input checked="" type="checkbox"/> if included. Leave blank if excluded	If appropriate, provide details of the RBW	Tick <input checked="" type="checkbox"/> 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 <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Damp proofing <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Roof cladding or roof cladding system <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Ventilation system (for example, subfloor or cavity) <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Wall cladding or wall cladding system <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Waterproofing <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
Other <input type="checkbox"/>		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick <input checked="" type="checkbox"/> if included. Leave blank if excluded	If appropriate, provide details of the RBW	Tick <input checked="" type="checkbox"/> 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 <input type="checkbox"/> Suppression or control systems Other		<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	
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. <input type="checkbox"/> Yes <input type="checkbox"/> 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:

LBP or Registration number:

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

Design Entity or Company (optional):

Mailing address (if different from below):

Street address/Registered office:

Suburb:

Town/City:

PO Box/Private Bag:

Postcode:

Phone number:

Mobile:

After hours:

Fax:

Email address:

Website:

DECLARATION

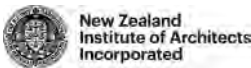
I _____ LBP, state that I have applied the skill and care reasonably required of a competent design professional in carrying out or supervising the Restricted Building Work (RBW) described in this form, and that based on this, I also state that the RBW:

- 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: _____



Date: _____



Building Code Clause(s).....

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance on use of Producer Statements (formerly page 2) is available at www.engineeringnz.org)

ISSUED BY:
(Design Firm)

TO:
(Owner/Developer)

TO BE SUPPLIED TO:
(Building Consent Authority)

IN RESPECT OF:
(Description of Building Work)

AT:
(Address)

Town/City: (Address) **LOT** **DP** **SO**

We have been engaged by the owner/developer referred to above to provide:

.....
(Extent of Engagement)

services in respect of the requirements of Clause(s).....of the Building Code for:

All or Part only (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

Compliance Documents issued by the Ministry of Business, Innovation & Employment.....or
(verification method/acceptable solution)

Alternative solution as per the attached schedule.....

The proposed building work covered by this producer statement is described on the drawings titled:

.....and numbered;
together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:

- (i) Site verification of the following design assumptions
- (ii) All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

CM1 CM2 CM3 CM4 CM5 (Engineering Categories) or as per agreement with owner/developer (Architectural)

I, am: CPEng # Reg Arch #
(Name of Design Professional)

I am a member of: Engineering New Zealand NZIA and hold the following qualifications:.....

The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$500,000*.

The Design Firm is a member of ACENZ:

SIGNED BY(Signature).....
(Name of Design Professional)

ON BEHALF OFDate.....
(Design Firm)

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$500,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.
THIS FORM AND ITS CONDITIONS ARE COPYRIGHT TO ACENZ, ENGINEERING NEW ZEALAND AND NZIA

Construction Notes
 • This page is to be read in conjunction with sheet A002 - construction notes for additional information

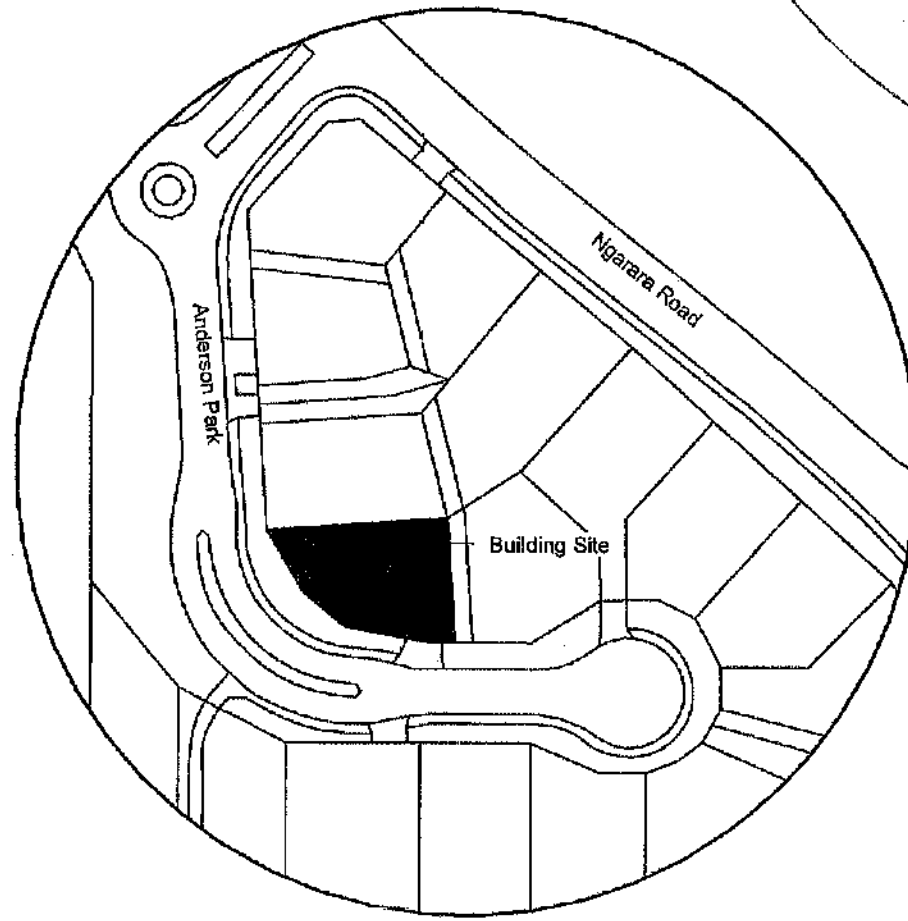
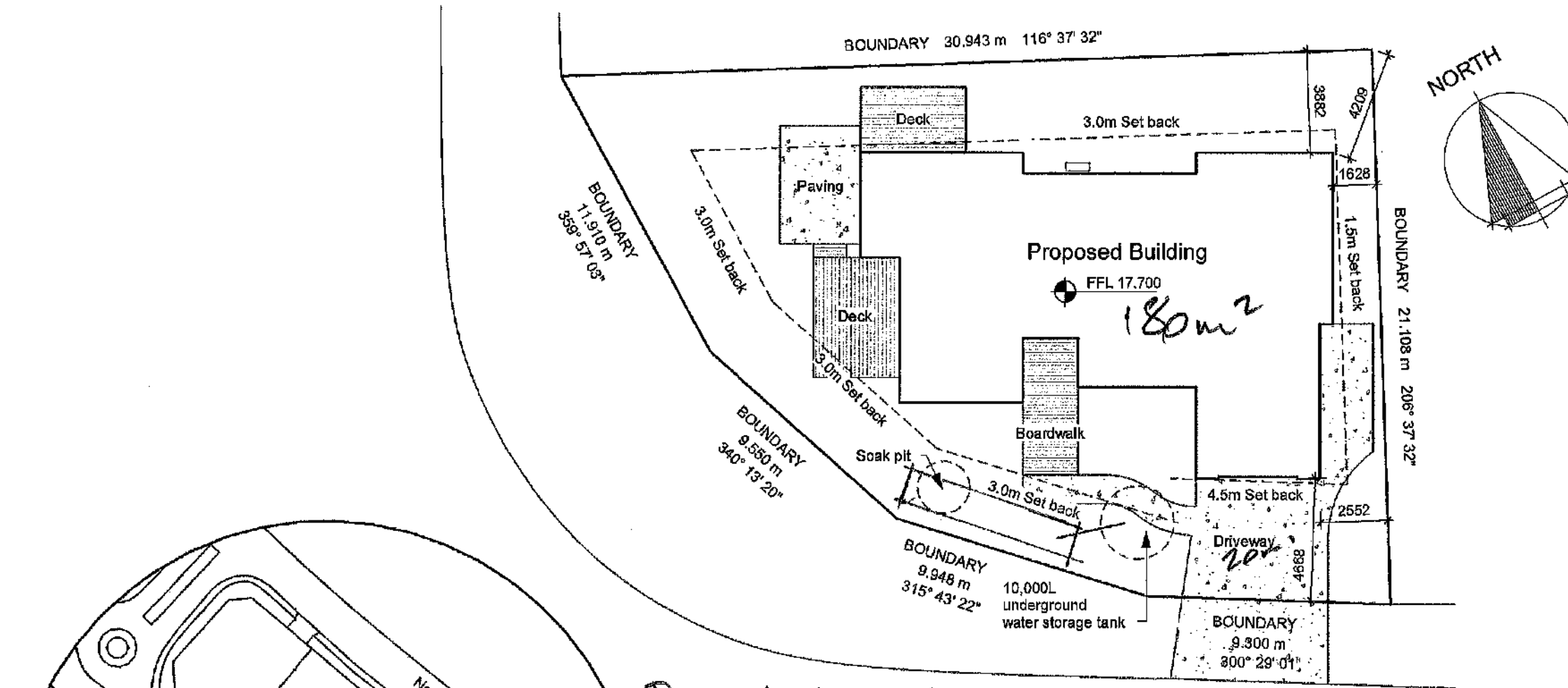
Legal Description
 LOT 6
 DP

Site areas
 Site area 495m²
 Site coverage 178m² (36%)

Planning features
 Planning zone - Residential
 Hazard zone - No
 Coastal building zone - No
 Noise zone - No

Site Information
 Wind zone - Very High
 Exposure zone - Zone C
 Earthquake zone - Zone 3
 Climate zone - Zone 2
 Snow zone - N1 (0-400m)
 Soil class - Refer to Eng.

Note - all boundaries are still to be confirmed by subdivision approval



LOCATION PLAN

RAIN SMART "CRATE"
 SOAKPIT
 6.5 LONG
 1.65 DEEP
 1.20 WIDE
 (9 CRATES LONG 3 DEEP 3 WIDE
 WITH 400 COVER)
 ALL AS PER CURTEX MANUAL.

SITE PLAN
 1:200

Area = 200m²



Rev Date Description

a. ADarchitecture
 Leaders in Applied Design
 Email: info@adarchitecture.nz Web: adarchitecture.nz
 Phone: (04) 298 5662
 5 Kodex Place, Paraparaumu 5032

Proposed House
 for Dan and Suki Green
 Lot 6 Anderson Park
 Waikanae

Building Consent

Site Plan

DO NOT SCALE DRAWING

Job Date Sheet(A3) Rev.
 20018 27/11/2020 A003

On site SW disposal by trench soakpit

Site	lot 6 Anderson Park	Regional Authority	GWRC
Client	DRH	Period of testing	2021
Territorial Authority	KCDC	Weather	fine
Topography	flat	Groundwater observations	nil
Ground cover	Grass	Rainfall	1000mm approx
Geology	sand	Site stability	ok
Existing drainage	to ground		
Soil data 1		Category	test bore
Q1d - Aeolian dune sands		2	test bore
		EF depth	diameter
		0.45	0.15

Soil test percolation data Note: only enter values in the yellow shaded cells!!!

line	int min	elap time	water depth	change	diameter	area	V loss	Av depth	p surface	P, l/m2/mn	test depth	Depth mm	Soil key	Bore data	Soil CAT
1	0	0.0	0.450												
2	1.0	1.000	0.370	0.080	0.15	0.02	1.414	0.41	0.2109	6.70					
3	1.0	2.000	0.310	0.060	0.15	0.02	1.060	0.34	0.1779	5.96					
4	1.0	3.000	0.260	0.050	0.15	0.02	0.884	0.29	0.1520	5.81					
5	1.0	4.000	0.220	0.040	0.15	0.02	0.707	0.24	0.1308	5.41					
6	1.0	5.000	0.180	0.040	0.15	0.02	0.707	0.20	0.1119	6.32					
7	5.0	10.000	0.050	0.130	0.15	0.02	2.297	0.12	0.0719	6.39					
8	5.0	15.000	0.001	0.049	0.15	0.02	0.866	0.03	0.0297	5.83					
9	5.0	20.000	0.000	0.001	0.15	0.02	0.018	0.00	0.0002	15.00					
10	10.0	30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!			Clean sands		2
11		30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!					
12		30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!					
13		30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!					
14		30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!					
15		30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!					
16		30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!					
17		30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!					
18		30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!					
19		30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!					
20		30.000	0.000	0.000	0.15	0.02	0.000	0.00	0.0000	#DIV/0!	3000				

sum P	# results	av
35.72	6	5.95
DF		0.25
Des infill		1.49

Average trench soakage is all the floor and half the side wall area

Soak pit design data

line no.	runoff data							soak pit data					Pit tank total				outputs					
	storm return period	storm duration	C runoff coefficient	I rainfall intensity	A for catchment	Q surface runoff	QT	perc rate	trench width	trench length	effective depth	depth from GL	average infiltrative surface including floor	excavated volume	MH volume MHv	effective storage volume	effective storage volume	effective storage volume	Average trench soakage rate	storage volume required	Time for pit to empty	Is there enough storage??
	years	min		mm/hr	m2	l/s	m3	l/m2/min	m	m	m	m	m2	v	m3	m3	m3	m3	l/s	m3	hrs	T or F
1	50	10	0.95	113.6	200	6.00	3.60	1.5	1.20	6.44	1.3	1.7	17.81	13.138	0.000	9.691	0.000	9.691	0.44	3.33	2.09	TRUE
2		20	0.95	78.5	200	4.14	4.97	1.5	1.20	6.44	1.3	1.7	17.81	13.138	0.000	9.691	0.000	9.691	0.44	4.44	2.79	TRUE
3		30	0.95	64.1	200	3.38	6.09	1.5	1.20	6.44	1.3	1.7	17.81	13.138	0.000	9.691	0.000	9.691	0.44	5.29	3.33	TRUE
4		60	0.95	43.1	200	2.27	8.19	1.5	1.20	6.44	1.3	1.7	17.81	13.138	0.000	9.691	0.000	9.691	0.44	6.60	4.15	TRUE
5		120	0.95	29.2	200	1.54	11.10	1.5	1.20	6.44	1.3	1.7	17.81	13.138	0.000	9.691	0.000	9.691	0.44	7.91	4.98	TRUE
6		360	0.95	16.2	200	0.86	18.47	1.5	1.20	6.44	1.3	1.7	17.81	13.138	0.000	9.691	0.000	9.691	0.44	8.92	5.61	TRUE
7		720	0.95	10.0	200	0.53	22.80	1.5	1.20	6.44	1.3	1.7	17.81	13.138	0.000	9.691	0.000	9.691	0.44	3.71	2.33	TRUE
8		1440	0.95	6.4	200	0.34	29.18	1.5	1.20	6.44	1.3	1.7	17.81	13.138	0.000	9.691	0.000	9.691	0.44	-8.99	5.65	TRUE

duration	l/mm/hr by return period Kapiti						
	1yr	2yr	5yr	10yr	20yr	50yr	100yr
10min	38.4	50.4	70.7	84.0	97.0	113.6	126.1
20min	28.8	37.4	50.5	59.3	67.7	78.5	86.5
30min	22.8	29.8	40.7	48.0	55.5	64.1	70.8
1hr	15.8	20.5	27.7	32.5	37.1	43.1	47.5
2hr	11.0	14.3	19.1	22.2	25.3	29.2	32.3
6hr	6.4	8.2	10.8	12.5	14.2	16.2	17.9
12hr	4.3	5.4	6.8	7.9	8.8	10.0	10.8
24hr	2.6	3.5	4.3	5.0	5.6	6.4	7.0

Excavated	floor area	7.728
Ratio	floor/wall	0.434
%	floor/wall	43.4
Design	SF	1.43

Trench perimeter 12.88

area	house and paved	m2	200	A	62	# of crates
length		m	6.44	L	63	9
depth		m	1.70	D	64	
width		m	1.20	W	65	3
design perc rate		l/m2/min	1.49	p	66	
effective depth in fil		m	1.32	Edp	67	3
storage tank size		m3	0	sTs	68	
effective depth in storage		m	1.32	Eds	69	3
MHd		m	0.95	MHv	70	
# MH's			0.95		71	
Pit fill void ratio	Crates		0.95		72	
					73	
					74	

Hamish Wells CPEng #186323

duration	l/mm/hr by return period 2100 Wanganui						
	1yr	2yr	5yr	10yr	20yr	50yr	100yr
10min	51.6	72.6	85.8	99.0	116.4	129.0	
20min	37.2	52.2	61.8	71.1	83.4	92.1	
30min	29.6	41.6	49.6	57.2	66.8	74.0	
1hr	19.4	26.5	31.3	36.0	41.9	46.4	
2hr	12.2	15.9	18.3	20.6	23.7	26.0	
6hr	6.1	7.8	8.8	9.9	11.2	12.3	
12hr	3.9	4.7	5.5	6.2	7.0	7.6	
24hr	2.4	3.1	3.6	4.1	4.7	5.2	

duration	l/mm/hr by return period Kimberly ex PB						
	1yr	2yr	5yr	10yr	20yr	50yr	100yr
10min	51.6	72.6	85.8	99.0	116.4	129.0	
20min	37.2	52.2	61.8	71.1	83.4	92.1	
30min	29.6	41.6	49.6	57.2	66.8	74.0	
1hr	19.4	26.5	31.3	36.0	41.9	46.4	
2hr	12.2	15.9	18.3	20.6	23.7	26.0	
6hr	6.1	7.8	8.8	9.9	11.2	12.3	
12hr	3.9	4.7	5.5	6.2	7.0	7.6	
24hr	2.4	3.1	3.6	4.1	4.7	5.2	

HMW Q100 plus GW

119.1
84.1
68.4
48.1
31.5
16.1
10.5
6.9



RAINSMART®

INSTALLATION GUIDE



IG G 001 018
MARCH 2020

0800 CIRTEX (247 839) | WWW.CIRTEX.CO.NZ

PRE-CONSTRUCTION CHECKLIST

TOOLS YOU WILL NEED

- Laser level
- Measuring tape (long enough to mark RainSmart system footprint)
- Knife
- Screw driver
- String line
- Spray paint
- Reciprocating saw (to cut in inspection & maintenance ports)

If you're assembling RainSmart modules:

- Rubber mallet
- Work tables or smooth, hard surface such as concrete or plywood.



MATERIALS YOU WILL NEED

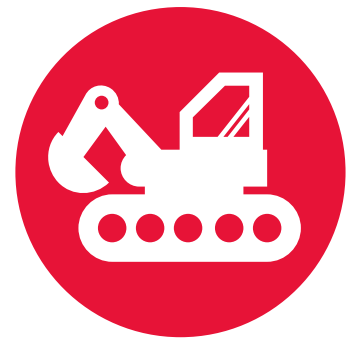
- RainSmart plates
- DuraForce™ geotextile (typically AS410 for soakage systems & AS440 for lined systems)
- DuraGrid X geogrid (only for load bearing applications)
- Impermeable liner (only for stormwater retention/recycling applications)
- Clean bedding & backfill material compactable to a minimum of 95% MDD, angular free draining stone/sand with a max particle size of 20mm)
- Pipe Boot Kits (if not using kits, you'll need duct tape and a stainless steel band clamp for each inlet and outlet pipe)
- Metallic tape to mark system edges, to allow for system location post-construction
- Cover soil to meet the site specific requirements, as per the engineers specification

Inspection and maintenance ports (if required)

- Pipe for inspection & maintenance ports (typically 150mm and 300mm PVC pipe, respectively)
- Ring, collar & cap (to fit each port)
- Pipe Boot Kits (fabric pipe boot, duct tape, stainless steel band clamp for each inspection and maintenance port)
- Traffic load rated ring, cover and frame, where required

EQUIPMENT YOU WILL NEED

- Forklift and other equipment/tools needed to unload curtain-sider truck
- Walk-behind trench roller/plate compactor
- Tracked skid steer or suitable loader, as per table on page 16
- Roller (2-3 tonne smooth drum)



Note: This list does not include equipment or tools needed to excavate or level the floor of the excavation.



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**

BEFORE YOU TURN THE FIRST SOD

- 1** Be sure to contact your Cirtex representative at least two weeks prior to installation. We can provide the necessary support to facilitate your installation.
- 2** All pictures, illustrations and instructions have been included to guide you through a typical installation. The approved engineering drawings should ALWAYS take precedence over these instructions.
- 3** Coordinate the installation of the RainSmart system at the end of the construction activities to minimise the construction traffic over the system. If the installation is completed during construction activities then the system MUST be roped off and construction traffic routed around the system. The installation contractor is responsible for all loads placed or driven over the RainSmart system during the construction process (including excavators, loaders, dump trucks, forklifts, concrete trucks, material delivery trucks and cranes). Rope off the area to prevent unauthorised traffic from driving over the RainSmart system. If sequencing of the project makes this impossible, a construction road or pad may be constructed over the RainSmart system. Consult the project engineer and/or Cirtex for assistance before allowing construction traffic on the system. **(For additional information see Step 12: Secure the installation, page 18)**
- 4** After installation of the RainSmart system, stormwater should not be allowed to enter the system until the site is completely stabilised and all pretreatment systems (designed to remove debris and heavy sediment) are active. Otherwise, the RainSmart system may become prematurely contaminated with sediments from the project.

IMPORTANT INFORMATION

Throughout this document you will see three types of notes:



TIP

Ideas to improve your profitability on the installation.



IMPORTANT

Steps that require extra attention.



WARNING

Critical issues that MUST be handled correctly to ensure a successful installation.

1. EXCAVATION

The excavation limits and the location of the RainSmart system should be staked out. The design drawings should be used to determine these locations. If the excavation limits are not shown on the plans, then add 500mm- 600mm on each side of the RainSmart system to determine the limits. Excavate the designated surveyed area according to plans, following all relevant regulations. Typical excavations should include:

- 500mm-600mm perimeter around RainSmart system to allow for proper compaction of backfill.
- Enough depth to accommodate 50mm-100mm of bedding material below the RainSmart modules if required.
- Enough depth to allow for a minimum of 600mm of cover material or as per engineer plans.

Level the bottom of the excavation (Fig. 1) as shown on plans. Most excavations have a flat base, however a slight fall towards an outlet is allowable.

Prepare the subgrade according to plans. Base of excavation shall be smooth, level and free of debris. Compact to at least 95% Standard Proctor Density (or as required by engineer) unless infiltration of stormwater into subgrade is desired. A thin layer, 100mm of material, is recommended to establish a level working platform (may not be needed in areas with sandy soils). A CBR > 5% must be achieved prior to beginning installation of RainSmart modules.

If the subgrade is heaving or appears excessively soft, the design engineer should be consulted for advice. In many cases a layer of GridTex 40/40 and 190mm-300mm of compactable material, that drains well will be sufficient to amend the bearing capacity of the soil.



Fig. 1
Excavate according to plans, following all relevant regulations



IMPORTANT

For trafficable applications - minimum cover of 600mm and maximum cover of 2m is required. Non-trafficable applications (inaccessible by vehicles) require minimum cover of 300mm and maximum cover of 2m.



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**

2. ASSEMBLE RAINSMART MODULES

RainSmart modules are supplied flat packed and will need to be assembled on site. Building the modules should take 2-3 minutes per module layer. This is a conservative estimate used to approximate the total man hours needed for assembly.

MODULES	TIME
Half	2-3 Minutes
Single	2-3 Minutes
Double	4-6 Minutes
Triple	6-9 Minutes
Quad	8-12 Minutes
Penta	10-15 Minutes



WARNING

Times relate to assembly only. Placement time frames will be dependent on site accessibility and layout.

Assembly Instructions - following the drawings in Fig. 2 and Fig. 3: Connect five small plates onto one large panel using the short pegs (not the long pegs). Attach small plates onto the large panel at the locations marked in red on Fig. 2. Only use these peg locations marked in yellow on Fig. 2, if you are building a 7-plate module. Use 7-plate modules for installation with more than 2m of cover and for installations beneath traffic loads with less than 600mm of cover. Please note, the RainSmart plate configuration shall be specifically designed by the project engineer for installations with >2m of cover or <600mm of cover.

Next, working from one end to the other, attach a second large plate on the opposite side of the first. Once the top and bottom large plates are attached, two more larger side plates are attached to complete the sides of the module. This is a single RainSmart module.

Completed RainSmart modules should be staged as close to the installation area as possible. Some projects may require 5 or 7 plate modules.

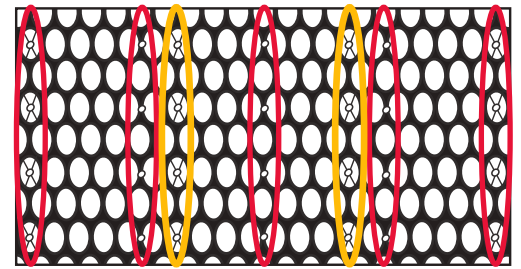


Fig. 2

For standard 5-plate installations, attach small plates at locations circled in red such that all small and large pegs are on same side.

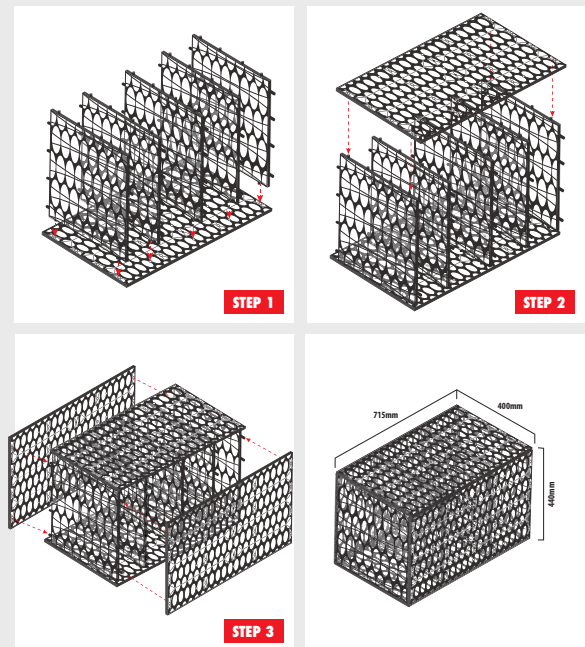


Fig. 3

Follow these steps to assemble a standard RainSmart 5 Plate Single module.



IMPORTANT

To build a DOUBLE module (or larger) follow the directions above, starting at "Assembly Instructions" using the top of the existing module as the base large plate for the next layer up.

3. PREPARE BASE

Examine prepared excavation and conditions for smoothness, compaction and level. Do not start RainSmart system installation until unsatisfactory conditions are corrected. Check for presence of high water table, which must be kept at levels below the bottom of the RainSmart system structure at all times. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact project manager for resolution.

Standing water in the excavation will prevent proper base preparation and must be removed, if present.

Grade and level base as shown on plans with no more than 10mm variance. Base must be free of debris and large rocks.



Fig. 5
Base must be smooth to ensure modules fit together without gaps.

Compaction	To 95% MDD minimum
Shape	Angular
Size	Not larger than 20mm in diameter
Consistency	Free of lumps, debris and sharp objects that could puncture the geotextile
Applicability	Stone or sand is acceptable if it meets these requirements. In NO case shall clays be used



Fig. 4
Preassembled modules can be placed in the excavation or installation can be sped up by assembling the modules in the excavation.



TIP

In regions with sandy soils meeting the requirements noted and where the subgrade elevation is above the ground water table, imported backfill materials may not be needed.

Creating a smooth, level platform will allow for faster installation of RainSmart modules, as they will fit together evenly, eliminating detail work that can delay your progress (Fig. 5).



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**

4. PLACE GEOTEXTILE

DuraForce™ AS410 geotextile will be required below the RainSmart system on most projects, but not all. Check your plans to confirm that geotextile is to be placed between the base and the RainSmart system.

Cut full-width strips of geotextile to the proper length and place them over the base, covering the floor of the excavation. The geotextile should extend at least the height of the module plus 1m beyond the edge of the RainSmart system footprint. This will enable the whole module to be wrapped to the dimensions required. All overlaps are then to be suitably secured, weighted down, taped or stapled in order to minimise the ingress of unwanted materials.



Fig. 6
Pull wrinkles out of geotextile so material lays flat



Fig. 7
Overlap geotextile by a minimum of 300mm

Adjacent panels of geotextile should be overlapped by 300mm or more, as shown on the plans (Fig. 7). Use pins, staples, sandbags or other ballast to hold the DuraForce geotextile in place, preventing it from blowing or sliding out of position. Patch any holes made in the DuraForce geotextile by placing a patch of fabric over the damaged area. The patch must be large enough to cover the damaged area with at least 300mm of overlap on undamaged fabric.

If an impermeable liner and/or additional geotextile is required per plans, install these now as shown on the project plans.



TIP

Some contractors choose to cut the geotextile strips long enough to wrap up the sides and over the top of the RainSmart module in a single piece (Fig. 6). If space allows and the folded flaps of geotextile will not slow your progress, you may want to consider doing this. If a liner is required on your project, this method should be used to protect the liner.

5. INSTALL RAINSMART MODULES

Determine the starting location. It is often helpful to use an inlet or outlet pipe to guide you. Using a string line, establish two adjacent edges of the RainSmart modules footprint. Ensure that your corner is square. Mark these two edges with spray paint and remove the string line (Fig. 8 and Fig. 8a)

Begin placing RainSmart modules in the corner of the marked area. DO NOT place modules on their sides, as this will void the warranty. Check your plans to ensure correct orientation of the RainSmart modules (Fig. 9).

Check the plans to ensure the RainSmart modules are running in the correct direction (North/South vs. East/West) to match the footprint shown.

- RainSmart modules width - 400mm
- RainSmart modules length - 715mm



Fig. 8
Use a string line & marking paint to square the system footprint.



Fig. 8a

RainSmart modules should fit together evenly. Minor gaps between modules <10mm or variations in the height of the modules <10mm are acceptable (Fig. 10), but reasonable efforts should be made to minimise these variations. Minor gaps will be eliminated during compaction of side backfill material. No lateral connections between adjacent RainSmart modules are required, but modules can be cable tied as a housekeeping measure.

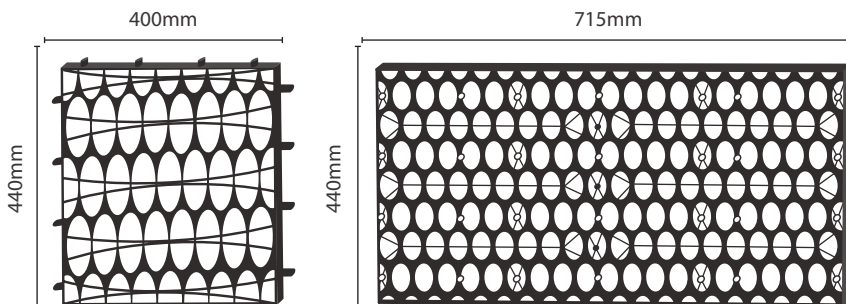


Fig. 9
Make sure the modules are oriented properly and in the correct way in the excavation.

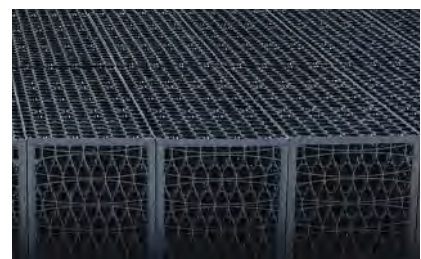


Fig. 10
Minor variations (less than 10mm) in height are acceptable.



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**

After placement of the RainSmart modules, wrap with geotextile which is brought up around the sides and lapped over the top of the full structure. Should any gaps be evident additional fabric can be cut and placed over any of these areas. Fold excess fabric at corners to lay flat against sides of structure, securing folds and seams with staples or similar methods.

Identify locations of inlet, outlet, inspection ports, and any other penetrations. All pipes should be positioned at 90 degree to the module structure. Any inlets, outlets etc should be installed using the RainSmart 160mm or 300mm access plates where the geotextile fabric shall be cut to enable hydraulic continuity at the pipe penetrations and must be secured around the pipe using a suitable coupling or a stainless steel clamp prior to backfilling.

Cutting of the modules to accommodate pipework may be acceptable, if required. However, will need to be approved by the engineer.



Modules require ventilation for proper hydraulic performance. The number of pipes and vents will depend on the size of the system and are to be stipulated by project engineer.

Vents are often installed using 90 degree elbows with PVC pipe into soft landscape areas with 'U' bend or venting bollard to inhibit the ingress of debris, alternatively a ground level concrete steel cover can be fixed to suit. If the manhole/catch pit connected to the RainSmart system is unsealed, vent connections back to the manhole can be used.



IMPORTANT

If using a liner, be careful not to puncture it with stakes or pins while placing your string line.



WARNING

Do not place the modules on their sides as this will void warranty.



TIP

Moving RainSmart modules into the excavation quickly is essential to a successful installation. Many contractors fabricate a platform that can be lifted by their forklift to quickly move a large number of modules with each trip.



TIP

RainSmart modules should be constructed around any pipe joints as the joint collars will typically not feed through the 160mm or 300mm access plates.

6. INSTALL INSPECTION/MAINTENANCE PORTS [IF REQUIRED]

If required by the design engineer, all ports should be made from pipe long enough to extend from the bottom of the RainSmart system to finished grade. They are typically PVC pipe, but can be formed from other types of pipe, as well.

Identify the location of all ports and remove the RainSmart module from each location.

Inspection ports:

Typically made from 150mm PVC pipe, cut the pipe to length, leaving enough excess to trim the top when final grade is reached (Fig. 11).

If the pipe is not already perforated, drill several holes in the pipe starting at the bottom. Perforations should extend as high as the height of the RainSmart module units being used. No perforations should be visible above the top of the RainSmart module once the port is in place.

Using your reciprocating saw, cut the horizontal RainSmart module plates (Fig. 12) in the centre, between the two internal plates, to accommodate the port. If the pipe will not fit between the two interior plates, one or both plates may be moved to the outer connection locations on the large plate (Fig. 13). All horizontally oriented plates will need to be cut EXCEPT FOR THE BOTTOM PLATE.

In total you will need to cut:

MODULES	PLATES
Single	1 Plate
Double	2 Plates
Triple	3 Plates
Quad	4 Plates
Penta	5 Plates



IMPORTANT

Do not over-cut the RainSmart module plates, minimise the gaps between the pipe and the RainSmart module plates. This is particularly important with the top plate.



TIP

If the location of inspection ports is not shown on your plans, use a single inspection port located in the middle of the RainSmart system.



Fig. 11
Installed inspection port.



Fig. 12
Cut the horizontal plates to accommodate all ports.



Fig. 13
Additional space for port can be created by moving the internal plates towards the ends



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**

For all systems deeper than a single module, you will need to disassemble the RainSmart module in order to cut the interior plates. Reassemble the RainSmart module when cutting is completed, and replace the RainSmart module into the proper location. (Fig. 15)

Install the pipe into the RainSmart module (Fig. 16)

Seal the opening on top of the pipe with a cap or temporary lid to prevent debris from entering the system.

Maintenance ports

Typically made from 300mm PVC pipe (check plans for actual type and size of pipe), cut the pipe to length, leaving enough excess to trim the top when final grade is reached.

Using your reciprocating saw, cut several 200mm notches into the bottom of the pipe as shown on plans (Fig. 14).



Fig. 14
Cut 200mm notches into the bottom of maintenance port.

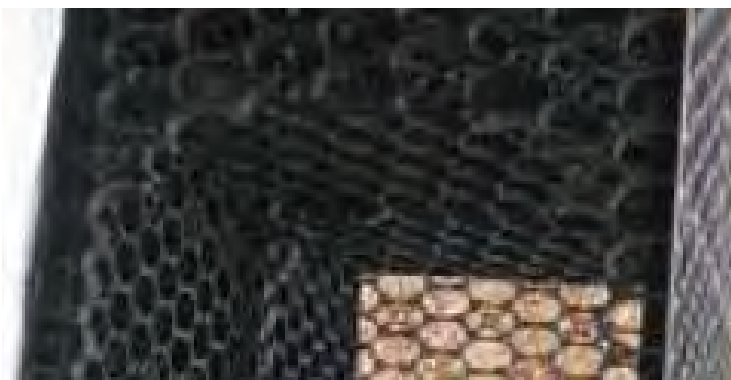


Fig. 15
If after adjusting the internal plates, the pipe will not fit, the top plate can be cut off centre and one of the internal plates can be removed.



TIP

If using prefabricated pipe boot kits, install them onto the pipe now, leaving the band clamps loose so that final adjustments may be made in Step 7.



TIP

If the location of maintenance ports is not shown on your plans, include a port within 3m of all inlet and outlet pipes (a single maintenance port can cover multiple pipe connections), and include additional maintenance ports, as needed, to prevent the distance between ports from exceeding 20m.



IMPORTANT

Do not over-cut the RainSmart module plates, minimise the gaps between the pipe and the RainSmart module plates. This is particularly important with the top plate.

12 RAINSMART® INSTALLATION GUIDE

Using your reciprocating saw, cut the horizontal plates in the centre, between the two internal plates, to accommodate the port. If the pipe will not fit between the two interior plates, one or both plates may be moved to the outer connection locations on the large plate (Fig. 13). All horizontally oriented plates will need to be cut EXCEPT FOR THE BOTTOM PLATE.

In total you will need to cut:

MODULES	CUT	MOVE
Half	1 Large Plate	2 Small Plates
Single	1 Large Plate	2 Small Plates
Double	2 Large Plates	4 Small Plates
Triple	3 Large Plates	6 Small Plates
Quad	4 Large Plates	8 Small Plates
Penta	5 Large Plates	10 Small Plates

For all modules you will need to disassemble the RainSmart module in order to cut and/ or move the interior plates.

Reassemble the RainSmart module when cutting is completed. Remember to insert the non-corrosive anti-scour pad in the bottom of the RainSmart module (should fit directly below the maintenance port), and replace the RainSmart module into the proper location (Fig. 15).

Install the pipe into the RainSmart module (Fig. 17) and seal the opening on top of the pipe with a cap or temporary lid to prevent debris from entering the system.



TIP

If using Prefabricated Pipe Boot Kits, install them onto the pipe now, leaving the band clamps loose so that final adjustments may be made in Step 7.



Fig. 16
Installed maintenance port



Fig. 17
Install port into RainSmart System



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**

7. WRAP RAINSMART SYSTEM WITH GEOTEXTILE

Clean off any debris that may be lying on top of the exposed geotextile around the perimeter of the RainSmart system.

Cut strips of geotextile to fit over the top and down both sides of the RainSmart system with at least 600mm of excess material on each side of the system. This 600mm flap should overlay the geotextile placed below the RainSmart modules, creating a clean 600mm overlap to wrap the system.

Adjacent strips of geotextile should overlap at least 300mm or as shown on plans. Use duct tape, sand bags or other ballast to temporarily secure overlaps.

Fold geotextile for outside corners similar to sheets on a bed, and lay excess material flat against RainSmart system. Leave corners loose to avoid creating weak spots in the material. Temporarily secure excess fabric with duct tape. Ensure geotextile is flush against RainSmart system.



IMPORTANT

Take special care with inside corners on the footprint of the system. Cut geotextile as needed to ensure that it lays flat against the RainSmart system. Use additional pieces of geotextile to seal the corner and any cuts that are made. Allow for 300mm overlap.



Fig. 18
Encapsulate RainSmart system with geotextile

Connect inlet & outlet pipes

Where the inlet and outlet pipes connect to the RainSmart system, cut an "X" into the geotextile. Pull the flaps of the "X" over the pipe so that the flaps of the "X" point AWAY from the RainSmart module. Use a stainless steel band clamp to seal the flaps to the pipe.

If used, adjust all pipe boots so that the fabric lays snug against the RainSmart system. Tighten the band clamps with a screw driver. Use duct tape to secure the boot flap to the outside of the geotextile envelope.



Fig. 21



WARNING

Inlet and outlet pipes must enter the RainSmart module allowing water to flow directly into or out of the system without filtering through the geotextile or module side wall. Failing to correctly connect pipes to the RainSmart module, will void the warranty. Where possible, use RainSmart 160mm or 300mm access plates.



TIP

If using prefabricated pipe boot kits, install them onto the inlet and outlet pipes, leaving the band clamps loose so that final adjustments may be made.



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**

8. BACKFILL SIDES

Place backfill material (same as bedding materials in Step 3) around perimeter of the RainSmart system, distributing the material evenly to prevent shoving of the RainSmart modules.

Use a trench roller or plate compactor to compact backfill in 300mm lifts.

Continue placing and compacting backfill in 300mm lifts until the material reaches the top of the RainSmart modules.



Fig. 22
Vibratory compaction of side backfill is always required, regardless of what backfill material is used.



WARNING

Care should be taken to NOT damage the geotextile or liner during backfill placement and compaction.



IMPORTANT

Vibratory compaction of the side backfill (Fig. 22) is a critical step that both compacts the backfill and eliminates the minor gaps between individual RainSmart modules. While some backfill materials will yield a 95% proctor density without compaction, **vibratory compaction of the material must be completed to ensure the stability of the system.** Skipping this step will void the manufacturer's warranty.

9. BACKFILL TOP

Dump backfill material adjacent to the RainSmart system and, using your skid-steer or dozer, place the material over the RainSmart system (Fig. 23). Install 100mm of clean backfill over the RainSmart system and compact backfill layer with walk-behind plate compactor (max 450kg). Place site specified cover material, over backfill layer, in no more than 300mm lifts. Continue compacting backfill material with a walk behind plate compactor until 450mm cover is achieved. Once 450mm cover is achieved, compact cover material using a 2-3 tonne smooth drum roller.

Largest track dozers that can be used with 450mm of cover over the RainSmart system.

MACHINE	OPERATING WEIGHT	TRACK DIMENSIONS	GROUND PRESSURE
Case 850K LGP	9.38 t	0.70m x 2.35m = 1.67 m ²	2.80 t/m ²
Caterpillar D5K LGP	9.68 t	0.66m x 2.31m = 1.52 m ²	3.17 t/m ²
John Deere 550J LGP	8.27 t	0.61m x 2.18m = 1.33 m ²	2.95 t/m ²
Komatsu D39PX-21	8.90 t	0.63m x 2.36m = 1.49 m ²	3.00 t/m ²
New Holland D95 LGP	9.38 t	0.71m x 2.36m = 1.68 m ²	2.81 t/m ²

** This list is not intended to be all inclusive, but representative.

If your machine is not listed, you'll need to find your vehicle's operating weight and measure the area where the tracks contact the ground. Take these dimensions and multiply them (length x width), then multiply by 2 (since the machine has two tracks), then divide the operating weight by the total sqm of contact area to determine the contact pressure of the machine. If the contact pressure is less than 4.8t and the operating weight is less than 9.0t the machine will work with 450mm of cover.



Fig. 23
Use skid-steer to place backfill over RainSmart modules.



TIP

When placing backfill over RainSmart modules, work in the direction of the geotextile overlap to avoid pushing material between the fabric layers.



WARNING

Dump trucks should not drive over or dump material on top of the RainSmart system, until pavement construction is fully complete.



WARNING

Some materials will compact significantly while others may shove excessively as you work. Never allow your lift thickness to compact to less than 300mm without adding more material.



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**

10. PLACE GEOGRID

Geogrid is required for all load-bearing applications (Fig. 24), such as systems placed beneath parking lots and roads. It is not required above systems used in open space where traffic is prohibited, such as sport fields or natural areas. Typically DuraGrid X 30/30 is used in this application.

Geogrid must be placed 300mm above the RainSmart system. Overlap adjacent panels by 300mm minimum or as specified in plans. Roll out geogrid over the top of the system, with the edges of the grid extending 1.5m from RainSmart system footprint or 1m from edge of excavation or more as show on plans.



Fig. 24
Overlap geogrid 300mm or as required by plans.

11. PLACE ADDITIONAL COVER MATERIAL AS NEEDED

If additional cover or pavement base is required by the plans, begin placing and compacting material in the same manner as discussed in Step 9. Push cover material parallel to the geogrid for best results.

Maximum cover for RainSmart modules is 2m with 4 internal plates. If your system exceeds these limits contact a Cirtex representative.



TIP

To achieve proper compaction requirements, it may be beneficial to begin placing material in 150mm lifts.

12. SECURE THE INSTALLATION

The contractor is to ensure the RainSmart system is protected from contamination during the construction phase of the project.

The RainSmart system should also be secured to prevent damage from construction equipment once it has been installed.

Rope off area (preferred method)

Use warning tape or temporary fencing to prevent unauthorised traffic from driving over the RainSmart system.

Regardless of which method is selected to secure the installation, it must remain in place until one of the following conditions is met:

- Pavement has been placed
- Construction activity at the site has been completed.



Fig. 25
Secure RainSmart system installation using barriers.



IMPORTANT

Some projects require the use of cranes above the RainSmart system. While it is advisable to avoid this scenario, it may be feasible to utilise a crane over the RainSmart system based on the depth of the RainSmart system installation and the size and weight of the crane. Please consult the project engineer or Cirtex for assistance prior to allowing a crane to drive over the RainSmart system.

13. INSTALLING PRETREATMENT DEVICES

If required by the engineer, install pre-treatment devices prior to activating the RainSmart system to keep debris from entering the system.



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**



SITING YOUR ELETANK - ELE5000 (25,000 Litres)

PREPARATION AND SITING FOR ELETANK

Try to locate your tanks away from the immediate vicinity of buildings to allow for future expansion and easy access for the Fire Service. Gone are the days when tanks are placed close to the house and downpipes run through the air. A few extra lengths of pipe now are less expensive than moving the tanks later. Rainwater is one of the few commodities that is free, so plan to collect water from all roof areas existing and proposed.

Delivery is relatively simple with the use of a large Hiab truck.

Allow 4.25 metres wide and 3.7 meters high for access for the delivery truck and its load.

Correct site preparation is essential. The loading must be transmitted through the floor onto the foundation – your ELETANK when filled with water will weigh 29,000Kgs.

The foundation requirements are for a bearing for 100kPa – the same as a house foundation.

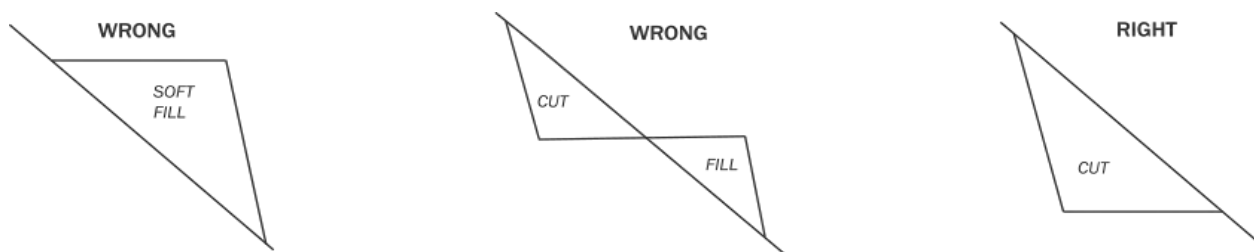
The site is to be chosen on virgin soil, flat and level and 4.1sqm. On this area spread a 100mm thickness of sand or fine metal. This equates to approximately 1.5 cubic metres. For sites where the tank is to be partially buried care must be taken to ensure that the bottom of the site is well drained to prevent Flotation of the tank when empty. (Specially designed tanks (ELE5000FLAT) are available for situations where the tank has to be completely buried.)

Do not back fill around your ELETANK until the tank has been filled with water for the first time.

Connections between dual tanks should be flexible to allow for differential site settlement and earth movement.

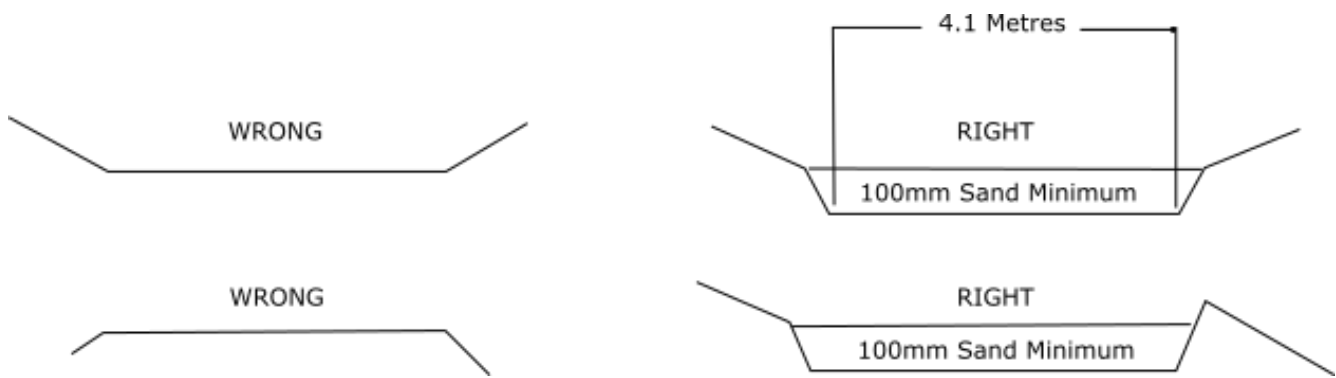
Protect Your Investment with Correct Site Preparation

Because water tanks are extremely heavy when full (29,000Kg), this type of loading demands a good foundation so that all the weight is distributed evenly on to solid ground.



If the site is off-level, the ELETANK will not sit plumb and will look odd. A level and straight edge must be used to avoid this. We recommend that the area designated for the tank be a prepared 4.1 metres square.

NOTE: Besides being level, the site **MUST** be flat to allow the ELETANK to sit evenly. If it is convex, concave or corrugated, the base of the ELETANK will bend to take on this ground shape when full. This pressure creates stress at the joint where the walls of the ELETANK meet the base and can cause leaks. A tolerance of 25mm - 100mm, is permitted over the site.



Because it is very difficult to get a site dead level on solid ground a cushion course or gasket of 100mm of loose moving material such as scoria, sand, builders mix, fine metal etc; is required to blind out small irregularities in the solid foundation. This cushion course must not be used to overlay uneven or soft ground instead of preparing a proper site initially.

After the ELETANK is delivered, the cushion course should be sealed in by placing soil or similar material around the base of the ELETANK and up the walls about 100mm. This prevents material such as sand being washed or blown away after delivery, thus creating holes under the base of the ELETANK and the danger of uneven weight distribution when the ELETANK is full. (Overflow should be piped well away from the foundation to avoid erosion).

ELETANKS are delivered by lifting off a truck with a rear mounted Hiab. The truck needs to have clearance from fences, banks, buildings etc.

OTHER POINTS TO WATCH ARE -

- 1| That the ELETANK will be low enough to catch the water from you lowest roof line
- 2| There are no overhead wires, branches etc, blocking the access of the loaded ELETANK delivery truck
- 3| The ground is firm enough for the truck and there are no holes, drains or septic tanks etc, to fall into
- 4| Do not completely fill your ELETANK after delivery. Allow gradual filling if possible

When siting your concrete water tank please remember that your ELETANK weighs 7000kg and a FLAT TOP TANK weighs 9000kg. Although it is simple to handle with the equipment we utilise; this equipment is specialised and very expensive. This equipment is not widely available, with the alternative being a separate crane and flat-deck truck.

Because the ELETANKS are 3.62 metres wide at the roof they are a wide-load and require a pilot on the road. The pilot and pilot vehicle are required by law and operate under stringent conditions with time restrictions. Due to these requirements our deliveries can be prone to delay.

Please ensure that you do not have other contractors (eg: plumbers, diggers) waiting on site specifically for your ELETANK delivery. The Company will not accept responsibility for your contractor's costs.

Remember that on arrival our pilot vehicle driver checks your site is correct as per the instructions above and assists our contractor with the siting procedure. If not correct, extra waiting time will be chargeable.

There is no need for other contractors to be there unless special site conditions apply. However, we do recommend that the owner of the property is on-site so that the ELETANK is positioned exactly where envisaged (provided this is practical).

We allow 30 minutes to site an ELETANK. Any extra time on site is chargeable at the delivery contractor's discretion.

If you are experiencing any delivery problems or if you require further information regarding your site, please contact our office for advise

*NOTE| Guarantee is only valid if the site meets these requirements
Buried tanks require special preparation, see separate siting sheet for details*

**FOR SALES & SERVICE PHONE
0800 ELE 222**



ADDITIONAL SPECIFICATIONS FOR
FLAT TOP WATER TANKS
BURIED IN THE GROUND

PROTECT YOUR INVESTMENT WITH CORRECT SITE PREPARATION.
FOLLOW THE ADVICE AND INSTRUCTIONS ON THE ATTACHED SITING SHEET.

When tanks are placed below ground adequate sub drainage MUST be provided to stop tanks rising when empty due to rising water tables

Access MUST be provided through the TOP of the buried tanks

If multiple tanks are installed under ground, coupling together would be preferred at the TOP

All joints between tanks are to be FLEXIBLE

If compacting around in-ground tanks, FILL TANKS FIRST, before compacting starts

If installing tanks under a floor, the floor MUST be designed to carry the loading

Tanks should not be buried more than the 300mm riser height without engineering advice

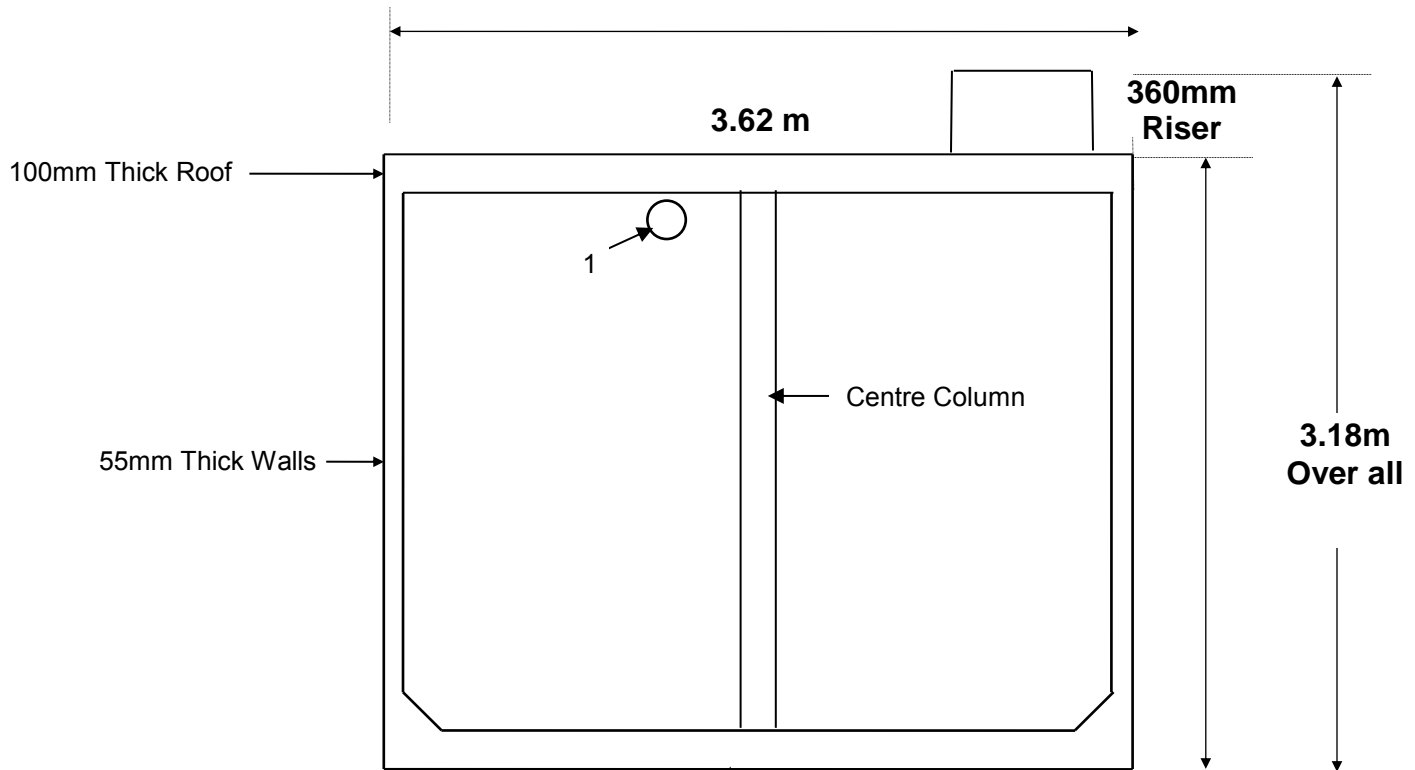
Installation of buried tanks - in special conditions ie: under floor - must be supervised by a REGISTERED ENGINEER

**Please Note: This siting sheet is used in conjunction with
"SITING YOUR ELETANK" information sheet**

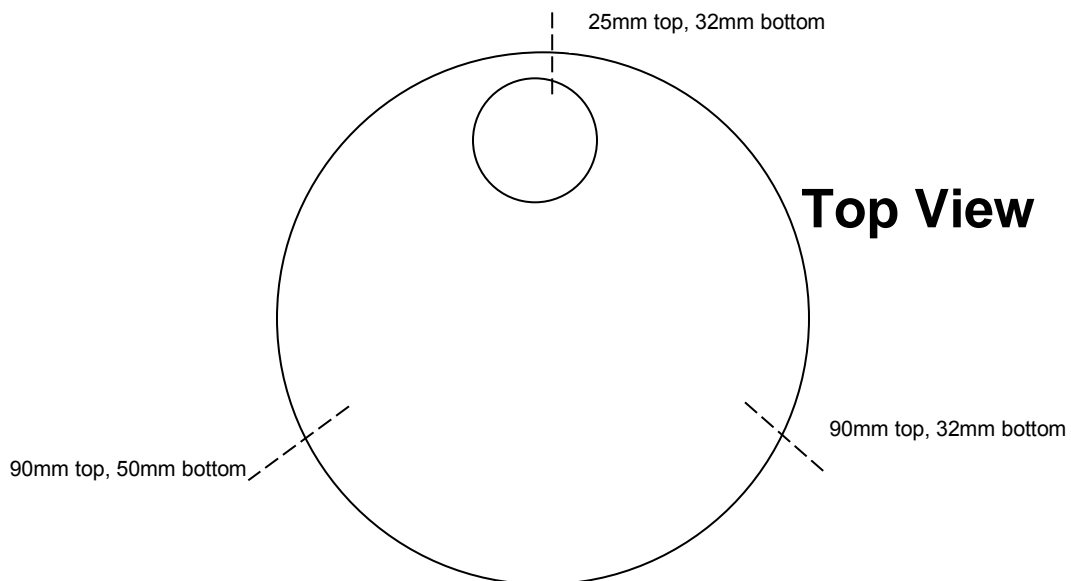
FOR SALES & SERVICE PHONE
0800 ELE 222

Flat-Top Water Tank

(ELE5000FLAT - 25000Lt Flat Top) 3.18m Over all depth

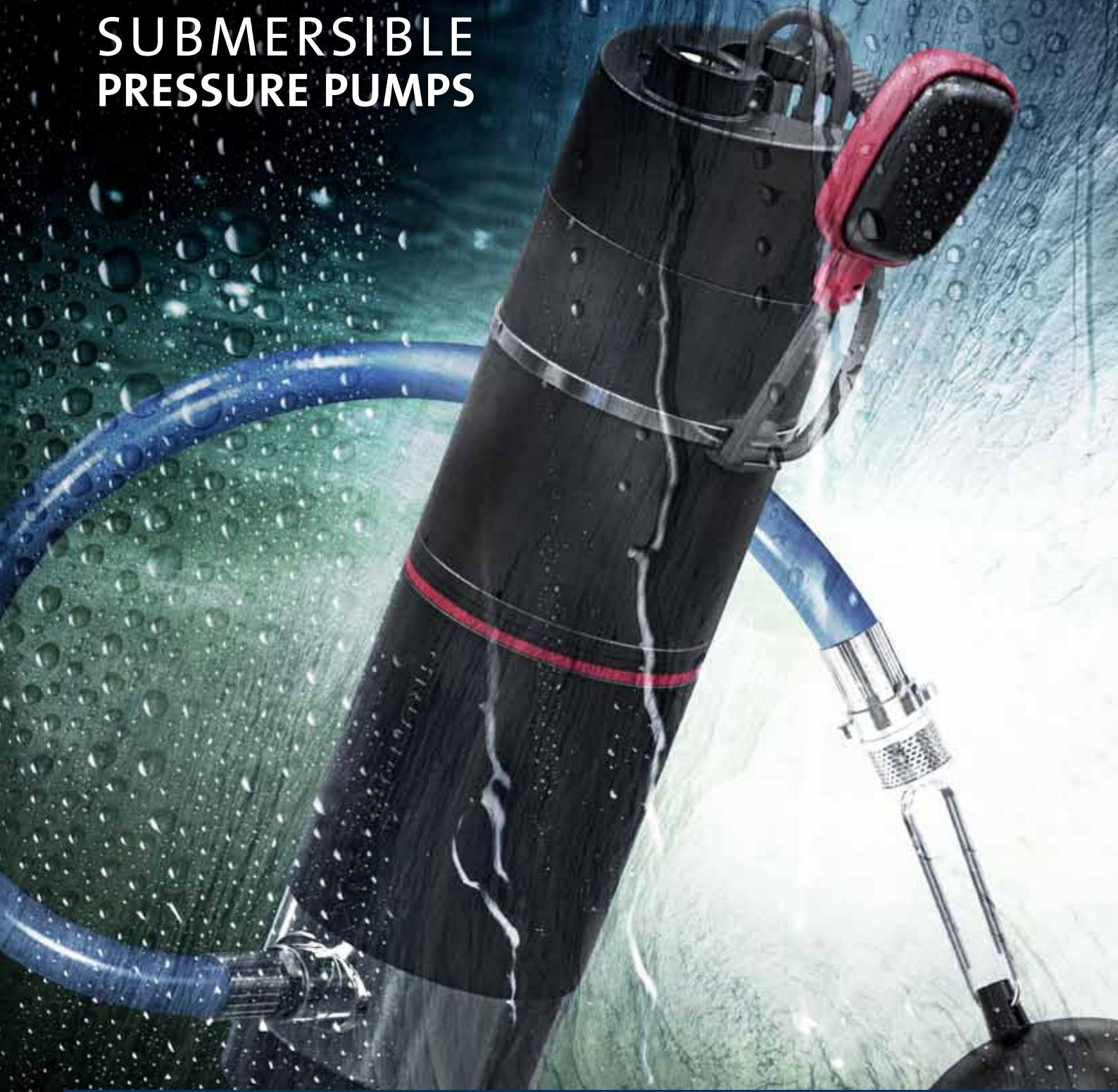


- 1. Overflow 90mm x 2
- 2. Outlets 32mm x 2
and Outlet 50mm x 1
- 3. Aux Inlet/Outlet 25mm x 1



SB&SBA

RELIABLE SUBMERSIBLE PRESSURE PUMPS



be
think
innovate

GRUNDFOS 

GRUNDFOS PUMP SOLUTIONS

Grundfos submersible pump solutions range from small submersible pressure pumps for domestic purposes to complete pressure management systems for commercial applications.

Our pump solutions turn rainwater in collecting tanks or water from wells into a reliable source of water for domestic and commercial applications.

Domestic submersible pressure pumps

The Grundfos SB and SBA are submersible pressure pumps. They offer simple installation and reliable operation in domestic applications such as:

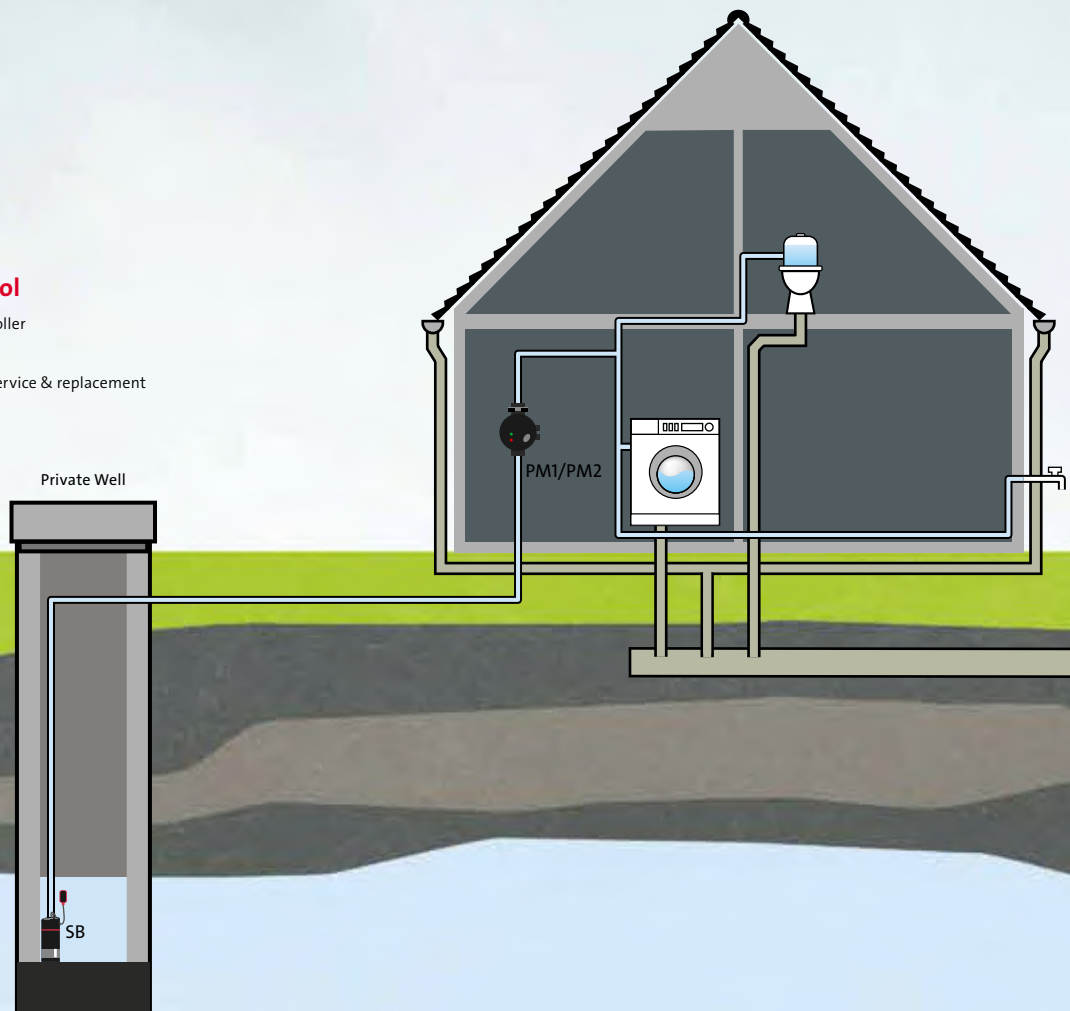
- Private wells
- Rain water tanks

SB - with external control

- Flexible selection – Pump + controller
- Complete control and monitoring
- Easily accessible controller – for service & replacement

Water from private wells

Water from private well, typically supplies drinking water to areas that are not connected to the municipal water supply. Or serves as a supplement to traditional water supply and used for irrigation, flushing toilets, washing machines in private homes and weekend cottages.



Water from rainwater tanks

The harvesting of rainwater involves filtration of roof run-off and subsequent storage for later use.

The water is collected from the roofs of buildings and stored in rainwater tanks.

The collected and stored rainwater is ideal for:

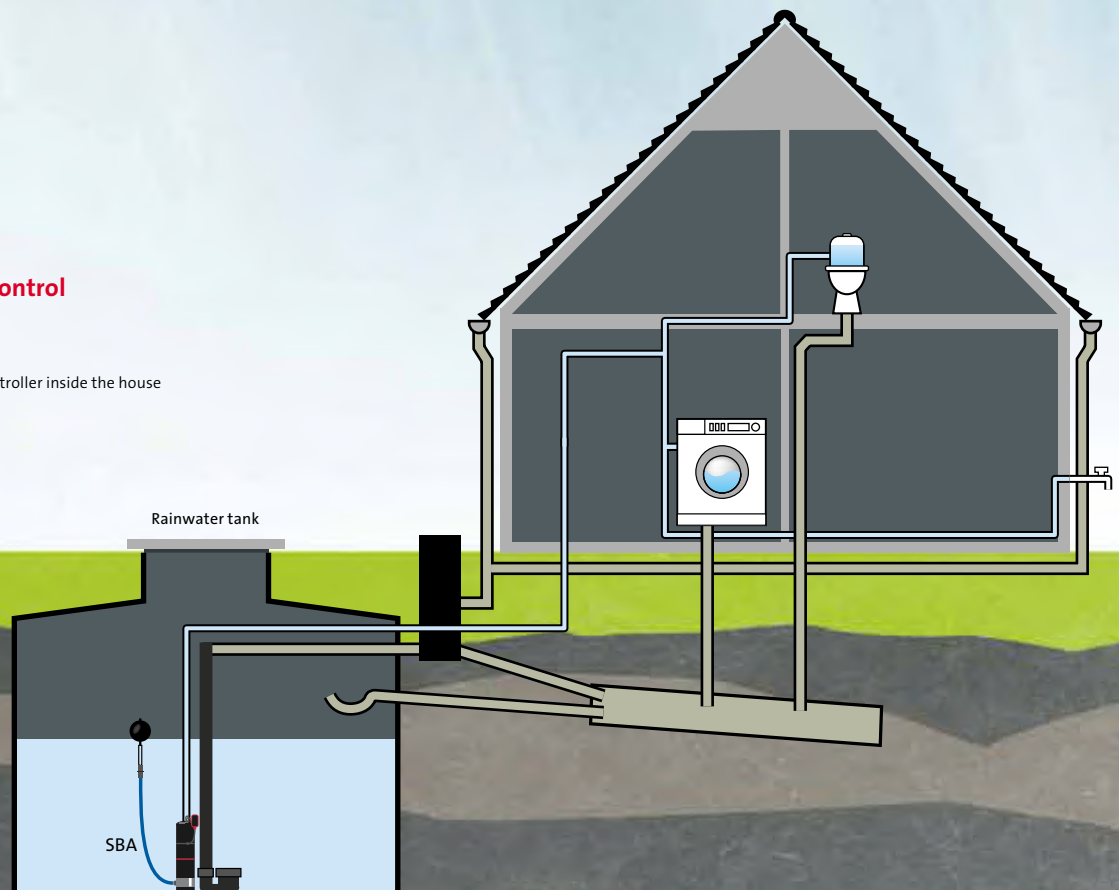
- Garden watering
- Toilet flushing
- Washing machines
- Car washing

Benefits of rainwater harvesting:

- **Reduces the risk of flooding**
Less pressure on the sewer at peak loads.
- **Saves up to 50 % of drinking water**
Use rainwater for purposes that do not require drinking water quality.
- **Prolongs the life of appliances**
Rainwater is soft water, which reduces lime scale build-up.

SBA - with internal control

- Easy selection – one unit
- Easy installation – one unit
- Flexible installation – no controller inside the house



PRODUCT OVERVIEW



SB

The Grundfos SB is a submersible pump for the pumping of clean water. It is designed for use in domestic applications.

The pump itself is very silent, and when installed underground in a rainwater collecting tank or well, noise will never become an issue. The SB pump requires an external controller, like Pressure Manager, for automatic operation.

SBA

The new Grundfos SBA is a complete all-in-one unit. It is built on the proven SB platform, but comes with an integrated control unit – eliminating the need for an external pump controller.

With the new SBA, everything you need to guarantee reliable pumping of water is included.

Built to your needs

Many installers and home owners want simple but reliable pump solutions that require only a minimum of changes to the original installation.

The SBA is literally a plug- and pump solution. Once installed and connected to the piping, all you need to do is switch on the pump. The result is a reliable solution and greatly reduced installation costs.

SB/SBA two main versions:

All SB and SBA are available in the following configurations:

- With integrated suction strainer (1 mm mesh)
- Or with side inlet/flexible suction hose with floating suction strainer (1 mm mesh).

All variants are available with or without float switch

The float switch offers stop at low water level, ensuring that surface fragments do not enter the strainer.

SB/SBA features and benefits:

Noiseless operation

The SB pump emits no noise when submerged and is therefore a noiseless alternative to non-submersible pumps.

High reliability

The SB pump is built from composite and stainless-steel materials which are resistant to corrosion. Furthermore, the pump has a stainless-steel strainer which prevents large particles from entering the pump housing.

Integrated protection

The pump offers thermal overload protection.

Floating suction strainer

The model with floating suction strainer always draws the water from just below the water surface where the water is clean and free from solid particles.

Especially for SBA:

- Simplicity – all-in-one unit
- Easy installation – no external control unit
- Integrated dry-running protection
- Automatic restart after dry-running
- Lifting eye



EXTERNAL PRESSURE MANAGER

The SB requires an external control unit. Used in combination with a Grundfos Pressure Manager PM1 or PM2 placed above ground, users have easy access to all information and complete control over the application.

Complete control

The external Pressure Manager for SB pumps comes in two variants:

- PM1 for basic flexibility
- PM2 for all-round control

PM1/PM2 Features and benefits:

Well-known Grundfos quality

- State-of-the-art product design
- Robust materials and electronics

Flexibility & adaptability

- Fits all domestic water supply pumps
- Easy to adapt to different types of systems (PM2 only)
- Free positioning in installation
- Adjustable start pressure (PM2 only)
- Plug-and-pump operation

High safety

- Dry-running protection
- Cycling alarm

Easy control & monitoring

- Intuitive LED user interface

PM1 and PM2 features

Model	PM1	PM2
Power on indication	•	•
Pump running indication	•	•
Alarm indication	•	•
Dry-running protection	•	•
Free position in installation	•	•
Suitable for generator supply	•	•
Rotary outlet connection	•	•
Integrated non-return valve	•	•
Cycling alarm	•	•
Internal pressure tank	•	•
Integrated pressure sensor from Grundfos Direct Sensors™		•
Adjustable start pressure		•
Start/stop with 1 bar differential pressure		•
Auto restart after dry running		•
Maximum run time 30 min. (safety)		•
Pressure indication		•

BENEFITS



Unique user benefits

Noiseless operation

Submerged SB/SBA pumps are noiseless alternatives to non-submersible pumps.

Resistant to corrosion

Made from composite and stainless-steel materials.

No clogging

Stainless-steel strainer prevents large particles from entering the pump housing.

No defects in case of water shortage

The SBA features integrated dry-running protection. All pumps are available with float switches for low water stop.

Clean water

The floating suction strainer draws the water from just below the water surface where the water is clean and free from solid particles.

Longer life

A Grundfos float switch prevents air from entering the system as a result of dry running.

Overheat protection

Built-in thermal protection immediately stops the pump if it overheats. The pump automatically restarts when it has returned to normal temperature.

Automatic restart

SBA with float switch automatically restarts when water is added.

SBA without float switch will try to restart every 24 hours.

SB with float switch will stop in case of low water. Restart is managed by the external controller.

TECHNICAL INFORMATION

SB pump range

Pump type	Max head/ nominal flow
3-25	25 mWc / 3m ³ /h
3-35	35 mWc / 3m ³ /h
3-45	45 mWc / 3m ³ /h

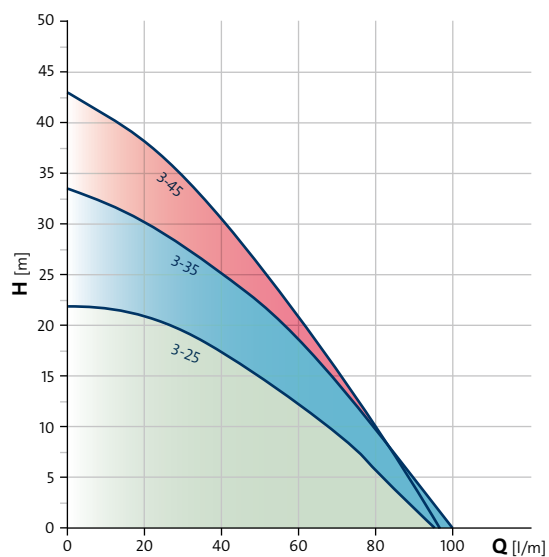
SBA pump range

Pump type	Max head /nominal flow
3-35	35 mWc / 3m ³ /h
3-45	45 mWc / 3m ³ /h

Technical data

Max depth	10 m. (for both SB and SBA)
Liquid temperature	0-40 °C

Performance: SB & SBA (50 & 60 hz)



Pumps for every purpose

In addition to submersible pump solution for installation inside rainwater-collecting tanks and wells, Grundfos offers a wide range of other solution – including dry installed pumps. These cover applications such as:

- Households
- Gardens
- Hobby activities
- Agriculture
- Horticulture
- Small industries

All Grundfos pump solutions come either as complete ready-to-install systems for monitoring and control of water distribution, or as custom solutions tailored specifically for your application.

To learn more and find your Grundfos solution please visit:

www.moderncomfort.grundfos.com

OUR REF 12016

January 26, 2021

David Reid Homes
Box 148
PARAPARAUMU

ATTENTION: Tim Sunderland

EMAIL: tim.sunderland@davidreidhomes.co.nz

by email only

Dear Sir

**PROPOSED DWELLINGS
ANDERSON PARK SUBDIVISION
104-110 NGARARA ROAD, WAIKANAE, KAPITI COAST**

This letter is in response to an RFI from Council requesting confirmation of the liquefaction/lateral spread risk for several residential sites in the subdivision.

The geotechnical report for the subdivision, reference 12016 dated September 2019 for the Stage 1B subdivision clearly assesses the liquefaction and lateral spreading risks/effects for the subdivision. The report was provided as part of the original subdivision consent and in Council files.

This letter is in response to Lots 6 and 11, but is relevant to all lots in this stage of the subdivision.

The report assessment indicated the following:

- Under an SLS (serviceability) event the site is considered resistant to liquefaction.
- Under a ULS (ultimate) event some liquefaction may occur at depth (9.5 to 14.6 metres) but is expected to be largely rafted by the overlying soils with minimal effects (settlement up to 50 mm) possible.
- Lateral spreading is not considered a risk.

We trust this allows the consent process to continue.

Yours faithfully
ABUILD™ Consulting Engineers Limited



Richard Skilton
BE(Hons) CEngNZ CPEng
Chartered Professional Engineer
Director

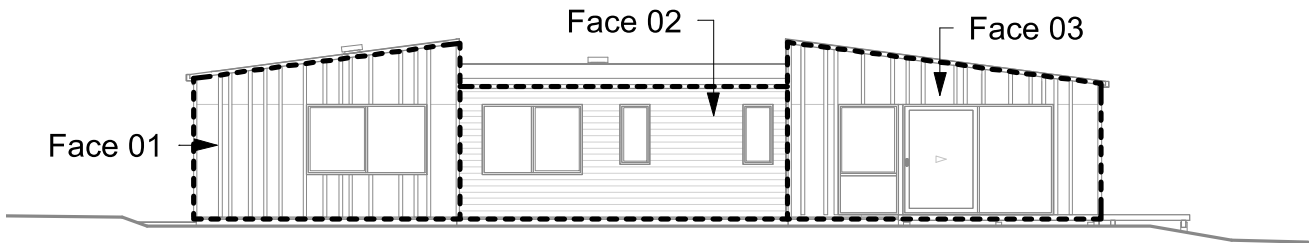
RISK MATRIX CALCULATION

(to E2/AS1 Building Envelope Risk Matrix)

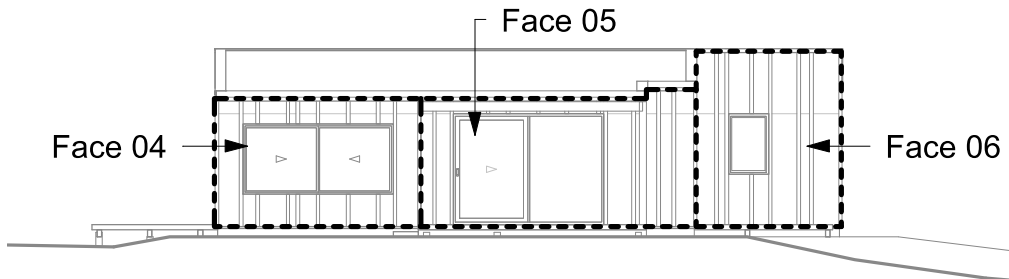
for

Proposed House
Dan and Suki Green
Lot 6 Anderson Park
Waikanae

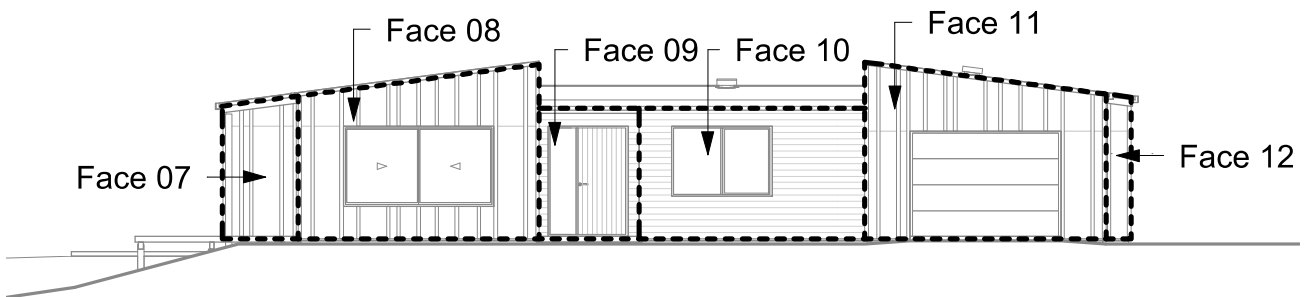
Job Number: 20018



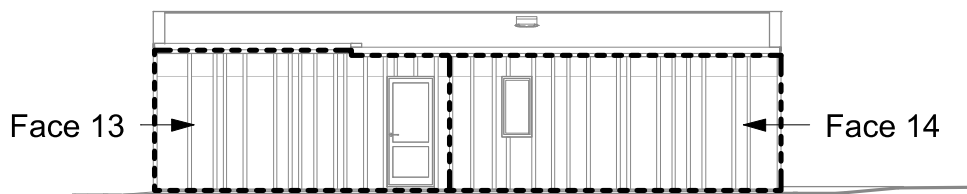
RISK ELEVATION 1



RISK ELEVATION 2



RISK ELEVATION 3



RISK ELEVATION 4

Risk Matrix Calculation

to E2/AS1 Building Envelope Risk Matrix



Wind Zone	Risk Factors												Total Risk Score
VERY HIGH	Wind Zone		Number of Storeys		Roof/Wall Intersection		Eaves Width		Envelope Complexity		Deck Design		
Building Faces (Refer Risk-Key)	Severity	Score	Severity	Score	Severity	Score	Severity	Score	Severity	Score	Severity	Score	
1,3,4,5,8,11,13,14	VH	2	L	0	M	1	VH	5	L	0	L	0	8
2,10	VH	2	L	0	M	1	VH	5	L	0	L	0	8
6	VH	2	L	0	H	3	VH	5	L	0	L	0	10
7,12	VH	2	L	0	L	0	L	0	L	0	L	0	2
9	VH	2	L	0	L	0	L	0	L	0	L	0	2

Risk Severity Key:	
Low Risk	L
Medium Risk	M
High Risk	H
Very High Risk	VH

Suitable Wall Claddings

to E2/AS1 Building Envelope Risk Matrix

Risk Score	Suitable Wall Claddings as per E2/AS1 - Table 3	
	Direct fixed to framing	Over nominal 20mm drained cavity
		Claddings on parapets, enclosed balustrades, and in Extra High wind zones shall be installed over drained cavity (5)(6)
0 – 6	a) Timber weatherboards – all types b) Fibre cement weatherboards c) Vertical profiled metal (3) – corrugated and symmetrical trapezoidal d) Fibre cement sheet (4) (Jointed finish) e) Plywood sheet	a) Masonry veneer (2) b) Stucco c) Horizontal profiled metal (3) – corrugated and trapezoidal only d) Fibre cement sheet (Flush-finished) e) EIFS
7 – 12	a) Bevel-back timber weatherboards b) Vertical timber board and batten c) Vertical profiled metal (3)(6) – corrugated only	a) Masonry veneer (2) b) Stucco c) Horizontal profiled metal – corrugated and trapezoidal only d) Rusticated weatherboards e) Fibre cement weatherboards f) Fibre cement sheet (Flush and jointed finish) g) Plywood sheet h) EIFS
13 – 20	a) Vertical profiled metal (3)(6) – corrugated only	a) Masonry veneer (2) b) Stucco c) Horizontal profiled metal – corrugated and trapezoidal only d) Rusticated weatherboards e) Fibre cement weatherboards f) Fibre cement sheet (Flush and jointed finish) g) Plywood sheet h) EIFS i) Bevel-back weatherboards
Over 20	a) Redesign the building to achieve a lower score, or b) Specific design – The design may need changing to reduce the risk – The building consent authority may require more comprehensive details and documentation providing evidence of weathertightness – The building consent authority, designer or owner may require more inspections – A third party audit of the design may be required.	
NOTES:		
(1) The wall claddings in this table are limited to those covered in this Acceptable Solution.		
(2) Traditional masonry veneer as per SNZ HB 4236, with minimum 40 mm cavity.		
(3) Refer Figure 38 for profiles.		
(4) Except stucco over a fibre cement backing.		
(5) Claddings in Extra High wind zones require rigid underlays - Refer to Paragraph 9.1.7.2		
(6) Direct fix vertical corrugated steel is included as cavity construction		

Definitions of Risk Levels

to E2/AS1 Building Envelope Risk Matrix

Definitions of risk levels as per E2/AS1 - Table 1

Risk Factor	Score (5)	Risk Severity	Comments
A: Wind zone	0	Low risk	Low wind zone as described by NZS 3604
	0	Medium risk	Medium wind zone as described by NZS 3604
	1	High risk	High wind zone as described by NZS 3604
	2	Very high risk	Very high wind zone as described by NZS 3604
	2	Extra high risk	Extra high wind zone as described by NZS 3604 (4)
B: Number of storeys	0	Low risk	One storey
	1	Medium risk	Two storeys in part
	2	High risk	Two storeys
	4	Very high risk	More than two storeys
C: Roof/wall intersection	0	Low risk	Roof-to-wall intersection fully protected (e.g. hip and design gable roof with eaves)
	1	Medium risk	Roof-to-wall intersection partly exposed (e.g. hip and gable roof with no eaves)
	3	High risk	Roof-to-wall intersection fully exposed (e.g. parapets, enclosed balustrades or eaves at greater than 90° to vertical with soffit lining)
	5	Very high risk	Roof elements finishing within the boundaries formed by the exterior walls (e.g. lower ends of aprons, chimneys, dormers etc)
D: Eaves width (1)(2)	0	Low risk	Greater than 600 mm for single storey
	1	Medium risk	451 – 600 mm for single storey, or over 600 mm for two storey
	2	High risk	101 – 450 mm for single storey, or 451 – 600 mm for two storey, or greater than 600 mm above two storey
	5	Very high risk	0 – 100 mm for single storey, or 0 – 450 mm for two storey, or less than 600 mm above two storey
E: Envelope complexity	0	Low risk	Simple rectangular, L, T or boomerang shape, with single cladding type
	1	Medium risk	Moderately complex, angular or curved shapes (e.g. Y or arrowhead) with no more than two cladding types
	3	High risk	Complex, angular or curved shapes (e.g. Y or arrowhead) with multiple cladding types
	6	Very high risk	As for High risk, but with junctions not covered in C or F of this table (e.g. box windows, pergolas, multi-storey re-entrant shapes etc)
F: Deck design (3)	0	Low risk	None, timber slat deck or porch at ground floor level
	2	Medium risk	Fully covered in plan by roof, or timber slat deck attached at first or second floor level
	4	High risk	Enclosed deck exposed in plan or cantilevered at first floor level
	6	Very high risk	Enclosed deck exposed in plan or cantilevered at second floor level or above

NOTES:

(1) Eaves width measured horizontally from external face of wall cladding to outer edge of overhang, including gutters and fascias.

(2) Balustrades and parapets count as 0 mm eaves.

(3) The term deck includes balconies, as described in the Definitions.

(4) For buildings in Extra High wind zones, refer to Table 3 for rigid underlay and drained cavity requirements.

(5) Refer also to Table 2

H1 ENERGY ANALYSIS

(Calculation Method)

for

Proposed House
Dan and Suki Green
Lot 6 Anderson Park
Waikanae

Job Number: 20018

HEAT LOSS EQUATION
REFERENCE BUILDING



Wall construction type:	Non-Solid
Climate Zone:	Zone 2
Glazing percentage:	23%

Non-Solid R-values as per NZS 4218 - Table 5			
Component	Area (m ²)	R-value (m ² °C/W)	Heat Loss (W/°C)
Roof (incl. Skylights)	161.74	2.90	55.8
Wall	121.50	1.90	63.9
Floor	161.49	1.30	124.2
Glazing (30%)	52.07	0.26	200.3
Glazing (>30%)		0.40	
Total			444.2

HEAT LOSS EQUATION
PROPOSED DESIGN

Component	Area (m ²)	R-value (m ² °C/W)	Heat Loss (W/°C)
Roof 1	50.60	2.27	22.3
Roof 2	110.90	3.09	35.9
Wall 1	87.65	2.14	41.0
Wall 2	27.31	2.17	12.6
Wall 3	19.13	2.05	9.3
Floor 1	161.49	1.91	84.5
Wdw 1	39.48	0.26	151.8
Skyl. 1	0.24	0.31	0.8
		Total	358.2

NOTE: Refer to component descriptions for type details.

COMPONENT DESCRIPTIONS
PROPOSED DESIGN

ROOFS							Total
Type	Cladding	Type	Construction	Frame	Spacing	Insul.	R-value
Roof 1	Profiled Metal	Rufters	Rafters and battens	70mm	900mm	R3.2	2.27
Roof 2	Profiled Metal	Truss	Bottom chord and battens	90mm	900mm	R3.2	3.09

WALLS							Total
Type	Cladding	Type	Construction	Frame	Stds/dwngs	Insul.	R-value
Wall 1	Battens on Ply	Cavity	Timber framed	90mm	400/800mm	R2.6	2.14
Wall 2	Bevel-back WB	Cavity	Timber framed	140mm	400/800mm	R2.6	2.17
Wall 3	10mm GIB - 2 sides	Direct fixed	Timber framed	90mm	600/800mm	R2.4	2.05

FLOORS							Total
Type	Flooring	Type	Construction	Frame	Ratio / crs	Insul.	R-value
Floor 1	Concrete	Slab on ground	50mm EPS under slab	90mm	2.39	R1.32	1.91

WINDOWS					Total
Type	Framing	Type	Construction	Glazing	R-value
Wdw 1	Aluminium	Vertical	Double glazed	Clear	0.26

SKYLIGHTS					Total
Type	Framing	Type	Construction	Glazing	R-value
Skyl. 1	VELUX	TWR OK14	Low Pitch fixed	Low-e	0.31

WALL DATA
PROPOSED DESIGN

Wall sub-totals per type	Area (m ²)
Wall type 1	87.65
Wall type 2	27.31
Wall type 3	19.13
Wall type 4	
Wall type 5	
Wall type 6	
Wall type 7	
Wall type 8	
Wall type 9	
Wall type 10	
Wall type 11	
Wall type 12	
Wall type 13	
Wall type 14	
Wall type 15	
Wall type 16	
Wall type 17	
Wall type 18	
Wall type 19	
Wall type 20	
Sum of actual wall areas (excl. openings)	134.09
Sum of total wall areas (incl. openings)	173.57
70% of total wall area	121.50
30% of total wall area	52.07
Sum of high thermal mass walls	N/A

WINDOW DATA
PROPOSED DESIGN

Window sub-totals per type	Area (m²)
Window type 1	39.48
Window type 2	
Window type 3	
Window type 4	
Window type 5	
Sum of window areas	39.48

Total windows minus 30% walls	-12.59
--------------------------------------	---------------

Window to wall ratio	23%
-----------------------------	------------

SKYLIGHT DATA
PROPOSED DESIGN

Type Mark	Type	Width (mm)	Height (mm)	Area (m ²)
1	SL01	400		0.12
1	SL02	400		0.12

Skylight sub-totals per type	Area (m ²)
Skylight Type 1	0.24
Skylight Type 2	
Skylight Type 3	
Skylight Type 4	
Skylight Type 5	
Sum of skylight areas	0.24

Demand Calculation Sheet

Job Details

Name: Dan and Suki Green
Street and Number: Anderson Park
Lot and DP Number: Lot 6
City/Town/District: Waikanae
Designer: Shasthri Herath
Company: AD Architecture
Date: 28/05/2020

Building Specification

Number of Storeys: 1
Floor Loading: 2 kPa
Foundation Type: Slab

Single

Cladding Weight: Light
Roof Weight: Light
Room in Roof Space: No
Roof Pitch (degrees): 7.5
Roof Height above Eaves (m): 1.0
Building Height to Apex (m): 3.5
Ground to Lower Floor (m): 0.2

Average Stud Height (m): 2.4
Building Length (m): 18
Building Width (m): 12.4
Building Plan Area (m²): 164.5

Building Location

Wind Zone = Very High

Earthquake Zone 3

Soil Type: D & E (Deep to Very Soft)
Annual Prob. of Exceedance: 1 in 500 (Default)

Bracing Units required for Wind

	Along	Across
Single Level	570	677

Bracing Units required for Earthquake

	Along & Across
Single Level	845

Single Level Along Resistance Sheet

Job Name: Dan and Suki Green

									Wind	EQ
									Demand	
									570	845
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1067 187%	1020 121%
A	1	0.40		2.4	GS1-N	GIB®	21	23		
	2	0.90		2.4	GS1-N	GIB®	57	53		
	3	0.50		2.4	GS1-N	GIB®	28	29		
	4	0.50		2.4	GS1-N	GIB®	28	29		
	5	1.50		2.4	GS1-N	GIB®	104	90		
									236 OK	225 OK
b	1	1.50		2.4	GS1-N	GIB®	104	90		
	2	1.20		2.4	GS1-N	GIB®	83	72		
	3	1.20		2.4	GS1-N	GIB®	83	72		
	4	1.10		2.4	GS1-N	GIB®	74	66		
									343 OK	300 OK
c	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	0.90		2.4	GS1-N	GIB®	57	53		
									140 OK	125 OK
d	1	0.75		2.4	GS1-N	GIB®	45	44		
	2	0.75		2.4	GS1-N	GIB®	45	44		
	3	0.50		2.4	GS1-N	GIB®	28	29		
	4	0.70		2.4	SBD-9	Strandboard	74	81		
									191 OK	198 OK
e	1	0.75		2.4	SBD-9	Strandboard	79	86		
	2	0.75		2.4	SBD-9	Strandboard	79	86		
									158 OK	173 OK

Single Level Across Resistance Sheet

Job Name: Dan and Suki Green

									Wind	EQ
									Demand	
									677	845
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1060	988
									157%	117%
M	1	0.80		2.4	GS1-N	GIB®	49	47		
	2	0.40		2.4	GS1-N	GIB®	21	23		
	3	1.20		2.4	GS1-N	GIB®	83	72		
									153 OK	142 OK
n	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	1.20		2.4	GS1-N	GIB®	83	72		
									166 OK	144 OK
o	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	1.20		2.4	GS1-N	GIB®	83	72		
									166 OK	144 OK
p	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	2.30		2.4	GS1-N	GIB®	159	138		
	3	1.20		2.4	SBD-9	Strandboard	126	138		
									368 OK	348 OK
q	1	1.20		2.4	GS1-N	GIB®	83	72		
	3	1.20		2.4	SBD-9	Strandboard	126	138		
									209 OK	210 OK

Custom Wall Elements

Supplier	System	Min. Length m	Wind BUs/m	EQ BUs/m
Strandboard	SBD-9	0.6	105	115
Ecoply	EPB1_0.4	0.4	80	95
Ecoply	EPB1_0.6	0.6	95	105
Ecoply	EPB1_1.2	1.2	120	135
Ecoply	EPBG_0.4	0.4	100	115
Ecoply	EPBG_1.2	1.2	150	150
Ecoply	EP1_0.4	0.4	80	95
Ecoply	EP1_0.6	0.6	95	105
Ecoply	EP1_1.2	1.2	120	135
Ecoply	EPBS_0.4	0.4	60	60
Ecoply	EPBS_0.6	0.6	60	65
Ecoply	EPBS_1.2	1.2	65	70
Ecoply	EPBS_2.4	2.4	80	90
Gammabrace	GBF400_2.4	0.4	112	137
Gammabrace	GBF600_2.4	0.6	133	150

BC200896

Received by

Kapiti Coast District Council

7/12/20

Hamish Wells

Civil Engineer

CMEngNZ #186323

Engineer Ltd

CIVIL
STRUCTURAL
INFRASTRUCTURE
LAND DEVELOPMENT
ENVIRONMENTAL

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PO Box 188, Otaki 5512

Hamish Wells
M: 0274 459 757

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184

6/11/2020

SITE SOIL REPORT

Address : Lot 6 Anderson Park
Waikanae
Prepared for: David Reid Homes

Civil Engineer
CMEngNZ #186323

Site suitability test report in terms of NZS 3604:2011 Timber framed buildings - Section 3 "Site requirements"

Date: 6/11/2020

Site Data

Address: Lot 6 Anderson Park
Town: Waikanae
Post code: 5391

Client Data

Client: David Reid Homes
Email: Tim.sunderland@davidreidhomes
Address:
Mobile: 021 880033
Landline:

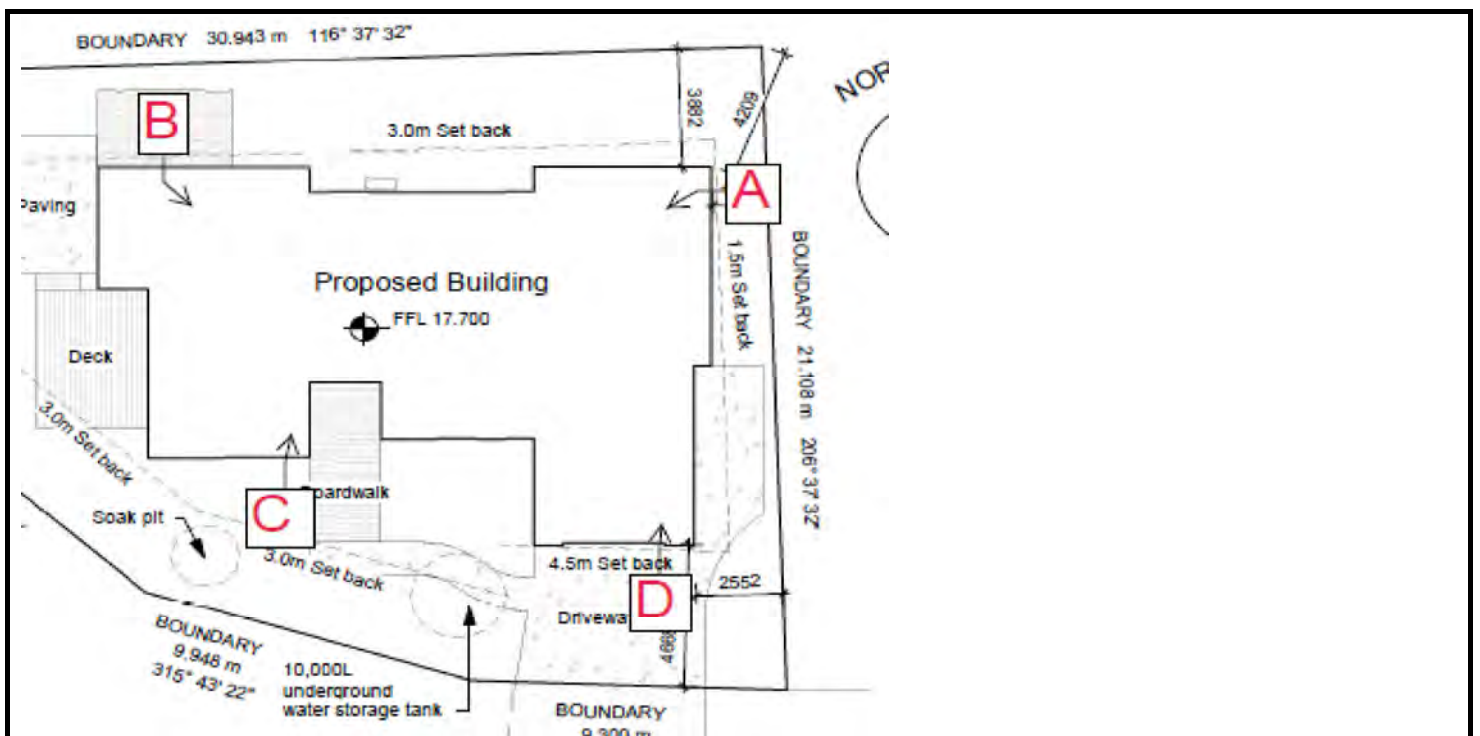
Legal

Lot: 6 **DP:** TBC
TA: KCDC
RA: GWRC

Wind Zone prov: VH
Corrosion zone: C
Earthquake zone: 3
Site subsoil class prov: D & E

Topography: Residential section with gentle contours
Basic soil type: Active Sand Dunes
NZGS data: Q1d on the map
Tested by: JM

Site Plan showing test locations



Hamish Wells

Civil Engineer
CMEngNZ #186323

Engineer Ltd

CIVIL
STRUCTURAL
INFRASTRUCTURE
LAND DEVELOPMENTS
ENVIRONMENTAL

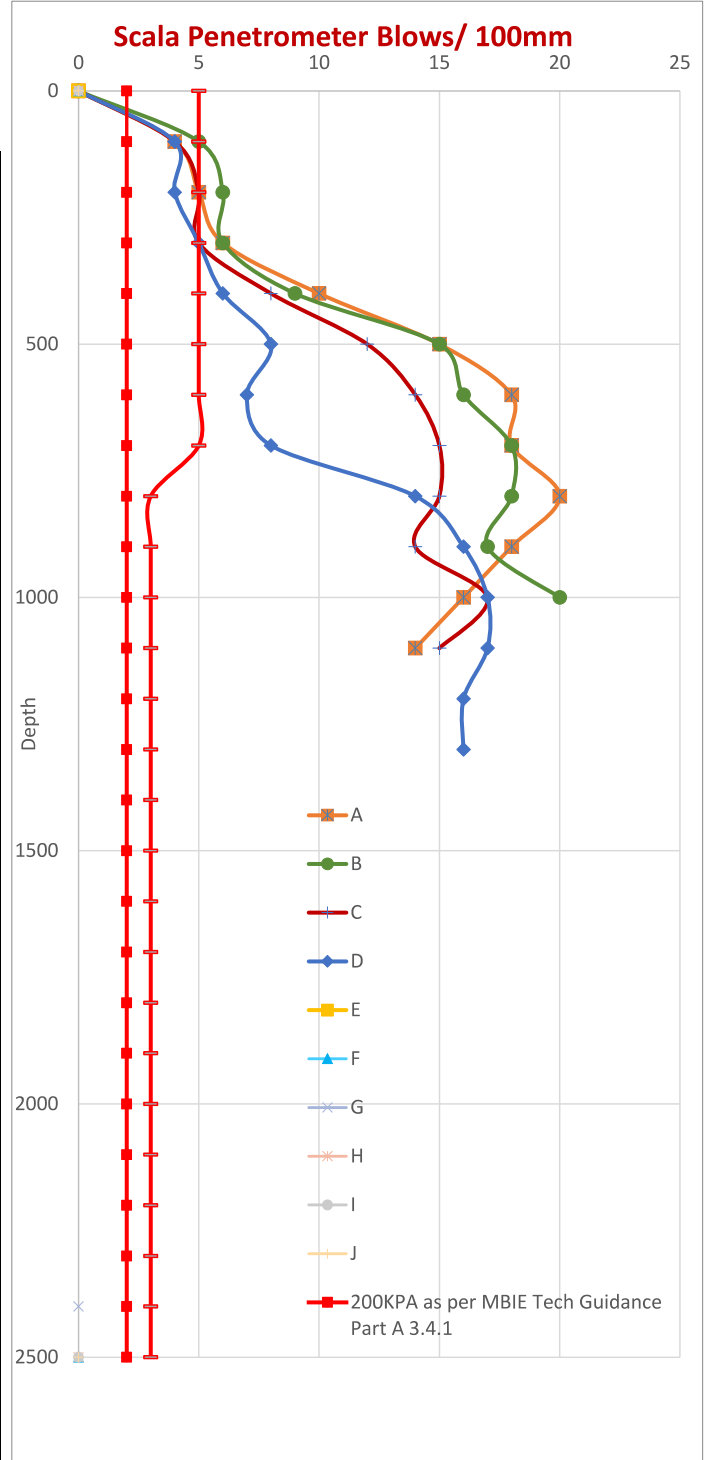
202 Otaki Gorge Rd, Otaki
PO Box 188, Otaki 5512
Hamish Wells
M: 0274 459 757
E: hamish@engennr.co.nz

SCALA PENETROMETER FIELD SHEET - SUMMARY

Property: Lot 6 Anderson Park **BY** JM
Client: David Reid Homes

Depth (m)	A	B	C	D	E	F	G	H	I	J	3604
0	0	0	0	0	0	0	0	0	0	0	5
100	4	5	4	4							5
200	5	6	5	4							5
300	6	6	5	5							5
400	10	9	8	6							5
500	15	15	12	8							5
600	18	16	14	7							5
700	18	18	15	8							5
800	20	18	15	14							3
900	18	17	14	16							3
1000	16	20	17	17							3
1100	14		15	17							3
1200				16							3
1300				16							3
1400											3
1500											3
1600											3
1700											3
1800											3
1900											3
2000											3
2100											3
2200											3
2300											3
2400											3
2500											3

yellow is less than 3604 allows



Test data analysis and comments for 3604:2011 type foundations systems

Symbol	Meaning
Y	Yes
N	No
Blank	Not applicable
P	Part
A	All
SED	Specific Engineering Design

Typical 3604:2011 compliant foundation systems

Timber subfloor			Slab on ground	
Standard piles	Driven timber piles	Ring Foundation	3604 Type	Non SED RibRaft

Y	Y	Y	Y	Y
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1 Do the test results comply with NZS 3604:2011 Section 3 Site requirements?

- 2 Reasons / causes of non compliance?**
- a) Peat or other organic materials
 - b) Clays or/and soft silts
 - c) Shallow poorly consolidated sands
 - d) Deep poorly consolidated sands
 - e) Uncertified fills
 - f) Unstable ground, adjacent slips, erosion
 - g) Proximity to banks
 - h) Ground water issues
 - i) Other issues see summation para 7

3 Is specific foundation design required ?

- a) Part of the site
- b) All of the site

N	N	N	N	N
---	---	---	---	---

4 Summation

Site tests comply with NZS 3604:2011 Sec 3 Good ground requirements. Once all topsoil and organic material has been removed this site will be suitable for standard in ground foundations or any type of ribraft foundation system.

Civil Engineer
CMEngNZ #186323

Site Report Explanation Notes

Soils/Foundation Site Requirements

This testing was carried out in general accordance with the requirements of NZS 306:2011 Section 3 "Site Requirements". This general procedure was used as the end use of the site is residential housing and the method is the most appropriate for that use.

- 1) **NZS 3604:2011 Section 3 Site Requirements** part 3.3 Test Method for soil bearing capacity, part 3.3.7 Ultimate Bearing Capacity defined ground as having 300kpa Ultimate bearing capacity (UBC) of not less than 300kpa as below.

3.3.7.1

The soil below the underside of the foundations shall be assumed to have an ultimate bearing capacity of not less than 300 kpa when:

- a) none of the following is encountered below the depth of the footing at any test site:
- (i) Organic topsoil
 - (ii) soft or very soft peat
 - (iii) soft or very soft clay
 - (iv) fill material, except where a certificate of suitability has been issued under NZS 4431
- b) Scala penetrometer tests conducted in accordance with 3.3.2(a), where the number of blows per 100mm depth of penetrometer below the underside of the proposed footing at each test site exceed.
- (i) Five down to a depth equal twice the width of the widest footing
 - (ii) Three at greater depths; and
 - (iii) Providing the set blow is relatively uniform, the number of blow per 100mm may be obtained by averaging the number of blow for depths not exceeding 300mm and
- c) Comparisons of the results at all test sites show that conditions are closely similar at each test site.

Based on a standard slab on ground foundation width of 240mm for a masonry veneer clad dwelling (either 1 or 2 story) from figure 7.15 NZS 3604:2011 section 7 floors - Masonry veneer foundation edge detail - in situ concrete and a minimum in ground embedment of 300mm for the concrete foundation, the minimum requirements in terms of Scala blows/100mm penetration are:

Existing ground level to - 300mm	not applicable to the foundation but relevant to the slab see section 7.5 re granular base for slab, minimum 5 blows/100mm penetration in the in granular fill recommend
-300mm to 800mm below existing ground level	5 blows/100mm
-800mm + depth	3 blows/100mm

2) **Analysis of the scala for each lot in term of paragraph 4 above (NZS 3604:2011 compliance):**

- a) If site test comply with the requirements of NZS 3604:2011 section 3 "site requirements" and it is reasonable to assume, Not gauranteed, that based on the test carried out, are suitable for standard foundation designs in accordance with NZS 3604 or non specific Rib raft slab on ground foundation systems.
- b) If tests do not comply with NZS 3604:2011 section 3 "site requirements" and specifically designed foundations (typically driven timber piles) or ground improvement of the existing site soils (which are readily compacted) to provide a complying building platform will be required.

- 3) **Ribrafft foundation system: Ribrafft** Ribrafft systems are being increasingly specified for domenstic construction and nonspecific design Ribrafft foundations (ie in compliance with firth Ribrafft manual 2012) have a **lower soil soil bearing requirement** than standard slab on ground system in compliance with NZS 3604:2011 (note: all other aspects of the requirements. Section 3 must be complied with). This lower soil bearing strength requirements is based on building type and the Ribrafft ability to better distribute load to the ground than conventional 3604 foundation solutions. There are four building types identified in the Ribrafft design manual and their relative minimum foundation soil requirements are as below:

Building identifier

Building Type	Description	Ground Floor External walls	Second Story External walls
A	Single Story	Light	
B	Single Story	Heavy	
C	Two Story	Light	Light
D	Two Story	Heavy	Light

Scala Penetrometer Blows Required For Determining Ultimate Bearing Capacity

Building type	Min. blows per 300mm depth
A	6
B	7
C	8
D	9

In blows/100mm consistent with the appended Scala tests

- a) For type A 2 blows/100mm minimum
- b) For type B 2.33 blows/100mm minimum
- c) For type C 2.67 blows/100mm minimum
- D) For type D 3 blows/100mm minimum

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+RibRaft®

TECHNICAL
MANUAL





This document contains design and installation information. A variation to any of the information given requires specific engineering design and is hence beyond the scope of this document.

The Firth RibRaft® Floor System can be constructed for all slab-on-ground concrete floors for domestic or residential buildings that fall within the scope of NZS 3604:2011 “Timber Framed Buildings” and Clause 3 “Scope” of Section 1 of this Manual. The design and installation details in this Manual shall be used to design and construct such a floor.

The Firth RibRaft® Floor System is covered by the MBIE Codemark®. This is conditional on the system being used as described in CertMark Australasia certification decision, which in turn requires design in accordance with Section 1 and installation in accordance with Section 2 of this Manual and on site verification in accordance with Section 3.

Note that a MBIE Codemark® means that if this Manual is rigidly followed the relevant Building Control Authority will automatically provide a building permit without the need for producer statements. To comply with the Manual does mean that Firth Certified Concrete® must be used.

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SECTION: DESIGN INFORMATION

1

1.0 THIS SECTION OF THIS MANUAL CONTAINS DESIGN INFORMATION NOT REQUIRING SPECIFIC ENGINEERING INPUT FOR THE FIRTH RIBRAFT® FLOOR SYSTEM (THE SYSTEM). FULL INFORMATION ON THE INSTALLATION PROCEDURES IS DESCRIBED IN SECTION 2 OF THIS MANUAL (INSTALLATION INFORMATION). WHERE STANDARDS ARE REFERENCED IN THIS MANUAL, THESE SHALL INCLUDE THE LATEST AMENDMENTS.

2.0 TECHNICAL INFORMATION

2.1 Overview

The Firth RibRaft® Floor System is a reinforced concrete waffle raft floor slab-on-ground. Typically it consists of an 85mm thick slab supported by a grid of ribs normally 100mm wide at 1200mm x 1200mm centres. The overall depth is 305mm. Edge beams and ribs under load bearing walls are 300mm wide to provide for the extra load carried by these members. Where heating coils of less than 25mm diameter are embedded in the topping, the slab concrete thickness shall be 110mm meaning the overall thickness is 330mm. Where the top floor surface is honed to provide a decorative finish, a slab thickness of 100mm (before honing) should be specified.

2.2 Pods

Firth RibRaft® polystyrene pods 1100mm square and 220mm thick are placed directly on levelled ground and are arranged in such a way as to form a reinforced concrete floor slab with a grid of reinforced concrete ribs and edge beams when concrete is placed onto them. Pods may be cut to suit specific architecture layout and also to accommodate services. 300mm thick pods are available if needed for deeper edge beams and internal ribs.

2.3 Steel

Reinforcing steel in the slab shall consist of Welded Reinforcing Mesh complying with AS/NZS 4671:2001 with a minimum weight of 2.27kg/m², a lower characteristic stress of 500MPa, square configuration of orthogonal bars between 150 to 200mm centres, and ductility class L or E, hereafter referred to “mesh”. The presence of Class E reinforcing bars in the ribs and beams provides adequate ductility of the system which allows the use of class L mesh. Typically the topping mesh reinforcement will be 665 mesh (class L) or SE62 ductile mesh, each being equally applicable. The reinforcing bars in the ribs and edge beams shall conform to AS/NZS 4671:2001 “Steel Reinforcing Materials”. Specifically designed spacers are used to position the polystyrene pods and the rib and edge beam reinforcing steel bars in a secure manner until the concrete is placed. The reinforcing mesh is held in place by mesh chairs. Conventional timber or steel formwork is used to form the edge of the slab.

2.4 Concrete

One of the following Firth concrete products shall be used in the system:

- 1) Raftmix: a 20MPa 100mm slump mix available as a pump mix suitable for 100mm pump lines available in either a 13mm or more usually a 19mm nominal aggregate size, or as a structural (non-pump) mix.
- 2) Raftmix25: a 25MPa 100mm slump mix available as a pump mix suitable for 100mm pump lines available in either a 13mm or more usually a 19mm nominal aggregate size, or as a structural (non-pump) mix. This mix shall be specified for buildings constructed in the ‘sea spray zone’ (i.e. within 500m of the sea including harbours, within 100m of tidal estuaries or inlets, on offshore islands and elsewhere defined as exposure zone D in 4.2.3.3 of NZS3604).



Note: Additional admixtures to standard RibRaft® mixes to be approved by the Firth Plant Engineer.

3.0 SCOPE

This Clause sets out the limitations that apply to the use of the system to ensure that specific engineering input is not required. The concrete floor slab for buildings or ground conditions that do not meet this scope must be subjected to specific engineering design to comply with the requirements of the New Zealand Building Code.

3.1 Structure Limitations

Specific engineering input shall not be required only where the structure supported by the system complies with the following criteria:

- > The structure supported by the system is constructed in a location where the Seismic Hazard Factor Z (defined in NZ1170.5) is less than or equal to 0.45 (refer to Figure 6).
- > The system is laid level, or has a maximum step of 600mm detailed in accordance with this Manual.
- > The structure supported by the system has no basement, part basement or foundation walls.
- > The total height from the lowest ground level to the highest point of the roof shall not exceed 10m.
- > The structure supported by the system has a roof pitch limited to 60 degrees maximum from the horizontal.
- > The maximum height of a single or top storey is 4.8m and any other storey is 3m.
- > Only ground floor walls of the structure supported by the system are permitted to be “heavy external walls” (as defined in Clause 3.3).
- > The roof truss span shall be less than or equal to 12m when the roof and ceiling loads are supported entirely by the external walls. Where internal support of roof trusses is used the footings below point loads identified by the truss designer shall comply with this Manual.
- > Where internal load bearing walls are used to support the roof and floor, the loaded dimensions stated in tables 8.2 and 14.10 of NZ3604:2011 shall apply, and these load bearing walls shall be supported on a 300mm wide load bearing rib as detailed in this manual.
- > Floors may be of unlimited size provided that the maximum dimension between free joints shall not exceed 30m. Where free joints are required they should be detailed in accordance with this Manual.

3.2 Live Loading

The live loading cases of structures covered by these designs are:

- > 1.5kPa and 3.0kPa as per NZS3604 “Timber Framed Buildings”.
- > 13kN concentrated load in garage over area of 0.3 x 0.3m (vehicle limited to 2500kg gross).

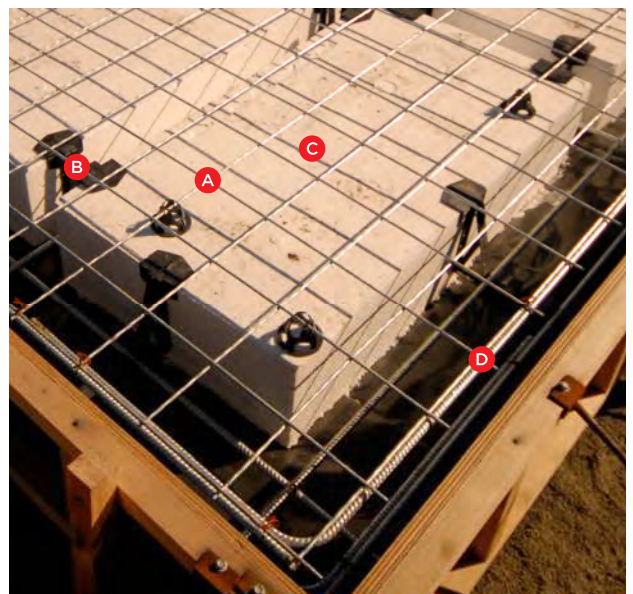
3.3 Snow Loading

Open ground snow loading as defined in NZS3604 of up to 2kPa.

3.4 Dead Loading for Use with This Manual

The dead load cases of structures covered by these designs are:

- > Light external walls with total mass not exceeding 60kg/m² – e.g. timber framing with weather boards and interior wall linings.
- > Heavy external walls with total mass greater than 60kg/m² but not exceeding 290kg/m² – e.g. timber framing with masonry veneer or partially filled 20 series masonry blocks.
- > Internal walls with total mass not exceeding 45kg/m² – e.g. timber framing and linings.
- > Light roofs with total mass not exceeding 45kg/m² – e.g. ceiling linings and metal roof, including framing.
- > Heavy roofs with total mass greater than 45kg/m² but not exceeding 85kg/m² – e.g. ceiling lining and concrete tiles or slates, including framing.
- > Mid-floors with total mass not exceeding 60kg/m² – e.g. timber framing and flooring, including ceiling linings.
- > Heavy internal walls and/or load bearing internal walls supported on a load bearing rib.



The RibRaft® System

- A** Steel mesh reinforcing
- B** Firth 100mm spacer
- C** Firth RibRaft® polystyrene pods
- D** Steel reinforcing

3.5 Foundation Requirement for Different Building Types

The designs given in this Manual are limited to where the system supports Building Types as described in Table 1. The classification of wall and roof weights are as detailed in Clause 3.4 of this Section. Single and two storey shall be as defined in NZS 3604:2011.

Table 1 Foundation Type Identifier

NUMBER OF STORIES	ROOF	GROUND FLOOR EXTERNAL WALLS	SECOND STOREY EXTERNAL WALLS	1.5KPA LIVE LOAD & UP TO 1KPA SNOW LOAD	3KPA LIVE LOAD & /OR 2KPA SNOW LOAD
SINGLE STOREY	Light	Light		A	A
	Heavy	Light		A	B
	Light	Heavy		B	B
	Heavy	Heavy		C	C
DOUBLE STOREY	Light	Light	Light	C	D
	Heavy	Light	Light	D	E
	Light	Heavy	Light	D	E
	Heavy	Heavy	Light	E	G

3.6 Foundation Soils

The system may be used when the supporting ground meets the definitions of “good ground” given in Section 3 of NZS 3604:2011 (as modified by B1 of the Building Compliance Documents). In addition, the system shall not be used for damp sites i.e. where it can be reasonably expected that the ground water level could come within 600mm of the underside of the system. The acceptability of the ground shall be verified in accordance with Clause 3.1.3 of NZS 3604:2011.

Solutions for soils prone to liquefaction or expansive soils are available using the Firth RibRaft® technology, however these are outside the scope of this Manual and require specific engineering design.

Where the ultimate bearing capacity required of the supporting ground is verified by Scala Penetrometer testing in accordance with Clause 3.3 of NZS3604:2011 or for cohesive soils using a calibrated shear vane in accordance with the NZGS Guideline for Hand Held Shear Vane Test, the bearing capacity shall exceed the values in Table 2 for the proposed building type. For scala penetrometer testing, the bearing capacity shall be considered adequate when the number of blows per 300mm depth of penetration below the underside of the system at each test site exceeds the values given in Table 2 below.

For RibRaft® foundations compliance with Table 2 allows ultimate bearing capacities of less than 300kPa. However, with the exception of bearing capacity all other requirements in NZS3604:2011 for “good ground” shall be complied with.

Table 2 Scala Penetrometer Blows Required and Ultimate Bearing Capacity

FOUNDATION TYPE	ULTIMATE BEARING CAPACITY (KPA)	MIN. BLOWS PER 300MM DEPTH FOR SCALA TESTING
A	140	4
B	175	5
C	210	6
D	240	7
E	275	8
G	Good ground	9

3.7 Flow Diagrams

The flow diagrams on the following pages (adapted from NZS3604:2011) will help in determining whether the non-specific details for the system can be used for the purposes of the concrete floor slab construction. There are two checks in the process. The first is to determine whether the proposed building complies with the requirements set out in this Manual (Building Check), and the second is to determine whether the site complies with the requirements set out in this Manual (Site Check).

(Note: NZS3604:2011 provides for parts of buildings to be considered as individual buildings. These flow diagrams apply to those parts of the building where slab-on-ground is being considered and where the part of the building can be considered as an individual building under NZS3604:2011).

Figure 1 Building Check Flow Diagram

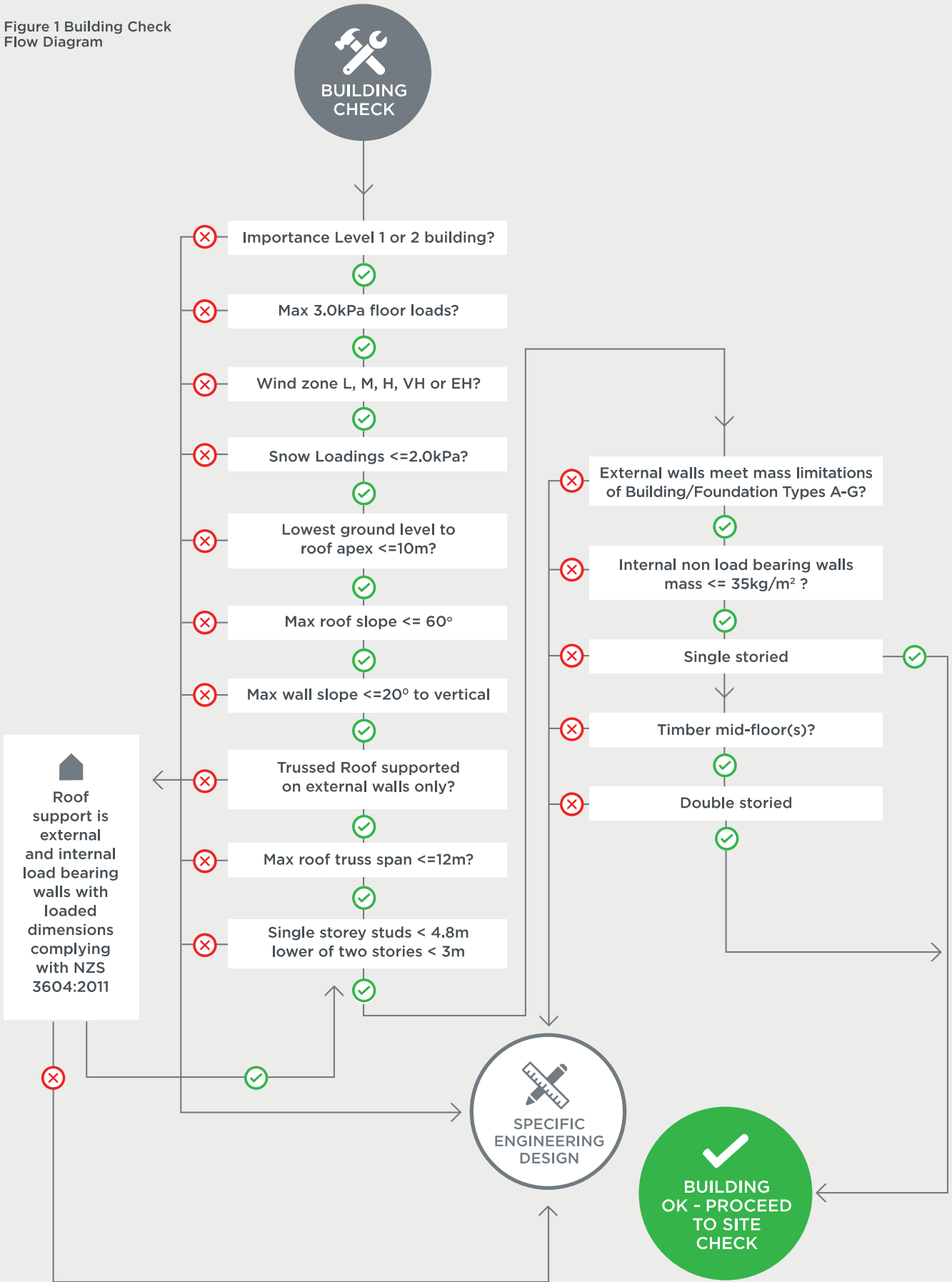
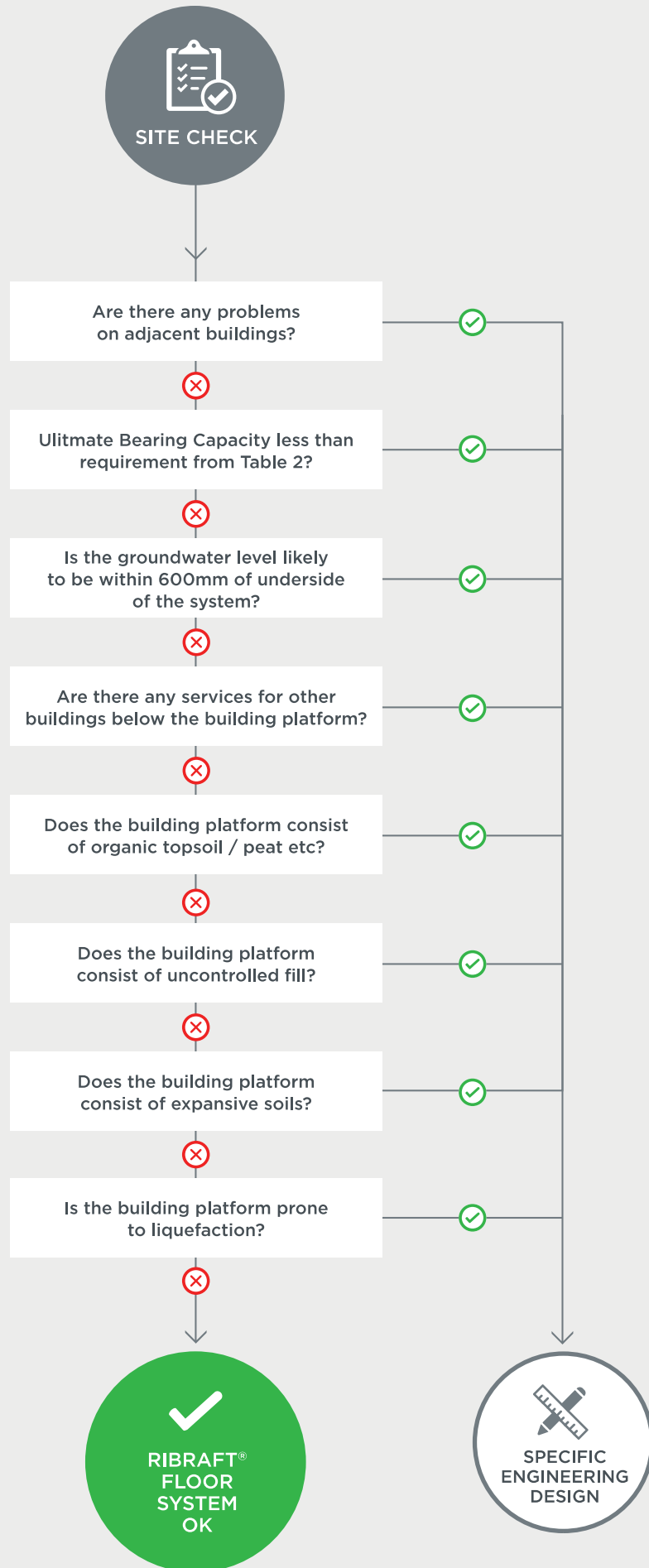


Figure 2 Building Check Flow Diagram



4.0 CONSTRUCTION DETAILS

Standard construction details for the system are provided here for buildings that fall within the below scope.

4.1 Pod Layout

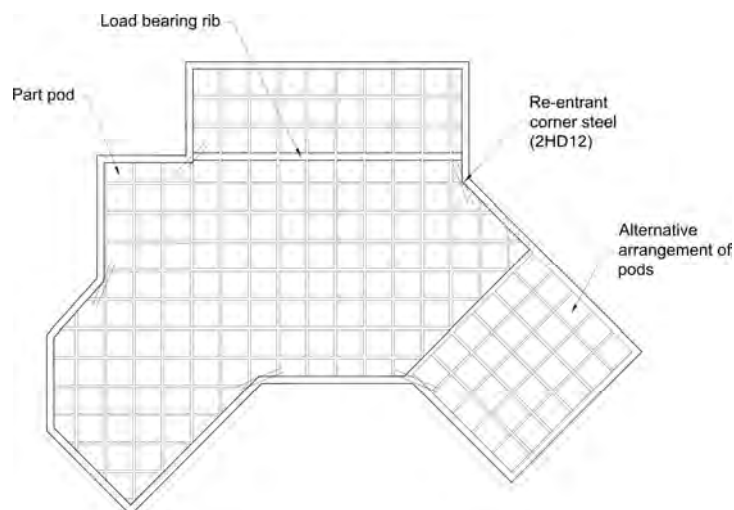
RibRaft® polystyrene pods supplied by Firth (1100 x 1100 x 220mm thick) shall be placed on levelled ground and arranged in a waffle pattern. The pods are used as void formers while the concrete is curing. These pods are an integral component of the system and shall not be substituted.

Pods shall be placed so as to provide the necessary spacing between the edge beams and ribs as described below. The first rib out from the edge beam shall have a maximum clear separation of 1100mm however in all other cases the centre to centre distance between the ribs, whether they are 100mm or 300mm wide, shall be 1200mm. In the case of 100mm ribs this centre to centre spacing is achieved by the 1100mm square pods however between 100mm and 300mm ribs, or between two 300mm ribs, the pods shall be cut down to suit. Pods may be cut down to size but shall not be added to, where this is necessary to suit the building layout, penetrations or orientation of beams and ribs.

Figure 3 shows a typical layout of the pods and ribs. Note the part pods around the edge, where the building shape dictates, and adjacent to the 300mm rib.

Firth suggests that when drawing the building plan, a generic RibRaft® grid (100mm wide ribs at 1200mm centres) is set out using the corner of the building as a starting point. The location of any load bearing ribs, or point loads greater than 10kN, are identified and pods cut to establish 300mm wide ribs or foundation pads as described in this Manual. The most cost effective solution being a simple grid layout which requires minimum cutting of the pods. Ribs can be used at less than 1200mm centres, however it is more cost effective to use the 1200mm centres wherever practicable.

Figure 3 Typical RibRaft® Plan



4.2 Edge Beam Width and Reinforcement

Edge beams around the perimeter of the floor slab shall be 300mm to provide bearing capacity for external load bearing walls, and contain 2-HD12 bars (Grade 500E) as bottom steel and 1-HD12 bar (Grade 500E) in the top. This top bar shall be tied to the underside of the reinforcement mesh. Refer Figure 5, below for construction details. The edge beam shall be rebated for brick veneers where necessary as shown in Figure 5(C).

4.3 Internal Ribs (non load bearing) Width and Reinforcement

Each standard internal rib shall be 100mm wide and shall contain 1-HD12 steel bar (Grade 500E) held in place at the bottom of the rib by a Firth spacer. Refer Figure 5E for construction details.

4.4 Internal Ribs (load bearing) Width and Reinforcement

For load bearing walls that support the roof and floors and heavy internal walls, the pods shall be cut to create a 300mm wide rib directly under the load bearing wall, Refer Figure 5(D) for construction details under load bearing walls. Where the load bearing ribs meet and terminate at an edge beam or internal rib the bottom reinforcement from the load bearing rib shall be bent into the adjacent rib and tied together. The reinforcement shall lap for at least 720mm.

4.5 Point Loads

Truss manufacturers often support the roof trusses internally on posts or studs within a wall, which are described on the truss manufacturer’s drawings as falling into various ultimate limit state categories. Table 3 summaries when individual footings are required below the reactions, and the form these should take.

Table 3 Foundation Requirements for Individual Point Loads

FOUNDATION OPTIONS BELOW POINT LOAD:

ULTIMATE LIMIT POINT LOAD REACTION	PAD OPTION, GOOD GROUND	BEAM OPTION, BEARING CAPACITY GREATER THAN 140KPA ⁽³⁾
Up to 10kN	No thickening required	No thickening required
Up to 20 kN	375x375 pad ⁽¹⁾	300mm wide load under point load as detailed in Figure 5
Up to 30kN	450x450 pad ⁽²⁾	300mm wide load under point load as detailed in Figure 5

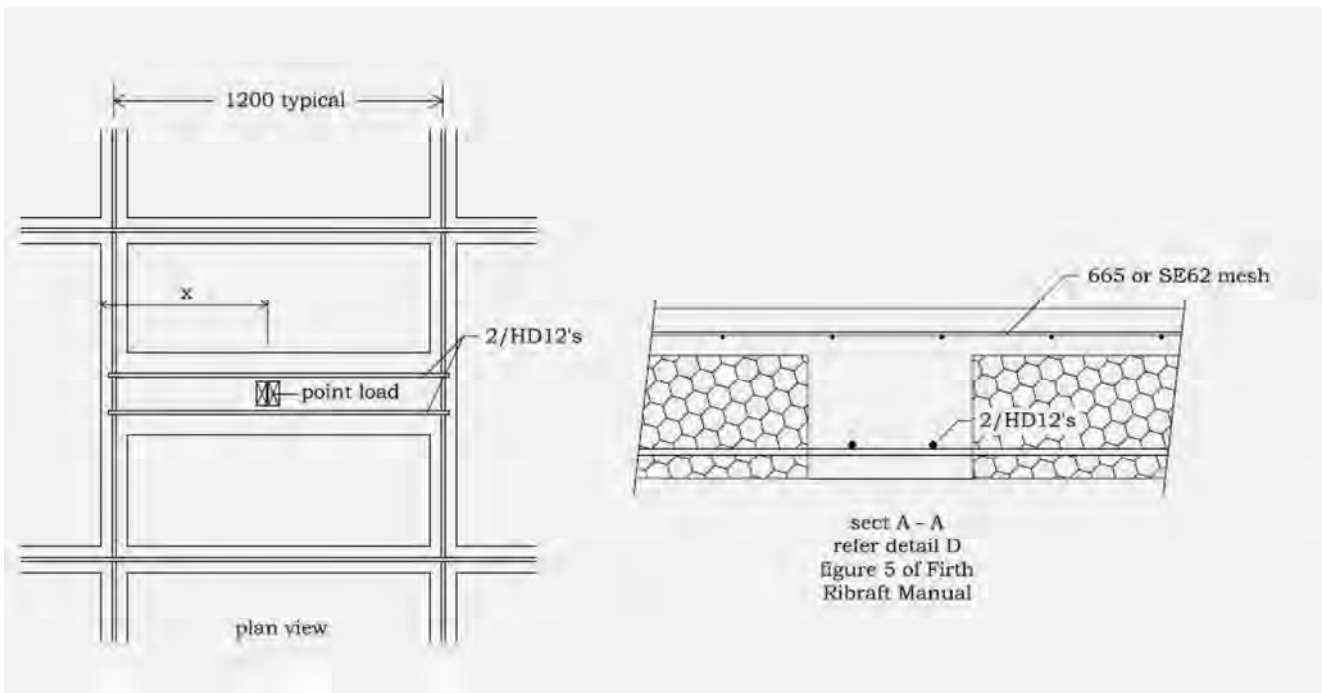
Notes

- (1) Pad thickness to match depth of pods plus topping (bears on ground not polystyrene) and reinforced with 2 x D12 Bars both ways
- (2) Pad thickness to match depth of pods plus topping (bears on ground not polystyrene) and reinforced with 3 x D12 Bars both ways
- (3) Refer section 3.6 for confirmation of bearing capacity. With exception of bearing capacity all other requirements in NZS3604 for good ground shall be complied with.

Figure 4 Details for Beam Option Thickening Under Point Loads

ULTIMATE LIMIT LOAD P FROM TRUSS DESIGNER	MINIMUM EDGE DISTANCE X IN MM
20kN	200 *
30 kN	400 *

* If minimum edge distances cannot be achieved extend thickening to next 100mm ribs



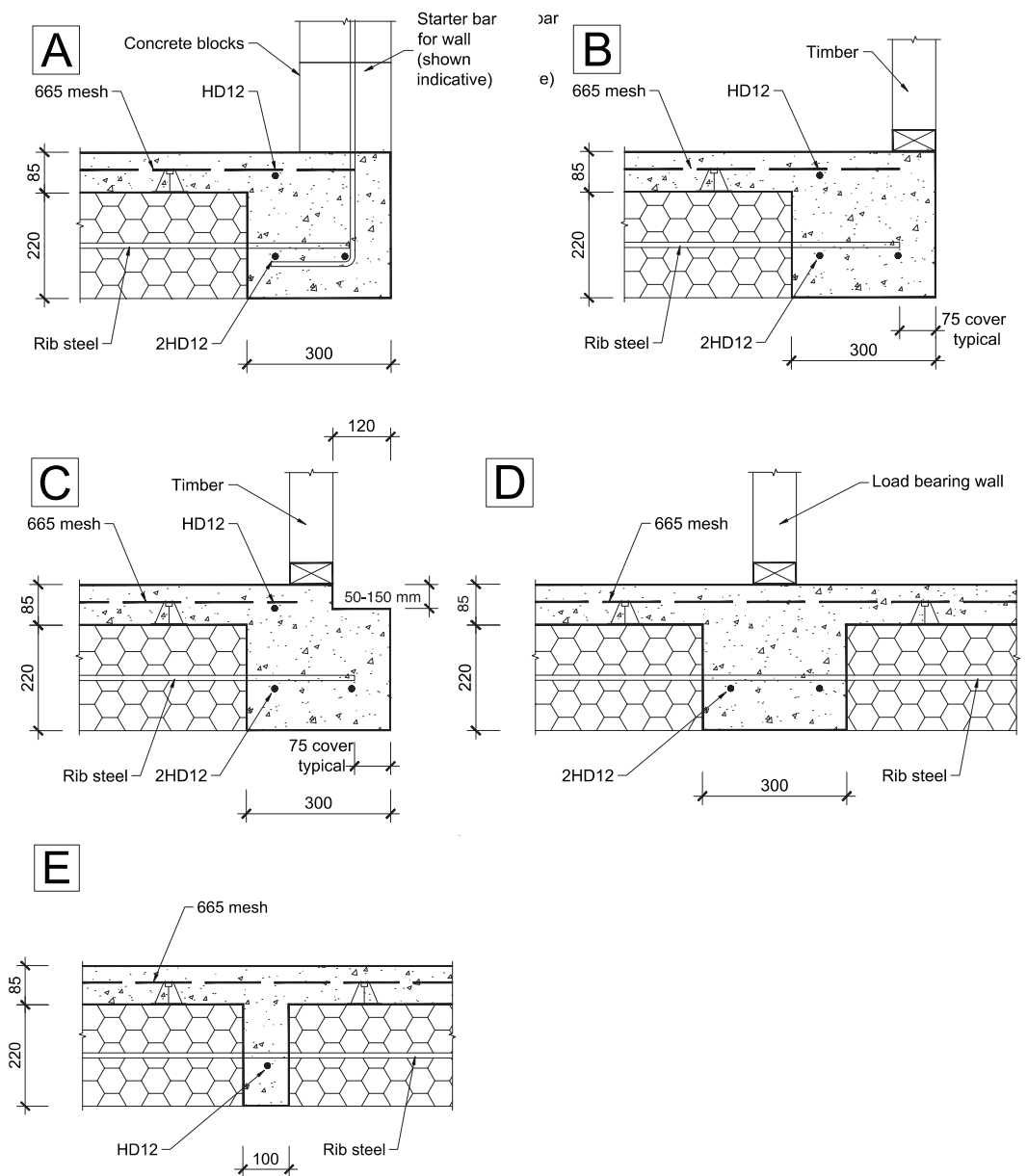
4.6 Mesh Reinforcement

The entire floor slab shall be reinforced with 665 mesh supported on 40mm mesh chairs sitting on the polystyrene pods.

4.7 Re-entrant Corners

In order to limit the width of cracking at the re-entrant, or internal corners, extra steel shall be placed on top of the mesh. These shall be 2-HD12 bars (Grade 500E), 1200mm long tied to the top of the mesh at 200mm centres, with 50mm cover from the internal corner - refer Figure 3.

Figure 5
Standard RibRaft®
Construction Details



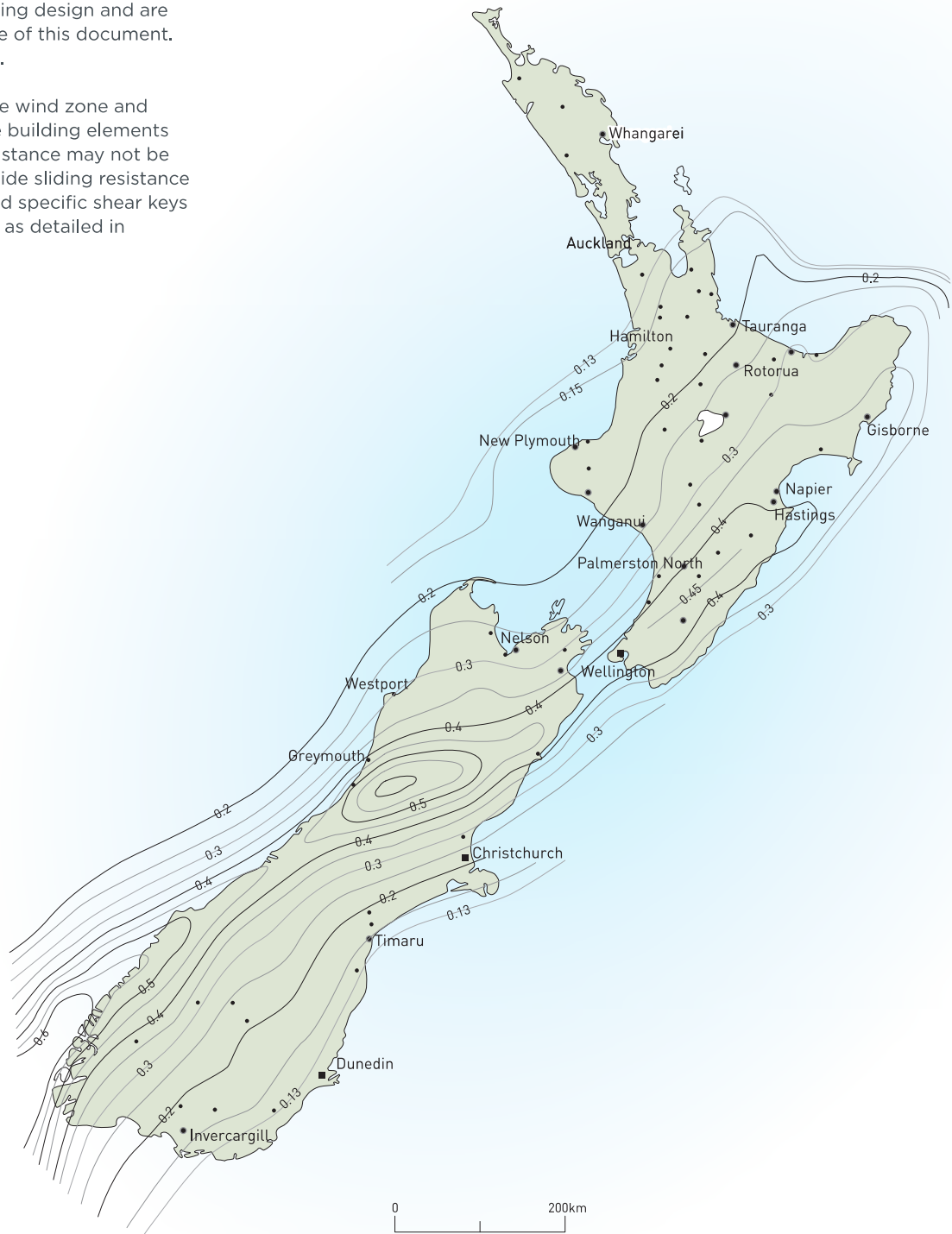
5.0 LATERAL RESISTANCE

5.1 Earthquake Resistance

Unlike conventional foundation systems, the Firth RibRaft® system is not embedded into the ground. Sliding resistance to horizontal seismic loads is provided by frictional contact with the soil. In locations where the Seismic Hazard Factor Z is greater than 0.45, shear keys maybe required to resist seismic loads. Such buildings require specific engineering design and are outside the scope of this document. Refer to Figure 6.

Depending on the wind zone and the weight of the building elements this frictional resistance may not be sufficient to provide sliding resistance to wind loads, and specific shear keys may be required, as detailed in Clause 5.2.

Figure 6
Seismic Hazard
Factor Z to
NZS 1170.5



5.2 Wind Resistance

The building's bracing demand from wind loading shall be assessed from Section 5 of NZS 3604:2011 for both directions (i.e. along and across the building). The bracing capacity of the system must exceed the greater of the bracing demands determined.

The bracing capacity of the system shall be determined as the sum of the bracing capacity provided by frictional resistance (i.e. friction between the system and the ground) and the bracing capacity provided by the shear keys (if any) necessary to meet the requirements of Clause 5.2.

The bracing capacity provided by frictional resistance shall be determined from Table 4 depending on the building type, roof weight, and floor live loading. The bracing capacity provided by the shear keys shall be the sum of the bracing capacity of the individual shear keys determined as follows. If the shear key is in clay, each shear key shall be considered to contribute 170 BU's. If the shear key is in sand, each shear key shall be considered to contribute 200 BU's. If the bracing capacity of the system, determined from the frictional resistance and the shear keys as described above, is less than the bracing demand further shear keys shall be added until the bracing demand is met.

BUILDING TYPE	ROOF TYPE	GROUND FLOOR EXTERNAL WALLS	SECOND STOREY EXTERNAL WALLS	BU's PROVIDED PER 100M ² 1.5KPA	FOR LIVE LOADING OF: 3.0KPA
Single Storey	Light	Light		1630	1746
Single Storey	Heavy	Light		1737	1857
Single Storey	Light	Heavy		1802	1922
Single Storey	Heavy	Heavy		1909	2029
Double Storey	Light	Light	Light	2163	2403
Double Storey	Heavy	Light	Light	2270	2510
Double Storey	Light	Heavy	Light	2335	2575
Double Storey	Heavy	Heavy	Light	2442	2682

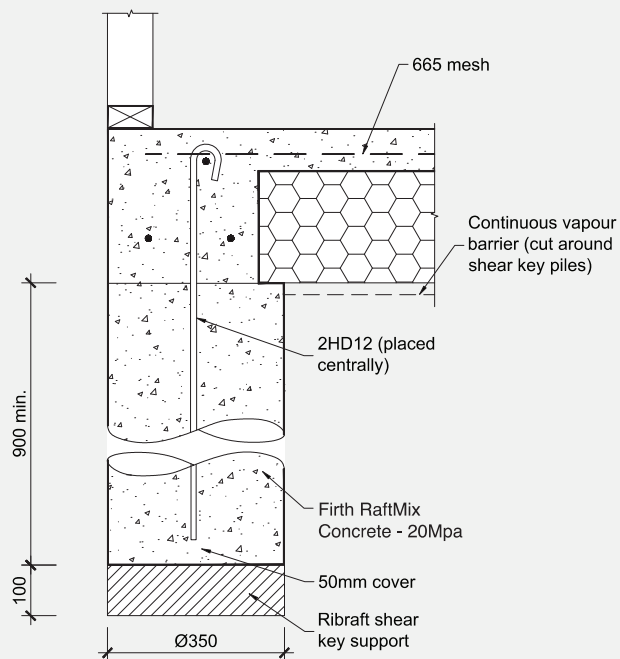
Table 4 Bracing Capacity Provided By Frictional Resistance Per 100m² Of Ground Floor Area

5.3 Shear Keys

Shear key piles required by Clause 5.2 must be uniformly distributed around the perimeter of the building, and be located at the edge beam/internal rib junction. Where a shear key is required, the minimum number of shear keys shall be two per floor plan. Where two shear keys are used they shall be placed at diagonally opposite ends of the floor plan.

Construction details of the shear keys shall be as shown on Figure 7. Shear keys shall be a minimum of 900mm long. The holes shall be over-drilled at least 100mm and a polystyrene RibRaft® Shear Key Support placed into the bottom of each hole. This will support only the plastic (wet) concrete and then allow movement of the shear key if settlement of the supporting ground occurs. The effective end bearing of the shear keys is therefore eliminated.

Figure 7 RibRaft® Shear Key



5.4 Design Example For Lateral Resistance Calculation

The following is a short example to demonstrate the process of determining whether shear piles are required.

Consider a 180m² single storey home with a light roof located in Palmerston North in a VH wind zone as defined by NZS3604. Assume the building height is 6m with 3m above the eaves. The length for across wind considerations is 15m and the width (along wind) is 12m.

First consider seismic actions. From Figure 6 the seismic hazard factor is 0.4. Since this is less than 0.45 shear keys will not be required for earthquake resistance.

Now consider wind loading. Table 5.5 of NZS3604 requires 95 bracing units per meter (BU/m) across the building and 90 BU/m along. As it's a very high wind zone these figures need to be increased by a factor of 1.3.

The BU demand for across building wind is therefore = $95 \times 1.3 \times 15 = 1853\text{BU}$
 The BU demand along the building = $90 \times 1.3 \times 12 = 1404\text{BU}$

From Table 4 for a single storey light weight roof with 1.5kPa live load the capacity is 1630BU per 100m². Therefore for 180m² the capacity is 2934BU. As the capacity (2934) is greater than the demand (1853) no shear keys are required.

If the demand had exceeded the capacity then any shortfall can be provided by supplying shear keys in accordance with Section 5.3 with each shear key providing the BU specified in Section 5.2.

6.0 OTHER DESIGN DETAILS

6.1 R-Values

The insulation performance of a building element is measured by the "R-Value". The schedule method is the simplest method to achieve compliance with Clause H1 of the Building Code. Using this method the minimum R-Values required for floors are R1.3 for light timber frame construction, and typically R1.5 for masonry construction. R-values of R1.3 can be used for masonry construction if glazing with greater insulation is used (refer NZBC, Clause H1). If in-floor heating is used the minimum required R-Value is increased to R1.9, and the resistance to thermal movement into the room must be one tenth of that to the outside environment.

The fourth edition of H1 (amendment 3, January 2017) states that "Concrete slab-on-ground floors are deemed to achieve a construction R-value of 1.3, unless a higher R-value is justified by calculation or physical testing". RibRaft® is therefore a deemed to comply solution however in some instances designers may wish to determine the R-value as part of the design process. There are numerous methods for calculating R-values for slabs on ground, with many of the processes giving quite different R-values. NZBC clause H1 prescribed that an "Acceptable methods for determining the thermal resistance (R-values) of building elements are contained in NZS 4214."

The R-values provided in this Manual use the NZS4214 methodology.

If the R-value calculation is required to demonstrate compliance with the Building Code, then the NZS4214 methodology is probably the best alternative due to its reference in H1. However, more technically robust calculation methodologies exist and where the R-values are important, for example heated floors, use can be made of the BRANZ Home Insulation Guide. For these instances edge insulation is also recommended.

When slab edge insulation is specified, it is recommended that Firth HotEdge® is used as it has been designed to be compatible with Firth RibRaft®.

The R-Value of a concrete floor is dependent on the floor area to perimeter ratio, and the details of the floor perimeter. The R-Value for various solutions are illustrated below. The R-Values have been independently calculated using NZS4214:2006 "Methods of Determining the Total Thermal Resistance of Parts of Buildings," though modified for perimeter heat loss using recommendations from the Building Research Establishment.

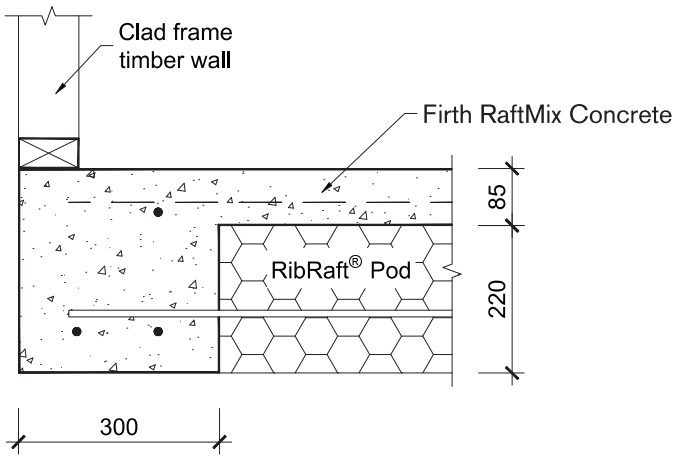


Figure 8
RibRaft® R Values
For 90mm Thick
Walls On The
Floor Edge

	FLOOR AREA TO PERIMETER RATIO M ² /M										
	1.00	1.25	1.50	1.75	2.00	2.25	2.5	2.75	3.0	3.5	4.00
R-Value m ² °C/W	1.28	1.40	1.52	1.64	1.75	1.86	1.97	2.07	2.17	2.38	2.57

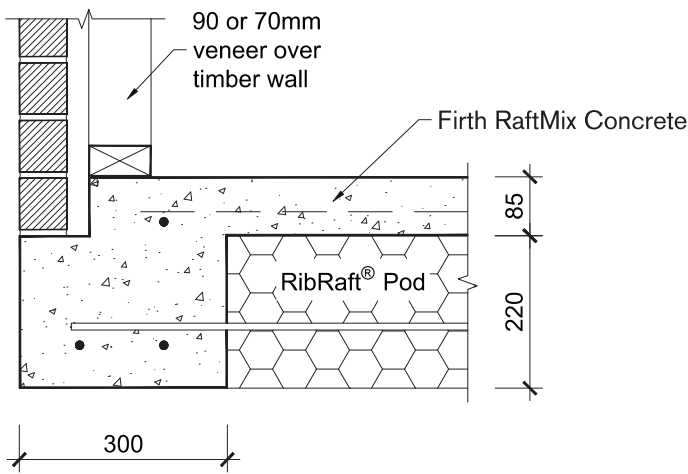


Figure 9
RibRaft® R Values
For 70-90mm
Thick Veneer,
Cavity, and
90mm Walls.

	FLOOR AREA TO PERIMETER RATIO M ² /M									
	1.25	1.50	1.75	2.00	2.25	2.5	2.75	3.0	3.5	4.00
R-Value m ² °C/W	1.54	1.67	1.80	1.93	2.05	2.17	2.28	2.40	2.62	2.84

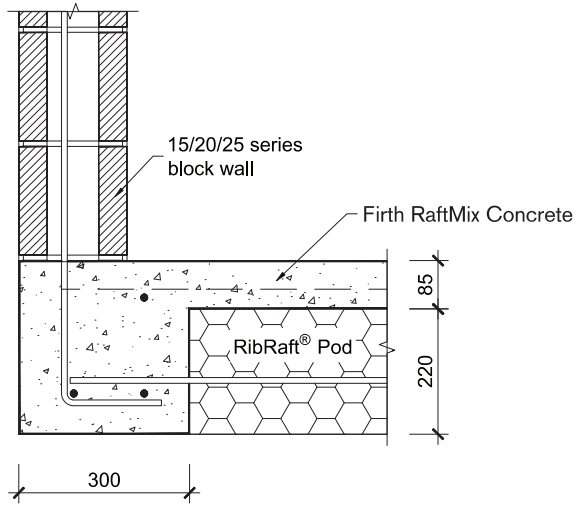


Figure 10
RibRaft® R Values
For Various
Thicknesses
Of Masonry Walls

	BLOCK	FLOOR AREA TO PERIMETER RATIO M ² /M									
		1.25	1.50	1.75	2.00	2.25	2.5	2.75	3.0	3.5	4.00
R-Value m ² °C/W	15 SERIES	1.48	1.60	1.73	1.85	1.96	2.08	2.19	2.30	2.51	2.72
	20 SERIES	1.54	1.67	1.80	1.93	2.05	2.17	2.28	2.40	2.62	2.84
	25 SERIES	1.59	1.73	1.86	1.99	2.12	2.24	2.37	2.49	2.72	2.95

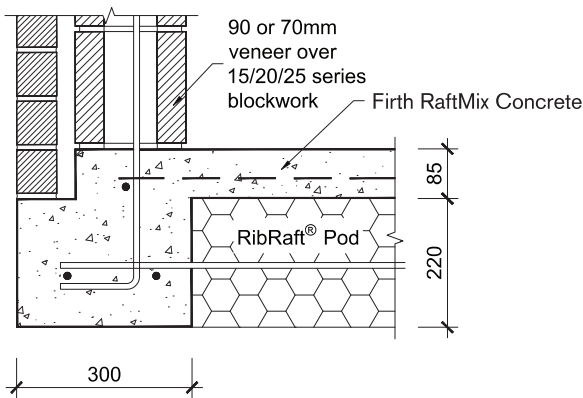


Figure 11
RibRaft® R-Values
For 70-90mm Thick
Veneer, Cavity, And
Various Thickness
Masonry Walls

	BLOCK	FLOOR AREA TO PERIMETER RATIO M ² /M									
		1.25	1.50	1.75	2.00	2.25	2.0	2.75	3.0	3.5	4.00
R-Value m ² °C/W	15 SERIES	1.59	1.73	1.86	1.99	2.12	2.24	2.37	2.49	2.72	2.95
	20 SERIES	1.64	1.78	1.92	2.06	2.19	2.32	2.44	2.56	2.81	3.04
	25 SERIES	1.69	1.83	1.98	2.11	2.25	2.38	2.51	2.64	2.88	3.12

6.2 Shrinkage Control

Shrinkage control joints reduce the risk of unwanted cracks, and their placement needs to be carefully considered where uncontrolled cracking could be unacceptable. Two types are described here: saw cut joints (which are tied joints), and free joints.

6.2.1 Saw Cut Joints

Saw cuts are located at positions in which the concrete is likely to crack due to stresses induced by restrained shrinkage. The aim of providing them is for the concrete to crack at the bottom of the saw cut thus minimizing the potential for a visible crack wandering over the surface. The level of reinforcement provided in a RibRaft® mean that cracks have no structural implications being only an aesthetics issue. Factors to consider are the type of floor finish, the location of ribs and ground beams, underfloor heating, and the effect of piles restraining shrinkage.

Preference should be given to using early entry saws which are used immediately after finishing. Shrinkage control joints cut using diamond blades shall be cut as early as possible which is typically within 24 hours of hardening in summer, and 48 hours in winter. They shall be cut to a depth of 25mm. Shrinkage control joints do not guarantee elimination of all visible or unwanted cracks but should minimise number.

Joints shall be positioned to coincide with major changes in floor plan. Where concrete is to be exposed, for example in a garage, or brittle covering placed over, the maximum intermediate bay sizes shall be limited to 5m. Bay dimensions formed by shrinkage control joints shall be limited to a maximum ratio of length:width of 1.5:1. Shrinkage control joints shall be placed over 100mm wide internal ribs wherever possible. Where a shrinkage control joint runs along the line of a 300mm wide load bearing rib, then the joint shall be located directly above one edge of that rib.

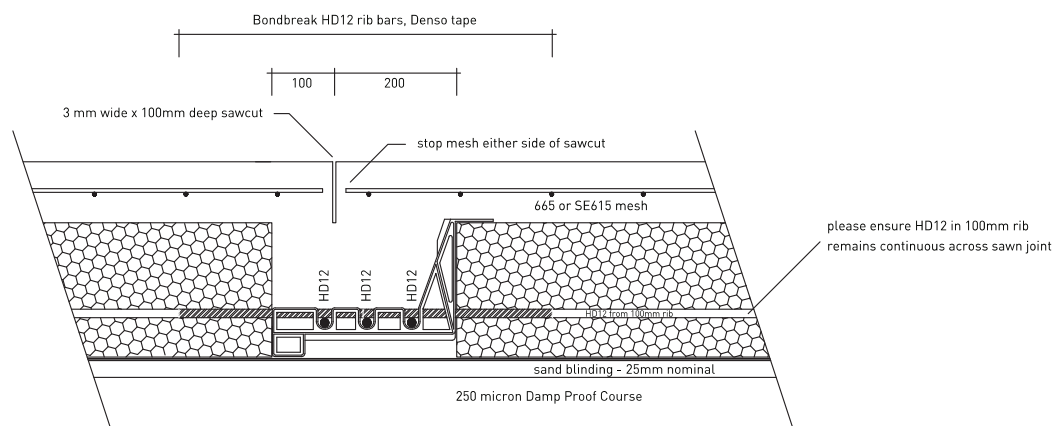
In order to limit the width of cracks at re-entrant, or internal corners, extra steel shall be placed on top of the mesh. These shall be 2-HD12 bars (Grade 500E), 1200mm long tied to the top of the mesh at 200mm centres, with 50mm cover to the internal corner – refer Figure 3.

6.2.2 Free Joints

Where the length of the floor exceeds 30m a free joint shall be provided as detailed in Figure 12. Movement, shrinkage and thermal, will occur over this joint so it shall be positioned to minimize the impact of this movement on floor coverings and wall elements.

Where the bottom of the RibRaft® is not flat (for example the floor incorporates a step down), free joints shall be provided if the distance from the step down to edge of slab exceeds 15m.

Figure 12
Free Joint
Details



RibRaft® control / free joint detail at 300mm wide thickening
align sawcut with internal corner where possible

6.3 Services Detailing

Two options exist for running services, both of which are appropriate, however some regional Building Control Authorities and Builders have clear preferences. The options being within slab, or under slab. Experience from the Christchurch earthquakes shows that the most seismically robust solution is for services to run within the plane of the pods (within slab).

6.3.1 Within Slab Running of Services

Pipes services can be run within the plane of the pods either exiting out of the side of the perimeter ring beam or going underground at the edge beam. Pipes shall be laid at a fall to comply with NZBC G13/AS1. For pipe up to 65mm diameter the minimum gradient is typically 1 in 40, while for 100mm pipes it's 1 in 60, however greater falls may be required dependent upon the required number of discharge units. Table 5 provides distances from the edge of the slab to pipe surface penetration to achieve minimum pipe gradients. A 300mm pod alternative is often used where the proposed positioning of the service means minimum required gradients cannot be achieved. Where gradients cannot be achieved with a 300mm pod, then service will require to be run under the slab.

Pipes shall be located to pass perpendicular to the ribs and beams and shall not be laid along the length of ribs or beams. Pods are cut as required to achieve the required fall and position. Pipes shall be laid to ensure 15mm concrete cover between pipe and reinforcement in the perimeter beam. All pipes in contact with concrete shall be lagged with an impermeable material of at least 6mm thickness.

Table 5 Maximum Distance From Exterior To Entrance Point Of Plumbing Pipes

PIPE DIAMETER (ID)MM	GRADIENT	MAXIMUM DISTANCE TO EDGE WITH 220MM THICK POD	MAXIMUM DISTANCE TO EDGE WITH 300MM THICK POD
40	1 in 40	3400	6600
50	1 in 40	3000	6200
65	1 in 40	2400	5600
100	1 in 60	1200	4400

6.3.2 Under Slab Running Of Services

For this option, services ducts shall be conveyed underground to their plan location then brought up through the polystyrene pod and the concrete floor slab, within the limitation imposed by Table 8. Services shall not be placed within any concrete except to cross that section of concrete i.e. services shall not run along ribs or edge beams. In accordance with AS/NZS3500.4:2015 pipes penetrating through concrete shall be:

- > Installed at right angles to the slab surface.
- > Lagged with an impermeable material for the full depth of the concrete penetration.
- > Lagging must be at least 6mm thick.

The maximum diameter of the services shall be as outlined in Table 6.

Any services crossing ribs or the edge beam horizontally shall be placed only within the middle third of the member. Except as noted in Figure 13, services crossing the ribs vertically shall also be constrained to the middle third of the width of the edge or internal load bearing rib. Except as noted in Figure 15 at no stage shall any of the reinforcement bars be relocated or cut to allow for the services (it is acceptable, however to cut the mesh). In some instances this will dictate the location of the ribs. The pods shall be cut to allow for this and if necessary, the spacing of the ribs shall be decreased locally. There shall be 600mm minimum clear spacing in each direction between penetrations through the system.

Table 6 Maximum Diameter Of Pipe Services

ELEMENT	VERTICAL SERVICE	HORIZONTAL SERVICE
300mm wide edge beam	50mm nominal bore pipe	100mm NB pipe
500mm localized wide edge beam (1)	100mm NB pipe	100mm NB pipe
300mm wide internal load bearing rib	50 NB pipe	100mm NB pipe
100mm wide internal rib	Nil	100mm NB pipe
Slab	100 NB pipe, or for large services 450mm square see also Note 3	Nil

Notes:

- (1) For situations where a 100mm diameter pipe is required to pass vertically through the edge beam, the edge beam shall be locally increased in width to a minimum of 500mm wide. This shall be achieved by keeping flush the outside face of the edge beam and removing 200mm from the pod. The width shall remain at 500mm for a distance of 600mm beyond the service pipe. Refer to figure 14 for details for pipes passing vertically through edge beam and internal rib.
- (2) Where a gas pipe line runs through the RibRaft® floor system, in addition to the requirements above, the pipeline shall enter the building through the outside face of the perimeter foundation beam and be located in the plane of the pods. The aim being to ensure that damage to the gas pipe will most likely occur outside the building envelope should movement occur between the ground and RibRaft® in a large earthquake.
- (3) Larger penetrations or voids up to 450mm square (e.g. for shower waste/traps) are permitted through the slab provided all the conditions of this paragraph are met. These openings shall be trimmed with 1 HD12 (Grade 500E) bar 1500mm long placed along each side of the opening, tied to the mesh. One set of parallel bars shall be placed on top of the mesh and the other set placed under the mesh. These openings shall not be placed over a rib or edge beam. If necessary, the rib spacing shall be reduced or the pod layout altered to ensure that the opening occurs solely in the slab above a polystyrene pod. Penetrations such as these shall not be installed in garages or other areas where large (>3kN) point loads could be present. Only one penetration greater than 110mm is permitted in the slab above any single pod or part pod. Where two large openings are required to be in close proximity, an internal rib shall separate them. For these large penetrations/voids in the slab, the services shall not be within 25mm of the edges of the void through which they pass, and the opening shall be sealed to prevent materials entering the subfloor cavities. (This type of opening is normally only required for a shower waste/trap and the installation of the shower will ensure that the void is sealed/covered).

A pictorial of some of the above requirements is illustrated in Figure 13 and 14.

Figure 13 Example of Detailing Requirements For Services

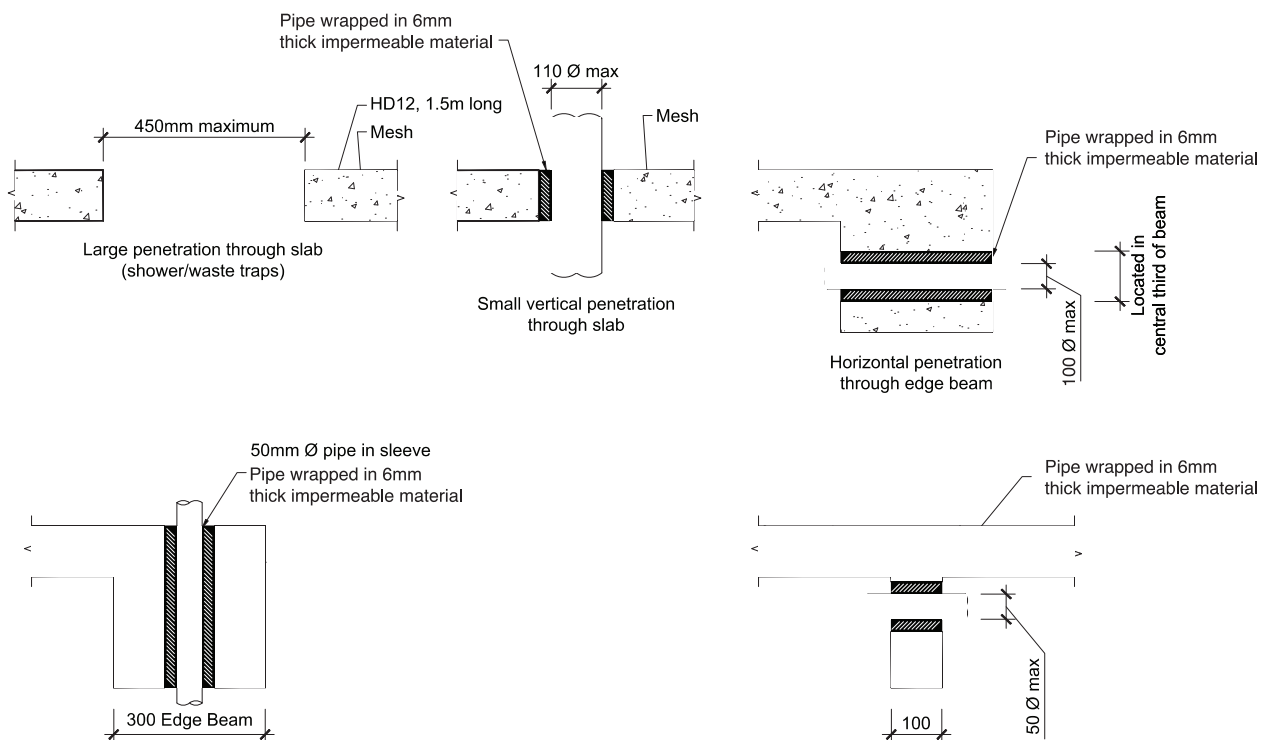
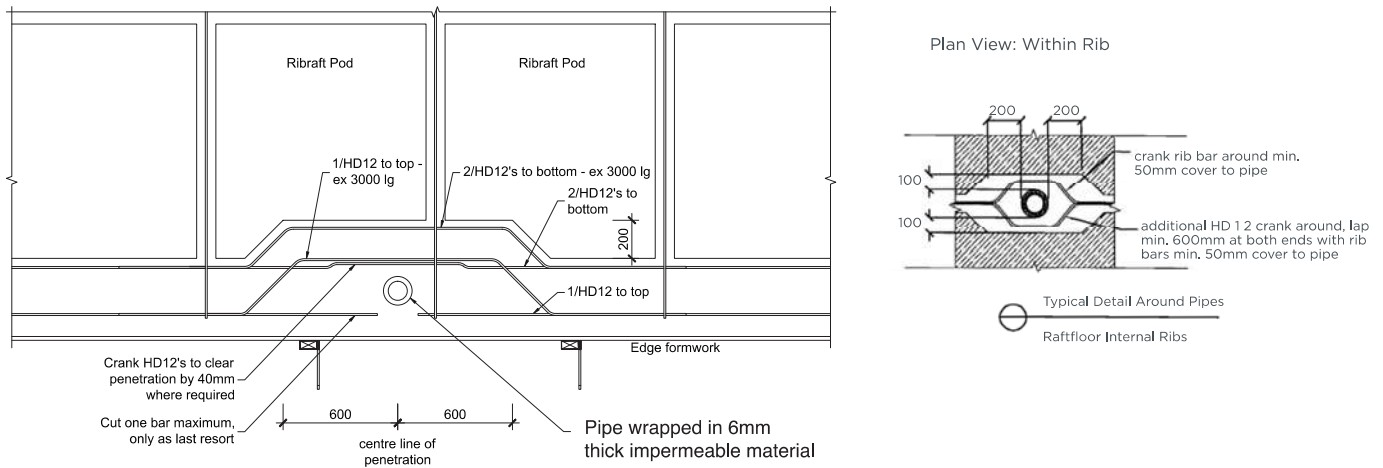


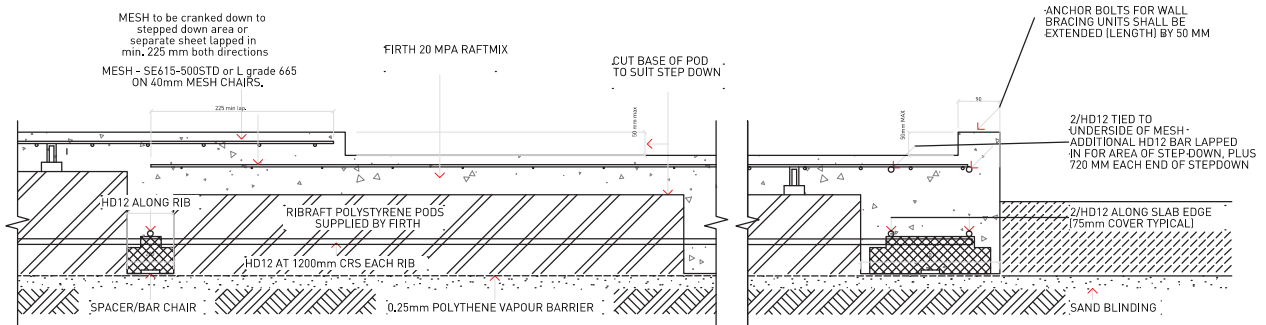
Figure 14
Localised Increase In Width At Edge Beam Where Vertical Service Up To 100mm Diameter Are Required



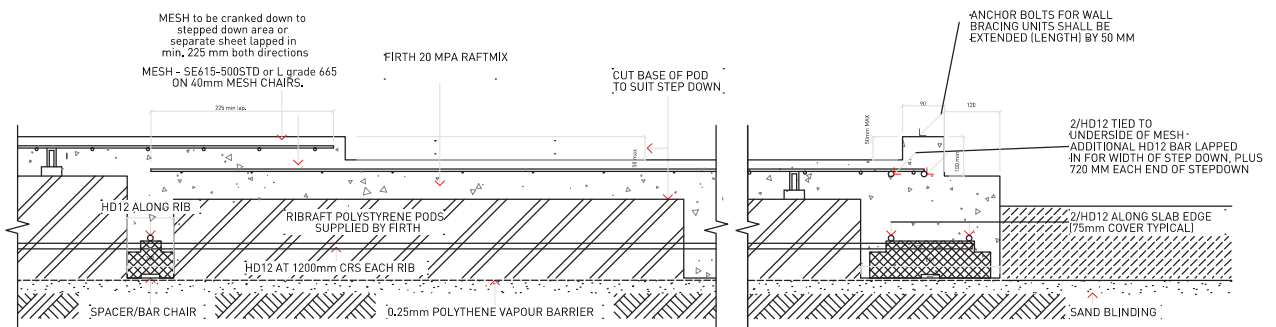
6.3.3 Recesses for Showers

Where showers are rebated up to 50mm into the RibRaft® concrete topping, the details specified shall be in accordance with Figure 15.

Figure 15 Details where recesses of up to 50mm are required for rebated showers

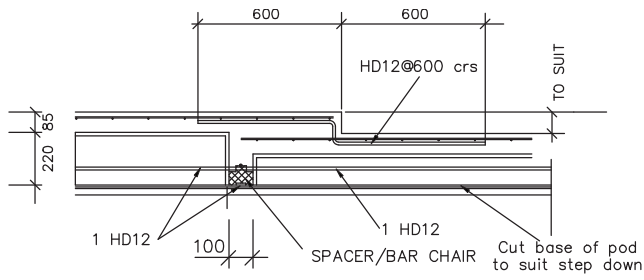


RIB RAFT FLOOR - SET-DOWN DETAIL FOR MAX. 50mm REBATED SHOWER

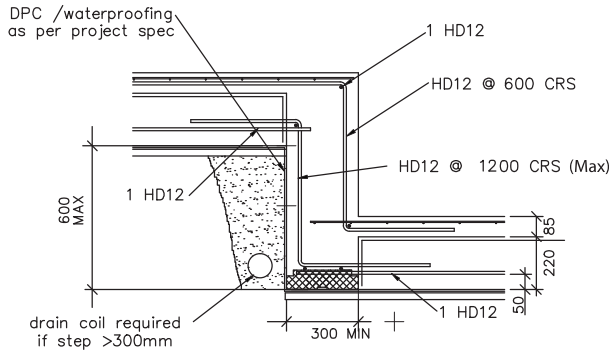


RIB RAFT FLOOR - SET-DOWN DETAIL FOR MAX. 50mm REBATED SHOWER

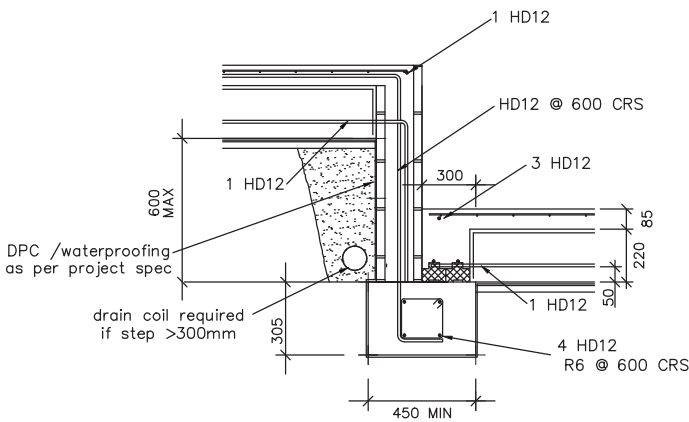
Figure 16 Details where step downs are required in the floor



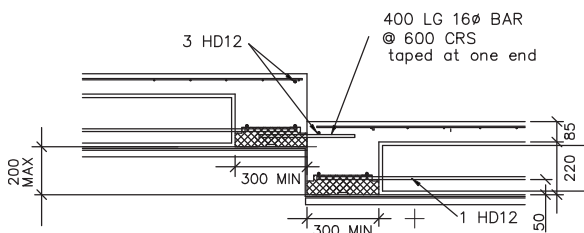
7
S2
SET-DOWN
DETAIL FOR STEP
UP TO 100mm
1:20



9
S2
SET-DOWN DETAIL
IN CONCRETE
FOR STEP LESS
THAN 600mm
1:20



8
S2
SET-DOWN DETAIL
IN MASONRY
FOR STEP LESS
THAN 600mm
1:20



10
S2
SET-DOWN
DETAIL FOR STEP
100 TO 200mm
FOR SEPARATELY
POURED SLABS
1:20

6.3.4 Step Down Of Up To 600mm In The RibRaft® Floor

Where the site topography requires a step down in the slab, steps of up to 600mm can be accommodated using one of the details provided in Figure 16. A step down in the RibRaft® floor system anchors the floor in that location with respect to volume changes associated with drying shrinkage. As required by 6.2.2, a free joint shall be provided if the distance from the step down to the slab edge exceeds 15m.

SECTION: INSTALLATION INFORMATION

2

1.0 THIS SECTION DETAILS THE INSTALLATION INFORMATION REQUIRED FOR THE FIRTH RIBRAFT® FLOOR SYSTEM (THE SYSTEM). FULL INFORMATION ON THE DESIGN PROCEDURES NOT REQUIRING SPECIFIC ENGINEERING INPUT, AND REQUIREMENTS FOR THE SITE ASSESSMENT ARE DESCRIBED IN SECTION 1 OF THIS MANUAL (DESIGN INFORMATION). WHERE STANDARDS ARE REFERENCED IN THIS MANUAL THESE SHALL INCLUDE THE LATEST AMENDMENTS.

2.0 SITE REQUIREMENTS

2.1 General

The site requirements of this Manual are concerned solely with the soil conditions under or immediately adjacent to the system. If a site does not comply with this Manual, the system shall be subject to specific engineering design.

This Section shall only apply for building sites such that:

- > The ground is as specified in Section 1 of this Manual;
- > Any system erected at the top of a slope (whether fill compacted in accordance with NZS4431, or natural ground) shall be located as shown in Figure 1 so that the finished ground is always outside the dashed line shown. (The vertical distance, V, shall be measured to 50mm below the underside of the slab).

Where the finished ground does not comply with Figure 1, the slope shall be retained by a specifically designed retaining wall.

2.2 Temporary Excavations

No excavation shall take place at a location or in a manner where the stability of the foundation material is likely to be compromised. The backfilled material shall match the compaction and strength of, and have similar properties to, the surrounding material. The sides of the excavation shall be propped as necessary.

Temporary excavations shall be open for no longer than 48 hours and shall take place only above the critical depth line as shown on Figure 2. Should temporary excavations be required below this line, specific engineering design is required.

2.3 Surface Water

Surface water from the site shall not flow across the slab platform. For example, on cut and fill sites the ground uphill from the system shall be graded to direct any surface run-off away from the system as shown in Figure 3.



Figure 1
Relationship
Of RibRaft®
To Sloping
Ground Surface

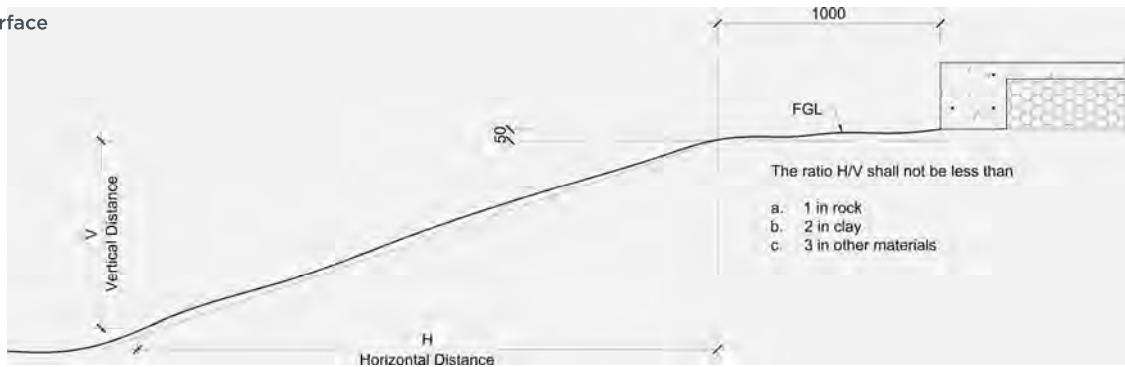


Figure 2
Temporary
Excavation
Limited

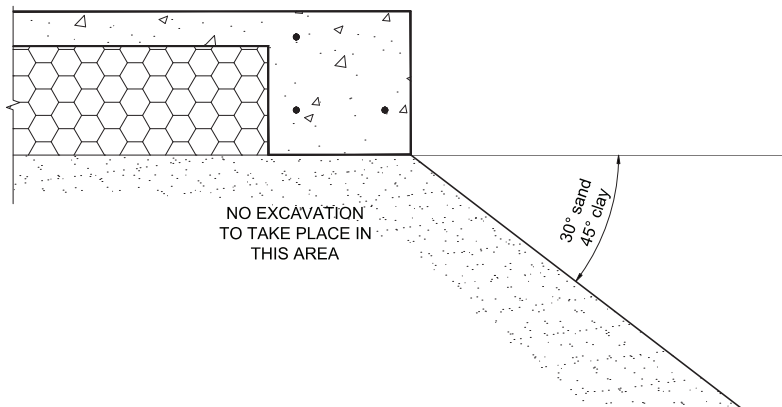
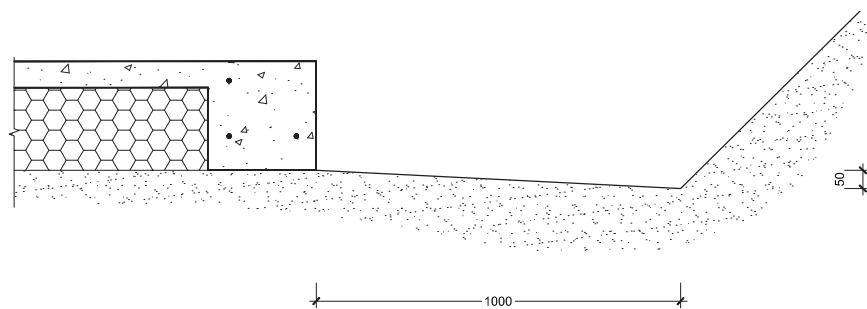


Figure 3
Site Grading



3.0 INSTALLATION PROCEDURE

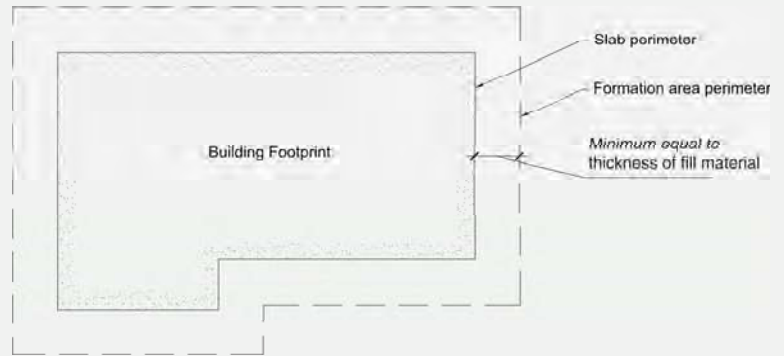
3.1 Site Preparation

All vegetation, topsoil and other organic or deleterious material shall be removed from the area to be covered by the building (formation area) prior to commencing construction of the system.

3.2 Earthworks

The formation area shall be cut or filled to a level approximately 330mm below finished floor level. Where fill is required to achieve this level, the fill shall be certified by a geotechnical engineer (outside the scope of this Manual) or shall be granular fill in accordance with Clause 7.5.3 of NZS 3604:2011 "Timber Framed Buildings". The formation area shall also extend a distance equal to the thickness of the fill material beyond the slab perimeter as shown in Figure 4. The installer shall confirm the acceptability of the ground over the entire building platform before proceeding with the construction. Refer to Clause 3.5 of Section 1 (Design Information) for requirements.

Figure 4 Plan of Formation Area



3.3 Shear Keys

Where shear keys are required, the holes shall be drilled following the site clearing and earthworks, in accordance with Clause 4 in this section, and prior to the construction of the system commencing.

3.4 Plumbing and Services

Plumbing and services required beneath the system should preferably be conveyed underground to their plan location then brought up through the system. The trenching, placing, and bedding of the pipes/ducts and the backfilling of the trenches shall conform to the requirements of the consent documentation. Services shall not run along ribs or edge beams. The maximum diameters of the services shall be as dictated in Clause 6.3 of Section 1.

Where required, the services can be installed by removing unnecessary polystyrene and placing pipes within the pod depth. All pipes shall be held firmly in place and have temporary end covers. Any services crossing ribs or the edge beam horizontally shall be placed only within the middle third of the member. Except as noted in Figure 14 (Section 1) services crossing the ribs vertically shall also be constrained to the middle third of the width of the edge or internal load bearing rib. Except as noted in Figure 13 (section 1) at no stage shall any of the reinforcement bars be relocated or cut to allow for the services (it is acceptable, however to cut the mesh). In some instances this will dictate the location of the ribs. The pods shall be cut to allow for this and if necessary, the spacing of the ribs shall be decreased locally. There shall be 600mm minimum clear spacing in each direction between penetrations through the system.

Where the services pass through the top of the pods, the opening shall be sealed to prevent materials entering the

subfloor cavities. (This can be achieved with Denso tape and a type of easily compressible foam.)

Larger penetrations or voids that are required, up to 450mm square (e.g. for shower waste/traps), shall be installed in accordance with all the conditions of this paragraph. These openings shall be trimmed with 1 HD12 bar (Grade 500E) 1500mm long placed along each side of the opening, tied to the mesh. One set of parallel bars shall be placed on top of the mesh and the other set placed under the mesh. These openings shall not be placed over a rib or edge beam. If necessary, the rib spacing shall be reduced or the pod layout altered to ensure that the opening occurs solely in the slab above a polystyrene pod. Penetrations such as these shall not be installed in garages or other areas where large (>3kN) point loads could be present. Only one penetration greater than 110mm is permitted in the slab above any single pod or part pod. Where two large openings are required to be in close proximity, an internal rib shall separate them. For these large penetrations/voids in the slab, the services shall not be within 25mm of the edges of the void through which they pass, and the opening shall be sealed to prevent materials entering the subfloor cavities. (This type of opening is normally only required for a shower waste/trap and the installation of the shower ensure that the void is sealed/covered).

Where a recess of up to 50mm is required in the topping to provide a rebate for a shower, the construction details shall be as shown in Figure 15 (Section 1).

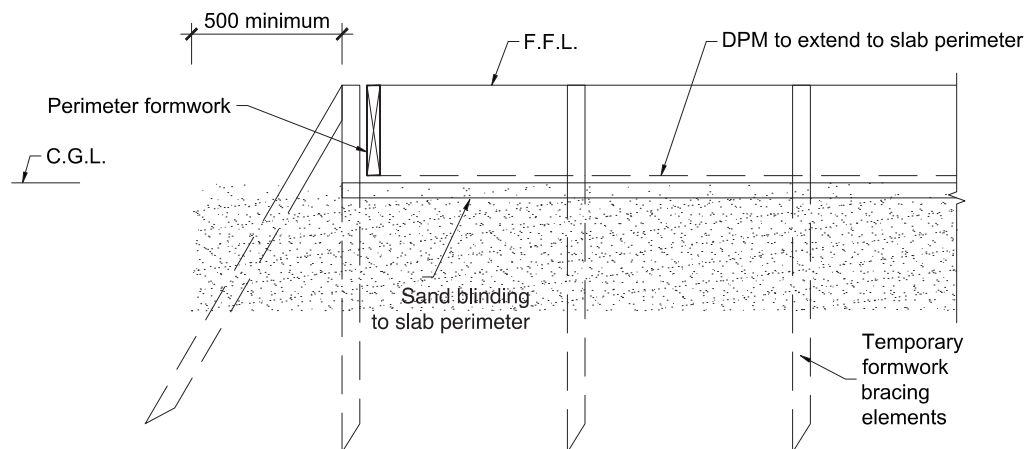
3.5 Sand Blinding

A layer of sand shall be placed, screeded and compacted over the building platform, extending to the outside edge of the perimeter foundation, refer Figure 5. The maximum thickness of this blinding layer shall be 50mm. The surface shall be level and a minimum of 305mm below finished floor level. A small plate compactor, vibrating roller or similar, should be used to compact the sand blinding layer. When the building platform is clay, it is essential that the blinding sand is compacted onto a clay surface that has not been softened by construction activities. If the clay has been softened (i.e. has a muddy surface layer due to construction activities), remove the softened material from under the RibRaft® ribs before placing the sand. If excavation lowers the clay surface to more than 50mm below the underside of the RibRaft®, fill shall be placed in accordance with Clause 7.5.3 of NZS 3604:2011 "Timber Framed Buildings". The sand is required to be level to ensure that pods remain stable throughout the installation of the system.

3.6 Damp Proof Membrane

The damp proof membrane (DPM) material shall be polyethylene sheet in accordance with NZS 3604:2011. The DPM shall be laid over the entire building platform directly on top of the sand blinding layer, extending to the outside of the edge beam - refer Figure 5 below. The joints shall be lapped not less than 150mm and sealed with pressure sensitive tape not less than 50mm wide. All penetrations of the DPM by plumbing and services or punctures during construction shall also be sealed with pressure sensitive tape. The DPM may extend beyond the edge of the slab i.e. underneath the formwork, or may be folded and stapled up the inside of the formwork. The minimum requirement is that the DPM extends to the outside of the edge beam. It is very important that the DPM is not bunched up at the formwork. The installer shall ensure a square and tidy finish at the underside and at all corners of the edge beam.

Figure 5 Sand blinding / DPM / Formwork Details



3.7 Edge Formwork

The edge formwork shall be constructed ensuring that the requirements of NZS 3109:1997 "Concrete Construction" are adhered to. The formwork shall be adequately supported and braced to prevent any buckling or warping. If the wall is to be constructed in masonry veneer, formwork for a masonry veneer rebate should be adequately fixed to the perimeter formwork.

Thorough cleaning of re-useable formwork and the use of release agents enhances the life and performance of formwork and maintains a quality surface finish.

3.8 Laying the Pods and Spacers

The Firth RibRaft® polystyrene pods shall be laid out over the DPM in a regular waffle pattern ensuring direct contact with the ground across the entire pod. The edge beam shall be formed using the Firth approved 300mm spacers (refer Figure 9). These shall be placed at a maximum of 1200mm centres along the perimeter of the slab and one per pod or part pod. Ribs supporting a load bearing wall shall be formed using a minimum of one Firth approved 300mm spacer along the edge of each pod or part pod.

Except where a 300mm wide rib is required, each pod or part pod shall always be separated by 100mm using a minimum of one Firth approved 100mm spacer along each edge of each pod or part pod. The ribs in both directions shall form a waffle pattern throughout the slab. It is essential that the ribs and edge beams are straight when the concrete is poured, i.e. the pods need to be lined up. Figure 6 shows a detailed layout of the pods and spacers.

Where the shape of the house plan dictates, it may be more practical to consider the floor to be made up of different segments. The pods in each segment shall be in a regular waffle pattern – refer right hand side of Figure 7. Where these segments meet, the pods shall be cut to suit and the ribs made to join. The non right-angle rib junctions created by this approach are acceptable.

Alternatively, it is also acceptable to keep the orientation of the pods constant throughout the plan and have non right-angle junctions between the ribs and edge beam – refer left hand side of Figure 7.

As can be seen from Figure 7, it is not necessary for the pods to line up perfectly with the edge beam. It is acceptable to cut the pods (i.e. use part pods).

Figure 6
Detailed layout
of Pods and
spacers (mesh
and top steel omit-
ted for clarity)

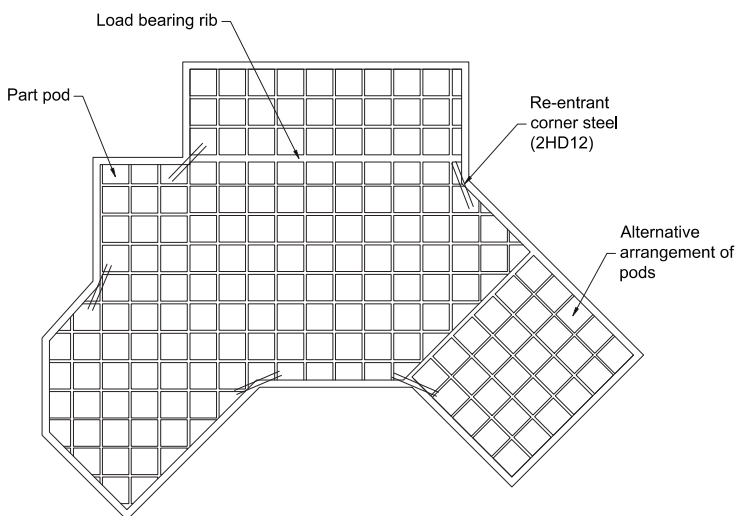
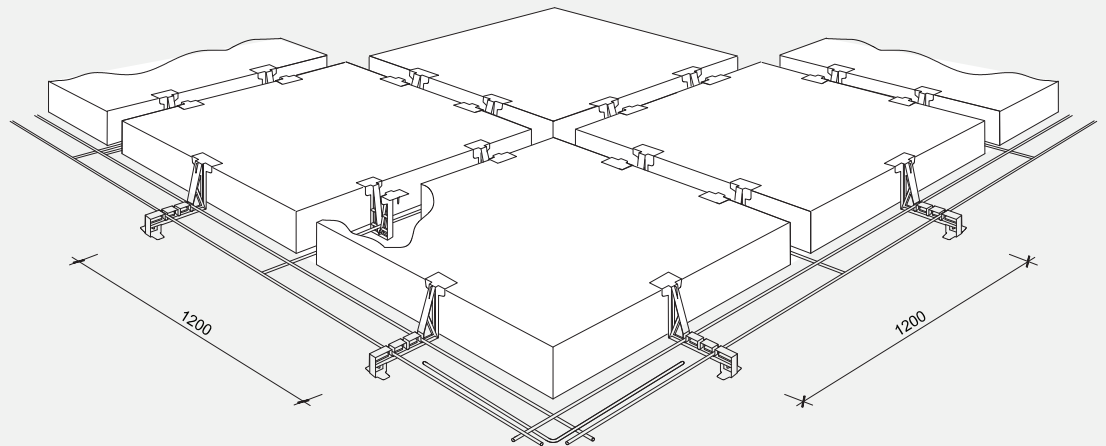


Figure 7 Typical Pod And Rib Layout

3.9 Reinforcing Steel

Reinforcing bars shall conform to NZS 4671:2001 "Steel Reinforcing Materials". All bars shall be of deformed type (Grade 500E). All bends shall be made cold without fracture and in accordance with the bend diameters given in NZS 3109 "Concrete Construction". Welded lap joints are not permitted.

Reinforcing steel in the slab shall consist of Welded Reinforcing Mesh complying with AS/NZS 4671:2001 with a minimum weight of 2.27kg/m, a lower characteristic stress of 500MPa, square configuration of orthogonal bars between 150 to 200mm centres, and ductility class L or E, hereafter referred to as "mesh". The presence of Class E reinforcing bars in the ribs and beams provides adequate ductility of the system which allow the use of class L mesh. Typically the topping mesh reinforcement will be 665 mesh (class L) or SE62 ductile mesh, each being equally applicable

Figure 10 shows the detailed layout of the spacers and the steel in the edge beam and the standard ribs.

3.9.1 Edge Beam Steel

Two edge beam reinforcing bars shall be placed in the bottom of the edge beam and supported in the correct position by the Firth spacers, as shown in Figure 10. One edge beam bar shall be tied below the mesh at the perimeter of the area covered by the polystyrene pods as shown in Figure 10.

All steel shall be lapped a minimum of 60 bar diameters (720mm for 12mm steel). Tying of the edge beam steel is only required at corners. Figure 8 shows the layout for the edge beam bottom steel bars at the corner. The inner bottom bars and the top bars shall cross each other and extend to 75mm from the outside face of the edge beam as shown. These bars shall be tied together where they cross. For solutions using veneer rebates the top bars shall terminate 50mm from the inside face of the rebate and be tied where they cross.

3.9.2 Rib Steel

Rib reinforcing steel shall be placed in the bottom of the internal ribs and supported in the correct position by the Firth or Wilton Joubert spacers (WJ). Figure 9 shows the detail of the Firth and WJ spacers, and Figure 10 shows a detailed section identifying how the steel is located in the spacers. The 300mm spacer shall be used for the 300mm wide internal ribs. These spacers ensure that cover to DPM below the base is greater than 45mm and cover to the exterior perimeter is 75mm.

All steel shall be lapped a minimum of 60 bar diameters (720mm for 12mm steel). At junctions with the edge beam, each rib steel bar shall sit on top of the edge beam bars, and extend to the outermost bar. The 75mm cover to the edge of the beam shall still be allowed for. One HD12 bar (Grade 500E) shall be placed in the bottom of each 300mm wide rib. For perimeter 300mm ribs a HD12 bar is also required in the top at the beam.

3.9.3 Mesh Reinforcing

Mesh reinforcing shall be placed over the pods and supported on 40mm mesh chairs spaced at a minimum of 1200mm centres, with at least two mesh chairs placed per pod and at least one per part pod. At laps the overlap of the outermost cross wires of the sheets shall be the spacing of the wires plus 50mm.

3.9.4 Re-entrant Corner Steel

Two HD12 bars (Grade 500E), 1200mm long tied to the top of the mesh at 200mm centres, with 50mm cover to the internal corner as detailed in Figure 7 (this steel is to help reduce the width of cracks that may develop at this location)

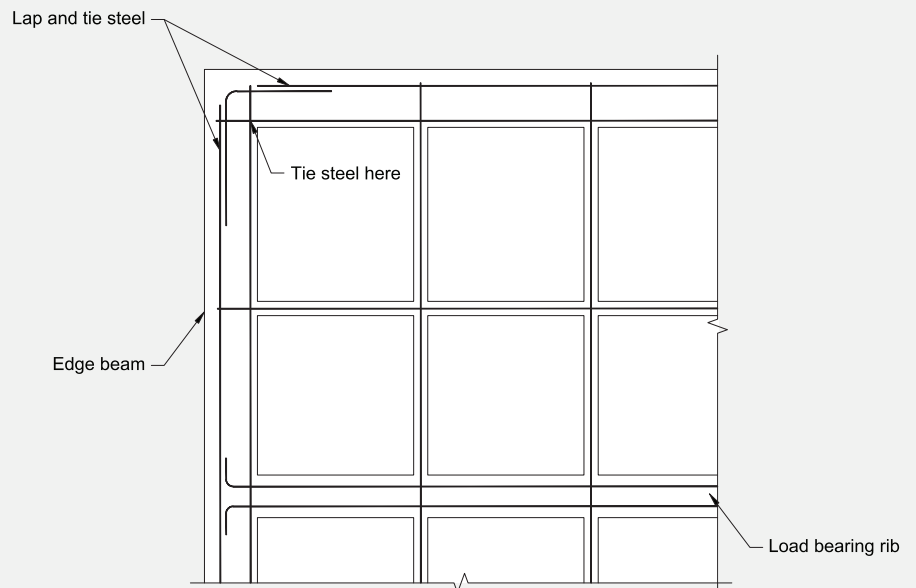


Figure 8 Corner steel layout

3.10 Concrete Installation

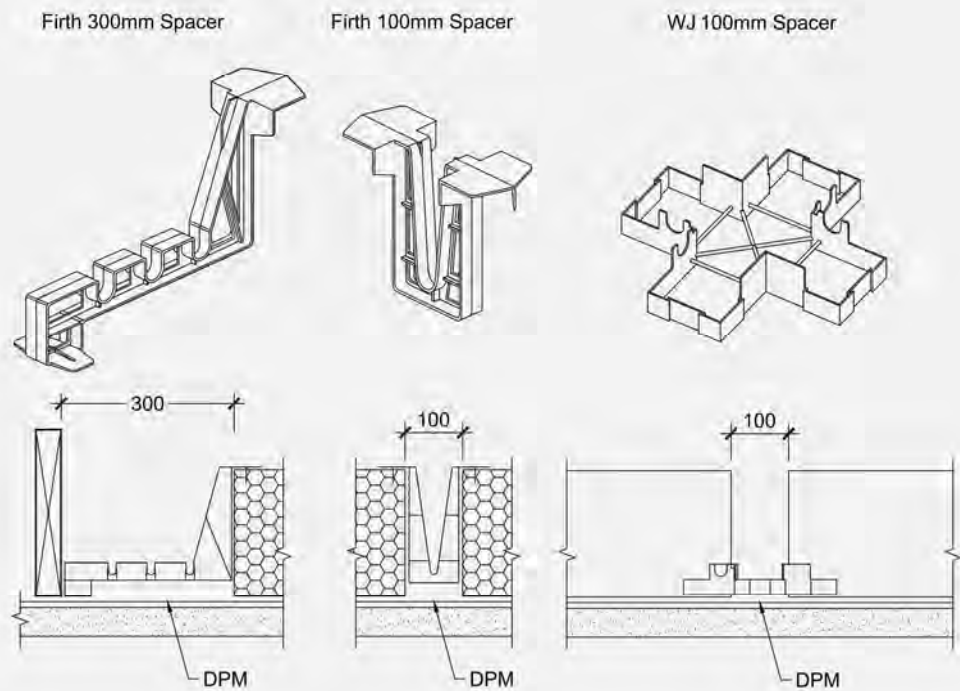
To comply with this manual, Firth Certified Concrete® must be used. Concrete placing, finishing and curing shall be in accordance with NZS 3109:1997, Clause 7.

3.10.1 Placing

Only Raftmix or Raftmix25 concrete supplied by Firth Industries, shall be used in the floor. These two different concrete mixes shall be used in the following instances:

- > Raftmix – a 20MPa 100mm slump mix available as a pump mix suitable for 100mm pump lines available in either a 13mm or more usually a 19mm nominal aggregate size, or as a structural (non-pump) mix
- > Raftmix25 – a 25MPa 100mm slump mix available as a pump mix suitable for 100mm pump lines available in either a 13mm or more usually a 19mm nominal aggregate size, or as a structural (non-pump) mix. This mix shall be specified for buildings constructed in the ‘sea spray zone’ (i.e. within 500m of the sea including harbors, within 100m of tidal estuaries or inlets, on offshore islands and elsewhere defined as exposure Zone D in 4.2.3.3 of NZS3604).

Figure 9
Spacer
Details



The concrete supplied by Firth shall be poured in such a way to ensure that the pods remain in position during placing (Firth recommends that small amounts of concrete be placed on top of the pods prior to the ribs being filled). The concrete shall be compacted with the use of an immersion vibrator around all steel and into all corners of the formwork.

3.10.2 Finishing

Screeding with the aid of a level shall commence immediately after compaction. Unless specifically installed as a screeding datum, the top of the formwork shall not be assumed as level and thus shall not be used for screeding purposes. Final finishing with a trowel shall take place after all the bleed water has evaporated. The edge of the slab and rebates shall be tooled to prevent chipping of the top of the slab.

Early age care of the slab shall be in accordance with good trade practice appropriate for the weather conditions – refer CCANZ website sections if further guidance is required:

www.ccanz.org.nz/page/Early-Age-Crack-Control.aspx

Early Age Crack Control

www.ccanz.org.nz/page/Hot-and-Cold-Weather-Concreting.aspx

Hot and Cold Weather Concreting

The surface shall be a blemish-free surface to class U3 finish (Refer NZS 3114:1987 “Specification for Concrete Finishes”).

3.10.3 Curing

Proper curing of the concrete must take place immediately after finishing the concrete. One of the following methods of curing is recommended:

- > Ponding or continuous sprinkling of water.
- > Placing a wet covering or plastic membrane over the slab.
- > The use of liquid membrane curing compounds. However if these are used, they must be compatible with any subsequent applied surfacing.

3.11 Shrinkage Control Joints

Shrinkage control joints reduce the risk of unwanted cracks, and their placement needs to be carefully considered where uncontrolled cracking could be unacceptable. Two types are described here: saw cut joints (which are tied joints), and free joints.

3.11.1 Saw Cut Joints

Saw cuts are located at positions in which the concrete is likely to crack due to stresses induced by restrained shrinkage. The aim of providing them is for the concrete to crack at the bottom of the saw cut thus minimizing the potential for a visible crack wandering over the surface. The level of reinforcement provided in a RibRaft® mean that cracks have no structural implications being only an aesthetics issue. Factors to consider are the type of floor finish, the location of ribs and ground beams, underfloor heating and the effect of piles restraining shrinkage.

When warm sunny days are followed by cool nights, the change in temperature can cause cracking. Hence preference should be given to using early entry saws which are used immediately after finishing. Shrinkage control joints cut using diamond blades shall be cut as early as possible which is typically within 24 hours of hardening in summer, and 48 hours in winter. They shall be cut to a depth of 25mm. Shrinkage control joints do not guarantee to eliminate all visible or unwanted cracks.

Joints shall be positioned to coincide with major changes in floor plan. Where concrete is to be exposed, for example in a garage, or brittle covering placed over, the maximum intermediate bay sizes shall be limited to 5m. Bay dimensions formed by shrinkage control joints shall be limited to a maximum ratio of length:width of 1.5:1. Shrinkage control joints shall be placed over 100mm wide internal ribs wherever possible. Where a shrinkage control joint runs along the line of a 300mm wide load bearing rib, then the joint shall be located directly above one edge of that rib.

In order to limit the width of cracks at re-entrant, or internal corners, extra steel shall be placed on top of the mesh. These shall be 2-HD12 bars (grade 500E), 1200mm long tied to the top of the mesh at 200mm centres, with 50mm cover to the internal corner – refer Figure 7.